# 050-110

## Media Converter, Single Channel 1000BASE-T to 1000BASE-LX10, 5-36VDC, SMF, GFOCA (FO), M38999 (Signal), M38999 (Power)

| REV | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| 2 | | 6/12/2014 | MF |
| | | | |

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# *1000BASE-T to 1000BASE-LX10, GFOCA, SMF, 5-36VDC*



The Glenair 050-110, Gigabit Ethernet media converter, communicates between 10/100/1000BASE-T and 1000BASE-LX10 protocols. It is designed for harsh environments and incorporates electronics in an environmentally sealed enclosure that incorporates three environmental connectors; M38999 connectors are utilized for power and for electrical signal and a GFOCA connector is used for the Fiber Optic signals.

## KEY FEATURES/BENEFITS

- 1310nm FP Lasers to support 1000BASE-LX10
- InGaAs PIN PD to support 1000BASE-LX10
- Input Power Regulator to support 5-36V input power
- GFOCA Fiber Optic Connector inter-mates with TFOCA II®
- Electrical Interface compliant with IEEE 802.3 (10/100/1000BASE-T)
- Optical Interface compliant with IEEE 802.3 (1000BASE-LX10)
- Magnetics on the electrical signal input side to support the 1000BASE-T requirements for 100m cable length
- IP67 in mated condition

## OPTIONAL FEATURES

- Built In Test Console Port accessible via USB2.0
- Built in Test Console Port accessible via UART

## APPLICATIONS

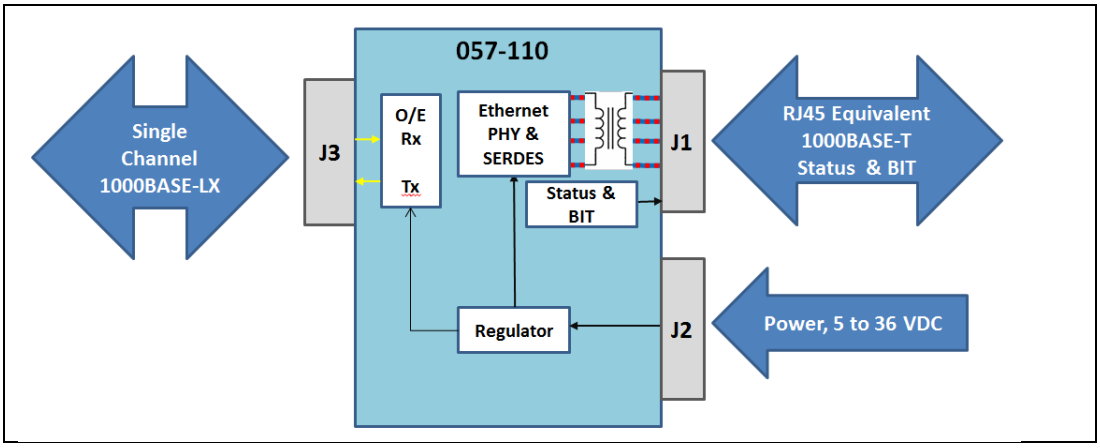
- Harsh Environment Ethernet for Airborne, Tactical and Shipboard applications

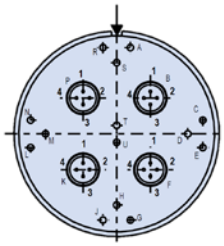
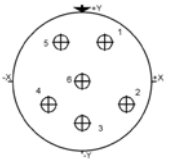
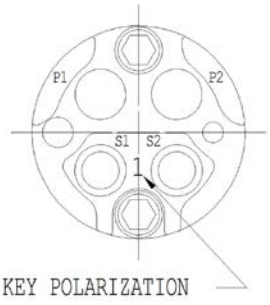
## How To Order

