

Professional, Struggle, Cooperation



FA9XX

10Gb/s SFP+ Active Optical Cable (AOC XXm)

Serene Nexus

10Gbps SFP+ Active Optical Cable (AOC)

Serene Nexus' high speed 10Gb/s Active Optical Cable (AOC) Assembly for SFP+ Applications is designed for 10 Gbps Ethernet equipment, providing high-speed transmission up to 100 meters of multimode fiber and enabling high port density and ease of handling of similar copper cables. The AOC transmits a single channel operating up to 10.3125 Gbps, using industry leading VCSEL technology and an advanced new light-engine design.

Features:

- ✧ Data-rate of 10.3125Gbps operation
- ✧ 850nm VCSEL laser and PIN photodetector
- ✧ Supports Fiber Channel Physical Interface-5 (FC-PI-5) Specification
- ✧ Supports SFF-8431 Specifications for Enhanced Small Form Factor Pluggable Module SFP+
- ✧ Fiber link up to 100 meters on 2000MHz/km MMF
- ✧ +3.3V single power supply and Hot Pluggable
- ✧ Operating case temperature: 0 to +70°C
- ✧ Full set of diagnostic features
- ✧ Low power consumption
- ✧ Bend insensitive fiber

Applications:

- ✧ 10 Gigabit Ethernet (10GbE)
- ✧ Cost effective 10G SFP+ link solution
- ✧ High Performance Computing clusters
- ✧ System Internal data link solution
- ✧ System cascade applications
- ✧ Proprietary Interconnects

Standards:

- ✧ Mechanical specifications compliant with SFF-8432
- ✧ Electrical specifications compliant with SFF-8431
- ✧ RoHS Compliant

Description:

Serene Nexus' high speed SFP+ AOC (Active Optical Cable) assemblies use active circuits to support longer distances than standard passive or Active SFP+ Copper Cables. They are designed for high speed, short range data link via optical fiber wire. SFP+ AOC cables provide high performance Enhanced Small Form Factor Pluggable (SFP+) interface and is a cost effective solution for Data Center/ storage and all short range data application.

SFP+ Connectors meet the harshest external operating conditions including temperature, humidity and EMI interference. Final test and quality systems assure high quality cable assemblies conforming to the high-speed electrical performance requirements in industry specifications.

SFP+ AOC modules allow hardware manufactures to achieve high port density, configurability and utilization at a very low cast and reduced power budget.

● **Recommended Operating Environment:**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Standard Tc	0	25	+70	°C
Power Supply Voltage	Vcc	3.13	3.30	3.47	V
Power Supply Current	Icc			260	mA
Power Consumption			600	800	mW
Power Supply Noise Tolerance	mVpp			200	mV

● **Absolute Maximum Ratings:**

Parameter	Symbol	Min.	Typical	Max.	Unit
Maximum Supply Voltage	Vcc	0		+3.6	V
Storage Temperature	Ts	0		+70	°C
Transmitter single-ended input voltage	mVpp			1400	mV

Relative Humidity	RH	5		95	%
-------------------	----	---	--	----	---

● Active Cable Transmitter Optical and Electrical Characteristics per Lane

Parameter	Symbol	Min	Typical	Max	Unit
Centre Wavelength	λ_c	840	850	860	nm
Spectral Width (RMS)	$\Delta\lambda$			0.45	nm
Average Output Power	Pout	-6.5		-1	dBm
Extinction Ratio	ER	3.5			dB
Transmitter Dispersion Penalty	TDP			3.9	dB
Relative Intensity Noise	Rin			-128(12dB reflection)	dB/Hz
Optical Return Loss Tolerance				12	dB
Optical Rise/Fall Time (20%~80%)	tr/tf	0.03			ns
Data Input Swing Differential	VIN	90		350	mV
C common mode voltage tolerance		15			mV
Data Dependent Input Jitter	DDJ			0.1	UI
Data Input Total Jitter	TJ			0.28	UI
Input Differential Impedance	ZIN	90	100	110	Ω
Transmit Disable Input	High	VIH	2.0	Vcc+0.3	V
	Low	VIL	0	0.8	V
Transmit Enable Output	High	VOH	2.4	Vcc+0.3	V
	Low	VOL	0	0.4	V

● Active Cable Receiver Optical and Electrical Characteristics per Lane

Parameter	Symbol	Min	Typical	Max	Unit
Centre Wavelength	λ_c	840	850	860	nm
Receiver Sensitivity	Psens			-11	dBm
Receiver Overload	Pin			-1.0	dBm
LOS De-Assert	LOSD			-11	dBm
LOS Assert	LOSA	-30			dBm
LOS Hysteresis		0.5		4	dB
Stressed Sensitivity in OMA				-7.5	dBm
Receiver Reflectance				-12	dB
Data Output Swing Differential	Vout	300		850	mV

