JB1270/1330-XFP-LC.S20

Tx: 1270nm/Rx: 1330nm BIDI XFP Transceiver for 10GbE/10FC
Tx: 1330nm/Rx: 1270nm BIDI XFP Transceiver for 10GbE/10FC
RoHS 6 Compliant

Features

- Supports 9.95Gb/s to 11.3Gb/s data rates
- Power budget up to 12dB
- Two types:

  A: 1270nm DFB Transmitter/ 1330nm Receiver

  B: 1330nm DFB Transmitter/ 1270nm Receiver
- LC Connector
- +3.3V power supply only
- Power dissipation <2W
- Built-in digital diagnostic functions
- Case temperature range:

  Standard: 0~+70℃
  Extended: -40~+85℃
- Complaint with XFP MSA
- Complaint with IEEE 802.3ae 10GBASE-LR/LW
- Complaint with 10GFC 1200-SM-LL-L

Applications

- 10GBASE-LR 10G Ethernet at 10.3125Gbps
- 10GBASE-LW 10G Ethernet at 9.953Gbps
- 1200-SM-LL-L 10G Fiber Channel at 10.51875Gbps

Ordering information

Part No.	Data Rate	Laser	Temp.	Distance	Optical Interface	DDMI
JB1270-XFP-LC.S20*	Up to 11.3Gbps	1270nm DFB	Standard	20km	LC	YES
JB1330-XFP-LC.S20*	Up to 11.3Gbps	1330nm DFB	Standard	20km	LC	YES
JB1270-XFP-LC.S20(WT)	Up to 11.3Gbps	1270nm DFB	Industrial	20km	LC	YES
JB1330-XFP-LC.S20(WT)	Up to 11.3Gbps	1330nm DFB	Industrial	20km	LC	YES

*Note1: Standard version.

Regulatory Compliance*[Note2]

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

*The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS.

Product Description

The JB1xx0-XFP-LC.S20 series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-LR/LW defined by IEEE 802.3ae and 10G Fiber Channel 1200-SM-LL-L. It is with the XFP 30-pin connector to allow hot plug capability.

The JB1270-XFP-LC.S20 module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; JB1330-XFP-LC.S20 module is designed for single mode fiber and operates at a nominal wavelength of 1330nm. The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings*

Parameter	Symbol	Min	Max	Unit
Maximum Supply Voltage	Vcc	-0.5	4.0	V
Storage Temperature	T_S	-40	85	°C

*Note3: Exceeding any one of these values may destroy the device permanently.

Recommend operating condition

Parameter	Symbol	Min	Typ	Max	Units
Case Operating Temperature	Tc, JB1xx0-XFP-LC.S20	0	-	70	°C
	Tc, JB1xx0-XFP-LC.S20(WT)	-10	-	85	
Power Supply Current	Icc	-	-	580	mA
Supply Voltage	Vcc	3.13	-	3.45	V

Electrical Characteristics

(T_C = -10 to 85℃, V_{CC} = 3.15V to 3.45V)

Parameter	Symbol	Min	Typ	Max	Unit
Transmitter					
Data Rate		9.95	-	11.3	Gbps
Input differential impedance	Rin	90	100	110	Ω
Differential data input swing*Note4	Vin,pp	120	-	820	mV
Transmit Disable Voltage	V_D	2.0	-	Vcc	V
Transmit Enable Voltage	V_{EN}	GND	-	GND+ 0.8	V
Transmit Disable Assert Time		-	-	10	us
Receiver					
Differential data output swing*Note4	Vout,pp	340	650	850	mV
Output Differential Impedance	Rout	90	100	110	Ω
Data output rise time*Note5	tr	-	-	38	ps
Data output fall time*Note5	tf	-	-	38	ps
LOS Fault	$V_{LOS\ fault}$	2.4	-	Vcc	V
LOS Normal	$V_{LOS\ norm}$	GND	-	GND+0.5	V

*Note4. Internal AC coupling.

*Note5. 20 – 80 %.

