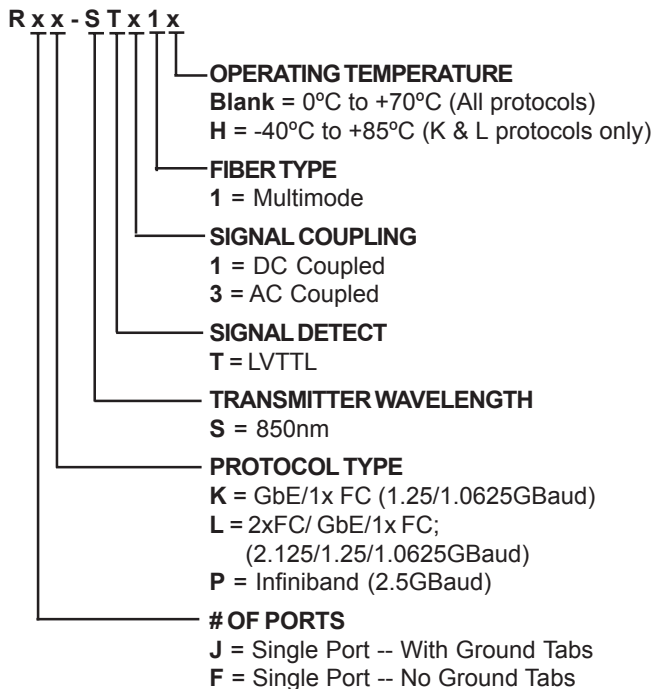


Rxx-STx1x Optical RJ Format 850nm Multimode Optical Transceiver



ORDERING INFORMATION



FEATURES

- 2.5GBaud Infiniband Compliant (RxP-STx1)
- 2.125GBaud Fibre Channel (FC-PI) Compliant (RxL-STx1x)
- 1.25GBaud Gigabit Ethernet (IEEE 802.3z) Compliant (RxK-STx1x and RxL-STx1x)
- 1.0625GBaud Fibre Channel (FC-PI) Compliant (RxK-STx1x and RxL-STx1x)
- Enables reuse of existing RJ-45 UTP equipment cabinets
- Overall metal shield with enhanced grounding tabs
- Duplex multimode LC receptacle
- LVTTTL signal detect output
- DC or AC coupled Inputs/Outputs option
- Single +3.3V Power Supply
- Compatible with wave solder and aqueous wash processes
- IEC 825 / CDRH Class 1 compliant

APPLICATIONS

The Rxx-STx1x multimode glass optical fiber transceivers provide low profile, cost effective solutions for high data rate multimode optical fiber data links with a duplex LC connector interface.

DESCRIPTION

The Rxx-STx1x fiber optic transceivers consist of transmitter and receiver functions combined in an RJ Format module. The optical transmitter is a high output 850nm VCSEL. The transmitter input lines are driven with differential CML/LVPECL level signals applied to the Transmit (TX+ and TX-) pins.

The optical receivers consist of PIN + Preamplifier assemblies and post-amplifier integrated circuits. Outputs from the receivers consist of differential CML level data signals on the Receive (RX+ and RX-) pins and a single ended LVTTTL signal detect function on the Signal Detect (SD) pin.



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ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNITS | NOTES |
|-----------------------|--------------------------------------|------|------|-------|--------------------------|
| Storage Temperature | Tstg | -50 | +100 | °C | |
| Soldering Temperature | | | 260 | °C | 10 seconds on leads only |
| Supply Voltage | V _{CC} T, V _{CC} R | -0.5 | 4.5 | V | VCC - ground |

Rxx-STx1x Optical RJ Format

850nm Multimode Optical Transceiver



RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|----------------------------|--------|--------|-----|-------|-------|------------------------------------|
| Operating Case Temperature | Tc | 0 | | +70 | °C | RxK-STx1, RxL-STx1, RxP-STx1 |
| | | -40 | | +85 | | RxK-STx1H & RxL-STx1H only |
| Supply Voltage | Vcc | +3.15 | | +3.45 | VDC | |
| Baud Rate | Brate | 1.0625 | | 1.25 | GBaud | RxK-STx1x (1.25/1.0625GBaud) |
| | | 1.0625 | | 2.125 | GBaud | RxL-STx1x (2.125/1.25/1.0625GBaud) |
| | | | | 2.5 | GBaud | RxP-STx1 |

