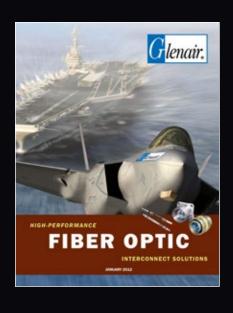


### TURNKEY OPTICAL AND ELECTRICAL

# INTERCONNECT **ASSEMBLIES AND** INTEGRATED SYSTEMS

customer bespoke harnesses, overmolded assemblies, conduit, and integrated systems



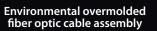




INTEGRATED-

#### **TURNKEY FIBER OPTIC CABLE ASSEMBLIES**







Multi-way inside-the-box D38999-to-ST assembly



GFOCA (IAW M83526) environmental cable assembly

#### **COMPLEX MULTIBRANCH AND OVERMOLDED CABLE ASSEMBLIES**



F/A-18 radar pantograph assembly





Hybrid fabric braid and overmolded environmental cable assembly



"Golden Umbilical" life-support umbilical cable for first American spacewalk, 1965

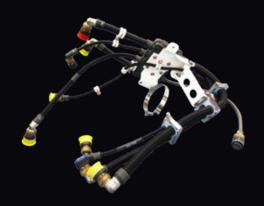


**AWACS** radar assembly



Soldier radio power and USB data overmolded cable assembly

#### **TURNKEY FACTORY-TERMINATED CONDUIT ASSEMBLIES**



Complex multibranch fighter jet electrical wire conduit assembly

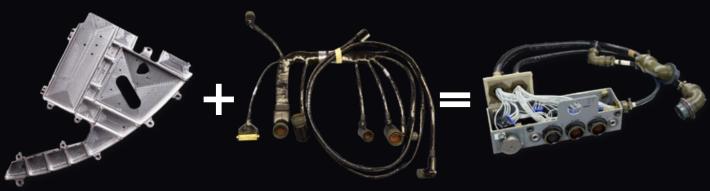


Lightweight, halogen-free rail industry wire conduit assembly



Crush-resistant commercial aerospace metal-core conduit assembly

#### **INTEGRATED SYSTEMS**



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

TURNKEY · CONNECTORIZED

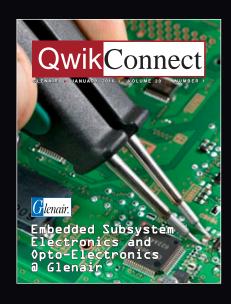
# INTEGRATED PCB/ **FLEX ASSEMBLIES**

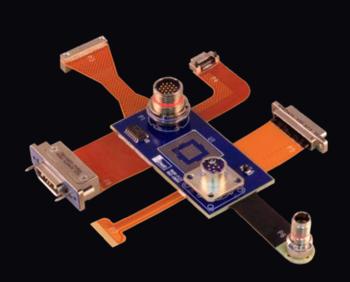


IPC-6012/6013 class I, II, III types 1-4









Multibranch demo flex assembly highlighting the broad range of catalog board connectors available from Glenair



Production flex and rigid flex assembly terminated, tested and ready for immediate use

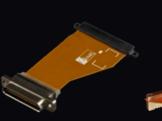
#### POINT-TO-POINT CONNECTORIZED FLEX AND RIGID FLEX JUMPERS







804 Mighty Mouse



Micro-D to Micro-D jumper



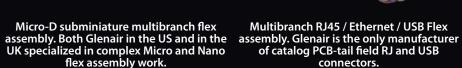
Series 23 SuperNine® to AlphaLink



#### **MULIBRANCH FLEX AND RIGID FLEX CONNECTORIZED ASSEMBLIES**



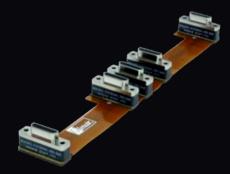
UK specialized in complex Micro and Nano flex assembly work.





26 layer EMI/RFI shielded rigid flex assembly

#### SPECIAL-PURPOSE FLEX AND RIGID-FLEX DESIGNS



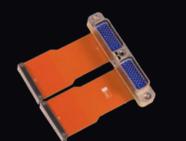
Space-grade Micro-D flex assemby with NASA EEE-INST-002 screening



Space-grade Series 28 HiPer-D to Series 80 Mighty Mouse I/O jumper



High-shock matched-impedance Mighty Mouse assembly with flex circuit



Dual-gang series 20 Super-Twin™ I/O connector to AlphaLink SL PCB connector



Stacked Micro-D I/O connectors with flex jumper to rigid PCB assembly



Hybrid flex/rigid flex multibranch Micro-D flex assembly with discrete RF circuits

### PCBA DESIGNS FOR

# RUGGEDIZED **EMBEDDED SYSTEMS**

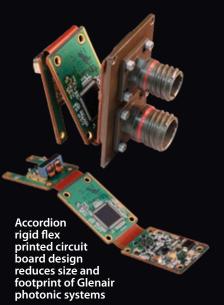
complete in-house optical and electrical PCBA design and development capability



The design and fabrication of printed circuit board assemblies is a critical inhouse capability of Glenair's Ruggedized Electronics and Photonics Group. These temperature, tolerant PCBAs are key components in our broad range of turnkey electronic and photonic systems



#### ADVANCED ELECTRONIC PACKAGING DESIGN FOR SIZE AND THERMAL MANAGEMENT





Ruggedized power distribution PCBA for use in STAR-PAN™ soldier system

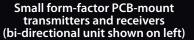




Soldier-worn data hub and power distribution board design with Series 80 Mighty Mouse interconnects

#### **SMALL FORM-FACTOR BOARD DESIGNS USED IN PHOTONIC SYSTEMS**







2.5mm ELIO® Compatible D38999 Series III type photonic connector with integrated PCBA



PCBA design for radio frequency-over-fiber links for SATCOM and RF signal distribution

#### **ELECTRONIC AND OPTO-ELECTRONIC EVALUATION BOARDS**



MIL-DTL-38999 type 2.5mm ELIO® compatible transceiver evaluation board



**PCB-mount transceiver** evaluation board



HiPer-D connector with size #8 opto-electronic contacts evaluation board

#### **VITA 57, FPGA MEZZANINE CARD BASED DEVELOPMENT BOARDS**

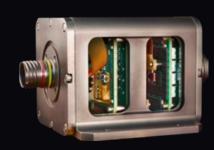




Ruggedized FMC connectivity PCBA for Ethernet, Fiber channel, and/or DVI, SMPTE video system applications

**FPGA** mezzanine card development board

#### **EMBEDDED ELECTRONIC AND OPTO-ELECTRONIC PCBAs IN ACTION**



Copper-to-fiber aggregation media converter (cutaway view)



Small form-factor opto-electronic media converter with field fault monitoring



Small form-factor ruggedized opto-electronic media converter

### RUGGEDIZED

# **OPTO-ELECTRONIC** INTERCONNECT SOLUTIONS

contacts · transceivers · SMPTE video · media converters · ethernet switches





#### SMALL FORM-FACTOR 10 GBPS HARSH-ENVIRONMENT PHOTONIC CONTACTS AND CONNECTORS





...for use in ARINC 600 avionics connectors



...and D38999 Series III Size #8 cavity adapter kit type receptacles for 1.25mm ARINC 801 termini



Size #8 cavity adapter kit for ELIO® 2.5mm termini



2.5mm **ELIO®** Compatible D38999 Series III type

#### RUGGEDIZED 10 GBPS PCB-MOUNT PHOTONIC TRANSCEIVERS, TRANSMITTTERS AND RECEIVERS



**Shielded PCB-mount** transceivers (radiation-tolerant versions available)



PCB-mount dual transceivers, guad transmitters and guad receivers

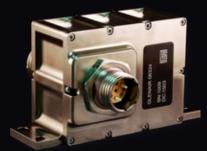


RF-over-fiber for SATCOM, IFE and other RF distribution systems



Parallel optical transceiver (40 Gbps available now; 120 Gbps version in development)

