SBU19120GE3D000

MSA 1000Base-BX SFP Transceiver (SMF, 1510nmTx/1590nmRx, 120km, SC, DOM)

Product Description

This MSA Compliant SFP transceiver provides 1000Base-BX throughput up to 120km over single-mode fiber (SMF) using a wavelength of 1510nmTx/1590nmRx via a SC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- SFF-8472 and MSA Compliant
- Simplex SC Connector
- Up to 1.25Gbps data links
- CWDM DFB and APD-TIA with 34dB power budget
- Single 3.3V power supply and TTL logic interface
- Single-mode fiber
- Support Hot Pluggable
- Commercial Temperature 0 to 70 Celsius
- RoHS compliant and Lead Free
- Metal with lower EMI

Applications:

- 1000Base Ethernet

For your product safety, please read the following information carefully before any manipulation of the transceiver:

ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.

LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage		Vcc	3.15	3.3	3.45	V
Storage Temperature		Tstg	-40		85	°C
Operating Case Temperature		Tc	0		70	°C
Operating Relative Humidity					95	%
Data Rate	**FE**			100		Mbps
	FC			1.063		Gbps
	GBE			1.25		Gbps

Notes:

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

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage		Vcc	-0.5		3.6	V	
Power Supply Current		Icc			300	mA	
Transmitter							
LVPECL Differential Inputs		VIN	400		2000	mVp-p	1
Input Differential Impedance		ZIN	85	100	115	Ω	2
Tx_Disable	**Disable**		2		Vcc	V	
	Enable		0		0.8	V	
Tx_Fault	**Fault**		2		Vcc+0.3	V	
	Normal		0		0.5	V	
Receiver							
LVPECL Differential Outputs		VOUT	370		2000	mVp-p	3
Output Differential Impedance		ZOUT	85	100	115	Ω	
Rx_LOS	**LOS**		2		Vcc+0.3	V	
	Normal		0		0.8	V	
MOD_DEF(0:2)		VOH	2.5			V	4
		VOL	0		0.5	V	4

Notes:

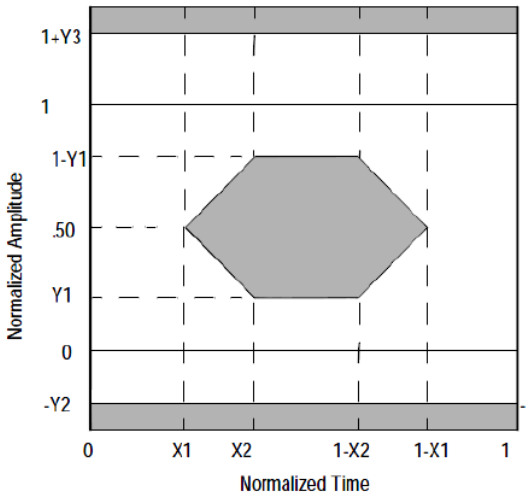
1. LVPECL logic. Internally AC coupled inputs.
2. RIN>100kΩ @DC.
3. LVPECL logic. Internally AC coupled outputs.
4. With serial ID.

