

A large American flag is being held by a line of soldiers in camouflage uniforms on a baseball field. The flag is spread across the width of the field, with the stars and stripes clearly visible. In the background, a large crowd of spectators is seated in the stadium stands. The scene is set during a game or event, with various advertisements and signs visible on the outfield fence.

# QwikConnect

GLENAIR APRIL 2016 VOLUME 20 NUMBER 2

## Celebrating 60 Years of Interconnect Excellence



### PLUS THREE NEW INTERCONNECT TECHNOLOGIES FOR 2016:

- ITS-Ex Hazardous Zone Connectors
- STAR-PAN™ USB Hub/Power Distribution System
- MasterWrap™ Self-Wrapping EMI/RFI Shielding



# Celebrating 60 Years of Interconnect Excellence

by **Chris Toomey, President**

Pretty proud moment for all of us at Glenair: 2016 marks our 60<sup>th</sup> year serving the high-performance interconnect industry with solutions designed, made and marketed in our original factory site on Air Way in Glendale, California. Today, our Southern California campus has grown to over 1 million square feet, making Glenair the biggest “made-in-the-USA” interconnect supplier in the hi-rel business. And of course we now produce a much wider range of solutions than we did when we first got started: From industry-standard and qualified offerings such as MIL-DTL-38999 Series III, to ultraminiature solutions like the Series 80 Mighty Mouse, Glenair has become a go-to supplier to the world’s biggest and most innovative OEM equipment manufacturers.

We like to think of ourselves as a “uniquely responsive” interconnect company of scale. I believe no other Mil-Aero interconnect supplier combines the service-levels of our technical support team, the productive capacity of our first-world based factories, the speed and availability of our massive same-day inventory, and our willingness to tackle even the most challenging interconnect problems—from small quantity specials to complex cables and integrated interconnect systems. One of our greatest sources of pride is our appetite for new product innovation, even as we maintain support for the broad range of legacy and industry-standard interconnect technologies. Above all, we pride ourselves on being an easy company to work with: we take our guiding principle to “build win-win business relationships” to heart in all our activities.

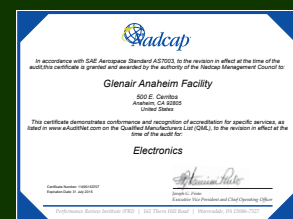
Glenair is also proud of the quality and reliability we build into every connector. It’s no mistake that our commitment to keeping our operation right here in Southern California has allowed us to consistently meet the challenging standards of both our customers and regulatory agencies. As a qualified supplier of numerous Mil-Spec connector series—38999, 85049, 83513, 32139, 28840, 29504 and others—we know first hand how difficult this work can be. But having been involved with Glenair for nearly 40 years—first as a manufacturer’s representative and ultimately as the company’s president—I believe we couldn’t be better positioned to continue to win and keep our reputation as a world-class supplier of these critical interconnect technologies.

The following pages are a bit of a “rah rah” session, celebrating just how far we have come in 60 years of business, as well as highlighting some of the key elements that make up the “complete solution” we deliver to our customers. On behalf of all my colleagues here at Glenair, I’d like to thank our customers for 60 years of profitable business and invite you to stick around—with confidence—for all the goodness yet to come.

*Chris Toomey*



Glenair is ISO 9001 and AS9100 certified and registered in the United States. Our electronic cable and harness assembly 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.

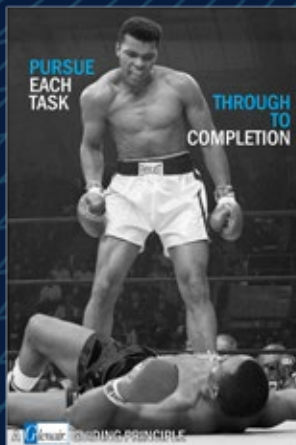
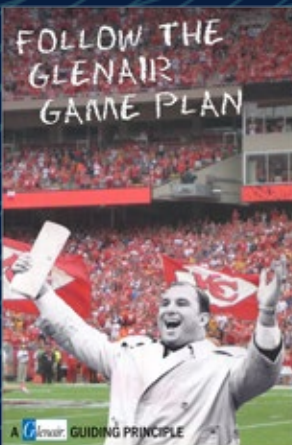






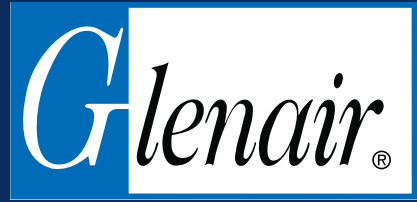
# The Glenair Guiding Principles

These guiding principles are the "backbone" of Glenair's unique approach to customer service and sustainability





# 60 Years of Growing Factory Capabilities



Glenair currently offers more than 30 unique, high-reliability interconnect technologies and product families. Our factories are organized in modular cells, each maintaining all the necessary capabilities to service their customers and markets with fast turnaround and outstanding technical support. Here is a quick tour of our current capabilities on the occasion of our 60<sup>th</sup> anniversary



Our in-house interconnect testing and product qualification laboratories manage design verification and standards compliance for application environments from inner space to outer space



Glenair innovation in the use of engineering thermoplastics is well-known in our industry and is supported by a complete range of injection molding equipment for small and large components



Glenair's engineering team tackles everything from discrete interconnect component part design to integrated systems, printed circuit boards, cable assemblies, as well as acceptance test requirements and assembly procedures



Glenair connector machining and box milling facilities are the largest in the interconnect industry, with ample capacity for both small and large production runs.



