

100Gb/s CFP4 Optical Transceiver

RTXM290-701



Features

- *Direct LC receptacle optical interface*
- *Single +3.3V power supply*
- *Hot-pluggable*
- *Operating optical data rate up to 112Gbps*
- *Operating electrical serial data rate up to 28Gbps*
- *10 parallel electrical serial interface*
- *Transmission distance up to 10km*
- *AC coupling of CML signals*
- *1310 nm window cooled EA-DFB LD*
- *PIN ROSA*
- *Low power dissipation(Max:6W)*
- *Built in digital diagnostic function*
- *Operating case temperature range:0℃ to 70℃*
- *Compliant with RoHs*
- *MDIO Communication Interface*

Application

- *OTN-OTU4*
- *Switch to switch interface*
- *Switch to router interface*
- *P to P Access Network*

Standards

- *Compliant with IEEE 802.3ba*
- *Compliant with CFP4 MSA hardware specification, Version 0.1 March 02, 2014*
- *Compliant with CFP MSA management specification, Version 2.2 July 01, 2013*
- *Compliant with ITU-T G.959.1 4/1-9D1F*
- *Compliant with RoHS&WEEE*

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
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I	H	1.2	IH	0.84	1.5	
I		1.2	I	-0.3	0.36	
I	C	1.2	II	A	-100	+100
	H	1.2	H	1.0	1.5	
		1.2		-0.3	0.2	
	H	1.2	I	H	A	-4
	C	1.2	I	A	+4	
I	C		C	F		10
C						
E						
(100G E)			G	-	25.78125	
E						
(4)					27.95249	
F		$\lambda 1$		1294.53	1295.56	1296.59
		$\lambda 2$		1299.02	1300.05	1301.09
		$\lambda 3$		1303.54	1304.58	1305.63
		$\lambda 4$		1308.09	1309.14	1310.19
B						
	A		B	30	-	
			B	-	10.5	
A		E		-4.3	+4.5	2
(100G E)			B			
A		E		-2.5	+2.9	
(4)						
	A		A	B	-1.3	4.5
E						3
D						
	E	(100G E)				2.2
			D	B		
(4)						1.5
A						
	E		B	-	-30	
E	(100G E)			4		
		E	B			

A	E		
A		B	-12
D	-	B	-19
H		B	0.2

Note1. CF

Note2. A , () ;

Note3. E D <1 B, A()

Note4.

Note5. , ,

Note6. () 100GBA E-E 4
100BA E-E 4 100BA E- 4

Note7. A , () ; ,

Note8. (A), ()

Note9. B 2^{31-1} BE = 10^{-5} . BE 4
FEC

Note10. 3 BE = 10^{-12}

Note11. 1.8 B; 2 0.3 I; 9
0.47 I.

Hardware Control Pins

CF - ,

: H C

#		H	C		H		- /
11	DI (G C)	D	I/	3.3 C	D	E	- 1
14	D		I	3.3 C		E	- 1
16	D	(I)	I	3.3 C	E		-D 2

Note1: - (4.7 10) CF

Note2: -D (4.7 10) CF

Hardware Alarm Pins

CF : H A

#		H	A		H		- /
15	D AB	A	I/	3.3 C	A		-D 1
12	(G A)			3.3 C			

Note1: -D (<100) CF . -

Management Interface Pins(MDIO)

CF DI , : I

#		D	I/	H		- /
---	--	---	----	---	--	-----

13	G B A	G A	I	3.3 C		A	
18	DI						

D						A & DI
I						DI

					C	C
I		80	100	120	Ω	
F					H	1/8
D	DIFF	400		1200		D
C	D	C	40	60	%	

CFP Register Allocation

CF					
A	E	A	A	D	D
H	A			B	
	H				
0000	7FFF	/A	32768	/A	IEEE 802.3
8000	807F		128	8	CF 1.B ID
8080	80FF		128	8	CF 2.E ID
8100	817F		128	8	CF 3.
8180	81FF		128	8	CF 4
8200	83FF		4 128		

CFP NVR1

H A		A
8000	1	
8001	1	
8002	1	

8003 1 7 0 E A C 01 /A

8069	1		7 0	CF A I		
806A	2		7 0	H		
806C	2		7 0	F		
806E	1		7 0	D D		
806F	1		7 0	D D C 1		
8070	1		7 0	D D C 2		
8071	1		7 0	E		
8072	1		7 0	H - -		
8073	1		7 0	- -		
8074	1		7 0	H		
8075	1		7 0	H		
8076	1		7 0	- - -		
8077	1		7 0	H - -		
8078	1		7 0	E 2		
8079	1		7 0	C		
807A	1		7 0	C		
807B	2		7 0	F B		
807D	2		7 0	DI		
807E	1		7 0	CF CF 2/4 E I		
807F	1		7 0	CF 1 C		

