

### SPP13040100B000

MSA 10GBase-LR40 SFP+ Transceiver (SMF, 1310nm, 0-40km, LC, DOM)

#### **Product Description**

This MSA Compliant SFP+ transceiver provides 10GBase-LR throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC 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-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



#### **Applications:**

- 10GBase-LR Ethernet
- Access, Datacenter and Enterprise
- 8x/10x Fibre Channel
- Mobile Fronthaul CPRI/OBSAI

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



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.

#### **Regulatory Compliance**

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

### **Absolute Maximum Ratings**

Parameter	Symbol	Min.	Тур.	Max.	Unit
Maximum Supply Voltage	Vcc	-0.5		4.0	V
Storage Temperature	TS	-40		85	°C
Operating Case Temperature	Ti	0	25	70	°C
Data Rate			10.3125		Gbps

#### Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter		Symbol	Min.	Тур.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.135	3.3	3.465	V	
Power Supply Current		Icc			300	mA	
Power Dissipation		PD			1000	mW	
Transmitter							
Input Differe	ntial Impedance	Zin		100		Ω	
Differential Data Input Swing		Vin,p-p	180		700	mVp-p	
TX_FAULT	Transmitter Fault	Voн	2.0		VccHOST	V	
	Normal Operation	VOL	0		0.8	V	
TX_DISABLE	Transmitter Disable	VIH	2.0		VCCHOST	V	
	Transmitter Enable	VIL	0		0.8	V	
Receiver							
Output Differential Impedance		Zo		100		Ω	
Differential Data Output Swing		VOUT, P-P	300		850	mVp-p	1
Data Output Rise Time, Fall Time		t <sub>r</sub> , t <sub>f</sub>	28			ps	2
RX_LOS	Loss of signal (LOS)	Voн	2.0		VCCHOST	V	3
	Normal Operation	VOL	0		0.8	V	3

#### Notes:

- 1. Internally AC coupled, but requires an external  $100\Omega$  differential load termination.
- 2. 20-80%.
- 3. LOS is an open collector output. Should be pulled up with  $4.7k\Omega$  on the host board.

**Optical Characteristics** 

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes	
Transmitter							
Launch Optical Power	Ро	0		+5	dBm	1	
Center Wavelength Range	λς	1260	1310	1355	nm		
Extinction Ratio	ER	3.5			dB	2	
Optical Modulation Amplitude	OMA	-5.2			dBm		
Spectral Width (-20dB)	Δλ			1	nm		
Side Mode Suppression Ratio	SMSR	30			dB		
Transmitter and Dispersion Penalty	TDP			3.2	dB		
Optical Return Loss Tolerance	ORLT			12	dB		
Pout @TX_Disable Asserted	Poff			-30	dBm	1	
Eye Diagram	IEEE Std 802.	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ER compatible					
Receiver							
Center Wavelength	λς	1260	1310	1355	nm		
Receiver Sensitivity (Pavg)	S			-15	dBm	3	
Receiver Overload (Pavg)	POL	0.5			dBm	3	
Stressed Sensitivity (OMA)				-10.3	dBm	4	
Optical Return Loss	ORL	12			dB		
LOS De-Assert	LOS <sub>D</sub>			-16	dBm		
LOS Assert	LOS <sub>A</sub>	-30			dBm		
LOS Hysteresis		0.5		4.5	dB		

### Notes:

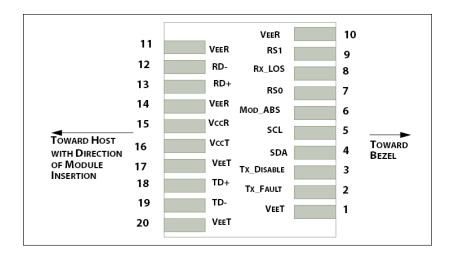
- 1. The optical power is launched into  $9/125\mu m$  SMF.
- 2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps
- 3. Measured with PRBS  $2^{31}$ -1 test pattern, 10.3125 Gb/s, BER<10<sup>-12</sup>.
- 4. Comply with IEEE 802.3-2005.

# **Pin Descriptions**

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0	Rate Select 0 – Not used, Presents high input impedance	
8	RX_LOS	Receiver Loss of Signal (LVTTL-O)	2
9	RS1	Rate Select 1 – Not used, Presents high input impedance	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O)	
13	RD+	Received Data out (CML-O)	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I)	
19	TD-	Inverse Transmitter Data In (CML-I)	
20	VeeT	Transmitter Ground	1

#### **Notes:**

- 1. The module signal grounds are isolated from the module case.
- 2. This is an open collector/drain output that on the host board requires a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccHost.
- 3. This input is internally biased high with a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccT.
- 4. Two-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
- 5. This is a ground return that on the host board requires a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccHost.



# **Recommended Host Board Power Supply Filter Network**

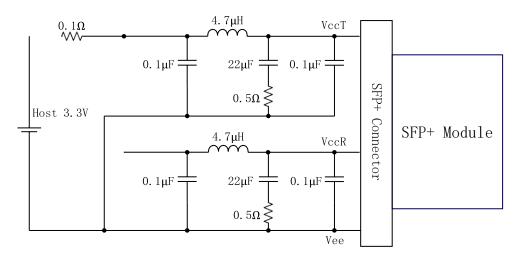
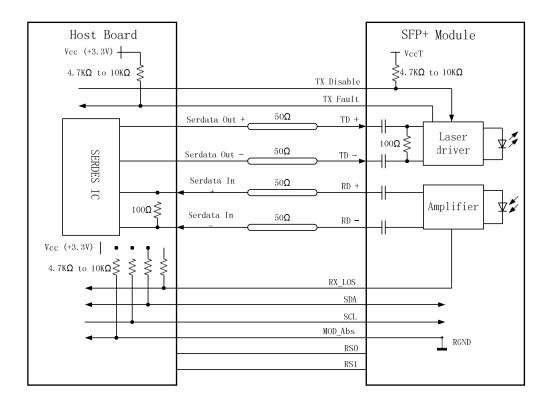


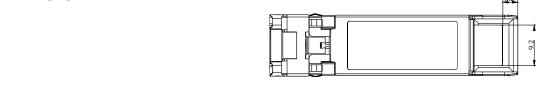
Figure 2. Recommended Host Board Power Supply Filter Network

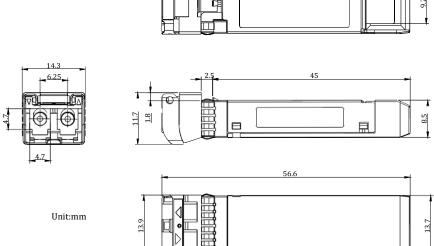
# **Recommended Application Interface Block Diagram**



# **Mechanical Specifications**

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).





# 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.