In-house clean room facilities for PCB and flex circuit fabrication as well as EMI/RFI filter array and opto-electronic system assembly distinguish Glenair from virtually every other supplier of high-performance interconnect solutions



A small selection of Glenair's total capacity in interconnect assembly, termination, and cable overmolding



Glenair manages most of our tooling requirements in-house, including design and fabrication of both rigid dielectric and environmental sealing components



Glenair composite injection molding cell, with plenty of room for future growth

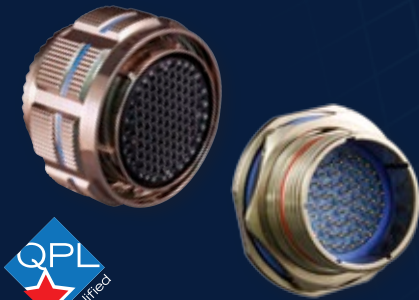




# 60 Years of Mil-Spec Performance



**Qualified Products:** Glenair is a Mil-Aero connector supplier. Our product quality begins in engineering and is realized in manufacturing. One of the key ways we ensure these areas are functioning smoothly is to submit designs and physical 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 (pending)



MIL-DTL-28840 shipboard connectors and accessories



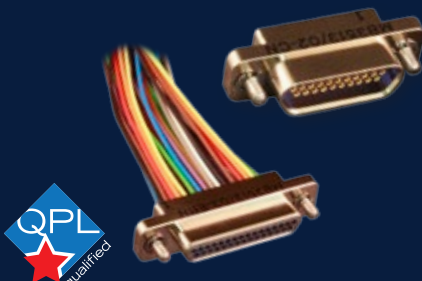
MIL-DTL-38999 Series I, II, III, and IV hermetic connectors



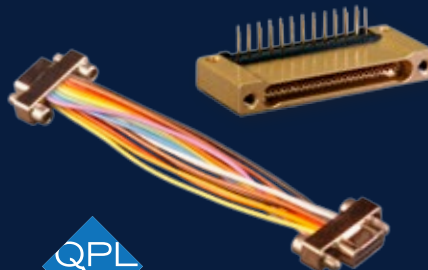
MIL-DTL-24308 hermetic connectors



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



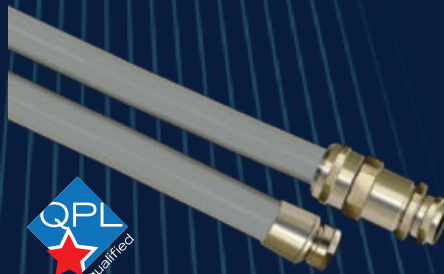
MIL-DTL-83723 backshells and connector accessories



M81511 (AS81511) protective covers and connector accessories



TACOM-approved environmental shrink boots



MIL-PRF-24758 Navsea-qualified conduit and fittings



MIL-DTL-38999 composite backshells and connector accessories

Glenair's mil-spec qualified interconnect technology is specified by EVERY major military/aerospace company in the world. For many of these OEM, system, and sub-system manufacturers, Glenair has become their principal interconnect design partner and supplier—especially for the most challenging and difficult components they buy.





# 60 Years of Interconnect Innovation



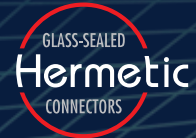
1956: Glenair founded to produce a universal Mil-Spec connector cable clamp, the G1



1965: Glenair's first connector product: the Sav-Con® Connector Saver



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



1988: Glenair launches hermetic connector product series



1980: Glenair expands metal-core conduit product line to include high-temperature thermoplastics

1950

1960

1970

1980



Grand Central Terminal, Glendale, Ca

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



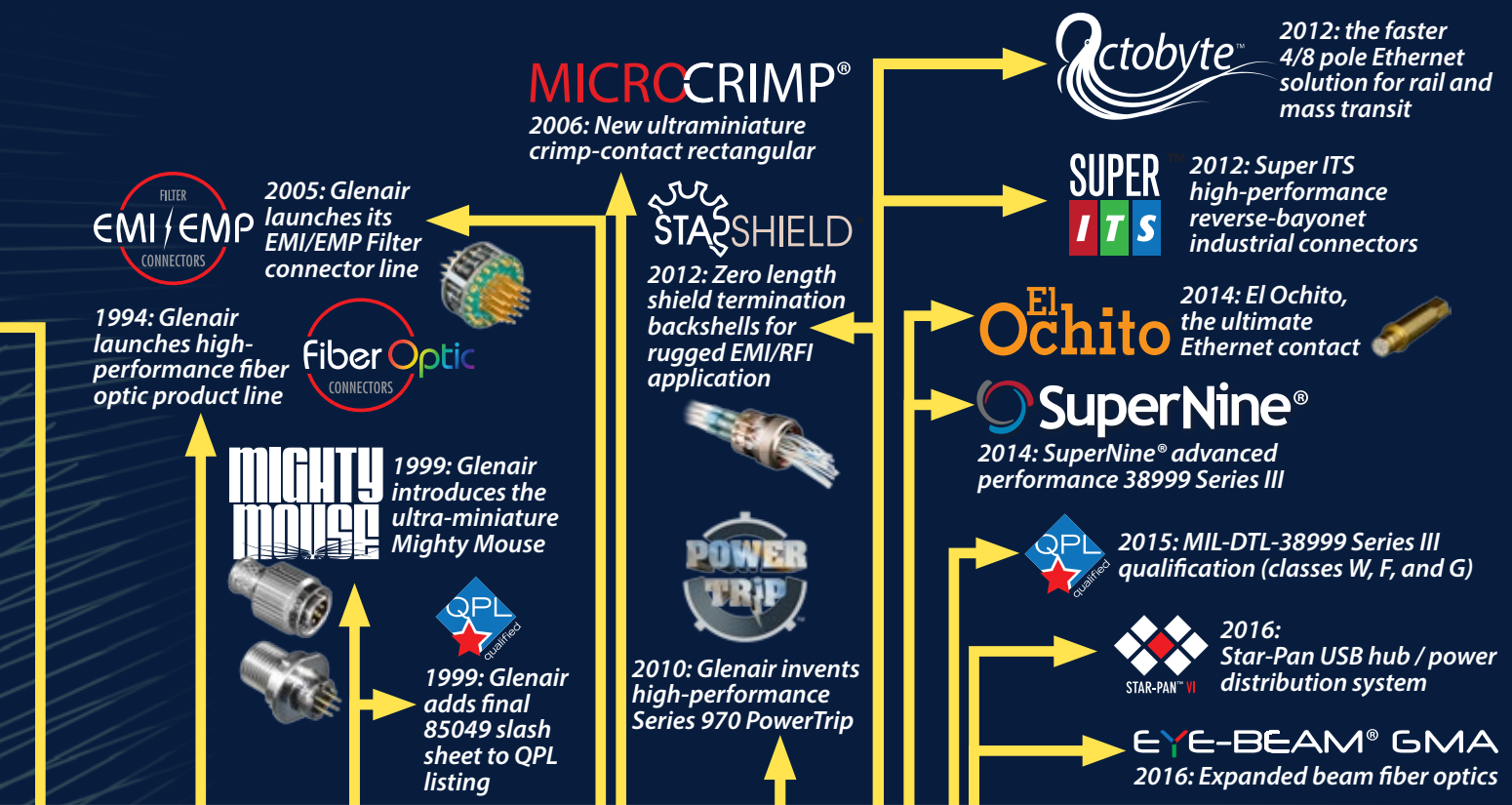
1980: Glenair enters harsh-environment oil & gas market with rugged multipin connector series