Optical Characteristics

(JB1270-XFP-LC.S20 Type, 1270nm DFB & PIN/TIA)

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		12			dB
Data Rate		9.953	10.3125	11.3	Gbps
Transmitter					
Centre Wavelength	λ_C	1260	1270	1280	nm
Spectral Width (-20dB)	Δλ			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power*note6	$P_{out,\ AVG}$	-2		3	dBm
Extinction Ratio	ER	3.5			dB
Average Power of OFF Transmitter				-30	dBm
Relative Intensity Noise	RIN			-128	dB/Hz
Input Differential Impedance	Z_{IN}	90	100	110	Ω
TX Disable Assert Time	t_off			10	us
Receiver					
Centre Wavelength	λ_C	1320		1340	nm
Sensitivity*note7	P_{IN}			-14	dBm
Receiver Overload	P_{MAX}	0.5			dBm

LOS De-Assert	LOS_D			-16	dBm
LOS Assert	LOS_A	-28			dBm

(JB1330-XFP-LC.S20 Type, 1330nm DFB & PIN/TIA)

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		12			dB
Data Rate		9.953	10.3125	11.3	Gbps
Transmitter					
Centre Wavelength	λ_C	1320	1330	1340	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power*note6	$P_{out, AVG}$	-2		3	dBm
Extinction Ratio	ER	3.5			dB
Average Power of OFF Transmitter				-30	dBm
Relative Intensity Noise	RIN			-128	dB/Hz
TX Disable Assert Time	t_off			10	us
Receiver					
Centre Wavelength	λ_C	1260		1280	nm
Sensitivity*note7	P_{IN}			-14	dBm
Receiver Overload	P_{MAX}	0.5			dBm
LOS De-Assert	LOS_D			-16	dBm
LOS Assert	LOS_A	-28			dBm

*Note6. Output is coupled into a 9/125um SMF.

*Note7: Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps.

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref.
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	$\overline{\text{Interrupt}}$	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 line	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	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	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 3.15Vand 3.6V.
3. A Reference Clock input is not required.

