

## DATA SHEET

### MODULETEK : DAC-SFP-10G-P-xxAWG-aa.aaM-C0C0B

SFP 10G Passive Direct Attach Copper Cable Assembly

#### Overview

ModuleTek's 10G passive cable uses shielded high-speed differential cables, compliant with 10 Gigabit Ethernet standards and SFP Multi-Source Agreement (MSA) standards, supports 10G transmission rates, and is backward compatible with 1G rates. SFP 10G passive cable is the preferred solution for short-distance applications. It is widely used for data transmission between data centers and cabinets or adjacent cabinets. Its biggest feature is low cost, ultra-low power consumption (less than 0.1 watt) and high reliability.

#### Product Features

- Up to 10 Gb/s bi-directional data links
- Compliant with 10GFC
- Compliant with SFF-8431
- AC coupled inputs and outputs
- 100 Ohm differential impedance
- Enhanced EMI design
- Single power supply 3.3V
- RoHS Compliant
- Operating temperature range: 0°C to 70°C



#### Applications

10G Ethernet  
10G Fiber Channel  
Serial Data Transmission

## Ordering Information

Part Number	Product ID	Description	Gauge	Length
DAC-SFP-10G-P-30AWG-aa.aaM-C0C0B	M600802	SFP+ Passive Direct Attach Copper Black Cable Assembly,without MCU, aa.aa $\leq$ 3	30AWG	$\leq$ 3m
DAC-SFP1-10G-P-28AWG-aa.aaM-C0C0B	M600825	SFP+ Passive Direct Attach Copper Black Cable Assembly,without MCU, aa.aa $<$ 5	28AWG	$<$ 5m
DAC-SFP-10G-P-24AWG-aa.aaM-C0C0B	M600801	SFP+ Passive Direct Attach Copper Black Cable Assembly,without MCU, aa.aa $\leq$ 10	24AWG	$\leq$ 10m
<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. "P" indicates passive cable.</li> <li>2. "aa.aa" indicates the cable length in meters.</li> <li>3. The product does not have write protection.</li> <li>4. The wire diameter of the products in the above list is the default value under different lengths. We can also provide other wire products to customers with special requirements.</li> <li>5. Product ID is the short order number of our product standard model.</li> </ol>				
<p><b>For More Information:</b>            ModuleTek Limited            Web: <a href="http://www.moduletek.com">www.moduletek.com</a>            Email: <a href="mailto:sales@moduletek.com">sales@moduletek.com</a></p>				

## General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		10.3125		Gb/s	1
Bit Error Rate	BER			$10^{-12}$		
Operating Temperature	T <sub>C</sub>	0		70	°C	2
Storage Temperature	T <sub>STO</sub>	-40		85	°C	3
Input Voltage	V <sub>CC</sub>	3.14	3.30	3.46	V	4

### Notes:

1. IEEE 802.3ae
2. Case temperature
3. Ambient temperature
4. For electrical power interface

## I2C Memory Map

Address A0					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
0	1	Identifier	SFP or SFP+	03	
1	1	Ext. Identifier	GBIC/SFP function is defined by two-wire interface ID only	04	
2	1	Connector	Copper pigtail	21	
3-10	8	Transceiver	Passive Cable	00 00 00 00 00 04 00 00	
11	1	Encoding	Code for high speed serial encoding algorithm	00	
12	1	BR, Nominal	Nominal Bit Rate 10.3Gb/s	67	
13	1	Rate Identifier	Type of rate select functionality	00	
14	1	Length(SMF,km)	Link length supported for single mode fiber, units of km	00	
15	1	Length (SMF)	Link length supported for single mode fiber, units of 100 m	00	
16	1	Length (50um)	Link length supported for 50 um OM2 fiber, units of 10 m	00	
17	1	Length (62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m	00	