#### COPPER-TO-FIBER MEDIA CONVERTERS FOR ETHERNET AND VIDEO



Lightning-strike protected ARINC 801 F/O to D38999-type media converter



**GFOCA** fiber optic **Ethernet media converter** 



DVI media converter

#### **COPPER-TO-FIBER MEDIA CONVERTERS FOR SIGNAL AGGREGATION**



**Small form-factor** low-speed signal aggregator



High-speed signal aggregator (cutaway view)

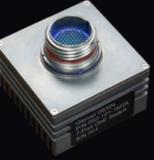


High-speed signal aggregator

#### SMALL FORM-FACTOR ETHERNET SWITCHES AND BREAKOUT CABLES



7-port Ethernet switch (shown with breakout test cable)



7-port Ethernet switch with heat-dissipation enclosure



Low-profile multiport Ethernet switch

JTAC-TOUGH<sup>™</sup>

# STAR-PANT SOLDIER STALL USB HUB / POWER DISTRIBUTION SYSTEM

battle-tested C4ISR / DACAS





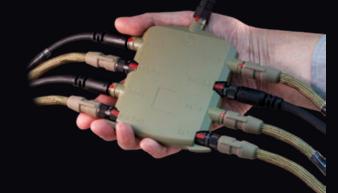


#### STAR-PAN™ MULTIPORT USB / POWER DISTRIBUTION HUBS FOR TACTICAL SOLDIER SYSTEMS



808-057 STAR-PAN II hub with dedicated host and radio cables

- Battery power/+5VBus power for 3 USB devices
- 2 power inputs for extended mission life
- SMBus, USB2.0 (full and high-speed), USB1.1 compatible interface



808-037 STAR-PAN VI hub with six PAN ports, two battery/auxiliary battery ports, and one universal host/EUD port

- Battery power/+5VBus power for 4 USB devices,2 dedicated radio ports
- Integrated power monitoring and management
- Proven performance in JTAC/DACAS applications

#### GENERAL-PURPOSE STAR-PAN™ SYSTEM CABLES



The state of the s



**NETT Warrior (C1) Extension Cable** 

Host USB-A Cable

C4 Micro USB EUD Host Cable

#### **STAR-PAN™ PERIPHERAL DEVICE CABLES**



DAGR GPS/Navigation Cable









**USB 2.0 Adapter Cable** 



PLRF-15C/25C Laser Range Finder Cable

#### STAR-PAN™ RADIO DATA / POWER CABLES AND ADAPTERS













Microlight Radio

PRC-117G Radio

dio

Harris Radio PRC-148 Radio
Adapter Cable Data Adapter

Radio PRC-152A Radio
apter Data Adapter

PRC-154 Rifleman Radio Data Adapter

#### **EXAMPLES OF STAR-PAN™ SUPPORTED PERIPHERALS / EUDs**









DAGR and other GPS / navigation systems

### PROVEN FLIGHT HERITAGE

# **SPACE-GRADE SOLUTIONS**

NASA · ESA · JAXA · Commercial



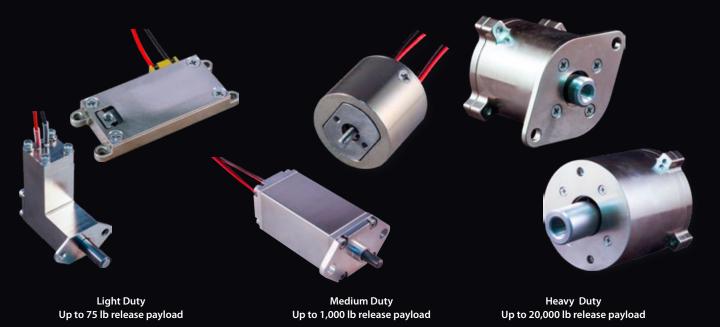
Complex space-grade cable assemblies (shown: Glenairmade "Golden Umbilical")



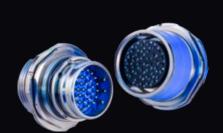




#### **HOLD-DOWN RELEASE MECHANISMS, PIN PULLERS AND PIN PUSHERS**

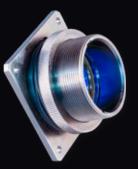


**ASSISTED-RELEASE QUICK-DISCONNECT BLIND-MATE CONNECTORS** 







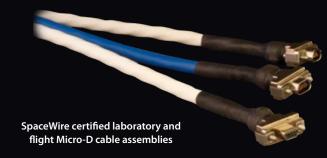


Glenair Series 253 connectors are designed to meet applicable environmental, electrical and mechanical performance characteristics of D38999 Series III. The technology is well suited for use in commercial blind-mate instrumentation panels, satellite deployment, scientific research and development payloads, as well as interstage, UAV, and munitions release applications.

#### SPACE-GRADE M24308 HIPER-D, MICRO-D, AND NANOMINIATURE CONNECTORS AND CABLES



ESA and NASA screened connectors and backshells available as discrete components or wired pigtail assemblies









Qualified MIL-DTL-24308 Class K Space-Grade Hermetic, plus HiPer-D high-performance space-grade and high-speed environmentals

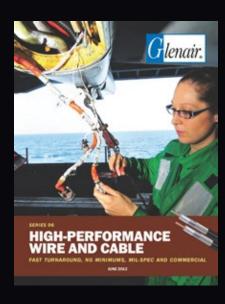
#### TURNKEY, SPACE-GRADE EMI/RFI SHIELDED WIRE HARNESS AND CABLE ASSEMBLIES



### HIGH-PERFORMANCE

### WIRE AND CABLE

M22759 · Ethernet · USB · coax · harsh-environment power and signal







#### **HIGH-PERFORMANCE WIRE AND CABLE**



M22759 single-ended hookup wire



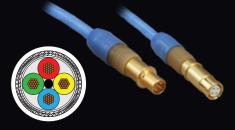
Coaxial cable for RF applications



Single and multimode graded-index fiber optic cable



Matched-impedance twisted pair cable for Glenair Ultra-Twinax contacts



Aerospace-grade quad cable for Glenair Quadrax contacts



Aerospace-grade 10G Ethernet cable



- Service temperature: -65°C to 225°C
- Duralectric K (Kelvin): -110° to 225°C
- Mil-aero and industrial fluid-resistant
- 53 year equivalent exposure
- Ozone resistant IAW ASTM D1149
- Moldable and extrudable

#### **DURALECTRIC® HIGH-TEMPERATURE, HALOGEN-FREE, CHEMICALLY RESISTANT JACKETING**



**Bulk jacketed Duralectric® cable for** harsh-environment power applications



Duralectric® Autoshrink™ employed in environmental boots and sleeves



Duralectric jacketing employed as conduit covering in topside naval applications



Aerospace overmolded cable assembly with rugged Duralectric® jacketing



Shipboard application with Duralectric® jacketing and overmolding



Duralectric® jacketing employed in environmental commercial application



- Ultra-flexible rope lay power cable
- Available in a broad range of gages, from 16 AWG to 450 MCM
- Rugged Duralectric® jacketing

#### TURBOFLEX™ ULTRA-FLEXIBLE / RUGGED POWER CABLE WITH DURALECTRIC® JACKETING



Ultra flexible rope-lay construction TurboFlex® power cable



TurboFlex® with Duralectric® jacketing ideally suited for equipment grounding



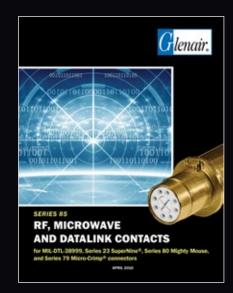
Turboflex® power pylon cable assembly with Duralectric® jacketing

