


10G SFP+ Active Optical Cables P/N: NDAC-SFP10G-XXXC (xxx: 001 to 300)

Features

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



Applications

- 10-Gigabit Ethernet
- 4G/8G Fibre Channel
- InfiniBand QDR/DDR/SDR
- High-Performance Computing (HPC)
- Servers, switches, storage and host card adapters

Description

The 10G SFP+ Active Optical Cables (AOCs) are direct-attach fiber assemblies with SFP+ connectors. They are suitable for short distances and offer a cost-effective solution to connect within racks and across adjacent racks. The length is up to 300 meters using OM3 MMF.

Absolute Maximum Ratings

Table 1 - 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	P _m	-	-	Note 1	nm	
Average Optical Power	P _{avg}	-6.5	-	-1	dBm	2
Extinction Ratio	ER	3.5	-	-	dB	3
Transmitter Dispersion Penalty	TDP	-	-	3.9	dB	
Relative Intensity Noise	R _{in}	-	-	-128	dB/Hz	12dB reflection
Optical Return Loss Tolerance		-	-	12	dB	
Receiver						
Center Wavelength	λ_r	840	850	860	nm	
Receiver Sensitivity	P _{sens}	-	-	-11.1	dBm	4
Stressed Sensitivity in OMA		-	-	-7.5	dBm	4
Los function	Los	-30	-	-12	dBm	
Overload	P _{in}	-	-	-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.

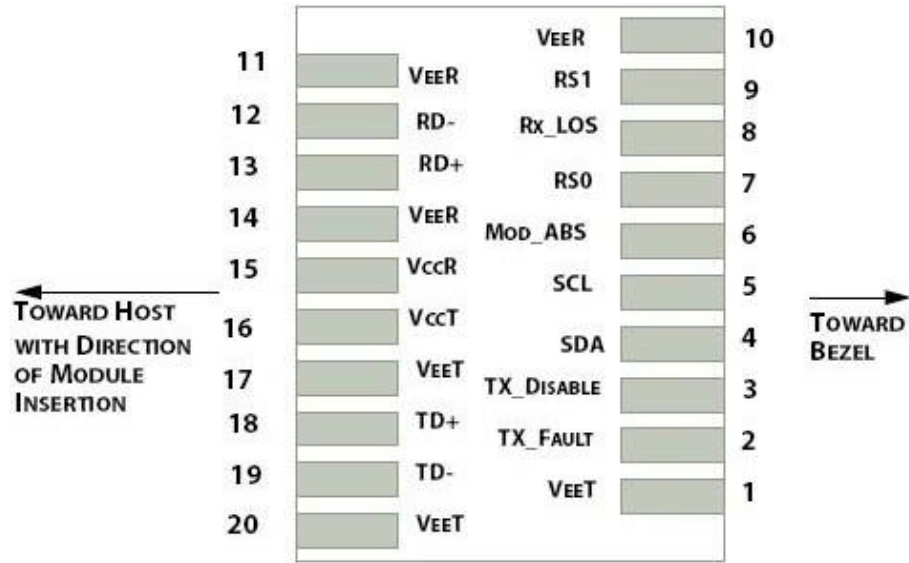


Figure 1: Interface to Host PCB

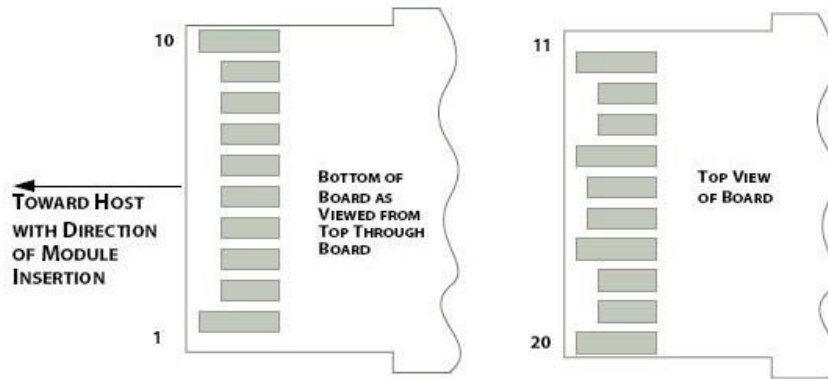


Figure 2: Module Contact Assignment

Pin definition

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

[1] Module circuit ground is isolated from module chassis ground within the module.