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







1990                      2000                      2010                      2020                      2030





# New for 2016



## SERIES ITS-Ex

# Industrial-strength power and signal connector series qualified for use in hazardous zone interconnect applications

**D**esigned for safe operation in petrochemical refineries, oil & gas drilling platforms, and other explosion zone applications, the Glenair ITS-Ex series connector is optimized for life-of-system durability and reliability. Qualified by the globally-recognized IEC and IECEx standards bodies, the connector series is suitable for use in application areas where flammable gases and vapors are present as a normal condition of operation (group IIC) and with temperature classes T6 and T5, zones 1 and 2; and for applications where potentially flammable dust is present as a normal condition of operation (group IIIC) and with temperature classes T80°C and T95°C in zone 21 and 22.

Series ITS-Ex is designed for easy and repeatable termination of armored and unarmored cables built to IEEE 45, IEC, BS, DIN, and JIC standards. A full range of power and signal contacts, from size #16 to size #0 in over 40 insert arrangements are available to address all common voltage, wire size and connector service class ratings.

Special Ex design attributes of the series include an integral labyrinth flame path cooling zone, 2-part epoxy potting well, fixed in-line receptacles for attachment of cables to cable management brackets and trays, set screw (grub screw) secured protective safety covers, and durable life-of-system Ex marking labels.



- Utilizes all standard features of 5015 inserts, contacts, tools, etc.
- Grub screws (set screw) to lock coupling nut
- Long plug barrels provide cooling zone
- Labyrinth gas exit port/pathway augments cooling
- Accessory accommodation for potted glands
- Increased wall thickness
- Stainless steel and Marine Bronze available



# SERIES ITS-EX IECEx/ATEX Qualified Explosive Zone Connectors

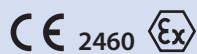


## RANGE OF APPLICATIONS

- Automotive refuelling or petrol stations
- Oil & gas extraction
- Oil refineries
- Gas pipelines and distribution
- Chemical processing plants
- Aircraft refueling and hangars
- Transportation
- Pharmaceuticals
- Food processing
- Metal surface grinding
- Sugar refineries
- Grain handling and storage
- Coal mining



### ATEX Marking



II 2 G Ex db IIC T6, T5 Gb  
 II 2 D Ex tb IIIC T80°C, T95°C Db IP68  
 -40°C ≤ Tamb ≤ +40°C (T6, T80°C) or +55°C (T5, T95°C)

### IECEx Marking

Ex db IIC T6, T5 Gb  
 Ex tb IIIC T80°C, T95°C Db IP68  
 -40°C ≤ Tamb ≤ +40°C (T6, T80°C) or +55°C (T5, T95°C)

Glenair ITS-Ex series encompasses both in-line cable plugs and receptacles as well as fixed bulkhead-mountable designs



# April 2016 Innovation LOLLAPALOOZA



## HiBeam

The Flashlight Connector

Say Goodbye to  
Blind Mating!