### QPL AND COMMERCIAL

## **CONTACT TECHNOLOGY**

signal · RF · high-speed datalink · microwave · power · fiber optic · high voltage









#### LOW-LOSS, MATCHED-IMPEDANCE RF AND MICROWAVE CONTACTS



Size #12



Size #12 75 Ohm contacts



Size #12 spring-loaded SMPM microwave contacts



Size #8 spring-loaded BMB microwave contacts

#### HIGH-SPEED DATALINK CONTACTS FOR ARINC, 38999, AND OTHER CONNECTORS



Size #8 differential twinax contacts



Size #8 quadrax contacts



Octobyte™ Ethernet Cat7A contacts

#### **AS39029 SIGNAL CONTACTS**











Standard density

High-density signal (up to 1500 cycles)

**Extended-duty** 

**Printed circuit board** 

Thermocouple

#### **AS39029 RF CONTACTS**



Size #16 coaxial contacts



Size #12 coaxial contacts



Size #8 coaxial contacts



Size #8 concentric twinax contacts

#### **POWER CONTACTS**



Size #8 power



LouverBand<sup>™</sup> power



High-voltage



Size #8 - 4/0 power

#### **FIBER OPTIC TERMINI**



MIL-DTL-29504 **OPL** termini





Glenair High-Density (GHD) and Front-Release (GFR) termini



**GFOCA** genderless termini



Eye-Beam® GLT grin lens termini

#### SPECIAL PURPOSE CONTACTS AND PURE GAS TUBE CONTACTS/ASSEMBLIES



Pneumatic contacts for Pitot applications



Lightweight sealing plugs and dummy sealing contacts



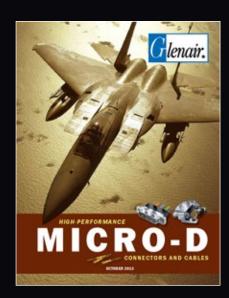
High-pressure (10K psi) gas tube

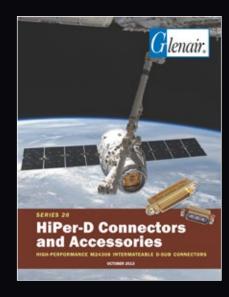
### QPL AND COMMERCIAL

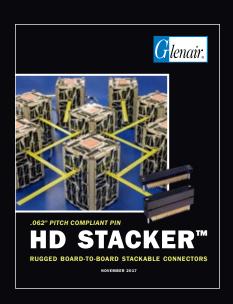
# RECTANGULAR CONNECTORS



AlphaLink<sup>™</sup> · HD Stacker<sup>™</sup> · Nano (32139) Micro-D (83513) · D-subminiature (24308) · Series 79/791 · Super-Twin™







### HIGH-DENSITY MISSION-CRITICAL BOARD-TO-BOARD STACKING CONNECTOR SERIES



Solder-free press-fit (compliant pin) board mounting





.0625" pitch contact spacing: Polarized shells and keyed guide highest available density pin hardware prevent mis-mating



Controlled signal integrity for differential applications (test reports available)

- High-density .0625" pitch "Chevron" layouts
- PCle 3.0 capable
- Performance up to 10.5 Gbps
- Polarized insulator and hardware options
- Solder free "eye of the needle" compliant tail
- High-temp PPS insulator meets NASA outgassing requirements
- Available wired / flex jumpers
- Available between-board spacers up to 1 inch
- 3 Amp current rating

#### SERIES 28 HIPER-D HIGH-PERFORMANCE MIL-DTL-24308 INTERMATEABLE



sealing and mounting



Enhanced panel mount Combo power and signal contact arrangements



**Ground spring for** improved EMC



Precision-machined shells and EMC cowlings

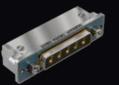


environmental and split-shell EMI backshells

#### SERIES 79 MICRO-CRIMP HIGH-DENSITY CRIMP CONTACT MICRO RECTANGULAR



Crimp-terminated cable connectors



**Crimp-terminated** panel-mount



Panel-mount connector with auxiliary sealing



Right angle PCB panel-mount connectors



**EMI** adapters and protective covers

#### MIL-DTL-83513 MICRO-D QPL AND GLENAIR COMMERCIAL EQUIVALENTS



Micro-D for harness applications



Micro-D for PCB applications (parylene compatible)



Master-Latch™ locking Micro-D



Well-Master™ 260° high-temperature downhole



Micro EdgeBoard connectors and locking Micro-Strips

#### **MIL-DTL-32139 NANOMINIATURE**



**Dual-row nano** with flying leads



Right-angle and straight-mount PCB connectors



Nanominiature dual-row back-to-back jumpers



Series 89 Nanominiature Sav-Con® connector saver

#### SERIES 20 SUPER-TWIN™



Super-Twin<sup>™</sup> lightweight composite modular connectors

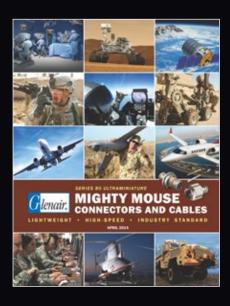


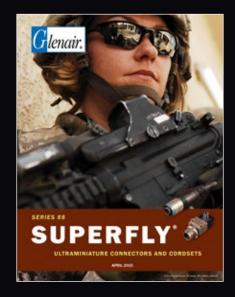
AlphaLink® board-level pogo-pin connectors and flex jumpers

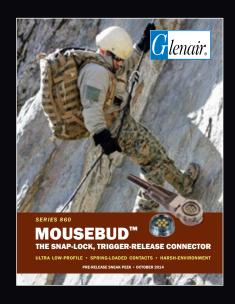
### LIGHTWEIGHT

# ULTRAMINIATURE MOUSE **CIRCULAR CONNECTORS**

save weight · save space · optimize power · enhance performance











#### **MIL-AERO NANOMINIATURE**



.025" contact spacing Nanominiature circular IAW MIL-DTL-32139

#### **SERIES 80 MIGHTY MOUSE**



Series 806 Mil-Aero: high-density, high-altitude, high-vibration and shock connectors



high-density TwistPin

locking push-pull



#### TURNKEY HARSH-ENVIRONMENT POINT-TO-POINT AND MULTIBRANCH CABLE ASSEMBLIES

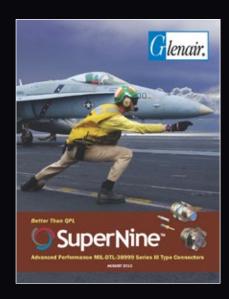


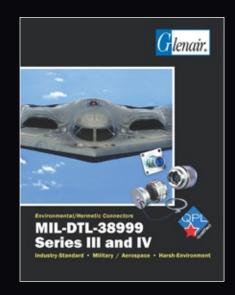
Mighty Mouse SuperSeal® Micro-USB

QPL AND COMMERCIAL

### SuperNine® **MIL-AERO CIRCULAR CONNECTORS**

environmental · hermetic · filter · fiber  $\cdot$  high-speed datalink  $\cdot$  bulkhead feed-thrus · Sav-Con®s · lanyard-release







#### **DLA QPL MIL-DTL-38999 SERIES III AND IV**



100% made-in-America: No foreign-sourced materials, component parts, or assembly labor employed



DLA Qualified Series III environmental plug, jam nut, and square flange receptacles, class W, F, T, and G. Qualified Series IV breech-lock connectors in classes F and W. All 1560 crimp-contact insert arrangements fully supported.

