Product Specification

Fiber Channel 8/16/32G SFP Transceiver Modules

Features

- Hot Pluggable SFP form factor

- Support for high - speed 8G/16G/32G Fibre Channel

- Utilize 850nm/1310nm/1550nm wavelength lasers

- Provide 100m/150m/10km/40km transmission distances

- Equipped with Digital Optical Monitoring (DOM) function

- Adopt LC connector for reliable fiber connection

- Commercial temperature range 0 °C to 70 °C

Compliance

- SFP MSA

- Compliant to SFP Electrical MSA SFF-8431

- Compliant to SFP Mechanical MSA SFF-8432

- SFF-8472

- IEEE 802.3ae

- RoHS

Applications

- Data center storage

- Server connections

- SAN network expansion

- High - speed data transfer

- Telecom infrastructure

Product overview

LSOLINK presents a comprehensive portfolio of high-performance Fiber Channel (FC) transceivers designed to meet the demanding requirements of modern data centers and storage area networks (SANs). Available in 8G, 16G, and 32G variants, these modules leverage SFP+ and SFP28 form factors, ensuring compatibility with a wide range of networking equipment, including switches, servers, and HBAs from leading vendors such as Cisco, Huawei, and Dell. Supporting both multimode (MMF) and single-mode (SMF) fiber optic cables, the modules offer flexible transmission distances, from 100 meters for short-reach applications using 850nm MMF to 40 kilometers for long-haul connectivity via 1550nm SMF. Each variant adher to industry standards like ANSI T11 and FC-PI, guaranteeing seamless integration into existing FC infrastructure.

Featuring dual LC connectors and hot-swappable design, LSOLINK FC transceivers enable easy deployment and maintenance. They incorporate advanced digital optical monitoring (DOM) for real-time performance tracking, ensuring optimal reliability. With low power consumption and compliance with safety regulations (Laser Class 1), these modules are ideal for high-density environments where energy efficiency and thermal management are critical. The portfolio includes SR, LR, and ER options, addressing diverse use cases such as server-to-storage connections, SAN expansion, and data center interlinks. By combining robust performance, broad compatibility, and scalable bandwidth, LSOLINK FC transceivers deliver a future-proof solution for mission-critical storage networks.

Product performance Specifications

1. Optical Specifications

Product	Transmit Power (dBm) per lane		Receive Power (dBm) per lane	Transmit and Receive Wavelength (nm)
	Min	Max	<-xxdBm	
8G-FC-SFP-SR	-6dBm	-1dBm	-11.1dBm	850nm
8G-FC-SFP-LR	-8dBm	0dBm	-15dBm	1310nm
8G-FC-SFP-ER	0dBm	4dBm	-15.8dBm	1550nm
16G-FC-SFP-SR	-6dBm	-1dBm	-11.1dBm	850nm
16G-FC-SFP-LR	-5dBM	2dBm	-12dBm	1310nm
16G-FC-SFP-ER	-1dBm	3dBm	-14dBm	1550nm
32G-FC-SFP-SR	-6.7dBm	2dBm	-10.2dBm	850nm
32G-FC-SFP-LR	-7dBm	2dBm	-11.6dBm	1310nm

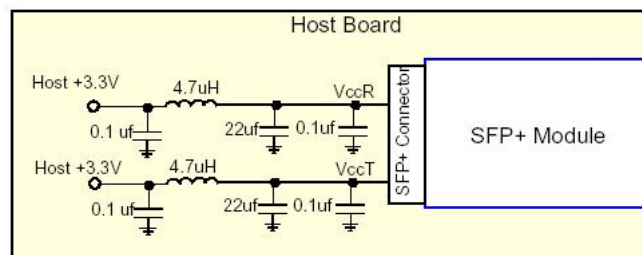## Recommended Host Board Power Supply Circuit

