

16G-SFPP-ERD-1558-17-AO

Brocade® 16G-SFPP-ERD-1558-17 Compatible TAA 16Gbs Fibre Channel DWDM 100GHz SFP+ Transceiver (SMF, 1558.17nm, 40km, LC, DOM)

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

- Ethernet over DWDM
- Access, Metro and Enterprise

Product Description

This Brocade® 16G-SFPP-ERD-1558-17 compatible SFP+ transceiver provides 16GBase-DWDM Fibre Channel throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1558.17nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Brocade® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

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

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



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

ITU-T Grid Channel (100GHz Spacing)

Channel	THz	nm	Channel	THz	nm
17*	191.7	1563.86	40	194	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61*	196.1	1528.77
39	193.9	1546.12			

*This channel is supported with limited availability.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	TS	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Input Voltage	Vin	-0.5		Vcc	V	
Baud Rate		4.25	14.025		Gbps	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	+3.15	3.3	3.45	V	
Power Supply Current	ICC		430	610	mA	
Surge Current	Isurge			+30	mA	
Transmitter						
CML Inputs (Differential)	Vin	250		1000	mVpp	AC coupled inputs
Input Impedance (Differential)	Zin	85	100	115	ohm	Rin > 100 kohms @DC
Differential Input S-parameter	SDD11			-10	dB	
Differential to Common Mode Conversion	SCD11			-10	dB	
Tx_DISABLE Input Voltage	High	2		3.45	V	
	Low	0		0.8	V	
Tx_Fault Output Voltage	High	2		Vcc+0.3	V	Io = 400µA; Host Vcc
	Low	0		0.5	V	Io = -4.0mA
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Zout	85	100	115	ohm	
Differential Output S-parameter	SD22			-10	dB	
Rx_LOS Output Voltage	High	2		Vcc+0.3	V	Io = 400µA; Host Vcc
	Low	0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
9µm Core Diameter SMF			40		Km	
Data Rate		4.25	14.025		Gbps	
Transmitter						
Center Wavelength Spacing			50		GHz	
			0.4		nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pout	0		+4	dBm	1
Extinction Ratio	ER	8.2			dB	
Average Power of OFF Transmitter	Poff			-30	dBm	
Transmitter Dispersion Penalty	TDP			2	dB	
TX Disable Assert Time	t_off			-30	dBm	
TX_DISABLE Negate Time	t_on			1	ms	
TX_DISABLE time to start reset	t_reset	10			us	
Time to initialize, include reset of TX_FAULT	t_init			300	ms	
TX_FAULT from fault to assertion	t_fault			100	us	
Total Jitter	TJ			0.28	UI (p-p)	
Data Dependent Jitter	DDJ			0.1	UI (p-p)	
Uncorrelated Jitter	UJ			0.023	RMS	
Receiver						
Center Wavelength	λ	1260		1565	nm	
Sensitivity	Pmin			-14	dBm	2
Receiver Overload	Pmax	0			dBm	
Optical Return Loss	ORL			-12	dBm	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-26			dBm	
LOS	High		2	Vcc+0.3	V	
	Low		0	0.8	V	

Notes:

- Output is coupled into a 9/125um SMF
- Minimum average optical power measured at the BER less than 1E-12, back to back. The measure pattern is PRBS 2³¹-1.

Pin Descriptions

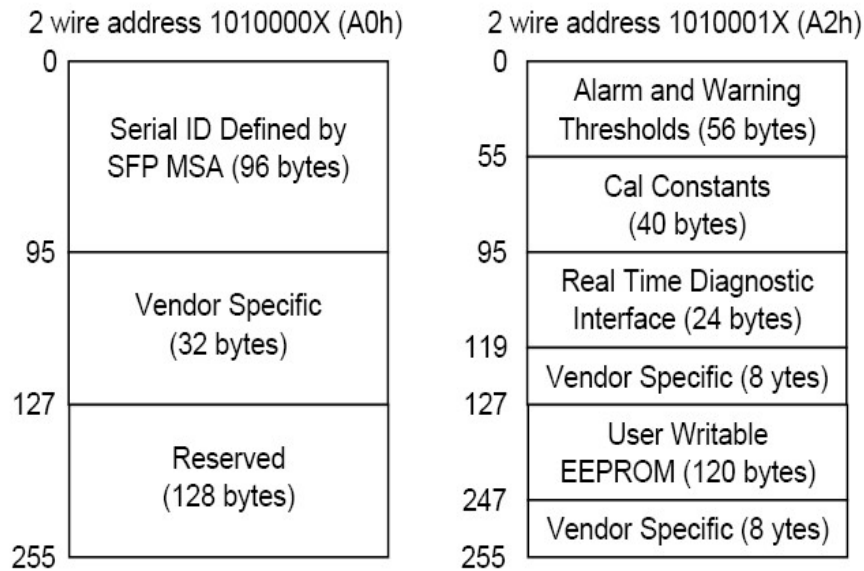
Pin	Symbol	Descriptions	Sequence	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select(LVTTL).	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(LVTTL).	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 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 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