18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10m. Alternatively copper or direct attach cable, units of m	01	
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m	00	
20-35	16	Vendor name	MODULETEK	4D 4F 44 55 4C 45 54 45 4B 20 20 20 20 20 20 20	
36	1	Transceiver	Code for electro nic or optical compatibility	0D	
37-39	3	Vendor OUI	SFP vendor IEEE company ID	00 00 00	
40-55	16	Vendor PN	Part number in Order information	-	
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	-	
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)	00 00	
62	1	Unallocated		00	
63	1	CC BASE	Check code for Base ID Fields (addresses 0 to 62)	-	
64-65	2	Options	Indicates which optional transceiver signals are implemented	00 00	
66	1	BR, max	Upper bit rate margin	64	
67	1	BR, min	Lower bit rate margin	00	
68-83	16	Vendor SN	Serial number provided by vendor	Programmed by Factory	
84-91	8	Date code	Year,Month,Day	Programmed by Factory	
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver	00	
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver	00	

94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.	00	
95	1	CC EXT	Check code for the Extended ID Fields (addresses 64 to 94)	-	
96-127	32	Vendor Specific	Vendor Specific EEPROM	-	
128-255	128	Vendor Specific	Vendor Specific EEPROM	-	

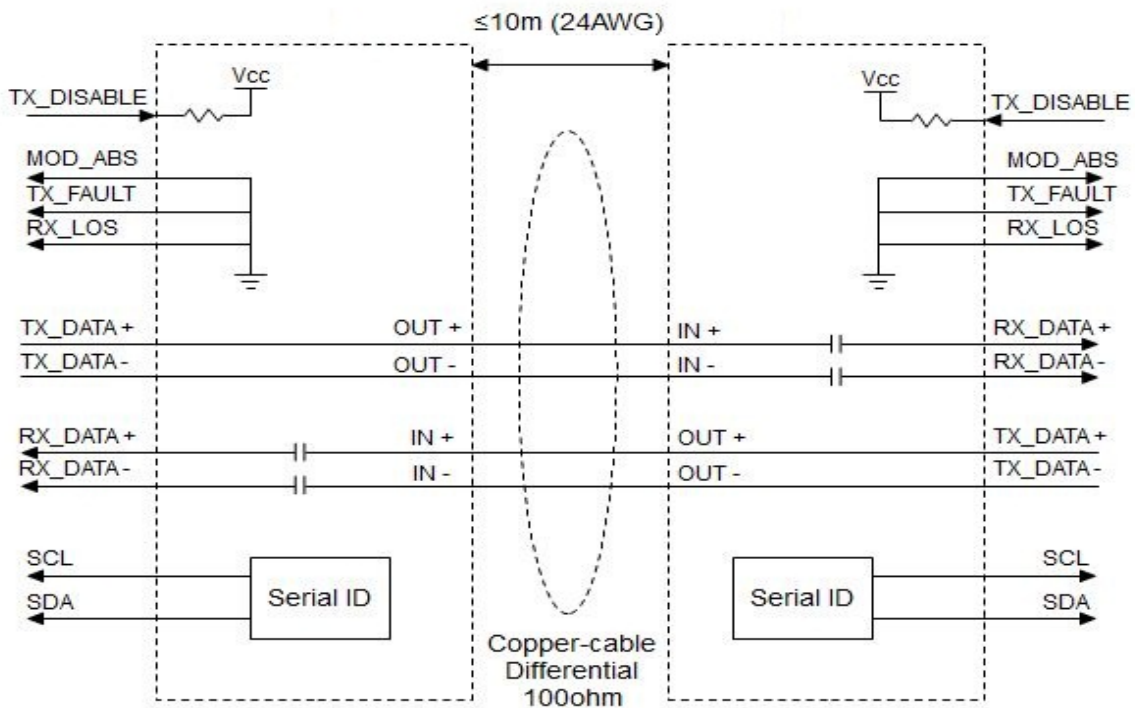
**Notes:**

1. Module without write protection

## Cable Specifications

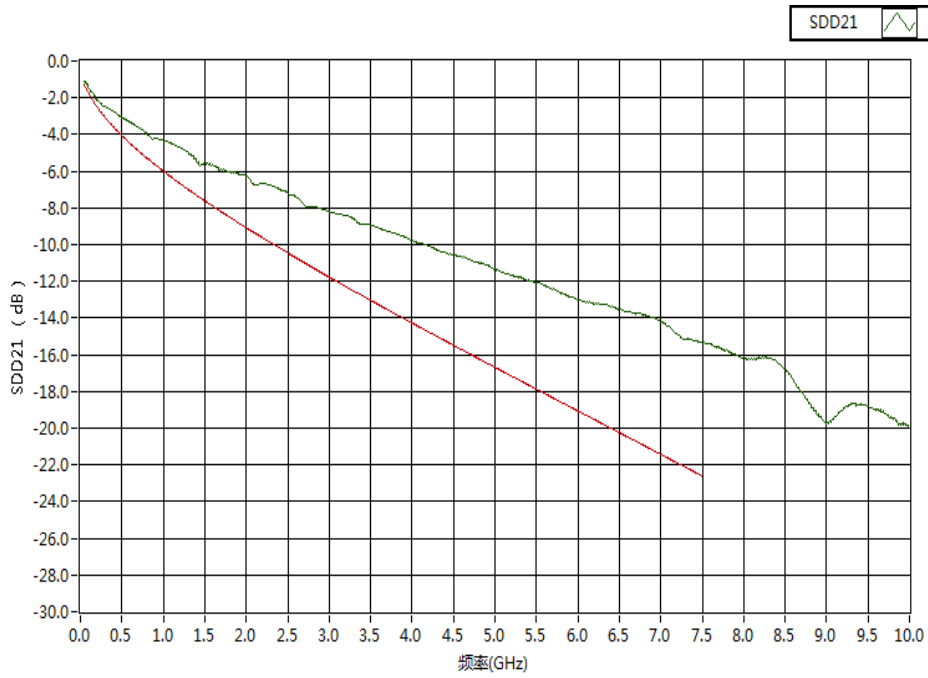
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Wire Gauge		30		24	AWG	
Cable Impedance	Z	90	100	110	Ohm	