ELECTRICAL SPECIFICATIONS -

+3.15<Vcc<+3.45V

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|------------------------------------|--------|-----|-----|------|-------|---------------------------------------|
| Supply Current | Icc | | 175 | 200 | mA | Tc = 25°C, Vcc = +3.3 V |
| | | | | 225 | mA | -40°C<Tc<+85°C, +3.15 V< Vcc <+3.45V |
| TRANSMITTER | | | | | | |
| CML/LVPECL Inputs (Differential) | | 400 | | 2500 | mVpp | |
| Input Impedance (Differential) | Zin | 85 | 100 | 115 | ohms | Rin > 100 kohms @ DC |
| Tx_DISABLE Input Voltage - High | VIH | 2 | | Vcc | V | |
| Tx_DISABLE Input Voltage - Low | UIL | 0 | | 0.8 | V | |
| RECEIVER | | | | | | |
| CML Outputs (Differential) | | 400 | 800 | 1200 | mVpp | |
| Output Impedance (Differential) | Zo | 85 | 100 | 115 | ohms | |
| LVTTTL Signal Detect Output - Low | | | | 0.8 | V | IOL = -1.6mA, 1 TTL unit load |
| LVTTTL Signal Detect Output - High | | 2.4 | 3 | | V | Ioh = 40µA, 1 TTL unit load |
| Total Jitter [Pk - Pk] | TJ | | | 130 | ps | Measured with 2 ⁷ - 1 PRBS |

RxK-STx1x GbE/1xFC OPTICAL SPECIFICATIONS -- 850nm Multimode

+3.15<Vcc<+3.45V

| 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 | 500 | | m | BER<1.0E-12 @ 1.25/1.0625GBaud |
| TRANSMITTER | | | | | | |
| Optical Center Wavelength | λ | 830 | 850 | 860 | nm | |
| Spectral Width | Δλ | | | 0.85 | nm | RMS |
| Optical Transmit Power | Popt | -9.5 | | -2 ¹ | dBm | Average @ 850nm |
| Extinction Ratio | ER | 9 | | | dBm | P1/P0 |
| Optical Modulation Amplitude | OMA | 180 | | | µW | pk-pk |
| Relative Intensity Noise | RIN | | | -117 | dB/Hz | |
| Total Jitter [Pk - Pk] | TJ | | | 170 | ps | Measured with 2 ⁷ - 1 PRBS |
| Output Rise/Fall Time | t _r , t _f | | | 260 | ps | 20%-80%; Measured unfiltered |
| RECEIVER | | | | | | |
| Optical Input Wavelength | λ | 770 | | 860 | nm | |
| Optical Input Power | Pr | -17 | | 0 | dBm | BER<1.0E-12 @ 1.25/1.0625GBaud |
| 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 | dB | |

Note¹ : Lessor of Class 1 Laser Safety limit (CDRH or EN60825) or Receiver Power, max.

