Product Specification

1000BASE-SX SFP 850nm 550m DOM Duplex LC/UPC Optical Transceiver Module

PN: SFP-1G-SX



Features

- Hot Pluggable SFP form factor
- Supports 1.0625 Gb/s Fibre Channel
- Supports 1.25 Gb/s Gigabit Ethernet
- Single +3.3V power supply
- Duplex LC-UPC connector
- Max power dissipation <1.0W
- Up to 550m transmission distance over OM2 fiber
- Up to 1000m transmission distance over OM3 & OM4 fiber
- 850nm VCSEL laser
- PIN receivers
- Built-in digital diagnostic function
- Commercial temperature range 0°C to 70°C

Compliance

- SFP MSA
- SFF-8472
- IEEE 802.3z (1000BASE-SX)
- RoHS
- FC-PI
- FC-PI-2

Applications

- 1000BASE-SX Gigabit Ethernet links
- Switch-to-switch optical links
- Switch-to-server or NIC links
- 1000BASE-SX Gigabit Ethernet
- 1.0625 Gb/s Fibre Channel

Description

The SFP-1G-SX integrates digital diagnostic monitoring (DOM), providing real-time monitoring of operating parameters such as module temperature, supply voltage, and transmit and receive optical power. It supports both 1.25 Gb/s 1000BASE-SX Gigabit Ethernet and 1.0625 Gb/s Fibre Channel applications over multimode fiber. Ideal for enterprise networks, data centers, and short-range interconnects, It is designed for use with compatible 1000BASE-SX SFP ports and complies with IEEE 802.3z and SFP MSA specifications.

Engineered for cost-effective scalability, the module features a compact SFP form factor, low power consumption, and a VCSEL-based transmitter for energy-efficient operation. Its robust design supports commercial temperature ranges (0°C to 70°C) and hot-swappability, minimizing downtime during upgrades or replacements. With a duplex LC interface and compact SFP form factor, the transceiver is designed for short-reach 1000BASE-SX Gigabit Ethernet links over multimode fiber.

Product performance Specifications

1、Basic Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T_S	-40	-	+85	°C
Supply Voltage	V_{CC}	-0.5	-	+4	V
Operating Case Temperature	T_C	0	-	70	°C
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Data Rate		-	1.0625 / 1.25	-	Gbps
Link Distance(OM2)				550	m
Link Distance(OM3)				1000	m
Supported Protocols		1000BASE-SX Gigabit Ethernet / 1G Fibre Channel			

2、Product Optical and Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Transmitter					
Center Wavelength	λ_C	830	850	860	nm
Launch Optical Power	P_{out}	-9		-3	dBm
Extinction Ratio[1]	ER	9			dB

Total Jitter[1]	TJ			0.47	UI
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
	VOH	2.0		Vcc	V
Tx_Disable	VOL	0		0.8	V
	VOH	2.0		Vcc	V
Receiver					
Receiver Wavelength Range	λ_r	770		870	nm
Receiver Sensitivity[2]	Sens.			-18	dBm
Receiver Overload	Pmax	0			dBm
LOS De-assert	LosD			-20	dBm
LOS Assert	LosA	-35			dBm

Note1: Filtered; measured with a PRBS 2^7-1 test pattern at 1.25 Gb/s.

Note2: Receiver sensitivity is specified at both 1.0625 Gb/s and 1.25 Gb/s unless otherwise noted.

