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Out of This World
INTERCONNECT
SOLUTIONS

*Out of This World*

# INTERCONNECT SOLUTIONS

Glenair®



## SELECTION GUIDE


**Contacts, Wires and Cables** — A

- SAE-AS39029 Crimp Contacts
- High Performance Shielded Contacts
- Special Purpose Contacts
- El Ochito® : The Ultimate Ethernet Contact
- Bulk Interconnect Cable
- Data Transmission Wire and Cable

**Ultraminiature Circular Connectors and Cable Assemblies** — B

- Series 80 Mighty Mouse Connectors
- Series 824 Mighty Mouse Locking Push-Pull Connectors
- Low-Profile Mighty Mouse Cobra Connectors
- Series 80 *High-Speed* Mighty Mouse Connectors
- Series 811 *High-Density* (HD) Mighty Mouse Connectors
- USB SuperSeal™ Ethernet Connectors
- Series 88 SuperFly® Ultraminiature Cordsets
- HiPer 55116 Audio Frequency Connectors
- Series 151 MIL-DTL-55116 Type Audio Connectors
- Series 15 "CB" Pogo Pin Audio Connectors

**Mil-Aero Circular Connectors and Cable Assemblies** — C

- SuperNine® MIL-DTL-38999 Series III Type Connectors
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- Glass-Sealed Hermetic Connectors
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- SuperSeal™ RJ45 / USB Field Connectors
- MIL-DTL-38999 Series IV Type Breech-Lock Connectors
- Sav-Con® Connector Savers
- MIL-DTL-28840 Connectors

**Industrial-Strength Power and Signal Connectors and Cable Assemblies** — D

- Series ITS Industrial Power and Signal Connectors
- High-Current/High-Voltage Power Connectors
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- RJ45 and USB SuperSeal™ for Industrial/Rail Applications
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- GeoMarine® and Seacrow Harsh-Environment Connectors

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- AlphaLink® Board-Level Connectors and Flex Jumpers
- Series 89 MIL-DTL-32139 Nanominiature Connectors
- MIL-DTL-83513 Micro-D Connectors
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- MasterLatch® Quick-Disconnect Micro-D
- Well-Master™ 260° High-Temperature Micro-D
- Series 79 Micro-Crimp Connectors
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- Series 28 HiPer-D 24308 Compatible Connectors
- ARINC 600 Filter Connectors

**Fiber Optic and Opto-Electronic Interconnect Systems** — F

- MIL-DTL-38999 Fiber Optic Connection System
- GHD High Density Fiber Optic Connection System
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- MIL-PRF-28876 Fiber Optic Connection System
- GFOCA M83526 Compliant Fiber Optic Connection System
- Eye-Beam™ and Hi-Beam™ Expanded Beam Fiber Optics
- Size 8 Cavity Opto-Electronic Contacts
- PCB-Mount Opto-Electronic Transceivers
- Harsh-Environment Opto-Electronic Connectors
- Copper-to-Fiber Media Converters
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- Ethernet Switches

**Shrink Boots, Jackets and Shields** — G

- Series 77 *Full Nelson* Environmental Shrink Boots
- TACOM and VG Approved Boots and Adhesives
- Piggyback Boot Backshell Adapters
- Heat Shrink Termination (HST) Sleeves
- Duralectric™, Viton® and other Cable and Conduit Jacketing
- AmberStrand® Lightweight Composite EMI/RFI Shielding
- ArmorLite™ Lightweight Stainless Steel EMI/RFI Shielding
- Metal Braided Shielding and Fabric Braided Sleeving
- MIL-DTL-24749 Type IV Qualified Ground Straps
- Lightweight ArmorLite™ Microfilament Ground Straps

**Metal and Polymer Core Conduit Systems** — H

- Series 72 Annular Polymer Core Conduit Systems
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**Backshells and Other Connector Accessories** — J

- Circular Connector Backshells and Accessories
- Rectangular Connector Backshells and Accessories
- Composite Backshells and Accessories
- EMI/RFI CostSaver Composite Junction Boxes

**Interconnect Assembly Tools** — K

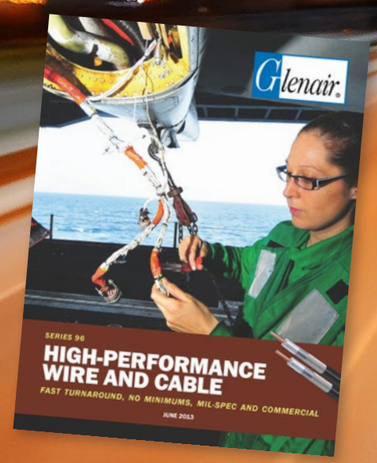
- BandMaster™ ATS EMI/RFI Shield Termination System
- Backshell to Connector Assembly Tools

**High Reliability Cable Assemblies and Integrated Systems** — L

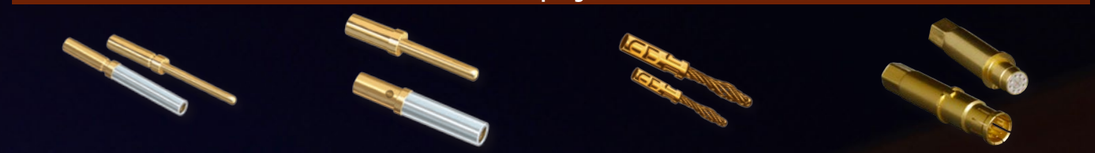
- Overmolded and ASAP Cable Assemblies
- Wired Conduit Assemblies
- Flex Circuit Asssemblies
- Pure Air/Nitrogen Tubing Systems
- Hold-Down Release Mechanisms
- Integrated Systems

# High Performance Connector Contacts, Wire and Cable

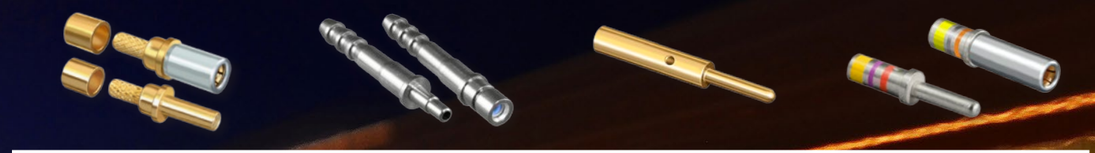


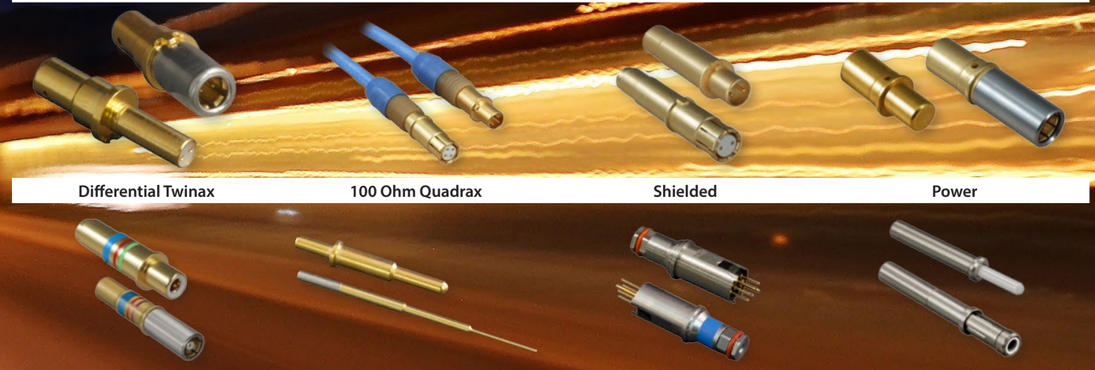

**We Never Lose Contact! A Sampling of Glenair Contact Families**



Standard and High-Density Signal Contacts | TwistPin Contacts | El Ochito®



Coaxial Contacts | Pneumatic Contacts | Wire Adapters | Thermocouple



Differential Twinax | 100 Ohm Quadrax | Shielded | Power



Concentric Twinax | Printed Circuit Board | Opto-Electronic | Fiber Optic Termini

Bulk Interconnect Cable • Data Transmission Wire and Cable • Flex Circuit Design and Manufacturing

**Glenair brings a new perspective to the supply of high-performance Mil-Spec and commercial contacts, wire and cable: High Availability! Whether you need a standard duty socket contact for a MIL-DTL-28840 connector or an extended duty pin for MIL-DTL-38999 Series III, we have you covered with products that are always in stock—with no dollar or quantity minimums. In addition to the broadest selection and availability, Glenair also delivers outstanding interconnection compatibility. Glenair QPL SAE-AS39029 as well as our proprietary contact series are guaranteed to mate properly and perform at the upper limits of application requirements.**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
U.S. CAGE code 06324

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| Military Part Number | Glenair Part Number | Contact Size | Wire Accommodation | Pin / Socket | BIN Color Striping | | |
|---|---|---|---|---|---|---|---|
| M39029/56-348 | 850-001-22-348 | 22 | 22-28 AWG | Socket | Orange | Yellow | Grey |
| M39029/56-351 | 850-001-20-351 | 20 | 20-24 AWG | Socket | Orange | Green | Brown |
| M39029/56-352 | 850-001-16-352 | 16 | 16-20 AWG | Socket | Orange | Green | Red |
| M39029/56-353 | 850-001-12-353 | 12 | 12-14 AWG | Socket | Orange | Green | Orange |
| M39029/56-527 | 850-001-10-527 | 10 | 10 AWG | Socket | Green | Red | Violet |
| M39029/57-354 | 850-003-22-354 | 22 | 22-28 AWG | Socket | Orange | Green | Yellow |
| M39029/57-357 | 850-003-20-357 | 20 | 20-24 AWG | Socket | Orange | Green | Violet |
| M39029/57-358 | 850-003-16-358 | 16 | 16-20 AWG | Socket | Orange | Green | Grey |
| M39029/57-359 | 850-003-12-359 | 12 | 12-14 AWG | Socket | Orange | Green | White |
| M39029/58-360 | 850-002-22-360 | 22 | 22-28 AWG | Pin | Orange | Blue | Black |
| M39029/58-363 | 850-002-20-363 | 20 | 20-24 AWG | Pin | Orange | Blue | Orange |
| M39029/58-364 | 850-002-16-364 | 16 | 16-20 AWG | Pin | Orange | Blue | Yellow |
| M39029/58-365 | 850-002-12-365 | 12 | 12-14 AWG | Pin | Orange | Blue | Green |
| M39029/58-528 | 850-002-10-528 | 10 | 10 AWG | Pin | Green | Red | Grey |
| M39029/63-368 | 850-021-20-368 | 20 | 20-24 AWG | Socket | Orange | Blue | Grey |
| M39029/64-369 | 850-022-20-369 | 20 | 20-24 AWG | Pin | Orange | Blue | White |

| BIN Color Coding | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 BLACK | 1 BROWN | 2 RED | 3 ORANGE | 4 YELLOW | 5 GREEN | 6 BLUE | 7 VIOLET | 8 GREY | 9 WHITE |

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SAE-AS39029
Crimp Contact Selection Guide

A

| Military Part Number | Glenair Part Number | Contact Size | Wire Accommodation | Pin / Socket | BIN Color Striping | | |
|---|---|---|---|---|---|---|---|
| M39029/83-450 | 850-004-20-450 | 20 | 22-26 AWG | Pin | Yellow | Green | Black |
| M39029/83-451 | 850-004-20-451 | 20 | 28-32 AWG | Pin | Yellow | Green | Brown |
| M39029/83-508 | 850-004-20-508 | 20 | 20-24 AWG | Pin | Green | Black | Grey |
| M39029/84-452 | 850-005-20-452 | 20 | 22-26 AWG | Socket | Yellow | Green | Red |
| M39029/84-453 | 850-005-20-453 | 20 | 28-32 AWG | Socket | Yellow | Green | Orange |
| M39029/84-509 | 850-005-20-509 | 20 | 20-24 AWG | Socket | Green | Black | White |
| M39029/106-614 | 850-006-22-614 | 22 | 22-28 AWG | Socket | Blue | Brown | Yellow |
| M39029/106-615 | 850-006-20-615 | 20 | 20-24 AWG | Socket | Blue | Brown | Green |
| M39029/106-616 | 850-006-16-616 | 16 | 16-20 AWG | Socket | Blue | Brown | Blue |
| M39029/106-617 | 850-006-12-617 | 12 | 12-14 AWG | Socket | Blue | Brown | Violet |
| M39029/106-618 | 850-006-10-618 | 10 | 10 AWG | Socket | Blue | Brown | Grey |
| M39029/107-620 | 850-007-22-620 | 22 | 22-28 AWG | Pin | Blue | Red | Black |
| M39029/107-621 | 850-007-20-621 | 20 | 20-24 AWG | Pin | Blue | Black | Brown |
| M39029/107-622 | 850-007-16-622 | 16 | 16-20 AWG | Pin | Blue | Red | Red |
| M39029/107-623 | 850-007-12-623 | 12 | 12-14 AWG | Pin | Blue | Red | Orange |
| M39029/107-624 | 850-007-10-624 | 10 | 10 AWG | Pin | Blue | Red | Yellow |



| BIN Color Coding | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
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| Military Part Number | Glenair Part Number | Contact Size | Pin / Socket | Type | BIN Color Striping | | |
|---|---|---|---|---|---|---|---|
| M39029/27-210 | 852-001-12-210 | 12 | Socket | Coaxial | Red | Brown | Black |
| M39029/27-402 | 852-001-12-402 | 12 | Socket | Coaxial | Yellow | Black | Red |
| M39029/27-403 | 852-001-12-403 | 12 | Socket | Coaxial | Yellow | Black | Orange |
| M39029/27-404 | 852-001-12-404 | 12 | Socket | Coaxial | Yellow | Black | Yellow |
| M39029/27-405 | 852-001-12-405 | 12 | Socket | Coaxial | Yellow | Black | Green |
| M39029/27-406 | 852-001-12-406 | 12 | Socket | Coaxial | Yellow | Black | Blue |
| M39029/27-407 | 852-001-12-407 | 12 | Socket | Coaxial | Yellow | Black | Violet |
| M39029/27-408 | 852-001-12-408 | 12 | Socket | Coaxial | Yellow | Black | Gray |
| M39029/28-211 | 852-002-12-211 | 12 | Pin | Coaxial | Red | Brown | Brown |
| M39029/28-409 | 852-002-12-409 | 12 | Pin | Coaxial | Yellow | Black | White |
| M39029/28-410 | 852-002-12-410 | 12 | Pin | Coaxial | Yellow | Brown | Black |
| M39029/28-411 | 852-002-12-411 | 12 | Pin | Coaxial | Yellow | Brown | Brown |
| M39029/28-412 | 852-002-12-412 | 12 | Pin | Coaxial | Yellow | Brown | Red |
| M39029/28-413 | 852-002-12-413 | 12 | Pin | Coaxial | Yellow | Brown | Orange |
| M39029/28-414 | 852-002-12-414 | 12 | Pin | Coaxial | Yellow | Brown | Yellow |
| M39029/28-415 | 852-002-12-415 | 12 | Pin | Coaxial | Yellow | Brown | Green |
| M39029/59-366 | 852-006-08-366 | 08 | Socket | Coaxial | Orange | Blue | Blue |
| M39029/60-367 | 852-007-08-367 | 08 | Pin | Coaxial | Orange | Blue | Violet |
| M39029/75-416 | 852-003-12-416 | 12 | Socket | Coaxial | Yellow | Brown | Blue |
| M39029/75-417 | 852-003-12-417 | 12 | Socket | Coaxial | Yellow | Brown | Violet |
| M39029/75-418 | 852-003-12-418 | 12 | Socket | Coaxial | Yellow | Brown | Gray |
| M39029/75-419 | 852-003-12-419 | 12 | Socket | Coaxial | Yellow | Brown | White |
| M39029/75-420 | 852-003-12-420 | 12 | Socket | Coaxial | Yellow | Red | Black |
| M39029/75-421 | 852-003-12-421 | 12 | Socket | Coaxial | Yellow | Red | Brown |
| M39029/75-422 | 852-003-12-422 | 12 | Socket | Coaxial | Yellow | Red | Red |
| M39029/75-423 | 852-003-12-423 | 12 | Socket | Coaxial | Yellow | Red | Orange |
| M39029/76-424 | 852-008-16-424 | 16 | Pin | Coaxial | Yellow | Red | Yellow |
| M39029/76-425 | 852-008-16-425 | 16 | Pin | Coaxial | Yellow | Red | Green |

| BIN Color Coding | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 BLACK | 1 BROWN | 2 RED | 3 ORANGE | 4 YELLOW | 5 GREEN | 6 BLUE | 7 VIOLET | 8 GREY | 9 WHITE |

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High-Performance Shielded Contacts
Selection guide

A

| Military Part Number | Glenair Part Number | Contact Size | Pin / Socket | Type | BIN Color Striping | | |
|---|---|---|---|---|---|---|---|
| M39029/76-426 | 852-008-16-426 | 16 | Pin | Coaxial | Yellow | Red | Blue |
| M39029/76-427 | 852-008-16-427 | 16 | Pin | Coaxial | Yellow | Red | Violet |
| M39029/77-428 | 852-009-16-428 | 16 | Socket | Coaxial | Yellow | Red | Gray |
| M39029/77-429 | 852-009-16-429 | 16 | Socket | Coaxial | Yellow | Red | White |
| M39029/77-430 | 852-009-16-430 | 16 | Socket | Coaxial | Yellow | Orange | Black |
| M39029/77-431 | 852-009-16-431 | 16 | Socket | Coaxial | Yellow | Orange | Brown |
| M39029/78-432 | 852-010-16-432 | 16 | Socket | Coaxial | Yellow | Orange | Red |
| M39029/78-433 | 852-010-16-433 | 16 | Socket | Coaxial | Yellow | Orange | Orange |
| M39029/78-434 | 852-010-16-434 | 16 | Socket | Coaxial | Yellow | Orange | Yellow |
| M39029/78-435 | 852-010-16-435 | 16 | Socket | Coaxial | Yellow | Orange | Green |
| M39029/90-529 | 853-001-08-529 | 8 | Pin | Concentric Twinax | Green | Red | White |
| M39029/91-530 | 853-002-08-530 | 8 | Socket | Concentric Twinax | Green | Orange | Black |
| M39029/102-558 | 852-004-12-558 | 12 | Pin | Coaxial | Green | Green | Gray |
| M39029/103-559 | 852-005-12-559 | 12 | Socket | Coaxial | Green | Green | White |
| M39029/113-625 | 853-003-08-625 | 8 | Pin | Concentric Twinax | Blue | Red | Green |
| M39029/113-626 | 853-003-08-626 | 8 | Pin | Concentric Twinax | Blue | Red | Blue |
| M39029/114-628 | 853-004-08-628 | 8 | Socket | Concentric Twinax | Blue | Red | Gray |
| M39029/114-629 | 853-004-08-629 | 8 | Socket | Concentric Twinax | Blue | Red | White |
| N/A | 854-001-01 | 8 | Pin | Quadrax | N/A | | |
| N/A | 854-001-02 | 8 | Pin | Quadrax | N/A | | |
| N/A | 854-001-03 | 8 | Pin | Quadrax | N/A | | |
| N/A | 854-001-04 | 8 | Pin | Quadrax | N/A | | |
| N/A | 854-001-05 | 8 | Pin | Quadrax | N/A | | |
| N/A | 854-002-01 | 8 | Socket | Quadrax | N/A | | |
| N/A | 854-002-02 | 8 | Socket | Quadrax | N/A | | |
| N/A | 854-002-03 | 8 | Socket | Quadrax | N/A | | |
| N/A | 854-002-04 | 8 | Socket | Quadrax | N/A | | |
| N/A | 854-002-05 | 8 | Socket | Quadrax | N/A | | |

BIN Color Coding

| 0 BLACK | 1 BROWN | 2 RED | 3 ORANGE | 4 YELLOW | 5 GREEN | 6 BLUE | 7 VIOLET | 8 GREY | 9 WHITE |
|---|---|---|---|---|---|---|---|---|---|

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## Size #12 Differential Twinax Contacts for Multi-Gigabit Data Rate Applications

| Glenair Part No. | Cable | Impedence | Frequency Range | VSWR | Insertion Loss |
|---|---|---|---|---|---|
| Socket = 853-015-01<br>Pin = 853-016-01 | 859-041<br>963-001 | 100-Ohms Nominal | DC to 10 GHz | 1.1 + (.03 * F GHz) | 1.3 *F GHz |



## 050-301 Size #8 Contact Cavity Optoelectronic Insert Transmitter and Receiver

- ARINC 664, 801, 803, 804, and 818 standard compliant
- Data rates from 125Mbps to 3.8 Gbps for transmitter, 125Mbps to 4.25Gbps for receiver
- Supports fast and Gigabit Ethernet, AFDX, 1x/2x Fibre Channel, DVI, HDMI, SFPDP, Serial Rapid I/O (sRIO).
- ARINC 801 1.25mm/2.5mm ceramic fiber ferrule, or expanded beam



## Thermocouple Contacts to Fit D38999 Series I, II, III and IV Connectors



| Glenair Part No. | Military Part No. | AWG Wire Size |
|---|---|---|
| Pin = 850-023 | Pin = AS39029/87 | 16–28 |
| Series I, III, IV Socket = 850-024 | Series I, III, IV Socket = AS39029/88 | |
| Series II Socket = 850-025 | Series II Socket = AS39029/89 | |
| Custom PCB and crimp termination thermocouples available in type K, E, J, N and more. | | |

## Wire-to-Contact Expansion and Reducer Adapters

| Glenair Part No. | Finish | Wire Accommodation | Contact Wire Barrel Size |
|---|---|---|---|
| 687-348 | Z2 - Gold Plate<br>Z3 - Silver Plate<br>Z4 - Tin Plate | 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 0-4 | 4, 8, 12, 16, 20, 22 |
| 859-015 | | 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 | 10, 12, 16, 20, 22 |



## PCB Contacts to Fit MIL-DTL-38999/20 and /24 Rear-Release Connectors



| Mating End Size | Glenair Part Number |
|---|---|
| 22 | 850-010-22 |
| 20 | 850-010-20 |
| 16 | 850-010-16 |
| 12 | 850-010-12 |



| Mating End Size | Glenair Part Number |
|---|---|
| 22 | 850-011-22 |
| 20 | 850-011-20 |
| 16 | 850-011-16 |
| 12 | 850-011-12 |

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## High-Power and LouverBand Contacts



| High-Power Contacts | | |
|---|---|---|
| Contact Cavity Size | Wire Accommodation | Glenair Part Number |
| 8 | 8 AWG | 850-013 (Socket)<br>850-014 (Pin) |



High ampacity LouverBand contacts for use in Glenair Series 970 PowerTrip™
850-026 (pin) 850-027 (skt)

## High-Pressure Assemblies for Pure Gas Pneumatic/Hydraulic Applications



831-001 #12 Gas Tube Assembly
for MIL-DTL-38999 Series I, III, and IV



D38999 Ser. I, III, IV

## Size #12 Pneumatic Contacts



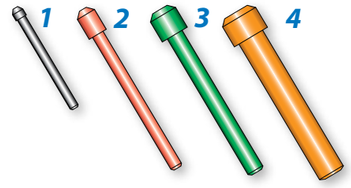
| Contact Type | For Use In | Part Number |
|---|---|---|
| Socket | D38999 Type Series I, III, IV | 830-005 |
| Socket | D38999 Series II, Series 79 and Series 80 | 830-004[1] |



| Contact Type | For Use In | Part Number |
|---|---|---|
| Pin | D38999 Type, All Series , Series 80 and Series 79 | 830-003[2] |

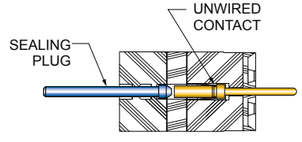
1. 830-004 supersedes 857-010
2. 830-003 supersedes 857-011

## Grommet Sealing Plugs




| Fig. | Size | Color | Part Number | Military Part Number |
|---|---|---|---|---|
| 1 | #23 | Black | 809-155 | (None) |
| 2 | #20 | Red | 859-012 | MS27488-20-2 |
| 3 | #16 | Green | 859-013 | MS27488-16-2 |
| 4 | #12 | Orange | 859-014 | MS27488-12-2 |

All sizes available and in Same-Day stock.
Consult factory for more information.




## Crimp Tool And Positioner For #12, #16 and #20 Power Contacts, Crimp Adapters




**1** Crimp tool for use with size #20, #16 and #12 power pins. 9.75 inches OAL, 1.25 pounds. Use with M39029/57 and /58 contacts and 809-093 adapters.

**2** Positioner for use with 809-093 adapters.

**3** Positioner for use with size #20, #12 and #16 Power contacts.

Glenair offers a complete line of crimp tools in Same-Day stock.

| Figure | Part Number | Military Part Number | Daniels Part Number |
|---|---|---|---|
| 1 | 809-136 | M22520/1-01 | AF8 |
| 2 | 809-137 | M22520/1-04 | TH163 |
| 3 | 809-138 | (none) | TH653 |

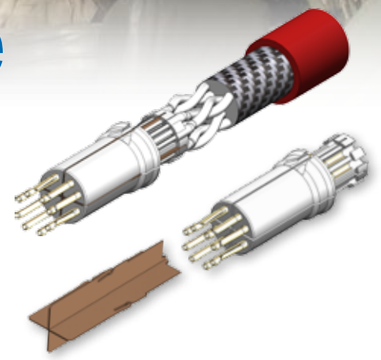
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# El Ochito™: The Ultimate Ethernet Contact

**"The Little Eight": Eight miniaturized contacts in a standard size #8 shielded module—10G Ethernet ready, with dramatic size and weight reduction compared to all other available solutions**

- **One full Ethernet channel per standard size #8 cavity**
- **Fast and easy crimp termination of wires to contacts—PC Tails available**
- **100% drop-in solution to installed connectors—no redesign or reinstallation of interfaces**
- **Supplied as crimp contacts, wire pigtails, or in PC tail configurations in the connector of your choice—up to 8 Ochito modules in a size 25 D38999**
- **Integral spline and short termination maximizes interconnect/cable performance and minimizes crosstalk**
- **El Ochito™ delivers the highest density contact system available—twice the density of Quadrax, split Quadrax, or other shielded contact solutions**
- **Tested, qualified, and in-stock for immediate shipment**



**El Ochito™ exploded view: High mating durability, lightweight contact system with 100 Ohm shielded performance. Note wire twist maintained to contact pair to minimize characteristic impedance mismatch. Also, Conductive isolation shield dramatically reduces crosstalk**





**El Ochito™ is a drop-in solution for Series 80 Mighty Mouse, as well as D38999 Series III, EN4165, EN3645, and other ARINC standards and is ideally suited for Ethernet, high-definition video, high-speed data loading, and other 1Gb/sec and 10Gb/sec applications.**


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# El Ochito™: The Ultimate Ethernet Contact



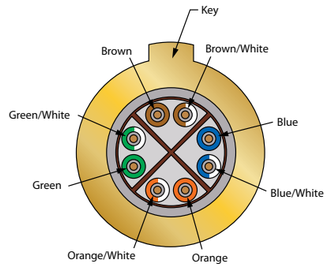
| How-To-Order El Ochito™ Contacts | |
|---|---|
|  |  |
| **858-003**<br>Size 8 Ochito<br>26-AWG crimp Pin | **858-004**<br>Size 8 Ochito<br>26-AWG crimp Socket |



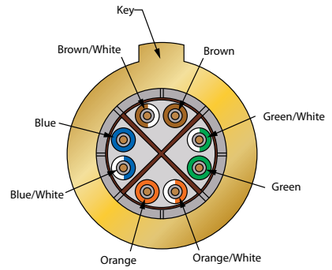



**El Ochito™ utilizes Stinger™ contact technology. These small, durable, low mating force contacts provide El Ochito™ with optimized performance.**

**Pin Interface**

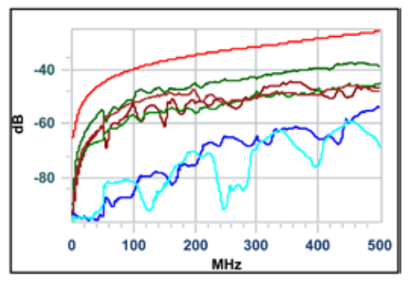



**Socket Interface**

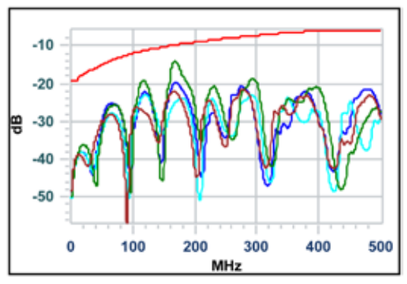



**Recommended wire-to-contact assignments**

| Contact Performance Specifications | |
|---|---|
| **Temperature Range** | -55°C to +175°C |
| **Environmental Sealing** | IAW connector specification |
| **Corrosion Resistance** | 48 hours salt spray |
| **Fire, Smoke and Toxicity** | IAW FAR 25 |
| **EMI Shielding** | 360° shielding for each pair |
| **Nominal Current** | 1 Amp |
| **Contact Resistance** | Max 60 milliohms |
| **Wire** | IAW TIA/EIA Cat 6A and ISO EA |
| **Mating Cycles** | > 500 |
| **DWV** | 500 VAC RMS sea level |




**Near End Crosstalk · Cat 6a · 500 MHz**




**Return Loss · Cat 6a · 500 MHz**

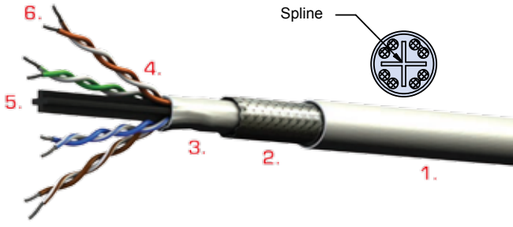
## AEROSPACE-GRADE CAT 6a CABLE FOR OCHITO CONTACTS 963-003-26

### CABLE PHYSICAL DATA

- Conductors: 26AWG stranded SPC
- Shield coverage: 80% (braid)
- Temperature: -55°C to +200°C
- Outer diameter: 0.220" (5.6mm)
- Minimum bend radius: 1.13" (28.7mm)
- Weight (lbs/100 ft): 3.05 (4.54 kg/100m)

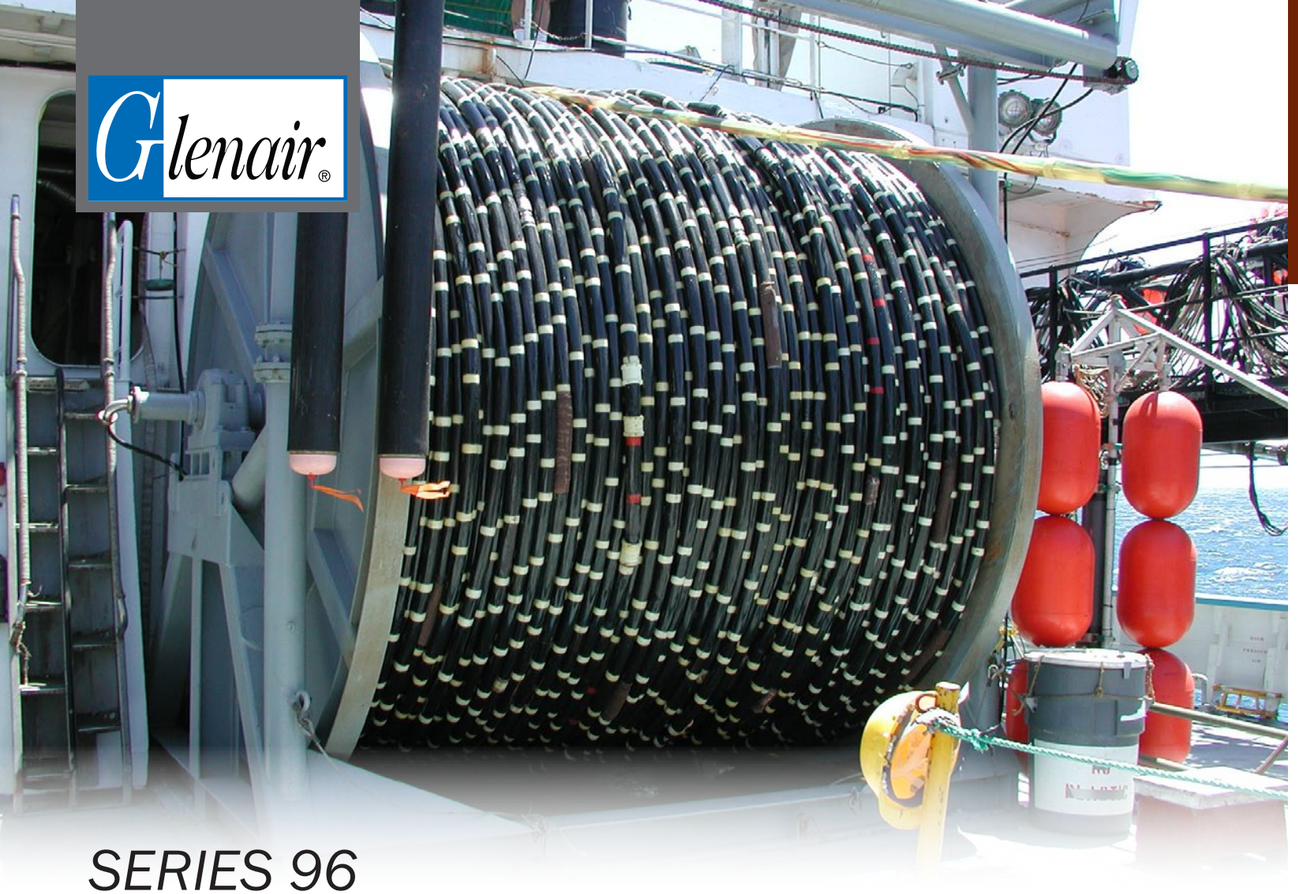
### CABLE CONSTRUCTION

1. White PTFE laser-printable jacket
2. Silver-plated copper shield
3. Fluoropolymer tape
4. PFA insulation
5. Fluoropolymer spline
6. Silver-plated copper conductors





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SERIES 96

# High-Performance Bulk Cable for Interconnect Applications

## Rugged high-performance environmental and EMC interconnect cable designs—from chemically-resistant jacketed solutions to high-flexibility power transmission cable

NO MINS. No Dollar or Quantity Minimum Orders

Glenair is pleased to offer our customers custom bulk cable for on-site termination. Glenair cables are designed and manufactured for optimal performance in mission-critical applications such as soldier systems, medical equipment, aerospace, geophysical and other military and commercial environments that rely on guaranteed signal integrity and cable durability. Cable jacketing, braiding and shielding technologies are specified according to application type, and the unique requirements of inner conductors including non-impedance-controlled signal wire, shielded multi-conductor cables, Coaxial, Quadrax, flexible power, fiber optic, and so on. Glenair cables are designed to optimize flexibililty, weight reduction, ruggedness, and insulator quality. Our protocol-specific cables are offered with guidance as to shielding properties, impedance performance, attenuation, temperature rating, bend radius, weight, and maximum practical distance.



**Coiled cable configurations for radio and comms applications are a Glenair specialty**

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# High-Performance Custom Bulk Cable for Interconnect Applications





**Rugged environmental jacketing in a broad range of material types and colors**

- **Extruded, blown-on and heat shrink jacketing for harsh application environments**
- **General purpose polyurethane**
- **Low-smoke, zero halogen Duralectric™**
- **Chemically-resistant Viton®**
- **Industry standard neoprene**
- **Selected materials CBRN tested**

## High-performance cable and jacketing materials for every application requirement: Immersion, chemical or caustic fluid exposure, temperature extremes, and UV radiation.

RoHS COMPLIANT

| Custom Capabilities | |
|---|---|
| **TurboFlex** | Highly flexible interconnect conductors and cables for power distribution applications |
| **Duralectric** | High-performance, flexible jacket material with outstanding resistance to environmental stress factors including heat, UV radiation and caustic chemicals |
| **Multiconductor cables** | Custom cables for unique applications such as robotics, defense electronics, and soldier systems |
| **Overbraiding** | Extensive range of conductive and non-conductive wire and fabric braid materials, including ultra-lightweight composites and micro-filaments |

turboflex™ THE ULTRA FLEXIBLE RUGGED POWER CABLE

TurboFlex™ power distribution cables are constructed from highly flexible conductors and high-performance insulation to produce cables ideally suited for applications where flexibility, durability, and weight reduction are required. Amazingly durable and flexible—especially in cold weather—the 16 AWG to 450 MCM TurboFlex cable features high strand count rope lay inner conductors made with copper-, tin-, nickel- and silver-plated copper. TurboFlex is jacketed with Glenair's unique Duralectric™ compound that provides outstanding flexibility and resistance to environmental and caustic chemical exposure. Duralectric is also halogen-free, flame resistant and has a low smoke index, appropriate for interior applications. Long life and performance are critical in power distribution applications. TurboFlex, with its flexible conductors and durable jacket delivers both.




**Available in a broad range of gages, 16 AWG to 450 MCM**

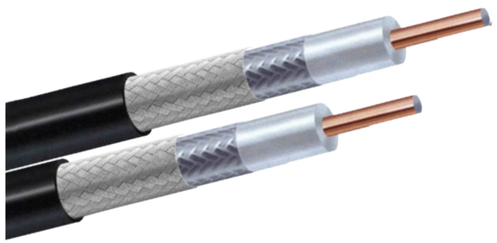


**Glenair's vertically integrated connector, hardware and cable facilities are perfectly positioned to supply catalog and custom short cable runs for the broad range of interconnect applications.**



**In-stock and available for immediate, same-day shipment. No minimums!**

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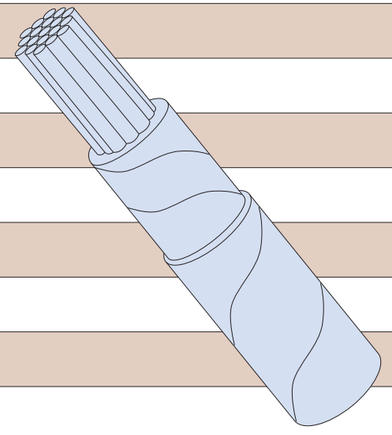
High-Speed Coaxial Cable

- **One-stop shopping for general-purpose, high-speed, and protocol-specific/ specialty wire and cable**
- **No minimum orders. Glenair wire and cable part numbers are in stock and ready for immediate, same-day shipment**
- **M22759 single-ended data transmission wire, high-speed Quadrax cable, 50 and 75 Ohm Coaxial cable, as well as unique protocol-specific wire solutions**
- **Custom marking available**

## High availability, high-speed wire and cable for digital and RF applications—No minimum orders or minimum cable runs

| Wire Type | Application | Commonly Used With |
|---|---|---|
| M22759 Single-Ended Data Transmission Wire | Non-impedance controlled signal applications | Non-shielded 39029 contacts |
| Quadrax Cable | 10/100/1000BASE-T Ethernet applications | 854-001/854-002 Quadrax contacts |
| Coaxial Cable | 50 Ohm/75 Ohm RF transmission | Size #16, #12, #8 Coaxial pin and socket contacts |
| Protocol Specific Cables | Commercial digital data device connections including Ethernet, USB, SATA/eSATA, Spacewire, LVDS/CML | High Speed Mighty Mouse<br>Mighty Mouse with Ultra-Twinax Differential Twinax contacts<br>SuperSeal USB/RJ45 |

| M22759 Hookup Wire |
|---|
| **M22759/11**<br>Silver Coated Copper Wire with Extruded PTFE Insulation |
| **M22759/16**<br>Tin Coated Copper Wire with Extruded ETFE Insulation |
| **M22759/18**<br>Tin Coated Copper Wire with Thin-Wall Extruded ETFE Insulation |
| **M22759/32**<br>Tin Coated Copper Wire with Crosslinked, Modified ETFE Insulation |
| **M22759/33**<br>Silver Coated Copper Wire with Crosslinked, Modified ETFE Insulation |
| **M22759/34**<br>Tin Coated Copper Wire with Overall Braid and Extruded ETFE Insulation |
| **M22759/44**<br>Silver Coated Copper Wire with Crosslinked, Extruded ETFE Insulation |
| **M22759/45**<br>Nickel Coated Copper Wire with Crosslinked, Extruded ETFE Insulation |
| **M22759/46**<br>Nickel Coated High Strength Copper Wire with Crosslinked, Extruded ETFE Insulation |
| **M22759/90**<br>Nickel Coated High Strength Copper Wire with Double Layer Tape Wrap Insulation |

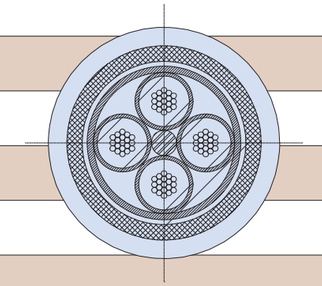


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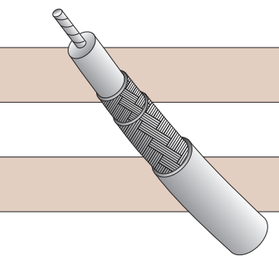
DATA TRANSMISSION
Wire and Cable

A

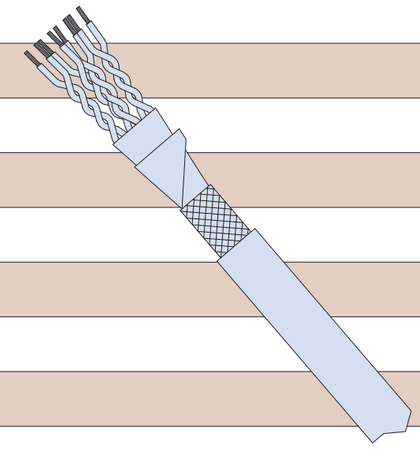
| Quadrax Cable |
|---|
| **963-019**<br>100 Ohm Ethernet Cable with 22 AWG Conductors, FEP Jacket |
| **963-020**<br>100 Ohm Ethernet Cable with 24 AWG Conductors , FEP Jacket |
| **963-021**<br>100 Ohm Ethernet Cable with 26 AWG Conductors , FEP Jacket |
| **963-022**<br>100 Ohm Ethernet Cable with 24 AWG Conductors, FEP Jacket, Without PTFE Binder |
| **963-023**<br>100 Ohm Ethernet Cable with 24 AWG Conductors, ETFE Jacket |
| **963-024**<br>100 Ohm Ethernet Cable with 26 AWG Conductors, ETFE Jacket |



| Coax Cable |
|---|
| **962-001**<br>TFlex® Low Loss Microwave 50 Ohm Coaxial Cable |
| **962-002**<br>M17/93 - RG178 General-Duty 50 Ohm High-Frequency Coaxial Cable with Extended Temperature Range |
| **962-003**<br>M17/94 - RG179 75 Ohm High-Frequency Coaxial Cable with Extended Temperature Range |
| **962-004**<br>M17/113 - RG316 Low-Loss 50 Ohm High Frequency Coaxial Cable with Extended Temperature Range |
| **962-005**<br>M17/152-00001 (RG316-DS) Double Shield 50 Ohm Coaxial Cable with Extended Temperature Range |



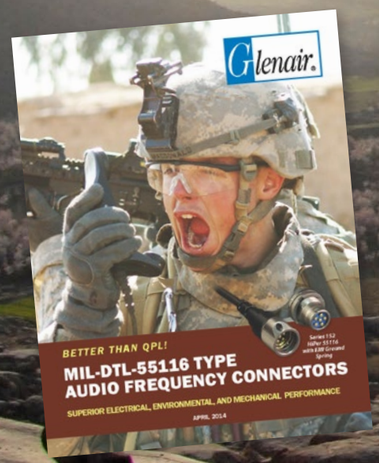
| Protocol-Specific Cable |
|---|
| **963-001**<br>100 Ohm differential parallel pair data cable |
| **963-002**<br>1000 BASE-T Ethernet Cable with Polyurethane Jacket |
| **963-003**<br>10G BASE-T Ethernet Cable with FEP Jacket |
| **963-004**<br>10G BASE-T Ethernet Cable with PVC Jacket |
| **963-005**<br>USB 2.0 Cable with FEP, Polyurethane or No Jacket |
| **963-012**<br>USB 3.0 Cable with Polyurethane Jacket |
| **963-006**<br>110 Ohm Firewire Quad Cable with FEP, Polyurethane or No Jacket |
| **963-013**<br>100 Ohm SATA/eSATA Cable with Polyurethane Jacket |
| **GWSM**<br>Glenair Spacewire Micro-D |

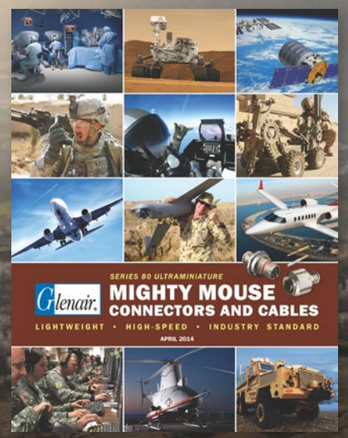


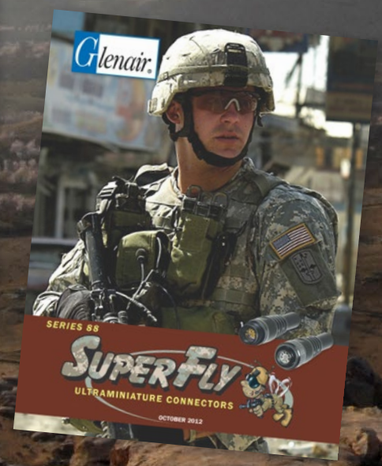
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# Ultraminiature Circular Connectors

## save weight • save space • enhance performance




Glenair designs and manufactures the world's broadest and deepest selection of ultraminiature circular connectors for tactical field applications, reduced size and weight aerospace systems, mission-critical satellite payloads, robotic medical/surgical equipment and more. Our Series 80 Mighty Mouse has become a new industry standard—both in and outside the high-performance mil-aero marketplace—and is now used in numerous industrial applications as well. The Series 88 SuperFly™ is just our latest offering in our ultraminiature circular product family that continues to expand year-after-year to meet evolving requirements for small-form-factor I/O and board-level interconnects.

**Ultraminiature Circular Connectors Selection Guide**



Series 80 Mighty Mouse | Series 811 Mighty Mouse HD | Series 80 Mighty Mouse SuperSeal USB



Series 88 SuperFly™ | HiPer 55116 Audio Frequency Connectors | Series 15 "CB" Audio Connectors

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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B



Size and weight comparison of Series 801 Mighty Mouse (7 Contacts)…

…to MIL-DTL-38999 (6 Contacts) Up to 71% weight savings and 52% size savings

## Series 80 Mighty Mouse: Half the size and weight of MIL-DTL-38999 with comparable ratings, features, and performance

The Series 80 Mighty Mouse Connector is designed for use in high-reliability, mission-critical applications—from commercial aerospace to soldier systems—that require robust environmental and EMC performance as well as reduced size and weight. The Series 80 Mighty Mouse connector offers comparable performance to MIL-DTL-38999 interconnects with up to 71% weight and 52% size savings for similar contact layouts. The industry-standard Mighty Mouse is a mature connector series with a proven range of catalog and custom configurations.

- **67 contact arrangements ranging from 1 – 130 contacts**
- **MIL-DTL-38999 caliber environmental, mechanical, and electrical performance**
- **Ultraminiature #23 contacts set on .076" centers**
- **Size #20, #20HD, #16, #12, #8 signal, power, fiber optic and shielded contacts**
- **Discrete connectors and turnkey cable assemblies**



EMI/EMP filter-class connectors also available in every Mighty Mouse series

**Series 80 Mighty Mouse *Environmental* Connectors**

| Series 800 | Series 801 | Series 802 | Series 803 | Series 804 | Series 805 |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Light-Duty UNF Thread | Rugged Double-Start ACME Thread | 3500 PSI AquaMouse | Fast-Mate Bayonet Coupling | Quick-Disconnect Push-Pull | Ratcheted Triple-Start |

**Series 80 Mighty Mouse *Hermetic* Receptacles**

| Series 800 | Series 801 | Series 802 | Series 803 | Series 804 | Series 805 |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

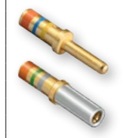
- Vitreous glass sealing
- $1X10^{-7}$ cc/sec maximum helium leak rate
- Solder-cup and PC tail terminations
- 304L stainless steel shells
- Alloy 52 iron alloy contacts
- Solder-mount, square flange or jam nut



SERIES 80
Mighty Mouse Connectors and Cables

B

**Series 80 Mighty Mouse Contact Arrangements**

| Contact Size and Current Rating | | Contact Quantity #23 | #20 | #20HD | #16 | #12 | #8 | Contact Arrangement* Series 800 | Series 801 | Series 802 | Series 803 | Series 804 | Series 805 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size #23 Contacts 5 Amp Max. Current #22–#28 AWG **750 VAC DWV** |  | 3 | | | | | | 5-3 | 5-3 | 5-3 | 5-3 | 5-3 | N/A |
| | | 4 | | | | | | 6-4 | 6-4 | 6-4 | 6-4 | 6-4 | 8-4 |
| | | 6 | | | | | | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 8-6 |
| | | 7 | | | | | | 6-7 | 6-7 | 6-7 | 6-7 | 6-7 | 8-7 |
| | | 10 | | | | | | 7-10 | 7-10 | 7-10 | 7-10 | 7-10 | 9-10 |
| | | 13 | | | | | | 8-13 | 8-13 | 8-13 | 8-13 | 8-13 | 10-13 |
| | | 19 | | | | | | 9-19 | 9-19 | 9-19 | 9-19 | 9-19 | 11-19 |
| | | 26 | | | | | | 10-26 | 10-26 | 10-26 | 10-26 | 10-26 | 12-26 |
| | | 31 | | | | | | N/A | 11-31 | N/A | N/A | 11-31 | 13-31 |
| | | 37 | | | | | | 12-37 | 13-37 | 12-37 | 12-37 | 12-37 | 15-37 |
| | | 55 | | | | | | N/A | 16-55 | 14-55 | 14-55 | 14-55 | 18-55 |
| | | 85 | | | | | | N/A | 17-85 | 15-85 | N/A | N/A | 19-85 |
| | | 100 | | | | | | N/A | 19-100 | N/A | N/A | N/A | 21-100 |
| | | 130 | | | | | | N/A | 21-130 | 21-130 | N/A | N/A | 23-130 |
| Size #20HD Contacts 7.5 Amp Max.Current #20–#24 AWG **1000 VAC DWV** |  | | | 3 | | | | 6-23 | 6-23 | 6-23 | 6-23 | 6-23 | 8-23 |
| | | | | 5 | | | | 7-25 | 7-25 | 7-25 | 7-25 | 7-25 | 9-25 |
| | | | | 8 | | | | 8-28 | 8-28 | 8-28 | 8-28 | 8-28 | 10-28 |
| | | | | 10 | | | | 9-210 | 9-210 | 9-210 | 9-210 | 9-210 | 11-210 |
| | | | | 20 | | | | 12-220 | 13-220 | 12-220 | 12-220 | 12-220 | 15-220 |
| | | | | 35 | | | | N/A | 16-235 | 14-235 | 14-235 | 14-235 | 18-235 |
| | | | | 41 | | | | N/A | 17-241 | 15-241 | N/A | N/A | 19-241 |
| | | | | 55 | | | | N/A | 19-255 | N/A | N/A | N/A | 21-255 |
| | | | | 69 | | | | N/A | 21-269 | 21-269 | N/A | N/A | 23-269 |
| Size #16 Contacts 13 Amp Max. Current #16–#20 AWG **1800 VAC DWV** |  | | | | 1 | | | 6-1 | 6-1 | 6-1 | 6-1 | 6-1 | 8-1 |
| | | | | | 2 | | | 8-2 | 8-2 | 8-2 | 8-2 | 8-2 | 10-2 |
| | | | | | 4 | | | 9-4 | 9-4 | 9-4 | 9-4 | 9-4 | 11-4 |
| | | | | | 5 | | | 10-5 | 10-5 | 10-5 | 10-5 | 10-5 | 12-5 |
| | | | | | 7 | | | 12-7 | 13-7 | 12-7 | 12-7 | 12-7 | 15-7 |
| | | | | | 12 | | | N/A | 16-12 | 14-12 | 14-12 | 14-12 | 18-12 |
| | | | | | 14 | | | N/A | 17-14 | 15-14 | N/A | N/A | 19-14 |
| | | | | | 19 | | | N/A | 19-19 | N/A | N/A | N/A | 21-19 |
| | | | | | 22 | | | N/A | 21-22 | 21-22 | N/A | N/A | 23-22 |
| Size #12 Contacts 23 Amp Max. Current #12–#14 AWG **1800 VAC DWV** |  | | | | | 1 | | 7-1 | 7-1 | 7-1 | 7-1 | 7-1 | 9-1 |
| | | | | | | 2 | | 10-2 | 10-2 | 10-2 | 10-2 | 10-2 | 12-2 |
| | | | | | | 2 | | 12-2 | 13-2 | 12-2 | 12-2 | 12-2 | 15-2 |
| | | | | | | 3 | | 12-3 | 13-3 | 12-3 | 12-3 | 12-3 | 15-3 |
| | | | | | | 5 | | N/A | 16-5 | 14-5 | 14-5 | 14-5 | 18-5 |
| | | | | | | 7 | | N/A | 17-7 | 15-7 | N/A | N/A | 19-7 |
| | | | | | | 12 | | N/A | 21-12 | 21-12 | N/A | N/A | 23-12 |
| Size #8 Contacts 46 Amp Max. Current #8 AWG **1800 VAC DWV** |  | | | | | | 1 | N/A | 8-1 | N/A | N/A | N/A | 10-1 |
| | | | | | | | 2 | N/A | 16-2 | N/A | N/A | N/A | 18-2 |
| | | | | | | | 3 | N/A | 17-3 | N/A | N/A | N/A | 19-3 |
| | | | | | | | 4 | N/A | 19-4 | N/A | N/A | N/A | 21-4 |
| | | | | | | | 5 | N/A | 21-5 | N/A | N/A | N/A | 23-5 |
| Combo Arrangements 750 VAC DWV | Size #23 and #12 Contacts | 12 | | | | 1 | | 10-200 | 10-200 | 10-200 | 10-200 | 10-200 | 12-200 |
| | | 4 | | | | 2 | | 10-201 | 10-201 | 10-201 | 10-201 | 10-201 | 12-201 |
| | | 6 | | | | 2 | | 12-200 | 13-200 | 12-200 | 12-200 | 12-200 | 15-200 |
| | | 10 | | | | 2 | | 12-201 | 13-201 | 12-201 | 12-201 | 12-201 | 15-201 |
| | Size #23 and #16 Contacts | 4 | | | 2 | | | 9-200 | 9-200 | 9-200 | 9-200 | 9-200 | 11-200 |
| | | 8 | | | 2 | | | 10-202 | 10-202 | 10-202 | 10-202 | 10-202 | 12-202 |
| | Size #23 and #20 Contacts | 4 | 2 | | | | | 8-200 | 8-200 | 8-200 | 8-200 | 8-200 | 10-200 |
| | | 8 | 2 | | | | | 9-201 | 9-201 | 9-201 | 9-201 | 9-201 | 11-201 |
| Combo Arrangements 1300 VAC DWV | Size #23 and #16 Contacts | 20 | | | 2 | | | 12-202 | 13-202 | 12-202 | 12-202 | 12-202 | 15-202 |
| | | 12 | | | 4 | | | 12-203 | 13-203 | 12-203 | 12-203 | 12-203 | 15-203 |
| | | 40 | | | 2 | | | N/A | 16-204 | 14-204 | 14-204 | 14-204 | 18-204 |
| | | 32 | | | 4 | | | N/A | 16-205 | 14-205 | 14-205 | 14-205 | 18-205 |
| | | 40 | | | 4 | | | N/A | 17-203 | 15-203 | N/A | N/A | 19-203 |
| | Size #23 and #12 Contacts | 12 | | | | 2 | | 12-204 | 13-204 | 12-204 | 12-204 | 12-204 | 15-204 |
| | | 4 | | | | 4 | | 12-205 | 13-205 | 12-205 | 12-205 | 12-205 | 15-205 |
| | | 34 | | | | 2 | | N/A | 16-206 | 14-206 | 14-206 | 14-206 | 18-206 |
| | | 20 | | | | 4 | | N/A | 16-207 | 14-207 | 14-207 | 14-207 | 18-207 |
| | | 28 | | | | 4 | | N/A | 17-204 | 15-204 | 15-204 | 15-204 | 19-204 |
| | Size #23 and #8 Contacts | 32 | | | | | 1 | N/A | 16-208 | N/A | N/A | N/A | 18-208 |
| | | 40 | | | | | 1 | N/A | 17-205 | N/A | N/A | N/A | 19-205 |
| | | 44 | | | | | 2 | N/A | 19-201 | N/A | N/A | N/A | 21-201 |
| | | 12 | | | | | 4 | N/A | 19-202 | N/A | N/A | N/A | 21-202 |
| | | 28 | | | | | 4 | N/A | 21-200 | N/A | N/A | N/A | 23-200 |

* DWV rating is applicable to contact arrangements shown.



