Canary Multi-Rate Transponders

Featuring:

- Multi-mode, Single-mode, Single-Fiber & CWDM Optics
- Protocol Transparent Interfaces from 10 Mbs to 2.7 Gigabits per second!
- Standalone Versions & Modules for CCN-2000 & CCM-1600 Converter Chassis

Canary’s Multi-Rate Transponders (MRT) provide extremely agile, protocol transparent, fiber-to-fiber network interfaces for data rates ranging from less than 100 Mbs (OC-3) to 2.7 Gigabits per second. As Optical Line Drivers, they function as mode and Wavelength Converters.

Our Multi-Rate Transponders are available as individual standalone units and as modules for Canary’s SNMP Manageable CCN-2000/0400 20-slot and 4-slot chassis and CCM-1600 16-slot chassis families.

One MRT configuration employs two SFP type fiber connectors, the other uses one SFP and one GBIC type connector. Both provide maximum flexibility with a wide array of hot-swappable optics.

Single-Fiber Bi-Directional and CWDM (Coarse Wavelength Division Multiplexing) interfaces are available for selected data rates. Both increase the data handling capacity of existing fiber infrastructures.

Configured with Single-Fiber Bi-Directional interfaces, a Multi-rate Transponder pair enables two stations to communicate over one strand of optical fiber.

With CWDM interfaces, MRTs enable multiple network users to simultaneously access a single-mode segment linking multiple locations and allow selected user channels to exit and return to a fiber ring at intermediate locations.

Canary Multi-rate Transponders enable Service Providers to economically provision and manage multiple services and protocols over fiber links by using a single board type – minimizing the number of boards needed for spares. Chassis versions are ideal for high-density central locations.

Canary Communications is an industry leader in providing advanced connectivity solutions for the evolving network.

Gigabit & Fibre Channel • Fiber-to-Fiber Conversion.

* Extends transmission distances to 80 Km for 1.0625 & 2.125 MegaBaud (up to 2.7 Gigabits) data traffic.

SONET • Fiber-to-Fiber Conversion.

* Supports OC-1/3/12/48 data rates with associated FEC. Jitter performance is better than minimum SONET requirements. Compatible with DS3, Fast Ethernet and HDTV transmissions.

Optional Single Fiber Bi-Directional and CWDM Interfaces.

* Single-Fiber Bi-Directional optics double the capacity of duplex fiber. CWDM allows multiple data channels to be multiplexed and simultaneously transported in parallel, over single-mode fiber.

Two Optional Connector Formats.

* One configuration includes two SFP (small form pluggable) LC type connectors, the second includes one SFP plus one GBIC SC type connector for a wider selection of lower cost Gigabit & Fibre Channel connections.

Unparalleled network integration and versatility.

* Use Multi-Rate Transponders with variable data rate fiber connectors for mixed protocol installations. Without changing the fiber connector, one Transponder can function as a spare for many different protocol interfaces.
### Specifications

#### Multi-Rate Transponders (No Optics)

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<th>Description</th>
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<th>Notes</th>
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<td>(2) SFP (LC Type) Slots</td>
<td>Data Rates Defined by SFP Connector Ranges</td>
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<tr>
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<td>Standalone Multi-Rate Transponder</td>
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<td>Gigabit Ethernet, Fibre Channel (1.063 - 2.125Gbd)</td>
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<td>CCN-2000/ 4000 Multi-Rate Transponder Module</td>
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<td>CCN-2000/ 4000 Multi-Rate Transponder Module</td>
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<tr>
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<td>CCM-1600 Multi-Rate Transponder Module</td>
<td>(2) SFP (LC Type) Slots</td>
<td>Data Rates Defined by SFP Connector Ranges</td>
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<tr>
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<td>CCM-1600 Multi-Rate Transponder Module</td>
<td>(1) SFP (LC) + (1) GBIC (SC) Slot</td>
<td>Gigabit Ethernet, Fibre Channel (1.063 - 2.125Gbd)</td>
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#### GBIC Optical Transceivers

