

SFP+ Active Copper Cable Assembly

CAB-10GSFP-A*M (型号)

Features

- Compliant with SFF-8431 and SFF-8432
- Supports data rates up to 11.1 Gb/s
- Power Level 1 : 0.5W per cable end
- 100 Ohm differential impedance
- Retractable pin latch
- EEPROM signature
- Pull to Release latch design
- 360° cable braid crimp
- Enhanced EMI skirt design
- Color options for strain relief and pull tab
- Linear design for use with EDCs
- AC-coupled inputs and outputs
- Lengths up to 10m
- 30AWG to 24AWG cable available

Product Applications

- Switches
- Networking – servers, routers and hubs
- Enterprise storage
- Telecommunication equipment
- Network Interface Cards (NIC's)

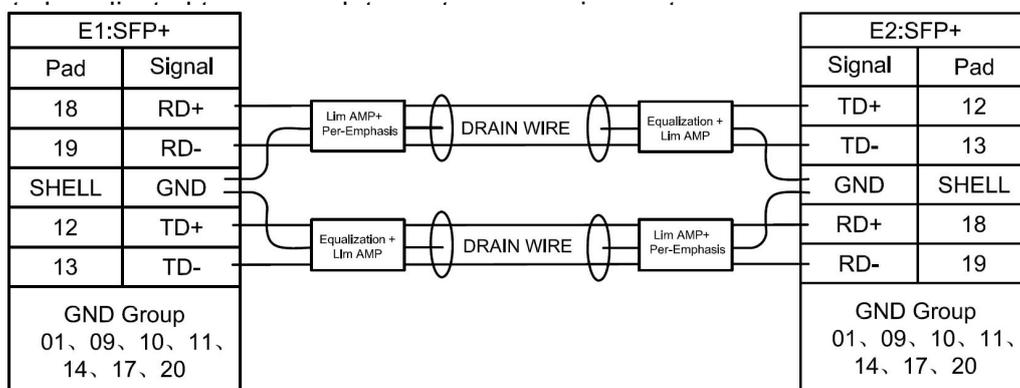
Applications by Protocol

- 10 Gigabit Ethernet and Gigabit Ethernet
- (IEEE802.3ae)
- Fiber channel: 1, 2, 4 and 8 GFC
- Fiber Channel over Ethernet (FCoE)
- Serial data transmission
- InfiniBand standard

Product Description

10Gtek’s Active SFP+ Copper Cables are full-active 11.1Gbps cable assemblies. The cables are compliant with the current SFF-8431, SFF-8432 and SFP+ MSA specifications. They fill the expanding need for cost effective data center interconnects that cannot be served with passive copper or expensive fiber optic solutions. 10Gtek’s unique low power silicon provides the additional benefit of consuming 50-75% less power than optical interconnects. When systems are optimized to operate with active copper cables, the end-to-end interconnect consumes significantly less power and emits less EMI than passive copper based systems that require the use of EDC hosts.

SFF-8431 requires active SFP+ cable assemblies to meet an output eye mask requirement when a minimal eye is transmitted through the cable assembly. The input eye mask is measured by transmitting a 10.3125 Gbps PRBS 31-1 signal into a module compliance test fixture and measuring the eye pattern through the mated host compliance test fixture. Once the input signal is established, the cable assemblies are measured through the module compliance test fixture. All cable assemblies meet the bit error rate requirement of 1×10^{-12} . This design allows for output de-emphasis and signal amplitude



Recommended Operation Condition

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	Topc	-40	--	85	degC
Relative Humidity (non-condensation)	RS	-	-	85	%
Supply Voltage	VCC3	3.135	3.30	3.465	V
Power Supply Current	ICC3	-	70	80	mA
Total Power Consumption	Pd	-	-	0.5	W
Differential Input Voltage Swing	V DIFF	100		1800	mVp-p
Differential Output Voltage Swing	V DIFF			600	mVp-p
Data Output Rise Time/Fall Time	Tr,Tf			120	ps

Performance Specifications – Electrical

Transmitter						
Reference Differential Input Impedance	Zd		100		Ω	
Termination Mismatch	$\frac{\Delta Z}{M}$			5	%	
Input AC Common Mode Voltage				25	mV (RMS)	
Differential Input S- parameter	SDD11	$< -12 + 2 \times \text{SQRT}(f)$, with f in GHz.			dB	0.01-4.1GHz
		$< -6.3 + 13 \times \log_{10}(f/5.5)$, with f in GHz			dB	4.1-11.1GHz
Reflected Differential to Common Mode Conversion	SCD11			-10	dB	0.01-11.1GHz
Total Jitter				0.40	UI	
Deterministic Jitter				0.15	UI	
Receive						
Reference Differential Input Impedance	Zd		100		Ω	
Termination Mismatch	$\frac{\Delta Z}{M}$			5	%	
Output AC Common Mode Voltage				15	mV (RMS)	
Differential Output S- parameter	SDD22	$< -12 + 2 \times \text{SQRT}(f)$, with f in GHz			dB	0.01-4.1GHz
		$< -6.3 + 13 \times \log_{10}(f/5.5)$, with f in GHz			dB	4.1-11.1GHz
Common Mode Output Reflection Coefficient	SCC22	$< -7 + 1.6 \times f$, with f in GHz.			dB	0.01-2.5GHz
				-3	dB	2.5-11.1GHz
Total Jitter				0.38	UI	
Deterministic Jitter				0.64	UI	

