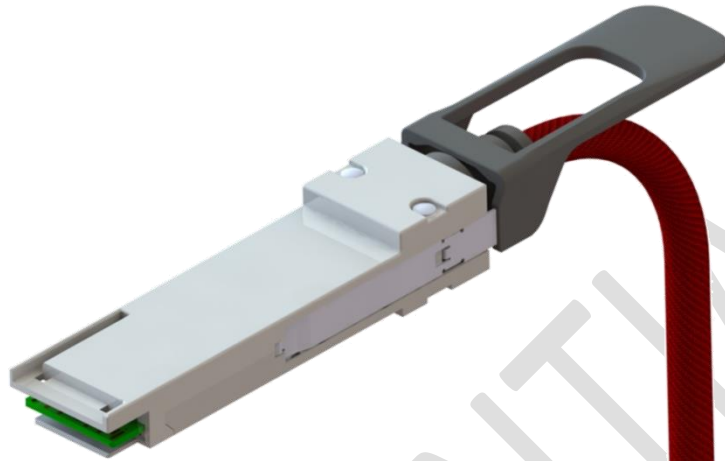


## Hairtail 200G HDR QSFP56 TO QSFP56

### Active Direct Attached Cable



#### FEATURES

- QSFP Module compliant to SFF-8665
- InfiniBand HDR compatible
- Transmission data rate up to PAM4 53.125Gbps per channel
- Enable 200Gb/s Transmission
- Supporting 28Gbaud line rate with highly liner equalization
- Maximum link length up to 8m
- Enable Auto-Negotiation and Link Training
- Low latency<10ps
- Supports device programming by MCU with I2C
- 3.3V Power supply
- Low power consumption
- Operating case temperature 0°C to +70°C
- RoHS2.0 compliant

## Absolute Maximum Ratings

| Parameter                  | Symbol          | Min  | Typical | Max | Unit |
|----------------------------|-----------------|------|---------|-----|------|
| Supply Voltage             | V <sub>cc</sub> | -0.3 | 3.3     | 3.6 | V    |
| Storage temperature        | T <sub>s</sub>  | -40  |         | 85  | °C   |
| Operating Case temperature | T <sub>c</sub>  | 0    |         | 70  | °C   |
| Humidity                   | Rh              | 5    |         | 85  | %    |
| Data Rate                  |                 |      | 200     |     | Gbps |

## Physical Characteristics

| Parameter       | Symbol | Min                          | Typical | Max | Unit |
|-----------------|--------|------------------------------|---------|-----|------|
| Length          | L      | 3                            |         | 8   | M    |
| AWG             |        | 32                           |         | 25  | AWG  |
| Jacket material |        | HAIRTAIL Technology Net, Red |         |     |      |

