

OC-12/STM-4 BiDi SFP 1550nm-TX/1310nm-RX 20km DOM Transceiver

SDH-SFP-OC12-BX20-D



Application

- 1000Base-LX Ethernet
- Metro/Access Networks
- 1 × Fibre Channel
- Other Optical Links

Features

- Up to 1.25Gb/s Data Links
- Hot-Pluggable
- Single LC connector
- Up to 20 Km on 9/ 125µm SMF
- 1550nm DFB laser transmitter
- 1310nm PIN photo-detector
- Single +3.3V Power Supply
- Monitoring Interface Compliant with SFF-8472
- Maximum power dissipation < 1W
- Operating temperature range: 0° C to 70° C
- RoHS compliant and Lead Free

Description

SFP12-BX Transceivers are a high performance, cost effective module which have a single LC optics interface. They are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and Digital diagnostics functions are available via the 2-wire serial bus specified in SFF-8472. The receiver section uses a PIN receiver and the transmitter uses a 1550 nm DFB laser, up to 14dB link budge ensure this module 1000Base-LX Ethernet 20km application.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature Range	Ts	-40	85	°C
Relative Humidity	RH	0	85	%
Supply Voltage	VCC	-0.5	4.0	V

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Case operating Temperature	TC	0		+70	° C
Supply Voltage	VCC	3.135		3.465	V
Supply Current	Icc			300	mA
Inrush Current	Isurge			Icc+30	mA
Maximum Power	Pmax			1	W

III. Electrical Characteristicss

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter						
Input differential impedance	Rin	90	100	110		1
Single ended data input swing	VinPP	200		1200	mVp-p	
Transmit Disable Voltage	VD	Vcc- 1.3		Vcc	V	2
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	
Transmit Disable Assert Time	Tdessert			10	us	
Receiver						
Dataoutputrisetime	tr			150	ps	4
Dataoutputfalltime	tf			150	ps	4
LOSFault	Vlofault	Vcc-0.5		VCC_host	V	5
LOSNormal	Vlosnorm	Vee		Vee+0.5	V	5
PowerSupplyRejection	PSR	100			mVpp	6
DeterministicJitterContribution	RXΔDJ			51.7	ps	7
TotalJitterContribution	RXΔTJ			122.4	ps	

Note:

- 1. AC coupled.
- 2. Or open circuit.
- 3. Into 100 ohm differential termination.
- 4. 20 – 80 %
- 5. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
- 6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.
- 7. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.

IV. Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter						
Center Wavelength	λ_c	1530	1550	1570	nm	1
Spectral Width(RMS)	σ			1	nm	
Optical Output Power	Pout	-9		-3	dBm	2
Optical Rise/Fall Time	tr/tf			160	ps	3
Extinction Ratio	ER	9			dB	
Deterministic Jitter Contribution	TXΔDJ			56.5	ps	4
Total Jitter Contribution	TXΔTJ			119	ps	
Eye Mask for Optical Output	Compliant with Eye Mask Defined in IEEE802.3 standard					
Relative Intensity Noise	RIN			- 120	dB/Hz	
Receiver						
Optical Input Wavelength		1290	1310	1330	nm	
Receiver Reflectance		12			dB	
Receiver Overload	Pol	-3			dBm	5.6

Parameter	Symbol	Unit	Min.	Typ.	Max.	Note
RX Sensitivity	Sen			-23	dBm	5.6
RX_LOSAssert	LOS _A	-40			dBm	
RX_LOSDeassert	LOS _D			-24	dBm	
RX_LOSHysteresis	LOS _H	0.5			dB	
General Specifications						
Data Rate	BR		1250		Mb/s	
Bit Error Rate	BER			10 ⁻¹²		
Max. Supported Link Length on9/125μm SMF@1.25G	LMAX		20		km	7
Total System Budget	LB	14			dB	8

- Note
- 1. Also specified to meet curves in FC-PI 13.0 Figures 18 and 19, which allow trade-off between wavelength spectral width.
 - 2. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
 - 3. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 1x and 2x eye masks when filtered.
 - 4. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.
 - 5. Measured with conformance signals defined in FC-PI 13.0 specifications.
 - 6. Measured with PRBS 27- 1 at 10- 12 BER
 - 7. Dispersion limited per FC-PI Rev. 13

