Product Specification

10.3125Gb/s ER XFP 1550nm 40km
Optical Transceiver

P/N: 10G-XFP-ER

Features

- Hot Pluggable XFP form factor
- Operating data rate 10.3125Gbps
- Single +3.3V power supply
- Duplex LC-UPC connector
- Max power dissipation <3W
- Maximum link length of 40km
- 1550nm DFB laser transmitter
- PIN receivers
- Built-in digital diagnostic function
- Commercial temperature range 0°C to 70°C

Compliance

- Compliant with XFP MSA INF-8077i
- RoHS

Applications

- 10GBASE-SR/SW Ethernet
- 1200-Mx-SN-I 10G Fibre Channel
- SONET OC-192/SDH STM-64
- Other devices with XFP Ports

Description

The 10G-XFP-ER XFP Optical Transceiver is a high-performance, long-reach solution designed for 10Gb/s SONET/SDH and Ethernet applications. Featuring a cooled 1550nm EML transmitter and a high-sensitivity PIN receiver, this transceiver delivers reliable transmission distances of up to 40 kilometers over single-mode fiber (SMF). Ideal for carrier-grade networks, metro/regional network interconnects, and data center backbones, it ensures robust connectivity for mission-critical environments demanding low latency and high signal integrity.

Compliant with the XFP Multi-Source Agreement (MSA) specifications, this module supports both SONET/SDH OC-192/STM-64 and 10GBASE-ER/EW Ethernet standards. Its advanced EML laser technology optimizes power efficiency and minimizes dispersion, while the PIN receiver enhances sensitivity for error-free performance over extended distances. The transceiver's design adheres to stringent industry protocols, ensuring seamless interoperability with XFP-compatible switches, routers, and transport equipment.

The 10G-XFP-ER combines carrier-class reliability with plug-and-play simplicity, making it a cost-effective choice for scaling high-speed networks. Its compact XFP form factor enables high-density deployments in space-constrained chassis, while the industrial-grade components ensure stable operation in demanding environments. Tailored for telecom operators and enterprises, this transceiver bridges the gap between performance and scalability, offering a future-proof solution for 10G long-haul optical connectivity.

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	-	4.0	V
Relative Humidity	RH	5	-	85	%
Operating Case Temperature	T_C	0	-	70	°C
Power Supply Voltage	V_{CC}	3.13	3.3	3.45	V
Power Supply Current	I_{CC}			500	mA
Module total power	PD	-	-	3	W
Data Rate	DR	-	10.3125	-	Gbps
Transmission Distance(OM3)	-		-	10	km

2. Product Optical and Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Transmitter						
Input Differential Impedance	Rin		100		Ω	1
Differential Data InputSwing	Vin,pp	150		820	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	
Transmit Enable Voltage	VEN	GND		GND+ 0.8	V	
Transmit Disable Assert Time	Toff			100	ms	
Tx Enable Assert Time	T_on			100	ms	
Operating Date Rate	BR	9.95		11.3	Gb/s	
Bit Error Rate	BER			10^{-12}		
Launch Power	Pout	0		4	dBm	5
Optical Wavelength	λ	1530	1550	1565	nm	
Optical Extinction Ratio	ER	8.2			dB	
Spectral Width@-20dB	Δλ			1	nm	
Side Mode Suppression Ratio	SMSRmin	30			dB	
Rise/Fall Time (20%~80%)	Tr/Tf			35	ps	
Average Launch power of OFF Transmitter	POFF			-30	dBm	
Tx Jitter	Txj	Compliant with each standard requirements				
Optical Eye Mask		IEEE802.3ae				6
Receiver						
Differential Data Output Swing	Vout,pp	340		850	mV	
Data Output Rise Time	tr			35	ps	2
Data Output Fall Time	tf			35	ps	2
LOS Fault	VLOS fault	Vcc – 0.5		VccHOST	V	3
LOS Normal	VLOS norm	GND		GND+0.4	V	3
Power Supply Rejection	PSR	See Note 4 below				4
Operating Date Rate	BR	9.95		11.3	Gb/s	
Receiver Sensitivity	Sen			-12.6	dBm	6

Maximum Input Power	PMAX	0			dBm	6
Optical Center Wavelength	λC	1260		1600	nm	
Receiver Reflectance	Rrx			-16	dB	
LOS De-Assert	LOSD			-17	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis	LOSH	0.5		5	dB	

Note1: After internal AC coupling.

