WHITE PAPER

SOLUTIONS FOR BROADCAST APPLICATIONS

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fischer® CONNECTORS

REIMAGINING CONNECTIVITY TOGETHER

SOLUTIONS FOR BROADCAST APPLICATIONS

BROADCAST CONNECTORS CAN LINK SO MUCH MORE THAN A TELEVISION CAMERA TO A SIGNAL TRANSMITTING DEVICE FOR A TV SHOW.

This article shows an overview of the various connectivity needs in the audio-video market and any other application directly linked to broadcasting television and movie productions where high performance reliable connectors play a key role.

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INTRODUCTION

Broadcast connectors can link so much more than a television camera to a signal transmitting device for a TV show. Although this is the first thought coming to mind when thinking of connectivity solutions for the broadcast market, the camera by itself is definitely not enough to guarantee a quality production and flawless transmission to the home.

Three segments within the broadcast industry can be identified. High performance reliable connectors play a key role in all of these three areas. The first part is connecting solutions for television production. The second part will show the connectors needed in the production of movies since television and movie production require two different approaches. The third part details the connecting technology for general on site equipment and broadcast accessories.

A COMPLETE RANGE FOR ALL BROADCAST APPLICATIONS

Fischer Connectors, a worldwide leader in push pull circular connectors and cable assemblies, offers a complete range of solutions answering the needs of these three types of broadcast applications. The Fischer 1051 Triax HD Pro+™ is the perfect connecting solution for signal transmission between a camera and the production unit in each possible environment.

Two new products of Fischer Connectors perfectly suitable for every device and accessory linked to television or movie production are the Fischer FiberOptic Series for robust optical performance and the Fischer MiniMax™ Series with twenty signal and four power connections in one small, dense pre-cabled connection solution. Other premium connector solutions include the Fischer Ultimate™ Series with ultralight designs and the Fischer Core Series with maximum flexibility.

TELEVISION PRODUCTION

The production of television programs worldwide has seen a major technical evolution over the last years. While in the past one type of still camera was used, miniaturization, high definition solutions and a larger number of cameras available have changed the landscape drastically. Technical evolution also increased the number of (live) productions on location and multiplied the number of television channels and outlets resulting in more available programs.

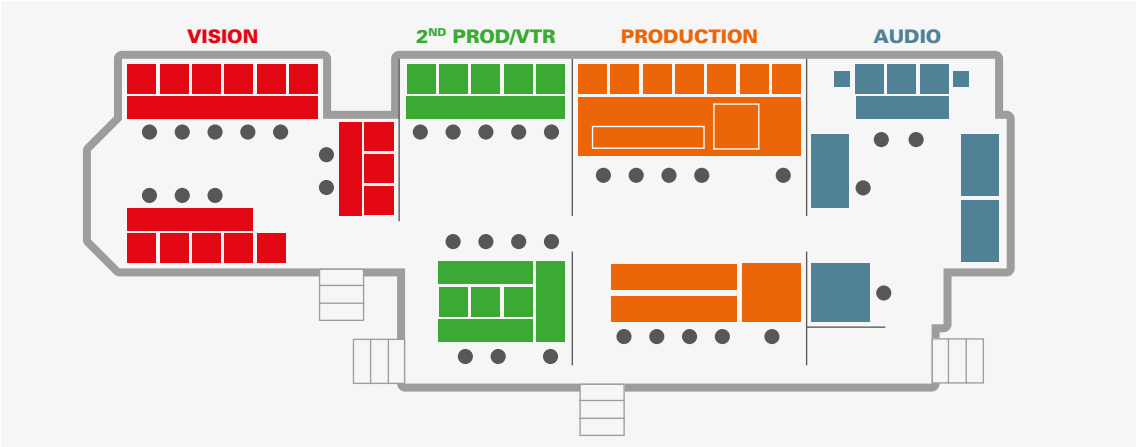
Television production takes place in the controlled environment of a studio. The connectivity for studio broadcasting is based upon a fixed installation. Studio Cameras on pedestals, partially fixed installations and well-handled equipment that doesn't move very much are the characteristics of this working environment. Users of that equipment are well trained and generally have technical in-house teams behind them.

This has an influence on the connecting techniques used for studio broadcast. The main goal is to have steady extremely high performance connections that don't need to be plugged and unplugged regularly. Standard Triax cables with relatively larger diameter can easily be used to get the signal from the cameras to the production area, while Triax HD Pro+™ connectors are also widely used. In addition, all other equipment in the studio has to be connected and disconnected easily.

