

Product Specification

1.25Gb/s SFP+ Active Optical Cable

P/N: 1G-SFP-A



Features

- Hot Pluggable SFP form factor
- Available length range 1~150m
- Active Optical Cable
- Operating data rate 1.25Gbps
- Single +3.3V power supply
- Max power dissipation <0.8W
- Small diameter cable design
- Built-in digital diagnostic function
- Commercial temperature range 0°C to 70°C

Compliance

- SFP MSA
- SFF-8472
- IEEE 802.3ae
- RoHS

Applications

- 1G Fibre Channel
- 1G Gigabit Ethernet
- 1GbE high performance computer clusters
- Data center and in-rack connection
- High capacity IO with SFP interface

Description

The 1G SFP Active Optical Cable (AOC) is a high-performance, cost-effective solution designed for high-speed, short-range data communication in data centers, storage networks, and other short-range applications. Utilizing advanced active optical technology, these cables support longer transmission distances compared to traditional passive or active SFP copper cables, ensuring reliable and efficient data transfer.

The SFP AOC assemblies feature an Enhanced SFP+ interface, providing seamless compatibility with a wide range of networking equipment. These cables are engineered to deliver superior signal integrity, enhanced electromagnetic immunity, and improved bit error rate (BER) performance, making them an ideal alternative to SFP copper cables.

Product performance Specifications

1. Product Basic Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T _s	-40	-	85	°C
Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Relative Humidity	RH	0		85	%
Operating Case Temperature	T _C	0		70	°C
Power Dissipation	I _{CC}			300	mA
Data Rate			1.25		Gbp/s

2. Product Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Transmitter						
Center Wavelength	λ_c	830	850	860	nm	
Launch Optical Power	P _{OFF}	-9.5		-3	dBm	
Extinction Ratio	ER	9			dB	1
Total Jitter	TJ			0.47	UI	1
Optical Eye Mask	Complies with IEEE802.3z eye masks when filtered					
Single Ended Data Input Swing				1100	mV	
Single Ended Data Output Swing		300		600	mV	

Tx Fault	VOL	0		0.8	V	VOL
	VOH	2.0		Vcc	V	VOH
Tx_Disable	VOL	0		0.8	V	VOL
	VOH	2.0		Vcc	V	VOH
Receiver						
Center Wavelength	λ_r	770		870	nm	
Receiver Sensitivity	Sens.			-17	dBm	2
Receiver Overload	Pmax	-3			dBm	
LOS De-assert	Los D			-20	dBm	
LOS Assert	Los A	-35			dBm	

Note1: Filtered, measured with a PRBS 27-1 test pattern @1.25Gbps

Note2: Minimum average optical power measured at BER less than 1E-12, with a 27-1 PRBS and ER=9Db.

