M2R-25-4-1-TL Optical Gigabit Ethernet/Fibre Channel 850nm SFF 2x5 Dual Receivers -- 1.25/1.0625GBaud --- +3.3V

ORDERING INFORMATION

M2R - 25 - 4 - 1 - T L

+3.3V POWER SUPPLY

SIGNAL DETECT
T - TTL Signal Detect Output

WAVELENGTH
1 - 850 nm (multimode)

PROTOCOL
4 - GbE/FC, 1.25/1.0625GBaud

STRATOS Lightwave™

Optoelectronic Products

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Features

- 1.25 Gbps Gigabit Ethernet Compliant
- Metalized Plastic Package
- TTL Signal Detect output
- AC coupled PECL level outputs
- Low profile fits Mezzanine Card Applications
- Single +3.3V Power Supply
- Wave Solderable / Aqueous Washable
- Class 1 Laser Safety Compliant
- UL 1950 Approved

PRODUCT OVERVIEW

The M2R-25-4-1-TL Small Form Factor (SFF) optical dual receiver modules are high performance integrated duplex data links for uni-directional communication over multimodeoptical fibre. The M2R-25-4 module is specifically designed to operate with M2T-25-4 (Dual transmitter module). The M2R-25 dual receiver modules are provided with the LC receptacle that is compatible with the industry standard LC connector. The Stratos Lightwave SFF dual receiver modules measure 0.532 inches in width. These modules provide double port densities by fitting twice the number of dual receiver modules onto the same board as compared to a 1x9 transceiver. This saves on system costs and can reduce overall design time.

This optoelectronic dual receiver module is designed to operate with a transmitter that is class 1 laser product compliant with FDA Radiation Performance Standards, 21 CFR Subchapter J. This component is also class 1 laser compliant according to International Safety Standard IEC-825-1.

SHORT WAVELENGTH RECEIVERS

The use of short wavelength integrated PIN pre-amp subassemblies and high volume production processes has resulted in a low cost, high performance product available in various data transfer rates up to 1.25 GBaud.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
Storage Temperature	Tstg	-40	+85	°C	
Soldering Temperature			260	ºC	10 seconds on leads only
Supply Voltage	$V_{CC}T$, $V_{CC}R$		6.0	V	VCC - ground
Data AC Voltage	Tx+, Tx-		2.6	Vpp	Differential
Data DC Voltage	Tx+, Tx-	-10	10.0	Vpk	V (Tx+ or Tx-) - ground

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Operating Case Temperature	Tc	0		+70	°C	
Supply Voltage	Vcc	3.0	3.3	3.6	VDC	
Baud Rate	Brate	1.0625		1.25	GBaud	

MODULE SPECIFICATIONS - ELECTRICAL **0º<Tc<70°C, +3.0<Vcc<+3.6V**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Current	Icc		200	225	mA	Tc=+25ºC; Vcc=+3.3V
				250	mA	0ºC<Tc<+70ºC; +3.0V<Vcc<+3.6V
RECEIVER						
PECL Outputs (Differential)		600	1200	1860	mVpp	AC coupled outputs
Total Jitter	TJ			130	ps	Measured with 2^7 - 1 PRBS
TTL Signal Detect Output - LOW				0.5	V	I_{OL}= -1.6mA, 1 TTL unit load
TTL Signal Detect Output - HIGH		2.4	3		V	I_{OH}= 40µA, 1 TTL unit load

M2R-25-4-1-TL OPTICAL SPECIFICATIONS -- 850 nm Laser Multimode **0º<Tc<70°C, +3.0<Vcc<+3.6V**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
50µm Core Diameter MMF		550	1000		m	BER<1.0E-12 @ 1.25/1.0625GBaud
62.5µm Core Diameter MMF		300[1]	500			
RECEIVER						
Optical Input Wavelength	λ	770		860	nm	
Optical Input Power	Pr	-17		0	dBm	BER<1.0E-12
Optical Modulation Amplitude	OMA	31			µW	pk-pk
Optical Return Loss	ORL	12			dB	
Signal Detect - Asserted	Pa			-17	dBm	Measured on transition - Low to High
Signal Detect - Deasserted	Pd	-29			dBm	Measured on transition - High to Low
Signal Detect - Hysteresis	Pa-Pd		1.5	5.0	dB	

Note[1] - This is the link length for at least 95% of the installed fibre base.

