050-105

PRODUCT BRIEF

Copper to Fiber Ethernet Media Converter
10/100/1000BASE-T to Fiber Optic Ethernet
(1000BASE-SX, 1000BASE-LX10, 1000BASE-EX, 100BASE-FX), 28VDC,
M38999 (Signal), M38999 (Power), M38999 (Fiber Optic)

REV	DESCRIPTION	DATE	APPROVED
B	Per DCN52472	10/07/2014	MF
C	Per DCN52728	10/27/2014	MF
D	Per DCN54108	02/23/2015	MF
E	Per DCN56892	09/17/2015	MF
F	Per DCN56963	09/22/2015	MF
G	Per DCN57922	12/08/2015	MF
H	Per DCN58351	01/07/2016	MF
I	Per DCN60323	05/23/2016	RAS
J	Per DCN64256; Add Flow Control option	03/10/2017	RAS/GC
K	Per DCN64961; added Z1 plating	05/02/2017	RAS
L	Per DCN65333; Update Copyright date	05/26/2017	GC
M	Per DCN71143; Remove incorrect receptacle connector part number references	06/26/2018	GC
N	Per DCN71379; Updated solder type in material table.	07/11/2018	DJM
O	Per DCN74169; Add UID Data Matrix specs in the Marking section, FO Inspection/Cleaning Tools	01/23/2019	YA/RAS
P	Per DCN75250; Update the Part Number Development Instruction. Correct the PRBS	04/04/2019	RAS/YA

050-105 PRODUCT BRIEF
Copper to Fiber Ethernet Media Converter
10/100/1000BASE-T to Fiber Optic Ethernet (SX, LX10, EX, FX)

10/100/1000BASE-T to 1000BASE-SX, 1000BASE-LX10, or 100BASE-FX

The Glenair 050-105 is an Ethernet Copper to Fiber media converter that supports 10/100/1000BASE-T copper input/output and can be configured to support 1000BASE-SX, 1000BASE-LX10, 1000BASE-EX or 100BASE-FX protocols. It is designed for harsh environments and incorporates electronics in an environmentally sealed enclosure that incorporates three environmental M38999 connectors. The Glenair Ethernet media converter enables reliable communications over longer distances in harsh environment applications. It extends network link distances between switches, routers, and other Ethernet peripherals. It converts 10/100/1000BASE-T data from twisted pair copper cable to 1000BASE-SX/LX serial data transmitted over a pair of optical fibers. This allows legacy equipment running at 10/100/1000BASE-T to be connected to newer networks, and provides a smooth upgrade path.

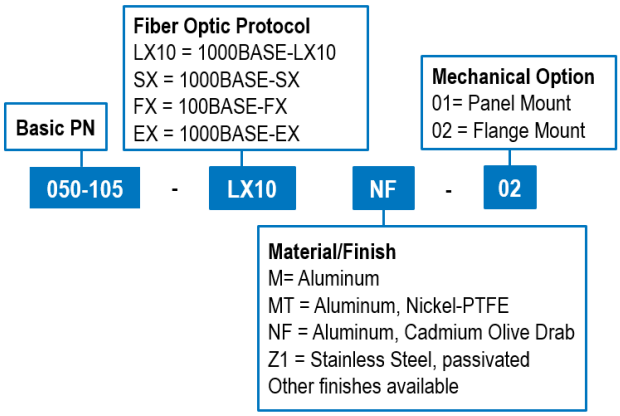
KEY FEATURES/BENEFITS

- 1310nm FP Lasers for 1000BASE-LX10
- 1310nm DFB Lasers for 1000BASE-EX
- InGaAs PIN PD for 1000BASE-LX10 & -EX
- 850nm Lasers for 1000BASE-SX
- GaAs PIN PD for 1000BASE-SX
- 1300nm LED for 100BASE-FX
- PIN PD for100BASE-FX
- Wide Input Voltage Range: 18-36V
- Electrical Interface compliant with IEEE 802.3 (10/100/1000BASE-T)
- Optical Interface compliant with IEEE 802.3 (1000BASE-LX10 or 1000BASE-SX)
- Contact Glenair if Flow Control is required
- -40°C to +85°C operating temperature range
- MIL-STD-810 Mechanical Shock and Vibration
- Up to 550 Meters over MMF (SX)
- Up to 10km over SMF (LX10)
- Up to 40km over SMF (EX)
- Magnetics on the electrical signal input side to support 10/100/1000BASE-T operation over 100m Cat 5E
- IP67 in mated condition
- M38999 Rugged connectors for Signal, Power & Fiber
- Panel Mount & Flange Mount Options

