

“Leveraging Hybrid (Fiber/Copper) Connectivity for Real-World Networks”



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Presented by

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Agenda:

This presentation will review the use and requirements of a new connection system.

Hybrid Connectors (Fiber/Copper) are being introduced to improve the ease of use, installation, reliability and resiliency of today's ICT Networks and communications infrastructures.



The inevitable merging or convergence of Fiber and Copper in one cable and one connector has brought the benefits/problems and challenges of copper into the optical networks.

The session will introduce the attendees to applications in wired and wireless networks and discuss options, safety codes, sizing etc. associated with the use and deployment of hybrid connectors.

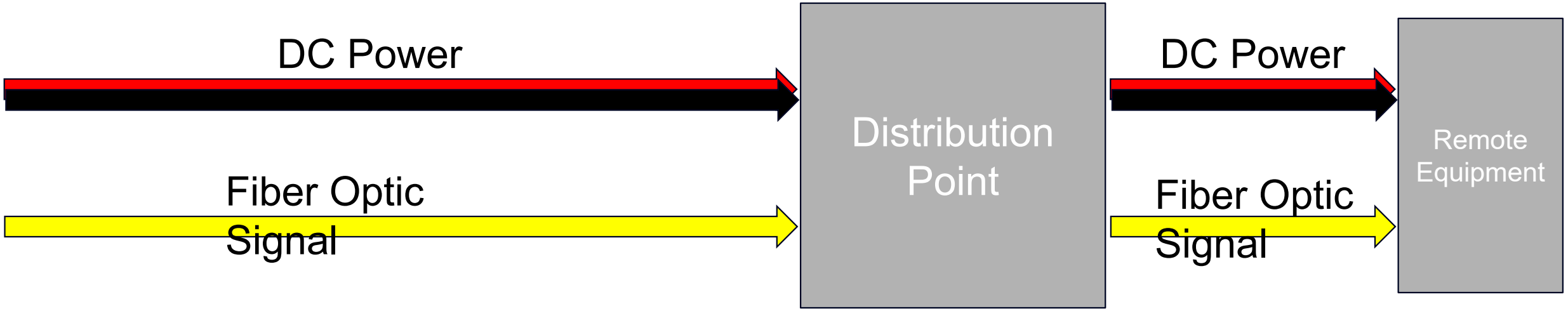
Hybrid Connectors (Fiber/Copper) are being introduced to ease installation and improve the reliability and resiliency of today's fixed and mobile networks.

Learn how to leverage the benefits and remedy the problems associated with this new network connectivity approach.



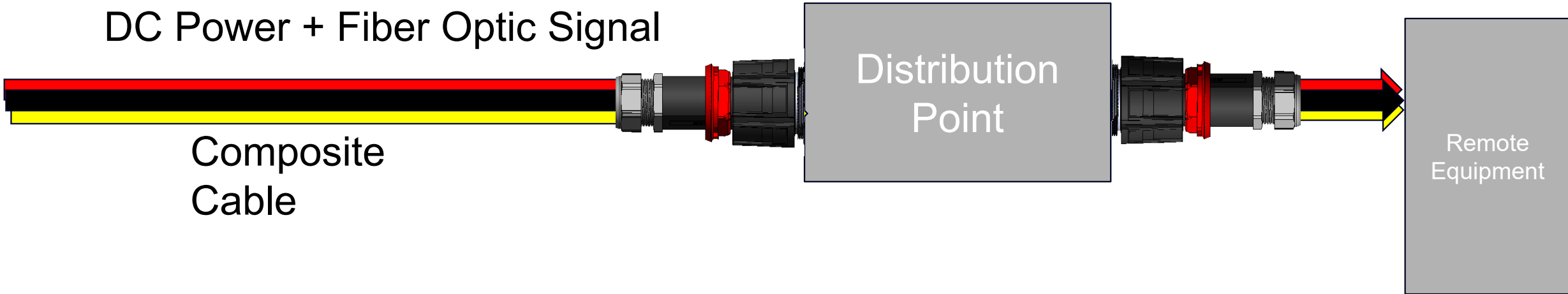


Optical Network with traditional (separate / discrete) Powering and Data delivery





Optical Network with Composite Cable (Hybrid) Powering and Data delivery





What is a Hybrid Connector?

