



# 050-315

## PRODUCT BRIEF

100 MBPS-5 GBPS

PRINTED CIRCUIT BOARD (PCB) MOUNT TRANSCEIVER

850NM VCSEL TRANSMITTER, PIN TIA RECEIVER

SMALL & COMPACT WITH RUGGED CONSTRUCTION FOR  
HARSH ENVIRONMENTS

| REV | DESCRIPTION  | DATE      | APPROVED |
|-----|--|-----------|----------|
| A   | Initial Release  | 1/16/2015 | SZ       |
| B   | Per DCN53850   | 2/6/2015  | SZ       |
| C   | Per DCN55452 (revised Samtec connector part numbers)     | 05/28/15  | TC       |
| D   | Revised typographical error on page 6, per DCN57413      | 10/27/15  | TC       |
| E   | Updated description on Pin Assignment Table per DCN58224 | 1/04/16   | SZ       |

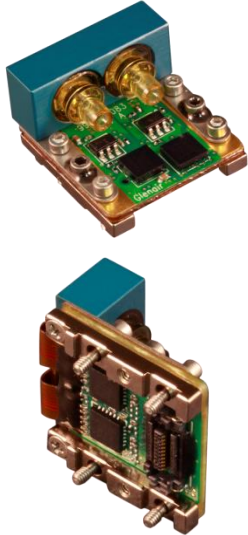
BF15U2-1911

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**050-315 Product Brief**  
**PCB Mount Transceiver**  
**100 Mbps – 5 Gbps, MMF, 3.3V**



**PCB Mount Fiber Optic Transceiver, 100M-5Gbps, MMF, 3.3V**



Glenair 050-315, is a ruggedized harsh environment PCB Mount Transceiver with electrical and optical functionality equivalent to SFP transceivers but with mechanical design that is suited to the harsh temperature and vibration environments found in the Military, Aerospace, Railway, Oil and Gas, and Industrial applications. The PCB mount optical transceivers also support optional Digital Monitoring Interface (DMI) features in accordance with SFF 8472. The transceiver is comprised of a transmitter section and a receiver section that resides on a common package and interface with a host board through a high speed electrical connector.

The transmitter section includes the Transmitter Optical Subassembly (TOSA) and laser driver circuitry. The TOSA, containing an 850 nm VCSEL (Vertical Cavity Surface Emitting Laser) light source, is located at the optical interface and mates with the GC optical connector. The TOSA is driven by a laser driver, which converts differential logic signals into an analog laser diode drive current. This laser driver circuit regulates the optical power at a constant level provided the data pattern is DC balanced (for example 8B10B encoding).

The receiver section includes the Receiver Optical Subassembly (ROSA) and amplification/quantization circuitry. The ROSA, containing a PIN photodiode and trans-impedance preamplifier, is located at the optical interface and mates with the GC optical connector. The ROSA is mated to a limiting amplifier IC that provides post-amplification and quantization. Also included is a Loss Of Signal (LOS) detection circuit.

**KEY FEATURES/BENEFITS**

- SFP Compatible Electrical I/O signal levels
- 850nm VCSEL lasers to support up to 5 Gbps
- PIN PD to support high sensitivity up to 5 Gbps
- Industry standard CML input and outputs that make for simple integration on customer host PCB
- Glenair Rugged GC Optical connector
- High Operational Shock (650 g) & Vibration (54 g rms) – test reports available
- Transceiver is securely mounted with screws to PCB to ensure excellent shock and vibration performance
- High-Speed Electrical plug-in connector eliminates the need for soldering & enables ease of servicing
- Captive screws to simplify manufacturing logistics and assembly
- Small: Approx. 0.8" x 0.9" x 0.5"

- -40°C to +85°C Operating Case Temperature
  - Extended Temperature Range Option
- Glenair fiber jumpers connect from transceiver to any Glenair Mil/Aero Fiber Optic Connector Style
- Evaluation fixtures available
- Digital Diagnostic and Monitoring (DMI) based on SFF-8472, enables monitoring of:
  - Transmitted optical power
  - Received optical power,
  - Laser bias current,
  - Temperature
  - Supply voltage

**APPLICATIONS**

- Harsh Environment such as: Airborne, Tactical, Railway, Industrial, Oil and Gas and Shipboard applications
  - Ethernet, FC 1x, 2x, 4x, SFPDP

**HOW TO ORDER Table 1 Part Number Options**

| Part Number     | Description   |
|-----------------|---|
| 050-315-1-D     | 100Mbps-2.5Gbps, with DMI                               |
| 050-315-1-D-ET1 | 100Mbps-2.5Gbps, with DMI, Extended Temperature Range 1 |
| 050-315-2-D     | 2.5Gbps-5Gbps, with DMI                                 |
| 050-315-2-D-ET1 | 2.5Gbps-5Gbps, with DMI, Extended Temperature Range 1   |

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**Ratings and Specifications**

**TABLE 2 ABSOLUTE MAXIMUM RATINGS**

| Parameter           | Symbol          | Min  | Typ | Max  | Units | Notes  |
|---------------------|-----------------|------|-----|------|-------|--|
| Storage Temperature | T <sub>s</sub>  | -55  |     | +100 | °C    |  |
| Supply Voltage      | V <sub>cc</sub> | -0.4 |     | 3.8  | V     | V <sub>ccT</sub> & V <sub>ccR</sub> may not differ by more than 0.5V |

