10G SFP+ Direct Attach Passive Copper Cables

1. Applications

- 10G Ethernet
- InfiniBand, Fiber Channel 4G/8G/10G
- Sonet Multiplatform support
- High Performance Computing Clusters
- High End Servers
- Metro Network Switch/Cross Connect

2. Features

- Support for multi-gigabit data rates up to 10.5Gbps
- Data rates backward compatible to 1Gbps
- Support for 1x, 2x, 4x and 8x Fiber Channel data rates
- Hot-pluggable SFP 20PIN footprint
- I/O Connector designed for high speed differential signal applications
- Improved Pluggable FormFactor(IPF) compliant for enhanced EMI/EMC performance
- Low Power Consumption < 0.5W
- Power Supply :+3.3V
- Compatible to SFP+
- Temperature Range: 0~ 70 °C
- RoHS Compatible

3. Description

Handar's High speed SFP+ Direct Attach Cable (DAC) provides high performance in 10 Gigabit Ethernet (10GbE) network applications, using an enhanced SFP+ connector to send 10Gbps data through one paired transmitters and receivers over a thin twinax cable. They are compliant with electrical standards SFF-8431, SFF-8083 and mechanical standard SFF-8432, EEPROM standard SFF-8472.

4. standard

- Compliant with electrical standards SFF-8431, SFF-8083
- Compliant with mechanical standard SFF-8432
- Compliant with EEPROM standard SFF-8472
- RoHS Compliant

5. Performance Specifications

5.1. Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Table.1 Absolute maximum ratings

Parameter	Symbol	Min	Max	Unit
Maximum Supply Voltage	Vcc	0	3.6	V
Storage Temperature	Ts	-40	85	°C
Relative Humidity	RH	5	95	%

5.2. Recommended Operating Conditions

Table.2 Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard Tc	0	25	70	°C
Storage Temperature	Ts	-40		85	°C
Power Supply Voltage	Vcc	3.13	3.30	3.47	V
Power Dissipation	PD			0.5	W
Relative Humidity	RH	5		95	%
Data Rate			10.5		Gbps

5.3.Product Specification

Table.3 Product Specification

Test Type	Test Item	Target	Reference
Electrical Characteristics	Differential Mode RL(SDDII)	0.01<f<4.1 ; < -12+2*SQRT(f) 4. 1<f<11. 1 ; <-6.3+13*log10(f/5.5) Where f is in GHz Measurements units: dB	SFF 8431
	Common mode return loss (SCCII)	0.01<f<2.5 ; <-7+1.6(f) 2.5<f<11.1 ; <-3 Where f is in GHz Measurements units: dB	SFF 8431
	NEXT	<-26dB from 1MHz to 11GHz	/
	Cable assembly Impedence	100+/ -100hm Rise time of 30 ps (20 %- 80 %)	(20%~80 %)
	Insertion Loss Deviation	-1dB≤ILD≤1dB 300KHz≤f≤6GHz	/
EnvironmentalCharacteristics	Operating Temperature	-40~85°C	Cable operating temp.range
	Thermal Shock	Electrical performance meet the specification requirement	EIA-364-32D. Method A. TC-1. -55 10 85C,100 cycles, 15 min, dwells
	Cyclic Temp. & Humidity	Electrical performance meet the specification requirement	EIA-364-31 Method III,Test Cond A
	Salt spray	48 hours salt spraying after shell corrosive area less than 5%	EIA-364-26
	Temperature Life	Performance meets the specification requirement	EIA-364-17B w/ RH, Damp heat 85C at 85% RH for 500 hours
MechanicalCharacteristics	MechanicalVibration	Performance meets the specification requirement	EIA-364-28E.11 TC-VII, Test Cond. D 15minutes in X,Y,Z axis.
	Cable Plug Retention in Cage	90N Min.	No functional damage to cable plug below 90N. Per

			SFF-8432 Rev 5.0
	Cable Retention in Plug	90N Min.	EIA-455-6B
	Mechanical Shock	Performance meets the specification requirement	Clamp and Shock per EIA-364-27B, TC-G, 3times in 6directions, 100g, 6ms
	Cable plug Insertion	18N(Max.)	SFF-8432 Rev 5.0
	Cable plug extraction	12.5N(Max.)	SFF-8432 Rev 5.0
	Durability	50 Time. No evidence of physical damage	EIA-364-09; performplug&unplug cycles Plug and Receptacle mate rate: 250times/hour

