XFP 8.5G 1310nm Single mode Optical Transceiver

Description

The BlueOptics© BO31H13610D XFP transceiver is a high performance, cost effective module supporting a datarate up to 8.5Gbps with 10 Kilometer link length on single mode fiber.

BlueOptics© transceivers are 100% compliant with XFP Multi-Source Agreement (MSA).

All BlueOptics© XFP transceivers are always equipped with digital diagnostic function compliant to MSA SFF-8472.

Using digital diagnostic, BlueOptics© XFP transceivers provide the following real time information:

- Supply voltage
- Laser bias current
- Laser average output power
- Laser received input power
- Temperature

The transceiver consists of five sections: A DFB transmitter, a PIN photodiode, a trans-impedance preamplifier (TIA), the LD Driver and the digital diagnostic function.

Applications

- ✓ 2x/4x/8x Fibre Channel
- ✓ FC-Pi-4 800-M5/m6/M5E-LC-I

Features

- ✓ 8.5Gb/s serial optical interface
- ✓ DFB laser transmitter
- ✓ PIN photo-detector
- ✓ Hot-pluggable XFP footprint compliant to INF-8077
- ✓ Duplex LC/UPC type pluggable optical interface
- ✓ 2-wire interface for management
- ✓ Metal enclosure, for lower EMI
- ✓ RoHS compliant and lead-free
- ✓ Single +3.3V power supply
- ✓ Compliant with SFF-8472
- ✓ Case operating temperature
  - Commercial: 0°C to +70°C
  - Extended: -10°C to +80°C
  - Industrial: -40°C to +85°C

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended.

Laser Safety: Even small radiation emitted by laser devices can be dangerous to human eyes and lead to permanent eye injuries. Be sure to avoid eye contact with direct or indirect radiation.

Warranty

Every BlueOptics© transceiver comes with a 5 year replacement warranty and lifetime support.
For a warranty inquiry, please contact your CBO sales representative.
This warranty only covers the first user of the equipment.

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by CBO before they become applicable to any particular order or contract. In accordance with the CBO policy of continuous improvement specifications may change without notice.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of CBO or others.

Further details are available from any CBO sales representative.

Installation

Before installation attach an ESD-preventive wrist to ensure not to damage the transceiver or hardware.

BlueOptics© BO31H13610D can be installed in any Small Form Factor Pluggable+ (XFP) port. You can install the BO31H13610D regardless if the system is powered on or off, because it is hot-swappable.

Insert the transceiver into the SFP port and remove the dust cap.

You can now connect your cable.

Order Information

Part No.	Temp.	DDM
BO31H13610D	0°C to +70°C	✓
BO31H13610DEX	-10°C to +80°C	✓
BO31H13610DIN	-40°C to +80°C	✓

Regulatory Compliance

Feature	Standard	Co.
Electrostatic Discharge (ESD)	- IEC/EN 61000-4- 2	✓
Electromagnetic Interference (EMI)	- FCC Part 15 Class B EN 55022 - Class B (CISPR 22A)	✓
Laser Eye Safety	- FDA 21CFR 1040.10, 1040.11 - IEC/EN 60825-1, 2	Class 1 ✓
Component Recognition	- IEC/EN 60950, UL	✓
RoHS	- 2002/95/EC	✓
EMC	- EN61000-3	✓

1. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Ts	-40		85	ºC
Storage Ambient Humidity	HA	5		95	%

2. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
		0		70		BO31H13610D
		-10		80	ºC	BO31H13610DEX
		-40		85		BO31H13610DIN
Ambient Humidity	HA	5		70	%	
Transmission Distance				10	KM	
Coupled Fiber	Single mode fiber					9/125µm MMF

3. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	Vcc	3.13	3.3	3.45	V	
Signal Input Voltage	Icc			450	mA	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin,pp	120		1000	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	
Transmit Enable Voltage	VEN	GND		GND+0.8	V	2
Transmit Disable Assert Time				10	µs	
Receiver						
Differential data output swing	Vout,pp	600	650	800	mV	3
Data output rise time	tr			40	Ps	4
Data output fall time	tf			40	Ps	4
LOS Fault	VLOS fault	Vcc-0.5		VccHOST	V	5
LOS Normal	VLOS norm	GND		GND+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Internally AC coupled.
2. Or open circuit.
3. Into 100Ω differential termination.
4. 20-80%
5. LOS is an open collector output. Should be pulled up with 4.7KΩ on the host board.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value through the power supply filtering network shown on page 23 of the Small Form - factor Pluggable (SFP) Transceiver Multi Source Agreement (MSA), September 14, 2000.

