

100G QSFP28 to QSFP28 Active Optical Cables HTOC-QQA5-xx01MB

Feature

- ◆ 4 channels full-duplex 850nm parallel active optical cable
- ◆ 4 channels 850nm VCSEL array and 4 channels PIN photo-detector array
- ◆ Maximum link length of 70m on OM3 MMF and 100m on OM4 MMF
- ◆ Low power consumption < 2.5W
- ◆ Internal CDR circuits on both receiver and transmitter channels
- ◆ RoHS 6 compliant
- ◆ Hot Pluggable QSFP form factor
- ◆ 0°C to +70°C case operating temperature
- ◆ Transmission data rate up to 25Gbps per channel

Applications

- ◆ 100GBASE-SR4
- ◆ InfiniBand FDR/EDR

Standards

- ◆ IEEE 802.3bm 100GBASE-SR4
- ◆ SFF-8665
- ◆ ROHS 6

Description

The Hirundo's HTOC-QQA5-xx01MB QSFP28 Active Optical Cables (AOCs) are direct-attach fiber assemblies with QSFP28 connectors, compliant with the SFF-8665 and 100G Ethernet IEEE 802.3bm 100GBASE-SR4 standards. They are suitable for short distances and offer a cost-effective solution to connect within racks and across adjacent racks. They integrate four data lanes in each direction with 100 Gbps bandwidth. Each lane can operate at 25Gbps up to 70 m using OM3 fiber or 100 m using OM4 fiber.

1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications							
	Package	Date rate (Gbps)	Wavelength (nm)	Optical Power (dBm)	Bit Error Rate	Temp (°C)	Reach (m)	Other
HTOC-QQA5-xx01MB ^[1]	QSFP28	103.12	850	-7.5~2.5	E ⁻¹²	0~70	100	DDM
PN	HTOC-QQA5-xx01MB[1]							
Description	100G QSFP28 to QSFP28 Active Optical Cables, up to 100m, 0-70°C							
SAP No	-							
Customer PN	-							

Notes:

1. Refer to Chapter 9 Ordering Information.

2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Revision	Date
V1.0	Leo	Virgil	LiuSJ	2020.11.23

3. Absolute Maximum Ratings and Recommended Operating Conditions

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	+85
Relative Humidity	RH	%	5	85
Power Supply Voltage	Vcc	V	-0.5	4.0
Signal Input Voltage		V	-0.3	Vcc+0.3
Receiver Damage Threshold		dBm	+2.5	

Table 3.2 Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature	Tc	°C	0		70
Power Supply Voltage	Vcc	V	3.135	3.3	3.465
Power Dissipation	Pm	W			2.5
Bit Rate(Per channel)	BR	Gbps		25.78125	
Bit Error Ratio	BER				10 ⁻¹²
Max Supported Link Length(OM3)	L	m			70
Max Supported Link Length(OM4)	L	m			100

4. Specification

Table 4.1 Specification

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter (per Lane)					
Centre Wavelength	λ_c	840	850	860	nm
RMS spectral width	σ			0.65	nm
Average launch power, each lane	PAVG	-7.5	-1	+2.5	dBm
Input differential swing	V _{in} PP	300		1100	mV
Input differential impedance	Z _{in}	90	100	110	Ω
Extinction Ratio	ER	2.0			dB
Receiver(per Lane)					
Center Wavelength	λ_c	840	850	860	nm
Bit Error Rate	BER			E-12	
Receiver Overload	PinMAX	2.5			dBm
Output Differential swing	V _{out} PP	500		800	mV
Output Differential Impedance	Z _{out}	90	100	110	Ω
IIC communication					
IIC Clock frequency	-	100		400	KHz

5. Module Memory Map

The common memory map for managed external cable interfaces is utilized for serial ID, digital monitoring and control functions. The map is arranged into a single lower page address space of 128 bytes and multiple upper address pages.

