

T-10G-XFP-SM-T3-20KM**10Gbps XFP BIDI Optical Transceiver, 20km Reach****Features**

Supports 9.95Gbps to 10.3Gbps data rates

Hot-pluggable XFP footprint

Maximum link length of 20km with SMF

A: 1330nm DFB Laser Transmitter, 1270nm Receiver

B: 1270nm DFB Laser Transmitter, 1330nm Receiver

XFP MSA package with LC connector

No reference clock required

Loop Back Support

+3.3V, +1.8V Power Supply

Power Dissipation < 2W

Compatible with RoHs

Built-in digital diagnostic functions

Temperature range 0~70°C

**Applications**

10GBase-LR at 10.3125Gbps Fiber Channel

10GBase-LW at 9.953Gbps

10GBase-BX 10G Ethernet

10GBase-BX 10G Ethernet with FEC

Description

T-10G-XFP-SM-T3-20KM is compliant with the IEEE803.3ae 10Gbase-Bx. and transmission distance up to 20km on SMF.

The transceiver module comprises a transmitter with a 1270/1330nm DFB laser transmitter, an integrated 1330/1270nm detector preamplifier(IDP) mounted in an optical header and a limiting post-amplifier IC.

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 10 GbE systems.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Ref.
Storage Ambient Temperature Range		-40	+85	°C	
Power Case Temperature Range		0	+70	°C	
Operating Relative Humidity	RH		85	%	
Supply Voltage Range@3.3V	Vcc3	0	+3.6	V	
Supply Voltage Range@1.8V		0	1.98	V	

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.	Typical	Max.	Unit
Supply Voltage	V _{cc}	3.0	3.3	3.6	V
Supply Current	I _{cc}		200	300	mA
Operating Case Temperature	T _c	0	25	70	°C
Module Power Dissipation	P _m		0.7	1.1	W

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Operating Case Temperature Range	T _c	0		+70	°C	
Power Supply Voltage @3.3V	Vcc3	3.13	3.3	3.47	V	
Power Supply Voltage @ 1.8V		1.62	1.8	1.98		
Supply Current	p			2	W	
Transmitter						
Input Impedance (Differential)	R _{in}		100		Ω	1
Single Ended Data Input Swing	V _{in,pp}	120		820	mVpp	
Transmit Disable Voltage	V _D	2.0		V _{cc}	V	
Transmit Enable Voltage	V _{EN}	0		0.8	V	3
Transmit Disable Assert Time				10	us	

Receiver						
Differential Data Output Swing	V _{out,pp}	340		850	mV	
Data Output Rise Time	t _r			38	ps	2
Data Output Fall Time	t _f			38	ps	2
LOS Fault	V _{LOS FAULT}	V _{cc} -0.5		V _{CCHOST}	V	3
LOS Normal	V _{LOS fault}	GND		GND+0.5	V	3
Power Supply Rejection	PSR	See Note 3 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.

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Optical Output Power	P	-2		2	dBm	
Optical Wavelength	λ_c	1260	1270	1280	nm	
		1320	1330	1340		
Side Mode Suppress Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	1
Average Launch Power of OFF Transmitter	POFF	-30			nm	
Tx Jitter	T _{XJ}	Compliant with each standard requirements				
Receiver						
Receiver Sensitivity	RSNS			-14	dBm	2
Receiver Sensitivity in OMA	RSNS			-12.5	dBm	2
Maximum Input Power	P _{max}	+0.5			dBm	
Optical Centre Wavelength	λ_c	1320		1340	nm	
		1260		1280		
LOS De-Assert	LOS _D			-18	dBm	
LOS Assert	LOS _A	-30			dB	
LOS Hysteresis		1		5	dB	

Notes:

- 1, PRBS 231-1 test pattern @10.3125Gbps.
- 2, PRBS 231-1 test pattern @10.3125Gbps, BER≤10⁻¹².

