

Specification

Small Form Factor Pluggable

Transceiver (MSA)

LC Receptacle – SFP+

12 Gigabit SDI 1T/1R



TIM-A1EB1-411

Ordering Information:

Model Name	TIM-A1EB1-411	Note
Voltage	3.3V	
Device type	1310 DFB	
Interface	AC-AC / TTL	
Temperature	0 °C~+70°C	
Distance	8~30m of OM3 or OM4 multi-mode fiber	
Latch Color	Blue 	

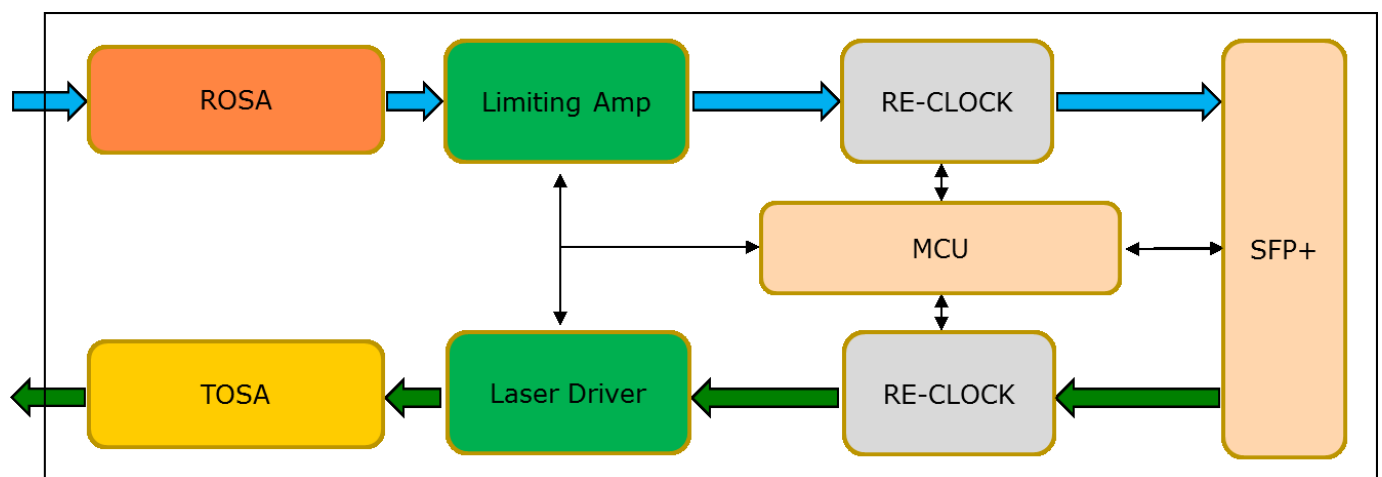
■ Features

- Compliant with SFP+ MSA
- Data Rate up to 12 Gbps
- Re-Clock built-in
- LC receptacle
- Hot Pluggable
- All-metal housing for superior EMI shielding performance
- SFF-8472 built in digital diagnostic Functions
- Operating case temperature range: Commercial Temperature 0°C~ 70°C

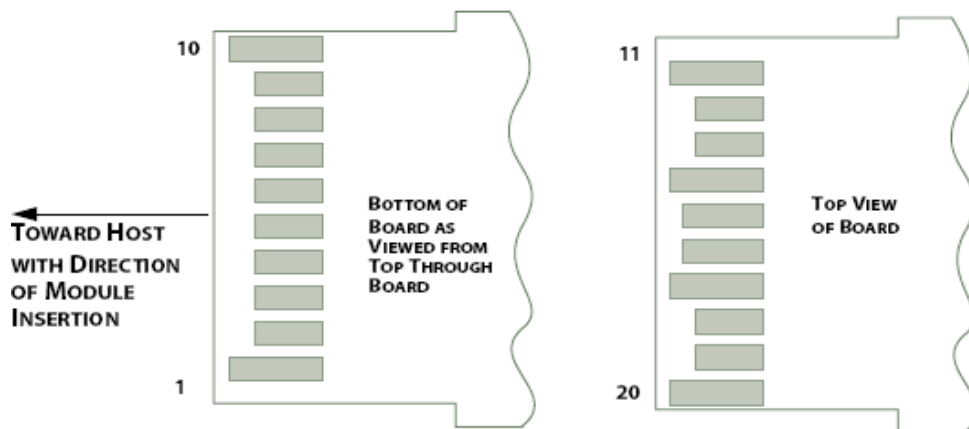
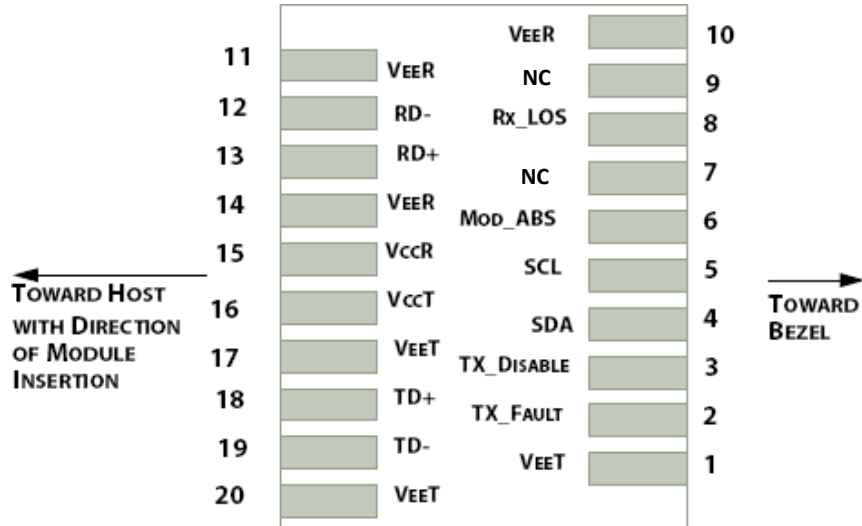
■ Application