| Part Number | Paint | GFOCA Dust Cover Style | Built In Test Console Port |
|---|---|---|---|
| | | | 0 = Not implemented |
| | | | 1 = Built in Test (USB2.0) |
| | | | 2 = Built in Test (UART) |
| | | | 3 = Built in Test (USB2.0 & UART) |
| | | | 4 = SNMP (future use) |
| 050-110 | ZL | F | 3 |
| | 1 = CARC 34094 | N = None | |

| Material & Finish | GFOCA Insert Captivation Key | GFOCA Seal Material(s) |
|---|---|---|
| ZL= CRES, Electrodeposited Nickel | 1 = Key 1 | 1 = Fluorosilicone |
| | 2 = Key 2 | 3 = EPDM |
| | 3 = Key 3 | |
| | 4 = Key U (Universal) | |

## *Functional Block Diagram*

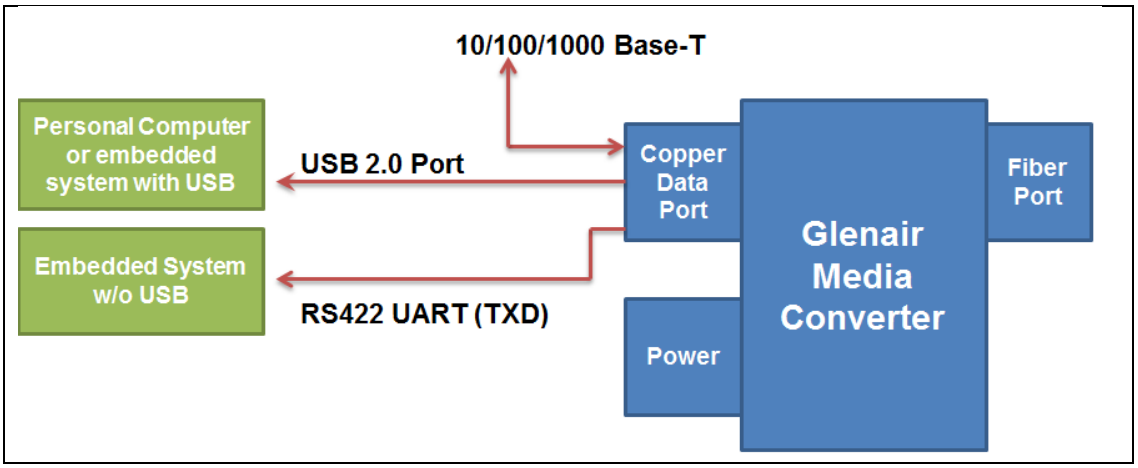



| NAME | Insert Arrangement | Function | Media Converter | Mating PLUG Connector |
|---|---|---|---|---|
| **J1** |  | Electrical Signal, Status and Built In Test (BIT) | D38999 Series III type, 19Q-18<br>14X SIZE 22D Pins<br>4X SIZE 8 QUADRAX Pins | Generic PN<br>D38999/26#F18SN<br><br>Glenair PN<br>257-606-G6##19-18SN |
| **J2** |  | Power | D38999 Series III type,<br>9-35<br>6X SIZE 22D Pins | Generic PN<br>D38999/26#A35SN<br><br>Glenair PN<br>233-105-G6##09-35SN |
| **J3** |  | Fiber Optic Signal | GFOCA Receptacle<br>Polarization Key 1 shown | TFOCA II® Plug<br><br>Glenair PN Family<br>180-145<br>GFOCA Hermaphroditic Plug Connector<br>MIL-DTL-83526/16 Type, 4 Channel |

***Note: # = Environmental Class (Material/Finish)***

## *Built In Test (BIT) Functionality - Optional Features*

This media converter can be offered with built in test functionality accessible through a Console Port via Universal Serial Bus 2.0 (USB 2.0) or via RS422 UART (TXD) or both options can be made available. Functional block diagram for this is shown below.




