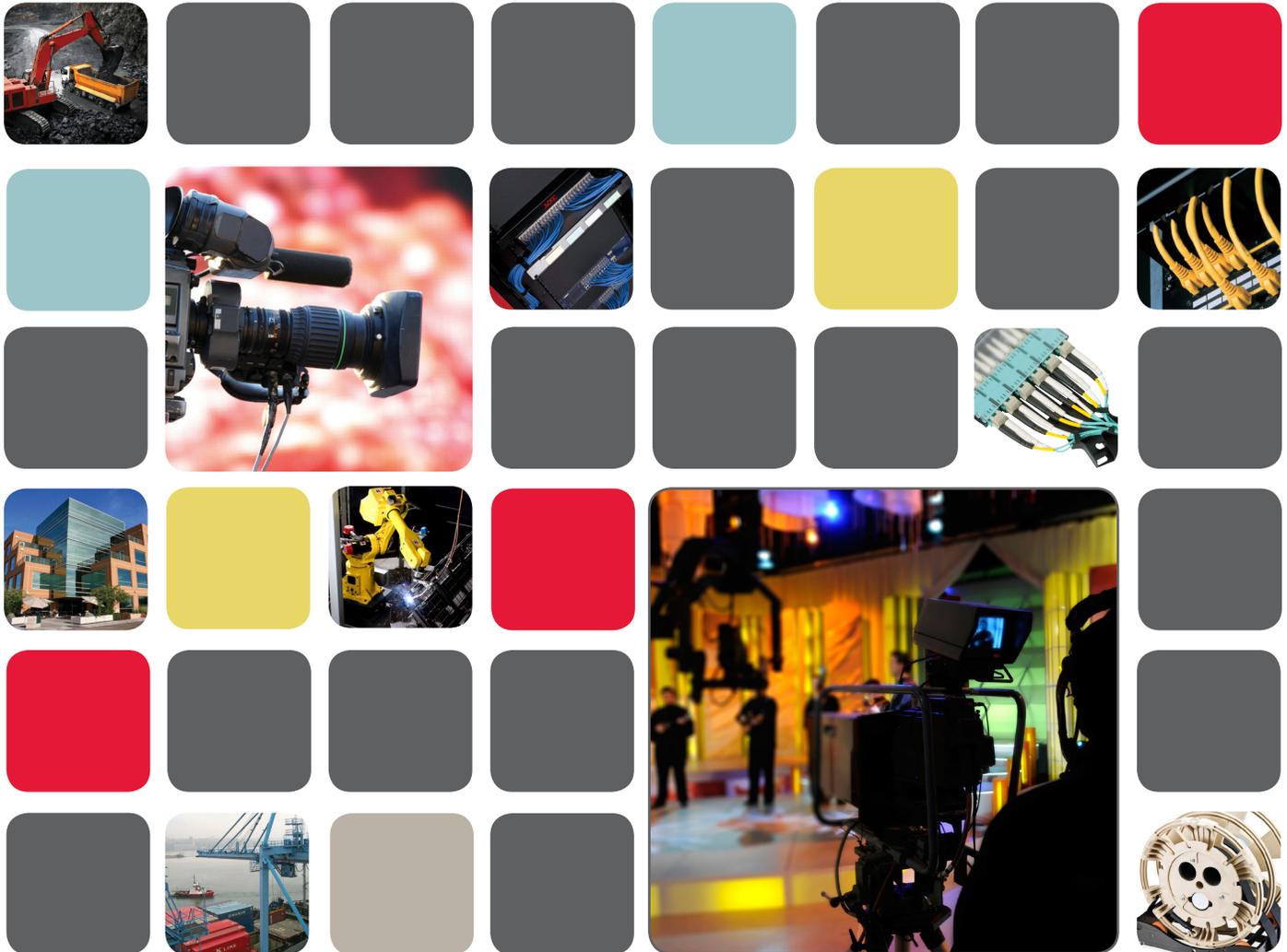




INDUSTRY SOLUTIONS: **BROADCAST**





OCC has a history of excellence in the broadcasting world. From worldwide sporting events, to political coverage to the most glamorous award ceremonies - OCC is there. When the camera is live, the pressure is on to ensure every exciting shot transverse the globe to a TV screen. Count on OCC for products that repeatedly withstand the extreme demands of rapid deployment and retrieval applications.

The broadcast industry has established high standards in delivering major events and programs around the world. OCC products solve many complex applications because of the ruggedness and reliability of our cables and hardware products. Our stadium and arena cables are optimized to withstand the rigors of installation challenges such as difficult cable pulls, high tensile loading, and severe crush occurrences.

# What makes OCC Broadcast products superior?

With advances such as HD video and multi-channel audio in the broadcasting market, greater demands are being put on data transmission systems. Fiber optic technology, with its ability to deliver digital, high-bandwidth, and low signal loss data streams is ideally suited to cope with these needs. Optical Cable Corporation's broad range of fiber optic broadcast products is specifically designed to withstand the challenges for real-time transmission of high definition broadcast signals.

OCC Broadcast solutions start with tough fiber optic cables. Our stadium and arena 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 demands in rapid deployment and retrieval applications. Where standard fiber optic cables are likely to fail, OCC's broadcast cables are particularly well-suited to the harsh environment associated with outside field broadcast applications. Factors that make OCC's fiber optic broadcast cables ideal for the broadcast industry include:

- OCC's special **Core-Locked™** jacket is extruded under high pressure directly over the cable's core, resulting in the internal surface of the cable jacket having helical cusped ridges that interlock with the subcables. This helps keep the cable cross-section circular for better crush and impact protection and superior tear resistance during installation.
- **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™ tightbound 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** cable design features unique fiber construction consisting of a primary coating of a UV-cured acrylate material and a tight fitting secondary coating of a hard elastomeric polymer buffer.