APPLICATIONS

- Harsh Environment such as: Airborne, Tactical, Railway, Industrial, Oil and Gas and Shipboard applications

How To Order



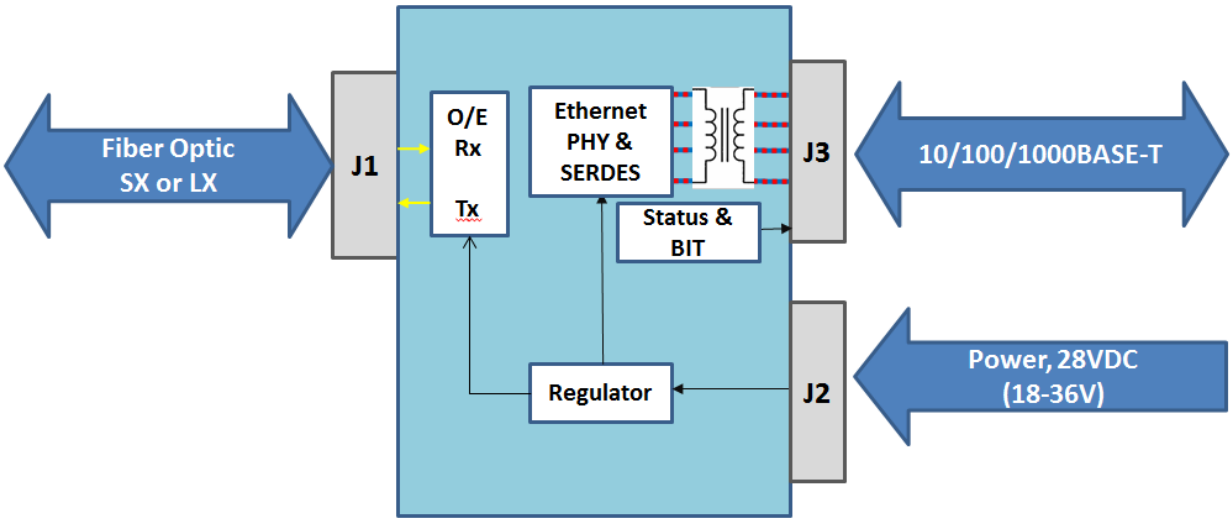
 REV: P US Cage Code 06324 Printed in USA

GLENAIR, INC. · 1211 AIR WAY · GLENDALE, CA 91201-2497 · TEL: 818-247-6000 · FAX: 818-500-9912
www.glenair.com

E-mail: sales@glenair.com

Functional Block Diagram

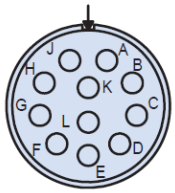
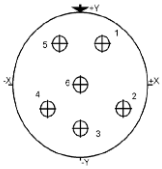
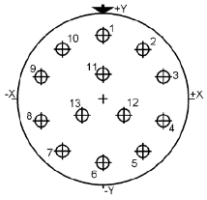
Figure 1 **SINGLE CHANNEL MEDIA CONVERTER**



Note: Fiber Optic Channels can be 1000BASE-LX10, 1000BASE-SX, 1000BASE-EX or 100BASE-FX

