



# 300Pin MSA 40Gbps SFF Receiver Module

## **RTXM298-302**

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### Features

- *Operating Temperature Range from 0°C up to 70°C*
- *40 Gbps 300 pin MSA compliant*
- *1 to 16 De-Multiplexing of 2.5Gb/s data signals*
- *Supports OC-768/ STM-256 (39.8Gbps) and G.709 (43.1 Gbps)*
- *Supports VSR2000-3R2, 3R3, and 3R5*
- *Provides MSA I2C Edition 4 compliant control, monitoring, and alarms for optics management*
- *OIF SFI-5 compliant electrical interface*
- *Uses standard un-sequencing supply voltages*
- *3.5" x 4.5" x 0.54" small form factor*

### Application

- *Cross-office Telecommunication & High-speed Data Communication Applications*
- *Intra-office SONET/SDH systems*
- *Optical Cross-connects , Optical switches and routers*

## Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Case Temperature Range	T <sub>s</sub>	°C	-40	+85
Relative Humidity	RH	%		85
Power Supply Voltage	+3.3V Supplies	V	-0.3	+3.6
	+1.8V Supplies	V	-0.3	+2.0
	+5.0V Supplies	V	-0.3	+6.0
	-5.2V Supplies	V	-5.5	+0.3
Fiber Bend Radius		mm	30	
Receive Optical Input Power PIN	P <sub>max</sub>	dBm		+6

## Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Max
Case Operating Temperature Range	T <sub>c</sub>	°C	0	+70
Power Supply Voltage	+3.3V Supplies	V	+3.13	+3.47
	+1.8V Supplies	V	+1.2	+2.5
	+5.0V Supplies	V	+4.75	+5.25
	-5.2V Supplies	V	-5.45	-4.94
Receive Optical Input Power PIN	P <sub>max</sub>	dBm	-	0

## Specifications (T=25°C, BOL ,unless otherwise noted)

Parameter	Symbol	Unit	Min	Typ	Max	Test condition
Data Rate		Gbps	39.8		43.1	
Receiver Sensitivity	S	dBm			-6	BER=10 <sup>-12</sup>
Overload Input Optical Power	P <sub>OL</sub>	dBm	+3			
Receiver Reflectance	RL	dB	27			
Optical Path Penalty	Pp	dB			2	

## Electrical Characteristics

### LVC MOS Signal Characteristics

Parameters	Cond	Symb	Min	Typ	Max	Unit
<b>LVC MOS output(RXS,LOS,STAT-INT,CFG-ALM)</b>						
LVC MOS output high level			2 400		3300	mV
LVC MOS output low level					400	mV
<b>LVC MOS input(REG-RESET,MOD-RESET)</b>						
LVC MOS input high level			2 000		3300	mV
LVC MOS input low level					800	mV

### Differential CML Input and Output Signals

Symbol	Parameter	Max	Min	Units
<b>CML Output</b>				
$V_{CM}$	Output Common Mode Voltage	1.23	0.72	V
$T_{DRF}$	Driver Rise/Fall Time		50	ps
$I_{DSHORT}$	Short Circuit Current	100	-100	mA
$R_{SE}$	Single-ended output impedance	65	35	$\Omega$
$R_D$	Differential Impedance	125	75	$\Omega$
$R_{HS}$	Single-ended return loss		7.5	dB
$RL_{DIFF}$	Differential return loss		7.5	dB
<b>CML Input</b>				
$V_{tt}$	Termination Voltage	1.30	1.10	V
$V_{Rsense}$	Input Sensitivity		0.175	Vp-p
$Z_{Vtt}$	Bias Voltage Source Impedance	30		$\Omega$
$T_{rise/fall}$	Rise/Fall time	0.36		UI
$V_{Rmax}$	Maximum Input Voltage	1.15		Vp-p
$V_{RCM}$	Input Common Mode Voltage	$V_{tt}$	0.7	V
$Z_{INDIFF}$	Differential input impedance	125	75	$\Omega$
$L_{DR}$	Differential return loss		10	dB