4.6. Pin Definitions

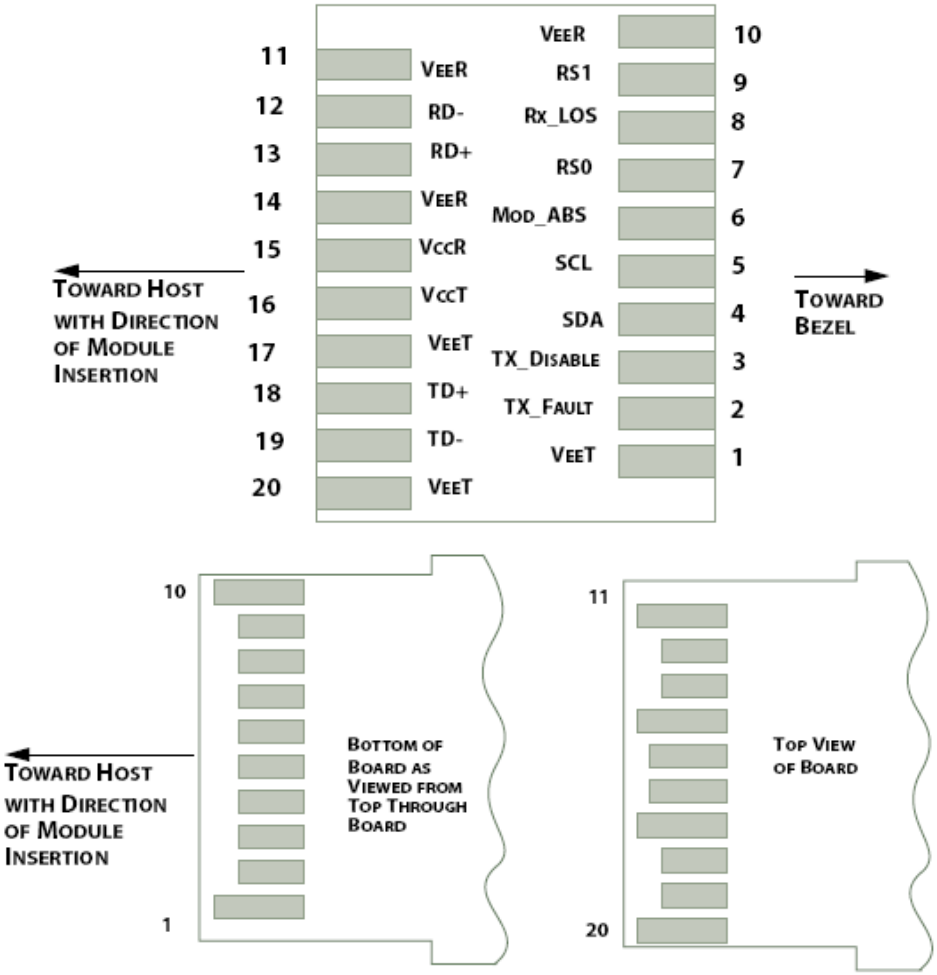


Table.8Pin Definitions

PIN	Symbol	Description	Remarks
1	$V_{EE}T$	Transmitter ground (common with receiver ground)	Circuit ground is isolatedfrom chassis ground
2	Tx_Fault	Transmitter Fault. Not supported	
3	Tx_Disable	Transmitter Disable. Laseroutput 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 with4.7k – 10kohm on hostboard to a voltage between2V and 3.6V
5	SCL	2-wire Serial Interface Clock Line	
6	M_{OD}_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	V_{EE}R	Receiver ground (common with transmitter ground)	Circuit ground is isolatedfrom chassis ground
11	V_{EE}R	Receiver ground (common with transmitter ground)	
12	RD–	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V_{EE}R	Receiver ground (common with transmitter ground)	Circuit ground is isolatedfrom chassis ground
15	V_{CC}R	Receiver power supply	
16	V_{CC}T	Transmitter power supply	
17	V_{EE}T	Transmitter ground (common with receiver ground)	Circuit ground is isolatedfrom chassis ground
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD–	Transmitter Inverted DATA in. AC coupled	
20	V_{EE}T	Transmitter ground (common with receiver ground)	Circuit ground is isolatedfrom chassis ground