CFP NVR2

Alarm/Warning Threshold Registers

H A		A	B		C (HE)	B
B ID I						
8080	2		7 0	H A		
8082	2		7 0	H		
8084	2		7 0			
8086	2		7 0	A		
8088	2					

809A	2		7 0	A	1	H		
809C	2		7 0	A	1			
809E	2		7 0	A	1	A		
80A0	2		7 0	A	2	H	A	
80A2	2		7 0	A	2	H		
80A4	2		7 0	A	2			
80A6	2		7 0	A	2	A		
80A8	2		7 0		B	C	H	A
80AA	2		7 0		B	C	H	
80AC	2		7 0		B	C		
80AE	2		7 0		B	C	A	
80B0	2		7 0			H	A	
80B2	2		7 0			H		
80B4	2		7 0					
80B6	2		7 0				A	
80B8	2		7 0			H	A	
80BA	2		7 0			H		
80BC	2		7 0					
80BE	2		7 0				A	
80C0	2		7 0			H	A	
80C2	2		7 0				H	
80C4	2		7 0					
80C6	2		7 0				A	
80C8	55		7 0					
80FF	1		7 0		CF	2	C	

CFP NVR3

Network Lane BOL Measurement Registers

H A		A	B		C (HE)	B
B ID I						
8100	32		7 0		0 15	
8120	32		7 0		0 15	
8140	32		7 0	E	0 15	
8160	32		7 0			

				0 15		
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CFP NVR4

H A		A	B		C (HE)	B
B ID I						
8180	1		7 0	CF 3 C		
8181	127		7 1			

CFP VR1

H A		A	B		C (HE)	B
C /						
A000	2		15 0			
A002	2		15 0			
A004	1			NVR Access Control		
			8 6			
			4			
			3 2	C		
			15 9			
			5	C		
			1 0	E C		
A005	1		PRG_CNTL3 Function Select			
		15 8				
		7 0	F C			
A006	1		PRG_CNTL2 Function Select			
		15 8				
		7 0	F C			
A007	1		PRG_CNTL1 Function Select			
		15 8				
		7 0	F C			
A008	1		PRG_ALRM3 Source Select			
		15 8				
		7 0	A C			
A009	1		PRG_ALRM2 Source Select			
		15 8				
		7 0	A C			
A00A	1		PRG_ALRM1 Source Select			
		15 8				
		7 0	A C			
A00B	1		B -/ -D			
		15 3				
		2 0	B / -D			
A00C	4					
C						
A010	1			Module General Control		
		/ C/ H	15			
			14			
			13	D		
			12	G C 3 C		

		11	G C 2 C		
		10	G C 1 C		
		9	G B A		
		8 6			
		5	DI		
		4	D		
		3	G C 3		
		2	G C 2		
		1	G C 1		
		0			
A011	1		Network Lane TX Control		
		15			
		14	B G E		
		13	B 1		
		12	B 0		
		11	D - E		
		10	FIF		
		9	FIF A		
		8			
		7 5	C C		
		4			
		3 1	(10G)		
		0	C		
A012	1		Network Lane RXControl		
		15	A D		
		14	B C E		
		13	B 1		
		12	B 0		
		11	C C		
		10	-		
		9	FIF A		
		8			
		7 5	C C		
		4	FIF		
		3 1			

			14	B C E		
			13	B 1		
			12	B 0		
			11			
			10	H - E		
			9			
			8			
			7	B G E		
			6	B 1		
			5	B 0		
			4 0			
A015	1					
A016	1			Module State		
			15 9			
			8	H - -		
			7	- -		
			6	F		
			5			
			4	- -		
			3	-		
			2	H - -		

			6	6 A		
			5	5 A		
			4	4 A		
			3	3 A		
			2	2 A		
			1	1 A		
			0	0 A		
A01A	1			Network Lane Fault and Status Summary		
			15	15 F		
			14	14 F		
			13	13 F		
			12	12 F		
			11	11 F		
			10	10 F		
			9	9 F		
			8	8 F		
			7	7 F		
			6	6 F		
			5	5 F		
			4	4 F		
			3	3 F		
			2	2 F		
			1	1 F		
			0	0 F		
A01B	1			Host Lane Fault and Status Summary		
			15	15 F		
			14	14 F		
			13	13 F		
			12	12 F		
			11	11 F		
			10	10 F		