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 compliment our broadcast 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 both multimode and single-mode versions as well as electro-optic design, and, along with many of OCC's harsh environment connectors, are hermaphroditic. This allows cable assemblies to be daisy-chained together, making it simple to extend camera range without the need for gender-changing adapters. Power or control signals for the cameras may be supplied using hybrid connector options that add electrical and optical signals within the same connector body. These connectors withstand extreme environmental demands and they are specifically designed for reliable HD signals.

## Applications:

- Arena Events
- Stadium Events
- Harsh Environments
- Studios

The OCC Broadcast system would not be complete without our Modular Advanced Reel System, or MARS, a lightweight, durable system constructed of a high impact glass enforced polymer that is easily transported and ideal for applications where cable needs to be deployed and reeled in quickly and stored efficiently.

The MARS cartridge system was specifically designed for deployment, retrieval and storage of fiber optic and copper communications cable. MARS offers the most advanced, self-contained reeling and storage system for broadcast deployable communication environments.





## CASE STUDIES

### OCC keeps pace with NASCAR

OCC engineers and business development representatives recently attended the 2012 Daytona 500 in Florida to view our fiber optic cable performance in a real time application. The following describes some of their experiences.

Bill Smith, Business Development Specialist notes, "The track and compound area is extremely busy with many technicians and engineers from different companies preparing equipment. They have thousands of connections both in copper and fiber to prepare and many hours of connecting and retesting until the day of the event. The area around the track and the grandstands is where all of the broadcast equipment and installation activities occur and it takes days to become fully operational. It was exciting to see OCC fiber optic cables being placed around the track for the key shots of the event."

"OCC cables have been pre-terminated with a 12-fiber hermaphroditic connector on one end and fanned out with a 12-channel breakout kit to ST connectors on the other end," adds Jim Mohler, Senior Engineer. "The cables are placed at convenient locations with rope, tie wraps, and fencing to support the fiber. In some instances the cable is pulled through drainage ditches - I'd say that's a pretty good indication of the ruggedness of our product," said Mohler.

Both observed the cable being routed through and over the track areas to be installed in suites at the top of the grandstands to provide communications for owners or TV Stations doing live video productions. Present that day were crews from ESPN, FOX

and the Speed Network.

Both Smith and Mohler noted the remarkable lengths and paths OCC cable traveled throughout the track areas. "We observed cabling all around the track," said Smith. "Up in the grandstands, down to the infield, basically anywhere audio and video signals need to travel. This could be from cameras to signage to timing trees to scoreboards." Mohler continued, "In this and many other high density applications our cables are terminated with multi-channel hermaphroditic connectors. OCC cable is found all around and because of the size of the track many of our cables are placed on walking surfaces around the grandstands. They are installed as unobtrusively as possible, but some are still located in areas where fans could walk, kick, stand on and even move them." "It's a good thing our cables can handle this type of abuse for an entire race season," said Mohler. Smith added, "There is over 10 miles of cable around and in this track. The longest run is 1,500 feet with hermaphroditic connectors on each end. The fan outs are set at 250 feet."

The job of broadcasting of one of the largest racing events in the world demands experienced personnel and extremely reliable and rugged products. And remarkably, after this race, the equipment and team will travel thousands of miles to the next event and will repeat this procedure for the entire race season. OCC is honored that our quality products are a part of this American tradition.

# CASE STUDIES



## Broadcasters in the UK rely on OCC

Capturing each nuance of an athlete's face and every inflection in a singer's voice is essential for the broadcasting team. This is not the time for signal failure. This is why several broadcast companies in the United Kingdom are using OCC's military tactical cable. Major news corporations (both UK and American broadcasters based in the UK) are using OCC cabling to report and broadcast news events including the royal marriage of Prince William and Kate Middleton. Sports broadcasters use OCC to cover golf tournaments such as the Wentworth in May 2012, motor racing like the World Grand Prix events, horse racing and the London Marathon. Television companies covering large music concerts such as the world famous summer festival at Glastonbury also rely on tough OCC cable. From singlemode, bend-tolerant OM1 through OM4 fibers, OCC has a cable that meets the latest standards required by system engineers to produce crisp, real-time video and audio.

OCC offers top-tier solutions for fiber optic and data communication cables and connectivity. OCC offers connectivity components such as specialized multi-pin cable assemblies connecting OB vehicle and remote broadcast vehicles outside stadiums, arenas and convention halls. One of the top manufacturers of outside broadcast trucks in the UK equips its trucks with OCC assemblies. Those rigs are then sold through out Europe and North Africa, adding to OCC's global presence.

In addition, OCC can preload the cable on our MARSTM reels to transport and retrieve the deployed fiber cable assemblies. Our cabling solutions can support Cat 5e, Cat 6 or Cat 6A connectivity for immediate cross connect applications. With the OCC solution, broadcasters never have to worry about down time of real-time transmission of high definition broadcast signals.

## Cameras fly high with OCC cable

When he first got into motion control engineering in the late 1990s, Alex MacDonald gave little or no thought to the Academy Awards. He was simply interested in the possibility of a "flying camera" - the robotic control of a video camera - for making television commercials.