- It is a Connector that has the capability to combine many forms & types of Fiber cable connectivity/terminations and Copper with the objective to provide One Integrated connectivity solution.



What it does

It provides One Integrated connectivity solution that delivers Data and Power utilizing One Connector and One Hybrid cable.



Challenges

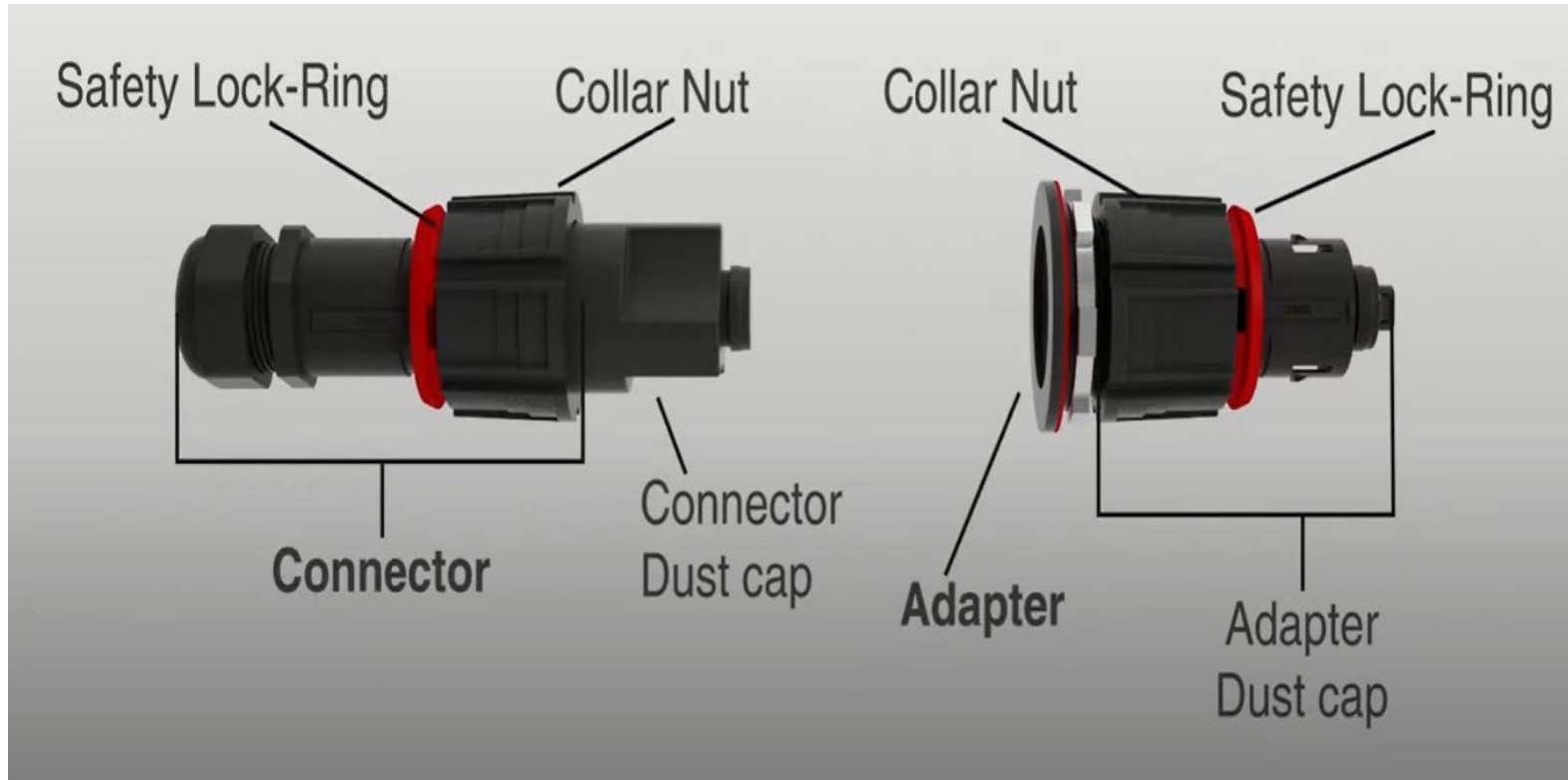
- Traditionally Fiber cables connecting Optical Networks are free from Electrical concerns and Code compliance requirements* but a Hybrid system must consider such effects in connected equipment and networks.
- Electrical concerns and Code compliance requirements* Protection from lightning surges, induced lightning, AC power cross, AC power industrial induction, AC power transients, harmonics, solar flare/storms, grounding and NEC/NFPA compliance.