			9	9 F	
			8	8 F	
			7	7 F	
			6	6 F	
			5	5 F	
			4	4 F	
			3	3 F	
			2	2 F	
			1	1 F	
			0	0 F	
A01C	1				
FA					
A01D	1			Module General Status	
			15		
			14		
			13	H I	

12 11



		/ H/C	4	A		
		/ H/C	3	A B H A		
		/ H/C	2	A B H		
		/ H/C				
		/ H/C				
A026	1					
		/ H/C				
		/ H/C				
		/ H/C	5	A 1		



A02B	1		0			
				A		
			15 12	1 E		
			11	H A E		
			10	H E		
			9	E		
			8	A E		
			7	H A E		
			6	H		
			5	E		
			4	A E		
			3	A B H A		
			2	A B H		
			1	A B		
			0	A B A		
A02C	1			Module Alarms and Warnings Enable		
			15 8			
			7	A 1 H A		
			6	A 1 H		
			5	A 1		
			4	A 1 A E		
			3	A 2 H A		
			2	A 2 H		
			1	A 2		
			0	A 2 A E		

A02D

CFP Network Lane VR1

Network Lane VR1

1						
H A		A	B		C (HE)	B
Network Lane FAWS Registers						
A200	16			Network Lane n Alarm and Warning		
			15	B	H	A
			14	B	H	

			14	F E		
			13	A D F E		
			12 8			
			7	F E		
			6	E		
			5			
			4	E		
			3	E		
			2	FIF E		
			1 0			
A260	32					

CFP Network Lane VR2

Network Lane VR2						
1						
H A		A	B		C (HE)	B
Network Lane Control Registers						
A280	16			Network Lane n FEC Controls		
			15 8	A		
			7 0	A A		
A290	16		15 0	E C B		
			15 10	E		

A410	16			Host Lane m Fault and Status Latch		
			15 2			
		/ H/C	1	FIF E		
		/ H/C	0	H		
Host Lane FAWS Enable Registers						
A420	16			Host Lane m Fault and Status Enable		
			15 2			
			1	FIF E E		
			0	H E		
Host Lane Digital PRBS Registe						
A430	16			Host Lane m PRBS TX Error Count		
			15 10	E		
			9 0			
Host Lane Control Registers						
A440	16			Host Lane m Control		
			15 4			
			3 0	/D -		
A450	48					

Pin Description

CF 4 56 B . 1 28
 . B 1 28
 . F .

Figure : CFP4 Pin Map Orientation

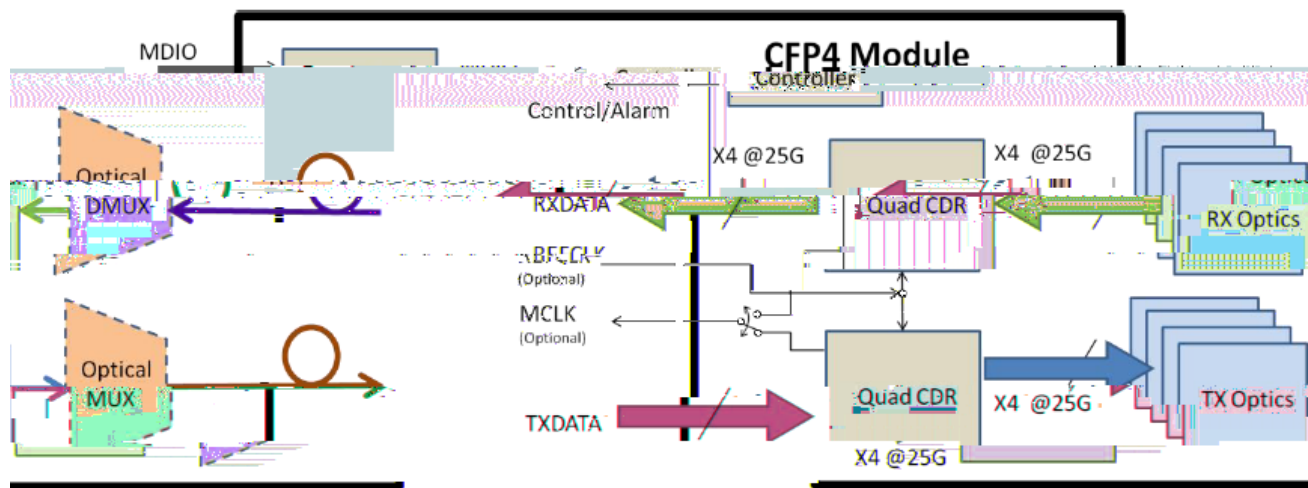
52	2	5	3.3	52	1
51	2	6	3.3	51	1
50	G D	7	3.3 G D	50	G D
49	1	8	3.3 G D	49	2
48	1	9	D I A	48	2
47	G D	10	D I B	47	G D
46	0	11	DI (G C 1)	46	3
45	0	12	(G A 1)	45	3
44	G D	13	G B A	44	G D
43	EFC	14	D	43	EFC
42	EFC	15	D AB	42	EFC
41	G D	16	D	41	G D
40	3	17	DC	40	3
39	3	18	DI	39	3
38	G D	19	AD 0	38	G D
37	2	20	AD 1	37	2
36	2	21	AD 2	36	2
35	G D	22	D I C	35	G D
34	1	23	D I D	34	1
33	1	24	D I E	33	1
32	G D	25	G D	32	G D
31	0	26	C	31	0
30	0	27	C	30	0
29	G D	28	G D	29	G D