MacDonald's passion for creating visually exciting scenes with computer-controlled equipment lead not only to his receiving an Academy Award in 2006, but also to break-through innovations providing surreal perspectives on film. His tour de force is the Optical Cable Corporation Fiber Optic Cable Based 3-D Flying Camera system.

MacDonald explains that image transmission from a video camera to recording equipment was dependent on RF signals coming from a moving transmitter, signals too undependable to integrate with ground-based network coverage. In search of a workable fiber optic solution for his system, MacDonald visited Optical Cable Corporation (OCC) in Roanoke, VA. OCC recommended its B-series Tactical Breakout Cable, a hybrid copper and fiber cable that could meet the performance, durability and safety requirements of the application.



"It was important that the cable could withstand extreme environments," MacDonald explains. "In addition, it had to survive rough handling; needed to have excellent tensile strength; and had to carry a reliable HD signal at a bandwidth of 1.6 Gig. The rugged, weatherproof OCC military style cable met all the requirements."

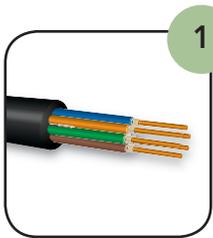
Properly rigged, today's flying camera systems give spectacular views of worldwide events ranging from concerts to political conventions and countless sporting events. "The camera moves in high-quality video games have actually become the new standard for shooting films and live events," MacDonald says. "Today we can shoot scenes for an action film that are so exactly repeatable that we can more easily and less expensively combine live action with special effects."



Advances such as high-definition video and multi-channel audio have created a greater demand on broadcaster's data transmission systems that are magnified when faced with stadium, arena and remote location environments. Fiber optic technology, with its ability to deliver digital, high-bandwidth and low signal loss data streams is ideally suited to cope with these needs.

OCC's ruggedized multi-channel connectors and cable assemblies, stored on our lightweight stackable MARS reels, can easily be deployed to transmit reliable HD signals in the most extreme environments. OCC's hermaphroditic connectors allow the cable assemblies to be daisy-chained together, making it simple to locate cameras further away from the operations center thus capturing the action from many angles. Power and/or controls for the cameras may be supplied using composite connectors and cable options that add electrical capabilities to the optical fiber cable.

Ideal for outfitting a mobile studio within a van or truck, OCC's broadcast products for stadium applications are proven for real-time transmission of high definition broadcast signals.



1

OCC's breakout field broadcast cables feature a rugged cable design with individual subcables for optimum fiber protection. This deployable cable is ideal for use in harsh environments where repeated deployment and retrieval for reuse are required.

Breakout field broadcast cables



2

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.

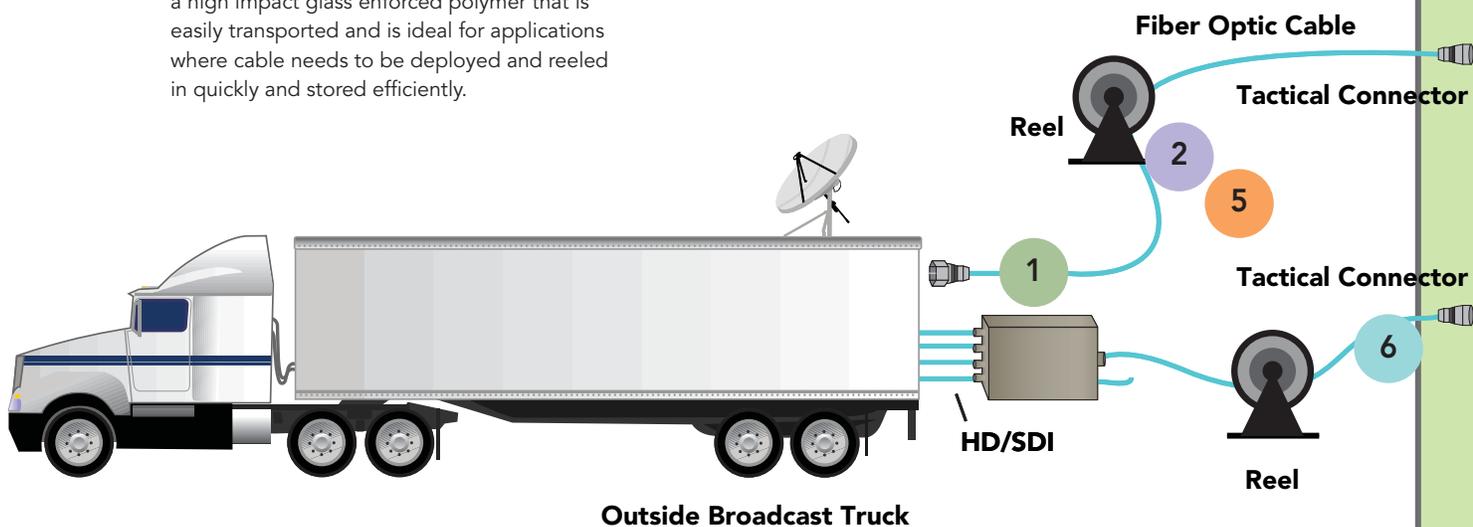
MARS™ reels



3

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.





4

**Composite broadcast cables**

Composite broadcast cable construction provides the convenience of having both fiber and copper within one cable jacket. Custom designed composite cables are available in a variety of configurations to meet the connector, cable size and electrical performance requirements and can be made in a variety of colors for easy identification or to blend in to the environment.