SERIES 824

# Mighty Mouse

## LOCKING PUSH-PULL CONNECTORS

Introducing the new Mighty Mouse Series 824 Locking Push-Pull Connector: all the familiar size, weight and performance advantages of the industry-standard Mighty Mouse 804 push-pull connector with a revolutionary low-profile locking coupling mechanism. Glenair's primary design goal in the development of the locking 824 was to bring mil-spec caliber connector performance to locking push-pull applications. The Series 824 Locking Push-Pull provides superior sealing, excellent EMI protection, low-profile ergonomic mating and demating, and easy crimp contact termination. The locking push-pull mechanism delivers visual, tactile, and audible mating confirmation under even the most extreme field conditions. Built for long-term durability and reduced size and weight, the high-density Series 824 Locking Push-Pull connector far surpasses commercial caliber push-pull connectors.

| Specifications | |
|---|---|
| Current Rating | #23 5 AMPS, #16 13 A., #12 23 A. |
| Dielectric Withstanding Voltage | #23 500 VAC RMS, #12 and #16 1800 VAC RMS |
| Insulation Resistance | 5000 megohms minimum |
| Operating Temperature | -65° C to +150° C |
| Shock / Vibration | 100 g / 16 g |
| Shell-to-Shell Resistance, Nickel Plated | 2 milliohms maximum |
| Durability | 500 mating cycles |
| Breakaway Force | 50 pounds minimum |

**Gold plated crimp contacts for #12 to #30 AWG wire**



- **Fast mating, quick-release coupling mechanism**
- **31 insert arrangements**
- **Integrated cable shield termination platform**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**

SERIES 824

# Mighty Mouse

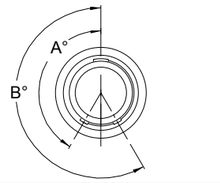
## LOCKING PUSH-PULL CONNECTORS



| How To Order Series 824 Locking Push-Pull Plug | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Part Number** | **824-001** | **-06** | **M** | **8-1** | **P** | **A** |
| **Product Series** | **824-001** Mighty Mouse Locking Push-Pull cable plug with integrated shield termination platform | | | | | |
| **Shell Style** | **-06** - Plug | | | | | |
| **Shell Material/Finish** | See Table II | | | | | |
| **Shell Size/Contact Arrangement** | See Table I | | | | | |
| **Contact Type** | Connector supplied with contacts: **P** - Pin **S** - Socket | | | | Connector supplied without contacts: **A** - Pin **B** - Socket | |
| **Shell Key Position** | Omit for single polarizing key. **A** (normal), **B**, **C**, **D**, **E**, **F** polarizing options per Table III | | | | | |

| How To Order Series 824 Locking Push-Pull Receptacle | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Part Number** | **824-003** | **-01** | **M** | **8-1** | **P** | **A** |
| **Product Series** | **824-003** Mighty Mouse Locking Push-Pull cable receptacle with integrated shield termination platform | | | | | |
| **Shell Style** | **-01** - In-Line **-07** - Rear-Panel Jam Nut Mount **-00** - Front-Panel Jam Nut Mount | | | | | |
| **Shell Material/Finish** | See Table II | | | | | |
| **Shell Size/Contact Arrangement** | See Table I | | | | | |
| **Contact Type** | Connector supplied with contacts: **P** - Pin **S** - Socket | | | | Connector supplied without contacts: **A** - Pin **B** - Socket | |
| **Shell Key Position** | Omit for single polarizing key. **A** (normal), **B**, **C**, **D**, **E**, **F** polarizing options per Table III | | | | | |

| Table III: Alternate Key Positions | | |
|---|---|---|
| Position | A° | B° |
| A | 150° | 210° |
| B | 45° | 210° |
| C | 45° | 230° |
| D | 140° | 315° |
| E | 150° | 315° |




| Table II: Material and Finish | |
|---|---|
| **M** | Aluminum/Electroless Nickel RoHS Compliant |
| **NF** | Aluminum/Cadmium with Olive Drab Chromate |
| **ZR** | Aluminum/Zinc-Nickel with Non-Reflective Black Chromate RoHS Compliant |
| **MT** | Aluminum/Nickel-PTFE RoHS Compliant |
| **Z1** | Stainless Steel/Passivated RoHS Compliant |

### MATERIAL/FINISH

Barrel: Copper Alloy
Shell/Release Sleeve: Aluminum Alloy or CRES
Insulators: Liquid Crystal Polymer
Interfacial Seal, O-Ring, Grommet: Fluorosilicone
Contacts: Copper Alloy/Gold over Nickel Plating
Spring: CRES/Gold Plated

| Table I: Contact Arrangements | | | | | |
|---|---|---|---|---|---|
| Contact Arr. | No. of Contacts #23 | #20 | #20HD | #16 | #12 |
| 5-3 | 3 | | | | |
| 6-1 | | | | 1 | |
| 6-23 | | | 3 | | |
| 6-4 | 4 | | | | |
| 6-6 | 6 | | | | |
| 6-7 | 7 | | | | |
| 7-1 | | | | | 1 |
| 7-25 | | | 5 | | |
| 7-10 | 10 | | | | |
| 8-2 | | | | 2 | |
| 8-28 | | | 8 | | |
| 8-13 | 13 | | | | |
| 8-200 | 4 | 2 | | | |
| 9-4 | | | | 4 | |
| 9-210 | | | 10 | | |
| 9-19 | 19 | | | | |
| 9-200 | 4 | | | 2 | |
| 9-201 | 8 | 2 | | | |
| 10-2 | | | | | 2 |
| 10-5 | | | | 5 | |
| 10-26 | 26 | | | | |
| 10-200 | 12 | | | | 1 |
| 10-201 | 4 | | | | 2 |
| 10-202 | 8 | | | 2 | |
| 12-2 | | | | | 2 |
| 12-3 | | | | | 3 |
| 12-7 | | | | 7 | |
| 12-220 | | | 20 | | |
| 12-37 | 37 | | | | |
| 12-200 | 6 | | | | 2 |
| 12-201 | 10 | | | | 2 |

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# MIGHTY MOUSE
# Cobra

## The ultra-low profile EMI/RFI plug and backshell assembly

Innovative shielded low profile right angle connector plug and backshell assemblies reduce clearance requirements without compromising ruggedness or shielding performance. Available in Series 801 double-start, Series 804 QDC push-pull, and Series 805 triple-start, Cobra assemblies provide optimal low-profile cable routing and legendary Mighty Mouse connector performance in a single package. Each Cobra assembly is equipped with a removable rear cover and gasket for easy crimp or solder contact termination of the connector. Integrated low-profile backshell is equipped with an EMI/RFI shield termination platform and a shrink boot lip. The ultra-lightweight assembly may be clocked in eight different angle orientations for additional flexibility in cable routing. Connectors are equipped with polarization keying to prevent mis-mating. Glenair Mighty Mouse Cobra mates with available square flange and jam nut receptacles from each respective connector series. Fourteen contact arrangements are available, all with Size #23 contacts from shell size 5 to shell size 21 with 3-130 contacts respectively. Connector shells are aluminum alloy or stainless steel.

### SPECIFICATIONS

- Current Rating: #23 5 Amps
- Test Voltage (DWV) #23: 500 VAC Sea Level
- Insulation Resistance: 5000 megohms minimum
- Contact Resistance: 73 millivolt drop at 5 Amp test current
- Mating Cycles Series 801 and 804: 2000; Series 805: 500
- Operating Temperature: -55° C to +150° C
- Shielding Effectiveness: 50 dB min from 100MHz to 1000MHz.
- Magnetic Permeability: 2.0µ
- Vibration: 37g / Shock: 300g
- Immersion, mated: 1meter water immersion for 1 hour

- **Space-saving design features one-piece machined and brazed connector shell and right angle backshell for minimum height and optimal EMI performance.**
- **Master key clocking enables easy cable entry/ exit routing in eight angles**
- **Removable rear cover and gasket provides easy access to end of connector for crimp or solder contact termination**

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# Low-Profile Cobra Plug Connectors



805-061 triple-start with self-locking coupling nut, exploded view



| How To Order Mighty Mouse Cobra Plug Connector and Backshell Assemblies | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **801-069-26** | **ZNU** | **8-13** | **P** | **A** | **1** | **05** |
| **Connector Series and Mighty Mouse Cobra Basic Part Number** | **801-069-26** Double-Start self-locking plug with ratchet mechanism (the clicker)<br>**804-066-06** QDC Push-Pull plug<br>**805-061-16** Triple-Start plug with ratcheting anti-decoupling mechanism | | | | | | |
| **Material/Finish** | **M** = Aluminum / Electroless Nickel RoHS Compliant<br>**NF** = Aluminum / Cadmium with Olive Drab Chromate<br>**ZNU** = Aluminum / Zinc-Nickel with Black Chromate<br>**MT** = Aluminum / Nickel-PTFE RoHS Compliant<br>**Z1** = Stainless Steel / Passivated RoHS Compliant | | | | | | |
| **Shell Size - Contact Arrangement** | See Table V - A: 801-069 B: 804-066 C: 805-061 | | | | | | |
| **Contact Style** | **A** = Pin, Solder **B** = Socket, Solder **P** = Pin, Crimp **S** = Socket, Crimp | | | | | | |
| **Polarization Key Position** | **A**, **B**, **C**, **D**, **E**, **F** - See Table II | | | | | | |
| **Cable Exit Direction** | **1**, **2**, **3**, **4**, **5**, **6**, **7**, **8** - See Table I | | | | | | |
| **Cable Entry Size** | See Table VI | | | | | | |

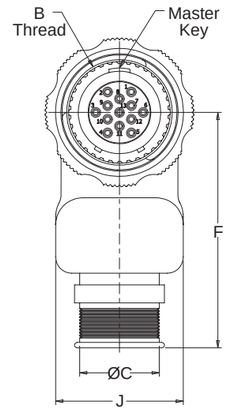
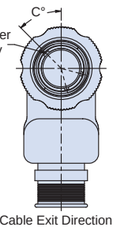



**Table I: Cable Exit Direction**

| Cable Exit Direction Code | C° |
|---|---|
| 1 | 0° |
| 2 | 45° |
| 3 | 90° |
| 4 | 135° |
| 5 | 180° |
| 6 | 225° |
| 7 | 270° |
| 8 | 315° |



Cable Exit Direction (Direction 2 Shown)

**Table II: Key Positions**

| | A° | B° |
|---|---|---|
| A | 150° | 210° |
| B | 75° | 210° |
| C | 95° | 230° |
| D | 140° | 275° |
| E | 75° | 275° |
| F | 95° | 210° |

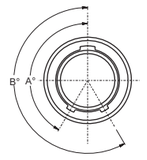



**Table VI - Cable Entry**

| Code | Entry Size | Code | Entry Size |
|---|---|---|---|
| 02 | .125 | 10 | .625 |
| 03 | .188 | 11 | .688 |
| 04 | .250 | 12 | .750 |
| 05 | .313 | 13* | .813 |
| 06 | .375 | 14* | .875 |
| 07 | .438 | 15* | .938 |
| 08 | .500 | 16* | 1.000 |
| 09 | .563 | 17* | 1.063 |

* Entry codes 13-17 not available for Series 804 Cobra

### MATERIALS/FINISH

- Contacts: Copper alloy, gold plated
- Backshell Housing, Connector Shell, Coupling Nut and Lid: Aluminum or Stainless Steel
- Backshell Sealing Gasket and Interfacial Seal: Fluorosilicone
- Screws: 300 Series Stainless Steel
- Insulator: LCP

**Table V - Shell Size/Contact Arrangements**

| A: 801-069 | | | B: 804-066 | | | C: 805-061 | | |
|---|---|---|---|---|---|---|---|---|
| Shell Size | Contact Arr. | Max Entry | Shell Size | Contact Arr. | Max Entry | Shell Size | Contact Arr. | Max Entry |
| 5 | 5-3 | 03 | 5 | 5-3 | 03 | 8 | 8-4, 8-6, 8-7 | 04 |
| 6 | 6-4, 6-6, 6-7 | 04 | 6 | 6-4, 6-6, 6-7 | 04 | 9 | 9-10 | 05 |
| 7 | 7-10 | 05 | 7 | 7-10 | 05 | 10 | 10-13 | 06 |
| 8 | 8-13 | 06 | 8 | 8-13 | 06 | 11 | 11-19 | 07 |
| 9 | 9-19 | 07 | 9 | 9-19 | 07 | 12 | 12-26 | 08 |
| 10 | 10-26 | 08 | 10 | 10-26 | 08 | 13 | 13-31 | 09 |
| 11 | 11-31 | 09 | 12 | 12-37 | 10 | 15 | 15-37 | 10 |
| 13 | 13-37 | 10 | 14 | 14-55 | 12 | 18 | 18-55 | 12 |
| 16 | 16-55 | 12 | | | | 19 | 19-85 | 13 |
| 17 | 17-85 | 13 | | | | 21 | 21-100 | 15 |
| 19 | 19-100 | 15 | | | | 23 | 23-130 | 17 |
| 21 | 21-130 | 17 | | | | | | |

### NOTES

- Rear insulator grommet not supplied.
- Cobra plugs mate with respective series receptacles with same layout, polarization and opposite contact gender.
- Hand crimp tool: P/N 809-015. Positioner for hand tool: P/N 809-005. Insertion/extraction tool P/N 809-088.
- Crimp barrel accommodates 22, 24, 26 and 28 gage wire.
- All Cobra plugs equipped with Size #23 contacts.

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B

## Mighty Mouse High-Speed and Ultra-Twinax connectors: rugged environmental sealing and high-speed matched impedance electrical performance in an ultraminiature package



Combine Mighty Mouse with—or even eliminate—low-performance commercial high-speed connectors

Glenair Series 80 Mighty Mouse connectors are the new industry standard for high-performance ultraminiature connectors. Now Glenair expands the Mighty Mouse line to include connectors optimized for high-speed matched impedance performance. The Mighty Mouse High-Speed product line features Fluoropolymer insulators for superior electrical performance in protocol-specific applications such as eSATA and USB 2.0/3.0.

Mighty Mouse Ultra-Twinax connectors utilize size #12 Twinax contacts for ultra-high speed differential pair applications such as LVDS and CML.

### MIGHTY MOUSE *HIGH-SPEED*



Series 80 Mighty Mouse *High Speed* Connectors with Fluoropolymer PFA Insulators

- **For high-speed protocols: eSATA, 10GBASE-T, USB 2.0 / 3.0**
- **Fluoropolymer PFA insulators for superior insertion loss and balanced impedance**
- **Series 801 double-start ACME thread and Series 804 push-pull quick disconnect connectors available**
- **Discrete components or overmolded cordsets**

### MIGHTY MOUSE *ULTRA-TWINAX*



Series 80 Mighty Mouse *Ultra-Twinax* Connectors with Size #12 Twinax contacts

- **For ultra high-speed differential pair applications: LVDS, CML**
- **Size #12 Twinax and hybrid contact arrangements**
- **Series 801 double-start ACME thread connectors**
- **Discrete components or overmolded cordsets**
- **Frequency range from DC to 10GHz**

### MIGHTY MOUSE WITH SIZE #8 QUADRAX, EL OCHITO® AND DIFFERENTIAL TWINAX CONTACTS



Series 805 Mighty Mouse plug with size 8 Quadrax contacts

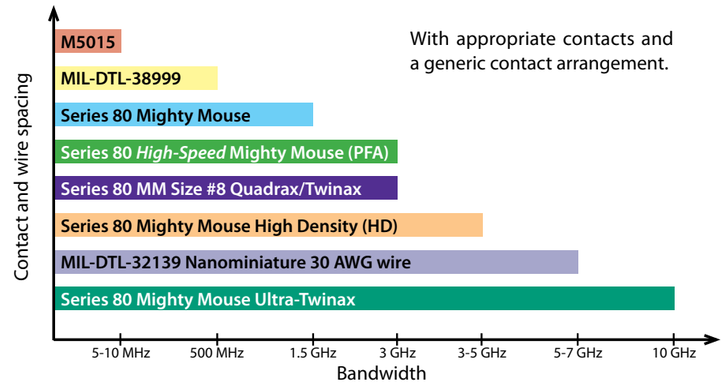
- **Differential Twinax contacts for 100 Ohm serial data transmission**
- **Quadrax contacts for 100BASE-T Ethernet**
- **Arrangements for 1, 2, 3, 4 or 5 snap-in, rear-release contacts**
- **Lightweight, low profile**
- **Comprehensive range of assembly tooling**
- **Available for Series 801 (double-start) and 805 (triple-start) Mighty Mouse connectors**
- **El Ochito®: the ultimate ethernet contact**

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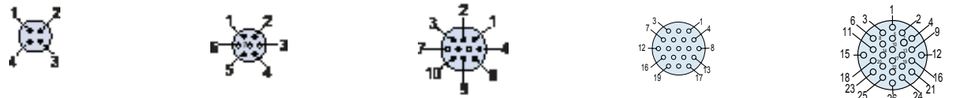
SERIES 80
High-Speed Mighty Mouse Connectors and Cables
Fluoropolymer PFA Insulators • Ultra-Twinax
Size #8 Quadrax/Twinax • Size #8 El Ochito®

B

This table compares contact and wire spacing and bandwidth performance in miniaturized interconnect applications. As contact density increases, the performance of the interconnect improves. Note the position of the High-Speed and Size #8 Mighty Mouse compared to standard Mighty Mouse, and the position of the Ultra-Twinax Mighty Mouse with performance up to 10 GHz. The density of the Ultra-Twinax contacts is measured between the two components in each contact—so although the #12 contact is larger overall, the effective contact density is higher.

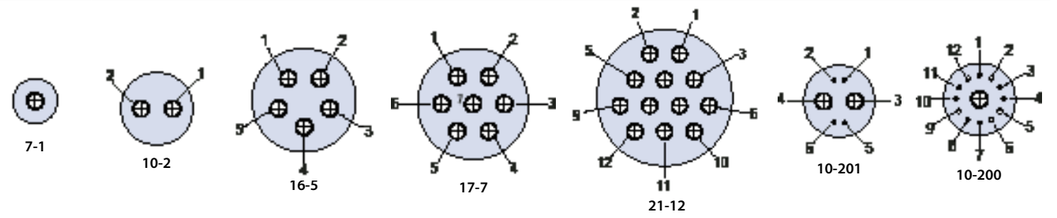



**Mighty Mouse *High Speed* Contact Arrangements**
**Mating Face View of Pin Connector (Socket Connector Numbers are Reversed)**



| 6 - 4 | 6 - 7 | 7 - 10 | 9 - 19 | 10 - 26 |
|---|---|---|---|---|
| Shell Size 6<br>4 Size #23 Contacts | Shell Size 6<br>7 Size #23 Contacts | Shell Size 7<br>10 Size #23 Contacts | Shell Size 9<br>19 Size #23 Contacts | Shell Size 10<br>26 Size #23 Contacts |

**Mighty Mouse *Ultra Twinax* Size #12 Differential Twinax Contact Arrangements (Mating Face/Pin Connector)**



| 7-1 | 10-2 | 16-5 | 17-7 | 21-12 | 10-201 | 10-200 |
|---|---|---|---|---|---|---|
| Shell Size 7<br>1 Size #12 Twinax Contact | Shell Size 10<br>2 Size #12 Twinax Contacts | Shell Size 16<br>5 Size #12 Twinax Contacts | Shell Size 17<br>7 Size #12 Twinax Contacts | Shell Size 21<br>12 Size #12 Twinax Contacts | Shell Size 10<br>2 Size #12 Twinax<br>4 Size #23 Contacts | Shell Size 10<br>1 Size #12 Twinax<br>12 Size #23 Contacts |

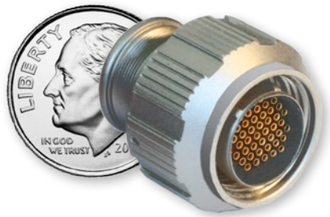
**Mighty Mouse #8 Quadrax / Differential Twinax, and El Ochito® Contact Arrangements**



| | | | | | |
|---|---|---|---|---|---|
| Mating Face | | | | | |
| Series 801 | Shell Size 8<br>1 Size # 8 Contact | Shell Size 10<br>2 Size #8 Contacts | Shell Size 17<br>3 Size #8 Contacts | Shell Size 19<br>4 Size #8 Contacts | Shell Size 21<br>5 Size #8 Contacts |
| Series 805 | Shell Size 10<br>1 Size #8 Contact | Shell Size 18<br>2 Size #8 Contacts | Shell Size 19<br>3 Size #8 Contacts | Shell Size 21<br>4 Size #8 Contacts | Shell Size 23<br>5 Size #8 Contacts |

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B



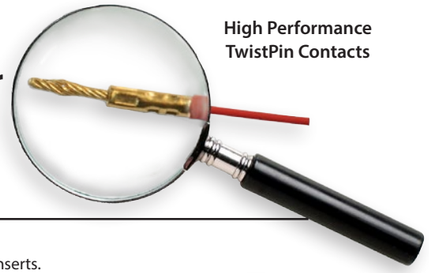
811-001-06ME9-42SA
Series 811 Plug



811-003-07ME9-42PA
Series 811 Receptacle

- **High Density Micro TwistPin Contacts set on .050" centers deliver over twice the density of standard Series 80 Mighty Mouse**
- **7 to 42 Contacts**
- **Water Resistant to 1 meter**
- **Double-start ACME threaded coupling**

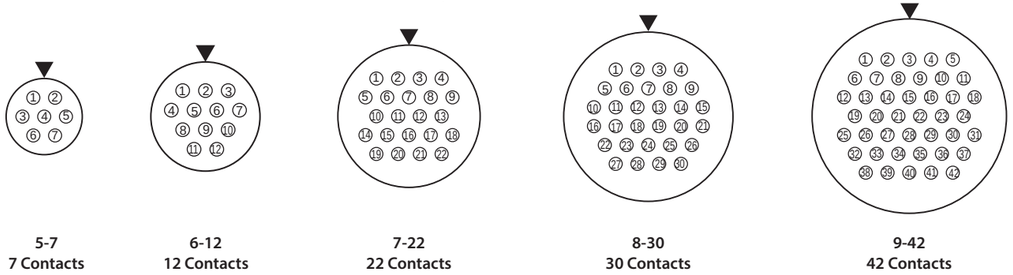
## Mighty Mouse high density (HD) connector delivers twice the size and weight savings compared to standard Mighty Mouse



High Performance TwistPin Contacts

### SERIES 811 MIGHTY MOUSE HD CONTACT ARRANGEMENTS

Pin insert shown, use reverse order for socket inserts.



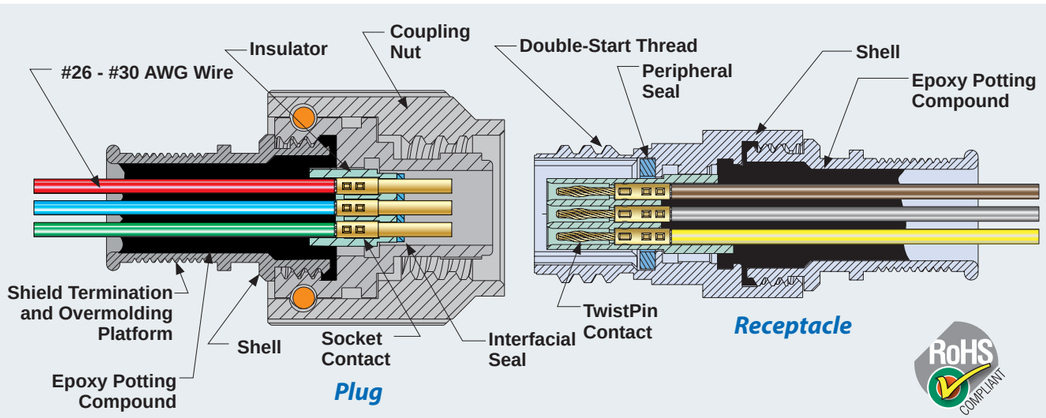
5-7
7 Contacts

6-12
12 Contacts

7-22
22 Contacts

8-30
30 Contacts

9-42
42 Contacts




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SERIES 811
Mighty Mouse High Density (HD)
Connectors and Cables

B

## The 811 HD Difference: Micro TwistPin Contacts

Widely used for radars, missiles, avionics, and space vehicles, the Micro TwistPin is a spring pin composed of helically wound strands of copper alloy wire, welded into a bundle, then "bulged" and crimped to a copper alloy sleeve. These gold over nickel plated pins and sockets offer low, stable contact resistance even when subjected to temperature extremes and vibration. Designers of soldier systems and other military electronics, medical and high-end industrial equipment have all turned to the TwistPin contact in order to reduce the size and weight of high-performance systems.

| Specifications | |
|---|---|
| Current Rating | 3 AMPS |
| Dielectric Withstanding Voltage | 600 VAC sea level, 150 VAC at 70,000 ft. |
| Insulation Resistance | 5000 megohms minimum |
| Operating Temperature | -65° C. to +150° C. |
| Contact Resistance | 8 milliohms maximum |
| Water Immersion, Mated | MIL-STD-810G, Method 512.5 1 meter for 1 hour |
| Water Ingress, Mated | Ingress protection 67 |
| Shock | 300 g's (MIL-DTL-38999 para. 4.5.21.1) |
| Vibration, Sine | 60 g's (MIL-DTL-38999 para. 4.5.23.2.1) |
| Vibration, Random | 23 g's (MIL-DTL-38999 para. 4.4.23.1) |
| Altitude-Low Temperature | EIA-364-105 |
| Durability | 2000 cycles of mating |
| Magnetic Permeability | 2 µ maximum |
| Shielding Effectiveness | 55 dB minimum from 100MHz to 1000MHz. |

### *TwistPin Contact*



TwistPin



Socket

### *Protective Covers*

Series 667-347 and 667-218





Series 809-190 and 809-191

### SERIES 811 MIGHTY MOUSE HD: PRE-WIRED CONNECTORS



Plugs
811-001-16 ratchet coupling
811-001-06 standard coupling



In-Line Receptacles
811-003-01



Square-Flange Receptacles
811-003-02 with banding porch
811-004-02 low-profile



Jam Nut Receptacles
811-003-07 with banding porch
811-004-07 low-profile

### SERIES 811 MIGHTY MOUSE HD: PC TAIL CONNECTORS



Square Flange Receptacles
811-005-02 splash-proof
811-006-02 immersion-proof



Jam Nut Receptacles
811-005-07 splash-proof
811-006-07 immersion-proof



Also Available:
Overmolded Cordsets

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B



Series 801 Mighty Mouse Plug and Receptacle with SuperSeal® Micro-B USB

## Crimp contact micro-USB connectors with outstanding environmental performance and EMI/RFI grounding. Smallest form-factor high-performance solution for integration of the commercial USB interface

- **Significant size and weight reduction compared to MIL-DTL-38999 type USB/ RJ45 solutions**
- **Rear-release crimp contact termination as well as USB/RJ45 jumper accommodation**
- **Superior sealing, IP67, in unmated condition compared to other available environmental circulars**
- **Superior grounding for electrostatic discharge and EMC**
- **Superior cable shield termination with integrated banding platform**
- **Optional spring-loaded protective covers for environmental protection of junction boxes and switches**
- **Wide range of high speed Ethernet/ network protocols supported, including USB 2.0**

| Test Description | Mighty Mouse USB Performance Requirements/Specifications | Procedure Per MIL-DTL-38999 or Other Standard |
|---|---|---|
| Dielectric withstanding voltage | Maximum leakage current = 2 milliamperes<br>No evidence of electric breakdown or flashover | 4.5.11.1 or 4.5.11.2<br>IAW EIA-364-20, Method A |
| Insulation resistance | At ambient temperature: >5000 megohms between any pair of contacts and between any contact and the shell.<br>after altitude immersion = 1000 megohms min.<br>after humidity = 100 megohms min.<br>At elevated temperature: >1000 megohms | 4.5.10.1 and 4.5.10.2<br>IAW EIA-364-21 |
| Contact resistance | Terminal-to-terminal resistance of vd connector contacts shall not exceed 0.050 ohms. | 4.5.14 |
| Mating durability | 500-1000 cycles depending on plating, with no mechanical damage. Dielectric, contact resistance and air pressure requirements as described above shall be met after 500-1000 mating cycles. | 4.5.8 |
| Contact retention | Individual contacts capable of withstanding at least 10 pounds axial load applied uniformly at one pound per second. | IAW EIA-364-29 |
| Vibration and Shock | 37 g's random vibration, 300 g's shock. No electrical discontinuity, no disengagement of mated connectors, backing off of the coupling mechanism, or evidence of cracking, breaking, or loosening. | 4.5.23 |
| Temperature cycling | -65°C to 175°C or 200°, depending on finish. No blistering, peeling or separation of plating or other damage detrimental to the operation of the connector. | 4.5.4<br>EIA364-32, Test cond. A |
| Salt spray | 5% solution, 34°–36°C. 48–1000 hours, depending on finish.<br>Unmated connectors show no lifting of plated coating or exposure of basis material under 3X magnification which adversely affects performance. | 4.5.13<br>EIA-364-26 |
| Humidity | Cycle wired, mated connectors between 25 °C at 80 % and 65 °C at 50 %. Ramp time = 0.5 hour, dwell = 1.0 hour. 24 cycles. | 4.5.26<br>EIA364-31, Method IV |
| Water immersion | 1 Meter for 1 Hour, mated. | MIL-STD-810 Method 512 |
| EMI Shielding | Series 801: Good • Series 804: Very Good • Series 805: Excellent | 4.5.28<br>EIA-364-66 |

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B

## SUPERSEAL™ MIGHTY MOUSE MICRO-B USB CONNECTOR SELECTOR



Series 801 Plug Connector with Micro-B USB



Series 801 In-Line Receptacle



Series 801 Square Flange Mount Receptacle



Series 801 Rear Panel Jam Nut Mount Receptacle



Series 804 Plug Connector with Micro-B USB



Series 804 In-Line Receptacle



Series 804 Rear Panel Jam Nut Mount Receptacle



Series 804 Front Panel Jam Nut Mount Receptacle



Plug-and-Play Micro-USB Plug and Receptacle

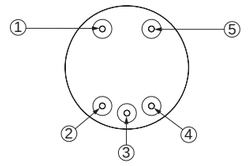


Plug-and-Play Micro-USB Booted Cordset



Spring-Loaded cover for Series 804 Jam Nut Receptacles

### Crimp Contact Pin Layout




| Pin Number | USB Designation | Typical Wiring Assignment |
|---|---|---|
| 1 | VBUS | Red |
| 2 | D- | White |
| 3 | D+ | Green |
| 4 | ID | RA_PLUG_ID |
| 5 | GND | Black |
| Shell | SHIELD | DRAIN WIRE |

### MATERIAL AND FINISHES

- Shell/coupling: High strength aluminum alloy
- Plating: Cadmium olive drab over electroless nickel; Nickel PTFE; Electroless nickel
- Contacts: Copper alloy, gold plated
- USB insulator: LCP
- Seals: Silicon-based elastomer
- Stainless steel and other materials and finishes available. Please consult factory.

### MICRO USB ELECTRICAL SPECIFICATIONS

- Voltage Rating: 30 VAC (rms)
- Current Rating: Signal pins 1.0A, Power pins 1.8A
- D.W.V.: 600 VAC
- Shield Continuity: Continous through coupler or continous coupler to shell

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SERIES 88

# SuperFly®: the ultimate nanominiature tactical connector

## The ultimate high-performance connector series: ready for the toughest (and smallest!) applications you've got

Glenair Series 88 *SuperFly®* represents a perfect storm of high-performance contacts, shells, wires, termination and mating technologies. *SuperFly®* is the only connector series in existence that combines the weight-saving and performance advantages of nanominiature, microminiature and AS39029 type (size #23) contacts in a precision package made to order for battlefield and other high-performance applications. Available in factory-terminated cordsets, single-ended pigtails, and discrete PCB termination receptacles for complete flexibility in cable and box configurations. *SuperFly* cordsets ship with ultra-flexible, high-speed GhostWire™ cabling, your choice of threaded or quick disconnect coupling and a wide-range of contact arrangements from 3–44 contacts. PCB receptacles are available in straight and right-angle configurations.



**Rear-panel mount push-pull and threaded PCB receptacles now available**

### SUPPORTED CONTACTS



**#23 AS39029 Type 5 Amp Crimp Contact**



**#24 Micro-D 3 Amp TwistPin Contact**



**#30 Nano-D 1 Amp TwistPin Contact**

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### ULTRAMINIATURE SUPERFLY® CORDSETS AND PIGTAILS



Overmolded threaded plug and receptacle



Threaded pigtail plug and receptacle



Quick-disconnect overmolded cordset



Quick-disconnect pigtail plug and jam nut receptacle

- IP67 immersion rated
- High-reliability contacts: 5 Amp, 3 Amp, and 1 Amp
- High shock and vibration
- Robust EMI shielding
- Designed for high speed data applications
- Pre-wired, epoxy-sealed cordsets
- Straight and right-angle PC tail receptacles
- 21 Contact arrangements
- Front or rear panel mounting
- Aluminum or stainless steel
- Accepts #22 to #32 AWG wire

**SuperFly® Layouts Arranged by Protocol**

| Layout | Protocol(s) | Layout | Protocol(s) | Layout | Protocol(s) |
|---|---|---|---|---|---|
| B-7N | eSATA/SATA | E-4M4N | Ethernet PoE | H-6W14N | HDMI (3 extra) |
| C-10N | USB 3.0 (low power) Ethernet | F-22N | HDMI (3 extra) DisplayPort (2 extra) | J-44N | |
| C-2M2N | USB | F-4W4N | Ethernet PoE | J-7W19N | HDMI (7 extra) Camera Link |
| D-3M | | G-7W | eSATA/SATA | K-19M | HDMI |
| D-2W2N | USB | G-10M | USB 3.0 Ethernet (2 extra) | K-13M19N | HDMI (13 extra) |
| E-3W | | H-10W | USB 3.0 Ethernet (2 extra) | L-22M | HDMI (3 extra) DisplayPort (2 extra) |
| E-19N | HDMI | H-37N | | | |

**Contact Arrangements**

| 5 AMP | | COMBO 5 AMP & 1AMP | | 3 AMP | | COMBO 3 AMP & 1 AMP | | 1 AMP | | |
|---|---|---|---|---|---|---|---|---|---|---|
| E3W (3) 5A | G7W (7) 5A | D2W2N (2) 5A, (2) 1A | F4W4N (4) 5A, (4) 1A | D3M (3) 3A | G10M (10) 3A | C2M2N (2) 3A, (2) 1A | E4M4N (4) 3A, (4) 1A | B7N (7) 1A | C10N (10) 1A | E19N (19) 1A |
| H10W (10) 5A | | H6W14N (6) 5A, (14) 1A | J7W19N (7) 5A, (19) 1A | K19M (19) 3A | L22M (22) 3A | G6M10N (6) 3A, (10) 1A | K13M19N (13) 3A, (19) 1A | F22N (22) 1A | H37N (37) 1A | J44N (44) 1A |

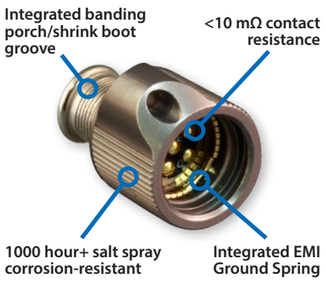
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*SERIES 152 • MIL-DTL-55116 TYPE*

# HiPer 55116 Audio Frequency Connectors

## Series 152 HiPer 55116 connectors offer significant performance advantages for modern soldier communication systems




Fully intermateable and interoperable with MIL-DTL-55116 connectors

- **Intermateable and interoperable with standard MIL-DTL-55116 connectors**
- **Low contact resistance: less than 10 milliohms**
- **Integrated EMI ground spring provides improved 2.5 milliohm shell-to-shell conductivity performance**
- **IP68 rated sealing in mated and unmated condition, prevents water ingress into radio equipment**
- **1,000 hour+ salt spray corrosion resistance**
- **Integrated cable shield termination band porch**
- **Superior 100 pound cable pull test rating**

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**Series 152 HiPer 55116 Selection Guide**

| Part Description | Glenair P/N | Equivalent Mil P/N, "U" designator | Mates with |
|---|---|---|---|
| Audio plug, field serviceable, with wire strain relief and rigid contacts | 152-001 | M55116/1 – /4 type U-229 | 152-003 HiPer 55116 type jam nut receptacle<br>152-004 HiPer 55116 type in-line receptacle<br>151-003 standard 55116 type jam nut receptacle<br>151-004 standard 55116 type in-line receptacle<br>any M55116 receptacle |
| Overmolded audio plug cordset with wire strain relief | 152-006 | | |
| Audio plug with shield termination porch, overmolding adapter and rigid contacts | 152-002 | M55116/5 – /8 type U-229 | 152-003 HiPer 55116 type jam nut receptacle<br>152-004 HiPer 55116 type in-line receptacle<br>151-003 standard 55116 type jam nut receptacle<br>151-004 standard 55116 type in-line receptacle<br>any M55116 receptacle |
| Overmolded audio plug cordset | 152-005 | | |
| In-line receptacle with shield termination porch, overmolding adapter, and non-rigid spring contacts | 152-004 | M55116/5 – /8 type U-229 | 152-003 HiPer 55116 type jam nut receptacle<br>152-004 HiPer 55116 type in-line receptacle<br>151-003 standard 55116 type jam nut receptacle<br>151-004 standard 55116 type in-line receptacle<br>any M55116 receptacle |
| Overmolded in-line receptacle cordset | 152-007 | | |
| Radio-mount jam nut receptacle with non-rigid spring contacts | 152-003 | M55116/9 – /10 type U-183 | 152-001 HiPer 55116 type plug<br>152-002 HiPer 55116 type plug<br>151-001 standard 55116 type plug<br>151-002 standard 55116 type plug<br>any M55116 plug |

**Series 152 HiPer 55116 Performance Specifications**

| Complies with all MIL-DTL-55116 specifications and exceeds the following performance criteria: | |
|---|---|
| Shell-to-shell conductivity | 152-001 and -002 Plugs: 2.5 milliohms max.<br>152-003 receptacle: 2.5 milliohms max when mated to Glenair HiPer 55116 plug 152-001 or -002 |
| Cable shield-to-shell conductivity | 2.5 milliohms max. |
| Contact resistance (mated) | 15 milliohms max. average; 20 milliohms max. |
| Water immersion (mated & un-mated) | 152-002 plug, 152-003 receptacle: IP68 (10 meters of standing water for 1 hour) |
| Air Pressure | 15 psi |
| Salt spray | 1,000 hours (MIL-STD-202, Method 101E) |
| Cable pull-out force (unmated) | 152-001 and -002 plugs: 100 lbs. (Cable shield strength dependent) |
| All other performance characteristics of Series 152 HiPer 55116 connectors are compliant with MIL-DTL-55116 (see table on Page 11 for specifications) | |

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# MIL-DTL-55116 Type Audio Frequency Connectors

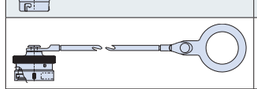




## High reliability performance for mission-critical communication systems

The MIL-DTL-55116 audio frequency connector has been used in tactical radio systems for generations. Now, this reliable, field-cleanable interconnect has been specified for use in the Joint Tactical Radio System—the next generation voice and data radio for U.S. military field operations, ensuring its continued use and service to soldiers, sailors and airmen. The Glenair MIL-DTL-55116 Type connector is manufactured in our Glendale, California factory with materials and processes guaranteed to result in the best performing and most reliable connector system available. Best of all, these products—from crimp and solder termination cable plugs, to ruggedized and sealed receptacles are in-stock and available for immediate, same-day shipment.

| Series 151 standard version offers performance IAW MIL-DTL-55116 | | | |
|---|---|---|---|
| **Test Description** | **Procedure Per MIL-DTL-55116** | **Test Description** | **Procedure Per MIL-DTL-55116 Or Other Standard** |
| Dielectric withstanding voltage | 4.7.1 | Pull test | 4.8.7 |
| Insulation resistance | 4.7.2 | Bounce | 4.9.1 |
| Contact resistance | 4.7.3 | Vibration | 4.9.2 and MIL-STD-202G, method 201A |
| Contact depression | 4.8.1 | Drop | 4.9.3 |
| Air pressure | 4.8.2 | Temperature cycling | MIL-STD-202, method 107, test condition A |
| Mating durability | 4.8.3 | Salt spray | MIL-STD-202, method 101E, test condition B |
| Contact retention | 4.8.4 | Humidity | 4.9.6 and EIA-364-31, method IV (step 7a not required) |
| Compression | 4.8.6 | Water immersion | 4.9.7 |

| Series 151 Standard MIL-DTL-55116 Type Audio Connectors - Product Selection Guide | |
|---|---|
|  | **151-001 Standard MIL-DTL-55116 type audio plug, field-servicable with wire strain relief and rigid contacts** |
|  | **151-002 Standard MIL-DTL-55116 type audio plug with overmold adapter and rigid contacts** |
|  | **151-003 Standard MIL-DTL-55116 type radio-mount Jam Nut receptacle with non-rigid spring contacts** |
|  | **151-004 Standard MIL-DTL-55116 type in-line receptacle with wire strain relief and non-rigid spring contacts** |
|  | **667-374 Protective Cover for 151 Series Plugs** |
|  | **667-355 Protective Cover for 151 Series Receptacles** |

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# CB Series Pogo Pin Audio Connectors





Series CB
Cable Plug



Series CB
Jam Nut Receptacle

- **Qualified to VG95351 (seven pole) and VG96934 (ten pole)**
- **Ultraminiature version of U.S. standard 55116 audio frequency connectors**
- **Robust environmental, mechanical and EMI performance**
- **High durability—5000 mating cycles**

## The compact audio frequency bayonet connector with spring-loaded contacts—VG qualified!



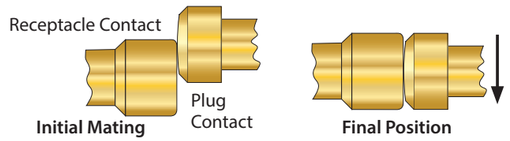
***CB 10 Pin (left) Compared to MIL-DTL-55116 6 Pin Connector***

| CB Series Specifications | |
|---|---|
| Current rating | 2.5 Amps per contact maximum |
| Voltage rating (DWV) | 500 VAC |
| Insulation resistance | 5000 MΩ |
| Durability | 5000 cycles of mating, minimum |
| Contact resistance | 5 mΩ |
| Water ingress protection | IP68 |
| Water immersion | 2 meters, 48 hours |
| Air pressure | 0.4 bar |
| Operating temperature | -55° C to +85° C |
| Shielding effectiveness | 50 dB attenuation up to 100 MHz |
| Corrosion resistance (salt spray) | 48 hours |
| Maximum wire size | 1mm maximum diameter |

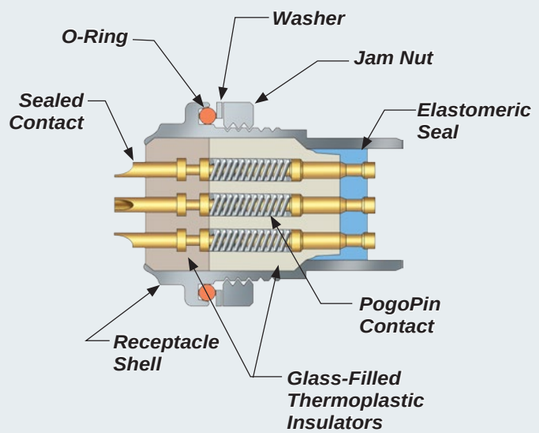



***Turnkey Cordsets***

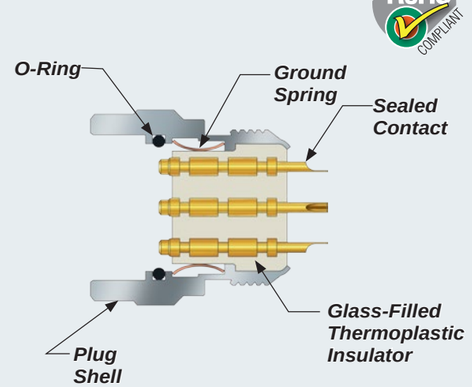
***Self-Cleaning "Wiping" Contacts***




***Receptacle***




***Plug***




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# Mil-Aero Circular Connectors

## Environmental, hermetic, and filter class




From satellites to ruggedized shipboard and aerospace applications, Glenair supplies virtually every power, signal, or high-speed cylindrical connector configuration currently in active use. From our QPL'd MIL-DTL-38999 hermetic connectors to our revolutionary SuperNine® family of high-performance D38999 Series III type connectors, Glenair is at the forefront in the manufacture and supply of mission critical mil/aero circulars.

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**Mil-Aero Circular Connectors Selection Guide**




SuperNine® High-Performance MIL-DTL-38999 Series III Type Crimp, PC Tail, High-Speed and Hermetic Connectors



MIL-DTL-38999 Type Specials



Glass-Sealed Hermetic Connectors



EMI/EMP Filter Connectors



USB and RJ45 SuperSeal™ Connectors



Sav-Con® Connector Savers and Adapters



MIL-DTL-28840 Connectors

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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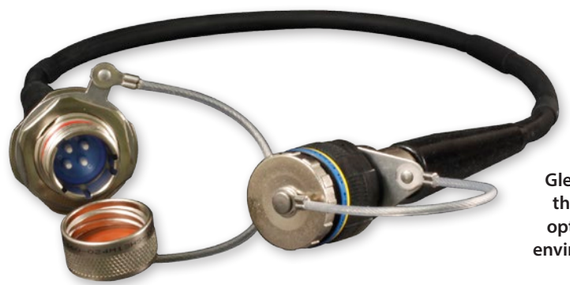

# SuperNine®: Glenair advanced-performance MIL-DTL-38999 Series III type connectors

SuperNine® is the industry's most complete and advanced D38999 Series III type connector family. From standard environmental-class connectors with improved durability and ease-of-use, to EMI/EMP filter connectors with innovative flange and PC tail termination configurations, SuperNine® offers military, commercial aerospace and other customers that have standardized on Series III technology the opportunity to improve interconnect system performance and resolve a wide range of persistent electrical, environmental, and mechanical performance problems —all with catalog connector solutions backed by Glenair's high-availability business model.

SuperNine® offers improved durability, sealing, cost-of-ownership, ease of shield termination, a broader range of PC tail configurations, environmental and hermetic bulkhead feed-throughs, connector savers, off-the-shelf EMI/EMP filter connectors and more—all supported with Glenair's well-established reputation for service, support, and fast turnaround.

### THE SUPERNINE® TECHNOLOGY PROMISE

- **Across-the-board improvements in mating-cycle and contact durability**
- **Advanced ease-of-use features such as integrated shield-termination band porches and threaded PC-Tail standoffs**
- **High-performance improvements in every connector class—from filters to fiber optics**



**Glenair SuperNine® connectors in action: in this example, a pair of our advanced fiber optic interconnects cabled-up in a turnkey, environmentally sealed point-to-point jumper**

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*BETTER THAN QPL*

## SuperNine®

## Advanced performance MIL-DTL-38999 Series III Type Connectors



### SuperNine™ Environmental I/O and Cable Connectors



- **Plug connectors with integrated ground springs and banding porch**
- **Complete range of crimp connectors with high-durability contacts**
- **Five different designs of printed circuit board connectors and standoffs**
- **Standard MIL-STD-1560 as well as high-density insert arrangements**
- **High-durability/advanced vibration and shock ratcheted coupling**

### SuperNine™ High-Speed Connectors



- **Full range of hybrid insert arrangements incorporating size #22 signal contacts, plus size #12 and #8 keyed shielded contacts**
- **El Ochito®: One full 1G/10G Ethernet channel per standard size #8 cavity**
- **Supported applications: 10/100/1G/10G BASE-T Ethernet, analog/digital video, 1553 databus and general RF or differential data transmission**
- **Turnkey Quadrax and El Ochito® solutions—from crimp and PCB contacts to connectors**

### SuperNine™ High-Pressure Hermetic Connectors



- **Glass-to-metal seal pin/socket hermetics with sealing up to $1x10^{-10}$cc/sec**
- **DSCC qualified and derivative solutions with advanced mounting features**
- **Pressure resistance to 32,000+ psi**
- **Stainless steel, titanium, Kovar® and Inconel® shell material options**
- **Bulkhead feed-through and hull penetrator versions**

### SuperNine™ Ruggedized RJ45 and USB Connectors



- **Insert-to-shell grounding for superior EMC continuity and shielding**
- **Superior environmental sealing, IP67 unmated compared to COTS solutions**
- **Advanced vibration and mechanical shock tolerance**
- **Full range of offerings for Cat6a Ethernet: Jacks, Plugs, PC tail and crimp**
- **High-temperature rated -40° to +125°C**

### SuperNine™ EMI/EMP Filter Connectors



- **Planar, multilayer ceramic capacative filters with and without TVS diodes**
- **C, L-C, C-L, and Pi filter electrical configurations**
- **Special high operating temperature solutions**
- **Industry's broadest range of pF capacitance: from 10 to 1,000,000 pF**
- **Fast and reliable in-house manufacturing of all filter elements and processes**

### SuperNine™ Fiber Optic Connectors



- **Ultralightweight composite thermoplastic connector solution**
- **Qualified size #16 MIL-PRF-29504 pin-socket precision ceramic termini**
- **Ultra tight tolerance shell and cavity dimensions for precise axial alignment**
- **Ultra low insertion loss values for both singlemode and multimode**
- **Insert arrangements from 2 to 37 ways**

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*MILITARY/AEROSPACE*

# Environmental Connector Specials

**Problem-solving mil-aero cylindrical connectors from the most accommodating engineering and manufacturing team in the interconnect industry—we say yes to specials!**

## ENGINEERED SOLUTIONS AND EXOTIC DERIVATIVES

- **High-density, push-pull, lanyard release, high temperature, ground plane, compliant pin, zero extraction force, thru-bulkhead, space-grade, gender changers, modified flange, or any other modification needed to solve a complex interconnect challenge**
- **Liberal policies on NRE costs, minimum order quantities and delivery schedules**



Space-grade zero extraction force connector for satellite payload deployment



High-density contact arrangement with size #23 contacts



Unique coupling nut castellations and coverings



Special-purpose connector go-betweens and buffers

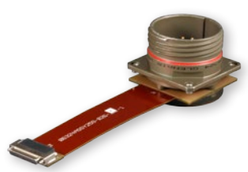
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*MIL-DTL-38999 DERIVATIVES AND OTHER*

# Environmental Connector Specials



## INNOVATIVE TERMINATION TECHNOLOGIES



Flex and Rigid Flex



Compliant (Press-Fit)



Insertable Solder Cups



Variable-Length PC Tails



Ground Plane Inserts

## INNOVATIVE SHELL PACKAGE MODIFICATIONS



Mounting Flange Modifications



Bulkhead Penetrators



Integrated/Housed Electronics



Integrated Band/Boot Porch

## NON-STANDARD CONTACT LAYOUTS



Hybrid Power Contact Arrangement



Sealed Coax Insert Arrangement



Hybrid Shielded Contact / Signal Contact Insert Arrangement

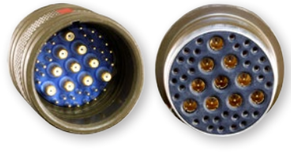


Ground Plane Metallic Insert for Shielded Contacts

## INNOVATIVE MATING TECHNOLOGIES



Center Jackpost and Guide Pin Integration



QDC Quick-Disconnect Push-Pull Mating



Quick-Disconnect Lanyard-Release Assemblies

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*HIGH-RELIABILITY*

# Glass-sealed Hermetic Connectors



**Resolve gas, moisture and particle ingress problems with advanced-performance glass-sealed hermetic connectors**

**VITREOUS GLASS TECHNOLOGY ADVANTAGES**

- **Superior pressure resistance to 32,000+ PSI**
- **Higher resistance to extreme operating temperatures to 260°+ C**
- **Superior mechanical strength**
- **No material breakdown or aging over time**
- **Helium leak rate <1X10$^{-7}$ cc/sec to 1X10$^{-10}$**

## CIRCULAR GLASS-SEALED HERMETIC CONNECTORS AVAILABLE WITH ACCELERATED LEAD TIMES



MIL-DTL-26482



MIL-DTL-83723



MIL-DTL-38999 (QPL)



MIL-DTL-5015



Series 80 Mighty Mouse

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*MIL-DTL-38999 AND OTHER*

# Glass-Sealed Hermetic Connectors

GLASS-SEALED Hermetic CONNECTORS



## GEOPHYSICAL AND OFFSHORE CONFIGURATIONS



GeoMarine® double-start hermetic connector



Hermetic power connector



Single-way tool joint hermetic connector



Hermetic probe connector



Hermetic bulkhead penetrator

## HIGH-SPEED/SHIELDED DESIGNS



Triax hermetic



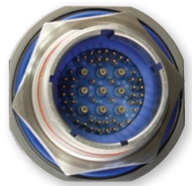
Hybrid coax/signal hermetic



Quadrax hermetic



MT ribbon fiber optic hermetic



Hybrid coax/signal hermetic

## RECTANGULAR PACKAGES



MIL-DTL-24308 QPL hermetic



Series 79 Micro-Crimp hermetic



MIL-DTL-83513 type micro-D hermetics

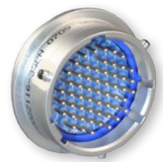


Sealed panel-mount micro-D hermetic

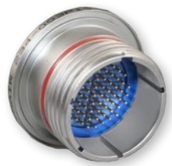
## MIL-DTL-38999 QPL PIN AND SOCKET HERMETICS



Series I
Scoop-proof
3 Point Bayonet Coupling



Series II
Low-profile
3 Point Bayonet Coupling



Series III
Scoop-proof
Triple Start, Self-Locking



Series IV
Scoop-proof
Breech Lock

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SERIES 240

# EMI/EMP Filter Connectors

Glenair manufactures a full range of filter connectors for use in EMC/EMP management of electronic systems and interconnect cabling. All connectors are designed in accordance with applicable connector specifications, and are designed to mate with plugs with the same insert configuration and opposite contact gender. Planar filter arrays and TVS diodes may be integrated into both standard catalog as well as build-to-order configurations. Glenair's state-of-the-art diode burn-in process tests leaded and surface mount diodes with leakage current monitored throughout the entire test procedure ensuring field reliability.

| Table I: Capacitor Array Code / Capacitance Range | | |
|---|---|---|
| Class | Pi - Circuit (pF) | C - Circuit (pF) |
| X | 160,000 - 240,000 | 80,000 - 120,000 |
| Y | 80,000 - 120,000 | 40,000 - 60,000 |
| Z | 60,000 - 90,000 | 30,000 - 45,000 |
| A | 38,000 - 56,000 | 19,000 - 28,000 |
| B | 32,000 - 45,000 | 16,000 - 22,500 |
| C | 18,000 - 33,000 | 9,000 - 16,500 |
| D | 8,000 - 12,000 | 4,000 - 6,000 |
| E | 3,300 - 5,000 | 1,650 - 2,500 |
| F | 800 - 1,300 | 400 - 650 |
| G | 400 - 600 | 200 - 300 |
| J | 70-120 | 35-60 |



ARINC 600 size 2 filter connector. Glenair also manufactures narrow-profile size 1 and double-wide size 3. All configurations are environmentally sealed for rugged airframe applications.

