



INDUSTRY SOLUTIONS: **MILITARY**



Photo Credit: U.S. Marine Corp photo by Cpl. Laura Gauna

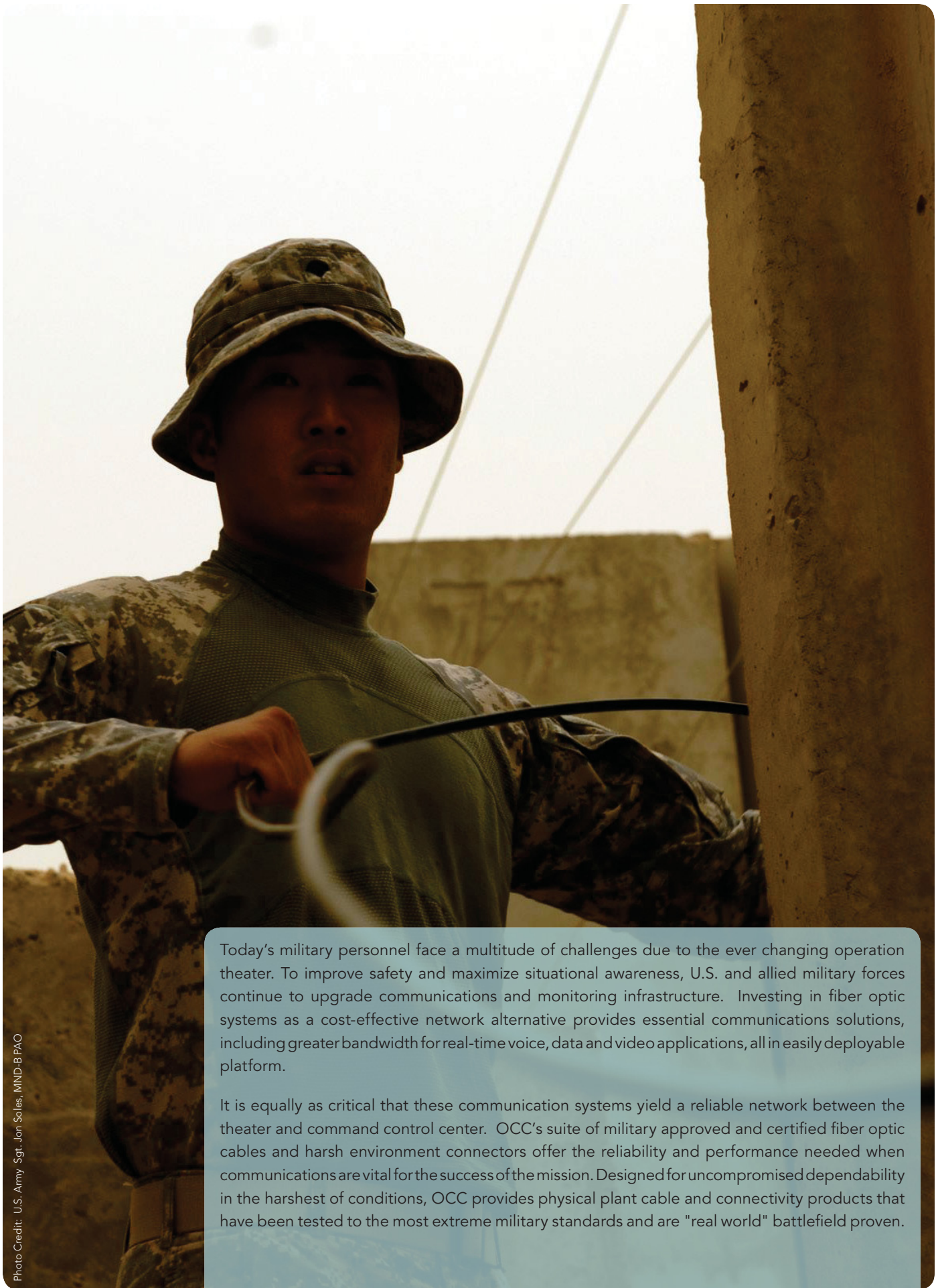


Photo Credit: U.S. Army Sgt. Jon Soles, MND-BPAO

Today's military personnel face a multitude of challenges due to the ever changing operation theater. To improve safety and maximize situational awareness, U.S. and allied military forces continue to upgrade communications and monitoring infrastructure. Investing in fiber optic systems as a cost-effective network alternative provides essential communications solutions, including greater bandwidth for real-time voice, data and video applications, all in easily deployable platform.