Technologies integrated in Hybrid Connectors

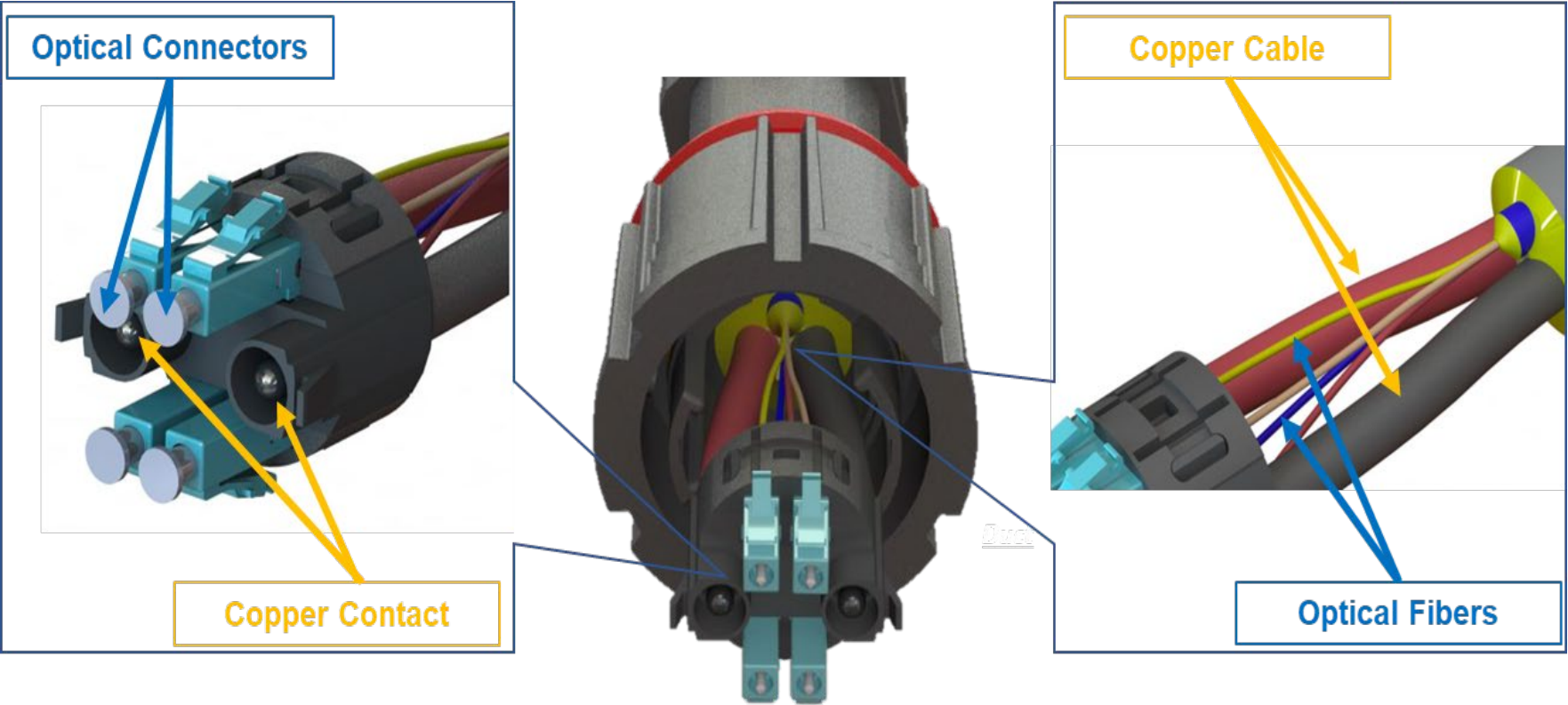
- Fiber Optics Connectivity.
- Copper Connectivity.
- Environmental protection from (Temperature variations, rain, ice)
- Mechanical strength and integrity of the Fiber connections.

