

# QwikConnect

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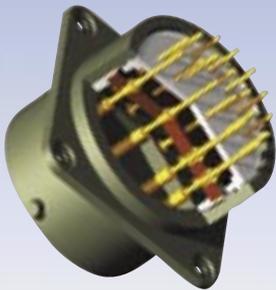
*In This Issue:*

Glenair Lights Up  
the Joint Strike Fighter

# EMI/EMP Filter Connectors

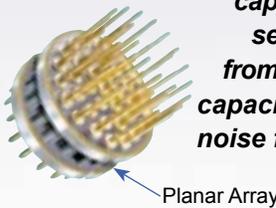


**Resolve Data Distortion  
Problems without Costly  
Printed Circuit Board Redesign**

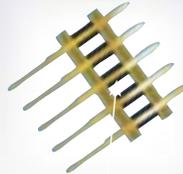


*Filter Technology Offers  
Improved EMI/EMP Shielding  
Effectiveness as well as  
Reduced Size and Weight*

*Filtering is accomplished  
through the integration of  
capacitors into the connector to  
separate high-frequency noise  
from low-frequency signals. The  
capacitors strip off the interfering  
noise from the signal as it passes  
through the filter device.*



Planar Array



Contact  
Capacitors

***Filter Technology is Available in  
Every Glenair Cylindrical Connector***

***Glenair can supply filter technology in every cylindrical connector  
standard we produce. Glenair Micro-D and other rectangular  
connector styles may also be equipped with EMI filters.***

- MIL-DTL-38999 Connectors
- MIL-C-5015 Connectors
- MIL-C-26482 Connectors
- MIL-C-83723 Connectors
- MIL-PRF-83513 Connectors
- MIL-C-28840 Connectors
- Glenair Series 80 Connectors
- Glenair Series 22 Geo-Marine®



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# New Glenair High-Reliability Fiber Optic Interconnect Technologies

It has been almost five years since *QwikConnect* last examined Glenair's high-reliability fiber optic technologies. Since then, we have developed several new fiber optic interconnection systems, hired even more of the industry's best fiber optic professionals, and expanded our factory capacity to support the design, manufacture and supply of our high-reliability fiber optic solutions.

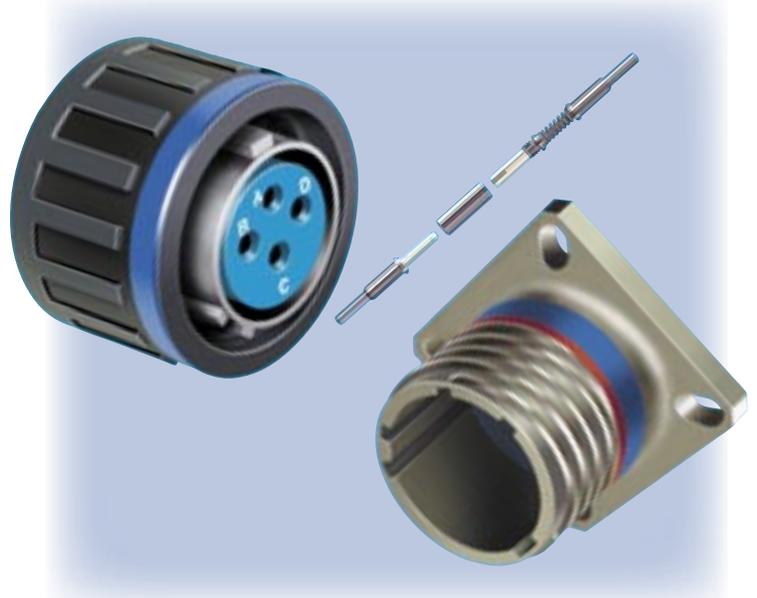
## ***Glenair's Long-Standing Tactical Fiber Optic Capabilities***

Glenair has been a long-standing leader in the development of fiber optic connection systems. By way of review, our expertise in optical interconnects for military and other high-reliability applications has focused on the MIL-DTL-38999 and MIL-PRF-28876 standards. In addition to supplying discrete components, our principal business is building custom fiber optic cable assemblies. Our turn-key service includes everything from engineering and design assistance to timely delivery of terminated and tested assemblies.