Rxx-STx1x Optical RJ Format

850nm Multimode Optical Transceiver



RxL-STx1x 2xFC/GbE/1xFC OPTICAL SPECIFICATIONS -- 850nm Multimode

+3.15<Vcc<+3.45V

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|------------------------------|---------------------------------|------|------|-----------------|-------|--|
| 50µm Core Diameter MMF | | 300 | 500 | | m | BER<1.0E-12 @ 2.125GBaud |
| | | 550 | 1000 | | m | BER<1.0E-12 @ 1.25/1.0625GBaud |
| 62.5µm Core Diameter MMF | | 200 | 300 | | m | BER<1.0E-12 @ 2.125GBaud |
| | | 300 | 500 | | m | BER<1.0E-12 @ 1.25/1.0625GBaud |
| TRANSMITTER | | | | | | |
| Optical Center Wavelength | λ | 830 | 850 | 860 | nm | |
| Spectral Width | $\Delta\lambda$ | | | 0.85 | nm | RMS |
| Optical Transmit Power | Popt | -9.5 | | -2 ¹ | dBm | Average @ 850nm |
| Optical Modulation Amplitude | OMA | 225 | | | µW | pk-pk |
| Extinction Ratio | ER | 9 | | | dB | P1/P0 |
| Relative Intensity Noise | RIN | | | -117 | dB/Hz | |
| Total Jitter | TJ | | | 85 | ps | Mesured with 2 ⁷ -1 PRBS @ 2.125GBaud |
| | | | | 170 | ps | Mesured with 2 ⁷ -1 PRBS @ 1.25/1.0625GBaud |
| Output Rise/Fall Time | t _R , t _F | | | 160 | ps | 20-80%; measured unfiltered @ 2.125GBaud |
| | | | | 260 | ps | 20-80%; measured unfiltered @ 1.25/1.0625GBaud |
| RECEIVER | | | | | | |
| Optical Input Wavelength | λ | 770 | | 860 | nm | |
| Optical Input Power | Pr | -17 | | 0 | dBm | BER<1.0E-12 @ 2.125/1.25/1.0625GBaud |
| Optical Modulation Amplitude | OMA | 31 | | | µW | pk-pk @ 2.125/1.25/1.0625GBaud |
| 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 | |

RxP-STx1 INFINIBAND OPTICAL SPECIFICATIONS -- 850nm Multimode

0°C to +70°C; +3.15<Vcc<+3.45V

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|------------------------------|---------------------------------|-----|-----|-----------------|-------|--------------------------------------|
| 50µm Core Diameter MMF | | 250 | 500 | | m | BER<1.0E-12 @ 2.5Gbaud |
| 62.5µm Core Diameter MMF | | 150 | 300 | | m | BER<1.0E-12 @ 2.5Gbaud |
| TRANSMITTER | | | | | | |
| Optical Center Wavelength | λ | 830 | 850 | 860 | nm | |
| Spectral Width | $\Delta\lambda$ | | | 0.85 | nm | RMS |
| Optical Transmit Power | Popt | -10 | | -2 ¹ | dBm | Average @ 850nm |
| Optical Modulation Amplitude | OMA | 200 | | | µW | pk-pk |
| Relative Intensity Noise | RIN | | | -117 | dB/Hz | |
| Total Jitter | TJ | | | 84 | ps | Mesured with 2 ⁷ -1 PRBS |
| Output Rise/Fall Time | t _R , t _F | | | 150 | ps | 20-80%; measured unfiltered |
| RECEIVER | | | | | | |
| Optical Input Wavelength | λ | 770 | | 860 | nm | |
| Optical Input Power | Pr | -15 | | -1.5 | dBm | BER<1.0E-12 |
| Optical Modulation Amplitude | OMA | 50 | | | µW | pk-pk |
| Optical Return Loss | ORL | 12 | | | dB | |
| Signal Detect - Asserted | Pa | | | -15 | 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 | |

Note¹ : Lessor of Class 1 Laser Safety limit (CDRH or EN60825) or Receiver Power, max.