A second part of television production is broadcast on location, sometimes outdoor.The infrastructure of this type of production varies a lot and can be hard to predict. Ideally the location is already equipped for a television production, like several large congress centers, sports stadiums, theatres and government buildings. Although most of the cable structure is already in place, equipment has to be brought in and out of the facility and needs to be connected and disconnected quickly and often.

One of the main requirements is a stable and reliable connection between the camera's and the OB (Outside Broadcasting) van. An OB van is used to secure the electronic field production (EFP) of television program from a mobile remote broadcast television studio. Professional video camera and microphone signals come into the production truck for processing, recording and possibly transmission. Depending on the infrastructure present at the location, cables with high performance connectors are the essential link between the production site and the OB van, the first step in ensuring a viable transmission to your home.

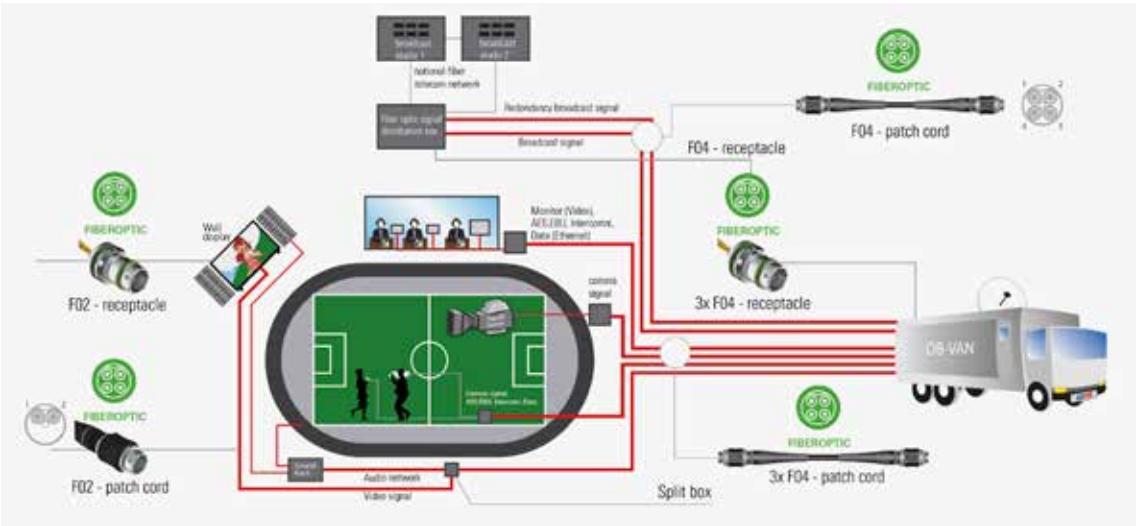
FIG.1



EXAMPLE OF AN OB VAN FLOOR PLAN

The number of connectors can increase rapidly. Many outside television productions use multiple cameras, microphones and other equipment, while the distance and number of cables needed will result into hundreds or sometimes thousands of meters of cables present onsite. Another set of cables is needed to guarantee the interface between the OB van and the satellite upstream of video and audio directly to the networks. This can either be done from a separate mobile satellite truck or the OB van itself when properly equipped.

