

DATA SHEET

MODULETEK: DAC-QSFP10-4SFP10-A-M-xxAWG-aa.aaM-C0C0B

QSFP+ to 4 SFP+ Active Copper Cable Assembly

DAC-QSFP10-4SFP10-A-M-xxAWG-aa.aaM-C0C0B Overview

ModuleTek's DAC-QSFP10-4SFP10-A-M-xxAWG-aa.aaM-C0C0B QSFP+ to 4SFP+ active cable can transmit data at up to 10Gbps with four lines, providing 40Gbps aggregation rate. Excellent performance in short-distance transmission of data, low power consumption, and cost-effective. QSFP+ to 4SFP+ active cables provide a low-cost solution for data transfer between racks and racks such as 10G Ethernet, data storage centers, and computing centers. In terms of compatibility, the QSFP+ to 4SFP+ active cable is compatible with most of the switches on the market, perfectly integrating high-speed cables into the customer's data transmission network. The QSFP+ to 4SFP+ active cable is fully compliant with the SFF-8436, QSFP+ MSA and IEEE 802.3ae standards.

Product Features

- QSFP+ End: Compliant with QSFP+ MSA specifications
- SFP+ End: Compliant with SFP+ MSA specifications
- 4 independent duplex channels operating at 10Gbps, also support for 2.5Gbps, 5Gbps data rates
- All-metal housing for superior EMI performance
- Single power supply 3.3V, low power consumption
- RoHS Compliant
- Operating temperature range: 0°C to 70°C

Applications

- 10Gigabit Ethernet
- Serial Data Transmission
- Storage
- Fiber Channel
- Switch, Router

Ordering Information

Part Number	Description	Gauge	Length
DAC-QSFP10-4SFP10-A-M-xxAWG-aa.aaM-C0C0B	QSFP+ to 4 SFP+ Active Copper Cable Assembly, aa.aa \leq 7	30AWG	\leq 7m
DAC-QSFP10-4SFP10-A-M-xxAWG-aa.aaM-C0C0B	QSFP+ to 4 SFP+ Active Copper Cable Assembly, 7<aa.aa \leq 10	28AWG	7m<length \leq 10m
Note: 1. "A" indicates active cable 2. "M" indicates built-in MCU 3. "aa.aa" indicates the cable length in meters. 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.			
For More Information: ModuleTek Limited Web: www.moduletek.com Email: sales@moduletek.com			

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Bit Error Rate	BER			10 ⁻¹²		
Operating Temperature	T _C	0		70	°C	1
Storage Temperature	T _{STO}	-40		85	°C	2
Input Voltage	V _{CC}	3.14	3.3	3.46	V	

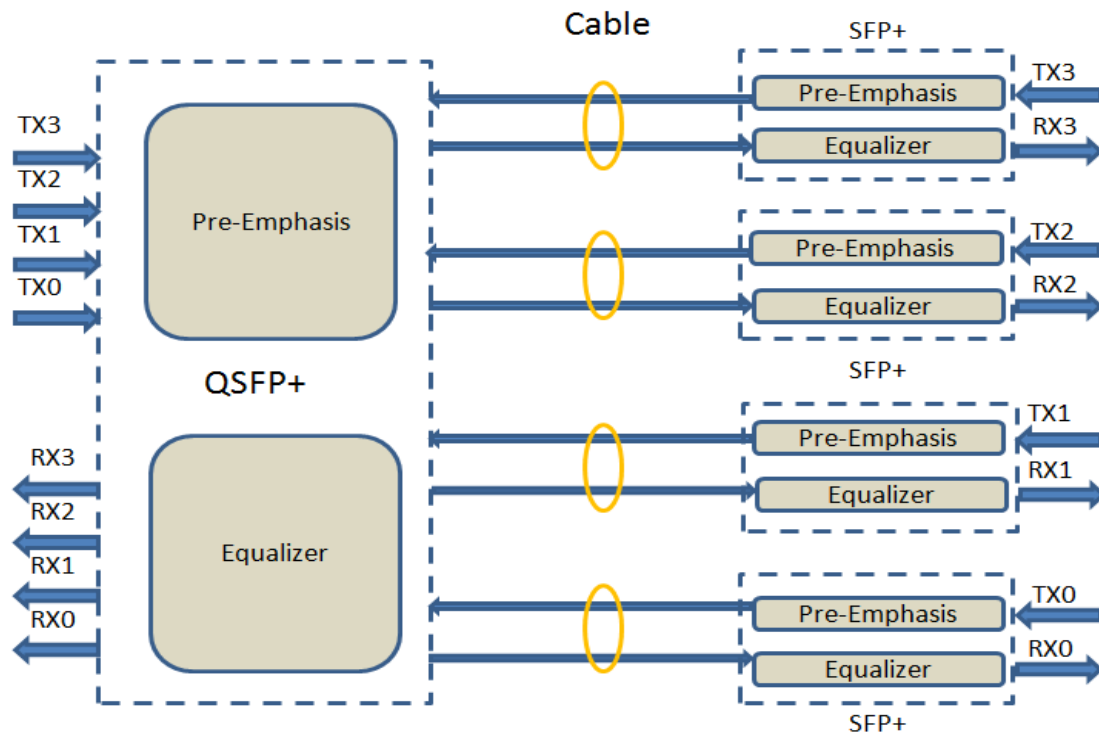
Notes:

1. Case temperature
2. Ambient temperature

Cable Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Wire Gauge		30AWG		28AWG	AWG	
Cable Impedance	Z	90	100	110	Ohm	

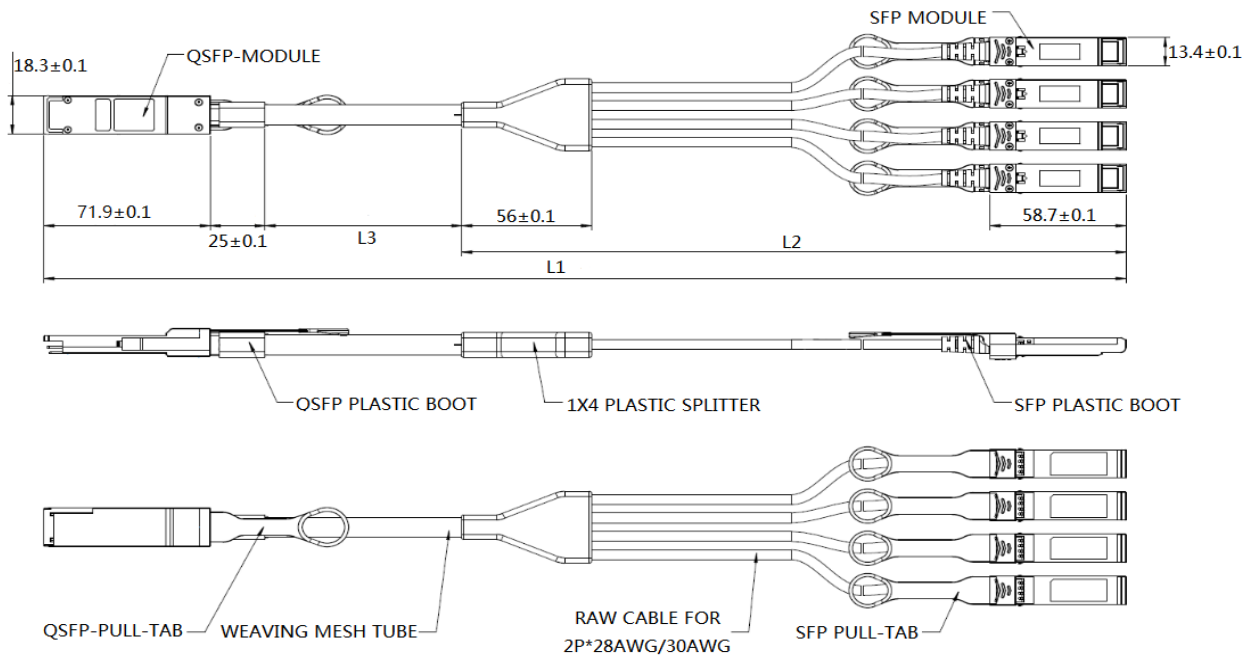
Block Diagram of Transceiver



Functions Description

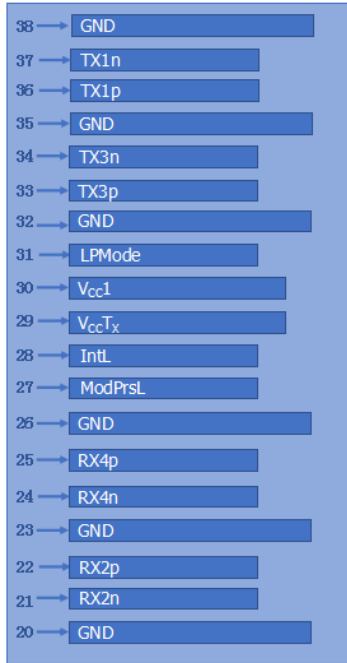
The transmitter side accepts electrical input signals. All input data signals are differential LVPECL or CML logic and they are internally terminated. The parallel input electrical signal first is processed via the Pre-Emphasis. At the receiver side, the parallel electrical signals are recovered via Equalizer. The output electrical