



Features:

- 1550nm cooled EML Transmitter
- Distance up to 40km over SMF
- Single 3.3V Power supply and TTL Logic Interface
- Duplex LC Connector Interface
- Hot Pluggable
- Dispersion Tolerance 800ps/nm
- Operating Case Temperature
Standard: 0°C~+70°C
- Compliant with SFF-8431 MSA
- Compliant with SFF-8432 MSA
- Compliant with SFF-8472 MSA

Applications

- 10GBASE-ER/EW
- 10G fiber channel
- Other Optical Links

Order Information

Table 1-order information

Part Number	Bit Rate (G)	Laser (nm)	Distance	Fiber Type	DDMI	Connector	Temp ^{note1}
GACP-1596-40	10	1550	40km	SMF	YES	LC	0°C~+70°C

Absolute Maximum Ratings

Table 2- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	Ts	-40	-	85	°C	
Supply Voltage	Vcc5	-0.5	-	4.0	V	
Operating Humidity	RH	-	-	+85	%	

Note: Exceeding any one of these values may destroy the device immediately.

Recommended Operating Conditions

Table 4- Recommended operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Top	0	-	70	°C	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC	-	-	450	mA	
Data Rate	BR	9.95	-	11.3	Gbps	
Transmission Distance	TD	2	-	40	km	

Electrical Characteristics

Table 5- Electrical Characteristics

Transmitter						
Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
Differential Data Input swing	Vin,p-p	mVpp	150	-	1200	
Input Differential impedance	Zin	Ω	85	100	115	
Tx_Disable,P_Down/RST	VIL	V	0	-	0.8	
	VIH	V	2.0	-	Vcc+0.3	
Receiver						
Differential Data Output	Vout	mVpp	350	-	700	
Output Differential impedance	Zin	Ω	85	100	115	
Output Rise Time,20%-80%	Tr	Ps	24	-	-	
Output Fall Time,20%-80%	Tf	Ps	24	-	-	
Rx_Los,Mod_NR,Interrupt	VoL	V	0	-	0.4	
	VoH	V	Vcc-0.5	-	Vcc+0.3	

Transmitter Performance

Table 6- optical TX Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
-----------	--------	------	---------	------	------	-------

Tx_Fault	Normal Operation	VOL	-0.3	-	0.4	V	
	Transmitter Fault	VOH	2.4	-	Vcc	V	
	Laser Disable	VIH	2.0	-	VCC+0.3	V	
Average Launch Optical Power		Pout	-4.7	-	+4	dBm	1
Extinction Ratio		ER	9.0	-	-	dB	2
Average Launch power of OFF TX		Poff	-	-	-30	dBm	1
Optical Wavelength		λ	1520	1550	1580	nm	
Dispersion penalty@9.95/10.7Gpbs		DP1	-	-	2	dB	2
Dispersion penalty@11.1/11.3Gpbs		DP2	-	-	3	dB	3
Side Mode Suppression Ratio		SMSR	35	-	-	dB	
TX Jitter			IEEE 802.3ae requirements				

Receiver Performance:

Table 7- optical RX Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Receiver Sensitivity@9.95Gpbs/10.7Gpbs	PIN_SENS1	-	-	-16	dBm	2
Receiver Sensitivity@11.1Gpbs/11.3Gpbs	PIN_SENS2	-	-	-14.5	dBm	3
Overload	PIN_OL	-1.0	-		dBm	3
Optical Center Wavelength	λ_C	1260	-	1600	nm	
Los Assert	LOSA	-28	-	-	dBm	
Los De-assert	LOSD	-	-	-18	dBm	
Los hysteresis	LOSH	0.5	-		dB	
Rx_LOS	High	2.0		Vcc+0.3	V	
	Low	0		0.8	V	

Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS 231-1 test pattern @9.95Gbps.
3. Measured with a PRBS 231-1 test pattern , @11.1Gbps. BER≤10⁻¹².