## Block Diagram of Transceiver

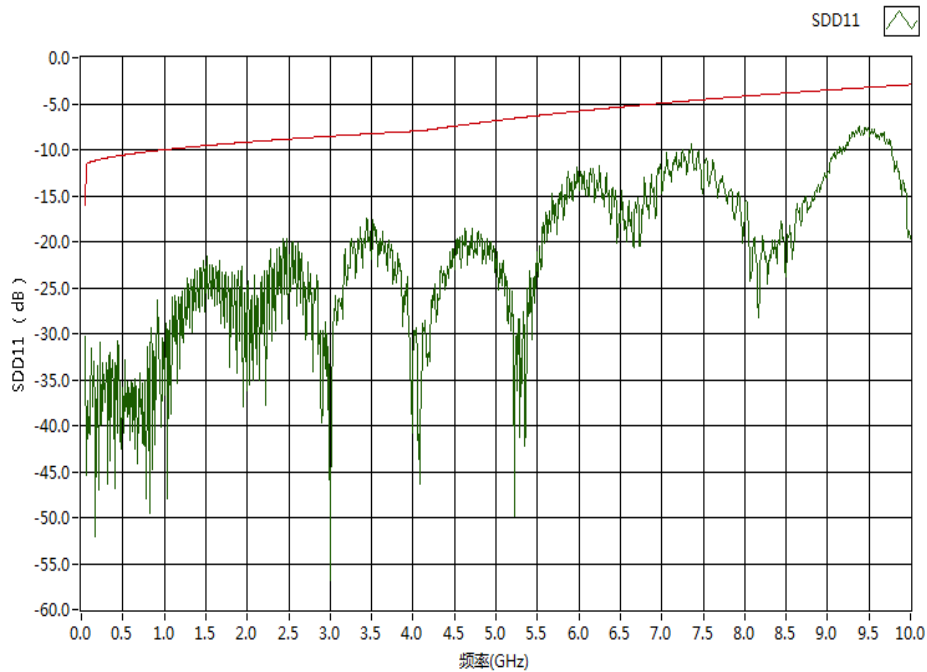


## Typical S parameter

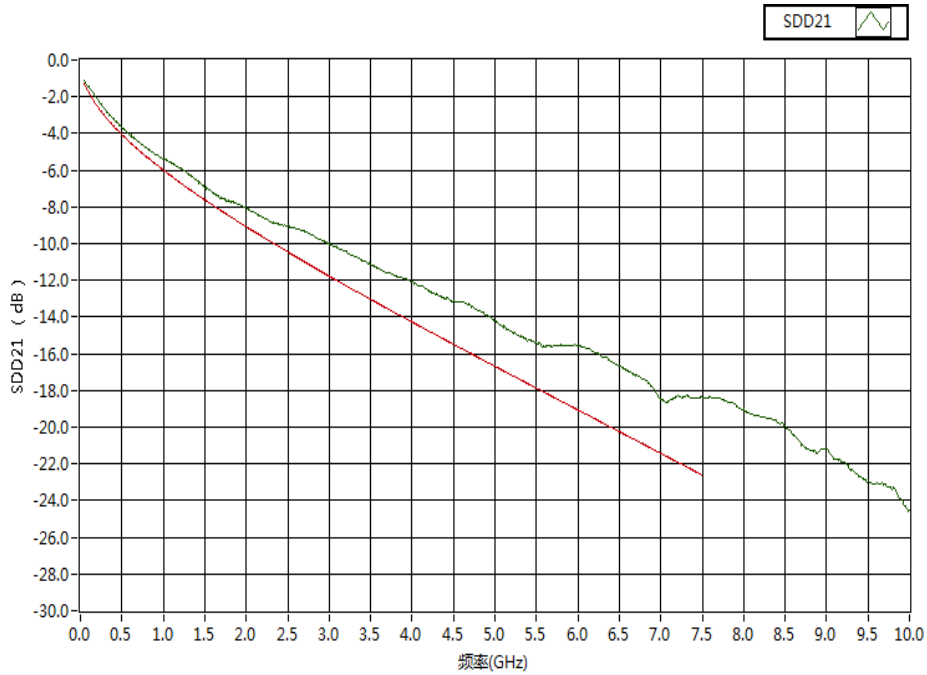
### 3m 30AWG typical insertion loss curve



