

10G SFP+ Active Optical Cable

Features :

- Support 10GBASE-SR/10G Fiber Channel application
- Compliant to SFP+ Electrical MSA SFF-8431
- Compliant to SFP+ Mechanical MSA SFF-8432
- Multi rate of up to 11.3Gbps
- Transmission distance up to 300m
- +3.3V single power supply
- Low power consumption
- Operating case temp
Commercial: 0°C to +70 °C
- RoHS compliant
- Password protection for A0h and A2h



Applications

- 10GBASE-SR at 10.31Gbps
- InfiniBand QDR, SDR, DDR
- Other optical links

Absolute Maximum Ratings

Table1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V _{CC3}	-0.5	-	+3.6	V	
Storage Temperature	T _s	-10	-	+70	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold	P R _{dmg}	+3.4	-	-	dBm	

Note1: No condensation

Recommended Operating Conditions

Table 2- Recommended operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_c	0	-	+70	°C	
Power Supply Voltage	V_{cc}	3.14	3.3	3.47	V	
Power Supply Current	I_{cc}	-	-	200	mA	
Power Dissipation	P_d	-	-	0.66	W	
Bit Rate	BR	-	10.3125	-	Gbps	
Fiber Bend Radius	Rb	3	-	-	cm	

Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes	
Transmitter							
Differential Data Input Swing	$V_{in,P-P}$	200	-	1600	mV _{pp}		
Input Differential Impedance	Z_{IN}	90	100	110	Ω		
Tx_Fault	Normal Operation	V_{OL}	0	-	0.8	V	
	Transmitter Fault	V_{OH}	2.0	-	V_{CC}	V	
Tx_Disable	Normal Operation	V_{IL}	0	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	$V_{CC}+0.3$	V	
Receiver							
Differential Date Output	V_{out}	370	-	1600	mV		
Output Differential Impedance	Z_D	90	100	110	Ω		
Rx_LOS	Normal Operation	V_{OL}	0	-	0.8	V	
	Lose Signal	V_{oH}	2.0	-	V_{CC}	V	

Optical Characteristics

Table 4-Optical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Optical transmitter Characteristics						
Data Rate	DR	Gbps	9.953	10.3125	11.3	
Center Wavelength Range	λ_c	nm	820	850	880	
Laser Off Power	Poff	dBm	-	-	-45	
Launch Optical Power	P0	dBm	-6.0	-	-	1
Extinction Ratio	ER	dB	3	-	-	
Spectral Width(RMS)	RMS	nm	-	-	0.45	
Optical Receiver Characteristics						
Data Rate	DR	Gbps	9.953	10.3125	11.3	
Bit Error Rate	BER	dBm	-	-	E-12	2
Overload Input Optical	P_{IN}	dBm	2.4	-	-	2

Power						
Center Wavelength Range	λ_c	nm	820	-	880	
Receiver Sensitivity in Average Power	Sen	dBm	-	-	-9.9	3
Los Assert	LosA	dBm	-26	-	-	
Los De-Assert	LosD	dBm	-	-	-12	
Los Hysteresis	LosH	dB	0.5	-	-	

Note:

1. Coupled into 50/125 MMF.
2. Measured with PRBS 2³¹-1 test pattern @10.3125Gbps.BER=10E-12

Recommended Host Board Power Supply Circuit

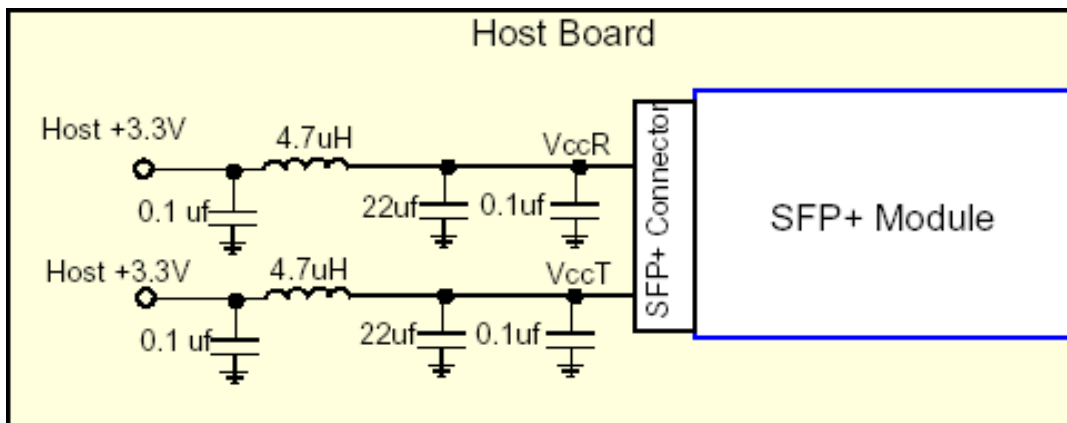


Figure 1, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

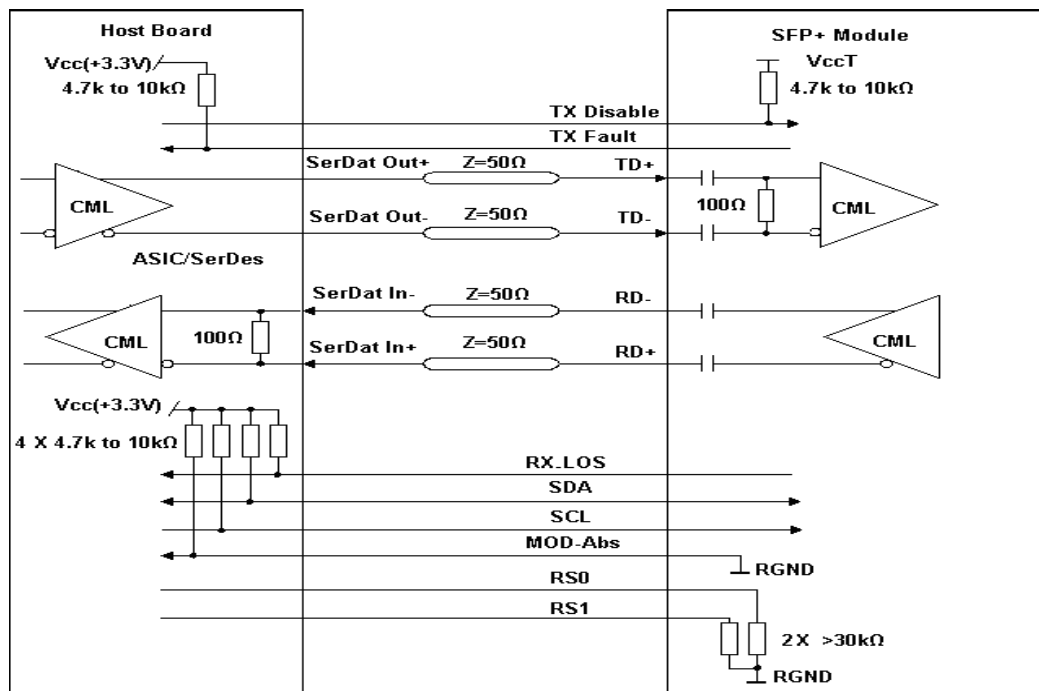


Figure 2, Recommended Interface Circuit

Pin arrangement

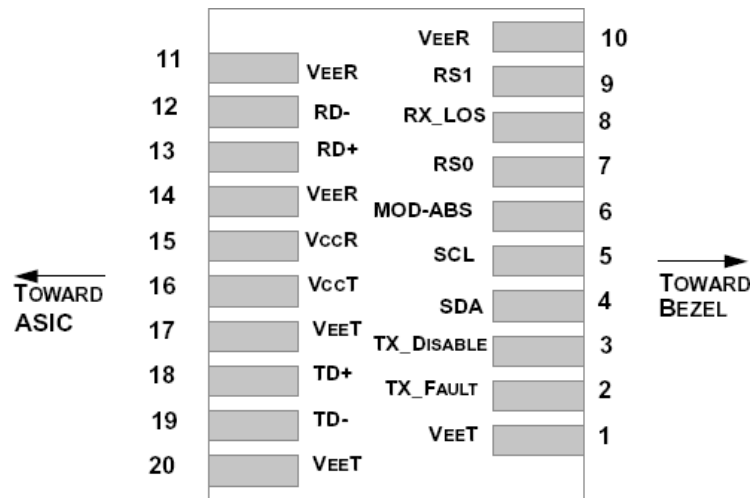


Figure 3, Pin View

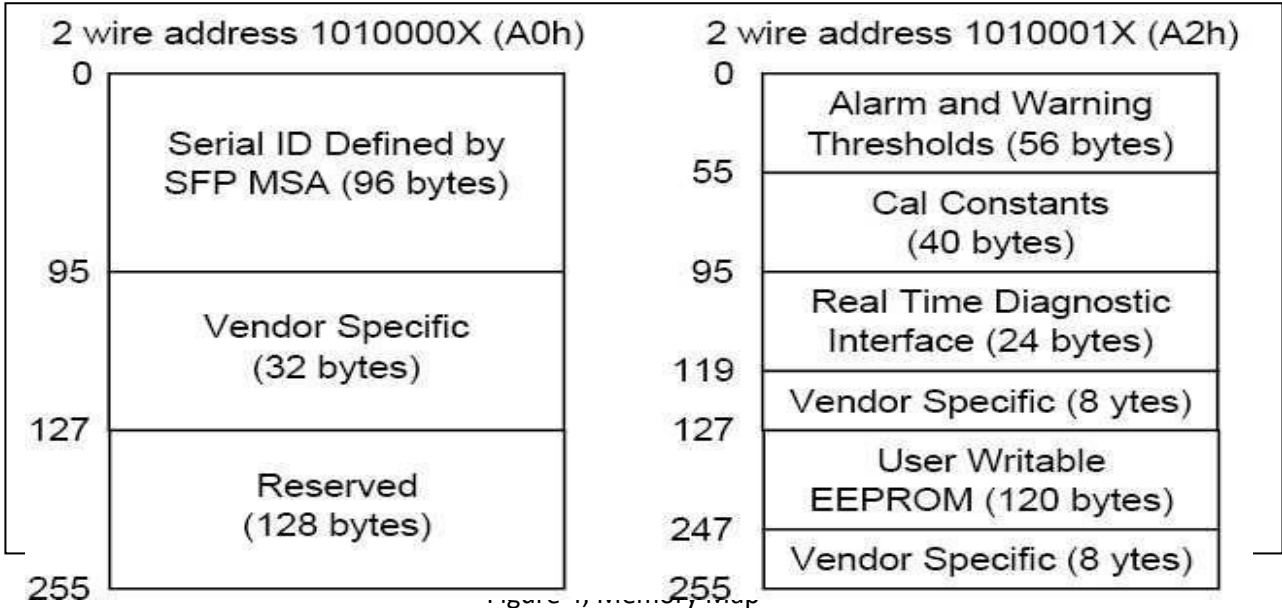
Table 5-Pin Function Definitions

Pin	Symbol	Name/Description	Notes
1	VEET	Module Transmitter Ground	1
2	TX_FAULT	Module Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to VEET or VEER in the module	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	
8	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect)	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	