Figure 1: Recommended Host Board Power Supply Circuit
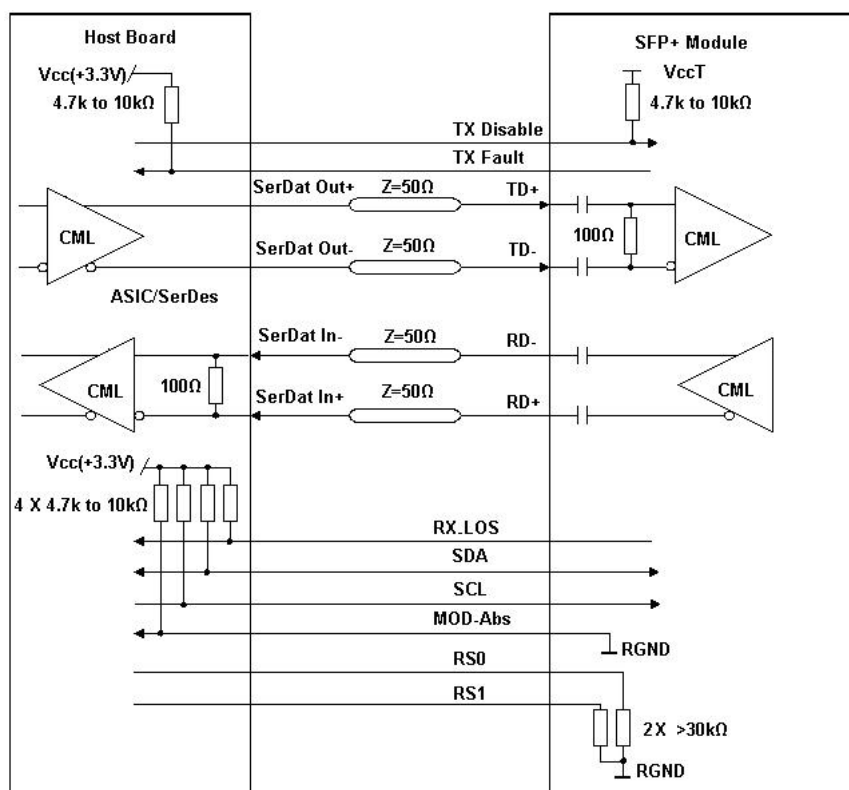
Recommended Interface Circuit

Figure2: Recommended Interface Circuit

Pin-out Definition

Figure3: Pin view

Pin Function Definitions

Pin	Logic	Symbol	Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	2
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	4
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	4
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	5
7	LVTTL-I	RS0	Adaptive multi-rate operation	6
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	2
9	LVTTL-I	RS1	Adaptive multi-rate operation	6
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 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	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

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 VccT/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.
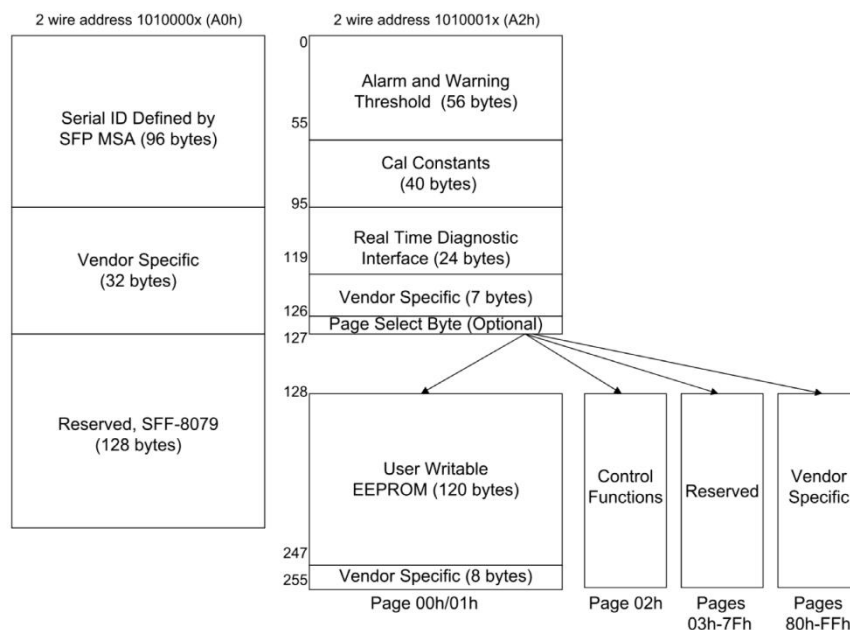
Monitoring Specification


Figure4: Memory map

Memory map Table

A0h	Bytes	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	Link length supported for single-mode fiber, units of km, or copper