Note2: 20 – 80 %.

Note3: Loss Of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Note4: Per Section 2.7.1. in the XFP MSA Specification.

Note5: The optical power is launched into SMF

Note6: Measured with a PRBS 2^{31}-1 test pattern @ 10.3125Gbps BER<10^{-12}.

Recommended Host Board Power Supply Circuit

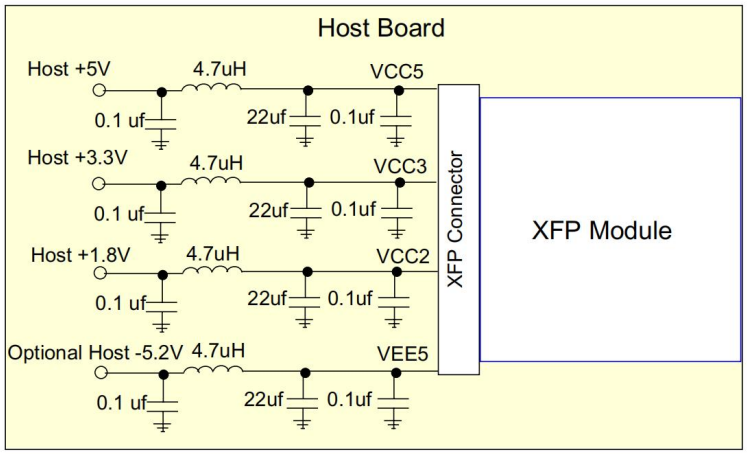


Figure 1: Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

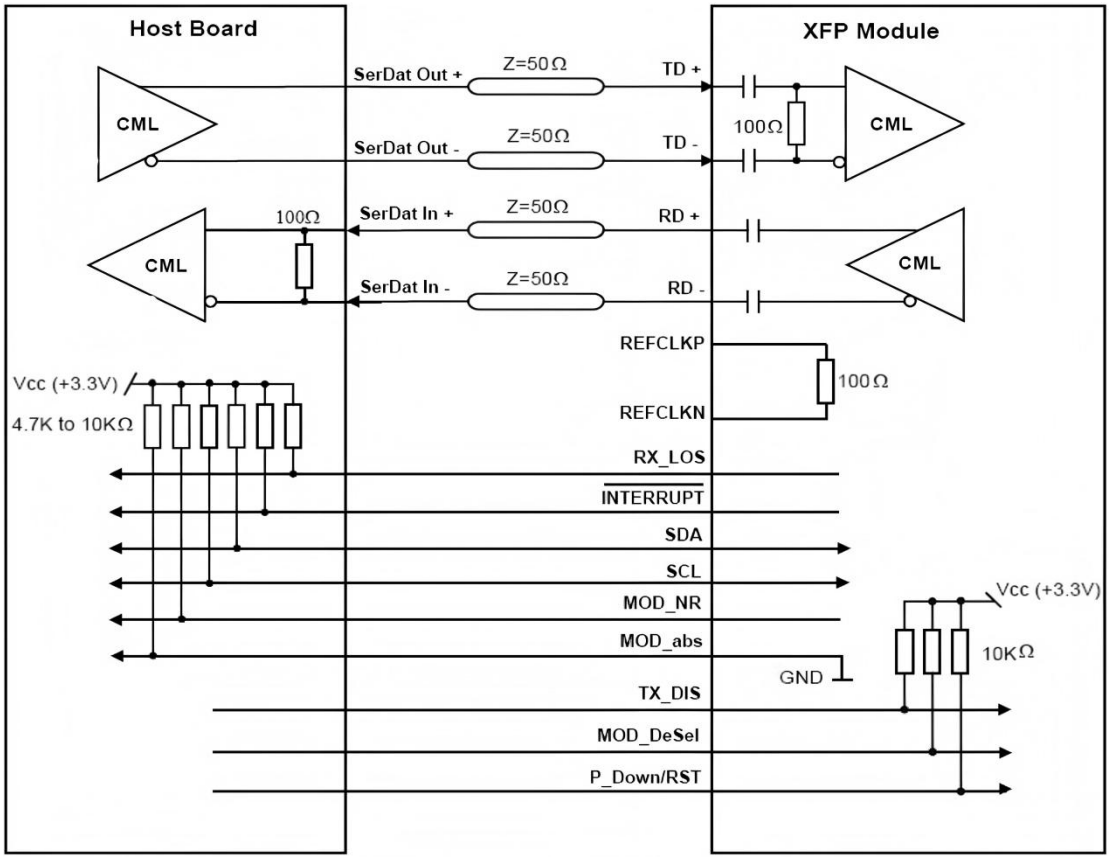


Figure2: Recommended Interface Circuit

Pin-out Definition

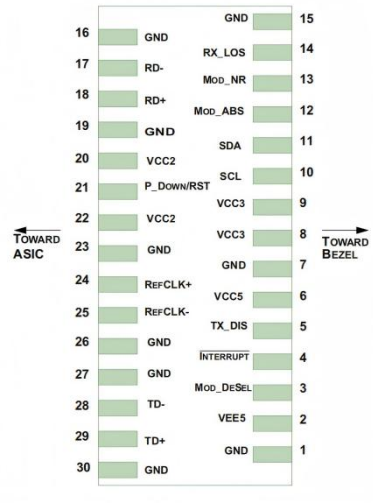


Figure3: Pin view

Pin Function Definitions

Pin	Logic	Symbol	Description	Note
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply	
3	LVTTL-I	Mod_DeSel	Module De-select; When held low allows module to respond to 2-wire serial interface	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	Mod_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTL-O	Mod_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTL-O	RX_LOS	Receiver Loss Of Signal Indicator	2

15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver Inverted Data Output	
18	CML-O	RD+	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply	3
21	LVTTL-I	P_Down/RST	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply	3
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock Non-Inverted Input, AC coupled on the host board	
25	PECL-I	RefCLK-	Reference Clock Inverted Input, AC coupled on the host board	
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter Inverted Data Input	
29	CML-I	TD+	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

Note1: Module ground pins Gnd are isolated from the module case and chassis ground within the module.

Note2: Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

Note3: The 1.8 V power supply can be optionally programmed to voltages lower than 1.8 V in modules supporting the variable power supply.