Host board Connector Pinout

Figure 1 :

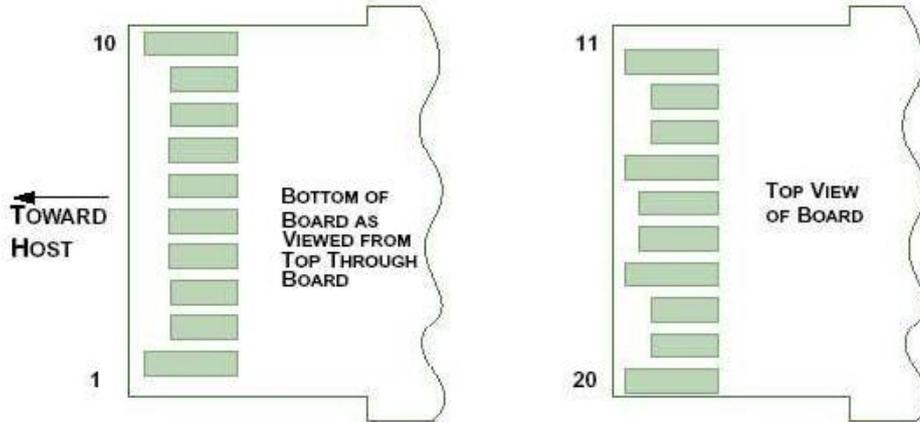


Figure 2: Pin Definitions.

Pin	Logic	Symbol	Features	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTTL-O	Tx_Fault	Transmitter Fault	2
3	LVTTTL-I	Tx_Disable	Transmitter Disable	3
4	LVTTTL-I/O	SDA	MOD-DEF2 2-wire serial interface data line	4
5	LVTTTL-I/O	SCL	MOD-DEF1 2-wire serial interface clock line	4
6		Mod_Abs	Module Absent	5
7	LVTTTL-I	RS0	Rate Select Zero	
8	LVTTTL- O	Rx_LOS	Module Receiver Loss of Signal	2
9	LVTTTL-I	RS1	Rate Select One	
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3V Supply	
16		VccT	Module Transmitter 3.3V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Notes:

- 1.The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.
- 2.This pin is an open collector/drain output pin and shall be pulled up with 4.7-10k to Vcc_Host on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.
- 3.This pin is an open collector/drain input pin and shall be pulled up with 4.7-10k to VccT in the module.
4. See 2-wire Electrical Specifications .
5. This pin shall be pulled up with 4.7-10k to Vcc_Host on the host board.

Pin Description

Tx_Fault:	Tx_Fault is an output pin to indicate a fault condition of a laser.This pin is connected to ground in the module.
Tx_Disable:	Tx_Disable is an input pin to disable the transmitter output. This pin is pulled high in the module with a 5.11kOhm resistor.
SDA/SCL:	SDA and SCL are the data and clock pins for the I2C interaction with the EEPROM. These pins are connected to the SDA and SCL pins of the EEPROM in the module.
MOD_ABS:	Mod_Abs is an output pin to indicate that a module is present in the port. This pin is connected to ground in the module.
RS0/RS1:	RS0 and RS1 are module rate select pins to determine the transmit data rate for lasers.
Rx_LOS:	Rx_LOS is an output pin to indicate if the signal amplitude is below the receiver threshold. This pin is connected to ground in the module.
Ground:	VeeT and VeeR are connected within the module and are used as a digital ground for signal integrity. This digital ground does not connect to the module case or the copper cable braid.
Power:	VccT and VccR are connected within the module and are used to power the EEPROM. Typical voltage is 3.3 Volts and each pin has a maximum current capacity of 500 mA.
Signal:	The two high speed signal pairs, TD+/TD- and RD+/RD-, are 100 Ohm differential impedance transmission lines with AC coupling on each RD trace.