		Attenuation	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)
A2h ID Fields			
00-01	2	Temp High Alarm	MSB at low address
02-03	2	Temp Low Alarm	MSB at low address
04-05	2	Temp High Warning	MSB at low address
06-07	2	Temp Low Warning	MSB at low address
08-09	2	Voltage High Alarm	MSB at low address
10-11	2	Voltage Low Alarm	MSB at low address
12-13	2	Voltage High Warning	MSB at low address
14-15	2	Voltage Low Warning	MSB at low address

16-17	2	Bias High Alarm	MSB at low address
18-19	2	Bias Low Alarm	MSB at low address
20-21	2	Bias High Warning	MSB at low address
22-23	2	Bias Low Warning	MSB at low address
24-25	2	TX Power High Alarm	MSB at low address
26-27	2	TX Power Low Alarm	MSB at low address
28-29	2	TX Power High Warning	MSB at low address
30-31	2	TX Power Low Warning	MSB at low address
32-33	2	RX Power High Alarm	MSB at low address
34-35	2	RX Power Low Alarm	MSB at low address
36-37	2	RX Power High Warning	MSB at low address
38-39	2	RX Power Low Warning	MSB at low address
40-41	2	Optional Laser Temp High Alarm	MSB at low address
42-43	2	Optional Laser Temp Low Alarm	MSB at low address
44-45	2	Optional Laser Temp High Warning	MSB at low address
46-47	2	Optional Laser Temp Low Warning	MSB at low address
48-49	2	Optional TEC Current High Alarm	MSB at low address
50-51	2	Optional TEC Current Low Alarm	MSB at low address
52-53	2	Optional TEC Current High Warning	MSB at low address
54-55	2	Optional TEC Current Low Warning	MSB at low address
56-91	36	Ext Cal Constants or Additional Enhanced Features	Diagnostic calibration constants for optional External Calibration if External Calibration bit, A0h, byte 92, bit 4 is 1 Additional Enhanced Features advertisement, control and status if External Calibration bit, A0h, byte 92, bit 4 is 0
92-94	3	Reserved	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated)
106-109	4	Optional Diagnostics	Monitor Data for Optional Laser temperature and TEC current
110	1	Status/Control	Optional Status and Control Bits
111	1	Reserved	Reserved (was assigned to SFF-8079)
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits
114	1	Tx Input EQ control	Tx Input equalization level control
115	1	Rx Out Emphasis control	Rx Output emphasis level control
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits
118-119	2	Ext Status/Control	Extended module control and status bytes
120-126	7	Vendor Specific	Vendor specific memory addresses
127	1	Table Select	Optional Page Select

A2h Page 00-01h

128-247	120	User EEPROM	User writable non-volatile memory
248-255	8	Vendor Control	Vendor specific control addresses
A2h Page 02h			
128-129	2	Reserved	Reserved for SFF-8690 (Tunable Transmitter)
130	1	Reserved	Reserved for future receiver controls
131	1	Rx Decision Threshold	RDT value setting
132-172	41	Reserved	Reserved for SFF-8690
173-255	83	Reserved	Reserved