Table: Pin description

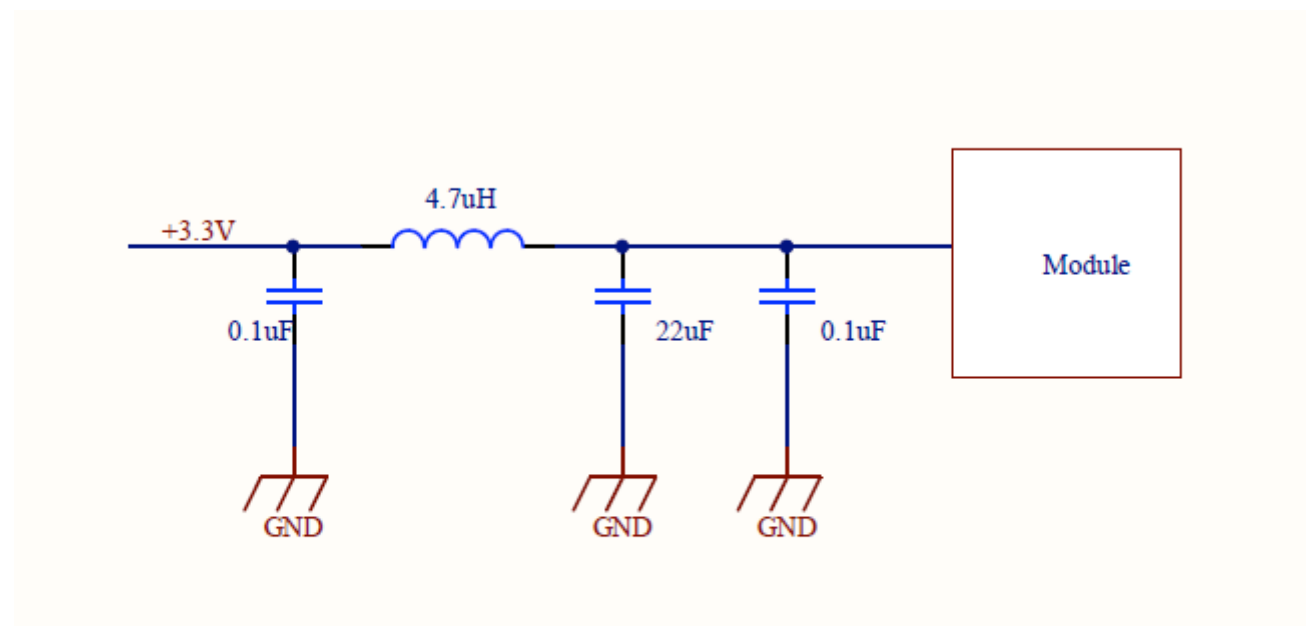
PIN#	Name	I/O	Logic	Description
1	3.3 G D			

8	3.3 G D			3.3 G ,
9	D I A	I/		I/ . D C
10	D I B			

Block diagram



Required Host Board Components



	CD H 21-CF 1040 C 1
	-G
	CE

Ordering Information

Part No	Specifications												Application	
	D												Code	
290-701 CF 4	1310													
	A													
	103.125/111.8													
	C -2.5 +2.9 I <-8.6 B 0 70 C 10 DD 100G E/ 4													
	G													
E A														
DFB- D														