It is equally as critical that these communication systems yield a reliable network between the theater and command control center. OCC's suite of military approved and certified fiber optic cables and harsh environment connectors offer the reliability and performance needed when communications are vital for the success of the mission. Designed for uncompromised dependability in the harshest of conditions, OCC provides physical plant cable and connectivity products that have been tested to the most extreme military standards and are "real world" battlefield proven.

What makes OCC Military products superior?

Founded in 1983, OCC was among the first companies to realize the potential of fiber optics. Since then we have been designing and manufacturing some of the most reliable, rugged and innovative cable products in the world. The U.S. military needed an extremely strong, lightweight, rugged and survivable fiber optic cable, able to efficiently transmit previously unprecedented volumes of data in the field. OCC and its engineers were at the forefront of the development of the tight-buffered, tight-bound cable technology that met these criteria. The result: cables that were easy to deploy and performed under the harshest of conditions.

Our military certified distribution and breakout fiber optic cables are optimized to withstand the rigors of difficult cable pulls, high tensile loading and severe crush occurrences and can repeatedly endure the abuse associated with the extreme environmental demands and repeated deployments. Where standard fiber optic cables are likely to fail, military cables are particularly well-suited to survive the harshest environments. Factors that make OCC's fiber optic cables ideal for the military include:

- OCC uses a unique manufacturing process that **pressure extrudes** the outer jacket to the cable core. This effectively locks all the cable components together, creating a very stable geometry. These components act as a single mechanical unit providing superior cable element retention and elimination of core component axial migration. Since the cable acts as a single mechanical unit, it exhibits very high crush and impact resistance.
- **Helical stranding** is a time-tested cable construction design proven to provide flexibility, survival in difficult pulls and excellent mechanical protection for the optical fibers. This design ensures that no one particular element of the cable receives more stress than the other elements—thus equalizing the stress load associated with particularly tough installations.
- Our **water-blocked** fiber optic cables provide the best water protection system available by combining the inherent water tolerant features of tight-buffered and Core Locked™ tight bound cable with super absorbent polymer aramid yarn. This design provides superb water-blocking performance while retaining the termination cost advantages of totally gel-free and powder-free tight-buffered cable.
- OCC's **Ultra-Fox™** and **Ultra-Fox™ Plus** cables feature a unique fiber construction consisting of a primary coating of a UV-cured acrylate material and a tight fitting secondary coating that provides an extraordinary level of protection.

All of these factors make OCC's cables a practical and reliable means of high capacity data transmission in challenging environments without the delicacy normally associated with

traditional fiber optic cables.

To complement our military certified cables, OCC manufactures a variety of rugged multi-channel fiber optic and electro-optic connectors. One such family of products is our compact Mini-Hermaphroditic Connector (MHC® II). These connectors are available in multimode, single-mode versions and electro-optic versions. Their hermaphroditic design allows cable assemblies to be daisy-chained together, making it simple to extend the fiber optic backbone system without the need for gender-changing adapters. Power or control signals for active equipment can be supplied using composite connector options that provide electrical and optical signal capability within the same connector body. These connectors withstand extreme environmental demands and are specifically designed for reliable optical and electrical signal transmission.

Certifications:

OCC's fiber optic cables and connectors have been qualified to the most demanding military specifications, including:

- **MIL-PRF-85045/8A** Ground Tactical Fiber Optic Cable (U.S. DoD)
- **DLA 09001-01 & -02** approved hybrid tactical cables (U.S. Marines)
- **A3159879** Ground Tactical Fiber Optic Cable (U.S. Army CECOM)
- **MIL-PRF-29504** Fiber Optic Connector Termini (U.S. DoD)
- **MIL-C-83522** Fiber Optic Connectors (U.S. DoD)
- **A3159869** and **A3302584** "TFOCA" Ground Tactical Fiber Optic Connectors (U.S. Army CECOM)
- **C-83526** multichannel hermaphroditic connector series
- **A336463A** performance specification, Reel, Cable, Light-weight Tactical (U.S. Army CECOM)
- **A3159864** and **A3302584** Ground Tactical Fiber Optic Cable Assemblies (U.S. Army CECOM)
- **Def-Stan 60-1, Part 3** Ground Tactical Fiber Optic Cable (U.K. MOD)
- **MIL-STD-790G**, High Reliability Manufacturing requirements for Military Supplier (DoD certified facility)

