OPC2488-xx80xxR

2.5Gb/s CWDM SFP Optical Transceiver, SMF, 1270~1610nm, 80km Reach

Features

- Support up to 2.5Gb/s data links
- Compliant with SFP MSA standard
- Hot pluggable SFP footprint
- 18 channel CWDM 1270nm~1610nm DFB laser and APD photo-detector
- Up to 80km on 9/125μm SMF
- Single 3.3V power supply
- Duplex LC connector
- Low power consumption, < 1.0 W
- Metal enclosure provides lower EMI
- Support Digital diagnostics, compliant with SFF-8472
- RoHS compliant and Lead Free
- Operating Temperature: Standard 0~70ºC Industrial -40~85ºC

Applications

- SDH STM-16 and SONET OC-48 system
- CWDM systems
- Switched backplane applications
- Router/Server interface
- Other Optical networking

Description

Optcore's OPC2488-xx80DxR is a high performance and cost effective CWDM (Coarse Wavelength-Division Multiplexing) SFP transceiver module for SDH STM-16/SONET OC-48 and 2x Fibre Channel long reach application. The 2.5Gbps CWDM SFP module provides a high capacity, high bandwidth communication solutions for multiplexed optical networks. This CWDM SFP transceiver module supports 80km transmission distance over single mode fiber. It features a highly reliable CWDM DFB transmitter and APD photodiode into duplex LC optical connector. There are 18 center wavelengths available from 1270nm to 1610nm with each step 20nm.

Additionally, the OPC2488-xx80DCR CWDM SFP module has been integrated with an enhanced digital diagnostic monitoring interface (DDMI) per SFF-8472, which providing real-time monitoring of the transceiver temperature, laser bias current, optical power, received optical power and transceiver supply voltage. These parameters are internally calibrated by default.

There are two versions of the series STM-16/OC-48 SFP CWDM optical transceiver modules for different applications. The Standard grade (0~70ºC) is for commonly commercial application and the Industrial grade (-40~85ºC) is made with robust and reliable components to meet the needs of Industrial Ethernet application under harsh environmental conditions.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5	4.0	V	
Storage Temperature	T_S	-40	85	°C	
Operating Humidity	RH	5	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			300	mA	
Case Operating Temperature	Tc	0		70	°C	Standard
		-40		85	°C	Industrial
Data Rate	DR		2.5		Gbps	STM-16 / OC-48
			2.125			2x Fibre Channel
Transmission Distance				80	km	9/125μm SMF

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	λ-7.5	λ	λ+7.5	nm	
Average Output Power	P_{out}	-2		3	dBm	1
Spectral Width (RMS)	σ			1	nm	
Extinction Ratio	ER	8.2			dB	1
Optical Rise/Fall Time	Tr-Tf			0.26	ns	2
Dispersion penalty	T_{DP}			3.9	dB	
Output Optical Eye	ITU-T G.957 Compliant (class 1 laser safety)					
Receiver						
Center Wavelength	λ_C	1270	-	1610	nm	
Receiver Sensitivity				-28	dBm	3
Receiver Overload		-9			dBm	3
LOS De-Assert	LOSD			-30	dBm	
LOS Assert	LOSA	-40			dBm	
LOS Hysteresis		0.5		6	dB	