2 Wire Interface EEPROM

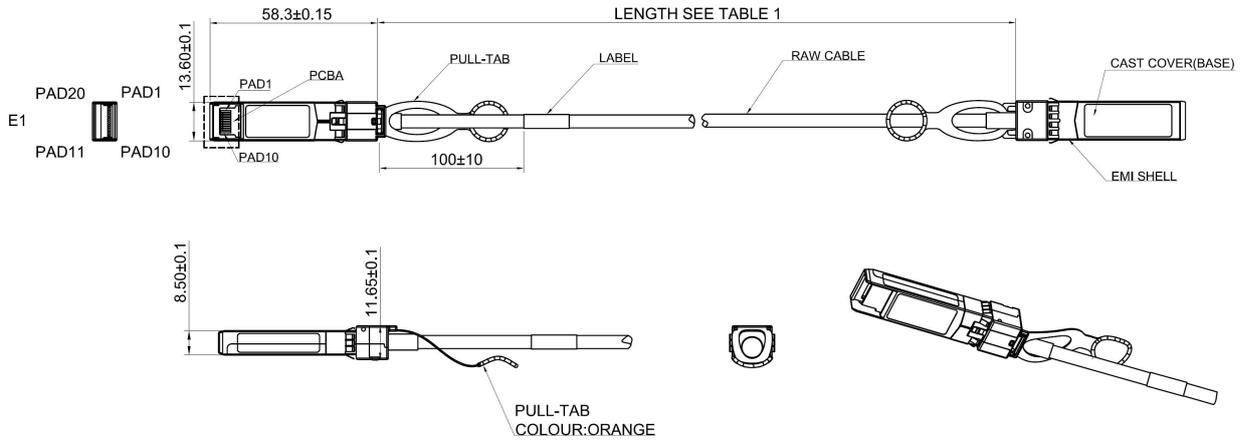
The EEPROM on the SFP+ passive cable assembly is designed for 256 addresses. The information for addresses 0 to 127 is listed below. This information can be tailored to any customer request. Any address can be altered to display customer specific information and more memory can be added if more addresses are needed. Addresses 128 to 255 can be reserved for customer specific information that is in addition to the SFF 8431 specification.

EEPROM Values for Manufacturers SFP+				10Gtek 10GTEK TRANSCEIVERS CO., LTD 深圳市万兆通光电技术有限公司			
20-35	Vendor name (ASCII)	31,30,47,54,45,4B,20,20,20,20,20,20,20,20,20,20	"10GTEK" followed by spaces	3RD ANGLES			
36	Transceiver code (reserved)	00		DESCRIPTION	10G SFP+ Passive Copper Cable Assembly EEPROM		
37-39	Vendor IEEE OUI	00,00,00		DRAWN BY / DATE	Lstar 2013.02.19	PART NAME	SEE ORDER INFORMATION
40-55	Vendor PN (ASCII)	fill in "10GTEK" PN	Extra bytes are filled with spaces (20h)	CHECKED BY / DATE	Amy 2013.02.19	PRODUCT NO.	SFP+ CABLE EEPROM INFORMATION
56-59	Vendor Rev (ASCII)	20,20,20,20	10GTEK's product drawing revision number. Extra bytes are filled with spaces (20h)	APPROVED BY / DATE	Nicky 2013.02.19	DRAWING NO.	W-R&D-E003
60	Passive Cable Specification Compliance	00	Unallocated			SCALE	1:1
61	Passive Cable Specification Compliance	00				SHEET NO.	1 OF 1
62	Unused	00				REV	1.1
63	CC_BASE check code	calculated value					
64	Options (power level, linear receiver)	00	Not used for passive copper				
65	Options (Tx_Disable, Tx_Fault, LOS)	00	Not used for passive copper				
66	Bit Rate, max	00	Upper bit rate margin, units of %, not specified				
67	Bit Rate, min	00	Lower bit rate margin, units of %, not specified				
68-83	Vendor S/N (ASCII)	10GTEK S/N	The serial number for the cable assembly				
84-85	Date Code (ASCII) two low order digits of year	year of manufacture	2 digit year (e 31h, 30h= 10 = 2010)				
86-87	Date Code (ASCII) digits of month (01-12)	month of manufacture	30h, 31h = 01 = January, 30h,32h = 02 = February, etc				
88-89	Date Code (ASCII) day of month (0-31)	day of manufacture	30h, 31h = 01 (1st day of the month)				
90-91	Lot Code (ASCII) vendor specific or blank	20,20	Not used. Manufacturers uses S/N for traceability				
92-94	Diagnostic Monitoring	00	Not implemented				
95	CC_EXT check code	calculated value	A check code for Bytes 64-94 inclusive				
96-127	Not being used	00					
128-255	Reserved for SFF-8079	not used					

Mechanical Specifications

Mechanical				
Parameter	Minimum	Typical	Maximum	Unit
Cable Diameter (24 AWG)		0.255		Inches
Bend Radius (24 AWG)	1.25			Inches
Cable Diameter (28 AWG)		0.185		Inches
Bend Radius (28AWG)	0.8			Inches
Cable Diameter (30 AWG)		0.175		Inches
Bend Radius (30 AWG)	0.7			Inches

Mechanical Dimensions



Revision History

Revision	Initiated	Review	Approved	Revision History	Release Date
V1.0	Vinson	Steven	Nicky	Released.	Dec,24, 2013

Further Information

For further information, please contact 10GTEK.

Tel : +86 755 2998 8100

Fax : +86 755 6162 4140

Web: www.10gtek.com