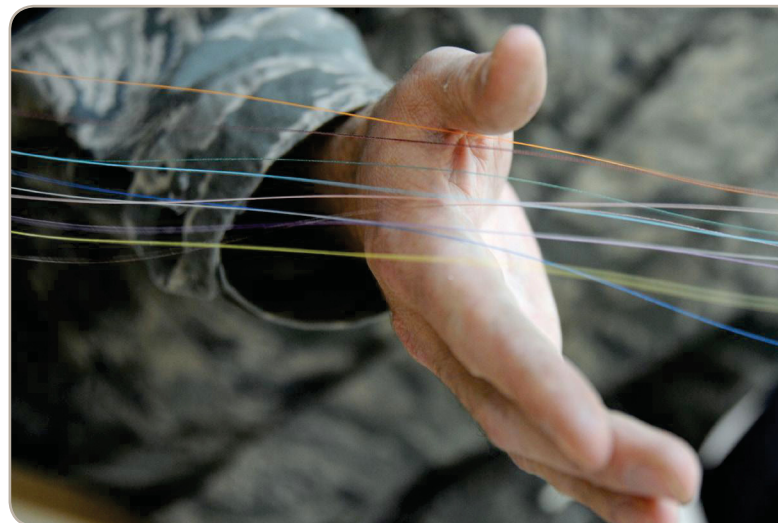


Photo Credit: U.S. Air Force photo, Master Sgt. Trish Bunting



CASE STUDY

The five primary advantages of fiber optic cable over coax cable.

Repeaters

- Fiber optic - repeaters every 16 kms (or more)
- Coax - repeaters every 500 meters

Weight

- Coax cable weighs approximately five times more than equivalent lengths of fiber optic cable
- 10 miles (16 km) of coax cables weighs more than 3 tons (2,800 kg), while 10 miles (16 kms) of fiber optic cables weighs just over 1/2 a ton (550 kgs)

Higher bandwidth

- Optimized for applications requiring multiplexed voice, data and video signals

Security

- Fiber optic cable is all dielectric, no metal for signature
- No grounding and lightening strike issues
- Not affected by EMI or RFI
- Very difficult to tap, reduces need for encryption

Rugged

- More rugged than coax in crush, bend & pull strength
- No memory coiling issues off the reels

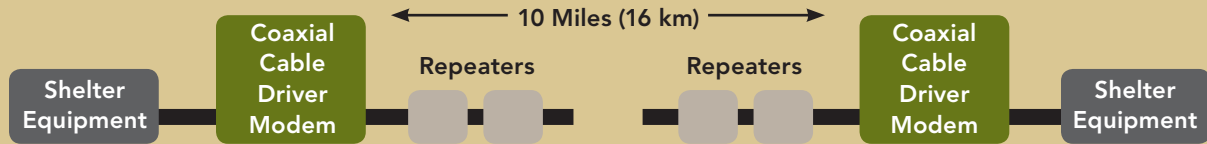


Photo Credit: U.S. Air Force photo by Tech. Sgt. Rob Wieland

The benefits of optical fiber over coax

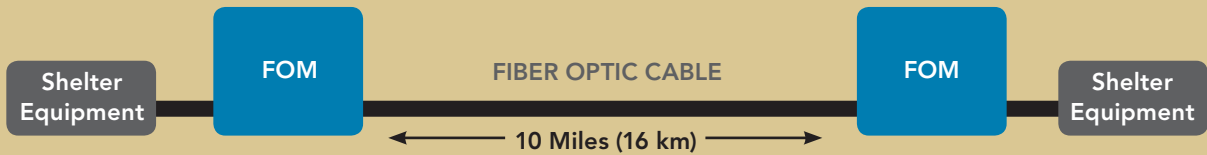
Coax Implementation

- 10 mile (16 km) link weighs 6,172 lbs (2,800 kgs)
- 10 mile (16 km) link requires 37 repeaters
- Five (16 km) links require five 2.5 ton trucks to transport



Fiber Implementation

- 10 mile (16 km) link weighs 1,212 lbs (550 kgs)
- 10 mile (16 km) link is repeaterless
- Eliminates requirement for coax modems
- Five (16 km) links require a single 2.5 ton truck to transport



OCC's MIL-PRF-85045/8A fiber optic cables. Field proven...and certified.