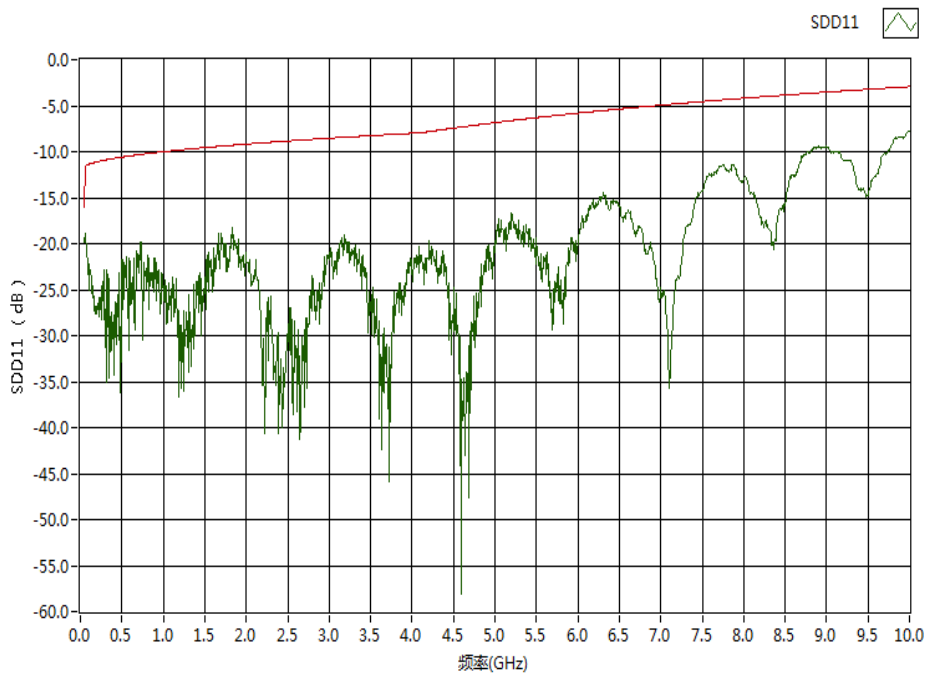
### 3m 30AWG typical reflection curve



## 5m 24AWG typical insertion loss curve



## 5m 24AWG typical reflection curve



**Note:**

1. Insertion loss standard reference IEEE802.3ba 85.10.2:  $IL < 17.04 \text{ dB} @ 5.15625 \text{ GHz}$
2. Reflection curve standard reference IEEE802.3ba 85.10.4:  $SDD_{xx}(\text{dB}) = 12 - 2 \times \text{SQRT}(f)$ ,  $0.05 \leq f < 4.1 \text{ GHz}$ .
3. Reflection curve standard reference IEEE802.3ba 85.10.4:  $SDD_{xx}(\text{dB}) = 6.3 - 13 \times \log_{10}(f/5.5)$ ,  $4.1 \leq f \leq 10 \text{ GHz}$ .

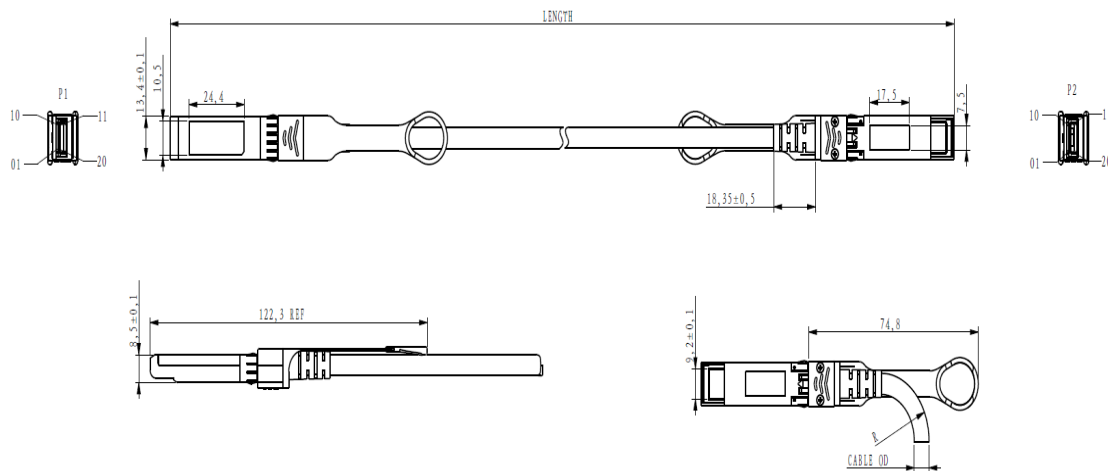
## Weight

Parameter	Symbol	Typ	Unit	Remarks
30AWG Product Weight	$G_{D30}$	72	g/PCS	1
28AWG Product Weight	$G_{D28}$	88	g/PCS	1
24AWG Product Weight	$G_{D24}$	96	g/PCS	1
30AWG Cable Weight	$G_{C30}$	26	g/M	
28AWG Cable Weight	$G_{C28}$	42	g/M	
24AWG Cable Weight	$G_{C24}$	50	g/M	
Dust Cap Weight	$G_S$	0.80	g/PCS	

### Notes:

1.The weight of DAC-SFP-10G-P-xxAWG-1M-C0C0B.For example:the weight of DAC-SFP-10G-P-24AWG-6M-C0C0B is: $96+50*(6-1)+0.80*2=347.6g$