Notes:

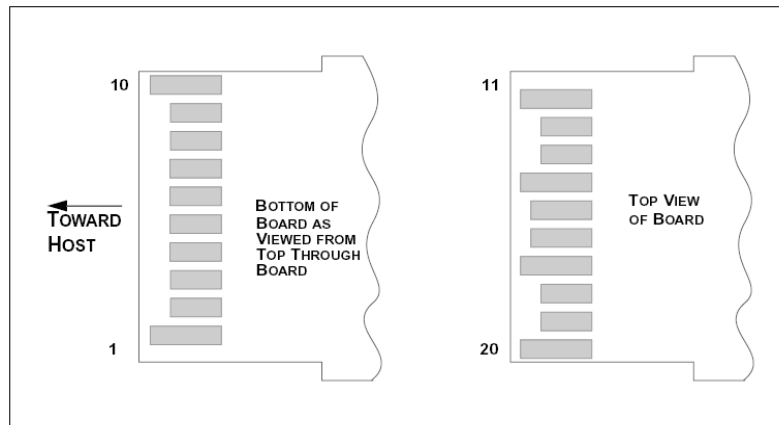
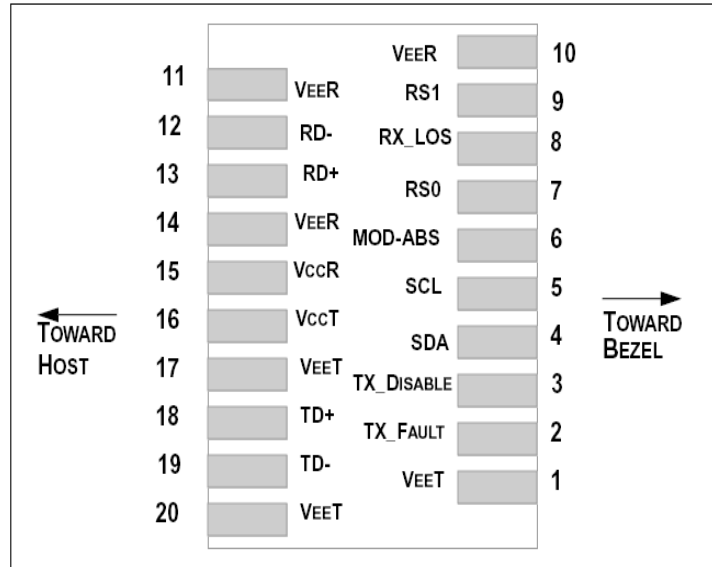
- TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 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 $V_{ccT}/R+0.3V$. 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 $< 0.8V$.