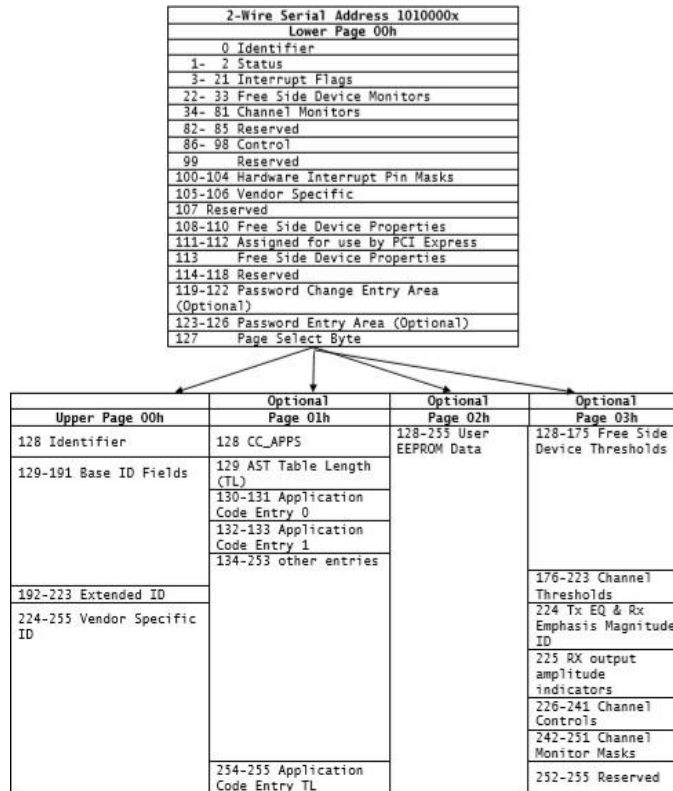


Figure 1 Digital Diagnostic Memory Map

6. Pin Assignment and Pin Description

6.1 Pin Assignment

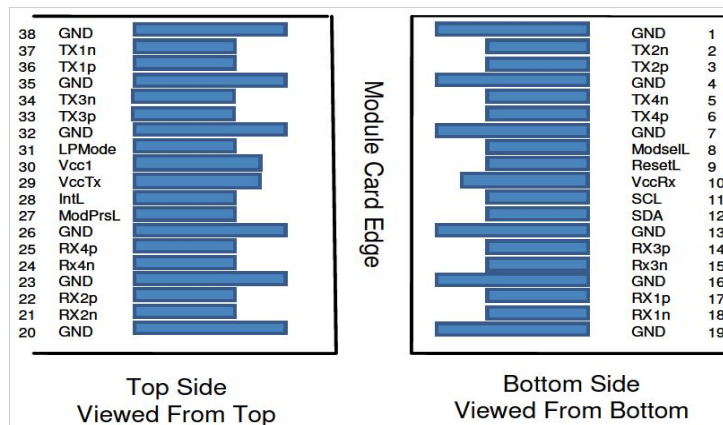


Figure 2 Electrical Pin-out Details

6.2 Pin Description

Table 6.1 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.

7. Typical Application Circuit

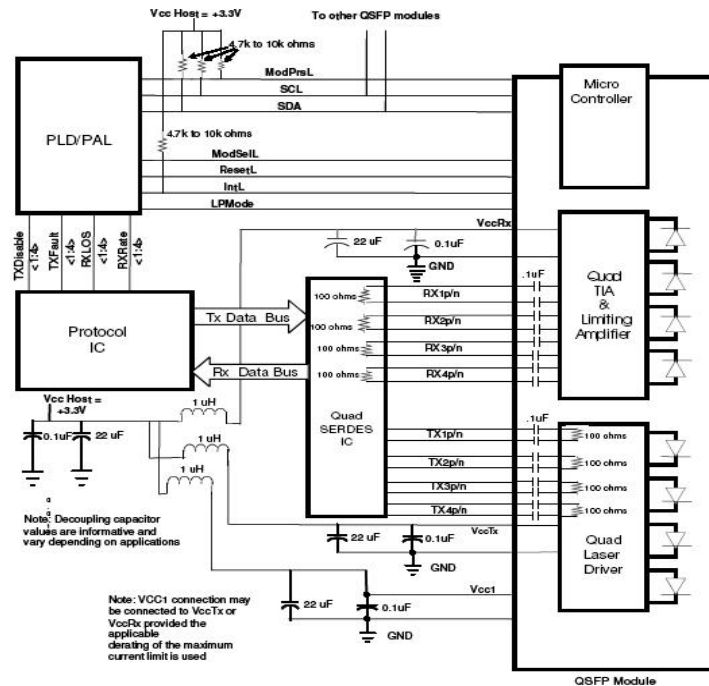


Figure 3 Typical application circuit

8. Package Dimensions

Figure 4 shows the package dimensions of the module. The module is designed to be compliant with QSFP28 MSA specification.

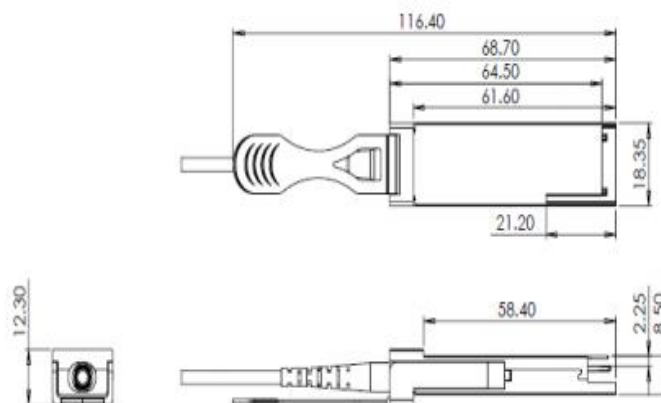


Figure 4 Package Dimensions

9. Ordering Information

Table 9.1 Ordering Information

Part Number	Description
HTOC-QQA5-xx01MB	100G QSFP28 to QSFP28 Active Optical Cables, up to 100m, 0-70°C
<u>xx</u> :Represents: wire type, type has: O2/O3/O4/O5=OM2/OM3/OM4/OM5 01~070,1~70 Length in meters OM3 MMF 071~100,71~100 Length in meters OM4 MMF	

10. For More Information

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