IV. Pin Function Definitions

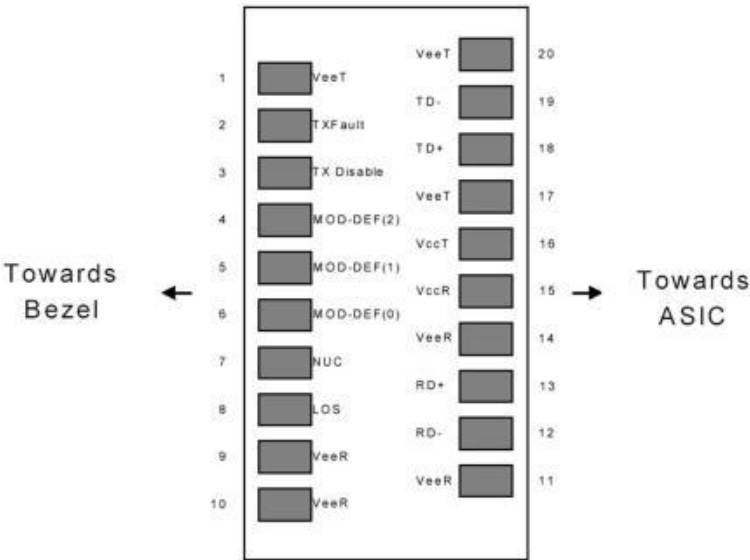


Figure1. Diagram of Host Board Connector Block Pin Numbers and Names

V. Transceiver Pin Descriptions

PinNo	Name	Function	PlugSeq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition1	3	3
6	MOD-DEF0	Module Definition0	3	3
7	Rate Select	Not Connected	3	4



PinNo	Name	Function	PlugSeq	Notes
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. TransmitIn	3	6
20	VeeT	TransmitterGround	1	

- Notes:
- 1. Circuit ground is internally isolated from chassis ground.
 - 2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
 - 3. Should be pulled up with 4.7k - 10 kohms 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. Rate select is not used
 - 5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
 - 6. AC Coupled