Hi-Beam Series,  
Rack and Panel

2 and 4 Beam Layouts • Up to 1100 Lumens •  
Direct DC Power or Rechargeable



## Series 824L Combo-Lock Push-Pull Mighty Mouse

Tamper Proof • User Configurable  
Day-Glo Numbering • 10,000  
available combinations

Safe,  
Secure  
**MIGHTY  
MOUSE**



## RainMan Series RF Antenna with Integrated IP66 Environmental Protection

Tactical nylon • Retractable •  
Sun and Water Resistant



Economical Size  
and Weight  
Reduction

## SuperMirage Series 321 Backshells

For New Designs and  
Retrofits • Daisy Chain for  
Compound Performance



## Interconnect Tool Storage IAW Lean 5S Six Sigma

Fingertip Tool Access •  
Removable for  
Scheduled Lunch and  
Bathroom Breaks •  
Latex-Free • Available  
First Aid Kit

**LATEX  
FREE**





### FOD Filter Adapter IAW MIL-STD-801 D Sand and Dust

Hybrid Design • Field Cleanable •  
Dishwasher Safe • European Styling



### Manportable Reel with “WipeTech” Technology for Easy Expanded Beam Fiber Optic Field Maintenance

Proven Performance • User-Configurable Roll  
Replacement (see fig. 1)

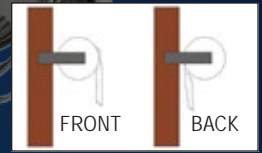


fig. 1

BO  
S



### Super ITS “Turbo”—with Integrated Cooling—for High-Temp Applications

Multiple speed settings • Optional  
rotating feature • Plug and Receptacle  
Configurations



### RoHS Compliant, All Natural Junction Box Surface Treatment Non-Conductive Cow Hide (CH)

Cadmium and Hexavalent Chromium Free •  
Methane Outgassing Available • Non-Galvanic



### GammaJack Inter- continental EMP Protection for Manned and Unmanned High-Altitude Operation

Bipolar and Unipolar TVS Diodes  
Available • RTCA/DO-160 Compliant •  
Batteries Not Included





# New for 2016



## WARFIGHTER TOUGH

# STAR-PAN™

## USB Hub / Power Distribution Interconnect Systems

**R**uggedized soldier-worn electronics have revolutionized mission effectiveness. But the evolution of advanced radio communications, tactical video, night vision technologies, GPS/navigation, blue force tracking, personal computing and smart phones have added significant mission weight to the dismounted soldier ensemble. Battery power management for this broad range of electronic gear is a significant challenge in terms of mission time, weight and supply logistics. The Glenair STAR-PAN™ data hub and power distribution system enables soldiers to make the most of

Personal Area Network (PAN) devices—improving situational awareness, surveillance, intelligence and reconnaissance—while optimizing power monitoring, conditioning, and distribution performance.

Importantly, all STAR-PAN™ technologies, from field-proven Glenair connectors and cables to the low-profile hub enclosures are designed for optimal size, weight, and ruggedized mil-spec performance. Glenair STAR-PAN™ connectors and hubs cut their teeth in the US Army Nett Warrior program—at the time the world's most advanced future soldier platform.

Glenair's Tactical Interconnect Solutions team is backed by six decades of proven, made-in-America interconnect industry performance in service of US and allied armed forces



STAR-PAN™ packaging reduces heat and increases power efficiency and battery life

### STAR-PAN™ ADVANTAGES

- Versatile 2, 4, and 6-port USB high-speed hub configurations
- Compatible with USB 1.1, USB 2.0, and SMBus
- Embedded power charging/conditioning electronics in all designs
- Smart power monitoring for longer mission life
- Robust circuit protection
- IAW MIL-STD-810 harsh-environment standard

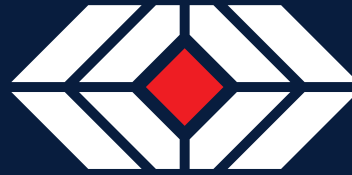




WARFIGHTER TOUGH

STAR-PAN™

USB Hub / Power Distribution  
Interconnect Systems



TACTICAL  
INTERCONNECT  
SOLUTIONS

## STAR-PAN™ USB HUB AND POWER DISTRIBUTION TECHNOLOGIES



Glenair STAR-PAN™ USB hub and power distribution interconnect systems are engineered and manufactured under one ISO 9001 and AS9100 certified quality system in our 1,000,000 sq. ft Southern California factory. All components, from the I/O interconnects to the precision-machined enclosures are produced in-house by Glenair. The STAR-PAN™ system is designed for maximum compatibility with non-proprietary Ethernet\* and USB data interfaces, and is capable of smart charging and power distribution for the broad range of military batteries, as well as from Direct Current (DC) power sources including vehicle power, solar panels, kinetic energy devices and fuel cells.

\* Requires STAR-PAN™ Ethernet Adapter

### STAR-PAN™ II

- Universal PAN compliant ports (up to two devices)
- 1 designated host/EUD port
- 1 designated radio peripheral port
- 1 expandable PAN port for up to two USB peripherals
- Hot-swappable power sources
- Radio-supplied backup power
- Glenair power port management



Lightweight,  
non-reflective,  
power and data hub for tactical  
radios and peripheral devices



STAR-PAN™ II



Ultraminiature  
form factor:  
.50" thick, 3.75" wide, 4.25" tall



STAR-PAN™ IV

### STAR-PAN™ IV

- Universal PAN compliant ports (up to four Devices)
- 1 designated host/EUD port
- 4 PAN ports for up to four peripherals
- Battery and auxillary power source input
- Glenair power port management
- Smart battery charging from auxillary power
- Up to 5A battery power per port, 5A system total
- Up to 3A 5 Volt VBUS power per port, 5A system total

### STAR-PAN™ VI

- Universal PAN compliant ports (up to six devices)
- 1 designated host/EUD port
- 2 designated radio peripheral ports
- 4 PAN ports for up to four peripherals
- Battery and auxillary power source input
- Glenair power port management
- Radio-supplied backup power
- Smart battery charging from auxillary power
- Up to 5A battery power per port, 5A system total
- Up to 3A 5 Volt VBUS power per port, 5A system total



The ultimate  
data backplane, power  
monitoring and distribution hub for  
tactical soldier systems