10	VEER	Module Receiver Ground	1
11	VEER	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	VEER	Module Receiver Ground	1
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	VEET	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VEET	Module Transmitter Ground	1

Note:

1. The module ground pins are isolated from the module case.
2. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
3. The pin is pulled up to VCCT with a 4.7K-10KΩ resistor in the module

Monitoring Specification



Mechanical Design Diagram

Unit:mm

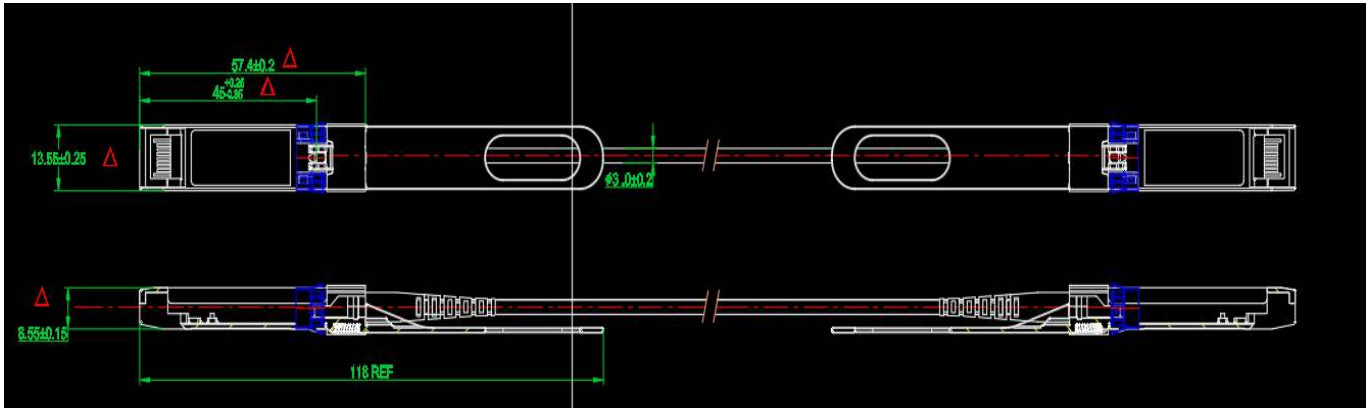


Table 6- Cable Length

Cable Length L (Unit: m)	Tolerant (Unit: cm)
<1.0	+10/-0
1.0 ≤ L ≤ 4.5	+15/-0
4.5 < L ≤ 14.5	+30/-0
> 14.5	+2%L/-0

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.