Rxx-STx1x Optical RJ Format

850nm Multimode Optical Transceiver

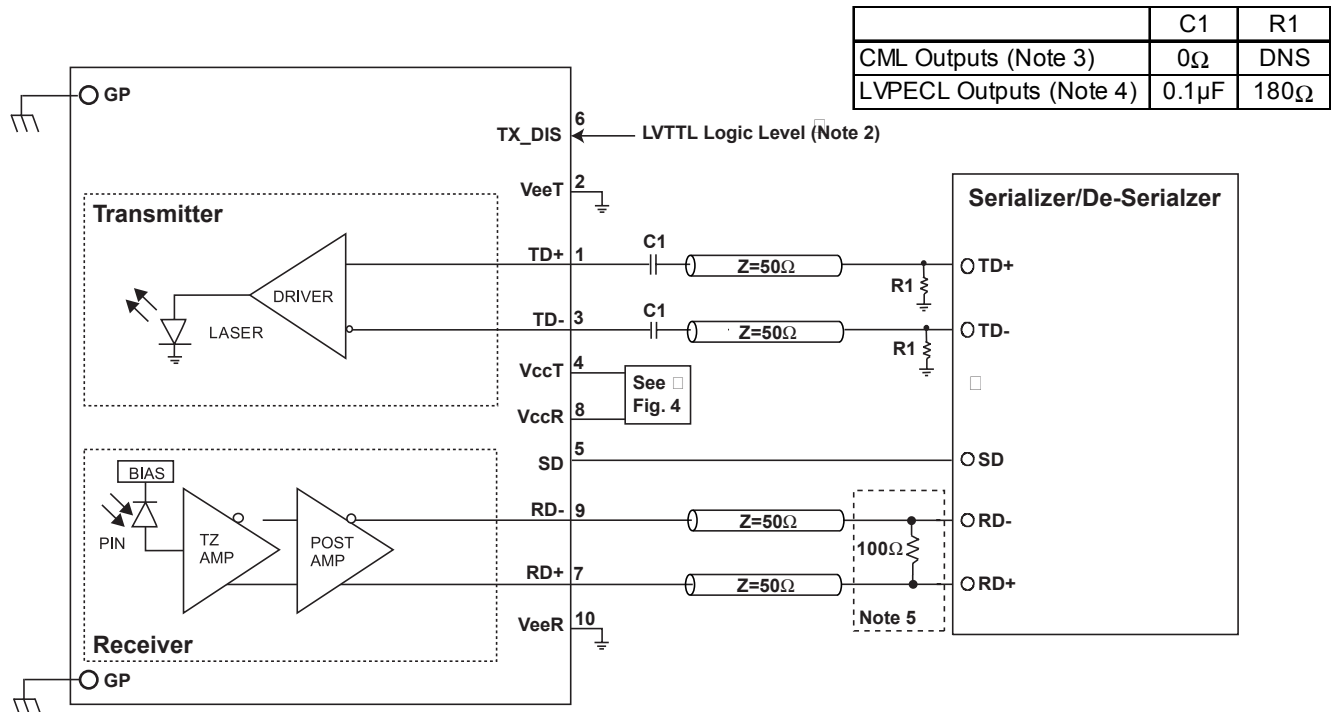


Fig. 1: Application Schematic for Interfacing Rxx-ST11x to +3.3V DC Coupled Circuits