Monitoring Specification

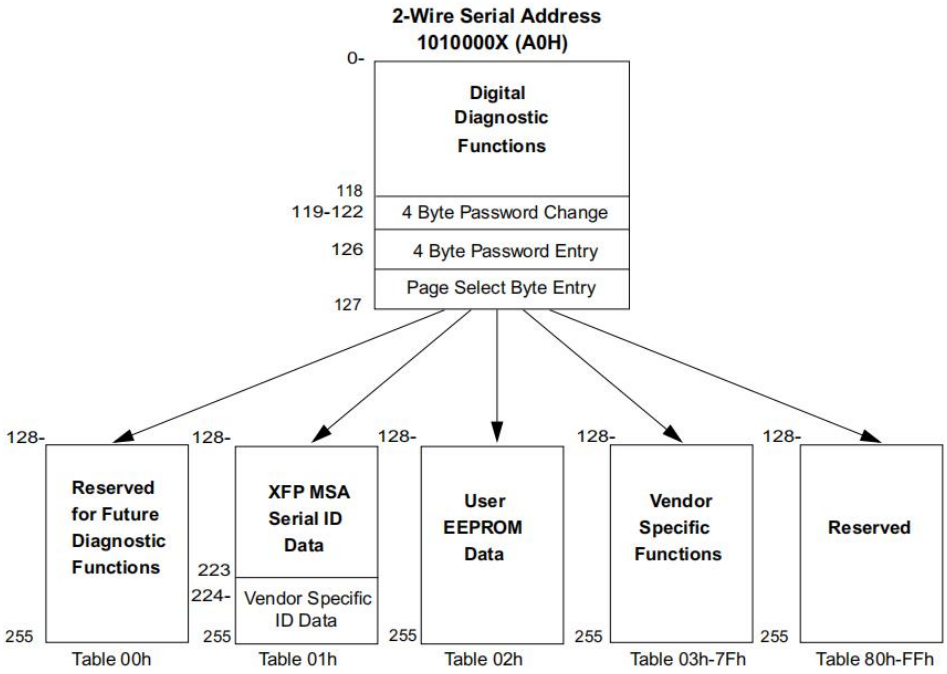
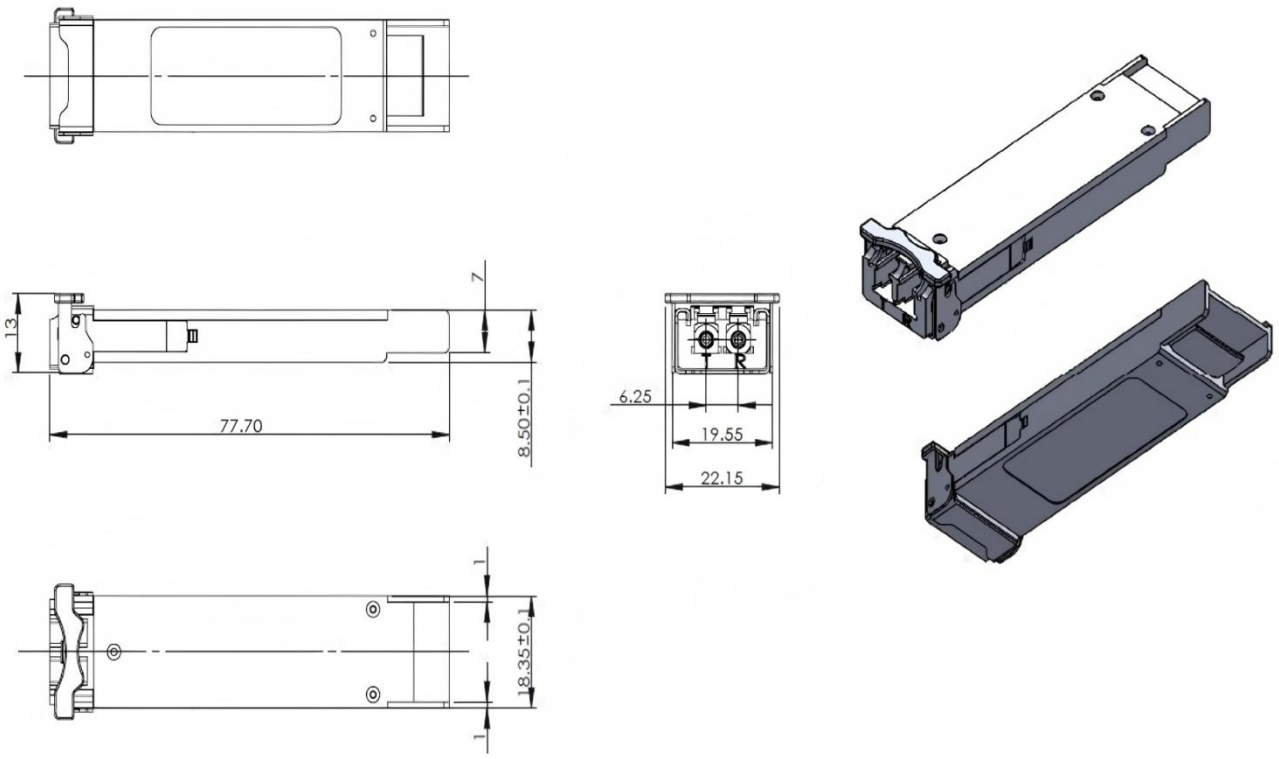