Pin Arrangement

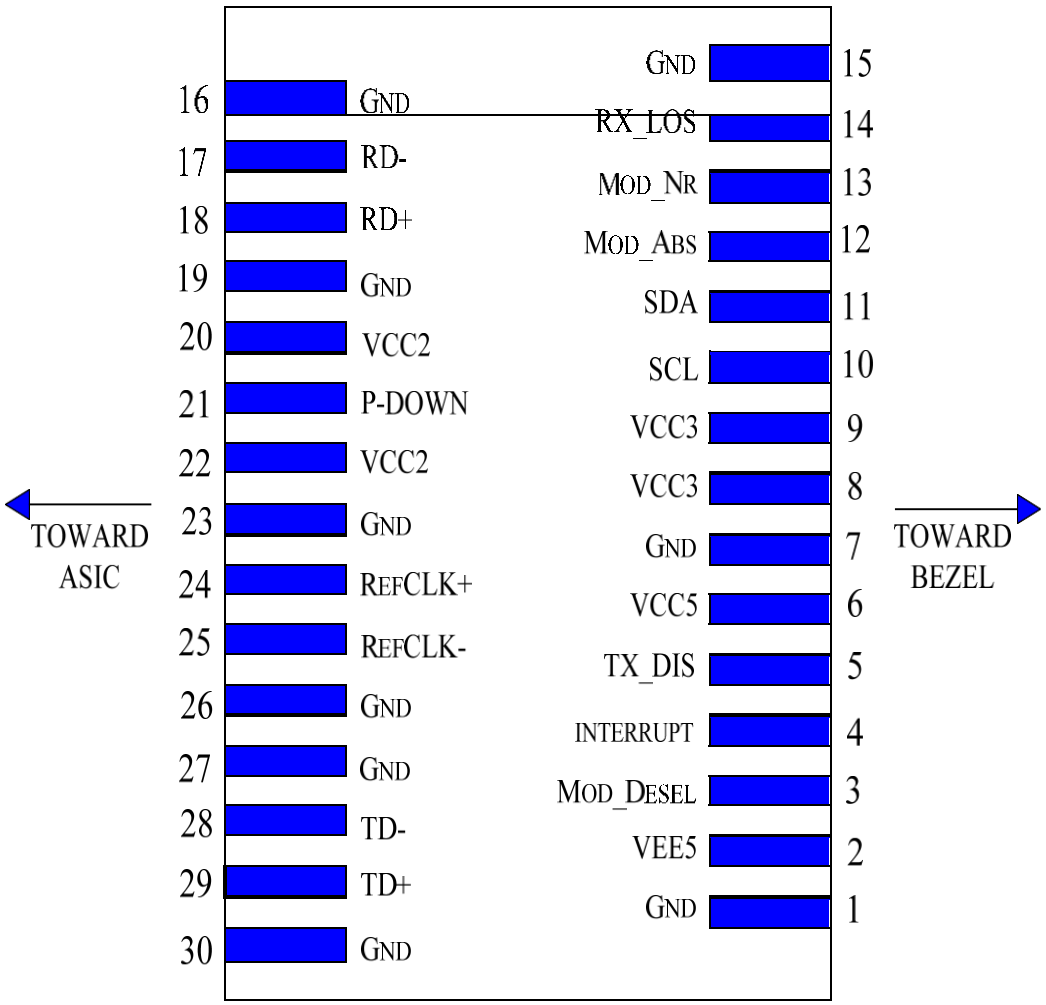


Diagram of Host Board Connector Block Pin Numbers and Name

Digital Diagnostic Functions

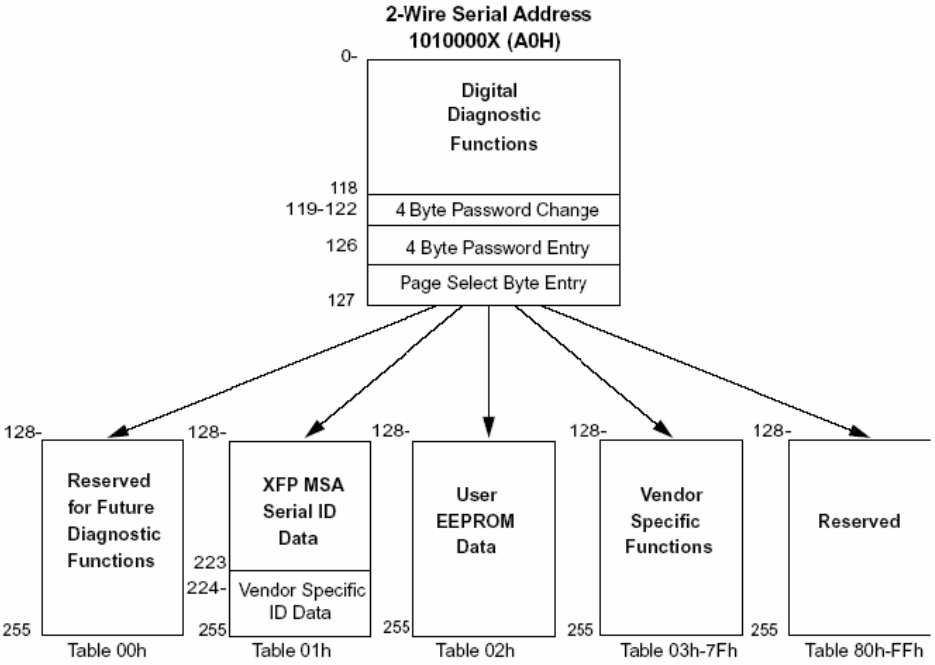
JB1xx0-XFP-LC.S20 Series Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification Rev 4.5.

As defined by the XFP MSA, Data Controls 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

The structure of the memory map is shown in the following figure, which is accessible over a 2-wire serial interface at the 8-bit address 1010000X (A0h). The normal 256 byte I^2C address space is divided into low and upper blocks of 128 Bytes. The lower block of 128 Bytes is always

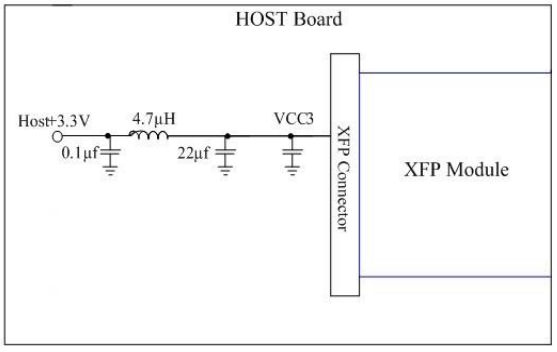
directly available and is used for the diagnostics and control function. Multiple blocks of memories are available in the upper 128 Bytes of the address space. These are individually addressed through a table select Byte which the user enters into a location in the lower address space. Thus, there is a total available address space of 128*256 = 32 Kbytes in this upper memory space. The contents of Table 01h are listed in following table. Please refer SFF INF-8077i (Revision 4.5) for detailed information.