**TABLE 3 OPERATING CONDITIONS**

| Parameter  | Symbol                 | Min   | Typ | Max   | Units             | Notes           |
|--|------------------------|-------|-----|-------|-------------------|-----------------|
| Operating Temperature, Case                        | T <sub>op</sub>        | -40   |     | +85   | °C                | Standard        |
| Extended Operating Temperature, Case, Extended ET1 | T <sub>op_ET1</sub>    | +85   |     | 100   | °C                | Note 1          |
| Supply Voltage                                     | V <sub>cc</sub>        | 3.135 | 3.3 | 3.465 | V                 |                 |
| Supply Current                                     | I <sub>cc</sub>        |       | 180 | 200   | mA                | Typical @ +85°C |
| Power Supply Noise (Peak-Peak)                     | V <sub>cc_ripple</sub> |       |     | 100   | mV <sub>p-p</sub> |                 |

**TABLE 4 ELECTRO-OPTICAL CHARACTERISTICS – TRANSMITTER (T<sub>OP</sub> UNLESS NOTED OTHERWISE)**

| Parameter                                    | Symbol               | Min  | Typ | Max  | Units             | Notes                     |
|--|----------------------|------|-----|------|-------------------|---------------------------|
| Optical Output Power                         | P <sub>OUT</sub>     | -6.5 | -5  | -1   | dBm               | 850nm VCSEL               |
| Optical Output Power in Extended Temp. Range | P <sub>OUT_ET1</sub> | -10  | -8  | -1   | dBm               | T <sub>op_ET1</sub>       |
| Extinction Ratio, 1.25Gbps                   | E <sub>r</sub>       | 7    | 10  |      | dB                | Exceeds OMA for GbE, 1FC  |
| Extinction Ratio, 2.125 Gbps & 4.25 Gbps     | E <sub>r</sub>       | 6    |     |      | dB                | Exceeds OMA for 2FC & 4FC |
| Extinction Ratio, Extended Temp Range        | E <sub>r_ET1</sub>   | 5    |     |      | dB                | T <sub>op_ET1</sub>       |
| Optical Wavelength                           | λ <sub>OUT</sub>     | 830  | 850 | 860  | nm                |                           |
| Optical Wavelength, Extended Temp Range      | λ <sub>OUT_ET1</sub> | 830  | 850 | 862  | nm                | T <sub>op_ET1</sub>       |
| Spectral Width, rms                          | Δλ                   |      |     | 0.85 | nm                |                           |
| Relative Intensity Noise                     | RIN                  |      |     | -117 | dB/Hz             |                           |
| Transmitter Differential Input Impedance     | Z <sub>in</sub>      |      | 100 |      | Ohms              | AC coupled Internally     |
| Differential Input Voltage                   | V <sub>in_d</sub>    | 250  |     | 2200 | mV <sub>p-p</sub> | CML, 100 ohm              |

Note 1: The motivation for the extended temperature range product option is to ensure that these devices will exhibit a graceful soft degradation in performance over the extended temperature range (T<sub>op\_ET1</sub>). Continuous operation at case temperatures above 85C for extended period of time is not recommended as it could adversely affect long term reliability.

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**Ratings and Specifications (continued)**

**TABLE 5 ELECTRO-OPTICAL CHARACTERISTICS – RECEIVER (T<sub>op</sub> UNLESS NOTED OTHERWISE)**

| Parameter   | Symbol             | Min  | Typ   | Max  | Units             | Notes                                   |
|---|--------------------|------|-------|------|-------------------|---|
| 050-315-1   |                    |      |       |      |                   |   |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -22.5 | -19  | dBm               | PIN PD @ 1.25 Gbps                      |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -22.5 |      | dBm               | PIN PD @ 2.5 Gbps                       |
| 050-315-2   |                    |      |       |      |                   |   |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -18.5 |      | dBm               | PIN PD @ 3.2 Gbps                       |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -18   |      | dBm               | PIN PD @ 4.25Gbps                       |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -17.5 | -16  | dBm               | PIN PD @ 5 Gbps                         |
| 050-315-1-D-ET1   |                    |      |       |      |                   |   |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -22.5 | -19  | dBm               | PIN PD @ 1.25 Gbps, T <sub>op ET1</sub> |
| 050-315-2-D-ET1   |                    |      |       |      |                   |   |
| Sensitivity, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1, Er 10 dB | P <sub>IN</sub>    |      | -17.5 | -16  | dBm               | PIN PD @ 5 Gbps, T <sub>op ET1</sub>    |
| Overload, BER 10 <sup>-12</sup> , PRBS 2 <sup>7</sup> -1              | P <sub>IN</sub>    | -1   |       |      | dBm               | @1.25Gbps or @ 5 Gbps                   |
| Optical Wavelength  | λ <sub>IN</sub>    | 770  |       | 870  | nm                |   |
| Receiver Differential Output Impedance                                | Z <sub>out</sub>   |      | 100   |      | Ohms              | AC coupled internally                   |
| Differential Output Voltage Swing                                     | V <sub>out_d</sub> | 600  |       | 1200 | mV <sub>p-p</sub> | CML, 100 ohm                            |
| LOS Assert Level  | LOS                |      | -24   | -22  | dBm               | @ 1.25Gbps                              |
| LOS Hysteresis  | LOS <sub>HYS</sub> | 1.25 | 2.3   |      | dB                | @ 1.25Gbps                              |

**TABLE 6 COMPLIANCE SPECIFICATIONS**

| CHARACTERISTIC  | Standard                    | Condition  | Notes  |
|---|-----------------------------|--|--|
| Mechanical Shock  | MIL-STD-810                 | Para. 516.6, proc. I, 650g   | 0.9 ms operating   |
| Mechanical Vibration  | MIL-STD-810                 | Para. 514.6, 40g rms   | Random, operating  |
| ESD   | MIL-STD-883                 |  | 1000V HBM  |
| Flame Resistance  | MIL-STD-1344                | Method 1012, Cond. B   | 30 seconds   |
| Altitude<br>Altitude, 25Kft<br>Altitude, 70Kft<br>Decompression<br>Overpressure | RTCA DO160 G                | Section 4.6.1 Category B1<br>Section 4.6.1 Category E1<br>Section 4.6.2 Category A2<br>Section 4.6.3 Category A1 | Operating Altitude, 25,000 ft<br>Operating Altitude, 70,000 ft<br>Operating Altitude, 45,000 ft<br>28 psia |
| Damp Heat   | RTCA DO160G<br>MIL-STD-1344 | Section 6 Category A<br>Method 1002.2, Cond. B   | 48 hours, Non-operational<br>10 cycles, 24 hours, Operational  |
| Eye Safety  | CDRH and IEC-825            | Class 1 Laser Product  |  |

