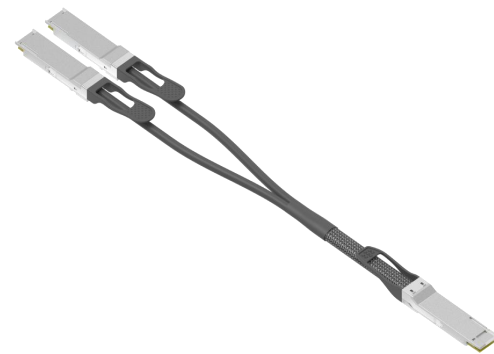


# 400G QSFP56-DD to 2x200G QSFP56 Breakout Passive Direct-Attached Copper Cables

## FWL2H-400xxxxxC

### Features

- Hot-plug QSFP56-DD and QSFP56 form factor
- Support 8x 50Gb/s PAM4 modulation
- Commercial case temperature range of 0°C to 70°C
- 26 AWG ~30 AWG support up to 3m length
- I<sup>2</sup>C management interface
- RoHS compliant



### Applications

- Data storage and communication industry
- Switch / router / HBA
- Enterprise network
- SAN
- Data Center Network

### STANDARDS COMPLIANCE

- IEEE802.3cd
- QSFP-DD MSA

### Description

FIBERSTAMP's FWL2H-400xxxxxC cable assembly is used in 2 X 200 Gigabit Ethernet links over copper cable, which provides connectivity between system units with a 400GbE connector on one side and two separate 200GbE connectors on the other two sides. The cable connects data signals from each of the 16 pairs on the single QSFP56-DD end to the dual pairs of each of the QSFP56 multiport ends.

FIBERSTAMP's FWL2H-400xxxxxC cable assemblies is compliant with the QSFP-DD-MSA and IEEE802.3cd ,it's high performance, cost effective I/O solutions for LAN, HPC and SAN. The high speed cable assemblies meet and exceed 400Gigabit Ethernet, InfiniBand EDR /HDR and temperature requirements for performance and reliability.



### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Ts	-20	85	°C
Case Operating Temperature	Tc	0	70	°C
Humidity (non-condensing)	Rh	5	95	%

### Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		70	°C
Baud Rate per Lane (PAM4)	fd		26.5625		GBaud/s
Humidity	Rh	5		85	%

### Pin Description

Pin	Logic	Symbol	Name/Description
1		GND	Module GroundNote5
2	CML-I	Tx2-	Transmitter inverted data input
3	CML-I	Tx2+	Transmitter non-inverted data input
4		GND	Module Ground Note5
5	CML-I	Tx4-	Transmitter inverted data input
6	CML-I	Tx4+	Transmitter non-inverted data input
7		GND	Module GroundNote5
8	LV TTL-I	MODSEIL	Module SelectNote6
9	LV TTL-I	ResetL	Module ResetNote6
10		VCCRx	+3.3V Power Supply
11	LVC MOS-I	SCL	2-wire Serial interface clockNote6
12	LVC MOS-I/O	SDA	2-wire Serial interface dataNote6
13		GND	Module GroundNote5
14	CML-O	RX3+	Receiver non-inverted data output
15	CML-O	RX3-	Receiver inverted data output
16		GND	Module GroundNote5
17	CML-O	RX1+	Receiver non-inverted data output
18	CML-O	RX1-	Receiver inverted data output
19		GND	Module GroundNote5
20		GND	Module GroundNote5
21	CML-O	RX2-	Receiver inverted data output
22	CML-O	RX2+	Receiver non-inverted data output
23		GND	Module GroundNote5