Recommended Host Board Power Supply Circuit

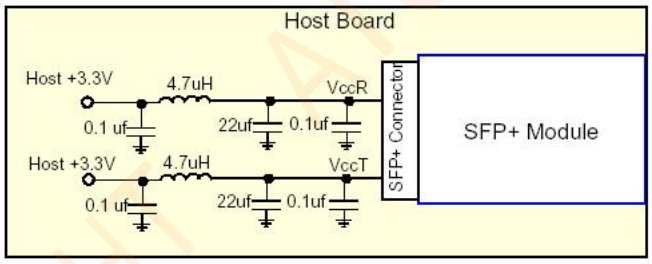


Figure 1: Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

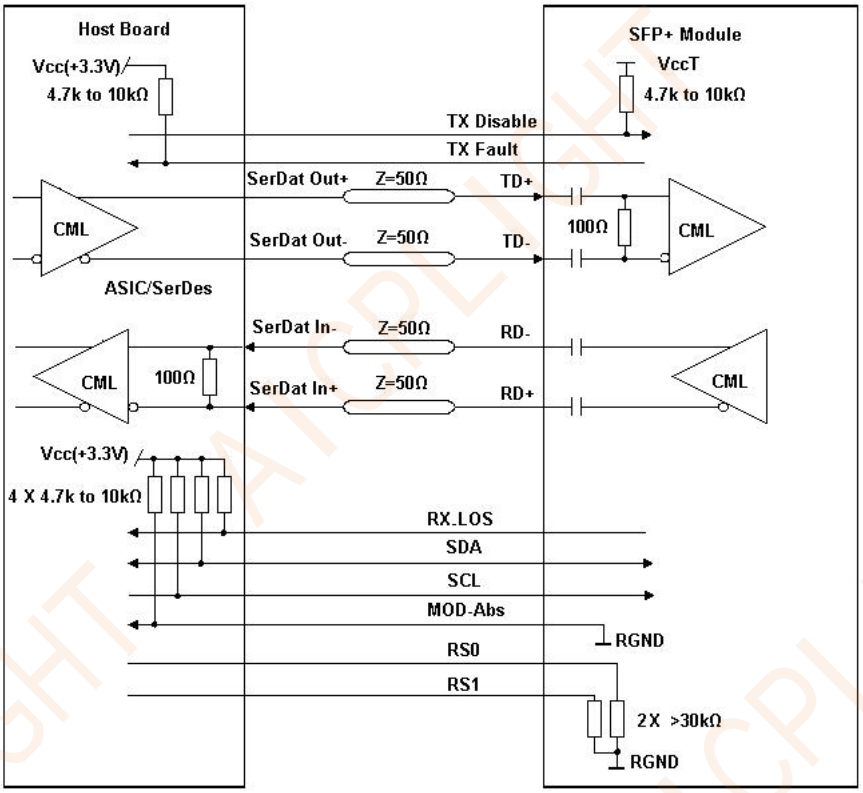


Figure2: Recommended Interface Circuit

Pin-out Definition

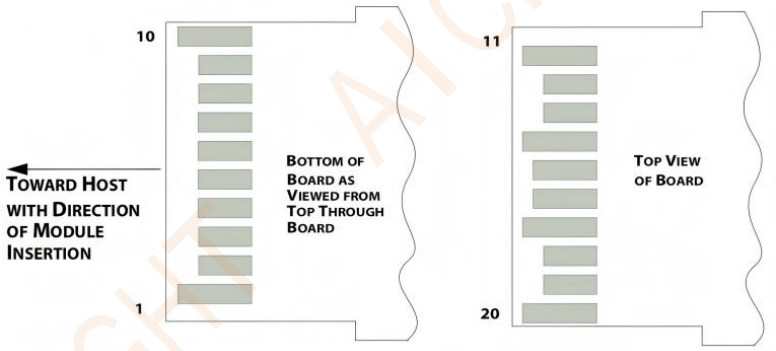


Figure3: Pin view

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

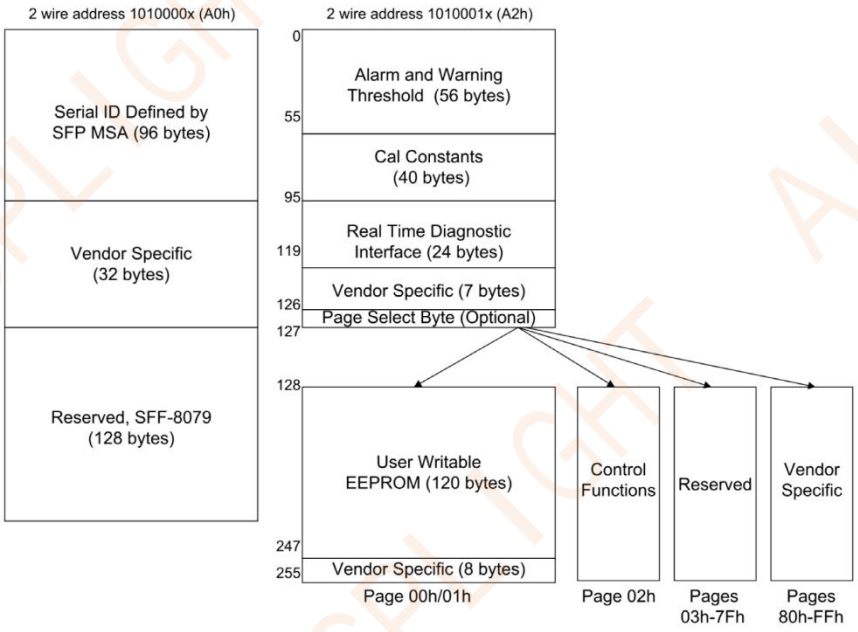


Figure4: Memory map

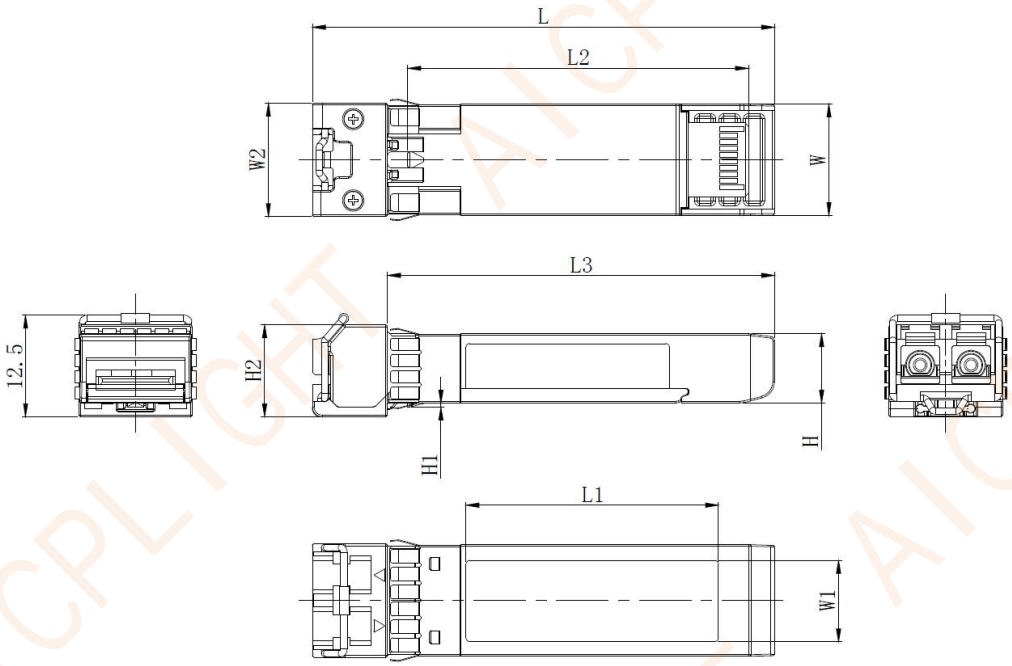
Memory map Table

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 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)
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
MIN	56.5	30.8	41.65	47.3	13.5	9.8	-	8.4	0.4	11.1
Typ.	56.7	31.0	41.80	47.5	13.7	10.0	-	8.5	0.5	11.3
MAX	56.9	31.2	41.95	47.7	13.8	10.2	14.0	8.6	0.6	11.5

Handling and Safety Precautions：

- **ESD Precautions:** Follow standard electrostatic discharge (ESD) handling procedures when handling, installing, or removing the module. Use a grounded wrist strap or other appropriate ESD protection.
- **Hot-Plug Handling:** The module is hot-pluggable. Insert or remove it only by holding the module housing and using the latch or release mechanism as intended.
- **Optical Connector Protection:** Keep the LC optical interface clean and protected from dust, moisture, oil, and other contaminants. Keep the dust cap installed whenever the optical connector is not in use.