FIGURE 1 - OUTLINE DRAWING CONTINUED (MARKING)

LABELING:

Each unit will be shipped in an antistatic bag. The label on the antistatic bag shall be at a minimum Arial size 10 black font and contain at a minimum the following information:

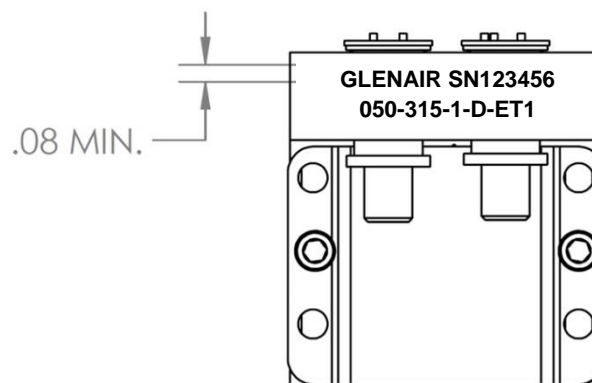
ANTISTATIC BAG LABEL:

Glenair  
Cage Code (06324)  
Part Number (PN 050-xxx as required)  
Date Code (DC xxxx)  
Serial Number (SN 123456)

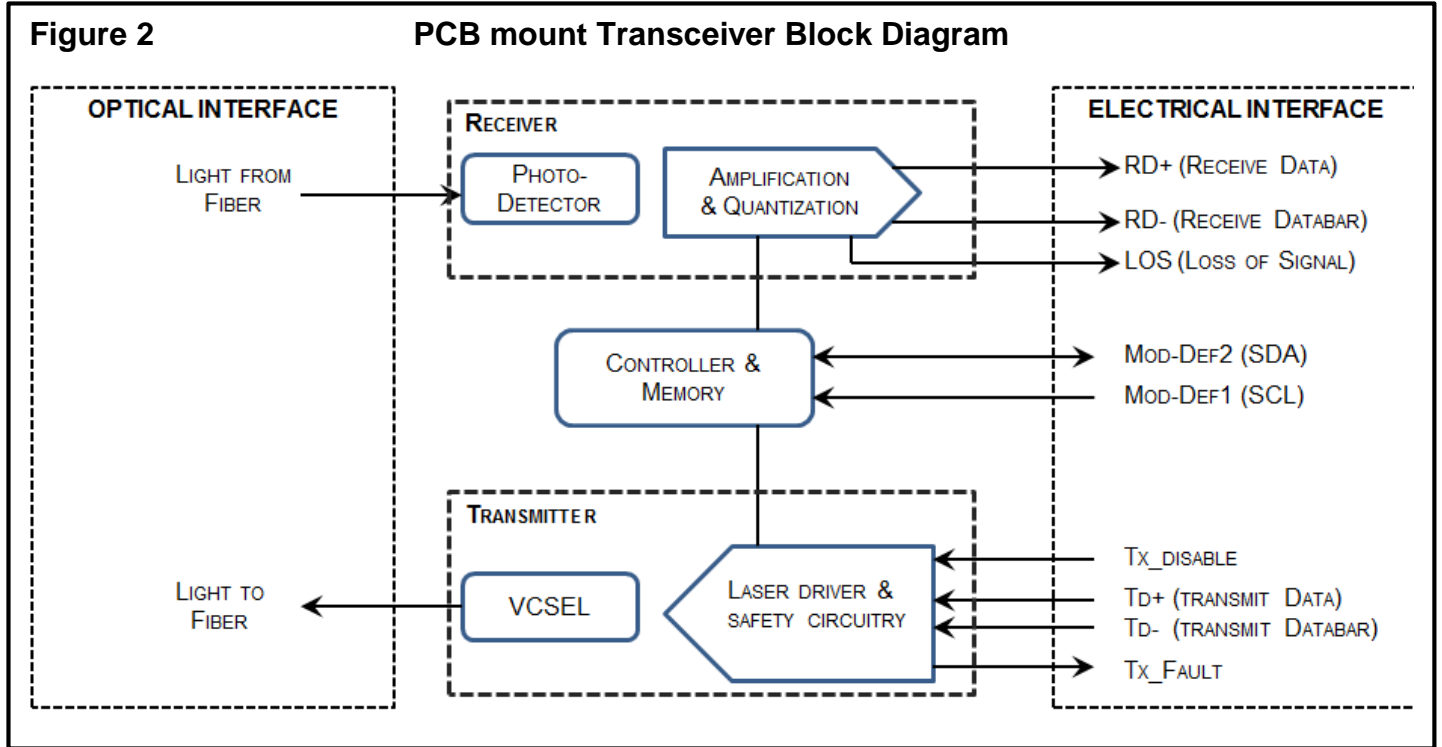
Each unit will be marked, either with a label or laser engraving, as follows:

- Marking font to be Arial, greater than .08 inches in height.
- Marking:
  - FIRST LINE OF TEXT
    - Glenair
    - Serial Number (6 digits)
  - SECOND LINE OF TEXT:
    - Part number

Example



**FUNCTIONAL DESCRIPTION**



**TRANSMITTER SECTION**

Transmit Disable (Tx\_Disable, pin 10)

The transmitter section of the transceiver accepts a TTL and CMOS compatible transmit disable control signal input that shuts down the transmitter optical output. A high signal disables the transmitter while a low signal allows normal transceiver operation. Also laser is disabled when TX Disable is open. In the event of a fault (e.g. eye safety circuit activated), cycling this control signal resets the module. Host systems should allow a 10ms interval between successive assertions of this control signal.