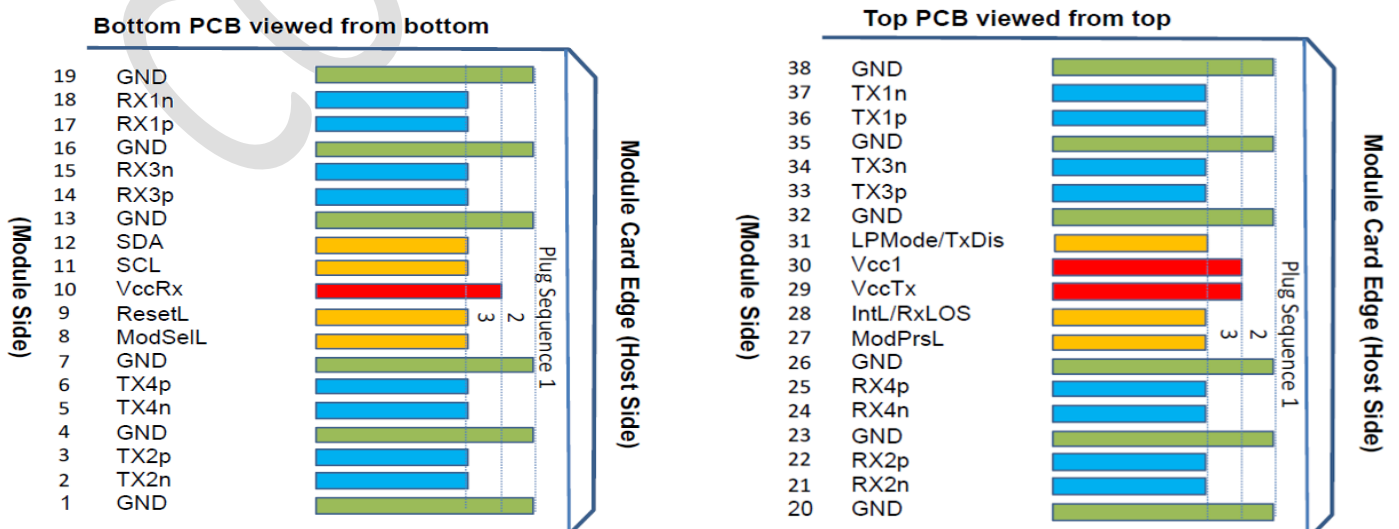
## Electrical Specifications

| Parameter                        | Symbol          | Min                   | Typical | Max                   | Unit             |
|----------------------------------|-----------------|-----------------------|---------|-----------------------|------------------|
| Power supply voltage             | V <sub>CC</sub> | 3.1                   | 3.3     | 3.5                   | V                |
| Input Amplitude                  |                 | 800                   |         | 1200                  | mV <sub>pp</sub> |
| Input LOW Voltage                | V <sub>IL</sub> | -0.3                  |         | 0.35*V <sub>CC</sub>  | V                |
| Input HIGH Voltage               | V <sub>IH</sub> | 0.65* V <sub>CC</sub> |         | V <sub>CC</sub> +0.3  | V                |
| Output Logic LOW                 | V <sub>OL</sub> |                       |         | 0.25* V <sub>CC</sub> | V                |
| I2C Master Mode Output Frequency |                 |                       | 400     |                       | kHz              |
| 200G end Power consumption       |                 |                       | 0.6     | 0.7                   | W                |

## High-Speed Specifications

| Parameter                                   | Symbol      | Min                                                                                                                                                                     | Typical | Max                  | Unit |
|---------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------|------|
| Raw cable impedance                         | Zca         | 90                                                                                                                                                                      | 100     | 110                  | ohm  |
| Mated connector Impedance                   | Zmated      | 85                                                                                                                                                                      | 100     | 115                  | ohm  |
| Insertion loss at 13.28 GHz                 | SDD21       | 6                                                                                                                                                                       |         | 14                   | dB   |
| Return loss                                 | SDD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} 11 & 0.05 \leq f < 26.5625/7.5 \\ 6.0 - 9.2 \lg(15f/5.5 \cdot 7.5 \cdot 26.5625) & 26.5625/7.5 \leq f \leq 26.5 \end{cases}$ |         |                      | dB   |
| Differential to common-mode return loss     | SCD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} -25 + (20/26.5625)f & 0.05 \leq f < 26.5625/2 \\ -18 + (6/26.5625)f & 26.5625/2 \leq f \leq 26.5625 \end{cases}$             |         |                      | dB   |
| Differential to common-mode conversion loss | SCD21-SDD21 | $\text{Conversion\_loss}(f) - \text{IL}(f) \geq \begin{cases} 10 & 0.01 \leq f < 12.89 \\ 27 - (29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{cases}$ |         |                      | dB   |
| Minimum COM                                 | COM         | 3                                                                                                                                                                       |         |                      | dB   |
| BER                                         |             |                                                                                                                                                                         |         | $2.4 \times 10^{-4}$ |      |