Recommended Host Board Power Supply Circuit

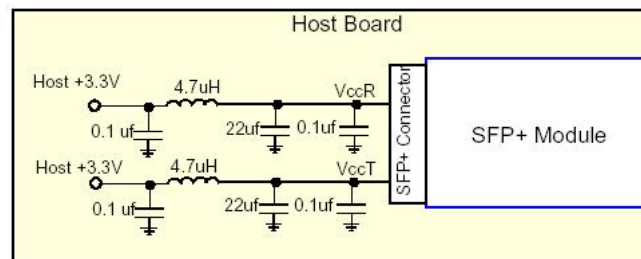


Figure 1: Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

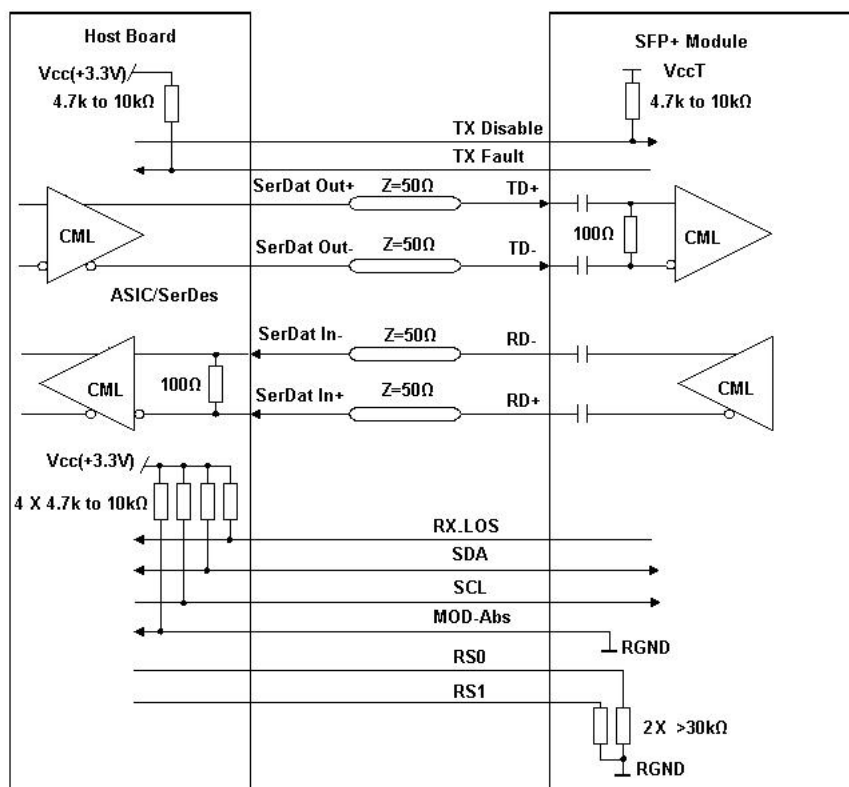


Figure 2: Recommended Interface Circuit

Pin-out Definition

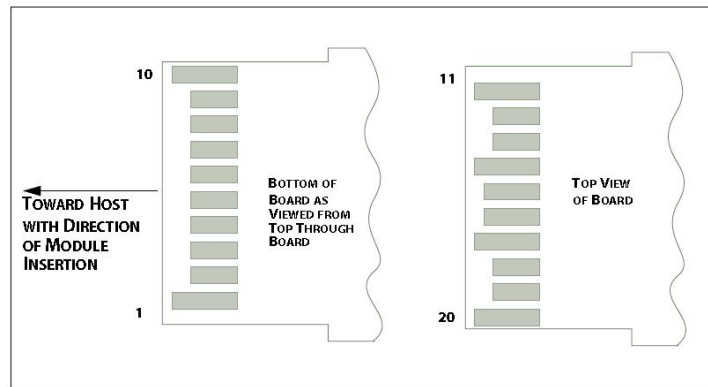


Figure3:Pin view

Pin Function Definitions

Pin	Logic	Symbol	Description
1		VeeT ₁	Module Transmitter Ground
2	LVTTL-O	TX_Fault ₂	Module Transmitter Fault
3	LVTTL-I	TX_Disable ₃	Transmitter Disable; Turns off transmitter laser output
4	LVTTL-I/O	SDA4	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)
5	LVTTL-I/O	SCL4	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)
6		MOD_ABS5	Module Absent, connected to VeeT or VeeR in the module
7	LVTTL-I	RS06	Adaptive multi-rate operation
8	LVTTL-O	RX_LOS ₂	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)
9	LVTTL-I	RS16	Adaptive multi-rate operation
10		VeeR ₁	Module Receiver Ground
11		VeeR ₁	Module Receiver Ground
12	CML-O	RD-	Receiver Inverted Data Output
13	CML-O	RD+	Receiver Non-Inverted Data Output
14		VeeR ₁	Module Receiver Ground
15		VccR	Module Receiver 3.3 V Supply
16		VccT	Module Transmitter 3.3 V Supply
17		VeeT ₁	Module Transmitter Ground

18	CML-I	TD+	Transmitter Non-Inverted Data Input
19	CML-I	TD-	Transmitter Inverted Data Input
20		VeeT ₁	Module Transmitter Ground

Note1: The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.

Note2: This pin is an open collector/drain output pin and shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module $V_{ccT}/R + 0.5V$.

Note3: This pin is an open collector/drain input pin and shall be pulled up with 4.7kΩ-10kΩ to VccT in the module.

Note4: See SFF-8431 4.2 2-wire Electrical Specifications.

Note5: This pin shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board.

Note6: Connect with 30kΩ load pulled down to GND in the module.