6

**EZ-MATE connector**

The OCC EZ-MATE family of hermaproditic-style fiber optic connectors provides a comprehensive connectivity solution for deployable or mobilized communications systems. Based on the hermaproditic 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.



5

**MARS™ Cartridge system**

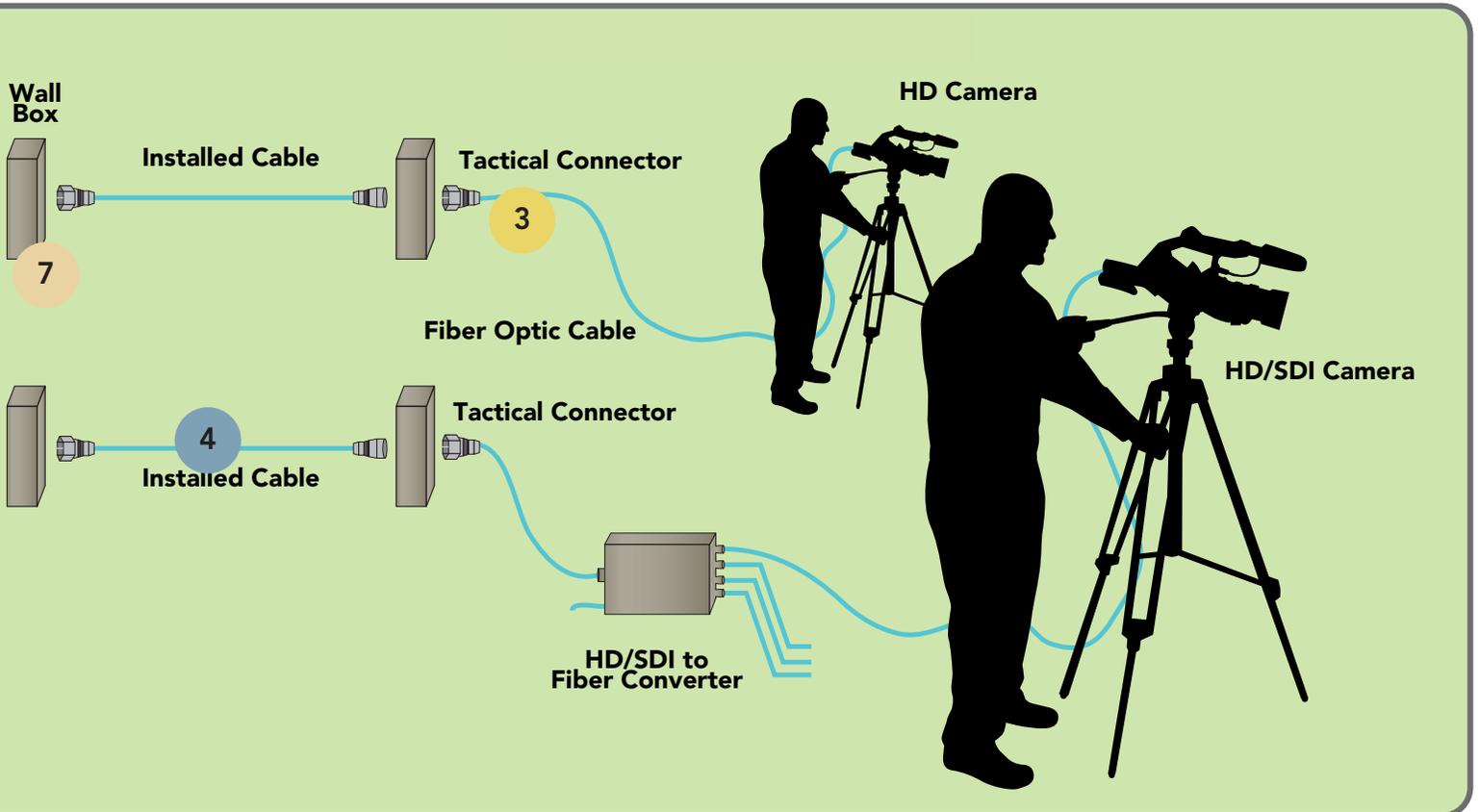
The MARS™ Cartridge system is designed for deployment, retrieval and storage of fiber optic and copper communications cable. The MARS Cartridge system offers the most advanced, self-contained reeling and storage system for broadcast, military or deployable communication environments. It employs many of the same features found in the MARS cradles, allowing different reels of the same size to be exchanged within one cartridge.



7

**NEMA 4X enclosures**

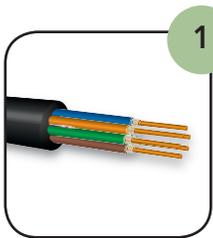
For applications where protection of components from dirt, dust, oil, or water are mandatory, OCC offers the NEMA 4X fiber optic enclosures. Available in four sizes, the OCC NEMA 4X enclosures are indoor/outdoor rated cabinets for patching and/or splicing 12 to 96 fiber ports. Constructed of molded fiberglass-reinforced polyester material, these enclosures are also well suited for high and low temperature environments.





There are only a handful of industries that feel the impact of rapid technology changes as much as the broadcast industry. Vastly increased bandwidth requirements of HD, 3D and other high quality video and audio signals require higher data rates. Reliable, high performance cabling and connectivity has never been more important in this industry. OCC products can play a major role in improving reliability, reducing costs and enhancing the workflow of digital studio production configurations.