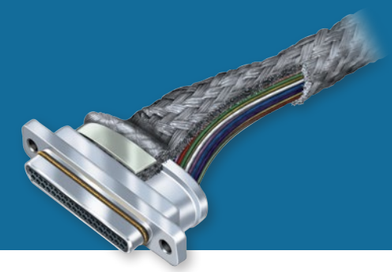
- **Planar, multilayer ceramic capacitive filters, with and without transient voltage suppression diodes**
- **C and Pi electrical configurations**
- **PC tail, crimp or solder cup termination**
- **35 – 240,000 pF capacitance**
- **Fast and reliable diode burn-in and test services**
- **Turnkey in-house manufacturing of all filter connector elements and processes**





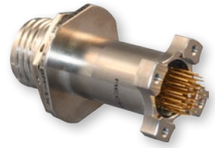
# EMI/EMP Filter connectors

## Fast, reliable in-house manufacturing





### UNIQUE AND SPECIAL PURPOSE EMI/EMP FILTER CONNECTORS



Extended-shell PC-tail cylindrical with threaded standoff



Special-purpose filter connector cable adapter



Series 80 Mighty Mouse PC-tail filter receptacle



MIL-STD-1760 filtered umbilical connector



Filter plug with crimp contacts

### RECTANGULAR PACKAGING



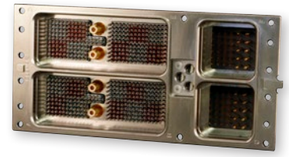
MIL-DTL-83513 type micro-D filter connector



MIL-DTL-24308 type D-sub filter connector

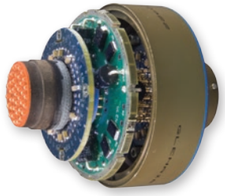


Series 79 Micro-Crimp filter connector



ARINC 600 rack and panel filter connector

### EMP TRANSIENT VOLTAGE SUPRESSION DIODE-EQUIPPED



EMP Diode-Equipped Connector with Oversized Shell



MIL-DTL-38999 series III type EMP connector



Reduced-package-size EMI/EMP cylindrical



MIL-DTL-38999 series III type EMP with rectangular housing

### THE INDUSTRY'S MOST COMPREHENSIVE AND COMPLIANT FILTER SERVICE

| Requirement Compliance: |
|---|
| MIL-STD-449D: RF Spectrum |
| MIL-STD-461E: EMI Susceptibility |
| MIL-STD-1310G: Shipboard EMC |
| MIL-STD-1512: Electroexplosive Subsystems |
| MIL-STD-1541A: EMC for Space Systems |
| MIL-STD-1795A: Aerospace Lightning Protection |
| MIL-STD-1857: Grounding, Bonding and Shielding |
| MIL-STD-1542B: EMC and Grounding for Space Systems |
| EN 61000-4-2, 3, 4, 5, 6, 8: EM, RF and Power |
| RTCA/DO-160 Sec 22: Pin/Cable Level and Waveform |

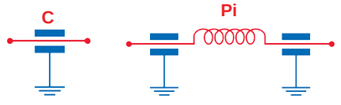
| Connector Series: | |
|---|---|
| 38999 Series I, II, III, IV | 83513 |
| 26482 | 5015 |
| 83723 | Sr. 80 Mighty Mouse |
| 28840 | Sr. 79 Micro-Crimp |
| 24308 | Sr. ITS Reverse-Bayonet |
| ARINC 600 | Sr. 970 PowerTrip |

| Line Types: | |
|---|---|
| CAN BUS | TTL |
| ARINC 429 | Analog Sensors |
| RS 232 | Thermocouple Wires |
| RS 422 | USB |
| RS 485 | Ethernet |

**Filter Types**

**C** Single capacitor with low self inductance

**Pi** Dual capacitors with a single inductive element positioned between.






# Ruggedized RJ45 and USB Connectors for Aerospace, Defense and Other Applications

Triple-start mating MIL-DTL-38999 type connectors with IP68 sealing (mated condition), robust insert-to-shell grounding, and a complete range of wire, cable, and circuit board terminations



MIL-DTL-38999 Series III with sealed RJ45



MIL-DTL-38999 Series III with USB jack and jumper



High-capacity, high-speed USB data stick

- Superior sealing—IP67 unmated—for complete system protection against water, sand and dust
- Highly durable RJ45 design, including enhanced operating temperature, increased life-cycle, and rugged vibration and shock performance
- Shielded/grounded coupler designs in both receptacle and plug connectors
- Crimp, solder-cup, PC tail, and Quadrax contact/wire termination options
- RJ45 plug and/or jack interface options available in Cat 5e or Cat 6a
- Intermateable with other MIL-DTL-38999 type RJ45 field-duty connectors

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# RJ45 and USB Aerospace/Defense Connectors



## Product Selection Guide



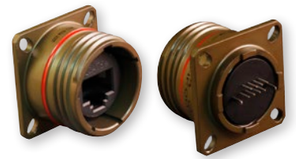
**233-300**

**SuperSeal™ MIL-DTL-38999 Series III Type Connector/ Adapter with RJ45 Jack/Jack or Plug/Jack Couplers**



**233-301**

**SuperSeal™ MIL-DTL-38999 Series III Type Connectors with RJ45 Jack or Plug to Rear Crimp Contact Termination**



**233-302**

**SuperSeal™ MIL-DTL-38999 Series III Type Connectors with RJ45 Jack to PC Tail Termination**



**233-303**

**SuperSeal™ MIL-DTL-38999 Series III Type Connectors with RJ45 Jack to Rear Solder Cup Termination**



**233-304**

**SuperSeal™ MIL-DTL-38999 Series III Type Connectors with Pin or Socket Contacts to RJ45 Jack or Plug Interface**



**233-305**

**SuperSeal™ MIL-DTL-38999 Series III Type Connectors with Pin or Socket Quadrax to RJ45 Jack or Plug**



**233-330**

**SuperSeal™ MIL-DTL-38999 Series III Type Feedthrough Receptacle with RJ45 Jack to Jack Coupler**

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*SERIES 234-105*

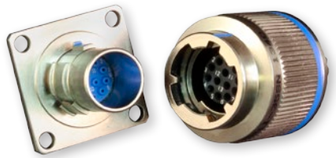
# MIL-DTL-38999 Series IV*

*Mil-Spec qualification pending

## Time-tested, industry standard breech-lock connector

From vertical launch fire-control, tracking, and multi-target missile systems to rugged industrial applications such as mining/gas-pressure blasting, the Glenair MIL-DTL-38999 Series IV type connector is the ultimate solution for positive and reliable breech-locking connector performance. Built IAW MIL-DTL-38999 Series IV, Glenair series 234-105 plug and receptacle connectors are available in shell sizes 11–25, with all MIL-STD 1560 insert arrangements as well as high-density and hybrid shielded contact arrangements. The heart of the 234-105 connector is its revolutionary coupling nut/locking technology which provides familiar breech-lock mating augmented with both primary and secondary locking mechanisms. Environmentally sealed, EMI grounded, and outfitted with pin-to-pin mating protection to prevent circuit shorts and mechanical damage, the Glenair 234-105 delivers unsurpassed reliability and anti-demating performance.

- **IAW MIL-DTL-38999 Series IV**
- **Optimized for SWAMP area applications**
- **Quick-disconnect 90° breech coupling mechanism**
- **Visual, audible and tactile full-mate indicators**
- **Integrated EMI grounding fingers**
- **-65°C to 200°C operating temperature range**



**Series IV solutions are available in environmental, filter, and hermetic class configurations in shell sizes from 11–25 supporting the full range of MIL-STD-1560 insert arrangements**



**Glenair's complete Series IV solution includes protective covers and dummy stowage receptacles—available in all sizes, materials, and plating configurations.**


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*SERIES 234-105*

# MIL-DTL-38999 Series IV

## Industry standard breech-lock connector
## Super fast turnaround on quotes and orders



### SERIES 234-105 PLUG AND RECEPTACLE, LOCKING, HIGH-VIBRATION



| How To Order | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **234-105** | **-44** | **NF** | **11** | **-35** | **P** | **N** |
| **D38999 Series IV Type Connectors** | **234-105** = Environmental Class* | | | | | | |
| **Connector Style** | See Table I | | | | | | |
| **Material/Finish** | See Table II | | | | | | |
| **Shell Size** | **11, 13, 15, 17, 19, 21, 23, 25** | | | | | | |
| **Contact Arrangement** | Per MIL-DTL-1560 | | | | | | |
| **Contact Designator** | **P** = Pin **A** = Pin Gender, Less Contacts<br>**S** = Socket **B** = Socket Gender, Less Contacts | | | | | | |
| **Polarization** | **N** (Normal), **A**, **B**, **C**, **D**, **K**, **L**, **M**, **R**, & **U** | | | | | | |

### NOTES

1. Materials and finish
   Insulator: High grade rigid dielectric
   O-ring: Silicone
   Contacts: IAW AS39029
   Seals: Fluorosilicone blend
2. Blue color band indicates rear release contact retention system
3. Connector supplied with contacts (including spares), insertion/removal tools and sealing plugs IAW MIL-DTL-38999
4. Glenair 234-105 connectors are designed to mate with any QPL manufacturer's MIL-DTL-38999 Series IV connectors with the same insert arrangement and polarization. Mil-spec qualification pending.

| Table I: Connector Style | |
|---|---|
| 40 | Square-flange wall mount receptacle |
| 42 | Box-mount square flange receptacle |
| 44 | Jam nut receptacle |
| 46 | Plug with EMI grounding spring |
| 47 | Plug without EMI grounding spring |
| 49 | In-line cable receptacle |

| Table II: Material / Finish | | |
|---|---|---|
| **Symbol** | **Material** | **Finish** |
| **ME** | Aluminum | Electroless Nickel |
| **NF** | | Cad O.D. over Electroless Nickel |
| **G2** | | Anodize, Hardcoat |
| **ZR** | | Zinc Nickel, Black |
| **MT** | | Nickel-PTFE |
| **Z1*** | Stainless Steel | Passivate |
| **ZL*** | | Electro-Deposited Nickel |
| *Available in receptacle only. Not firewall rated. | | |

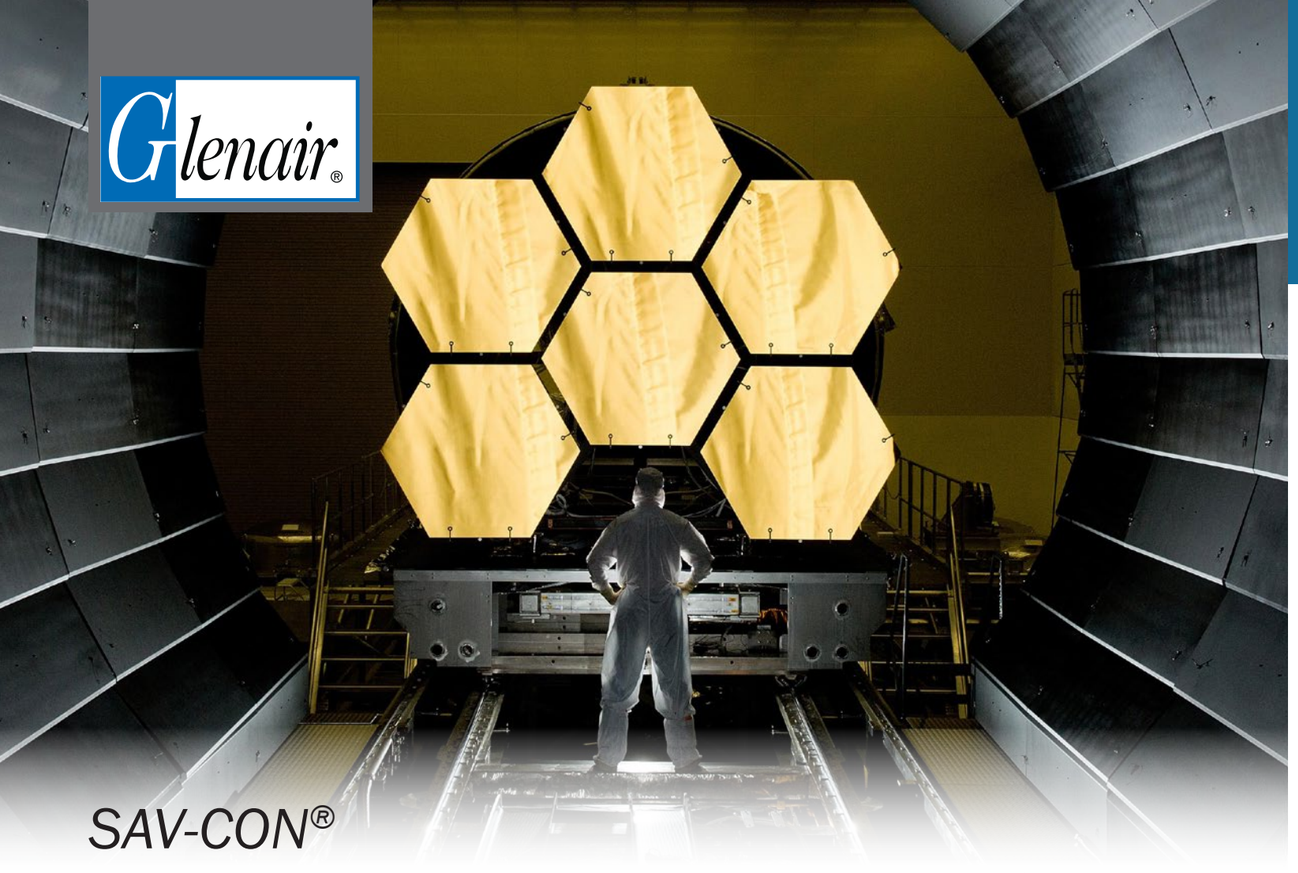
*Glenair also supplies a full line of qualified MIL-DTL-38999 Series IV pin and socket contact hermetic receptacles—most popular part numbers in stock and ready for immediate shipment



**A complete range of application tooling is available, including adjustable crimp tools, contact insertion and removal tools, Band-Master™ EMI shield termination system tools and others—all available for immediate, same-day shipment**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
U.S. CAGE code 06324



SAV-CON®

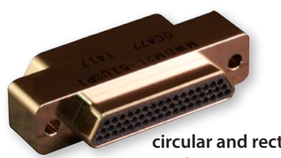
# Connector Savers and Bulkhead Feed-Thrus

## The smart solution for preventing contact damage and extending the service life of cable assemblies and box and panel-mount receptacles

- Sav-Con®s for every Military Standard connector
- Bulkhead feed-thrus for environmental, filter and hermetic applications
- Pin/pin, pin/socket, and socket/socket versions
- Traditional plug-receptacle savers, as well as in-line versions and gender changers
- Available EMI/EMP filter savers and adapters
- Optional locking mechanism

Series changers and gender changers available in both Sav-Con® and bulkhead feed-thru configurations

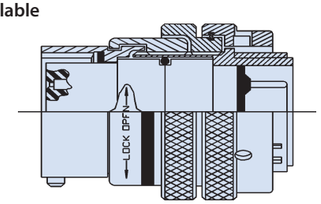




circular and rectangular configurations available

**Sav-Con® Lock Ring prevents accidental disengagement of bayonet coupled connectors**

Locking a Sav-Con® Connector Saver to a receptacle can prevent accidental or unauthorized unmating. This can ensure that the equipment receptacle remains in its unused condition prior to delivery.




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*HIGH-PERFORMANCE CONNECTOR GO-BETWEENS*

# Sav-Con® Connector Savers and Bulkhead Feed-Thrus

**Each Glenair Sav-Con® Connector Saver meets the military specification performance requirements of its mating connector. Glenair manufactures and supplies a Sav-Con® connector saver for every military standard connector currently in use including:**

- MIL-DTL-26482 Series I and II
- MIL-DTL-28840
- MIL-DTL-38999 Series I, II and III
- MIL-DTL-83723
- LN 29729 (SJT)
- PATT 105 and PATT 602
- MIL-DTL-5015
- Series 801 and 805 Mighty Mouse
- M24308 D-Subminiature
- MIL-DTL-83513 Micro-D Subminiature
- Series 28 HiPer-D M24308 intermateable
- Series 79 Micro-Crimp

Comprehensive materials, plating, and polarization options available

C

## TRADITIONAL PLUG-RECEPTACLE SAV-CON® CONNECTOR SAVERS



MIL-DTL-38999 series III type



MIL-DTL-5015 threaded and/or reverse-bayonet



MIL-DTL-38999 series II bayonet-coupling saver



Series 80 Mighty Mouse Sav-Con®

## BULKHEAD FEED-THRUS





MIL-DTL-38999 series III type jam nut and square-flange bulkhead feed-thrus



MIL-DTL-5015 bulkhead feed-thru

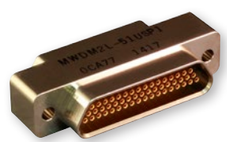


Special shielded contact bulkhead feed-thru

## SPECIAL-PURPOSE ADAPTERS AND SAVERS



EMI/RFI filter Sav-Con® adapter



MIL-DTL-83513 type micro-D filter connector



Special in-line receptacle-to-receptacle feed-thru



Power distribution connector saver

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MIL-DTL-28840 qualified connectors in-stock and ready for immediate, same-day shipment

- High density, scoop proof contact arrangements
- Flange mount, box mount, jam-nut and in-line receptacles
- Straight, 45° and 90° strain reliefs and backshell assemblies
- Sav-Con® connector savers
- MIL-DTL-28840 qualified
- Additional glenair commercial part numbers with features not available in the mil-spec

C

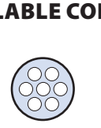
## Qualified military standard electrical connectors and accessories for shipboard—and all rugged environmental applications

| Performance Specifications | |
|---|---|
| Current Rating (Maximum) | Size #20 Contact with 20AWG wire=7.5Amps, with 22AWG wire=5.0Amps |
| Test Voltage (DWV) | 1000 VAC RMS at sea level. Test per EIA-364-20 |
| Insulation Resistance | 5000 megohms minimum (at ambient temperature) per EIA-364-21 |
| Contact Resistance | Per SAE-AS39029 |
| Operating Temperature | -55° C to +200° C |
| Immersion | per test method EIA-364-09 |
| Shock | in accordance with MIL-S-901 grade A |
| Vibration | per EIA-364-28 test procedure |
| Magnetic Permeability | 2.0 µ (Aluminum), 5.0 µ (Stainless Steel) maximum; ASTM-A342/A342M |



Splined MIL-DTL-28840 connector-to-backshell interface is ideally suited for heavy backshells and cables

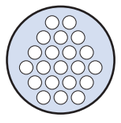
## AVAILABLE CONTACT ARRANGEMENTS



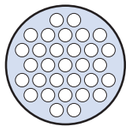
Shell Size 11
7 Contacts



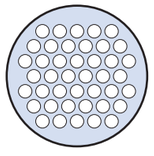
Shell Size 13
12 Contacts



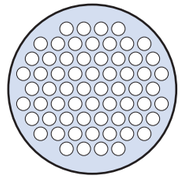
Shell Size 15
21 Contacts



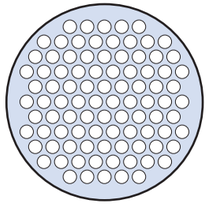
Shell Size 17
31 Contacts



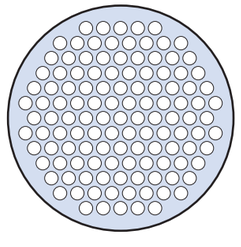
Shell Size 19
42 Contacts



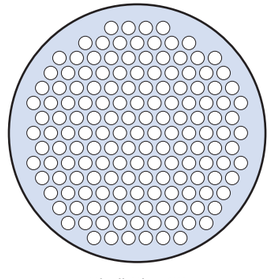
Shell Size 23
64 Contacts



Shell Size 25
92 Contacts



Shell Size 29
121 Contacts



Shell Size 33
155 Contacts

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QUALIFIED
MIL-DTL-28840
Connectors and Accessories

## STANDARD PIN CRIMP CONTACT FOR MIL-DTL-28840 CONNECTORS



| Mating End Size | Wire Accomodation | Military Part Number | Glenair Part Number |
|---|---|---|---|
| 20 | 28-32 AWG | M39029/83-451 | 850-004-20-451 |
| 20 | 22-26 AWG | M39029/83-450 | 850-004-20-450 |
| 20 | 20-24 AWG | M39029/83-508 | 850-004-20-508 |

## STANDARD SOCKET CRIMP CONTACT FOR MIL-DTL-28840 CONNECTORS



| Mating End Size | Wire Accomodation | Military Part Number | Glenair Part Number |
|---|---|---|---|
| 20 | 28-32 AWG | M39029/84-453 | 850-005-20-453 |
| 20 | 22-26 AWG | M39029/84-452 | 850-005-20-452 |
| 20 | 20-24 AWG | M39029/84-509 | 850-005-20-509 |

C



**Crimping Tools**

M22520/34-01 Basic Crimp Tool
M22520/34-02 Positioner
M22520/35 Gage



**Insertion & Removal Tools**

M81969/33-01 Straight Insertion Tool
M81969/33-02 Offset Insertion Tool
M81969/34-01 Removal Tool



**Pin Contact**

M39029/83 Standard Duty Electrical Pin Contact



**Socket Contact**

M39029/84 Standard Duty Electrical Socket Contact



**Environmental Backshells**

M28840/6 B Straight
M28840/9 B 45°
M28840/8 B 90°



**EMI/RFI Environmental Backshells**

M28840/6 A Straight
M28840/8 A 90°
M28840/9 A 45°



**Connector Sockets**

600G005

**"E" Nuts**



**Non-Self-Locking**

M28840/23

**Strain Reliefs**



**Non-Self-Locking**

M28840/1 Straight
M28840/3 45°
M28840/2 90°



**Dummy Stowage Receptacles**

M28840/7



**Protective Plug Covers**

M28840/15



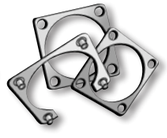
**Protective Receptacle Covers**

M28840/13



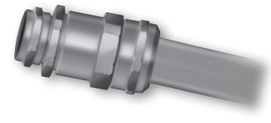
**Jam Nuts**

MS3186



**Mounting Flanges and Gaskets**

M28840/24 Gasket



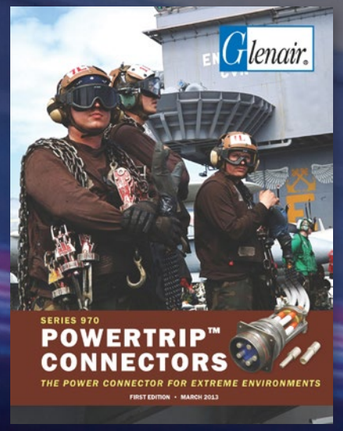
**MIL-PRF-24758A Conduit Fittings**

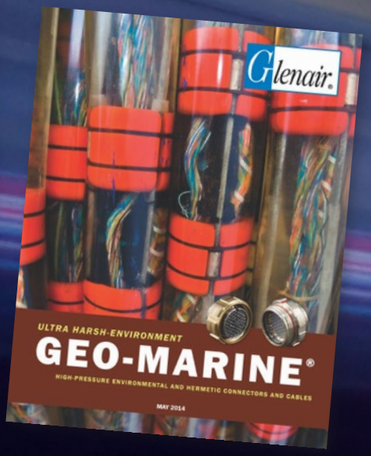
M24758-14 Straight
(M24758/14 Straight.)
M28840/5 Straight • M28840/25 90° •
M28840/27 45° • M28840/30 Coupling

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# Industrial-Strength Power and Signal Connectors




**Industrial-Strength Power and Signal Connectors**



Series ITS and Derivative Industrial/Rail Power and Signal Connectors



Series IRT/ITS/UJ High-Current/High-Voltage Power Connectors for Rail and Industrial Applications



PowerTrip™ Extreme Environment Power Connectors



Ruggedized High-Speed Ethernet Connectors



Series 22 Geo-Marine® High-Pressure Harsh-Environment Connectors and Cordsets

**Glenair offers a "no gap" family of ruggedized power and signal interconnect solutions for industrial, rail, geophysical and power industry applications. No other interconnect manufacturer in the world supplies such a broad range of connectors, backshells, wire protection conduit, shrink boots, tools and more to meet harsh-environment industrial requirements. All our solutions are backed with our high availability customer service model, which includes in-stock inventory for thousands of critical part numbers, no dollar or quantity minimum orders, free samples upon request, free engineering and application development and more. Contact the factory or our industrial/rail product team for application engineering assistance.**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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*SERIES ITS & DERIVATIVES*

# Circular industrial power and signal connectors for rugged applications—from mining equipment to military vehicles

- **Dozens of proven connector technologies for harsh application environments**
- **Hundreds of power and signal contact arrangements (crimp and solder)**
- **Threaded, reverse bayonet, and innovative latch-and-lock coupling technologies**
- **Flame-resistant, caustic substance-free material choices for RoHS and other compliance standards**

**Circular Reverse-Bayonet and Threaded Coupling Connectors**

- ***Series ITS -*** *Reverse-Bayonet Power and Signal*
- ***Series ITS-RG -*** *RadGrip™ Rubber Coupling Nut Circular*
- ***Series FRITS -*** *Flame-Resistant Insert for Rail Applications*
- ***Series IT -*** *Threaded Coupling Power and Signal*
- ***Series ITH -*** *Rigid Insert / Mechanical Contact Retention*
- ***Series ITK -*** *High-Temperature Ceramic*
- ***Series ITZ -*** *Triple-Start Thread Power and Signal*
- ***Series IFO -*** *Reverse-Bayonet Fiber Optic*
- ***Series IGE -*** *High Currrent, Low Voltage Single Pole*
- ***Series 901 -*** *High Current Medium Voltage Circular*
- ***Series 500 -*** *Reverse-Bayonet Single-Pole High Voltage*
- ***Series IPT -*** *Standard Bayonet Power and Signal*
- ***Series IPT-SE -*** *Standard Bayonet Crimp Contact*



Series IT, ITS and derivative connector families are available with three plug coupling nut designs: Standard, Arctic, and rubber-covered RadGrip™

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*INDUSTRY STANDARD AND GLENAIR INNOVATIONS*

# Industrial/Rail Power and Signal Connectors



## CIRCULAR INDUSTRIAL/RAIL POWER AND SIGNAL CONNECTORS: 5015 TYPE DERIVATIVES



Series ITS
Reverse-Bayonet



Series ITH
Rigid Insert



Series IT
Threaded Coupling



Series ITZ
Triple-Start Coupling



Series ITK
High-Temperature Ceramic Insert



Seacrow
Marine Bronze



Series 901
Multi-Pin High Voltage



Series 500
Single-Pole High Voltage



Series IGE
Single-Pole High Power



Series ITS Bayonet
with Wing Locks

## HIGH-SPEED / RUGGEDIZED CONNECTORS FOR INDUSTRIAL AND RAIL APPLICATIONS



SuperSeal™
with RJ45 Ethernet



Series CX
High-Speed Coaxial



Octobyte™
Ethernet Contact



Series IFO
High-Speed Fiber Optic

## SERIES ITS-RG RADGRIP™ REINFORCED RUBBER COUPLING NUT CONNECTORS



ITS-RG
(Basic Black)



ITS-RG
(Semper Tan)



ITS-RG
(Fiber Optic Blue)



ITS-RG
(Safety Red)

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# *SERIES IRT • ITS 500 • ITS 901 • UJ*

## Rugged high current/high voltage power connectors for rail and industrial applications

Connection of power cables in rolling stock is a critical application. Beyond specific parameters like voltage, current, or watertight sealing, other application requirements must be considered: environment and operating conditions, robustness, handling, and other specifications.

The IRT connector series is one of the most popular connection systems used around the world, and is able to satisfy all of the common parameters from different railway authorities. Glenair is able to develop customized connectors for specific applications, certifying the products according to unique customer requirements.



Innovative tool-free locking and latching mechanisms

### SERIES IRT RECTANGULAR MULTIPOLE HIGH VOLTAGE TRACTION MOTOR CONNECTORS



Plug Connector



Receptacle Connector

The Glenair IRT series is a rectangular power connector for harsh environmental conditions.
Available with three, four and six contacts, typical for traction motor applications.
Suitable for single cables AWG 4 – 373MCM (35 to 185 mmq).
Working voltage up to 3000 Vcc.

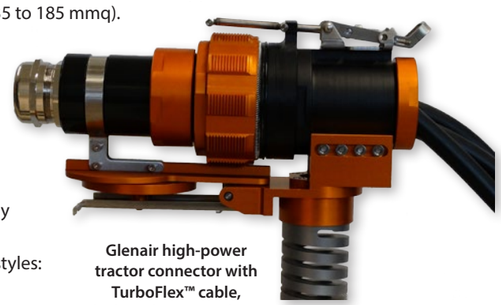
Two mating systems offered:

- Screws, for light weight and reduced dimensions
- Lever system with secondary lock, easy to use in difficult positions.

The IRT Series is suitable for separated power cables, with or without shielding, ground body available with a copper plait.

Available with three different cable backend styles:

- Metallic gland
- Clamp with strain relief
- EMC shield and gland



Glenair high-power tractor connector with TurboFlex™ cable, locking/lever coupling, and flexible standoff

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# High Current/High Voltage Power Connectors

## for rail and industrial applications



### ITS 901 SERIES REVERSE BAYONET MULTI-POLE MEDIUM VOLTAGE JUMPER CONNECTORS



Plug Connector



Receptacle Connector

ITS 901 Series is the extension of the ITS Reverse Bayonet connector family, for power cables over AWG 1/0.
Suitable for harsh environmental conditions, 901 Series Connectors accept cable from AWG 4 to 262 MCM (35 - 120 mmq), for current up to 450 Amp.
Working voltage: 800 - 1000 Vac.
Available for single wires and multipole jacketed cables, with cable clamp or conduit.
Male contacts with Finger Test Protection, Load Side (Receptacle or Plug).
Long bayonet ramps, three polarization keys and rubber recovered coupling facilitate mating and unmating operations.

901 Series meet the most important rail requirements and specifications:

- Salt Spray Test Corrosion: 500 hours;
- 500 Mating Cycles;
- Shock and Vibrations for Under-Car and Car-To-Car Applications;
- IP67 Sealing (Coupled Connectors);
- Fire Resistant and RoHS Compliant Materials.

### ITS 500 SERIES REVERSE BAYONET SINGLE-POLE HIGH VOLTAGE JUMPER CONNECTORS



Plug Connector



Receptacle Connector

ITS 500 Series derives from an important Military Specification for Power Connectors: VG96929.
Suitable for harsh environmental conditions, ITS 500 accepts cable gauges AWG 3/0 to 444MCM (95-240 mmq), for current up to 750 Amp.
Special insulator drawing allows high working voltage, up to 3000 Vcc.
Suitable for jacketed cables, with or without conduit protection.
Receptacle with finger protection (Load side).

ITS 500 meets the most important rail requirements and specifications:

- 500 Mating Cycles;
- Salt Spray Test Corrosion: 500 hours;
- Shock and Vibrations for Under-Car and Car-To-Car Applications;
- IP67 Sealing (Coupled Connectors);
- Fire Resistant and RoHS Compliant Materials.

### UJ SERIES POWER JOINT CONNECTOR SYSTEM





Offers the possibility to connect medium and high power cables without the need for bulky junction boxes. The UJ Power Joint System offers the same environmental protection with substantial size and weight savings.





| | UJ Series | Junction Box |
|---|---|---|
| **Dimensions** | Small | Regular / Big |
| **Weight** | Light | Heavy |
| **Protective Varnish** | No | Yes |
| **Modularity** | Yes | No |
| **Environmental** | Yes | Yes |
| **Electrical Performance** | Yes | Yes |
| **Cost Reduction** | Yes | No |
| **Temperature Range** | High | Standard |

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SERIES 970

# PowerTrip™

## Reduced size and weight power connectors



Lightweight plug with ratcheting coupling nut and LouverBand contacts



Keyed receptacle with superior sealing and EMI shielding



- **Fast, easy mating with triple-start ACME thread: 360° turn for full mating**
- **Reduced size and weight compared to 5015/VG95234 solutions**
- **LouverBand sockets for improved current ratings and longer life, up to 2000 mating cycles**
- **Splined backshell interface for improved backshell attachment and EMI shielding**
- **Ratcheting coupling nut for secure mating**
- **Operating temperature -65° C to +200° C**
- **Hermetic and filter options available**

The Series 970 PowerTrip™ offers improved performance compared to standard 5015 type power connectors: higher density and lighter weight packaging, rapid mating and demating triple-start threaded coupling, and extremely rugged splined and threaded backshell attachment interface

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## SERIES 970 POWERTRIP™ CONNECTOR STYLES



Plug
970-001



Square Flange Receptacles
970-003



Jam Nut Receptacles
970-004



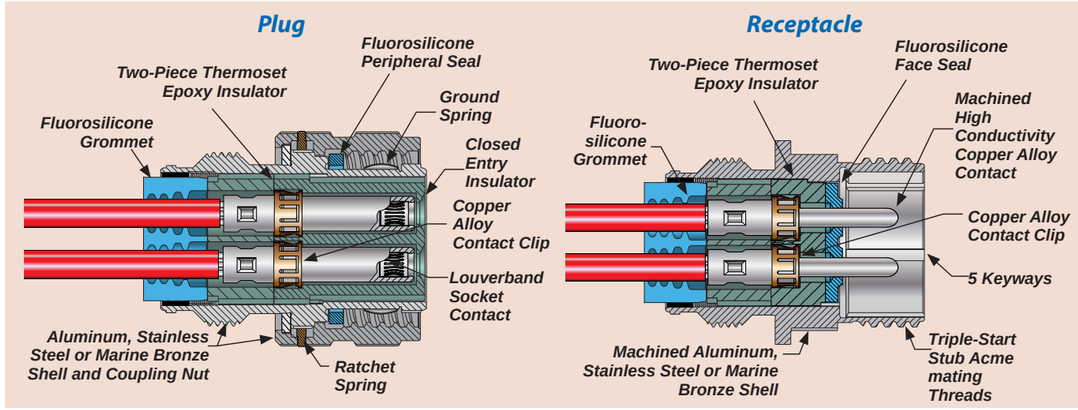
Cable Receptacles
970-005



Feed-Thru Bulkhead
970-006

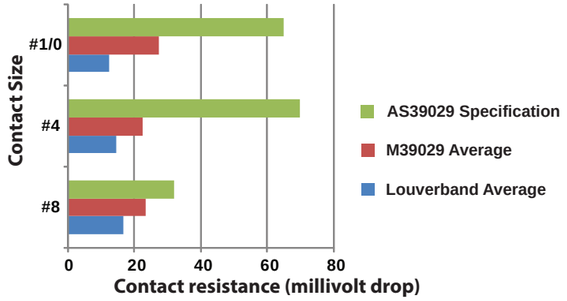


Hermetic Feed-Thru Bulkhead
970-007




| Series 970 PowerTrip™ Specifications | |
|---|---|
| Current Rating | Up to 225 A. |
| Dielectric Withstanding Voltage | 2000 VAC |
| Insulation Resistance | 5000 megohms minimum |
| Operating Temperature | -65° C. to +200° C. |
| Shock | 300 g. |
| Vibration | 37 g. |
| Shielding Effectiveness | 65 dB minimum from 1GHz to 10GHz. |
| Durability | 2000 mating cycles |

## CONTACT RESISTANCE AFTER 1000 MATING CYCLES




## ABOUT THE POWERTRIP CONTACT SYSTEM

Series 970 contacts are precision-machined using high conductivity copper alloy. A stamped and formed spring ("LouverBand") is installed into the socket contact. The spring is made from 6 mil copper alloy. Testing has demonstrated that this contact system outperforms conventional aerospace-grade contact systems. The LouverBand spring provides many points of electrical contact with the mating pin, as opposed to a few "high spots" on a conventional four-finger contact as shown in the figure below. The size #8 Powertrip socket contact has a total of 18 louvers. The #4 has 27 louvers, and the #1/0 has 42 louvers. The LouverBand design offers lower voltage drop for reduced joule heating. In addition to its electrical advantages, the LouverBand also is mechanically superior to four-finger contacts. The LouverBand spring has consistent, stable normal force, even when subjected to thousands of mating cycles and temperature extremes.



Conventional contact on the left, LouverBand contact on the right



LouverBand socket contact cutaway

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*RJ45/USB SUPERSEAL™*

# Ruggedized bayonet and reverse-bayonet RJ45 and USB connectors for industrial/rail applications

Glenair offers the world's most comprehensive line of ruggedized RJ45 Ethernet and USB connectors in 5015 and 26482 type connector packaging. The Series ITS reverse-bayonet and IPT bayonet RJ45/USB SuperSeal™ lines offer fast mating and demating, resistance to vibration and shock, as well as superior sealing for complete protection against water, sand and dust in harsh environment applications. High-performance RJ45 and USB inserts feature integrated shielding and grounding in both plug and receptacle connectors plus crimp, solder-cup, PC tail and Quadrax contact/wire termination options.

- **Proven reverse-bayonet mating for vibration and shock resistance**
- **Superior sealing—IP67 in unmated condition—compared to other available environmental circulars**
- **Rear-release crimp contact termination and USB/RJ45 jumper accommodation**
- **Superior grounding for electrostatic discharge and EMC**
- **Superior cable shield termination with integrated banding platform**
- **Optional spring-loaded protective covers for environmental protection of junction boxes and switches**
- **Wide range of high speed Ethernet/ network protocols supported, including USB 2.0 and RJ45**







**In addition to ITS series (5015 type) reverse-bayonet solutions, low-profile series IPT bayonet RJ45 SuperSeal™ connectors and integrated box assemblies are also available**

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*USB AND RJ45*

# SuperSeal™ Ruggedized Bayonet and Reverse-Bayonet Connectors



## Product Selection Guide



**SuperSeal™ 5015 Reverse Bayonet Plug with Cat 5e RJ45 Plug and Rear Crimp Contact Termination**



**SuperSeal™ 5015 Reverse Bayonet Plug with Cat 5e RJ45 Plug and Pre-Terminated Pigtail**



**SuperSeal™ 5015 Reverse Bayonet Receptacle with Cat 5e RJ45 Jack and Pre-Terminated Pigtail**



**SuperSeal™ 5015 Reverse Bayonet Receptacle with Cat 5e RJ45 Jack and PCB Termination**



**SuperSeal™ 5015 Reverse Bayonet Receptacles with Cat 5e RJ45 Jack/Jack Couplers**



**SuperSeal™ Reverse Bayonet RJ45 Connectors Cable Clamps, Cable Glands, and Backshells**

## PRODUCT SPECIFICATIONS

**MATERIAL AND FINISHES:**
Shell/coupling – High strength Aluminum alloy
Plating – Electroless Nickel, Cad O.D., Black Zinc Cobalt or Std. black electrodeposited paint
Bronze, stainless steel and other materials and finishes available. Please consult factory.

**SHELL TYPE AND SIZES:**
Shell Type – D5015 Reverse-Bayonet Type
Sizes – Shell size 18

**CONNECTOR STYLES:**
Receptacle – MIL-DTL-5015 type in shell size 18 with integrated RJ45 jack/jack or jack/PCB coupler available in Cat 5e
Plug – MIL-DTL-5015 type plug in shell size 18 with integrated RJ45 plug/jack coupler available in Cat 5e
Available in square flange front or rear wall mount with slotted or round holes, jam nut front or rear wall mount, in-line, and feedthrough configurations.

**TECHNICAL CHARACTERISTICS:**
Category – Cat 5e
Connection – 10BASE-T, 100BASE-TX, 1000BASE-T
Max Current Rating –1.5 Amps at 20° C
Dielectrc Withstanding Voltage – 1000 volts
Working Temperature – -40° to +85° C
Environmental Rating – IP67 unmated

**TERMINATION OPTIONS:**
Crimp contact and PCB termination, pre-terminated pigtails; jack/jack and jack/plug RJ45 configurations

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# Octobyte™

## The faster 4/8 pole interconnect system for industrial Ethernet data applications

Glenair series ITH connector with Octobyte™ contacts is available with fully dedicated Ethernet protocol or in a combo version where a mix of signal-power and Ethernet is required. RoHS compliant, IP67 (IP68 on request) exceeds performance expectations typical in harsh environmental applications found throughout rail and industrial markets.

OCTOBYTE™ contacts are vibration resistant and designed to work with Ethernet cables from CAT 5 to CAT 7A, MVB-WTB, RG58 Coax.

ITH connectors with Octobyte™ contacts are easy and fast to assemble, making them the best solution for harsh-environment applications where signal reliability is a must.



**Tested for compliance according to EN50173-1 standards set for CAT5E and CAT7. Testing was conducted using 12 jumpers, each 7.5 meters in length for a total of 90 meters.**

- **Commuter rail**
- **Passenger information systems (audio/video/ digital displays)**
- **Monitoring and control (braking/doors/lighting/ data)**
- **Heavy industry**
- **Data control**
- **Safety systems**
- **Tested in accordance with: ISO F0 STP: CAT 7A EN50173-1 F600-STP: CAT 7 EN50173-1 D STP: CAT 5E**

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# The faster 4/8 pole industrial Ethernet interconnect system



## ETHERNET CAT 7A CONTACTS



| | |
|---|---|
| **Data Transmission Ethernet Contacts for** | Ethernet CAT 6A |
| | Ethernet CAT 7 |
| | Ethernet CAT 7A |
| **Featuring** | Internal crimpable contacts |
| | Inspectable contact |
| | Integrated cable clamp |
| | Low mating force |
| **Technical Characteristics** | Current rating 5A max |
| | Voltage drop (at 5A and 25°C) 70mV max |
| **Materials and Finish** | Copper alloy and gold plating |
| **Inserts** | Thermoplastic resin |

## ETHERNET CAT 5 CONTACTS



| | |
|---|---|
| **Data Transmission Contacts for** | Ethernet CAT 5 |
| | Ethernet CAT 5E |
| | Ethernet CAT 6 |
| | Ethernet CAT 6A |
| **Featuring** | Internal crimpable contacts |
| | Inspectable contact |
| | Integrated cable clamp |
| | Low mating force |
| **Technical Characteristics** | Current rating 5A max |
| | Voltage drop (at 5A and 25°C) 70mV max |
| **Materials and Finish** | Copper alloy and gold plating |
| **Inserts** | Thermoplastic resin—UL94V0-NFF 16-102 12F3 Exigence 3 |

## COAX CONTACTS



| | |
|---|---|
| **Data Transmission Contacts for** | RG58 |
| **Featuring** | Internal crimpable contacts |
| | Inspectable contact |
| | Integrated cable clamp |
| | Low mating force |
| **Technical Characteristics** | Current rating 5A max |
| | Voltage drop (at 5A and 25°C) 70mV max |
| **Materials and Finish** | Copper alloy and gold plating |
| **Inserts** | PTFE |

## ETHERNET MVB - WBT CONTACTS



| | |
|---|---|
| **Data Transmission Contacts for** | MVB - Multifunctional Vehicle Bus |
| | WTB - Wired Train Bus |
| **Featuring** | Internal crimpable contacts |
| | Inspectable contact |
| | Integrated cable clamp |
| | Low mating force |
| **Technical Characteristics** | Current rating 5A max |
| | Voltage drop (at 5A and 25°C) 70mV max |
| **Materials and Finish** | Copper alloy and gold plating |
| **Inserts** | Thermoplastic resin—UL94V0-NFF 16-102 12F3 Exigence 3 |

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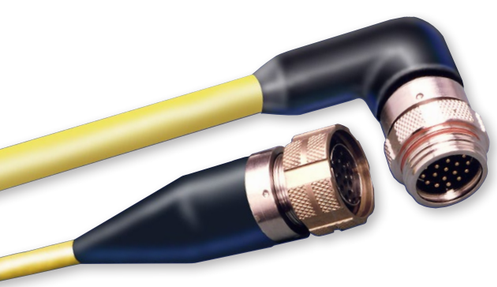


SERIES 22

# Geo-Marine®

## High-pressure harsh-environment connectors and overmolded cables for towed array and other high-pressure/submersible applications

Designed for use in oceanographic, geophysical and other severe industrial environments, Glenair Series 22 Geo-Marine® Connectors and Cables are the ultimate harsh-environment power and signal connector solution. Built to withstand hydrostatic pressures up to 5,000 PSI and exposure to extreme temperatures and corrosives, the Series 22 Geo-Marine® is ideally suited for applications such as US Navy towed array sonar systems, military land vehicles, submersibles and ROV's, offshore-oil drilling equipment, seabed exploration, pipeline inspection systems, well monitoring equipment, and digital seismic streamers.



**Geo-Marine® plugs are equipped with arctic coupling nuts—made from marine-grade naval bronze—with easy-to-grip castellated knurling and a powerful ratcheted anti-decoupling mechanism which guarantees reliable mating and demating performance in even the harshest environments. Supplied as discrete connectors—or more typically in build-to-print overmolded cable assemblies.**

- **Marine Grade 316 stainless steel machined shells and Naval Bronze coupling rings**
- **High-pressure environmental and hermetically sealed receptacles for field applications**
- **Power and signal contact arrangements from 2 to 128 contacts**
- **Anti-vibration ratcheted coupling nuts with castellated knurling**
- **Available Viton® overmolded cable assemblies**

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photo: Seismometer, geophysical observatory, Neumayer Station, Antarctica by Dr. Hannes Grobe



## Anti-Galling Arctic Coupling Nuts



One of the most valuable features of the Series 22 Geo-Marine® from the user's perspective is the specially-designed castellated and knurled coupling nut which facilitates rapid mating and demating in field applications. Single-start, stub Acme threads reduce thread fouling and binding, and are supplied with an anti-vibration/anti-decoupling device which prevents accidental loosening or decoupling. Plugs contribute to high-pressure sealing, up to 5,000 PSI in the mated condition, by means of rugged and durable interfacial and peripheral seals.

## Range of Offerings

Series 22 Geo-Marine® connectors are supplied with either fused-glass ("H" hermetic class) or high grade thermoplastic ("E" environmental class) insulators. Both classes of connectors are supplied with rugged, corrosion-resistant materials. Low-profile and scoop-proof cable plugs and receptacles, as well as bulkhead feed-throughs are available. Specially-designed cable sealing backshells as well as EMI/RFI shield termination backshells and environmentally-sealed protective covers complete the range of discrete product offerings. 35 insert arrangements (contact sizes #12, #16, #20 and #22) are tooled and fully available.

**Receptacle Configurations:** High-pressure environmental ("E") and hermetic ("H") class receptacles are available for cable as well as box applications. Rugged o-ring piston seals located inside the receptacle barrel contribute to reliable high-pressure sealing in the mated condition. Glenair is able to supply Geo-Marine® customers with a wide range of receptacle configurations for unique requirements including low-profile and scoop-proof designs, pin and socket contact designs, solder cup and printed circuit board termination, unique flange shapes and mounting configurations, in-line cable receptacles, connector savers and gender changers.

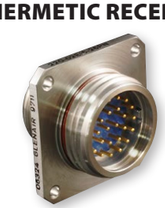
### HIGH-PRESSURE ENVIRONMENTAL AND HERMETIC RECEPTACLE CONFIGURATIONS



Jam Nut



In-Line



Square Flange



Solder-Mount



Bulkhead Feed-Through

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*MARINE BRONZE*

# Seacrow Connectors



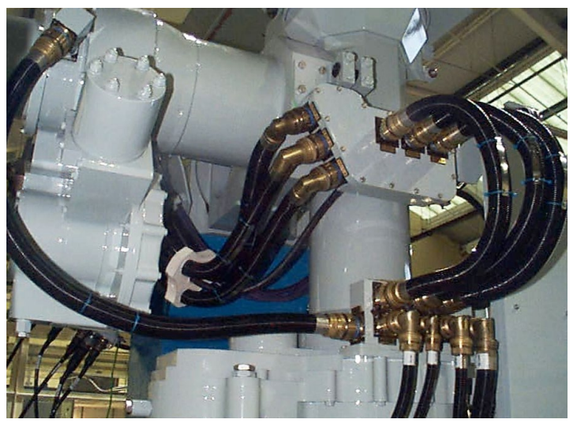
## For geophysical/offshore and other harsh-environment applications



RoHS COMPLIANT

c UL us

Glenair manufactures connectors qualified to VG96929, VG95234 and VG95328 standards. These connectors are mostly used in harsh-environment military applications for ground vehicles and ground systems. Our new Marine Bronze version increases the level of robustness of these connectors to be succesfully used in all severe environment navy installations, as well as off-shore platforms, sea ports, geological and oceanographic applications.



- **Marine bronze alloy for superior corrosion resistance in seawater and other harsh environments**
- **Ideal for shipboard and offshore drilling applications**
- **Available in Series ITS (5015 reverse-bayonet), Series IPT (26482), Series IGE (Single-pole high-power VG95234) and Series IT (5015 threaded)**
- **IP67 environmental sealing in mated condition; IP68 available**
- **Hundreds of available contact arrangements for both power and signal as well as hybrid applications**

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*HARSH ENVIRONMENT*

# Seacrow Marine Bronze Connectors

## Superior corrosion resistance

Seacrow™



### ITS-MB REVERSE-BAYONET CONNECTORS



**VG95234 Compliant Marine Bronze Series**

ITS-MB connectors are compliant with VG95234, using all the same insert arrangements available in the standard ITS Reverse Bayonet Connectors catalogue. Typically they are used for power and signal transmission, with wires from 26 AWG to 4/0. A wide variety of backshells allow the ITS-MB to accept jacketed cables, single or multi-poles, with or without RFI/EMI shielding, conduits with PG or metric thread. IP67 protection is the standard performance. IP68 on request.

### IPT-MB MIL-DTL-26482 HIGH DENSITY CONNECTORS



**VG95328 Compliant Marine Bronze Series**

IPT-MB connectors are the choice for reliability when 20-16 AWG signal cables are used. The insert arrangements as well as the electrical characteristics are detailed in the IPT IPT-SE Catalogue. Backshells suitable for EMI shield terminations and heat shrink boots are also available.
The receptacle is also available with PCB contacts. IP67 protection is the standard performance. IP68 on request.

### IGE-MB REVERSE-BAYONET SINGLE-POLE CONNECTORS



**VG96929 Compliant Marine Bronze Series**

IGE-MB High Power Single Pole Connectors are used with cables from 16 to 240 mmq. These connectors achieve high-performance working current and peak current, and are ideal for engines, power supplies, and power distribution boxes. Several backshells are available, either straight or 90° elbows for the most reliable cable accomodation. See the VG96929 Catalogue for detailed electrical characteristics. IP67 protection is the standard performance. IP68 on request.

### IT-MB MIL-C-5015G THREADED CONNECTORS



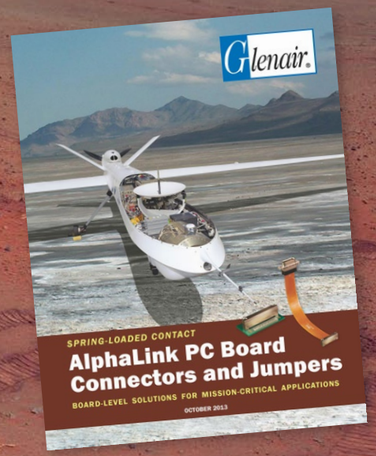
**Marine Bronze Series**

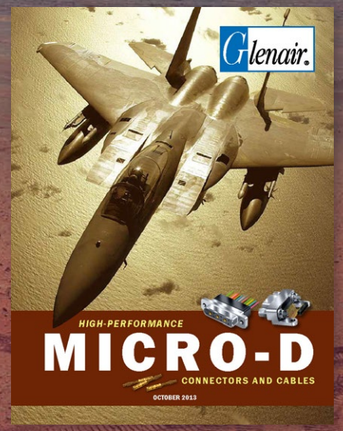
IT-MB is a threaded connector compliant with the MIL-DTL-5015 standard. All the electrical characteristics are available in the IT standard catalogue. IT-MB family is a threaded version mostly used for power and signal, with IP67 standard performance sealing.

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# Rectangular Connectors

## From nano and micro to D-subminiature—the industry's best performance and availability



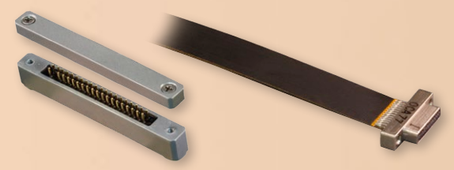







**Glenair manufactures all of the popular industry-standard rectangular connectors used in military and aerospace applications, including special high-performance versions of the M24308 D-Sub and our revolutionary Series 79 Micro-Crimp connector. We offer a small form factor rectangular connector for virtually every I/O and wire-to-board requirement including MIL-DTL-83513 Micro-D subminiatures and MIL-DTL-32139 Nanominiature. All of our rectangular connector products are available in filter and hermetic versions, as well as with flex circuit terminations. Point-to-point cordsets, pigtails, and build-to-print harnesses are Glenair specialties.**

**Rectangular Connector Selection Guide**



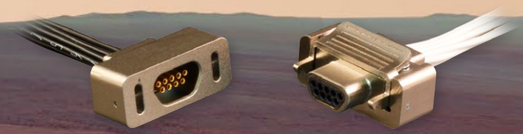
AlphaLink® Board-Level Connectors and Flex Jumpers



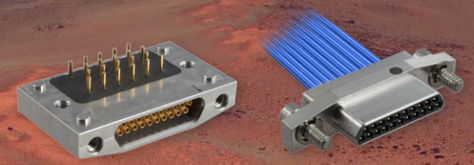

Series 89 MIL-DTL-32139 Nanominiature Connectors



Micro-D (MIL-DTL-83513) Connectors and Cable Assemblies



MasterLatch® Quick-Disconnect Micro-D



Well-Master™ 260° High-Temperature Micro-D



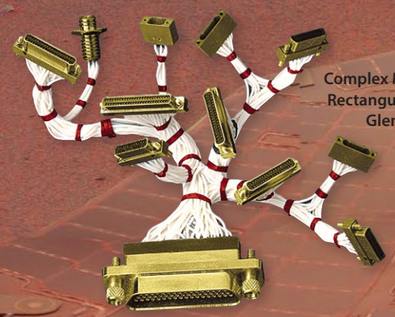
Series 79 Micro-Crimp Connectors



SuperTwin™ Lightweight Composite Modular Connectors



Series 28 HiPer-D 24308 Compatible Connectors



Complex Multi-Branch Micro Rectangular Harnessing is a Glenair Specialty

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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SERIES 171

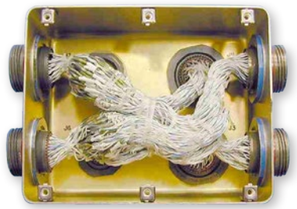
# Alphalink®

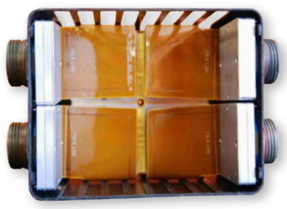
## Board-level spring-loaded-contact connectors and turnkey flex jumpers



AlphaLink SL is a high-performance, solderless board-level connector technology developed by Glenair that significantly expands board-level interconnection options for users of mil-spec caliber connectors. Precision-machined and EMI shielded, these ultra lightweight PC tail, solder cup, and/or pigtail equipped connectors are designed for high-reliability applications that require avionic system levels of vibration and shock tolerance. Ultra low-profile and high-density, AlphaLink SL connectors are equipped with 2–3 Amp spring-loaded contacts and may be ordered either as discrete connectors or in turnkey flex jumpers with Glenair high-reliability I/O connectors. Glenair is perfectly positioned to provide the entire solution with in-house manufacturing for every component part—from contacts and connectors to rugged polyimide-based flex. AlphaLink SL flex jumpers are available with Series 80 Mighty Mouse and Series 88 SuperFly ultraminiature and nanominiature circular connectors, as well as Micro-D subminiature, Series 79 Micro-Crimp, and nanominiature rectangular connectors. A wide range of insert arrangements, from 4–40 contacts is available.

- **Spring-loaded, solderless board-level connector**
- **PC tail and solder cup versions offer easy termination to flex or wire**
- **Turnkey I/O-to-board flex and pigtail wire jumpers**
- **Lightweight and low-profile—up to 40% space savings compared to 2mm pitch solutions**
- **High-density .050" center-to-center contact footprint**
- **Fast PC board integration with reduced board preparation and masking**
- **Withstands temperature, vibration and shock extremes**





**Flex offers many advantages over conventional wire, including reduced size, weight, and complexity.**


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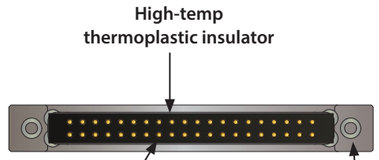
# Spring-loaded contact board-level connector

## Fast and easy PC board integration

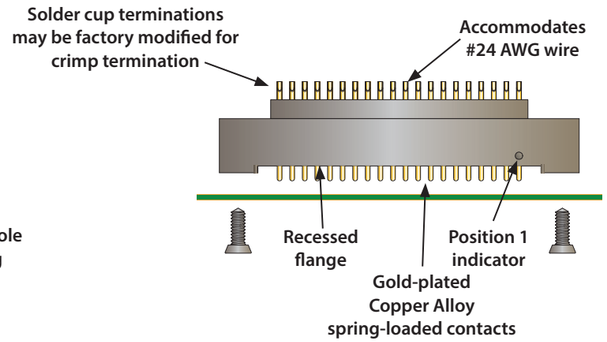


New! AlphaLink SL board-level spring-loaded contact pre-wired pigtail assemblies

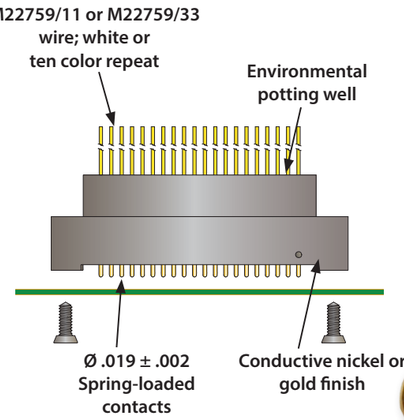
### AlphaLink SL Spring-Loaded Contact Interface



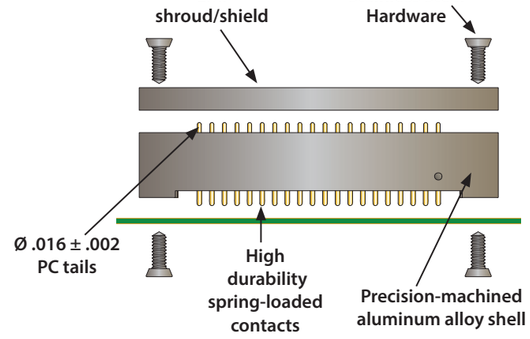

### 171-134-01 Solder Cup Termination



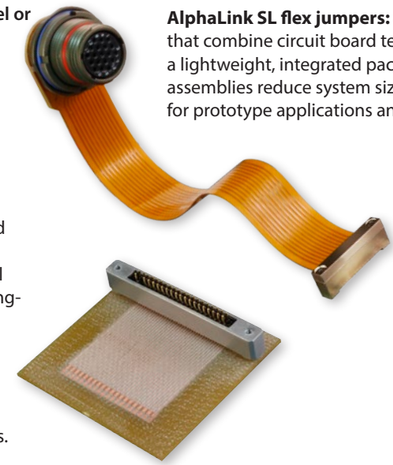

### 171-134-03 Wire Pigtail Termination




### 171-134-02 PC Tail Termination



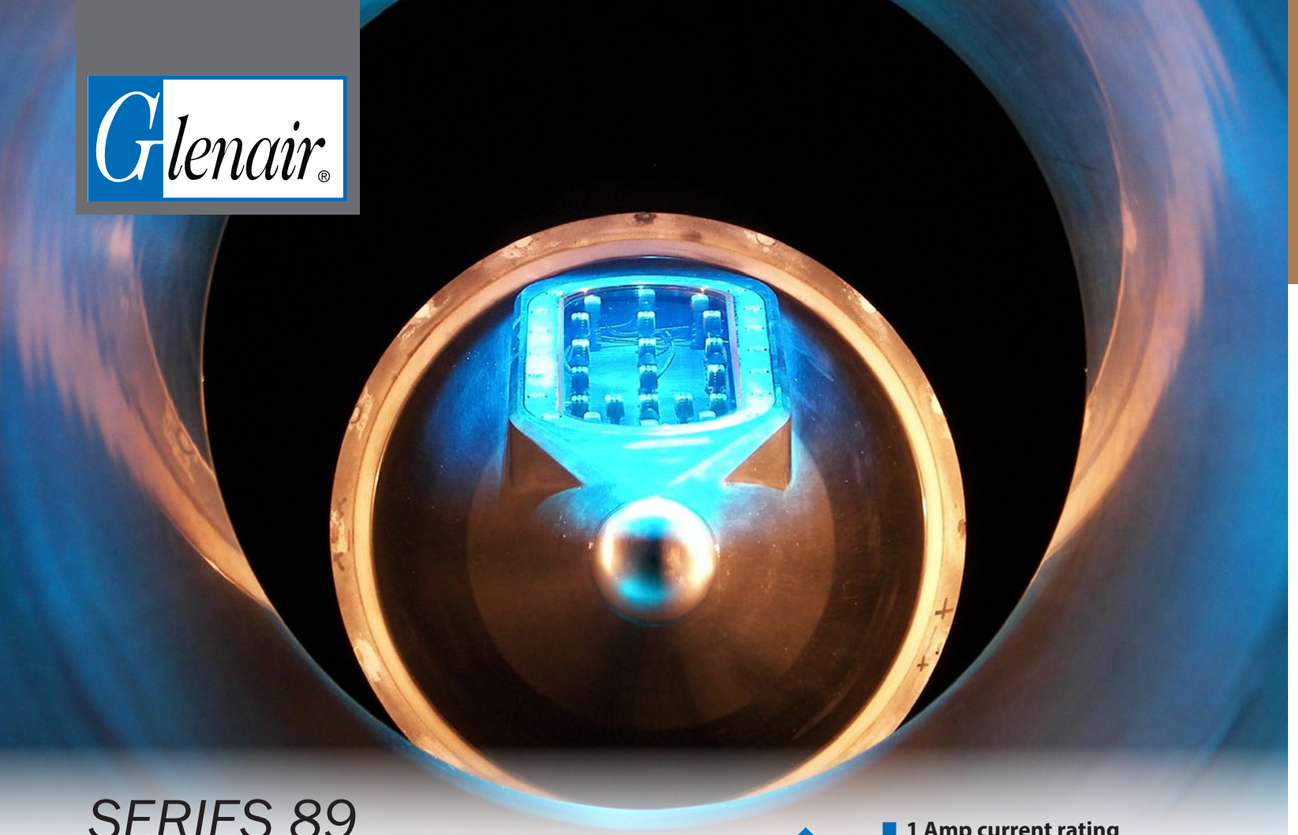

**AlphaLink SL flex jumpers:** Compact interconnect assemblies that combine circuit board technology and cabling into a lightweight, integrated package. These turnkey jumper assemblies reduce system size and weight and are ideally suited for prototype applications and new product development efforts.



