

1442913F2-80KM-A
10GBASE, XFP, ZR, BIDI Transceiver

Features

- Supports 9.95Gb/s to 11.3Gb/s bit rates
- Hot-pluggable XFP footprint
- Single LC for Bi-directional Transmission
- Maximum link length of 80km
- Built-in 1490/1570 WDM
- Cooled CWDM EML Laser.
- APD Receiver
- Power dissipation <2W
- No Reference Clock required
- Built-in digital diagnostic functions
- Temperature range 0°C to 70°C
- Very low EMI and excellent ESD protection
- RoHS Compliant Part



Applications

- 10GBASE-ZR/ZW Ethernet
- SONET OC-192 /SDH
- 10G Fibre Channel

1. Description

Approved Networks 10GBASE-XFP-ZR Bi-directional 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. They comply with 10-Gigabit Ethernet 10GBASE-ZR/ZW per IEEE 802.3ae, SONET OC-192 /SDH and 10G Fibre Channel . Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA.

2. Absolute Maximum Ratings

Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TST	-40	+85	°C
Case Operating Temperature	TIP	0	+70	°C
Supply Voltage	VCC3	-0.5	+4.0	V

3. Electrical Characteristics (TOP = 0 to 70 °C)

Parameter	Symbol	Min	Typ	Max	Unit	Notes	
Supply Voltage	Vcc3	3.13		3.45	V		
Supply Current	Icc3			800	mA		
Module total power	P			2	W		
Transmitter							
Parameter	Symbol	Min	Typ	Max	Unit	Notes	
Input differential impedance	Rin		100		Ω	1	
Differential data input swing	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	T_off			100	ms		
Tx Enable Assert Time	T_on			100	ms		
Receiver							
Parameter	Symbol	Min	Typ	Max	Unit	Notes	
Differential data output swing	Vout,pp	300	500	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+0.5	V	3	
Power Supply Rejection	PSR	See note 4 below.					4

Notes:

1. After internal AC coupling.
2. 20 – 80 %
3. 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.

4. Per Section 2.7.1. in the XFP MSA Specification.

4. Optical Parameters (TOP = 0 to 70°C)

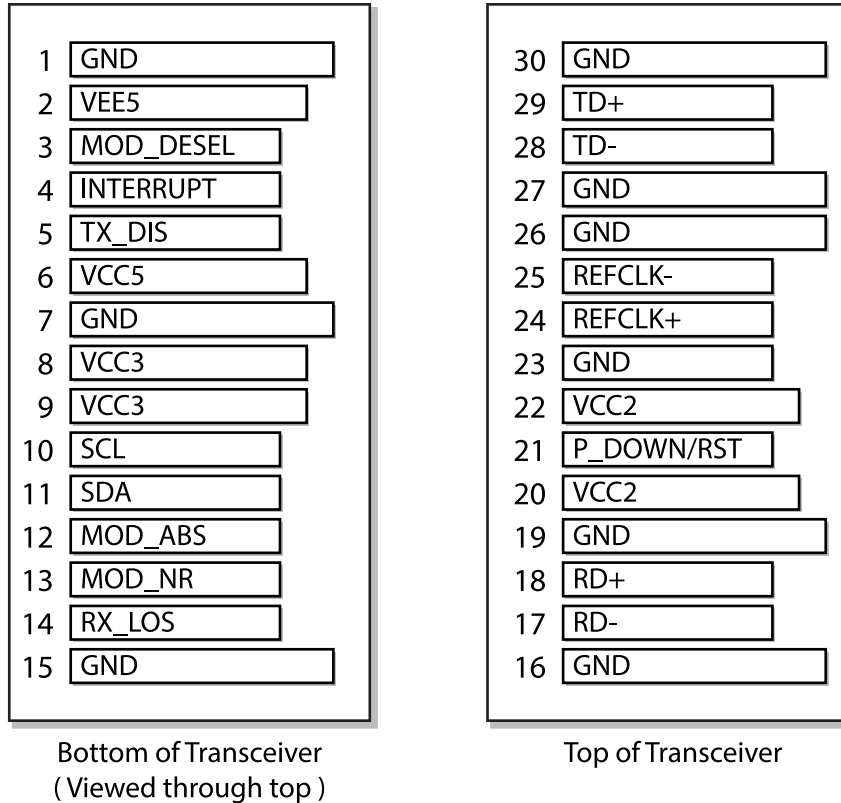
Transmitter						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Data Rate	BR	9.95		11.3	Gb/s	
Bit Error Rate	BER			10 ⁻¹²		
Maximum Launch Power	P _{MAX}	0		5	dBm	1
Optical Center Wavelength		1560	1570	1580		
Optical Extinction Ratio	ER	3.5			dB	
Spectral Width	Δλ			1	nm	
Sidemode Supression ratio	SSR _{min}	30			dB	
Rise/Fall Time (20%~80%)	Tr/Tf			50	ps	
Average Launch power of OFF Transmitter	P _{OFF}			-30	dBm	
Tx Jitter	T _{xj}	Compliant with each standard requirements				
Optical Eye Mask		IEEE802.3ae 2				
Receiver						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Data Rate	BR	9.95		11.3	Gb/s	
Receiver Sensitivity	S _{en}			-22	dBm	2
Maximum Input Power	P _{MAX}	0			dBm	2
Optical Center Wavelength	λ _C	1560	1570	1580	nm	
Receiver Reflectance	R _{rx}			-27	dB	
LOS De-Assert	LOSD			-25	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis	LOSH	0.5		5	dB	