Pin	Logic	Symbol	Name/Description
24	CML-O	RX4-	Receiver inverted data output
25	CML-O	RX4+	Receiver non-inverted data output
26		GND	Module GroundNote5
27	LVTTL-O	ModPrsL	Module Present, internal pulled down to GND
28	LVTTL-O	IntL	Interrupt output, should be pulled up on host board2
29		VCCTx	+3.3V Transmitter Power Supply
30		VCC1	+3.3V Power Supply
31	LVTTL-I	LPMode	Low Power ModeNote6
32		GND	Module GroundNote5
33	CML-I	Tx3+	Transmitter non-inverted data input
34	CML-I	Tx3-	Transmitter inverted data input
35		GND	Module GroundNote5
36	CML-I	Tx1+	Transmitter non-inverted data input
37	CML-I	Tx1-	Transmitter inverted data input
38		GND	Module GroundNote5
39		GND	Module GroundNote5
40	CML-I	Tx6-	Transmitter inverted data input
41	CML-I	Tx6+	Transmitter non-inverted data input
42		GND	Module Ground Note5
43	CML-I	Tx8-	Transmitter inverted data input
44	CML-I	Tx8+	Transmitter non-inverted data input
45		GND	Module GroundNote5
46		Reserved	
47		TBD	For future use
48		VCC	+3.3V Receiver Power Supply
49		TBD	For future use
50		TBD	For future use
51		GND	Module GroundNote5
52	CML-O	RX7+	Receiver non-inverted data output
53	CML-O	RX7-	Receiver inverted data output
54		GND	Module GroundNote5
55	CML-O	RX5+	Receiver non-inverted data output
56	CML-O	RX5-	Receiver inverted data output
57		GND	Module GroundNote5
58		GND	Module GroundNote5
59	CML-O	RX6-	Receiver inverted data output



Pin	Logic	Symbol	Name/Description
60	CML-O	RX6+	Receiver non-inverted data output
61		GND	Module GroundNote5
62	CML-O	RX8-	Receiver inverted data output
63	CML-O	RX8+	Receiver non-inverted data output
64		GND	Module GroundNote5
65		NC	No connect
66		TBD	For future use
67		VCC	+3.3V Power Supply
68		VCC	+3.3V Power Supply
69		TBD	For future use
70		GND	Module GroundNote5
71	CML-I	Tx7+	Transmitter non-inverted data input
72	CML-I	Tx7-	Transmitter inverted data input
73		GND	Module GroundNote5
74	CML-I	Tx5+	Transmitter non-inverted data input
75	CML-I	Tx5-	Transmitter inverted data input
76		GND	Module GroundNote5

**Note:**

Note5. Module circuit ground is isolated from module chassis ground within the module.

Note6. Open collector should be pulled up with 4.7K to 10K ohms on host board to a voltage between 3.15V and 3.6V.