**AlphaLink SL spring-loaded contact PC board connectors** deliver up to 50% footprint savings versus conventional 2mm pitch solutions. PC tail equipped connectors, the 171-134-02, are supplied with an EMI shroud / shield for improved EMC compared to low-cost plastic board connectors. All connector styles incorporate a high-reliability spring-loaded contact that delivers a virtually unlimited number of mating cycles. Connectors are typically mated to the PC board using conductive pads or via's. Stainless steel mounting hardware provides a robust, vibration-resistant attachment solution compared to stamped-and-formed retention barbs.

Glenair®

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# SERIES 89
# Nanominiature Connectors

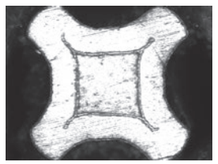
QPL qualified




- 1 Amp current rating
- .025 Inch (0.635 mm) contact spacing
- #30 And #32 gage wire accommodation
- Single and double row
- Metal shell, aluminum, titanium or stainless steel
- TwistPin contact system
- Gold alloy contact, unplated
- Thru-hole and surface-mount PCB versions

**MIL-DTL-32139 qualified connectors for mission-critical board-to-wire applications—simply the smallest and lightest mil-spec connector in the business**

## THE NANO TWISTPIN ADVANTAGE



Transverse cross-section of a TwistPin contact crimped to solid wire



- Gas-Tight Crimp Joint
- Better Shock and Vibration Performance
- Corrosion Proof Contact Alloy

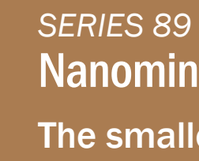
Nanominiature sized circular connectors in threaded and push-pull styles are also now available from Glenair




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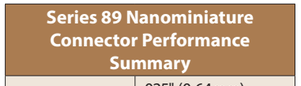


| Series 89 Nanominiature Connector Performance Summary | |
|---|---|
| Contact Spacing | .025" (0.64mm) Contact Centers |
| Wire Accommodation | #30-#32 AWG |
| Current Rating | 1 AMP Max |
| DWV | 250 VAC RMS Sea Level |
| Insulation Resistance | 5000 Megohms Minimum |
| Operating Temperature | -55° C. to +125° C. |
| Contact Resistance | 71 Millivolt Drop Maximum |
| Shock, Vibration | 100g's, 20 g's |
| Durability | 200 Mating Cycles |
| Corrosion Resistance | 48 Hours Salt Spray |
| Mating Force | 5 Ounce Max, 0.4 Ounce Min |

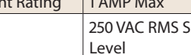



Glenair nanominiature connectors are MIL-DTL-32139 qualified. Series 89 products offer options not covered in the mil-spec.

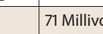
## How Small Are They?



***D-Subminiature Connector***
25 Contacts
on 0.109 Inch Spacing



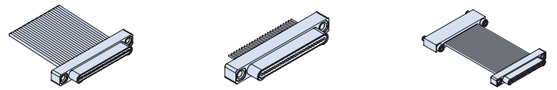
***Micro-D Connector***
25 Contacts
on 0.050 Inch Spacing



***Nano Connector***
25 Contacts
on 0.025 Inch Spacing

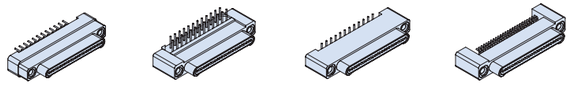
## SERIES 89 NANOMINIATURE PRODUCT SELECTION GUIDE

**Pre-Wired Single Row Connectors**



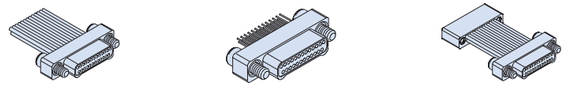
Insulated Wire · Uninsulated Wire · Back-to-Back Cables

**Pre-Wired PCB Connectors**



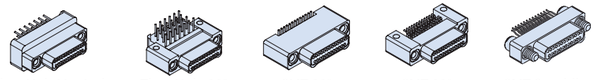
Thru-Hole Vertical · Thru-Hole 90° · SMT 90° · SMT 90°

**Pre-Wired Double Row Connectors**



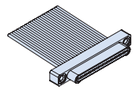
Insulated Wire · Uninsulated Wire · Back-to-Back Cables

**Double Row PCB Connectors**

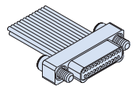


Thru-Hole Vertical · Thru-Hole 90° · SMT 90° · SMT 90° · SMT Straddler

**Pre-Wired MIL-DTL-32139 Connectors**



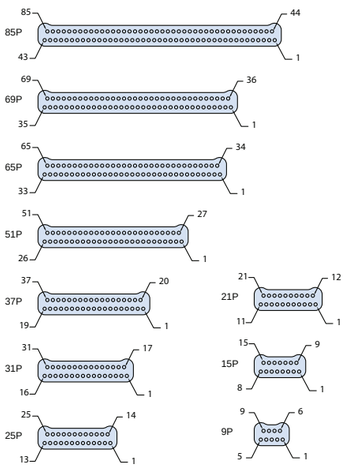
Single Row, Insulated Wire



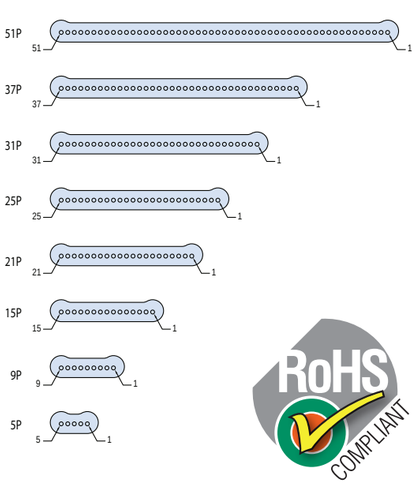
Double Row, Insulated Wire

## NANOMINIATURE CONTACT ARRANGEMENTS

Double Row Mating Face of Pin (Plug) Connector




Single Row Mating Face of Pin (Plug) Connector




RoHS COMPLIANT





High-performance
Micro TwistPin contacts

SERIES MWDM

# Micro-D Connectors

- High density Micro TwistPin contacts set on .050 centers
- 9 to 130 contact arrangements
- Pigtail, PCB, solder cup, and flex terminations
- Single row, multi-row, low profile and high density insert arrangements
- QPL and commercial versions
- Same-day availability on all part numbers



*Standard*



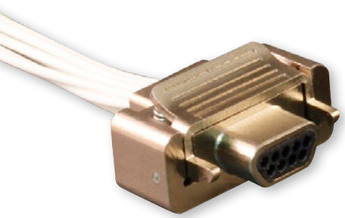

*Hermetic*



*EMI Filter*

TwistPin equipped MIL-DTL-83513 Micro-D connectors offer outstanding mating performance, durability and minimal contact resistance

QPL qualified



*MasterLatch™*



*Surface Mount*



*Rear Panel Mount*



*Flex Circuit*

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*MIL-DTL-83513 AND COMMERCIAL*

# Micro-D Connectors

## Mission-critical mating performance

MICRO-D

### METAL SHELL MICRO-D FOR HARNESSING APPLICATIONS



GRPM Solder Cup



GRPM
Insulated Wire



GRPM
Uninsulated Wire



MWDM Solder Cup



MWDM
Insulated Wire



MWDM
Back-To-Backs



Shielded Cable
Assembly



MWDM
Uninsulated Wire



GMDR
Insulated Wire



GMDE
Environmental



GSWM SpaceWire



GMLM
MasterLatch

### MICRO-D FOR PRINTED CIRCUIT BOARD



GRPM-CBS



GRPM-CBR



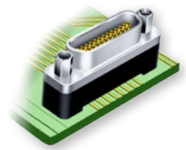
MWDM-BS



MWDM-BR



MWDM-CBR



MWDM-CBS



90° Surface Mount



GMR7580



GMR7590



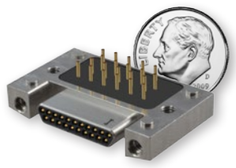
GMR7580C



GMR7590C



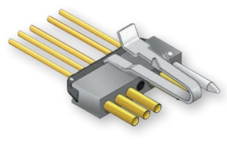
Right Angle Filter



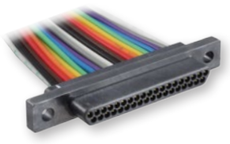
*WellMaster™ 260*



*Sav-Con®*



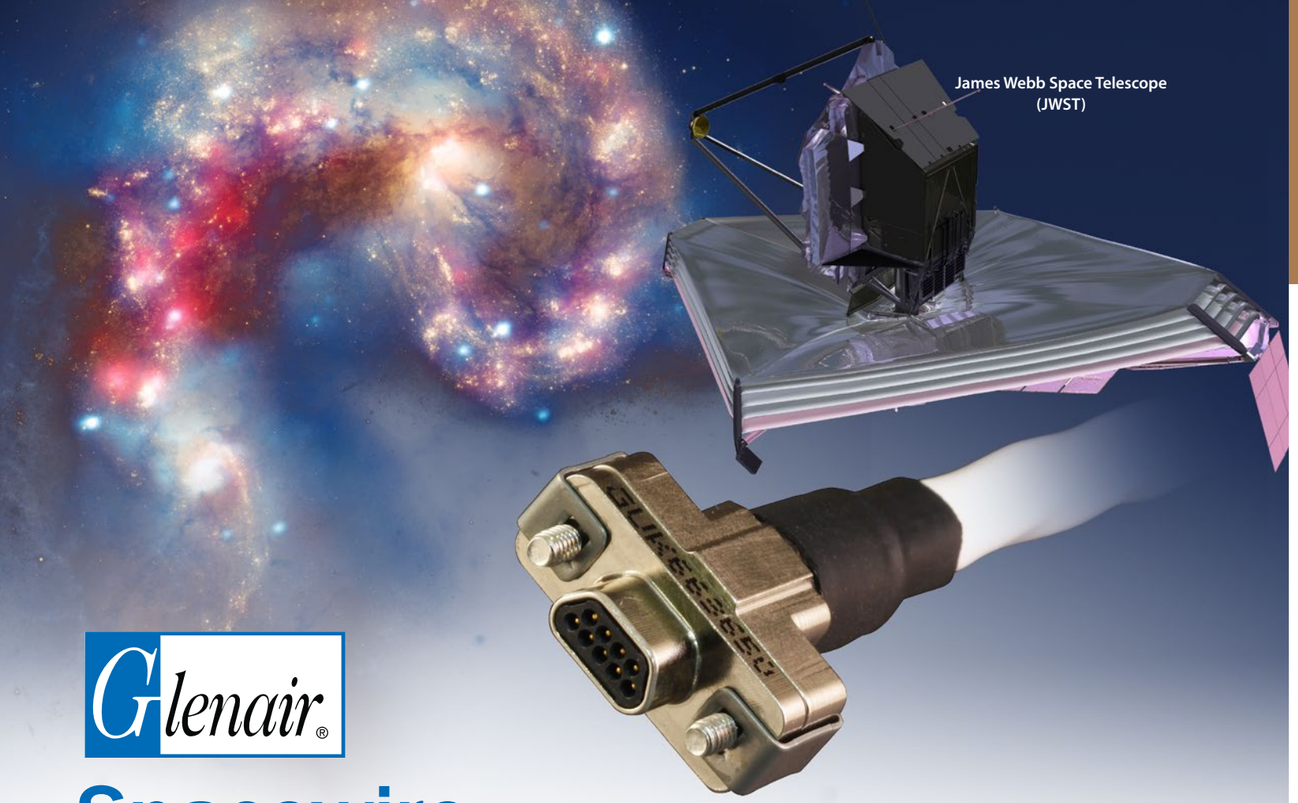
*Latching MicroStrip*



*Low Profile*

E

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# Spacewire

## Reduced Cost of Ownership, Easy Integration, and High-Performance for Flight and Lab Grade Cable Assemblies.

The success of any space mission begins with reliable data transmission and Glenair Spacewire cables, built to meet the strict standards set forth by ECSS-E-ST-50-12C, make this a reality. Our Spacewire cables offer bidirectional, high speed data transmission rates up to 400 Mbits/s while significantly reducing cross talk, skew, and signal attenuation. By incorporating a serial, point-to-point cable, with low voltage differential signaling (LVDS) reduced costs are realized through an easily integrated data transmission cable. These features allow Spacewire cables to be incorporated across various satellite programs without the expense of costly design customization.

## Spacewire: The Space Industry Data Transmission Standard

Glenair Spacewire assemblies begin with a high performance cable built with expanded polytetraflouroethylene (ePTFE) insulation. This material allows for low-loss transmission of LVDS signals maximizing data-rates while allowing for the implementation of standard hardware protocols, thus eliminating the need for design customization and long lead time cable projects.

### TYPICAL USES INCLUDE

- EGSE applications
- Radar sensor systems
- Hi-resolution camera equipment
- Sensor, mass-memory unit, and telemetry subsystem interconnections

### APPROVED FOR USE BY:

- ESA
- NASA
- JAXA
- RKA

### CONNECTOR/CABLE

- Laboratory and Space Grade Versions Available
- Qualified MIL-DTL-83513 Micro-D Connector
- Gold Plated Copper Alloy TwistPin Contacts
- Basic Cable, 4 Twisted Pair Cables and a Ground
- Epoxy Resin Potting
- EMI Banding Backshell

### PERFORMANCE

- 3 Amps
- Temperature Tolerance -200°C to +180°C
- 100 Ω Impedance Shielded Signal Pair
- Very Low Skew, Signal Attenuation and Cross Talk
- 65dB Minimum Attenuation Shielding Effectiveness
- Low Magnetic Permeability IAW EIA-364-54

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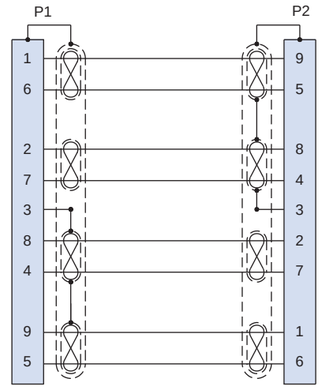
### NOTES:

1. Flight grade (cable Type F) assemblies to be screened IAW NASA EEE-INST-002, Table 2. Level 1 with 100% thermal vacuum outgassing (24 hours/+125°C/$10^{-6}$ torr). Reference Glenair Mod Code 429C.
2. Operating temperature - 200°C to +180°C. Reference Glenair Mod Code 428.
3. Electrical performance:
   Dielectric withstanding voltage: 600 VAC.
   Insulation resistance: 5000 megohms @500 VDC.
4. Assembly to be identified with Glenair's name, Part Number, Cage Code and Date Code or ESCC Component Part Marking Standards.

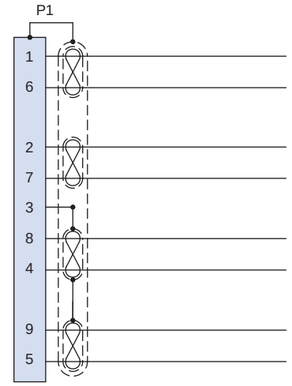
### MATERIALS/FINISH:

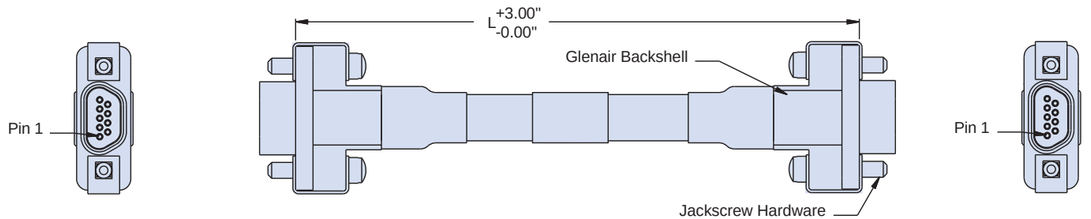
- Shells/backshells - aluminum alloy/electroless nickel.
- Insulators - high grade rigid dielectric/N.A.
- Contacts - copper alloy, gold plated.
- Hardware - stainless steel/passivated.

**Back To Back Wiring**
Diagram (GP)




**Single Ended Wiring**
Diagram (P)




**How To Order Spacewire***

| Sample Part Number | GSWM | 2 | L | -9 | GP | -6 | F | B | -16 | S |
|---|---|---|---|---|---|---|---|---|---|---|
| **Product Series** | **GSWM**–Glenair Spacewire Micro-D | | | | | | | | | |
| **Shell Plating** | **2**–Electroless Nickel **5**–Gold | | | | | | | | | |
| **Insulator Material** | **L**–LCP | | | | | | | | | |
| **Shell Size** | **-9** | | | | | | | | | |
| **Connector Type** | **P**–Single Ended Pin (Plug)<br>**GP**–Pin (Plug) Connector Both Ends | | | | | | | | | |
| **Wire Gauge** | **-6**–26 AWG **-8**–28 AWG **-0**–30 AWG (30 AWG–Lab Only) | | | | | | | | | |
| **Cable Type** | **F**–Flight Grade **L**–Lab Grade | | | | | | | | | |
| **Termination Option** | **B**–Backshell | | | | | | | | | |
| **Cable Length In Inches** | **-16** = 16 inches (12 inches minimum) | | | | | | | | | |
| **Hardware** | **S**–Male Slotted Jackscrew **P**–Female Jackpost | | | | | | | | | |

*Use Mod Code 428 for high-temp version and Mod Code 429C for NASA thermal outgassing



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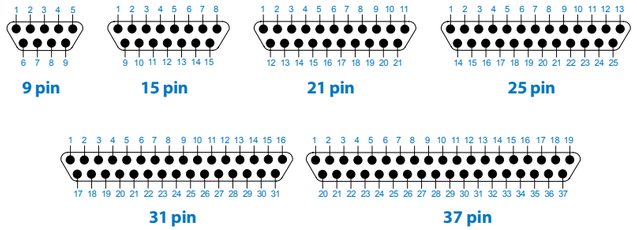
SERIES GMLM

# MasterLatch®

## Quick-disconnect Micro-D

MasterLatch (GMLM) Quick-release locking Micro-D connector pairs are equipped with a precision latching and locking mechanism. The single thumb latch on the plug side actuates a pair of locking latches that mate quickly and reliably to GMLM receptacles. These TwistPin equipped, low-insertion-force connectors meet all the standard performance requirements of MIL-DTL-83513 including vibration, shock, and mating durability. Choose from 6 different insert arrangements, with 9 to 37 contacts. The unique ergonomic latching mechanism can be easily activated with a thumb and forefinger grip even when wearing gloves, or when difficult access to connector pairs makes the use of jacking hardware and tools impossible.

**Face view pin connector - Micro-D contact arrangements**





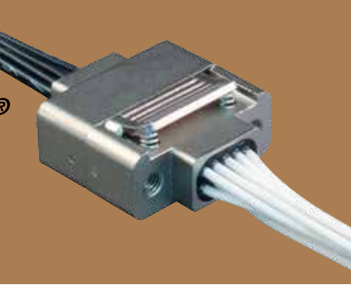

- **Precision latch meets MIL-DTL-83513 vibration and shock**
- **Low insertion force TwistPin contacts**
- **Easy-to-activate latching mechanism**


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SERIES GMLM

# MasterLatch®

## Quick-disconnect Micro-D

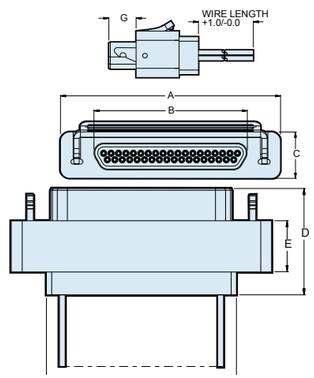


**How To Order GMLM MasterLatch™**

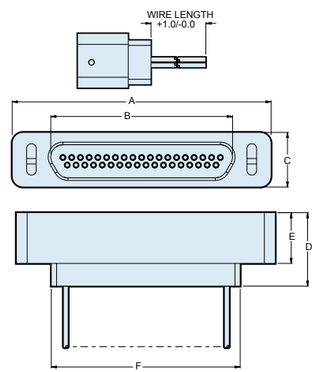
| Sample Part Number | GMLM | 2 | L | -25 | P | -6 | K | 7 | -18 |
|---|---|---|---|---|---|---|---|---|---|
| **Product Series** | **GMLM** Glenair MasterLatch™ Micro-D | | | | | | | | |
| **Shell Plating** | **1**- Cadmium **2** - Nickel **4** - Black Anodize **5** - Gold **6** - Chem Film | | | | | | | | |
| **Insulator Material** | **L** - LCP or PPS | | | | | | | | |
| **Contact Layout** | **9, 15, 21, 25, 31, 37** | | | | | | | | |
| **Connector Type** | **P** - Pin Connector<br>**S** - Socket Connector | | | | | | | | |
| **Wire Gauge** | **4** - 24 AWG **6** - 26 AWG **8** - 28 AWG **0** - 30 AWG (30 AWG–Lab Only) | | | | | | | | |
| **Wire Type** | **K** - M22759/11 600 Vrms Fluoropolymer (TFE) **J** - M22759/33 600 Vrms Modified Cross-Linked Tefzel (ETFE) | | | | | | | | |
| **Wire Color Code** | **1** - White **2** - Yellow **5** - Color Coded **7** - Ten Color Repeating | | | | | | | | |
| **Cable Length In Inches** | **18** - 18 inches | | | | | | | | |

**Series GMLM MasterLatch™ Dimensions**

Pin




Socket




| Layout | A Max | B Max | C | D Max | E Max | F Max | G |
|---|---|---|---|---|---|---|---|
| 9P | 0.785 | 0.333 | 0.320 | 0.610 | 0.290 | 0.400 | 0.183 |
| 9S | 0.785 | 0.342 | 0.320 | 0.429 | 0.295 | 0.400 | 0.183 |
| 15P | 0.935 | 0.483 | 0.320 | 0.610 | 0.290 | 0.550 | 0.183 |
| 15S | 0.935 | 0.492 | 0.320 | 0.429 | 0.295 | 0.550 | 0.183 |
| 21P | 1.085 | 0.633 | 0.320 | 0.610 | 0.290 | 0.700 | 0.183 |
| 21S | 1.085 | 0.642 | 0.320 | 0.429 | 0.295 | 0.700 | 0.183 |
| 25P | 1.185 | 0.733 | 0.320 | 0.610 | 0.290 | 0.800 | 0.183 |
| 25S | 1.185 | 0.742 | 0.320 | 0.429 | 0.295 | 0.800 | 0.183 |
| 31P | 1.335 | 0.883 | 0.320 | 0.610 | 0.290 | 0.950 | 0.183 |
| 31S | 1.335 | 0.892 | 0.320 | 0.429 | 0.295 | 0.950 | 0.183 |
| 37P | 1.485 | 1.033 | 0.320 | 0.610 | 0.290 | 1.100 | 0.183 |
| 37S | 1.485 | 1.042 | 0.320 | 0.429 | 0.295 | 1.100 | 0.183 |

MasterLatch™ GMLM connectors are sold as prewired pigtails only, with 18 inch wire leads. Contact factory for alternative lengths.

### MATERIAL AND FINISH

- Insulator: Liquid crystal polymer or PPS
- Wire: M22759/11 600 Vrms Fluoropolyer (TFE) or M22759/33 600 Vrms Modified Cross-Linked Fluoroplastic (ETFE)
- Pin Contacts: Gold-plated beryllium copper alloy
- Socket Contacts: Gold-plated phosphor bronze alloy
- Shell: Aluminum alloy with choice of cadmium plate, electroless nickel, black anodize, gold, or chem film
- Latching mechanism: Stainless steel

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U.S. CAGE code 06324



HIGH-TEMPERATURE

# Well-Master™ 260°

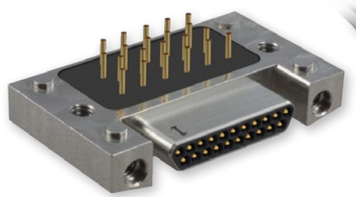
Glenair®

## The Micro-D connector for serious, high-temperature applications

Standard Micro-D connectors are rated for +125°C. Glenair's MWDM Micro-D can withstand +150°C continuous operating temperature and can be upgraded to +200°C if assembled with special high temperature epoxies. But oil, gas and geothermal wells can subject electronic instruments to temperatures as high as +260°C. The GHTM Series Micro-D meets the need for a high density, high performance connector capable of handling this temperature. The GHTM features contacts made from a special alloy that resists softening when exposed to temperatures up to +260°C (500° F). Rugged passivated stainless steel shells and hardware, high temperature liquid crystal polymer (LCP) insulators allow these connectors to survive the most demanding environments. Unique angled mounting ears allow the Well-Master™ 260° to fit in confined spaces.

- **+260°C Operating Temperature**
- **Angled Mounting Ears to Fit in Small Diameter Instruments**
- **High Reliability TwistPin Contact System with Special High Temperature Alloy**
- **.050" Pitch Contact Spacing for Reduced Size**
- **Solder Cup, Pre-Wired or PCB**

Well-Master 260°



**+260°C PCB Header**



**+260°C Cable Connector**

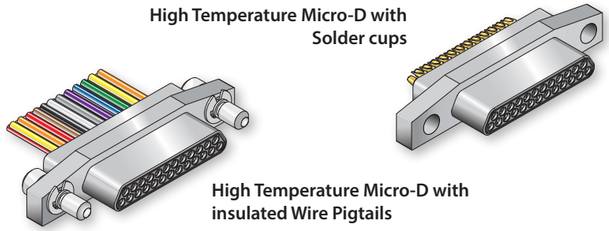
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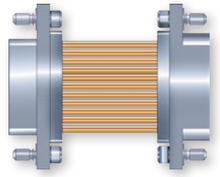
Well-Master 260°

In addition to extreme high temperature tolerance, and demating resistance to vibration and shock, the Glenair Well-Master™ 260° Micro-D connector features unique shell packaging designed to conform with the cylindrical shape of instrument housings. Special angled mounting ears facilitate incorporation of the connector into available space, and the Micro-D's overall reduced size compared to other rectangular connector solutions allows for more efficient utilization.

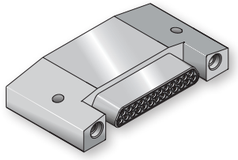
**High Temperature Micro-D with Solder cups**



**High Temperature Micro-D with insulated Wire Pigtails**



**High Temperature Back-to-Back Micro-D**

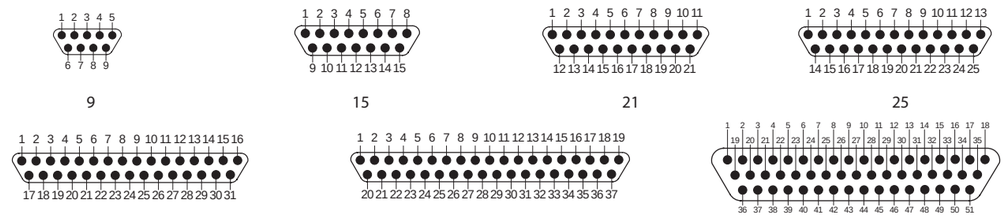


**High Temperature PCB Header**



E

## GHTM HIGH TEMPERATURE CONTACT ARRANGEMENTS




**Mating face of pin connector. Socket connector contact numbers are reversed.**

| Materials and Finishes | |
|---|---|
| Contacts | Proprietary nickel alloy, gold plated |
| Insulators | Liquid crystal polymer (LCP) |
| Shell | Stainless steel, passivated |
| Mounting Hardware | Stainless Steel |
| Insulated Wire | Nickel-coated copper, PTFE insulation per M22759/87 (260°C) |

| Specifications | |
|---|---|
| Current Rating | 3 Amps |
| Contact Resistance | 8 milliohms maximum |
| Dielectric Withstanding Voltage | 600 Vac sea level |
| Insulation Resistance | 5000 megohms minimum |
| Operating Temperature | -55° C. to +260° C. |
| Shock | 50 g. |
| Vibration | 20 g. |

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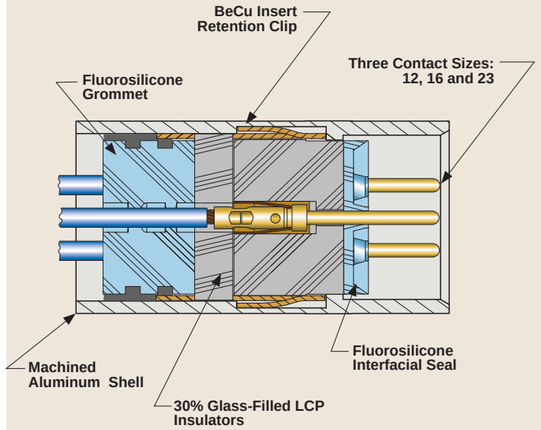
SERIES 79

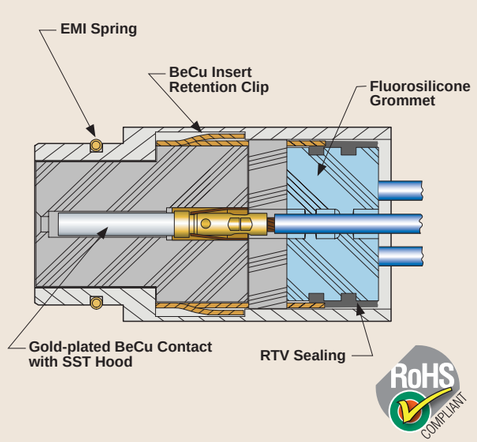
MICROCRIMP®

# Micro-Crimp

## The ultraminiature crimp contact rectangular with advanced environmental and EMC performance

- Crimp, PCB, fiber optic, coax, power and pitot
- Precision machined aluminum shells sealed to IP67
- High-density #23 contact arrangements set on .076 centers
- Blind mating for rack and panel applications
- Environmental, hermetic and filter versions
- Integrated ground spring for improved EMI shielding




RoHS COMPLIANT

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SERIES 79

# Micro-Crimp

MICROCRIMP®

## High-reliability crimp contact performance

### SERIES 79 MICRO-CRIMP PRODUCT SELECTION GUIDE



Crimp Terminated Cable Connectors



Crimp Terminated Panel Mount Connectors



Straight PCB Panel Mount and Free-Standing Connectors

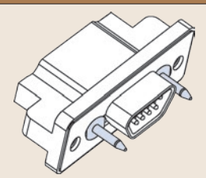


Right Angle PCB Panel Mount and Free-Standing Connectors

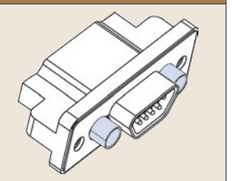


Backshells and Accessories, EMI Adapters and Protective Covers

**Blind Mate Guide Pins and Sockets**



**Guide Pins**
Connector may be supplied with stainless steel non-removable guide pins.



**Guide Sockets**
Connector may be supplied with stainless steel non-removable bushings.

### *Selected Contact Types*



Standard Signal



Power



Coaxial



Differential Twinax



Fiber Optic



Pitot Tube

| Shell Size | Contact Arrangement | Contact Quantity #23 | #16 | #12 |
|---|---|---|---|---|
| A | A-5 | 5 | — | — |
| B | B-2P2 | — | 2 | — |
| | B-9 | 9 | — | — |
| C | C-13 | 13 | — | — |
| D | D-15 | 15 | — | — |
| | D-3P3 | — | 3 | — |
| | D-7P2 | 5 | 2 | — |
| E | E-11P2 | 9 | 2 | — |
| | E-19 | 19 | — | — |
| | E-7P3 | 4 | 3 | — |

| Shell Size | Contact Arrangement | Contact Quantity #23 | #16 | #12 |
|---|---|---|---|---|
| F | F-15P2 | 13 | 2 | — |
| | F-23 | 23 | — | — |
| | F-5P5 | — | 5 | — |
| G | G-33 | 33 | — | —— |
| H | H-10P4 | 6 | — | 4 |
| | H-29P7 | 22 | 7 | — |
| | H-36P2 | 34 | — | 2 |
| | H-54P2 | 52 | 2 | — |
| | H-5P5 | — | — | 5 |
| | H-66 | 66 | — | — |

| Shell Size | Contact Arrangement | Contact Quantity #23 | #16 | #12 |
|---|---|---|---|---|
| J | J-17P4 | 13 | 4 | — |
| | J-25P2 | 23 | 2 | — |
| | J-33 | 33 | — | — |
| | J-7P7 | — | 7 | — |
| K | K-27P4 | 23 | 4 | — |
| | K-35P2 | 33 | 2 | — |
| | K-43 | 43 | — | — |
| | K-9P9 | — | 9 | — |
| L | L-6P6 | — | — | 6 |
| | L-78 | 78 | –– | –– |
| M | M-102 | 102 | –– | –– |

| Performance Specifications | |
|---|---|
| Current rating | Contact size #23 5 Amps, size #16 13 Amps, size #12 23 Amps maximum |
| Voltage rating (DWV) | Contact size #23 500 VAC rms. size #16 and #12 1800 VAC rms. Sea level. |
| Insulation resistance | 5000 megohms minimum |
| Operating temperature | -65° C. to +150° C. |
| Contact resistance | 5 milliohms maximum |
| Water ingress protection | IP67 |
| Shielding effectiveness | >75 dB attenuation from 100 MHz to 1000MHz, >60dB 1GHz to 4GHz, >40dB 4GHz to 10GHz. |

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
U.S. CAGE code 06324




# Super Twin™

# Lightweight Composite Modular Connectors

## Drop-in replacements for legacy modular rectangular connectors save weight, space, and assembly time

Today's high-performance commercial aircraft are looking for revolutionary materials and product designs that can reduce weight and improve reliability and performance. The Glenair Series 20 Super-Twin™ lightweight modular connector is a drop-in replacement for legacy cable and panel connectors that no longer meet these performance specifications—especially for ease of assembly, electromagnetic compatibility and size, weight and power optimization.

The Glenair Series 20 Super-Twin™ can accommodate a broad range of contact sizes and types from #23 to #8 signal, Quadrax, El Ochito®, power, and fiber. Modular inserts offer fast and flexible assembly and repair. Peripheral and grommet seals provide outstanding environmental protection. Keyed inserts and shells provide versatile polarization and protection against mis-mating. The innovative clamshell and banding porch design brings modern, state-of-the-art connector capabilities to modular cable and panel applications.



- **For reduced size and weight cable and panel applications**
- **Lightweight composite shell with integral strain relief/banding porch**
- **Modular inserts support a wide range of contact sizes and types up to #8**
- **Polarization – both shell and inserts**
- **Center jackscrew with self-locking hardware**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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*SERIES 20 Super-Twin™*

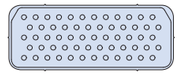
# Lightweight Composite Modular Connectors

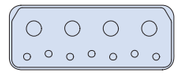


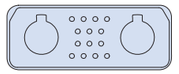

## SUPER-TWIN™ SHELLS AND INSERTS ARE ORDERED SEPARATELY

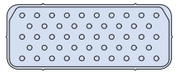
| How To Order - Shells | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Part Number** | **200-013** | **P** | **2** | **–XM** | **31** | **K** |
| **Series 20 Modular Connector** | **200-013** Plug Shell<br>**200-014** Receptacle Shell | | | | | |
| **Plug/Receptacle** | **P** = Plug Shell, **R** = Receptacle Shell | | | | | |
| **Size** | Size **2** | | | | | |
| **Finish** | **XM** = Electroless Nickel **XB** = No plating, black | | | | | |
| **Polarization Code** | 2 digits:<br>First digit **1** – **4** (factory installed)<br>Second digit **1** – **4** (factory installed)<br>**Blank** = keys supplied as kit | | | | | |
| **MicroBand Option** | **K** = MicroBand supplied. Blank = no MicroBand | | | | | |

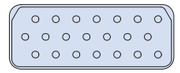
| How To Order - Inserts | | | | | |
|---|---|---|---|---|---|
| **Sample Part Number** | **200-005** | **P** | **2** | **–60** | **A** |
| **Series 20 Modular Connector** | **200-005** Pin Insert<br>**200-006** Socket Insert | | | | |
| **Pin/Socket Insert** | **P** = Pin Insert, **S** = Socket Insert | | | | |
| **Size** | Size **2** | | | | |
| **Insert Pattern** | **60** = 60X #23 contacts | | | | |
| **Polarization** | **A, B, C, D, E, F, G, H** (must match with shell polarization) | | | | |

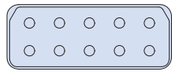

PATTERN 60
60 X Size 23 Contacts
DWV= 750 VAC


PATTERN 7W4
4 X Size 12 Contacts
7 X Size 20 Contacts
DWV= 1500 VAC


PATTERN 14Q2
2 X Size 8 Contacts
14 X Size 23 Contacts
DWV= 750 VAC


PATTERN 48
48 X Size 23 Contacts
DWV= 1300 VAC
DWV@50 000 ft = 800 VAC


PATTERN 21
21 X Size 20 Contacts
DWV= 1500 VAC


PATTERN 10
10x Size 16 Contacts
DWV= 1500 VAC


**Modular inserts easily removed with available tool**

**Keyed, snap-in-place insert modules are currently available in six tooled layouts, accommodating size #23, #20, #16, #12 and keyed size #8 contacts (for use with Quadrax or El Ochito™ contacts).**



## Weight Study, Typical Regional Jet Airframe

Series 20 SuperTwin™
Mated Pair: 67g
Weight/Plane: 7,661g

Legacy rectangular: aluminum
Mated Pair: 192g
Weight/Plane: 22,103g

Legacy rectangular: composite
Mated Pair: 141g
Weight/Plane: 16,123g

**Summary:**
Using Series 20 composite instead of legacy aluminum connector saves **14,442 grams** (31.8 lbs) per plane.

Using Series 20 composite instead of legacy composite connector saves **8,482 grams** (18.6 lbs) per plane

## Series 20 Super-Twin™ Performance

| | |
|---|---|
| DWV | 1500 Vac; 750 VAC (#23 contacts) |
| Shell-to-Shell | 2.5 mΩ |
| Temp Range | -65°C / +125 °C |
| Shock* | 50 g, half sine, 18x |
| Vibration* | Random, 8 hrs/ axis, Type VI, cond. G (27.8 g) |
| Altitude Immersion* | 12.1 kPa (15000 m / 49000 ft) |
| Lightning Indirect Effects | 3 kA min |

*Test by similarity, Series 79 Micro-Crimp

E


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Glenair®

# SERIES 28
# HiPer-D Connectors
## High-performance M24308 intermateable

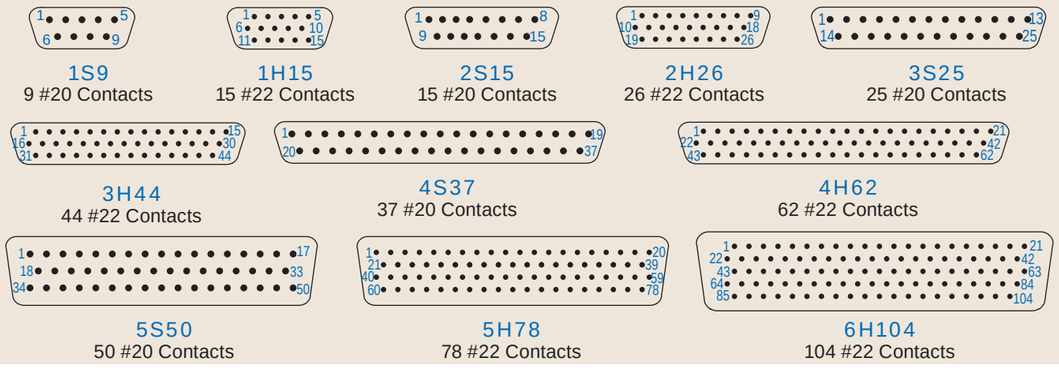
The HiPer-D connector is a M24308-type D-Subminiature connector with superior design features. Unlike standard M24308 connectors with stamped steel shells, the HiPer-D connector features a one-piece machined shell, and is rated for 200°C continuous operating temperature. Aerospace grade fluorosilicone grommets and face seals provide environmental protection. The HiPer-D is intermateable, intermountable and interchangeable with standard M24308 D-Sub connectors. A ground spring offers enhanced EMI/RFI protection. New Combo-D insert arrangements for Coax, Quadrax, fiber and El Ochito® contacts now available.

- **Advanced temperature, vibration and EMC/ electrical performance**
- **11 standard and 20 combo insert arrangements**
- **High temperature epoxy insulators**
- **Watertight sealing**
- **Rugged machined one-piece shell**



**Available EMI/EMP filters**

### STANDARD AND HIGH DENSITY CONTACT ARRANGEMENTS *(face view of pin connector)*




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*SERIES 28 M24308 INTERMATEABLE*

# HiPer-D® Connectors



**Enhanced Panel Mount Technology**



**Combo HiPer-D Contact Arrangements**



**Ground Spring for Improved EMC**



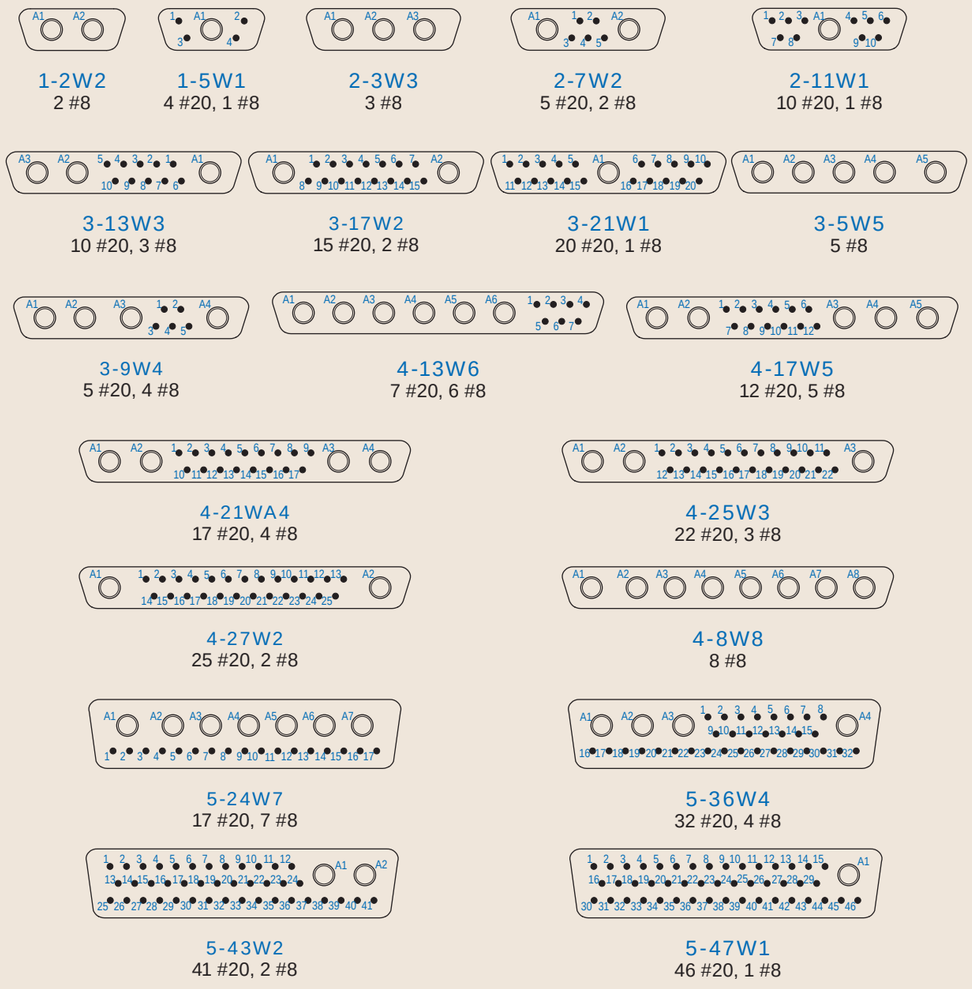
**Advanced Board Mount Features**



**Modern EMI backshells**



### COMBO-D CONTACT ARRANGEMENTS *(face view of pin connector)*




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# SERIES 240
# ARINC 600 Filter Connectors



Glenair manufactures a full range of ARINC 600 filter connectors for use in EMC/EMP management of electronic systems and interconnect cabling. All connectors are designed in accordance with the ARINC 600 specification, and are designed to mate with ARINC 600 plugs with the same insert configuration and opposite contact gender. Planar filter arrays and TVS diodes may be integrated into both standard catalog as well as build-to-order configurations. Glenair's state-of-the-art diode burn-in process tests leaded and surface mount diodes with leakage current monitored throughout the entire test procedure ensuring field reliability.

| Capacitor Array Code / Capacitance Range | | |
|---|---|---|
| Class | Pi - Circuit (pF) | C - Circuit (pF) |
| X | 160,000 - 240,000 | 80,000 - 120,000 |
| Y | 80,000 - 120,000 | 40,000 - 60,000 |
| Z | 60,000 - 90,000 | 30,000 - 45,000 |
| A | 38,000 - 56,000 | 19,000 - 28,000 |
| B | 32,000 - 45,000 | 16,000 - 22,500 |
| C | 18,000 - 33,000 | 9,000 - 16,500 |
| D | 8,000 - 12,000 | 4,000 - 6,000 |
| E | 3,300 - 5,000 | 1,650 - 2,500 |
| F | 800 - 1,300 | 400 - 650 |
| G | 400 - 600 | 200 - 300 |
| J | 70-120 | 35-60 |



ARINC 600 size 2 filter connector. Glenair also manufactures narrow-profile size 1 and double-wide size 3. All configurations are environmentally sealed for rugged airframe applications.

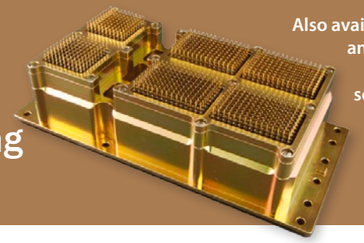
- **Planar, multilayer ceramic capacitive filters, with and without transient voltage suppression diodes**
- **C and Pi electrical configurations**
- **PC tail or solder cup wire termination**
- **36 – 240,000 pF capacitance**
- **Insert arrangements IAW ARINC 600**
- **Fast and reliable diode burn-in and test services**
- **Turnkey in-house manufacturing of all filter connector elements and processes**

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*SERIES 240*

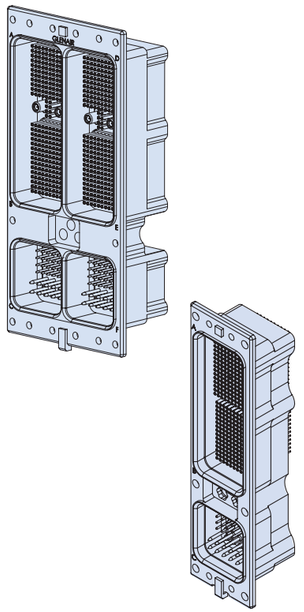
## ARINC 600 Filter connectors

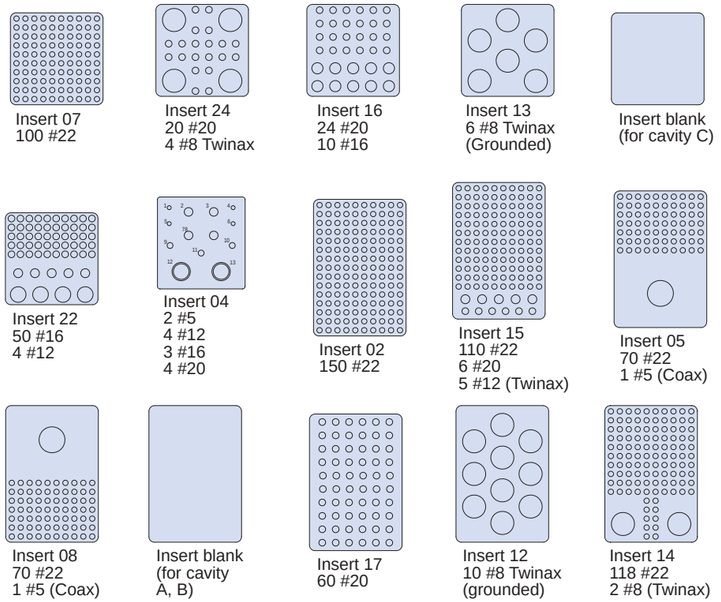
### Fast, reliable in-house manufacturing



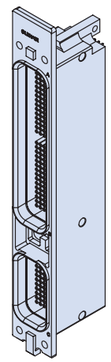
Also available: ARINC 404 and build-to-order ARINC filter solutions. Consult factory for more information

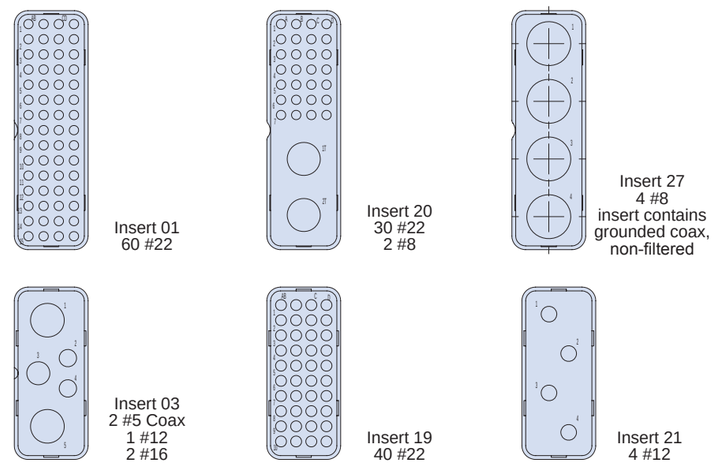
### ARINC 600 SIZE 2 AND 3 INSERT ARRANGEMENTS






### ARINC 600 SIZE 1 INSERT ARRANGEMENTS






E

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*QPL AND COMMERCIAL*

# Fiber Optic and Opto-Electronic Interconnect Solutions

## For land, sea, air, space, and C4ISR applications




**Fiber Optic Interconnect Systems**



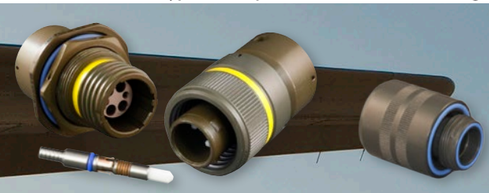
MIL-DTL-38999 Type Fiber Optic



GHD High Density Fiber Optic



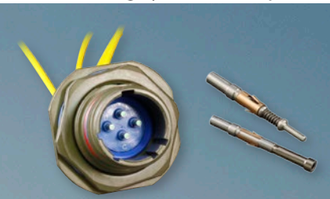
Series 80 Mighty Mouse Fiber Optic



MIL-PRF-28876 Fiber Optic



GFOCA M83526 Compliant Fiber Optic



Eye-Beam™ Expanded Beam Fiber Optic

**Opto-Electronic Interconnect Solutions**



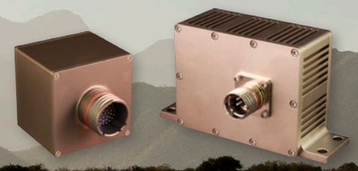
Size 8 Cavity Opto-Electronic Contacts



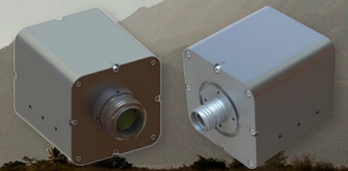
PCB-Mount Opto-Electronic Transceivers



Harsh-Environment Opto-Electronic Connectors



Copper-to-Fiber Media Converters



Signal Aggregation Media Converters



Ethernet Switches



***Now Available:***
**Glenair Series 185-002 Hi-Beam™ MIL-DTL-83526/20 and /21 compliant and intermateable hermaphroditic expanded beam comnnectors**

Glenair Fiber Optic and Opto-Electronic interconnect technologies deliver high data rate and bandwidth, reduced size and weight, EMI immunity, enhanced security, and spark/arc immunity. Our broad offering of fiber optic systems includes qualified MIL-PRF-28876 connectors and termini for shipboard applications, MIL-DTL-38999 Series III type fiber optic connectors and termini for aerospace applications, as well as our revolutionary Eye-Beam™ Expanded Beam termini. Small form-factor Opto-Electronic solutions are offered for harsh-environment Ethernet, video, high-speed data, and signal aggregation.

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Glenair®

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*TIGHT-TOLERANCE*

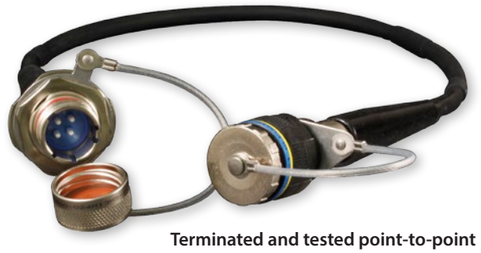
# MIL-DTL-38999 Series III Type

## Fiber optic connection system



MIL-DTL-38999 Series III type plug and square flange wall-mount receptacle

The high perfomance fiber optic interconnect system successfully deployed in hundreds of commercial and military aerospace and other applications—from F-16 upgrade systems to the revolutionary F-35 Joint Strike Fighter



Terminated and tested point-to-point and multibranch D38999 type fiber optic cable assemblies

- MIL-DTL-38999 type tight tolerance fiber optic connectors
- Composite, aluminum and stainless steel shells available
- Qualified size #16 MIL-PRF-29504 precision ceramic termini
- Singlemode and multimode fiber, from 9/125 to 1000 microns
- Ultra-low insertion loss values, <.50dB typical
- From 2 to 37 Termini
- Plug and In-Line, Jam Nut and Square Flange Receptacles
- Patented MIL-DTL-38999 fiber optic test probes and adapters

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MIL-DTL-38999 type fiber optic connection system termination, inspection, test, and cleaning tools are available now from Glenair. We also offer comprehensive F/O training services for assembly and maintenance technicians.



Glenair optical fiber test probes and connector adapters provide accurate and repeatable testing of MIL-DTL-38999 F/O assemblies

Glenair M29504/4 and /5 QPL termini are in stock and ready for immediate, same-day shipment



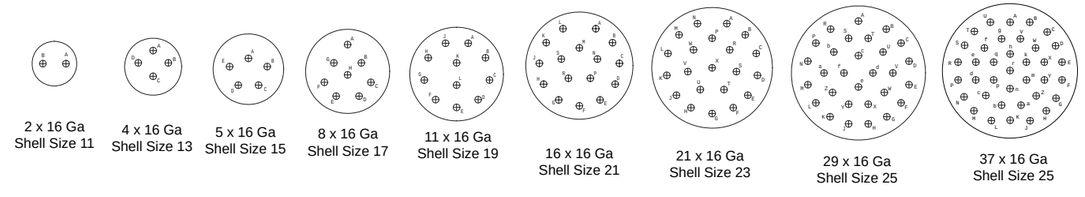


A complete range of metal and composite backshells and protective covers is available

| MIL-PRF-29504/04 and /05 Fiber Optic Termini Performance Data | |
|---|---|
| **Test Type** | **Performance Requirement** |
| Operating Temperature | -55°C to +165°C (dependent on epoxy and cable) |
| Temperature Cycling | -65°C to +175°C |
| Thermal Shock | -55°C to +150°C, 5 cycles |
| Temperature Life | +150°C for 1,000 hours |
| Random Vibration | 20-2,000 Hz, 42.2 g's |
| Shock (Half-sine Pulse) | 300 g Peak Load |
| Mechanical Shock | MIL-S-901, Grade A, Type B, Class I |
| Mating Durability | 500 cycles (cleaning after 100 matings) |
| Salt Spray | 48 hours (Terminus only) |
| Cable Retention Force | 22.0 lbs (dependent on cable construction) |

| D38999 Type Fiber Optic Connector Part Numbers | |
|---|---|
| **Glenair Dwg. Number*** | **Product Description** |
| 181-001 | #16 Socket Terminus |
| 181-002 | #16 Pin Terminus |
| 181-048 | #16 Dummy Terminus |
| 180-091 (05) | In-Line Receptacle Connector |
| 180-091 (06) | Plug Connector |
| 180-091 (08) | Jam Nut Mount Receptacle Connector |
| 180-091 (H7) | Square Flange Wall Mount Receptacle with Round Holes |
| 180-091 (S7) | Square Flange Wall Mount Receptacle with Slotted Holes |
| 180-091 (T7) | Square Flange Wall Mount Receptacle with Tapped Holes |
| * See fiber optic catalog for complete part number information | |

## INSERT ARRANGEMENTS




Per MIL-STD-1560. Mating face of pin insert shown.