Output Differential Impedance		Zon	90	100	110	Ω
LOS Output	High	VOH	2.4		Vcc+0.3	V
	Low	VOL	0		0.4	V

● Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to 70	°C	$\pm 3^\circ\text{C}$	Internal / External
Voltage	3.0 to 3.6	V	$\pm 3\%$	Internal / External
Bias Current	0 to 100	mA	$\pm 10\%$	Internal / External
TX Power	-6.5 to -1	dBm	$\pm 3\text{dB}$	Internal / External
RX Power	-18 to 0	dBm	$\pm 3\text{dB}$	Internal / External

● Pin Definitions

PIN	Symbol	Description	Remarks
1	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
2	Tx_Fault	Transmitter Fault. Not supported	
3	Tx_Disable	Transmitter Disable. Laser output disable on high or open	Disabled: TDIS >2V or open Enabled: TDIS <0.8V
4	SDA	2-wire Serial Interface Data Line	Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V
5	SCL	2-wire Serial Interface Clock Line	
6	MOD_ABS	Module Absent. Grounded within the module.	
7	RS0	No connection required	
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	LOS is open collector output
9	RS1	No connection required	
10	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
11	VEER	Receiver ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	

14	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
15	VCCR	Receiver power supply	
16	VCCT	Transmitter power supply	
17	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground

● Mechanical Characteristics

Parameter	Min	Typ	Max	Unit
Cable Installation Tension			98	N
Cable Operating Tension			31	N
Operating Cable Bend Radius	3			cm

● Pin Diagram

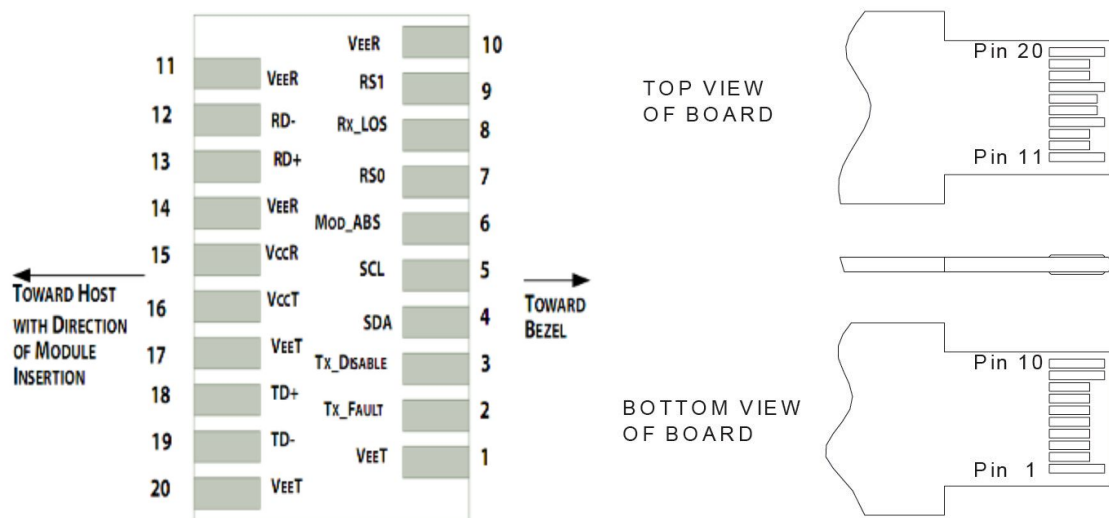
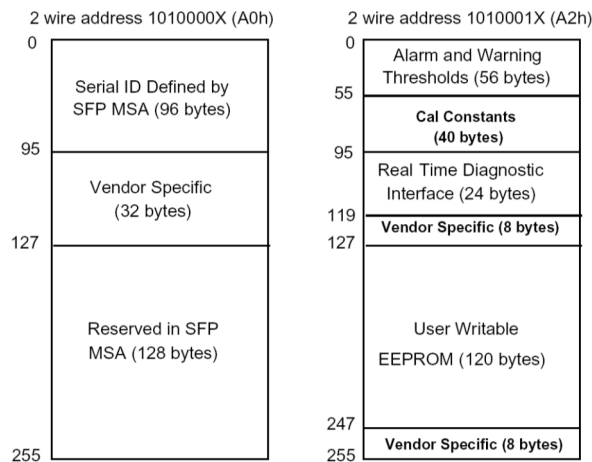


Diagram of Host Board Connector Block Pin Numbers and Names

● SFP Module EEPROM Information and Management

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”.



