

100G QSFP28-to-4*SFP28 Direct Attach Cable Specification HTDC-QPA5-xx01MB

Feature

- ◆ Compatible with IEEE 802.3bj, IEEE 802.3by and InfiniBand EDR
- ◆ Supports aggregate data rates of 100Gbps
- ◆ Optimized construction to minimize insertion loss and cross talk
- ◆ Backward compatible with existing QSFP+ connectors and cages
- ◆ Pull-to-release slide latch design
- ◆ 26AWG through 30AWG cable
- ◆ Straight and break out assembly configurations available
- ◆ Customized cable braid termination limits EMI radiation
- ◆ Customizable EEPROM mapping for cable signature
- ◆ RoHS compliant

Applications

- ◆ 100/25 Gigabit Ethernet
- ◆ Switches, Routers, and HBAs
- ◆ Data Centers

Standards

- ◆ 100G Ethernet(IEEE 802.3bj)
- ◆ 25G Ethernet(IEEE 802.3by)
- ◆ InfiniBand EDR
- ◆ SFF-8665 QSFP+ 28G 4X Pluggable Transceiver Solution(QSFP28)
- ◆ SFF-8402 SFP+ 1X 28Gb/s Pluggable Transceiver Solution(SFP28)

Description

The Hirundo's 100G QSFP28 to 4x25G SFP28 Passive Direct Attach Copper Breakout Cable assemblies are high performance, cost effective for SFP28 and QSFP28 equipment interconnects. The Hybrid cables are compliant with SFF-8402 and SFF-8665 specifications. It offers a low power consumption, short reach interconnect applications.

The cable each lane is capable of transmitting data at rates up to 25Gb/s, providing an aggregated rate of 100Gb/s.

1. Ordering Information

Table 1.1 Ordering Information

| Part No. | Specifications | | | | | | Application |
|---------------------------------|--|------------------|------------------|--------------|-----------|--------|-------------------------|
| | Package | Data rate (Gbps) | Wire gauge (AWG) | Cable length | Temp (°C) | Others | |
| HTDC-QPA5-xx01MB ^[1] | QSFP28 4*SFP28 | 103.12 | 30 to 26 | up to 5m | 0~70 | RoHS | 100/25 Gigabit Ethernet |
| PN | HTDC-QPA5-xx01MB ^[1] | | | | | | |
| Description | 100G QSFP28-to-4*SFP28 Direct Attach Cables,30 to 26 AWG, up to 5m, 0-70°C | | | | | | |
| SAP No | - | | | | | | |
| Customer PN | - | | | | | | |
| | | | | | | | |

Notes:

1. Refer to Chapter 7 Ordering Information

2. Revision History

Table 2.1 Revision History

| Version | Initiated | Reviewed | Revision | Date |
|---------|-----------|----------|----------|-----------|
| V1.0 | Leo | Virgil | LiuSJ | 2020.7.27 |
| | | | | |

3. Absolute Maximum Ratings

Table 3.1 Absolute Maximum Ratings

| Parameter | Symbol | Unit | Min | Max |
|----------------------------------|--------|------|-----|-------|
| Storage Temperature Range | Ts | °C | -40 | +85 |
| Operating Temperature | T | °C | 0 | +70 |
| Power Supply Voltage | Vcc | V | - | 3.47 |
| Data Rate Per Lane (Per channel) | | Gbps | | 25.78 |

4. High Speed Characteristics

Table 4.1 High Speed Specifications

| Parameter | Symbol | Min | Typ. | Max | Unit | Note |
|---|----------|-------|------|-------|------|----------------------|
| Differential Impedance | RIN, P | 9 | 100 | 110 | Ω | |
| Insertion loss | SDD21 | 8 | | 22.48 | dB | At 12.8906 GHz |
| Differential Return Loss | SDD11 | 12.45 | | See 1 | dB | At 0.05 to 4.1 GHz |
| | SDD22 | 3.12 | | See 2 | | At 4.1 to 19 GHz |
| Common-mode to common-mode output return loss | SCC11 | 2 | | | dB | At 0.2 to 19 GHz |
| | SCC22 | | | | | |
| Differential to common-mode return loss | SCD11 | 12 | | See 3 | dB | At 0.01 to 12.89 GHz |
| | SCD22 | 10.58 | | See 4 | | At 12.89 to 19 GHz |
| Differential to common Mode Conversion Loss | SCD21-IL | 10 | | | dB | At 0.01 to 12.89 GHz |
| | | | | See 5 | | At 12.89 to 15.7 GHz |
| | | 6.3 | | | | At 15.7 to 19 GHz |
| Channel Operating Margin | COM | 3 | | | dB | |

Notes:

2. Reflection Coefficient given by equation $SDD11(dB) < 16.5 - 2 \times \text{SQRT}(f)$, with f in GHz.
3. Reflection Coefficient given by equation $SDD11(dB) < 10.66 - 14 \times \log_{10}(f/5.5)$, with f in GHz.
4. Reflection Coefficient given by equation $SCD11(dB) < 22 - (20/25.78) \times f$, with f in GHz.
5. Reflection Coefficient given by equation $SCD11(dB) < 15 - (6/25.78) \times f$, with f in GHz.
6. Reflection Coefficient given by equation $SCD21(dB) < 27 - (29/22) \times f$, with f in GHz.