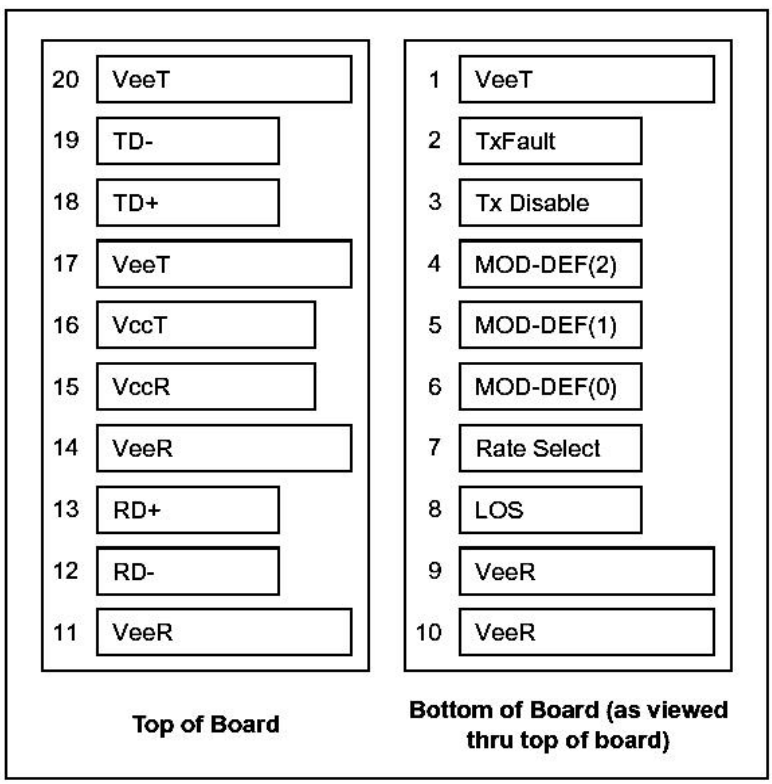
Note :

1. Measured at 2.5Gbps with PRBS 2^{23}– 1 NRZ test pattern.
2. Unfiltered, measured with a PRBS 2^{23}-1 test pattern @2.5Gbps
3. Measured at 2.5Gbps with PRBS 2^{23}– 1 NRZ test pattern for BER < $1x10^{-12}$

Electrical Input/Output Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Input differential impedance	Z_{IN}		100		Ω	
Data Input Swing Differential	Vin,pp	120		820	mV	
TX Disable - High	V_{IH}	2.0		Vcc+0.3	V	
TX Disable - Low	V_{IL}	0		0.8	V	
TX Fault - High	V_{OH}	2.0		Vcc+0.3	V	
TX Fault - Low	V_{OL}	0		0.5	V	
Receiver						
Data Output Swing Differential	Vout,pp	300	650	800	mV	
RX LOS - High	V_{LOS}	2.0		Vcc+0.3	V	
RX LOS - Low	V_{LOS}	0		0.8	V	

Pin Definitions



Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	Model present indication	3	Note 3

7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inverse Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V_{EET}	Transmitter Ground	1	

Notes:

1. TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2. TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:

   Low (0 to 0.8V): Transmitter on (>0.8V, < 2.0V): Undefined

   High (2.0 to 3.465V): Transmitter Disabled Open:Transmitter Disabled
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

   Mod-Def 0 is grounded by the module to indicate that the module is present

   Mod-Def 1 is the clock line of two wire serial interface for serial ID

   Mod-Def 2 is the data line of two wire serial interface for serial ID
4. LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
5. RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6. TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Digital Diagnostic Functions

Optcore 2.5Gb/s SFP CWDM optical transceiver support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the E2PROM defined in the GBIC standard, with the same electrical specifications. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, Optcore 2.5Gb/s SFP CWDM optical transceiver provide an optional enhanced digital diagnostic

