40G QSFP+ to 4*SFP+ Direct Attach Cable Specification
HTDC-QPA4-xx01MB

Feature

- Connector 1: QSFP+ 40GBASE Rated Connector (SFF-8436 Compliant)
- Connector 2: 4 x SFP+ 10GBASE Rated Connector (SFF-8431 Compliant)
- Up to 10.3125GBASE transfer rate per SFP+ channel (40GBASE aggregate)
- Cable Type: Passive Copper Cable
- Wire AWG: AWG30/AWG26/AWG24
- Available lengths (in meters): 1, 2, 3..... 7
- Hot plug swappable
- Commercial temperature range (COM): 0~ 70 °C
- Low power consumption: 0.02W (typ.)
- Power supply :+3.3V
- Low cross-talk and pair-to-pair skew maintains signal integrity
- Fully compliant to the latest SFP+ & QSFP MSA

Applications

- 10G/40Gigabit Ethernet
- Switches, Routers, and HBAs

Standards

- SFF- 8436, SFF-8431, SFF-8432
- SFF-8472

Description

The Hirundo ’ s HTDC-QPA4-xx01MB QSFP+ to 4 x SFP+ passive copper cables are 40Gb/s to 10Gb/s cable assemblies. The cables are compliant with SFF-8431 and SFF-8436 specifications and provide connectivity between devices using QSFP+ port on one end and multiple SFP+ ports on the other end. Each QSFP+ to SFP+ cable features a single QSFP+ connector (SFF-8436) rated for 40-Gb/s on one end and 4 SFP+ connectors (SFF- 8431), each rated for 10-Gb/s, on the other. The cables use state-of-the-art signal processing technology to fill the expanding need for cost effective data center intercon-nects.

1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications						Application
	Package	Data rate	Wire gauge	Cable lengthr	Temp	Others	
HTDC-QPA4-xx01MB[1]	QSFP+ 4*SFP+	4X10.3125 Gbps	30 to 26 AWG	up to 7m	0~70 ℃	RoHS	40G BASE CR
PN	HTDC-QPA4-xx01MB[1]						
Description	40G QSFP+ to 4*SFP+ Direct Attach Cables,30 to 24 AWG, up to 7m, 0-70℃						
SAP No	-						
Customer PN	-						

Notes:

1. Refer to Chapter 7 Ordering Information

2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Approved	Date
V1.0	Leo	Virgil	LiuSJ	2020-12-30

3. Absolute Maximum Ratings

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	℃	-40	+85
Operating Temperature	T	℃	0	+70
Power Supply Voltage	Vcc	V	-	3.47
Data Rate Per Lane（Per channel）		Gbps		10.3125

4. High Speed Characteristics

Table 4.1 High Speed Specifications

Parameter	Symbol	Min	Typ	Max	Units	Notes
Differential Impedance	Zd	90	100	110	Ω	
Differential Input Return Loss	SDDXX	<-12+2* SQRT (f) with f in GHz			dB	0.01~4.1GHz
		<-6.3+13* Log10/(f/5.5) with f in GHz			dB	4.1~11.1GHz
Common Mode Output Return Loss	SCCXX	< -7+1.6*f with f in GHz			dB	0.01~2.5GHz
				-3	dB	2.5~11.1GHz
Difference Waveform Distortion Penalty	dWDPc			6.75	dB	
VMA Loss	L			4.4	dB	
VMA Loss to Crosstalk Ratio	VCR	32.5			dB	

5. Pin Assignment and Pin Description

5.1.1 QSFP+ Pin Assignment

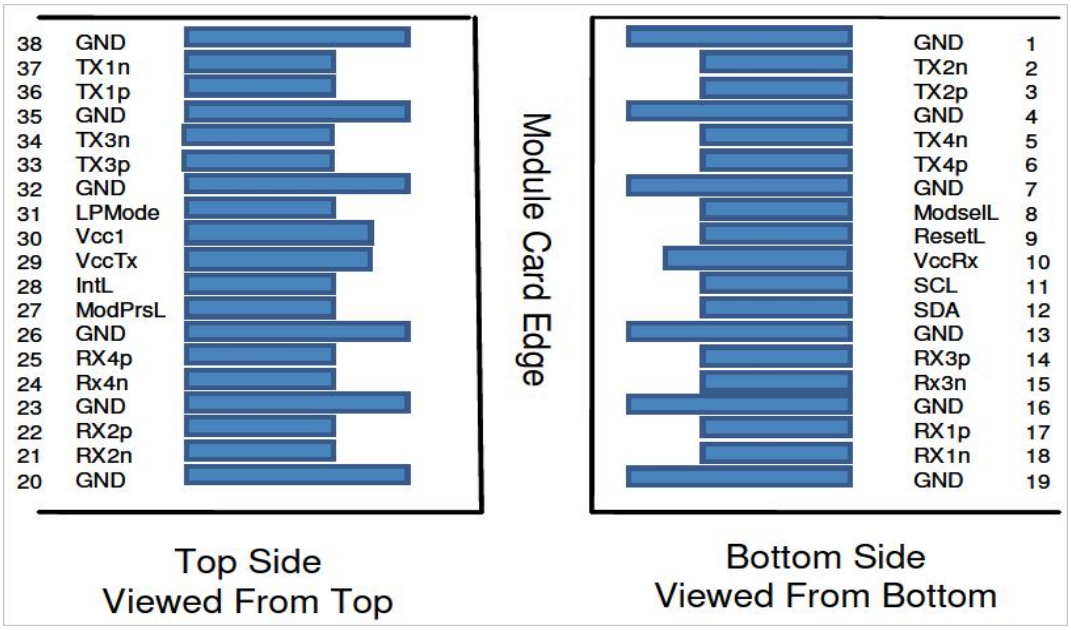


Figure 1 QSFP28 Electrical Pin-out Details

5.1.2 QSFP+ Pin Description

Table 5.1 Pin Description

Pin	Symbol	Name/Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSe1L	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power supply receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrSL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:
1.GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.Circuit ground is internally isolated from chassis ground.