Starting at the backbone of your studio, our Procyon™ line of data center cabinets, fiber and copper panels and high density LC and MTP cassettes lay the foundation for high efficiency data transmission. Continuing throughout the studio, we have products to solve nearly every challenge in the broadcast studio setup. Whether it is fiber optic broadcast cables specifically designed for real-time transmission of high definition broadcast signals to the tiny MHC® II hermaphroditic multi-channel connectors that interconnects fiber optic channels in a small, tough, yet efficient package, OCC has the right gear to implement the best technology into your broadcasting studio.



1

Breakout field broadcast cables

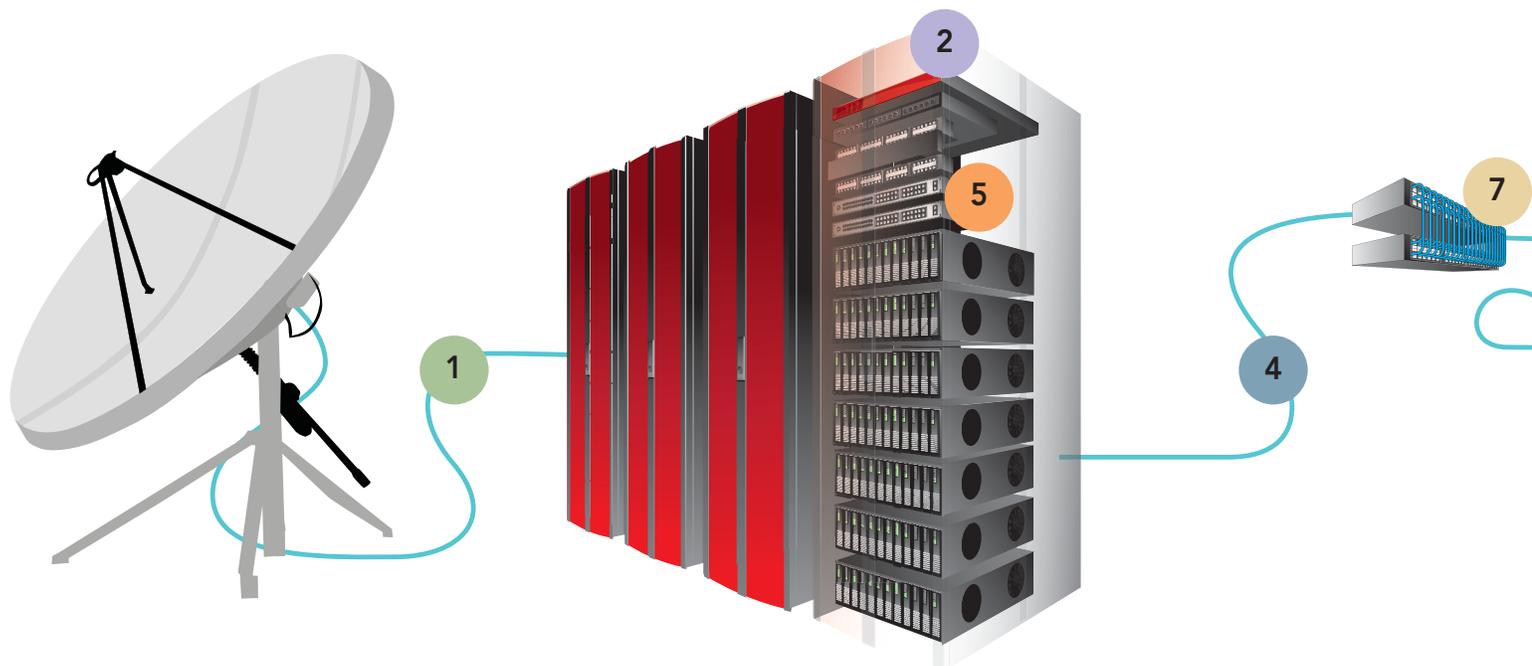
OCC's Breakout field broadcast cables feature a rugged cable design with individual subcables for optimum fiber protection. This deployable cable is ideal for use in harsh environments where repeated deployment and retrieval for reuse are required.



2

Procyon™ solutions

OCC's Procyon™ data center solutions and products allow for working smarter, not harder. From cabinets to panels to cassettes, the full lineup of Procyon products features high-density in smaller spaces, ease of adds & changes with little downtime and incredible cable management features.





**MHC® II connector**

3

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.



**Composite broadcast cables**

4

Composite broadcast cable construction provides the convenience of having both fiber and copper within one cable jacket. Custom designed composite cables are available in a variety of configurations to meet the connector, cable size and electrical performance requirements and can be made in a variety of colors for easy identification or to blend in to the environment.



**Procyon™ fiber panel**

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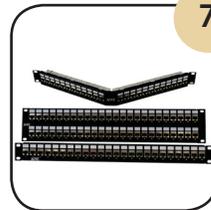
The Procyon™ fiber panel is designed for high-density with comprehensive trunk and patch cord cable management features. The unit accommodates 144 LCs or 48 MTPs in 1RU, and is designed to be easily accessible when fully populated. It can be horizontally or vertically mounted (with hardware) and is intended to be used for switching, server and storage applications.