FIG.2



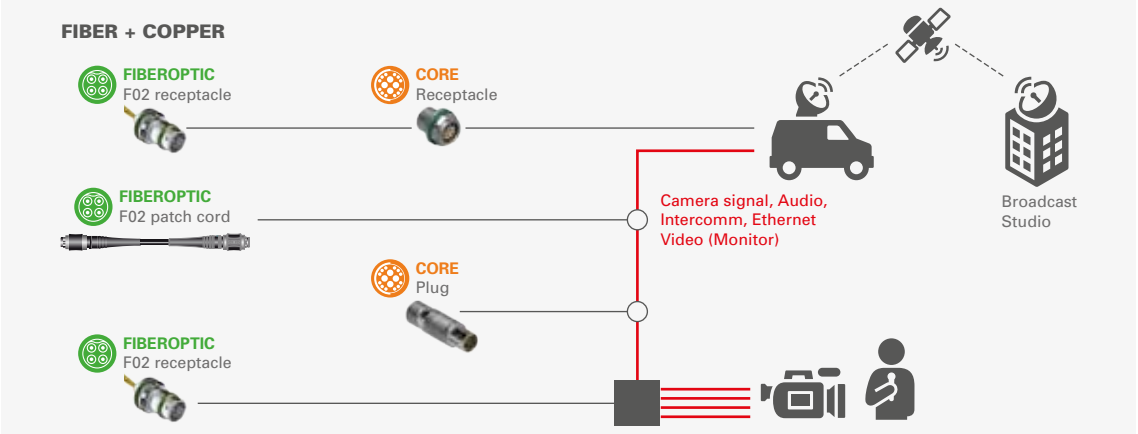
CONNECTING SOLUTIONS FOR ON LOCATION PRODUCTION USING AN OB VAN

Broadcast on location requires several types of cameras. In addition to the fixed placed cameras, ENG (Electronic News Gathering), super-slow-mo and miniature wireless cameras are often used. They all need a specific connection for each type of camera. An extremely small wireless camera placed in the swimming pool to capture the diving at the Olympic Games requires a different connectivity from the super-slow-mo camera that transfers an extremely large number of high definition images in a split-second.

One of the constraints of broadcast on location is time.The technicians only have a short amount of time to set-up and break down.Temporary people or ad hoc subcontractors can be employed to handle materials and equipment which are on hire, this means that cables can are deployed without training or experience. Reliability and simplicity are therefore vital bearing in mind that the provider can be fined for picture loss. The connectors will need to be mated and unmated many times by potentially inexperienced hands.

Broadcast on location is not only applicable for major events or large productions. For a press conference, news item or other shooting on a location not directly suitable and equipped for television production, other techniques from miniature cameras to Satellite News Gathering (SNG) are used worldwide.

FIG.3



CONNECTING SOLUTIONS FOR SNG AND ENG BROADCAST

EXAMPLE OF A FLYAWAY FOR SATELLITE UPLINK

When a broadcast production takes place on location, the signals captured have to be transmitted to one or more television studios by satellite. The satellite uplink is done by a special vehicle or flyaway equipment, while other equipment is needed for the downlink. For both options, a mixture of connectors is needed.There will be very high frequency connections together with Triax and power connectors.

Keeping the above in mind, many different types of connectors are required to guarantee a television production at the highest level. This is sometimes underestimated when talking about broadcast solutions. Each type of connection and each type of environment requires another approach.

Fischer Connectors' range of products are commonly used by television production companies worldwide and they are adapted to each individual situation; from a fixed studio to the harshest outdoor environment where secondary elements like weather, extremely short timelines and areas difficult to access come into play.

The Fischer Core Series Broadcast (1051Triax HD Pro+™) is the right selection for the connection between the camera and the production area, whether this is a television studio or an OB van. Already a recognized industry standard for both studio and outside broadcasting, it was awarded in 2010 the Best of IBC award for innovation and cost-efficiency. Triax is a major technology to connect HD video cameras and related equipment. To ensure flawless transmission, cameramen are eager for increased user-friendliness of their video equipment on top of a highly reliable signal performance. Long transmission distance up to 1.5 kilometers for HD transmission without a repeater is an important parameter for broadcasters when events take place in large-scale venues.

FISCHER CORE SERIES BROADCAST

Some of the key advantages of the Fischer Core Series Broadcast (1051 Triax HD Pro+™) are that production companies don't need to invest large sums of money for special tools unlike for some other connecting solutions and that unspecialized, skilled and trained personal are needed for its operation. Spare parts can easily be obtained through an extensive worldwide support network. These aspects dramatically reduce the cost of ownership and maintenance.

FISCHER FIBEROPTIC SERIES

The Fischer FiberOptic Series is a rugged fiber solution that secures premium optical performance in extreme environments. The fiber optic connectors offer the essential quality and stability needed for an optical link combined with extreme robustness, easy mating and easy cleaning. This high performance fiber optic connector is not only suitable for camera connections, but also for general equipment and accessories for any type of broadcast applications, like all of the other Fischer Connectors' solutions.

The Fischer MiniMax™ Series, the Fischer UltiMate™ Series and the Fischer Core Series are additional efficient solutions that are used by television production companies to secure their connecting needs.

MOVIE PRODUCTION

The first difficulty for movie producers is that the images shot are not for direct broadcast. The shooting is one part of a number of stages in filmmaking. After the shooting, editing and screening of the finished product will take place before a movie is released. Secondly, the equipment used is different from television production.

A high performance movie camera is only a small part of the equipment present at a movie set. Lens motors, breakout boxes, lens controllers, remote boxes, multiplexers, viewfinders, screens, batteries and power splitters are just examples of additional equipment that needs connecting solutions while producing a movie. Other constrains are the location, the different types of cameras used and the fact that the equipment should not be seen in the final version of the movie.