Universal Serial Bus (2.0) BIT

- Presents itself as a “Virtual” Communications Port
- Compatible with Microsoft Windows, Mac, and Linux OS’s.
- On the computer side, open any terminal application (PuTTY, HyperTERM, TeraTERM, etc.) to communicate with the media converter hardware.
- Simple “Human Readable” status messages.
- This interface may run concurrently with the RS422 UART

RS422 UART (TXD) BIT

- Useful for when you are interfacing with a embedded microprocessor or micro controller.
- Status messages delimitated to allow for easy parsing by embedded software.
- This interface may run concurrently with the USB Port

ALARM STATUS MESSAGES

Fiber Side Alarm/Status

- Temperature
- Transmitter Disable Status
- Transmitter Fault Alarm Status
- Receiver loss of signal (LOS) or signal Detect (SD) Status

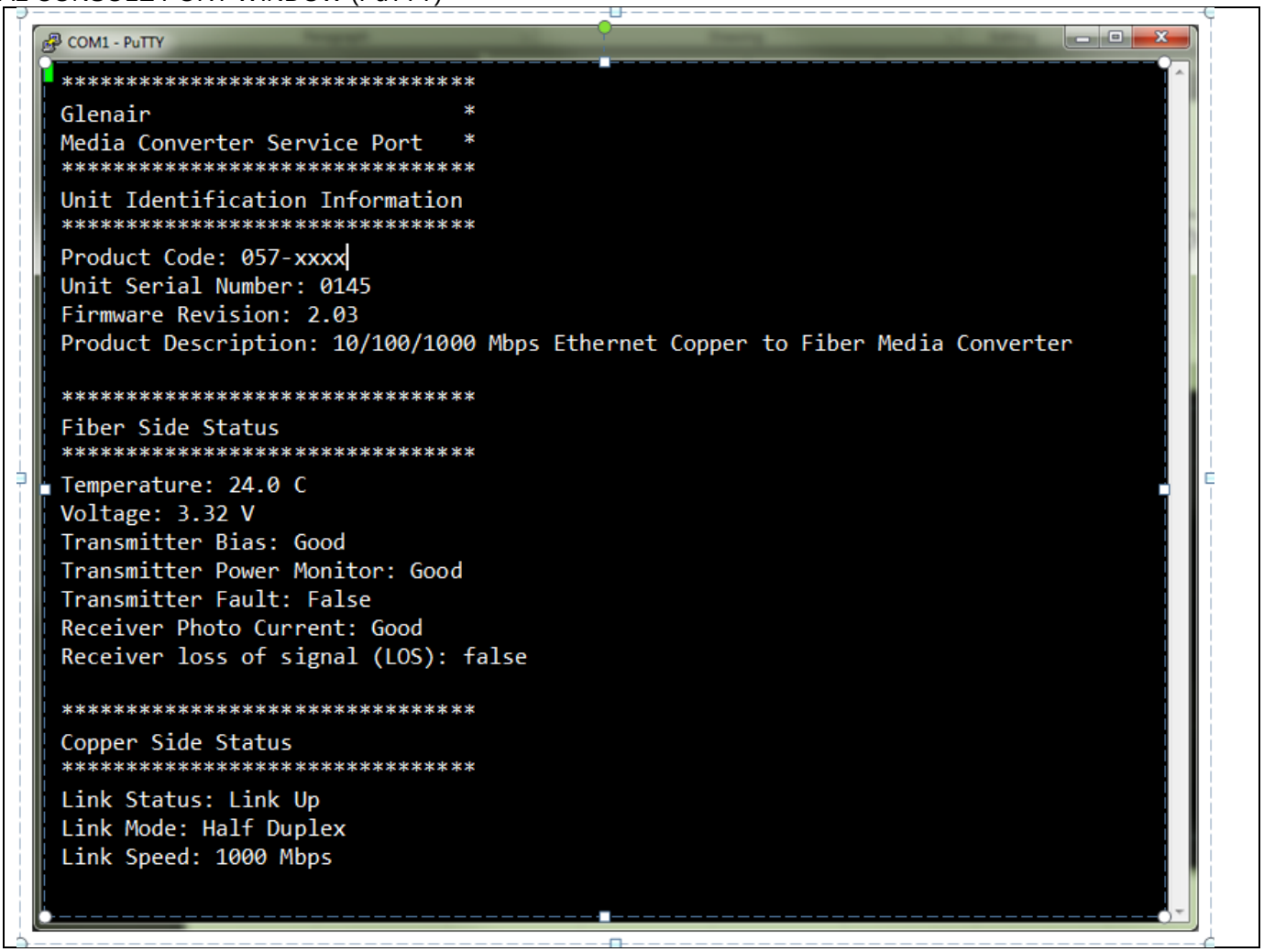
Copper Side Status

- Link Status (Up or Down)