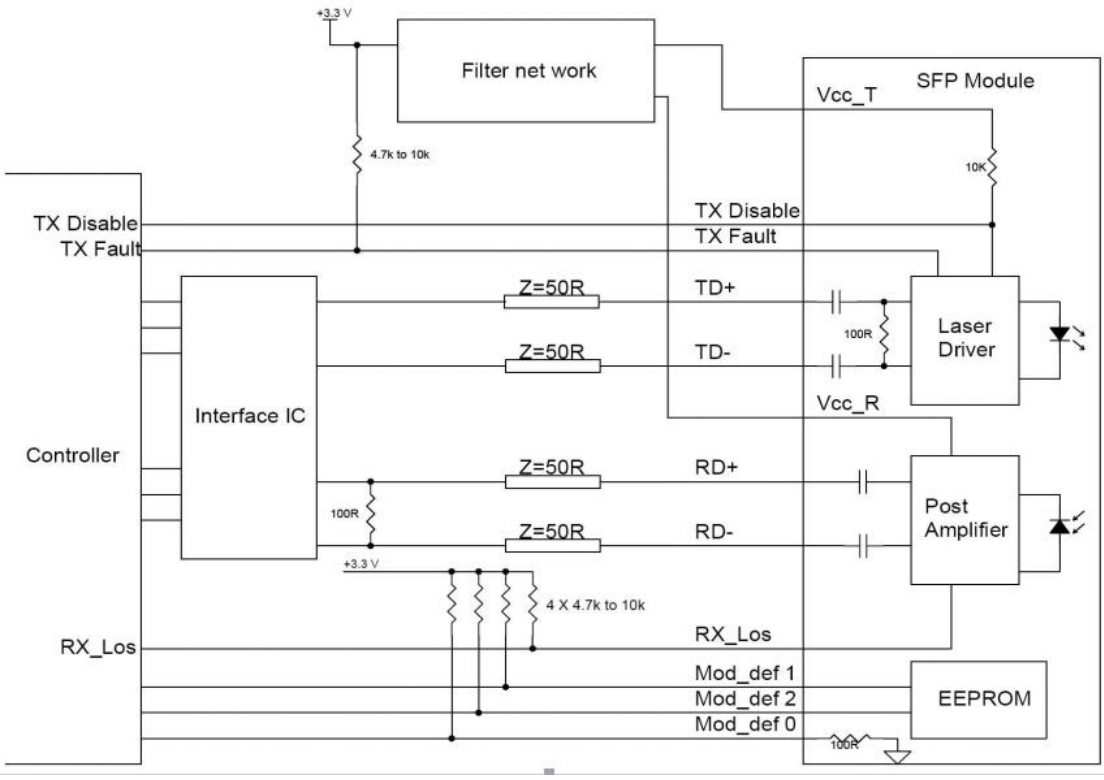
monitoring interface, which allows real-time access to device operating parameters such as **transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage**.It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in E2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

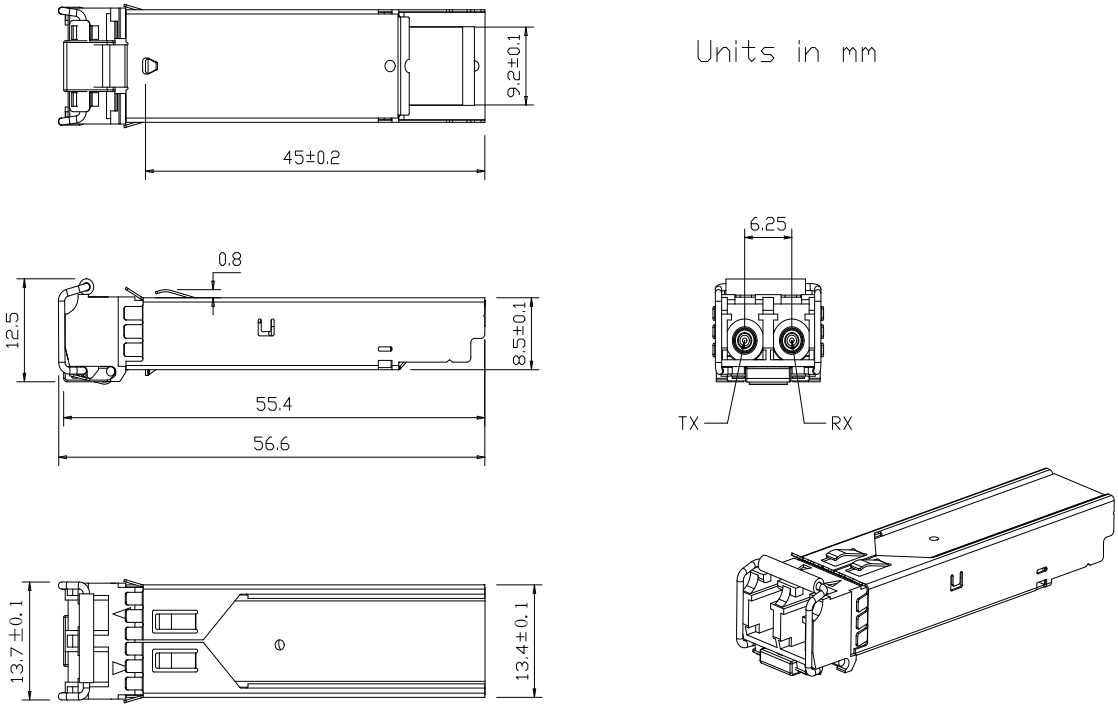
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver module. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Digital diagnostics for this 2.5G SFP CWDM optical transceiver is internally calibrated by default.