#### **SUPERNINE® MIL-DTL-38999 TYPE CRIMP CONTACT TERMINATION**



**Extended-durability** plug with band porch and 1500 mating cycle contacts



**Extended-durability** plug with accessory threads



High-density plugs and receptacles in all mounting styles (up to 1500 cycles)



submersible series

#### SUPERNINE® MIL-DTL-38999 TYPE POTTED/SEALED PC TAIL RECEPTACLES (PARYLENE-COMPATIBLE)







Stepped contact



**Short standoff** 



Threaded standoff



**Dual flange** 

#### SUPERNINE® MIL-DTL-38999 SERIES III TYPE HIGH SPEED, HERMETIC, FIBER, AND FILTER



#### SAV-CON® CONNECTOR SAVERS AND OTHER HIGH-PERFORMANCE SERIES



Sav-Con® connector savers for every MS circular series



**Environmental and hermetic** bulkhead feed-thrus



Space-grade blind-mate and assisted-separation connectors

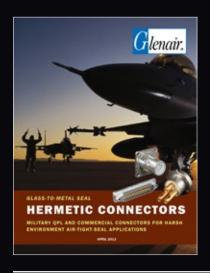


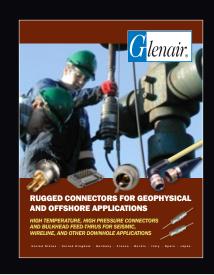
AS81703 Series 3 type high-shock lanyard release

### QPL AND COMMERCIAL

### **GLASS- AND ADHESIVE-SEAL HERMETIC** Hermetic CONNECTORS

heavy-duty and lightweight solutions



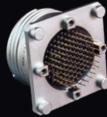




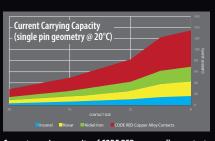
#### **CODE RED™ LIGHTWEIGHT HERMETIC SEALING**



Lightweight hermetic encapsulant sealing solution with better than 1X10<sup>-7</sup> leak rate performance. Available now for D38999 and Series 806 Mighty Mouse.



Aluminum shell CODE RED hermetic connectors and copper contacts reduce weight and improve electrical performance compared to heavier-duty glass-to-metal seal hermetic solutions



Current carrying capacity of CODE RED copper alloy contacts compared to Inconel, Kovar, and nickel iron contacts.

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



Series I scoop-proof bayonet coupling



Series II low-profile bayonet coupling



Series III scoop-proof triple-start coupling



Series IV breech lock

#### HARSH-ENVIRONMENT / MODIFIED PACKAGE HERMETICS



Geo-Marine® double-start hermetic connector



Hermetic power connector



Single-way tool joint HTHP hermetic connector



Hermetic probe connector with modified flange

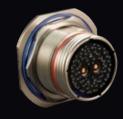


Long-length hermetic bulkhead penetrator with optional crimp piggy-back termination

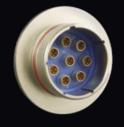
#### **HIGH-SPEED DATALINK HERMETICS**



Triax hermetic



Hybrid coax/signal hermetic

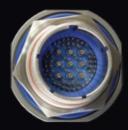


**Quadrax hermetic with** 



**FIBER OPTIC HERMETICS** 

MT ribbon fiber optic hermetic



Hybrid coax/signal

#### **RECTANGULAR PACKAGE HERMETICS**



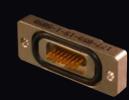
MIL-DTL-24308



Series 79 Micro-Crimp hermetic



MIL-DTL-83513 type



Sealed panel-mount Micro-D hermetic

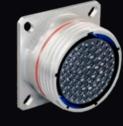
#### OTHER CIRCULAR GLASS-SEALED HERMETIC SERIES



MIL-DTL-26482



MIL-DTL-83723



MIL-DTL-38999 (OPL)



MIL-DTL-5015



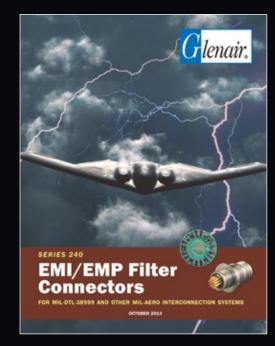
**Series 80 Mighty Mouse** 

SERIES 240

# EMI/EMP FILTER EMI/EMP CONNECTORS



EMI ceramic planar array filter connectors · EMP TVS diode solutions



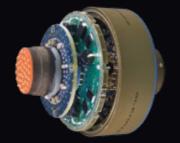
Glenair is the only mil-aero-grade filter connector supplier that offers same-day delivery of off-the-shelf, catalog filter connectors, for every MIL-DTL-38999 series

#### MINIATURIZED EMI/RFI FILTER PRESSURE TRANSDUCERS



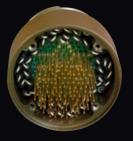
Small form-factor pressure sensors for commercial and military aerospace applications with integrated ceramic planar array EMI/RFI filter technology (miniaturized MIL-DTL-38999 version shown on left, ultraminiature Mighty Mouse 804 on right)

#### **EMP TRANSIENT VOLTAGE SUPPRESSION DIODE-EQUIPPED CONNECTORS**



EMP diode-equipped connector MIL-DTL-38999 Series III type with oversized shell





Reduced-package-size EMI/EMP cylindrical



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

#### CATALOG EMI FILTER CONNECTORS WITH MIL-STANDARD CIRCULAR PACKAGING



MIL-DTL-38999 Series III MIL-DTL-38999 Series IV triple-start



breech-lock



MIL-DTL- 26482 Series I and II bayonet



MIL-DTL-83723 Type T



MIL-DTL-5015 threaded

#### **UNIQUE AND SPECIAL-PURPOSE EMI FILTER CONNECTORS**



Extended-shell PC-tail cylindrical with threaded standoff



Special-purpose filter connector cable



Series 80 Mighty Mouse PC-tail filter receptacle



MIL-STD-1760 filtered umbilical connector



Filter plug with crimp contacts



MIL-DTL-38999 type filter connector with sidecar ceramic array packaging



MIL-DTL-38999 type filter connector with hybrid analog signal and RF contacts



Series 970 PowerTrip™ high-density EMI filtered



Series 804 EMI filtered Mighty Mouse push-pull with custom



SuperSeal™ RJ45 **Ethernet connector** with EMI filtering

#### EMI FILTER CONNECTORS WITH MIL-STANDARD / GLENAIR RECTANGULAR PACKAGING



MIL-DTL-83513 type Micro-D filter connector



MIL-DTL-24308 type D-sub filter connector



Series 79 Micro-Crimp filter connector

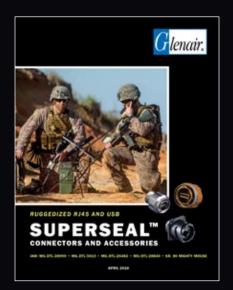


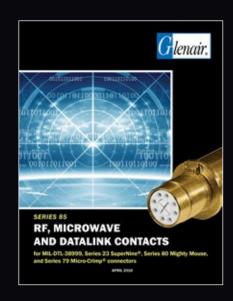
ARINC 600 rack-and-panel filter connector

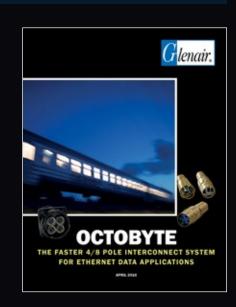
### RUGGEDIZED

# HIGH-SPEED DATALINK INTERCONNECTS datalink group

contacts · connectors · jumpers







#### **SUPERSEAL™ IP67 OPEN-FACE RUGGEDIZED FIELD RJ45 SOLUTIONS**



MIL-DTL-38999 Sr. III type Series 80 Mighty Mouse SuperSeal™ RJ45 SuperSeal™ RJ45