List of connector components



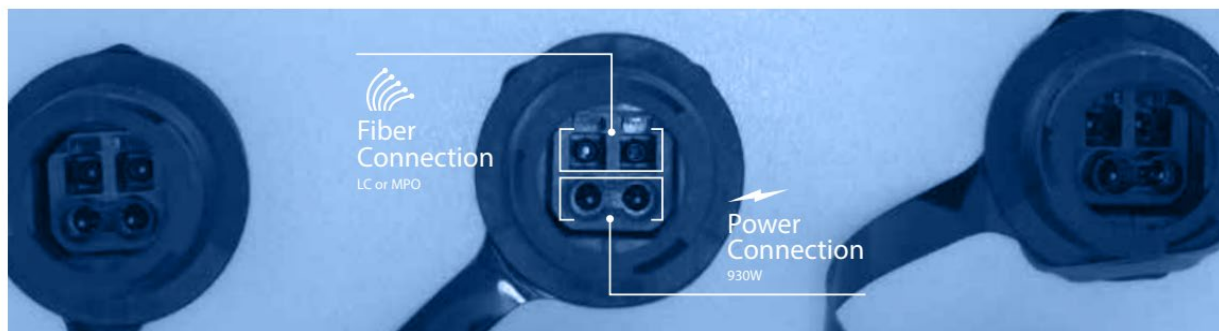
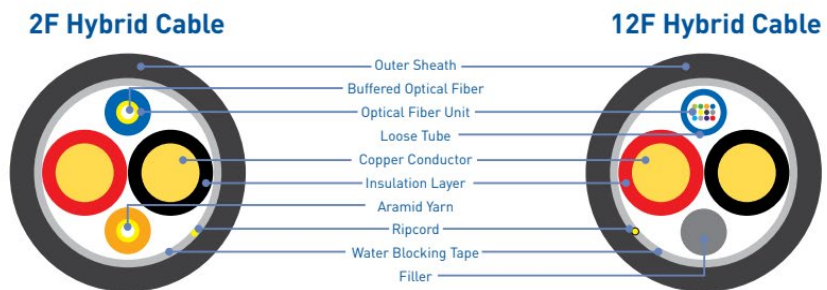