Figure4: Memory map

Memory map Table

A0h	Bytes	Description
0	1	Identifier
1	1	Signal Conditioner Control
2-57	56	Threshold Values used for Alarm and Warning Flags
58-59	2	Optional VPS Control Registers
60-69	10	Reserved
70-71	2	BER Reporting
72-75	4	Wavelength Control Registers
76-79	4	FEC control Registers
80-95	16	Flags and Interrupt Control
96-109	14	A/D readout
110-111	2	General Control/Status bits
112-117	6	Reserved
118	1	Serial Interface Read/Write Error Checking
119-122	4	Password Change Entry Area (Optional)
123-126	4	Password Entry Area (optional)
127	1	Page Select Byte

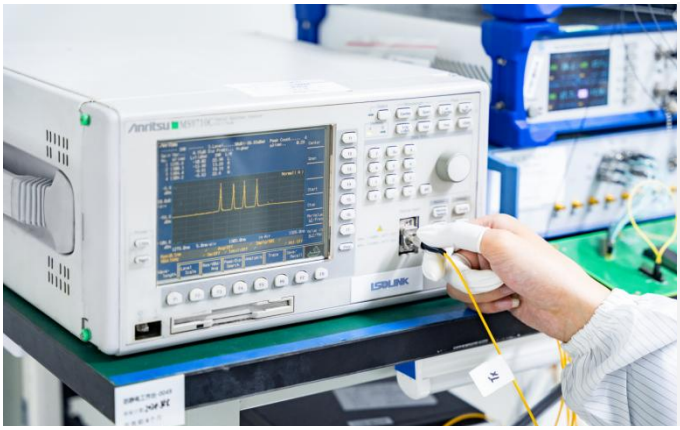
Mechanical Dimension



Test Center

1. Performance Testing

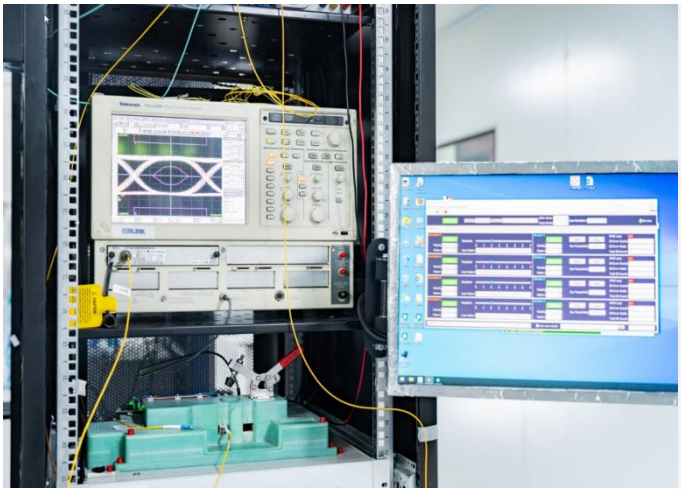
Every fiber optic transceiver is thoroughly tested by the LSOLINK Assurance Program, which is equipped with the world's most advanced analytical equipment to ensure that our transceivers meet the industry's international public protocol standards while still functioning flawlessly in your facility.



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
10G-XFP-SR	10GBASE-SR XFP 850nm 300m DOM LC MMF Transceiver Module
10G-XFP-LR	10GBASE-LR XFP 1310nm 10km DOM LC SMF Transceiver Module
10G-XFP-ER	10GBASE-ER XFP 1550nm 40km DOM LC SMF Transceiver Module

Further Information

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Disclaimer

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

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

3. LSOLINK assumes no responsibility for the use or reliability of equipment or software not provided by LSOLINK.