STAR-PAN™ VI



WARFIGHTER TOUGH

STAR-PAN™

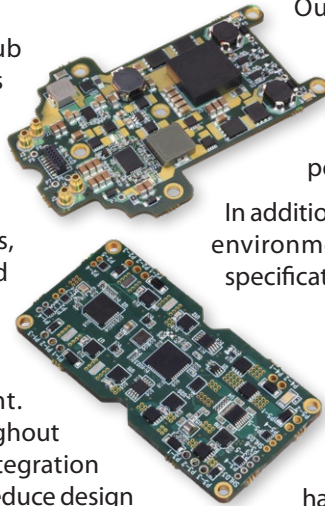
## USB Hub / Power Distribution Interconnect Systems



### STAR-PAN™ RUGGEDIZED POWER AND DATA HUB PCB TECHNOLOGY

#### GOING ALL-IN FOR THE WARFIGHTER

The heart of the Glenair STAR-PAN™ USB hub and power distribution interconnect system is a micro-controlled embedded system with surge and voltage protection, temperature sensors, smart-charge controllers, and USB/SMBus management circuits. Glenair provides complete system design solutions, from connectorized printed circuit board engineering (including PCB schematic and layout), mechanical package system (i.e. thermal, stack-up, vibration and so on), software, firmware and FPGA development. Glenair system engineers are available throughout the process with real-time, on-site system integration and troubleshooting support to dramatically reduce design cycle time and cost.



Our design team is laser focused on optimized systems suited for applications such as ground soldier systems, unmanned aerial vehicles, robotic systems, field sensors, and other systems where attention to SWaP and rugged performance are paramount.

In addition, our PCB technologies are designed to stringent environmental, electromagnetic, and mechanical stress specifications including:

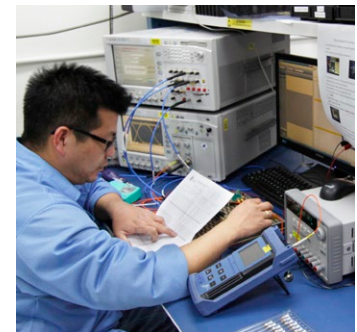
- MIL-STD-810G harsh environment
- MIL-STD-461 electromagnetic compatibility
- MIL-STD-1275 land vehicle power

Acceptance test stations and software, leveraging LabView, Visual Basic and other tools, have been developed in-house by Glenair to support comprehensive board qualification and testing.

> STAR-PAN™ ruggedized technology includes tactical nylon packaging built for easy integration and maximum durability



> Our Tactical Interconnect Solutions Team includes mechanical and electrical engineers who manage PCBA design and fabrication, FPGA / firmware programming, PCB layout, wet processing and more. System debug and acceptance test professionals also play key roles in every program.



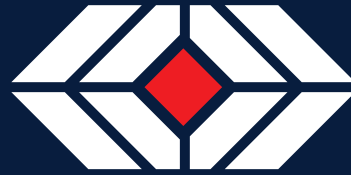
Glenair assembly technicians support both rapid prototyping as well as full-production programs. Our dedicated team ensures final subsystem assemblies meet every rugged performance requirement, including resistance to vibration, shock, and other mechanical stress factors.



WARFIGHTER TOUGH

STAR-PAN™

USB Hub / Power Distribution  
Interconnect Systems



TACTICAL  
INTERCONNECT  
SOLUTIONS

**TACTICAL SOLDIER-SYSTEM INTERCONNECT SOLUTIONS**

Unlike most suppliers of soldier C4ISR interconnect technology, Glenair is not just a system integrator. We design and manufacture all of the core components in our STAR-PAN™ hubs, ruggedized cable assemblies, flex circuit assemblies, and enclosures. This page presents six tactical Glenair connector series, field-proven in a broad range of warfighter applications.

**MIGHTY  
MOUSE**



Series 824 locking  
quick-disconnect

Series 804 breakaway  
quick-disconnect

**SuperFly®**



The ultimate  
nanominiature tactical connector

**MOUSEPOD™**



Low-profile, snap-  
lock, trigger-release  
connector for  
wearable soldier  
systems

**HiPer 55116**



HiPer 55116 advanced-performance audio frequency  
connectors

**BB-2590  
BA-5590 Battery  
CONNECTORS AND CABLES**



Military battery connectors and cables

**RJ45/USB  
SUPER  
SEAL™**



Small form-factor field USB connectors



**STAR-PAN™ SYSTEM HOST, PERIPHERAL, RADIO, AND HUB CHARGING CABLE ASSEMBLIES**

Glenair STAR-PAN™ USB hub and power distribution interconnect systems are optimized with embedded power conditioning and charging electronics which allow the hub to utilize both primary battery as well as scavenged power from direct current sources such as transport vehicles and power cells. Dedicated adapters and cabling for all charging functions as well as interconnect cabling for the broad range of soldier peripherals, radios, and computer EUDs are also supplied. Glenair STAR-PAN™ system cables utilize field-proven Mighty Mouse Series 804 connectors, and are optimized for durability, flexibility, and environmental sealing.