Unit Identification Information

- Unit Serial Number
- Unit Product Code
- Unit Description

TYPICAL CONSOLE PORT WINDOW (PuTTY)



## *Built In Test (BIT) Functionality – UART*

This media converter can be offered with built in test functionality accessible via an RS-422 Port. The UART Bit message is a 10 bit message with an update rate of 1 Hz. The message format can be seen below.

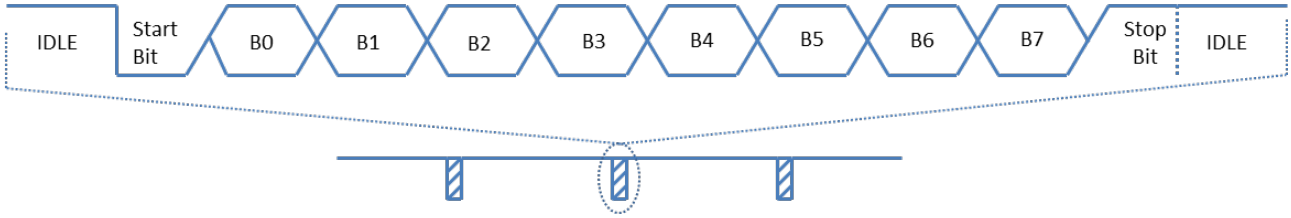
ALARM STATUS MESSAGES

- Fiber Link Status (Up or Down)
- Copper Link Status (Up or Down)
- Power Supply Status (In Range, or Fault)

**Ethernet Media Converter Status Message Format**

Standard UART-Type Format (Start and Stop Bits, 8 Data bits, no parity)

Data Rate = 9600 baud, RS422 Output, Message Repetition Rate = 1 Sec




SERIAL STATUS MESSAGE BIT MAPPING

| Bit | Description |
|---|---|
| 0 | Channel 1 Fiber Optic TX Fault (1 = Fault, 0 = No Fault) |
| 1 | Channel 1 Ethernet copper Link UP (1 = Link Up, 0 = Link Down) |
| 2 | Channel 1 Power Supply Voltage “In Range” Fault (1 = Fault, 0 = No Fault) |
| 3 | Not used |
| 4 | Channel 2 Fiber Optic TX Fault (1 = Fault, 0 = No Fault) |
| 5 | Channel 2 Ethernet copper Link UP (1 = Link Up, 0 = Link Down) |
| 6 | Channel 2 Power Supply Voltage “In Range” Fault (1 = Fault, 0 = No Fault) |
| 7 | Not Used |

## Ratings and Specifications

### Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|
| Storage Temperature | Ts | -55 | | +100 | °C | |
| Supply Voltage | $V_{cc}$ | -0.5 | | 40 | V | |
| | | | | | | |

### Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|
| Operating Temperature | $T_{op}$ | -40 | | +85 | °C | |
| Supply Voltage | $V_{cc}$ | 5 | 28 | 36 | V | |
| Supply Current | Icc | | 100 | 150 | mA | @28VDC |
| Power Supply Noise (Peak-Peak) | $V_{cc\ ripple}$ | | | 200 | mV | |

### Optical Characteristics – Transmitter

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|
| Optical Output Power | $P_{OUT}$ | -8.5 | -4 | -3 | dBm | 1310nm Fabry-Perot |
| Optical Wavelength | $\lambda_{OUT}$ | 1285 | 1310 | 1345 | nm | |
| Spectral Width | $\Delta\lambda$ | | | 3.5 | nm | |