OCC has always manufactured the most rugged and robust fiber optic cables for the military ground tactical market - field proven cables relied on by defense agencies around the world.

In 2005, the United States Defense Logistics Agency certified Optical Cable Corporation as an approved manufacturer of qualified ground tactical fiber optic cables in accordance with MIL-PRF-85045/8A.

This certification was granted after subjecting these fiber optic cable products to an exhaustive series of optical, mechanical and environmental tests to ensure full compliance with the demanding requirements of the United States Military.

Now, OCC hybrid ground tactical cable products, comprised of a combination of single-mode and multimode fibers, are approved to DLA specification 09001 and are set to provide the next generation of tactical fiber cable communications.





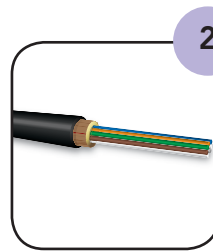
In today's modern military, reliable communication is key to ensure real time situation awareness is shared by commanders and troops on the battlefield. It is imperative that communications not be compromised or corrupted. Our military should expect only the best and with OCC, they get it. Our line of military fiber optic cable, connector and deployment systems products have been thoroughly tested to the most stringent military specifications and have been field proven since 1983. As communication bandwidth requirements increase to better accommodate data, voice and video and the demands on physical plant products is to make it "smaller, faster, lighter", OCC continually rises to the challenge by bringing innovative solutions. This includes lighter, more robust composite reeling systems as well as hybrid and composite military grade cables. Militaries around the world rely on OCC's comprehensive product line to meet the demands of today and the future.

OCC is the premier manufacturer of military ground tactical fiber optic cable and connectivity solutions for the U.S. military. Our broad product offering for military tactical applications is built on the evolution of fundamental technologies designed to provide end users with components that are easy to install, provide a high degree of reliability and offer outstanding performance characteristics.