TERMINATION CIRCUITS

Output from the M2R-25 dual receiver module is AC coupled PECL level and is expected to drive into a 50 ohm load. Different termination strategies may be required depending on the particular De-Serializer chip set used.

The M2R-25 product family is designed with AC coupled outputs to provide the following advantages:

- Close positioning of De-Serializer with respect to dual receiver; allows for shorter line lengths and at gigabit speeds reduces EMI.
- Minimum number of external components.
- Internal termination reduces the potential for unterminated stubs which would otherwise increase jitter and reduce transmission margin.

Subsequently, this affords the customer the ability to optimally locate the De-Serializer as close to the M2R-25 as possible and save valuable real estate on PCI cards and other small circuit assemblies. At gigabit rates this can provide a significant advantage resulting in better transmission performance and accordingly better signal integrity.

AC coupling allows the Stratos Lightwave M2R-25 to be applied across a wider range of applications without modification. This benefits users in terms of enhanced RF performance, reduced component count, tighter layout and fewer design problems.

Figure 1 illustrates the recommended receive data line terminations and Figure 2 describes an alternative termination approach. Figure 3 illustrates a Thevenin equivalent 50 ohm termination circuit for the De-Serializer receiver input data lines, which require a +3.3V PECL termination. Other equivalent circuits can be readily calculated for other bias voltages.