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<th>Protocol</th>
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<th>Model</th>
<th>Transmit Distance</th>
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<th>Single-Fiber Bi-Direct</th>
<th>Single-Mode</th>
<th>CWDM</th>
<th>Notes</th>
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<td>1.250</td>
<td>G-55SX</td>
<td>220/550m</td>
<td>N/A</td>
<td>N/A</td>
<td>G-31LX</td>
<td>10 Km</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>1.0625 Gbd</td>
<td>G-55SX</td>
<td>220/550m</td>
<td>•</td>
<td>•</td>
<td>G-31L-2</td>
<td>20 Km</td>
<td>•</td>
</tr>
<tr>
<td>Fibre channel -1</td>
<td>1.0625 Gbd &amp; To</td>
<td>GD-55SX</td>
<td>150/300m**</td>
<td>•</td>
<td>•</td>
<td>GD-31L-4</td>
<td>40 Km **</td>
<td>GD-CXX-4</td>
</tr>
<tr>
<td>Fibre channel -2</td>
<td>2.125 Gbd</td>
<td>GD-55SX</td>
<td>150/300m**</td>
<td>•</td>
<td>•</td>
<td>GD-31Z-7</td>
<td>70 Km</td>
<td>GD-CXX-7</td>
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</table>

#### SFP Optical Transceivers

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Data Rate (Mbps)</th>
<th>Model</th>
<th>Transmit Distance</th>
<th>Multi-Mode</th>
<th>Single-Fiber Bi-Direct</th>
<th>Single-Mode</th>
<th>CWDM</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS3</td>
<td>44.73</td>
<td>SA-M13</td>
<td>1000 m</td>
<td>SA-53A</td>
<td>1000 m</td>
<td>SM-S13</td>
<td>2 Km ^</td>
<td>•</td>
</tr>
<tr>
<td>OC-1</td>
<td>51.84</td>
<td>SA-M13</td>
<td>1000 m</td>
<td>SA-35MB</td>
<td>2000 m</td>
<td>SM-S13-1</td>
<td>15 Km ^</td>
<td>•</td>
</tr>
<tr>
<td>Fast Ethernet &amp; OC-3 / STM-1</td>
<td>125.00 &amp; 155.52</td>
<td>SF-M13</td>
<td>2000 m</td>
<td>SF-53SA</td>
<td>20 Km</td>
<td>SM-S13-4</td>
<td>40 Km ^</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SF-M13</td>
<td>2000 m</td>
<td>SF-53SA</td>
<td>20 Km</td>
<td>SM-S15-4</td>
<td>40 Km ^</td>
<td>* SM-CXX</td>
</tr>
<tr>
<td>OC-12 / STM-4</td>
<td>622.08</td>
<td>SA-M13</td>
<td>1000 m</td>
<td>SA-53SA</td>
<td>20 Km</td>
<td>SM-S13-4</td>
<td>40 Km ^</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA-M13</td>
<td>1000 m</td>
<td>SA-35MB</td>
<td>2000 m</td>
<td>SM-S13-1</td>
<td>15 Km ^</td>
<td>•</td>
</tr>
<tr>
<td>Gigabit Ethernet &amp; fibre channel -1</td>
<td>1250.00 &amp; 1.0625 Gbd</td>
<td>SD-M85</td>
<td>300/500m**</td>
<td>SG-53SA</td>
<td>300/500m</td>
<td>SM-S13</td>
<td>2 Km ^</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD-M85</td>
<td>300/500m**</td>
<td>SG-53SA</td>
<td>10 Km</td>
<td>SM-S13-4</td>
<td>40 Km ^</td>
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<td>SD-M85</td>
<td>300/500m**</td>
<td>SG-53SA</td>
<td>20 Km</td>
<td>SM-S15-4</td>
<td>40 Km ^</td>
<td>* SM-CXX</td>
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<tr>
<td>OC-48 / STM-16</td>
<td>2488.32</td>
<td>SD-M85</td>
<td>150/300m**</td>
<td>NA</td>
<td>NA</td>
<td>SM-S13</td>
<td>2 Km ^</td>
<td>•</td>
</tr>
</tbody>
</table>