Pin Function Definitions

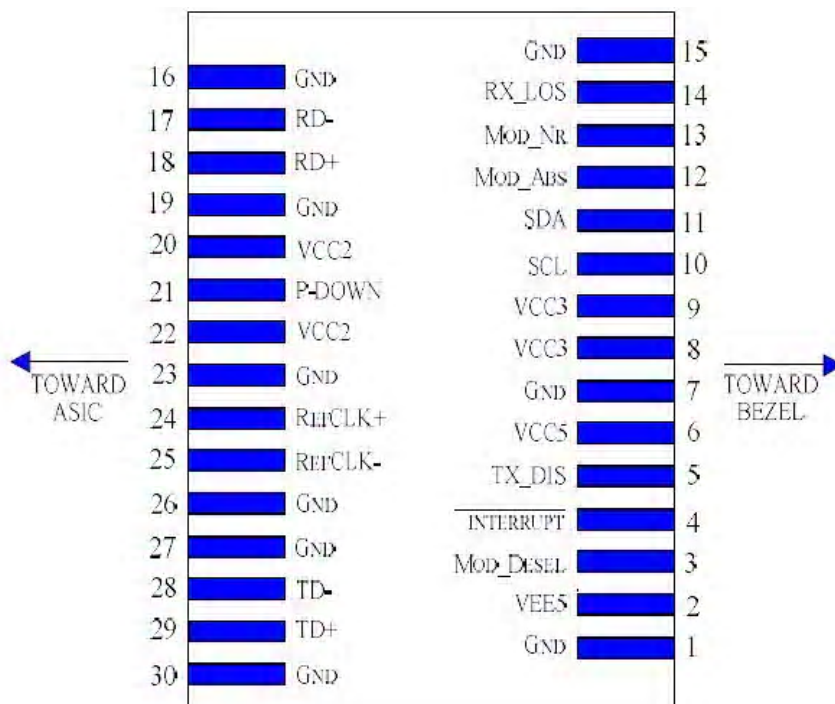
Parameter	Logic	Unit	Values	
1		GND	Module Ground	1
2		VEE 5	Optional-5.2 Power Supply-Not Required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to , respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition 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	
20		VCC2	+1.8V Power Supply	

21	LVTTTL	P Down/R ST	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
23		GND	Module Ground
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
27		GND	Module Ground
28	CML-I	TD-	Transmitter inverted data input
29	CML-I	TD+	Transmitter non-inverted data input
30		GND	Module Ground

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.

Host board Connector Pinout



General Specification

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate	BR	9.95		10.5	Gb/s	1
Bit Error Ratio	BER			10^{-12}		2
Max. Supported Link Length	L_{MAX}			20	km	1

Notes:

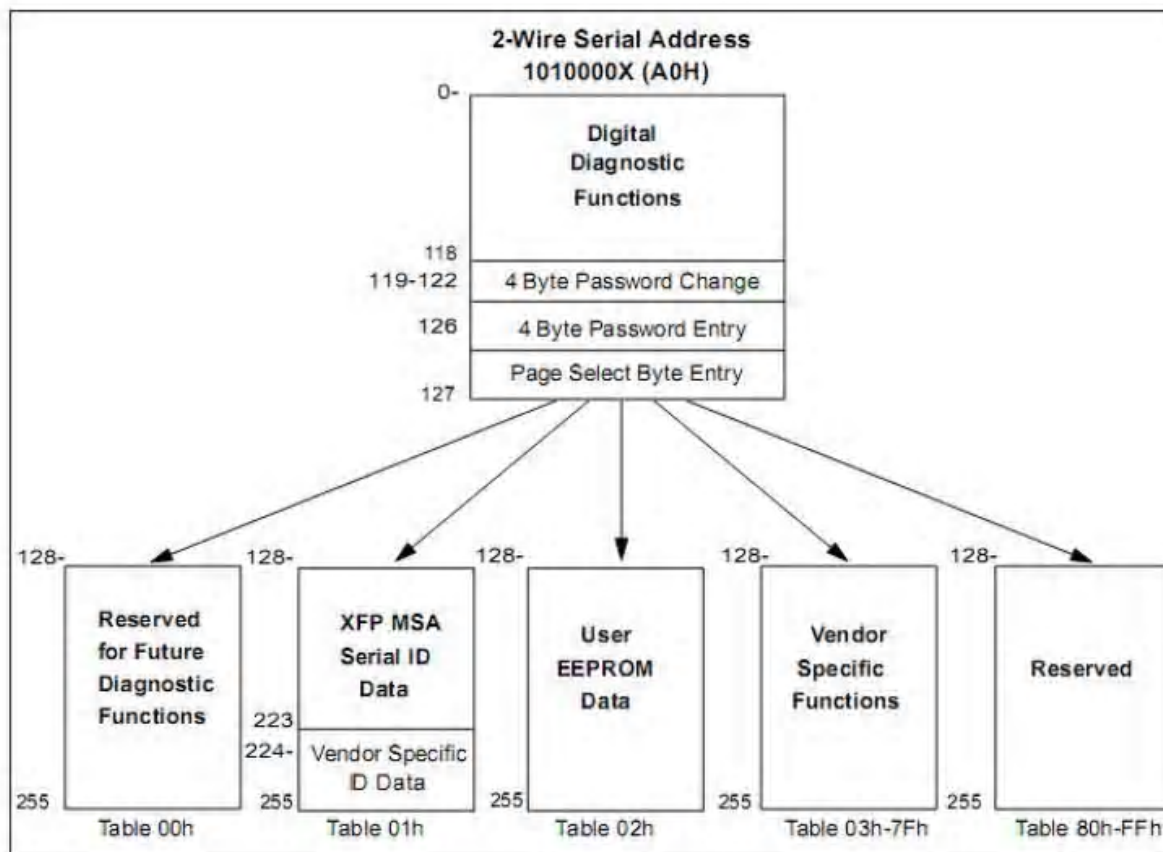
1. SONET OC-192 SR-1, SDH STM I-64.1, 10GBASE-LR/LW, 1200-SM-LL-L
2. Tested with a 231 – 1 PRBS