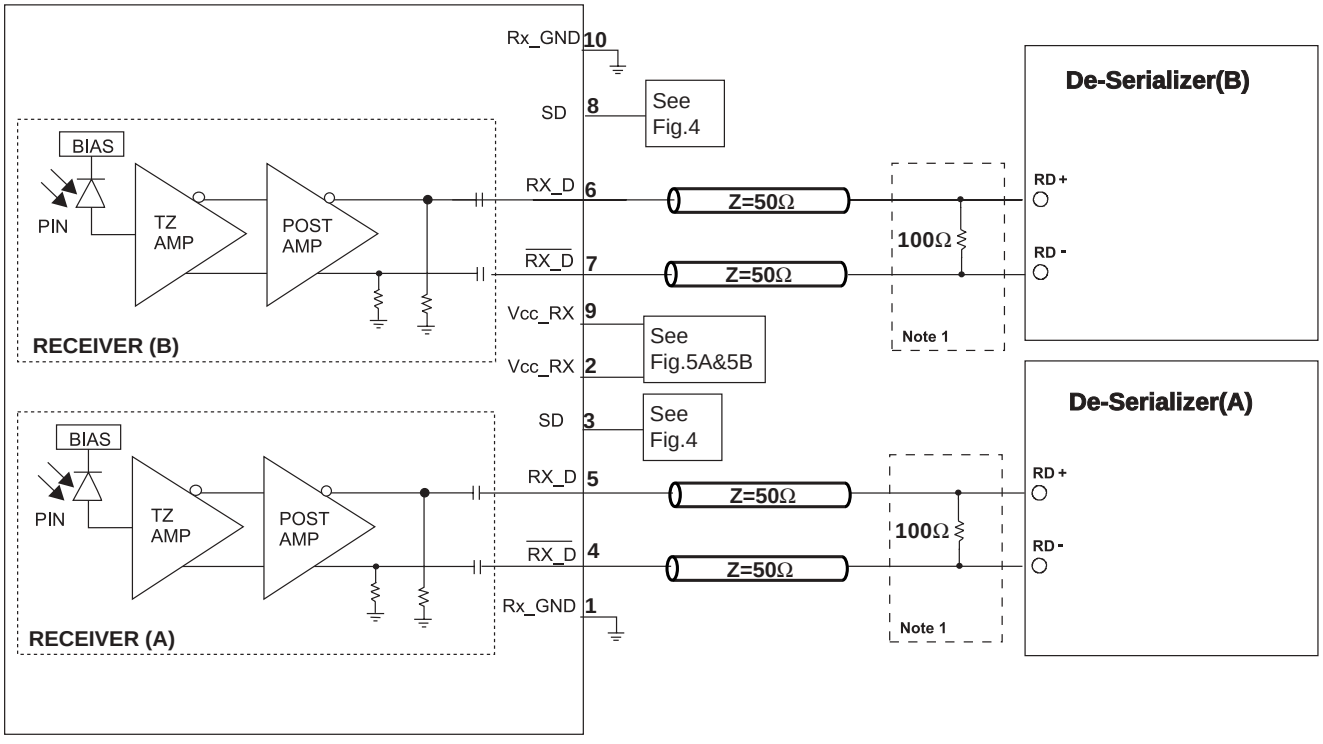


Figure 1. Recommended RECEIVE Data Terminations

Notes:

1. Consult De-Serializer manufacturer's data sheet and application data for appropriate receiver input biasing network.

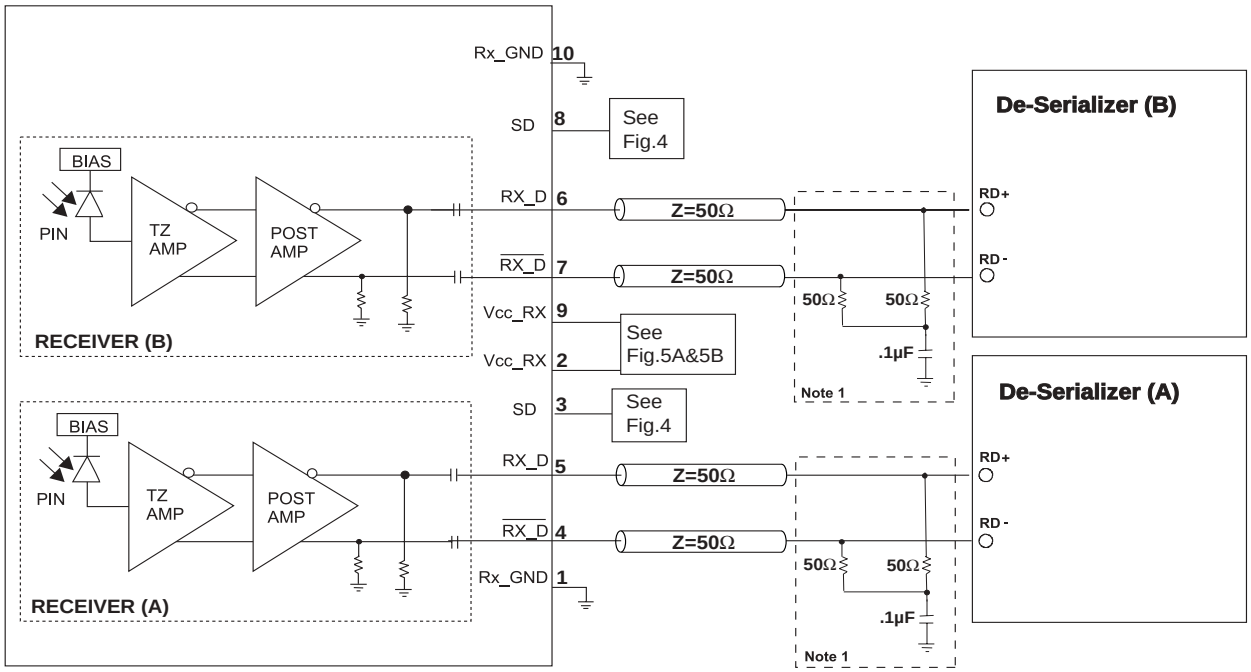


Figure 2. Alternative RECEIVE Data Terminations

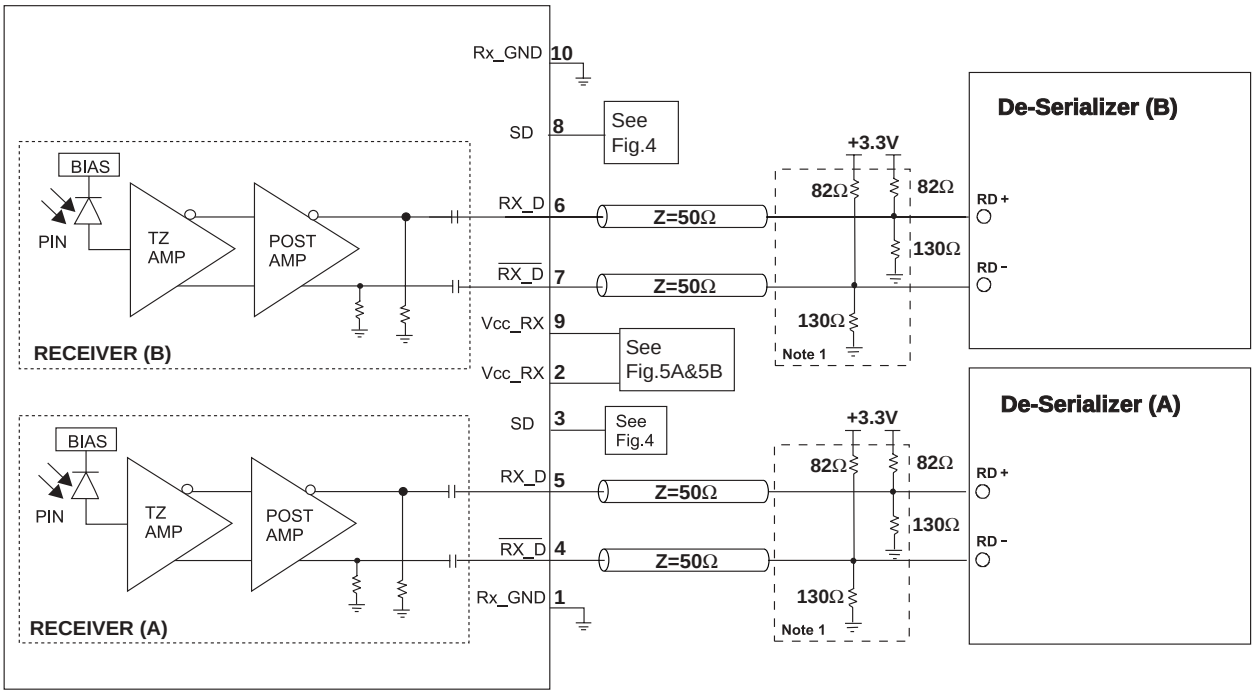


Figure 3. Thevenin Equivalent RECEIVE Data Terminations

Notes:
1. Consult De-Serializer manufacturer's data sheet and application data for appropriate receiver input biasing network.

SIGNAL DETECT

The M2R-25 dual receivers are equipped with TTL signal detect outputs. The standard TTL output eliminates the need for a PECL to TTL level shifter in most applications. The SFF adhoc industry standard provides for a TTL level SIgnal Detect output.

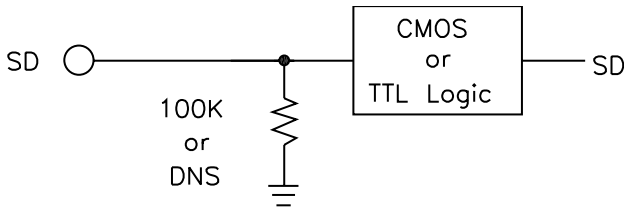
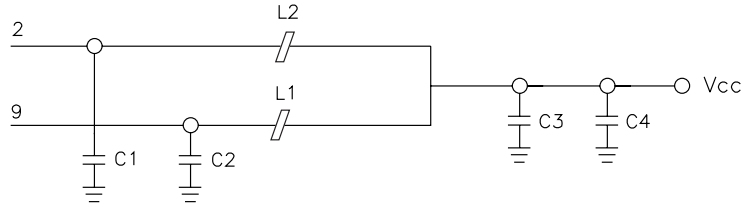