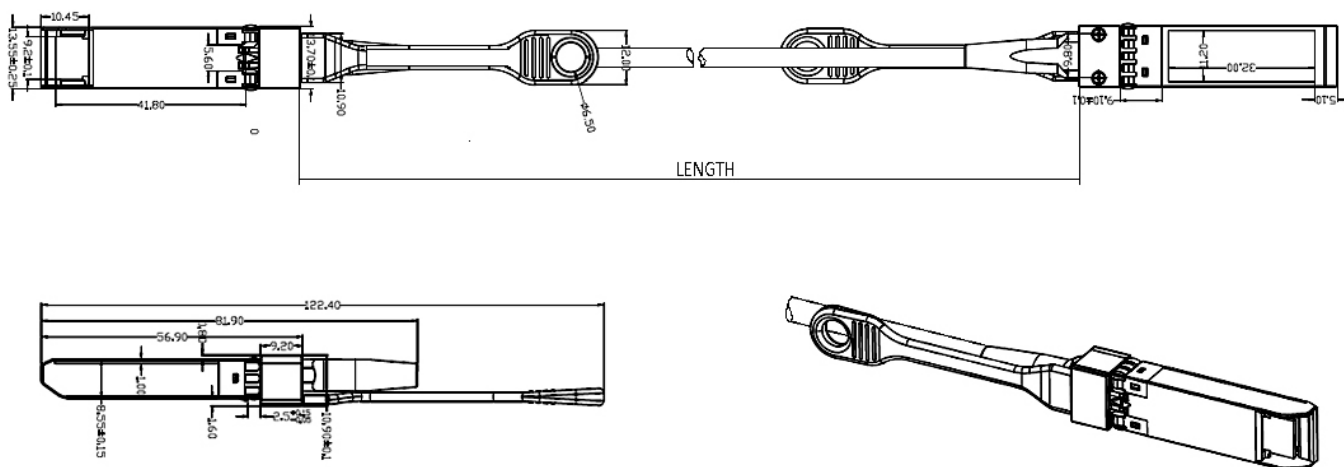
Digital Diagnostic Memory Map (Specific Data Field Descriptions)

Data Address	Field Size (Bytes)	Name of field	Description of field
BASE ID FIELDS			
0	1	Identifier	Type of serial transceiver (03h=SFP)
1	1	Ext. Identifier	Extended identifier of type of serial transceiver(04h)
2	1	Connector	Code for connector type (07=LC)
3-10	8	Transceiver	Code for electronic compatibility or optical compatibility
11	1	Encoding	Code for serial encoding algorithm (64B/66B (06h))
12	1	BR, Nominal	Nominal bit rate, units of 100 MBits/sec(67h)
13	1	Reserved	(0000h)
14	1	Length(9um) - km	Link length supported for 9/125 um fiber, units of km
15	1	Length (um)	Link length supported for 9/125 um fiber, units of 100 m
16	1	Length (50um)	Link length supported for 50/125 um fiber, units of 10 m
17	1	Length (62.5um)	Link length supported for 62.5/125 um fiber, units of 10 m

18	1	Length (Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor name	SFP transceiver vendor name (ASCII)
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP transceiver vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-62	3	Reserved	
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)
EXTENDED ID FIELDS			
64-65	2	Options	Indicates which optional 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 provided by vendor (ASCII)
84-91	8	Date code	Vendor's manufacturing date code
92-94	3	Reserved	
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
VENDOR SPECIFIC ID FIELDS			
96-127	32	Read-only	Vendor specific data, read only
128-511	384	Reserved	
512-n			Vendor specific

EEPROM Serial ID Memory Contents (A0h)

● Mechanical Dimensions




● Ordering Information

Part Number	Description	Temp. Range
FA901	SFP+ Active Optical Cable Assembly, 1m	0-70°C
FA902	SFP+ Active Optical Cable Assembly, 2m	0-70°C
FA903	SFP+ Active Optical Cable Assembly, 3m	0-70°C
FA904	SFP+ Active Optical Cable Assembly, 4m	0-70°C
FA905	SFP+ Active Optical Cable Assembly, 5m	0-70°C
FA907	SFP+ Active Optical Cable Assembly, 7m	0-70°C
FA910	SFP+ Active Optical Cable Assembly, 10m	0-70°C
FA920	SFP+ Active Optical Cable Assembly, 20m	0-70°C
FA930	SFP+ Active Optical Cable Assembly, 30m	0-70°C
... FA9100	... SFP+ Active Optical Cable Assembly, 100m	... 0-70°C

● **Important Notice**



Important Notice:



DO NOT
Kink
the
Cable

DO NOT
Over-Bend
the Cable
Behind the
Connector

DO NOT
Twist
the
Connector

 **ANTISTATIC**  **FRAGILE**

Fiberoptics Technology reserves the right to make changes to the products or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such products or information.

Published by Serene Nexus, Inc.

Copyright © Serene Nexus
All Rights Reserved