Optical Characteristics

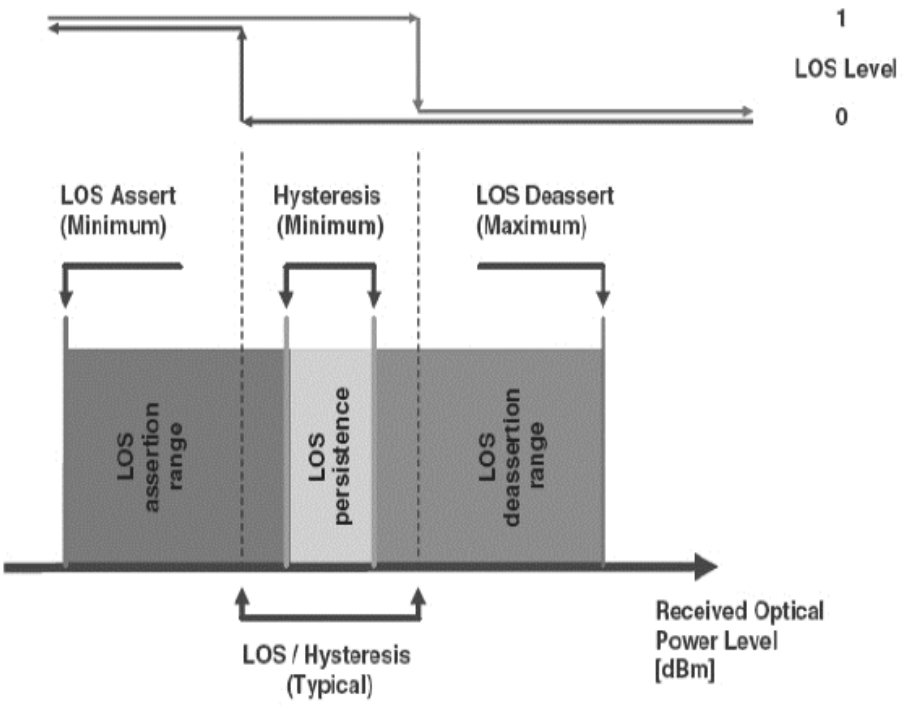
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Budget		34			dB	
Data Rate		100		1250	Mbps	
Transmitter						
Channel Center Wavelength		1504	1510	1517.5	nm	1
Spectral Width (-20dB)	Δλ			1	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	POUT	1		5	dBm	2
Extinction Ratio	ER	9			dB	3
Rise/Fall Time (20-80%)	Tr/Tf			2	ns	
Output Optical Eye		Compliant with IEEE 802.3ah-2004				3, 4
Tx_Disable Assert Time	T_off			10	us	
Receiver						
Channel Center Wavelength		1570	1590	1610	nm	1
Receiver Sensitivity	Pmin			-33	dBm	5
Receiver Overload	Pmax	-8			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	
LOS De-Assert	LOSD			-34	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis		0.5			dB	6

Notes:

1. The channel center wavelength of the transmitter and receiver sides are typical wavelengths of CWDM channels ±20nm.
2. Output is coupled into a 9/125μm single-mode fiber.
3. Filtered. Measured with a PRBS 2^7-1 test pattern @1250Mbps.
4. Eye pattern mask:



5. Measured at all data rates specified above with ER=9dB, 2^7-1 PRBS data pattern, and BER<$1E^{-12}$.
6. LOS Hysteresis:



Pin Descriptions

Pin	Symbol	Name/Description	Plug Sequence	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	Module Definition 2. 2-Wire Serial Interface Data.	3	3
5	MOD-DEF1	Module Definition 1. 2-Wire Serial Interface Clock.	3	3
6	MOD-DEF0	Module Definition 0. Grounded Within the Module.	3	3
7	Rate Select	Not Connected.	3	9
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground.	1	5
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverted Received Data Out.	3	6
13	RD+	Received Data Out.	3	7
14	VeeR	Receiver Ground.	1	5
15	VccR	Receiver Power. 3.3±5%.	2	7
16	VccT	Transmitter Power. 3.3±5%.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmit Data In.	3	8
19	TD-	Inverted Transmit Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

Notes:

1. Tx_Fault is an open collector/drain output which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage is between 2.0V and VccT/R+0.3V. When “high,” the 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 in the module with a 4.7kΩ to 10kΩ resistor. Its states are:

   Low (0V-0.8V): Transmitter On

   (>0.8V, <2.0V): Undefined

   High (2.0V-3.465V): Transmitter Disabled

   Open: Transmitter Disabled.
3. MOD-DEF0, 1, and 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

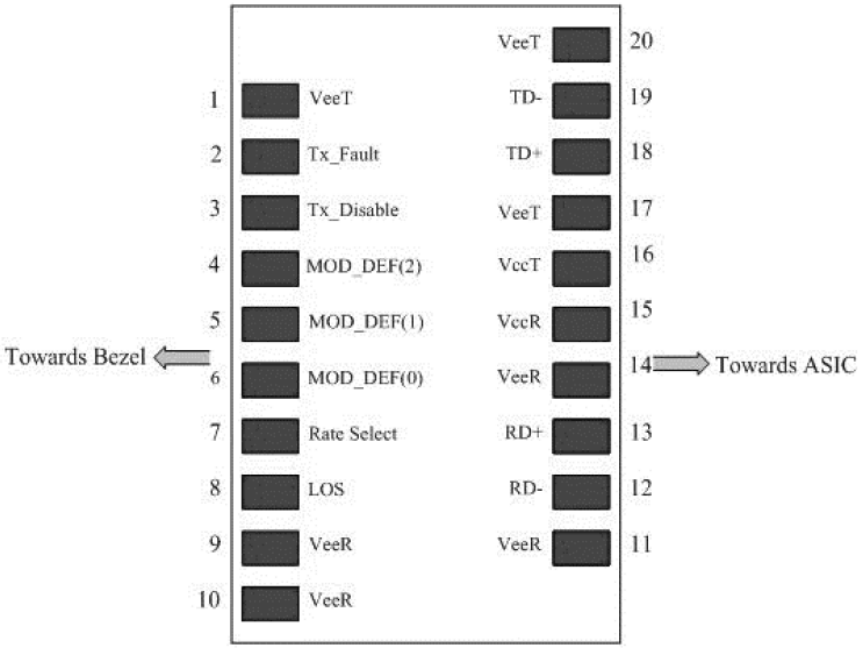
   MOD-DEF0 is grounded by the module to indicate that the module is present.