Mechanical Dimension
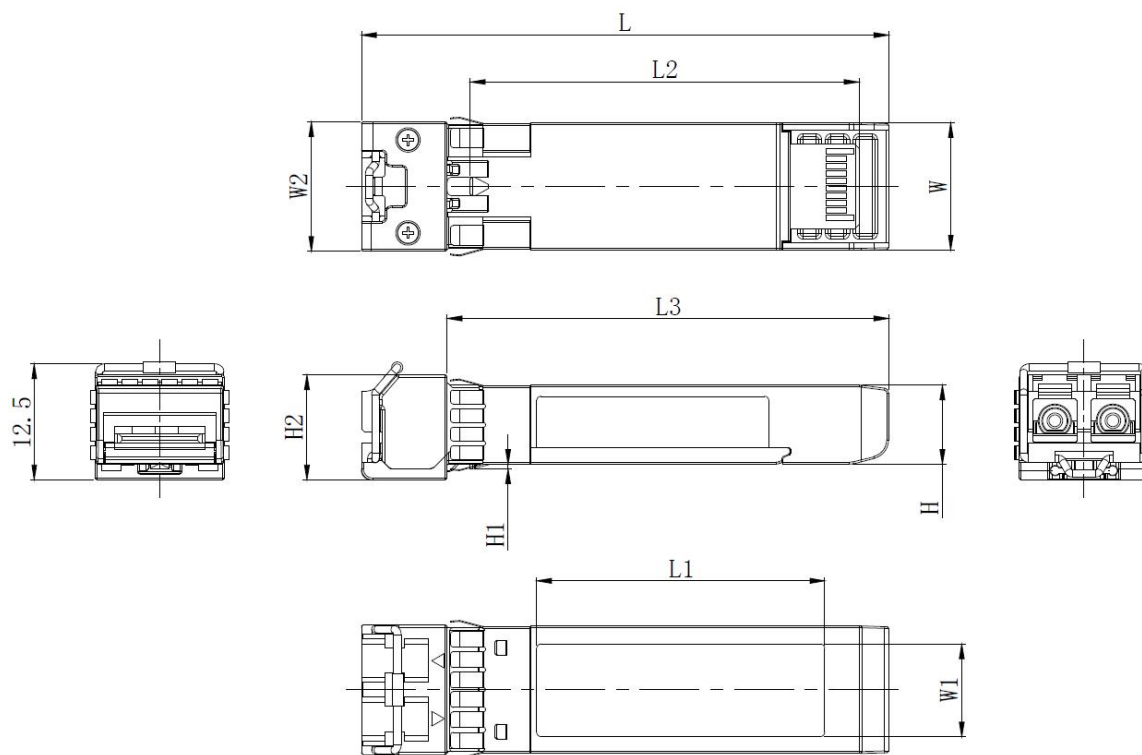
Unit: mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	56.9	31.2	41.95	47.7	13.8	10.2	14.0	8.6	0.6	11.5
Typical	56.7	31.0	41.80	47.5	13.7	10.0	–	8.5	0.5	11.3
MIN	56.5	30.8	41.65	47.3	13.5	9.8	–	8.4	0.4	11.1

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.
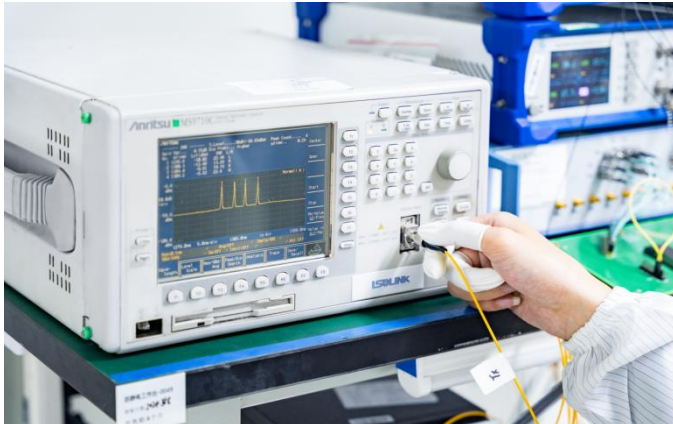
Optical Spectrum Inspection

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 WI:** 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**

Aboveis 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

Order Information

Part Number	Description
8G-FC-SFP-SR	8GBASE-SR SFP+ Fibre Channel 850nm 150m DOM LC MMF Transceiver Module
8G-FC-SFP-LR	8GBASE-LR SFP+ Fibre Channel 1310nm 10km DOM LC SMF Transceiver Module
8G-FC-SFP-ER	8GBASE-ER SFP+ Fibre Channel 1550nm 40km DOM LC SMF Transceiver Module
16G-FC-SFP-SR	16GBASE-SR SFP+ Fibre Channel 850nm 100m DOM LC MMF Transceiver Module
16G-FC-SFP-LR	16GBASE-LR SFP+ Fibre Channel 1310nm 10km DOM LC SMF Transceiver Module
16G-FC-SFP-ER	16GBASE-ER SFP+ Fibre Channel 1550nm 40km DOM LC SMF Transceiver Module
32G-FC-SFP-SR	32GBASE-SR SFP28 Fibre Channel 850nm 100m DOM LC MMF Transceiver Module
32G-FC-SFP-LR	32GBASE-LR SFP28 Fibre Channel 1310nm 10km DOM LC SMF Transceiver Module

Further Information

LSOLINK | Lighting the Path to Global Links

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Disclaimer

1. We are committed to continuous product improvement and feature upgrades, and the contents contained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

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