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*SIZE AND WEIGHT-SAVING*

# Glenair High-Density (GHD)

## Fiber optic connection system

**The system of choice for military and commercial air, space and other applications: Outstanding optical and environmental performance with nearly double the density of standard mil-spec designs**







GHD plug connector with alignment sleeve retainer, and square flange receptacle. Termini available in keyed and non-keyed styles

- **Innovative #18 (1.25mm ferrule) front-release genderless termini accommodate 900µ to 2.0mm jacketed fiber**
- **M85045/16 cable accommodation**
- **Composite, aluminum and stainless steel shells available**
- **Single keying for APC polish available**
- **Better optical performance than D38999 with nearly double the density**
- **Precision alignment sleeve retainer with integrated guide pins**
- **Piston o-ring sealing—submersible design**

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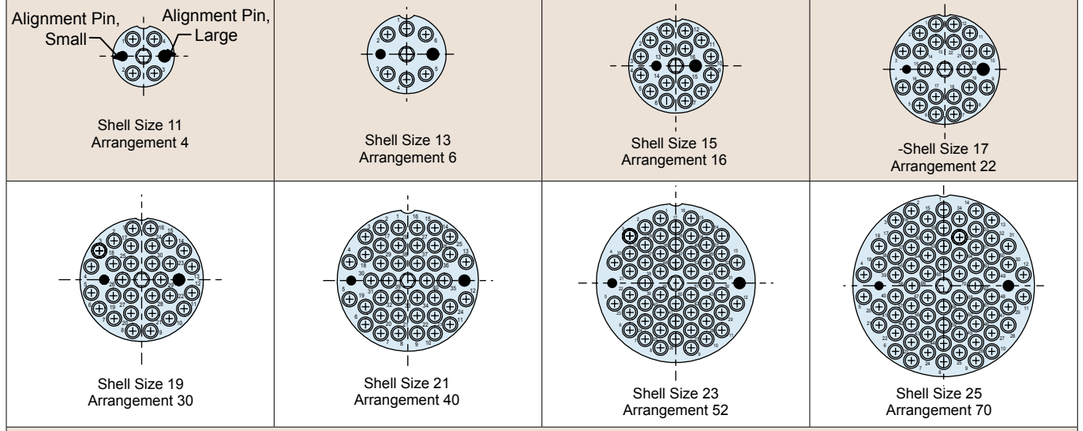
*SIZE- AND WEIGHT-SAVING*

# Glenair High Density (GHD)

## Fiber optic connection system



**Glenair High Density (GHD) Insert arrangements**




Plug face marking with removable alignment sleeve retainer (ASR) shown. Receptacle face - opposite.
ASR includes two guide pins and a threaded center jackscrew.

**Fiber Optic Pin Termini Specifications**

| Assembly Dash Number | | Fiber Size Core/Cladding | A Dia. [microns] |
|---|---|---|---|
| Keyed | Non-Keyed | | |
| 181-047-1255C | 181-056-1255C | 9/125 (Singlemode) | 125.5 |
| 181-047-1260C | 181-056-1260C | 9/125, 50/125, 62.5/125 | 126.0 |
| 181-047-1270C | 181-056-1270C | 50/125, 62.5/125 | 127.0 |
| 181-047-1420C | 181-056-1420C | 100/140 | 142.0 |
| 181-047-1450C | 181-056-1450C | 100/140 | 145.0 |
| 181-047-1560C | 181-056-1560C | 62.5/125/155 (Polyimide) | 156.0 |
| 181-047-1570C | 181-056-1570C | 62.5/125/155 (Polyimide) | 157.0 |
| 181-047-1730C | 181-056-1730C | 100/140/172 (Polyimide) | 173.0 |
| 181-047-1750C | 181-056-1750C | 100/140/172 (Polyimide) | 175.0 |
| 181-047-2360C | 181-056-2360C | 200/233 | 236.0 |
| 181-047-2860C | 181-056-2860C | 200/280 | 286.0 |

Crimp Sleeve is supplied with Terminus Assembly, and may be ordered separately. For terminus less crimp sleeve, omit **C** from end of part number (e.g. **181-056-1260**)

**GHD Fiber Optic Part Number Reference**

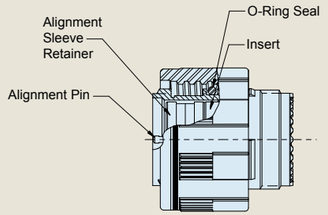
| Glenair Dwg. Number | Product Description |
|---|---|
| 181-047 | #18 Pin Terminus, Keyed for APC Polish |
| 181-056 | #18 Pin Terminus (non-keyed) |
| 181-058 | #18 Dummy Terminus |
| 180-122 (05) | In-Line Receptacle Connector |
| 180-122 (06) | Plug Connector with Alignment Sleeve Retainer |
| 180-122 (08) | Jam Nut Mount Receptacle Connector |
| 180-122 (H7) | Square Flange Receptacle with Round Holes |
| 180-122 (S7) | Square Flange Receptacle with Slotted Holes |

* See fiber optic catalog for complete part number information

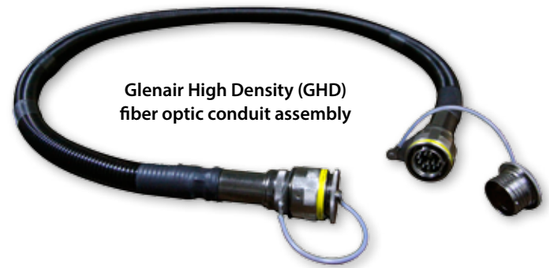
**Pin Density Comparison: Glenair High Density Versus D38999 and M28876**

| Connector Style / Size | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
|---|---|---|---|---|---|---|---|---|
| D38999 Cavity Count | 2 | 4 | 5 | 8 | 11 | 16 | 21 | 29/37 |
| M28876 Cavity Count | 2 | 4 | 8 | N/A | N/A | N/A | 31 | N/A |
| **GHD Cavity Count** | **4** | **6** | **16** | **20** | **30** | **40** | **52** | **70** |

### *Glenair High Density (GHD) Features*




**D38999 Series III Style Coupling**
Five Alternate Key Positions: A, B, C, D, E (N = Normal)



Glenair High Density (GHD) fiber optic conduit assembly

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Series 801 Plug
with 181-057 pin termini



Series 801 receptacle
with 181-075 socket termini

- **Three snap-in, rear release fiber optic termini sizes: #23, #20HD, and #16 for use in any Series 80 Mighty Mouse connector**
- **The smallest mil-aero caliber fiber optic connection system available**
- **Singlemode and multimode**
- **Precision ceramic ferrules**
- **<0.5 dB typical attenuation**
- **1 to 130 channels**

RoHS COMPLIANT

## The perfect marriage of high bandwidth fiber optics with ultra-miniature packaging—half the size of D38999

### SIZE #16 FIBER OPTIC TERMINI



181-057 Pin Terminus



181-075 Socket Terminus

| Termini Type | Optical Fiber Type | Part Number | A Ferrule I.D. | Fiber Size Core/Cladding |
|---|---|---|---|---|
| Pin | Multi Mode | **181-057-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-057-125** | 125.5 microns | 9/125 |
| Socket | Multi Mode | **181-075-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-075-125** | 125.5 microns | 9/125 |

*Consult factory for additional sizes

*Series 801 9-4 with size #16 fiber optic termini vs. equivalent functionality D38999*



Series 801
Shell size 9, 4 channel
6 Grams (less termini)

D38999 Series III
Shell size13, 4 channel
27 Grams (less termini)

### SIZE #20HD FIBER OPTIC TERMINI



181-084 Pin Terminus



181-085 Socket Terminus

| Termini Type | Optical Fiber Type | Part Number | A Ferrule I.D.* | Fiber Size Core/Cladding |
|---|---|---|---|---|
| Pin | Multi Mode | **181-084-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-084-1255** | 125.5 microns | 9/125 |
| Socket | Multi Mode | **181-085-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-085-1255** | 125.5 microns | 9/125 |

*Consult factory for additional sizes

*Series 801 8-8 with size #20 HD fiber optic termini vs. equivalent functionality D38999*



Series 801
Shell size 8, 8 channel
8 Grams (less termini)

D38999 Series III
Shell size 17, 8 channel
40 Grams (less termini)

### SIZE #23 FIBER OPTIC TERMINI



181-063 Pin Terminus



181-064 Socket Terminus

| Termini Type | Optical Fiber Type | Part Number | A Ferrule I.D. | Fiber Size Core/Cladding* |
|---|---|---|---|---|
| Pin | Multi Mode | **181-063-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-063-1255** | 125.5 microns | 9/125 |
| Socket | Multi Mode | **181-064-126** | 126.0 microns | 50/125, 62.5/125 |
| | Single Mode | **181-064-1255** | 125.5 microns | 9/125 |

*Consult factory for additional sizes

*Series 801 6-4 with size #23 fiber optic termini vs. equivalent functionality D38999*



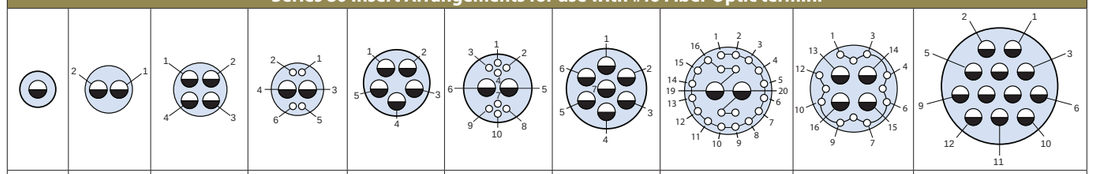
Series 801
Shell size 6, 4 channel
5 Grams (less termini)

D38999 Series III
Shell size 13, 4 channel
21 Grams (less termini)

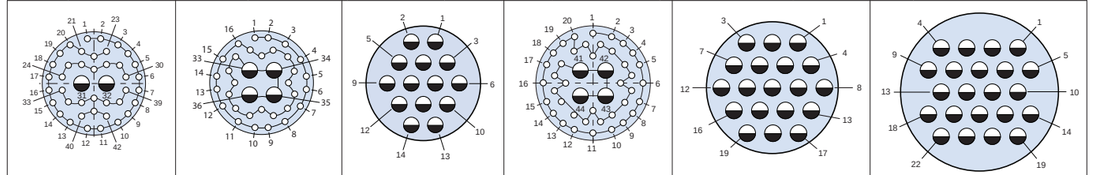


*ULTRAMINIATURE*
Series 80 Mighty Mouse
Fiber optic connection system

### Series 80 Insert Arrangements for use with #16 Fiber Optic termini

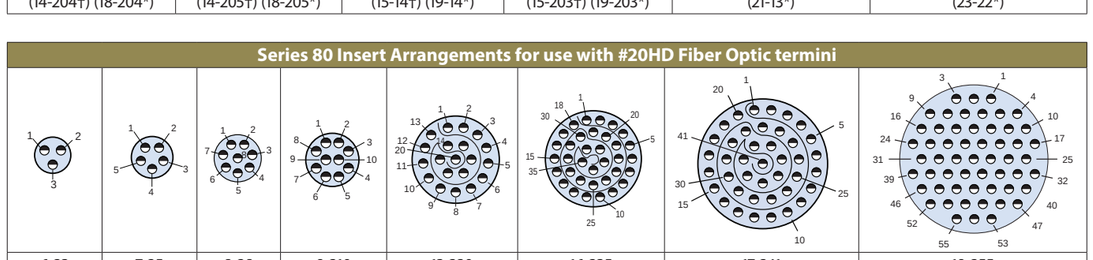


| 6-1 (8-1) | 8-2 (10-2) | 9-4 (11-4) | 9-200 (11-200) | 10-5 (12-5) | 10-202 (12-202) | 12-7 (13-7†) (15-7*) | 13-202 (12-202†)(15-202*) | 13-203 (12-203†)(15-203*) | 16-12 (14-12†) (18-12*) |
|---|---|---|---|---|---|---|---|---|---|



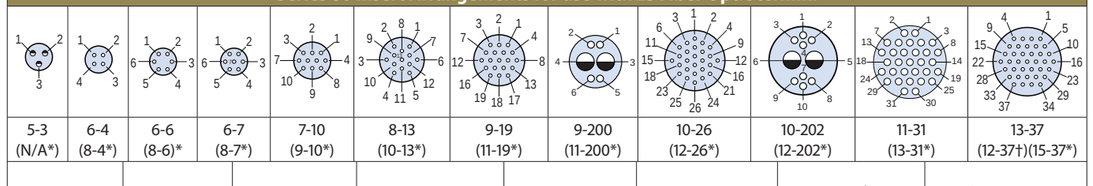
| 16-204 (14-204†) (18-204*) | 16-205 (14-205†) (18-205*) | 17-14 (15-14†) (19-14*) | 17-203 (15-203†) (19-203*) | 19-19 (21-13*) | 21-22 (23-22*) |
|---|---|---|---|---|---|

### Series 80 Insert Arrangements for use with #20HD Fiber Optic termini

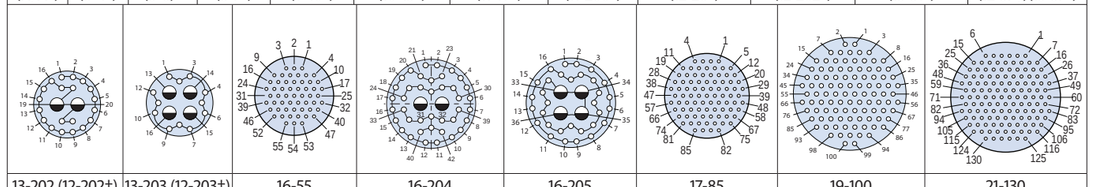


| 6-23 (8-23*) | 7-25 (9-25*) | 8-28 (10-28*) | 9-210 (11-210*) | 13-220 (12-220†)(15-220*) | 16-235 (14-235†)(18-235) | 17-241 (15-241†)(19-241*) | 19-255 (21-255*) |
|---|---|---|---|---|---|---|---|

### Series 80 Insert Arrangements for use with 23 Fiber Optic termini



| 5-3 (N/A*) | 6-4 (8-4*) | 6-6 (8-6)* | 6-7 (8-7*) | 7-10 (9-10*) | 8-13 (10-13*) | 9-19 (11-19*) | 9-200 (11-200*) | 10-26 (12-26*) | 10-202 (12-202*) | 11-31 (13-31*) | 13-37 (12-37†)(15-37*) |
|---|---|---|---|---|---|---|---|---|---|---|---|



| 13-202 (12-202†) (15-202*) | 13-203 (12-203†) (15-203*) | 16-55 (14-55†)(18-55*) | 16-204 (14-204†)(18-204*) | 16-205 (14-205†)(18-205*) | 17-85 (15-85†)(19-85*) | 19-100 (21-100*) | 21-130 (23-130*) |
|---|---|---|---|---|---|---|---|

Series 801/802 designator
(*Series 805 designator)
(†Series 802 designator)

*See Series 80 Mighty Mouse catalog for connector ordering information. Order connectors less contacts and order fiber optic termini separately. Cavity numbers are mating face view of pin connectors.*



*QPL AND COMMERCIAL*

# MIL-PRF-28876

## Fiber optic connection system

**Qualified MIL-PRF-28876 fiber optic connectors and MIL-PRF-29504 termini—Navy approved, in stock, and ready for immediate shipment**



M28876/11 jam nut receptacle

M28876/7 plug with backshell

M28876/2 receptacle with backshell

- **Connectors qualified to the complete requirements of MIL-PRF-28876 including plugs, wall-mount receptacles, jam-nut mount receptacles and in-line receptacles**
- **Multiple shell sizes and insert arrangements, including 2, 4, 6, 8, 18 and 31 channel layouts**
- **Backshells in straight, 45° and 90° configurations**
- **Corrosion-resistant and environmentally sealed**
- **Qualified MIL-PRF-29504/14 and /15 pin and socket termini and /3 dummy terminus**
- **Connectors, backshells and protective covers available for immediate, same-day shipment**

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| Connector/Backshell Types | | | |
|---|---|---|---|
| **Connector Type** | **Backshell Type** | **MIL-Spec** | **Commercial Connector Type Code** |
| Wall Mount Receptacle | None | M28876/1 | 03 |
| | Straight | M28876/2 | 13 |
| | 45° | M28876/3 | 23 |
| | 90° | M28876/4 | 33 |
| In-Line Receptacle | Straight | M28876/5 | 15 |
| Plug | None | M28876/6 | 06 |
| | Straight | M28876/7 | 16 |
| | 45° | M28876/8 | 26 |
| | 90° | M28876/9 | 36 |
| Jam Nut Receptacle | None | M28876/11 | 04 |
| | Straight | M28876/12 | 14 |
| | 45° | M28876/13 | 24 |
| | 90° | M28876/14 | 34 |



Qualified QPL-29504 pin and socket termini

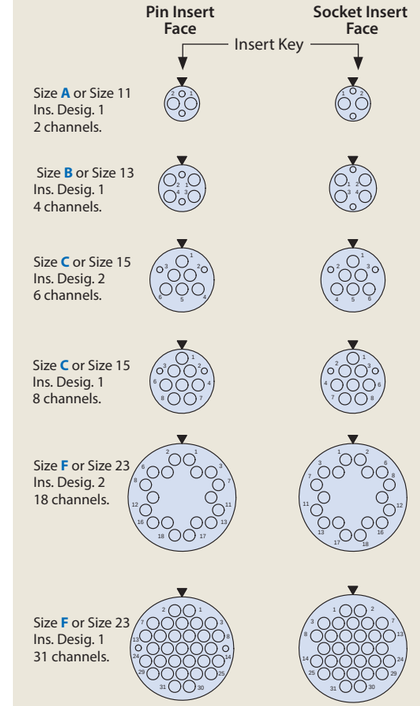
| Qualified Fiber Optic Termini | | | |
|---|---|---|---|
| **Type** | **Military Part Number** | **A Dia (Microns)** | **Typical Fiber Type** |
| Pin Termini | M29504/14-4131C | 126.0 | Multi Mode |
| | M29504/14-4132C | 127.0 | Multi Mode |
| | M29504/14-4135C | 142.0 | Multi Mode |
| Socket Termini | M29504/15-4171C | 126.0 | Multi Mode |
| | M29504/15-4172C | 127.0 | Multi Mode |
| | M29504/15-4175C | 142.0 | Multi Mode |
| Dummy Terminus | M29504/3-4038 | | |
| Crimp sleeve is supplied with terminus assembly and may be ordered separately (see Table II). For terminus less crimp sleeve, omit **C** from end of part number. Consult factory for additional sizes. | | | |



Terminated and tested MIL-PRF-28876 fiber optic cable assembly

| Test Description | Performance Requirements/ Specifications |
|---|---|
| Optical Insertion Loss, Multimode | -0.3 dB Typical (62.5/125) |
| Optical Insertion Loss, Singlemode | -0.3 dB Typical (9/125) |
| Optical Back Reflection, Singlemode | Better than -40 dB - PC Polish • Better than -50 dB - Enhanced PC Polish |
| Operating Temperature | -28°C to +65°C (MIL-Spec Epoxy and Cable)<br>-55°C to +125°C (alternative Epoxy and Cable) |
| Temperature (Thermal) Shock | -40°C to +70°C, 5 Cycles |
| Temperature Cycling | -28°C to +65°C, 5 Cycles |
| Temperature/Humidity Cycling | -10°C to +65°C, 10 Cycles, 240 hours, 98% RH |
| Temperature Life Aging | +110°C, 240 hours, Dry Air |
| Mating Durability | 500 cycles |
| Vibration - Sinusoidal | 10 g Peak, 5-500 Hz sin./ 10.2 g RMS, 50-2000 Hz random |
| Impact | 8 Drops from 8 feet |
| Crush Resistance | 281 lbs, 7 Cycles |
| Cable Pull Out Force - Termini | Termini: 22 lbs min for 1 minute<br>Connector: 162 lbs min for 10 minutes |
| Fluid Immersion | Turbine Fuel, Isopropyl Alcohol, Hydraulic Fluid, Lubricating Oil, Coolant, Tap- and seawater, 24 hrs |
| Water Pressure | 32 feet for 48 hours at +10°C to +35°C |
| Mechanical Shock (High Impact) | MIL-S-901, Grade A, Type B, Class I |
| Corrosion Resistance (Salt Spray) | 500 hours |
| Sand and Dust | 12 hours |
| Flammability | 0.75 inch flame for 10 sec. mated, 1.50 inch flame for 60 sec. unmated |
| *Performance Specifications/Requirements based on the use of MIL-PRF-24792 Epoxy and MIL-PRF-85045 Simplex and Breakout Shipboard Optical Fiber. | |

### *Insert Arrangements*




F

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*M83526 COMPLIANT*

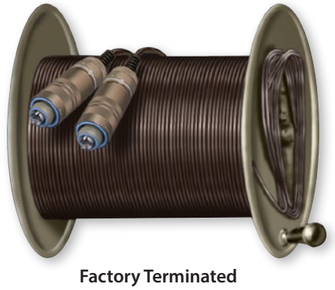
# GFOCA

## Fiber optic connection system

**GFOCA: the genderless, ruggedized, environmentally-sealed solution ideal for fiber optic battlefield communications—TFOCA-II® intermateable!**



Turnkey point-to-point and pigtail GFOCA cable assembly



Factory Terminated Fiber Optic Cable Spool

- 4 channel singlemode and multimode configurations
- Designed IAW MIL-PRF-29504/16 and MIL-DTL-83526/16 and /17 drafts
- Discrete components or complete cable-on-reel solutions available
- Rugged field deployable system
- Corrosion resistant and environmentally sealed
- Low insertion loss 2.5mm diameter genderless butt joint termini
- Designed for both low speed analog and high-speed digital data

TFOCA-II® is a registered trademark of Amphenol Fiber Systems International

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## GFOCA COMPONENTS AND CABLE-ON-REEL SOLUTIONS



GFOCA jam nut mount receptacle connector with lanyard-attached dust cover



Hermaphroditic Cable Plug Connector



Genderless Butt-Joint Terminus

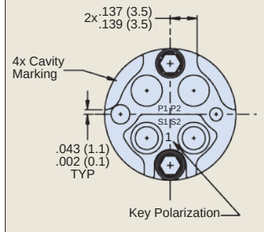


Glenair GFOCA M83526 Compliant fiber optic connection system termination, inspection, test, and cleaning tools are available now from Glenair. We also offer comprehensive F/O training services for assembly and maintenance technicians.

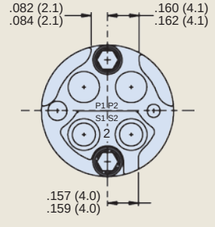
| GFOCA Performance Specifications | |
|---|---|
| Insertion Loss | <.50 dB Typical |
| Cable Pull Resistance | 400 pounds minimium, 1 hour; applies to plug and strain relief receptacles |
| Mating Durability | 2000 Cycles |
| Operating Temperature | -46° C to +71° C |
| Storage Temperature | -55° C to +85° C |
| Cable Diameter Accommodation | .190" Minimum to .379" Maximum |

**Available Insert Cap Key Configurations**

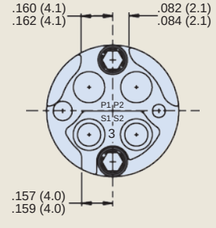
Key 1



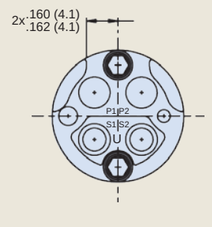

Key 2




Key 3




Key "U" (Universal)




| GFOCA Part Number Reference | |
|---|---|
| Drawing Number | Product Description |
| 181-050 | Pin Terminus |
| 180-050-S | Alignment Sleeve, Split, Ceramic |
| 181-059 | Dummy Terminus |
| 180-145 | Plug Connector, Hermaphroditic, 4 Channel |
| 180-146 | Jam Nut Receptacle, 4 Channel |
| 180-147 | Square Flange Receptacle, 4 Channel |
| 180-148 | Jam Nut Receptacle, 4 Ch, Internal Mount |
| 180-149 | Jam Nut Receptacle, 4 Channel, Internal Mount with Accessory Threads |
| 180-150 | Jam Nut Receptacle, 4 Channel, Panel Mount with Accessory Threads |
| 180-153 | Jam Nut Receptacle, 4 Channel, Internal Mount with Strain Relief |
| 180-137 | Plug Connector, Hermaphroditic, 90°, 4 Channel |

| GFOCA Genderless Termini Part Numbers | | |
|---|---|---|
| Dash Number | Ø A (Microns) | Fiber Type (Typ) |
| 181-050-1255C | 125.5 | SM |
| 181-050-1260C | 126.0 | SM and MM |

SM: Singlemode MM: Multimode
Consult Factory for Additional Sizes

F

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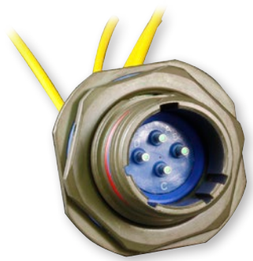



*EXPANDED-BEAM*

# Eye-Beam™

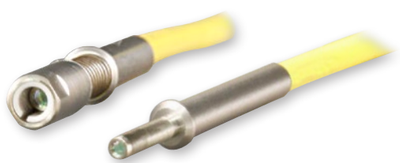
## Fiber optic connection system

**Innovative expanded beam termini and factory-terminated jumpers deliver optimal performance in harsh environments**



**Eye-Beam™ Expanded Beam fiber optic termini integrated into a tight-tolerance D38999 Series III type jam-nut receptacle connector**

**Factory terminated GRIN lens pin termini and GRIN lens socket termini on pigtail fibers allow for easy fusion splicing in the field.**



- **All the benefits of an expanded beam connection system built into a discrete, removable F/O terminus**
- **Factory-terminated F/O Eye-Beam™ termini easily integrated into any connector package**
- **Innovative expanded beam GRIN lens terminus expands signal 27X from a standard 9.3 micron fiber core**
- **Revolutionary design delivers low dB loss (1.5 dB multimode, 2.0 dB singlemode) performance while reducing maintenance, inspection and test costs**
- **Ultra-high precision ceramic sleeves and custom designed terminus bodies ensure perfect axial alignment**

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**Basic Part Number**: FA1000

**Operating Wavelength**: 85 = 850nm; 13 = 1300/1310nm; 15 = 1550nm

**Temperature Rating**: A = -40°C to +85°C; B = -55°C to +125°C; C = Customer Specified*

**End B** *(See Table II)*: 1

**Fiber Size**: 09 = 9.3/125 Singlemode; 50 = 50/125 Multimode; 62 = 62.5/125 Multimode

**End A** *(See Table I)*: A

**Length in Inches** *(Omit for Standard 36 Inches)* *Ex: -0040 = 40 inches*: XXXX

FA1000 - 50 - 85 A 1 - XXXX A

**Note: For customer specific connectors and fiber, Glenair will assign a unique part number for the cable assembly.*

**Table I: Eye-Beam™ Termini**

| Designator | Description | Connector Series |
|---|---|---|
| A | M29504/04 Style Pin (181-070) | MIL-DTL-38999 Series III |
| | Mighty Mouse Size 16 Pin (181-070) | Series 80 Mighty Mouse |
| B | M29504/05 Style Socket, Springless (181-077) | MIL-DTL-38999 Series III |
| C | M29504/14 Style Pin (181-095) | MIL-PRF-28876 |
| D | M29504/15 Style Socket (181-096) | MIL-PRF-28876 |
| F | Mighty Mouse Size 16 Socket (181-083) | Series 80 Mighty Mouse |
| G | GFR Pin (181-082) | Glenair GFR System |
| H | GFR Socket (181-081) | Glenair GFR System |
| J | GFOCA Termini (181-067) | GFOCA (hermaphroditic) |

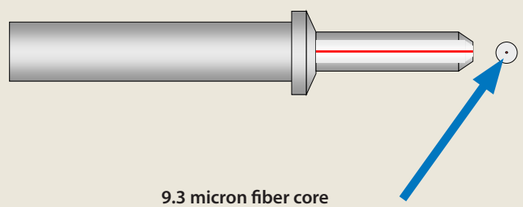
**Table II: Eye-Beam™ Termini and Commercial Connectors**

| | |
|---|---|
| A | M29504/04 Style Pin (181-070) |
| | Mighty Mouse Size 16 Pin (181-070) |
| B | M29504/05 Style Socket, Springless (181-077) |
| C | M29504/14 Style Pin (181-095) |
| D | M29504/15 Style Socket (181-096) |
| F | Mighty Mouse Size 16 Socket (181-083) |
| G | GFR Pin (181-082) |
| H | GFR Socket (181-081) |
| J | GFOCA Termini (181-067) |
| 1 | LC Connector |
| 2 | LC APC Connector |
| 3 | FC Connector |
| 4 | FC APC Connector |
| 5 | ST Connector |
| 6 | SC Connector |
| 7 | SMA 905 Connector |
| 8 | SMA 906 Connector |
| 9 | Customer Specified* |



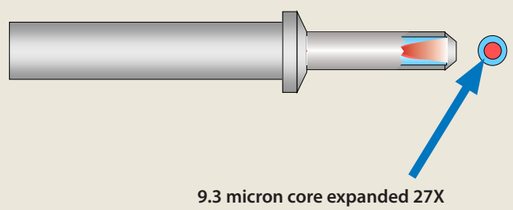
**Eye-Beam termini and factory-terminated jumpers may be integrated into a broad range of circular and rectangular connector packaging**

***Butt-Joint Fiber Optic Terminus***



**9.3 micron fiber core**
**Fiber surfaces exposed and susceptible to damage**
**Must be cleaned prior to mating**

***Eye-Beam™ Expanded Fiber Optic Terminus***



**9.3 micron core expanded 27X**
**Fiber surfaces protected from contamination**
**Easy clean lens surface**

F

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SERIES 185-002 HI-BEAM™

# Industry standard ball lens expanded beam solution

## In accordance with MIL-DTL-83526 /20 and /21 hermaphroditic

Commercial and military customers, such as those engaged in geo-physical exploration, mass-transit and tactical warfare now depend on optical interconnect technology due to its many advantages over electrical transmission systems. Sealed expanded beam interconnect technology prevents water, mud, dust, oil and other chemicals from contaminating the optical path and deteriorating system performance. Connector housings are available in a variety of material and finish choices, including cadmium-free and RoHS-compliant options. Boots, grips, and seals are available in a range of materials as well.

- **Ball lens expanded beam IAW MIL-DTL-83526 /20 and /21**
- **Beam expansion dramatically reduces loss due to contamination**
- **Large ball lens facilitates easy cleaning**
- **Fully intermateable with all MIL-DTL-83526 /20 and /21 compliant connectors**
- **2 and 4-channel insert arrangements**
- **Expanded beam lens insert also available in D38999 type packaging**

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# MIL-DTL-83526 /20 & /21 compliant and intermateable hermaphroditic expanded beam connectors

## SERIES 185-002 HI-BEAM™ CONNECTORS AND CABLES



**M83526/20 type**
**Hermaphroditic Cable Plug Configuration**



**M83526/21 type**
**Panel-Mount Configuration**

The Glenair 185-002 Hi-Beam™ connector series is a miniaturized connector suited for a vast array of applications. The innovative design ensures its ability for deployment in the toughest environments where high performance, total reliability and reduced package size are critical. Benefiting from low insertion loss expanded beam technology, the precision optical alignment system is tolerant of water, mud, dust and other contaminants. Hermaphroditic coupling eliminates the need for adapters and male and female mating halves. The 185-002 Hi-Beam™ is ideally suited for environmental extremes where low maintenance and rapid deployment are necessary. Connectors and cable assemblies are field installable and repairable.

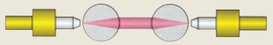
### *Expanded Beam vs. Physical Contact Connectors*

**Physical Contact**



Physical contact fiber optic connectors utilize butt-joint type contacts called termini. Mating pairs of termini may be integrated into virtually any connector shell design. The polished mating faces provide extremely low-loss transmission of optical signals but are best suited to clean and controlled environmental applications.

**Expanded Beam**



Expanded Beam connectors utilize a sealed lens to expand the emitting beam of light from the fiber media. The expanded beam is then refocused back into the fiber of the mating half. These sealed assemblies are ideally suited for environmental applications where optical connectors are subjected to repeated mating/unmating cycles.

| Series 185-002 Hi-Beam™ Performance Specifications | |
|---|---|
| Insertion Loss | Multimode: 1.0 dB at 850/1300nm<br>Singlemode: 1.5 dB at 1310/1550nm |
| Return Loss | Singlemode: Better than 34 dB unmated |
| Operating Temperature | -46°C to +71°C |
| Storage Temperature | -57°C to +85°C |
| Mating Durability | 3000 mating cycles minimum |
| Cable Retention | 1500N (cable dependent) |
| Bump | 4000 bumps at 40g acceleration |
| Impact | 8 drops from 0.9m per TIA/EIA-455-2, Method C, Service Class: Severe |
| Drop (Free Fall) | 500 falls onto concrete from 1.2m |
| Vibration - Sinusoidal | 10g Peak per TIA/EIA-455-11, Test Condition III |
| Vibration - Random | 9g RMS per TIA/EIA-455-11, Test Condition VI-C, for 1.5 hours |
| Physical Shock (Half-sine Pulse) | 50g Peak, 5 shocks per axis (30 shocks total) per TIA-455-14, Test Condition A |
| Water Immersion | Depth of 15m for 24 hours per TIA-455-74 |



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*HARSH-ENVIRONMENT*

# Opto-Electronic Interconnect Solutions

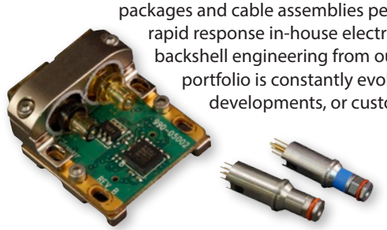


Technology can be integrated into mil-standard connectors or ruggedized packaging to suit any application

## Unlock the huge bandwidth of optical fiber and dramatically reduce the size and weight of interconnect systems

Glenair leverages its extensive portfolio of military and aerospace interconnect products to bring you ruggedized opto-electronic solutions, converting signals between the electrical domain and the fiber domain. These opto-electronic products are designed for harsh military/aerospace system and subsystem environments and will operate reliably over very wide temperature ranges and high shock and vibration conditions; they have been optimized to minimize size, weight and power and offer electrical-to-fiber conversion for Ethernet, video, signal aggregation and high-speed digital signals.

Glenair also offers integration of electronics or opto-electronics into rugged connector packages and cable assemblies per specific customer requirements. We offer rapid response in-house electrical/PCB design, and mechanical connector/backshell engineering from our vertically intergrated factory. Our product portfolio is constantly evolving. Please contact Glenair for the latest developments, or custom solutions.



### ADVANTAGES OF GLENAIR OPTO-ELECTRONICS

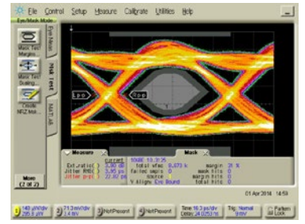
- **Reduced size, weight, and power consumption**
- **Leverages the virtues of fiber optics: EMI immunity, network security, increased transmission distance and high bandwidth**
- **High shock and vibration to support mil/aero applications**
- **Wide operating temperature range: -40°C to +85°C and beyond**
- **Designed IAW military and aviation requirements: MIL-STD-883, MIL-STD-461, DO-160 and others**

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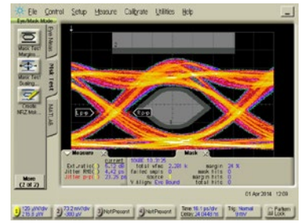


# Harsh-Environment, Small Form-Factor Opto-Electronic Interconnect Solutions





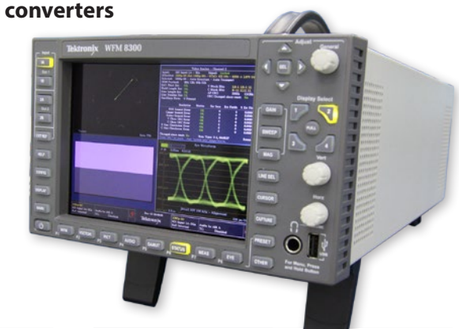
10Gbps at -65°C



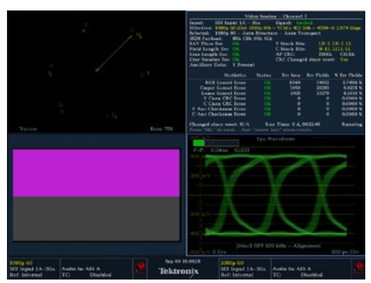
10Gbps at +100°C

### PROVEN-PERFORMANCE OPTO-ELECTRONIC INTERCONNECT SOLUTIONS

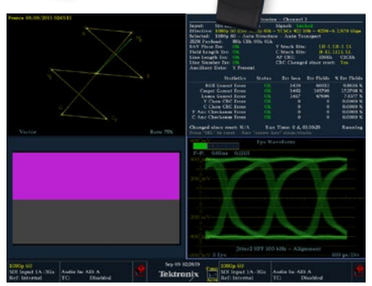
- **Military, industry-standard and custom connector integration**
- **Custom aggregation media converters**
- **Integration of active components into cable assemblies**
- **Link testing and qualification**



Laboratory link test and qualification data for harsh-environment opto-electronic solutions are available—just contact the factory



SMPTE 3G – SDI at -40°C
Pathological Case 3



SMPTE 3G – SDI at +90°C
Pathological Case 3











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Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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SIZE 8

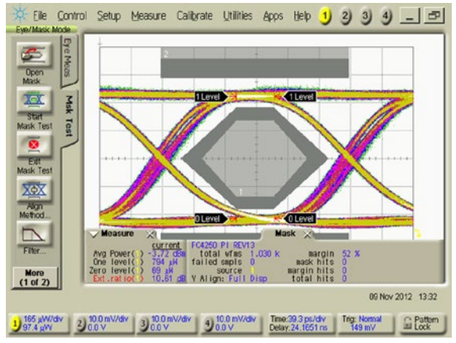
# Opto-Electronic Contacts

Size 8 Opto-electronic contacts transmit and receive differential CML or LVPECL electrical signals over Multimode fiber optic cable. Transmitters consist of a laser driver or LED driver with a temperature compensation circuit to maintain optical power over the entire operating temperature range, and a 850nm VCSEL laser or a 1300nm LED. Receivers consist of a PIN Photo Detector, a Transimpedance Amplifier with automatic gain control circuit, and a Limiting Amplifier. Differential output data signals are LVPECL or CML compatible. The transmitter has a Tx Disable pin to turn off transmitter output.



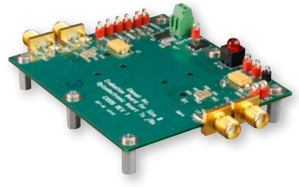
*(patent pending)*

- **Transmit (Tx) and Receive (Rx) Opto-Electronic contacts for use in ARINC 600 and other size #8 cavity equipped connectors**
- **Current offerings include 1.25mm ARINC 801 and 2.5mm ELIO® solutions**




4.25 Gbps / +25°C

- **Fast and Gigabit Ethernet, DVI, HDMI video capable transmitter and receiver-equipped contacts**
- **ARINC 664, 801, 803, 804 and 818 standard compliant**
- **Link distances up to 500 meters, multimode**
- **Single, 3.3 V power supply**
- **Wave-solderable termination with RoHS-compliant solders**



**Evaluation Test Boards Available**

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# Size 8 Opto-Electronic Transmitter and Receiver Contacts for Ethernet, Video and High-Speed Data

*PRODUCT SELECTION GUIDE*

visit **glenair.com** for detailed product datasheets

## TRANSMITTER AND RECEIVER CONTACTS, 850nm LASER, ARINC 801 1.25mm TERMINUS



050-301
*(patent pending)*

Size 8 Opto-electronic contacts transmit and receive differential CML electrical signals over Multimode fiber optic cable. Transmitters consist of a laser driver with a temperature compensation circuit to maintain optical power over the entire operating temperature range, and a 850nm VCSEL laser. Receivers consist of an 850nm PIN Photo Detector, a Transimpedance Amplifier with automatic gain control circuit, and a Limiting Amplifier. Differential output data signals are CML compatible. The transmitter has a Tx Disable pin to turn off transmitter output and a Tx Fault pin to signal a fault condition. Receiver includes a CMOS compatible Loss of Signal Indicator to prevent invalid data.

| Opto-Electronic Converter | Opto-Electronic Series | | Optical Device Type | Signal Type |
|---|---|---|---|---|
| 050 | 301 | 01 | T = Optical Transmitter<br>R = Optical Receiver | -01 = 1.25 Gbps<br>-02 = 2.50 Gbps<br>-03 = 3.20 Gbps<br>-04 = 4.25 Gbps |

## TRANSMITTER AND RECEIVER CONTACTS, 850nm LASER, ELIO® 2.5mm TERMINUS



050-307
*(patent pending)*

Size 8 Opto-electronic contacts transmit and receive differential CML electrical signals over Multimode fiber optic cable. Transmitters consist of a laser driver with a temperature compensation circuit to maintain optical power over the entire operating temperature range, and a 850nm VCSEL laser. Receivers consist of an 850nm PIN Photo Detector, a Transimpedance Amplifier with automatic gain control circuit, and a Limiting Amplifier. Differential output data signals are CML compatible. The transmitter has a Tx Disable pin to turn off transmitter output and a Tx Fault pin to signal a fault condition. Receiver includes a CMOS compatible Loss of Signal Indicator to prevent invalid data.

| Opto-Electronic Converter | Opto-Electronic Series | | Optical Device Type | Signal Type |
|---|---|---|---|---|
| 050 | 307 | 01 | T = Optical Transmitter<br>R = Optical Receiver | -01 = 1.25 Gbps<br>-02 = 2.50 Gbps<br>-03 = 3.20 Gbps<br>-04 = 4.25 Gbps |

## TRANSMITTER AND RECEIVER CONTACTS, 1300 nm LED, ARINC 801 1.25mm TERMINUS



050-308
*(patent pending)*

Size 8 Opto-electronic contacts transmit and receive differential LVPECL electrical signals over Multimode fiber optic cable. Transmitters consist of an LED driver with a temperature compensation circuit to maintain optical power over the entire operating temperature range, and a 1300nm LED. Receivers consist of a PIN Photo Detector, a Transimpedance Amplifier with automatic gain control circuit, and a Limiting Amplifier. Differential output data signals are LVPECL. The transmitter has a Tx Disable pin to turn off transmitter output.

| Opto-Electronic Converter | Opto-Electronic Series | | Optical Device Type | Signal Type |
|---|---|---|---|---|
| 050 | 308 | 01 | T = Optical Transmitter<br>R = Optical Receiver | -01 = 100 Mbps |

## OPTO-ELECTRONIC CONTACT EVALUATION BOARD



050-301

The evaluation board is designed as an interface to allow evaluation of the size 8 transmitters or receivers. Devices are powered through the 3.3V and GND connections. For the transmitter fault pin can be monitored and the transmitter disable can be controlled via an external voltage supply. For the receiver, loss of signal (LOS) state can be monitored.

Test configuration options:

- **Transmitter only**
- **Receiver only, and**
- **Both transmitter and receiver either in a single link or two separate links.**

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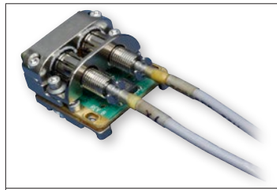
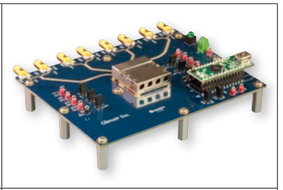

*HIGH-SHOCK, HIGH-VIBRATION*

# PCB-Mount Opto-Electronics

## Connectorized, high-density, board-mount transceivers built for rugged vibration and shock applications up to 10Gbps

Glenair PCB mount transceivers are ruggedized harsh-environment equivalents to SFP transceivers but with mechanical design suited to the harsh temperature and vibration environments found in Military, Aerospace and Other applications. PCB mount optical transceivers 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 reside on a common package and interface with a host board through a high-speed electrical connector.

- **Smallest footprint available**
- **Passed jet fighter and space launch shock and vibration testing**
- **No soldering required**
- **CML 100 Ohm differential input and output**
- **-40°C to +85°C operating temperature range—extended temperature ranges available**

| | | | |
|---|---|---|---|
|  |  |  |  |
| **GC fiber optic connector retained with mounting screws to withstand high vibration and shock** | **PCB-mount opto-electronics feature Samtec high-speed surface-mount connectors** | **Dual-transceiver, Quad-Transmitter and Quad-Receiver form factor with ARINC 801 contacts** | **Evaluation boards for all PCB mount transceiver configurations are available** |

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# Harsh-Environment PCB-Mount Transceivers, Transmitters and Receivers

*PRODUCT SELECTION GUIDE*

visit **glenair.com** for detailed product datasheets



### General Purpose Applications:

High-Speed Digital balanced signals (i.e. 4B/5B, 8B/10B, 62B/64B etc)
Fast Ethernet, Gigabit Ethernet, 10G Ethernet Fiber Channel (1X, 2X, 4X, 8X), ARINC 818, AFDX, SFPDP, Serial Rapid I/O (sRIO)

### Video Applications

DVI, ARINC 818, SMPTE (SDI, HD-SDI, 3G-SDI)

| Part Number | Description | Data Rate (Gbps) | Wavelength (nm) | Laser Type | Number of Transmitters | Number of Receivers | Number of Fibers | Fiber Type | General Purpose | Video (DVI, ARINC 818) | Video SMPTE HD-SDI | Video SMPTE 3G-SDI | Distance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 050-315 | PCB Mount OE Transceiver 5G, MMF | 0.1–5 | 850 | VCSEL | 1 | 1 | 2 | MMF | Y | Y | N | N | 1m-500m |
| 050-316 | PCB Mount OE Dual-Transmitter 5G, MMF | 0.1–5 | 850 | VCSEL | 2 | 0 | 2 | MMF | Y | Y | N | N | 1m-500m |
| 050-317 | PCB Mount OE Dual-Receiver 5G, MMF | 0.1–5 | 850 | N/A | 0 | 2 | 2 | MMF | Y | Y | N | N | 1m-500m |
| 050-318 | PCB Mount OE Transceiver, 4G, SMF | 0.1–4.25 | 1310 | FP | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-10km |
| 050-319 | PCB Mount OE Dual Transmitter, 1310nm FP, 4G, SMF | 0.1–4.25 | 1310 | FP | 2 | 0 | 2 | SMF | Y | Y | N | N | 1m-10km |
| 050-320 | PCB Mount OE Dual Receiver, 1310nm, 4G, SMF | 0.1–4.25 | 1310 | N/A | 0 | 2 | 2 | SMF | Y | Y | N | N | 1m-10km |
| 050-321 | PCB Mount OE Transceiver, 1300nm LED, 200M, MMF | 0.05–.2 | 1300 | LED | 1 | 1 | 2 | MMF | Y | N | N | N | 2km |
| 050-322 | PCB mount 10Gbps XVR, 1310nm FP, 2km, SMF | 5–10.5 | 1310 | FP | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-2km |
| 050-324 | PCB Mount OE Transceiver, 1310nm DFB, 4G, SMF | 0.1–4.25 | 1310 | DFB | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-40km |
| 050-325 | PCB Mount OE Dual Transmitter, 1310nm DFB, 4G, SMF | 0.1–4.25 | 1310 | DFB | 2 | 0 | 2 | SMF | Y | Y | N | N | 1m-40km |
| 050-326 | PCB Mount OE Dual Receiver, 1310nm DFB, 4G, SMF | 0.1–4.25 | 1310 | N/A | 0 | 2 | 2 | SMF | Y | Y | N | N | 1m-40km |
| 050-327 | PCB mount 10Gbps SR Serial XVR, 850nm, MMF | 5–10.5 | 850 | VCSEL | 1 | 1 | 2 | MMF | Y | Y | N | N | 1m-400m |
| 050-328 | PCB mount 10Gbps XVR, 1310nm DFB, 10km | 5–10.5 | 1310 | DFB | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-10km |
| 050-331 | PCB Mount OE Dual-Transmitter SMPTE 3G-SDI | 2.97 | 850 | VCSEL | 2 | 0 | 2 | MMF | N | N | Y | Y | 1m-1km |
| 050-332 | PCB Mount OE Dual-Receiver SMPTE 3G-SDI | 2.97 | 850 | N/A | 0 | 2 | 2 | MMF | N | N | Y | Y | 1m-1km |
| 050-333 | PCB Mount OE Dual-Transceiver 5G MMF, ARINC 801 | 0.1–5 | 850 | VCSEL | 2 | 2 | 4 | MMF | Y | Y | N | N | 1m-500m |
| 050-336 | PCB Mount OE Quad-Transmitter 5G MMF, ARINC 801 | 0.1–5 | 850 | VCSEL | 4 | 0 | 4 | MMF | Y | Y | N | N | 1m-500m |
| 050-337 | PCB Mount OE Quad-Receiver 5G MMF, ARINC 801 | 0.1–5 | 850 | N/A | 0 | 4 | 4 | MMF | Y | Y | N | N | 1m-500m |
| 050-339 | PCB Mount OE Dual-Transceiver, 10G MMF, ARINC 801 | 0.1–5 | 850 | VCSEL | 2 | 2 | 4 | MMF | Y | Y | N | N | 1m-400m |
| 050-340 | SINGLE FIBER Bidirectional Transceiver, 2.5G, SMF | 0.1–2.5 | 1310/ 1550 | FP/FP | 1 | 1 | 1 | SMF | Y | Y | N | N | 1m-2km |
| 050-341 | SINGLE FIBER Bidirectional Transceiver, 10G, SMF | 5–10.5 | 1310/ 1550 | DFB/DFB | 1 | 1 | 1 | SMF | Y | Y | N | N | 1m-10km |
| 050-342 | CWDM Transceiver, 2.5G, SMF | 0.1–2.5 | CWDM | DFB | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-20km |
| 050-343 | CWDM Transceiver, 10G, SMF | 5–10.5 | CWDM | DFB | 1 | 1 | 2 | SMF | Y | Y | N | N | 1m-10km |

| Evaluation Boards | | |
|---|---|---|
| **Part No.** | **Description** | **for testing Part Number(s)** |
| 050-329 | EVALUATION BOARD supporting Board Mount Transceivers, 1-10Gbps | 050-315, 050-318, 050-321, 050-324 |
| 050-330 | EVALUATION BOARD supporting Board Mount Dual Transmitters and Board Mount dual Receivers | 050-316, 050-317, 050-319, 050-320, 050-325, 050-326, 050-331, 050-332 |
| 050-334 | EVALUATION BOARD supporting PCB Mount Dual-Transceiver 050-333+ | 050-333 |
| 050-338 | EVALUATION BOARD | 050-336, 050-337 |
| 050-344 | FMC Connectivity Card | All Glenair PCB Mount Components |

| Accessories | | |
|---|---|---|
| **Part No.** | **Description** | **Details** |
| FA02454 | Fiber Optic jumper cable, GC | Singlemode or multimode connects transceiver to mil/aero connector |
| FA03286 | Fiber Optic jumper cable, ARINC 801 | Singlemode or multimode connects transceiver to mil/aero connector |
| 059-0007 | PCB Threaded Insert | Simplifies installation of PCB transceivers |

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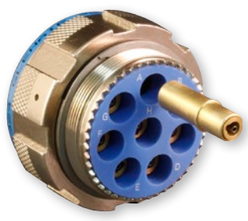
*SMALL FORM-FACTOR • HARSH-ENVIRONMENT*

# Opto-Electronic Connectors

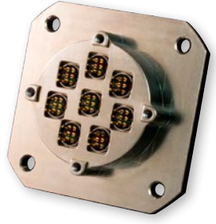
## Environmentally sealed, D38999 type triple-start connectors housing turnkey copper-to-fiber transceiver technology

Glenair is able to offer our Opto-Electronic solutions customers turnkey multichannel receptacle connectors housing integrated transceiver technology for fast/gigabit Ethernet, DVI and HDMI video, as well as various high-speed data transfer protocols. The two available connector designs incorporate Glenair small form-factor ARINC 801 type opto-electronic contacts (050-301) or an ELIO® equipped configuration that intermates with the standard ELIO®2.5mm fiber optic terminus (050-307). Receptacles are populated with factory-tested size #8 contacts, and are ready for immediate use as fiber-optic-to-electrical circuit board I/O connectors. Special size #8 cavity adapters are also available to enable construction of compatible plug connectors on the cable side.

- **Catalog solutions include:**
  - **2.5mm ELIO® solution for multimode Ethernet, video, and high-speed data applications**
  - **1.25mm ARINC 801 multimode fiber optic termini solution for Ethernet, video, and high-speed data**
- **Made-to-order configurations with a wide range of connector packages including Glenair Series 80 Mighty Mouse**



**Special size #8 cavity adapters facilitate construction of standard fiber optic plug connectors that intermate with the size #8 opto-electronic transceiver contacts**



**Opto-electronic receptacle connectors are populated with size #8 contacts, and ready for immediate assembly in I/O to circuit board applications**

ELIO® is a registered trademark of SOURIAU

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# Opto-Electronic Connectors for Ethernet, Video, and High-Speed Data Applications

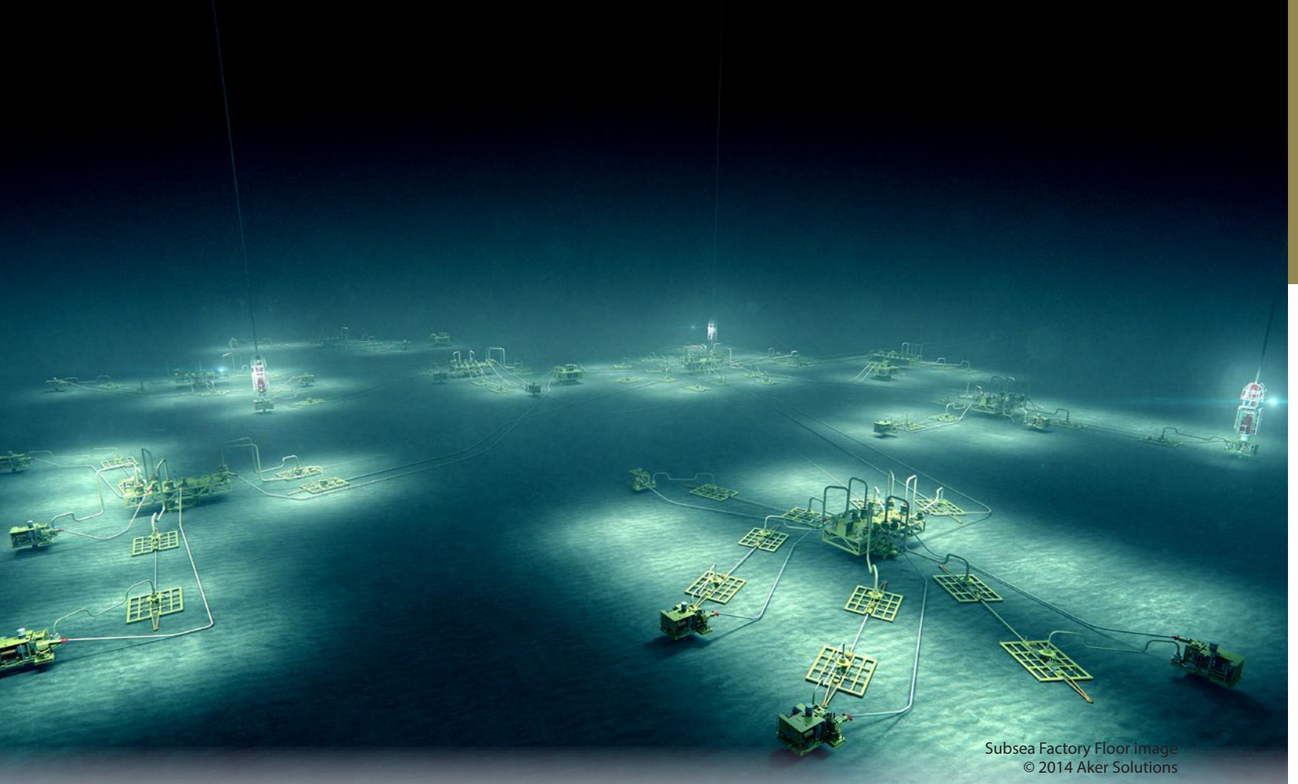
*PRODUCT SELECTION GUIDE*

visit **glenair.com** for detailed product datasheets



| | Part No. | Description |
|---|---|---|
|  | **050-304** | **050-304 MIL-DTL-38999 Series III Type Receptacle Connectors with Size 8 Opto-Electronic Contacts**<br>The 050-304 series of Active Opto-electronic sealed panel mount connectors offers customers the power to convert from electrical to fiber optic signals within a D38999 connector to support high speed fiber optic transmission in harsh environments. The 050-304 incorporates size 8 active contacts in one of three standard configurations to enable optical Transmitters, optical Receivers or Optical Transceivers, or custom configurations. |
|  | **059-0001** | **059-0001 Size 8 cavity adapter kit for 1.25mm ARINC 801 terminus**<br>Size 8 cavity adapter will convert D38999 size 8 cavities (Twinax, Coax, Quadrax or power) into ARINC 801 fiber optic cavities. Kit includes the adapter and an ARINC 801 terminus. |
|  | **059-0002** | **059-0002 Size 8 cavity adapter for ELIO® 2.5mm terminus**<br>Size 8 cavity adapter will convert D38999 size 8 cavities (Twinax, Coax, Quadrax or power) into ELIO® fiber optic cavities per EN4531. |
|  <br>*(patent pending)* | **050-313** | **050-313 Opto-Electronic Transceiver, MIL-DTL-38999 Type 2.5mm ELIO® Compatible, 100Mbps – 4.25Gbps**<br>Glenair 050-313 is a D38999 Type 11-02 receptacle connector incorporating an opto-electronic transceiver operating from 100Mbps to convert electrical signals to multimode fiber. The Glenair optical transceiver is ideal for harsh-environment, extreme shock, vibration and temperature avionics and military applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, Twinax or Quadrax copper conductors unacceptable. |
|  | **050-303** | **050-303 Opto-Electronic Receiver with Mighty Mouse connectors, 100Mbps – 2.5 Gbps**<br>Glenair 050-303 optical transceiver, connectorized with Series 805 Mighty Mouse connectors, employs state-of-the-art opto-electro-mechanical technology to provide effective harsh environment fiber-optic interconnect solutions for high-speed digital data. |

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Subsea Factory Floor image
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*ETHERNET*

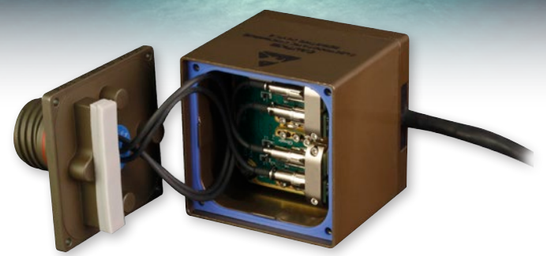
# Copper-to-Fiber Media Converters

## Reduced form-factors for harsh-environment applications

Glenair offers turnkey harsh-environment media converters for in-line and select panel mount applications. The devices facilitate conversion of 10/100/1000BASE-SX/LX fiber optic gigabit Ethernet data streams to electrical signals servicing switches, routers, and other peripherals.

