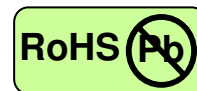


3 Gb/s Dual Optical Receiver



SFP, LC Connector, Dual Receiver for Single Mode Fiber, RoHS Compliant

Digital Diagnostics Functions



Features

- 1260~1620 nm PIN-TIA
- Data Rate: 50 Mb/s to 3 Gb/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
- Digital Diagnostic Monitoring Interface (Received Power, Supply voltage and Operating temperature)
- Duplex LC Connector

Applications

- SMPTE 297-2006 compatible optical-to-electrical interfaces
- High-density video routers

Description

The CT-2500TRP-MB4L-D AB series from Coretek Opto Corp. are the high performance and cost-effective modules for serial optical data communication applications specified for data-rates of 3 Gb/s. It operates with +3.3 V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of 1260-1620 nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated with digital diagnostics functions via an I²C serial interface.

The module is a duplex LC connector with separated dual receiver designed for robust performance in the presence of SDI pathological patterns for SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M serial rates including SD-SDI compliant link at 270 Mb/s, HD-SDI compliant link at 1.485 Gb/s and 3G-SDI compliant link at 2.97 Gb/s. It provides extensive operational status monitoring through I²C interface. For each receiver channel, input optical power, supply voltage and operating temperature are monitored. If a parameter monitored is outside the pre-defined range, the alarm flag associated with the parameter will be raised. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed dual transmitters will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the dual transmitters have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

3 Gb/s Dual Optical Receiver



Product Information

| Model Number | Operating Voltage & Interface | TX | | RX | |
|----------------------|-------------------------------|----------------|-------------|----------------|-------------|
| | | λ (nm) | Power (dBm) | λ (nm) | Sens. (dBm) |
| CT-2500TRP-MB4L-D AB | 3.3 V AC | | | 1260-1620 | 0 to -20 |

Link Distance

| Transmitter | Receiver | SDI | Bit Rate | Max Link Distance | |
|----------------------|----------------------|--------|------------|-------------------|-------|
| CT-2500TTP-MB4L-D AB | CT-2500TRP-MB4L-D AB | 3G-SDI | SMPTE 424M | 2.97 Gb/s | 10 km |
| | | HD-SDI | SMPTE 292M | 1.485 Gb/s | 21 km |
| | | SD-SDI | SMPTE 259M | 270 Mb/s | 30 km |

ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---------------------|----------|------|----------|--------------------|------|
| Storage Temperature | T_S | -40 | 85 | $^{\circ}\text{C}$ | |
| Supply Voltage | V_{CC} | -0.5 | 4.5 | V | |
| Data Input Voltage | --- | 0 | V_{CC} | V | |
| Supply Current | I_S | | 200 | mA | |

OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------------------|----------|------|------|------|--------------------|------|
| Case Operating Temperature | T_C | 0 | | 70 | $^{\circ}\text{C}$ | |
| Supply Voltage | V_{CC} | 3.1 | | 3.5 | V | |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|----------|---------------------|---------------------|-------|------|
| Supply Current | I_{CC} | | 200 | mA | |
| In-rush current ramp rate | | | 50 | mA/ms | |
| $I^2\text{C CLK}$, $I^2\text{C DATA}$ - Low | V_{IL} | -0.6 | $V_{CC} \times 0.3$ | V | |
| $I^2\text{C CLK}$, $I^2\text{C DATA}$ - High | V_{IH} | $V_{CC} \times 0.7$ | $V_{CC} + 0.5$ | V | |

