



400G QSFP-DD to 400G QSFP-DD Passive Direct-Attached Copper Cables (8x 50G PAM4) FWL-400xxxxxC

Features

- Hot-plug QSFP-DD 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
- Support SFF-8636 management interface with I²C EEPROM
- 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 FWL-400xxxxxC cable assemblies are effective alternatives to fiber optics. The cable connects data signals from each of the 16 pairs on the single QSFP-DD end to the other QSFP-DD end, each pair operates at data rates of up to 50Gb/s, each QSFP-DD port can be addressed by EEPROM to provide product information, which can be read or write by I²C interface.

FIBERSTAMP's FWL-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 Ground Note5
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 Ground Note5
8	LVTTL-I	MODSEIL	Module SelectNote6
9	LVTTL-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 Ground Note5
14	CML-O	RX3+	Receiver non-inverted data output
15	CML-O	RX3-	Receiver inverted data output
16		GND	Module Ground Note5
17	CML-O	RX1+	Receiver non-inverted data output
18	CML-O	RX1-	Receiver inverted data output
19		GND	Module Ground Note5
20		GND	Module Ground Note5
21	CML-O	RX2-	Receiver inverted data output
22	CML-O	RX2+	Receiver non-inverted data output
23		GND	Module Ground Note5



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 Ground Note5
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 Ground Note5
33	CML-I	Tx3+	Transmitter non-inverted data input
34	CML-I	Tx3-	Transmitter inverted data input
35		GND	Module Ground Note5
36	CML-I	Tx1+	Transmitter non-inverted data input
37	CML-I	Tx1-	Transmitter inverted data input
38		GND	Module Ground Note5
39		GND	Module Ground Note5
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 Ground Note5
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 Ground Note5
52	CML-O	RX7+	Receiver non-inverted data output
53	CML-O	RX7-	Receiver inverted data output
54		GND	Module Ground Note5
55	CML-O	RX5+	Receiver non-inverted data output
56	CML-O	RX5-	Receiver inverted data output
57		GND	Module Ground Note5
58		GND	Module Ground Note5
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 Ground Note5
62	CML-O	RX8-	Receiver inverted data output
63	CML-O	RX8+	Receiver non-inverted data output
64		GND	Module Ground Note5
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 Ground Note5
71	CML-I	Tx7+	Transmitter non-inverted data input
72	CML-I	Tx7-	Transmitter inverted data input
73		GND	Module Ground Note5
74	CML-I	Tx5+	Transmitter non-inverted data input
75	CML-I	Tx5-	Transmitter inverted data input
76		GND	Module Ground Note5

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.

