

XFP Optical Transceiver, 300m Reach

NX-85192-SRC

Features

Supports 9.95Gbps to 11.1Gbps bit rates

Maximum link length of 300m (50um,MMF)

850nm VCSEL laser and PIN receiver

XFP MSA Rev 4.5 Compliant


No reference clock required

+3.3V Supply Voltage

Low Power Dissipation 1.5W Maximum

0°C to 70°C Operating Case Temperature

Diagnostic Performance Monitoring of module temperature, Supply Voltages, laser bias current, transmit optical power, and receive optical power

RoHS6 compliant (lead free) 

Applications

10GBASE-SR/SW 10G Ethernet

1200-Mx-SN-I 10G Fiber Channel

Other optical links

Description

NX-85192-SRCD is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 10.3125Gbps(10GBASE-SR) or 9.953Gbps (10GBASE-SW), and transmission distance up to 300m on 50µm MMF (2000MHz.km).

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°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10G systems.



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Tst	-40	+85	°C
Case Operating Temperature	Top	0	+70	°C
Operating Relative Humidity	RH		85	%
Supply Voltage	Vcc3.3		3.6	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply current	Icc3	-	350	-	mA
Operating Case temperature	Tca	0	-	70	°C
Module Power Dissipation	Pm	-	-	1.5	W

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Ref.
Input Differential Impedance	R_{IND}	-	100	-	Ω	1
Differential input Voltage Swing	V_{ID}	120	-	850	mV	2
Transmit Disable Voltage	VDis	2.0	-	VCC		
Transmit Enable Voltage	VEN	GND	-	GND+0.8		
Transmit Disable Assert Time		-	-	10	us	

Note:

1. after internal AC coupling.
2. Beneath this level the signal can't meet the specification

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Center Wavelength	λ_c	840	850	860	nm
RMS Spectral Width	$\Delta\lambda$		0.4	0.45	nm
Average Launch Power (each lane)	P_{out}	-7.3		-1	dBm
Optical Modulation Amplitude (each lane)	OMA	-4.3	-1.5		dBm
Extinction Ratio	ER	3			dB
Tx Jitter	TXJ	Per 802.3ae requirements			
Relative Intensity Noise	RIN			-128	dB/Hz
Transmitter and Dispersion Penalty	TDP			3.9	dB
Receiver					
Center Wavelength	λ_c	840	850	860	Nm
Receiver Sensitivity in OMA	P_{IN}			-11.1	dBm
Stressed receiver sensitivity in OMA	P_{IN}			-7.5	dBm
Receiver Overload	Pin			-1	dBm
LOS De-Assert	LOSD			-11	dBm
LOS Assert	LOSA	-28			dBm
LOS Hysteresis	LOSH	0.5			dB

Note:

1. Measured with PRBS 2³¹-1 @ 10.3125Gbps

Electrical Receiver

Differential Output Impedance	Z_{OD}		100		Ω	
Differential Output Amplitude	V_{OSPP}	500		800	mV	1
Transition Time Low to High	t_r	40			ps	2
Transition Time High to Low	t_f	40			ps	2
LOS Fault	L fault	Vcc-0.5		VCC_HOST	V	3
LOS Normal	L normal	GND		GND+0.5	V	3

Notes:

1. Into 100 ohms differential termination. 2. 20 – 80 %.
3. Loss Of Signal is open collector to be pulled up with a 4.7k Ω – 10k Ω resistor to 3.15 – 3.6V. Logic 0, indicates normal operation; logic 1 indicates no signal detected.

General Specifications

Operating Range	62.5/125 μ m MMF	160	I_{OP}	2		26	m	
	50/125 μ m MMF	400				66		
	62.5/125 μ m MMF	200				33		
	50/125 μ m MMF	500				82		
	50/125 μ m MMF	2000				300		
Bit Rate			BR	9.95		11.1	Gbps	1
Bit Error Ratio			BER			10^{-12}		2

Notes:

1. 10GBASE-SR/SW, 1200-Mx-SN-I
2. Measured with PRBS 2³¹-1

Pin Descriptions

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 – Not required	
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
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	LVTTTL-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	3
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+	Transmitter non-inverted data input	
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 3.6V.
3. Reference Clock input is not required.