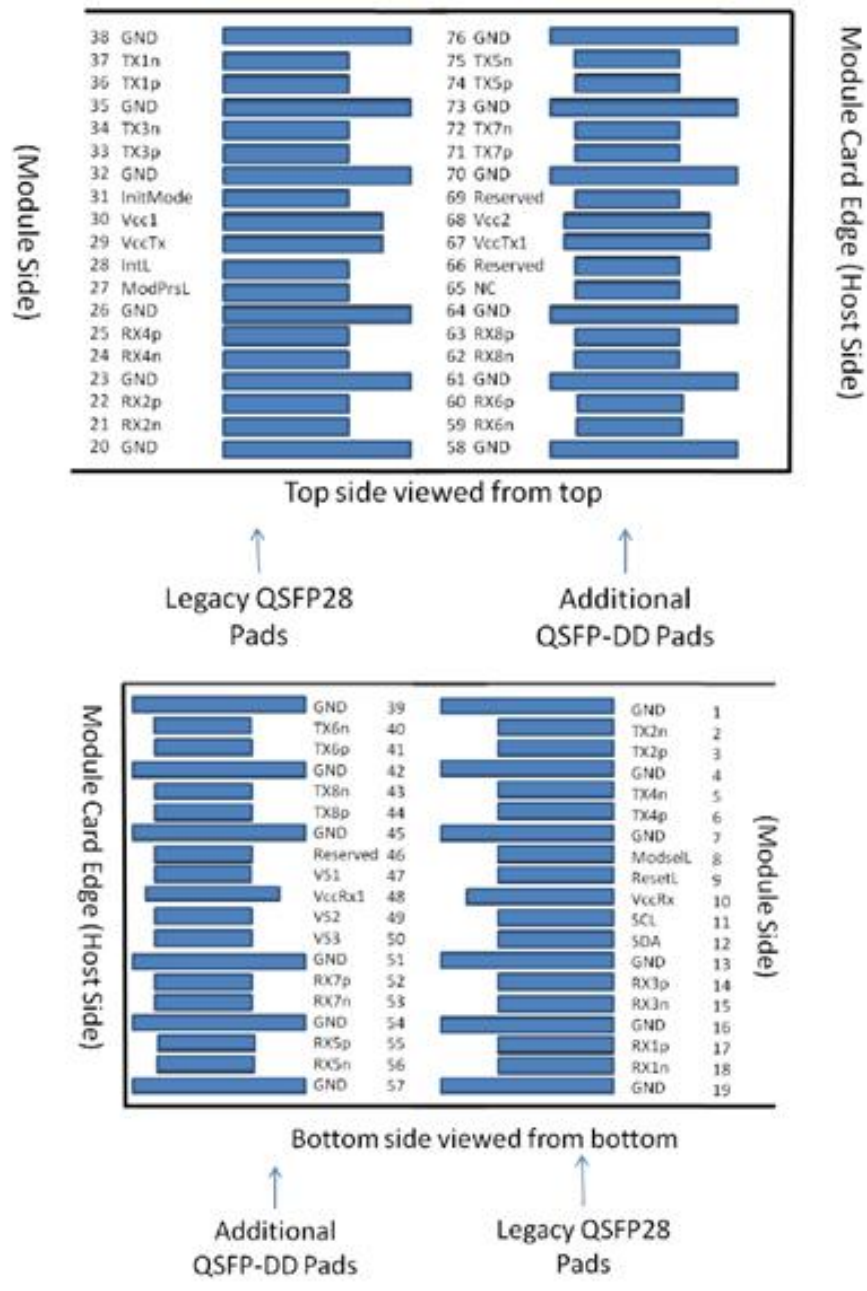


Figure 1. Electrical Pin-out Details

SIGNAL INTEGRITY

A	Time domain parameter	Test condition	Spec	Equipment
1	Diff. impedance		100+/-10ohms	E5071C
2	Intra-skew	Tr:25ps	L*15+20	
			L: length(m) SPEC: ps	
B	Frequency domain parameter	Test condition	Test spec(dB)	f(GHz)
1	SDD11/SD D22	Freq:50MHz ~20GHz Points:1601	-22+20/25.78*f*10^(-3) -10.66+14*log((f*10^(-3))/5.5) ≤5.3dB@13.26GHz	0.05≤f<4.1 4.1≤f≤19
2	SCC11/SC C22	Freq:50MHz ~20GHz Points:1601	≤-2dB	0.2≤f≤19
3	SDC11/SD C22	Freq:50MHz ~20GHz Points:1601	-16+2*f/3	0.05≤f≤2
5	SCD21- SDD21	Freq:50MHz ~20GHz Points:1601	10 as 0.01≤f < 12.89 -27+29/22*f*0.001 as 12.89≤f < 15.7 6.3 as 15.7≤f≤19	0.01≤f≤19
6	MDNEXT	Freq:50MHz ~20GHz Points:1601	≤-26dB@12.89GHz	0.01≤f≤19
7	SDD21	Freq:50MHz ~20GHz Points:1601 IF: 1KHz	-0.7*(f*10^(-3))^0.5-0.3*(f*10^(-3))-0.01*(f*10^(-3))^2 <17.16dB@13.26GHz	0.01≤f≤19
8	COM	IEEE802.3cd	>3dB	