**Notes:**
- **Multi-Rate:** $A = Tx1550 / Rx1310 \text{ nm} \text{ and } B = Tx1310 / Rx1550 \text{ nm}$
- **SM-CXX** with XX = 43 to 61 = (1430 to 1610 nm)

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< Optical Transceivers are Special Order With 2 to 4 Week Lead Times >

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**Single-Mode Transponders**

- **Data Rates Defined by SFP Connector Ranges**
- **Connectors:**
  - (1) SFP (LC) + (1) GBIC (SC) Slot
  - (2) SFP (LC Type) Slots
- **Wave-length (nano-meters):**
  - **220/550m**
  - **150/300m**
  - **300/500m**
  - **1430-1610 nm**
Mechanical Specifications

Chassis Modules for CCN-2000 & CCN-0400

**CN-MT-2SFP**
- Two SFP (LC Type) Receptacles
- Six Diagnostic LED Indicators

**CN-MT-GBSF**
- One SFP (LC) + One GBIC (SC) Receptacle
- Six Diagnostic LED Indicators:

Chassis Modules for CCM-1600

**CM-MT-2SFP**
- Two SFP (LC Type) Receptacles
- Six Diagnostic LED Indicators

**CM-MT-GBSF**
- One SFP (LC) + One GBIC (SC) Receptacle
- Six Diagnostic LED Indicators:

Standalone Multi-Rate Converters

**MRT-2SFP**
- Two SFP (LC Type) Receptacles
- Six Diagnostic LED Indicators

**MRT-GBSF**
- One SFP (LC) + One GBIC (SC) Receptacle
- Six Diagnostic LED Indicators:

LED Indicators (all versions):
- Six Diagnostic LED Indicators:
- Fiber Link, Port 1
- Fiber Link, Port 2
- Loss Lock, Port 1*
- Loss Lock, Port 2*
- LFS (Disabled)
- Status (PCB Temp. & Voltage within Specifications)
* Loss Lock ~ Internal processor has lost its Lock on the transported protocol’s reference timing signal.

Power Supply:
- External Switching Power Supply
- 100/240 VAC, 50/ 60 Hz, 0.4 Amp max

Environmental:
- Operating Temp.: 0 to 50 °C
- Storage Temp.: -10 to 66 °C
- Relative Humidity: 5% to 95%, non-condensing

Mechanical:
- Length: 5.75" (14.61 cm)
- Width: 2.82" ( 7.16 cm)
- Height: 1.00" ( 2.54 cm)
- Single Unit Weight: 1.5 lb ( 0.68 Kg)
- Shipping Weight 2.5 lb ( 1.14 Kg)

Notes on CWDM Usage:
Group (A) Wavelengths (λs) = 1470, 1510, 1550, 1590 nm
Group (B) Wavelengths (λs) = 1490, 1530, 1570, 1610 nm

Transponders use CWDM transceivers that are specified to use wavelengths from the above Groups in order to be compatible with Canary Passive Multiplexer/De-multiplexers and OADMs (Optical Add - Drop Multiplexers) as well as other vendor’s products.

Each optical CWDM transceiver or module includes two characters that exactly specify its working wavelength. That is, where XX = the middle characters of the wavelength e.g. XX= 47 ~ 1470 nm. Thus a G-L-47 and G-L-55 operate at 1470 nm or 1550 nm respectively.

ITU G-652.C compliant, single-mode fiber or better is recommended for CWDM applications.

Regulatory: (compliant or pending)
- IEEE 802.3u, z, A/B, ANSI X3T1 FC-AL compliant
- Designed in compliance with CE, UL, CSA and TUV Safety Standards (certifications pending)
- Class 1 lasers conform to US 21 CFR (J), EN 60825-1 and UL 1950 applications
- FCC Part 15, Class A and EN 55022 (Radiated Emissions) (certifications pending)
- EN 55024:1998 (Immunity)
- ISO 9001:2000 Certified

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