Transmit Fault (Tx\_Fault, Pin 2)

A catastrophic laser fault will activate the transmitter signal, TX\_FAULT, and disable the laser. This signal is an open collector output (pull-up required on the host board). A low signal indicates normal laser operation and a high signal indicates a fault. The TX\_FAULT will be latched high when a laser fault occurs and is cleared by toggling the TX\_DISABLE input or cycling the power of the transceiver. The transmitter fault condition can also be monitored via the 2-wire serial interface (address A2, byte 110, bit 2).



## Eye Safety Circuit

The Transmitter section provides Class 1 eye safety by design and is compliant with US FDA CDRH AEL Class 1 and EN(IEC) 60825-1,2, EN60950 Class 1. The eye safety circuit continuously monitors optical output power levels and will disable the transmitter and assert a TX\_FAULT signal upon detecting an unsafe condition. Such unsafe conditions can be created by inputs from the host board (Vcc fluctuation, unbalanced code) or faults within the module.

## RECEIVER SECTION

### Receiver Loss of Signal (LOS, Pin 20)

The Loss Of Signal (LOS) output indicates an unusable optical input power level. The post-amplification IC includes transition detection circuitry which monitors the ac level of incoming optical signals and provides a TTL/CMOS compatible status signal to the host. A low LOS logic level indicates the presence of an optical input while a high LOS logic level indicates an unusable optical input. The LOS thresholds are factory-set so that a high output indicates a definite optical fault has occurred (e.g. failed transmitter, broken or disconnected fiber connection to the transceiver, etc.). The LOS can also be monitored via the 2-wire serial interface (address A2h, byte 110, bit 1).

## FUNCTIONAL I/O

The PCB Mount Transceiver accepts industry standard differential signals such as LVPECL and CML within the scope of the SFP MSA. To simplify board requirements, transmitter bias resistors and ac coupling capacitors are incorporated, per SFF-8074i, and hence are not required on the host board. The module is AC-coupled and internally terminated.

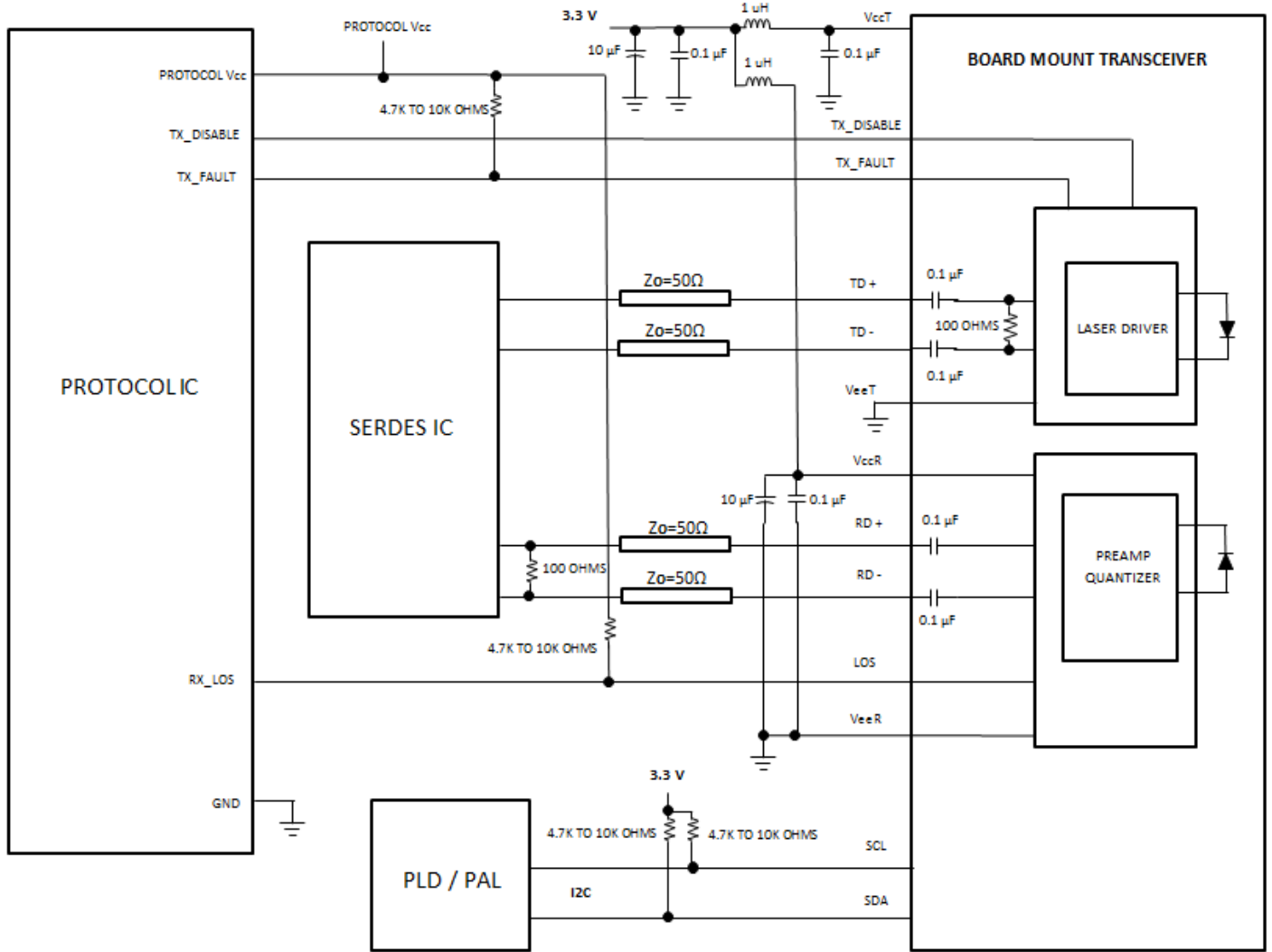
Figure 3 illustrates a recommended interface circuit to link the PCB Mount Transceiver to the supporting Physical Layer integrated circuits.

