

AXF85-192-M3

850nm XFP Multi-Mode for 10GbE
Duplex XFP Transceiver
RoHS 6 Compliant



Features

- Supports 9.95Gbps to 11.3Gbps bit rates
- 850nm VCSEL Transmitter
- GaAs PIN photodiode Receiver
- Maximum link length of 300m
(OM3 50um, MMF)
- Single 3.3V Power supply and TTL Logic Interface
- Duplex LC Connector Interface
- Operating Case Temperature Standard: 0 to +70 °C
- Hot Pluggable
- XFI electrical interface
- No reference clock required
- Compliant with XFP MSA Specification

Applications

- 10GBase-SR/SW
- Compliance to Fiber Channel 1200-M5-SN-I, 1200-M5E-SN-1 1200-M6-SN-I at 10.51875Gbit/s
- Other optical links

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000 V)
Electrostatic Discharge to the Enclosure	EN 55024:1998+A1+A2 IEC-61000-4-2 GR-1089-CORE	Compliant with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 CISPR 22B :2006 VCCI Class B	Compliant with standards
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compliant with standards. 1KHz sine-wave, 80% AM, from 80MHz to 1GHz. No effect on transmitter/receiver performance is detectable between these limits.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product.
Component Recognition	UL and CUL EN60950-1:2006	Compliant with standards
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards ^{note1}

Note1: For update of the equipments and strict control of raw materials, 10Gtek has the ability to supply the customized products since Jan 1st, 2007, which meets the requirements of RoHS6 (Restrictions on use of certain Hazardous Substances) of European Union.

In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.

In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item13: Lead and cadmium in optical and filter glass. The three exemptions are being concerned for 10Gtek’s transceivers, because 10Gtek’s transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Product Description

The AXF85-192-M3 series multi-mode transceiver is XFP module for duplex optical data communications such as 10GBASE-SR and 10GBASE-SW.

The transceiver module comprises a transmitter with 850nm a vertical cavity surface emitting (VCSEL)

laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of 0 to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Absolute Maximum Ratings^{note2}

Rating	Symbol	Min	Max	Units	Notes
Storage Ambient Temperature Range		-40	+85	°C	
Powered case Temperature Range		0	+75	°C	
Operating Relative Humidity	RH		80	%	
Supply Voltage Range	Vcc	-0.5	4.0	V	
Static Discharge Voltage on XFI High			500	V	
Static Discharge Voltage excluding XFI High Speed Pins			2,000	V	
Static Discharge Voltage on XFP Module			15,000 8,000	V V	

Note2: Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units	Notes
Operating Case Temperature Range	Tc	0		+70	°C	
Transceiver total Power Consumption	P _{TOT}			1.5	W	Note3
Power Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Vcc			500	mA	

Note3: Maximum total power value is specified across the full temperature and voltage range

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
Input Differential Impedance	R _{IN}		100		Ω	Note4
Differential input Voltage Swing	V _{IN}	120		1000	mV	Note5

Transmit Disable Voltage	V _{Dis}	2.0		VCC		
Transmit Enable Voltage	V _{EN}	0		0.8		
Transmit Disable Assert Time				10	us	
Receiver						
Differential Output Amplitude	V _{OUT}	500		800	mV	Note6
Transition Time Low to High	t _r	40			ps	Note7
Transition Time High to Low	t _f	40			ps	Note7
LOS Fault	L fault	Vcc-0.5		Vcc	V	Note8
LOS Normal	0	GND		0.5	V	Note8

Note4: After internal AC coupling.

Note5: Beneath this level the signal can't meet the specification

Note6: Into 100 ohms differential termination.

Note7: 20 – 80%.

Note8: Loss Of Signal is open collector to be pulled up with a 4.7kΩ–10kΩ resistor to 3.15 – 3.5V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical and Electrical Characteristics