With in-house capability for short-run extruded fiber cable in a variety of styles and materials, Glenair is able to provide lightning-fast turnaround on prototypes and custom cables. Our ASAP Fiber Optic Cable service allows customers to specify a broad range of point-to-point cable assemblies without entering into a complex and time-consuming quoting process (see [www.glenair.com](http://www.glenair.com) for more information). Glenair's in-house overmolding capabilities are ideal when field reparability is not anticipated and harsh environmental and mechanical stress conditions call for extra sealed protection of fiber optic media and terminations. When field reparability is required, Glenair can also deliver fiber optic conduit systems made from highly crush-resistant and EMI-hardened protection media, including high-temperature convoluted tubing, metal-core conduit and composite junction boxes.

Glenair's MIL-DTL-38999 style fiber optic connector and termini have been designed into a

number of programs and applications from avionics to ground-based systems. We enhanced the dimensional tolerances of the standard electrical D38999 connector to meet stringent fiber optic alignment requirements. Alignment key and keyway tolerances were tightened, along with tolerances of all connector components. These improvements allow precise mating of the connectors and provide optimal termini positioning.



***Glenair MIL-DTL-38999 style fiber optic connectors and MIL-PRF-29504 qualified termini for use in Mil-Aero applications.***

Our Qualified MIL-PRF 29504/4 (pin) and /5 (socket) termini employ precision ceramic ferrules and alignment sleeve, allowing us to control fiber alignment concentricity to less than 1 micron (.00004 inch). While some manufacturers use less costly materials, Glenair has selected ceramic materials for their superior performance and durability. Connectors are available in a variety of mounting styles and materials including aluminum alloy, stainless steel, and composite thermoplastic with finish treatments such as electroless nickel, passivation, cadmium over nickel and more.

MIL-DTL-38999 style connectors and Qualified MIL-PRF-29504/4 and /5 termini are available for immediate shipment from our Same Day inventory.

MIL-PRF-28876 interconnection systems have become the universal standard for Navy shipboard applications and Glenair's offering delivers all the necessary performance—precise optical alignment, environmental protection, and corrosion resistance for shipboard environments. The Glenair MIL-PRF-28876 style interconnect is available in multiple plating and backshell options not currently included in the MIL-PRF document. Available in a variety of plug and receptacle styles, the MIL-PRF-28876 style connector is highly resistant to corrosion, environmentally sealed, very durable and designed to meet severe shock requirements. This interconnection system uses MIL-PRF-29504/14 and /15 style contacts, qualified parts will soon be available from Glenair.



***Glenair MIL-PRF-28876 style fiber optic connector and MIL-PRF-29504 style contacts for use in Naval applications.***

Glenair is the only fiber optic connector and termini manufacturer to also offer a complete line of specialized fiber optic backshells. Glenair fiber optic backshells prevent mechanical and environmental damage to fiber strands and eliminate data loss from micro-bending. Glenair offers both standard catalog backshell designs as well as custom versions in straight configurations as well as 45° and 90° angled fittings to mate with MIL-DTL-38999 and MIL-PRF-28876 and other connector types. Glenair's line of fiber optic backshells include strain-reliefs,

banding adapters, cable seals, conduit adapters and protective covers. Available materials include aluminum alloy, stainless steel, and composite thermoplastic with a range of plating options and overmolding if desired. Many of these backshells and accessories are in our Same Day inventory and available for immediate shipment.

The Glenair-patented Fiber Optic Test Probe and Connector Adapter System provide accurate, rapid and repeatable testing of even the most complex cable assemblies. Probes and adapters are available for all standard insert arrangements. Glenair also supplies fiber optic termination, inspection and cleaning systems as well as polishing and termination kits. In addition, Glenair supplies Video Bore Scopes, automated Cleaning Systems, and all the other tools required to keep system running at optimal performance.

## New Fiber Optic Technologies

### ***The Glenair High Density (GHD) Fiber Optic Connector System***

The Glenair High Density (GHD) Fiber Optic Connector System is designed for applications requiring reduced size and weight. GHD offers insertion loss values less than .5 dB with dense cavity spacing achieved using an innovative Front Release terminus design that accommodates M85045/16 simplex cable.

With nearly double the density of MIL-PRF-28876 and MIL-DTL-38999, the GHD utilizes precision SFF 1.25 mm ceramic ferrules and achieves optical performance equal to or better than the D38999 and M28876 interconnection systems. The GHD incorporates an O-ring piston seal at the connector interface that is far superior to traditional gasket sealing that can be susceptible to contamination or damage. The Alignment Sleeve Retainer (ASR) is easily removed to facilitate thorough cleaning and utilizes guide pin alignment to achieve repeatable optical performance through mating cycles. Should the ASR be damaged, it can be replaced or factory repaired.