signals of the receiver side are voltage compatible with Current Mode Logic (CML) levels. All data signals are differential and support a data rate up to 10Gbps per channel. All transmitter signals and receiver signals are AC coupled internally on both module ends. Active cable assembly has built-in MCU, offering 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

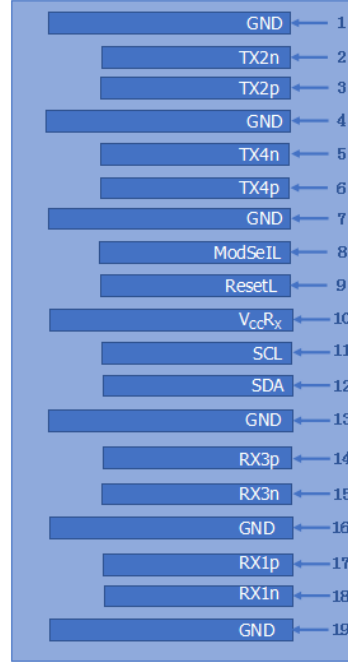


ALL DIMENSIONS (NOT INCLUDING THE LENGTH OF THE CABLE) ARE ± 0.2 mm
 UNLESS OTHERWISE SPECIFIED
 UNIT: mm

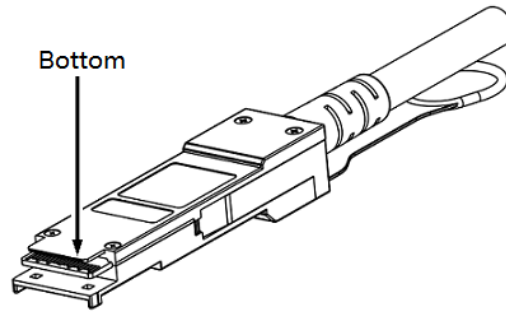
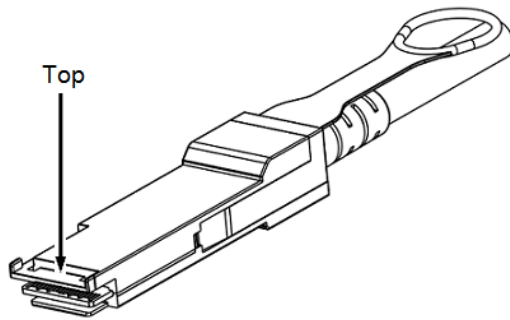
Electrical Pad Layout (QSFP+ END)



