

## OP-X10GDXX-80 10G DWDM XFP Module, SM 80km LC DDM

### Features

- Wavelength selectable to C-band ITU-T grid wavelengths
- Suitable for use in 50/100GHz channel spacing DWDM system
- XFP MSA Rev 4.5 Compliant
- Cooled EML laser transmitter and APD receiver
- Up to 10Gb/s Data Links and 80km on 9/125um SMF
- Case operating temperature range 0°C to 70°C
- Duplex LC connector interface
- Built-in digital diagnostic functions



### Applications

- SONET OC-192&SDH STM 64
- DWDM Networks

### Description

OP-X10GDXX-80 XFP DWDM transceiver is designed to deploy in the DWDM networking equipment in metropolitan access and core networks. It operates at a nominal wavelength of ITU Grid, C band DWDM wavelength and up to 80km transmission distance on single mode fiber. The transmitter section use a DWDM EML laser, the receiver section consists of a APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. OPTINET XFP transceiver provides an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	85	°C
Supply Voltage	Vcc	-0.5	4	V
Operating Humidity	RH	5	95	%
Power Consumption			3.5	W

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0		70	°C
Power Supply Voltage	Vcc	3.15	3.3	3.47	V



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Power Supply Current	Icc			290	mA
Data Rate	-	9.95		11.1	Gbps

### Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Average Output Power	Po	-1		+3	dBm
Center Wavelength	$\lambda$	$\lambda_c - 25$	$\lambda_c$	$\lambda_c + 25$	nm
Center Wavelength Spacing			100		GHz
Extinction Ratio	Er	9			dB
Side Mode Suppression Ratio	SMSR	30			dB
Transmitter and Dispersion Penalty	TDP			2	dB
Spectral Width (-20dB)	DI20		0.1	0.3	nm
Average Launch Power OFF Transmitter	Poff			-30	dBm
Output Optical Eye Mask	Compliant with ITU-T G.691 STM-64 eye mask				
<b>Receiver</b>					
Receiver Sensitivity	S			-23	dBm
Center Wavelength	$\lambda_c$	1260		1600	nm
Receiver Overload	P <sub>in</sub>	-7			dBm
Loss of Signal Asserted		-34			dBm
LOS De-Assert	LOS <sub>D</sub>			-24	dBm
LOS Hysteresis		0.5			dB

### Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>Transmitter</b>					
Differential Data Input Swing	V <sub>in</sub>	120		850	mV
Input Differential Impedance	Z <sub>in</sub>		100		$\Omega$
Transmit Disable Voltage	V <sub>D</sub>	2.0		V <sub>cc3</sub> +0.3	V
Transmit Enable Voltage	V <sub>en</sub>	0		+0.8	V
Transmit Disable Assert Time	V <sub>n</sub>			10	us
<b>Receiver</b>					
Differential Data Output Swing	V <sub>out</sub>	350		850	mV

Rise/Fall Time	Tr / Tf	24	100		ps
Loss of Signal –Asserted	VOH	2		Vcc3+0.3	V
Loss of Signal –Negated	VOL	0		+0.4	V