3 Gb/s Dual Optical Receiver



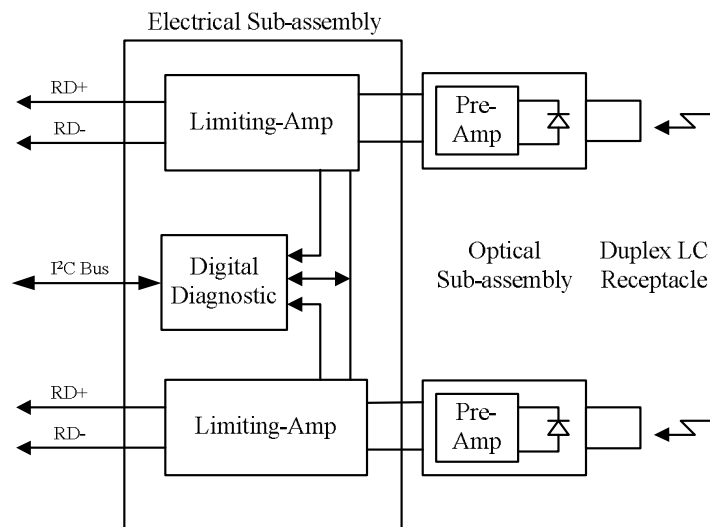
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|-----------------------------|-------------|-----------|------|------|------|-------------------|
| Maximum Input Optical Power | P_{max} | 0 | | | dBm | PRBS23, BER=1e-12 |
| Minimum Input Optical Power | 2.97 Gb/s | P_{min} | | -18 | dBm | pathological |
| | | | | -20 | dBm | PRBS23, BER=1e-12 |
| Minimum Input Optical Power | 1.485 Gb/s | P_{min} | | -20 | dBm | pathological |
| | | | | -21 | dBm | PRBS23, BER=1e-12 |
| Operating Wavelength | λ | 1260 | | 1620 | nm | |
| LOS of Signal - Asserted | P_A | -35 | | | dBm | |
| LOS of Signal - Deasserted | P_D | | | -21 | dBm | |
| Loss of Signal -Hysterisis | $P_D - P_A$ | 0.5 | | | dB | |

TIMING CHARACTERISTICS

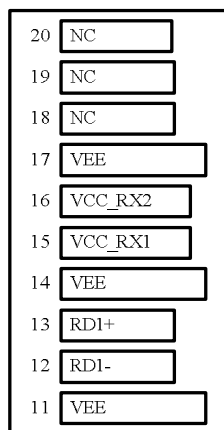
| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|-----------------|-----|------|-----|---------|------|
| Time to initialize | t_{init} | | | 300 | ms | |
| Receiver Loss of Signal Assert Time (off to on) | t_{A,RX_LOS} | | | 100 | μ s | |
| Receiver Loss of Signal Assert Time (on to off) | t_{D,RX_LOS} | | | 100 | μ s | |

BLOCK DIAGRAM OF DUAL TRANSMITTER

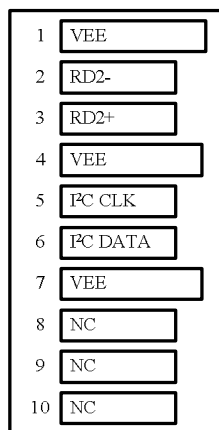


3 Gb/s Dual Optical Receiver

PIN OUT DIAGRAM OF DUAL TRANSMITTER



Top of Board



Bottom of Board (As Viewed through Top of Board)

PIN OUT TABLE

| Pin | Symbol | Functional Description |
|-----|----------|--------------------------------------|
| 1 | VEE | Receiver Ground |
| 2 | RD2- | Receiver Data Out 2 |
| 3 | RD2+ | Inverse Receiver Data Out 2 |
| 4 | VEE | Receiver Ground |
| 5 | I2C CLK | Two wire serial ID interface - Clock |
| 6 | I2C DATA | Two wire serial ID interface - Data |
| 7 | VEE | Receiver Ground |
| 8 | NC | Not Connect |
| 9 | NC | Not Connect |
| 10 | NC | Not Connect |
| 11 | VEE | Receiver Ground |
| 12 | RD1- | Receiver Data Out 1 |
| 13 | RD1+ | Inverse Receiver Data Out 1 |
| 14 | VEE | Receiver Ground |
| 15 | VCC_RX1 | Receiver Power 1 |
| 16 | VCC_RX2 | Receiver Power 2 |
| 17 | VEE | Receiver Ground |
| 18 | NC | Not Connect |
| 19 | NC | Not Connect |
| 20 | NC | Not Connect |