Other Fiber Optic connections are possible – Contact Factory

Connectors

NAME	Insert Arrangement	Function	Media Converter Connector	Mating PLUG Connector
J1	 **D38999 Series III** **MIL-STD-1560 Arrangement** **19-11** **(Mating face - PIN insert shown)**	Fiber Optic Signal Connector	D38999 Series III type 180-091#S7-19-11SN (D38999/20WF11SN) SOCKET TERMINUS SX or FX CONFIGURATION: 181-001-126 (M29504/5-4239) LX10 or EX CONFIGURATION: 181-001-125 (M29504/5-4237)	D38999 Series III type 180-091#06-19-11PN (D38999/26WF11PN type) PIN TERMINUS SX or FX CONFIGURATION: 181-002-126 (M29504/4-4210) LX10 or EX CONFIGURATION: 181-002-125 (M29504/4-4208)
J2	 **D38999 Series III** **MIL-STD-1560 Arrangement** **9-35** **(Mating face - PIN insert shown)**	Power Connector	D38999 Series III type, 9-35	D38999 Series III type 233-105-G6#09-35SN (D38999/26WA35SN) SOCKET CONTACTS 850-002-22-348 (M39029/56-348)
J3	 **D38999 Series III** **MIL-STD-1560 Arrangement** **11-35** **(Mating face - PIN insert shown)**	Electrical Ethernet Signal Connector	D38999 Series III type, 11-35	D38999 Series III type 233-105-G6#11-35SN (D38999/26WB35SN) SOCKET CONTACTS 850-002-22-348 (M39029/56-348)

Note: # = Environmental Class (Material/Finish)

 REV: P US Cage Code 06324 Printed in USA

Ratings and Specifications – LX10 VERSION

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}	18	28	36	V	
Supply Current	Icc		70	110	mA	@28VDC

OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Output Power	P_{OUT}	-8.5	-4	-1	dBm	1310nm Fabry-Perot
Optical Wavelength	λ_{OUT}	1280	1310	1345	nm	
Spectral Width	$\Delta\lambda$			2.75	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 7	P_{IN_MIN}		-22	-20	dBm	PIN PD, LX10 source
Overload, BER 10^{-12}, PRBS 7	P_{IN_MAX}	-1			dBm	
Optical Wavelength	λ_{IN}	1270		1600	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	

Ratings and Specifications – EX VERSION

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}	18	28	36	V	
Supply Current	Icc		70	110	mA	@28VDC

OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Output Power	P_{OUT}	-1	+1	+3	dBm	1310nm DFB
Optical Wavelength	λ_{OUT}	1290	1310	1330	nm	
Spectral Width	$\Delta\lambda$			1	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 7	P_{IN_MIN}		-22	-20	dBm	PIN PD
Overload, BER 10^{-12}, PRBS 7	P_{IN_MAX}	-1			dBm	
Optical Wavelength	λ_{IN}	1270		1600	nm	

ETHERNET COMPLIANCE

Parameter	Medium Type	Distance	Notes
Gigabit Ethernet, IEEE 802.3ab, 1000BASE-T	TIA/EIA-568-B Cat 5E	100m	
Derived from Gigabit Ethernet, IEEE 802.3z	Single Mode Fiber (9/125µm)	40km**	** 19dB optical Loss budget, 0.35dB/km loss assumed

Ratings and Specifications – SX VERSION

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Typ	Max	Units	Notes
Storage Temperature	Ts	-55		+100	°C	
Supply Voltage	V_{cc}	-0.5		40	V	1 second maximum

OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Units	Notes
Operating Temperature	T_{op}	-40		+85	°C	
Supply Voltage	V_{cc}	18	28	36	V	
Supply Current	Icc		70	110	mA	@28VDC

OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Output Power	P_{OUT}	-7		-1	dBm	VCSEL, 50/125µm MM
Optical Wavelength	λ_{OUT}	830	850	860	nm	
Spectral Width	$\Delta\lambda$			0.85	nm	

OPTICAL CHARACTERISTICS - RECEIVER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Sensitivity (Input Power Range)	P_{IN_OP}	-17		-2	dBm	
Min. Sensitivity, BER 10^{-12}, PRBS 7	P_{IN_MIN}		-22	-17	dBm	PIN PD, 50/125µm MM
Overload, BER 10^{-12}, PRBS 7	P_{IN_MAX}	-2	-1		dBm	
Optical Wavelength	λ_{IN}	770	850	860	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-SX	OM3 MMF (50/125µm) OM1 MMF (62.5/125µm)	550m 275m	850nm VCSEL