### Input Reference Clock Characteristics

Parameters	conditions	Min	Typ	Max	Unit
RXREFCK Frequency			622.08		MHz
Differential Input Impedance Diff	AC Coupled	90	100	110	$\Omega$

RXREFCK Jitter			1.8	ps (RMS)
RXREFCK Duty Cycle	45		55	%
RXREFCK Level	Peak - peak	400	1000	mV <sub>pp</sub> (Single Ended)
RXREFCK Accuracy			30	ppm

### RXMONCK

Parameters	Cond	Symb	Min	Typ	Max	Unit
RXMONCK	Frequency	RXMON_Freq		622.08		MHz
	Level	Single Ended	RXMON_LVL	300		500 mVpp





### Electrical power supplies

Parameters		Unit	Min	Typ	Max
+5.0V Supply	voltage	V	4.75	5.0	5.25
	current	A		0.1	0.2
+3.3V Supply	voltage	V	3.13	3.3	3.47
	current	A		0.3	
-5.2V Supply	voltage	V	- 5.45	- 5.2	- 4.94
	current	A		0.8	
+1.8V Supply	voltage	V	1.71	1.8	1.89
	current	A		0.3	0.6
Power dissipation		W		6.0	7

## Pin Description

	K	J	H	G	F	E	D	C	B	A
1	GND	RxDSCP	GND	RxData12P	GND	RxData8P	GND	RxData4P	GND	RxData0P
2	GND	RxDSCN	GND	RxData12N	GND	RxData8N	GND	RxData4N	GND	RxData0N
3	THRESH_ADJ	GND	-5.2V	GND	FFU	GND	1.8V	GND	3.3V	GND
4	GND	RxDCKP	GND	RxData13P	GND	RxData9P	GND	RxData5P	GND	RxData1P
5	GND	RxDCKN	GND	RxData13N	GND	RxData9N	GND	RxData5N	GND	RxData1N
6	LOS	GND	-5.2V	GND	I2C_ADDR_0	GND	1.8V	GND	3.3V	GND
7	GND	RXREFCKP	GND	RxData14P	GND	RxData10P	GND	RxData6P	GND	RxData2P
8	GND	REFCKN	GND	RxData14N	GND	RxData10N	GND	RxData6N	GND	RxData2N
9	FFU	GND	-5.2V	GND	I2C_ADDR_1	GND	1.8V	GND	3.3V	GND
10	I2C_SDA	FFU	GND	RxData15P	GND	RxData11P	GND	RxData7P	GND	RxData3P
11	GND	RXMONCK	GND	RxData15N	GND	RxData11N	GND	RxData7N	GND	RxData3N
12	I2C_SCL	GND	RXS	GND	I2C_ADDR_2	GND	1.8V	GND	3.3V	GND
13	FFU	NUC	NUC	NUC	NUC	NUC	FFU	NUC	NUC	FFU

14	GND	-5.2V	GND	-5.2V	GND	3.3V	GND	3.3V	GND	5.0V
15	GND	-5.2V	GND	-5.2V	GND	3.3V	GND	3.3V	GND	5.0V
16	GND	-5.2V	GND	-5.2V	GND	3.3V	GND	3.3V	GND	5.0V
17	FFU	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
18	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
19	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
20	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
21	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
22	STAT_INT	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
23	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
24	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
25	REG_RESET	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
26	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
27	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
28	MOD_RESET	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
29	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC
30	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC	NUC

	Differential Data / Clock Signals
	Power Pins
	Ground Pins
	Control Signals

NUC: no user connection  
 FFU: reserved for future use  
 Italics: optional feature