**KMJ jacks and adapters**

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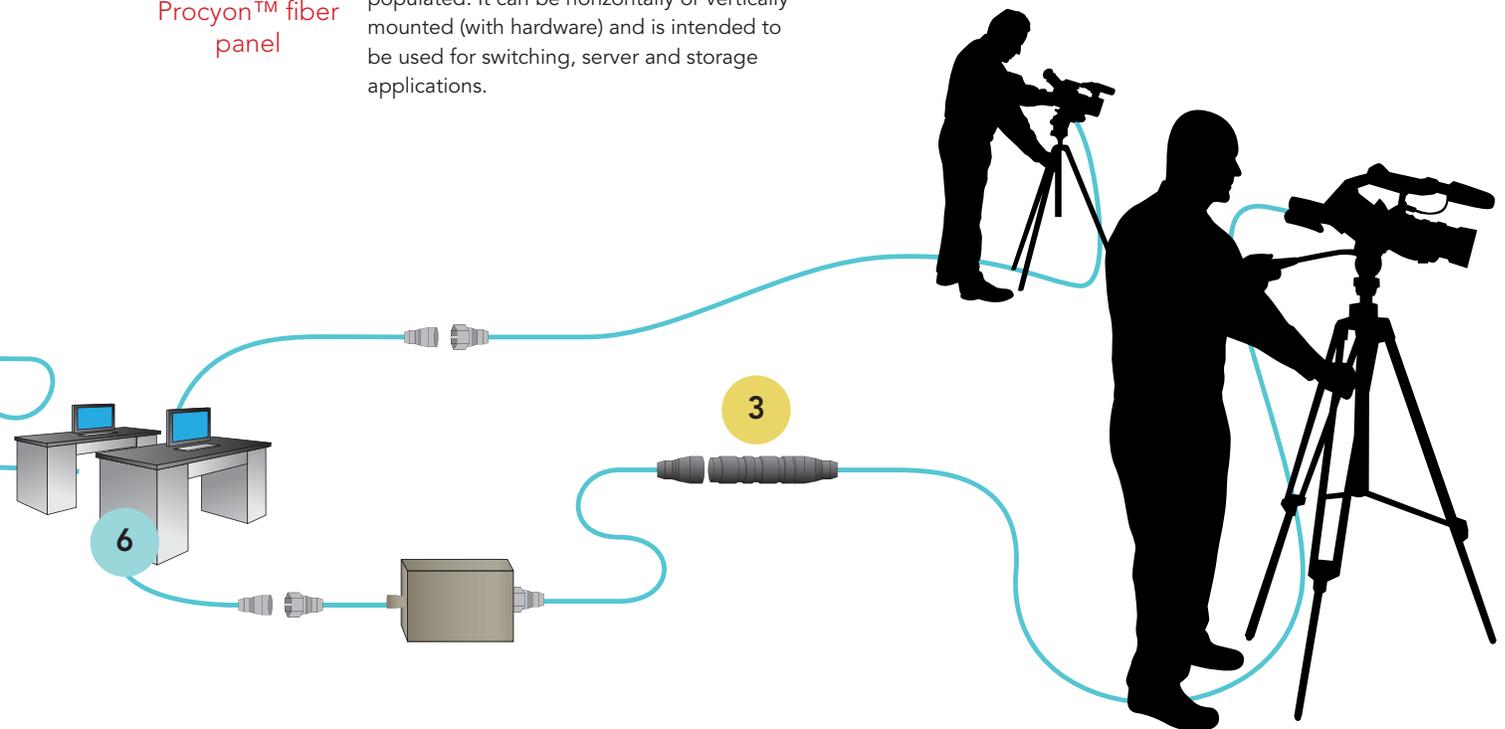
For multimedia options, OCC's complete line of data, video and audio ports for fiber, copper, coaxial and speaker cables have it covered. With 12 color options, OCC's jacks and adapters offer a multitude of configurations for port identification.



**Copper patch panels**

7

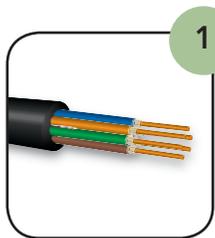
OCC's copper patch panels offers a high-density solution for 10GBASE-T Ethernet applications. Our UTP and FTP Cat 6A patch panels present a product solution that exceeds TIA Category 6A standards and achieves superior performance compliance. The category 6A patch panel is ideal for end users who are looking for superior network performance to keep their infrastructure lasting well into the future.





With today's broadcast applications often extending across multiple locations, and high-bandwidth signal transport requirements becoming the norm, broadcasters are increasingly looking at fiber optic systems as a more efficient and reliable way to manage signal transport.

OCC's fiber optic broadcast products address the transmission of quality audio and video signals, and are particularly well-suited to the harsh environment of deployable applications where delicate standard fiber optic systems would be likely to fail. In addition to ruggedized fiber optic connector systems and unique, light-weight deployable reeling systems options, we offer proven field broadcast fiber optic cables. Designed to withstand the installation challenges of broadcast cabling, OCC's fiber optic cables survive difficult cable pulls, high tensile loading and severe crush occurrences. Our flexible solutions are available for a range of deployable applications including post production, satellite and cable facilities, telecommunications, outside/truck-based broadcasting — anywhere that reliable video and audio transmission is required.



1

OCC's breakout field broadcast cables feature a rugged cable design with individual subcables for optimum fiber protection. This deployable cable is ideal for use in harsh environments where repeated deployment and retrieval for reuse are required.