Ratings and Specifications – FX VERSION

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Typ	Max	Units	Notes
Storage Temperature	Ts	-55		+100	°C	
Supply Voltage	V_{cc}	-0.5		40	V	1 second maximum

OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Units	Notes
Operating Temperature	T_{op}	-40		+85	°C	
Supply Voltage	V_{cc}	18	28	36	V	
Supply Current	Icc		70	110	mA	@28VDC

OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical Output Power	P_{OUT}	-19		-14	dBm	1300nm LED (IEC 9314-3)
Optical Wavelength	λ_{OUT}	1260	1310	1380	nm	
Spectral Width	$\Delta\lambda$		147		nm	

OPTICAL CHARACTERISTICS - RECEIVER

Parameter	Symbol	Min	Typ	Max	Units	Notes
Sensitivity, BER 10^{-10}, PRBS 7	P_{IN}			-32	dBm	PIN PD
Overload, BER 10^{-10}, PRBS 7	P_{IN}	-14			dBm	
Optical Wavelength	λ_{IN}	1270	1310	1380	nm	

ETHERNET COMPLIANCE

Parameter	Medium Type	Distance	Notes
Fast Ethernet, IEEE 802.3u, 100BASE-T	TIA/EIA-568-B Cat 5E	100m	
Fast Ethernet, IEEE 802.3u, 100BASE-FX, IEC 9314-3	MMF (50/125µm) & (62.5/125µm)	2km	

Ratings and Specifications - (continued)

COMPLIANCE SPECIFICATIONS

CHARACTERISTIC	Standard	Condition	Notes
Mechanical Shock	MIL-STD-810G	40g	6-9 ms pulses
Mechanical Vibration	MIL-STD-810G	30 grms	
ESD	MIL-STD-883	Class II	2200V HBM
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	
Mating Durability	MIL-DTL-38999/20	500 Cycles	
Flame Resistance	EIA364-104		30 seconds
Damp Heat	MIL-STD-810G		120 hours
Aircraft Electrical Power Characteristics	MIL-STD-704F		28V DC Systems
Military Vehicle Electrical Power Characteristics	MIL-STD-1275		28V DC Systems
Eye Safety	CDRH and IEC-825	Class 1 Laser Product	

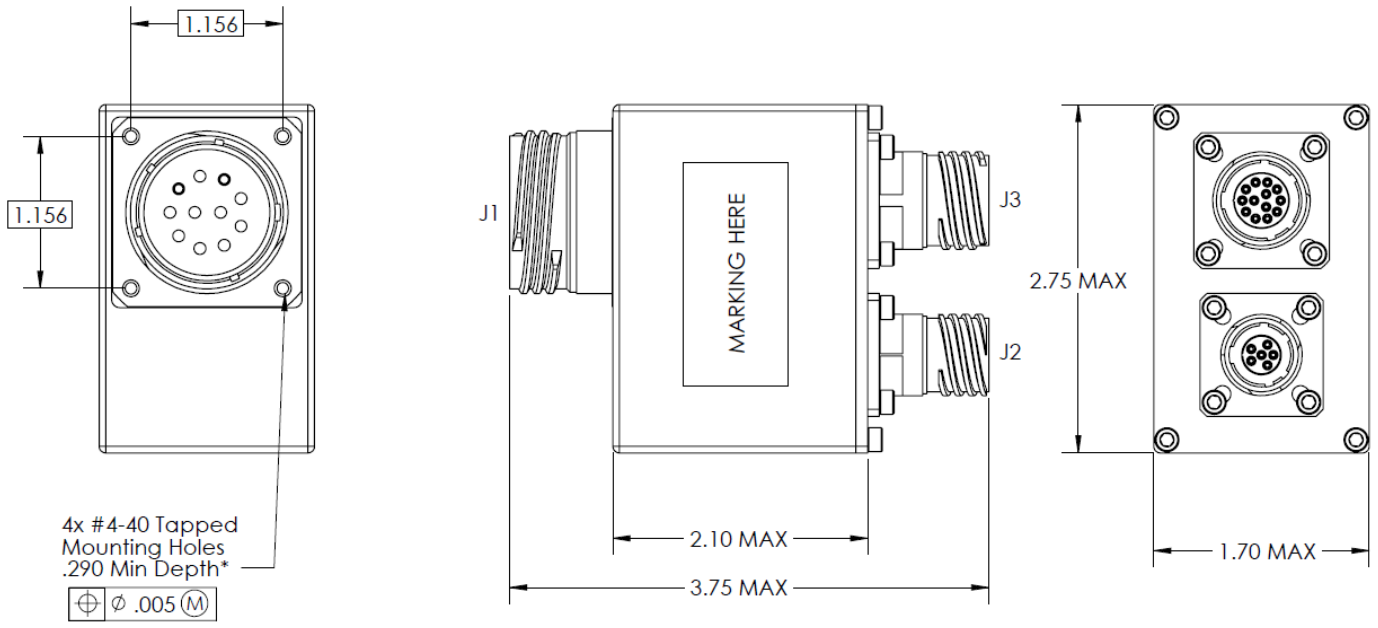
Ratings and Specifications - (continued)

