



100G CFP2 to QSFP28 Adapter
P/N: CFP2-QSFP28-x000
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Description

Menara Networks QSFP-28 to CFP-2 port adapter is a unique solution that converts any MSA compliant QSFP-28 100Gbps transceiver module into a corresponding MSA compliant CFP-2 100 Gbps transceiver module. Menara CFP-2 port adapter accommodates any MSA QSFP-28 PMDs including PSM4, SR4, CWDM, LR4 and their variants, performs all necessary retiming functions and appropriately maps the QSFP-28 MSA alarms, Performance Monitoring metrics, vendor-specific data, and non-volatile registers into the appropriate CFP-2 MSA registers.

Mapping the QSFP-28 2 wire I2C interface into the CFP-2 MDIO management interface preserves all QSFP-28 digital diagnostics and monitoring functions. In order to preserve critical timing requirements, all QSFP-28 hardware control pins are mapped via a Menara proprietary hardware mapping to the corresponding CFP-2 control pins thus allowing real time monitoring and short recovery time. CFP2 present asserted only when QSFP28 is installed.

Menara 100 Gbps CFP-2 port adapters are designed to simplify and streamline operators 100G optics qualification and procurement processes and are compatible with both 103.125 and 111.81 Gbps aggregated data rate and complies with the CFP MSA CFP2 Hardware Specification Rev. 1.0, IEEE 802.3-2012 Clause 88, and ITU-T G.959.1-2012-02.

Management

The Menara 100G CFP-2 port adapter is managed via MDIO management interface compliant with IEEE 802.3-2012 Clause 45 and CFP MSA Management Interface Specification V2p2_r06.

All QSFP-28 hardware CONTROL pins are mapped via hardware to a corresponding CFP-2 pin to preserve the MSA timing requirements and ENABLE faster service recovery.

Applications

- Data Center Intra-connection
- LAN Networks
- Access, Metro and Regional Carrier Ethernet DWDM Networks
- IP/MPLS Routers and Ethernet Switches

Features

- Compliant with 100GBase-XX and OTU4
- Supports 103.125 to 111.81 Gbps line rates
- Built-in Tx and Rx re-timers with Host CTLE and Emphasis Control
- No external reference clock required
- Accommodates any MSA (SFF-8665) QSFP28 Pluggable Transceiver
- Universal model accommodates QSFP+ 40 Gb/s and lower data rates w/ CDR bypass
- Accommodates all QSFP-28 PMDs including PAM-4 PMD
- Accommodates QSFP-28 module with up to 5W power consumption
- Compliant with CAUI4/CEI-28G-VSR: 25.78125-27.9525 Gbit/s x 4 channel Electrical Interface
- Supports digital diagnostic monitoring
- Compliant with CEI-28G-VSR electrical interface Real-time digital diagnostic monitoring (DDM) support
- Operating temperature range of -5 to 85°C
- Low power dissipation: 2W typical (adapter PD with QSFP28 installed)
- Single 3.3 V power supply
- Hot pluggable
- RoHS 6/6 compliant

Compliance

- IEEE 802.3-2012 Clause 88 standard
- MDIO IEEE 802.3-2012 Clause 45 standard
- ITU-T G.959.1-2012-02 OTL4.4 standard
- OIF2010.404.08 CEI-28G-VSR standard
- MSA CFP2 Hardware Specification Rev. 1.0
- CFP MSA Management Interface Spec V2.2 (R06a)
- Class 1 laser safety
- Telcordia GR-468 compliant testing



Menara CFP-2 port adapter is compatible with all QSFP-28 modules compliant with:

- SFF-8661 Rev 2.3 QSFP28 Module Mechanical
- SFF-8679 Rev 1.7 QSFP28 Base Electrical
- SFF-8636 Rev 2.6 Common Management Interface

Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

General Specifications

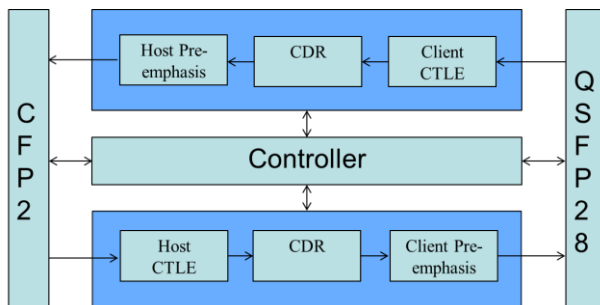
Parameter	Symbol	Min	Typical	Max	Units
Operating Temperature	T_{OPER}	-5		85	C
Storage Temperature	T_{STOR}	-40		85	C

Power Requirements

Parameters	Symbol	Min	Typ.	Max	Unit	
AbsoluteMaximumPowerSupply Voltage	V_{CC}			3.6	V	
OperatingPower Supply	Voltage	V_{CC}	3.2	3.3	3.4	V
	Current ¹	I_{CC}	-	-	5.625	A
LowPowerMode Dissipation	P_{low}			2	W	
Inrush Current	I_{inrush}			250	mA/usec	
Turn-offCurrent	$I_{turnoff}$	-250			mA/usec	
PowerSupply Noise	V_{rip}			2%	DC –1MHz	
				3%	1–10MHz	