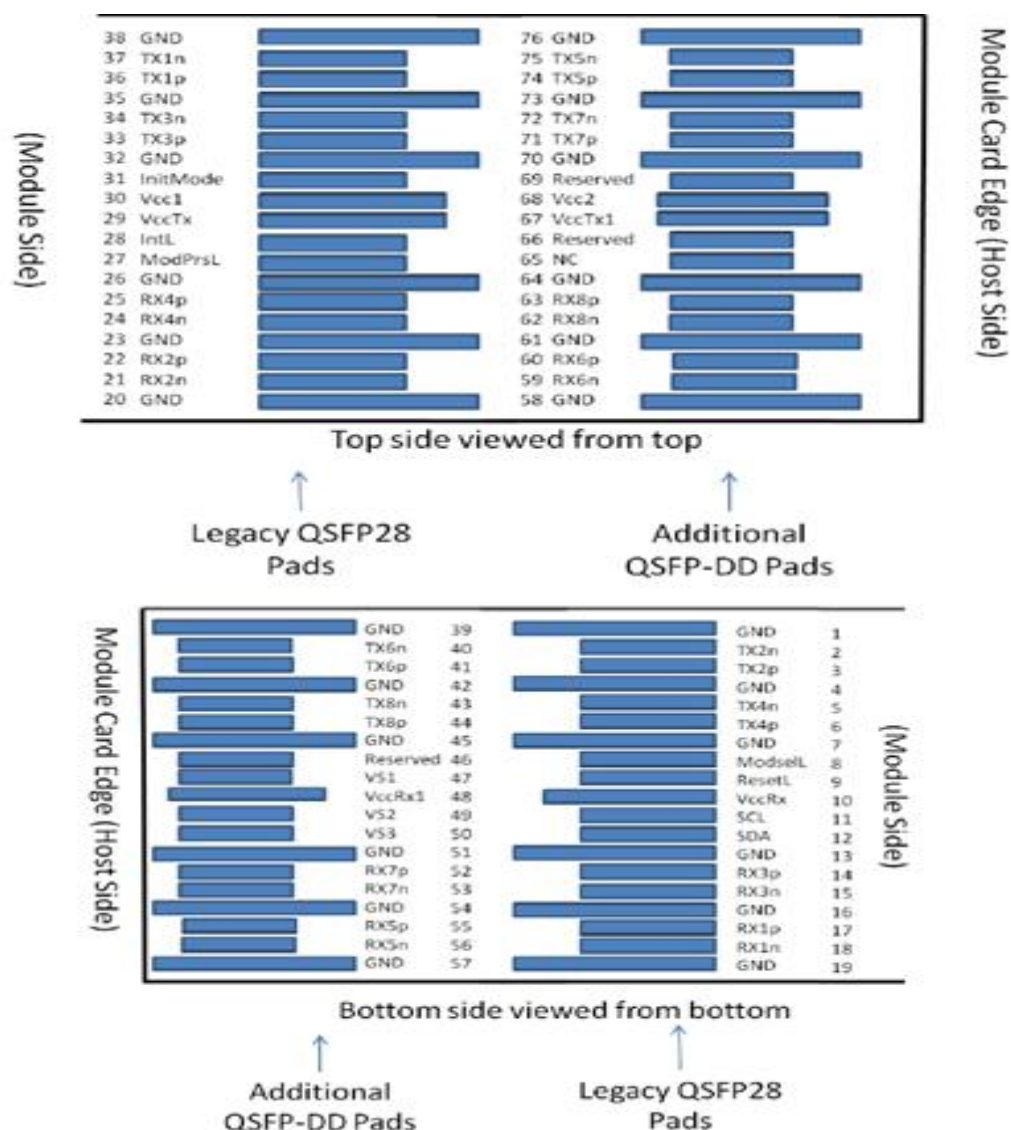


Figure 1. Electrical Pin-out Details

SIGNAL INTEGRITY

A		Time domain parameter	Test condition	SPEC	Equipment	
1	Differential Impedance(bulk cable)	Tr:25ps		100+10/-5 ohms	E5071C	
2	Differential Impedance (Mated connector)			100+/-10 ohms		
3	Differential Impedance(cable termination)			100+10/-15 ohms		
4	Intra-skew		L*15+20	L:length(m) SPEC:ps		
B		Frequency domain parameter	Test condition	Test spec(dB)	f(GHz)	Equipment
1	SDD11/SDD22	Freq: 50MHz~20GHz Points:1601		-22+20/25.78*f*10 ⁽⁻³⁾	0.05≤f<4.1	E5071C
				-10.66+14*log((f*10 ⁽⁻³⁾)/5.5) ≤5.3dB@13.26GHz	4.1≤f≤19	
2	SCC11/SCC22	Freq: 50MHz~20GHz Points:1601		≤-2dB	0.2≤f≤19	
3	SDC11/SDC22	Freq: 50MHz~20GHz Points:1601		-16+2*f/3	0.05≤f≤2	
4	SCD21- SDD21	Freq: 50MHz~20GHz Points:1601		10 as 0.01≤f < 12.89 ;	0.01≤f≤19	
				-27+29/22*f*0.001 as 12.89≤f < 15.7 ; 6.3 as 15.7≤f≤19		
5	MDNEXT	Freq: 50MHz~20GHz Points:1601		≤-26dB@12.89GHz	0.01≤f≤19	
6	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	