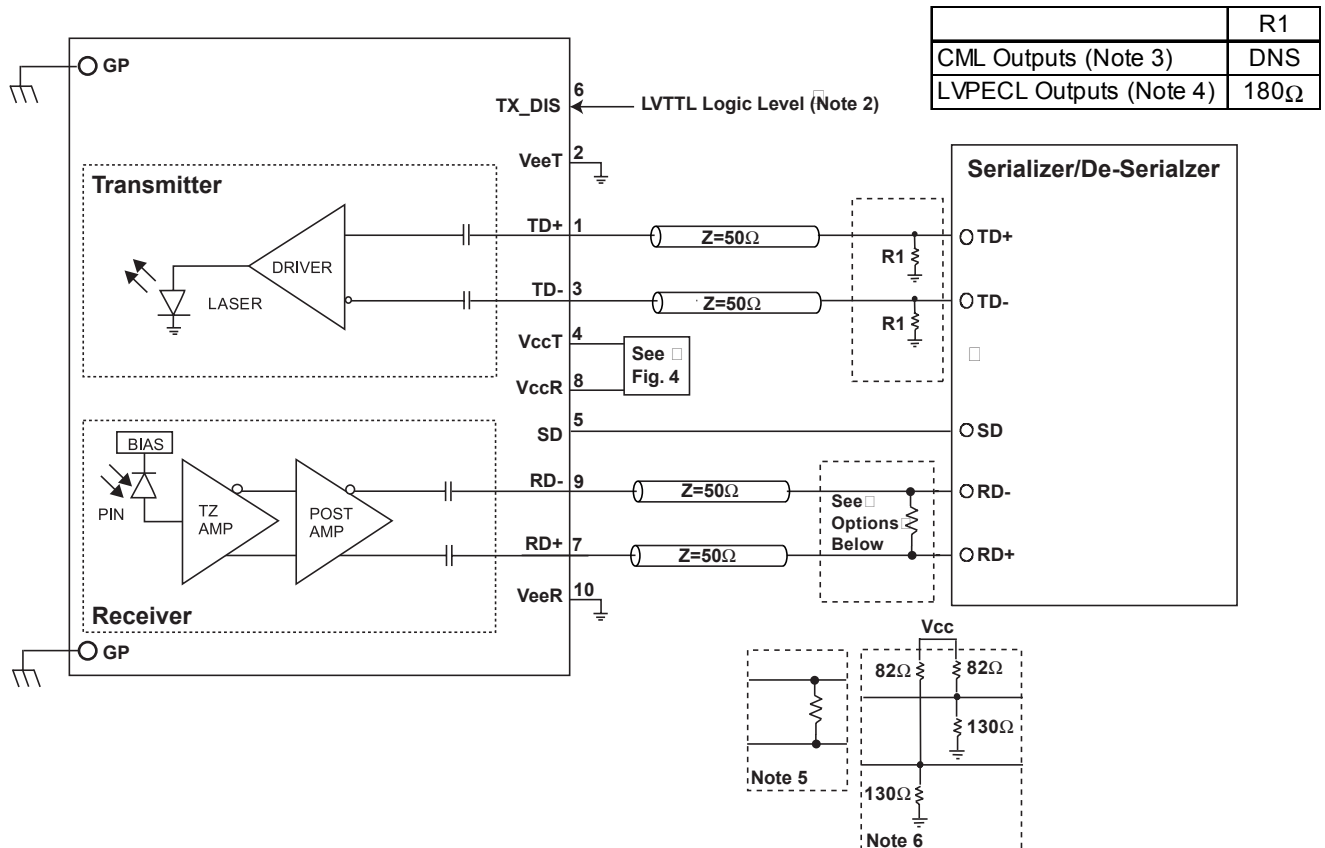


Fig. 2: Application Schematic for Interfacing Rxx-ST31x to +3.3V AC Coupled Circuits