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps BER<10⁻¹².

5. Pin Assignment

Diagram of Host Board Connector Block Pin Numbers and Name



6. Pin Function Definitions

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground	1
2		VEE5	Optional -5.2 Power Supply - Not required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
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; Transmitter laser source turned off	
6		VCC5	+5 Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL- I/O	SDA	Serial 2-wire interface data line	2

Pin	Logic	Symbol	Name/Description	Notes
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready;	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 – Not required	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset 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 – Not required	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input 29 CML-I TD+	
30		GND	Module Ground	1

Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.45V.
3. A Reference Clock input is not required.

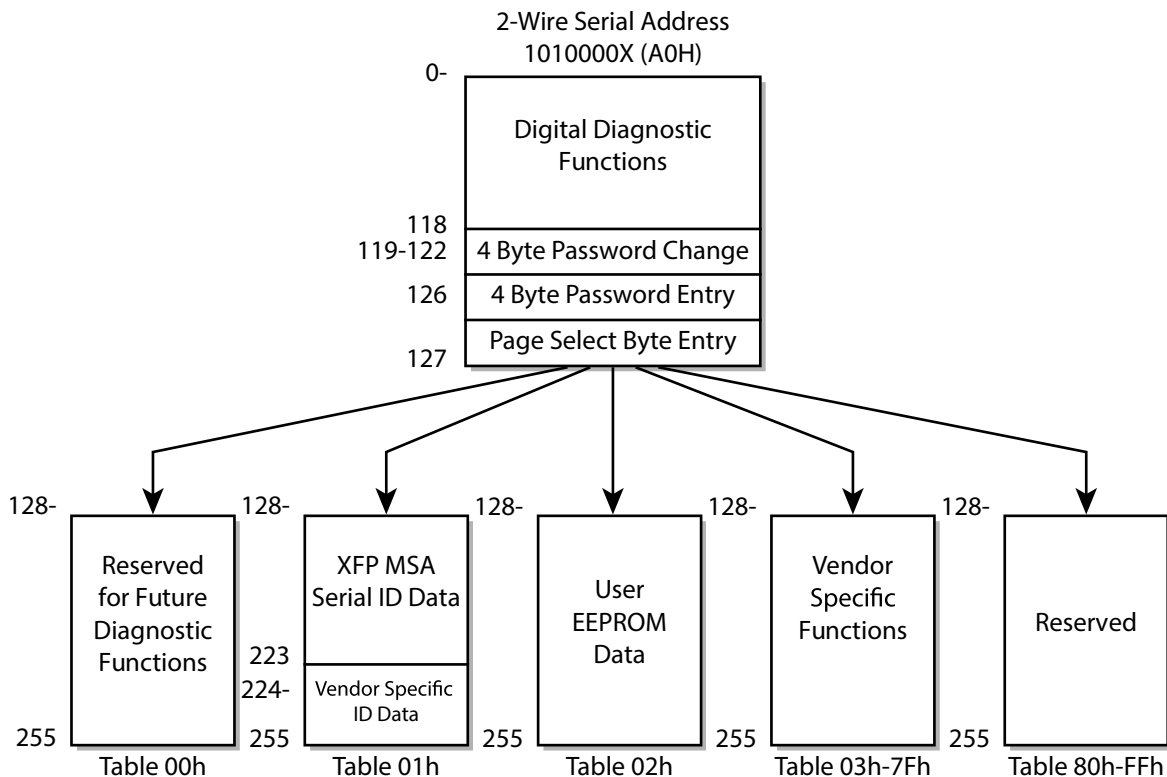
7. Digital Diagnostic Functions

As defined by the XFP MSA 1, XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- **Transceiver temperature**
- **Laser bias current**
- **Transmitted optical power**
- **Received optical power**
- **Transceiver supply voltage**

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

For more detailed information including memory map definitions, please see the XFP MSA Specification.



