SNR-CFP2-QSFP28

Convert 100G QSFP28 to CFP2 Port

RoHS6 Compliant

Features

- Compatible with CFP2 MSA Specification
- Compatible with QSFP28 MSA Specification
- Single 3.3V Power Supply and Power Dissipation ＜1.8W
- Case Temperature Range:
  Standard: 0℃ - 70℃
- Hot Pluggable 104-Pin Connector
- 4 x 25G CFP2 Electrical Plug_Interface Provided
- 4 x 25G QSFP28 Electrical Socket_Interface Provided
- Management and Control via MDIO 2-Wire Interface
- Complaint with the EU RoHS 6 Environmental Requirements.

Applications

- Convert QSFP28 port to CFP2 port
- 100GBASE Ethernet
- OTU4

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Regulatory Compliance*

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

*The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with Eoptolink.

Product Description

The EOLC-1HG-PCT-EH converts a 100 Gigabit Ethernet QSFP28 port into a 100 Gigabit Ethernet CFP2 port. With the converter module, customers have the flexibility to use the 100 Gigabit CFP2 interface port of a switch with CFP2 modules or QSFP28 modules. This flexibility is critical when the specific type of interface is not available in one or the other form factor or when customers want to use the same form factor for interfaces across multiple platforms deployed in their network.

It is a highly integrated, serial optical converter module for high-speed, 100Gbit/s data transmission applications. The converter operates within a wide case temperature range of 0°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding which enables high port densities for 100GBE systems. A 104 pin CFP2 plug_connector and a QSFP28 socket_interface assure that connectivity is compliant to the CFP2 MSA and QSFP28 MSA.

Thermal Management

The converter is designed for an operation within a case temperature range from 0℃ to +70℃ at
an altitude of < 3km. The built in heatsink provides an optimized thermal performance.
The user needs to guarantee per system design not to exceed this temperature range. It has to be considered that in case of usage of multiple modules on a single hostboard that there is a temperature rise among the modules hosted side by side. Airflow direction and air speed needs to be choosen accordingly. For further information it is referred to the MSA document.

Electro Static Discharge (ESD)

The maximum electrostatic charge based on a human body model and the conditions as outlined below is:

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Static Discharge Voltage	MIL STD 883 Method				500	V

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	3.6	V
Operating Relative Humidity	RH	5	85	%

*Exceeding any one of these values may destroy the device immediately.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_A	0		+70	°C
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Power Supply Current*	Icc	-		550	mA
Aggregate Bit Rate	BR_{AVE}	-	103.125	111.8	Gbps
Lane Bit Rate	BR_{LANE}	-	25.78	27.95	Gbps

*the load current here is only the converter.

1.2V MDIO Interface Specifications

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Input Voltage	V_{IH}	0.84		1.5	V	
	V_{IL}	-0.3		0.36	V	
Input Leak current	I_{IN}	-100		100	uA	
Output Voltage	V_{OH}	1.0		1.5	V	
	V_{OL}	-0.3		0.2	V	
Input Capacitance	C_I			10	pF	
Input MDC Clock	f_{MDC}	0.1		4	MHz	
MDC Clock Period	T_{MDC}	250		10000	ns	
MDIO Hold Time	T_{hold}	10			ns	
MDIO SetupTime	T_{setup}	10			ns	
GLB_ALM	$T_{glb\_alm\_ass}$			150	ms	
	$T_{glb\_alm\_dea}$			150	ms	

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Performance Specifications - Electrical

Parameter		Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter							
Input Amplitude (Differential)		Vin	150		1000	mVpp	AC coupled inputs
Input Impedance (Differential)		Zin	85	100	115	ohms	Rin > 100 kohms @ DC
TX_DIS	Disable	V_{IH}	2		Vcc+0.3	V	
	Enable	V_{IL}	0		0.8		
Receiver							
Output Amplitude (Differential)		Vout	340		900	mVpp	AC coupled outputs
Output Impedance (Differential)		Zout	85	100	115	ohms	
Output Rise/Fall Time		t_r/t_f	24			ps	20%~80%
RX_LOS	LOS	V_{OH}	2.4		Vcc+0.3	V	
	Normal	V_{OL}	0		0.8	V	