Mechanical Dimensions

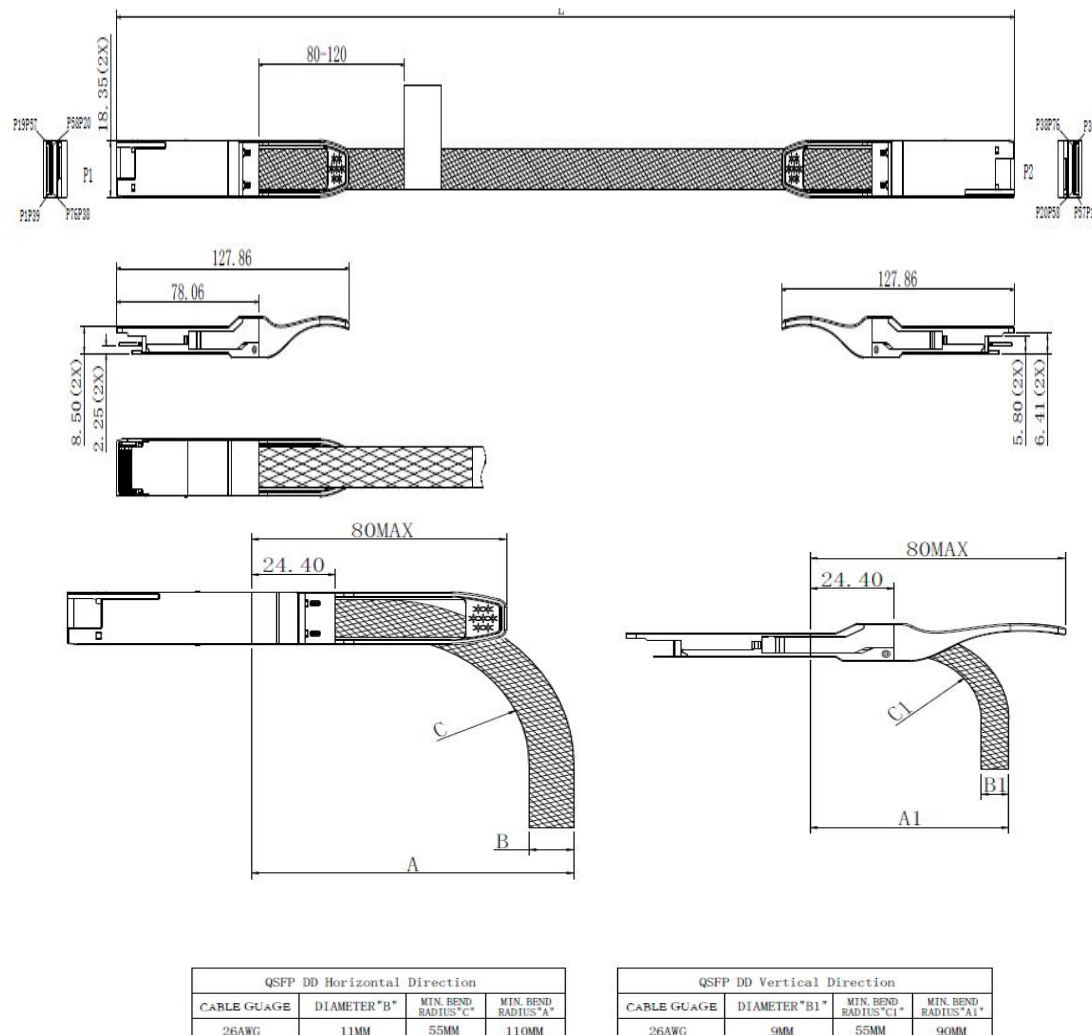


Figure 2. Mechanical Specifications

Regulatory Compliance

FIBERSTAMP FWL-400xxxxC passive cable assemblies meet the requirements of the following standards:

Feature	Standard
Electrical Safety	EN 62368-1: 2014 IEC 62368-1:2014 UL 62368-1:2014
Environmental protection	Directive 2011/65/EU with amendment(EU)2015/863
CE EMC	EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013
FCC	FCC Part 15, Subpart B; ANSI C63.4-2014

Ordering information GQS

Part Number	FWL-400xxxxC		
Length (meter)	1	2	3
Wire gauge (AWG)	30/26	30/26	26

Important Notice

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