GHD Termini are 18 AWG with a standard 1.25 mm diameter LC type precision ceramic ferrule. This smaller size not only enables greater cavity density, it also reduces weight and vibration and promotes the use of industry-standard polishing techniques. The front release termini design means the removal tool no longer needs to accommodate cable jacketing, so the contacts can be placed much closer together than in comparable rear-release designs. This innovative release system allows use of up to 2.5 mm diameter jacketed fiber cable. The built-in



***Glenair High Density (GHD) F/O connection system, available in multiple materials and platings, for use in both military and ruggedized commercial applications.***

contact strain relief crimps to the Kevlar™ strength members to achieve 30 lbs. pull strength.

O-ring sealing and terminus retention are built into the termini, eliminating potential rear grommet contamination and allowing tighter dimensional control in the one-piece insulator. If you damage a retaining clip, the damaged retention clip on the specific terminus can be replaced. A keying feature facilitates Angle Polish Connection that minimizes unwanted back reflections to better than -60 dB, and hex feature on the terminus body accommodates tuning for optimal performance. GHD termini are genderless, eliminating the need to stock pins and sockets separately.

When it comes to backshell and accessory needs, the GHD is fully compatible with MIL-DTL-38999 accessory threads. The GHD will also install into the same size MIL-DTL-38999 panel cutout, but

with higher terminus density layouts providing up to 70 channels in shell size 25, and the ability to run more fibers. Cleaning and inspection is the same as for any LC ferrule, and Glenair has a full assortment of fiber optic termination, cleaning and inspection tools available. As mentioned, the Alignment Sleeve Retainer is easily removed, cleaned and re-inserted.

The GHD is ideal for just about every MIL-PRF-28876 and MIL-DTL-38999 application where high density fiber connection is needed. GHD Connectors are available in stainless steel, aluminum, nickel-aluminum-bronze, and high-strength composite thermoplastic in a wide variety of finish treatments. Where weight reduction is paramount, such as in avionics applications, GHD composite connectors are ideal. The piston seal feature also makes the GHD attractive for geophysical environments such as down-hole drilling.

### ***Glenair Expanded Beam Fiber Optic Connection System***

The Glenair Expanded Beam Fiber Optic Connection System is ideal for harsh environments and uses proven STRATOS Lightwave™ Technology to eliminate data loss from environmental contaminants, rough handling, and repetitive mating cycles. STRATOS Lightwave™ Technology achieves superior optical performance by using laser-shaped optical-ball lens componentry that develops 800 times expansion for multimode and 2,000 times expansion for singlemode. This beam expansion virtually eliminates concerns about contamination, and the sealed optical alignment system provides superior protection from water, mud, dust, oil, and other contaminants.



***Glenair expanded beam tactical fiber optic connection system for use in environmental field applications.***

Glenair offers the complete family of STRATOS Lightwave™ expanded beam fiber optic technologies in a full range of material and plating options. Choose from four unique connector styles with 1 to 8 channels plus hybrid and electrical layouts. Hermaphroditic mating eliminates the complexity of configuring cables for daisy-chaining in field applications by eliminating dedicated plug and receptacle cable-ends. An added benefit is the reduction of part numbers and stocking requirements.

Applications for the Glenair Expanded Beam Fiber Optic Connection System include any harsh environment where optical connectors are subjected to repeated mating and unmating cycles. Some examples include lanyard-release missile fiber connections, geo-physical and down-hole settings. Glenair has integrated the STRATOS Lightwave™ Technology into standard MIL-DTL-38999 connector packages, for use in tactical military applications.

### **Glenair GFOCA Hermaphroditic Fiber Optic Connection System**

The Glenair GFOCA, designed to meet requirements of MIL-PRF-83526/16 and /17 intermateable specifications with TFOCA II®, is the ultimate harsh environment, field-deployable fiber optic connection system. Corrosion-resistant and environmentally sealed with rugged aluminum housing and inserts, the GFOCA is ideal for applications that require reliable, repeatable mating. The GFOCA is hermaphroditic, simplifying potential



**Glenair GFOCA hermaphroditic fiber optic connection system is optimized for rapid deployment in rugged field applications.**

confusion of whether plug or receptacle mating is required when stringing multiple fiber cable assemblies together.