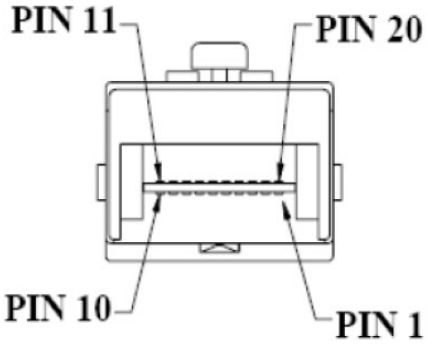
   MOD-DEF1 is the clock line of the 2-wire serial interface for serial ID.

   MOD-DEF2 is the data line of the 2-wire serial interface for serial ID.

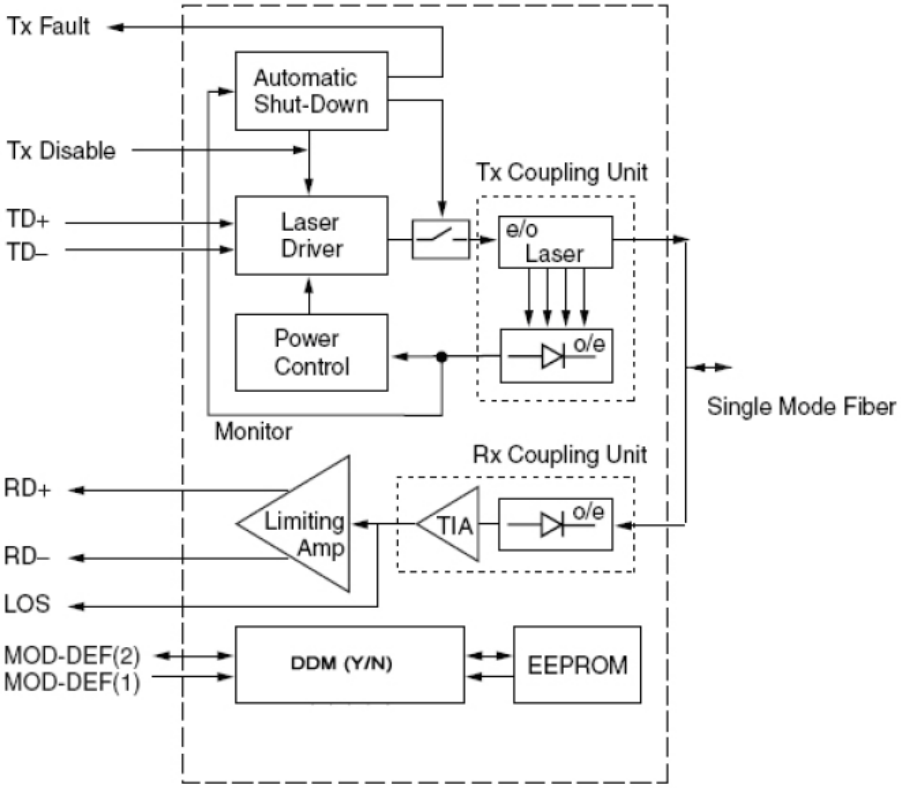
4. LOS (Loss of Signal) is an open collector/drain output which should be pulled up with a 4.7kΩ to 10kΩ resistor. Pull-up voltage is between 2.0V and VccT/R+0.3V. When “high,” this output indicates that the received optical power is below the worst-case receiver sensitivity (as defined by the standard 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 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 370mV and 2000mV differential (185mV to 1000mV single-ended) when properly terminated.
7. 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 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω 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 400mV to 2000mV (250mV to 1200mV single-ended), though it is recommended that values between 500mV and 1200mV differential (250mV to 600mV single-ended) be used for best EMI performance.
9. Function not available.