Designed for use in ruggedized applications such as geophysical, naval, commercial and military aerospace, these reduced form-factor electrical-to-optical transceivers deliver proven performance with significant size and weight savings compared to conventional form-factor technologies. Available for a wide range of fiber optic formats, including 1.25mm, 1.6mm, 2.0mm, and 2.5mm ferrules, in both singlemode and multimode, Glenair's complete range of media converters meets virtually every fiber-optic-to-copper application requirement.





- **Reduced form-factor devices for in-line conversion of electrical and optical signals**
- **Active cable versions that reduce the risk of damage to fiber optic interfaces**
- **Weight-saving technology that incorporates power and signal conversion functions**
- **Auto-negotiation 10/100/1000BASE-T to 100BASE-FX, 1000BASE-SX and 1000BASE-LX**
- **Advanced monitor & control functions via serial interface to facilitate network management and BIT**

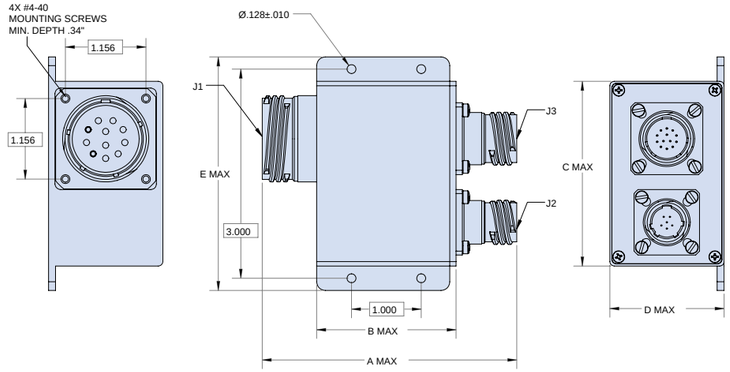


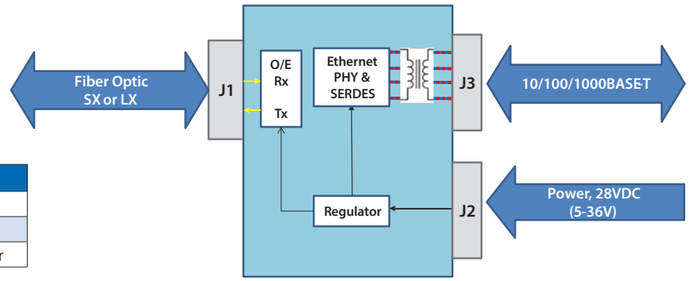


### EXAMPLE FUNCTIONAL BLOCK DIAGRAM FOR GLENAIR 050-105 ETHERNET MEDIA CONVERTER

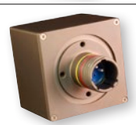


**050-105**
10/100/1000BASE-T to 1000BASE-SX/LX Media Converter




| Table I: Signal Protocol | | |
|---|---|---|
| Code | Name | Medium |
| -SX | 1000BASE-SX | Multimode Fiber |
| -LX10 | 1000BASE-LX10 | Singlemode Fiber |

| | Part No. | Description | | Part No. | Description |
|---|---|---|---|---|---|
|  | **050-101** | 1000BASE-T to 1000BASE-SX/LX Media Converter |  | **050-112** | 10/100/1000BASE-T to SX, LX10, or FX Fiber Optic Ethernet, GFOCA Fiber Optic interface |
|  | **050-103** | 10/100/1000BASE-T to 1000BASE-SX/LX Media Converter with Mighty Mouse Connectors |  | **050-113** | 10/100/1000BASE-T to SX, LX10, or FX Fiber Optic Ethernet, MIL-DTL-1560 interface |
|  | **050-104** | 10/100/1000BASE-T to 1000BASE-SX/LX Active Cable with Mighty Mouse Connectors |  | **050-115** | 10/100/1000BASE-T to 1000BASE CWDM Media Converter |
|  | **050-110** | 10/100/1000BASE-T to 1000BASE-SX/LX, GFOCA, 38999 Quadrax (signal and BIT), 38999 (Power) |  | **050-117** | LRU Media Converter, Single or Dual Channel, 10/100/1000BASE-T to SX/LX Lightning Strike Protection DO160 level 3 |

F



VIDEO

# Copper-to-Fiber Media Converters

## Reduced form factor media converters for harsh-environment video applications

Glenair Copper-to-Fiber-Optic Video Media Converters enable extended link distances, improved EMI and security in harsh environments and provide solutions for both MMF and SMF applications. These media converters support ruggedized military systems applications and are tailored to support a variety of Video protocols including DVI, HDMI, SMPTE (SDI, HD-SDI and 3G-SDI), ARINC 818 and more. Many options for mil-spec and military-grade electrical and fiber optic connectors are available. Contact Glenair for custom configurations, application-specific designs and engineering services.



- **Fiber Link 500m with MMF**
- **Fiber Link 10km with SMF**
- **38999 with MIL-STD-1560 and custom contact arrangements—including quadrax and coaxial contact options**
- **Mighty Mouse electrical and fiber optic connectors**
- **Fiber Optic connectors including D38999, M28876, GHD, NGCON (M64266), HMA (M83526), and GFOCA**
- **Power supply functions with wide input-voltage ranges**
- **DVI, HDMI, SMPTE, ARINC 818**
- **Advanced monitor & control functions via serial interface to facilitate network management and BIT**

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# Copper-to-Fiber Media Converters for Video Applications

*PRODUCT SELECTION GUIDE*

visit **glenair.com** for detailed product datasheets

## MIL-DTL-38999 SERIES III TYPE DVI VIDEO MEDIA CONVERTER

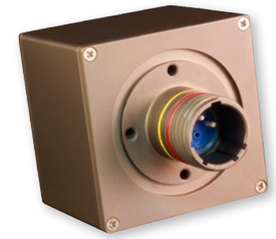
**How To Order**

| Product Series | | Transmitter = *TX*<br>Receiver = *RX* | | Dash Number |
|---|---|---|---|---|
| 050 | - 201 - | TX | NF - | 01 |
| DVI Media Converter *(See Table)* | | | Plating Code | |

**Video Media Converter Selection Guide**

| | | |
|---|---|---|
|  | **050-201** | DVI Copper-to-Fiber Media Converter |
|  | **050-203** | DVI Copper-to-4-Fiber, VCSEL, DO160 Lightning Strike level 3 and "dirty" 28V power |
| | **050-206** | 4 Channel SMPTE HD-SDI & 3G-SDI Transmitter or Receiver |
|  | **050-204** | 4 Channel 3G-SDI MMF TX and 3G-SDI MMF RX, GHD Fiber, Mighty Mouse (Coax and Power). |
| | **050-205** | DVI Copper-to-Fiber Media Converter, Inline |

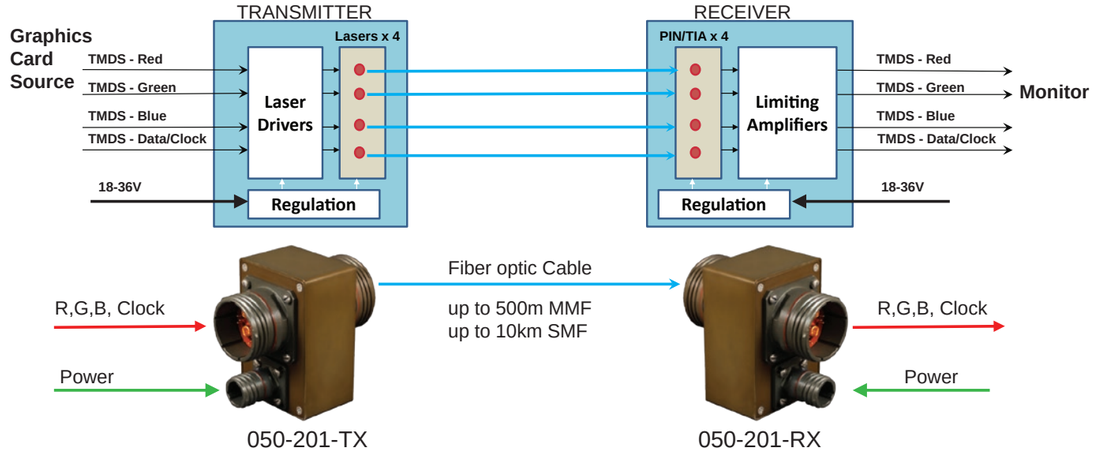
## ENVIRONMENTAL PERFORMANCE



- **-40°C to +85°C operating temperature range**
- **Meets MIL-STD-810 Mechanical Shock and Vibration**
- **Meets MIL-STD-1344 immersion resistance**

F

## VIDEO MEDIA CONVERTER FUNCTIONAL BLOCK DIAGRAM



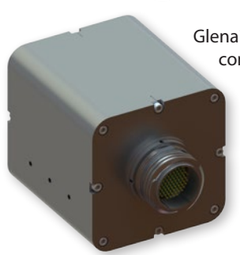

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*SIGNAL AGGREGATION*

# Copper-to-Fiber Media Converters

## Combine multiple electrical signals into a high-speed fiber data stream



Glenair signal aggregation media converters integrate a set of compact opto-electronic modules to digitize and/or aggregate multiple common signal types, and combine them onto high-data-rate serial optical fiber channels. Silicon field-programmable gate array (FPGA) technology provides a flexible way to accommodate many signal I/O types.

| Signal Aggregation Media Converter Selection Guide | |
|---|---|
| 050-501 | 12-Channel RS422 Copper-to-Fiber Media Converter |
| 050-502 | 6x RS-422 and 6x ARINC 429 Copper-to-Fiber Media Converter |
| 050-503 | DVI/HDMI (Dual fiber) + USB(HID) interface (KVM) Copper-to-Fiber Media Converter |
| 050-504 | CAN Bus "bridge"(ARINC 825), ARINC 429, ARINC 664 (AFDX ethernet) DO-160 compliant Copper-to-Fiber Media Covnerter |
| 050-505 | 2x Ethernet, 2xRS-422 or 2xRS-232 (422 & 232 not simultaneously) Copper-to-Fiber Media Converter |

- **Dramatically reduce size, weight, wire count, and shielding of copper cables**
- **Leverage the high bandwidth of optical fiber by multiplexing many lower-data-rate signals onto a few fibers**
- **One high-speed opto-electronic interface can serve practically all signal types**
- **Ideal solution to enable optical rotary joints**
- **-40°C to +85°C operating temperature range**
- **Meets MIL-STD-810 Mechanical Shock and Vibration**
- **Meets MIL-STD-1344 immersion resistance**
- **Advanced monitor & control functions via serial interface to facilitate network management and BIT**

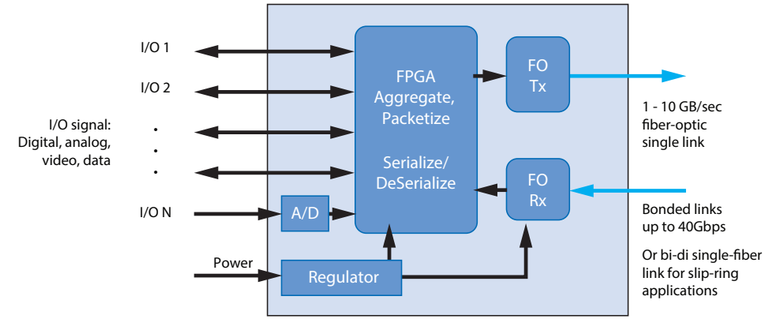
 © 2014 Glenair, Inc 

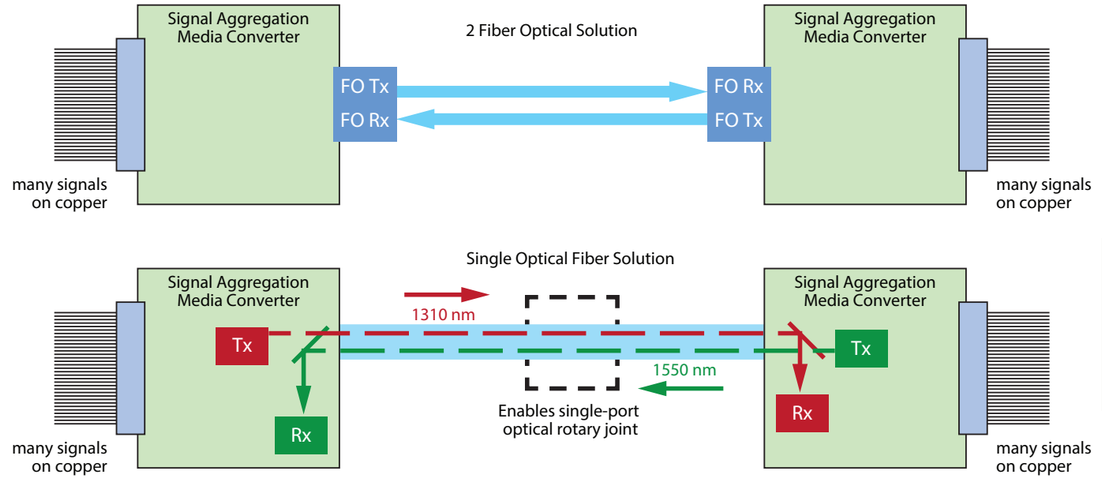


visit **glenair.com** for detailed product datasheets

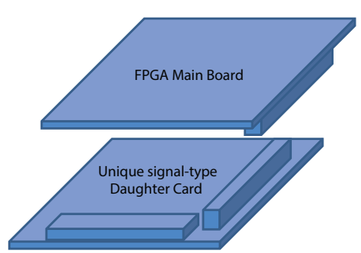
## SIGNAL AGGREGATOR FUNCTIONAL DIAGRAMS

- **One compact LRU digitizes or aggregates multiple electrical signals on copper using an FPGA**
- **FPGA digitizes and serializes the signals onto a high-speed data stream**
- **Opto-electronic converters get the serialized signals on and off the optical fiber**




## FPGA MAIN BOARD AND DAUGHTER CARD ARCHITECTURE CAN HANDLE MANY SIGNAL TYPES




**SERIAL**
- **RS422/RS485**
- **RS232**
- **USB**
- **MIL-STD-1553**
- **CAN Bus**
- **ARINC 429**
- **SMBus**
- **I2C**
- **SPI**
- **Ethernet 10/100/1000**

**VIDEO**
- **DVI**
- **HDMI**
- **SMPTE SDI**
- **SMPTE HD-SDI**
- **SMPTE 3G-SDI**
- **ARINC 818**
- **VGA**

**ANALOG**
- **RF/IF Sampling**
- **Analog Sensor Data**

Contact the factory for other signal formats and custom configurations



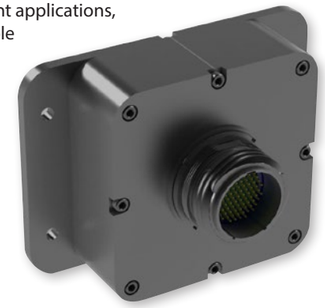
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*SMALL FORM-FACTOR*

# Ethernet Switches and Breakout Cables

Glenair unmanaged Ethernet switches are layer 2 switches with Auto negotiation and Auto MDI / MDIX circuitry that enables port expansion with IEEE-802.3U 10/100/1000Base-T Ethernet ports. Developed for use in harsh environment applications, the electronics are incorporated into a panel-mountable housing that is sealed against liquid and solid contaminants and designed for shock and vibration resistance. Standard connector interfaces include high-performance size- and weight-saving Glenair Series 805 Mighty Mouse jam nut receptacles and M28876 type fiber-optic connectors.



- **Unmanaged—plug and play operation—no configuration required**
- **Jumbo frame support in all speeds (10/100/1000 Mbps)**
- **Operating temperature range: -40°C to +85°C**
- **Standard ultraminiature Mighty Mouse electrical and M28876 type fiber optic connector interfaces**
- **Experienced opto-electronic engineering services available for special connector and form-factor configurations**
- **Breakout cables with industry-standard connector interfaces available**

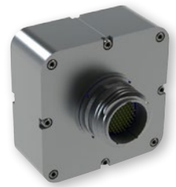
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# Small Form-Factor Ethernet Switches and Breakout Cables

*PRODUCT SELECTION GUIDE*

visit **glenair.com** for detailed product datasheets

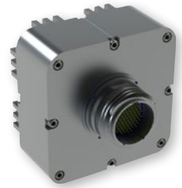
## 052-101 7-PORT UNMANAGED ETHERNET SWITCH



*Form 1 (no flanges)*



*Form 2 (with flanges)*



*Form 3 (heat sink)*

- **7 copper (10/100/1000 Mbps) Ethernet ports per IEEE 802.3:2005**
- **Non-Blocking switch fabric allows 1000 Mbps data rate on all 7 ports simultaneously**
- **Cable link distances up to 100 Meters (EIA/TIA Cat-5E)**
- **Full duplex flow control per IEEE Std 802.3X and half duplex back pressure, symmetric and asymmetric**
- **Shock, vibration and immersion resistant per MIL-STD-810F**
- **Auto sensing of half or full duplex operation**
- **Mighty Mouse Series 805 shell is water-tight to MIL-STD-810 when mated**
- **3 form-factors available**

## 050-118 5-PORT UNMANAGED ETHERNET SWITCH



- **1 PORT : 10/100/1000 BASE-T consistent with IEEE 802.3**
- **4 PORTS: 1000BASE-LX (IEEE 802.3)**
- **Non-blocking switch fabric allows 1000 Mbps on all ports**
- **Material/Plating: Aluminum with Cadmium Olive Drab over electroless Nickel (500 hours salt spray plating)**
- **6 Status LEDs to Denote: (Power, Ethernet activity with one LED for each of the 5 ports)**
- **4 M28876 type fiber-optic connectors**
- **Mighty Mouse ultraminiature electrical connector interface**
- **IP67 in mated condition**

## BREAKOUT CABLES FOR 7-PORT ETHERNET SWITCH



**How To Order**

| Active Product Code | | Material/Finish | | Length *(in Inches)* |
|---|---|---|---|---|
| 8071 | - 3089 - | M | A | - 48 |

***3089*** = L-Com Cable
***3667*** = PIC Cable

Key Polarization

F

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# Shrink Boots, Jackets, and Braided Shielding

## for extreme environmental and EMI/RFI protection




**Cable assemblies, exposed to harsh environmental, mechanical and electromagnetic stress are routinely equipped with boots, shields, and jackets designed to protect critical circuits from damage. Glenair offers a complete, turnkey solution to cable and conduit protection that includes innovative lightweight braided EMI/RFI shielding, revolutionary Duralectric™ jacketing, and our full spectrum Series 77 *Full Nelson* environmental heat shrink boot product family.**

**Shrink Boots, Jackets, and Braided Shielding Product Selection Guide**



Series 77 *Full Nelson* Environmental Heat Shrink Boots



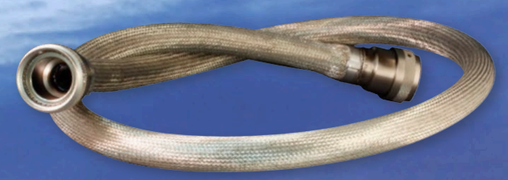
Piggyback Boot Connector Adapters



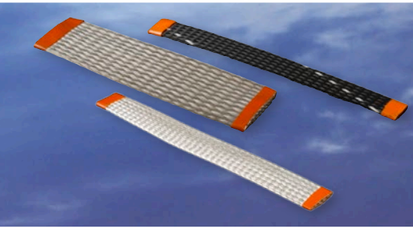
Duralectric™, Viton® and other Cable and Conduit Jacketing



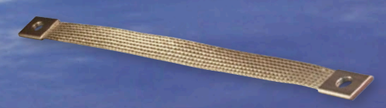
AmberStrand® Lightweight Composite EMI/RFI Shielding



ArmorLite™ Lightweight Stainless Steel EMI/RFI Shielding



EMI/RFI Metal Braided Shielding and Fabric Braided Sleeving



MIL-DTL-24749 Type IV Qualified Ground Straps



Lightweight ArmorLite™ Microfilament Ground Straps

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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Standard Lipped or Lipless Boots



Transitions



Convoluted Boots

## Mechanical and environmental protection/ strain relief for connector-to-cable transitions

- **Standard, short, long and 90° lipped and lipless boots**
- **Choice of six boot materials and a complete range of high-performance adhesive types**
- **A wide range of colors including desert tan**
- **The industry's largest selection of metal and composite shrink boot adapters**
- **All popular part numbers in stock and ready for same-day shipment**

### *The industry's broadest selection of heat shrink products*



Red straight boot with eyelet



Desert Tan widebody Y transition



Right-angle adapter, purple



4–1 widebody transition, yellow



Green long-tail boot



High-ratio right-angle adapter, grey

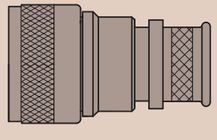


Low-profile 3–1 adapter, white

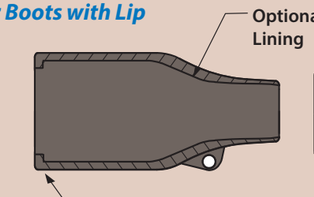
**Material Color Options for Type 1 High Performance Elastomer Boots and Transitions**

| Mod Code | Color | Similar to (Reference) | Mod Code | Color | Similar to (Reference) |
|---|---|---|---|---|---|
| 632 B | Blue | PANTONE 3005U | 632 R | Red | PANTONE 1797U |
| 632 E | Grey | FED-STD-595; #36270 | 632 T | Tan | FED-STD-595; #33446 |
| 632 G | Green | PANTONE 355U | 632 W | White | FED-STD-595; #37875 |
| 632 P | Purple | FED-STD-595; #37100 | 632 Y | Yellow | PANTONE YELLOW U |
| 632 O | Orange | FED-STD-595; #32300 | Standard | Black | FED-STD-595; #37038 |

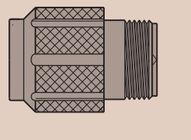
### *Adapter Boots with Lip*



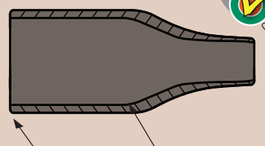
Adapter with Boot Groove for MIL-Spec Circular Connector




### *Lipless Boots*



Direct Attachment to Connector Threads




RoHS COMPLIANT

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**Shrink Boot Typical Material Properties**

| Property | Type 1 High Performance Elastomer | Type 2 Zero Halogen Polyolefin | Type 3 General Purpose Polyolefin | Type 5 Viton® Fluoroelastomer Blend | Type 6 High Performance Elastomer Alloy | Type 7 Flexible Polyolefin |
|---|---|---|---|---|---|---|
| Flexibility | Semi-rigid | Semi-flexible | Flexible | Flexible | Flexible | Highly Flexible |
| Operating Temperature Range | -75°C to +150°C | -30°C to +135°C | -55°C to +135°C | -55°C to +150°C | -55°C to +135°C | -55°C to +135°C |
| Shrink Temperature (min.) | 135°C | 135°C | 120°C | 135°C | 135°C | 135°C |
| Tensile Strength (psi) | 1700 | 1100 | 1400 | 2200 | 1500 | 1400 |
| Elongation (% min.) | 400 | 250 | 400 | 400 | 300 | 250 |
| Long Term Heat Aging | 3000 hrs, 150°C | 3000 hrs, 135°C | 168 hrs, 175°C | 168 hrs, 150°C | 168 hrs, 150°C | 168 hrs, 175°C |
| Heat Shock | 4 hrs, 215°C | 4 hrs, 215°C | 4 hrs, 225°C | 4 hrs, 225°C | 4 hrs, 220°C | 4 hrs, 250°C |
| Heat Aging | 168 hrs, 160°C | 168 hrs, 160°C | 168 hrs, 175°C | 168 hrs, 150°C | 168 hrs, 150°C | 168 hrs, 175°C |
| Dielectric Strength (V/mil) | 300 | 380 | 250 | 200 | 200 | 300 |
| Volume Resistivity (ohms-cm) | $10^{13}$ | $10^{12}$ | $10^{12}$ | $10^{10}$ | $10^{10}$ | $10^{12}$ |
| Water Absorption (%) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Flammability | Burn Time <15 sec Burn Length <25mm | Burn Time <15 sec Burn Length <25mm | Burn Time <120 sec Burn Length <25mm | Burn Time <120 sec Burn Length <25mm | Burn Time <120 sec Burn Length <25mm | Burn Time <90 sec Burn Length <25mm |
| RoHS Compliant | Yes | Yes | Yes | Yes | Yes | Yes |
| Oxygen Index (% min.) | | 30 | | | | |
| Temperature Index (°C) | | 250 | | | | |
| Smoke Index (max.) | | 20 | | | | |
| Toxicity Index (max.) | | 3 | | | | |

**Glenair's complete vertical integration ensures high-availability heat-shrink boots for all connector types**






SuperFly® boot



Mighty Mouse USB and 45° boots



Nanominiature boot



D-Subminiature boot

## SHRINK BOOT ADAPTERS SELECTION GUIDE



Series 310 Shrink Boot Adapters



Series 311 EMI/RFI Lamp-Base Thread/Boot Adapters



Series 319 Shield Sock/Boot Adapters



Series 440 Band/Boot Adapters



SAE-AS85049 QPL Shrink Boot Adapters



Composite Thermoplastic Band/Boot Adapters

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SERIES 77
ENVIRONMENTAL
SHRINK BOOTS




## Glenair Environmental Shrink Boots Now TACOM Approved, In-Stock and Ready for Immediate Shipment

High-performance Series 77 "Full Nelson" environmental shrink boots manufactured by Glenair in Glendale, California are now approved by the US Army Tank-Automotive Command (TACOM). Manufactured from high-temperature crosslinked elastomeric polymer material and/or caustic chemical-resistant Viton polymer, Glenair straight and right angle long-tail shrink boots, Y and T transitions, convoluted strain-relief boots and heat-shrinkable adapter shims have been added to the following source control documentation:

**Glenair Series 77 "Full Nelson" TACOM APPROVED Shrink Boots**

| Description | Military Part Number | Glenair Part Number | Raychem Part Number | Hellermann Part Number |
|---|---|---|---|---|
| Heat Shrinkable Low Profile 3-Entry "Y" Transition | 12273148-1** | 770-009Y*05 | 381A301-** | 492H412-* |
| | 12273148-2** | 770-009Y*06 | 381A302-** | 492H413-* |
| | 12273148-3** | 770-009Y*07-01 | 381A303-*01 | 492H414-*01 |
| | 12273148-4** | 770-009Y*08-01 | 381A304-*01 | 492H415-*01 |
| | 12273148-5** | 770-009Y*07 | 381A303-** | — |
| Heat Shrinkable Low Profile 3-Entry "T" Transition | 12273162-1** | 770-012T*01 | 301A511-** | 412H622-* |
| | 12273162-2** | 770-012T*02 | 301A512-** | 412H623-* |
| | 12273162-3** | 770-012T*03 | 301A513-** | 412H624-* |
| | 12273162-4** | 770-012T*04 | 301A514-** | 412H625-* |
| Heat Shrinkable Low Profile 4-Entry 3:1 Transition | 12273163-1** | 770-014*09 | 462A421-** | 573H532-* |
| | 12273163-2** | 770-014*10 | 462A422-** | 573H533-* |
| | 12273163-3** | 770-014*11 | 462A423-** | 573H534-* |
| | 12273163-4** | 770-014*12 | 462A424-** | 573H535-* |
| Heat Shrinkable Adapter Shim Boot | 12273164-1** | 770-019SB*01 | 202E334-** | 313E445-* |
| | 12273164-2** | 770-019SB*02 | 202E344-** | 313E455-* |
| | 12273164-3** | 770-019SB*03 | 202E336-** | 313E447-* |
| | 12273164-4** | 770-019SB*04 | 202E346-** | 313E457-* |
| Heat Shrinkable Convoluted Strain Relief 2-Entry Boot | 12273242-1** | 770-022C*01 | 202C611-** | 313C722-9 |
| | 12273242-2** | 770-022C*02 | 202C621-** | 313C732-9 |
| | 12273242-3** | 770-022C*03 | 202C632-** | 313C743-9 |
| | 12273242-4** | 770-022C*04 | 202C642-** | 313C753-9 |
| | 12273242-5** | 770-022C*05 | 202C653-** | 313C764-9 |
| | 12273242-6** | — | 202G621-** | — |
| | 12273242-7** | — | 202G632-** | — |
| | 12273242-8** | — | 202C642-** | — |
| | 12273242-9** | — | 202C653-** | — |

| Description | Military Part Number | Glenair Part Number | Raychem Part Number | Hellermann Part Number |
|---|---|---|---|---|
| Heat Shrinkable Straight Lipped 2-Entry Long Tail Boot | 12273147-1** | 770-020S*02 | 202F211-** | 313F322-* |
| | 12273147-2** | 770-020S*03 | 202F221-** | 313F332-* |
| | 12273147-3** | 770-020S*04 | 202F232-** | 313F343-* |
| | 12273147-4** | 770-020S*05 | 202F242-** | 313F353-* |
| | 12273147-5** | 770-020S*06 | 202F253-** | 313F364-* |
| | 12273147-6** | 770-020S*07 | 202F263-** | 313F374-* |
| | 12273147-7** | 770-020S*08 | 202F274-** | 313F385-* |
| Heat Shrinkable 90° Lipped 2-Entry Long Tail Boot | 12273176-1** | 770-021A*02 | 222F211-** | 333F322-* |
| | 12273176-2** | 770-021A*03 | 222F221-** | 333F332-* |
| | 12273176-3** | 770-021A*04 | 222F232-** | 333F343-* |
| | 12273176-4** | 770-021A*05 | 222F242-** | 333F353-* |
| | 12273176-5** | 770-021A*06 | 222F253-** | 333F364-* |
| | 12273176-6** | 770-021A*07 | 222F263-** | 333F374-* |
| | 12273176-7** | 770-021A*08 | 222F274-** | 333F385-* |

### VG QUALIFIED SHRINK BOOTS AND ADHESIVES

DIN



**VG Standards are established by the Deutsches Institut für Normung (DIN) and are widely used in European defense programs. Glenair Type 2 shrink boots are qualified to VG95343 Part 28, and our adhesives are qualified to VG95343 Part 18. Consult Glenair UK for price and delivery.**

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# TACOM-Approved Environmental Shrink Boots

**Expanded Cross-Reference: TACOM-to-Glenair Shrink Boot Part Numbers**

| TACOM # | GLENAIR # | TACOM # | GLENAIR # | TACOM # | GLENAIR # |
|---|---|---|---|---|---|
| 12273147-120 | 770-020S602 | 12273162-110 | 770-012T601 | 12273176-120 | 770-021A602 |
| 12273147-220 | 770-020S603 | 12273162-210 | 770-012T602 | 12273176-220 | 770-021A603 |
| 12273147-320 | 770-020S604 | 12273162-310 | 770-012T603 | 12273176-320 | 770-021A604 |
| 12273147-420 | 770-020S605 | 12273162-410 | 770-012T604 | 12273176-420 | 770-021A605 |
| 12273147-520 | 770-020S606 | 12273162-120 | 770-012T501 | 12273176-520 | 770-021A606 |
| 12273147-620 | 770-020S607 | 12273162-220 | 770-012T502 | 12273176-620 | 770-021A607 |
| 12273147-720 | 770-020S608 | 12273162-320 | 770-012T503 | 12273176-720 | 770-021A608 |
| 12273147-130 | 770-020S502 | 12273162-420 | 770-012T504 | 12273176-130 | 770-021A502 |
| 12273147-230 | 770-020S503 | 12273163-110 | 770-014609 | 12273176-230 | 770-021A503 |
| 12273147-330 | 770-020S504 | 12273163-310 | 770-014611 | 12273176-330 | 770-021A504 |
| 12273147-430 | 770-020S505 | 12273163-410 | 770-014612 | 12273176-430 | 770-021A505 |
| 12273147-530 | 770-020S506 | 12273163-120 | 770-014509 | 12273176-530 | 770-021A506 |
| 12273147-630 | 770-020S507 | 12273163-220 | 770-014510 | 12273176-630 | 770-021A507 |
| 12273147-730 | 770-020S508 | 12273163-320 | 770-014511 | 12273176-730 | 770-021A508 |
| 12273148-110 | 770-009Y605 | 12273163-420 | 770-014512 | 12273242-110 | 770-022C601 |
| 12273148-210 | 770-009Y606 | 12273164-110 | 770-019SB601 | 12273242-210 | 770-022C602 |
| 12273148-310 | 770-009Y607-01 | 12273164-210 | 770-019SB602 | 12273242-310 | 770-022C603 |
| 12273148-410 | 770-009Y608-01 | 12273164-310 | 770-019SB603 | 12273242-410 | 770-022C604 |
| 12273148-510 | 770-009Y607 | 12273164-410 | 770-019SB604 | 12273242-510 | 770-022C605 |
| 12273148-120 | 770-009Y505 | 12273164-120 | 770-019SB501 | 12273242-120 | 770-022C501 |
| 12273148-220 | 770-009Y506 | 12273164-220 | 770-019SB502 | 12273242-220 | 770-022C502 |
| 12273148-320 | 770-009Y507-01 | 12273164-320 | 770-019SB503 | 12273242-320 | 770-022C503 |
| 12273148-420 | 770-009Y508-01 | 12273164-420 | 770-019SB504 | 12273242-320 | 770-022C503 |
| 12273148-520 | 770-009Y507 | | | 12273242-420 | 770-022C504 |
| | | | | 12273242-520 | 770-022C505 |

**TACOM Approved Shrink Boot Material Properties**

| Property | Viton® Fluoroelastomer Blend (SPEC-01417-SC-X15111) | High Performance Elastomer Blend (SPEC-01417-SC-X15112) |
|---|---|---|
| Flexibility | Flexible | Flexible |
| Operating Temperature Range | -55°C to +150°C | -55°C to +135°C |
| Shrink Temperature (min.) | 135°C | 135°C |
| Tensile Strength (psi) | 2200 | 1500 |
| Elongation (% min.) | 400 | 300 |
| Heat Shock | 4 hrs, 225°C | 4 hrs, 220°C |
| Heat Aging | 168 hrs, 150°C | 168 hrs, 150°C |
| Dielectric Strength (V/mil) | 200 | 200 |
| Volume Resistivity (ohms-cm) | $10^{10}$ | $10^{10}$ |
| Water Absorption (%) | 0.5 | 0.5 |
| Flammability | Burn Time <120 sec<br>Burn Length <25mm | Burn Time <120 sec<br>Burn Length <25mm |
| RoHS Compliant | Yes | Yes |

**Approval:**
Project Manager, Heavy Brigade Combat Team (PM-HBCT),
US Army Tank-Automotive Command (TACOM)

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
U.S. CAGE code 06324

## 310-048 ENVIRONMENTAL PIGGYBACK BOOT ADAPTER



Pre-positioned and partially recovered shrink-boot/adapter unit is ready for fast and reliable final recovery of the boot. Provides durable environmental sealing and strain-relief to the cable-to-backshell junction. Adapter is lightweight composite thermoplastic.

| How To Order | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **310** | **F** | **S** | **048** | **XB** | **16** | **–2** |
| **Piggyback Boot Adapter** | Environmental | | | | | | |
| **Connector Designator** | **A** = MIL-DTL-83723, Sr. III; MIL-DTL-5015; MIL-DTL-26482<br>**F** = MIL-DTL-38999, Sr. I & II **H** = MIL-DTL-38999, Sr. III & IV | | | | | | |
| **Angular Function** | **S** = Straight | | | | | | |
| **Basic Number** | | | | | | | |
| **Finish** | **XB** = no plating, black composite | | | | | | |
| **Shell Size** | **08**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24** | | | | | | |
| **Boot Material Type** | **1** = High-Performance Semi-Rigid Elastomer **2** = Zero-Halogen Semi-Rigid Polyolefin<br>**3** = General Purpose Flexible Polyolefin | | | | | | |

## 317-102 EMI/RFI ENVIRONMENTAL PIGGYBACK BOOT ADAPTER WITH DROP-IN BANDING PORCH



This Piggyback boot features a unique drop-in conductive banding porch. The pre-positioned and partially recovered shrink boot is ready for final recovery after the cable shield is band terminated to the drop-in accessory. Adapter is lightweight composite thermoplastic.

| How To Order | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **317** | **F** | **S** | **102** | **XB** | **16** | **–2** | **K** |
| **Piggyback Boot Adapter** | EMI/RFI Environmental with drop-in banding porch | | | | | | | |
| **Connector Designator** | **A** = MIL-DTL-83723, Sr. III; MIL-DTL-5015; MIL-DTL-26482<br>**F** = MIL-DTL-38999, Sr. I & II **H** = MIL-DTL-38999, Sr. III & IV | | | | | | | |
| **Angular Function** | **S** = Straight | | | | | | | |
| **Basic Number** | | | | | | | | |
| **Finish** | **XB** = electroless nickel **XMT** = Ni-PTFE, Nickel-Fluorocarbon Polymer<br>**XN** = Selective plating, Nickel & Cad O.D. | | | | | | | |
| **Shell Size** | **08**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24** | | | | | | | |
| **Boot Material Type** | **1** = High-Performance Semi-Rigid Elastomer **2** = Zero-Halogen Semi-Rigid Polyolefin<br>**3** = General Purpose Flexible Polyolefin | | | | | | | |
| **Pre-Coiled Band** | **K** = Pre-Coiled Band, **Omit** if not required | | | | | | | |

## 635-005 ENVIRONMENTAL PIGGYBACK BOOT CABLE FEED-THROUGH



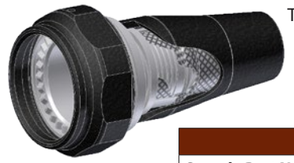
This composite feed-through is supplied with a pre-positioned and partially recoverd shrink-boot—ready for fast and reliable final recovery of the boot. Provides durable environmental sealing and strain-relief to the feed-through-to-box junction. Adapter is lightweight composite thermoplastic.

| How To Order | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Part Number** | **635** | **005** | **XB** | **01** | **–2** | **5** |
| **Piggyback Boot Adapter** | Environmental Cable Feed-Through | | | | | |
| **Basic Number** | | | | | | |
| **Finish** | **XB** = no plating, black composite | | | | | |
| **Dash No.** | **01**, **02**, **03**, **04**, **05**, **06**, **07** (consult factory) | | | | | |
| **Boot Material Type** | **1** = High-Performance Semi-Rigid Elastomer **2** = Zero-Hal Semi-Rigid Polyolefin<br>**3** = General Purpose Flexible Polyolefin | | | | | |
| **Length** | in 1/8 inch increments, 5/8" minimum, e.g. 5 = .625 in. | | | | | |

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COMPOSITE
Piggyback boot backshell adapters
Partially recovered for quick and easy assembly

## 319-183 EMI/RFI ENVIRONMENTAL PIGGYBACK BOOT ADAPTER WITH INTEGRATED SHIELD SOCK



This integrated EMI/RFI shield sock, with its partially recovered shrink-boot and composite connector backshell delivers speed, convenience, and performance. Simply couple in place, terminate the supplied shield to the cable and complete the recovery of the boot.

| How To Order | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **319** | **H** | **S** | **183** | **XM** | **19** | **B** | **-2** | |
| **Piggyback Boot Adapter** | EMI/RFI Environmental with integrated shield sock | | | | | | | | |
| **Connector Designator** | **A** = MIL-DTL-83723, Series III; MIL-DTL-5015; MIL-DTL-26482<br>**F** = MIL-DTL-38999, Series I & II **G** = MIL-DTL-28840<br>**H** = MIL-DTL-38999, Series III & IV **U** = MIL-DTL-29600 | | | | | | | | |
| **Angular Function** | **S** = Straight **T** = 45° Elbow **W** = 90° Elbow | | | | | | | | |
| **Basic Number** | | | | | | | | | |
| **Finish** | **XM** = Electroless Nickel<br>**XMT** = Ni-PTFE, Nickel-Fluorocarbon Polymer<br>**XW** = Cad/O.D.over electroless nickel | | | | | | | | |
| **Shell Size** | **08**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24** | | | | | | | | |
| **Optional Braid Material** | **A** = 100% AmberStrand® **B** = 75%/25% AmberStrand® Blend<br>**–** = Nickel-Copper 34AWG **T** = Tin/Copper 34AWG **L** = ArmorLite™ | | | | | | | | |
| **Boot Material Type** | See Table IV | | | | | | | | |

## 443-033 EMI/RFI ENVIRONMENTAL BAND-IN-A-CAN PIGGYBACK BOOT AND COMPOSITE BACKSHELL



This composite, two-piece band-in-a-can adapter comes equipped with a partially recovered shrink boot attached to the nut. After the cable shield is terminated to the band porch, simply screw the nut and boot into place and complete the boot recovery process.

| How To Order | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Part Number** | **443** | **H** | **S** | **033** | **XM** | **19** | **20** | **K** | **S** | **–2** |
| **Piggyback Boot Adapter** | EMI/RFI Environmental Band-in-a-Can boot/backshell | | | | | | | | | |
| **Connector Designator** | **A** = MIL-DTL-83723, Series III; MIL-DTL-5015; MIL-DTL-26482<br>**F** = MIL-DTL-38999, Series I & II **G** = MIL-DTL-28840<br>**H** = MIL-DTL-38999, Series III & IV | | | | | | | | | |
| **Angular Function** | **S** = Straight **W** = 90° Elbow | | | | | | | | | |
| **Basic Number** | | | | | | | | | | |
| **Finish** | **XM** = Electroless Nickel<br>**XMT** = Ni-PTFE, Nickel-Fluorocarbon Polymer<br>**XW** = Cad/O.D.over electroless nickel | | | | | | | | | |
| **Shell Size** | **08**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24**, **28** | | | | | | | | | |
| **Entry Dia.** | Codes 10–32 for diameters .236" – .394" after shrinkage, consult factory | | | | | | | | | |
| **Pre-Coiled Band** | **K** = Pre-Coiled Band, **Omit** if not required | | | | | | | | | |
| **Slot Option** | **S** = Pigtail Slot, **Omit** for none | | | | | | | | | |
| **Boot Material** | See Table IV | | | | | | | | | |

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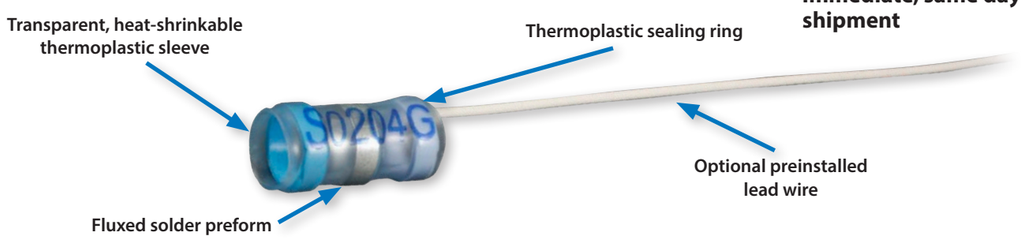
*AS83519/1 AND /2 TYPE*

# Heat Shrink Termination (HST) Sleeves

## For fast and reliable termination of EMI cable shielding to ground

Reliable termination of EMI/RFI shielding (to ground) in wire harness applications is universally accomplished with AS83519/1 and /2 type heat shrink termination (HST) sleeves. These devices, supplied in five different sizes—with or without pre-installed ground lead wires—provide environmental encapsulation and insulation of the shield termination site. Lead wire-equipped versions allow for easy and reliable grounding to connector shells, backshells, or ground posts. Transparent heat shrink tubing allows for easy inspection and supplies additional strength and strain-relief. The preflux solder preform delivers a fast and controlled solder joint each and every time.

- **Heat shrink termination sleeves, with and without lead wire**
- **Ultra-fast recovery for reduced assembly time**
- **Pre-installed, pre-tinned braid version available**
- **Mil-qualified 81824/1 in-line-splices**
- **High availability: all Glenair HSTs made in USA and in-stock for immediate, same day shipment**



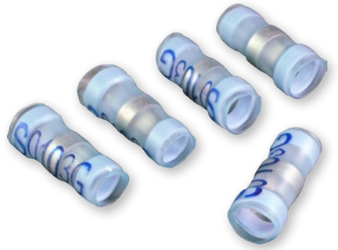

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*AS83519 TYPE • 81824/1 QUALIFIED*

# Heat Shrink Termination Sleeves and Mil-Qualified In-Line Splices

Glenair

### AS83519/1 TYPE HEAT SHRINK TERMINATION (HST) SLEEVES, NO LEAD WIRE

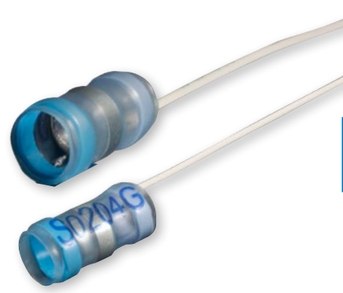


| Basic Part Number | Size | Thermal Indicator (Omit for None) |
|---|---|---|
| 077-010 | 03 | T |

*T = Thermal Indicator (Omit for None)*

| Basic No. | Size |
|---|---|
| GS83519/1 | - 03 |

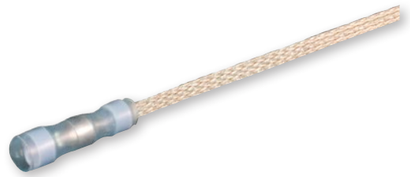
### AS83519/2 TYPE HEAT SHRINK TERMINATION (HST) SLEEVES, PRE-INSTALLED LEAD WIRE




| Basic Part Number | Thermal Indicator (Omit for None) | Size |
|---|---|---|
| 077-020 | 02 | T |

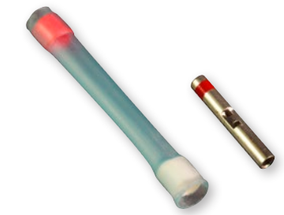
| Product Series | Size |
|---|---|
| GS83519/2 | - 03 |

### AS83519/2 TYPE HEAT SHRINK TERMINATION (HST) SLEEVES, PRE-INSTALLED BRAID, PRE-TINNED ON BOTH ENDS



| Basic Part Number | Thermal Indicator (Omit for None) | Size |
|---|---|---|
| 077-030 | 03 | T |

### MIL-QUALIFIED IN-LINE SPLICE



| Product Series | Size | Basic No. |
|---|---|---|
| 070 - 001 | 03 | |

| Product Series | Size |
|---|---|
| M81824/1 | - 1 |



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# High-performance jacketing material

## Outstanding durability and insulation performance

**DURALECTRIC™**



**Rugged high-temperature, environmental Duralectric™ jacketing is available in a broad range of and colors inculding safety orange**

## Duralectric™ is the high-performance jacketing material perfectly suited for immersion, chemical or caustic fluid exposure, temperature extremes, UV radiation and more

Glenair *Duralectric*™ weatherproof jacketing is halogen free, flame resistant, and functional to 260˚C. *Duralectric*™ far surpasses the accelerated solar weathering standards under IEC 60068-2-5, and is tested to 56 accelerated days, equivalent to 53 years of solar exposure. Glenair can supply the material in a variety of formats, including blown jacketing, as an extrusion over wire and cable, as an overmolding compound and as a self-vulcanizing repair tape.

| Jacketing Options | | |
|---|---|---|
| 0 | Black | Weatherproof, halogen free, flame resistant, functional to 260°C |
| 1 | Desert Tan | Fed Std #33446 Desert Tan color |
| 2 | Red | Pantone® 1797 U |
| 3 | Orange | OSHA Safety Orange to mark energized electrical cables |
| 4 | Yellow | Pantone® Yellow U |
| 5 | Green | Pantone® 355 U |
| 6 | Blue | Pantone® 3005 U |
| 7 | Violet | Fed Std 595; #37100 |
| 8 | Gray | Qualified to US Navy MIL-PRF-24758A, Fed Std 595B #26270 Haze Gray color |
| 9 | White | Fed Std 595; #37875 |

| Jacketing Material Properties | |
|---|---|
| Material Property | Duralectric™ |
| Temperature Range | -60°C to +260°C |
| Specific Gravity | 1.22 |
| Weight: Lbs./Cubic Inch | .045 |
| Abrasion Resistance | Good |
| Wear Resistance | Good |
| Flame Resistance | Excellent |
| Sunlight Resistance | Excellent |

| Chemical Resistance | |
|---|---|
| Aliphatic Hydrocarbons | Excellent |
| Aromatic Hydrocarbons | Excellent |
| Ketones, Etc. | Excellent |
| Oil & Gasoline | Excellent |

| Glenair Duralectric™ Material Specifications | |
|---|---|
| Temperature rating: -60°C to +260°C (with excursions to 290°C) | |
| Halogen free per IEC 60614-1. Less than 5mg of hcl per 1 gm of product tested. | |
| Accelerated Weathering (Solar) per IEC 60068-2-5; 56 days exposure | |
| Flame Resistant per IEC 60614-1; Material does not sustain combustion when the source of flame is removed. | |
| Low Smoke Index per NES 711 (11.75); Minimum standard is 25. The Glenair tested level is 11.75. This makes the material acceptable for interior applications as well as topside. | |
| Smoke Density Class F1 Per NF F 16-101 IAW DIN EN 60695-2-11:2001 | |
| Toxicity Index per NES 713 (1.9); Minimum standard is 5. The Glenair tested level is 1.9. This makes the material acceptable for interior applications as well as topside. | |
| Colorable to Fed Std 595B | |
| Markable IAW MIL-PRF-24758A | |
| Oxygen Limiting Index = 45.1 Per EN ISO 4589-2:1999; Minimum is 28. | |
| ASTME 595 vacuum outgassing–post bake results: TML .06%, CVCM .006%, WVR .02% | |
| Fungus resistance testing (rating of 0) per MIL-STD-810F, method 508.5 | |
| ASTM D624 DIE B tear test: 150 KN/M | |
| **12 Sec Vertical Burn: (Pass) Per 14CFR Part 25.853(a) amdt 25-116 App F Part 1 (a)(1)(ii)** | |
| Fluids Per MIL STD 810F, Method 504 | Cleaner (MIL-C-85570): CALLA-855 |
| Fuel (MIL-T-83133): JPG | Solvent (Isopropyl Alcohol): TT-I-735 |
| Fuel (MIL-T-83133): JPG | De Icer (AMS-1432): E36 Runway Deicer |
| Hydraulic Fluid (MIL H 5606): ROYCO 756 | Coolant (MIL-C-87252): Coolanol 25R |
| Lube Oil (MIL-L-23699): ROYCO-500 | Fire Extinguishant Foam: AMEREX AFFF |

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# Cable and conduit jacketing

## Neoprene • Hypalon® • EPDM • Viton



- **Extruded, blown-on and heat shrink jacketing for harsh application environments**
- **General purpose polyurethane**
- **Chemically-resistant Viton®**
- **Industry standard neoprene**
- **Selected materials CBRN tested**

## Cable and conduit jacketing materials purpose-designed for every application requirement: Immersion, chemical or caustic fluid exposure, temperature extremes, UV radiation and more

RoHS COMPLIANT

| Jacketing Options | | |
|---|---|---|
| N | Neoprene | Tough, durable polychloroprene for mechanical and environmental protection |
| H | Hypalon® | Light weight with broad temperature range |
| E | EPDM | Better resistance to Ketones |
| V | Viton® | Heaviest material with best resistance to oil and gasoline |

| Jacketing Material Properties and Chemical Resistance | | | | |
|---|---|---|---|---|
| Material Property | EPDM (Ethylene Propylene Diene Monomer) | Hypalon (Chlorosulfonated Polyethylene) | Neoprene (Polychloroprene) | Viton® (Fluoroelastomer) |
| Temperature Range | -60°F to +300°F (-51°C to +149°C) | -60°F to +300°F (-51°C to +149°C) | -60°F to +250°F (-51°C to +121°C) | -40°F to +392°F (-40°C to +200°C) |
| Specific Gravity | 1.26 | 1.18 | 1.25 | 1.80 |
| Weight: Lbs./Cubic Inch | .045 | .043 | .045 | .055 |
| Abrasion Resistance | Excellent | Excellent | Excellent | Excellent |
| Wear Resistance | Good | Good | Good | Good |
| Flame Resistance | Good | Good | Good | Good |
| Sunlight Resistance | Good | Excellent | Excellent | Excellent |
| **Chemical Resistance** | | | | |
| Aliphatic Hydrocarbons | Good | Good | Good | Excellent |
| Aromatic Hydrocarbons | Good | Fair | Fair | Excellent |
| Ketones, Etc. | Good | Poor | Poor | Poor |
| Oil & Gasoline | Good | Good | Good | Excellent |

MASTER Seal®

SELF-VULCANIZING SEALING TAPE

**GLENAIR PART NO. 687-758**




*Duralectric™ material sealing tape designed for temporary repair of cable and conduit. Glenair Master Seal effectively stops water incursion until a permanent repair can be made.*

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AmberStrand®



AmberStrand® is ultra-lightweight microfilament metal clad EMI/RFI composite braiding

- Metal-clad EMI/RFI Shielding with a lightweight composite thermoplastic base material
- Highly conductive surface plating
- Reduce shielding weight up to 80% and more
- Reduce operation costs by permanently reducing launch and aircraft all-up weights
- Superior high frequency shielding compared to tinned and/or nickel plated copper
- Exceptional tensile strength: 590,000 psi (min)



## AmberStrand®:The smart way to reduce launch and flight weights in aerospace systems



Glenair can also offer AmberStrand® users direct factory overbraiding services for both point-to-point as well as multi-branch interconnect assemblies.



Composite strain-relief backshell with integrated AmberStrand® lightweight composite metal-clad braid shield sock.

