

PROLABS – 487652-B21-C

11GBd Active Copper SFP+ (Small Form Pluggable) Transceiver

487652-B21-C Overview

PROLABS's 487652-B21-C Active Copper SFP+ transceivers are designed for operation in short connection using Fiber Channel and 10G Ethernet networking equipment. It is integrated with Amphenol Spectra Strip SkewClear cable, the completed assembly spans 15 meters and operates up to 11GBd. The transmitter pre-emphasis can be configured to best compensate for different cable lengths. Active copper assemblies are typically used in host systems that do not employ EDC.

Product Features

- Up to 11 GBd bi-directional data links
- 24AWG through 30 AWG cable available
- Dual SFP+ Connectors
- Industry standard small form pluggable (SFP+) package
- Spans up to 15 meters
- Hot Pluggable
- Single power supply 3.3V
- RoHS Compliance
- Operating temperature range: 0°C to 70°C

Applications

- 10G Ethernet
- 10G Fiber Channel

Ordering Information

Part Code	Description	Length
487652-B21-C	HP Compatible 10G SFP+ Active Cable 1m	1m
487655-B21-C	HP Compatible 10G SFP+ Active Cable 3m	3m
487655-B21-5M-C	HP Compatible 10G SFP+ Active Cable 5m	5m
487658-B21-C	HP Compatible 10G SFP+ Active Cable 7m	7m

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Storage Temperature	T_S	- 40		85	°C	
Supply Voltage	V_S	- 0.5		6	V	
Operating Current	I_{OP}			400	mA	
Relative Humidity	RH	0		85	%	Non Condensing

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR	0.155		11	GBd	
Bit Error Rate	BER			10^{-12}		
Case Operating Temperature	T_{OP}	0		70	°C	
Supply Voltage	V_{CC}	3.15	3.3	3.6	V	
Supply Current	I_{CC}		100	300	mA	

Electrical Characteristics - Transmitter

$V_{CC} = 3.15 \text{ V to } 3.6 \text{ V}$, $T_{OP} = 0^\circ \text{C to } 70^\circ \text{C}$

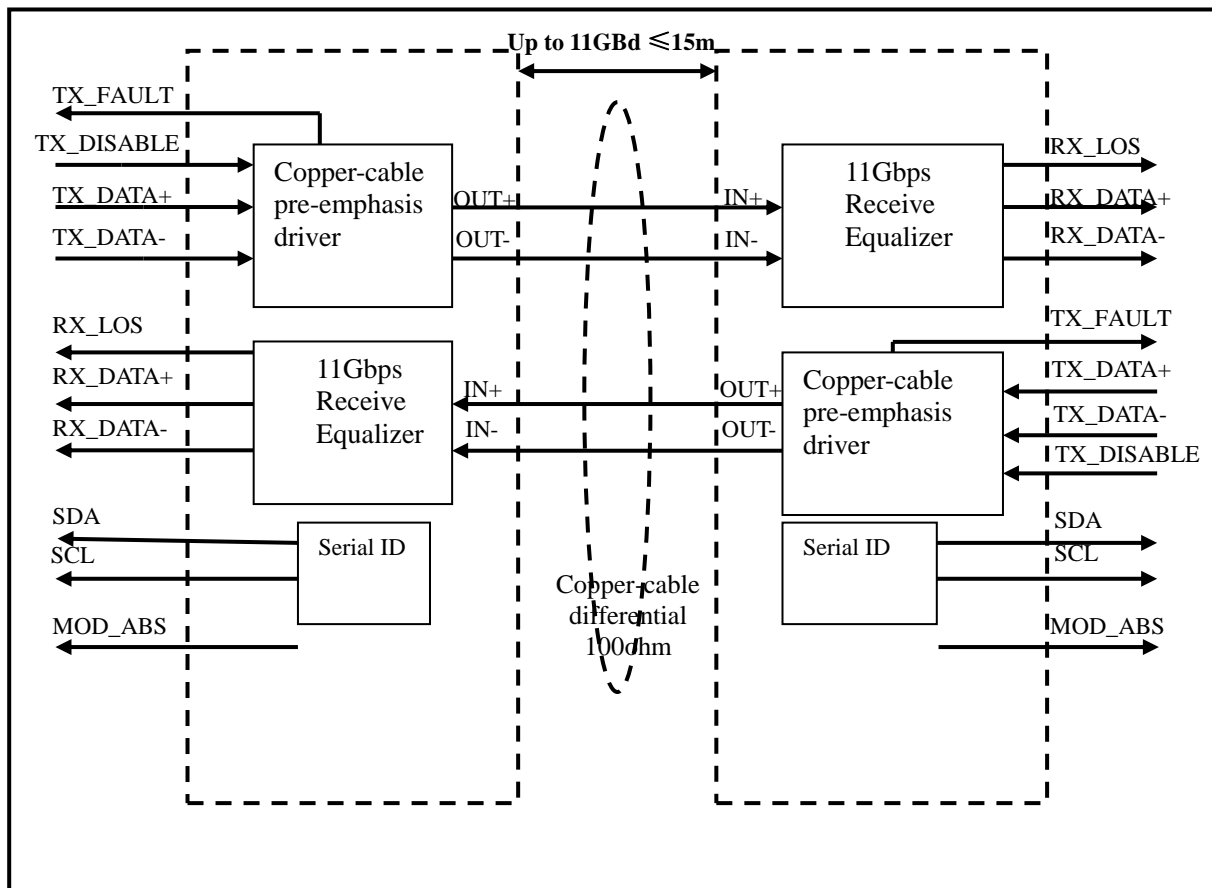
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{IN}			100	Ω	
Transmit Disable Voltage	V_D	$V_{CC}-1.5$		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	
Transmit Disable Assert Time				10	μs	