General-Purpose STAR-PAN™ System Cables		
<p>NETT Warrior (C1) Extension Cable</p>  <p>808-047</p>	<p>Bifurcated Cable with 5V Regulator</p>  <p>808-054</p>	<p>C4 Micro USB EUD Host Cable</p>  <p>808-046</p>
STAR-PAN™ Peripheral Device Cables		
<p>STAR-PAN™ Ethernet Adapter</p>  <p>808-074</p>	<p>USB Flash Drive</p>  <p>808-002</p>	<p>USB 2.0 Adapter Cable</p>  <p>808-053</p>
<p>DAGR GPS/Navigation Cable</p>  <p>808-040</p>	<p>TacROVER P ISR Receiver Cable</p>  <p>808-045</p>	<p>PLRF-15C/25C Laser Range Finder Cable</p>  <p>808-049</p>

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



Open system  
tablets and  
Android smart  
phones



Laser range finders  
and IR goggles



DAGR and  
other GPS /  
navigation  
systems

TacROVER  
ISR receiver

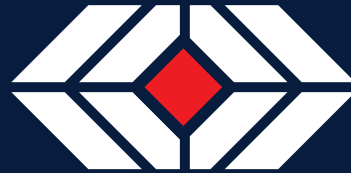




WARFIGHTER TOUGH

**STAR-PAN™**

USB Hub / Power Distribution  
Interconnect Systems



**TACTICAL  
INTERCONNECT  
SOLUTIONS**

STAR-PAN™ Power Adapters			
Cigarette Lighter Power Adapter  808-059	AC/DC Power Adapter  808-064	BB5590 / 2590 Battery Adapter  808-048	Hand-Held Radio Battery Adapter  808-066
STAR-PAN™ Radio Data / Power Cables and Adapters			
Microlight Radio Data Cable  808-044	PRC-148 Radio Data Adapter  808-039	PRC-152A Radio Data Adapter  808-032	PRC-154 Rifleman Radio Data Adapter  808-051
STAR-PAN™ Miscellaneous System Cables and Accessories			
Coil Cord Audio Cable  808-019	STAR-PAN™ Molle Pouch  COTS and made-to-order designs: consult factory		STAR-PAN™ Smartphone X-Frame  8071-5058

**EXAMPLES OF STAR-PAN™ SUPPORTED RADIOS**



PRC-117G manpack and vehicle-mounted radios

AN/PRC 154 Rifleman radios

JTRS PRC-148 radios

Hand-held tactical PRC-152A radios

**STAR-PAN™ SUPPORTED PRIMARY BATTERIES AND DIRECT CURRENT AUXILIARIES**

STAR-PAN™ incorporates embedded charge control circuitry for smart battery interface with a wide charge voltage range.



BB-2590 or BA-5590 battery

Conformal Wearable Battery (CWB)

Universal field charging station

Handheld radio battery





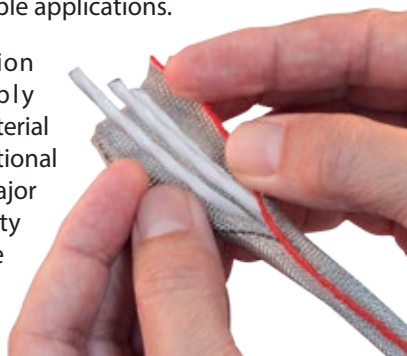
SERIES 103

# MasterWrap™

Lightweight, side-entry EMI/RFI cable wrap  
with **ARMORLITE™** technology

**T**ubular braided sleeving meets the broad range of shielding and mechanical protection requirements of harness assemblies. But the need to apply conductive shielding materials over installed aircraft wire and cable bundles requires new technology. Legacy self-wrapping cable braid has long been available for EMI/RFI applications and abrasion protection, albeit with poor performance due to its heavy weight, inflexibility, and "windowing," which results in poor shielding performance. MasterWrap™, a lightweight, easy-to-install, side-entry, self-wrapping shielding solution solves these problems and more. MasterWrap™ is ideally suited for both long-run wire harness protection as well as spot coverage and maintenance of EMC cable applications.

Glenair MasterWrap™ is both a weight reduction technology as well as an ease-of-assembly improvement for wire and cable protection. The material offers significant weight savings compared to traditional copper braid, and is already qualified for use at major aircraft manufacturers. MasterWrap™ adds flexibility and reparability capabilities to wire and cable harness applications traditionally shielded with tubular braid—from long runs to spot coverage and repairs.



MasterWrap™

- **Saves weight:** 70% material weight reduction compared to QQ-B-575 / A-A-59569 nickel copper
- **Simplifies installation:** Replaces harder-to-install tubular EMI/RFI sleeving
- **Saves time:** Fast and easy side-entry installation and removal
- **Improves EMI/RFI shielding:** Reduces windowing and coverage gaps
- **Improves mechanical performance:** Delivers superior flexibility, durability and reparability



# MasterWrap™ flexible, lightweight wraparound shield braid

## for spot coverage and repair of wire harnesses

### MASTERWRAP™ KEY FEATURES AND PERFORMANCE

- Side-entry wrap-around design delivers outstanding EMI/RFI shielding with easy assembly and maintenance
- Core materials ideally suited for a broad range of temperature extremes from -65°C to 200°C
- Breakthrough weight reduction technology for electrical wire interconnect systems: up to 70% weight reduction compared to standard metallic EMI shielding
- High-frequency EMI shielding performance comparable to standard metallic braid as well as lightweight tubular braid designs
- Halogen-free and RoHS compliant
- 500 hour salt spray corrosion resistance
- 50,000 cycle 90°–120° bend flex tested
- Outstanding caustic chemical and corrosive fluid resistance

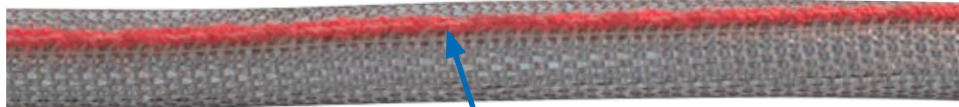
### MATERIAL CONSTRUCTION, SIZE COLOR CODING, AND HANDLING PERFORMANCE

- Flexible material eliminates kinking and windowing
- Spring members ensure shielding stays tight to wire bundle