- **Fiber Connector Cleaning:** Inspect and clean the fiber connector end faces before connection. Do not touch the optical end faces directly with fingers or unapproved materials.
- **Fiber Cable Handling:** Avoid excessive bending, pulling, twisting, crushing, or other mechanical stress on the fiber patch cord. Follow the minimum bend-radius requirements specified for the fiber cable.
- **Installation and Removal:** Ensure the module is properly aligned with the SFP cage before insertion. Do not force the module into the port or remove it without releasing the latch.
- **Optical and Laser Safety:** Do not look directly into the optical port or the end of a connected fiber while the module is powered. Avoid direct eye exposure to emitted optical radiation.
- **Mechanical Handling:** Do not drop, crush, strike, or apply excessive mechanical force to the module, optical receptacle, or latch mechanism.
- **Operating Environment:** Do not operate the module outside the specified temperature, humidity, or supply-voltage limits.

- **Disassembly:** Do not disassemble, modify, or attempt to repair the module. Opening the module may damage the optical and electronic components and affect product performance.

Ordering Information

PN	Description
SFP-1G-T	1000BASE-T SFP Copper RJ45 100m Transceiver Module
SFP-1G-SX	1000BASE-SX SFP 1G 850nm 550m DOM Duplex LC/UPC MMF Optical Transceiver Module
SFP-1G-LX	1000BASE-LX SFP 1G 1310nm 10km DOM Duplex LC/UPC SMF Optical Transceiver Module