Material/Finish

Item	Material/Finish
Housing & Connector Shell	Aluminum
Plating Finish: M	Nickel
Plating Finish: MT	Nickel PTFE
Plating Finish: NF	Olive Drab Cadmium
Contacts	Copper alloy, 50 µInch gold plated
D38999 Inserts	Thermoplastics
Interfacial Seals, 38999 only	Elastomer, Fluorosilicon
Optical Ferrules & Sleeves	Zirconia, Ceramic
Insulators	Liquid crystal polymer (LCP)
Contact retention clip	Beryllium copper alloy
Seal, O-rings	Fluorosilicone rubber
Seal	Silicone elastomer
Spring	Nickel-plated beryllium copper
PC tail contacts	Copper alloy/gold plated
PCB flex	FR4 & Polyimide
Encapsulant	HYSOL
Solder type	Sn60/Pb40 & Sn63/Pb37

OUTLINE DRAWING

-01 (PANEL MOUNT)



* Note: See Recommended Panel Cutout for More Information

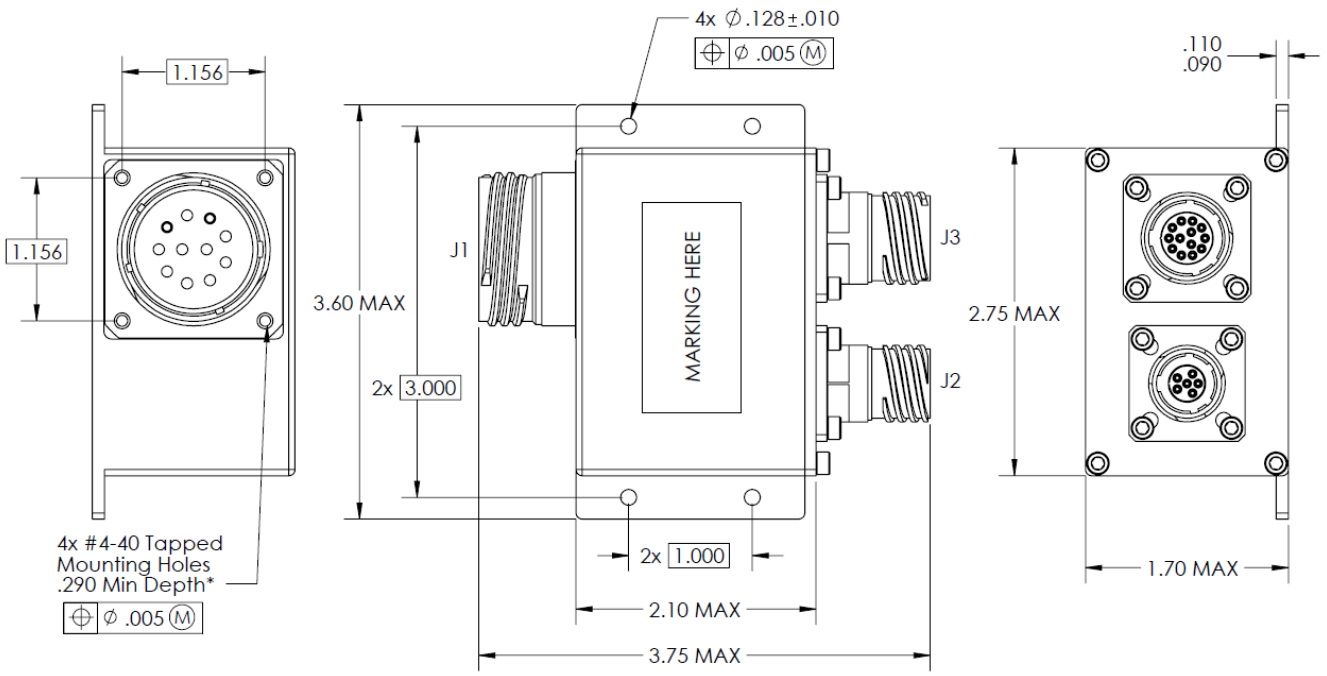
Dimensional Tolerances Unless specified otherwise:
0.x ± 0.1"
0.xx ± 0.03"
0.xxx ± 0.015"