Ultra-lightweight microfilament stainless steel core, plated with conductive nickel for outstanding shielding performance



MasterWrap™ is interwoven with high-temperature PEEK composite thermoplastic spring members that ensure up to 95% optical coverage



Color-coded MasterWrap size indicator

- Material design provides uniform surface with limited interference to structures and clamps during installation and routing
- Provides optimum surface coverage and adherence to bundle without buckling during both straight and angled routing
- Delivers increased abrasion protection with additional axial edge strength members compared to standard tubular braided shielding
- Reduces kinking and windowing compared to full metal braid solutions, and as a result delivers excellent shielding performance, particularly at high frequencies

### HERE'S WHAT YOU NEED TO KNOW ABOUT WEIGHT

Weight of standard metallic tubular braided cable shielding		
EMI Braided Shielding Type (measured samples all 1/2" diameter)	Weight g/ft	Weight g/m
Glenair nickel-clad copper braid	21.6	70.9
Raychem RAY-103-12.5 nickel-clad copper braid	21.9	72.0
Weight of lightweight tubular (LWB) braided cable shielding		
AmberStrand® 100%	3.7	12.1
AmberStrand® 75% / NiCu 25%	4.9	16.1
ArmorLite™ 100%	4.4	14.4
ArmorLite™ 75% / NiCu 25%	5.4	17.7
Raychem INSTALITE	13.4	44.0
Weight of side-entry self-wrapping braided cable shielding		
MasterWrap™	6.2	20.3
Federal Mogul ROUNDIT® EMI FMJ	18.0	59
Federal Mogul ROUNDIT® EMI C27 XWS	23.5	77



103-079

# MasterWrap™ flexible, lightweight wraparound shield braid

## for spot coverage and repair of wire harnesses

### MasterWrap™

Made from our own ArmorLite™ lightweight microfilament stainless steel braid, plus thermoplastic (PEEK) spring members—up to 70% lighter than standard NiCu braid



Qualification Test Plan (QTP) QTP-405 summary results. For more information or for a copy of the full report, please contact the factory

#### ABOUT ARMORLITE™ TECHNOLOGY

### ARMORLITE™

ArmorLite™ is an expandable, flexible, high-strength, conductive stainless steel microfilament material designed for use as EMI/RFI shielding in high-performance interconnect cabling. The principal benefit of ArmorLite™ is its extreme light weight compared to conventional Nickel/Copper shielding. By way of comparison, 100 feet of 5/8 inch ArmorLite™ is more than four pounds lighter than standard 575 A-A-59569 shielding.

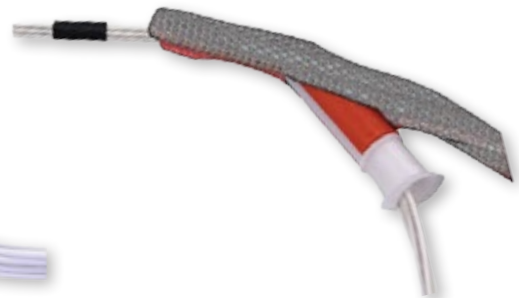
- Ultra-lightweight EMI/RFI braiding for high-temperature applications -80°C to +260°C
- Microfilament stainless steel: 70% lighter than NiCu A-A-59569/QQB575
- Superior flexibility and “windowing” resistance: 90 to 95% optical coverage

MasterWrap™ Mechanical and Environmental Performance Summary		
Vibration	No evidence of wear or visible defect	DO-160G Cat S and H
Abrasion	No evidence of wear, visible defect or electrical degradation	EN-3475-511:2002
High Temperature Exposure	168 hours at 200°C; no visual or electrical degradation	EN 6059-302 part 302
Rapid Change of Temperature	10 hour hot and cold cycling; no evidence of wear or visible defect	EN 6059-308 part 308
Vertical Flammability	Pass	14 CFR part 25.853
Fluid Immersion Testing	No visual or electrical degradation	DO-160G
Bending Properties	25000 cycles; no breakage, no plating delamination	EN 6059-402
Salt Fog 500 Hours	No evidence of base metal on braid	ASTM B117-03 Sodium Chloride 5%

MasterWrap is compatible with most aerospace industry fluids. Consult factory for specifics.

#### AVAILABLE WIRE LOOM TOOL FOR EASY ASSEMBLY

Select size based on max bundle diameter



Part Number	Max Bundle Dia.
600-180-08	3/8 in (8mm)
600-180-15	5/8 in (15mm)
600-180-20	3/4 in (20mm)
600-180-25	1 in (25 mm)
600-180-32	1 1/4 in (32mm)

Easy to use: simply gather wire bundle into the tool...