### Optical Characteristics - Receiver

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|
| Optical Sensitivity ( Input Power Range) | $P_{IN\ OP}$ | -20 | | 0 | dBm | |
| Min. Sensitivity, BER $10^{-12}$, PRBS $2^{-7}$-1 | $P_{IN\ MIN}$ | | -22 | -20 | dBm | PIN PD, LX10 source |
| Overload, BER $10^{-12}$, PRBS $2^{-7}$-1 | $P_{IN\ MAX}$ | 0 | | | dBm | |
| Optical Wavelength | $\lambda_{IN}$ | 1100 | 1310 | 1590 | nm | |

### Ethernet Compliance

| Parameter | Medium Type | Distance | Notes |
|---|---|---|---|
| Gigabit Ethernet, IEEE 802.3ab, 1000BASE-T | TIA/EIA-568-B Cat 5E | 100m | |
| Gigabit Ethernet, IEEE 802.3z, 1000BASE-LX10 | Single Mode Fiber (9/125µm) | 10km | |

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## *Ratings and Specifications (continued)*

### COMPLIANCE SPECIFICATIONS

| CHARACTERISTIC | Standard | Condition | Notes |
|---|---|---|---|
| Mechanical Shock | MIL-STD-810 | 40g | 6-9rms |
| Mechanical Vibration | MIL-STD-810 | 30g rms | |
| ESD | MIL-STD-883 | Class II | 2200V HBM |
| Mating Durability | MIL-DTL-38999/20 | 500 Cycles | |
| GFOCA (TFOCA II® equivalent) | MIL-DTL-83526 (Draft) | 2000 cycles | |
| Conducted Emissions, Power Leads, 30 Hz to 10 kHz | MIL-STD-461F | CE101 | |
| Conducted Emissions, Power Leads, 10 kHz to 10 MHz | MIL-STD-461F | CE102 | |
| Conducted Susceptibility, Power Leads, 30 Hz to 150KHz | MIL-STD-461F | CS101 | |
| Conducted Susceptibility, Transients, Power Leads | MIL-STD-461F | CS106 | |
| Conducted Susceptibility, Structure Current, 60 Hz to 100 kHz | MIL-STD-461F | CS109 | |
| Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 200 MHz | MIL-STD-461F | CS114 | |
| Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz | MIL-STD-461F | RS101 | |
| Radiated Susceptibility, Electric Field, 2 MHz to 18 GHz | MIL-STD-461F | RS103 | |
| Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz | MIL-STD-461F | RE101 | |
| Radiated Emissions, Electric Field, 10 kHz to 18 GHz | MIL-STD-461F | RE102 | |
| Flame Resistance | EIA364-104 | | 30 seconds |
| Damp Heat | EIA364-321 | | 240 hours |
| Eye Safety | CDRH and IEC-825 | Class 1 Laser Product | |