A CAMERA FOR MOVIE PRODUCTIONS

image courtesy of ARRI

All signals, data, controls or other information such as video, audio, lens control, light conditions or 3D set up from film cameras need to be available either on other systems, remotely or via cables. Cameras need external power supply and provide external power for the lens controllers, motors and other features. The cameras therefore have a main power input as well as several outlets. The connectors in use need to be as robust as possible and protect the electronics and all external equipment.

Movie cameras are often used in harsh environment with short build up times. Even when the technical material is set up by technicians, the users are the artists, many times without technical knowledge. The material needs to be simple and reliable to allow efficient work for expensive film productions.

Fischer Connectors is a well-known connector supplier of the movie industry. The Fischer MiniMax™ Series with a high data rate will bring advantages to the movie industry, thanks to its miniaturization enabling the use of less connectors, a smaller housing and smaller size equipment. Its light weight, high density, IP68 sealing, color coding and reliability are mandatory for many of the applications. It is designed for the harshest environments, passing extreme temperature tests and boosts an impressive 1,000 hours resistance to salt water spray.

FISCHER MINIMAX™ SERIES

The Fischer MiniMax™ Series, awarded as the Best of 2015 by the magazine TM Broadcast International, is more cost-effective not only because the connector is physically smaller, but with the 19 and the 24-contact configuration fewer connectors can be used to achieve the same performance. The Fischer MiniMax™ Series is available in three different locking systems: push-pull, quick release and screw lock.

The Fischer FiberOptic Series providing robust optical performance offers the essential quality and stability needed for an optical link combined with extreme robustness, easy mating and easy cleaning. It has a high ingress protection, IP68 when mated and IP67 when unmated conditions. In addition, Fischer Connectors' FiberOptic optical performance is insensitive to mechanical strain or vibration. The spring optical contacts employed allow for filtering out any stress applied to the connector housings while keeping the typical advantage of a push-pull solution: quick, safe and easy locking.

Two other product lines of Fischer Connectors, the Fischer UltiMate™ Series and the Fischer Core Series are very common in the movie industry because of their high performance in all types of environments.


POWER SPLITTER


BREAKOUT BOX

LENS CONTROLLER

GENERAL EQUIPMENT & BROADCAST ACCESSORIES

Broadcast equipment doesn't stop with camera equipment only. It is therefore clear that besides main broadcast connectors and cable solutions, producers need several multi-pole, power, fiber optic, electrical or hybrid connectors. Cranes equipped with a camera, camera lens controllers, camera housing mounted on a helicopter or drone or underwater cameras for example all need reliable connections in addition to efficient and constant transmission of the signal. All this equipment is used for television, film and movie production.