Electrical Characteristics - Receiver

$V_{CC} = 3.15 \text{ V to } 3.6 \text{ V}$, $T_C = 0^\circ \text{C to } 70^\circ \text{C}$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single ended data output swing	$V_{OUT\ PP}$	175	300	600	mV	
Data output rise time (20%-80%)	T_R		30		ps	
Data output fall time (20%-80%)	T_F		30		ps	
LOS Fault	$V_{LOS\ Fault}$	2		$V_{CC\ HOST}$	V	
LOS Normal	$V_{LOS\ normal}$	V_{EE}		$V_{EE}+0.5$	V	

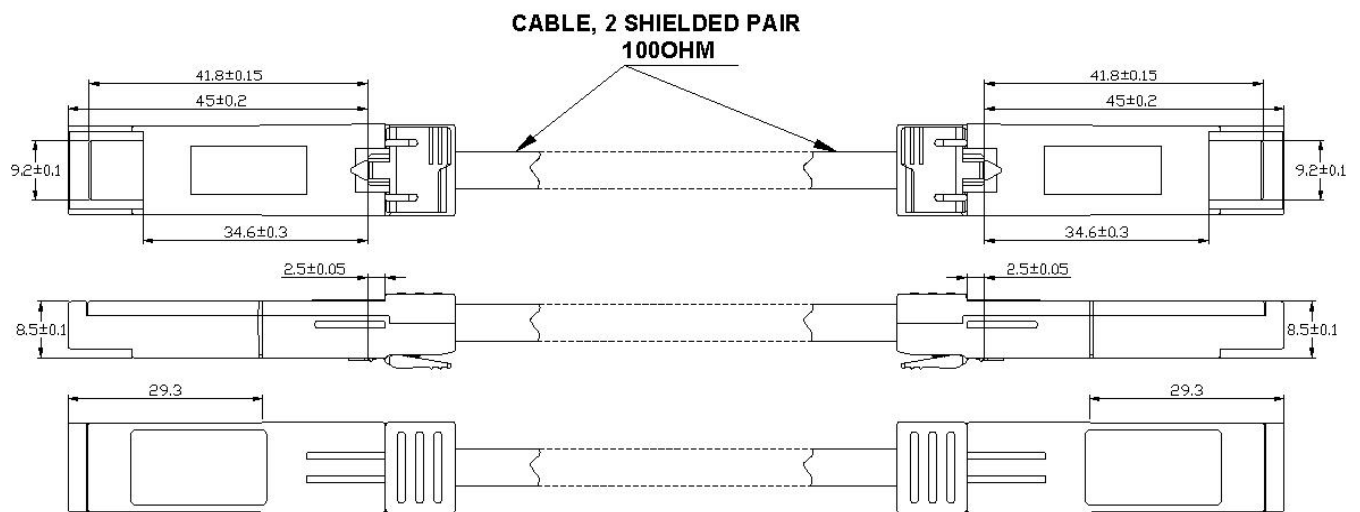
Block Diagram of Transceiver



Active cable assembly has signal amplification and equalization in the assembly. Active copper assemblies are typically used in host systems that do not employ EDC. Active SFP+ cable assemblies also incorporate Rx LOS and Tx Disable features.

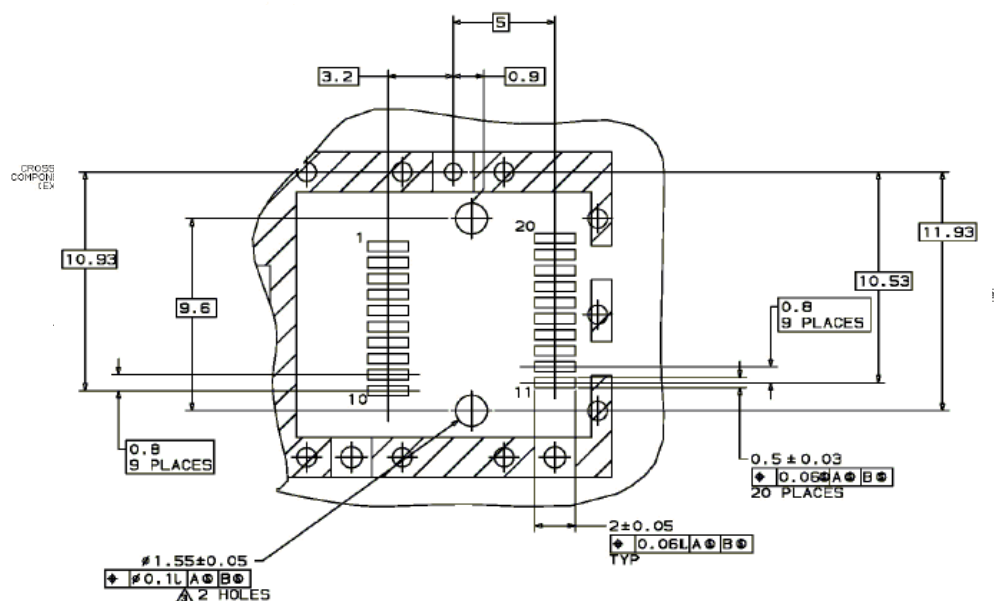
Active cable assembly has built-in MCU, offer a number of additional host-management capabilities. I2C (Inter-IC bus protocol) interface and on-board EEPROM features enable the host to detect or configure specific performance characteristics.