Monitoring Specification

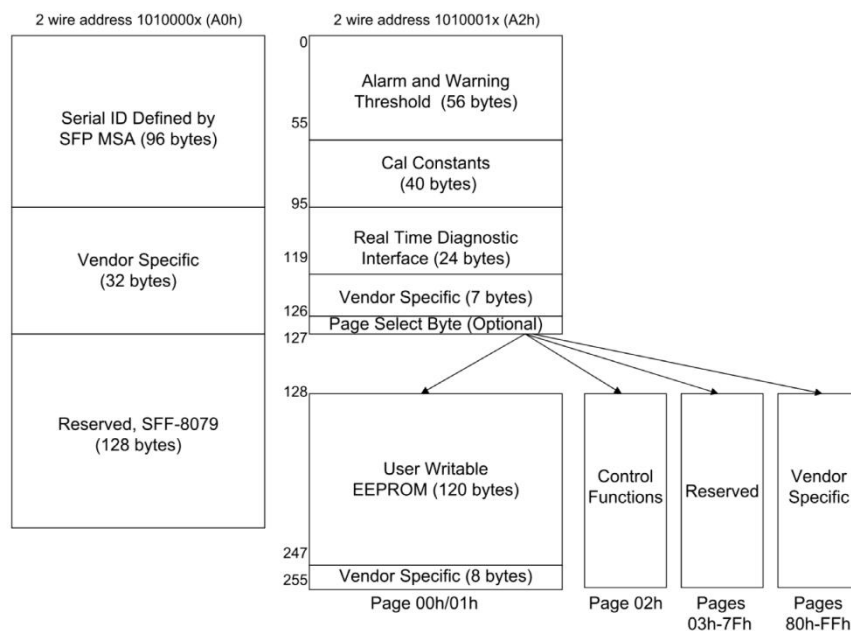


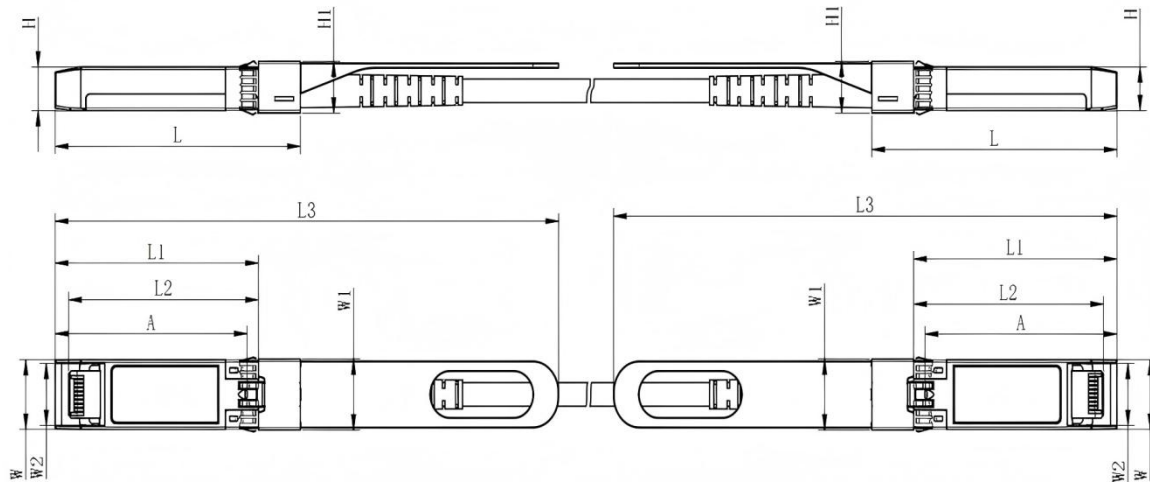
Figure4:Memory map

Memory map table

Byte	Unit	Name	Description
A0h ID Fields			
0	1	Identifier	Type of transceiver
1	1	Ext. Identifier	Extended identifier of type of transceiver
2	1	Connector	Code for connector type

3-10	8	Transceiver	Code for electronic or optical compatibility
11	1	Encoding	Code for high speed serial encoding algorithm
12	1	Signaling Rate, Nominal	Nominal signaling rate, units of 100 MBd.
13	1	Rate Identifier	Type of rate select functionality
14	1	Length (SMF,km) or Copper Cable Attenuation	Link length supported for single-mode fiber, units of km, or copper cable attenuation in dB at 12.9 GHz
15	1	Length (SMF) or Copper Cable Attenuation	Link length supported for single-mode fiber, units of 100 m, or copper cable attenuation in dB at 25.78 GHz
16	1	Length (50 um, OM2)	Link length supported for 50 um OM2 fiber, units of 10 m
17	1	Length (62.5 um, OM1)	Link length supported for 62.5 um OM1 fiber, units of 10 m
18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10 m. Alternatively, copper or direct attach cable, units of m
19	1	Length (OM3) or Cable length, additional	Link length supported for 50 um OM3 fiber, units of 10 m. Alternatively, copper or direct attach cable multiplier and base value
20-35	16	Vendor name	SFP vendor name (ASCII)
36	1	Transceiver	Code for electronic or optical compatibility
37-39	3	Vendor OUI	SFP vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)
62	1	Fibre Channel Speed 2	Transceiver's Fibre Channel speed capabilities
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)
64-65	2	Options	Indicates which optional transceiver signals are implemented
66	1	Signaling Rate, max	Upper signaling rate margin, units of %
67	1	Signaling Rate, min	Lower signaling rate margin, units of %
68-83	16	Vendor SN	Serial number provided by vendor (ASCII)
84-91	8	Date code	Vendor's manufacturing date code
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
96-127	32	Vendor Specific	Vendor Specific EEPROM
128-255	128	Reserved	Reserved (was assigned to SFF-8079)

