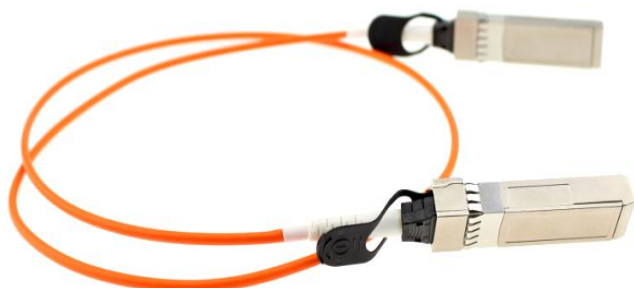


10G SFP+ Active Optical Cable

P/N: WST-SFP+AOCxCxxx



Features:

- Electrical interface compliant to SFF-8431
- Hot Pluggable
- 850nm VCSEL transmitter, PIN photo-detector receiver
- Up to 300m on OM3 MMF
- Operating case temperature: 0 to 70°C
- All-metal housing for superior EMI performance
- RoHS compliant (lead free)

Specification:

- 10 Gigabit Ethernet
- 4G and 8G Fibre Channel Applications
- 1x InfiniBand QDR. DDR, SDR
- High-performance computing clusters
- Servers, switches, storage and host card adapters

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	0	3.6	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

SFP+ AOC Specifications

Parameter	Description
Module Form Factor	SFP+ (Supports SFF8431/SFF8432/SFF8472)
Protocols Supported	InfiniBand, Ethernet, Fiber Channel
Channel Data Rate	Rate 1 to 10.3125Gbps
BER	<10 ⁻¹²
Operating Case Temperature	0 to + 70°C

Storage Temperature	-20 to + 85°C
Supply Voltage	3.3V
Supply current	230mA per end typical
Management Interface Serial	I ² C (Supports SFF8472)

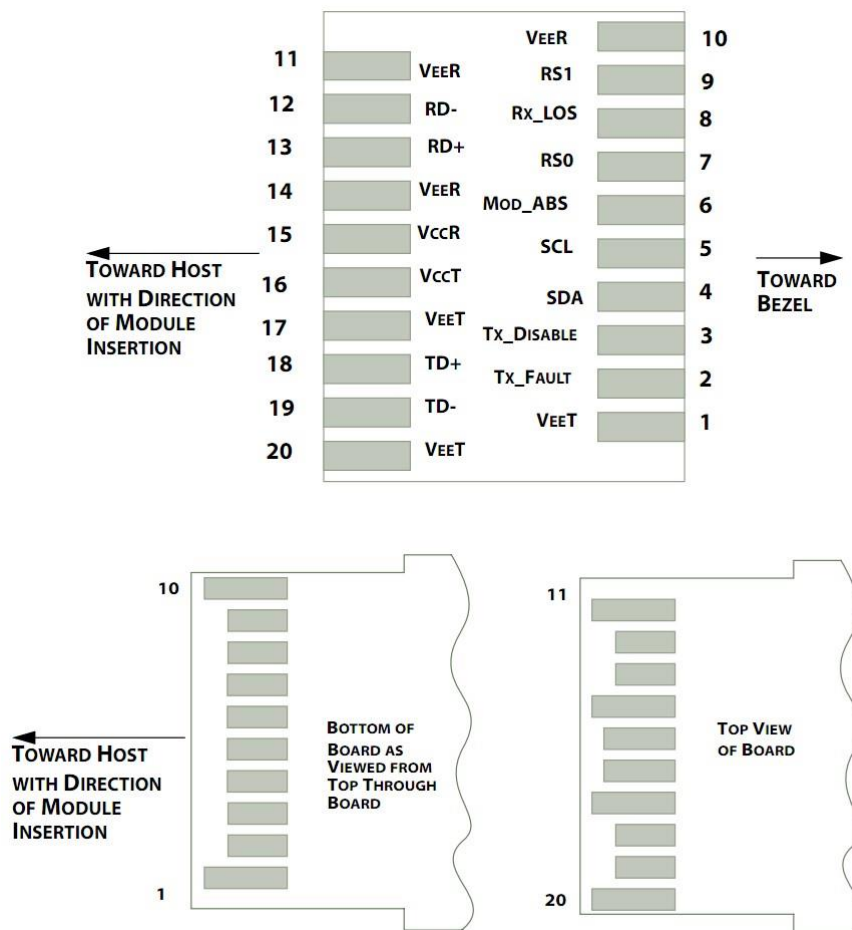
Optical characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_t	840	850	860	nm	
RMS spectral width	Pm	-	-	Note 1	nm	
Average Optical Power	Pavg	-6.5	-	-1	dBm	2
Extinction Ratio	ER	3.5	-	-	dB	3
Transmitter Dispersion Penalty	TDP	-	-	3.9	dB	
Relative Intensity Noise	Rin	-	-	-128	dB/Hz	12dB reflection
Optical Return Loss Tolerance		-	-	12	dB	
Receiver						
Center Wavelength	λ_r	840	850	860	nm	
Receiver Sensitivity	Psens	-	-	-11.1	dBm	4
Stressed Sensitivity in OMA		-	-	-7.5	dBm	4
Los function	Los	-30	-	-12	dBm	
Overload	Pin	-	-	-1.0	dBm	4
Receiver Reflectance		-	-	-12	dB	