CFP2 Memory Map

EEPROM Definition					
EEPROM Address			CFP NVR 1	Version	
Data Addr	**Field Size (Byte)**	**Name Of filed**	**Description of field**	**Coded value**	**Hex**
BASE ID FIELDS					
8000h	1	Module Identifier	Module Identifier	CFP2	11
8001h	1	Extended Identifier	Extended Identifier	Power Class 3 Module (≤9W max),Network lane : Host lane = 1 : n (Mux type),LANWDM,No CLEI code present	84

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8002h	1	Connector Type Code	Connector Type Code	LC	07
8003h	1	Ethernet Application Code	Ethernet Application Code	100GE SMF 10km, 100GE-LR4	01
8004h	1	Fiber Channel Application Code	Fiber Channel Application Code		00
8005h	1	Copper Link Application Code	Copper Link Application Code		00
8006h	1	SONET/SDH Application Code	SONET/SDH Application Code		00

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8007h	1	OTN Application Code	OTN Application Code	4I1-9D1F (OTL4.4)	(8
8008h	1	Additional Capable Rates Supported	Additional Capable Rates Supported	111.8 Gbps,103.125 Gbps	18
8009h	1	Number of Lanes Supported	Number of Lanes Supported	Number of Network Lanes:4; Number of Host Lanes:4;	44
800Ah	1	Media Properties	Media Properties	Media Type:SMF,Directionality:Norma;With optical MUX/DEMUX,1 TX Lanes and 1 RX Lanes	11
800Bh	1	Maximum Network Lane Bit Rate	Maximum Network Lane Bit Rate	28Gbps	8C
800Ch	1	Maximum Host Lane Bit Rate	Maximum Host Lane Bit Rate	28Gbps	8C
800Dh	1	Maximum Single Mode Optical Fiber Length	Maximum Single Mode Optical Fiber Length	10km	0A
800Eh	1	Maximum Multi-Mode Optical Fiber Length	Maximum Multi-Mode Optical Fiber Length		00
800Fh	1	Maximum Copper Cable Length	Maximum Copper Cable Length		00
8010h	1	Transmitter Spectral Characteristics 1	Transmitter Spectral Characteristics 1	Number of Active Transmit Fibers	01
8011h	1	Transmitter Spectral Characteristics 2	Transmitter Spectral Characteristics 2	Number of Wavelengths per active Transmit Fiber	04
8012h	2	Minimum Wavelength per Active Fiber	Minimum Wavelength per Active Fiber	1294.53nm	CA
8013h					45
8014h	2	Maximum Wavelength per Active Fiber	Maximum Wavelength per Active Fiber	1310.2nm	CC
8015h					B8

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8016h	2	Maximum per Lane Optical Width	Maximum per Lane Optical Width	2100pm	(8
8017h					34
8018h	1	Device Technology 1	Device Technology 1	DFB-EML	21
8019h	1	Device Technology 2	Device Technology 2	No wavelength control,Cooled or Semi-cooled transmitter,Transmitter not Tunable,Detector side VOA not implement,PIN detector,CDR without EDC	44
801Ah	1	Signal Code	Signal Code	NRZ,Non-PSK	40
801Bh	1	Maximum Total Optical Output Power per Connector	Maximum Total Optical Output Power per Connector	11200uW	70
801Ch	1	Maximum Optical Input Power per Network Lane	Maximum Optical Input Power per Network Lane	2800uW	1C
801Dh	1	Maximum Power Consumption	Maximum Power Consumption	9000mW	2D
801Eh	1	Maximum Power Consumption in Low Power Mode	Maximum Power Consumption in Low Power Mode	2000mW	64
801Fh	1	Maximum Operating Case Temp Range	Maximum Operating Case Temp Range	70℃	46
8020h	1	Minimum Operating Case Temp Range	Minimum Operating Case Temp Range	0℃	00
8021h	8	Vendor Name	Vendor Name	E	45
8022h				o	6F
8023h				p	70
8024h				t	74
8025h				o	6F
8026h				l	6C
8027h				i	69