4. Transmitter Specifications - Optical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	P_{OUT}	-6		-1	dBm	
Extinction Ratio	ER	3.5			dB	
Center Wavelength	λC	1290	1310	1330	nm	DFB Laser
Average Launch power of transmitter	POFF			-30	dBm	
Transmitter and Dispersion Penalty	TDP			3.2	dBm	
RIN	RIN			-128	dB/Hz	
Output Eye Mask	Compliant with IEEE802.3ae (class 1 laser safety)					

5. Receiver Specifications - Optical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	λ_{IN}	1270		1610	nm	
Receiver Sensitivity	P_{IN}			-15	dBM	1
Input Saturation Power (Overload)	P_{SAT}	0.5			dBm	
LOS Assert	P_A	-32			dBm	
LOS De-assert	P_D			-18	dBm	
LOS Hysteresis	P_A-P_D	0.5			dB	

Notes:

1. Measured with Light source 1310nm, ER=3.5dB; BER =<10^{-12} @PRBS=2^{31}-1 non-return-to-zero.

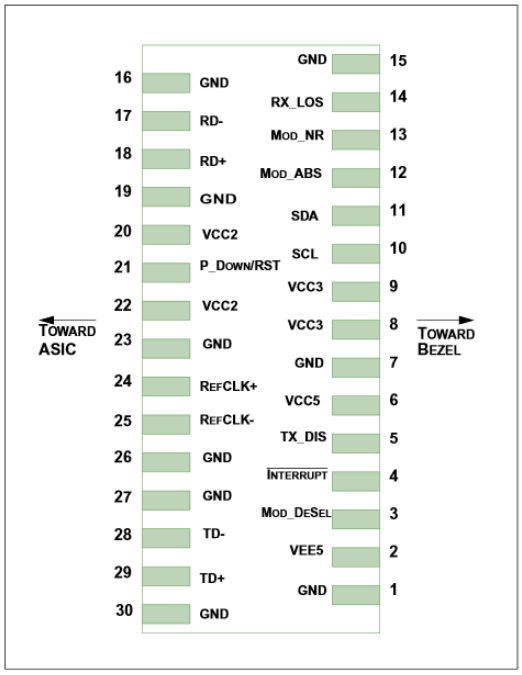
6. XFP to Host Connector Pin Out

Pin	Symbol	Name / Description	Note
1	GND	Module Ground	1
2	VEE5	Optional –5.2 Power Supply – ***Optional***	
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	Interrupt	Interrupt (bar); Indicates presence of an important condition which can read over the serial 2-wire interface	2
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6	VCC5	+5 Power Supply – ***Optional***	
7	GND	Module Ground	1
8	VCC3	+3.3V Power Supply	
9	VCC3	+3.3V Power Supply	
10	SCL	Serial 2-wire interface clock	
11	SDA	Serial 2-wire interface data line	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	Mod_NR	Module Not Ready; CBO defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	2
14	RX_LOS	Receiver Loss of Signal indicator	2
15	GND	Module Ground	1
16	GND	Module Ground	1
17	RD-	Receiver inverted data output	
18	RD+	Receiver non-inverted data output	
19	GND	Module Ground	1
20	VCC2	+1.8V Power Supply – ***Optional***	
		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 – ***Optional***	
23	GND	Module Ground	1
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – ***Optional***	3
25	RefCLK-	Reference Clock inverted input, AC coupled on the host board – ***Optional***	3
26	GND	Module Ground	1
27	GND	Module Ground	1
28	TD-	Transmitter inverted data input	
29	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 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.
3. Reference Clock input not required. If present, it will be ignored.