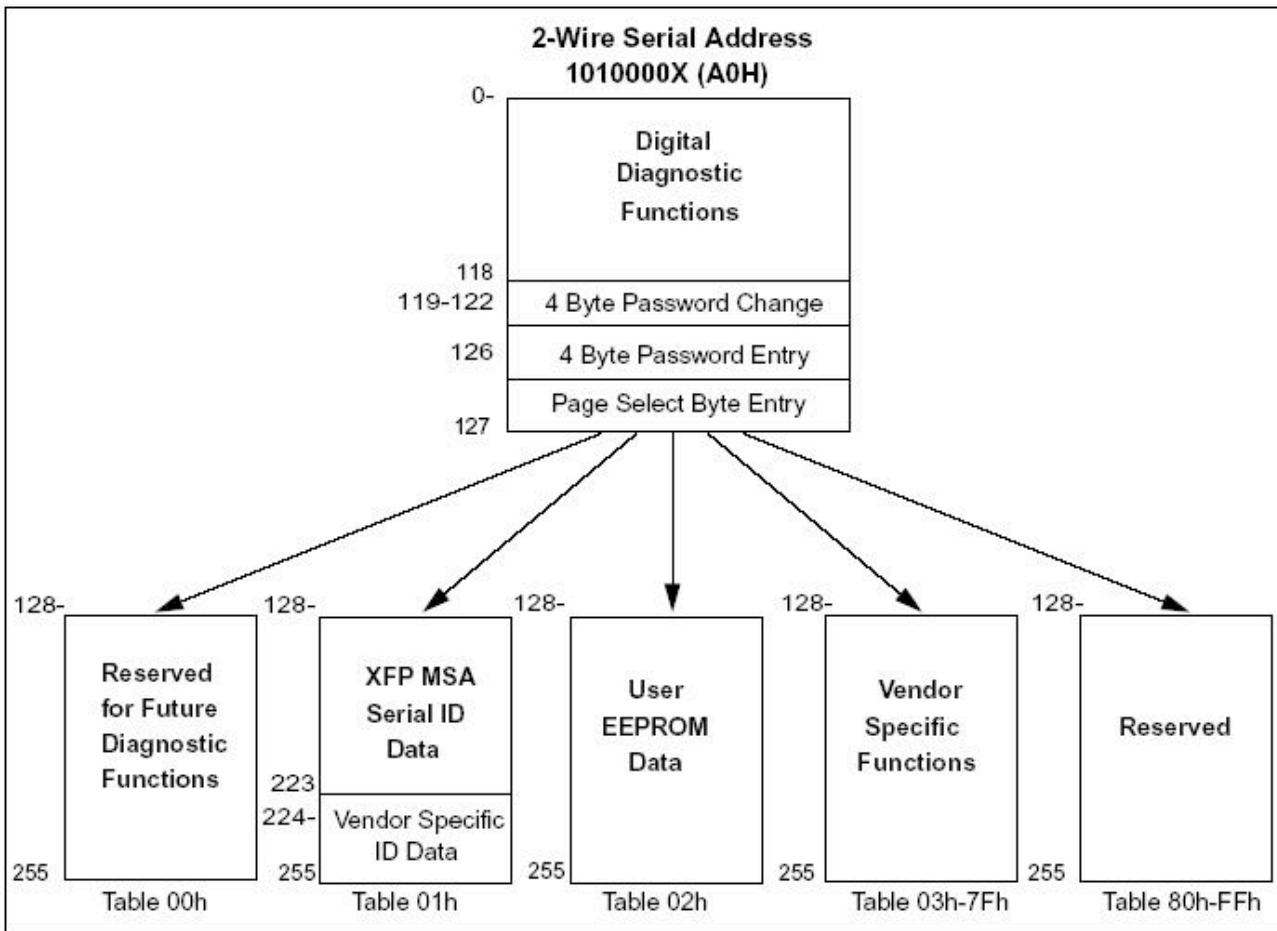
### Digital Diagnostic Function

OP-X10GD1XX-80 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, OPTINET XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

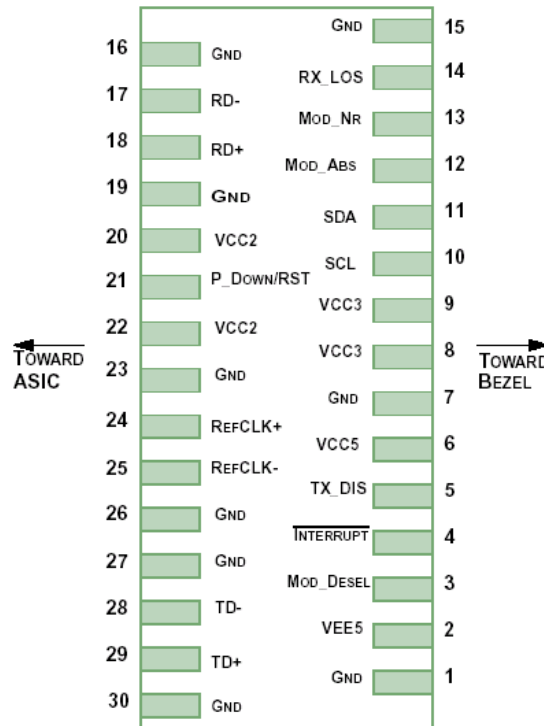
- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

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.