Mechanical Dimensions

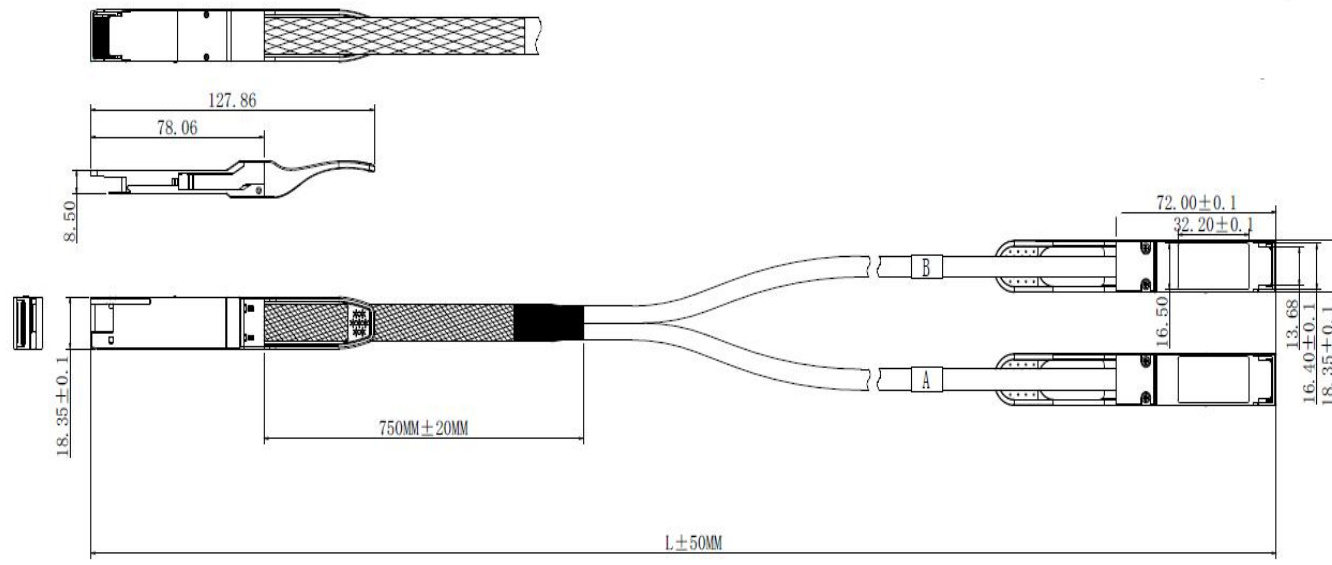
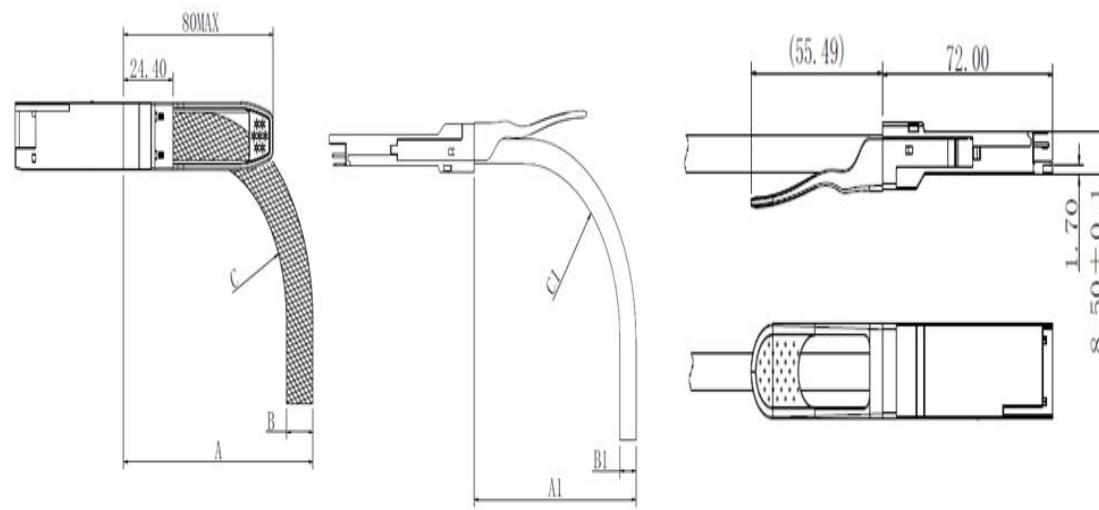