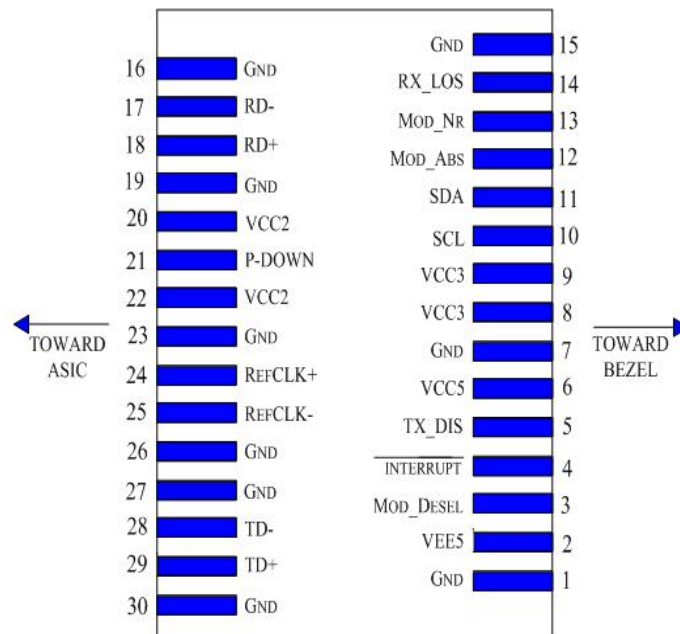
Parameter	Conditions	Symbol	Min.	Typical	Max.	Notes
MMF				300		m
Data Rate				9.95/10.3		Gbps
Transmitter						
Nominal Wavelength		λTRP	840	850	860	nm
Spectral Width		Δλ		0.4	0.45	nm
Average Power ^{note9}		Poptavg	-6		-1	dBm
Extinction Ratio ^{note10}		ER	3			dB
Relative Intensity Noise		RIN			-128	dB/Hz
Operating Range	62.5/125μm MMF	160	2		26	m
	50/125μm MMF	400			66	
	62.5/125μm MMF	200			33	
	50/125μm MMF	500			82	
	50/125μm MMF	2000			300	

Receiver						
Center Wavelength		λ_C	840	850	860	nm
Receiver Sensitivity ^{note10}		P_{IN}			-11.1	dBm
Receiver Overload ^{note10}		P_{IN}	-1.0			dBm
Receiver Reflectance					-27	dBm
LOS De-Assert		LOSD			-12	dBm
LOS Assert		LOSA	-30			dBm

Note9: launched into MMF.

Note10: Measured with PRBS 2³¹-1@10.3125Gbps

Host Board Connector Pinout



Electrical Pin Definition

PIN	Logic	Symbol	Name Description	Notes
1		GND	Module Ground	Note1
2		VEE5	Optional -5.2 Power Supply – Not Required	
3	LVTTTL-I	Mod_DeSel	Mode De-select; When held low allows module to 2-wire serial interface commands	

4	LVTTTL-O	Interrupt	Interrupt(inverted); Indicates Presence of an important condition which can be read over the 2-wire serial interface	Note1 2
5	LVTTTL-I	TX_DS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5 Power Supply - Not Required	
7		GND	Module Ground	Note1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTTL-I/O	SCL	2-Wire Serial Interface Clock	Note1
11	LVTTTL-I/O	SDA	2-Wire Serial Interface Data Line	Note1
12	LVTTTL-O	Mod_Abs	Indicates Module is not present. Grounded in the module	Note1 2
13	LVTTTL-O	Mod_NR	Module Not Ready; Indicating module operational fault	Note1
14	LVTTTL-O	RX_LOS	Receiver Loss Of Signal Indicator	Note1
15		GND	Module Ground	Note1
16		GND	Module Ground	Note1
17	CML-O	RD-	Receiver Inverted Data Output	
18	CML-O	RD+	Receiver Non-Inverted Data Output	
19		GND	Module Ground	Note1
20		VCC2	+1.8V Power Supply – Not required	
21	LVTTTL-O	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 – Not required	
23		GND	Module Ground	Note1
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	
26		GND	Module Ground	Note1
27		GND	Module Ground	Note1
28	CML-I	TD-	Transmitter Inverted Data Input	

29	CML-I	TD+	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	Note1

Note11: Module ground pins GND are isolated from the module case and chassis ground within the module. Note12: Shall be pulled up with 4.7kΩ-10 kΩ to a voltage between 3.15V and 3.5V on the host board.

Digital Diagnostic Functions

10Gtek’s AXF85-192-M3 Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification Rev 4.5.

As defined by the XFP MSA, 10Gtek 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 inside the transceiver, which is accessed through the 2-wire serial interface.