Figure 4. Signal Detect

POWER COUPLING

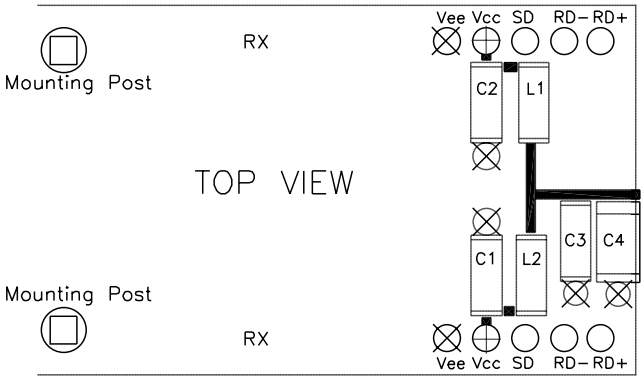
A suggested layout for power and ground connections is given in figure 5B below. Connections are made via separate voltage and ground planes. The mounting posts are at case ground and should not be connected to circuit ground. The ferrite bead should provide a real impedance of 220 ohms at 100MHz. Bypass capacitors should be placed as close to the 10-pin connector as possible.



Values:

C1, C2 = 1000pF, COG
C3 = 0.1µF
C4 = 10µF, Tantilum
L1, L2 = Real Impedence of 220Ω @ 100MHz

Figure 5A. Suggested Power Coupling - Electrical Schematic



Values:
C1, C2 = 1000pF, COG
C3 = 0.1µF
C4 = 10µF, Tantilum
L1, L2 = Real Impedence of 220Ω @ 100MHz

Note:
(1) Components shown are placed on the bottom layer and are viewed through the board.

LEGEND:
Vcc Plane Connection
Circuit Ground Connection
Case Ground

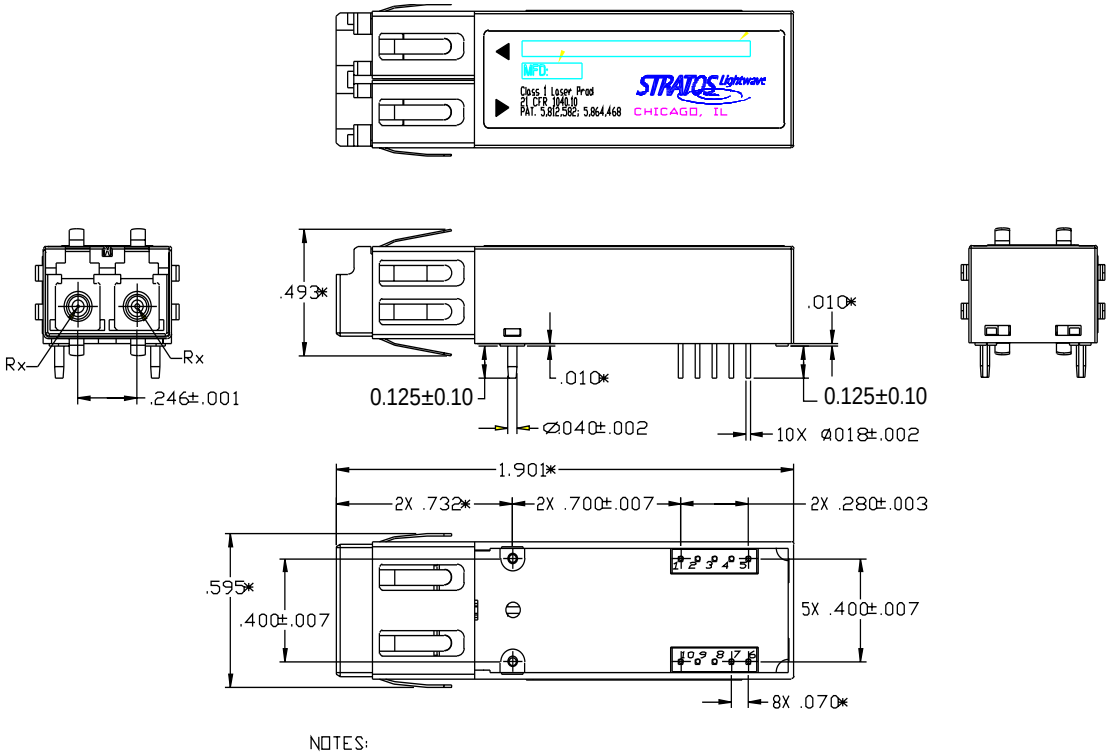
Figure 5B. Suggested Power Coupling - Component Placement