Series IPT 26482 type SuperSeal™ RJ45



Series ITS 5015 type SuperSeal™ RJ45



MIL-DTL-28840 type SuperSeal™ RJ45

#### SUPERSEAL™ IP67 OPEN-FACE RUGGEDIZED FIELD USB 2.0 AND 3.0 SOLUTIONS





MIL-DTL-38999 Sr. III type Series 80 Mighty Mouse SuperSeal™ USB SuperSeal™ USB



Series IPT 26482 type





MIL-DTL-28840 type

#### **HIGH-SPEED / RF DATALINK CONTACTS**



contacts

Size #8 differential Size #12 ultra-twinax twinax contacts differential twinax



Size #8 quadrax contacts



Size #8 spring-loaded BMB microwave contacts



Size #12 SMPM type spring-loaded coaxial

Series 79 right-angle PCB

connector with El Ochito

### THE OCTAXIAL SIZE #8 CONTACT FOR GbE/10GbE ETHERNET, USB 3.0, HDMI, AND MORE



#### GLENAIR CONNECTOR SERIES FOR EL OCHITO® AND OTHER HIGH-SPEED DATALINK CONTACTS













MWDM Micro-D with coax contacts

Series 28 HiPer-D® with Series 23 SuperNine® with Series 79 Micro-Crimp® Quadrax contacts El Ochito PC tail contacts with coax contacts Series 80 Mighty Mouse with differential twinax

#### OCTOBYTE™ SERIES RUGGEDIZED ETHERNET CONNECTOR

#### SPEED-MASTER™ 10G+ ETHERNET





**Ethernet Cat7A Ethernet Cat5** contacts



contacts



Ethernet MVB -

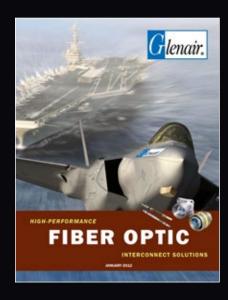


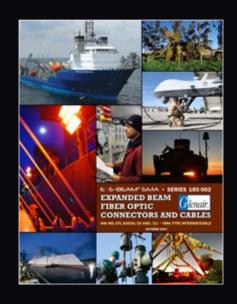
Speed-Master™ modular 10G+ Ethernet technology (shown here in SuperNine®packaging) available now for 22D gage contacts and wires

### HIGH-PERFORMANCE

### Fiber Optic CONNECTORS FIBER OPTIC INTERCONNECT SYSTEMS

connectors  $\cdot$  termini  $\cdot$  cables  $\cdot$  tools







#### EYE-BEAM® GMA AND EYE-BEAM® GLT EXPANDED-BEAM CONNECTION SYSTEMS



Innovative Eye-Beam® GLT grin-lens expanded-beam termini can be integrated into virtually any circular or rectangular connector package. Factory terminated lens pin termini and lens socket termini on cable jumpers allow for easy fusion splicing in the field.

#### **GLENAIR BUTT-JOINT FIBER OPTIC CONNECTION SYSTEMS**







Mighty Mouse fiber optic



ARINC 801 type fiber optic



MT Ferrule 38999 type fiber optic



NGCON MIL-PRF-64266 fiber optics



Fiber optic Sav-Con® connector savers



MIL-PRF-28876 Fiber Optic



**GFOCA M83526 Compliant Fiber Optic** 



Glenair Front Release (GFR) fiber optic

#### **TOOL KITS AND TRAINING**



Fiber Optic termination and maintenance kits



Dry-wipe fiber optic cleaning tools and adapters



On-site fiber optic technician

#### FIBER OPTIC CONNECTOR BACKSHELLS TURNKEY FIBER OPTIC CABLE AND CONDUIT ASSEMBLIES





For user termination and fabrication of fiber optic cable and conduit assembiles

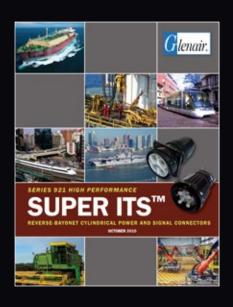


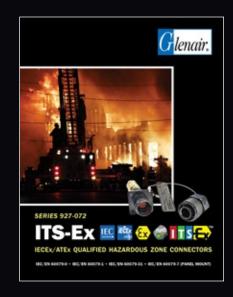
Catalog point-to-point solutions as well as bespoke multibranch assemblies

VG QUALIFIED AND COMMERCIAL

# INDUSTRIAL-STRENGTH CONNECTORS ES

power · signal · hazardous zone · military







#### HIGH-VOLTAGE SINGLE AND MULTIPOLE POWER CONNECTORS



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



Series IRT rectangular multipole high voltage traction motor connectors



power joint connector system



Innovative tool-free locking and latching

#### **SUPER ITS™ HIGH-PERFORMANCE REVERSE BAYONET**



Higher temperature and ampacity rating with rigid insert and mechanical contact retention

#### **ITS-Ex HAZARDOUS ZONE CONNECTORS**



IECEx / ATEx qualified explosive zone 5015 type reverse-bayonet connectors for Group IIC, Temperature Classes T6 and T5, Zones 1 and 2

#### **POWERTRIP™ EXTREME ENVIRONMENT POWER CONNECTOR**



The high-density, advanced performance PowerTrip™ is a reduced size and weight solution for demanding interconnect applications. High ampacity, anti-decoupling, and robust backshell accommodation standard.

#### **SERIES 928 HMI LIGHTING**



Rugged bayonet-lock plugs and receptacles for ballast and head connections

#### **5015 TYPE CIRCULAR HEAVY-DUTY POWER AND SIGNAL CONNECTORS**



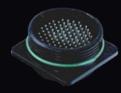
Series ITS reverse-bayonet



Series ITH rigid insert



Series IT threaded coupling



Series ITZ triple-start coupling



Series ITK high-temperature



ITS-RG RadGrip



multi-pin high voltage



Series 500 single-pole high voltage



Series IGE single-pole high power

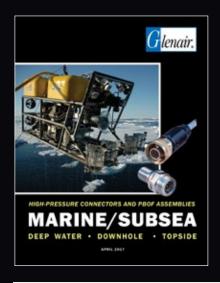


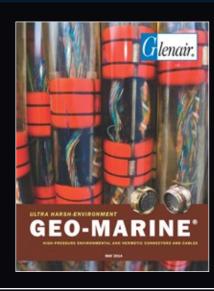
Series ITS bayonet with wing locks

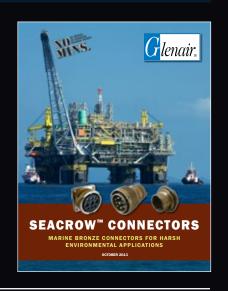
### 10K PSI OPEN-FACE

# **UNDERWATER / SUBSEA** CONNECTORS

deep water · downhole/HTHP · topside · shallow water · high-speed copper/fiber







#### SEAKING™: FLAGSHIP SERIES MECHANICAL AND ENVIRONMENTAL FEATURES











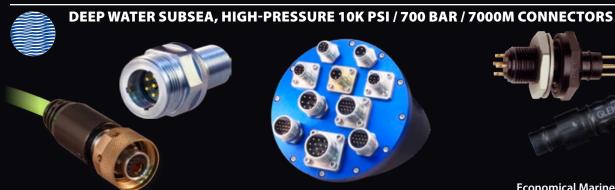


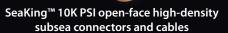




Well-Master 26







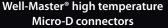


SuperG55<sup>™</sup> dry-mate 10K PSI subsea electrical connectors



**Economical Marine Molded** cable-to-cable and cable-to-panel interconnects

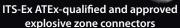




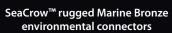


Single- and multi-pin High Temperature/High Pressure (HTHP) Glass sealed penetrators and feedthroughs