5.2.1 SFP+ Pin Assignment

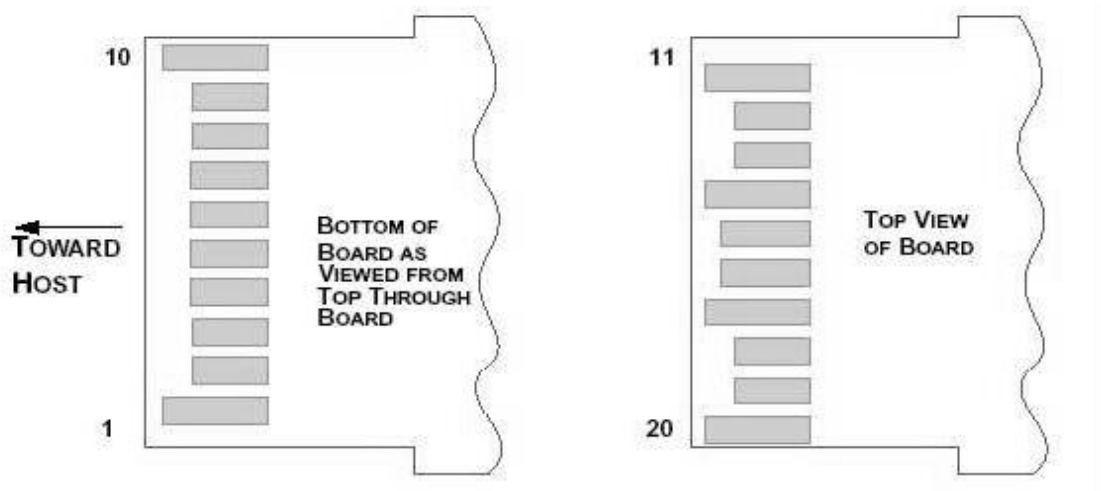


Figure 2 SFP28 Electrical Pin-out Details

5.2.2 SFP+ Pin Description

Table 5.2Pin Description

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	
2	Tx Fault	Module transmitter fault	1
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	2
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	
7	RS0	Rate select0: module inputs and are pulled low to VeeT with > 30 kΩ resistorsin the module	1
8	LOS	Receiver Loss of Signal Indication	2
9	RS1	Rate select1: module inputs and are pulled low to VeeT with > 30 kΩ resistorsin the module.	1
10	VeeR	Module receiver ground	
11	VeeR	Module receiver ground	
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	

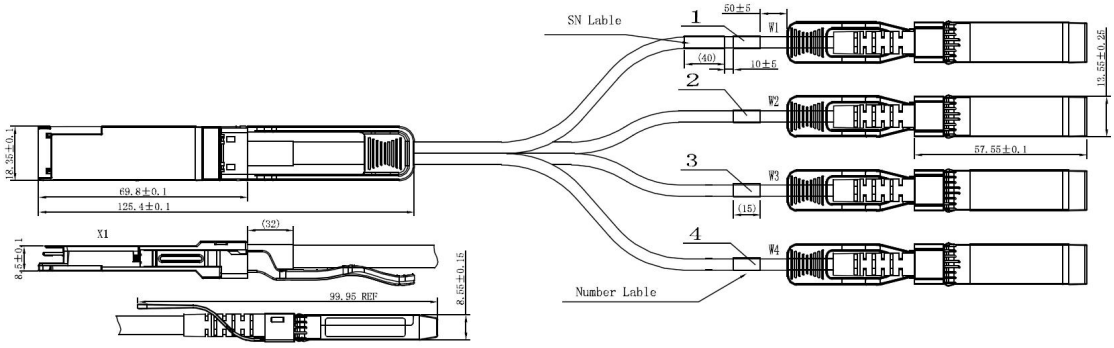
Notes:

1.Signals not supported in SFP+ Copper pulled-downto VeeT with 30K ohms resistor.

2.Passive cable assemblies do not support LOS and TX_DIS

6. Mechanical Specifications

The connector is compatible with the SFF-8436 to SFF-8432 specification.



FFigure 3 Mechanical Dimensions

Table 6.1 Length and related Cable AWG

Length (m)	Cable AWG
1	30
2	30
3	30
4	26
5	26
6	24
7	24

7. Ordering Information

Table 7.1Ordering Information

Part Number	Description
HTDC-QPA4-3001MB	40G QSFP+-4*SFP+ 1m 30AWG DAC Cable
HTDC-QPA4-3002MB	40G QSFP+-4*SFP+ 2m 30AWG DAC Cable
HTDC-QPA4-3003MB	40G QSFP+-4*SFP+ 3m 30AWG DAC Cable
HTDC-QPA4-2604MB	40G QSFP+-4*SFP+ 4m 26AWG DAC Cable
HTDC-QPA4-2605MB	40G QSFP+-4*SFP+ 5m 26AWG DAC Cable
HTDC-QPA4-2406MB	40G QSFP+-4*SFP+ 6m 24AWG DAC Cable
HTDC-QPA4-2407MB	40G QSFP+-4*SFP+ 7m 24AWG DAC Cable

8. For More Information

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