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1G SFP LX Transceiver	REVISION：04	AUTHORIZED BY：Mike Sun
	DATE：2022.05.26	CLASSIFICATION：CONFIDENTIAL

SFP 1G LX Transceiver

1. SCOPE

This product family of Small Form Factor Pluggable (SFP) transceiver module is specifically designed for the high performance integrated duplex data link over single-mode. These transceiver modules are compliant with the SFP Multisource Agreement (MSA). With the hot pluggability, these modules offer an easy way to be installed into SFP MSA compliant ports at any time without the interruption of the host equipments operating online. The 1G LX SFP transceivers using a long wavelength (1310nm) FP laser diode enable data transmission up to 10km on a single-mode (9/125μm) optical fiber.

2. PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

SFP 1G LX Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
P58000ABCB10-1	1G	1310	10 km	SMF	-9.5~-3	-17	LC	C
P58000ABIB10-1	1G	1310	10 km	SMF	-9.5~-3	-17	LC	I

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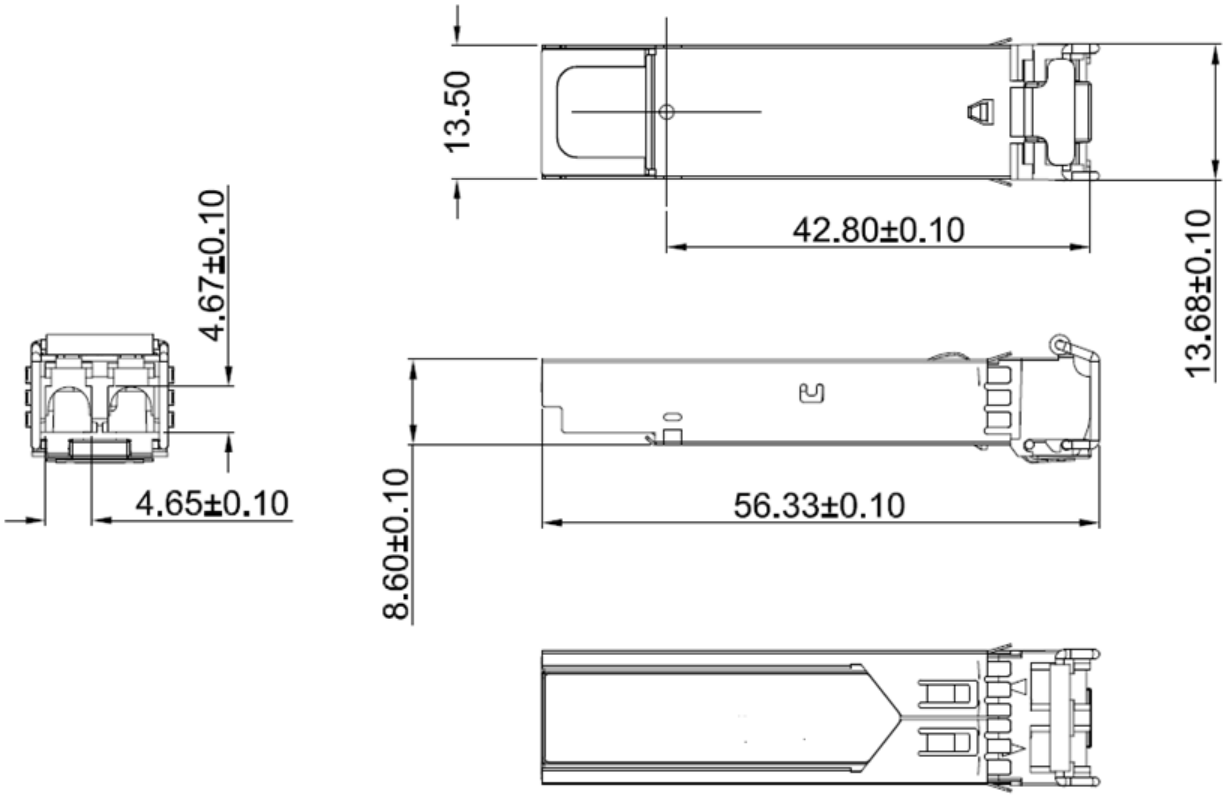
2.2 DIMENSIONS,MATERIALS,PLATINGS AND MARKING



3. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- Compliant with SFP MSA
- 1.0625Gbps Fibre Channel FC-PI
- 100-SM-LC-L compliant
- 1.25Gbps IEEE 802.3 1000BASE-LX
- TUV certification

4. Regulatory Compliance

JPC transceivers are Class 1 Laser Products and comply with US FDA regulations. These products are certified by TÜV and CSA to meet the Class 1 eye safety

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requirements of IEC 60825-1 and IEC 60825-2. Copies of certificates are available at JPC Corporation upon request

5. Absolute Maximum Ratings & Recommended Operating Conditions

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	℃
Supply Voltage	VCC3	-0.5	4	V
Relative Humidity(Non-condensing)	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature(I-temp)	TI	-40		85	℃
Operating Case Temperature(C-temp)	TC	0		70	℃
Power Supply Voltage	VCC3	3.1	3.3	3.5	V
Data Rate			1.25/1.0625		Gbps
Transmission Distance	SMF			10	km
Transmission Distance	MMF			0.5	km

Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	λC	1260	1310	1360	nm	Note1
Laser Off Power	Poff	-	-	-30	dBm	
Average Optical Power	Pavg	-9.5	-	-3	dBm	
RMS spectral width				4	nm	
Extinction Ratio	ER	9	-	-	dB	
Transmitter Dispersion Penalty	TDP	-	-	1	dB	

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Operating Data Rate				1.25/ 1.0625		Gbps	
Optical Eye Mask Margin			10			%	
Tx Input Diff Swing		VI	300		2200	mV	
Tx_Disable	Disable		2		VCC	V	
	Enable		VEE		VEE+ 0.8	V	

Notes:
[1] Average optical power shall be measured using the methods specified in TIA/EIA-455-95.

Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λr	1260	1310	1360	nm	
Receiver Sensitivity (OMA)				-17	dBm	1
LOS Assert	LOS A	-35		-	dBm	
LOS Dessert	LOS D			-21	dBm	
LOS Hysteresis	LOS H	0.5		6	dB	
Overload	Pin	-3			dBm	
Return Loss of Receiver		12			dB	
Operating Data Rate			1.25/		Gbps	
Rx Output Diff Swing	Vo	500		1200	mV	

Notes:
[1] Receiver sensitivity is informative. shall be measured with conformance test signal for BER =1x 10^{-12} .

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Control and Status I/O Timing Characteristics

Parameter	Symbol	Min.	Max.	Unit	Note
TX Disable Assert Time	t_off		100	μs	Note1
TX Disable Negate Time	t_on		2	ms	Note2
Time to initialize including reset of TX_Fault	t_init		300	ms	Note3
TX Fault Assert Time	t_fault		1	ms	Note4
Tx_Fault Reset	t_reset	10		μs	Note5
LOS Assert Time	t_loss_on		100	μs	Note6
LOS Deassert Time	t_loss_off		100	μs	Note7
Serial ID Clock Rate	f_serial_clock	100	400	kHz	

Notes:

[1] Time from rising edge of TX Disable to when the optical output falls below 10% of nominal

[2] Time from falling edge of TX Disable to when the modulated optical output rises above 90% of nominal

[3] From power on or negation of TX Fault using TX Disable
[4] Time from fault to TX fault on

[5] Time TX Disable must be held high to reset TX_fault

[6] Time from LOS state to RX LOS assert
[7] Time from non-LOS state to RX LOS deassert.

[8] Time from rising or falling edge of Rate Select input until receiver bandwidth is in conformance with appropriate specification

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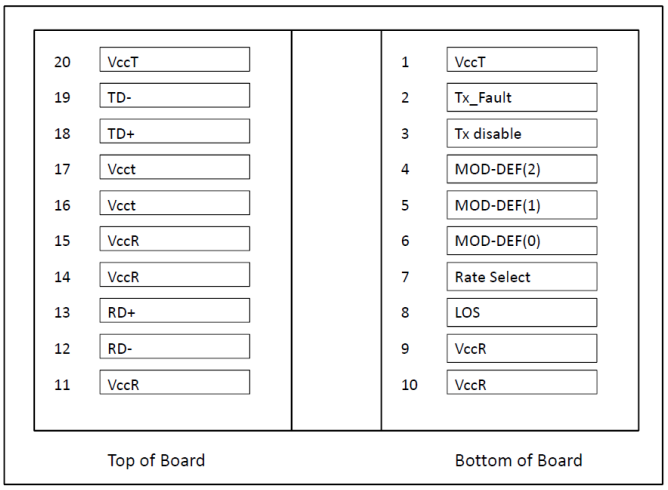
6. Pin-out Definition:



Pin Definitions

Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	3
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	3
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	3
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	3
7	LVTTL-I	RS	Rate select, optionally controls SFP module receiver. When High input data rate 10.3GBd and when LOW data-rate 1.25GBd.	3
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	3
9		VeeR	Module Receiver Ground	1
10		VeeR	Module Receiver Ground	1

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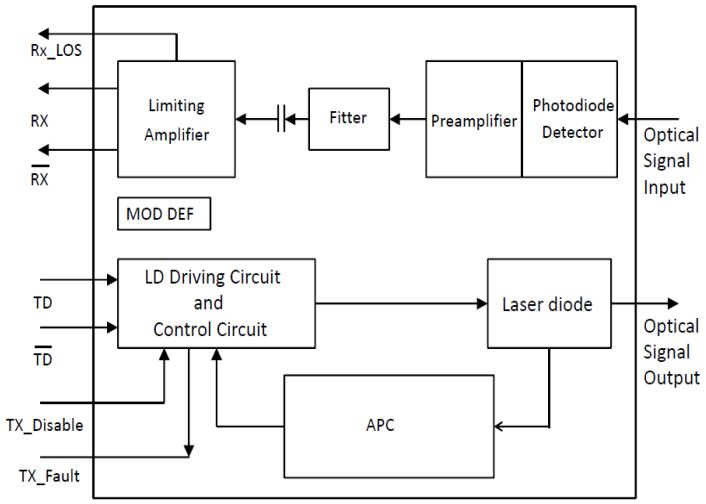
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	3
13	CML-O	RD+	Receiver Non-Inverted Data Output	3
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	2
16		VccT	Module Transmitter 3.3 V Supply	2
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	3
19	CML-I	TD-	Transmitter Inverted Data Input	3
20		VeeT	Module Transmitter Ground	

Block Diagram of Transceiver



Block Diagram of Transceiver

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Transmitter Section

The transmitter converts 1.25Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 1G BASE standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic “1,” or no connection on this pin will disable the laser from transmitting. A logic “0” on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is a module output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 kΩ. TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the SFP module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 kΩ to 10 kΩ resistor.

Receiver Section

The receiver converts 1.25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 kΩ, or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.

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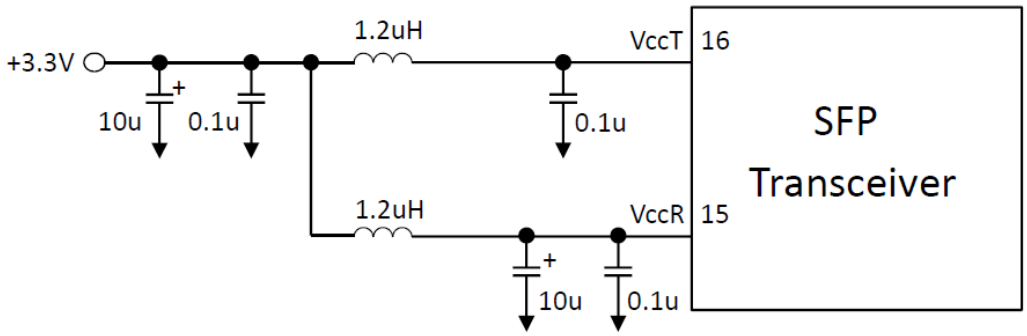
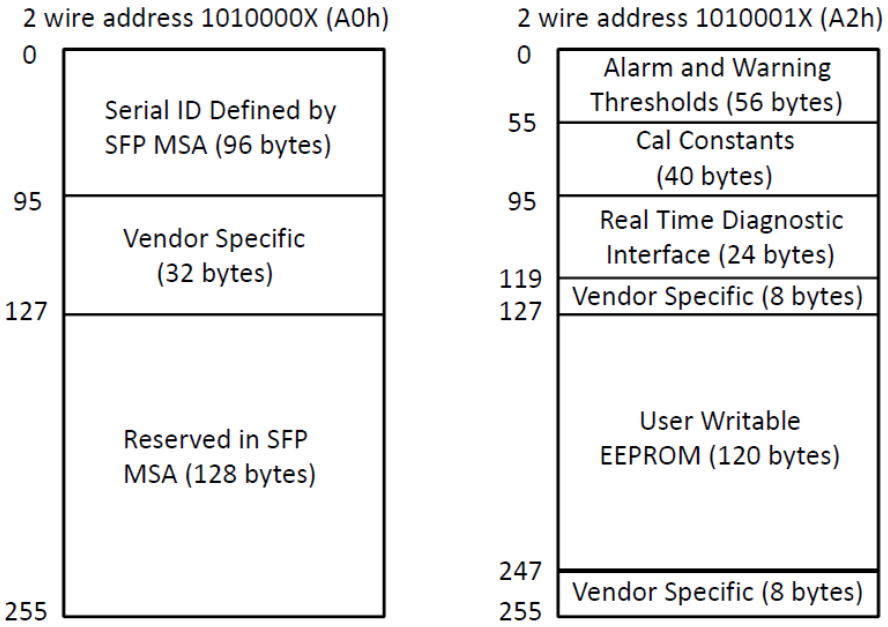