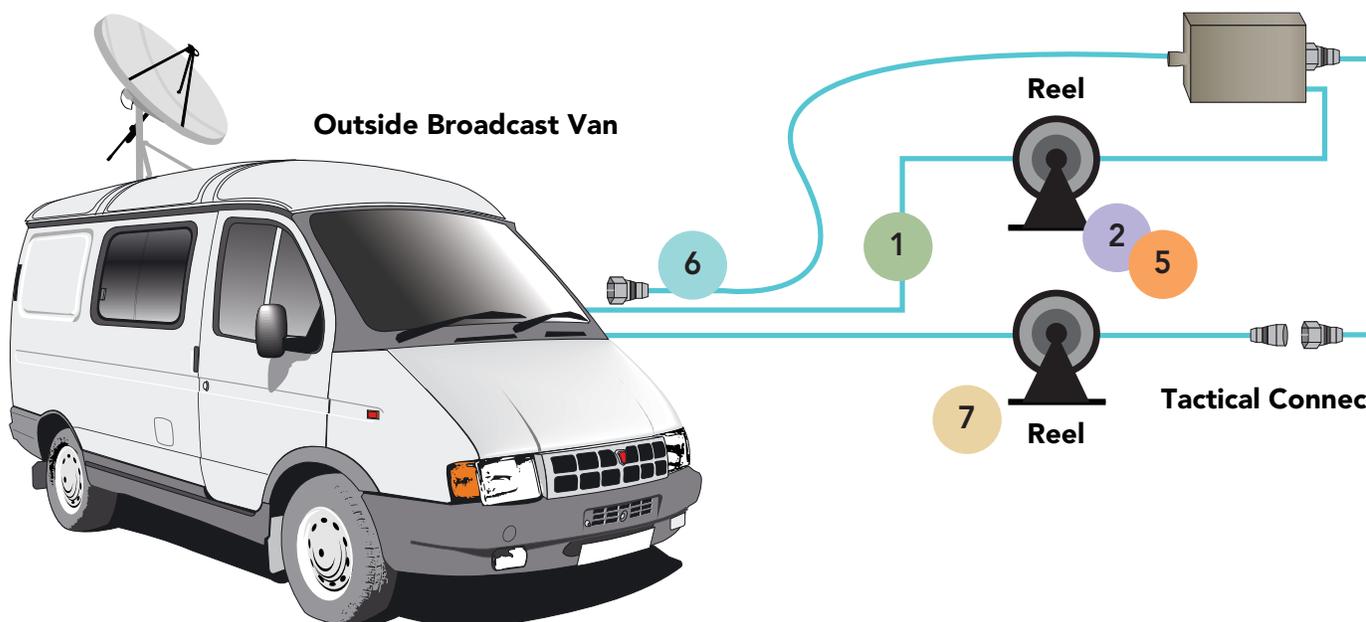
Breakout field broadcast cables



2

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.





**MHC® II connector**

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**MARS Cartridge system**

5

The MARS™ Cartridge system is designed for deployment, retrieval and storage of fiber optic and copper communications cable. The MARS Cartridge System offers the most advanced, self-contained reeling and storage system for broadcast, military or deployable communication environments.



**EZ-MATE connector**

6

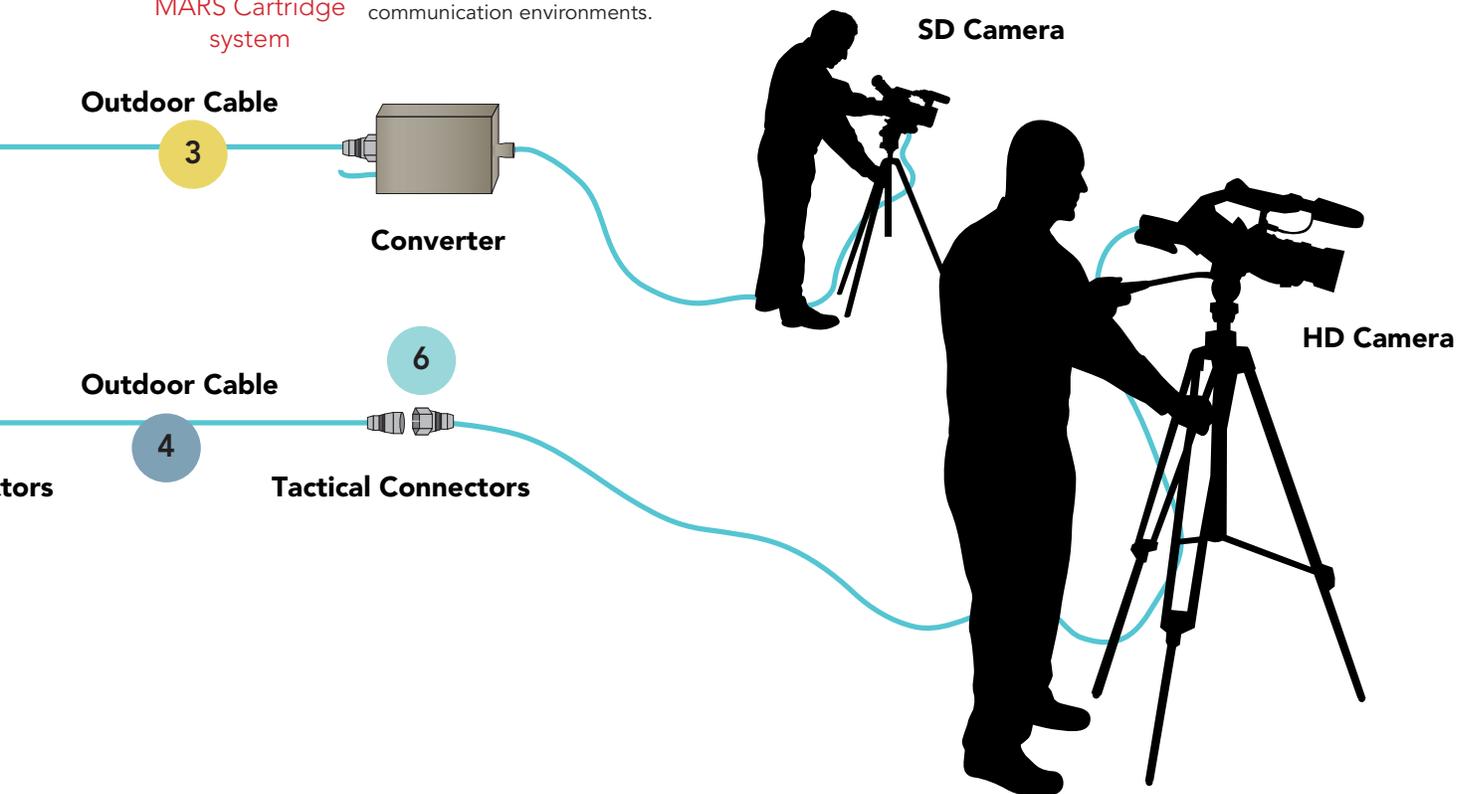
The OCC EZ-MATE family of hermaphroditic-style fiber optic connectors provides a comprehensive connectivity solution for deployable or mobilized communications systems. The EZ-MATE line of connectors provides the same proven technology used in advanced military communication systems, but with simplified interfaces for applications that require repeated or blind matings. Based on the 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.