With 2 and 4 channel designs available, the GFOCA is singlemode and multimode capable, with low insertion loss 2.5 mm diameter genderless butt-joint termini rated to 1,000 – 2,000 cycles, depending on fiber media selection. The relatively large termini are easy to handle and clean, making them ideal for field applications. The insert is removable to permit easy access to all end faces.

The GFOCA is available as discrete connectors and termini or in a spooled assembly with up to two kilometers of cable. Designed to handle low speed analog and high speed digital data transmission, the GFOCA excels for long-run tactical battlefield communications, and is used for radar systems, missile defense systems, mobile launchers, down-hole drilling, the broadcast industry, and other extremely harsh environments.

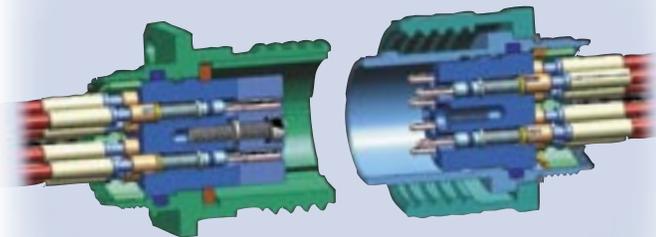
### **Next Generation (NGCON) Fiber Optic Connection System**

The emerging NGCON Fiber Optic Connection System is designed to become the new standard for shipboard fiber optic interconnect applications. NGCON combines proven technology from standard MIL-PRF-28876 and MIL-DTL-38999 designs with new innovations that include rear-release genderless contacts and high-density packaging. Glenair is an active member of the NGCON consortium designing this new interconnection system for the US Navy and other potential applications.

Available in various materials and finishes, the NGCON connector will be offered in plug and receptacle and both jam-nut and wall-mount configurations. NGCON will incorporate MIL-DTL-38999 accessory threading to allow for legacy backshell configurations.

High-density insert arrangements will house genderless rear-release precision termini. The genderless terminus design reduces inventory and part numbers by eliminating discrete pins and sockets.

Like the Glenair High-Density (GHD) product, the NGCON will employ a removable Alignment Sleeve Retainer (ASR) for trouble-free cleaning



***The Next Generation fiber optic connection system (NGCON) is designed for Naval and Mil-Aero applications requiring higher density and advanced performance.***

and guide pin alignment. Again, should the ASR be damaged, it can be replaced or factory repaired. The 1.25 mm diameter ceramic ferrule is standard LC size, with environmental sealing on the terminus. NGCON's rear-release contacts will be familiar to traditional MIL-DTL-38999 users. The NGCON design specifies 10 polarization positions—more than any other connectors.

With tighter tolerance and greater flexibility than MIL-PRF-28876, the Glenair NGCON will be ideal for shipboard, ground tactical and avionics applications. Glenair intends to qualify this new product upon release of the new NGCON specification.

### ***Glenair Size 16 Front Release Custom Fiber Optic Connection System***

Glenair Size 16 precision front release termini are a unique vehicle to facilitate custom connector design. Say “goodbye” to long engineering processes and prototyping for optical media integration into a broad range of cylindrical and rectangular connector packages and systems—lead times have never been so short.

Glenair designed the 181-011 and 181-012 series rear-insertion, front-release fiber optic contacts with retention and environmental sealing components directly on the termini—ready for snap insertion into a machined cavity within the connector— with no upper limit on number of fiber cavities. In the unlikely circumstance that you break a retention clip or damage an O-ring, both component elements can be replaced without

discarding the entire terminus or connector. The terminus uses precision ceramic ferrule and alignment sleeves coupled with stainless steel contact components. It accommodates all popular fiber sizes from 9/125 micron singlemode to 1,000 micron multimode.

Glenair has extensive in-house expertise and capacity to machine custom connector shells (in all standard materials and finishes including aluminum alloy, stainless steel and titanium) to the precise tolerances required in fiber optic connection systems. The size 16 custom termini allows us to do so without costly tooling and engineering charges. Finished custom connector systems perform at insertion-loss levels (less than 0.5 dB) equivalent to other high-performance tactical fiber optic systems such as MIL-DTL-38999 and MIL-PRF-28876.