- SMPTE ST-2082, ST2081, 424M, 292M, 259M compliant
- Support video pathological patterns for 12G-SDI, 6G-SDI, 3G-SDI and HD-SDI, SD-SDI
- Applicable for 8~30m MMF connection of uncompressed video transmission

■ Transceiver Block Diagram



■ Pin Definition and Descriptions



PIN	Logic	Symbol	Name / Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	
5	LVTTL-I	SCL	2-Wire Serial Interface Clock	
6		Mod_ABS	Module Absent, connected to VeeT or VeeR in the module	
7		NC		
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication	
9		NC		
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver 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	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Note:

1. Module ground pins are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7k to 10k ohm to Vcc Host in the host board.
3. Shall be pulled up with 4.7k to 10k ohm to VccT in the module.

■ Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	V_{CC}	0	3.6	V
Storage Temperature	T_s	-40	85	°C
Relative Humidity	RH	5	95	%
Optical Receiver Power (Damage)	P_{max}		1.5	dBm

■ Recommended Operating Environment

Parameters	Symbol	Min.	Typical	Max	Unit	Note
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Operating Case Temperature	T_{op}	0		70	°C	
Power Supply Current	I_{CC}			600	mA	
Power Consumption				2	W	
Data rate	BRSD		270		Mbps	1
	BRHD		1483, 1485		Mbps	2
	BR3G		2967, 2970		Mbps	3
	BRUHD		5934, 5940, 11868, 11880		Mbps	4

Note:

1. Compatible with the SMPTE standard of ST259
2. Compatible with the SMPTE standard of ST292
3. Compatible with the SMPTE standard of ST424
4. Compatible with the SMPTE standard of ST2081 and ST2082

■ Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
Average Launch Power	P _o	-5.0		1.0	dBm	
Center wavelength	λ	1300	1310	1320	nm	
Spectrum Width	$\sigma\lambda$			1.0	nm	@-20dB
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction ratio	ER	3.5			dB	
Relative Intensity Noise	RIN		-130		dB/Hz	
Average launch power of OFF transmitted	P _{off}			-30	dBm	
Receiver						
Sensitivity@11.88Gbps				-9.0	dBm	1
				-12.0	dBm	2
Sensitivity@6Gbps				-10.0	dBm	1
				-14	dBm	2
Sensitivity@2.97Gbps				-10.0	dBm	1
Sensitivity@1.485Gbps				-10.0	dBm	1

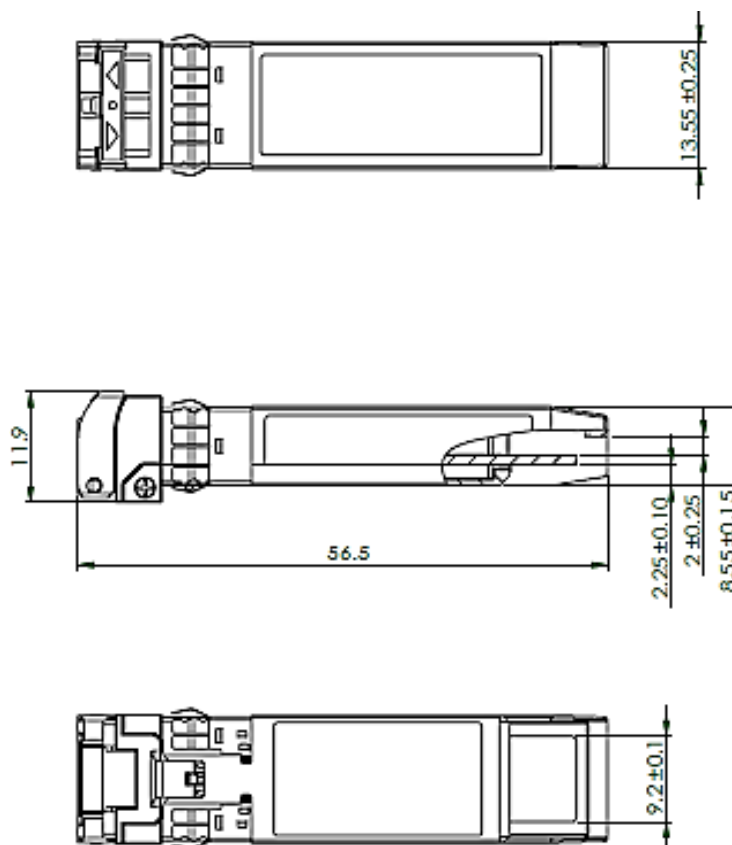
Note-

1. Measured with pathological pattern; BER < 10⁻¹²
2. Measured with ER= 7dB, BR = 12Gbps RBS31

■ Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
High-Speed Signal Interface Specification						
Input Data Rate			11.88		Gbps	
Differential Input Impedance	R _{IN}		100		Ω	
Output Data Rate			11.88		Gbps	
Differential Output Impedance	R _{out}		100		Ω	

■ Mechanical (mm) : $\pm 0.5\text{mm}$



■ ESD

Normal ESD precautions are required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

■ Laser Safety

This is a Class 1 Laser Product according to IEC/EN60825-1:2014 (Third Edition). This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, MAY 8, 2019.

Caution:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Attention: L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées dans le document peut entraîner une exposition à des radiations dangereuses.

■ Contact Information

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■ Revision History

Date	Version	Description
04/16/2018	Preliminary	Initial release.



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