# TOPSIDE OR SHIPBOARD CONNECTORS









Corrosion-resistant composite junction boxes, cable bays, and wire protection conduit





overmolded cables



**SHALLOW WATER SUBSEA CONNECTORS** 



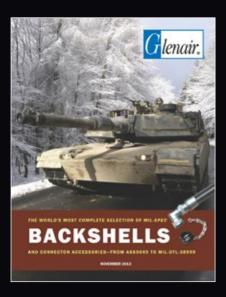


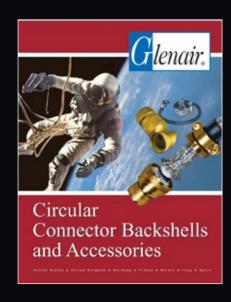
AguaMouse™ 3500 PSI miniature Connectors and overmolded cables

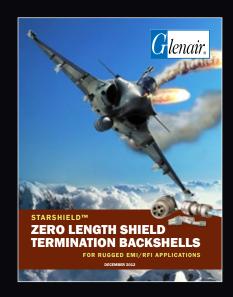
### QPL AND COMMERCIAL

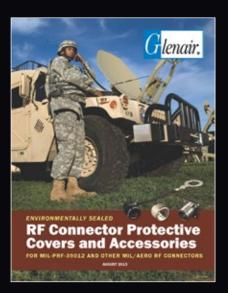
# **CONNECTOR BACKSHELLS AND ACCESSORIES**

environmental sealing  $\cdot$  wire management  $\cdot$ strain relief · EMC shield termination

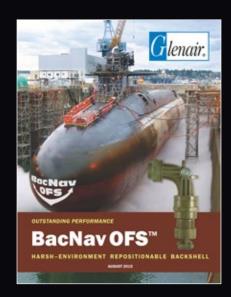












#### LIGHTWEIGHT COMPOSITE THERMOPLASTIC BACKSHELLS AND ACCESSORIES



Band-in-a-Can EMI/RFI composite



Composite EMI/RFI backshell with attached lightweight braid



Swing-Arm<sup>™</sup> Flex with drop-in wire shield



Split-shell low profile composite banding

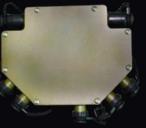


feed-thru with hybrid wire sealing grommet

#### LIGHTWEIGHT COMPOSITE EMI/RFI ENVIRONMENTAL JUNCTION BOXES



Modular junction box with feed-thru fittings and caps



**Custom connectorized** low-profile composite data hub



Heavy-duty composite cable/equipment bay



Ultra small form-factor miniature enclosure

#### **M24308 D-SUB SOLUTIONS: HIGH PERFORMANCE, RUGGEDIZED D-SUBMINIATURE PRODUCTS**



Split-shell D-subminiature Split-shell M24308 Composite D-subminiature composite backshell composite backshell







Flex-D composite M24308 backshell



M24308 EMI/RFI backshell

#### **BACKSHELL AND CONNECTOR ACCESSORY INNOVATION SHOWCASE**



StarShield™ zero-length shield termination



Spring-loaded "flop-lid" protective cover



Space-grade Qwik Clamp backshell



Ultra low-profile



BacNav OFS™ repositionable EMI/EMP



Backshell connector saver



Self-locking, anti-decoupling



Meta-Loc™ series quick-lock, quick-release covers and accessories



Mil-grade RF protective



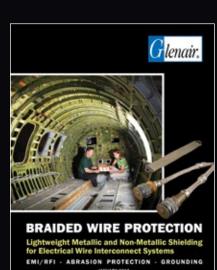
Pressure-barrier

### METALLIC AND NON-METALLIC

### **BRAIDED SHIELDING**

EMI screening  $\cdot$  weight reduction  $\cdot$  abrasion protection  $\cdot$  spot repair

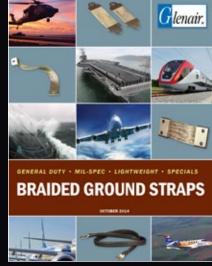


















For spot EMI/RFI shielding coverage and reinforcement of cable interstices



The most innovative line of metallic, monofilament non-metallic, and microfilament composite and stainless steel braiding solutions for environmental, mechanical, and EMC shielding in the world. From high-temperature fiberglass tubular shielding for engine applications to ultra-lightweight EMI/RFI braided shielding for electrical wire interconnect grounding applications, Glenair offers the industry's most versatile range

## ARMORI ITE Amberstrand

#### LIGHTWEIGHT ARMORLITE™ (STAINLESS STEEL) AND AMBERSTRAND® (COMPOSITE) SHIELDING







Shield sock backshells with lightweight ArmorLite<sup>™</sup> or AmberStrand<sup>®</sup> microfilament EMI/RFI braid



MasterWrap™ flexible, field-installable/ repairable side-entry EMI/RFI shielding with ArmorLite™ technology

#### **TURNKEY FACTORY OVERBRAIDING WITH LIGHTWEIGHT AND QQ-B-575B/A-A-59569 BRAID**



Turnkey factory-overbraided multibranch cable assembly



Overbraided conduit assembly, ready for customer termination

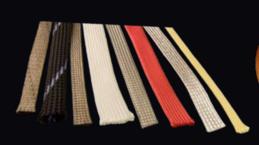


Factory-overbraided pigtail assembly

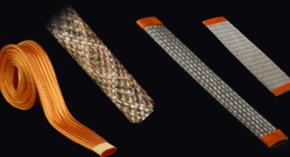
#### ARMORLITE™ AND METALLIC BRAID GROUND STRAPS



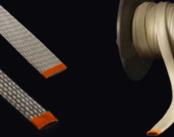
#### INDUSTRY-STANDARD TUBULAR FABRIC AND METAL BRAID



Tubular fabric braid for mechanical and abrasion protection of electrical wire interconnect systems



Wide range of colored Nomex for abrasion protection and wire identification



QQ-B-575B/A-A-59569 metallic braid

High-temperature fiberglass braid for engine applications

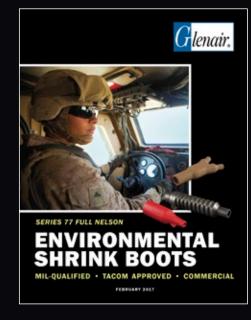
### **ENVIRONMENTAL**

# **SHRINK BOOTS** AND HEAT-SHRINK **TERMINATIONS**



abrasion protection · environmental sealing splicing · space-grade wire protection







#### **HEAT SHRINK TERMINATION SLEEVES / SPLICES**



Three sizes of available inline splices



Wired and unwired AS83519/1 and /2 Type heat shrink terminations for EMI shield-to-ground termination applications (note braided versions qualified for lightning strike)



Example rectangular interconnect assembly outfitted with heat shrink termination grounds

#### HOT AND COLD SHRINK BOOTS AND TUBING FOR RUGGED ENVIRONMENTAL APPLICATIONS



#### **SELECTED ENVIRONMENTAL SHRINK BOOT COLOR OPTIONS**



#### SHRINK BOOT ADAPTERS SELECTION GUIDE





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



Series 319 Shield Sock/Boot



Series 440 **Shrink Boot** Band/Boot



Thermoplastic Band/Boot Adapters

#### **PIGGYBACK SHRINK BOOT ADAPTERS**



Environmental piggyback adapter with pre-installed boot, ready for heat shrink



Heat shrink recovery completed with significant time saved



Composite, aluminum, or stainless steel environmental feed-thru with piggyback boot