VI. Recommended Circuit

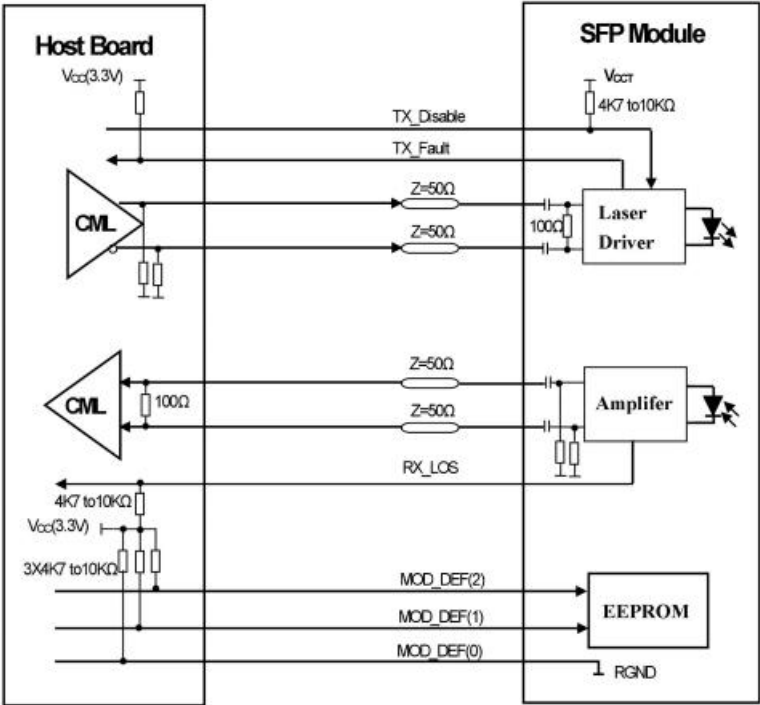


Figure 2. SFP Host Recommended Circuit

VII. Mechanical Dimensions

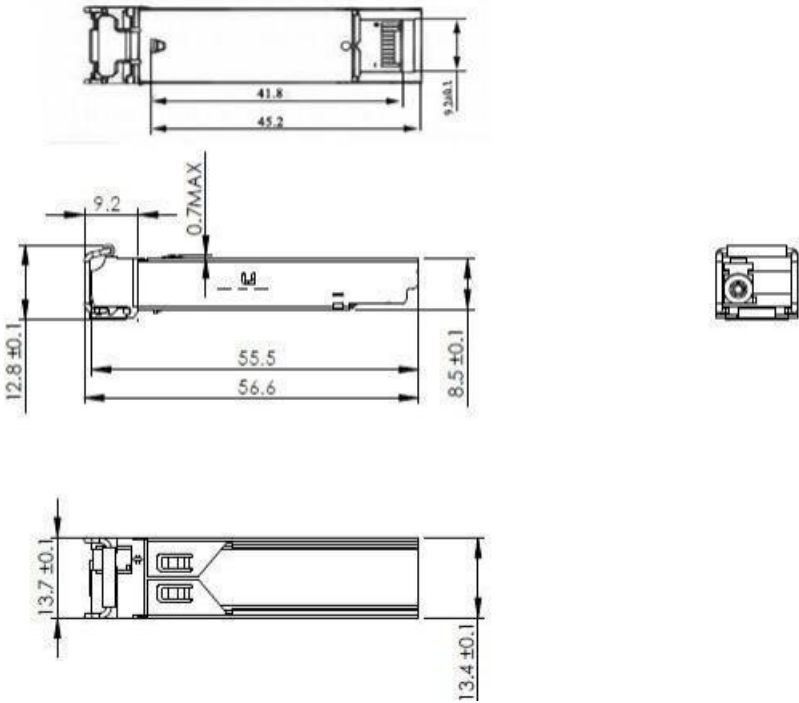


Figure 3. Mechanical Drawing

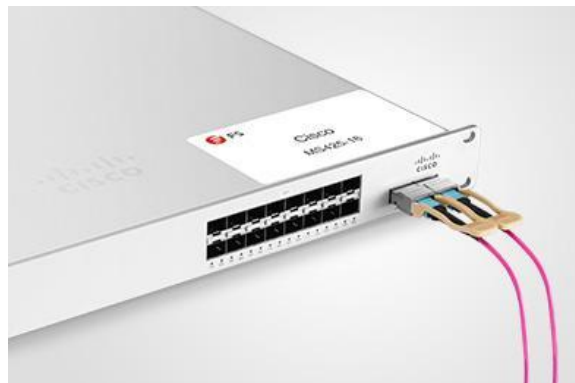
Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force10 S60-44T

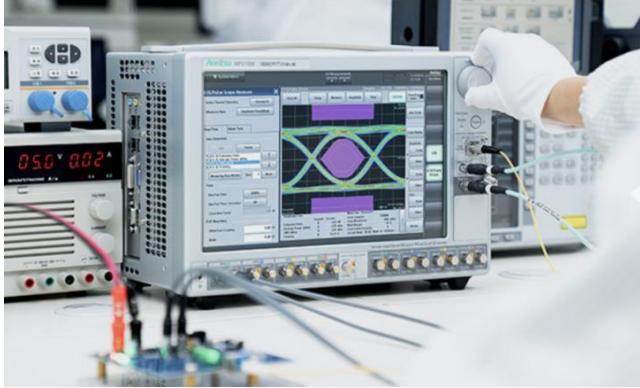


HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

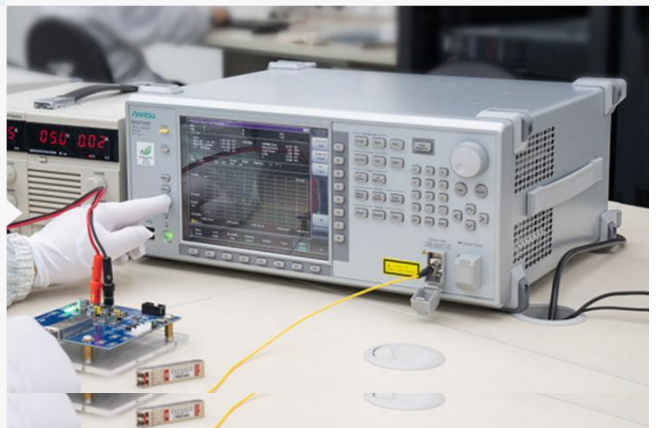
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

Part Number	Description
SDH-SFP-OC12-BX20-D	OC-12/STM-4 BiDi SFP 1550nm-TX/1310nm-RX 20km DOM Transceiver
SDH-SFP-OC12-BX40-U	OC-12/STM-4 BiDi SFP 1310nm-TX/1550nm-RX 40km DOM Transceiver
SDH-SFP-OC12-BX80-U	OC-12/STM-4 BiDi SFP 1490nm-TX/1550nm-RX 80km DOM Transceiver
SDH-SFP-OC12-BX120-U	OC-12/STM-4 BiDi SFP 1490nm-TX/1550nm-RX 120km DOM Transceiver