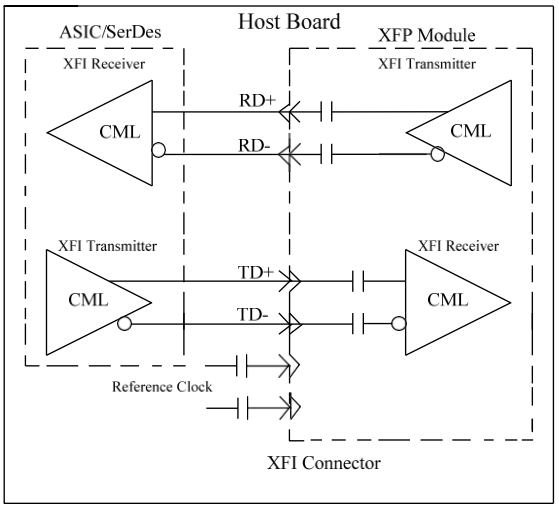
Monitor Specification:

Data Address	Parameter	Accuracy
96 ~ 97	Temperature	± 3℃
98 ~ 99	Reserved	
100~101	Tx Bias	±10%
102~103	Tx Power	±2dB
104~105	Rx Power	± 2dB
106~107	VCC3	± 3%

Recommended Host Board Power Supply Circuit

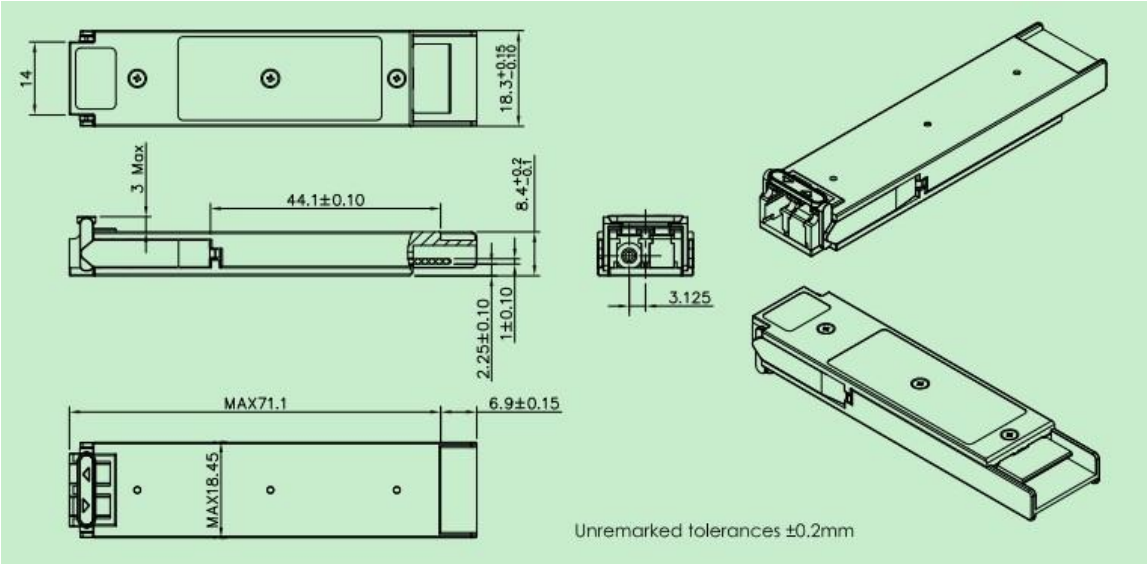


Recommended High-speed Interface Circuit



Mechanical Specifications

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



Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

Notice:

Data Controls reserves the right to make changes to or discontinue any optical link product or service identified in this publication, without notice, in order to improve design and/or performance. Applications that are described herein for any of the optical link products are for illustrative purposes only. Data Controls makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Contact:

Data Controls Inc.
E-mail: info@dci.jp

http://www.dci.jp