Mechanical Dimension



Note:

- Diameter: 3mm
- Minimum bend radius:30mm
- Cable color:Orange(OM2),Aqua(OM3),Magenta(OM4)
- When $L \leq 1\text{m}$, the tolerance is +5cm
- When $1\text{m} \leq L \leq 4.5\text{m}$, the tolerance is +15cm
- When $5\text{m} \leq L \leq 14.5\text{m}$, the tolerance is +30cm
- When $L \geq 15\text{m}$, the tolerance is +2%m

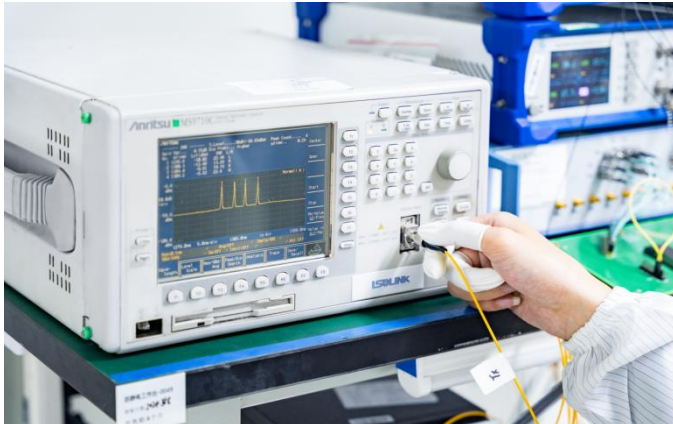
Waring:

- The transceiver optics is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles.It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.
- 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.

Test Center

1. Performance Testing

Every fiber optic transceiver is thoroughly tested by the LSOLINK Assurance Program, which is equipped with the world's most advanced analytical equipment to ensure that our transceivers meet the industry's international public protocol standards while still functioning flawlessly in your facility.



Optical Spectrum Inspection

Using the industry's leading optical spectrum analyser to check in real time that the parameters of the optical transceiver's laser comply with industry standards.

- **Peak:** Peak wavelength and peak level
- **2nd Peak:** Side-mode wavelength and level
- **Mean Wl:** Center wavelength
- **Total Power:** Total power of spectrum
- **SMSR:** Side-Mode Suppression Ratio



Optical Signal Quality Inspection

Using highly efficient sampling oscilloscopes and BERT testers, equipped with an automated test platform to accurately test the signal quality of the transceiver, test records are kept for up to 5 years to ensure the traceability of each transceiver.

- **Eye Mask Margin(NRZ)**
- **TDECQ(PAM4):**transmitter dispersion eye closure
- **OMA:** Optical modulation amplitude
- **BER:** Bit error rate
- **ER:** Extinction Ratio



Flow Pressure Test

Using multi-protocol network traffic analyser with various brands of switches to test the transceiver's ability to transmit at full speed.

- **Bandwidth:** Actual transceiver bandwidth on the port
- **Packet Loss**
- **Packet Errors:**CRC Errors/PCS Errors/Symbol Errors
- **LinkDown Counts**
- **latency**

Above is part of our test bed network equipment. For more information, Please click [download](#) for optical transceiver performance test report.

2. Quality Control

We adopt advanced quality management solutions. Each transceiver is self-inspected, including: 20x microscope inspection, 200x microscope inspection, and QC process inspection.



visual inspection



Microscopic inspection: 20X



Microscopic inspection: 200X



Reliability Verification



Optical endface inspection



OQC Inspection

3. Compatibility Testing

Each optical transceiver is tested in LSOLINK's library of compatibility test equipment to ensure perfect compatibility with multiple brands on the market.



Alcatel OS6900-X20



Arista DCS-7060SX2-48YC6-R



Aruba 8360-32Y4C



Brocade ICX-7750-48F



Cisco Catalyst C9500-24Y4C



Cisco Catalyst WS-C2960L-8TS-LL

Above is part of our test bed network equipment. For more information, Please click [download](#) to get the compatibility test report of each brand of optical transceiver.


Order Information

Part Number	Length(m)	Connector Type	Cable Type	Cable Jacket
1G-SFP-A1	1	SFP to SFP	Active Optical	OFNP
1G-SFP-A3	3	SFP to SFP	Active Optical	OFNP
1G-SFP-A5	5	SFP to SFP	Active Optical	OFNP
1G-SFP-A7	7	SFP to SFP	Active Optical	OFNP
1G-SFP-A10	10	SFP to SFP	Active Optical	OFNP
1G-SFP-A15	15	SFP to SFP	Active Optical	OFNP

Further Information

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Disclaimer

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