## Pin Definitions

Diagram of Connector Block Pins on Host Board



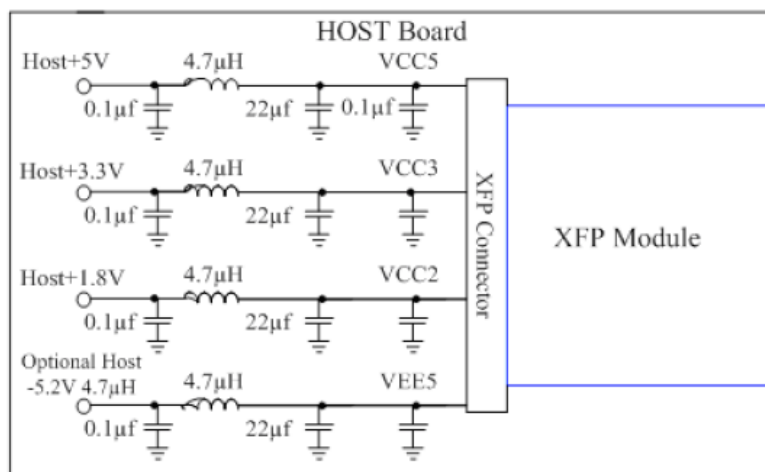
### Pin Definitions

Pin	Logic	Symbol	Name/Description	Note
1		GND	Module Ground	1
2		VEE5	Optional -5.2V 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	
4	LVTTL-O	Interrupt	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	MOD_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTL-O	MOD_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTL-O	RX_LOS	Receiver Loss Of Signal Indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1

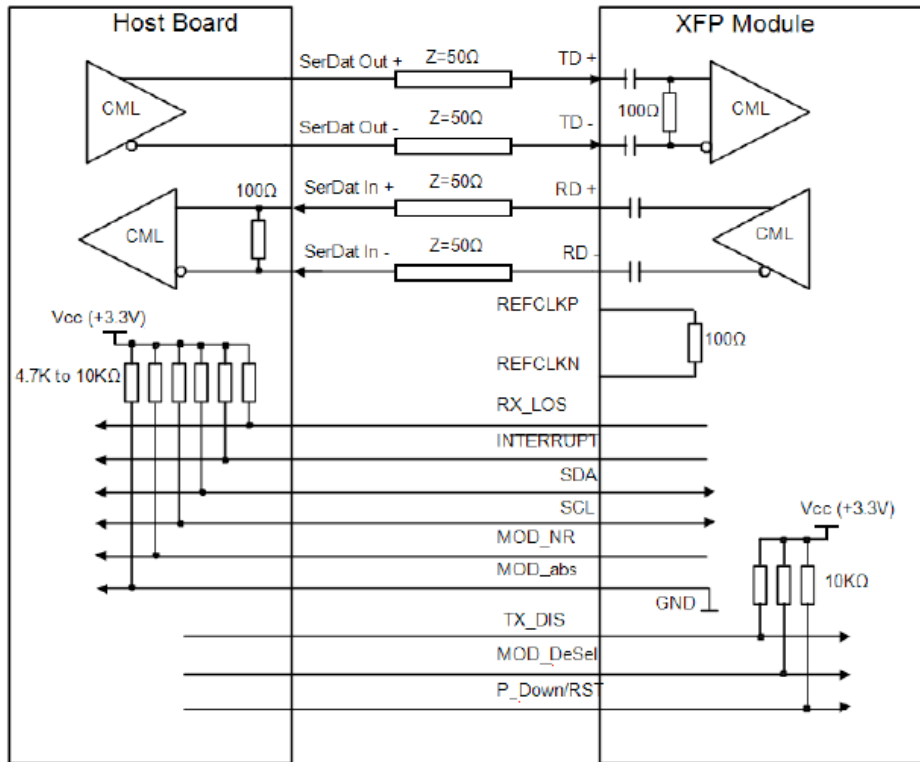
17	CML-O	RDN	Receiver Inverted Data Output	
18	CML-O	RDP	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply (Not required).	3
21	LVTTTL-I	P_DOWN/RST	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must 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)	3
23		GND	Module Ground	1
24	PECL-I	REFCLKP	Not used, internally terminated to 50ohm (100ohm diff).	4
25	PECL-I	REFCLKN	Not used, internally terminated to 50ohm (100ohm diff).	4
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TDN	Transmitter Inverted Data Input	
29	CML-I	TDP	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