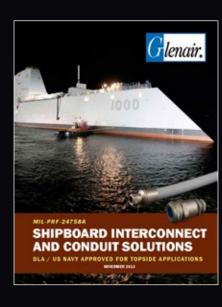


Composite band-in-a-can piggyback boot adapter

### HARSH-ENVIRONMENT

# METAL AND POLYMER **CORE CONDUIT SYSTEMS**

high-temperature · crush-resistant · EMI/RFI shielded · land, sea, and air







#### **TURNKEY FACTORY-TERMINATED CONDUIT ASSEMBLIES**



Complex multibranch fighter jet electrical wire conduit assembly



Lightweight, halogen-free rail industry wire conduit assembly



Crush-resistant commercial aerospace metal-core conduit assembly

#### LIGHTWEIGHT, SEALED/FLEXIBLE POLYMER-CORE ANNULAR CONDUIT WIRE PROTECTION SYSTEMS



Kynar, PVDF, and G-Flex Siltem materials



jacketing options



Easy-to-install Guardian wire protection system



Sentry economical wire protection system



Non-wired factory-terminated assemblies

#### HIGH-TEMPERATURE, HIGH-STRENGTH HELICAL POLYMER-CORE WIRE PROTECTION SYSTEMS







wire protection system





Non-wired factory-terminated assemblies

#### **HEAVY-DUTY METAL-CORE CONDUIT WIRE PROTECTION SYSTEMS**



Flexible, crush-proof EMI/ Low-profile RP Plus





Heavy-duty metal and RFI metal-core conduit wire protection system weight-saving composite wire protection system



Legacy Mil-C-24758



Non-wired factory-terminated assemblies

#### MIL-PRF-24758 SHIPBOARD CONDUIT WIRE PROTECTION SYSTEMS



Stainless steel and brass metal-core conduit with UV-resistant BlueJacket



Complete range of qualified MIL-PRF-24758 fittings



Master Seal self-vulcanizing BlueJacket (Duralectric) repair tape



Non-wired factory-terminated

#### **SPECIAL-PURPOSE CONDUIT MATERIALS AND CONFIGURATIONS**



Halogen-free PEEK tubing

Spring-reinforced polymer-core assemblies



Special composite fiber optic backshells



Conduit and jacket color options including



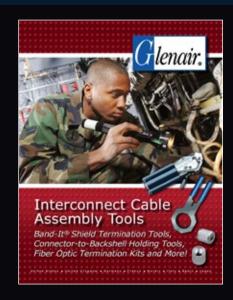
Special processing including drain holes, ovalization and split-entry

### INTERCONNECT

# **ASSEMBLY TOOLS**

banding · grounding · crimping · mounting · termination · testing







#### **GROUNDCONTROL EARTH BOND**



Hydraulic Earth Bond setting tools for aluminum and stainless steel plate



Bi-laminar (copper core) earth bonds



**Available** dynamometer



Used for ground strap bonding and equipment rack installation

#### FIBER OPTIC TERMINATION AND TEST TOOLKITS



and maintenance kits



Turnkey fiber optic termination Inspection and test probes Dry-wipe fiber optic





Video scope inspection kits

### **CRIMP TOOLS**





accessories

Crimp contact insertion and removal tools

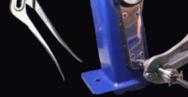
#### **BACKSHELL-TO-CONNECTOR MOUNTING TOOLS**



Circular backshell assembly wrenches



**Connector holding tool** kits and wrenches



Soft jaw pliers

Bench-mount tools for volume production

### Band-Master ATS® EMI/RFI CABLE SHIELD TERMINATION SYSTEM



Nano banding tool for use with ultraminiature connectors and banding backshells



Micro banding tool for use with most subminiature connectors and banding backshells



**Standard and Slim Standard banding tools** for use with large form-factor connectors and banding backshells



Each tool accommodates a specific width of band (nano, micro, or standard)



Bands are available precoiled for high-volume assembly operations



Special high-volume pneumatic tool for bench use, available for all sizes



The only banding tool with a built-in calibration counter



Bands and tools optimized for size and weight reduction across the complete range of connector, backshell, and cable form factors

# **Glenair Track Record** of Interconnect Innovation



Hermetic <

1988: Glenair launches



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** 



1973: Glenair qualifies to MIL-C-85049 spec governing electrical connector accessories



hermetic connector product series 1980: Glenair





2006: New ultraminiature crimp-contact rectangular



1994: Glenair launches high-Fiber Optic performance fiber optic product line



introduces the ultra-miniature Mighty Mouse



1999: Glenair adds final 85049 slash sheet to QPL



2012: Zero length shield termination backshells for rugged EMI/RFI application



2010: Glenair invents high-performance Series 970 PowerTrip



4/8 pole Ethernet solution for rail and mass transit



2012: Super ITS high-performance reverse-bayonet 5015 connectors





2014: SuperNine® advanced performance 38999 Series III







2016: SeaKing and SuperG55 subsea





STAR-PAN USB hub / STAR-PAN" VI power distribution system



2016: Expanded beam fiber optics

1950

1960

1970

1980

2000

2010





Air Way, Glendale California, circa 1950



1965: Glenair manufactures the "Golden Umbilical" spacewalk cable

1972: Glenair launches Mansfield, UK factory specializing in complex cable assemblies and Micro-D flex circuitry

1980: Glenair enters harshenvironment oil & gas market with rugged connector series





1989: Glenair retools entire metal connector accessory product family with composite thermoplastic alternatives

At home in SoCal since 1956, Glenair's engineering team tackles everything from new interconnect component R&D to complex cable design and prototyping, as well as all acceptance test requirements and standards qualification programs



1990

Glenair expands Micro-D and Nanominiature connector lines with acquisition of Microway Systems



2003: Glenair revolutionizes EMI/ RFI cable shielding with microfilament technology

amberstrand"

Armori ite

2011: Series 28 HiPer-D highperformance . M24308 intermateable

2005: Glenair acquires Italian industrial/rail connector manufacturer, Commital



3-in-1 Swing-Arm strain-relief



2012: Glenair nanominiature Series 88 SuperFly

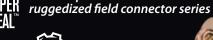




MasterWrap lightweight side-entry EMI shielding

MasterWrap







2014: MouseBud the snap-lock, trigger release soldier connector



2012: Glenair launches ruggedized electronics and photonics group





2012: Glenair introduces high-temperature Micro-D for downhole applications

Xlphalink<sup>\*</sup> 2013: AlphaLink spring-loaded solderless board level interconnect



# **Glenair Mil-Spec** Interconnect **Technologies**



Qualified Products: Glenair is a Mil-Aero connector supplier. Our product quality begins in engineering (the largest team in the high-performance interconnect business) and is realized in our "made in the USA" vertically-integrated manufacturing cells. One of the key ways we ensure both areas are functioning smoothly is to submit designs and manufactured specimens into the military QPL process administered by the Defense Logistic Agency of the US government. These certification exercises are multi-year activities that test every aspect of a connector's performance.



MIL-DTL-38999 Series III environmental connectors



MIL-DTL-38999 Series IV environmental connectors



MIL-DTL-28840 shipboard connectors and accessories



MIL-DTL-38999 Series I, II, III, and IV hermetic connectors



MIL-DTL-24308 hermetic connectors



MIL-DTL-28876 shipboard fiber optic



MIL-DTL-83513 Micro-D connectors and accessories



MIL-DTL-32139 Nanominiature connectors and accessories



MIL-DTL-29504 (fiber optic) and AS39029 (electrical) contacts



M85049 (AS85049) backshells and connector accessories



MIL-DTL-83723 backshells and connector accessories



M81511 (AS81511) protective covers and connector accessories



M85049/140 series qualified / TACOMapproved environmental shrink boots



MIL-PRF-24758 Navsea-qualified conduit and fittings



M85049 composite backshells and covers for MIL-DTL-38999

# COMMITMENT TO QUALITY

lenair is proud of the quality and reliability we build into our extensive range of interconnect solutions—from discrete connectors to complex integrated systems. Glenair is the biggest "made in the USA" interconnect supplier in the high-reliability industry. Glenair is ISO 9001:2008 and AS9100:2009 certified and registered in the United States. Our PCB and solder termination operations are also Nadcap certified. Internationally, Glenair's industrial operation in Bologna, Italy is IRIS, AS9100 SAE Aerospace and ISO 9001 certified. Our Mansfield, UK Micro and Nano connector and cable operation is likewise AS9100 certified and registered. We are laser-focused on customer service and committed to being the easiest manufacturer in our market to do business with. Here are just some of our key customer service principles:

- Lightning-fast turnarounds on quotes and special orders
- Worldwide sales and technical support in every major market
- Full-spectrum, "no gap" product lines
- No dollar or quantity minimums

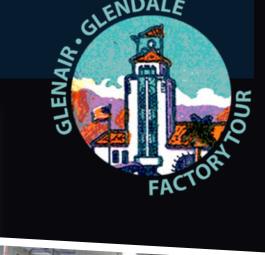
- ISO 9001: 2008 and AS9100: 2009 quality
- Huge same-day shipment inventory
- Generous NRE, RMA, and sample request policies
- Abundant engineering and technical support
- No attitudinal constraints when it comes to customer convenience and service

GLENDALE, CALIFORNIA Complete vertical integration of manufacturing resources—at home in Southern California since 1956



Glenair operates the largest precision machining facility in the high-performance interconnect industry, allowing us to support both small and large-volume interconnect requirements—from one piece to 100,000









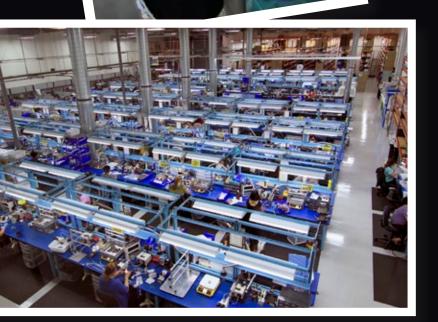


GLENDALE, CALIFORNIA Complete vertical integration of manufacturing resources—at home in Southern California since 1956





Glenair design, engineering, and fabrication capabilities extend to both electrical as well as optical connectors, cables, and complex integrated assemblies—all under one roof and one worldwide quality system







GLENDALE, CALIFORNIA

Special behind-the-scenes tour of Glenair's hydrostatic test lab for high-pressure subsea GLENDALE

electrical and fiber optic interconnects



CONNECTOR TESTING: All Glenair subsea nterconnects are subjected to 100% inspection and test

CONTROL ROOM: The modular consoles in the control room provide for up to 8 pressure circuits, operating in Manual mode or Automated. Each circuit is capable of a maximum of 16.5K psi. Monitors display: Automated Test Profiles, Data Acquisition, remote viewing of Test rooms and more. System is network connected for access to Profiles and distribution of test reports.





3. Hydrostatic test lab control room

4. Production staging



5. Small connector pressure test bunker

2. Large cable and subassembly pressure test bunker



TECHNICAL STAFF: Knowledgable and trained subsea specialists perform both in-house product qualification testing, as well as customer



SeaKing<sup>™</sup> and SuperG55<sup>™</sup> QUALIFICATION TESTING: Both Glenair Series 70 SeaKing and SuperG55 rugged dry-mate subsea connectors have been tested and qualified to their 10K psi pressure rating—open-face and mated—in Glenair's state-of-the-art hydrostatic test lab. Additional testing included mating cycles, salt spray, and electrical continuity.

Glenair Hydrostatic Test Lab Technical Specifications and Pressure Test Standards	
Pressure test profiles	Automated or manual
Maximum test pressure	16.5K psi
Data acquisition types	Pressure, time, temperature, and electrical performance
Performance monitoring under pressure	I/R, continuity, insertion loss, and backreflection (optical)
Industry profiles	All major oil & gas standards
Custom profiles	Yes, including customer-supplied subassemblies
Capacity (large pressure vessels)	Working volume = 12" diameter x 72" depth; Test specimen weight up to 1500 lbs.

LARGE PRESSURE **VESSELS:** Built to accommodate complete cable assemblies, mated connectors, and customersupplied subassemblies

MANSFIELD, ENGLAND

Mission-critical interconnect technologies for the UK and European markets with a special focus on micro and nanominiature flex assemblies



#### MICRO AND NANOMINIATURE HARNESS AND FLEX ASSEMBLIES



Terminated and tested flexi and rigid flexi point-to-point assemblies with Glenair Micro and Nano interconnects



Complex multibranch flexi and rigid flexi assembly with Glenair Micro and

Micro and Nano wired harnesses and pigtails

#### MOULDED ENVIRONMENTAL INTERCONNECT COMPONENTS AND COMPLEX ASSEMBLIES



In-house moulded shrink boots and multibranch cable transitions



Color-coded overmoulded power and signal cable assemblies



Complex integrated Micro assemblies with machined chassis

#### **MWDM MICRO CONNECTORS**



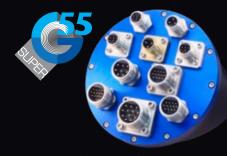
**ESCC** series Micro connectors for ESA space and other UK and EU markets

#### **TOOLING**



Complete range of interconnect tooling including GroundControl Earth Bond system

#### **SUPERG55 SUBSEA**



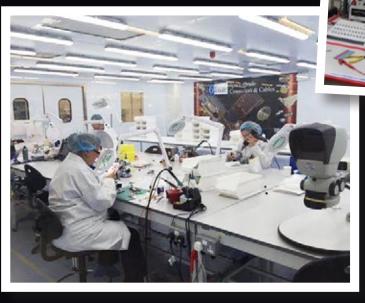
Oil & Gas industry subsea connector series



Micro-D and Nanominiature harnessing is completed in our ISO 9001:2008 and BS EN 9100:2003, BS EN 9120:2005 certified facility



The Glenair Mansfield clear room assembly area is used for fabrication of laser, space, and satellite assemblies **IAW ISO Class 8** -100,000 PPM



Glenair UK operates an independently accredited BS9000:CECC:IECQ test lab for both internal as well as third-party product development / design verification and connector qualification

BOLOGNA, ITALY
Glenair Italia serves harshenvironment military, transportation,
rail, and industrial markets
with power, high-speed Ethernet,
hazardous-zone connectors and more.



### SUPER ITS™ HIGH-PERFORMANCE REVERSE BAYONET



Higher temperature and ampacity rating with rigid insert and mechanical contact retention

#### ITS-Ex HAZARDOUS ZONE CONNECTORS



IECEx / ATEx qualified explosive zone 5015 type reverse-bayonet connectors for Group IIC, Temperature Classes T6 and T5, Zones 1 and 2

#### **CIRCULAR HEAVY-DUTY POWER AND SIGNAL CONNECTORS: 5015 TYPE DERIVATIVES**



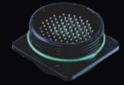
Series ITS reverse-bayonet



Series ITH rigid insert



Series IT threaded coupling



Series ITZ triple-start coupling



high-temperature ceramic insert

#### **OCTOBYTE SERIES RUGGEDIZED ETHERNET CONNECTOR**





Ethernet Cat7A contacts



Ethernet Cat5



Coax Ether contacts WBT



Ethernet MVB -WBT contacts



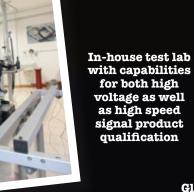
**HIGH-VOLTAGE POWER** 

Series IRT rectangular multipole high voltage traction motor connectors

Total vertical integration includes in-house contact fabrication



In-house injection molding (far left) and resilient insert processing (left) provides Glenair Italia with all the resources required to fabricate interconnect technologies from scratch without dependence on outside suppliers



Glenair Italia hosts the most modern and comprehensive interconnect plating facility in Europe





# INTERCONNECT SOLUTIONS

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