

VC-2.5G-SFP-CWxx-120

2.5Gb/s 120km SFP Transceiver (Multi-rate)

Hot Pluggable, Duplex LC, +3.3V, CWDM, DFB-LD&APD, Single-mode, DDM

Features

- ✓ Up to 2.67Gb/s Data Links
- ✓ Hot-Pluggable
- ✓ Duplex LC connector
- ✓ Up to 120km on 9/125μm SMF
- ✓ CWDM DFB laser transmitter
- ✓ APD receiver
- ✓ Single +3.3V Power Supply
- ✓ Monitoring Interface Compliant with SFF-8472
- ✓ Maximum Power<1W
- ✓ Industrial /Extended/ Commercial operating temperature erange: -40°C to 85°C/-5°C to 85°C/-0°C to 70°C Version available
- ✓ RoHS compliant and Lead Free



Applications:

- ✓ SONET OC-48 / SDH STM -16
- ✓ SONET OC-12 / SDH STM -4
- ✓ SONET OC-3 / SDH STM -1
- ✓ Gigabit Ethernet
- ✓ 1x/2xFibre Channel

Description:

Ascent Optics' VC-2.5G-SFP-CWxx-120 Transceivers are a high performance, cost effective module which have a duplex LC optics interface. They are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and Digital diagnostics functions are available via the 2-wire serial bus specified in SFF-8472. The receiver section uses a APD receiver and the transmitter uses a CWDM DFB laser, up to 32dB link budget ensure this module SONET OC-48 / SDH STM -16120km application.

Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T _s	-40		+85	°C
Supply Voltage	V _{CC}	-0.5		4	V
Relative Humidity	RH	0		85	%

Recommended Operating Environment

Table 2 - Recommended Operating Environment

Parameter		Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	Industrial	T _C	-40		85	°C
	Extended		-5		85	°C
	Commercial		0		+70	°C
Supply Voltage		V _{CC}	3.135		3.465	V
Supply Current		I _{CC}			300	mA
Inrush Current		I _{surge}			I _{CC} +30	mA
Maximum Power		P _{max}			1	W

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See table 3 below for "xx" values

Table 3 - λC Wavelength Guide

Wavelength guide					
code	λ_c	code	λ_c	code	λ_c
27	1270nm	39	1390nm	51	1510nm
29	1290nm	41	1410nm	53	1530nm
31	1310nm	43	1430nm	55	1550nm
33	1330nm	45	1450nm	57	1570nm
35	1350nm	47	1470nm	59	1590nm
37	1370nm	49	1490nm	61	1610nm

Electrical Characteristics

VC-2.5G-SFP-CW_{xx}-120(CWDM DFB and APD, 120km Reach)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ_c	-6.5	CWDM	+6.5	nm	
Spectral Width@-20dBm	σ			1	nm	
Sidemode Supression ratio	SSRmin	30			dB	
Optical Output Power	P _{out}	0		5	dBm	1
Extinction Ratio	ER	8.2			dB	
Optical Rise/Fall Time	t _r / t _f			260	ps	2
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Generated Transmitter Jitter (peak to peak)	J _{TXp-p}			0.07	UI	
Total Generated Transmitter Jitter (rms)	J _{TXrms}			0.007	UI	
Output Eye Mask	Compliant with eye mask Telcordia GR-253-GORE					
Receiver Section:						
Optical Input Wavelength	λ_c	1470		1610	nm	
RX Sensitivity @ OC-48/STM-16	Sen _I			-32	dBm	
RX_LOS Assert	LOS _A	-45			dBm	
RX_LOS De-assert	LOS _D			-34	dBm	
RX_LOS Hysteresis	LOS _H	0.5			dB	
Receiver Overload	P _{ol}	-9			dBm	

General Specifications:						
Data Rate	BR	155		2667	Mb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125 μ m SMF@ OC-48/STM-16	L _{MAX1}		80		km	
Max. Supported Link Length on 9/125 μ m SMF@ 2xFibre channel	L _{MAX2}		85		km	
Max. Supported Link Length on 9/125 μ m SMF@ Gigabit Ethernet	L _{MAX3}		100		km	
Max. Supported Link Length on 9/125 μ m SMF@ OC-12/STM-4	L _{MAX4}		100		km	
Max. Supported Link Length on 9/125 μ m SMF@ OC-4/STM-1	L _{MAX5}		100		km	

Table 4 - Optical and Electrical Characteristics

Note:

- 1.Compliant with FDA/CDRH and EN (IEC) 60825 regulations (Class 1 Laser Safety).
- 2.20-80%.
- 3.Measured with PRBS $2^{31}-1$ at 10^{-12} BER
- 4.Measured with PRBS 2^7-1 at 10^{-12} BER
- 5.Measured with PRBS $2^{23}-1$ at 10^{-12} BER

Diagnostic Monitoring Interface

Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	± 3.0	$^{\circ}\text{C}$
98-99	VCC3 Internal Supply Voltage	± 3.0	%
100-101	Laser Bias Current	± 10	%
102-103	Tx Output Power	± 3.0	dB
104-105	Rx Input Power	± 3.0	dB