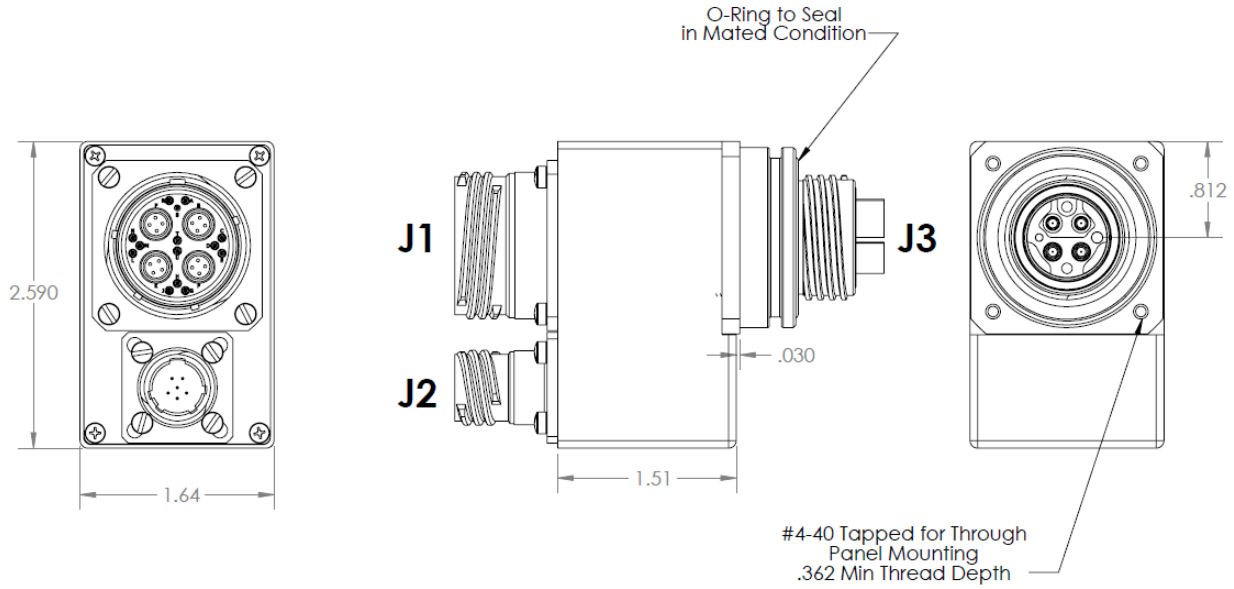
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## Materials/Finish

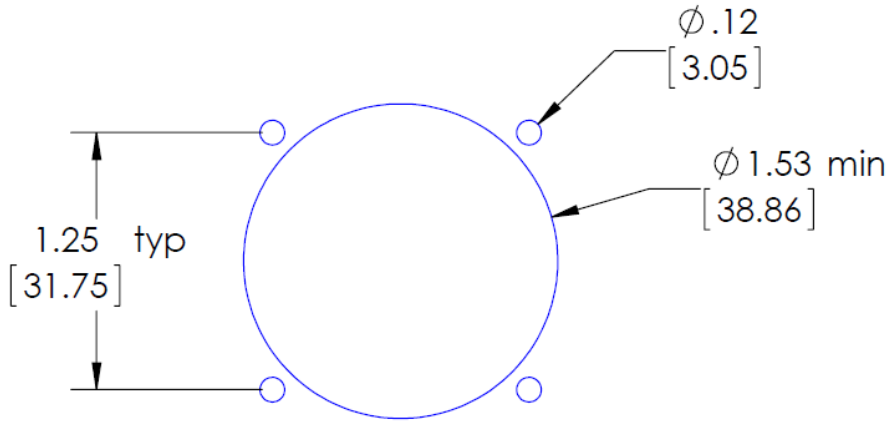
| Item | Material | Notes |
|---|---|---|
| D38999 & GFOCA | Stainless Steel, Nickel plated (GFOCA only) | |
| D38999 Inserts | Thermoplastics | |
| Interfacial Seals, 38999 only | Elastomer, Fluorosilicon | |
| Optical Ferrules & Sleeves | Zirconia, Ceramic | |
| Printed Circuit Boards | FR4/Polyimide | |
| Housing | Stainless Steel, Nickel plated + CARC 34094 paint | |
| D38999 Inserts | Thermoplastics | |
| O-Ring Seals (GFOCA) | EPDM | |