3 Gb/s Dual Optical Receiver



EEPROM Serial ID Memory Contents

Table 1 - EEPROM Serial ID A0h/B0h Memory Contents

| Addr. | Field Size (Bytes) | Name of Field | Hex | Description |
|---------|--------------------|---------------------|--|------------------------------|
| 00 | 1 | Identifier | 03 | SFP |
| 01 | 1 | Ext. Identifier | 04 | MOD4 |
| 02 | 1 | Connector | 07 | LC |
| 03 ~ 10 | 8 | Transceiver Codes | 00 00 00 00 00 00 00 00 | |
| 11 | 1 | Encoding | 00 | |
| 12 | 1 | BR, Nominal | 19 | |
| 13 | 1 | Reserved | 00 | |
| 14 | 1 | Length (SMF)-km | 28 | 40 km |
| 15 | 1 | Length (SMF)-100m | FF | |
| 16 | 1 | Length (50um,OM2) | 00 | |
| 17 | 1 | Length (62.5um,OM1) | 00 | |
| 18 | 1 | Length (copper) | 00 | |
| 19 | 1 | Length (50um, OM3) | 00 | |
| 20 ~ 35 | 16 | Vendor Name | 43 4F 52 45 54 45 4B 20 20 20 20 20 20 20 20 20 | CORETEK |
| 36 | 1 | Unallocated | 00 | |
| 37 ~ 39 | 3 | OUI Code | 00 00 00 | |
| 40 ~ 55 | 16 | Vendor PN | 43 54 32 35 30 30 54 52 50 4D 42 34 4C 45 41 42 | CT2500TRPMB4LEAB |
| 56 ~ 59 | 4 | Vendor Rev | 30 30 30 30 | 0000 |
| 60 ~ 61 | 2 | Wavelength | 051E | 1310 nm |
| 62 | 1 | Reserved | 00 | |
| 63 | 1 | CC BASE | XX | Check sum |
| 64 ~ 65 | 2 | Options | 00 04 | LOS, TX_FAULT and TX_DISABLE |
| 66 | 1 | BR max | 00 | |
| 67 | 1 | BR min | 00 | |
| 68 ~ 83 | 16 | Vendor SN | 4B 52 xxxxxxxxxxxx | KR xxxxxxxxxxxx |

3 Gb/s Dual Optical Receiver



| | | | | |
|----------|----|----------------------------|----|--------------------------------|
| 84 ~ 91 | 8 | Date code | | |
| 92 | 1 | Diagnostic Monitoring Type | 60 | |
| 93 | 1 | Enhanced Options | 80 | |
| 94 | 1 | SFF-8472 | 01 | Rev 9.3 of SFF-8472 Compliance |
| 95 | 1 | CC BASE | XX | Check sum |
| 96 ~ 127 | 32 | Vendor Specific | | |