Marking:
Assembly is identified with a label in the approximate marking location as shown. The label contains Manufacture's Name, Cage Code, Part Number, Date Code and Serial Number. The label also includes a UID to report the part number and the serial part number for tracing purposes. The UID is a Construct Number 2 MIL-STD-130N Data Matrix Symbol using ECC 200 encoding/decoding format.

 REV: P US Cage Code 06324 Printed in USA

OUTLINE DRAWING (Continued)

-02 (FLANGE MOUNT)



* Note: See Recommended Panel Cutout for More Information

Dimensional Tolerances Unless specified otherwise:
0.x ± 0.1"
0.xx ± 0.03"
0.xxx ± 0.015"

Marking:
Assembly is identified with a label in the approximate marking location as shown. The label contains Manufacture's Name, Cage Code, Part Number, Date Code and Serial Number. The label also includes a UID to report the part number and the serial part number for tracing purposes. The UID is a Construct Number 2 MIL-STD-130N Data Matrix Symbol using ECC 200 encoding/decoding format.

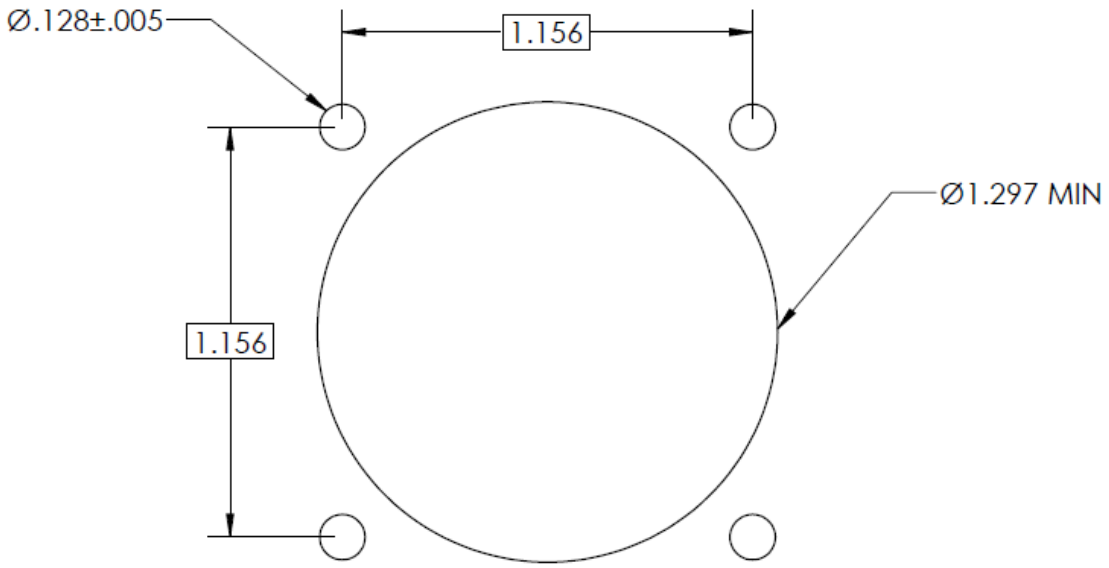
Weight:

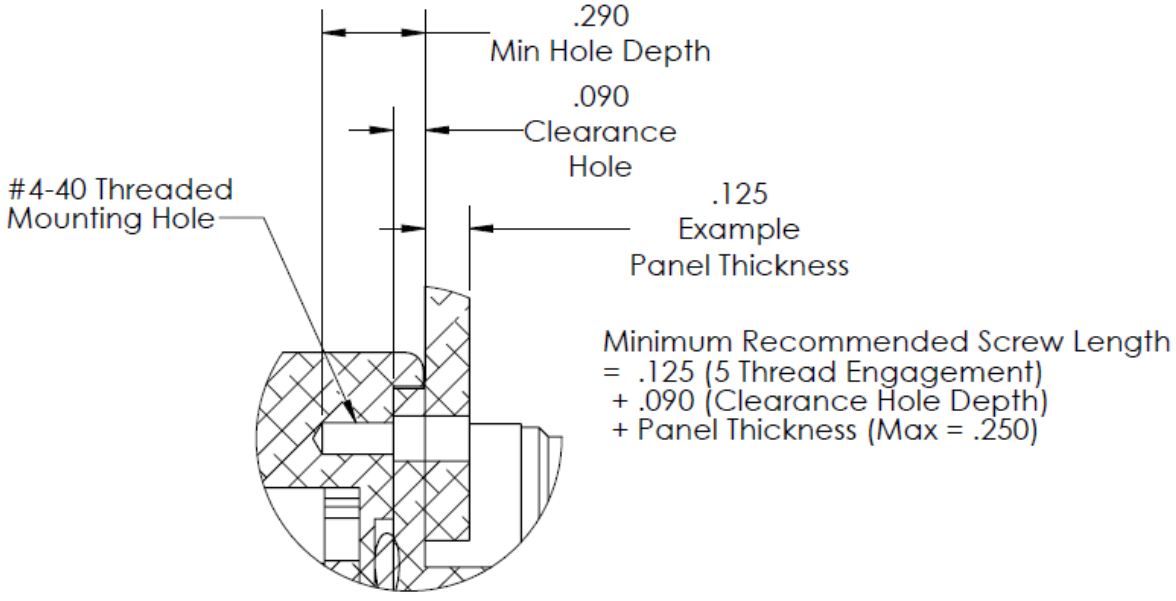
Mechanical Configuration	Weight (lbs)
-01 (Panel Mount)	0.553 nominal
-02 (Flange Mount)	0.553 nominal

Connectors will be covered with protective caps at time of shipment
Please contact Glenair for other configurations