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8028h				n	(E
8029h				k	6B
802Ah				<space>	20
802Bh				<space>	20
802Ch				<space>	20
802Dh				<space>	20
802Eh				<space>	20
802Fh				<space>	20
8030h				<space>	20
8031h	3	Vendor OUI	Vendor OUI		00
8032h					00
8033h					00
8034h	16	Vendor Part Number	Vendor Part Number	E	45
8035h				O	4F
8036h				L	4C
8037h				C	43
8038h				-	2D
8039h				1	31
803Ah				H	48
803Bh				G	47
803Ch				-	2D
803Dh				P	50
803Eh				C	43
803Fh				T	54
8040h				-	2D
8041h				E	45
8042h				H	48
8043h				<space>	20
8044h	16	Vendor Serial Number	Vendor Serial Number	C	43
8045h				x	xx
8046h				x	xx
8047h				x	xx
8048h				x	xx
8049h				x	xx
804Ah				x	xx
804Bh				x	xx
804Ch				x	xx
804Dh				x	xx
804Eh				<space>	20
804Fh				<space>	20
8050h				<space>	20
8051h				<space>	20

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8052h				<space>	20
8053h				<space>	20
8054h	8	Date Code	Date Code	Year	xx
8055h				Year	xx
8056h				Year	xx
8057h				Year	xx
8058h				Month	xx
8059h				Month	xx
805Ah				Day	xx
805Bh				Day	xx
805Ch	2	Lot Code	Lot Code	<space>	20
805Dh				<space>	20
805Eh	10	CLEI Code	CLEI Code	0	30
805Fh				0	30
8060h				0	30
8061h				0	30
8062h				0	30
8063h				0	30
8064h				0	30
8065h				0	30
8066h				0	30
8067h				0	30
8068h	1	CFP MSA Hardware Specification Revision Number	CFP MSA Hardware Specification Revision Number	V1.0	0A
8069h	1	CFP MSA Management Interface Specification Revision Number	CFP MSA Management Interface Specification Revision Number	V2.2	16
806Ah	2	Module Hardware Version Number	Module Hardware Version Number	V1.0	01
806Bh					00
806Ch	2	Module Firmware Version Number	Module Firmware Version Number	V1.0	01
806Dh					00
806Eh	1	Digital Diagnostic Monitoring Type	Digital Diagnostic Monitoring Type	Received power measurement type: Average Power,Transmitted power measurement type: Average Power.	0C

806Fh	1	3	Digital Diagnostic Monitoring Capability 1	Transceiver auxiliary monitor 1,2 Not supported,Transceiver SOA bias current monitor Not supported,Transceiver power supply voltage monitor supported.Transceiver temperature monitor supported.	(3
8070h	1	Digital Diagnostic Monitoring Capability 2	Digital Diagnostic Monitoring Capability 2	Network Lane received power monitor,Network Lane laser output power monitor,Network Lane laser bias current monitor ,Network Lane laser temperature monitorsupported.	0F
8071h	1	Module Enhanced Options	Module Enhanced Options	Host Lane Loop-back,Host Lane PRBS Not Supported,Host Lane emphasis control Supported,Network Lane Loop-back,Network Lane PRBS Not Supported	20
8072h	1	Maximum High-Power-up Time	Maximum High-Power-up Time	60s	3C
8073h	1	Maximum TX-Turn-on Time	Maximum TX-Turn-on Time	1s	01
8074h	1	Host Lane Signal	Host Lane Signal	CAUI	01

		Spec	Spec		
8075h	1	Heat Sink Type	Heat Sink Type	Heat Sink Type:Flat top	00
8076h	1	Maximum TX-Turn-off Time	Maximum TX-Turn-off Time	20ms	14
8077h	1	Maximum High-Power-down Time	Maximum High-Power-down Time	1s	01
8078h	1	Module Enhanced Options 2	Module Enhanced Options 2	Active Decision Voltage and Phase function Not supported,RX FIFO Reset Not Supported,RX FIFO Auto Reset Not Supported,TX FIFO Reset Not Supported,TX FIFO Auto Reset Not Supported	00
8079h	1	Transmitter Monitor Clock Options	Transmitter Monitor Clock Options	1/8 of Network Lane Rate Supported;Monitor Clock Option sopported	05
807Ah	1	Receiver Monitor Clock Options	Receiver Monitor Clock Options	1/8 of Network Lane Rate Supported;Monitor Clock Option sopported	05
807Bh	2	Module Firmware B Version Number	Module Firmware B Version Number		00
807Ch					00
807Dh	1	Maximum MDIO Ready Time	Maximum MDIO Ready Time		00
807Eh	1	CFP and CFP2/4 Extended Identifier	CFP and CFP2/4 Extended Identifier		00
807Fh	1	CFP NVR 1 Checksum	CFP NVR 1 Checksum	Note 1	xx

Note 1: The check code shall be the 8 bit unsigned result of the checksum of all of the CFP register LSB contents from addresses 8000h to 807Eh inclusive.