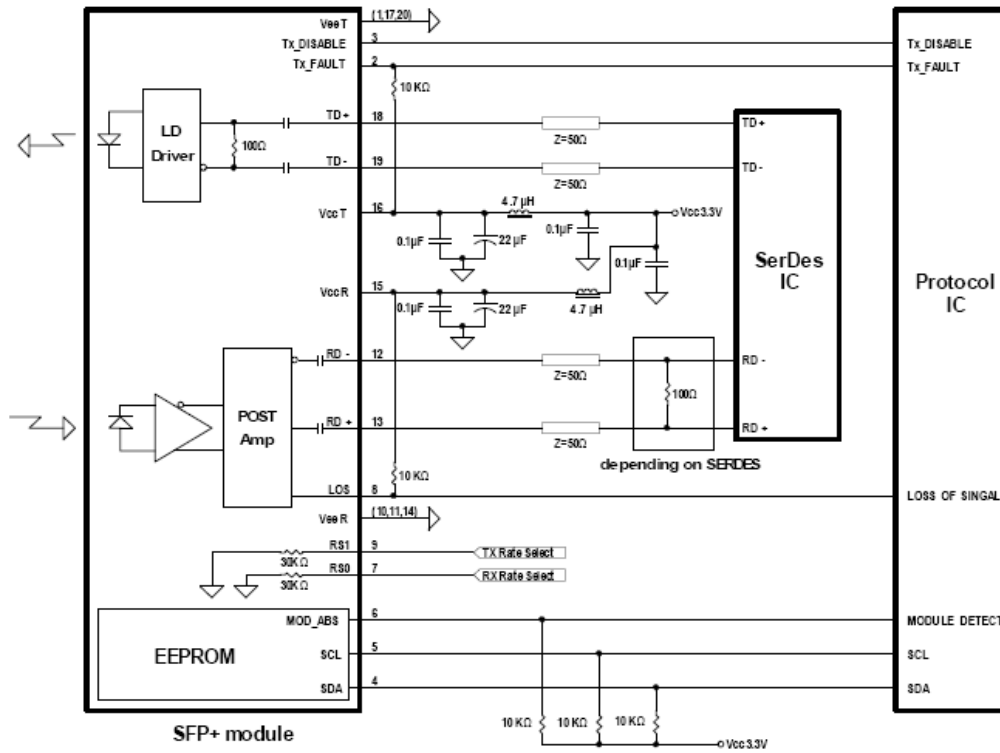
5. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
6. RD-/+ : These are the different receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as $3.3V \pm 5\%$ at the SFP+ connector pinn. Maximum supply current is 610mA. 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.



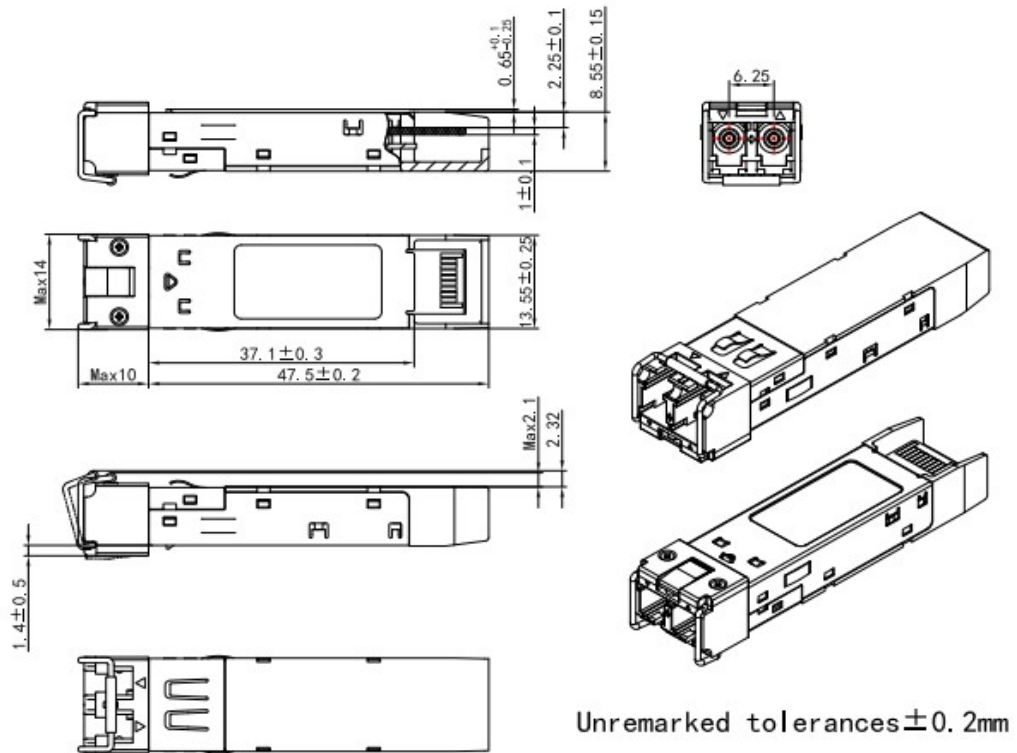
SFP+ Transceiver Electrical Pad Layout



Recommended Circuit Schematic



Mechanical Specifications



About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is engrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.

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