Rxx-STx1x Optical RJ Format

850nm Multimode Optical Transceiver

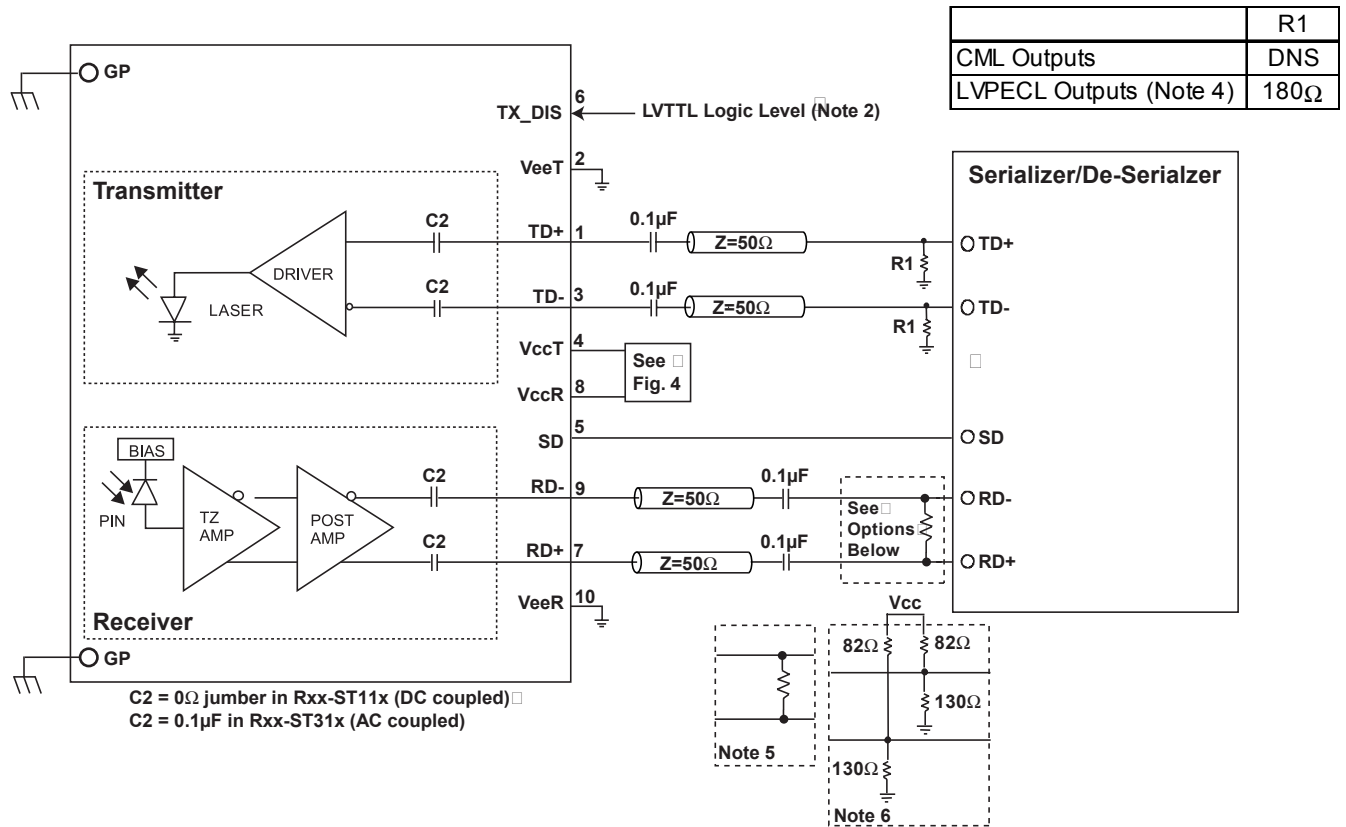


Fig. 3: Application Schematic for Interfacing Rxx-ST11x or Rxx-ST31x to +3.3V AC Coupled Circuits

NOTES:

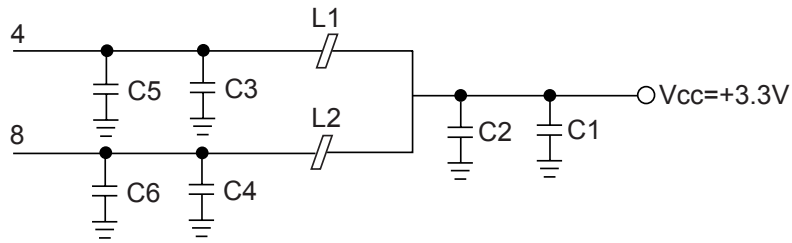
- The Rxx-STx1x transceivers are designed with active low TX_DISABLE input signal. It is internally pulled to logical LOW. To disable the transmitter optical output, the host shall pull up to Vcc. If this signal is not implemented in the host application then the TX_DISABLE input (Pin #6) can be left open.
- Internally biased CML outputs must be tied to same Vcc±2mV.
- Consult the SERDES manufacturer's data sheet for biasing required for Tx outputs. Some serializer outputs are internally biased and may not need external bias resistors.
- Consult SERDES manufacturer's data sheet for appropriate termination network. Some de-serializer inputs are internally terminated and may not need external termination resistors.
- Thevenin equivalent receive data terminations for de-serializer whose inputs are not internally terminated and biased.

PIN DESCRIPTION:

| Pin Number | Symbol | Description | Logic Family |
|------------|--------|--|--------------|
| GP | GP | Ground posts. Connect to chassis ground | N/A |
| 1 | TD+ | Non-inverted transmitter DATA input | CML/LVPECL |
| 2 | VeeT | Transmitter signal ground | N/A |
| 3 | TD- | Inverted transmitter DATA Input | CML/LVPECL |
| 4 | VccT | Transmitter power supply | N/A |
| 5 | SD | Signal Detect. Active high on this line indicates a received optical signal. | LVTTTL |
| 6 | TX_DIS | Transmitter Disable. | LVTTTL |
| 7 | RD+ | Non-Inverted receiver DATA output | CML |
| 8 | VccR | Receiver power supply | N/A |
| 9 | RD- | Inverted receiver DATA output | CML |
| 10 | VeeR | Receiver signal ground | N/A |