Recommended Host Board Power Supply Circuit

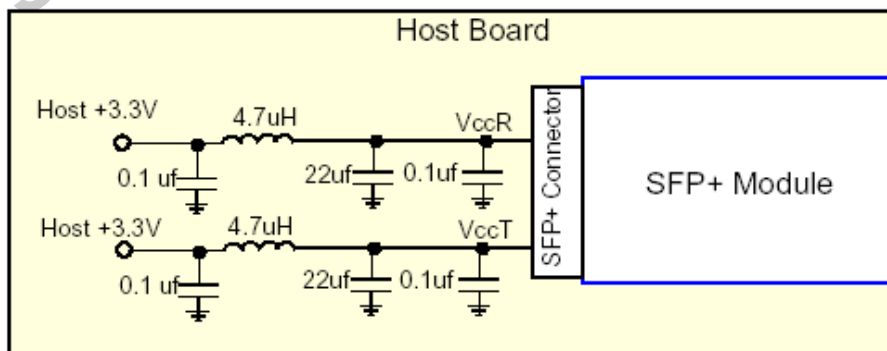


Figure 1, Recommended Host Board Power Supply Circuit

Recommended interface Circuit

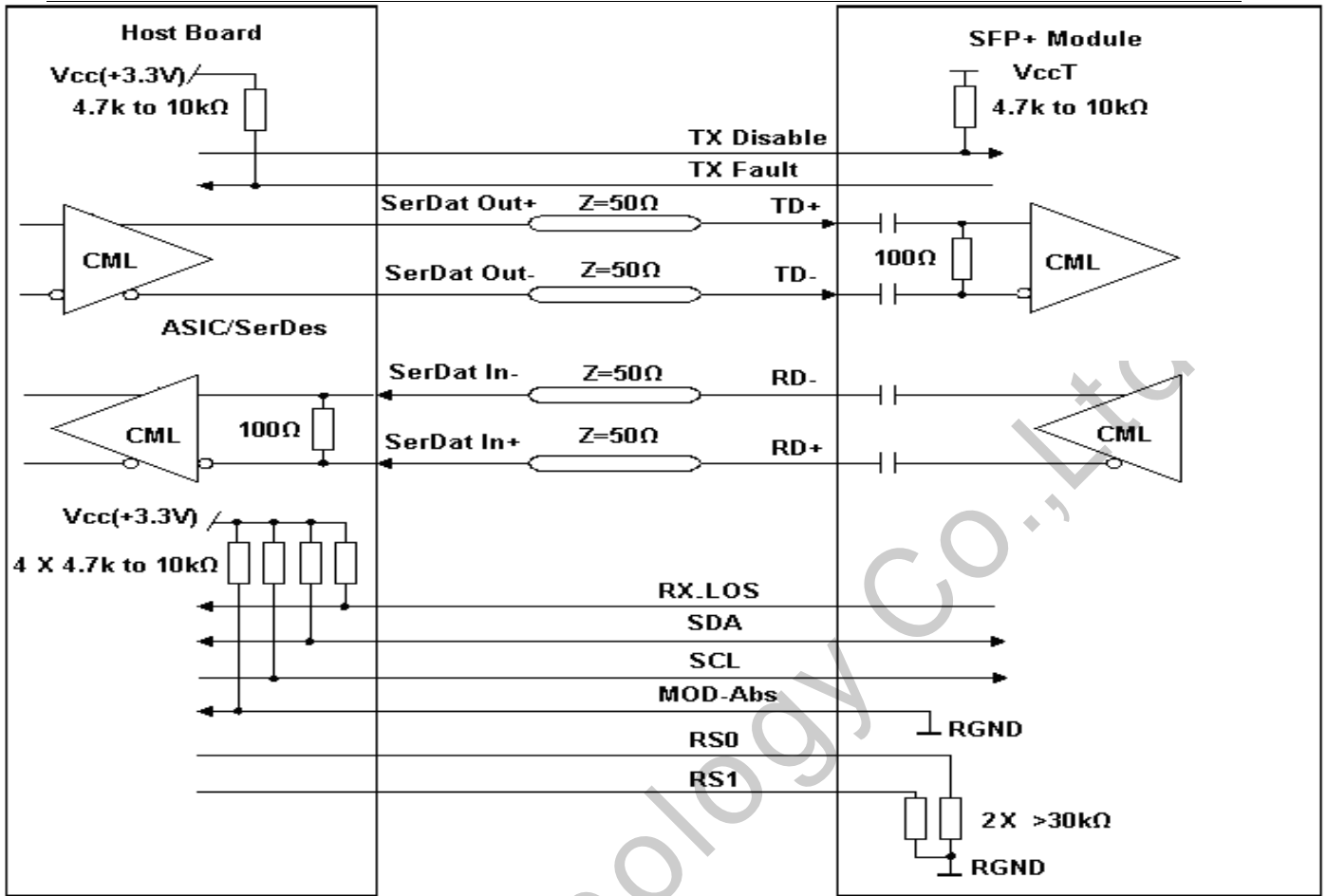


Figure 2, Recommended Interface Circuit

Pin arrangement

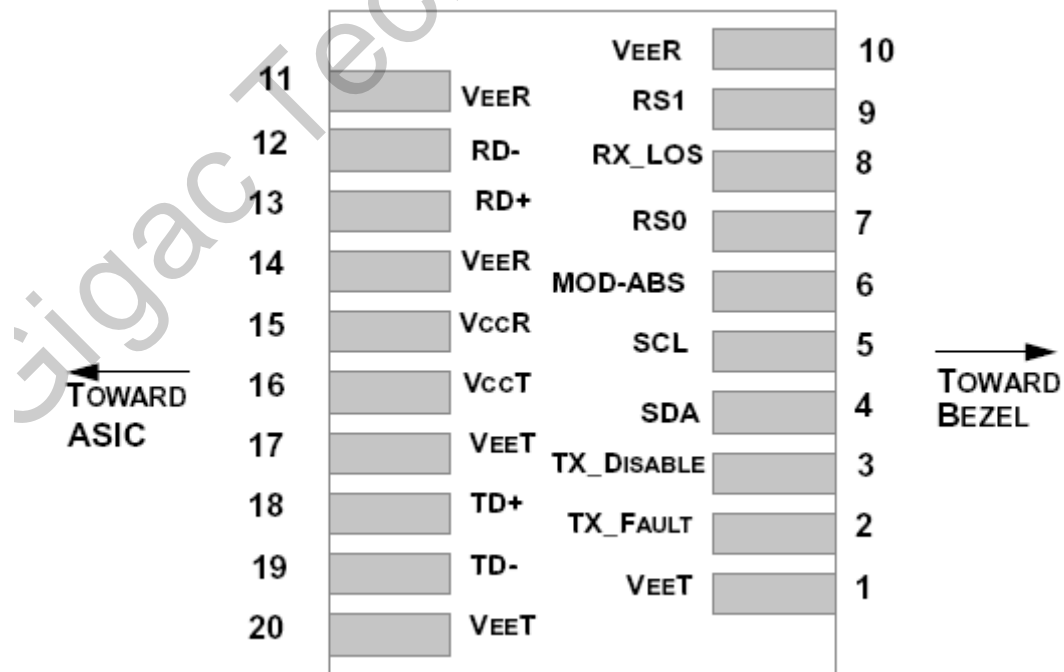


Figure 3, Pin View

Table 6-Pin Function Definitions

Pin	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD_ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTTL).	3	Rate Select 0, optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor..
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTTL).	1	Rate Select 1, optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