100% AmberStrand®

103 - 026 - 024

Diameter Dash Number

75%/25% AmberStrand® Blend

103 - 027 - 024

Diameter Dash Number

**How does Amberstrand® compare, in terms of mechanical performance, to other materials?**

| Material Type | AmberStrand® Thermoplastic | PEEK (Monofil) | Fluoropolymer (Yarn) | Kevlar (Yarn) | Dacron (Yarn) | Halar (Monofil) | Fluoropolymer FEP (Monofil) | Nomex (Yarn) | Polyester Type FR (Monofil) | Ryton Type R-7 (Monofil) | PTFE-Glass (Yarn) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Glenair P/N | 103-026 103-027 | 102-051 | 102-061 | 102-071 | 102-073 | 102-023 | 102-060 | 103-013 | 102-001 102-002 | 102-080 | 100-022 |
| Temperature Range | -65°C to +200°C | -65°C to +260°C | -55°C to +200°C | -73°C to +175°C | -62°C to +150°C | -65°C to +200°C | -55°C to +260°C | -55°C to +125°C | -55°C to +200°C | -65°C to +200°C | -75°C to +525°C |
| Tensile Strength (PSI) Yield | 590,000 | 780,000 | 40,000 | 400,000 | 160,000 | 35,000 | 14,000 | 90,000 | 50,000 | 19,000 | 450,000 |
| Elongation Percentage | 2.5% | 38% | 19% | 3.6% | 12% | 15% | 50% | 25% | 20% | 35% | 5% |
| Chemical Resistance | Excellent | Excellent | Excellent | Excellent | Good | Excellent | Excellent | Excellent | Good | Excellent | Excellent |
| Abrasion Resistance | Good | Excellent | Good | Good | Excellent | Excellent | Good | Good | Good | Excellent | Excellent |
| Specific Gravity | 1.45 | 1.30 | 2.10 | 1.44 | 1.38 | 1.68 | 2.17 | 1.58 | 1.38 | 1.25 | 2.50 |
| Flammability | Will Not Burn | Very Low | Will Not Burn | Will Not Melt | Flammable | Flammable | Very Low | Will Not Melt | Very Low | Very Low | Will Not Burn |





AmberStrand®

## Aircraft Utilization Analysis

Comparison of AmberStrand® Composite EMI/RFI braid to 36 AWG A-A-59569 Ni/Cu Braid results in 60+ pounds weight savings in a typical commercial carrier

**Where is all the EMI/RFI braid deployed in a typical commercial aircraft?**

| Diameter (in) | L Wing | R Wing | Fwd Belly | Aft Belly | HYD Bay | Aft Barrel | Tail | V/H Stab | Totals (in) |
|---|---|---|---|---|---|---|---|---|---|
| 0 - 0.25 | 1852.2 | 1852.2 | 0 | 2811.4 | 168.2 | 2015.2 | 2480.6 | 1385 | 12564.8 |
| 0.25 - 0.5 | 434.8 | 434.8 | 511.6 | 1034.6 | 257.4 | 506.2 | 958.2 | 1121.7 | 5259.3 |
| 0.5 - 0.75 | 0 | 0 | 260.9 | 223 | 0 | 184.2 | 392.4 | 152.1 | 1212.6 |
| 0.75 - 1.0 | 0 | 0 | 77.2 | 0 | 0 | 1198 | 162.2 | 0 | 1437.4 |
| 1.0 - 1.5 | 0 | 0 | 0 | 0 | 0 | 446 | 21 | 0 | 467 |

**How much would all this braid weigh if it was made of 36 AWG A-A-59569 NiCu?**

| Diameter (in) | Weight (Lb/ft) | Length (in) | Weight (Lb) |
|---|---|---|---|
| 0 - 0.25 | 0.02 | 12564.8 | 21.08 |
| 0.25 - 0.5 | 0.05 | 5259.3 | 21.17 |
| 0.5 - 0.75 | 0.07 | 1212.6 | 7.12 |
| 0.75 - 1.0 | 0.14 | 1437.4 | 16.88 |
| 1.0 - 1.5 | 0.18 | 467 | 7.05 |
| | | **Total weight** | **73.30 lbs** |

**How much would all this braid weigh if it was made of lightweight composite AmberStrand®?**

| Diameter (in) | Weight (Lb/ft) | Length (in) | Weight (Lb) |
|---|---|---|---|
| 0 - 0.25 | 0.003 | 12564.8 | 4.16 |
| 0.25 - 0.5 | 0.008 | 5259.3 | 3.58 |
| 0.5 - 0.75 | 0.011 | 1212.6 | 1.16 |
| 0.75 - 1.0 | 0.018 | 1437.4 | 2.11 |
| 1.0 - 1.5 | 0.034 | 467 | 1.30 |
| | | **Total weight** | **12.31 lbs** |

**Expressed in percentages, how does 100% and 75% metal clad AmberStrand® compare against tin-coated copper?**

| Braid Diameter | AmberStrand® 100% 103-026 | Tinned Copper 100-001 | % Weight Savings/Foot | AmberStrand® 75/25% NiCu 103-027 | Tinned Copper 100-001 | % Weight Savings/ Foot |
|---|---|---|---|---|---|---|
| .062 | .6 | 1.9 | 68% | .9 | 1.9 | 52% |
| .125 | 1.0 | 4.8 | 79% | 1.5 | 4.8 | 68% |
| .250 | 1.8 | 16.1 | 88% | 2.4 | 16.1 | 85% |
| .375 | 2.3 | 18.5 | 87% | 3.9 | 18.5 | 79% |
| .500 | 3.7 | 22.3 | 83% | 5.4 | 22.3 | 76% |
| .625 | 4.4 | 27.7 | 84% | 6.4 | 27.7 | 77% |
| .750 | 5.2 | 34.3 | 85% | 7.2 | 34.3 | 79% |
| 1.000 | 8.0 | 35.0 | 77% | 11.0 | 35.0 | 69% |

*LIGHTWEIGHT*

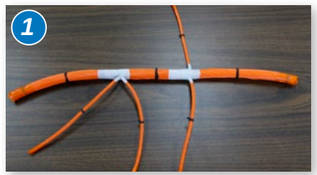
# ArmorLite™

## Microfilament nickel-clad stainless steel EMI/RFI braided shielding



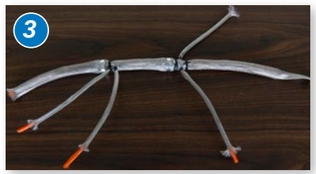
- **Ultra-lightweight EMI/RFI braiding for high-temperature applications -80°C to +260°C**
- **Microfilament stainless steel: 70% lighter than NiCu A-A-59569**
- **Outstanding EMI/RFI shielding and conductivity**
- **Reduce shielding weight up to 70% and more**
- **Superior flexibility and "windowing" resistance: 90 to 95% optical coverage**
- **220,000 psi (min) tensile strength**
- **Best performing metallic braid during lightning tests (Run to ANSI/EIA-364-75-1997 Waveform 5B)**

**Save weight and money every time you fly! Aircraft All-Up-Weight (AUW) has met its match: ArmorLite™ microfilament stainless steel braid saves pounds compared to standard QQ-B-575/ A-A-59569 EMI/RFI shielding.**










Choose user-installable microfilament tubular braid in twelve standard diameters.
Assemble per standard multi-branch cable shielding processes, as above.



**Glenair can also offer ArmorLite™ users direct factory overbraiding services for both point-to-point as well as multi-branch assemblies.**

**100% ArmorLite™**

**103 - 051 - 024**

**Diameter Dash Number**





**A single layer of ArmorLite™ Shields from 40dB to 80dB in Frequency Ranges from 30kHz to 2.5GHz**

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*LIGHTWEIGHT*

# ArmorLite™

## Microfilament nickel-clad stainless steel EMI/RFI braided shielding

### Aircraft Utilization Analysis

Comparison of ArmorLite™ nickel clad stainless steel braid to A-A-59569 Ni/Cu braid

**Where is all the EMI/RFI braid deployed in a typical commercial aircraft?**

| Diameter (in) | L Wing | R Wing | Fwd Belly | Aft Belly | HYD Bay | Aft Barrel | Tail | V/H Stab | Totals (in) |
|---|---|---|---|---|---|---|---|---|---|
| 0 - 0.25 | 1852.2 | 1852.2 | 0 | 2811.4 | 168.2 | 2015.2 | 2480.6 | 1385 | 12564.8 |
| 0.25 - 0.5 | 434.8 | 434.8 | 511.6 | 1034.6 | 257.4 | 506.2 | 958.2 | 1121.7 | 5259.3 |
| 0.5 - 0.75 | 0 | 0 | 260.9 | 223 | 0 | 184.2 | 392.4 | 152.1 | 1212.6 |
| 0.75 - 1.0 | 0 | 0 | 77.2 | 0 | 0 | 1198 | 162.2 | 0 | 1437.4 |
| 1.0 - 1.5 | 0 | 0 | 0 | 0 | 0 | 446 | 21 | 0 | 467 |

**How much would all this braid weigh if it was made of 36 AWG A-A-59569 NiCu?**

| Diameter (in) | Weight (Lb/ft) | Length (in) | Weight (Lb) |
|---|---|---|---|
| 0 - 0.25 | 0.02 | 12564.8 | 21.08 |
| 0.25 - 0.5 | 0.05 | 5259.3 | 21.17 |
| 0.5 - 0.75 | 0.07 | 1212.6 | 7.12 |
| 0.75 - 1.0 | 0.14 | 1437.4 | 16.88 |
| 1.0 - 1.5 | 0.18 | 467 | 7.05 |
| | | **Total weight** | **73.30 Lbs** |

**How much would all this braid weigh if it was made of ArmorLite™ Micro Stainless Steel Braided Shielding?**

| Diameter (in) | Weight (Lb/ft) | Length (in) | Weight (Lb) |
|---|---|---|---|
| 0 - 0.25 | .00507 | 12564.8 | 5.309 |
| 0.25 - 0.5 | .0097 | 5259.3 | 4.251 |
| 0.5 - 0.75 | .0178 | 1212.6 | 1.737 |
| 0.75 - 1.0 | .0256 | 1437.4 | 3.063 |
| 1.0 - 1.5 | .0368 | 467 | 1.434 |
| | | **Total weight** | **15.794 Lbs** |

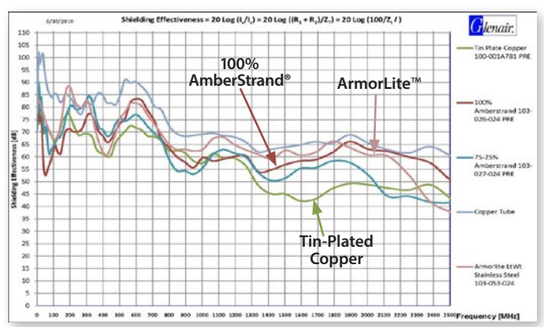


The lightest ground straps in the industry: Silver or nickel plated

- **Thermal Cycling: No Adverse Effects**
- **Flame: Self Extinguishing**
- **Flex Test: 50,000 Cycles**
- **Salt Spray: 500 Hours**
- **70+% Lighter than NiCu QQ-B-575/A-A-59569**
- **Enhanced EMI/RFI Electrical Performance (DC resistance 1 Ohm/ft).**

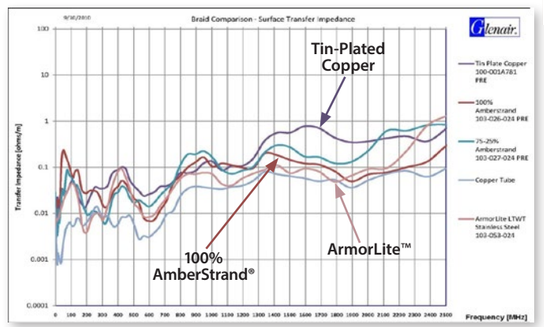
### Shielding Effectiveness

**For EMI/RFI Braiding Solutions - 0 MHz to 2500 MHz Range**




### Surface Transfer Impedance

**For EMI/RFI Braiding Solutions - 0 MHz to 2500 MHz Range**






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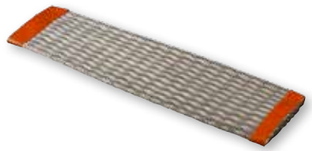
# EMI/RFI metal braided shielding and fabric braided sleeving



- **Complete range of QQ-B-575B/A-A and ASTM B conductive braided shielding solutions**
- **Tubular, tapered tubular, and overbraided application options**
- **Every size from 1/32" to 3¾"**
- **High performance tubular fabric braided sleeving for every mechanical and wire-protection application requirement**

## World's largest selection of metal and fabric cable shields

### 100-001 TUBULAR METAL BRAID QQ-B-575B/A-A-59569 ASTM B298 TIN COATED COPPER



| How To Order | | | | |
|---|---|---|---|---|
| **Sample Part Number** | **100-001** | **A** | **XXX** | **L** |
| **Tubular Metal Braid** | Tin Coated Copper Braid | | | |
| **Wire Gauge** | **A** = 36 AWG **B** = 34 AWG | | | |
| **Size** | Consult Factory | | | |
| **Lanyard Option** | **L** = Lanyard Omit for none | | | |

### 100-002 TUBULAR METAL BRAID QQ-B-575B/A-A-59569 ASTM B298 SILVER COATED COPPER



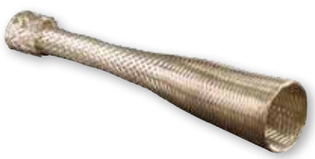
| How To Order | | | | |
|---|---|---|---|---|
| **Sample Part Number** | **100-002** | **A** | **XXX** | **L** |
| **Tubular Metal Braid** | Silver Coated Copper Braid | | | |
| **Wire Gauge** | **A** = 36 AWG **B** = 34 AWG | | | |
| **Size** | Consult Factory | | | |
| **Lanyard Option** | **L** = Lanyard Omit for none | | | |

### 100-003 TUBULAR METAL BRAID ASTM B355 CLASS 4 OFHC NICKEL PLATED COPPER



| How To Order | | | | |
|---|---|---|---|---|
| **Sample Part Number** | **100-003** | **A** | **XXX** | **L** |
| **Tubular Metal Braid** | Nickel Plated Copper Braid | | | |
| **Wire Gauge** | **A** = 36 AWG **B** = 34 AWG | | | |
| **Size** | Consult Factory | | | |
| **Lanyard Option** | **L** = Lanyard Omit for none | | | |

### 100-041 TAPERED TUBULAR METAL BRAID



| How To Order | | | | | |
|---|---|---|---|---|---|
| **Sample Part Number** | **100-041** | **-06** | **T** | **10** | **A** |
| **Tubular Metal Braid** | Tapered Braid | | | | |
| **Dash No.** | Diameters .15 – 1.38, Consult Factory | | | | |
| **Material** | **A** = 100% AmberStrand® **N** = Nickel/Copper<br>**B** = 75%/25% AmberStrand® **S** = Silver/Copper<br>**L** = 100% ArmorLite™ **T** = Tin/Copper | | | | |
| **Length** | In 1 inch increments | | | | |
| **Wire Gauge** | A = 36 AWG, Omit for std. 34 AWG (applies to N, S, T materials only. | | | | |

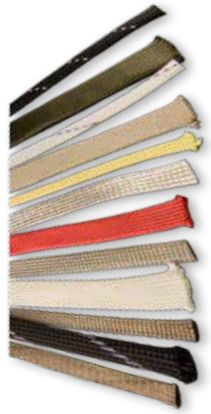
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INDUSTRY-STANDARD

EMI/RFI metal braided shielding and fabric braided sleeving

### FABRIC BRAIDED SLEEVING FOR NON-ENVIRONMENTAL WIRE AND CABLE PROTECTION



| Non-Environmental Fabric Braided Sleeving Types | |
|---|---|
| **Series No.** | **Type** |
| **100-022** | PTFE glass tubular braided sleeving |
| **102-001 and -002** | Polyethelene expandable fabric tubular braided sleeving; black, green, red, white, and yellow |
| **102-020, -021, -022 and -023** | Halar expandable fabric tubular braided sleeving, white or black, with and without tracers |
| **102-073** | Dacron tubular braid, black |
| **103-013** | Nomex tubular braid; black, white, red, green, gray, and desert tan |
| **102-051** | PEEK tubular braid, black |
| **102-061** | Fluoropolymer tubular braid, clear and natural |
| **102-071** | Kevlar tubular braid, natural |
| **102-072** | Nylon tubular braid, black |

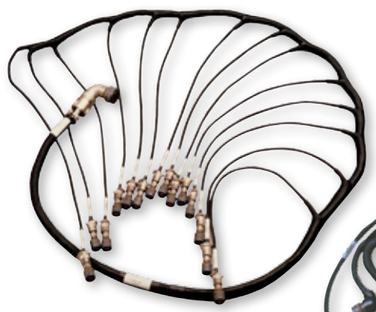
### SERIES 100-022 HIGH-TEMPERATURE PTFE-GLASS TUBULAR BRAIDED SLEEVING



**Highly flexible PTFE-glass tubular braided sleeving with outstanding high- and low-temperature resistance (-240°C to +525°C)**

| How To Order | | | |
|---|---|---|---|
| **Sample Part Number** | **100-022** | **XXX** | **GN** |
| **Tubular Metal Braid** | PTFE-Glass Braided Sleeving | | |
| **Size** | Consult Factory | | |
| **Color Option** | **GN** = Green/Olive Drab (Omit for Natural) | | |

### FACTORY OVERBRAIDING SERVICES FOR MULTI-BRANCH CABLE ASSEMBLIES



**Glenair operates its own high-capacity multi-spindle overbraiding operation**





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*MIL-DTL-24749 TYPE IV*

# Ground Straps

## for Navy shipboard applications

Ground straps utilized in shipboard applications are subject to grueling environmental conditions: wet, cold, salt water spray, and caustic hydraulic fluids. Conventional copper braid/copper lug ground straps corrode, and become a source of electrical resistance problems in these harsh environments.

Glenair MIL-DTL-24749 Rev B Type IV ground straps solve these corrosion and electrical resistance problems with a unique 50% Stainless Steel 316L / 50% Nickel 200 36AWG blend braid, and passivated Stainless Steel lugs. These US Navy-approved ground straps are qualified to the rigorous standards of M24749, and are tested beyond the mil-spec to survive 1000 hours salt spray. Allowed usages for Type IV straps can be found in MIL-STD-1310H.



**Glenair MIL-DTL-24749 Rev. B Type IV Stainless Steel/Nickel Ground Straps: US Navy qualified and tested to survive extreme environments**

- **Meets the rigorous specifications of MIL-DTL-24749 Rev. B**
- **Tested to survive 1000 hours salt spray**
- **Unique Stainless Steel/Nickel hybrid braid**
- **Available in six standard configurations, with non-standard length/lug size configurations available**

Glenair

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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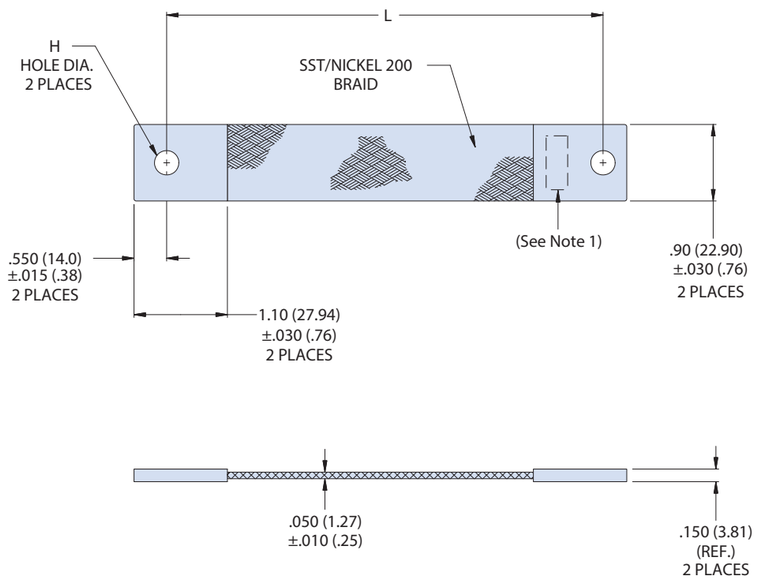




# Stainless Steel/Nickel Ground Straps



| How To Order | | | | | |
|---|---|---|---|---|---|
| **Sample Part Number** | **MS24749** | **–IV** | **–B** | **–L** | **–H** |
| **Product Series** | MIL-DTL-24749 Rev. B Type IV bond strap | | | | |
| **Bond Strap Type** | **IV** = Flat CRES 316 / Nickel 200 braid with mounting lugs | | | | |
| **Standard Size Code** | **A** = 6.0" length; .90" width, .406 H dia. **D** = 6.0" length; .90" width, .282 H dia.<br>**B** = 12.0" length, .90" width, .406 H dia. **E** = 12.0" length, .90" width, .282 H dia.<br>**C** = 18.0" length, .90" width, .406 H dia. **F** = 18.0" length, .90" width, .282 H dia.<br>**N** = for non-standard sizes | | | | |
| **Non-Standard Length** | Non-Standard length in inches (omit for standard sizes) | | | | |
| **Hole Diameter** | Non-Standard diameter in inches (omit for standard sizes) | | | | |




**NOTES**

1. Lugs are ink stamped or electro-etched per M24749 Rev B. Minimum character height shall be .06 (1.52)
2. Metric dimensions (mm) indicated in parentheses
3. Codes A – F are standard lengths. To order non-standard straps, omit Standard Size Code and enter length (in inches) in part number.

**MATERIAL/FINISH**

Lugs - 316L Stainless Steel/Passivate
Braid - 316L Stainless Steel 36 AWG, 50%; 200 Nickel 36 AWG, 50%



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*LIGHTWEIGHT*

# ArmorLite™ Microfilament Ground Straps—for Aircraft ESD, Lightning Strike and Other Applications

Lightning interaction mechanisms and protection techniques are well known disciplines in aircraft design. But innovations are still required, particularly in support of efforts to reduce the size, weight and assembly complexity of aircraft electrical systems. Lightweight Glenair technologies for spot grounding are broadly utilized for:

- Grounding airframe sections
- Dissipating static build-up in composite structures
- Dissipating lightning strike energy
- Grounding individual moving parts in complex equipment such as landing gear

ArmorLite™ microfilament braid offers 70+% weight savings over standard NiCu braid—plus advantages in virtually every category due to Glenair's ability to fine-tune the makeup of the material cross-section (core, cladding and protective plating) to the exact requirements of each application. Glenair ArmorLite™ lightweight microfilament braids, and hybrid ArmorLite™ and nickel braids are now approved for use by every major airframe and equipment manufacturer.

## CUSTOM CONFIGURATIONS AVAILABLE



**Hybrid Materials**



**Bent Lugs**



**Heavy Duty**

ARMORLITE™

RoHS COMPLIANT

## GLENAIR BONDING ENGINEERS ARE EXPERTS IN GROUND STRAP OPTIMIZATION FOR:

- **Weight and conductivity**
- **Electrical resistance and high operating temperature (200°C)**
- **Rapid heat distribution**
- **Bend cycle durability up to 250,000 cycles per EN4199-001**
- **Material aging and corrosion resistance**

**Comprehensive test reports available**

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*LIGHT-DUTY, LOW PROFILE*

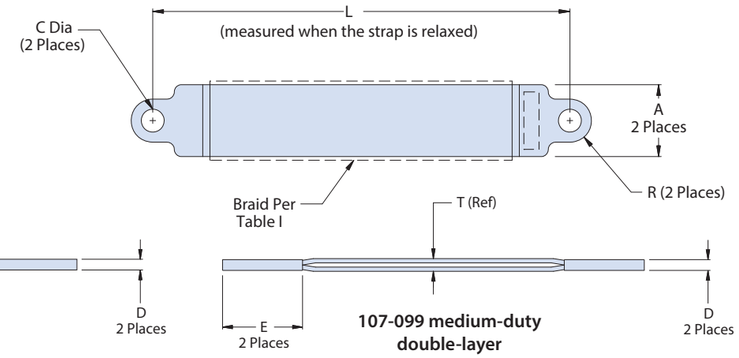
# ArmorLite™ Single-Layer ESD Grounding Strap

## 107-098

## LOW-PROFILE ESD GROUNDING STRAPS, LIGHT AND MEDIUM DUTY



| How To Order | | | | |
|---|---|---|---|---|
| **Sample Part Number** | **107-098** | **-A** | **-12** | **-6** |
| **Grounding Strap** | **-098** = Single layer light duty ArmorLite<br>**-099** = Dual layer medium duty ArmorLite | | | |
| **Material** | **A** = ArmorLite microfilament stainless steel braid | | | |
| **Width Code** | (See Table II) | | | |
| **Length** | Dimension (L) in one inch increment | | | |




| Table II: Mechanical/Electrical Parameters for ArmorLite Material | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Width Code | A ± .03 | C | R | D | E | T | Nom. Resistance mOhm/m* (AWG Equiv.) | Lug Junction Resistance mOhm | Weight gr/m* | Inductance nH/m (Ref. Only) | Test Current Amps** | Tensile Strength Lbf |
| **12** | .290 (7.37) | .150 (3.81) | .145 (3.68) | .042 (1.06) | .480 (12.19) | .016 (.41) | 48 (22) | 0.129 | 9.0 | 1277 | 37 | 130 |
| **20** | .480 (12.19) | .200 (5.08) | .240 (6.10) | .042 (1.06) | .690 (17.53) | .016 (.41) | 26 (19) | 0.111 | 13.4 | 1170 | 52 | 216 |
| **24** | .590 (14.99) | .260 (6.60) | .295 (7.49) | .042 (1.06) | .790 (20.06) | .016 (.41) | 23 (18) | 0.097 | 17.9 | 1116 | 62 | 219 |
| **32** | .820 (2.83) | .390 (9.91) | .375 (9.53) | .052 (1.32) | .950 (24.13) | .021 (.53) | 13 (16) | 0.089 | 35.8 | 1047 | 127 | 483 |
| **40** | .870 (22.10) | .390 (9.91) | .375 (9.53) | .052 (1.32) | .950 (24.13) | .021 (.53) | 11 (15) | 0.061 | 40.3 | 1034 | 141 | 524 |
| **48** | 1.080 (27.43) | .390 (9.91) | .375 (9.53) | .052 (1.32) | .950 (24.13) | .021 (.53) | 8 (14) | 0.054 | 53.8 | 983 | 162 | 590 |
| **64** | 1.330 (33.78) | .390 (9.91) | .375 (9.53) | .052 (1.32) | .950 (24.13) | .021 (.53) | 6 (12) | 0.047 | 71.7 | 936 | 208 | 723 |
| **for 107-098 double-layer straps** | | | | | | | | | | | | |
| **48** | 1.080 (27.43) | .390 (9.91) | .375 (9.53) | .080 (2.03) | 1.15 (29.21) | .042 (1.06) | 4 (11) | 0.054 | 107.6 | 976 | 500 | 590 |
| **64** | 1.330 (33.78) | .390 (9.91) | .375 (9.53) | .080 (2.03) | 1.15 (29.21) | .042 (1.06) | 3 (10) | 0.047 | 143.4 | 930 | 650 | 723 |

* Braid only, figures exclude termination lugs. **Test current is defined as the current required to reach 200° C at ambient temperature

## GROUND CONTROL EARTH BOND SYSTEM



| How To Order | |
|---|---|
| **600-120** | Hydraulic Setting Tool for 1/4" Earth Bonds |
| **600-123** | Hydraulic Setting Tool for 3/8" Earth Bonds |
| **600-124** | Hydraulic Setting Tool for M6 Earth Bonds |
| **600-125** | Hydraulic Setting Tool for M10 Earth Bonds |
| The tools feature one hand operation and ram retract mechanism actuated by release trigger. Consult factory for control gauges and earth bond part numbers for each material type and size. | |



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# Metal and Polymer Core Conduit Systems

## The flexible, lightweight alternative to standard jacketed cables










**Conduit systems are ideally suited when wire protection requirements do not allow the specification of standard jacketed and shielded cabling. Jet aircraft landing gear applications, for example, require greater flexibility and mechanical protection against impact damage than is possible to provide in even the most aggressively armored cables. Glenair metal-core and polymer-core conduit systems provide superior wire protection, electromagnetic compatibility, flexibility, and ease-of-installation and maintenance compared to standard jacketed cables. Choose from turnkey factory-terminated systems or convenient user-installable fittings and materials.**

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**Metal and Polymer Core Conduit Product Families**



Series 72 Annular Polymer Core Conduit Systems



Series 74 Helical Polymer Core Conduit Systems



Series 75 Metal-Core Conduit Systems



MIL-PRF-24758/Special-Purpose Conduit Systems

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
U.S. CAGE code 06324



Standard Black and Natural/Clear Annular Tubing

Blue, Yellow, Red, Desert Tan, and Orange Annular Polymer-Core Tubing

- **Lightweight, flexible polymer-core materials and easy to install fittings, transitions and adapters**
- **Choice of three tubing material choices: Kynar, PVDF and G-FLEX Siltem**
- **A wide range of colors including desert tan**
- **Choice of turnkey, factory-terminated assemblies or user-installable configurations**
- **All popular part numbers in stock and ready for same-day shipment**

## High-performance annular convoluted tubing provides an economical, lightweight and durable enclosure for interconnect wiring



**Part Number 120-144**

### *For non-environmental and non-EMI/RFI applications*

Strong, abrasion resistant annular conduit tubing, supplied in thermally stabilized Kynar®, PVDF, or medium duty Siltem. Available in 7 colors, standard or slit.



**Part Number 121-190**

### *For non-environmental EMI/RFI applications*

Annular conduit tubing with braided shield for EMI/RFI protection and additional structural integrity, particularly pull (tensile) strength.



**Part Number 121-191**

### *For environmental EMI/RFI applications*

Annular conduit tubing with braided shielding for EMI/RFI protection and a ruggedized jacket for environmental protection against dust, dirt, and moisture incursion.



**Part Number 121-192**

### *For non-environmental EMI/RFI applications with high dB shielding requirements*

Annular conduit tubing with double braided shield for high frequency EMI/RFI protection and mechanical strength.



**Part Number 121-193**

### *For environmental EMI/RFI applications with high dB shielding requirements*

Annular conduit tubing with double braided shield and jacket for optimum EMI/RFI protection, strength and environmental sealing.


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SERIES 72
Annular Polymer-Core Conduit Systems

| Tubing Material Choices | | |
|---|---|---|
| Y | Kynar® | Flexible, thermally stabilized, resistant to harsh chemicals and radiation. UV resistant, self-extinguishing, nontoxic and resistant to low-temperatures. 166° C temp. rating. |
| V | PVDF | Flexible and chemical/radiation resistant. Available in 4 colors plus standard black and natural. 150° C temperature rating. |
| S | G-FLEX Siltem | Lightweight, halogen-free, low toxicity, low smoke. Exceptional flexibility and crush resistance. 175°C temperature rating. Ideal for harsh environment applications. |

| Material Properties - Kynar® and PVDF | | | | |
|---|---|---|---|---|
| **Material Property** | **Service Temperature** | **Tensile Strength** | **Elongation** | **Specific Gravity** |
| **Kynar® and PVDF** | -65°F/330°F (-54°C/166°C)* | 5000 PSI (34,474 KP) | 250% | 1.8 Max |
| **Material Property** | **Heat Aging** | **Dielectric Strength** | **Volume Resistivity** | **Water Absorption** |
| **Kynar® and PVDF** | 168 Hrs. @ 347°F (175°C) | 10,000V | $10^{16}$ | 0.02% |
| **Material Property** | **Solvent Resistance** | **Flammability** | **Fungus Resistance** | |
| **Kynar® and PVDF** | No swelling, stickiness or weight change | Non-burning | Does not support fungus growth | |

*Note: Kynar® and PVDF material properties are identical, with the exception that Kynar® has been irradiated for thermal stability, and thus has a higher temperature rating of 166°C compared to 150°C for non-thermally-stabilized PVDF.

G-FLEX Siltem is Glenair's proprietary annular polymer-core convoluted tubing formulation, developed for harsh environment applications that require a lightweight, halogen-free material with exceptional flexibility and crush resistance

| Material Properties - G-FLEX Siltem | | | | |
|---|---|---|---|---|
| **Material Property** | **Flexural Modulus** | **Flexural Strength** | **Tensile Strength** | **Elongation** |
| | 168,000 PSI | 5590 PSI | 5700 PSI | 60% |
| | **Melt Flow Rate** | **Dielectric Strength** | **Volume Resistivity** | **Water Absorption** |
| | 38.0 G/10 min | 422.9 V/mil | >1.E+16 Ohm-cm | 0.58% |

## SERIES 72 CONVOLUTED TUBING PRODUCT SELECTION GUIDE



**Convoluted Tubing**



**Factory Terminated Assemblies**



**Sentry system**

**Easy-to-Install Guardian system**


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Seven standard tubing configurations,
with and without braided shielding and jacketing

- **Lightweight, flexible helical polymer-core materials and easy to install fittings, transitions and adapters**
- **ETFE, FEP, PFA, PTFE, and PEEK plus AS81914 /1 – 11 qualified materials and configurations**
- **Choice of turnkey, factory-terminated assemblies or user-installable configurations**
- **All popular part numbers in stock and ready for same-day shipment**

## AS81914 qualified Series 74 high-performance helical convoluted tubing, backshells, fittings and assemblies




### *Outstanding mechanical wire protection and lubricity for non-environmental and non-EMI/RFI applications*

Helical plastic convoluted tubing , available in a choice of 5 materials. Choose standard black or clear color.




### *Adds EMI/RFI braided shielding for use in non-environmental applications*

Helical plastic convoluted tubing, available in a choice of 5 materials, with a single braided shield for EMI/RFI protection.




### *Adds a second layer of high dB EMI/RFI shielding for use in non-environmental applications*

Helical plastic convoluted tubing, available in a choice of 5 materials, with double braided shield for high frequency shielding applications.




### *A jacketed configuration with one EMI/RFI shield for use in environmental applications*

Helical plastic convoluted tubing, available in a choice of 5 materials, with braided shielding for EMI/RFI protection and a ruggedized jacket for environmental protection.




### *Double-braided and jacketed configuration for environmental and high dB EMI/RFI shielding protection*

Helical plastic convoluted tubing, available in a choice of 5 materials with double shielding and jacket for optimum EMI/RFI protection and environmental sealing.




### *For environmental applications without EMI shielding requirements*

Helical convoluted tubing in choice of 5 materials with a ruggedized jacket for environmental protection.




### *Internal braid configuration for harsh chemical environment applications, with EMI/RFI shielding*

Chemical- and UV-resistant plastic conduit tubing with internal braid for weight savings and harsh-environment EMI/RFI protection.

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SERIES 74 / AS81914
Helical Polymer-Core Conduit Systems

| Series 74 Convoluted Tubing Material Choices | | |
|---|---|---|
| E | ETFE (fluoropolymer) (Series 74 standard) | Highest tensile strength and lubricity. Combines mechanical toughness with outstanding chemical, dielectric and thermal properties, improved radiation resistance. This is our standard material for a reason: ETFE delivers the best performance and best value in high-performance polymer resins. |
| F | FEP | Economical with relatively high thermal stability, excellent dielectric properties. Unaffected by virtually all solvents and chemicals, good adhesion resistance. |
| P | PFA (Fluoropolymer) | Outstanding lubricity and resistance to corrosives, -95°F to 500°F temperature rating. Melt-extruded for better cold flow and long-term sealing than PTFE; more economical. |
| T | PTFE (Fluoropolymer) | Outstanding resistance to corrosives, -95°F to 500°F temperature rating. Somewhat better folding endurance than PFA. However, this paste-extruded Fluoropolymer® material is more difficult to process and so costs more than PFA with virtually equal performance. |
| K | PEEK | Low-smoke, zero-halogen with high strength and superior crush resistance. Lightest weight of all the tubing polymers, but also the highest material cost. |

| Series 74 Convoluted Tubing Material Properties | | | | | |
|---|---|---|---|---|---|
| **Material Property** | **Perfluoroalkoxy (PFA)** | **Fluorinated Ethylene Propylene (FEP)** | **Ethylene Tetrafluoroethylene (ETFE)** | **Polytetrafluoroethylene (PTFE)** | **Polyether Ketone (PEEK)** |
| **Service Temperature** | -95°F/500°F (-71°C/260°C) | -95°F/400°F (-71°C/204°C) | -65°F/310°F (-54°C/154°C) | -95°/500°F (-71°C/260°C) | -76°F/392°F (-60°C/200°C) |
| **Tensile Strength** | 3,000 PSI (20,684 KP) | 2,500 PSI (17,237 KP) | 5,000 PSI (34,474 KP) | 2,500 PSI (17,237 KP) | 7,000 PSI (48,300 KP) |
| **Elongation** | 250% | 200% | 100% | 175% | 100% |
| **Specific Gravity** | 2.15 | 2.15 | 1.70 | 2.15 | 1.26 |
| **Heat Aging** | 2000 Hrs.@ 525°F (274°C) | 2000 Hrs.@ 430°F (221°C) | 2000 Hrs.@ 350°F (177°C) | 2000 Hrs. @ 525°F (274°C) | 2,000 Hrs. @ 464°F (240°C) |
| **Dielectric Strength** | 12,000V | 12,000V | 12,000V | 12,000V | 12,000V |
| **Volume Resistivity** | 1018 | 1018 | 1016 | 1018 | 1016 |
| **Water Absorption** | 0.03% | 0.01% | 0.02% | 0.01% | 0.03% |
| **Solvent Resistance** | No swelling, stickiness or weight change | | | | |
| **Flammability** | Non-burning | | | | |
| **Fungus Resistance** | Does not support fungus growth | | | | |

## SERIES 74 CONVOLUTED TUBING PRODUCT SELECTION GUIDE



**Helical Convoluted Tubing**



**Factory Terminated Assemblies**

**Swivel-joint circular connector backshell**



**Easy Assembly Hat Trick System**



**Super Durable Internal Braid System**



**Ultra Lightweight Composite Hummer Nut System**

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Copper-clad nickel iron conduit

- **Hermetically sealed, flexible metal-core conduit for interconnect applications**
- **Choice of three materials: Brass, Stainless Steel, and Nickel Iron Alloy**
- **Turnkey, factory-terminated assemblies for landing gear and other rugged aerospace applications**
- **All materials deliver superior EMC performance as well as crush resistance and environmental sealing**

## The ultimate in highly flexible, crush-proof EMI/EMP protection: Series 75 helically-wound metal-core conduit




### *Superior EMI protection and crush-proof strength for static applications*

Highly flexible crush-proof metal conduit, available in Nickel-Iron, Brass, or SST.




### *Adds braided shielding for additional tensile strength applications*

Flexible metal-core conduit tubing with numerous braided shielding options, for additional tensile strength and effective grounding of electromagnetic interference.




### *Adds a jacket for environmental protection*

Flexible metal-core conduit tubing with braided shielding plus a ruggedized jacket for environmental protection against contaminants and moisture.




### *Adds a second braided shield for high dB EMI/RFI shielding*

Flexible metal-core conduit tubing with double braided shield for high frequency EMI/RFI shielding requirements.




### *A jacketed, double-braided configuration for combined environmental and EMI/RFI applications with high dB shielding requirements*

Flexible metal-core conduit tubing with double braided shield and jacket for optimum EMI/RFI protection, strength and environmental sealing.




### *Triple-braided conduit for predictable and reliable grounding of surface-borne/high frequency electromagnetic interference*

Flexible metal-core conduit tubing with triple braided shield for optimal tensile strength and enhanced high frequency EMI/RFI protection.




### *Triple-braided and jacketed conduit for maximum EMI shielding in environmental applications*

Flexible metal-core conduit tubing with triple braided shield and jacket for enhanced high-frequency EMI/RFI protection, strength and environmental sealing.



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SERIES 75
Metal-Core Conduit Systems

| Conduit Material Choices, Material Properties, and Military Specifications | | | |
|---|---|---|---|
| Glenair Code | Material | Properties | Applicable Military Specifications |
| B | Brass, Per A-A-52440 Type I, Grade B | Optimal EMI shielding when combined with bronze overbraid. Generally specified with bronze overbraid and jacket. | • IAW A-A-52440 (Covering shielded, electrical, flexible, metal conduit for use as protection of wiring in military vehicles from mechanical injury and, when properly installed and grounded, to prevent radiation that may cause interference with radio and other electronic equipment.)<br>• MIL-C-13909 (Superseded by IAW-A-A-52440 above)<br>• MIL-PRF-24758 (Covering the performance requirements for weatherproof flexible conduit systems for use primarily in exposed areas on U.S. Navy ships, to shield against electromagnetic (EM) radiation from own-ship transmitters and emissions external to the ship, electromagnetic pulse (EMP) events, and to minimize corrosion while being field repairable to reduce maintenance.)<br>• MIL-DTL-28840 (Covering Connectors, Electrical, Circular, Threaded, High Shock, High Density, Shipboard, Metal Conduit, for EMI Shielding) |
| C | Stainless Steel AISI 316 | Specified for high-temperature, corrosion, and crush resistance. Nominal shielding value. Typically braided with stainless steel braid for additional pull strength and durability. Available with or without a jacket. | |
| N | Nickel Iron Alloy Type 4 ANSI/ASTM-A-753 | 80% Nickel, 20% Iron. Optimal low-frequency shielding material. Typically braided with stainless steel braid for additional pull strength and durability. Available with or without a jacket. | |

| EMI/RFI Braided Shielding and Non-Metallic (Fabric) Overbraids | | |
|---|---|---|
| B | Bronze | Standard for for brass core conduit |
| T | Tin/Copper | 150°C temperature rating, 125 lbs. tensile strength, 96 hr. salt spray corrosion resistance |
| C | Stainless Steel | Highest tensile strength (225 lbs.), highest temperature—1093°C+ |
| N | Nickel/Copper | 200°C temperature rated, 150 lbs. tensile strength, 500 hrs. salt spray corrosion resistance |
| S | SnCuFe | Tin plated iron/copper |
| L | ArmorLite™ | Microfilament metal-clad ultra lightweight stainless steel braid |
| D | Dacron | Yarn with excellent abrasion resistance, good chemical resistance, non-conductive |
| M | Nomex | -55°C to 260°C temperature range - will not melt, excellent chemical resistance, non-conductive |
| E | AmberStrand® 100% | Expandable, flexible, high-strength conductive metal-clad composite thermoplastic |
| F | AmberStrand® 75%/25% | 75% Expandable, flexible, high-strength conductive metal-clad composite thermoplastic combined with 25% nickel-plated 36AWG copper wire for additional strength |

## SERIES 75 METAL-CORE HELICALLY-WOUND CONDUIT PRODUCT SELECTION GUIDE



**Metal-Core Helical-Wound Conduit**



**Turnkey Factory Terminated Assemblies**



**Low-Profile RP Plus System**



**Heavy-Duty Environmental Metal System**



**Heavy-Duty Environmental Conduit System**

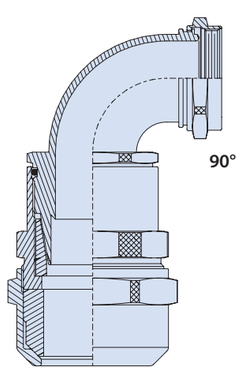
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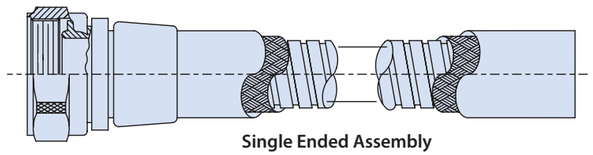
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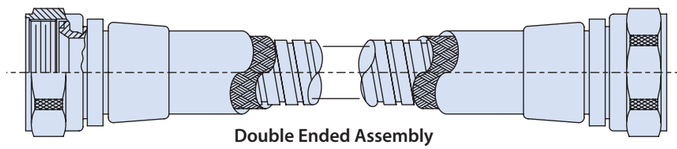


- **Qualified to MIL-PRF-24758A(SH)**
- **User-installable and factory terminated configurations**
- **Innovative stainless steel fittings with advanced environmental sealing, EMI shield termination and rotatable coupling nut**
- **Adapters for all shipboard interfaces—fully compatible with legacy MIL-C-24758 conduit system components**

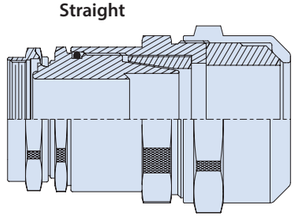
## Do it once, do it right with Glenair MIL-PRF-24758 and other special purpose wire protection conduit systems

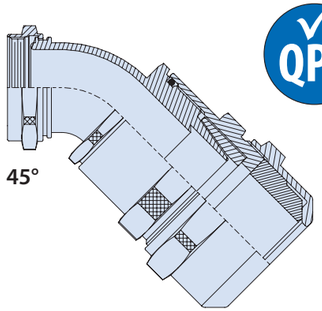




Single Ended Assembly


Double Ended Assembly

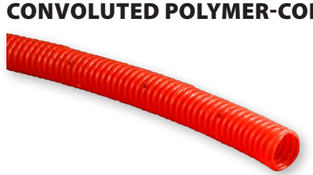
Straight






MIL-PRF-24758 Configuration Options: Choose from high-performance user-installable fittings or lighter weight factory terminated assemblies

### CONVOLUTED POLYMER-CORE TUBING WITH DRAIN HOLES



**Reference Part No.**
*(Consult factory for additional materials and configurations)*

120 - 143

For aerospace applications where altitude changes can cause moisture condensation within conduit, Glenair produces convoluted polymer-core tubing with drain holes. All major aircraft OEM hole patterns are on file, contact the factory for details on specific configurations.

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### WIRE-REINFORCED CONVOLUTED POLYMER-CORE TUBING



**Reference Part No.**
*(Consult factory for additional materials and configurations)*

127 - 009

Glenair has developed a unique configuration where helical polymer-core tubing is reinforced with a stainless steel wire, adding at least 200 lbs. crush strength while maintaining the lightweight, chemical-resistant and environmental protection properties of Polymer-Core tubing.

### SLIT POLYMER-CORE TUBING



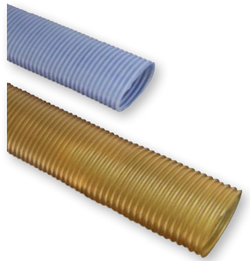
**Reference Part No.**
*(Consult factory for additional materials and configurations)*

120 - 144



Any of Glenair's regular bulk helical or annular polymer-core tubings can be provided slit, for on-site installation or addition of wires in open wire loom applications.
Use the Wire Loom Tool for easy wire insertion: simply gather the wires into the tool, insert into the slit conduit, and run the tool through the tubing.

### OVAL POLYMER-CORE ANNULAR TUBING



**Reference Part No.**
*(Consult factory for additional materials and configurations)*

120 - 140 - 40

For specialized wire routing applications, Glenair can fabricate annular tubing with an oval shaped profile. In-house manufacturing allows us to design and fabricate non-standard shapes.

### "NO-HAL" HALOGEN FREE FLEXIBLE HELICAL PEEK TUBING ASSEMBLY




**Reference Part No.**
*(Consult factory for additional materials and configurations)*

127 - 130

The Glenair "No Hal" tubing assembly is designed for applications where RoHS compliance or other environmental standards mandate a halogen-free configuration. Halogen-free PEEK tubing (with optional stainless steel wire reinforcement for crush strength) is combined with Glenair halogen-free Duralectric™ jacketing material. Add an optional braided shield for EMI/RFI protection.

### DUAL-CORE TUBING



In applications where helical convoluted tubing needs to perform in harsh chemical environments, and weight savings is a concern, dual-core conduit is the answer. Glenair Series 74 Polymer-Core tubing materials are chemical- and UV resistant, and protecting the outside of tubing with a second layer of polymer tubing can save weight over standard jacketing. Consult the factory for Polymer-Core and braided shield material options.

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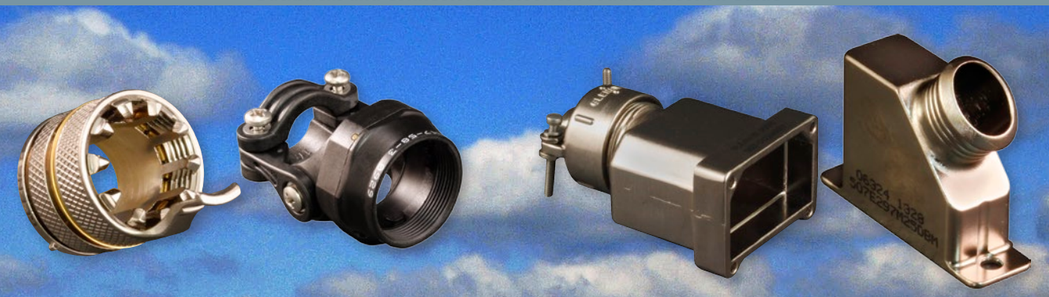
# Backshells and Connector Accessories

## For every environmental, mechanical, and EMI requirement




**Glenair is one of the original military/aerospace manufacturers engaged in the design and production of high-performance backshells, dustcaps, shield termination devices and other connector accessories. In operation since 1956, Glenair has designed and produced more innovative connector accessory products than the rest of our industry combined. Glenair interconnect engineers are responsible for developing literally thousands of innovative connector accessories—from lightweight and corrosion-free composite thermoplastic strain reliefs to innovative fiber optic backshells. Today, the company is able to supply accessory solutions for every requirement, no matter how unique or challenging.**

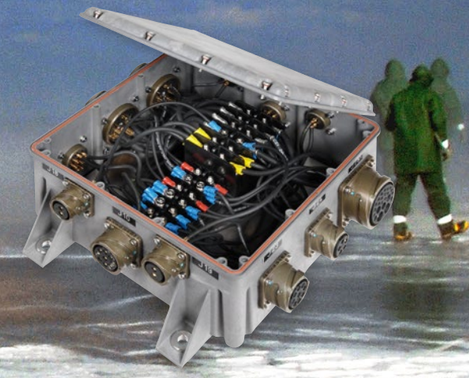
**Backshells and Connector Accessories Product Selection Guide**



**Circular Connector Backshells and Accessories**



**Rectangular Connector Backshells and Accessories**



**Composite Backshells and Accessories**

**EMI/RFI CostSaver Composite Junction Boxes**

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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*QPL AND COMMERCIAL*

# Circular Connector Backshells and Accessories

## Innovation and availability: the Glenair connector accessory product line

- **High-performance circular connector accessories for every environmental, mechanical and electromagnetic shielding requirements**
- **QPL'd AS85049 backshells**
- **Tens of thousands of popular part numbers in inventory ready for same-day shipment**
- **Fast turnaround on non-standard and made-to-order accessories, typically only two to three weeks**
- **RoHS compliant plating options**

### PROTECTIVE COVERS AND STOWAGE RECEPTACLES



Proper environmental and mechanical protection of mission-critical connectors relies on protective covers and stowage receptacles. Only Glenair offers the complete range of these accessories for every connector series in active use, including the hard-to-find protective covers for MIL-PRF-39012 RF connectors shown here. All Glenair protective covers and dummy stowage receptacles are in-stock and available for immediate, same-day shipment.



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*THE WORLD'S FOREMOST SUPPLIER*

# Circular Connector Backshells and Accessories

### BACKSHELL INNOVATION SHOWCASE



TAG-Ring/Qwik-Ty® Feed-Through Fitting




Spring-Loaded "Flop-Lid" Protective Cover



Space Grade Quick Clamp Backshell



Ultra Low-Profile Backshell



Series 437-001 Backshell "Connector Saver"



Self-Locking, Anti-Decoupling Protective Covers



Ultra small-form-factor Mighty Mouse environmental backshell



High-Performance Banding Backshell

### STARSHIELD "ZERO LENGTH" INDIVIDUAL SHIELD TERMINATION BACKSHELL



STARSHIELD®

- **Eliminates "standing antenna" problems common with pigtail shield termination systems**
- **Utilizes heat shrink termination (HST) sleeve technology for fast and reliable shield termination—even with dissimilar wire types/ gauges**
- **Available in a standard configuration featuring a threaded compression nut and a tapered split-ring that fits snugly into a conical backshell or a lightweight split banding version.**

### STANDARD AND PRESSURE BOUNDARY FEED-THRUS



High-performance, weight saving composite feed-thrus



EMI/RFI split-shell metal feed-thru

- **High-grade engineering thermoplastic or machined metal**
- **Six pressure-boundary feed-thru layouts with accommodation for 1 – 6 cables**
- **Split-shell jam nut versions with EMI/RFI shield termination porch**
- **O-ring sealed panel and box mounting interface**
- **Conductive and non-conductive finish options**

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*METAL AND COMPOSITE*

# Rectangular backshells and accessories



## Proven performance backshells and accessories for rectangular connectors

Glenair offers more tested and tooled rectangular interconnect products–including the world's broadest range of rectangular backshells–than any other supplier in the industry. Simply put, from the smallest Micro-D subminiature to the largest ARINC 600, Glenair has an unparalleled range of solutions. Need something light and corrosion free? Glenair is the industry leader in tooled composite thermoplastic connector accessories.

**QWIKSNAP™**



**Glenair has developed an extensive range of lightweight QwikSnap™ backshells that completely eliminate assembly hardware in split-shell backshells. QwikSnap™ utilizes innovative composite spring latch technology to reduce weight, FOD, and accelerate assembly.**

- **All forms of environmental, mechanical and EMC backshells**
- **Straight, 45° and 90° cable routing**
- **High-temp composite thermoplastic and metal shell versions**
- **To fit all current and legacy rectangular connectors**
- **Innovative split-shell versions for easy access to wire terminations**
- **Equally large range of protective covers and caps**
- **Thousands of part numbers in stock and ready for immediate shipment**

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*METAL AND COMPOSITE*

# Rectangular backshells and accessories

## The world's largest *tooled* selection

### MICRO-D AND NANOMINIATURE BACKSHELLS AND CONNECTOR ACCESSORIES



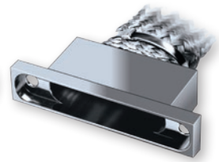
Composite Micro-D banding backshell



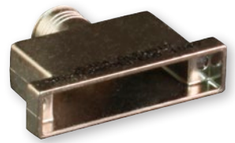
Plastic caps and covers for safe shipment and storage of connectorized devices



Micro-D backshell with elliptical banding platform



Metal Micro-D banding backshell



Split-shell backshell



Environmental protective covers for Micro-D connectors





Conductive rubber covers

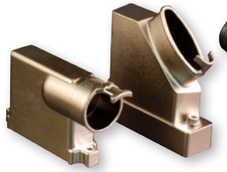
### M24308 D-SUB SOLUTIONS: HIGH PERFORMANCE, RUGGEDIZED D-SUBMINIATURE PRODUCTS



Split-shell D-subminiature composite backshell



Split-shell M24308 composite backshell



Composite D-subminiature backshells



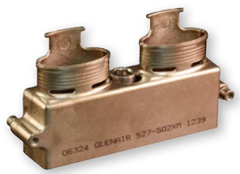
Flex-D Composite M24308 Backshell



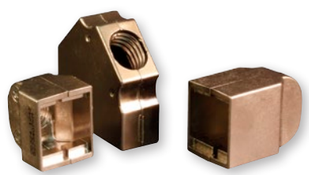
M24308 EMI/RFI backshell

### LARGER FORM FACTOR RECTANGULAR BACKSHELLS

EPX® and EPXB® are registered trademarks of Radiall



Composite EMI/RFI banding backshell for EPXB® connectors



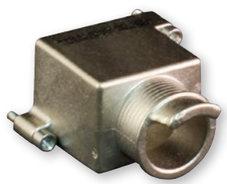
Composite EN4165 fiber optic/electrical backshells



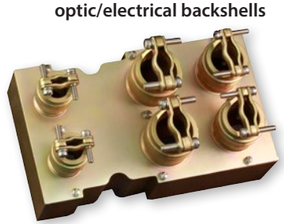
Backshells for EPX® series connectors



ARINC series backshells



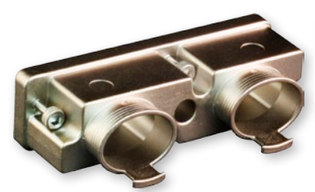
Composite airframe banding backshell



ARINC series backshell with individual wire bundle strain relief



MIL-C-81659



Special Quadrax connector backshell

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*LIGHTWEIGHT*

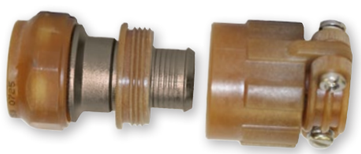
# Composite Backshells and Accessories

## Corrosion resistance, weight reduction, durability and design innovation

- **High temperature engineered thermo-plastics for maximum strength and durability**
- **Total immunity to galvanic corrosion**
- **Up to 70% weight reduction compared to standard metal connectors and accessories**
- **Hundreds of innovative, tooled designs in stock**



Composite Swing-Arm™ shield termination strain-relief clamp



Composite Band-in-a-Can shield termination backshell and strain-relief clamp

### 1000 HOUR GREY™ Ni-PTFE NICKEL FLUOROCARBON POLYMER PLATING



The MIL-DTL-38999 Rev L detail specification lists Nickel Fluorocarbon Polymer as a qualified Cadmium free plating alternative. This highly conductive, RoHS compliant plating formula is now available on composite interconnect products from Glenair and offers the following benefits in harsh-environment applications:

- **2000+ hour salt spray**
- **Cadmium free**
- **Outstanding mating lubricity**
- **Hexavalent Chromium free**
- **500+ mating cycles**
- **Non-Magnetic**


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*COMPOSITE*

# Circular and Rectangular Backshells and Accessories

SWING ARM®
COMPOSITE THREE-IN-ONE BACKSHELL

### COMPOSITE DESIGN INNOVATION REDUCES CABLE HARNESS ASSEMBLY TIME



Composite QwikSnap™ M24308 Backshell



Composite Swing-Arm with Keyed Drop-In Banding Insert



All-In-One Booted "Piggyback" Backshell



Isolated Conductive Ground Path



Conductive composite protective covers



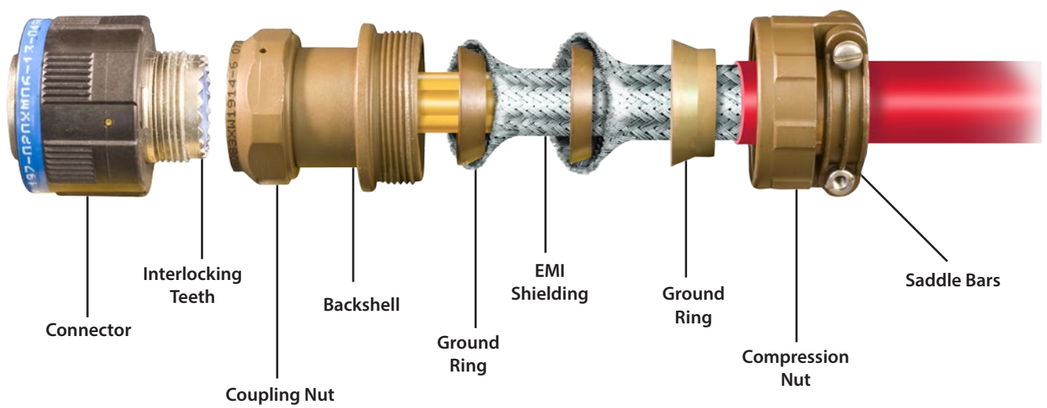
Non-conductive unplated protective covers

| Composite Thermoplastic Vs. Common Metal Materials | | | |
|---|---|---|---|
| **Material** | **Specific Gravity** | **Density (lbs. Inch³)** | **Salt Spray** |
| Composite | **1.27 - 1.51** | **.055** | **2000+ Hrs** |
| Aluminum | **2.55 - 2.80** | **.098** | **48-1000 Hrs** |
| Titanium | **4.51 - 4.62** | **.162** | **500-1000 Hrs** |
| Stainless Steel | **7.70 - 7.73** | **.284** | **500-1000 Hrs** |
| Brass | **8.40 - 8.70** | **.305** | **500-1000 Hrs** |

Glenair composite interconnect components are principally manufactured from 30% glass fiber polyetherimide (PEI). At room temperature PEI exhibits tensile strength yield of over 15,000 psi. The PEI material meets the most stringent outgassing and flammability requirements.