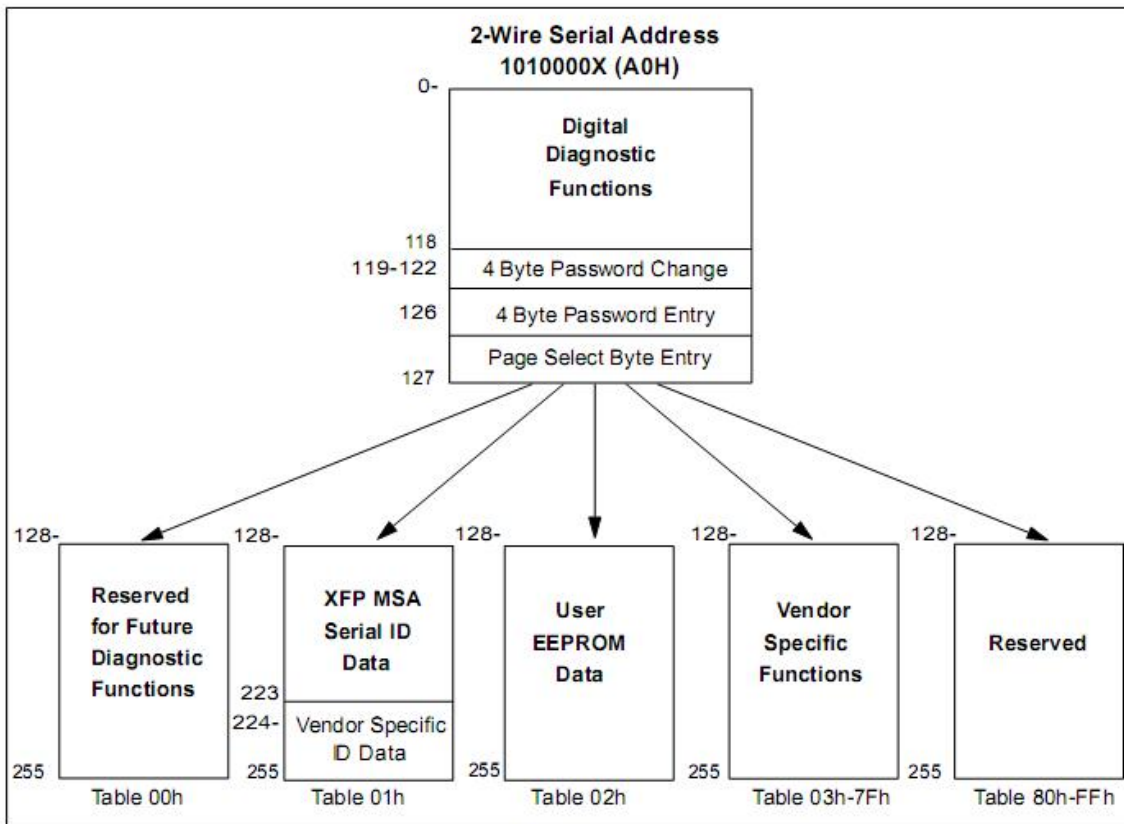
When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (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.

Management Interface

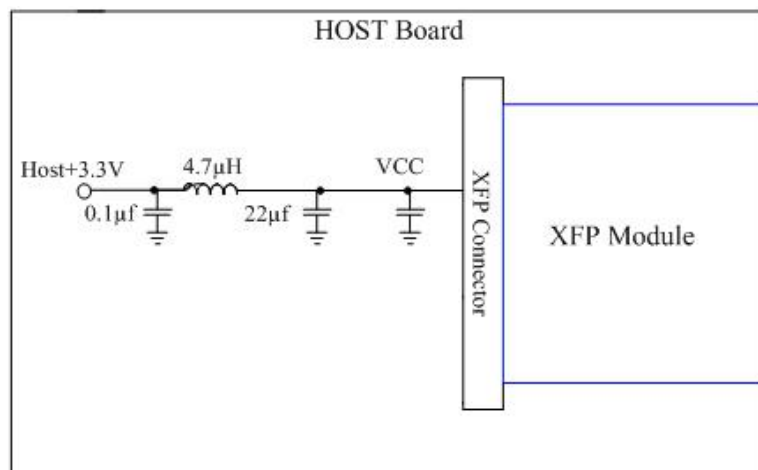
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface(SCL, SDA).

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.