## QSFP Pin Description



## Electrical Pin-out Details for QSFP

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

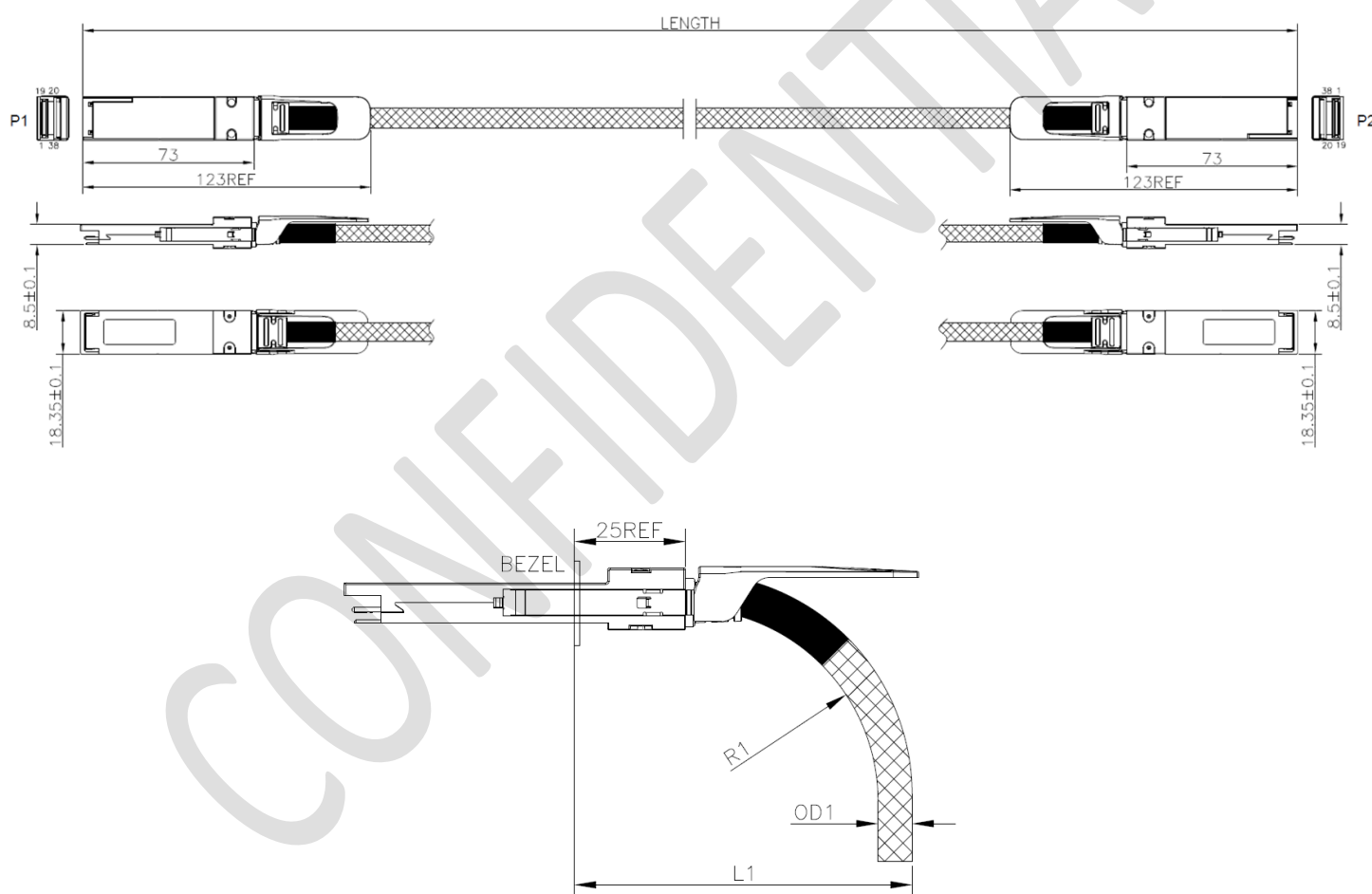
Note 1: GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

Note 2: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figures 3 and 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500 mA.

## Module Memory Map

Compatible with SFF-8636 and customer spec.

## Mechanical Dimensions



**Mechanical Drawing**

## Bending radius

## A-50H-Q-Q-XXXB Series Active Direct Attached Cable

| Wire gauge | OD1(Ref) | Min. bend radius (R1) | Min. Bend space(L1) |
|------------|----------|-----------------------|---------------------|
| 32/30AWG   | 5.7mm    | 12mm                  | 46mm                |
| 28AWG      | 7.0mm    | 14mm                  | 50mm                |
| 27AWG      | 7.6mm    | 16mm                  | 53mm                |
| 26/25AWG   | 8.3mm    | 17mm                  | 55mm                |

## Ordering Information

| Model Number   | Part Number   | Description                                                    |
|----------------|---------------|----------------------------------------------------------------|
| A-50H-Q-Q-030B | 1060100013216 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 3.0M,32/30AWG, RED |
| A-50H-Q-Q-040B | 1060100013218 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 4.0M,32/30AWG, RED |
| A-50H-Q-Q-050B | 1060100013220 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 5.0M,30/28AWG, RED |
| A-50H-Q-Q-060B | 1060100013222 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 6.0M,28/27AWG, RED |
| A-50H-Q-Q-070B | 1060100013224 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 7.0M,26/25AWG, RED |
| A-50H-Q-Q-080B | 1060100013226 | 200G QSFP56 to QSFP56 ADAC,IB HDR,HAIRTAIL, 8.0M,25AWG, RED    |