The PCB Mount Transceiver interfaces with the host circuit board through twenty I/O pins identified by function in Table 7. The transceiver high speed transmit and receive interfaces requires SFP MSA compliant signal lines on the host board. The Tx\_Disable, Tx\_Fault, and Rx\_LOS lines require TTL lines on the host board (per SFF-8074i) if used. If an application chooses not to take advantage of the functionality of these pins, TX\_Disable need to be tied to GND, TX\_Fault and RX\_LOS do not need to be connected.

### Digital Diagnostic Interface and Serial Identification (EEPROM)

The PCB Mount Transceiver is compatible with the SFF-8074i SFP specification and with SFF-8472, the SFP specification for Digital Diagnostic Monitoring Interface. Both specifications can be found at <http://www.sffcommittee.org>.

FIGURE 3 RECOMMENDED PCB MOUNT TRANSCEIVER HOST BOARD SCHEMATIC



The PCB Mount Transceiver features EEPROM for Serial ID, which contains the product data stored for retrieval by host equipment. This data is accessed via the 2-wire serial EEPROM protocol of the ATMEL AT24C01A or similar, in compliance with the industry standard SFP Multi-Source Agreement. The base EEPROM memory, bytes 0-255 at memory address 0xA0, is organized in compliance with SFF-8074i. The I2C accessible memory page address 0xB0 is reserved and used internally by SFP for the test and diagnostic purposes.

As an enhancement to the conventional SFP interface defined in SFF-8074i, the PCB Mount Transceiver is compliant to SFF-8472 (digital diagnostic interface for optical transceivers). This new digital diagnostic information is stored in bytes 0-255 at memory address 0xA2. Using the 2-wire serial interface defined in the MSA, the PCB Mount Transceiver provides real time temperature, supply voltage, laser bias current, laser average output power and received input power. These parameters are internally calibrated, per the SFF-8472 MSA. The digital diagnostic interface also adds the capability to



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monitor for Transmitter Faults (TX\_FAULT), and monitor for Receiver Loss of Signal (RX\_LOS). The diagnostic information provides the opportunity for Predictive Failure Identification, Compliance Prediction, Fault Isolation and Component Monitoring.

#### Predictive Failure Identification

The predictive failure feature allows a host to identify potential link problems before system performance is impacted. Prior identification of link problems enables a host to service an application via “fail over” to a redundant link or replace a suspect device, maintaining system uptime in the process. For applications where ultra-high system uptime is required, the PCB Mount Transceiver provides a means to monitor two real-time laser metrics associated with observing laser degradation and predicting failure: average laser bias current (Tx\_Bias) and average laser optical power (Tx\_Power).

#### Compliance Prediction

Compliance prediction is the ability to determine if an optical transceiver is operating within its operating and environmental requirements. The PCB Mount Transceiver provide real-time access to transceiver internal supply voltage and temperature, allowing a host to identify potential component compliance issues. Received optical power is also available to assess compliance of fiber cable plant and remote transmitter. When operating out of requirements, the link cannot guarantee error free transmission.

#### Fault Isolation

The fault isolation feature allows a host to quickly pinpoint the location of a link failure, minimizing downtime. For optical links, the ability to identify a fault at a local device, remote device or cable plant is crucial to speeding service of an installation. PCB Mount Transceiver real-time monitors of Tx\_Bias, Tx\_Power, Vcc, Temperature and Rx\_Power can be used to assess local transceiver current operating conditions. In addition, status flag Rx Loss of Signal (LOS) is mirrored in memory and available via the two-wire serial interface.

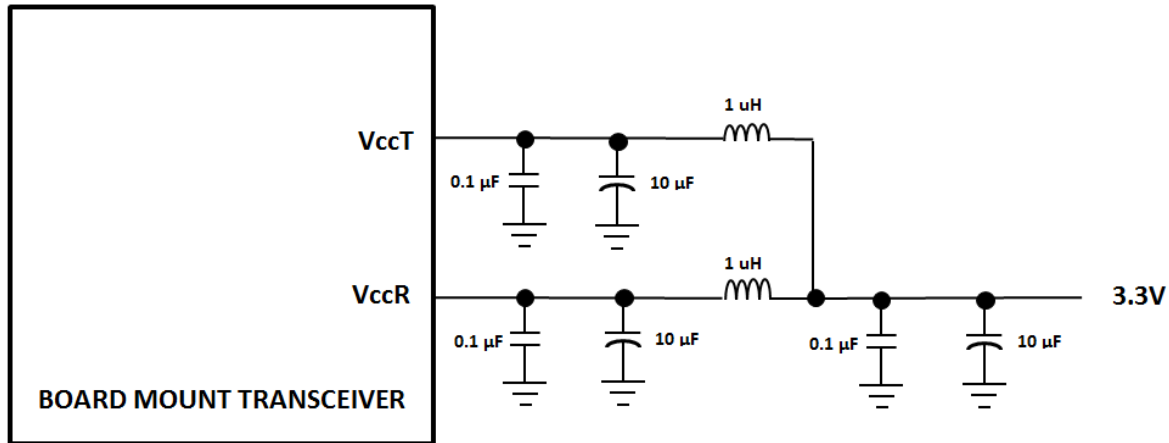
#### Component Monitoring

Component evaluation is another use of the PCB Mount Transceiver real-time monitors of Tx\_Bias, Tx\_Power, Vcc, Temperature and Rx\_Power. Potential uses are as debugging aids for system installation and design, and transceiver parametric evaluation for factory or field qualification. For example, temperature per module can be observed in high density applications to facilitate thermal evaluation of systems that incorporate this PCB Mount Transceiver