Note:

1. Trade-offs are available between spectral width, center wavelength and minimum OMA, as shown in table 6.
2. The optical power is launched into MMF
3. Measured with a PRBS 231-1 test pattern @10.3125Gbps
4. Measured with a PRBS 231-1 test pattern @10.3125Gbps, BER≤10⁻¹².

Pin Description**SFP+ module and Host Electrical contact definition**

Pin No.	Pin Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	1
2	Tx_Fault	Transmitter Fault Indication	3	2
3	Tx_Disable	Transmitter Disable	3	3
4	SDA	I2C Data Line	3	4
5	SCL	I2C Clock Line	3	4
6	MOD_ABS	Module Absent	3	4
7	RS0	No connection requirement	3	
8	Rx_LOS	Receiver Loss of Signal indication	3	5
9	RS1	Rate Select 1,control SFP+ transmitter	1	6
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground	1	1

12	RD-	Receiver inverted Data Output	3	
13	RD+	Receiver non-inverted Data Output	3	
14	VeeR	Receiver Ground	1	1
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	1
18	TD+	Transmitter non-inverted Data Input	3	
19	TD-	Transmitter inverted Data Input	3	
20	VeeT	Transmitter Ground	1	1

Note:

1. Circuit ground is internally isolated from chassis ground
2. Open-Collector outputs, asserted when LD and/or APC function fail.
3. Disable when high voltage (>2.0V or Open)
4. Should be pulled up with 4.7K Ω – 10K Ω on host board to a voltage between 2.0V and 5.5V. MOD_ABS pulls line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7K Ω – 10K Ω to on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. RS1 is connected to VeeT in module.

Digital Diagnostic Monitor Interface

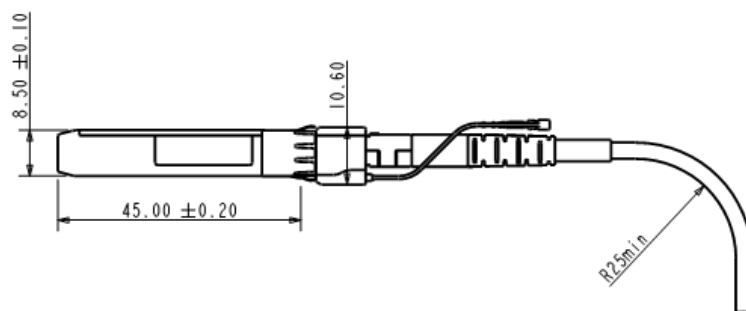
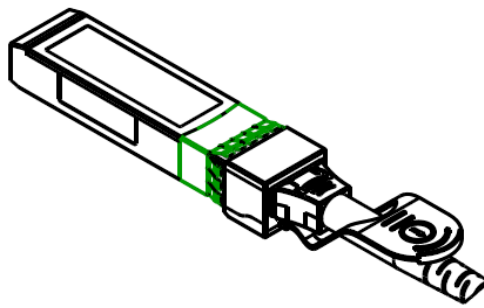
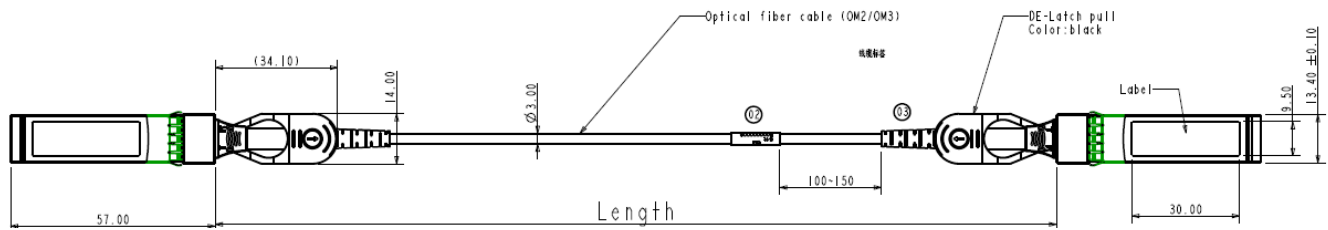
Two-wire interface ID: Data Fields – Address A0h