...Insert tool and wires into MasterWrap and run through



103-079

# MasterWrap™ flexible, lightweight wraparound shield braid

for spot coverage and repair of wire harnesses



## WHAT YOU NEED TO KNOW ABOUT EMI/RFI SHIELDING PERFORMANCE

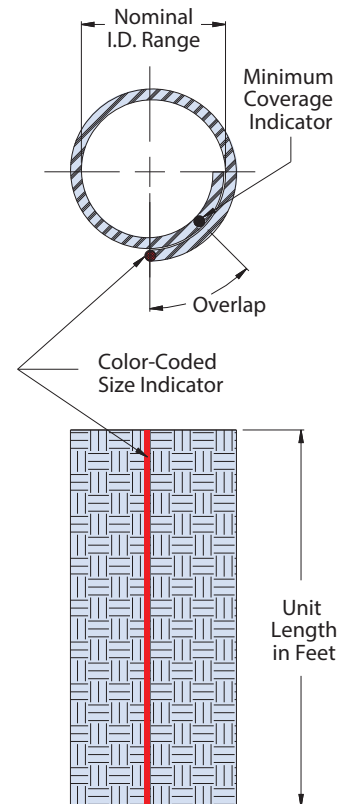
	NiCu	Armorlite™	Amberstrand®	MasterWrap™
TRANSFER IMPEDANCE (Per IEC 62153-4) (Max values for 1/2 inch diameter shields)				
<b>FREQUENCY</b>				
10 KHz	5 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
100 KHz	5 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
1 MHz	12 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
10 MHz	80 mΩ/m	50 mΩ/m	80 mΩ/m	40 mΩ/m
100 MHz	130 mΩ/m	30 mΩ/m	110 mΩ/m	80 mΩ/m
SHIELDING ATTENUATION (Per IEC 62153-4) (Min values for 1/2 inch diameter shields)				
<b>FREQUENCY</b>				
1 GHz	38 dB	55 dB	48 dB	40 dB
3 GHz	40 dB	60 dB	55 dB	35 dB
5 GHz	44 dB	60 dB	60 dB	45 dB
8 GHz	40 dB	50 dB	60 dB	40 dB
<b>WEIGHT</b>	70.9 g/m	14.4 g/m	12.1 g/m	20.3 g/m

The table at left is a useful summary of MasterWrap™ shielding performance compared to NiCu and lightweight braid. Transfer impedance as well as shielding attenuation data is supplied for 1/2" diameter test samples. At high frequencies, both LWB and MasterWrap™ provide comparable and even superior performance to reduced windowing and superior optical coverage with significant reduction in weight. Further improvements in high-frequency shielding attenuation can be achieved using conductive tape wraps and/or via hybrid blends of LWB and NiCu.

## DIMENSIONAL INFORMATION • HOW TO ORDER

How to Order      **103-079**      **-024**  
 Product Series      Dash No (See Table 1)

Dash No	Nominal I.D. (Ref)	Reference Wire Bundle Range Nominal	Approximate Weight Grams/Ft.	Approximate Milliohms per Meter	Min. Pull Strength (lbs)	Size Indicator color code
004	.125 (3.2)	.093 (2.4) .170 (4.3)	2.1	99.8	39	BLACK
008	.250 (6.4)	.170 (4.3) .300 (7.6)	4.0	52.2	75	BROWN
012	.375 (9.5)	.300 (7.6) .406 (10.3)	5.0	41.8	94	RED
016	.500 (12.7)	.406 (10.3) .520 (13.2)	6.2	34.0	116	ORANGE
020	.625 (15.9)	.520 (13.2) .675 (17.2)	8.7	24.2	158	YELLOW
024	.750 (19.1)	.675 (17.2) .825 (21.0)	10.6	20.0	193	GREEN
032	1.000 (25.4)	.825 (21.0) 1.100 (27.9)	12.9	16.4	237	BLUE
040	1.250 (31.8)	.938 (23.8) 1.312 (38.3)	17.4	TBD	TBD	VIOLET
048	1.500 (38.1)	1.187 (30.1) 1.590 (40.4)	21.2	TBD	TBD	GRAY
064	2.000 (50.8)	1.812 (33.0) 2.090 (53.1)	25.8	TBD	TBD	WHITE



## Guiding principles redux

I asked the *QwikConnect* editorial team to indulge me, yet again, by reprinting the Glenair Guiding Principles here in my outlook column. They did me one better with that beautiful array of thematic posters inside the front cover. Thanks guys. I think it pays dividends to revisit these principles time and again as they are one of the big reasons we have managed to keep this enterprise running so smoothly for these past 60 years.

There is a quote I enjoy sharing with young people from Oliver Wendell Holmes (an old Bostonian like myself) about following rules. It goes, *the young man knows the rules, but the old man knows the exceptions*. Now the reason I appreciate this wisdom is that it is so obviously true. As young people, we all do our best to understand and follow the many rules of society. After all, we have only limited experience of our own from which to form sensible standards and practices. But as we grow older and wiser, we come to learn when and how rules may be modified according to circumstances (telling a white lie, for example, if the truth is bound to hurt someone's feelings). Some rules, to be clear, should never be violated, such as prohibitions against cheating or unethical behavior in business.

Which brings me back to the Glenair Guiding Principles—notice they are not called Guiding Rules—because if they were, folks would likely be breaking them left, right and 24/7. But they are principles and not rules. They steer our behavior in a positive direction rather than dictating every possible turn in every road.

- Protect the reputation of the organization
- Bow to the customer's convenience
- Pursue each task through to completion
- Be reality oriented
- Build win-win business relationships

These are some of my favorites. Again, you can see these are principles that direct general behavior, not rules that spell out every do and don't. But make no mistake: These principles have been more powerful in establishing our culture here at Glenair—and keeping us laser-focused on customer service and ease of doing business—than any book of rules could ever be. I just love hearing my colleagues encouraging each other to “find the win-win,” or to “bow to the customer's convenience.” That's the ticket, gang!

I believe our Guiding Principles are unique in our industry and that they have saved us from making many of the mistakes that can destroy even a great company. The inverse is also true: following these principles has positively made us a better company with a better culture. If there is any confusion regarding how important these principles are in sustaining our business, please feel free to give me a call or stop by my office for a chat. My door is always open.

*Chris Toomey*

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