Pin Assignment

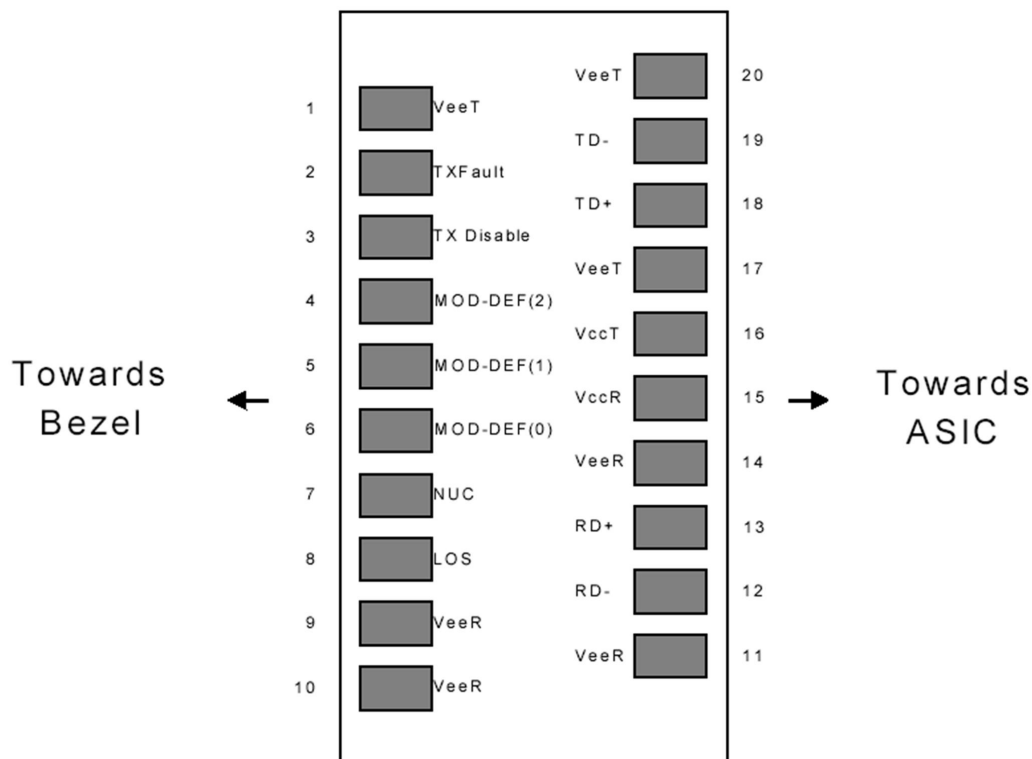


Diagram of Host Board Connector Block Pin Numbers and Names

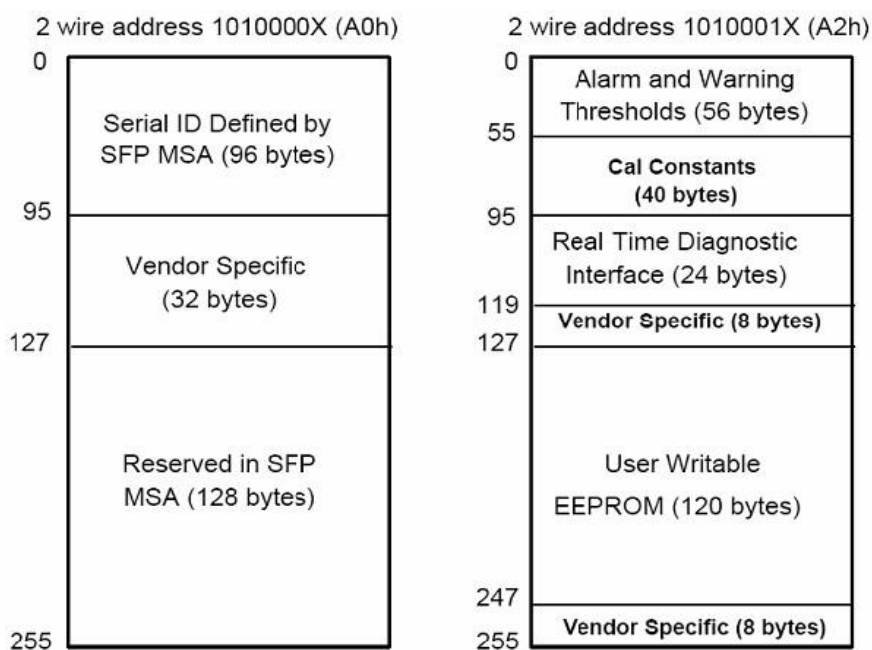
Pin Description

Pin No	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connected	3	4
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6

14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Digital Diagnostic Memory Map

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I²C interface at address A0h and A2h. The memory is mapped in Table 1. Detailed ID information(A0h) is listed in Table 2. And the DDM specification at address A2h. For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.



Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	
11	1	Encoding	NRZ(03h)
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber,units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: Ascent Optics
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "AOC-XX48-R120D"
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number
84-91	8	Date code	Ascent Optics' Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)

Vendor Specific ID Fields			
96-127	32	Readable	Ascent Optics specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

Notes:

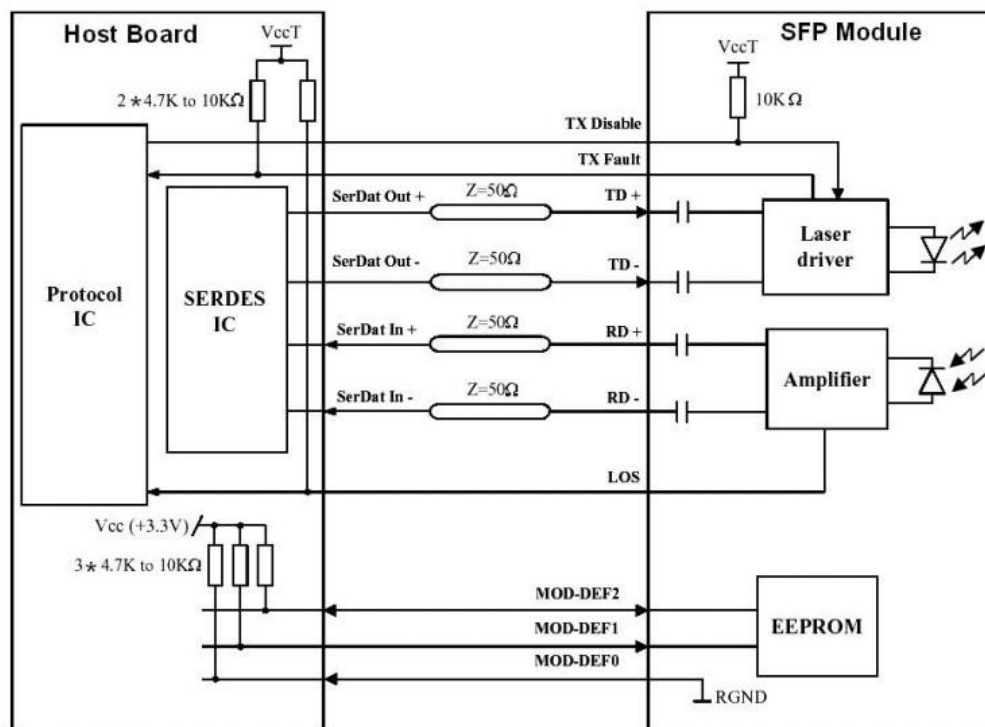
- 1.Circuit ground is internally isolated from chassis ground.
- 2.Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 3.Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF(0) pulls line low to indicate module is plugged in.
- 4.Rate select is not used
- 5.LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 6.AC Coupled

Regulatory Compliance

The AOCP-XX48-R120D complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

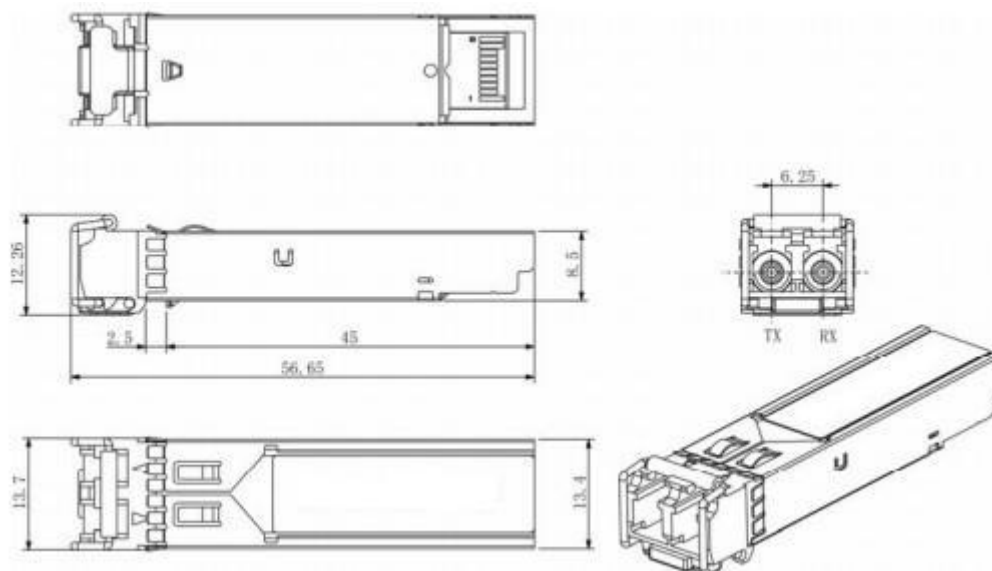
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

Recommended Circuit



SFP Host Recommended Circuit

Mechanical Dimensions



Mechanical Drawing

Ordering information

Part Number	Product Description
VC-2.5G-SFP-CWxx-120	CWDM, 2.488Gbps, 120km, 0°C ~ +70°C, With DDM