155Mbps ATM-Single Mode Transceiver

1×9, Duplex SC/ST/FC Connector, 1310nm FP LD for Single Mode Fiber

Extended Operating Temperature from –40 to +85 °C, RoHS Compliant

Applications

- Fast Ethernet
- FDDI
- ATM/SONET OC-3/SDH STM-1
- Single mode fiber links
- Optical-Electrical Interface Conversion

Features

- 1310nm FP LD
- Data Rate: 100Mbps~155Mbps, NRZ
- Single +3.3V or +5V Power Supply
- RoHS Compliant and Lead-free
- PECL Differential Electrical Interface/PECL Compatible Logic Interface
- PECL or TTL Signal Detect Output
- Industry Standard 1×9 Output Footprint
- Duplex SC/ST/FC Connector
- Compliance with 100Base-FX of IEEE802.3u Standard
- FDDI PMD Standard
- ATM Standard
- Eye Safety
  Designed to meet Laser Class 1 comply with EN60825-1

Description

The CT-0155TTR-Mx6x-A series from Coretek Opto Corp. are the high performance and cost-effective modules for serial optical data communication applications specified for single mode of 155 Mb/s. It operates with +5V or +3.3V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of 1310nm and complies with the industry standard 1x9 footprint. Each module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All of them are housed in a plastic package and the combination produces a reliable component.

The module is a dual fiber connector transceiver designed for use in fast Ethernet applications and to provide an ATM/SONET OC-3/SDH STM-1 compliant link for 155 Mb/s long reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceivers 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 transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.
# 155Mbps ATM-Single Mode Transceiver

## Product Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Operating Voltage &amp; SD Output</th>
<th>Connector</th>
<th>Distance</th>
<th>LD Type &amp; Wavelength</th>
<th>Output Power</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-0155TTR-M16C-A</td>
<td>5V PECL DC/DC</td>
<td>SC</td>
<td>40 km</td>
<td>1310 nm FP</td>
<td>-5 ~ 0 dBm</td>
<td>&lt;=-35 dBm</td>
</tr>
<tr>
<td>CT-0155TTR-M26C-A</td>
<td>3.3V PECL DC/DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT-0155TTR-MA6C-A</td>
<td>5V TTL DC/DC</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT-0155TTR-ME6C-A</td>
<td>3.3V TTL DC/DC</td>
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<tr>
<td>CT-0155TTR-M16T-A</td>
<td>5V PECL DC/DC</td>
<td>ST</td>
<td>40 km</td>
<td>1310 nm FP</td>
<td>-5 ~ 0 dBm</td>
<td>&lt;=-35 dBm</td>
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<tr>
<td>CT-0155TTR-M26T-A</td>
<td>3.3V PECL DC/DC</td>
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<tr>
<td>CT-0155TTR-MA6T-A</td>
<td>5V TTL DC/DC</td>
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<tr>
<td>CT-0155TTR-ME6T-A</td>
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<tr>
<td>CT-0155TTR-M16F-A</td>
<td>5V PECL DC/DC</td>
<td>FC</td>
<td>40 km</td>
<td>1310 nm FP</td>
<td>-5 ~ 0 dBm</td>
<td>&lt;=-35 dBm</td>
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<tr>
<td>CT-0155TTR-M26F-A</td>
<td>3.3V PECL DC/DC</td>
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<tr>
<td>CT-0155TTR-MA6F-A</td>
<td>5V TTL DC/DC</td>
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<td>CT-0155TTR-ME6F-A</td>
<td>3.3V TTL DC/DC</td>
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</table>

## ABSOLUTE MAX RATINGS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>MAX</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>T_s</td>
<td>-40</td>
<td>85</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>V_{CC}</td>
<td>0</td>
<td>6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Lead Soldering Temperature/Time</td>
<td>T_{SOLD}</td>
<td>260</td>
<td></td>
<td>°C</td>
<td>10 sec on lead</td>
</tr>
<tr>
<td>Data Input Voltage</td>
<td></td>
<td>0</td>
<td>V_{CC}</td>
<td>V</td>
<td></td>
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</table>

## OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Operating Temperature</td>
<td>T_a</td>
<td>-40</td>
<td>85</td>
<td>°C</td>
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<tr>
<td>Supply Voltage (for 3.3V)</td>
<td>V_{CC}</td>
<td>3.10</td>
<td>3.50</td>
<td>V</td>
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<td></td>
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<tr>
<td>Supply Voltage (for 5.0V)</td>
<td>V_{CC}</td>
<td>4.75</td>
<td>5.25</td>
<td>V</td>
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## ELECTRICAL CHARACTERISTICS

### Transmitter

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>MAX</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter Supply Current</td>
<td>I_{CCT}</td>
<td>200</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter Data Input Current – Low</td>
<td>I_{IL}</td>
<td>-350</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter Data Input Current – High</td>
<td>I_{IH}</td>
<td>350</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmitter Data Input Voltage – Low</td>
<td>V_{IL-V_{CC}}</td>
<td>-1.810</td>
<td>-1.620</td>
<td>V</td>
<td>1</td>
</tr>
<tr>
<td>Transmitter Data Input Voltage – High</td>
<td>V_{IH-V_{CC}}</td>
<td>-1.025</td>
<td>-0.880</td>
<td>V</td>
<td>1</td>
</tr>
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</table>

### Receiver

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>MAX</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver Supply Current</td>
<td>I_{CR}</td>
<td>100</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver Data Output Voltage – Low</td>
<td>V_{OL-V_{CC}}</td>
<td>-1.810</td>
<td>-1.620</td>
<td>V</td>
<td>2</td>
</tr>
<tr>
<td>Receiver Data Output Voltage – High</td>
<td>V_{OH-V_{CC}}</td>
<td>-1.025</td>
<td>-0.880</td>
<td>V</td>
<td>2</td>
</tr>
<tr>
<td>Signal Detect Output Voltage – Low (for PECL)</td>
<td>V_{OL-V_{CC}}</td>
<td>-1.810</td>
<td>-1.620</td>
<td>V</td>
<td>2</td>
</tr>
<tr>
<td>Signal Detect Output Voltage – High (for PECL)</td>
<td>V_{OH-V_{CC}}</td>
<td>-1.025</td>
<td>-0.880</td>
<td>V</td>
<td>2</td>
</tr>
<tr>
<td>Signal Detect Output Voltage – Low (for TTL)</td>
<td>V_{OL}</td>
<td>0.4</td>
<td>V</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Signal Detect Output Voltage – High (for TTL)</td>
<td>V_{OH}</td>
<td>2.4</td>
<td>V</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
# 155Mbps ATM-Single Mode Transceiver

## TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP.</th>
<th>MAX</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Output Power (avg.)</td>
<td>Po</td>
<td>-5</td>
<td>0</td>
<td>dBm</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Extinction Ratio</td>
<td>ER</td>
<td>10</td>
<td>dB</td>
<td>4, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Wavelength</td>
<td>λ&lt;sub&gt;c&lt;/sub&gt;</td>
<td>1263</td>
<td>1310</td>
<td>1360</td>
<td>nm</td>
<td>4, 5</td>
</tr>
<tr>
<td>Spectral Width (RMS)</td>
<td>Δλ</td>
<td>3</td>
<td>nm</td>
<td>4, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical Rise time (10%-90%)</td>
<td>t&lt;sub&gt;r&lt;/sub&gt;</td>
<td>2.0</td>
<td>ns</td>
<td>4, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical Fall time (10%-90%)</td>
<td>t&lt;sub&gt;f&lt;/sub&gt;</td>
<td>2.0</td>
<td>ns</td>
<td>4, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Eye</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Compliant with Bellcore TR-NWT-000253 and ITU recommendation G957</td>
</tr>
</tbody>
</table>

## RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP.</th>
<th>MAX</th>
<th>UNIT</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Input Optical Power</td>
<td>P&lt;sub&gt;max&lt;/sub&gt;</td>
<td>-3</td>
<td>dBm</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Receiver Sensitivity</td>
<td>P&lt;sub&gt;min&lt;/sub&gt;</td>
<td>-35</td>
<td>dBm</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Operating Wavelength</td>
<td>λ</td>
<td>1100</td>
<td>1600</td>
<td>nm</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Signal Detect - Asserted</td>
<td>P&lt;sub&gt;A&lt;/sub&gt;</td>
<td>P&lt;sub&gt;D&lt;/sub&gt;</td>
<td>0.5</td>
<td>-35</td>
<td>dBm</td>
<td>6</td>
</tr>
<tr>
<td>Signal Detect - Deasserted</td>
<td>P&lt;sub&gt;D&lt;/sub&gt;</td>
<td>-47</td>
<td>dBm</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Signal Detect - Hysteresis</td>
<td>P&lt;sub&gt;A&lt;/sub&gt; - P&lt;sub&gt;D&lt;/sub&gt;</td>
<td>0.5</td>
<td>dB</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

### Notes:

1. Compatible with 10K, 10KH, 100K ECL and PECL output signals.
2. These outputs are compatible with 10K, 10KH, 100K ECL and PECL inputs.
3. Measured average power coupled into 9/125 μm single mode fiber.
4. The input data pattern is a 12.5MHz square wave pattern.
5. Measured with 2<sup>23</sup>-1 PRBS at BER<10<sup>-10</sup>
6. Measured on transition – low to high
7. Measured on transition – high to low

## BLOCK DIAGRAM OF TRANSCEIVER

![Block Diagram of Transceiver](image-url)
PIN OUT DIAGRAM OF TRANSCEIVER

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Functional Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V_EER</td>
<td>Receiver Signal Ground</td>
</tr>
<tr>
<td>2</td>
<td>RD+</td>
<td>Receiver Data Non-inverted Differential Output</td>
</tr>
<tr>
<td>3</td>
<td>RD-</td>
<td>Receiver Data Inverted Differential Output</td>
</tr>
<tr>
<td>4</td>
<td>SD</td>
<td>Signal Detect is a PECL or TTL output. A high level indicates a received optical signal</td>
</tr>
<tr>
<td>5</td>
<td>V_CCR</td>
<td>Receiver Power Supply</td>
</tr>
<tr>
<td>6</td>
<td>V_CCT</td>
<td>Transmitter Power Supply</td>
</tr>
<tr>
<td>7</td>
<td>TD-</td>
<td>Transmitter Data Inverted Differential Input</td>
</tr>
<tr>
<td>8</td>
<td>TD+</td>
<td>Transmitter Data Non-inverted Differential Input</td>
</tr>
<tr>
<td>9</td>
<td>V_EET</td>
<td>Transmitter Signal Ground</td>
</tr>
</tbody>
</table>

Mounting Posts: The mounting posts are provided for transceiver mechanical attachment to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis ground.

RECOMMENDED CIRCUIT SCHEMATIC

1) 5V SD PECL DC/DC Module

C1 = 4.7 μF  
L1/L2 = 1 μH  
C2/C3/C4/C5 = 0.1 μF  
R1/R3/R5/R7/R9 = 82 Ω  
R2/R4/R6/R8/R10 = 130 Ω
2) 3.3V SD PECL DC/DC Module

C1 = 4.7 μF    L1/L2 = 1 μH
C2/C3/C4/C5 =0.1 μF
R1/R3/R5/R7/R9 = 130 Ω
R2/R4/R6/R8/R10 = 82 Ω

3) 5V SD TTL DC/DC Module

C1 = 4.7 μF    L1/L2 = 1 μH
C2/C3/C4/C5 =0.1 μF
R1/R3/R5/R7 = 82 Ω
R2/R4/R6/R8 = 130 Ω

4) 3.3V SD TTL DC/DC Module

C1 = 4.7 μF    L1/L2 = 1 μH
C2/C3/C4/C5 =0.1 μF
R1/R3/R5/R7 = 130 Ω
R2/R4/R6/R8 = 82 Ω
MECHANICAL DIMENSIONS

Units in mm

DIMENSIONS ARE IN MILLIMETERS. ALL DIMENSIONS ARE ±0.1mm UNLESS OTHERWISE SPECIFIED.

SC Connector Type

ST Connector Type

FC Connector Type

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