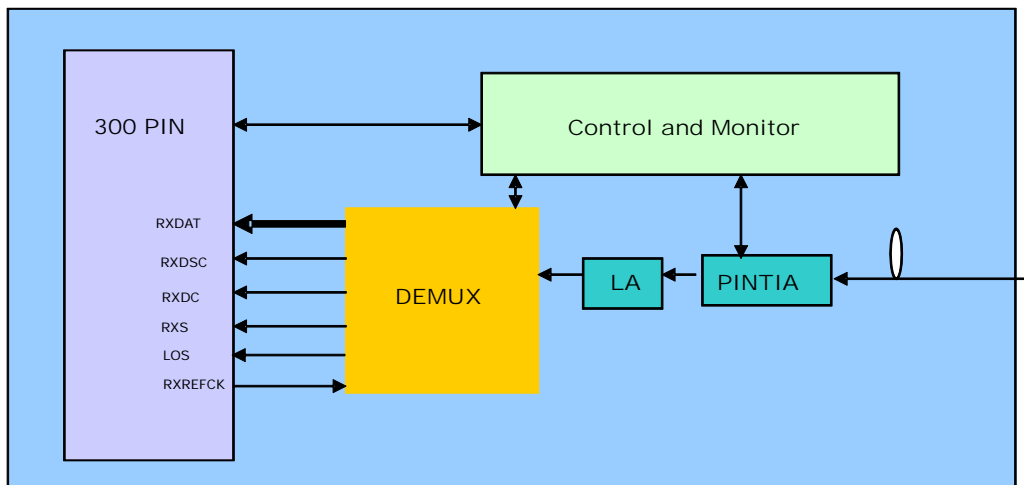
## Signal Definition

Electrical specifications for the SFI-5 interface can be found in OIF2001.145.X and OIF 2001.149.X. The signal descriptions for the SFI-5 bus are reproduced below.

Name	Type	I/O	Signal Description
RXDATA[15:0]	Diff CML	O	<b>Receive Data Bus</b> SFI-5 compliant 16 wide receive data bus from SerDes
RXDSC	Diff CML Note 1	O	<b>Receive Deskew channel</b> used to deskew the RX_DATA[15:0]
RXDCK	Diff CML	O	<b>Receive Data Clock</b> provides a timing reference for receive data. It is at ¼ data rate of RXDATA and RXDSC
RXREFCK	AC Coupled LVPECL	I	<b>Receive Reference Clock</b> provides an alternate timing reference. The clock is at ¼ data rate of RXDATA and RXDSC
RXMONCK	Analog	O	<b>Receive Monitor Clock</b> provides a single ended clock that can be used to monitor the receive clock on the demux. This clock shall be turned off during normal operation and startup.
RXS	LV_CMOS	O	<b>Receiver Status</b> is an asynchronous signal used to indicate an alarm to the Framer (active high).

I2C_ADDR[2:0]	LV_TTL with 1k ohm pull down resistors	I	<b>I<sup>2</sup>C Address[2:0]</b> is the 3 bit address provided to the transponder for the I <sup>2</sup> C protocol. Each bit in the address shall be zero if left open.
I2C_SCL	Open Collector	I/O	<b>I<sup>2</sup>C Clock</b> is a signal used to control the data transfer on the I <sup>2</sup> C serial interface.
I2C_SDA	Open Collector	I/O	<b>I<sup>2</sup>C Data</b> is a signal used to transfer data across the serial I <sup>2</sup> C bus. The bus is used for control information and some alarms.
LOS	LVC MOS	O	<b>Loss of Signal</b> is a signal to indicate to the there is no incoming optical signal (active low).
THRESH_ADJ	Analog	I	<b>Threshold Adjust</b> is a un-used pin, This feature is supported through I2C.
STAT_INT	LVC MOS	O	<b>Status Interrupt</b> is an electrical "or" of the status registers (active low).
REG_RESET	LVC MOS	I	<b>Register Reset</b> is active low and when asserted to its low state will return all writable registers to their default state after resetting the CPU/CPLD on the transponder.
MOD_RESET	LVC MOS	I	<b>Module Reset</b> is active low and when asserted to its low state will reset the optical module. The module reset will force all components in the transponder to their reset state, including the I <sup>2</sup> C registers, the laser and the respective chips.
CFG_ALM	LVC MOS	O	<b>User Configurable Alarm</b> is a user selectable alarm pin. TBD Alarm signals can be software configured to this pin.