Typical Interface Circuit



Mechanical Dimensions



Ordering information

Part number	Description
Commercial Temperature	
OPC2488-2780DCR	2.5G CWDM SFP Transceiver, SMF, 1270nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-2980DCR	2.5G CWDM SFP Transceiver, SMF, 1290nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-3180DCR	2.5G CWDM SFP Transceiver, SMF, 1310nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-3380DCR	2.5G CWDM SFP Transceiver, SMF, 1330nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-3580DCR	2.5G CWDM SFP Transceiver, SMF, 1350nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-3780DCR	2.5G CWDM SFP Transceiver, SMF, 1370nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-3980DCR	2.5G CWDM SFP Transceiver, SMF, 1390nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-4180DCR	2.5G CWDM SFP Transceiver, SMF, 1410nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-4380DCR	2.5G CWDM SFP Transceiver, SMF, 1430nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-4580DCR	2.5G CWDM SFP Transceiver, SMF, 1450nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-4780DCR	2.5G CWDM SFP Transceiver, SMF, 1470nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-4980DCR	2.5G CWDM SFP Transceiver, SMF, 1490nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-5180DCR	2.5G CWDM SFP Transceiver, SMF, 1510nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-5380DCR	2.5G CWDM SFP Transceiver, SMF, 1530nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-5580DCR	2.5G CWDM SFP Transceiver, SMF, 1550nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-5780DCR	2.5G CWDM SFP Transceiver, SMF, 1570nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-5980DCR	2.5G CWDM SFP Transceiver, SMF, 1590nm, 80km, LC, DDM, 0ºC~+70ºC
OPC2488-6180DCR	2.5G CWDM SFP Transceiver, SMF, 1610nm, 80km, LC, DDM, 0ºC~+70ºC
Industrial Temperature	
OPC2488-2780DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1270nm, 80km, LC, DDM, -40ºC~+85ºC

OPC2488-2980DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1290nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-3180DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1310nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-3380DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1330nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-3580DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1350nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-3780DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1370nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-3980DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1390nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-4180DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1410nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-4380DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1430nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-4580DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1450nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-4780DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1470nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-4980DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1490nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-5180DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1510nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-5380DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1530nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-5580DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1550nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-5780DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1570nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-5980DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1590nm, 80km, LC, DDM, -40ºC~+85ºC
OPC2488-6180DTR	2.5G CWDM SFP Industrial Transceiver, SMF, 1610nm, 80km, LC, DDM, -40ºC~+85ºC

Warnings

Process plug

The transceiver optics is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles.It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.

Handling Precautions

The transceiver optics 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

The transceiver optics is a Class 1 laser product per international standard IEC 60825-1. Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

For more product information, visit us on the web at www.optcore.net