¹Current includes operating and inrush conditions

Block Diagram



Alarms Supported (Preliminary)

- Module Temperature
- Module VCC
- Laser Bias
- TX Output power
- RX Input power
- TX LOL, RX LOL, RX LOS

Performance Monitoring (Preliminary)

- TX Output power
- RX Input power
- Laser Bias
- Module VCC
- Module Temperature

Other Features

- Loopback on a per lane basis
- PRBS on a per lane basis
- Host Signal Pre/De-emphasis
- High speed Eye-scan monitoring

QSFPs Supported

- QSFPs meeting SFF-8636 Rev 2.4

Adapter Vendor Data in Vendor NVR2

Address	#Bytes	Description	Content
8480	16	Vendor Name	MENARA NETWORKS
8490	16	Vendor Part Number	CFP2-QSFP28-A000
84A0	16	Vendor Serial Number	CIM-G00050
84B0	5	Vendor Revision	B
84B5	b7:0	Module Hardware Major Version Number	Hardware Version Major
84B6	b7:0	Module Hardware Minor Version Number	Hardware Version Minor
84B7	b7:0	Module Software Major Version Number	Software Version Major
84B8	b7:0	Module Software Minor Version Number	Software Version Minor

Host Pre-Emphasis and Host CTLE (Equalization) Register Mapping (accessible via MSA register)

Register A440 bit 0-3	Pre-Emphasis(dB)	Register A440 bit 8-14	Equalization(dB)
(Default) 0	0	(Default) 0	0
1	0.3	40	1.2
2	1.1	59	2.4
3	1.5	74	3.6
4	1.9	87	4.8
5	2.4	96	6
6	2.8	105	7.2
7	3.5	112	8.4
8	4	118	9.6
9	4.6	123	10.8
10	5.2	127	12
11	5.2		
12	5.9		
13	6.6		
14	6.6		
15	7.4		

*Default client side pre-emphasis set to 1.5 dB at signal amplitude of 800 mVpp. Client CTLE default is 0 dB.

Control Pin Timing

CFP2 module present is asserted only when the QSFP is installed and detected.

Parameter	Symb	Min.	Max.	Unit	Notes&Conditions
Hardware MOD_LOPWR assert	t_MOD_LOPWR_assert		1	ms	
Hardware MOD_LOPWR deassert	t_MOD_LOPWR_deassert		300	ms	
Receiver Loss of Signal Assert Time	t_loss_assert		100	ms	
Receiver Loss of Signal De-AssertTime	t_loss_deassert		100	ms	
Global Alarm Assert Delay Time	GLB_ALRMn_assert		150	ms	This is a logical "OR" of associated MDIO alarm & status registers.
Global Alarm De-Assert Delay Time	GLB_ALRMn_deassert		150	ms	This is a logical "OR" of associated MDIO alarm & status registers.
Management Interface Clock Period	t_prd	250		ns	MDC is 4MHz rate
Host MDIO t_setup	t_setup	10		ns	
Host MDIO t_hold	t_hold	10		ns	
CFP MDIO t_delay	t_delay	0	175	ns	
Initialization time from Reset	t_initialize		2.5	s	
Transmitter Disabled (TX_DIS asserted)	t_deassert		100	ms	
Transmitter Enabled (TX_DIS de-asserted)	t_assert		1.2	s	

Electrical Pin Out

Pin #	Bottom	Pin #	Top
1	GND	104	GND
2	TX_MCLKn	103	N.C.
3	TX_MCLKp	102	N.C.
4	GND	101	GND
5	N.C.	100	TX3n
6	N.C.	99	TX3p
7	3.3V_GND	98	GND
8	3.3V_GND	97	TX2n
9	3.3V	96	TX2p
10	3.3V	95	GND

Pin #	Bottom	Pin #	Top
11	3.3V	94	N.C.
12	3.3V	93	N.C.
13	3.3V_GND	92	GND
14	3.3V_GND	91	N.C.
15	VND_IO_A	90	N.C.
16	VND_IO_B	89	GND
17	PRG_CNTL1	88	TX1n
18	PRG_CNTL2	87	TX1p
19	PRG_CNTL3	86	GND
20	PRG_ALRM1	85	TX0n
21	PRG_ALRM2	84	TX0p
22	PRG_ALRM3	83	GND
23	GND	82	N.C.
24	TX_DIS	81	N.C.
25	RX_LOS	80	GND
26	MOD_LOPWR	79	N.C
27	MOD_ABS	78	N.C
28	MOD_RSTn	77	GND
29	GLB_ALRMn	76	N.C.
30	GND	75	N.C.
31	MDC	74	GND
32	MDIO	73	RX3n
33	PRTADR0	72	RX3p
34	PRTADR1	71	GND
35	PRTADR2	70	RX2n
36	VND_IO_C	69	RX2p
37	VND_IO_D	68	GND
38	VND_IO_E	67	N.C.
39	3.3V_GND	66	N.C.
40	3.3V_GND	65	GND
41	3.3V	64	N.C.
42	3.3V	63	N.C.
43	3.3V	62	GND
44	3.3V	61	RX1n
45	3.3V_GND	60	RX1p
46	3.3V_GND	59	GND
47	N.C.	58	RX0n
48	N.C.	57	RX0p
49	GND	56	GND
50	RX_MCLKn	55	N.C.
51	RX_MCLKp	54	N.C.
52	GND	53	GND