1. Module ground pins GND are isolated from the module case and chassis ground within the module.  
 2. Open collector; Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.  
 3. The pins are open within module.  
 4. Reference Clock is not required.

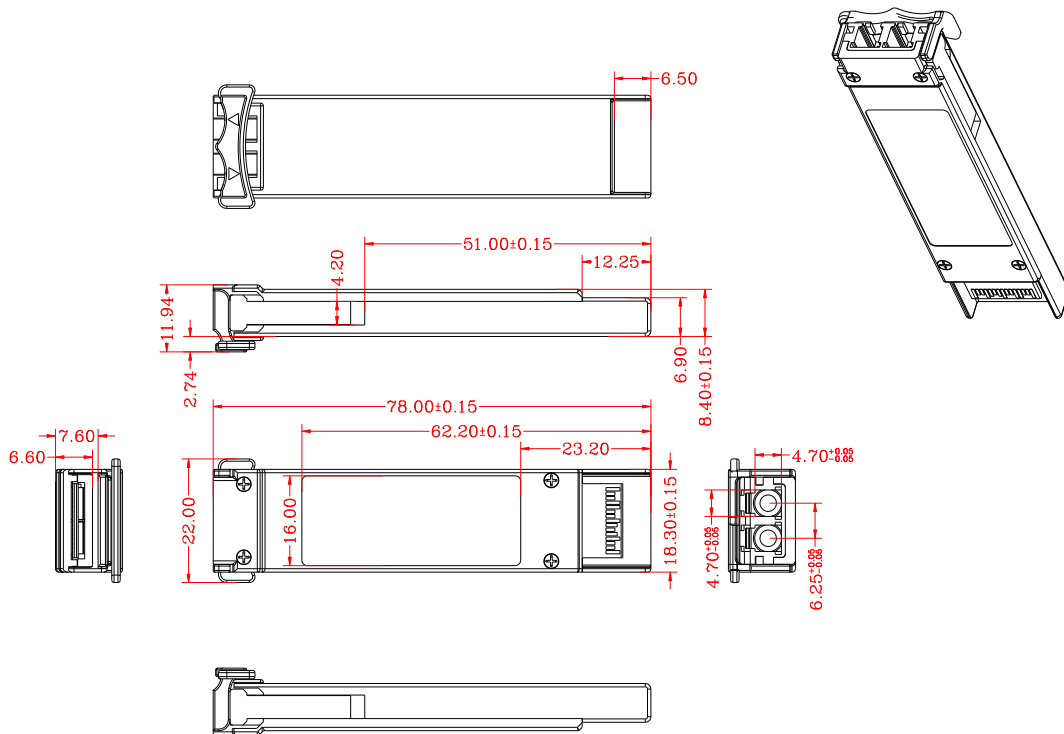
### Recommended Host Board Power Supply Unit



## Recommended Interface Circuit



## Mechanical Diagram





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### C-band $\lambda_c$ Wavelength Guide

ITU Channel Product Code	Frequency (THz)	Wavelength	ITU Channel Product Code	Frequency (THz)	Wavelength
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			



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## Ordering Information

Part No	Data Rate	Wavelength	Fiber	Reach	Temp	DDM
OP-X10GD1XX-80	10Gbps	100GHz C17-61	80KM	0~70°C	YES	Yes
OP-X10GD5XX-80	10Gbps	50GHz C17-61	80KM	0~70°C	YES	Yes

## Warnings

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

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.