Rxx-STx1x Optical RJ Format

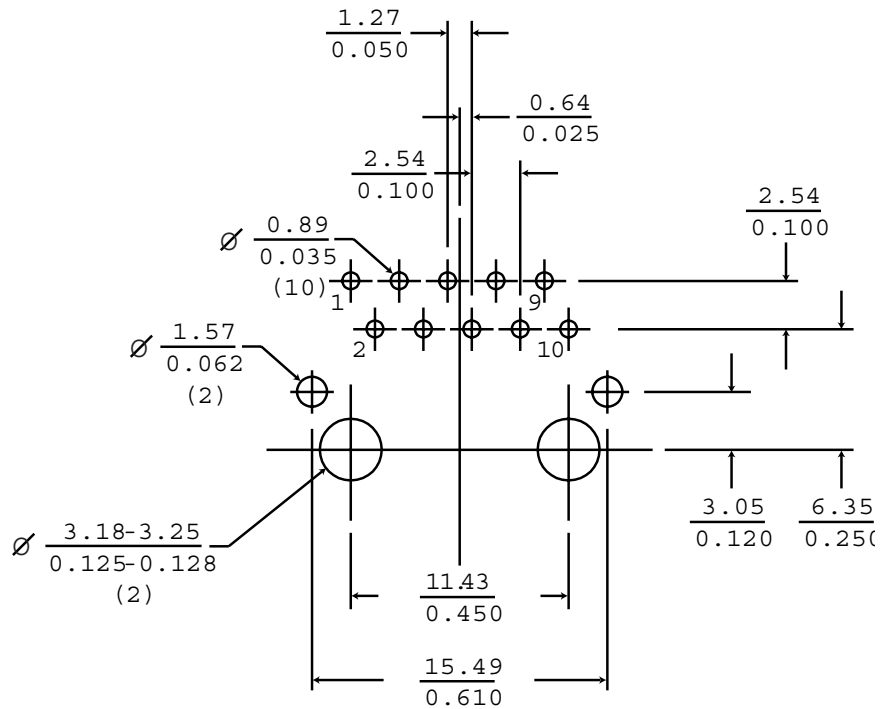
850nm Multimode Optical Transceiver



Values:

- C1 = 22 μ F to 47 μ F
- C3, C4 = 10 μ F
- C2, C5, C6 = 0.01 μ F
- L1, L2 = Impedance of 220 Ω @ 100MHz

Figure 4. Suggested Power Coupling



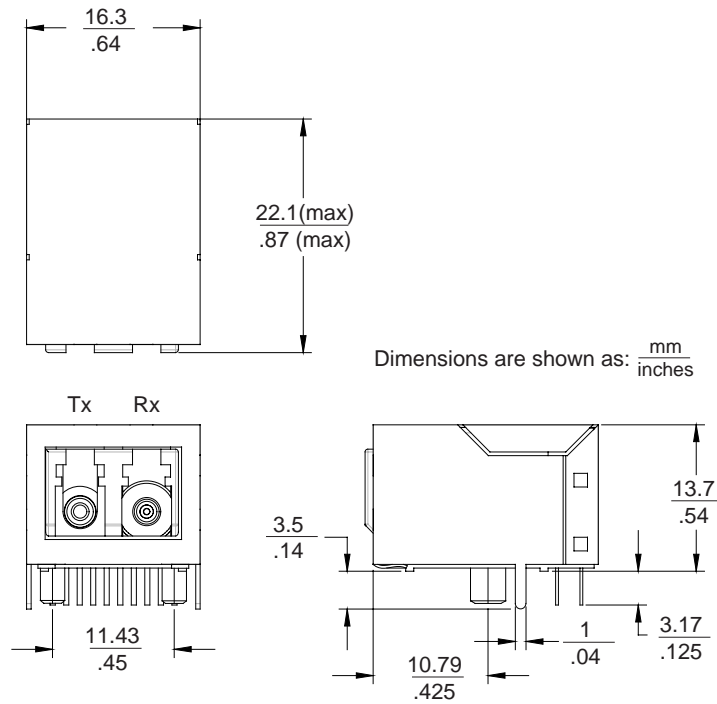
Dimensions are shown as: $\frac{\text{inches}}{\text{mm}}$