Recommended Interface Circuit

7. Digital Diagnostic Memory Map



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Addr.	Field Size (Bytes)	Name of Field	Hex	Description
0	1	Identifer	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver	10 00 00 00 20 40 0C 54	Transceiver Codes
11	1	Encoding	03	NRZ
12	1	BR, Nominal	01	1Gb/s
13	1	Rate Identifier	00	Unspecified
14	1	Length (9um) km	00	Transceiver transmit distance
15	1	Length (9um) 100m	00	Transceiver transmit distance
16	1	Length (50um OM2)	00	
17	1	Length (62.5um) 10m	00	Transceiver transmit distance
18	1	Length (Copper)	00	Not compliant
19	1	Length (50um OM3)	00	
20-35	16	Vendor name	59 69 20 56 61 6C 6C 65 79 20 20 20 20 20 20 20	“JPC” Vendor Name(ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	59 56 30 31 2D 50 30 32 20 20 20 20 20 20 20 20	Part No.(ASCII)
56-59	4	Vendor rev	31 2E 30 20	“1.0” (ASCII)
60-61	2	Wavelength	03 52	Transceiver wavelength
62	1	Reserved	00	
63	1	CC_BASE	87	Check code for Base ID Fields
64-65	2	Options	00 1A	TX_DISABLE, TX_FAULT and Loss of Signal implemented.
66	1	BR,MAX	00	Not Specified
67	1	BR,MIN	00	Not Specified
68-83	16	Vendor SN	SN(Variable)	Serial Number of transceiver(ASCII).
84-91	8	Date code	DC(Variable)	Manufactory Date Code.

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92	1	Diagnostic Monitoring Type	68	Digital diagnostic monitoring implemented, “Internally calibrated” is implemented
93	1	Enhanced Options	F0	Optional Alarm/Warning flags implemented for all monitored quantities, Optional Soft TX_Disable control and monitoring implemented,
				Optional Soft TX_FAULT monitoring implemented, Optional Soft RX_LOS monitoring implemented
94	1	SFF_8472 Compliance	04	Includes functionality described in Rev10.4 SFF-8472
95	1	CC_EXT	CS(Variable)	Check sum for Extended ID Field.
96-127	32	Vendor Specific	Read only	Depends on customer information Filled by zero
128-255	128	Reserved	Read only	Filled by zero

8. Modification History

Rev.	Comments	Date	Originator	Approval
01	Preliminary Draft	2017.11.16	Mike Sun	Ray Yang
02	Revise Part Number	2018.05.27	Mike Sun	Ray Yang
03	Add Certificate	2020.11.6	Mike Sun	Ray_Yang
04	Modify Power and Receiver Sensitivity	2022.05.26	Albert	Mike Sun