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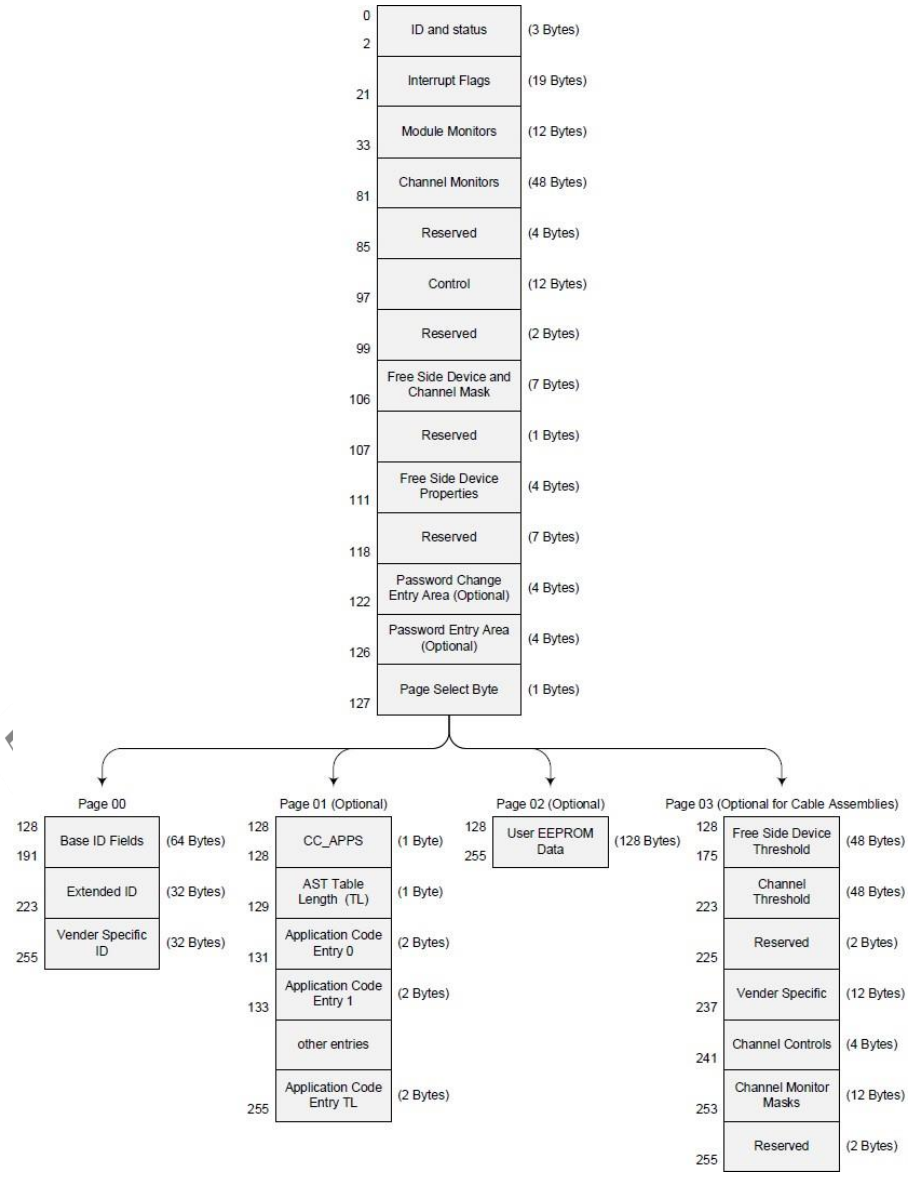
QSFP28 Memory Map



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Method to Access and Control QSFP28

R/W QSFP28 Memories

QSFP28 module memories are mapped into CFP2-QSFP28-CONVERTER registers 0x9000 to 0x92FF. Please see table below for detail.