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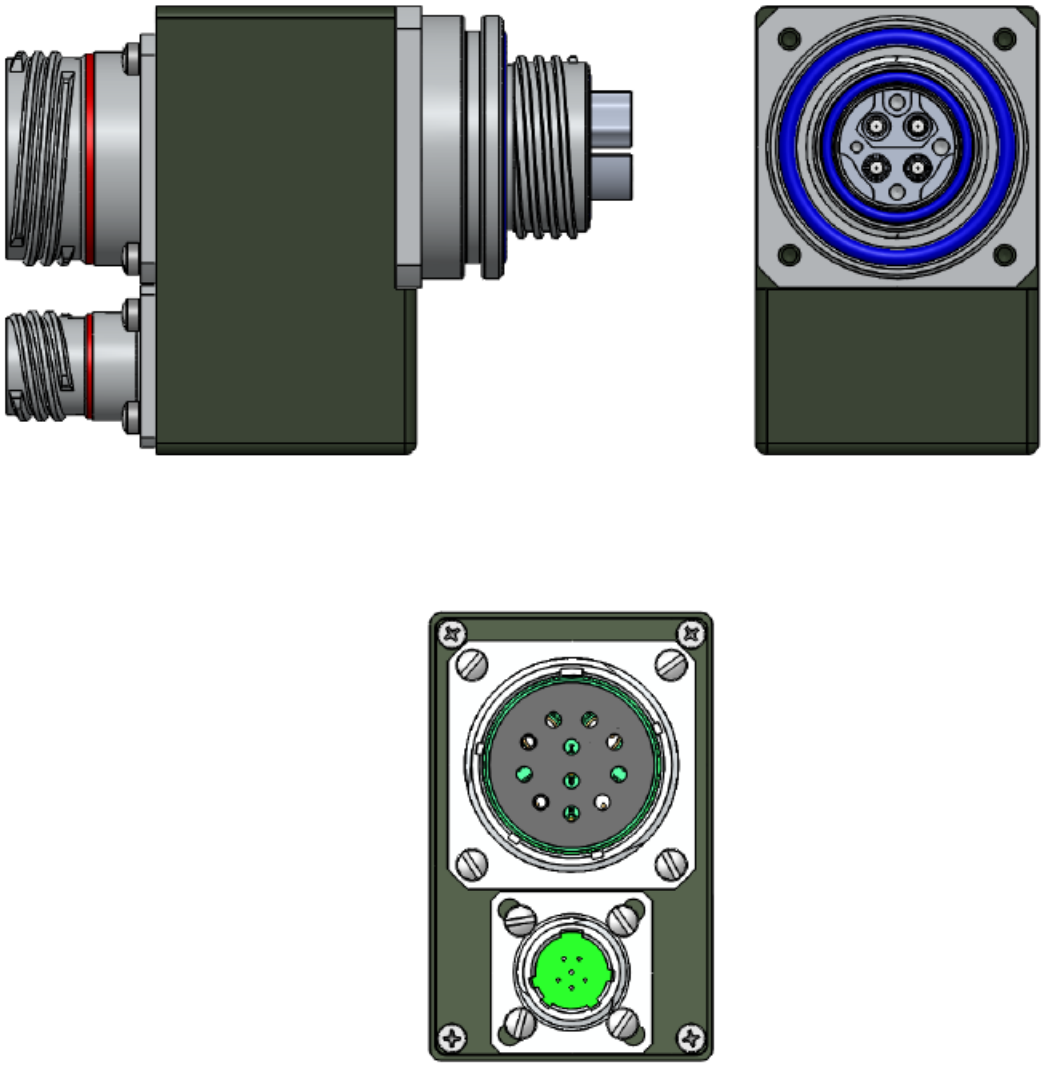
## *OUTLINE DRAWING & PANEL CUT OUT*




PANEL CUT OUT – J3



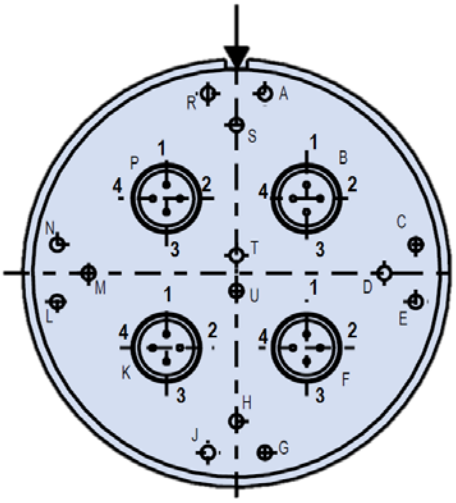
## *CARC Paint Application and Masking*



**Paint CARC 34094 (Green 383) per MIL-DTL-53072**
**except as shown above**

## *Input/Output Definition*

### J1 – ELECTRICAL SIGNAL CONNECTOR




D38999 Series III 19Q-18
Mating face for PIN shown
14X SIZE 22D
4X SIZE 8 QUADRAX