Electrical Pin Description

PIN #	Name	I/O	Logic	Description
1	GND			
2	TX_MCLKn	O	CML	For optical waveform testing. Not for normal use.
3	TX_MCLKp	O	CML	For optical waveform testing. Not for normal use.
4	GND			
5	N.C.			No Connect
6	N.C.			
7	3.3V_GND			3.3V Module Supply Voltage Return Ground
8	3.3V_GND			
9	3.3V			3.3V Module Supply Voltage
10	3.3V			
11	3.3V			
12	3.3V			
13	3.3V_GND			
14	3.3V_GND			
15	VND_IO_A	I/O		Module Vendor I/O A. Do Not Connect.
16	VND_IO_B	I/O		Module Vendor I/O B. Do Not Connect.
17	PRG_CNTL1	I	LVC MOS w/ PUR	Programmable Control 1 set over MDIO per MSA
18	PRG_CNTL2	I	LVC MOS w/ PUR	Programmable Control 2 set over MDIO per MSA
19	PRG_CNTL3	I	LVC MOS w/ PUR	Programmable Control 3 set over MDIO per MSA
20	PRG_ALARM1	O	LVC MOS	Programmable Alarm 1 set over MDIO per MSA
21	PRG_ALARM2	O	LVC MOS	Programmable Alarm 2 set over MDIO per MSA
22	PRG_ALARM3	O	LVC MOS	Programmable Alarm 3 set over MDIO per MSA
23	GND			
24	TX_DIS	I	LVC MOS w/ PUR	Transmitter Disable for all lanes, "1" = transmitter disabled
25	RX_LOS	O	LVC MOS	Receiver Loss of Optical Signal, "1": low optical signal, "0": normal condition
26	MOD_LOPWR	I	LVC MOS w/ PUR	Module Low Power Mode. "1": module in low power (safe) mode, "0": power-on enabled
27	MOD_ABS	O	GND	Module Absent. "1": module absent, "0": module present, Pull Up Resistor on Host
28	MOD_RSTn	I	LVC MOS w/ PDR	Module Reset. "0" resets the module, "1" or NC = module enabled
29	GLB_ALRMn	O	LVC MOS	Global Alarm. "0": alarm condition in any MDIO Alarm register, "1": no alarm condition Open Drain, Pull Up Resistor on Host
30	GND			
31	MDC	I	1.2V CMOS	Management Data Clock (electrical specs as per IEEE Std 802.3-2012)
32	MDIO	I/O	1.2V CMOS	Management Data I/O bi-directional data (electrical specs as per IEEE Std 802.3-2012)

PIN #	Name	I/O	Logic	Description
33	PRTADR0	I	1.2V CMOS	MDIO Physical Port address bit 0
34	PRTADR1	I	1.2V CMOS	MDIO Physical Port address bit 1
35	PRTADR2	I	1.2V CMOS	MDIO Physical Port address bit 2
36	VND_IO_C	I/O		Module Vendor I/O C. Do Not Connect.
37	VND_IO_D	I/O		Module Vendor I/O D. Do Not Connect.
38	VND_IO_E	I/O		Module Vendor I/O E. Do Not Connect.
39	3.3V_GND			
40	3.3V_GND			
41	3.3V			3.3V Module Supply Voltage
42	3.3V			
43	3.3V			
44	3.3V			
45	3.3V_GND			
46	3.3V_GND			
47	N.C.			No Connect
48	N.C.			
49	GND			
50	RX_MCLKn	O	CML	For optical waveform testing. Not for normal use.
51	RX_MCLKp	O	CML	For optical waveform testing. Not for normal use.
52	GND			

Ordering Information

Part Number	Description	Operating Case Temperature
CFP2-QSFP28-x000	CFP-2 Port Adapter to QSFP-28 100 Gb/s transceiver, Compatible with MSA Standard QSFP28 transceivers, 0-70°C	-5 ~ +70°C
CFP2-QSFPU-x000	Universal model also supports lower data rate QSFP+ modules with CDRs bypassed	-5 ~ +70°C

x = Customer Specific Part Number

Example

CFP2-QSFP28-C000 = Standard 100Gb/s Adapter

CFP2-QSFPU-C000 = Standard Universal Adapter

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Subject to change.