### ULTRA-LIGHTWEIGHT COMPOSITE THERMOPLASTIC SHIELD TERMINATION




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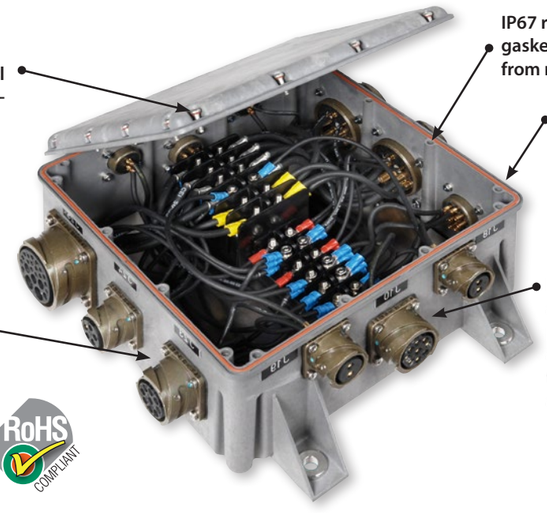



*COST SAVER*

# Shielded Composite Junction Boxes

## Install it and forget it: Glenair corrosion-free EMI/RFI shielded composite junction boxes

- **Over a dozen different tooled sizes and shapes.**
- **Extremely durable, corrosion-free, high temperature engineering composite thermoplastic**
- **Tested and qualified to U.S. Navy, UK MOD and hundreds of commercial aircraft and marine applications**



Series 316 stainless steel hardware provides long-term durability

IP67 rated seals and gaskets protect equipment from moisture and dust

Unlimited corrosion resistance compared to metal junction boxes reduces repair and maintenance costs.

Glass reinforced composite thermoplastic material is strong and durable and yet extremely lightweight.

Low harmonic resonance and inherent attenuating properties reduce loosening and decoupling of feed-through fittings and accessories.

RoHS COMPLIANT

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## COMMERCIAL OFF-THE-SHELF AND CUSTOM COMPOSITE THERMOPLASTIC JUNCTION BOXES



| Glenair Composite Box Product Specifications | | |
|---|---|---|
| **Description/Test Report** | **Requirement** | **Procedure** |
| **Plating Adhesion** *Glenair #9-44-18/TN94-159* | Should not exhibit any blistering, peeling or other separation of the units plating. | Tested IAW MIL-DTL-38999. |
| **Vibration** *NTS #973-7369-2* | Should not exhibit loosening of component parts or evidence of damage. | Tested IAW MIL-STD-167 Type 1 for box units and MIL-STD-1344, Method 2004 Condition II for fittings and accessories. |
| **Shock** *MOD #BR8470 Grade C and F* | There shall be no loosening of parts or evidence of damage. | Tested IAW MOD BR 8470 Grade C and F. |
| **Salt Spray** *Glenair #9-44-18/TN94-159* | Should exhibit no exposure of underplate or base material. | Tested IAW MIL-STD-1344, Method 1001. |
| **Dust** *NTS #973-7369-1* | Should conform to required torque limits and functional requirement within 25%. | Tested IAW MIL-STD-202. |
| **UV Light Resistance** *GE RDM88050255-6042* | No degradation of the mechanical properties defined in the specification after testing. | Tested IAW ASTM D2565. |
| **Impact** *MIL-STD-1344, Method 2015* | No evidence of breaking or cracking of components or other damage that could affect the product performance. | Tested IAW MIL-STD-1344, Method 2015. |
| **Temperature Cycling** *NTS #575-9249* | No cracking, peeling or separation of plating or other functional damage. | Tested IAW MIL-STD-1344, Method 1003 at -65°C to 200°C. |
| **Hydrolytic Stability** *NTS #878-536* | No evidence of increased weight greater than 1% and no evidence of cracking, breaking or loosening of component parts. | Tested IAW ASTM D570-81. |
| **Flammability** *MIL-STD-1344, Method 1012, Smoke Index, NES 711 Issue 2, NES 713 Issue 3 and ISO 4589* | The item flame and after flow extinguishing time shall not exceed the defined limits. | Tested IAW Table II of of MIL-STD-1344, Method 1012, Smoke Index, NES 711 Issue 2, NES 713 Issue 3. Burning behavior by Oxygen Index, ISO 4589. |
| **Water Tightness** *EA #0C13513-039514* | Water tightness and internal pressurization is maintained. | Tested IAW EA #0C13513-039514. |
| **Outgassing** *JPL #081892* | Maximum allowable weight loss is 10%. | Tested IAW ASTME 595. |
| **Electromagnetic Shielding** *TRW/ABQ-55C-1186-0* | Should demonstrate shelding effectiveness and transfer impedance conforming to military industry standards and specific customer requirements. | Tested IAW TRW/ABQ-55C-1186-0. |



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*INDUSTRY STANDARD*

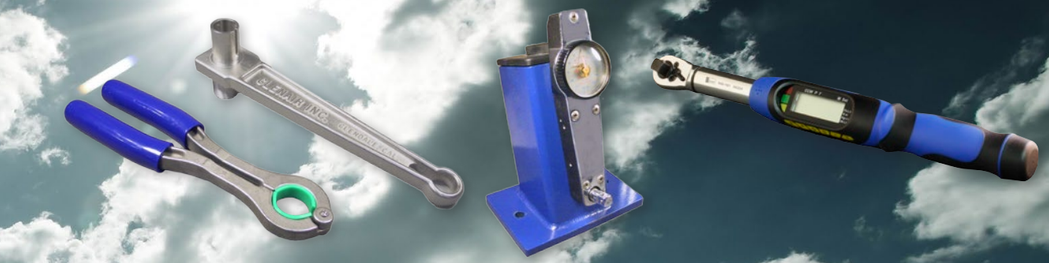
# Interconnect Assembly Tools

## The right tool for every interconnect assembly requirement













**Glenair offers its connector and connector accessory customers every convenience in the provision of contact termination, shield termination, and backshell-to-connector assembly tooling. We are also proud to offer branded solutions from other well-known tool manufacturers such as Daniels (DMC) crimp tools. From pneumatic Earth-Bond tooling for the rail industry, to fiber optic termination and test equipment, Glenair is your most knowledgeable and reliable source for special-purpose interconnect assembly tooling.**

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Glenair®

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- **Fast, cost-effective cable shielding termination**
- **Precision hand-held tool and bands deliver reliable, repeatable performance**
- **Single piece stainless steel bands in various sizes and lengths**
- **Clamp both small and large diameters easily and reliably**
- **Pneumatic banding tool for high-speed mass production**
- **Qualified for both military and commercial aviation**

## The Band-Master™ ATS provides quick, easy, cost-effective and highly reliable termination of braided metallic shielding or fabric braid to connectors and backshells.

Band-Master™ ATS is the advanced termination system for interconnect cable shielding. The unique low profile and smooth inside diameter of the one-piece type 304 austenitic stainless steel clamping band virtually eliminates RFI/EMI/EMP leakage paths. The lock maintains constant tension under extreme environmental conditions. Band-Master™ ATS bands have passed severe shock, vibration and thermal cycle testing with negligible deterioration of shell conductivity.

**Glenair Band-Master™ ATS Bands are also AS85049/128 qualified**

### BAND-MASTER™ ATS ADVANCED TERMINATION SYSTEM



Easy-to-use manual tools with built-in calibration counter



High-volume pneumatic tool for bench use



Save time and tool maintenance costs with the Glenair band tool calibration system



BAND-MASTER™ ATS
EMI/RFI Shield Termination System
The advanced termination system for interconnect cable shielding

**Band-Master™ ATS Manual Tool Selection**



### 601-100 Hand Tool for Standard Bands

***The 601-100 Standard Band-Master™ ATS Tool*** weighs 1.18 lbs., and is designed for standard flat .24" width clamping bands (601-005, 601-040 and 601-049) in a tension range from 100 to 180 lbs. Calibrate at 150 lbs. ± 5 lbs. for most shield terminations. Tool and band should never be lubricated.



### 601-101 Hand Tool for Micro Bands

***The 601-101 Micro Band-Master™ ATS Tool*** weighs 1.18 lbs., and is designed for micro .120" width clamping bands (601-024, 601-060 and 601-064) in a tension range from 50 to 85 lbs. Calibrate at 80 lbs ±5 lbs. for most shield terminations. Tool and band should never be lubricated.



### 601-108 Hand Tool for Nano Bands

***The 601-108 Nano Band-Master™ ATS Tool*** weighs 1.18 lbs., and is designed for nano flat .075" width clamping bands (601-500, 601-504 and 601-508) in a tension range from 20 to 50 lbs. Calibrate at 50 lbs. ± 3 lbs. for most shield terminations. Tool and band should never be lubricated.



### 601-109 Hand Tool for Slim Bands

***The 601-109 Slim Band-Master™ ATS Tool*** weighs 1.2 lbs., and is designed for slim standard flat .24" width clamping bands (601-570, 601-571, 601-572 and 601-573) in a tension range from 50 to 100 lbs. Calibrate at 100 lbs. ± 5 lbs. for most shield terminations. Tool and band should never be lubricated.



3 lengths and 3 widths of EMI braid termination bands plus new slim bands for size and weight savings—50% lighter and lower-profile than standard bands.

**Band-Master™ ATS Band Selection**

| Bands | Length in. | Length mm. | Part Number Flat | Part Number Pre-Coiled | Fits Diameter in. | Fits Diameter mm. |
|---|---|---|---|---|---|---|
| Short Standard Band | 9.0 | 228.6 | 601-005 | 601-006 | 1.0 | 25.4 |
| Medium Standard Band | 14.0 | 355.6 | 601-040 | 601-041 | 1.8 | 47.8 |
| Long Standard Band | 18.0 | 457.2 | 601-049 | 601-050 | 2.5 | 63.5 |
| Short Micro Band | 5.0 | 127.0 | 601-024 | 601-025 | 0.5 | 12.7 |
| Medium Micro Band | 8.0 | 203.2 | 601-060 | 601-061 | .88 | 22.4 |
| Long Micro Band | 14.0 | 355.6 | 601-064 | 601-065 | 1.8 | 47.8 |
| Short Nano Band | 6.0 | 152.4 | 601-500 | 601-501 | .60 | 15.2 |
| Medium Nano Band | 9.0 | 228.6 | 601-504 | 601-505 | .94 | 23.9 |
| Long Nano Band | 14.0 | 355.6 | 601-508 | 601-509 | 1.8 | 47.8 |
| Short Slim Standard Band | 9.0 | 228.6 | 601-570 | 601-571 | .94 | 25.4 |
| Medium Slim Standard Band | 14.25 | 362.0 | 601-572 | 601-573 | 1.8 | 47.8 |



*INDUSTRY STANDARD*

# Assembly Tools

**Glenair offers a complete family of backshell assembly tools for most Mil-Standard circular connectors, as well as connector wrenches, strap wrenches, and universal connector holding tools**



- **Backshell-to-connector holding tools for all cylindrical connectors and accessories in current use**
- **Special composite thermoplastic coupling nut holding tools**
- **Discrete tools and complete sets available**
- **Popular Glenair strap wrenches**
- **Hand-held and bench-mountable digital torque wrenches**
- **Cutting shears and other special-purpose cable assembly tools**
- **Instructional videos, installation procedures and manuals available at glenair.com**

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## TORQUE WRENCHES AND BENCH STANDS



Hand-Held Torque Wrench
600-076 High Torque
600-004 Standard Torque



Digital Torque Wrench
600-161



600-162 Bench Stand for digital torque wrench with vertical and horizontal mounting options

## CONNECTOR HOLDING WRENCHES, PLUG AND RECEPTACLE HOLDING TOOLS AND KITS



Connector holding wrenches, plug and receptacle holders for most military standard circular connectors

**TG47** • MIL-DTL-22992
**TG48** • MIL-DTL-38999 Series II
**TG52** • MIL-DTL-81511 Series II and IV
**TG60** • MIL-DTL-27599 and MIL-DTL-38999 Series I
**TG61** • MIL-DTL-81511 Series I and II
**TG83** • (LN29729) for SJT Connectors
**TG90** • MIL-DTL-38999 Series III



Plug Holder



Receptacle Holder



Universal Holding Tool Kit

## BACKSHELL ASSEMBLY AND REPAIR TOOLS AND KITS





TG69 Soft Jaw Pliers





Glenair TG70 Strap Wrench with Square Drive for Torque Wrench



Coupling Nut Wrenches for Composite and Metal Backshells

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# Cable Assemblies and Integrated Systems

## Customer bespoke cable harnesses and assemblies for mil/aero applications







**Cable Assemblies and Intergrated Systems**





Overmolded and ASAP Cable Assemblies

Wired Conduit Assemblies



Integrated Systems

**Glenair has been the go-to cable house for high-performance interconnect cable assemblies for more than 50 years. We specialize in delivering terminated, tested cable harnesses and assemblies with 100% reliability and quality control. We offer complete, turnkey cable assembly services from design engineering to fabrication and test, and are qualified to all military and commercial aerospace standards.**

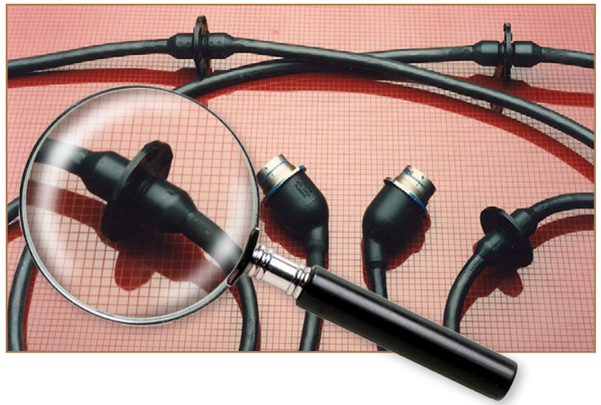
Glenair®

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*MADE-TO-ORDER*

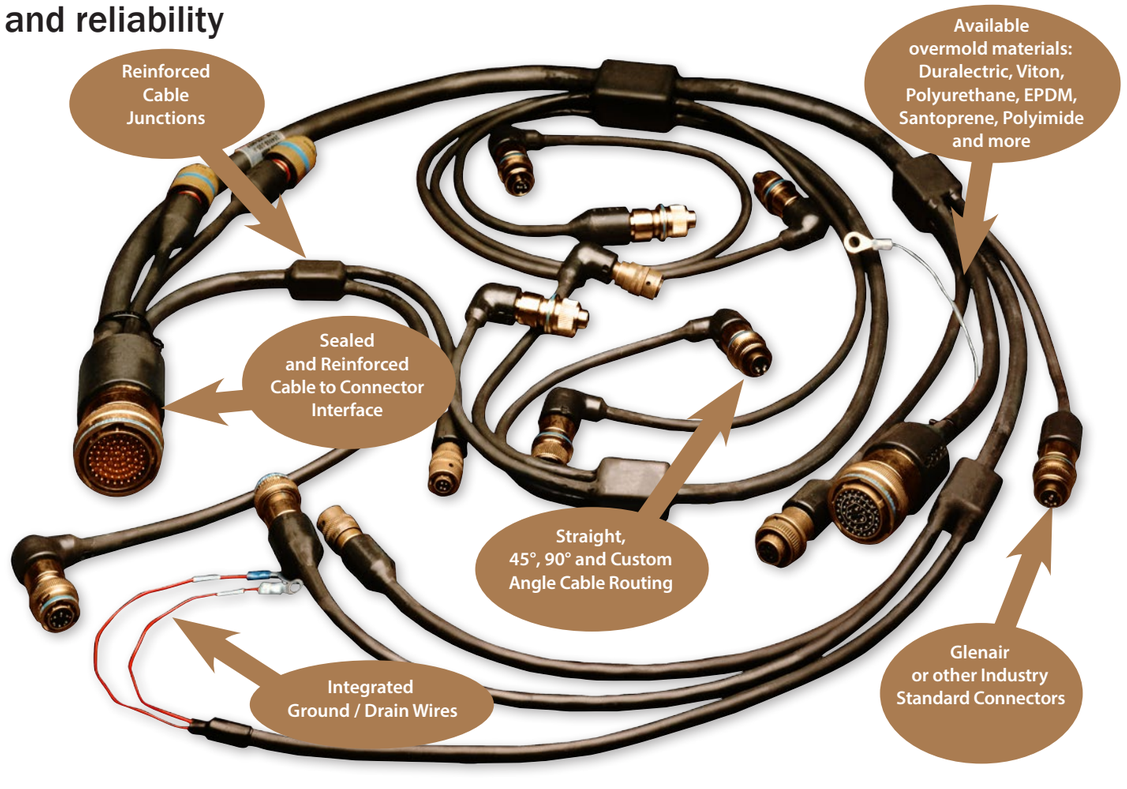
# Complex Cable Assemblies
# Glenair: *The* Overmold Specialists



## Advantages of Overmolding

- **Waterproof sealing**
- **Robust mechanical protection**
- **Protection of terminations**
- **Ideally suited for chemical and fuel cell applications**
- **No induced cold flow stress**
- **Electrical isolation and insulation**
- **Reduced wear damage**
- **Flexible routing/cable entry**

## Terminated, overmolded, tested, and ready for use. Glenair cable harnesses and assemblies are recognized industry-wide for quality and reliability



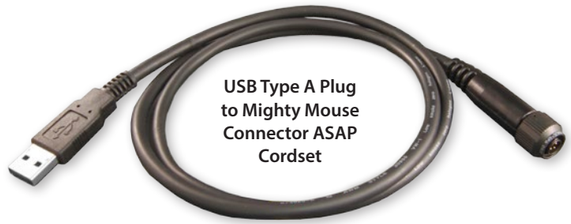


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*ASAP*

# Cable Assemblies

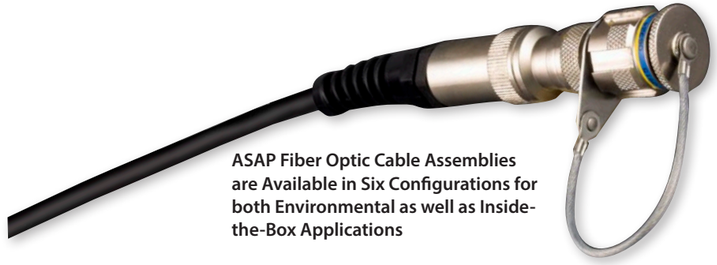
## Point-to-point jumper cables and cordsets for high-speed and high-reliability applications—easy to order and shipped ready for immediate use



USB Type A Plug to Mighty Mouse Connector ASAP Cordset



Micro-Crimp Cable Assembly



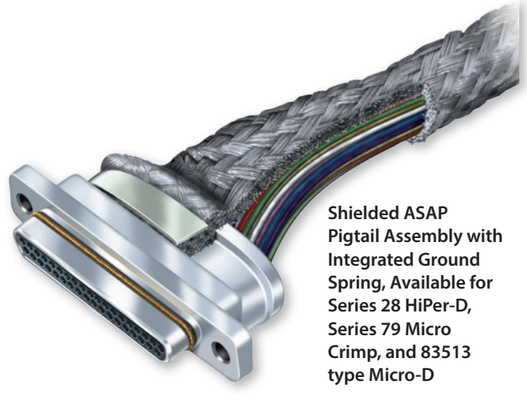
ASAP Fiber Optic Cable Assemblies are Available in Six Configurations for both Environmental as well as Inside-the-Box Applications



ASAP High Speed Cables



Cat 5 RJ-45 to Mighty Mouse Connector ASAP Cordset



Shielded ASAP Pigtail Assembly with Integrated Ground Spring, Available for Series 28 HiPer-D, Series 79 Micro Crimp, and 83513 type Micro-D


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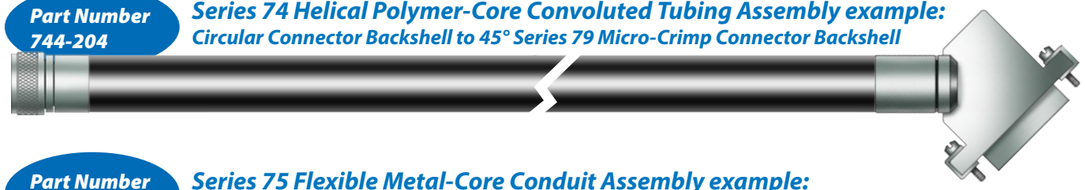


- **Glenair can design, build, terminate—and even pre-wire—turnkey conduit wire routing solutions.**
- **Certified factory assemblers and calibrated tooling create better-performing systems.**
- **Simple point-to-point or complex multi-branch.**

## Reduce package size, weight, and labor with turnkey factory assemblies

**Part Number 744-204**

***Series 74 Helical Polymer-Core Convoluted Tubing Assembly example:***
***Circular Connector Backshell to 45° Series 79 Micro-Crimp Connector Backshell***



**Part Number 754-007**

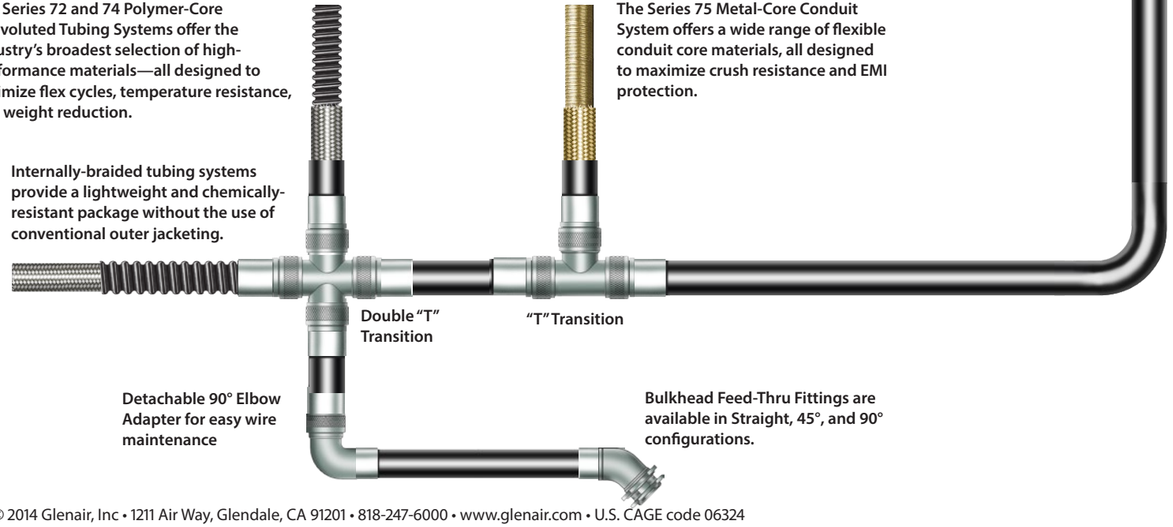
***Series 75 Flexible Metal-Core Conduit Assembly example:***
***Band-In-A-Can Connector Backshell to Band-In-A-Can Connector Backshell***



The Series 72 and 74 Polymer-Core Convoluted Tubing Systems offer the industry's broadest selection of high-performance materials—all designed to optimize flex cycles, temperature resistance, and weight reduction.

The Series 75 Metal-Core Conduit System offers a wide range of flexible conduit core materials, all designed to maximize crush resistance and EMI protection.

Internally-braided tubing systems provide a lightweight and chemically-resistant package without the use of conventional outer jacketing.



Double "T" Transition

"T" Transition

Detachable 90° Elbow Adapter for easy wire maintenance

Bulkhead Feed-Thru Fittings are available in Straight, 45°, and 90° configurations.

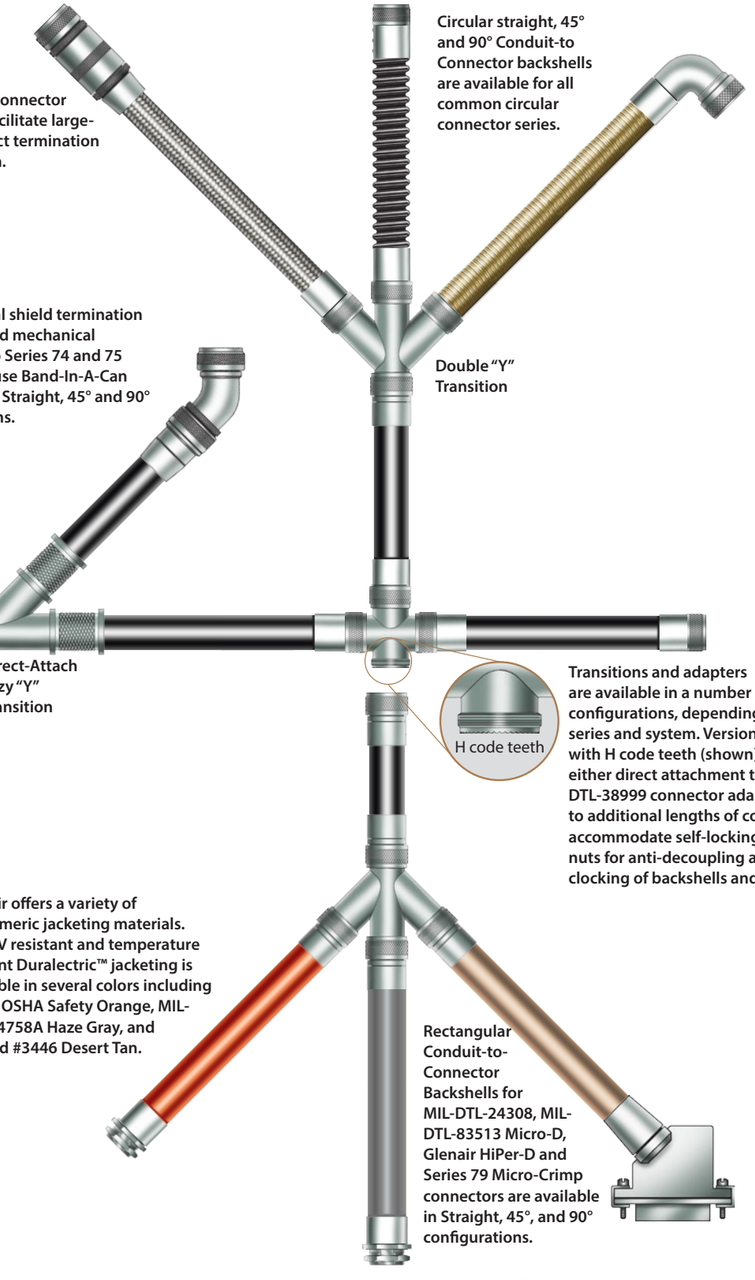

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Retractable connector backshells facilitate large-gauge contact termination and insertion.

Circular straight, 45° and 90° Conduit-to Connector backshells are available for all common circular connector series.

For individual shield termination and enhanced mechanical protection to Series 74 and 75 assemblies, use Band-In-A-Can Backshells in Straight, 45° and 90° configurations.



Double "Y" Transition

Direct-Attach Lazy "Y" Transition

H code teeth

Transitions and adapters are available in a number of configurations, depending on series and system. Versions with H code teeth (shown) for either direct attachment to MIL-DTL-38999 connector adapters, or to additional lengths of conduit, accommodate self-locking coupling nuts for anti-decoupling and easy clocking of backshells and fittings.

Glenair offers a variety of elastomeric jacketing materials. Our UV resistant and temperature tolerant Duralectric™ jacketing is available in several colors including black, OSHA Safety Orange, MIL-PRF-24758A Haze Gray, and Fed Std #3446 Desert Tan.

Rectangular Conduit-to-Connector Backshells for MIL-DTL-24308, MIL-DTL-83513 Micro-D, Glenair HiPer-D and Series 79 Micro-Crimp connectors are available in Straight, 45°, and 90° configurations.


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*MICRO/NANO*

# Flex Circuit Assemblies

Build-to-print interconnect assemblies that combine circuit board technology and cabling into a lightweight, integrated package.

Glenair turnkey design, termination and assembly services available worldwide.

### ADVANTAGES OF FLEX CIRCUITRY

- Unsurpassed size and weight reduction
- Outstanding mechanical performance
- Convenient packaging and integration
- Reliable resistance to Harsh environments

**Turnkey AlphaLink™ Flex Jumpers**



Circular Nano to AlphaLink® flex jumper



SuperFly to AlphaLink® flex jumper



Mighty Mouse to AlphaLink® flex jumper



Rectangular Nano to AlphaLink® flex jumper



Micro-D to AlphaLink® flex jumper



Micro-Crimp to AlphaLink® flex jumper

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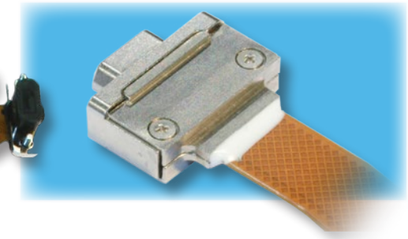
*BUILD-TO-PRINT*

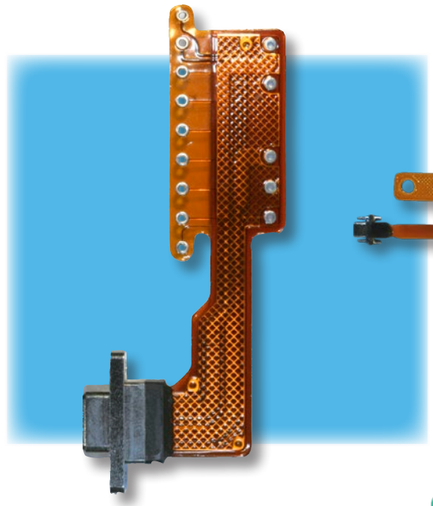
# Flex circuit assemblies for mission-critical applications

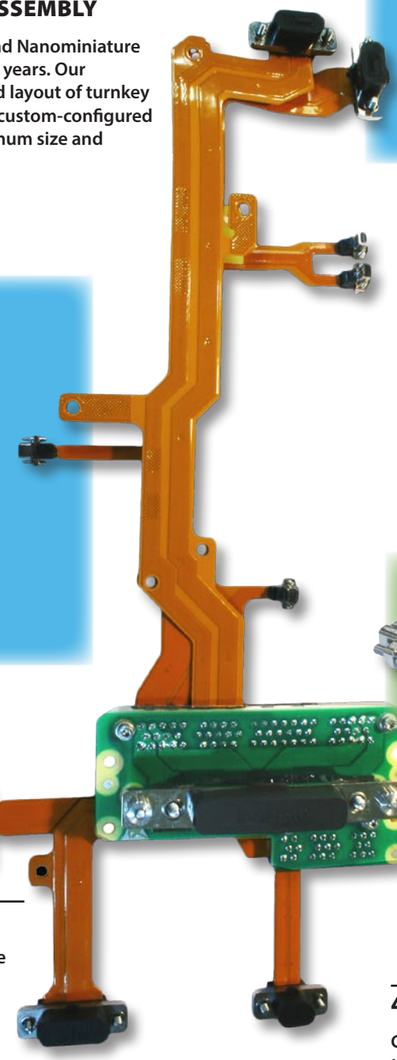
## Four reasons to specify flex in your next application

### 1. UNSURPASSED EXPERIENCE IN MICRO/NANO FLEX CIRCUIT ASSEMBLY

Glenair has been integrating Micro-D and Nanominiature connectors into flex circuitry for over 30 years. Our technical capabilities include design and layout of turnkey assemblies as well as the production of custom-configured micro and nano interconnects for maximum size and weight savings.







### 2. FULL SPECTRUM PRODUCT OFFERING

Glenair offers a complete range of miniaturized printed circuit board connectors with high-reliability TwistPin contacts. We supply both through-hole and surface mount designs in every angle and mounting style for integration into single-sided, double-sided and multilayered flex circuitry.



### 3. APPLICATION DESIGN

Our turnkey Micro-D and Nanominiature flex circuit assemblies are produced to exacting specifications. Customer-supplied concepts and designs are reviewed and revised to ensure the most advantageous utilization of EMI shielding, polarization, strain-relief and connector packaging technologies. At Glenair, the final design solution is optimized to meet the exact mechanical and electronic requirements of the target environment.

### 4. TERMINATION EXPERTISE

Glenair's experienced workforce is trained and qualified to produce consistently reliable circuit terminations using the most advanced techniques and technologies, including automated solder reflow systems.

L

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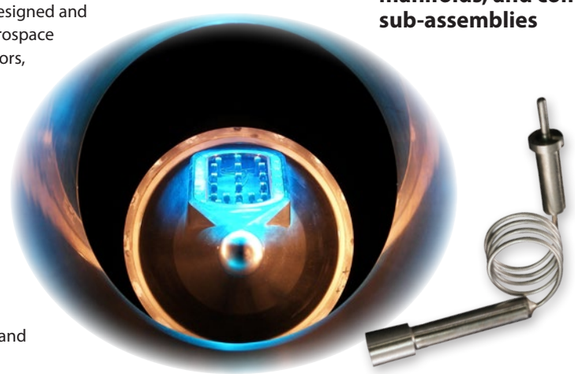


# Pure Air/Nitrogen Cooling Systems

## Complete systems and ancillaries for IR guided weapons and weapons ejection applications

- **Ultraminiature and lightweight pneumatic components and sub-assemblies**
- **Brazed stainless steel pipework**
- **Pure air and nitrogen (DEF STAN 58-96)**
- **High-pressure cylinders, soleniod valves, manifolds, and complete sub-assemblies**

Glenair high pressure Pure-Air/Nitrogen gas solutions are designed and performance tested for use in a wide variety of Defence, Aerospace and Other applications, including cooling of infrared detectors, missile seekers and all high pressure pneumatic actuation and deployment systems. Products include, Sealed for Life Gas Supply Systems, Re-chargeable Gas Supply Systems, High Pressure Solenoid Valves (miniature & low voltage), Small Bore pipe Assemblies, Relief Valves, Integrated Manifold Assemblies, Charge Valves and High Pressure Vessels. All Systems and Ancillaries are designed for direct incorporation into Joule Thompson (JT) cryogenic systems and all applications which require reliable pressurization, blow down, actuation, and IR Cooling. Glenair Pure-Air and High Pressure Systems and components are designed to exact customer requirements and specifications.



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*PURE AIR/NITROGEN*

# Lightweight Modular Cooling and Actuation Systems



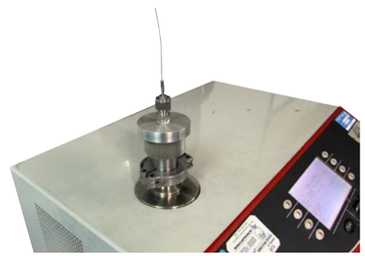
Glenair pure gas/nitrogen systems and sub-assemblies provide passage of nitrogen and other pure, pressurized gases through precision-machined components such as pressure regulating valves, solenoids, and Joule-Thompson cryogenic cooling systems. Assemblies feature precision stainless steel pipeworks and tubing which are fabricated using a flux-free brazing process and are ultrasonically cleaned and packaged in a sealed, dust-free environment. Electromechanical components are also precision-machined with material properties and dimensional attributes per customer specifications.

- **Manifold Assemblies – including Charging Valves, Relief Valves or Burst Discs, Pressure Gauges, Control Valves**
- **Pipework Sub-Assemblies connecting cylinders to manifolds or components**
- **Pressure Regulating Valves**
- **Solenoid Valves – manifold or in-line; single or two-stage**
- **Manifolds to other sub-assemblies**

| Typical Performance | |
|---|---|
| Flow Rate | Typical Flow Rate is 5 liters per minute (lpm) @ 150 PSI. |
| Operating Temperature | -65°C +175°C for all applicable mechanical requirements. |
| Physical Shock | No loosening of parts, cracking or other deleterious results hindering further part operation after 300 G's in each of 3 mutually perpendicular planes. |
| High Impact Shock | All components withstand high impact shock per MIL-S-901. |
| Vibration | All components withstand high-vibration with no evidence of cracking, breaking or loosening of parts. |



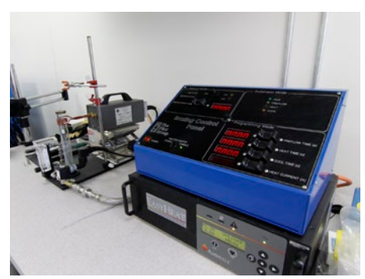
Pressure test rig



Gas tube helium leak test equipment

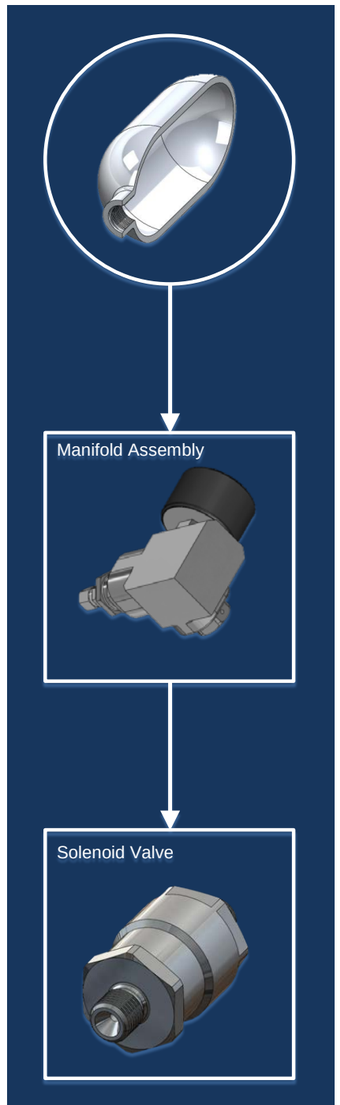


Pure air compatibility test equipment



Brazing control panel

**Solutions built to exact customer requirements and specifications**






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# Hold-Down Release Mechanism Technology

## High-reliability, non-explosive electromechanical release mechanism technology for dependable stowage and release of deployable space systems

- **Electromechanical (non-explosive) technology**
- **Immune to electromagnetic interference**
- **User-serviceable and reusable**
- **Scalable design, up to 40,000 lbs. preload**
- **Ultra-low-shock release**

Glenair HDRM device technology is optimized for reliability with built-in mechanical and electrical redundancy. The planned release of the deployable system is activated by a pre-determined value of electrical current to a fuse-wire system which causes the wire to break under tension and allow the pre-loaded mechanical bolt to actuate. Glenair is now positioned to incorporate HDRM technology into a broad range of customer-defined housing and mounting configurations.



Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**





# Hold-Down Release Mechanism Technology

Glenair®

## Resets in Minutes

Glenair hold-down release mechanism (HDRM) technology is based on a fusable wire-actuated separation nut design. Increasingly popular for its reliability and non-pyrotechnic action, fusable wire-actuated nut technology has the added benefit of being partially reusable and refurbishable post-deployment. Glenair HDRM technology is immune to all forms of EMI or ESD, and is capable of easily sustaining launch loads as well as defined preloads—with release deployment times comparable to conventional explosive actuators, but with low-shock and low power input.

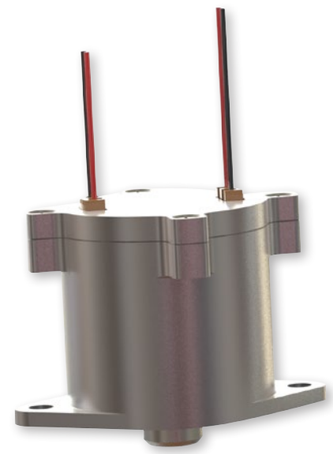
A broad range of hold down release mechanism technologies have been historically used to secure and subsequently deploy satellites and other appendages (solar arrays, antenna reflectors, radiators, instruments, doors, sensors, booms, and so on) in space. Most of these technologies relied on non-reusable (explosive/pyrotechnic) designs that suffered from a broad range of deficiencies, including susceptibility to electromagnetic interference, problematic sychronization of release with mission requirements, high-shock release action, and significantly, the inability to reuse or refurbish the device during test. Historically, actuators and release devices of this type have included:

- Explosive release nuts
- Bolt cutters
- Separation nuts
- Wire and pyro cable cutters

Glenair has taken a different path in the development of a non-explosive HDRM with a consumable initiator which, post-actuation, allows the device to be refurbished and reset on-site, or at the factory. Glenair fusable wire-actuated nut technology solves all of the problems associated with conventional explosive HDRM devices. In addition, the three key components of the Glenair HDRM (preloading assembly, release actuator, and load-carrying structure) may be packaged according to specific customer requirements including the addition of connectors to replace wire leads, cylindrical or rectangular housings, lightweight materials, package size and profile, mounting dimensions and so on. Consult the Glenair HDRM team at our Glendale factory for more information.



**7/16 inch unit with 35,000 pound preload and connectorized interface**



**1/4 inch unit wtih 5,000 pound preload and conventional wire lead interface**

| Physical characteristics for ¼ inch unit | |
|---|---|
| Mass | 228 grams nominal weight with 18 inch lead wire included |
| Bolt | 1/4-28 UNJF-3B* |
| Material list | IAW MSFC-STD-3029 |
| Epoxy | Outgassing requirements per GSC19384 |

| Device features for ¼ inch unit | |
|---|---|
| Redundant initiation | 2 initiation points |
| Field refurbishable | Initiator can be replaced in less than 15 minutes by trained personnel |
| Reliability prediction | 0.9999995 |
| Packaging | External housing typically supplied with two mounting points. Custom housings and mountings available |
| Connectorization | Standard design supplied with wire inputs. Connectorized versions available |
| Scalable bolt size | Bolt size determines preload and can be scaled to accommodate a wide range of requirements |

*The size callout is based off the bolt size that is to be used. Metric thread can also be called out. Complete test report available upon request



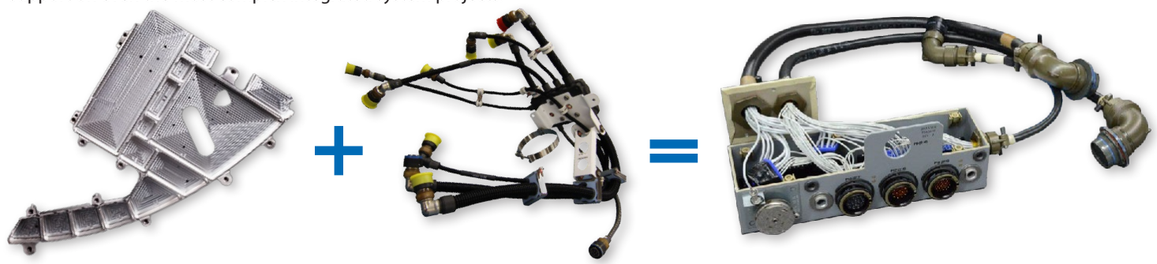
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# Integrated Systems

## Turnkey, precision-machined wired chassis, integrated electronic/photonic systems *plus* Glenair-built interconnect cabling

Glenair, together with our precision machining partner Dynomax, is able to offer our defense, aerospace and other customers fast, turnkey build-to-print integrated system solutions. From landing gear assemblies to in-flight entertainment platforms, Glenair is uniquely positioned to leverage our component manufacturing, interconnect cable assembly and structural member fabrication capabilities to meet the broadest range of integrated system requirements. Our US-based factories in Glendale, California and Chicago, Illinois are FAA, Mil and ISO 9001 certified, and ready to tackle any integrated system requirement for today's high-performance military and aerospace applications. Our Glenair UK facility is also Mil and ISO 9001 certified and in addition offers ESA and BS certified components and technologies. Glenair Italia is equally credentialed and adds IRIS (International Railway Industry Standard) certification and operates an IEC certified test lab. Our worldwide design and manufacturing teams are ready to provide start-to-finish engineering and assembly support on even the most complex integrated system projects.



**Precision-machined, injection molded or stamped-and-formed boxes and structural members**

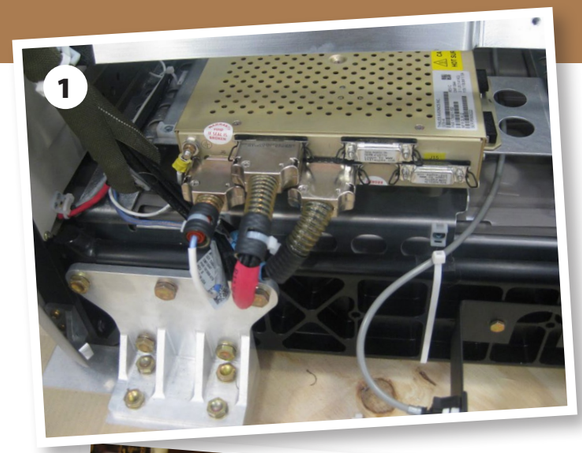
**Multibranch interconnect cable harnesses and assemblies—terminated, tested, and ready for use**

**Turnkey integrated system components: Vertically integrated manufacturing, from backplanes to avionic control panels**

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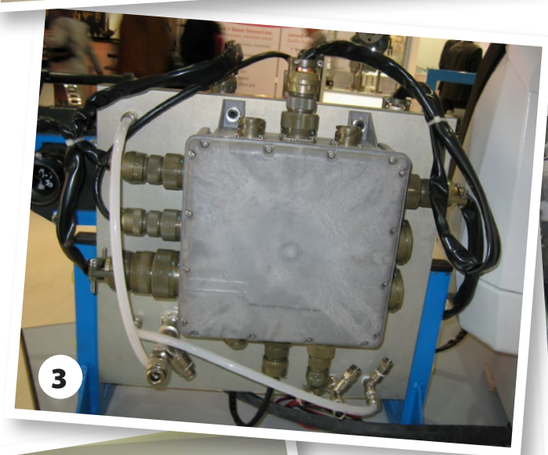


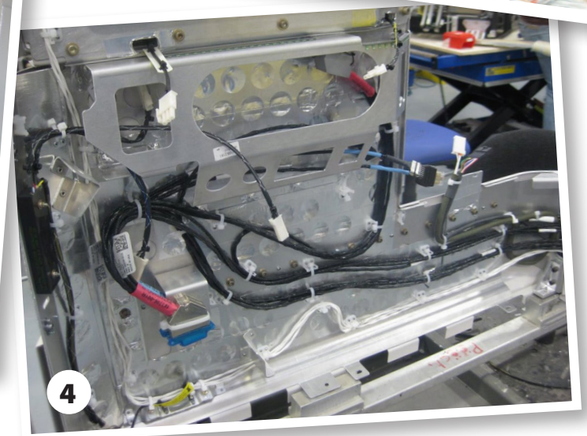
**Turnkey complex cable assemblies • junction box assemblies wired avionic control panels • connectorized backplanes**

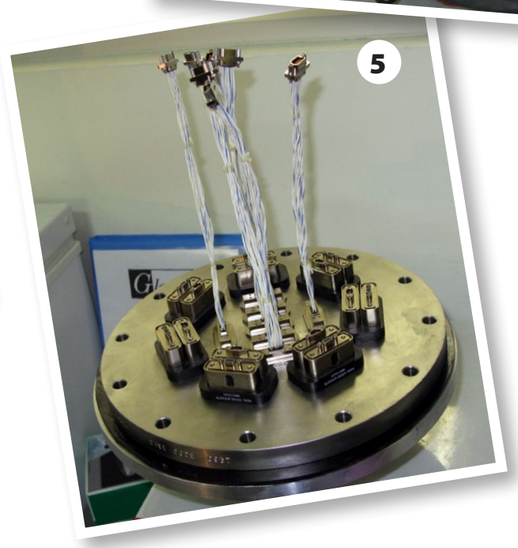









***Integrated systems: all interconnect components, boxes and machined chassis manufactured by Glenair. All cabling and final integration completed by Glenair. Glenair engineering provides extensive design support throughout.***

**Figure 1:** Integrated in-flight entertainment console and cabling

**Figure 2:** Wired unmanned vehicle control module

**Figure 3:** Rail industry corrosion-resistant junction box assembly

**Figure 4:** Business-class seat chassis with integrated cabling

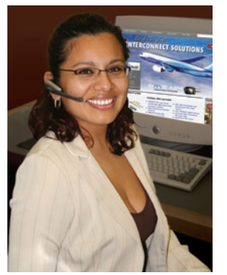
**Figure 5:** Stainless steel vacuum plate with machine-integrated Micro-D connectors and jumpers

Glenair®

For more information contact Glenair at **818-247-6000** or visit our website at **www.glenair.com**
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# Service and Support



Fast Turnaround on Quotes and Orders

*Our high-availability business model puts customer service, support, and convenience first*



Huge "Same-Day" Inventory

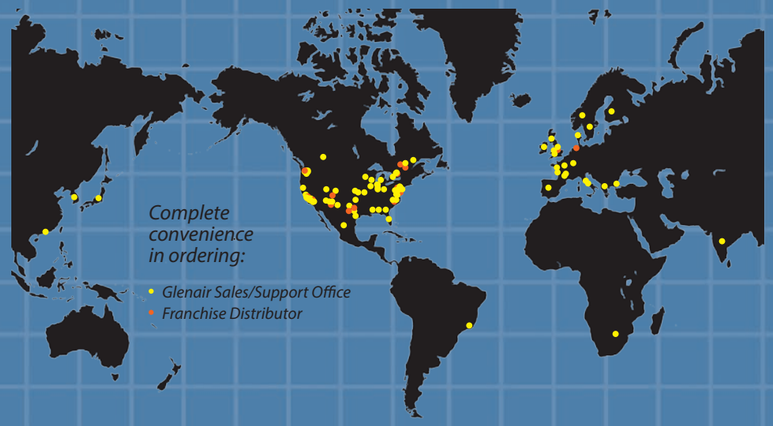
**NO MINS.** No Dollar or Quantity Minimum Orders



Made in America since 1956



Abundant Machining Capacity






Plenty of Raw Materials



High-Production Injection Molding

*Every factory operation controlled by Glenair—from machining to molding, plating, testing and assembly*



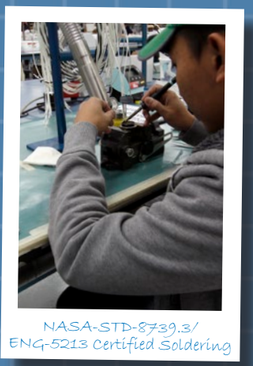
Cable Assembly Overmolding



Clean Rooms for Filter Array and Printed Circuit Board Assembly



The Industry's Most Advanced EMI/RFI Braided Shielding Operation



NASA-STD-8739.3/ ENG-5213 Certified Soldering



State-of-the-Art Plating Capabilities



In-House Connector and Cable Harness Assembly



Test and Burn-In Labs for Both Electrical and Optical Systems

# Glenair Backshells and Beyond

## Glenair is a full-spectrum interconnect supplier—manufacturing a complete range of solutions in Glendale since 1956



*1956: Glenair founded to produce a universal mil-spec connector cable clamp, the G1*

*1965: Glenair's first connector product: the Sav-Con® Connector Saver*



*1965: Glenair manufactures the "Golden Umbilical" spacewalk cable*




*1972: Glenair launches Mansfield, UK factory specializing in complex cable assemblies and Micro-D flex circuitry*



*1973: Glenair qualifies to MIL-C-85049 spec governing electrical connector accessories*




*1997: Glenair introduces the ultra-miniature Series 80 Mighty Mouse*



*1997: Glenair acquires Micro-D connector and TwistPin contact manufacturer, Microway Systems*



*1999: Glenair introduces the composite 3-in-1 Swing-Arm strain-relief*

SWING ARM®
COMPOSITE THREE-IN-ONE BACKSHELL

*2001: Glenair launches high-performance fiber optic product line*



*2005: Glenair acquires Italian industrial/rail connector manufacturer, Commital*



*2005: Glenair launches its line of EMI/EMP Filter connectors*

EMI-EMP FILTER CONNECTORS

*2010: Glenair invents high-performance Series 970 PowerTrip*

POWER TRIP

*2012: Glenair launches Opto-Electronic connector division*



*2012: Glenair introduces nanominiature Series 88 SuperFly*

SuperFly®

1950 1960 1970 1980 1990 2000 2010 2020 2030

## More Glenair milestones and innovations:



*Grand Central Terminal, Glendale, Ca*

HiPerCon® MIL-24308®

MICROCRIMP®

SuperNine®

Stinger™

Geo-Marine®

STAGSHIELD®

MIGHTY MOUSE

GLASS-SEALED Hermetic CONNECTORS

RJ45/USB SUPER SEAL

SAV-CON®

Band-Master ATS®

AmberStrand®

ARMORLITE™

Well-Master 260®

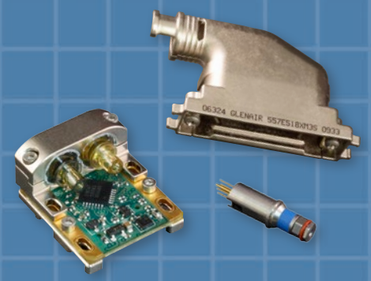
FOLLO NELSON

Octobyte™

# Glenair®

# Engineering Services





*Glenair design expertise extends from innovative composite backshells to complex opto-electronic assemblies*

## *The industry's most experienced engineering and design team—in every discipline—from backshells to flex circuit boards*



*Manufacturing engineering is an art form at Glenair—particularly in our complex cable group*



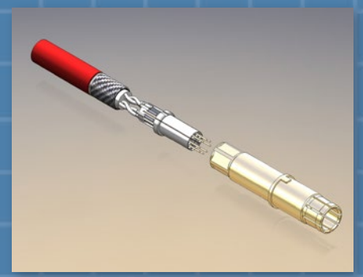
*Our tooling design team has all the capacity required for even the most aggressive production schedules*

LIBERAL NRE POLICY

*Let us be your design partner: Glenair has the most liberal NRE policy in the industry*



*Glenair's engineering team in Glendale is augmented by regional teams worldwide, and we love to travel. Our place or yours? We work at our customers' convenience.*



*Glenair excels in the design of miniaturized components such as this full Gigabit Ethernet contact*

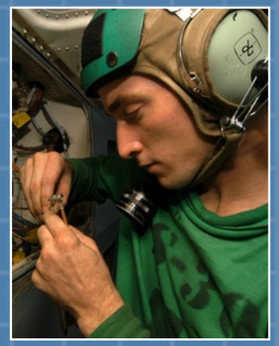
*No one in our industry has more engineering experience with composites, and other innovative materials, than Glenair*



*Four of the many reasons our engineering team takes their work so seriously:*









# Glenair® Committed to Quality





## *How can you be sure Glenair connectors are high-quality and will deliver long-term reliable performance?*

**1 Mil-Spec Certifications:** *Glenair is qualified to hundreds of rigorously controlled product and process certifications administered by the US government.*




**2 Certified Quality System:** *Glenair is ISO 9001:2008 and AS9100:2009 Rev. C certified and registered in North America; IRIS (International Railway Industry Standard), AS9100 SAE Aerospace and ISO 9001 certified and registered in Italy, and AS9100 certified and registered in the U.K.*

**3 Satisfied Customers:** *Hundreds of world-class OEMs and system manufacturers have tested and qualified our products. Many conduct independent audits of Glenair quality on an annual basis.*

Raytheon · Northrop Grumman · DRS Technologies · JPL Jet Propulsion Laboratory · Boeing · Lockheed Martin · COMAC · L3 · General Atomics · SAIC From Science to Solutions · ATK · Bombardier · Honeywell · SAAB · Embraer · eurocopter an EADS Company · Sikorsky A United Technologies Company · SpaceX · General Dynamics · Gulfstream A General Dynamics Company · BAE Systems · Airbus · Harris · Thales · Orbital · Rockwell Collins

**4 Design Partner:** *Not just a supplier, Glenair has been a key design partner on thousands of successful electrical/optical interconnect applications*

## *How can you be sure they will ship on time and in the correct quantity ordered? Here are seven things to consider:*

**5 Go-To Supplier:** *In applications where a single fault can lead to mission failure, Glenair is selected time and time again—from high-pressure subsea applications to missions to Mars.*



**6 Factory Capacity:** *Our first-world factories, the largest in the mil-aero interconnect industry, are positioned for ongoing growth and materials/process compliance.*



**7 In-House IEC Qualified Assessment Laboratory:** *Our one-of-a-kind commitment to qualification testing and product quality includes comprehensive environmental, mechanical, and electrical test capabilities.*

Glenair®

*Out of This World*

# INTERCONNECT SOLUTIONS


**Glenair, Inc.**
1211 Air Way • Glendale, California • 91201-2497
Telephone: 818-247-6000 • Fax: 818-500-9912 • sales@glenair.com
**www.glenair.com**

**Glenair Power Products Group**
860 N. Main Street Extension
Wallingford, CT
06492
Telephone: 203-741-1115
Facsimile: 203-741-0053
sales@glenair.com

**Glenair UK Ltd**
40 Lower Oakham Way
Oakham Business Park
P.O. Box 37, Mansfield
Notts, NG18 5BY England
Telephone: +44-1623-638100
Facsimile: +44-1623-638111
sales@glenair.co.uk

**Glenair Microway Systems**
7000 North Lawndale Avenue
Lincolnwood, IL
60712
Telephone: 847-679-8833
Facsimile: 847-679-8849

**Glenair Nordic AB**
Gustav III : S Boulevard 46
S - 169 27 Solna
Sweden
Telephone: +46-8-50550000
Facsimile: +46-8-50550001
sales@glenair.se

**Glenair Electric GmbH**
Schaberweg 28
61348 Bad Homburg
Germany
Telephone: 06172 / 68 16 0
Facsimile: 06172 / 68 16 90
germany@glenair.com

**Glenair Iberica**
C/ La Vega, 16
45612 Velada
Spain
Telephone: +34-925-89-29-88
Facsimile: +34-925-89-29-87
sales@glenair.es

**Glenair Italia S.p.A.**
Via Del Lavoro, 7
40057 Quarto Inferiore –
Granarolo dell'Emilia
Bologna, Italy
Telephone: +39-051-782811
Facsimile: +39-051-782259
info@glenair.it

**Glenair France SARL**
7, Avenue Parmentier
Immeuble Central Parc #2
31200 Toulouse
France
Telephone: +33-5-34-40-97-40
Facsimile: +33-5-61-47-86-10
sales@glenair.fr


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