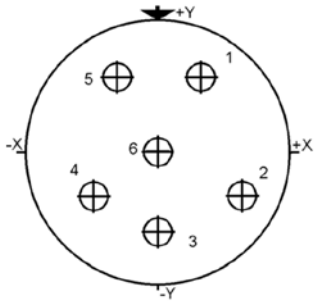
### J1 PIN FUNCTION ASSIGNMENTS

| PIN | NAME | DESCRIPTION | NOTES | PIN | NAME | DESCRIPTION | NOTES |
|---|---|---|---|---|---|---|---|
| A | PSS | Power Supply Status | 1 | K1 | NC | No connect | |
| B1 | Ch1-MDA+ | Channel 1, MDA+ | 2 | K2 | NC | No connect | |
| B2 | Ch1-MDB+ | Channel 1, MDB+ | 2 | K3 | NC | No connect | |
| B3 | Ch1-MDA- | Channel 1, MDA- | 2 | K4 | NC | No connect | |
| B4 | Ch1-MDB- | Channel 1, MDB- | 2 | L | UART_P | BIT UART | 4 |
| C | D+ | USB D+, BIT | 3 | M | UART GND | BIT UART Ground | 4 |
| D | D- | USB D-, BIT | 3 | N | UART_N | BIT UART | 4 |
| E | NC | No connect | | P1 | NC | No connect | |
| F1 | Ch1-MDC+ | Channel 1, MDC+ | 2 | P2 | NC | No connect | |
| F2 | Ch1-MDC+ | Channel 1, MDD+ | 2 | P3 | NC | No connect | |
| F3 | Ch1-MDC- | Channel 1, MDC- | 2 | P4 | NC | No connect | |
| F4 | Ch1-MDC- | Channel 1, MDD- | 2 | R | Ground | DC Return | |
| G | NC | No connect | | S | NC | No connect | |
| H | NC | No connect | | T | USB GND | USB Ground | 3 |
| J | NC | No connect | | U | USB VBUS | 5V, USB supply | 3 |

Notes
1. Power Supply Status indicator is high, referenced to 3.3VDC, when power supply is working correctly and low for fault or warning condition.
2. IEEE-802.3 1000BASE-T compliant
3 Built In Test Port, USB2.0
4 Built In Test Port, RS422 UART (TXD)

## *Input/Output Definition (continued)*

### J2 – POWER CONNECTOR

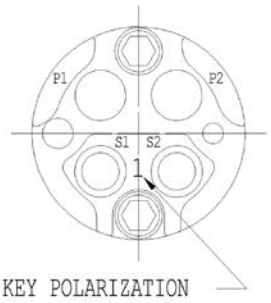



D38999 Series III, 9-35
Mating face for PIN shown
6X SIZE 22D

**J2 PIN FUNCTION ASSIGNMENTS**

| PIN | NAME | DESCRIPTION | NOTES |
|---|---|---|---|
| 1 | Isolated Case Ground | | |
| 2 | Isolated Case Ground | | |
| 3 | Isolated Case Ground | | |
| 4 | Isolated Case Ground | | |
| 5 | Vcc | 18-36VDC | |
| 6 | VDC Return | | |

### J3 – OPTICAL CONNECTOR




GFOCA
MIL-DTL-83526/16 Type,
4 Channel

**J3 PIN FUNCTION ASSIGNMENTS**

| PIN | NAME | DESCRIPTION | NOTES |
|---|---|---|---|
| S1 | NC | No Connect | |
| S2 | TX1 | Channel 1 Transmitter | |
| P1 | NC | No Connect | |
| P2 | RX1 | Channel 1 Receiver | |

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