Dimensions




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

PCB Layout Recommendation

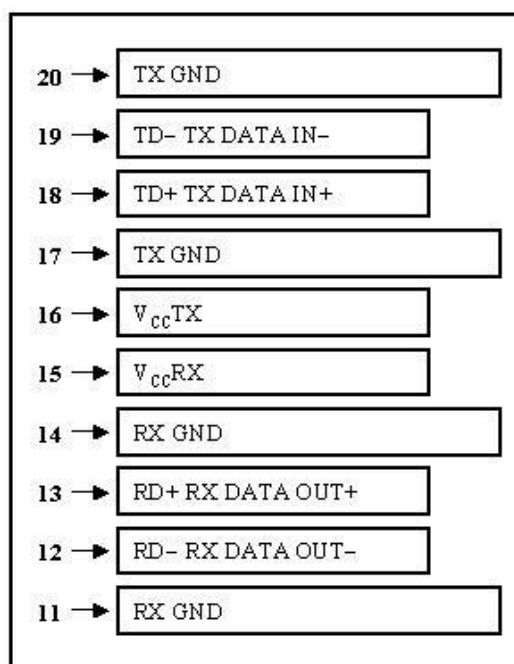
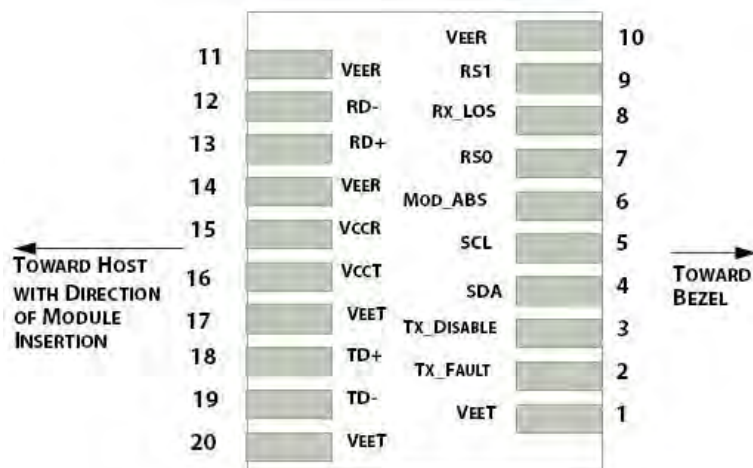


 Datum and Basic Dimension Established by Customer

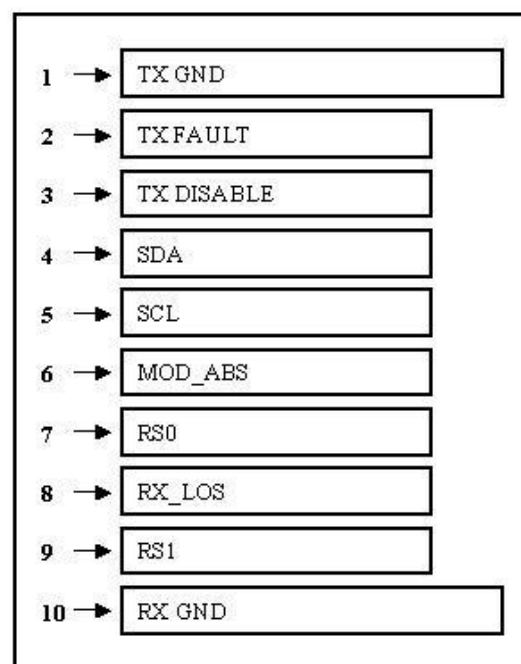
 Pads and Vias are Chassis Ground, 11 Places

 Through Holes are Unplated

Electrical Pad Layout



Top of Board



Bottom of Board

Pin Assignment

PIN #	Symbol	Description	Remarks
1	V _{EET}	Transmitter ground (common with receiver ground)	
2	T _{FAULT}	Transmitter Fault.	
3	T _{DIS}	Transmitter Disable. Laser output disable on high or open	
4	SDA	Data line for serial ID	
5	SCL	Clock line for serial ID	
6	MOD_ABS	Module Absent. Grounded within the module	
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	
9	RS1	No connection required	
10	V _{FEER}	Receiver ground (common with transmitter ground)	
11	V _{FEER}	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 _{FEER}	Receiver ground (common with transmitter ground)	
15	V _{CCR}	Receiver power supply	
16	V _{CCT}	Transmitter power supply	
17	V _{EET}	Transmitter ground (common with receiver ground)	
18	TD ⁺	Transmitter Non-Inverted DATA in. AC coupled	
19	TD ⁻	Transmitter Inverted DATA in. AC coupled	
20	V _{EET}	Transmitter ground (common with receiver ground)	

References

1. IEEE standard 802.3ae. IEEE Standard Department, 2005.
2. Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module "SFP+" – SFF-8431 (FC-PH/PH2/PH3).