#### Required Host Board Components

A power supply noise rejection filter as describe in SFP MSA is required on the host PCB to meet data sheet performance. This is filter incorporates an inductor which should be rated to 400 mADC and 1  $\Omega$  series resistance or better. It should not be replaced with a ferrite. The required filter is illustrated in Figure 4. Also, the host PCB for the PCB Mount Transceiver requires 4.7 K to 10 K $\Omega$  pull-up resistors for TX\_FAULT, LOS, SCA and SDL lines.

FIGURE 4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING CIRCUIT



#### Fiber Compatibility

The transceiver is capable of transmission at 2 to 550 meters with 50/125  $\mu\text{m}$  fiber, and at 2 to 275 meters with 62.5/125  $\mu\text{m}$  fiber, for 1.25 GBd Ethernet. It is capable of transmission up to 550m with 50/125  $\mu\text{m}$  fiber and up to 300m with 62.5/125  $\mu\text{m}$  fiber, for 1.0625 GBd Fiber Channel.

#### Electrostatic Discharge (ESD)

The Transceiver is compatible with ESD levels found in typical manufacturing and operating environments as described JEDEC EIA JESD22-A114, Class 1C (<2000Volts) HBM. Glenair recommends that devices are handled with ESD precautions to limit exposure to below 500V HBM.

There are two design cases in which immunity to ESD damage is important. The first case is during handling of the transceiver prior to insertion to the host board. To protect the transceiver, it's important to use standard industry ESD handling precautions. These precautions include using grounded wrist straps, work benches, and floor mats in ESD controlled areas. The ESD sensitivity of the Glenair PCB Mount Transceiver is compatible with typical industry production environments.

The second case to consider is static discharges to the exterior of the host equipment after installation, in which case the transceiver may be subject to system-level ESD requirements.

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Application Support

To assist in the transceiver design and evaluation process, Glenair offers the following aids:

- Evaluation board & Product Manual, part number 050-329, which facilitates in the testing of the PCB Mount Transceiver.
- 3D Step file to support modeling of mechanical fit and routing
- PADS schematic and PCB layout library files that can be exported into customer's PCB software design program
- Applications Aid Example of PCB layout including details of high speed transmission designs

Customer Manufacturing Processes

This module is mounted with screws and interfaces with a high-speed low cost surface mount electrical connector residing on the host PC board. The PCB Mount Transceiver is not designed for aqueous wash, IR reflow, or wave soldering processes and should be mounted on the host board after host PC board has been through these processes.

Proper torque values for mounting screws must be observed. Please contact Glenair for hardware mounting process recommendations.

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**TABLE 8 TWO-WIRE INTERFACE ID: DATA FIELDS – ADDRESS A0h**

| Byte Decimal | # Hex | Data Notes                           | Byte Decimal | # Hex | Data Notes                                 |
|--------------|-------|--------------------------------------|--------------|-------|--|
| 0            | 80    | Glenair PCB Mount Transceiver        | 37           | 00    | Vendor OUI (NOT USED)                      |
| 1            | 04    | Serial ID Module Definition          | 38           | 00    | Vendor OUI (NOT USED)                      |
| 2            | 80    | "GC" Fiber Optic Connector           | 39           | 00    | Vendor OUI (NOT USED)                      |
| 3            | 00    |                                      | 40           | 30    | "0" Vendor Part Number ASCII character     |
| 4            | 00    |                                      | 41           | 35    | "5" Vendor Part Number ASCII character     |
| 5            | 00    |                                      | 42           | 30    | "0" Vendor Part Number ASCII character     |
| 6            | 01    | 1000BASE-SX                          | 43           | 2D    | "-" Vendor Part Number ASCII character     |
| 7            | 00    |                                      | 44           | 33    | "3" Vendor Part Number ASCII character     |
| 8            | 00    |                                      | 45           | 31    | "1" Vendor Part Number ASCII character     |
| 9            | 00    |                                      | 46           | 35    | "5" Vendor Part Number ASCII character     |
| 10           | 00    |                                      | 47           | 2D    | "-" Vendor Part Number ASCII character     |
| 11           | 01    | Compatible with 8B/10B encoded data  | 48           | 32    | "2" Vendor Part Number ASCII character     |
| 12           | 32    | BR, 5Gbps                            | 49           | 2D    | "-"  |
| 13           | 00    |                                      | 50           | 44    | " D" Vendor Part Number ASCII Character    |
| 14           | 00    |                                      | 51           | 2D    | "-" Vendor Part Number ASCII Character     |
| 15           | 00    |                                      | 52           | 45    | " E" Vendor Part Number ASCII Character    |
| 16           | 37    | 550m of 50/125mm Fiber @ 1.25Gbps    | 53           | 54    | " T" Vendor Part Number ASCII Character    |
| 17           | 1B    | 275 m of 62.5/125mm Fiber @ 1.25Gbps | 54           | 31    | " 1" Vendor Part Number ASCII Character    |
| 18           | 00    |                                      | 55           | 20    | Note 5                                     |
| 19           | 00    |                                      | 56           | 20    | " " Vendor REV Level ASCII Character       |
| 20           | 47    | "G" Vendor NAME ASCII Character      | 57           | 20    | " " Vendor REV Level ASCII Character       |
| 21           | 4C    | "L" Vendor NAME ASCII Character      | 58           | 20    | " " Vendor REV Level ASCII Character       |
| 22           | 45    | "E" Vendor NAME ASCII Character      | 59           | 20    | " " Vendor REV Level ASCII Character       |
| 23           | 4E    | "N" Vendor NAME ASCII Character      | 60           | 03    | Hex Byte of Laser Wavelength (Note 6)      |
| 24           | 41    | "A" Vendor NAME ASCII Character      | 61           | 52    | Hex Byte of Laser Wavelength (Note 6)      |
| 25           | 49    | "I" Vendor NAME ASCII Character      | 62           |       | RESERVED                                   |
| 26           | 52    | "R" Vendor NAME ASCII Character      | 63           |       | Check sum code for ID fields 0-62 (Note 7) |
| 27           | 20    | " " Vendor NAME ASCII Character      | 64           | 00    |  |
| 28           | 20    | " " Vendor NAME ASCII Character      | 65           | 1A    | Hardware TX_Disable, TX_Fault, & LOS       |
| 29           | 20    | " " Vendor NAME ASCII Character      | 66           | 00    |  |
| 30           | 20    | " " Vendor NAME ASCII Character      | 67           | 00    |  |
| 31           | 20    | " " Vendor NAME ASCII Character      | 68-83        |       | Serial Number, ASCII (Note 8)              |
| 32           | 20    | " " Vendor NAME ASCII Character      | 84-91        |       | Date Code (Note 9)                         |
| 33           | 20    | " " Vendor NAME ASCII Character      | 92           | 68    | Diagnostic Monitoring Type                 |
| 34           | 20    | " " Vendor NAME ASCII Character      | 93           | B0    | Enhanced Options                           |
| 35           | 20    | " " Vendor NAME ASCII Character      | 94           | 05    | SFF-8472 rev 11.0                          |
| 36           | 00    |                                      | 95           |       | Checksum for bytes 64-94 (Note 7)          |
|              |       |                                      | 96-255       | 00    |  |