Although potential applications are virtually unlimited, the Custom Fiber Optic Connection System can be used in situations where an existing Micro-D or D-Subminiature requires fiber optic cavitation. As an example, the THAAD Missile program requires fiber optics in unique packaging to withstand extremely harsh and vibration-riddled environments. THAAD engineers tapped Glenair's in-house expertise to design the Custom Fiber Optic Connection System into a D-Subminiature-style package. Another project, the NSM Missile, specified a custom Micro-D fiber optic connector for use on a PCB connector. Yet another application called for a custom rectangular fiber optic connector with 98 channels for automated test equipment. And to demonstrate the agility of the Custom Fiber Optic Connection System, a radar installation customized a Glenair Mighty Mouse circular connector for fiber optics. The possibilities are truly unlimited.



***Glenair's size 16 front release custom fiber optic terminus facilitates easy integration of optical media into virtually any connector package.***

# High-Reliability Fiber Optic Technologies

Technology	Types	Features	Same Day Availability
ASAP Fiber Optic Cable Sets	Custom configurations	<ul style="list-style-type: none"> <li>•Short lead times</li> <li>•Rugged overmolded polyurethane assemblies</li> <li>•Plastic and metal-core conduit assemblies</li> <li>•Field repairable banding backshell assemblies</li> <li>•Inside-the-box receptacle/pigtail assemblies</li> </ul>	Go to <a href="http://www.glenair.com">www.glenair.com</a> for Fiber Optic ASAP Cable Designer's Guide to specify your needs for a fast quotation
Qualified MIL-PRF-29504 Fiber Optic Termini for MIL-DTL-38999 type interconnects	Pin and socket	<ul style="list-style-type: none"> <li>•Stainless steel body</li> <li>•Precision ceramic alignment sleeves</li> <li>•Optional stainless steel alignment sleeves</li> <li>•Precision ceramic ferrule</li> <li>•Stainless steel protective thread-on cover</li> <li>•Concentric and diametric tolerances controlled within one micron (.00004 of an inch)</li> <li>•Insertion loss less than 0.5 dB</li> </ul>	Available in Same Day inventory
Custom size 16 M29504/4 & /5 MIL-DTL-38999 Fiber Optic Termini	Pin and socket	<ul style="list-style-type: none"> <li>•Rear insertion and release</li> <li>•For use in MIL-DTL-38999 connectors</li> <li>•M29504/4 &amp; /5 Qualified</li> <li>•Precision ceramics used</li> </ul>	Available in Same Day inventory
MIL-DTL-38999 type Fiber Optic connectors	Plug and receptacle	<ul style="list-style-type: none"> <li>•Materials include aluminum alloy, composite thermoplastic, stainless steel</li> <li>•Finish treatments include nickel, cadmium olive drab over nickel, passivation</li> <li>•Receptacle in jam nut mount, square flange wall mount, and many special connectors</li> </ul>	Many popular sizes available in Same Day inventory
GHD • Glenair High Density Fiber Optic Connector System	Genderless termini Plug and receptacle	<ul style="list-style-type: none"> <li>•Nearly double the density of M28876 and D38999</li> <li>•Equal optical performance compared to M28876 and D38999</li> <li>•Environmentally sealed</li> <li>•18 AWG front release high density termini</li> <li>•Precision 1.25 mm diameter ceramic ferrule</li> <li>•Ceramic alignment sleeve</li> <li>•Hex feature for optional tuning</li> <li>•Standard single keying feature for APC polish</li> <li>•Accommodates 900 micron to 2.0 mm buffered and jacketed fiber</li> <li>•Removable alignment sleeve module for easy cleaning</li> <li>•Same materials and finishes available as MIL-DTL-38999 type connectors</li> </ul>	Coming soon to Same Day Inventory
MIL-PRF-28876 Style Fiber Optic Connection System	Plug and receptacle	<ul style="list-style-type: none"> <li>•Designed to meet the general requirements of MIL-PRF-28876</li> <li>•Plugs, wall-mount receptacles, and jam-nut mount receptacles available</li> <li>•Multiple shell sizes and insert arrangements</li> <li>•Singlemode and multimode capable</li> <li>•Corrosion-resistant</li> <li>•Environmentally sealed</li> </ul>	Coming soon to Same Day Inventory
GFOCA Fiber Optic Connection System	Genderless Termini Hermaphroditic mating	<ul style="list-style-type: none"> <li>•Hermaphroditic field deployable connection system</li> <li>•Designed to meet requirements of MIL-PRF-83526/16 and /17 and M29504/16 specifications (intermateable and intermountable with industry STD TFOCA II @ connectors)</li> <li>•Singlemode and multimode capable</li> <li>•Low insertion loss 2.5 mm diameter genderless termini</li> <li>•Corrosion-resistant and environmentally sealed</li> <li>•Designed for both low speed analog and high-speed digital data</li> <li>•Available as discrete connectors and termini or as spooled cable assembly</li> </ul>	Coming soon to Same Day Inventory
Expanded Beam Fiber Optic Connection System	Hermaphroditic mating or 38999 Series III	<ul style="list-style-type: none"> <li>•Sealed Expanded Beam STRATOS Lightwave™ Technology</li> <li>•Chose from four unique connector styles</li> <li>•All styles optimized for use in harsh application environments where optical connectors are subjected to repeated mating / unmating cycles</li> <li>•Full range of material and plating options</li> <li>•US and NATO approved systems</li> <li>•1 to 8 Channels plus hybrid optical and electrical layouts</li> </ul>	Consult Factory