Electrical Pin-out Details

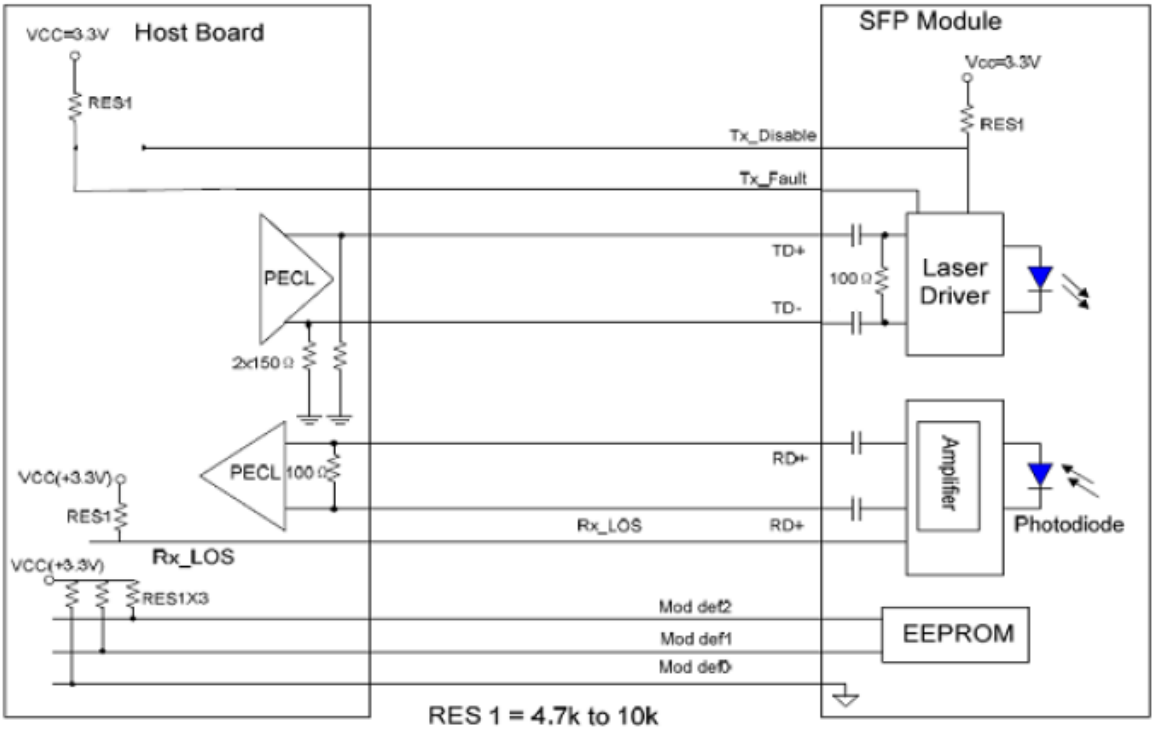




Functional Description of the Transceiver



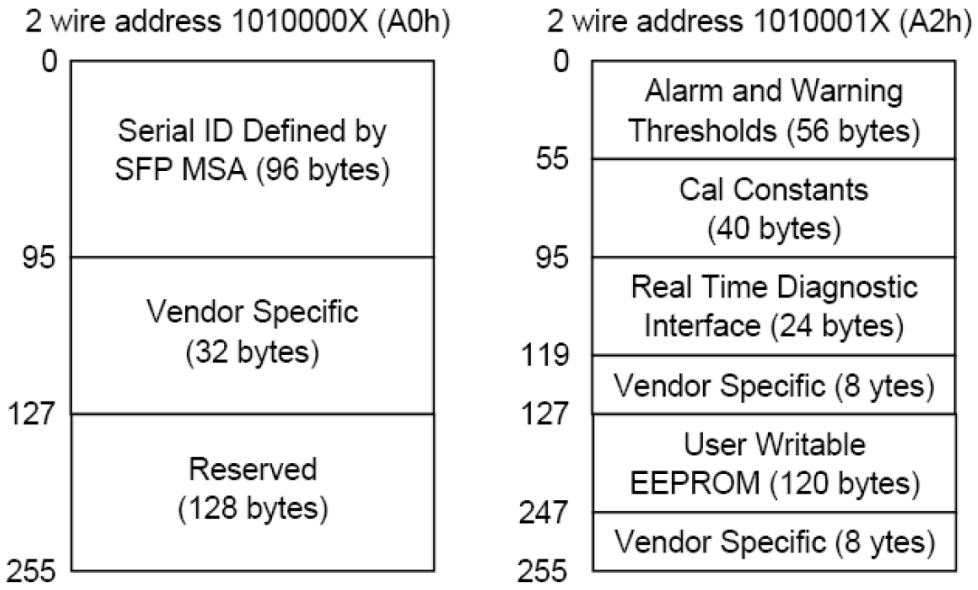
Recommended Circuit Schematic



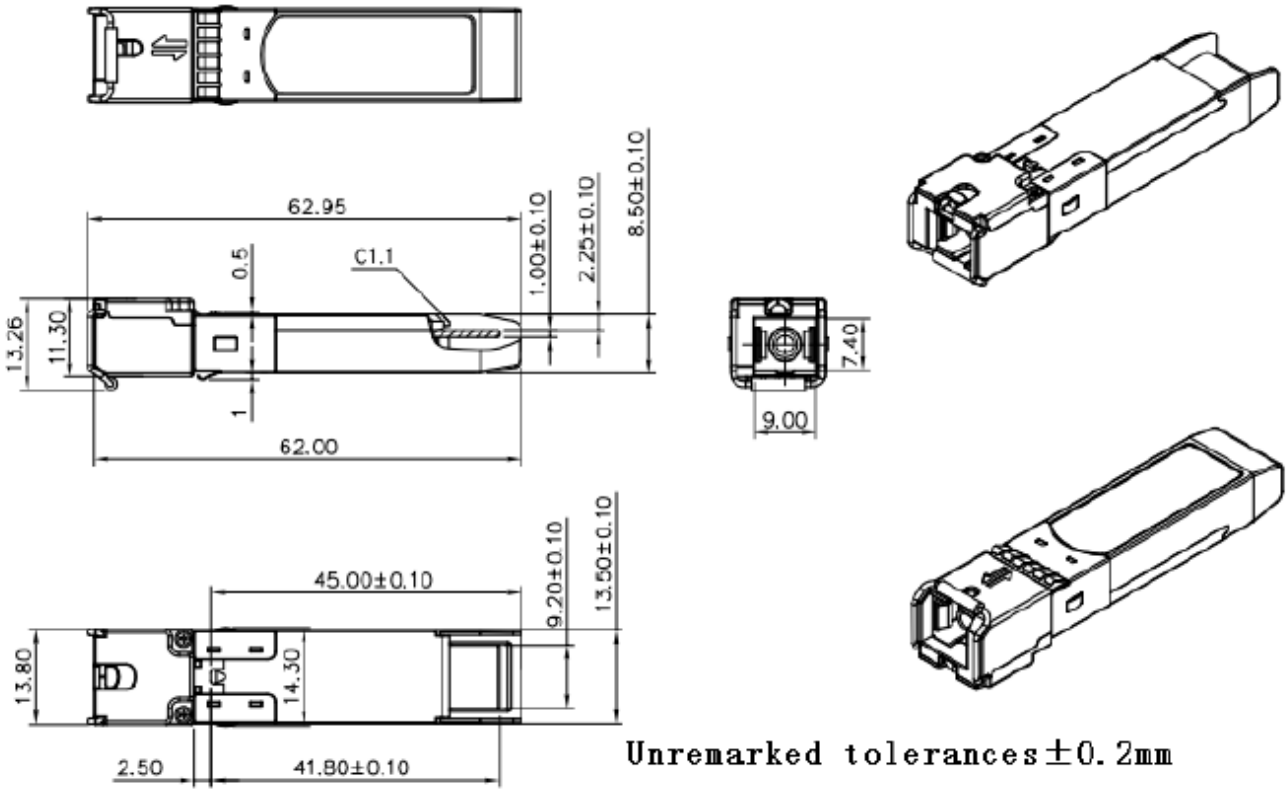
EEPROM

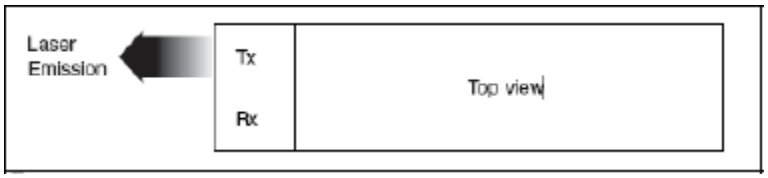
The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA) is bidirectional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring, and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following. For detailed EEPROM information, please refer to the related document of SFF 8472 Rev 9.3.



Mechanical Specifications





About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.