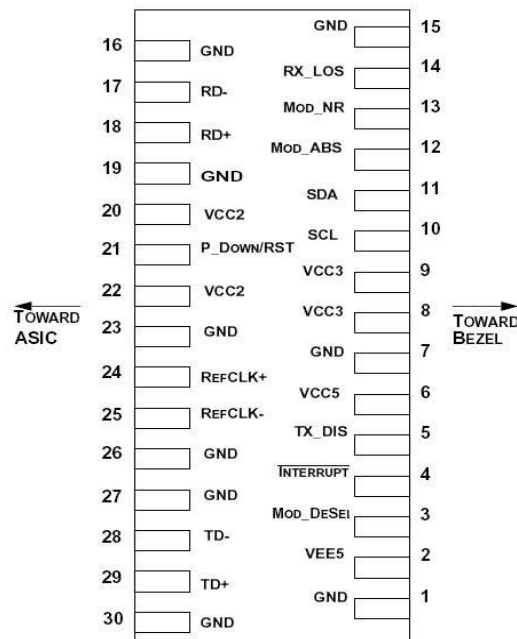


Figure1. Electrical Pin-out Details

Mechanical Dimensions

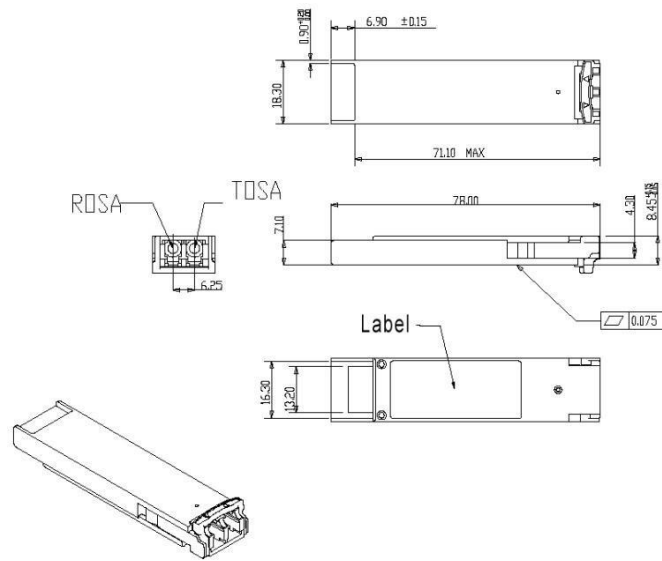


Figure2. Mechanical Specifications

The mechanical components defined:

1. The module, clip and connector dimensions are constant for all applications. While the bezel, cage assembly, EMI gasket and heat sink can be designed and/or adjusted for the individual application.
2. The relatively small form factor of the XFP module combined with an adaptable heatsink option allows host system design optimization of module location, heatsink shape/dimension/fins design, and airflow control. The module can be inserted and removed from the cage with the heat sink and clip attached.

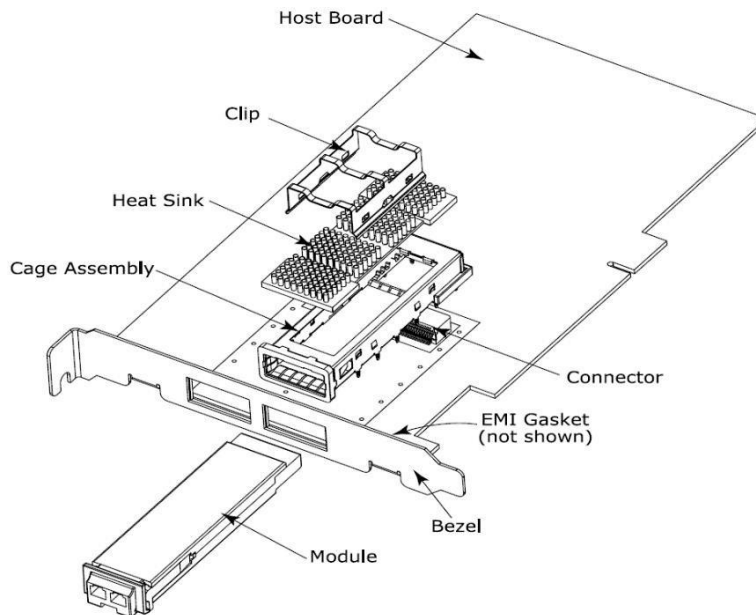


Figure3. XFP Mechanical Components

Power Supply Filtering

The host board should use the power supply filtering shown in Figure 4.