Data Address	Size (Bytes)	Name of Field	Description of Field
BASE ID FIELDS			
0	1	Identifier	Type of transceiver
1	1	Ext.Identifier	Extended identifier of type transceiver
2	1	Connector	Code for connector type
3-10	8	Transceiver	Code for electronic compatibility or optical compatibility
11	1	Encoding	Code for high speed serial encoding algorithm
12	1	BR, Nominal	Nominal signaling rate, units of 100MBd.
13	1	Rate Identifier	Type of rate select functionality
14	1	Length(SMF, km)	Link length supported for single mode fiber, units of km
15	1	Length(SMF)	Link length supported for single mode fiber, units of 100 m
16	1	Length(50um)	Link length supported for 50 um OM2 fiber, units of 10 m
17	1	Length(62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Length(OM3)	Link length supported for 50 um OM3 fiber, units of 10 m
20-35	16	Vendor name	SFP vendor name (ASCII)
36	1	Unallocated	

37-39	3	Vendor OUI	SFP vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-61	2	Wavelength	Laser wavelength
62	1	Unallocated	
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)
EXTENDED ID FIELDS			
64-65	2	Options	Indicates which optional transceiver signals are implemented
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	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented(if any) in the transceiver
93	1	Enhanced Options	Indicates which optional enhanced features are implemented(if any) in the transceiver
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
VENDOR SPECIFIC ID FIELDS			
96-191	32	User EEPROM	User writable non-volatile memory
192-255	128	Vendor Specific	Vendor Specific EEPROM

Diagnostics: Data Fields – Address A2h

Data Address	Size (Bytes)	Name of Field	Description of Field
DIAGNOSTIC AND CONTROL/STATUS FIELDSBASE ID FIELDS			
0-39	40	A/W Thresholds	Diagnostic Flag Alarm and Warning Thresholds
40-55	16	Unallocated	
56-91	36	ExtCal Constants	Diagnostic calibration constants for optional External Calibration
92-94	3	Unallocated	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated)
106-109	4	Unallocated	
110	1	Status	Optional Status Bits
111	1	Reserved	Reserved for SFF-8079
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits
114-115	2	Unallocated	
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits
118-119	2	Ext Status/Control	Extended module control and status bytes
GENERAL USE FIELDS			
120-127	8	Vendor Specific	Vendor specific memory addresses
128-247	120	User EEPROM	User writable non-volatile memory
248-255	8	Vendor Control	Vendor specific control addresses

Mechanical drawing**Figure1.Mechanical Specifications**

Order information

Part No	Specification						
	Package	Datarate	Fiber	Cable Type	Cable Length	Temp.	Application
WST-SFP+AOCLC012	SFP+	10.3Gbps	OM2	LSZH PE	1m	0~70°C	10GbE
WST-SFP+AOCLC032	SFP+	10.3Gbps	OM2	LSZH PE	3m	0~70°C	10GbE
WST-SFP+AOCLC052	SFP+	10.3Gbps	OM2	LSZH PE	5m	0~70°C	10GbE
WST-SFP+AOCLC102	SFP+	10.3Gbps	OM2	LSZH PE	10m	0~70°C	10GbE
WST-SFP+AOCLC152	SFP+	10.3Gbps	OM2	LSZH PE	15m	0~70°C	10GbE
WST-SFP+AOCLC202	SFP+	10.3Gbps	OM2	LSZH PE	20m	0~70°C	10GbE
WST-SFP+AOCLC302	SFP+	10.3Gbps	OM2	LSZH PE	30m	0~70°C	10GbE
WST-SFP+AOCLC502	SFP+	10.3Gbps	OM2	LSZH PE	50m	0~70°C	10GbE
WST-SFP+AOCLCH02	SFP+	10.3Gbps	OM2	LSZH PE	100m	0~70°C	10GbE

Note:

Cable type: LSZH

Fiber: 1m~100m OM2; 101m~300m, OM3

*Any special request for Cable Types (OFNR or OFNP), please contact our sales for detail information

Modification History

Revision	Date	Description	Originator	Review	Approved
V1.0	9-Aug-2017	Revised	Ivy Chen	Min Liu	Min Liu
V1.1	17-Nov-2017	P/N revised	Ivy Chen	Min Liu	Min Liu



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