[2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ.Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

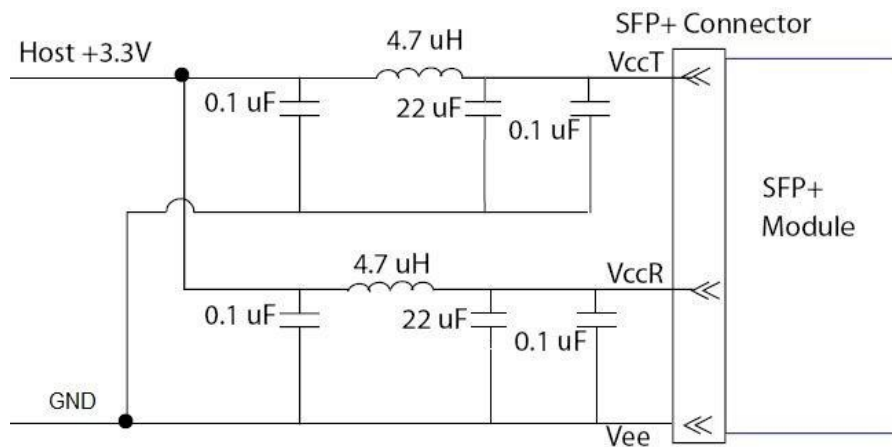


Figure3. Host Board Power Supply Filters Circuit

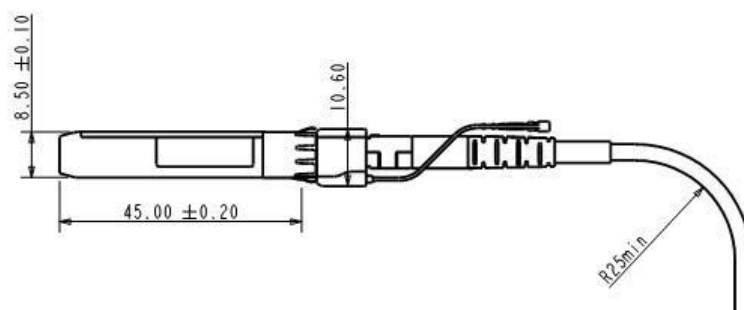
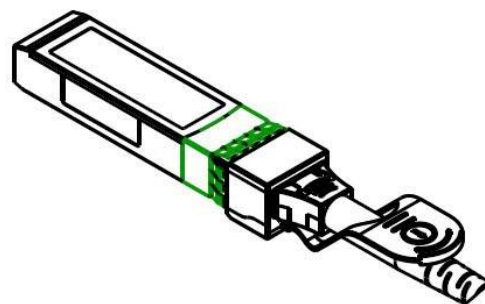
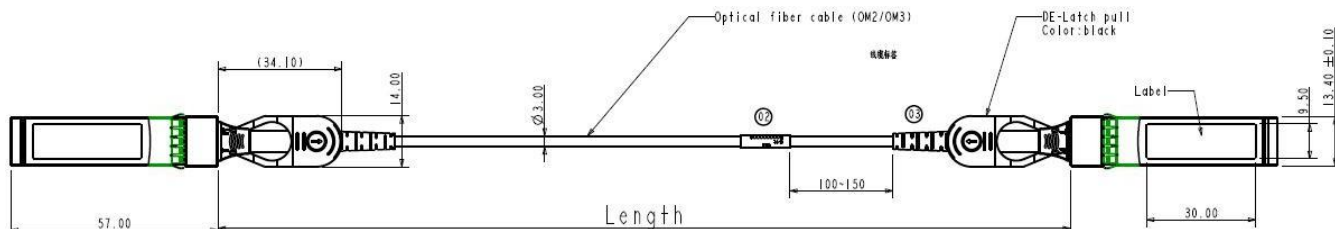


Figure4. Mechanical Specifications

Ordering information

Part Number	Product Description
NDAC-SFP10G-001C	1m SFP+ Active Optical Cable
NDAC-SFP10G-002C	2m SFP+ Active Optical Cable
NDAC-SFP10G-003C	3m SFP+ Active Optical Cable
NDAC-SFP10G-005C	5m SFP+ Active Optical Cable
NDAC-SFP10G-007C	7m SFP+ Active Optical Cable
NDAC-SFP10G-010C	10m SFP+ Active Optical Cable
NDAC-SFP10G-XXXX	10G SFP+ Active Optical Cable up to 300m on OM3 MMF
xxx: 001~100,1~300 length in meters (OM3 fiber is available)	