Technology	Types	Features	Same Day Availability
Fiber Optic Backshells and Accessories	Strain-reliefs Banding adapters Cable seals Conduit adapters Protective covers	<ul style="list-style-type: none"> <li>•Corrosion free composite thermoplastic materials</li> <li>•High temperature Ultem 2300 material</li> <li>•Optional stainless steel and aluminum designs</li> <li>•Design eliminates micro-bending of fiber</li> <li>•Keyed termini alignment</li> <li>•Environmentally sealed</li> <li>•Compatible with Glenair and other industry standard connectors</li> <li>•Ratcheted spin coupling designs</li> <li>•Accepts standard backshell assembly tools</li> </ul>	Many items in Same Day inventory
Conduit, Fittings, Transitions and Adapters for Fiber Optic Media	For D38999, M28876 and Mighty Mouse Connection Systems	<ul style="list-style-type: none"> <li>•Flexible Helical Convolutions</li> <li>•Easy Assembly and Repair</li> <li>•3/16 inch to 2 inch Diameter Systems</li> <li>•Lightweight and Halogen free materials</li> <li>•Unique fittings facilitate field polishing and termination</li> <li>•Environmentally sealed systems</li> <li>•Crush proof designs</li> <li>•Choose discrete components or turnkey assembly</li> <li>•Backshells and adapters in aluminum and composite thermoplastic</li> </ul>	Popular backshells and adaptors available in Same Day inventory
Fiber Optic Extruded Bulk Cable	Custom configurations	<ul style="list-style-type: none"> <li>•Kevlar® reinforced strength filaments</li> <li>•Hytre® outer jacket standard</li> <li>•Simplex, duplex and hybrid constructions</li> <li>•Graded index and singlemode stepped index designs</li> <li>• -40° C to +85° C temperature range</li> <li>•No minimums—short runs a specialty</li> <li>•Fast turnaround</li> </ul>	
Fiber Optic Test Probes and Connector Adapters	For MIL-DTL-38999	<ul style="list-style-type: none"> <li>•Designed to mate with MIL-DTL-38999 Series I and III connectors</li> <li>•Replaces the need for expensive test harnesses</li> <li>•Easy to inspect and clean</li> <li>•Same terminus mating force as the MIL-DTL-38999 connector for repeatable low-loss measurements</li> <li>•Utilizes precision ceramic ferrules</li> <li>•Fast and efficient testing of fiber media in factory or field</li> </ul>	Many items in Same Day inventory
Fiber Optic Termination, Assembly, Inspection and Cleaning Tools	Kits and individual tools available	<ul style="list-style-type: none"> <li>•Complete termination toolkits</li> <li>•Video Bore Scope inspection toolkits</li> <li>•CleanBlast® Cleaning system</li> <li>•Cleaning swabs</li> <li>•Polishing tools</li> <li>•Specialty tooling for all fiber optic operations</li> <li>•Band-It® Shield termination system</li> </ul>	Various Band-It® items, polishing tools and cleaning swabs available in Same Day inventory
Size 16 Front Release Custom Fiber Optic Connection System	Pin and socket	<ul style="list-style-type: none"> <li>•Precision front release contact system with integrated retention clip and environmental sealing</li> <li>•All popular fiber sizes from 9/125 singlemode to 1,000 micron multimode</li> <li>•Ceramic alignment sleeve coupled with stainless steel contact components</li> <li>•Broad range of existing custom interconnects including cylindrical and rectangular designs</li> <li>•Typical insertion loss less than 0.5 dB</li> <li>•Machined connector shells in all standard materials</li> <li>•No upper limit on number of fiber cavities</li> <li>•Rapid engineering and prototyping without costly tooling</li> </ul>	Popular styles available in Same Day inventory
Next Generation (NGCON) Fiber Optic Connection System	Genderless termini Plug and receptacle	<ul style="list-style-type: none"> <li>•Will be available in a variety of materials and finishes</li> <li>•High-density insert arrangements available • Removable insert (ASR)</li> <li>•Plug and wall-mounted receptacle configurations</li> <li>•Rear release precision genderless termini</li> <li>•1.25 mm diameter ceramic ferrule</li> <li>•Environmental sealing on terminus</li> <li>•Next Generation choice for Naval applications • 10 Polarizations</li> <li>•Conforms to emerging NGCON Military Standard</li> </ul>	Coming soon to Same Day Inventory