PANEL CUT OUT

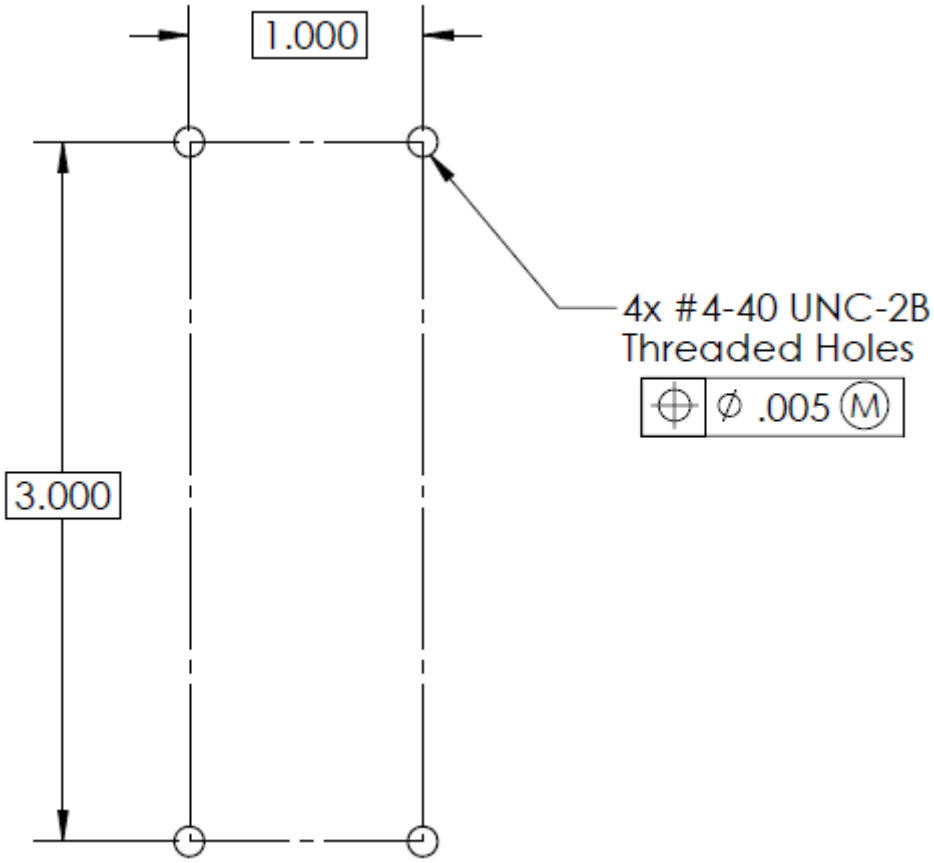
RECOMMENDED PANEL CUT OUT – J1





PANEL CUT OUT (Continued)

RECOMMENDED PANEL CUT OUT – FLANGE MOUNT



Recommended Inspection & Cleaning Tools/Kits

The following recommendations are suggested for the 050-105 Copper to Fiber Media Converter:

- ***GBS-1001 Inspection Kit (Includes GIT-003 tip for Arinc 801 & GHD systems)***
- ***GIT-006 (FBPT-MIL-2p) tip to inspect the MIL-DTL-38999 Series III (M29504/4) pin termini***
- ***GIT-007 (FBPT-MIL-2s) tip to inspect the MIL-DTL-38999 Series III (M29504/5) socket termini***
- ***GCLT-H160 or GCLT-HA160 cleaning tool for MIL-DTL-38999 system***

GBS1001 Inspection Probe with USB Adapter and Fiber Chek 2 Software

How To Order

GBS1001

Basic Part Number Includes:
- *Inspection probe with USB adapter*
- *Fiber Chek 2 Software*

Comes with
(installed on the probe):
GIT-003 Universal 1.25mm patch cord

The GBS1001 is the only inspection probe today with a high resolution, all digital sensor and USB2 video stream which delivers high-resolution uncompressed images directly to your personal computer.

GBS1001 Specifications	
Weight	.11 Kg / .25 lb
Resolution	Better than 1.5 Microns
Cable	Integrated USB 2.0 coil cable 2.5' relaxed, 10.5' fully extended
Certification	CE
Warranty	1 year

Fiber Chek Software
Fiber Optic Analysis Program

Fiber Chek is an integrated hardware/software package engineered with the single purpose of critically and consistently grading fiber end-faces. Works hand in hand with the Quick Capture Analog Probe for visual inspection, taking pictures and testing fibers.

- Automatic debris and defect detection, including fine scratches
- Measures epoxy ring for out-of-tolerance conditions
- Inspection results, including image data, can be printed or archived
- Utilizes industry standards or user defined threshold settings

Recommended Inspection & Cleaning Tools/Kits – (Continued)

Dry Action Cleaning Tool for MIL-DTL-38999 System

GCLT - H160

Dry Action Cleaning Tool for MIL-DTL-38999 Test Adapters

GCLT - HA160

- **A simple push motion engages tool**
- **Audible click when tool is fully engaged**
- **Durable — over 525 engagements per tool**
- **Crush resistant to over 250N**
- **Impact resistant to survive drops over 1.5M**