Table 2- EEPROM Serial ID A2h/B2h Memory Contents

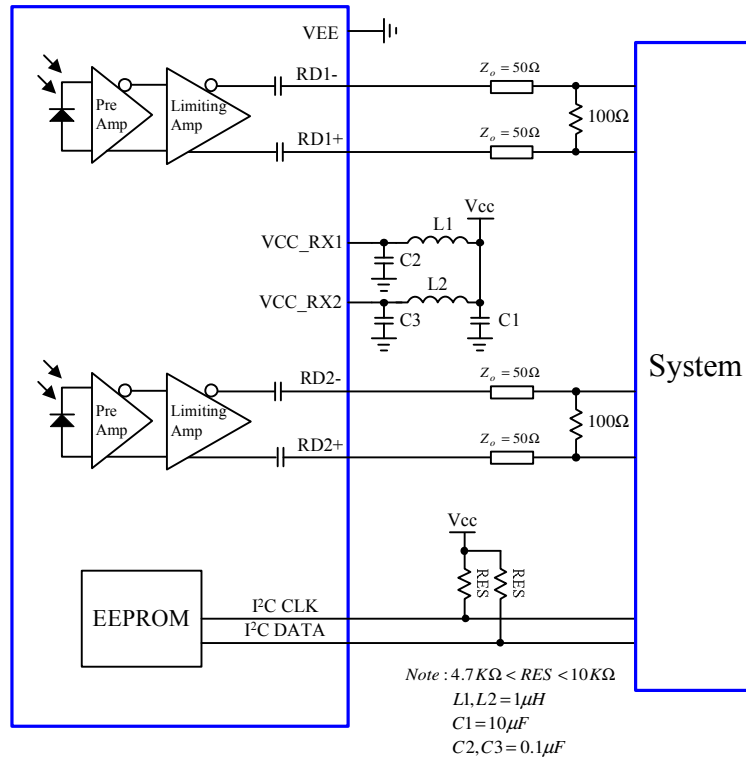
| Addr. | Field Size (Bytes) | Name of Field | Hex | Description |
|-----------|--------------------|---------------------------------|-------------------------|--|
| 00 ~ 07 | 8 | Temperature Alarm/Warning (°C) | 6E 00 EC 00 64 00 F1 00 | Alarm_H/L : 110/-20 Warning_H/L : 100/-15 |
| 08 ~ 15 | 8 | Voltage Alarm/Warning (V) | 8C A0 75 30 88 B8 79 18 | Alarm_H/L : 3.6/3 Warning_H/L : 3.5/3.1 |
| 16 ~ 23 | 8 | Bias Current Alarm/Warning (mA) | | |
| 24 ~ 31 | 8 | Tx Power Alarm/Warning (dBm) | | |
| 32 ~ 39 | 8 | Rx Power Alarm/Warning (dBm) | 27 10 00 64 1F 07 00 7E | Alarm_H/L : 0/-20 Warning_H/L : -1/-19 |
| 128 ~ 143 | 16 | Vendor Specific | | |

Table 3- Monitoring Specification

| Parameter | Range | Accuracy | Calibration |
|-------------|---------------|----------|-------------|
| Temperature | -20°C to 85°C | ±3°C | Internal |
| Voltage | 3.0 to 3.6 V | ±3% | Internal |
| RX Power | -20 to 0 dBm | ±3 dB | Internal |

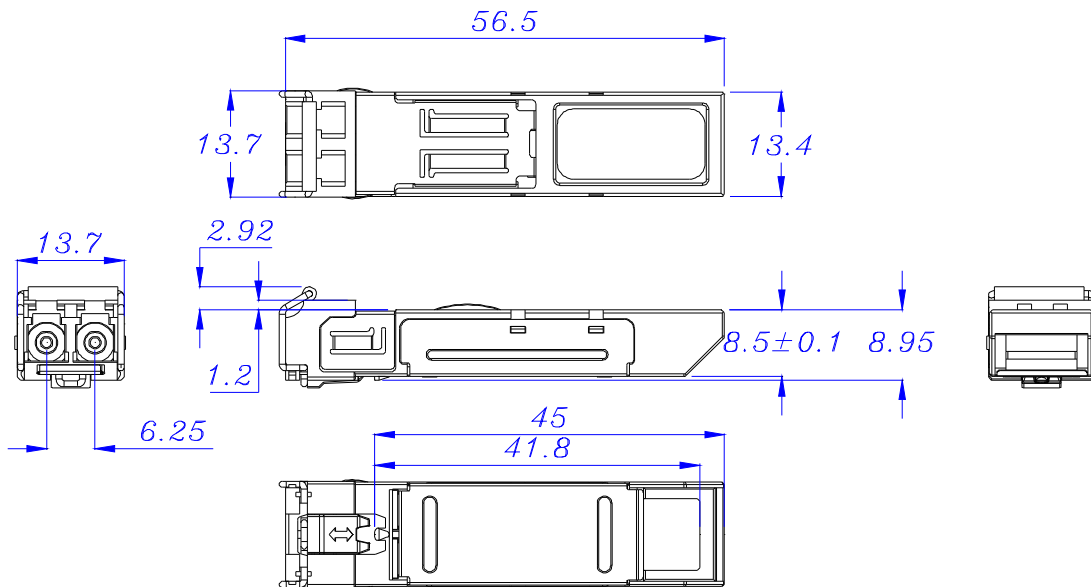
3 Gb/s Dual Optical Receiver

RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm



All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified.

Claim:

CORETEK Opto Corp. reserves the right to make changes in the specification described hereinafter without prior notice.