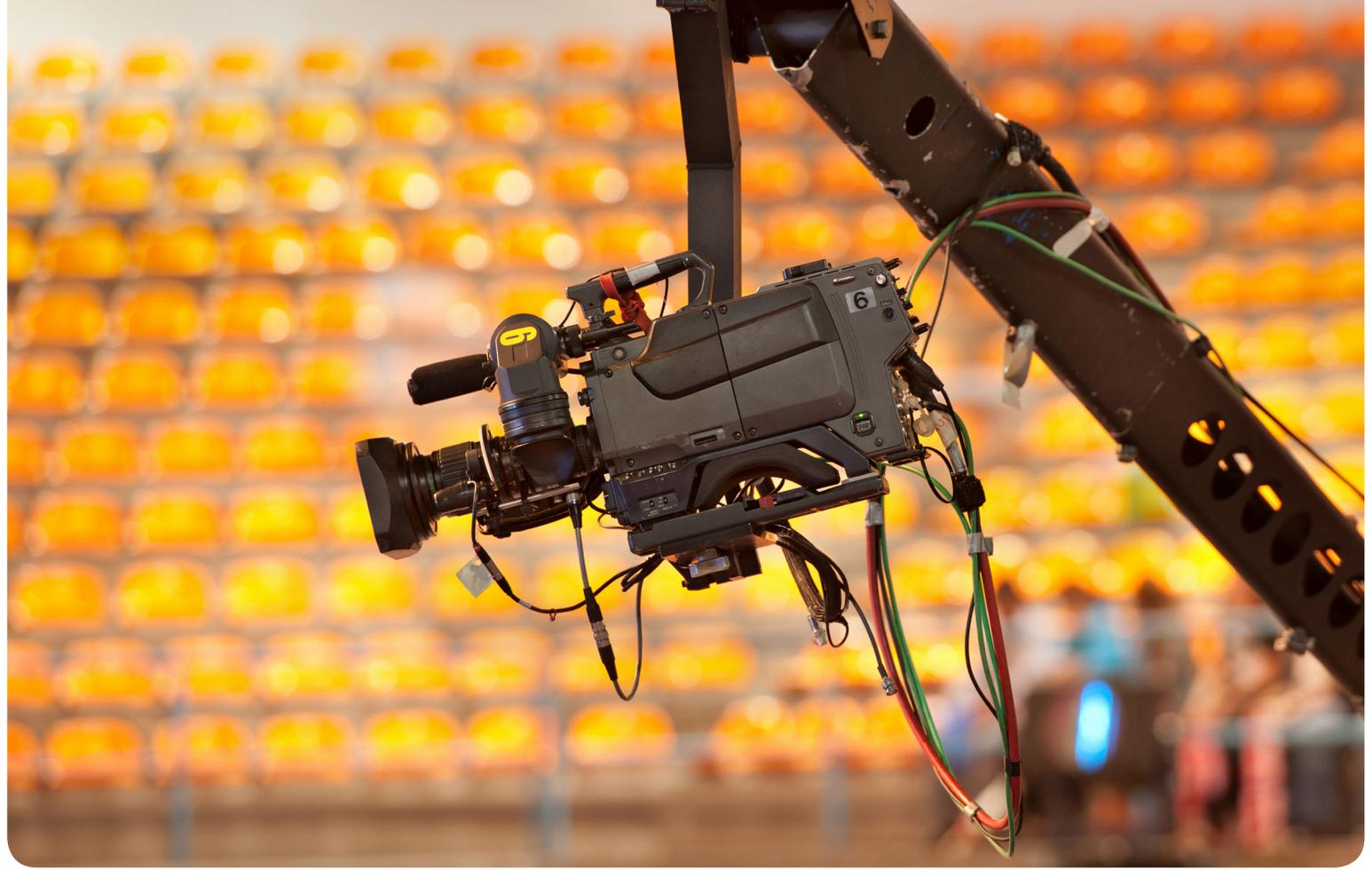


**MARS™ tripod**

7

The MARS™ system offers a variety of deployment options including optional frames, back packs, shipping cases, and cable acquisition platforms including the MARS tripod, ideal for deployable situations.





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