Management Interface

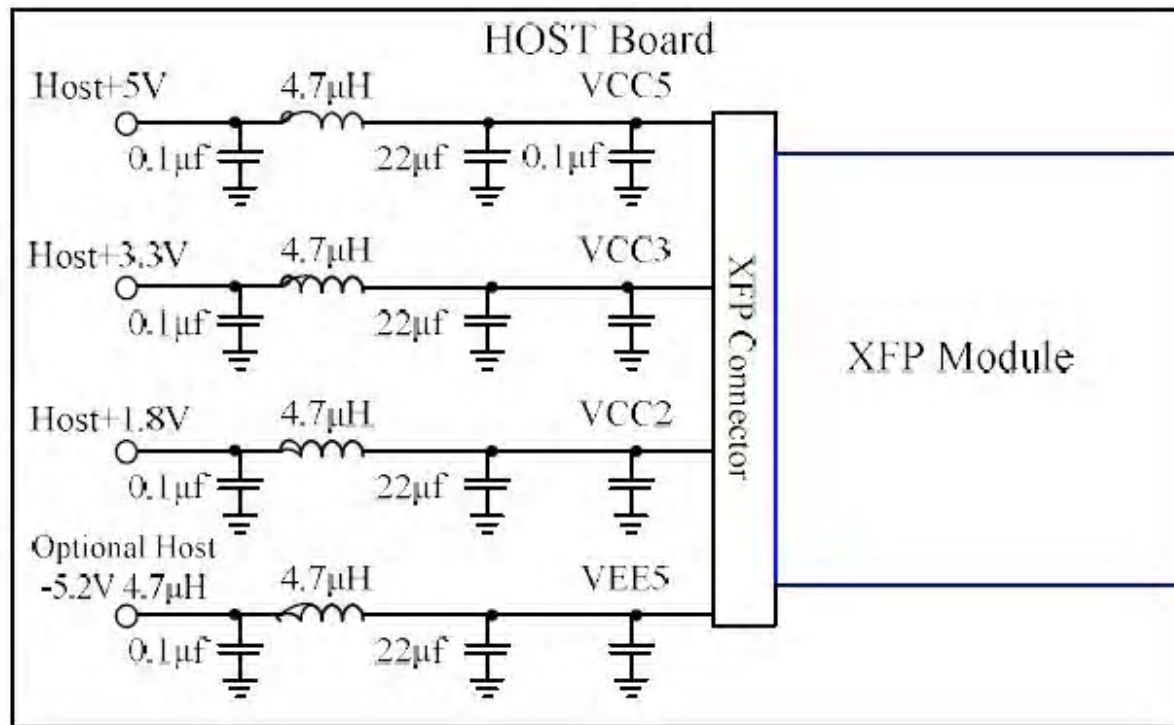
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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.