FIG.5

POWER SUPPLIER


UNDERWATER CAMERA

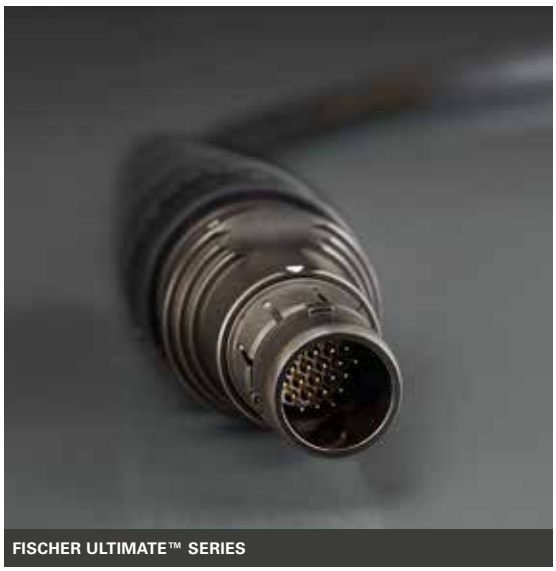

HF TRANSMITTER

CRANES	Cranes are used to allow dynamic camera positions Cameramen are sometimes located on the ground and steer the camerahead with the monitor system on the ground. Cranes need reliable connections for all remote camera functions as well the mechanical steering and control of the crane.
CAMERA LENS CONTROLLERS	According to the camera position, camera lenses can be remote controlled. Zoom, focal, diaphragm need to be activated by small motors, which are controlled from a control box.
STEADY CAM AND PORTABLE MONITORING	Portable camera system allow full movement along the ground. All camera functions are standard including remote monitor system.
CAMERA HEAD, OR POD	Camera housing mounted on helicopters, drones or even fix poles. All camera functionalities, as well the monitoring system are handled from remote position.
TROLLEYS	All kind of moving cameras: on the floor, hanging on cables, following running athletes or race cars and all other dynamic sport events need drives to move the camera. All those movement are remote controlled.
3D RIG	3D camera systems need perfect synchronization of all functions on cameras. All motor controllers are connected to a remote controller and synchronisation unit.
UNDERWATER	Underwater videos are popular for amateurs as well professionals. Camera function, light, and in particular battery power is connected to the underwater housings.
HIGH SPEED CAMERAS	High speed cameras are used everywhere when detailed images are important, such as sport events, test laboratories, crash test, etc. Some cameras can resist extreme acceleration and deceleration, depending on the application.
LED LIGHT	LED light consumes less power than traditional spots, and on some systems, the light "temperature" can be modified with additional colour LED's, switched on/off as necessary. DC power supply is necessary, as well as signals to regulate the light temperature.
POWER SUPPLY	Remote cameras need a power supply. external DC power is necessary. accessories, light, and motors are heavy power consumers.
HF TRANSMITTER	High Frequency transmitters on portable cameras to avoid cable link. Need a power supply and all relevant data connections.

The broadcast accessory market is important, and developers are not always the same persons as the end-user.The Broadcast market is dependent on reliable high technology products, which are often used in harsh and unfriendly environments. Connections/disconnections are frequent to set up and dismantle a production site or event.

Many times, the operation of the equipment must be done remotely. In these situations - remote lens control, remote head operation, motion control dolly or cranes, or portable filming equipment - where the operator is often remote and equipment is mounted on special cranes, connections must be flawless. There is no margin for error because the camera and the accessories' performance must complement each other and there is no room for mistakes.

Fischer Connectors is the perfect partner in terms of product performance and product range. The Fischer Core Series and the Fischer UltiMate™ Series are ideal for applications in harsh environments. The Fischer Core Series offer a high flexibility of configurations, including low/high voltage, coax/ triax, fiber optic and hybrid with over 20,000 references.


FISCHER ULTIMATE™ SERIES


FISCHER CORE SERIES

The Fischer UltiMate™ Series offers rugged, compact, lightweight, sealed connectors able to withstand a variety of severe environmental conditions.This push-pull connector is available in a wide range of body styles, sizes and configurations from 2 to 42 poles. The compact product design with short plugs, small and easy to handle low profile receptacles makes it perfect for connected devices with restricted space requirements.

As miniaturization is more and more required for equipment and accessories, the Fischer MiniMax™ Series will definitely solve the design problems as this connector is physically smaller and with the 24-contact configuration, fewer connectors can be used to achieve the performance required.

The Fischer FiberOptic Series for robust optical performance can also provide the solution designers of broadcast equipment and accessories need when they are looking for robust optical performance. As of September 2015, two new accessories are available to make fiber optic deployment and

transmission testing in the field as easy as child's play: the daisy chaining and the loopback.The accessories come along with Fischer Connectors' pre-configured FiberOptic reels of any required length, a convenient and flexible turnkey solution. The daisy chaining adapter connects the plugs on each reel, enabling several reels to be connected quickly and seamlessly. The loopback offers a shortcut to speed up testing, so that even someone working alone can ensure everything is in perfect working order; by shining a light down the first fiber, it is possible to check if light appears on the second fiber, without having to walk right to the end to take a look.

CONCLUSION

There is more to the broadcast connecting needs than a connection between a camera and another piece of equipment. Finding the right connecting solutions and the connector suppliers shouldn't be underestimated. The time and money invested by television and movie producers in addition to the technical and environmental challenges require true quality and reliability at any time and in any location.

As a worldwide leader in high performance rugged circular connectors and cable assembly solutions, Fischer Connectors is an expert, reliable and innovative partner, committed to working closely with its customers to select the best connectivity solution to turn their challanges into success stories.

ABOUT FISCHER CONNECTORS

Fischer Connectors has been designing, manufacturing and distributing high-performance connectors and cable assembly solutions for more than 60 years. Known for their reliability, precision and resistance to demanding and harsh environments, Fischer Connectors' products are commonly used in fields requiring faultless quality, such as medical equipment, industrial instrumentation, measuring and testing devices, broadcast, telecommunication and military forces worldwide.

Primary design and manufacturing facilities are located in Saint-Prex, Switzerland, with subsidiaries and distributors located worldwide.

Fischer® CONNECTORS

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