Notes:

1. RESERVED.
2. RESERVED.
3. RESERVED.
4. RESERVED.
5. Table 1, Part number options/extensions
6. Laser wavelength is represented in 16 unsigned bits. The hex representation of 850nm is 0352.
7. Addresses 63 and 95 are checksums calculated per SFF-8472 and SFF-8074, and stored prior to product shipment.
8. Addresses 68-83 specify the module's ASCII serial number and will vary by unit.
9. Addresses 84-91 specify the module's ASCII date code and will vary according to manufactured date-code.

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**Table 9 Two-Wire interface ID: Data Fields – Address A2h**

| Byte #<br>Decimal | Data<br>Notes                  | Byte #<br>Decimal | Data<br>Notes                   | Byte #<br>Decimal | Data<br>Notes              |
|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|----------------------------|
| 0                 | Temp H Alarm MSB (Note 1)      | 26                | TX Pwr L Alarm MSB (Note 4)     | 104               | Rx Pavg MSB (Note 5)       |
| 1                 | Temp H Alarm LSB (Note 1)      | 27                | TX Pwr L Alarm LSB (Note 4)     | 105               | Rx Pavg LSB (Note 5)       |
| 2                 | Temp L Alarm MSB (Note 1)      | 28                | TX Pwr H Warning MSB (Note 4)   | 106               | Reserved                   |
| 3                 | Temp L Alarm LSB (Note 1)      | 29                | TX Pwr H Warning LSB (Note 4)   | 107               | Reserved                   |
| 4                 | Temp H Warning MSB (Note 1)    | 30                | TX Pwr L Warning MSB (Note 4)   | 108               | Reserved                   |
| 5                 | Temp H Warning LSB (Note 1)    | 31                | TX Pwr L Warning LSB (Note 4)   | 109               | Reserved                   |
| 6                 | Temp L Warning MSB (Note 1)    | 32                | RX Pwr H Alarm MSB (Note 5)     | 110               | Status/Control             |
| 7                 | Temp L Warning LSB (Note 1)    | 33                | RX Pwr H Alarm LSB (Note 5)     | 111               | Reserved                   |
| 8                 | Vcc H Alarm MSB (Note 2)       | 34                | RX Pwr L Alarm MSB (Note 5)     | 112               | Flag Bits                  |
| 9                 | Vcc H Alarm LSB (Note 2)       | 35                | RX Pwr L Alarm LSB (Note 5)     | 113               | Flag Bits                  |
| 10                | Vcc L Alarm MSB (Note 2)       | 36                | RX Pwr H Warning MSB (Note 5)   | 114               | Reserved                   |
| 11                | Vcc L Alarm LSB (Note 2)       | 37                | RX Pwr H Warning LSB (Note 5)   | 115               | Reserved                   |
| 12                | Vcc H Warning MSB (Note 2)     | 38                | RX Pwr L Warning MSB (Note 5)   | 116               | Flag Bits                  |
| 13                | Vcc H Warning LSB (Note 2)     | 39                | RX Pwr L Warning LSB (Note 5)   | 117               | Flag Bits                  |
| 14                | Vcc L Warning MSB (Note 2)     | 40-45             | Reserved                        | 118               | Reserved                   |
| 15                | Vcc L Warning LSB (Note 2)     | 56-94             | External Cal Constants (Note 4) | 119               | Reserved                   |
| 16                | Tx Bias H Alarm MSB (Note 3)   | 95                | Checksum for bytes 0-94         | 120-122           | Reserved                   |
| 17                | Tx Bias H Alarm LSB (Note 3)   | 96                | Temperature MSB (Note 1)        | 123               | Reserved                   |
| 18                | Tx Bias L Alarm MSB (Note 3)   | 97                | Temperature LSB (Note 1)        | 124               | Reserved                   |
| 19                | Tx Bias L Alarm LSB (Note 3)   | 98                | Vcc MSB (Note 2)                | 125               | Reserved                   |
| 20                | Tx Bias H Warning MSB (Note 3) | 99                | Vcc LSB (Note 2)                | 126               | Reserved                   |
| 21                | Tx Bias H Warning LSB (Note 3) | 100               | TX Bias MSB (Note 3)            | 127               | Reserved (Note 8)          |
| 22                | Tx Bias L Warning MSB (Note 3) | 101               | TX Bias LSB (Note 3)            | 128-247           | Customer Writable (Note 9) |
| 23                | Tx Bias L Warning LSB (Note 3) | 102               | TX Power MSB (Note 4)           | 248-255           | Vendor Specific            |
| 24                | TX Pwr H Alarm MSB (Note 4)    | 103               | TX Power LSB (Note 4)           |                   |                            |
| 25                | TX Pwr H Alarm LSB (Note 4)    |                   |                                 |                   |                            |