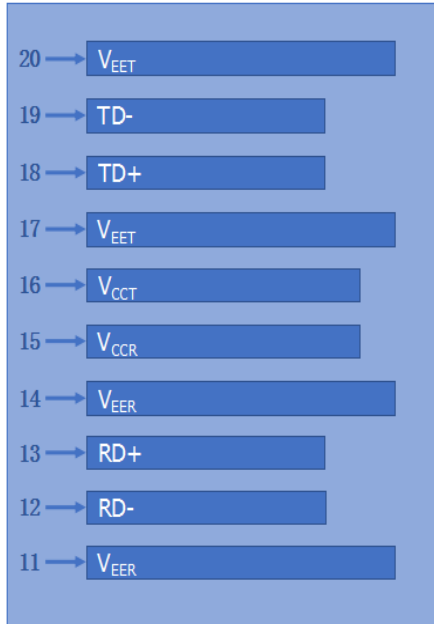
Top of Board



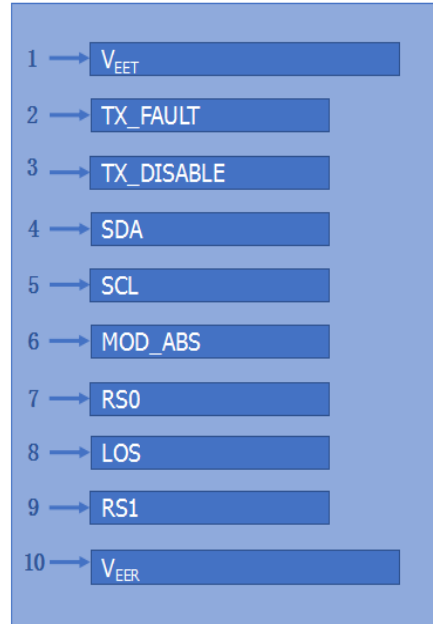
Bottom of Board



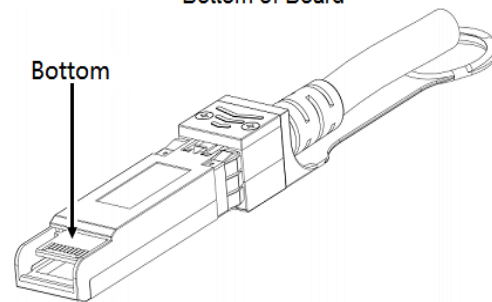
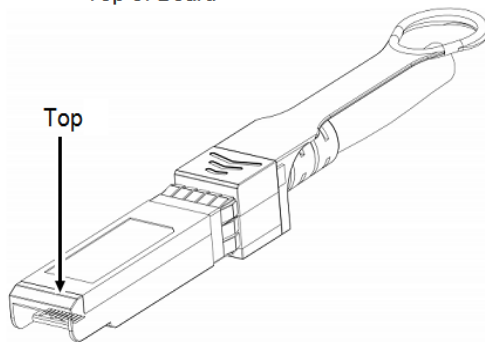
Electrical Pad Layout (SFP+ END)



Top of Board



Bottom of Board



Pin Assignment (QSFP+ END)

PIN #	Symbol	Description	Remarks
1	GND	Ground	5
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	5
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	5
8	ModSelL	Module Select	1
9	ResetL	Module Reset	2
10	V _{CC} RX	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	5
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	5
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	5
20	GND	Ground	5
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	5
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	5
27	ModPrsL	Module Present	3
28	IntL	Interrupt	4
29	V _{CC} TX	+3.3V Power Supply transmitter	
30	V _{CC} 1	+3.3V Power Supply	
31	LPMoDe	Low Power Mode	5
32	GND	Ground	5
33	Tx3p	Transmitter Non-Inverted Data Input	

34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	5
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	5

Notes:

1. ModSelL is the input pin. The module responds to 2-wire serial communication commands when it is held low by the host. ModSelL allows multiple QSFP modules to be used on a single 2-wire interface bus. If ModSelL is High, the module will not respond to any 2-wire interface communication from the host. ModSelL has internal pull-up resistors in the module
2. The module restart pin, when the low level on the ResetL pin lasts longer than the minimum pulse length, resets the module and restores all user modules to their default state. When performing reset device, the host should ignore all status bits. Until the module reset interrupt is completed, please note that during hot plugging, the module will issue this information to complete the reset interrupt without resetting
3. This pin is active high, indicating that the module is running under a low power module. The signal has no effect on the functionality of this product.
4. IntL is the output pin, which is the open collector output and must be pulled up to Vcc with a 4.7kΩ-10kΩ resistor on the motherboard. When it is low, it indicates that the module may malfunction. The host uses a 2-wire serial interface to identify the interrupt source
5. Circuit ground is internally isolated from chassis ground.

Pin Assignment (SFP+ END)

PIN #	Symbol	Description	Remarks
1	V _{EET}	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault.	
3	TX_DISABLE	Transmitter Disable. Laser output disabled on high or open	2
4	SDA	Data line for serial ID	3
5	SCL	Clock line for serial ID	3
6	MOD_ABS	Module Absent. Grounded within the module	3
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1	No connection required	
10	V _{EER}	Receiver ground (common with transmitter ground)	1
11	V _{EER}	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 _{EER}	Receiver ground (common with transmitter ground)	1
15	V _{CCR}	Receiver power supply	
16	V _{CCT}	Transmitter power supply	
17	V _{EET}	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 _{EET}	Transmitter ground (common with receiver ground)	1

Notes:

1. Circuit ground is isolated from chassis ground
2. Disabled: T_{DIS}>2V or open, Enabled: T_{DIS}<0.8V
3. Should Be pulled up with 4.7k - 10k ohm on host board to a voltage between 2V and 3.6V
4. LOS is open collector output

References

1. Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module “SFP+” - SFF-8431
2. IEEE standard 802.3ae. IEEE Standard Department, 2008.
3. QSFP+ 10Gbps 4X PLUGGABLE TRANSCEIVER - SFF-8436