## Dimensions



ALL DIMENSIONS ARE  $\pm 0.2\text{mm}$  UNLESS OTHERWISE SPECIFIED  
UNIT: mm

## Cable Dimension

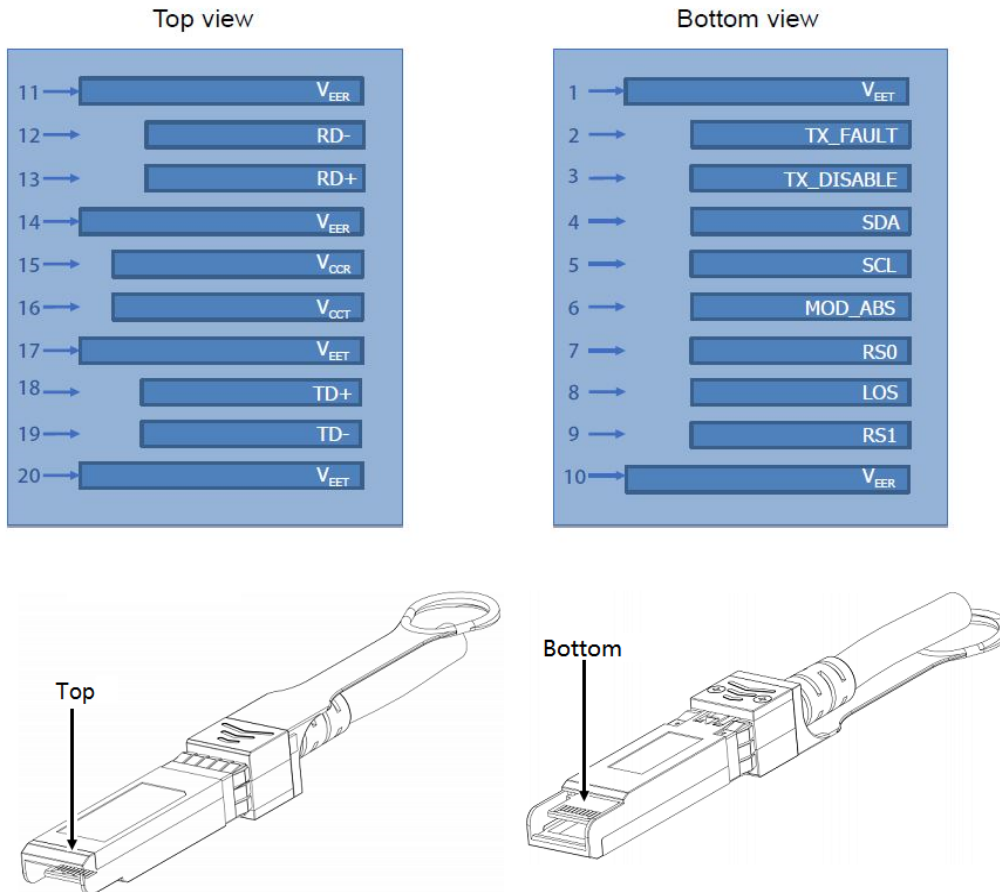
serial number	Standard Wire Gauge AWG	Cable diameter OD (mm)	Minimum bending radius R (mm)
1	30	4.2	25
2	28	4.7	26
3	24	6.0	28



## Length Tolerance

Serial number	Nominal length (m)	Tolerance range $\pm$ (cm)
1	$\text{Length} \leq 2$	2
2	$2 < \text{Length} \leq 4$	4
3	$4 < \text{Length} \leq 6$	6
4	$6 < \text{Length}$	8

## SFP Electrical Pad Layout



## Pin Assignment

PIN #	Symbol	Description	Remarks
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter failure alarm, not used	
3	TX_DISABLE	The signal turns off the module transmitter when it is high or open, not used.	
4	SDA	Data line for serial ID	2
5	SCL	Clock line for serial ID	2
6	MOD_ABS	Module Absent. Grounded within the module	2
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	
9	RS1	No connection required	
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1

### Notes:

1. Circuit ground is isolated from chassis ground
2. Should Be pulled up with 4.7k - 10k ohm on host board to a voltage between 2V and 3.6V

## References

1. IEEE standard 802.3ae. IEEE Standard Department, 2005.
2. IEEE standard 802.3ba. IEEE Standard Department.