Figure 5. Suggested PCB Land Pattern

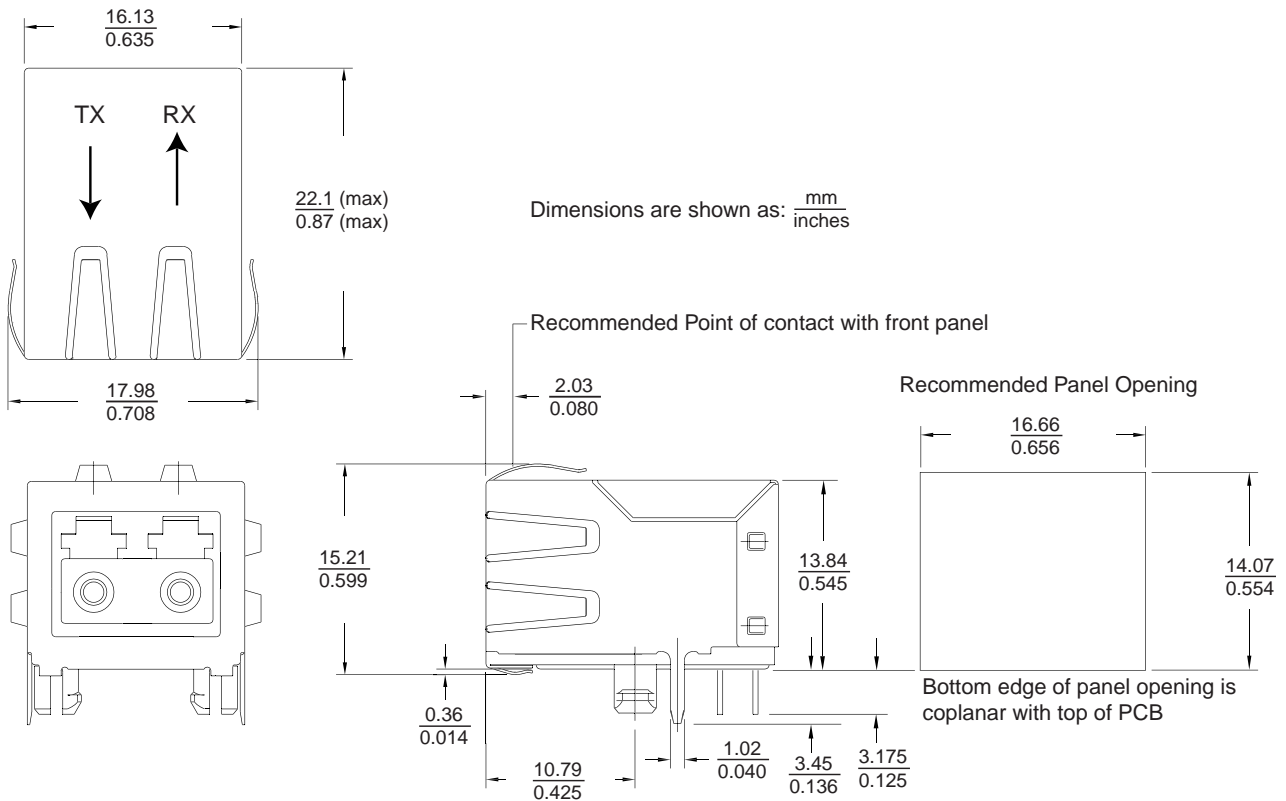
Rxx-STx1x Optical RJ Format 850nm Multimode Optical Transceiver



MECHANICAN DIMENSIONS --- SINGLE PORT WITH NO GROUND TABS



MECHANICAN DIMENSIONS --- SINGLE PORT WITH GROUND TABS



Rxx-STx1x Optical RJ Format 850nm Multimode Optical Transceiver



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