5.9. Mechanical Dimensions

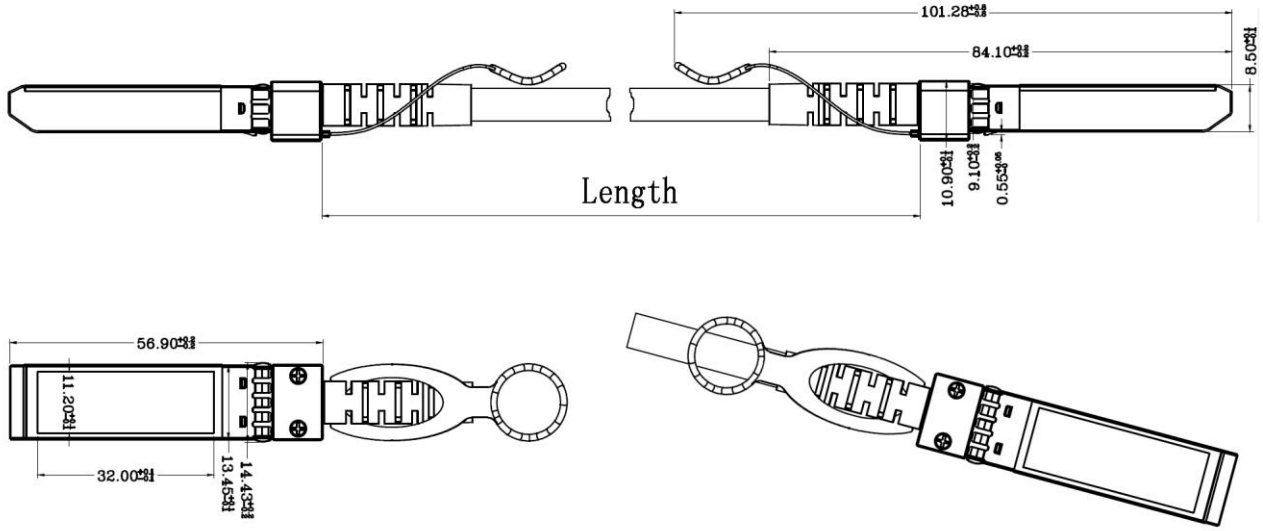


Diagram of Mechanical Dimensions

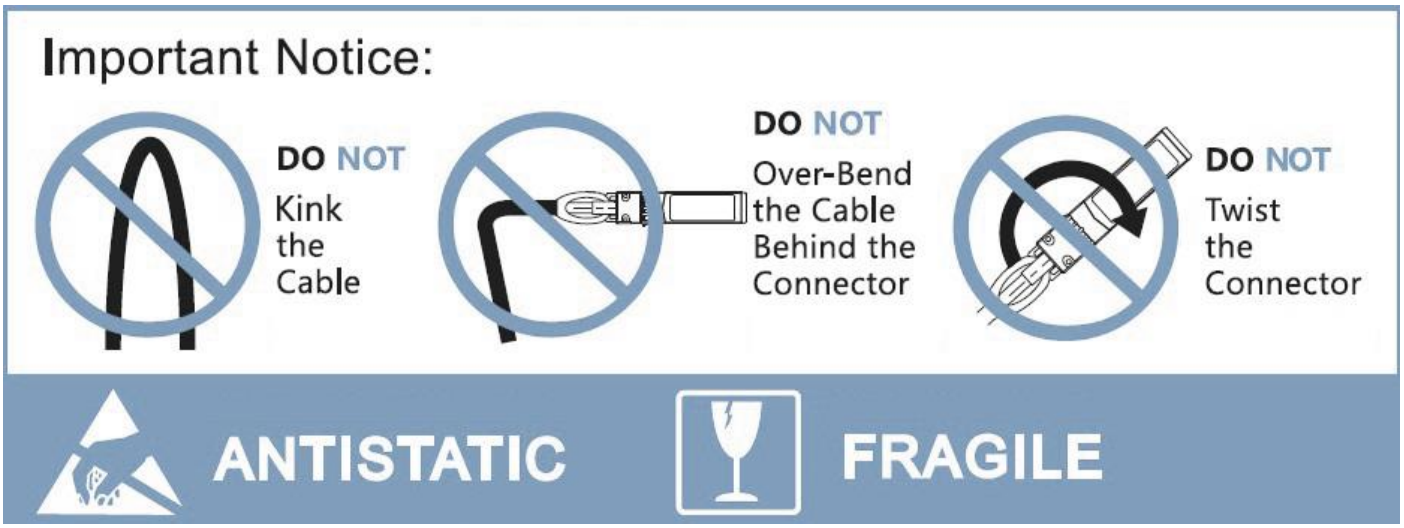
6. Application Cautions

6.1. ESD

This transceiver is specified as ESD threshold 1kV for high speed pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

6.2. LASER SAFTY

This is a Class 1 Laser Product according to IEC 60825-1:1993:+A1:1997+A2:2001. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001)



6.3. Important Notice

Note:

1)Copper type maximum length recommended at 15 meters;

2)Various cable lengths available for all types;

3)Latch/tab available”on top”or”bottom”position.

7. Order Information

Part No.	Description	Rate	Length	Wire Gauge
HD-SFP+/10G-DAC-24-P1	10G SFP+ DAC Passive	10.3G	1 meter	AWG24
HD-SFP+/10G-DAC-24-P2	10G SFP+ DAC Passive	10.3G	2 meter	AWG24
HD-SFP+/10G-DAC-24-P3	10G SFP+ DAC Passive	10.3G	3 meter	AWG24
HD-SFP+/10G-DAC-24-P5	10G SFP+ DAC Passive	10.3G	5 meter	AWG24
HD-SFP+/10G-DAC-24-P7	10G SFP+ DAC Passive	10.3G	7 meter	AWG24
HD-SFP+/10G-DAC-30-P1	10G SFP+ DAC Passive	10.3G	1 meter	AWG30
HD-SFP+/10G-DAC-30-P2	10G SFP+ DAC Passive	10.3G	2 meter	AWG30
HD-SFP+/10G-DAC-30-P3	10G SFP+ DAC Passive	10.3G	3 meter	AWG30