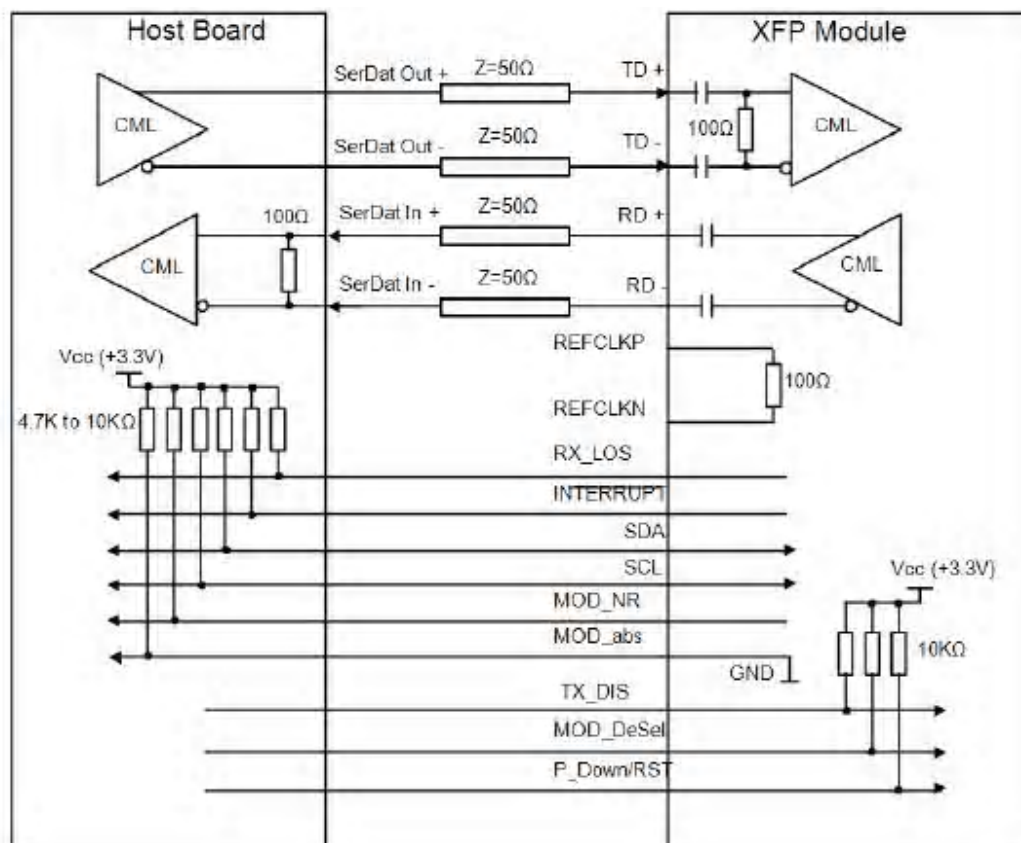
The digital diagnostic memory map specific data field defines as following.

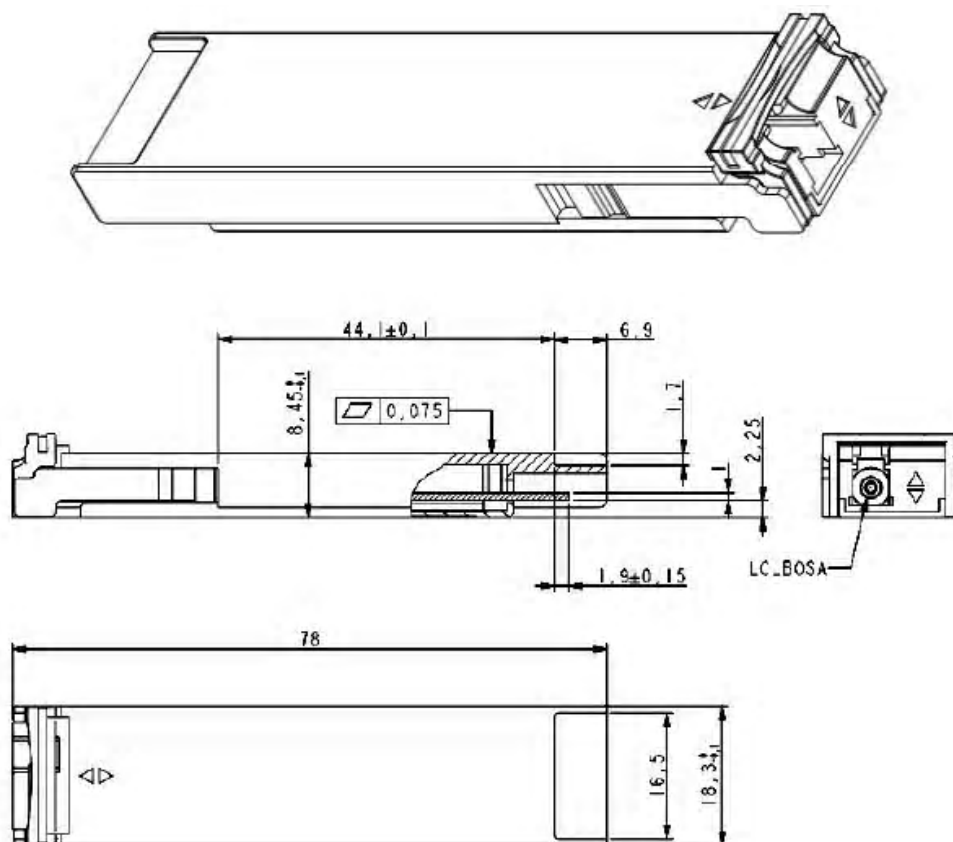


Recommended Host Board Power Supply Circuit



Recommended High-speed Interface Circuit



Mechanical Specifications

Ordering information

Part Number	Product Description
T-10G-XFP-SM-T3-20KM	9.95~10.3Gbps Tx:1330nm / Rx:1270nm 20KM 0℃~+70℃
T-10G-XFP-SM-T2-20KM	9.95~10.3Gbps Tx:1270nm / Rx:1330nm 20KM 0℃~+70℃

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Contact

E-mail: sales@t-techvip.com
<http://www.t-techvip.com>