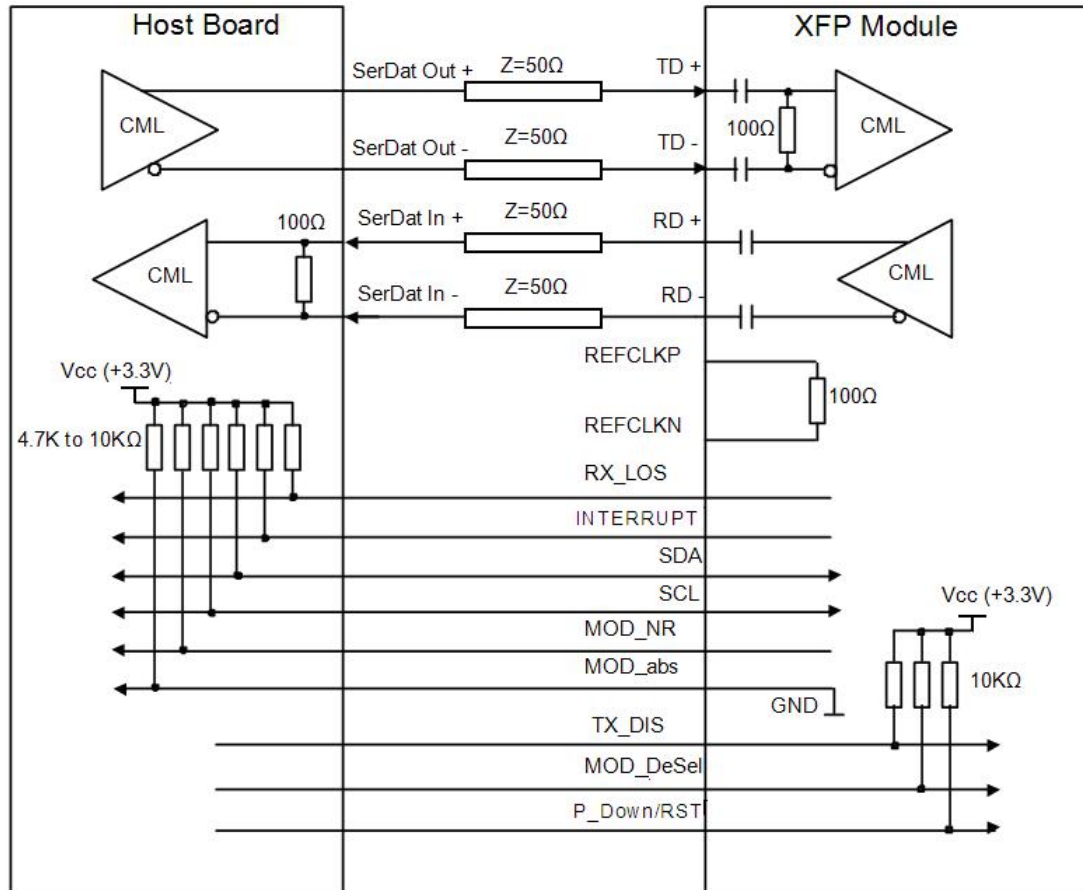
The digital diagnostic memory map specific data field defines as following.



Recommended Host Board Power Supply Circuit

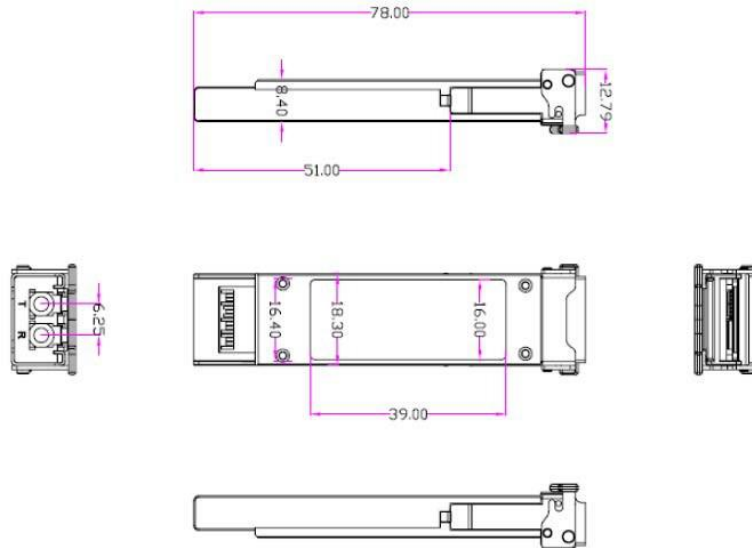


Recommended High-speed Interface Circuit



Mechanical Specifications

XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).



Revision History

Revision	Initiated	Approved	content	Release Date
Ver1.0	Jacky	Nicky	Released	Dec/2011

Ordering information

Part No.	Data Rate	Laser	Fibre Type	Temp.	Distance	Optical Interface	DDMI
AXF85-192-M3	10Gbps	850nm VCSEL	MMF	0~70°C	300m	LC	YES

Further Information

For further information, please contact info@10gtek.com

Tel : +86 755 2998 8100

Fax: +86 755 6162 4140

Web: www.10gtek.com