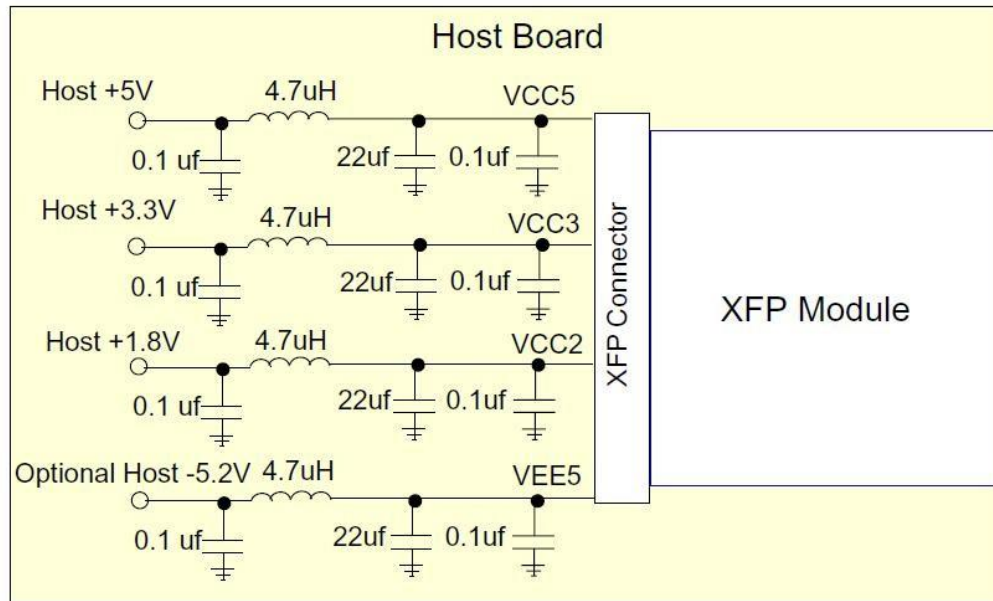


Figure 4. Host Board Supply Filtering Network

DIAGNOSTIC MONITORING INTERFACE

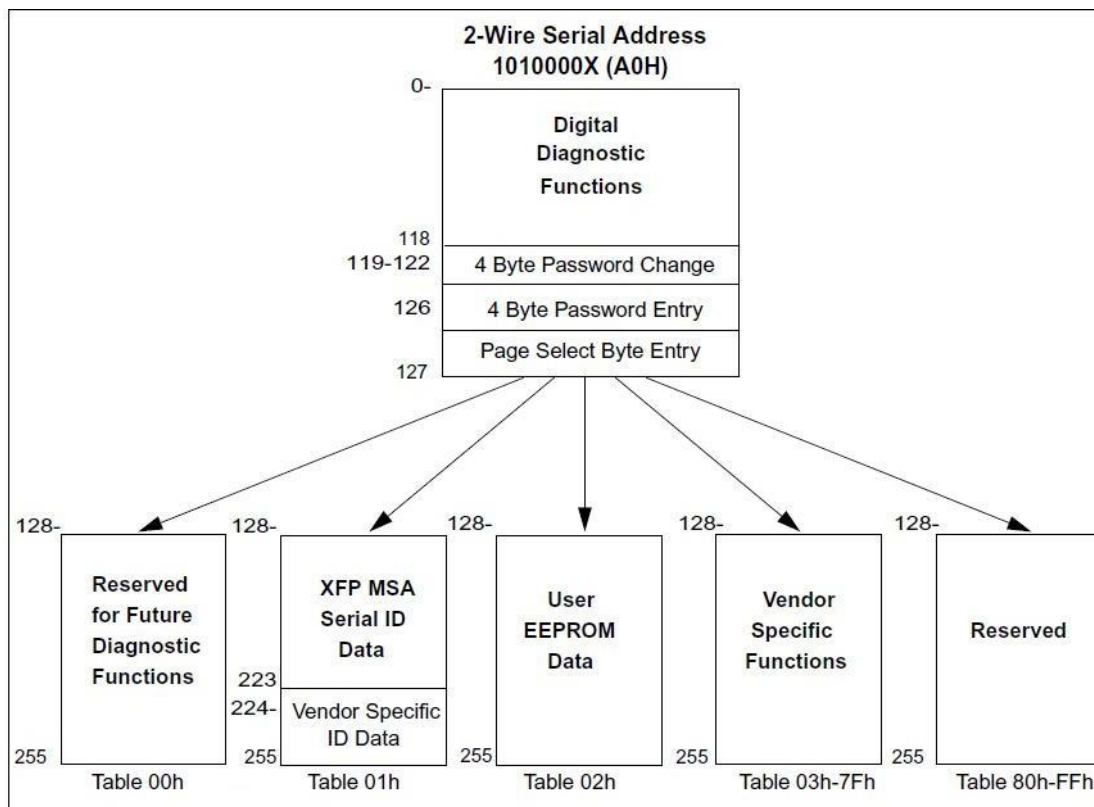


Figure 5. XFP 2-wire Serial Digital Diagnostic Memory Map

<i>Address</i>	<i>Size (Bytes)</i>	<i>Name</i>	<i>Description</i>
<i>Base ID Fields</i>			
128	1	Identifier	Type of serial transceiver (see Table 32)
129	1	Ext. Identifier	Extended identifier of type of serial transceiver (see Table 47)
130	1	Connector	Code for connector type (see Table 48)
138-131	8	Transceiver	Code for electronic compatibility or optical compatibility (see Table 49)
139	1	Encoding	Code for serial encoding algorithm (see Table 50)
140	1	BR-Min	Minimum bit rate, units of 100 Mbits/s.
141	1	BR-Max	Maximum bit rate, units of 100 Mbits/s.
142	1	Length(SMF)-km	Link length supported for SMF fiber in km
143	1	Length (E-50µm)	Link length supported for EBW 50/125 µm fiber, units of 2 m
144	1	Length (50 µm)	Link length supported for 50/125 µm fiber, units of 1 m
145	1	Length (62.5 µm)	Link length supported for 62.5/125 µm fiber, units of 1 m
146	1	Length (Copper)	Link length supported for copper, units of 1m
147	1	Device Tech	Device technology (see Table 51 , Table 52)
163-148	16	Vendor name	XFP vendor name (ASCII)
164	1	CDR Support	CDR Rate Support (see Table 53)
167-165	3	Vendor OUI	XFP vendor IEEE company ID
183-168	16	Vendor PN	Part number provided by XFP vendor (ASCII)
185-184	2	Vendor rev	Revision level for part number provided by vendor (ASCII)
187-186	2	Wavelength	Nominal laser wavelength (Wavelength = value / 20 in nm)
<i>Extended ID Fields</i>			