Starting Address in Hex	Ending Address in Hex	Access Type	Allocated Size	Data Bit Width	Table Name and Description
9000	907F	RW	128	8	QSFP28 Lower Page00
9080	90FF	RO	128	8	QSFP28 Upper Page00
9100	917F	RO	128	8	QSFP28 Page 01
9180	91FF	RW	128	8	QSFP28 Page 02
9200	927F	RW	128	8	QSFP28 Page 03

For R/W QSFP28 module memories, just R/W corresponding CFP2 registers.

Disable/Enable QSFP28 Lanes

QSFP28 REG86 is mapped into CFP2-QSFP28-CONVERTER register 0x9056. For disable all lanes, you should write 0x000F to 0x9056.

Write QSFP28 Register	Operation for QSFP28
Reg9056	
x	Set QSFP28 Register 86 bit0~3 to 1
Reg9056.0	Set QSFP28 Register 86 bit0 = Reg9056.0
Reg9056.1	Set QSFP28 Register 86 bit1 = Reg9056.1
Reg9056.2	Set QSFP28 Register 86 bit2 = Reg9056.2
Reg9056.3	Set QSFP28 Register 86 bit3 = Reg9056.3

Method to Configure CFP2-QSFP28-CONVERTER

1. Write 000b into 0xA011.BIT3-1. Then the four TX channels will work at 25.78125Gbps for 100GbE, and the work rate for four RX channels are automatically changed with TX rate. So it's not necessary to configure the RX work rate. Similarly, Write 011b into 0xA011.BIT3-1. for OTU4.
2. Once the work rate of CFP2-QSFP28-CONVERTER is configured certainly, it will automatically change the work rate of QSFP28 module to match the rate configuration of converter.
3. The equalization and Pre/De-emphasis for host side can be adapt via registers 0xA440 to 0xA443. For detail, please refer to document "CFP MSA Management Interface Specification Version 2.4 r06b", which is descripted in Table 32 Host Lane VR 1.

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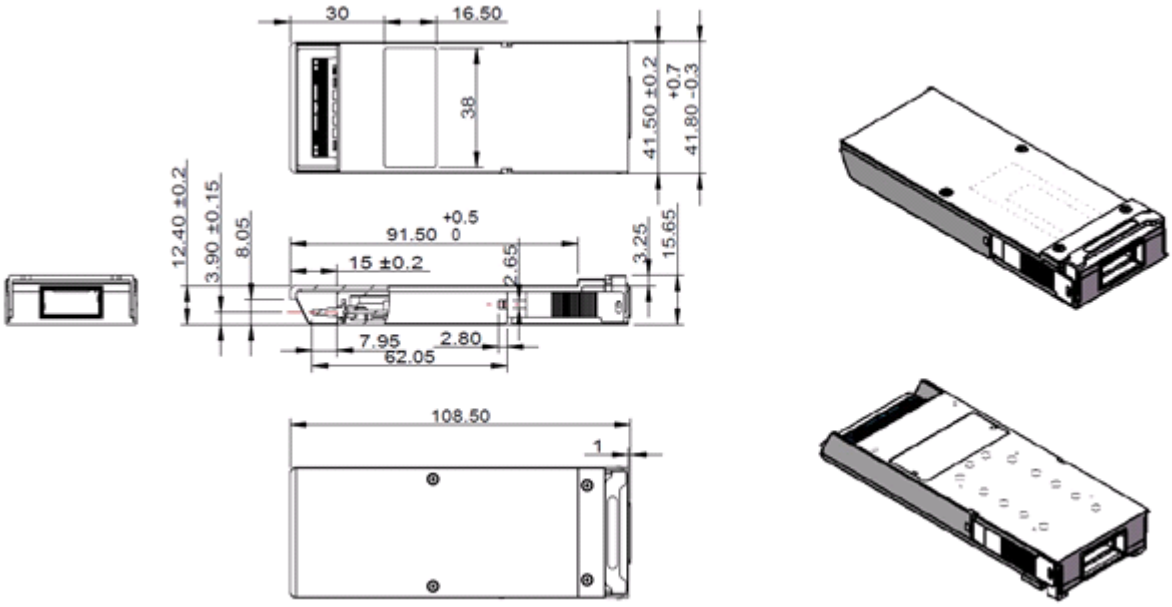
Mechanical Specification



*This 2D drawing only for reference, please check with NAG before ordering.