EMI and ESD CONSIDERATIONS

Stratos Lightwave optoelectronic dual receiver modules offer a Metalized plastic case and special chassis grounding clips. As shown in the drawing, grounding clips connect the module case to chassis ground when installed flush through the panel cutout. The grounding clip in this way brushes the edge of the cutout in order to make a proper contact. The use of a grounding clip also provides increased electrostatic protection and helps reduce radiated emissions from the module or the host circuit board through the chassis faceplate. The attaching posts are at case potential and may be connected to chassis ground. They should not be connected to circuit ground.

Plastic optical subassemblies are used to further reduce the possibility of radiated emissions in multimode dual receiver module. By providing a non-metal receptacle for the optical cable ferrule, the gigabit speed RF electrical signal is isolated from the connector area thus preventing radiated energy leakage from these surfaces to the outside of the panel.

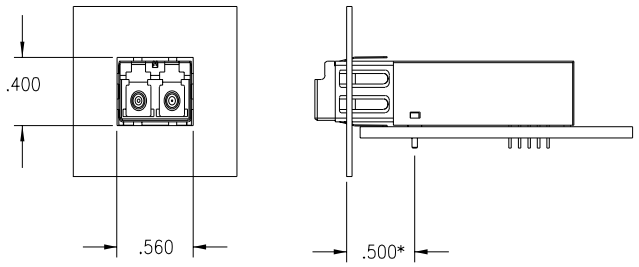
MECHANICAL DIMENSIONS



NOTES:

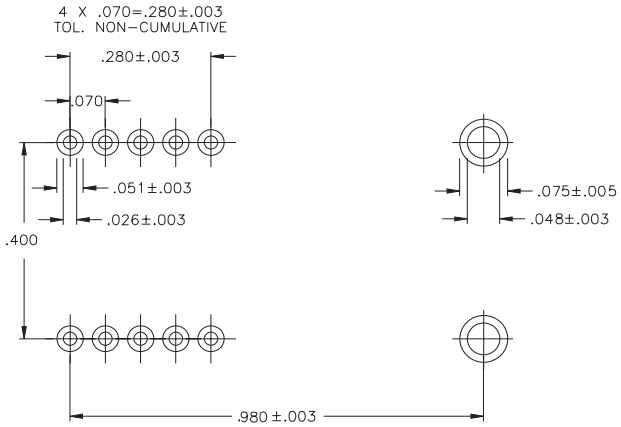
* DIMENTIONS ARE FOR REFERENCE

PANEL CUTOUT DIMENSIONS



*DIMENSION REFERRED TO OUTSIDE WALL

SUGGESTED PCB LAND PATTERN



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PHYSICAL DESCRIPTION

The M2R-25 features a compact design with a standard LC duplex connector for fibre optic connections. The 10-pin connector (70 mil spacing) provides the electrical connection for all operation. With a height of 9.8 mm the M2R-25 fits mezzanine card applications. Two wave-solderable posts are provided for attaching the package to the circuit board without the need for multiple attachment operations.

ELECTRICAL INTERFACE, PIN DESCRIPTIONS

PIN 1	RX_GND	Ground. (A)
PIN 2	Vcc_RX	+3.3 volt supply for the Receiver Section . (A)
PIN 3	SD	Receiver Signal Detect TTL output. Active high on this line indicates a received optical signal. (A)
PIN 4	RX -	Receiver Data Inverted Differential Output . (A)
PIN 5	RD+	Receiver Data Non-Inverted Differential Output (A)
PIN 6	RD+	Receiver Data Non-Inverted Differential Output (B)
PIN 7	RD -	Receiver Data Inverted Differential Output (B)
PIN 8	SD	Receiver Signal Detect TTL output. Active high on this line indicates a received optical signal. (B)
PIN 9	Vcc_RX	+3.3 volt supply for the Receiver Section (B)
PIN 10	RX_GND	Ground. (B)
Attaching Posts		The attaching posts are at case potential and may be connected to chassis ground. They should not be connected to circuit ground.

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