189-188	2	Wavelength Tolerance	Guaranteed range of laser wavelength (+/- value) from Nominal wavelength. (Wavelength Tol. = value/200 in nm)
190	1	Max Case Temp	Maximum Case Temperature in Degrees C.
191	1	CC_BASE	Check code for Base ID Fields (addresses 120-190)
<i>Vendor Specific ID Fields</i>			
195-192	4	Power Supply	Power supply current requirements and max power dissipation (see Table 54)
211-196	16	Vendor SN	Serial number provided by vendor (ASCII)
219-212	8	Date code	Vendor's manufacturing date code (see Table 55)
220	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver (see Table 56) Bit 1, 0 Reserved
221	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver (see Table 57)
222	1	Aux Monitoring	Defines quantities reported by Aux. A/D channels (see Table 58 Table 59)
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)
<i>Vendor Specific ID Fields</i>			
255-224	32	Vendor Specific	Vendor Specific EEPROM

Figure 6. Serial ID: Data Fields - Page 01h

Regulatory Compliance

NX-85192-SRC XFP transceivers are Class 1 Laser Products. They are certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120288-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008706/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 -	WT10093768-D-E-E



CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Ordering Information

Part Number	Product Description
NX-85192-SRC	XFP, 850nm VCSEL, 10Gbps, 300m, 0°C ~ +70°C

References

1. 10 Gigabit Small Form Factor Pluggable Module (XFP) Multi-Source Agreement (MSA), Rev 4.5 – August 2005.
2. IEEE802.3ae – 2002
3. ITU-T G.709 / ITU-T G.959.1 <http://www.itu.int/>
4. Telcordia GR-253-CORE