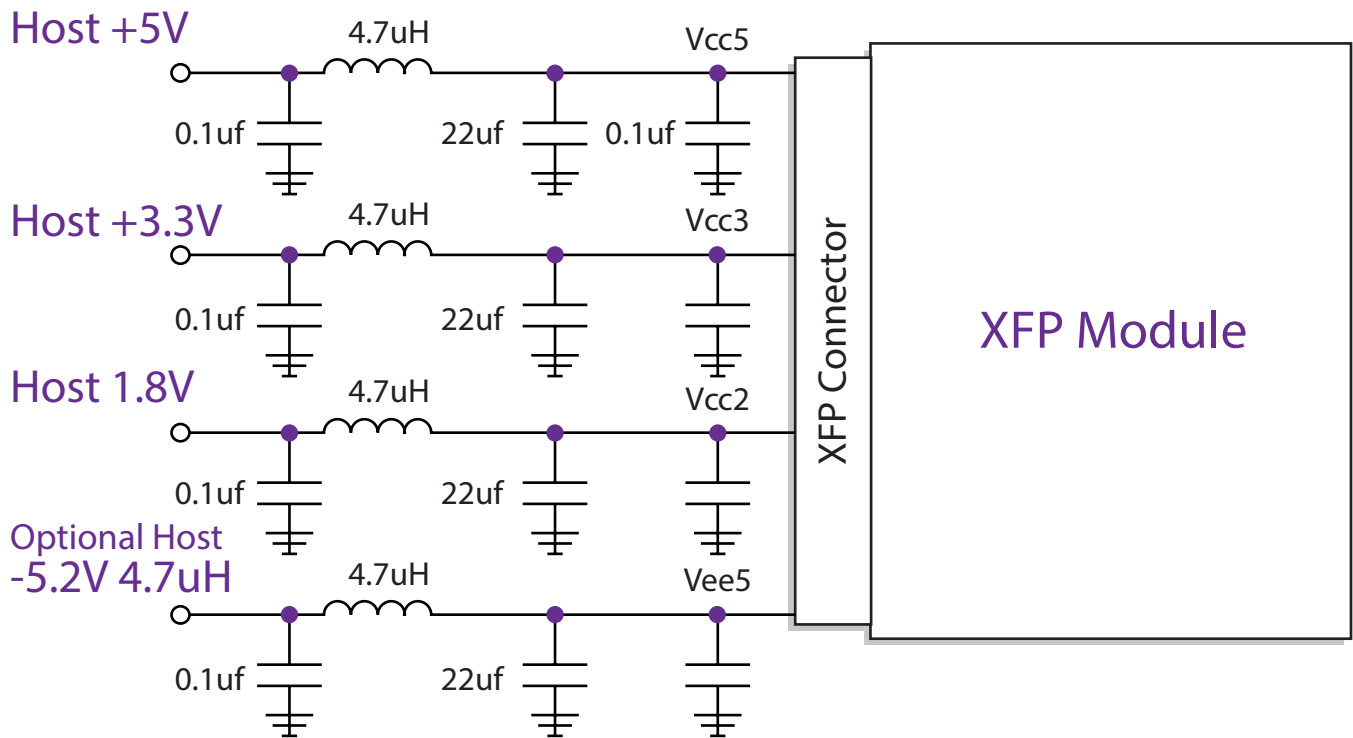
8. Management Interface

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

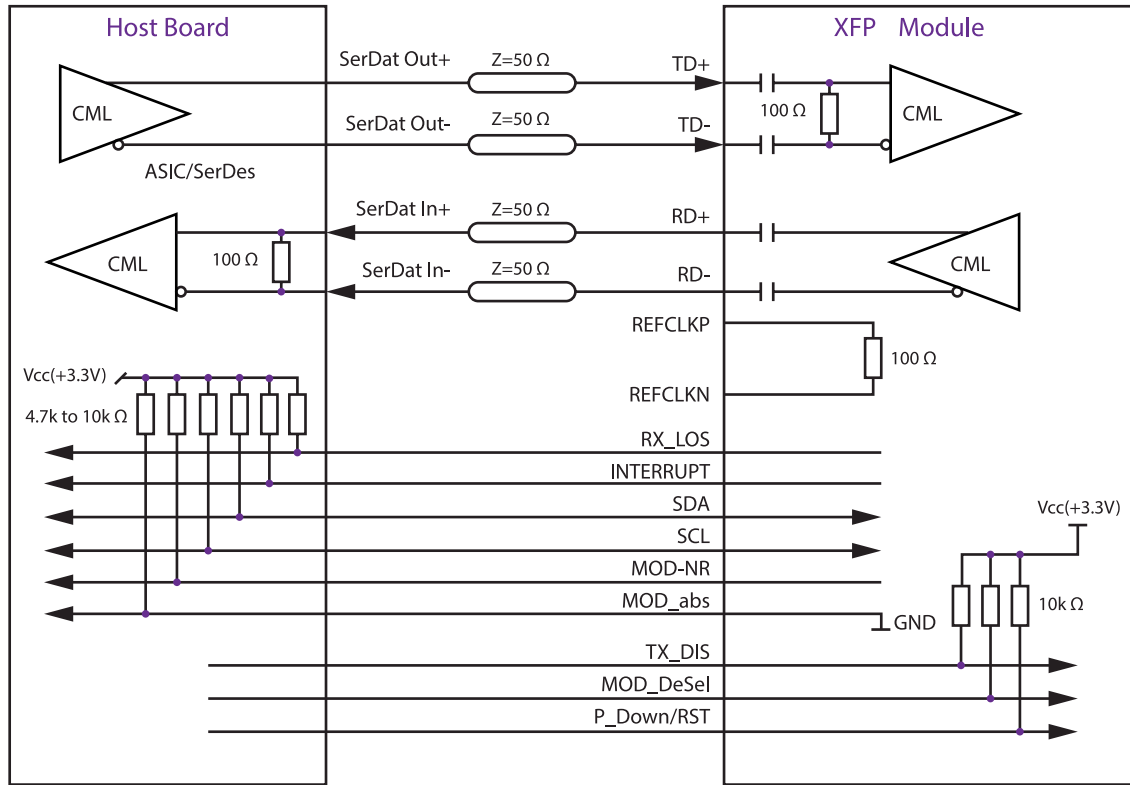
The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented.

The digital diagnostic memory map specific data field defines as following:

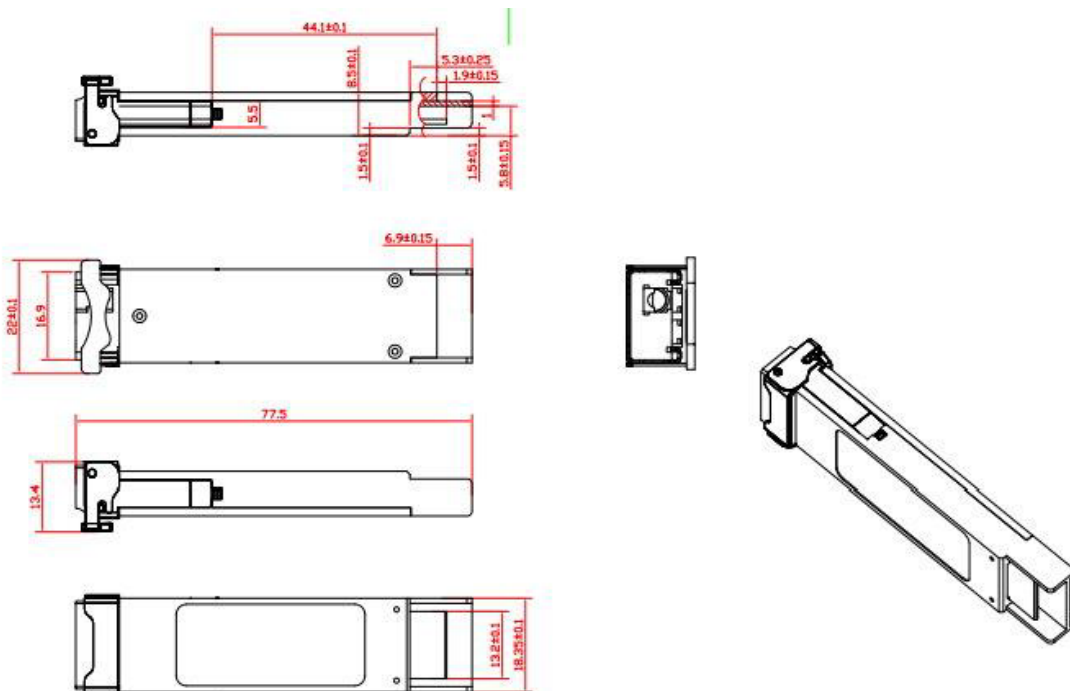
9. Recommended Host Board Power Supply Circuit



10. Recommended High-speed Interface Circuit



11. Mechanical Dimensions



12. Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950 , UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

13. Contact Information

Approved Networks is a leading supplier of Network Transceivers and Connectivity products to Channel Partners, Resellers, and OEMs. With more than 9 years of direct industry experience, our products are resident in the most demanding and mission critical functional networks Worldwide. We serve as a Master Distributor to the largest CMs in the world and deploy the most rigorous testing and firmware management programs to bring the highest level of functional product to the market at a cost that makes sense.

Corporate Offices: **Approved Networks, Inc.**

Tel: 800.590.9535

Web: <http://www.approvednetworks.com>