## Block diagram

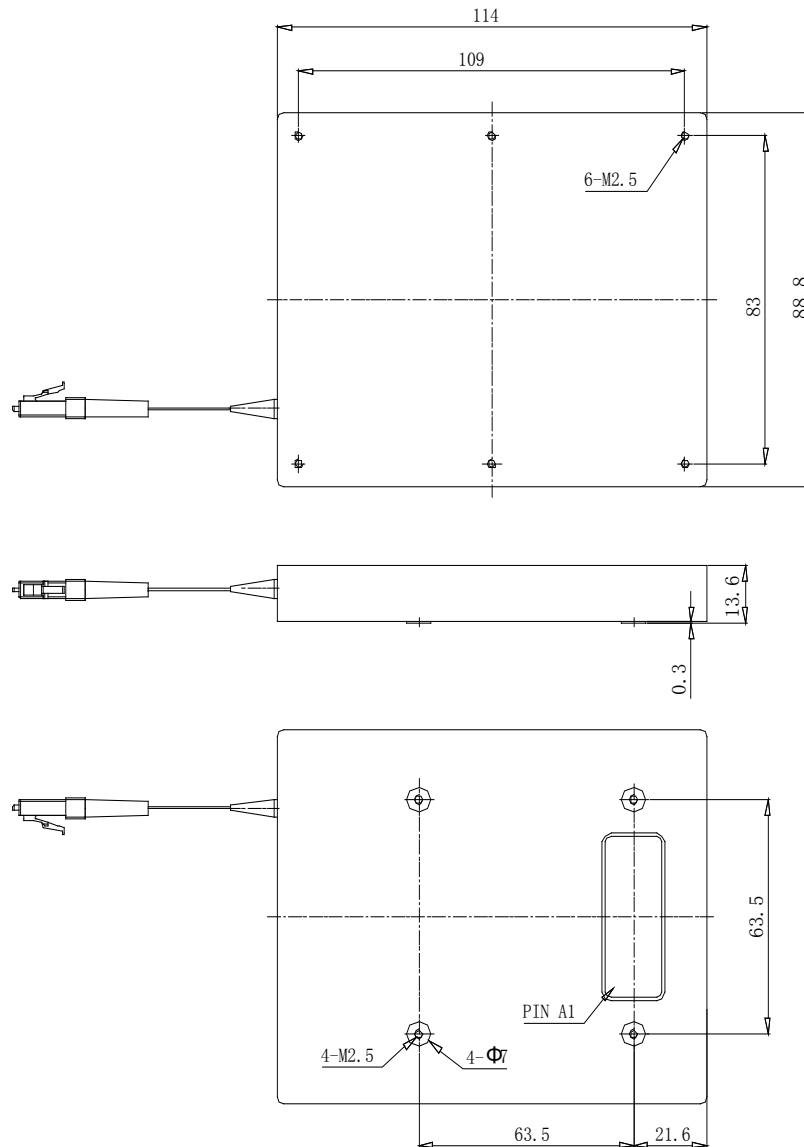


## Connector description

FCI Meg-Array® 300 position receptacle, 1.27 mm x 1.27 mm (0.050 x 0.050 inch) ball to ball pitch, FCI part  
 Wuhan Telecommunication Devices Co., Ltd.  
 88 Youkeyuan Road, Hongshan District Wuhan, Hubei 430074, P.R.C  
<http://www.wtd.com.cn>

number 84501-10X. Mating line card connector shall be FCI part number 84500-002.

## Package Outline (Unit:mm)



## Ordering information

Part No	Specification							Application
	Package	Datarate	Laser	Optical Overload	Detector	Sensitivity	Temp Reach	
RTXM298-302	300pin	40G	-	+3dBm	PIN	-6dBm(Max)	0~70	-

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