Notes:

1. Temperature (Temp) is decoded as a 16 bit signed twos complement integer in increments of 1/256 °C.
2. Supply voltage (VCC) is decoded as a 16 bit unsigned integer in increments of 100 μV.
3. Laser bias current (Tx Bias) is decoded as a 16 bit unsigned integer in increments of 2 μA.
4. Transmitted average optical power (Tx Pwr) is decoded as a 16 bit unsigned integer in increments of 0.1 μW.
5. Received average optical power (Rx Pwr) is decoded as a 16 bit unsigned integer in increments of 0.1 μW.
6. Bytes 55-94 are not intended for use but have been set to default values per SFF-8472.
7. Bytes 95 is a checksum calculated (per SFF-8472) and stored prior to product shipment.
8. Byte 127 accepts a write but performs no action (reserved legacy byte).
9. Bytes 128-247 are write enabled (customer writable).

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**TABLE 10      TRANSCEIVER DIGITAL DIAGNOSTIC MONITOR CHARACTERISTICS (WHEN APPLICABLE)**

| PARAMETER   | SYMBOL | MIN. | UNITS | NOTES  |
|---|--------|------|-------|--|
| Transceiver Internal Temperature Accuracy         | TINT   | ±3.0 | °C    | Temperature is measured internal to the transceiver and is valid from -40°C to +85 °C case temperature   |
| Transceiver Internal Supply Voltage accuracy      | VINT   | ±0.1 | V     | Supply voltage is measured internal to the transceiver and can, with less accuracy, be correlated to the voltage at the Vcc pin. Valid over 3.3V ±5% |
| Transmitter Laser DC Bias Current Accuracy        | IINT   | ±10  | %     |  |
| Transmitted Average Optical Output Power Accuracy | PT     | ±3.0 | dB    | Coupled into 50/125 mm MM fiber. Valid from -1dBm to -10dBm  |
| Received Average Optical Input Power Accuracy     | PR     | ±3.0 | dB    | Coupled from 50/125 mm MM fiber. Valid from -24 dBm to - 1 dBm   |

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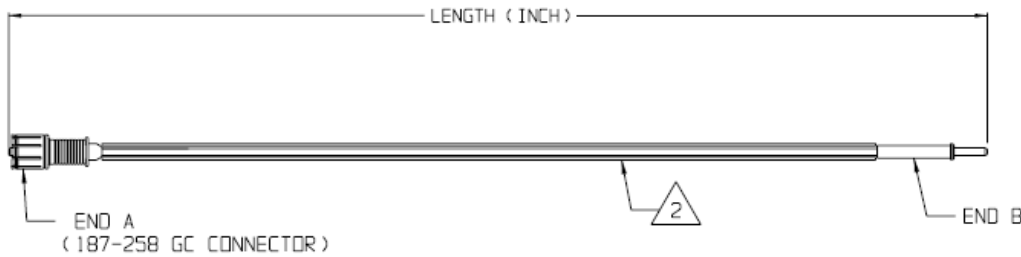
**ACCESSORIES**

**Fiber Optic Jumper Cables to support connection to Mil/Aerospace Connectors**

**KEY FEATURES:**

- Jumper cable between Glenair Transceiver (end A) and Mil/Aero Connector termini (End B)
- Offered with either Multimode or Single Mode fibers

**FIGURE 5  
Fiber Optic Jumper Cable Assembly (see separate Glenair sales drawing FA02454 for details)**



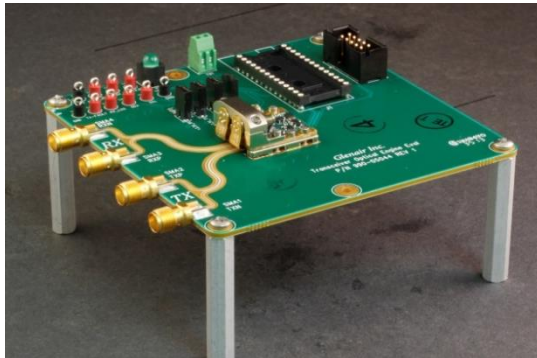
**PCB Threaded Inserts, PN 059-0007**

**KEY FEATURES**

- Simplifies installation of PCB Mount Transceivers eliminating the need for washers and nuts
- Existing Options to support PCB thickness from 0.03” to 0.92”
- Can support thicker PCB if required

**EVALUATION Boards, PN 050-329 Include**

- Manual with test block diagram, schematic and Evaluation board PCBA
- Multiple types of PCB Mount Transceiver modules supported by this evaluation board
- 2 fiber optic cables



Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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