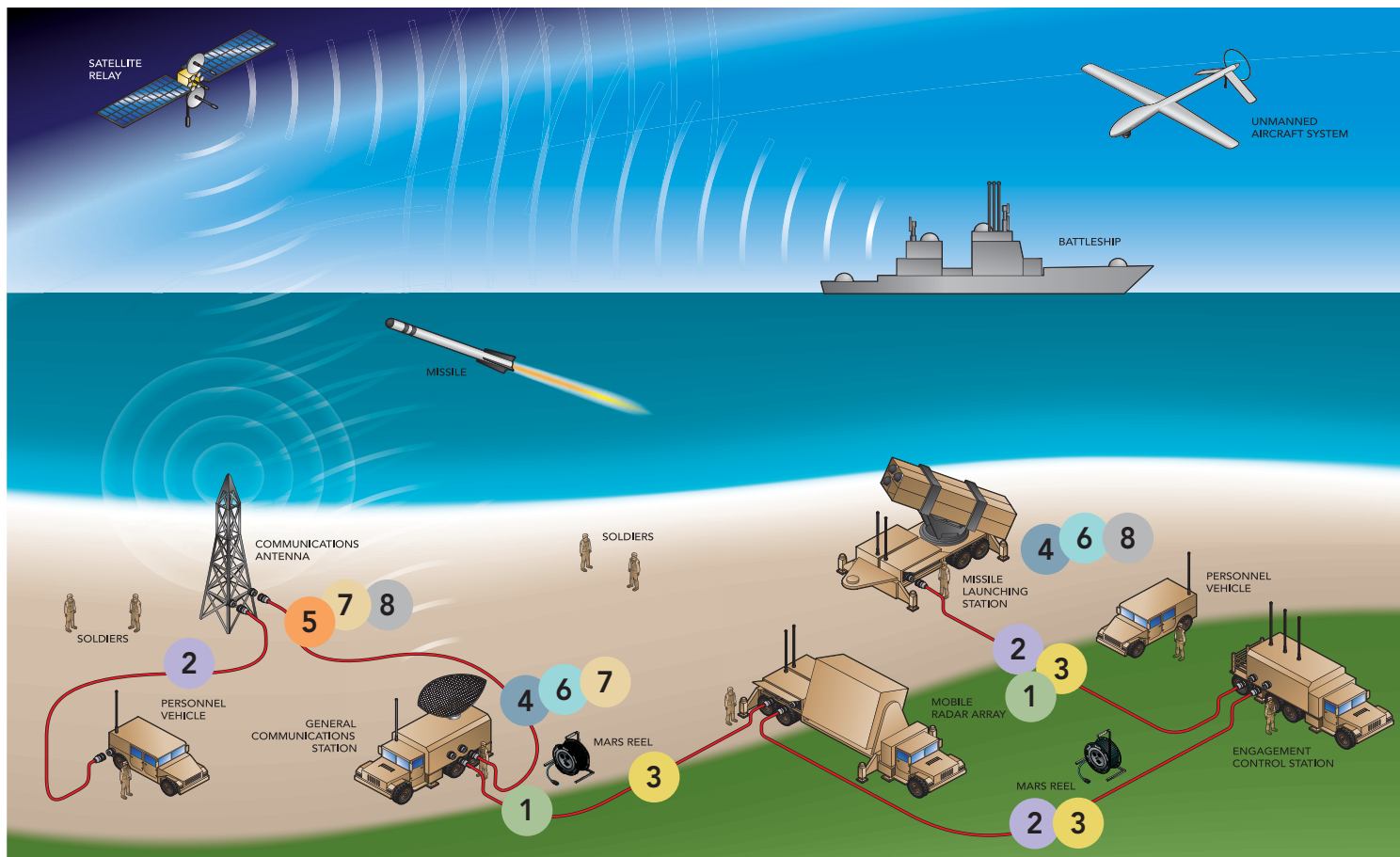
MARS™ reels

OCC's Modular Advanced Reel System, or MARS™, is the industry's first lightweight cable deployment reel system designed specifically for the demanding needs of harsh-environment fiber optic installations. Unlike traditional metal-style reels, MARS is a lightweight, durable system constructed of a high impact glass enforced polymer that is easily transported and is ideal for applications where cable needs to be deployed and reeled in quickly and stored efficiently.

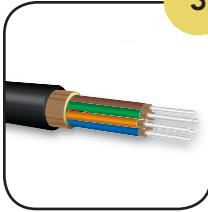


**D-Series
Distribution Mil-
Tac cables**

D-Series Distribution Mil-Tac cables by OCC are ideal for use in harsh environments where deployment and retrieval are required. Designed for use in adverse environments where reduced size and weight are important, the helically stranded cable core provides flexibility, deployment survivability and exceptional mechanical protection for the optical fibers.



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**B-Series Breakout
– Mil-Tac cables**

B-Series Breakout – Mil-Tac cables are ideal for use in harsh environments where deployment and retrieval are required and for applications that require termination of the subcables to a connector. These are extremely strong, lightweight and rugged tight-buffered cables designed for military tactical field use and commercial applications.

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**EZ-MATE
connector**

The OCC EZ-MATE family of hermaphroditic-style fiber optic connectors provides a comprehensive connectivity solution for deployable or mobilized communications systems. Based on a hermaphroditic design, EZ-MATE connectors allow for quick deployment and gender-independent connectivity, permitting the end user to unreel fiber cable without regard for male or female ends.

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**M83526
connector**

This tactical fiber optic connector system features a hermaphroditic plug with integrated strain-relief and tactical cable retention systems. Available in either 4-, 6- or 12-channel shell sizes, this family of connectors also features specifications for a wide variety of harsh environment companion receptacles.

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**R-JACK™
connector**

R-JACK™ connectors provide an efficient solution to ethernet connectivity in harsh environments. R-JACK receptacles feature 100% transversely sealed (IP-68) configurations as a standard product design, preventing dust, water or moisture penetration, with or without dust cap or plug engagement. R-JACK is available in a variety of metals and finishes to fit specific applications.

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**F-LINK™
connector**

The F-LINK™ Inter-Connect platform was born out of the proven performance of MIL-SPEC cylindrical components, and is a cost-effective solution for commercial, industrial and military applications. F-LINK components were designed to solve a multitude of fiber optic applications, as well as hybrid inter-connect systems (the combination of fiber optic and electrical power). F-LINK is available in a variety of metals and finishes to fit specific applications.

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**MHC® II
connector**

OCC's MHC® II is designed specifically to inter-connect fiber optic channels in a small, yet effective, package. Using a bayonet-style, mechanical coupling interface, the connector is easily mated by a simple twisting motion. The MHC II fiber optic connector features both pin and socket configurations to accommodate a number of fiber types and is available in two, four, six and eight channel versions.



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