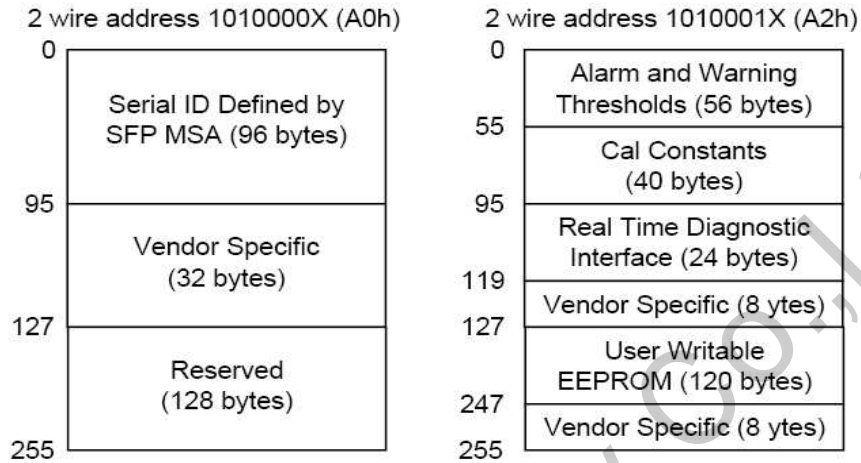
Note:

- TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ 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.
- 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 – 10 KΩ resistor. Its states are: Low (0 – 0.8V): Transmitter on (>0.8, < 2.0V): Undefined High (2.0 – 3.465V): Transmitter Disabled Open: Transmitter Disabled
- Module Absent, connected to VeeT or VeeR in the module.
- LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ 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.
- The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
- 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 is thus not required on the host board. The voltage swing on these lines will be between 350 and 700 mV differential (175 –350 mV single ended) when properly terminated.
- VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 725mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm 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 inrush 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 100Ω differential termination 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 150 – 1200 mV (75 – 600mV single-ended).

Digital Diagnostic Memory Map



Mechanical Dimension:

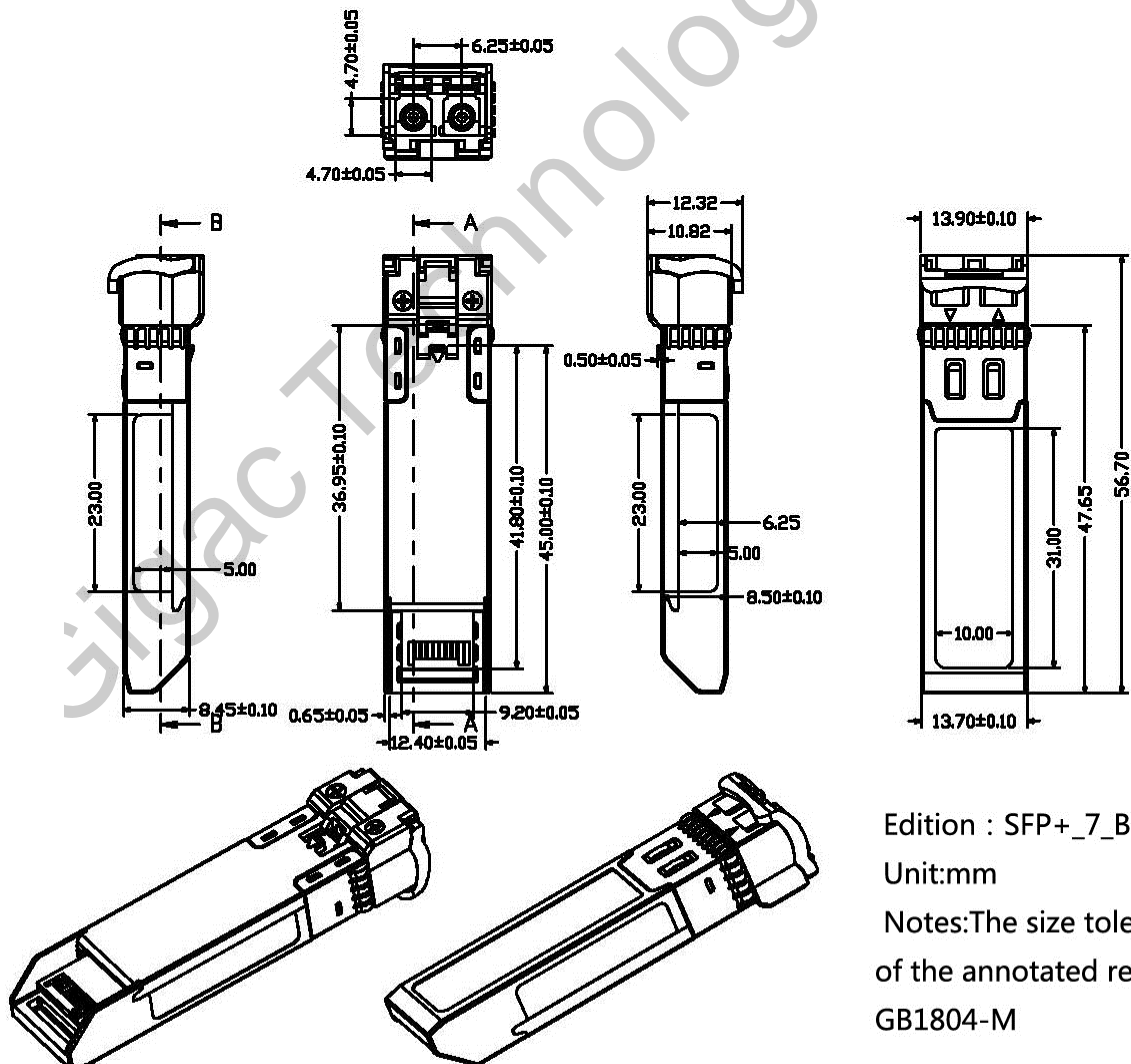


Figure 5, Mechanical Diagram (Rev SFP+_7_b)

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000 V)
Electrostatic Discharge to the enclosure	EN 55024:1998+A1+A2 IEC-61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 CISPR 22B :2006 VCCI Class B	Compatible with standards Noise frequency range: 30MHz to 6GHz. Good system EMI design practice required to achieve Class B margins. System margins are dependent on customer host board and chassis design.
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compatible with standards. 1KHz sine-wave, 80% AM, from 80MHz to 1GHz. No effect on transmitter/receiver performance is detectable between these limits.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product. TüV Certificate No. 50135086
Component Recognition	UL and CUL EN60950-1:2006	UL file E317337 TüV Certificate No. 50135086 (CB scheme)
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards ^{*note2}

Note1: For update of the equipment and strict control of raw materials, Gigac has the ability to supply the customized products since Jan 1, 2007, which meet the requirements of RoHS6 (Restrictions on use of certain Hazardous Substances) of European Union.

In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.

In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item13: Lead and cadmium in optical and filter glass. The three exemptions are being concerned for Gigac's transceivers, because Gigac's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Notice

Gigac reserves the right to make changes to or discontinue any optical link product or service identified in this publication, without notice, in order to improve design and/or performance. Applications that are described herein for any of the optical link products are for illustrative purposes only. Gigac makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Revision history

Version	Initiated	Reviewed	Revision History	Release Date
A0	Simon	Smith	Initialization	2012-04-08
A1	Code	Smith	Updated output power value.	2013-03-28
A2	Code	lucky	Update case temp. symbol.	2014-06-24
A3	code	Lucky	Add the extended temperature range	2015-03-18

Contact

Add: 3rd Floor, Business Incubator Park(Neighborhood Center), Section 2 of Xihang Port Avenue,Southwest



SFP+ 10G 1550nm 40KM

Airport Economic Development Zone, Chengdu 610207, China

Tel: (+86) 028-85124518

Fax: (+86) 028-85154518

Postal: 610207

E-mail: sales@gigac.com

Website: <http://www.gigac.com>

Gigac Technology Co., Ltd