5. Pin Assignment and Pin Description

5.1.1 QSFP28 Pin Assignment

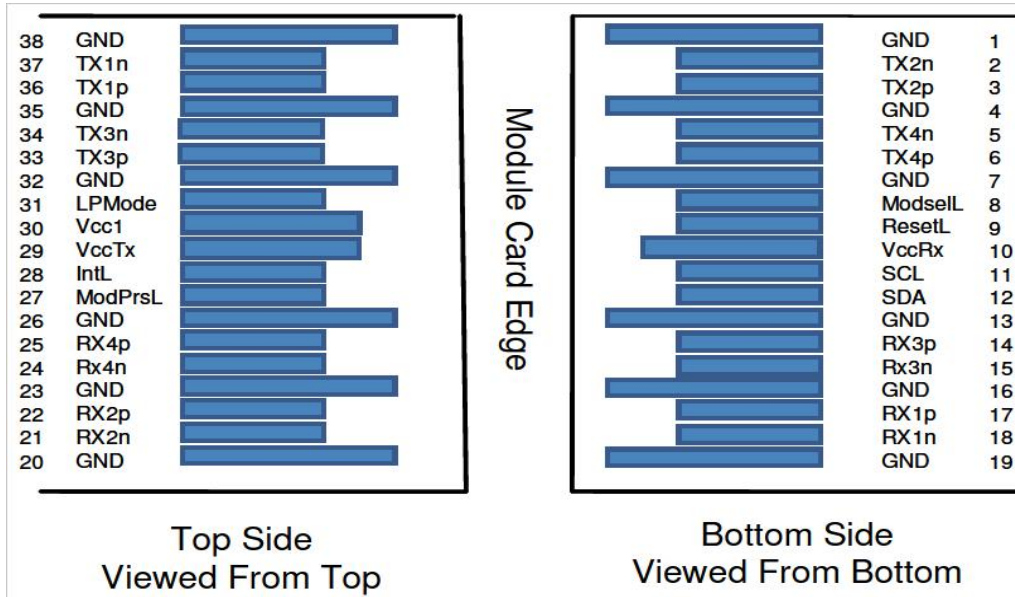


Figure 1 QSFP28 Electrical Pin-out Details

5.1.2 QSFP28 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 SFP28 Pin Assignment

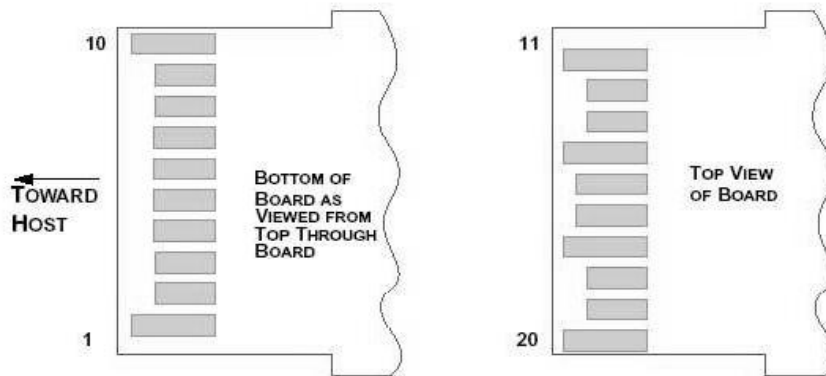


Figure 2 SFP28 Electrical Pin-out Details

5.2.2 SFP28 Pin Description

Table 5.2 Pin 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 resistors in 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 resistors in 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-8432 and SFF-8665 specification.

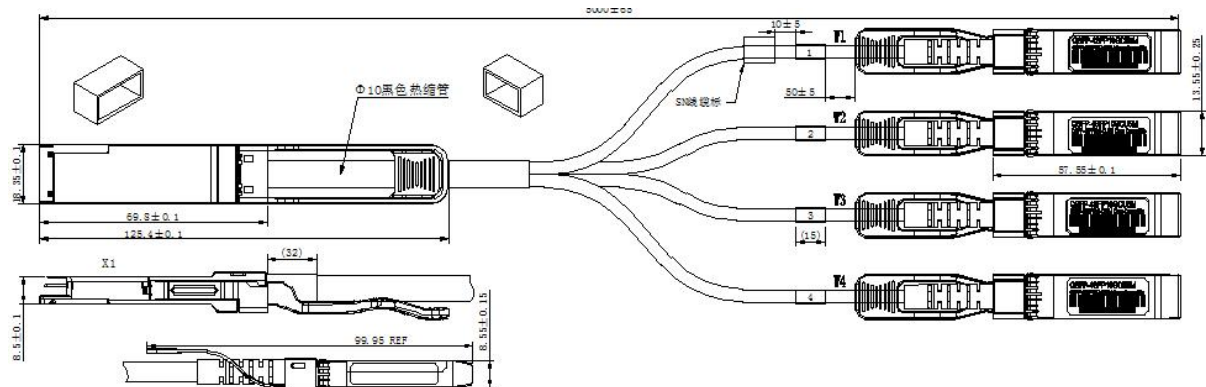


Figure 3 Mechanical Dimensions

Table 6.1 Length and related Cable AWG

| Length (m) | Cable AWG |
|------------|-----------|
| 1 | 30 |
| 2 | 30 |
| 3 | 30 |
| 4 | 26 |
| 5 | 26 |

7. Ordering Information:

Table 7.1 Ordering Information

| Part Number | Description |
|------------------|--|
| HTDC-QPA5-3001MB | 100G QSFP28-4*SFP28 1m 30AWG DAC Cable |
| HTDC-QPA5-3002MB | 100G QSFP28-4*SFP28 2m 30AWG DAC Cable |
| HTDC-QPA5-3003MB | 100G QSFP28-4*SFP28 3m 30AWG DAC Cable |
| HTDC-QPA5-2604MB | 100G QSFP28-4*SFP28 4m 26AWG DAC Cable |
| HTDC-QPA5-2605MB | 100G QSFP28-4*SFP28 5m 26AWG DAC Cable |

8. For More Information

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