**Conclusion**

These new technologies demonstrate how seriously Glenair takes its commitment to providing complete, full-spectrum, "one-stop shopping," in fiber optic interconnect solutions. Even as new solutions are added, we continue to shrink lead times on components, quotations, and assemblies. We are committed to acting as more than just a supplier—we're serious about the business of engineering the right solution for every application. From free samples, to free application engineering, to a liberal attitude on tooling expenses and other one-time charges, Glenair is committed to being not only the technology leader, but also the service and availability leader in the high-reliability fiber optic interconnect industry. Please feel free to contact the factory for engineering assistance on both standard and custom fiber optic connection systems. Our latest catalog, *Fiber Optic Interconnect Solutions*, covers all the technologies introduced in this issue of *QwikConnect* and is available in hard-copy or on the web at [www.glenair.com](http://www.glenair.com)



**Rounding out Glenair's complete capability in high-reliability fiber optic interconnect technologies: specialized backshells, extruded cable and patented test probes.**

# Spotlight on the Joint Strike Fighter

One of the most significant Glenair Fiber Optic success stories is the F-35 Joint Strike Fighter (JSF) in development for the US Air Force, Navy and Marine Corps, as well as the UK Royal Navy. Led by Lockheed Martin, with international partners that include Northrop Grumman, BAE Systems, General Electric, Rolls-Royce, Hamilton Sundstrand, Vision Systems, Harris Advanced Avionic Systems, Honeywell, Moog and others, the JSF is being built in three forms: conventional take-off, carrier take-off, and short take-off and vertical landing. These fighter jets feature some of the world's most sophisticated and complicated systems for avionics, communications, navigation, targeting, countermeasures, and helmet display.

Glenair has considerable interconnect content designed into the JSF, including many backshells, connectors and cable assemblies. But most relevant to this story is Glenair's High-Reliability Fiber Optic Technology serving the new JSF.

Fighter plane conditions are severe, and Glenair Fiber Optic products are well suited for the circumstances. Temperature shifts of +125°C in deserts to -65°C at 30,000 feet within only a few minutes, call for high-reliability solutions. Weight limits and tight spaces for components within the wing, tail and cockpit dictate small, lightweight and compact packaging. Glenair MIL-DTL-38999 style tight-tolerance fiber optic connectors in lightweight,





but extremely rugged, composite thermoplastic are a perfect match for these temperature and restricted space requirements. Electromagnetic compatibility was specified because placement and routing put electronics near magnetic interference generators such as engines and high-frequency computer equipment. Glenair Fiber Optic technology, immune from electromagnetic interference, is ideal for these EMI environments. Reliability is also crucial. As the JSF is a single-seat aircraft, the flawless performance of the interconnect system is vitally important to help the pilot carry out his or her mission.

Day Inventory program), and Glenair MIL-Qualified 29504/4 and /5 termini (these MIL-Qualified termini and their COTS equivalent part numbers are also available from our Same Day Inventory program). Glenair-built fiber optic cables connect critical systems throughout the Joint Strike Fighter.