Pinout of Connector Block on Host Board

7. EEPROM Information

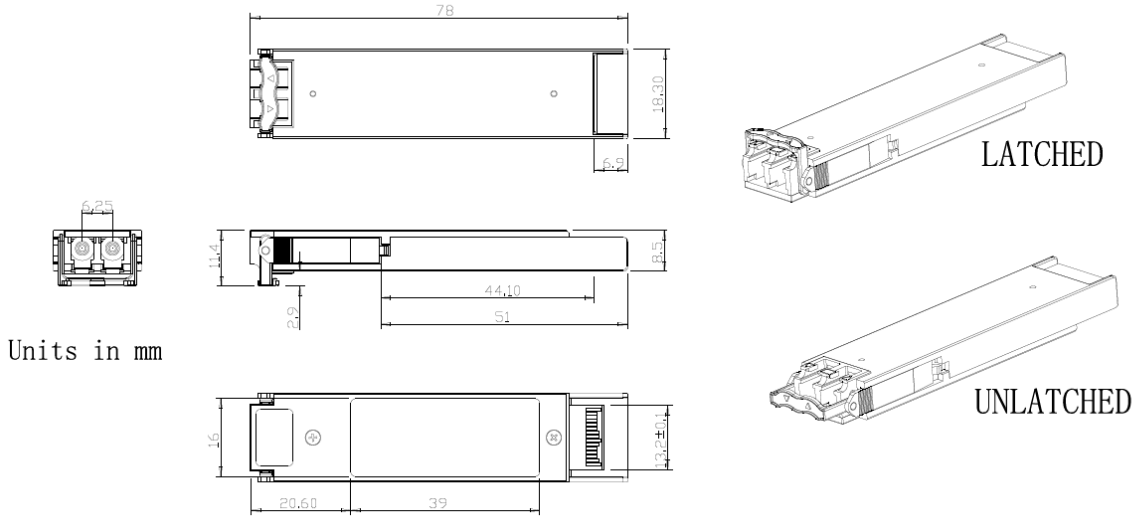
The SFP MSA defines a 256-byte memory map in EEPROM describing the transceivers capabilities, standard interfaces, manufacturer, and other information, which is accessible over a 2 wire serial interface at the 8-bit address 1010000X (A0h).

Data Address	Field Size (Bytes)	Name of Field	Contents (Hex)	Description
128	1	Identifier	XX	Formfactor
129	1	Ext. Identifier	XX	
130	1	Connector	XX	
131-138	8	Transceiver	XX XX XX XX XX XX XX XX	Transmittter Code
139	1	Encoding	XX	
140	1	BR-Min	XX	Minimum bit rate, units of 100 MBits/s
141	1	BR-Max	XX	Maximum bit rate, units of 100 MBits/s
142	1	Length (9µm) km	XX	Max. link length in KM
143	1	Length (9µm) 100m	XX	Max. link length in M
144	1	Length (50µm) 10m	XX	Max. link length in M
145	1	Length(62.5µm)10m	XX	Max. link length in M
146	1	Length (Copper)	XX	Max. link length in M
147	1	Device Tech	XX	Device technology
148-163	16	Vendor name	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Vendor name - OEM
164	1	CDR Support	XX	CDR Rate Support
165-167	3	Vendor OUI	XX XX XX	
168-183	16	Vendor PN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Product Number - depending on Part
184-185	2	Vendor rev	XX XX XX XX	Vendor revision
186-187	2	Wavelength	XX XX	Transceiver Wavelength
188 – 189	2	Wavelength tolerance	XX	Guaranteed range of laser wavelength
190	1	Max Case Temp	XX	Checksum of bytes 0-62
191	1	CC BASE	XX	Checksum of bytes 0-62
192-195	4	Power Supply	XX XX XX XX	Power supply current requirements and max power dissipation
196-211	16	Vendor SN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Part serial number
212-219	8	Vendor date code	XX XX XX XX XX XX 20 20	Year, Month, Day
220	1	Diagnostic Monitoring Type	XX XX XX XX XX XX 20 20	Year, Month, Day
221	1	Enhanced Options	XX	Indicates which optional enhanced features are implemented (if any) in

				the transceiver
222	1	Aux Monitorin	XX	Defines quantities reported by Aux. A/D channels
223	1	CC_EXT	XX	Check code for the Extended ID Fields
224-255	32	Vendor Specific	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	

8. Digital Diagnostics / Digital Optical Monitoring

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

The diagnostic information with internal calibration or external calibration are all implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

9. Mechanical Specifications (Unit: mm)