Figure 2. Typical mechanical structure



QSFP DD				QSFP56			
CABLE GAUGE	DIAMETER "B"	MIN. BEND RADIUS "C"	MIN. BEND RADIUS "A"	CABLE GAUGE	DIAMETER "B1"	MIN. BEND RADIUS "C1"	MIN. BEND RADIUS "A1"
26AWG	11MM	55MM	110MM	26AWG	8.4MM	45MM	74MM

Figure 3. Typical diameter and bend radius

Wiring connection diagram

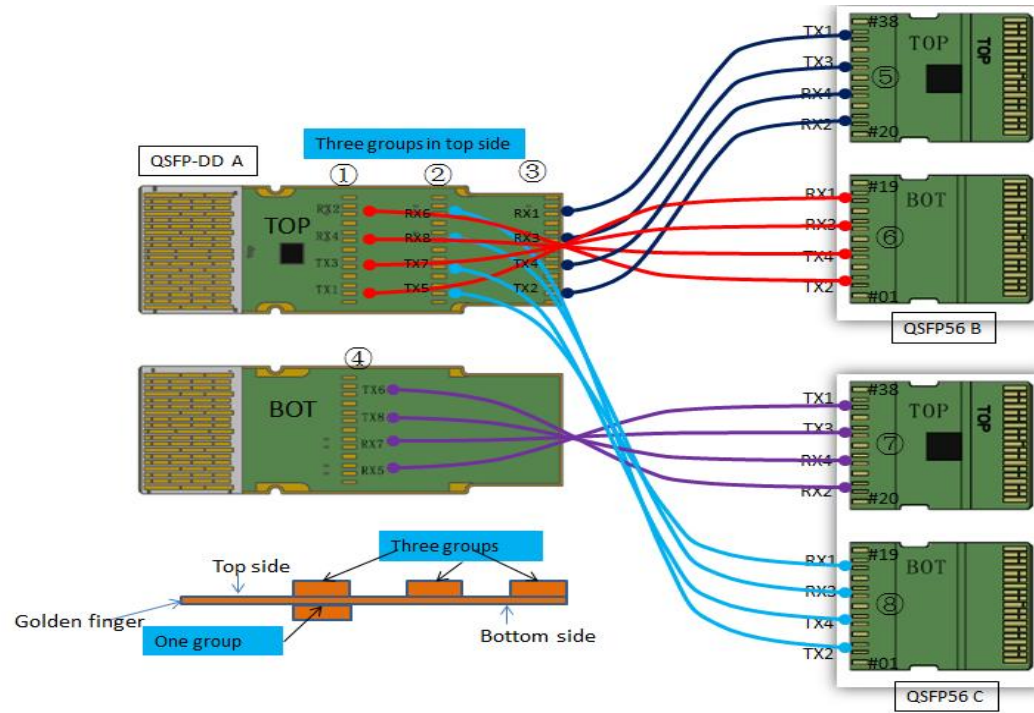


Figure 4. Wiring connection diagram

Environmental

Item	Specification
Physical shock	Subject mated specimens to 30G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks
Vibration (random)	Subject mated specimens to 3.10G's rms between 20-500 Hz for 15 minutes in each of 3 mutually perpendicular planes
Thermal shock	100 cycles of: a) -55°C for 30 minutes b) +85°C for 30 minutes
Temperature Life	Subject mated Specimens to +105°C for 500 hours
Humidity and Temperature cycling	Subject unmated specimens to 10 cycles (10 days) between 25 and 65°C at 80% to 100% RH
Visual Examination.	Connectors & contacts shall have no evidence of physical defects or otherwise unfit for testing.

Ordering information

Part Number	FWL2H-400xxxxxC		
Cable Length (meter)	1	2	3
Cable Wire gauge (AWG)	30	30	26

The cable length and wire gauge can be customized, further details are available from any FIBERSTAMP sales representative.

Important Notice

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