To keep these fiber cable assemblies and other fiber lines running at top performance, regular testing is required. The standard way to test for contamination or scratches on fiber end faces and termini is to use a complicated test harness. This testing process can be time-consuming and expensive. Thanks to Glenair's Test Probes, Adaptors, Calibrators, and Handheld Inspection Systems, all in use on JSF, evaluation of fiber and termini condition can be handled on the plane instead of in the lab or back at the factory. Cables are tested and cleaned in place, saving hours of removal and reinstallation time.

Glenair is proud to have been chosen to "light up" the Joint Strike Fighter with our extensive family of fiber optic connectors, termini, cables, and test equipment.

Early in the JSF program, fiber optic interconnection was handled by modifying MIL-DTL-38999 electrical connectors for use with fiber optic contacts. Higher bandwidth and tighter tolerance requirements drove Glenair to develop specific MIL-DTL-38999 style fiber optic connectors with tighter dimensional control of connector keys and keyways and other dimensional stability needs of fiber. The Glenair MIL-DTL-38999 style connector established true positioning of cavities with extremely accurate termini retention clip location.

The JSF uses Glenair MIL-DTL-38999 style tight-tolerance fiber optic connectors (well over 100 part numbers in this connector family are available for immediate shipment from our Same

Many front-line fighter aircraft are now integrating fiber optic media into their avionics, flight control and computer systems. The advantages include EMI immunity and of course reduced size and weight. The ability to more easily accommodate future bandwidth requirements as well as the ability to incorporate redundant fibers for improved safety and reliability are important additional considerations.

Glenair is the only manufacturer of tactical fiber optic interconnect systems to commit resources to produce such a broad spectrum of connection systems, backshell accessories and assembly tooling. The high-reliability interconnect systems we produced for the Joint Strike Fighter exactly meet the requirements of the U.S. Air Force, Navy, and Marines as well as the U.K. Royal Navy. They also demonstrate Glenair's capability to "over-serve" our customers with outstanding product designs, customer service and product availability.

## A Truly Special Team

Over the past few years, we have brought in some of the interconnect industry's top professionals to augment our terrific longer-tenured staff here at Glenair. We have also made significant investments in manufacturing capacity to keep pace with growing sales. These investments in talent and capacity are making a significant impact in our fiber optic business.

Adopting a "Special Team" approach to the fiber optic business, we applied dedicated resources to build a world-class organization with a singular focus: to provide the industry's best availability and customer service in tactical fiber optic interconnect systems. In just the past year, we have added four regional fiber optic Sales Applications Managers in North America, and another in Europe. These new field managers are the fiber optic industry's "cream of the crop" who, between them, have nearly 100 years combined experience in fiber optics application development. Truly, this is the ultimate "Special Team," ready to take action on both fiber optic and EMI/EMP filter connector opportunities throughout the Mil-Aero marketplace.

At the factory, we have enhanced our application sales support team to further improve the speed of our quoting, expediting and technical support. As with the Sales Applications Managers, we brought in some of the industry's most experienced fiber optic engineers as well as fiber optic production control specialists to enhance our already top-flight factory team. We are now perfectly positioned to rapidly tackle virtually any custom product design, prototyping or manufacturing assignment. The expansion of our fiber optic operation has also included the ongoing development of our state-of-the-art fiber optic fabrication cell. This expanded capacity allows us to build the finest close-tolerance, high-reliability cable assemblies. Perhaps most importantly, we have continued to add new fiber optic part numbers, including a wide range of connectors and termini, to our Same Day inventory—everything neatly bagged and tagged and ready for immediate shipment.

We have the finest talent in the fiber optic industry. Our newly-expanded factory capacity and full-service design and prototyping capabilities combined with our ever-growing Same Day stock, truly makes Glenair the winning "Special Team" in high-reliability fiber optics.

*Chris Toomey*

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Glenair has been the leading manufacturer and supplier of commercial and Mil-Spec connector accessories since 1956. Building on that foundation, we now offer a dozen, full-spectrum product lines designed to meet every interconnect requirement. From ruggedized military connectors to tactical fiber optic connectors and cables, from EMI conduit systems to Micro-D harness assemblies, from Navy approved composite enclosures to a complete range of connector assembly tools—Glenair does it all. And throughout the years, we've made outstanding customer service our approach to earning customer trust, and to maintaining our position as the industry's best-value interconnect supplier. *QwikConnect* is published occasionally by Glenair, Inc. Printed in U.S.A. All rights reserved. © Copyright 2006 Glenair, Inc.



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