A look inside a Hybrid Connector





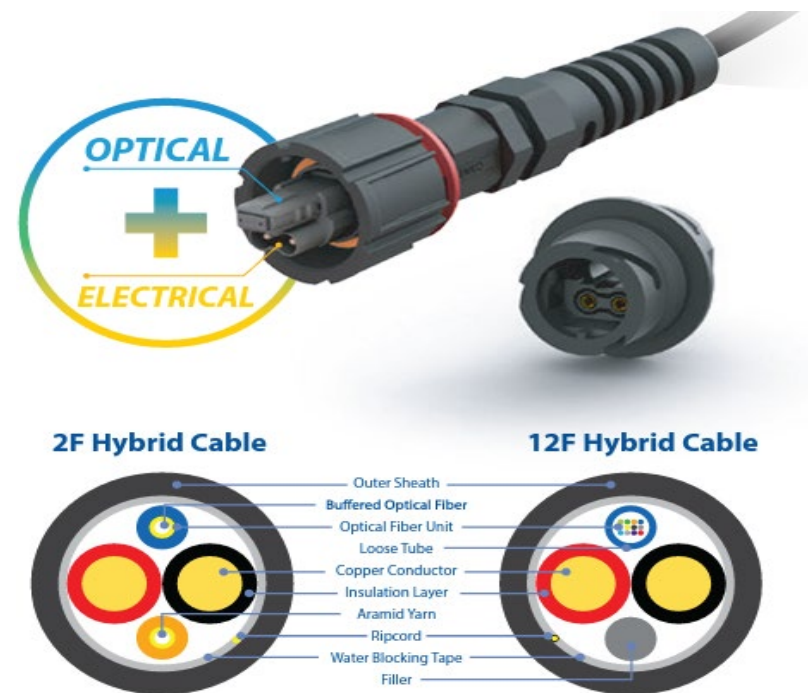
Fiber connectivity/terminations



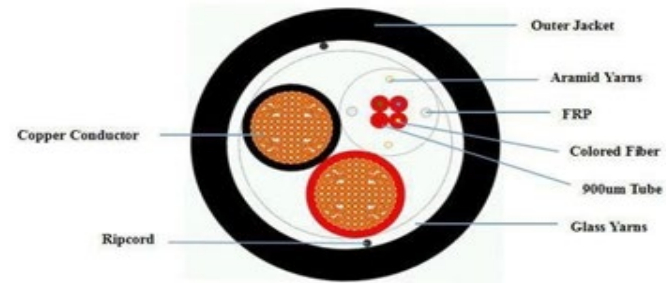
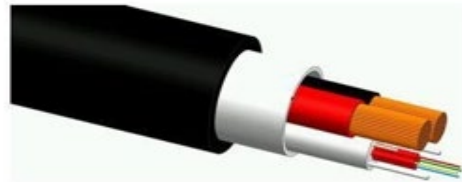


Copper connectivity and terminations

Various connectors can accommodate stranded conductors from 18 AWG to 6 AWG.



Indoor Hybrid connectivity





Copper connectivity and Power

*From DC to 600 VAC traditional powering methods

*FMPS per NEC article 726 –Class 4 (CL4)
(Fault Managed Power Systems)

UL 1400-1 (Class 4 Equipment)

UL 1400-2 (Class 4 Cables)



Selection and Considerations

- AC/DC Voltage supply and configuration.
- Load/equipment current requirement.
- Voltage withstand level of connected equipment and systems.
- Mounting and support.
- Special Environmental Requirements.
- Certification Standards and Safety Requirements (UL/CSA/IEC)



Selection and Considerations cont.

- IP68 or better rated hybrid connectors
- Fiber count and power rating
- Ruggedized to meet application requirements



Selection and Considerations cont.

Adherence to GR-3120

Generic Requirements for Hardened Fiber Optic Connectors (HFOCs) and Hardened Fiber Optic Adapters (HFOAs)

Telcordia Technologies Generic Requirements
GR-3120-CORE
Issue 2, April 2010



What to look for when choosing Hybrid Connectors

Quality

Standards and Testing

Application support



Key benefits

- Low profile that is less intrusive to surroundings
- Flexible location of power source
- Plug and play reduces installation time
- Reduces cable runs and simplifies installation
- Reduces overall cost



Key benefits cont.

- Reduction in Size
- Modular
- Factory Terminated- Offload from Field Techs



How to handle Hybrid Connectors

- The Copper section can be handled as any other electrical connector.
- The Fiber section requires expert care to prevent damage and contamination to fiber surfaces and specialty materials and equipment for cleaning and testing.



Dry cleaning tools

Lint Free Swabs



Lint Free Wipes



Cartridge Cleaners



Pen Cleaner



Adhesive Backed Cleaner



Compressed Air



Fiber Inspection equipment

Fiber microscope



Fiber Inspection Probe (FIP)



Automated analysis microscopy



CLEAN PASS

DIRTY FAIL



Applications utilizing Hybrid connectors

Star Network

A star network is where the head end device is located in a centralized location and a distribution device, such as a multi-port media converter, is located in a remote location to serve a cluster of access points. Such a network design reduces the number of cables and connectors, but will require the use of a remote distribution device. Where the remote cluster is too far away to be powered from a central location, it is possible to boost the power by using a power injector at the distribution device.



Applications utilizing Hybrid connectors

cont.....

Point-to-Point (P2P) Network

A P2P system is where all the access points are directly connected to the head end device and power source. This type of design requires the highest number of cables and connectors. This is usually deployed in small coverage area that is local to the head-end device such as in an office

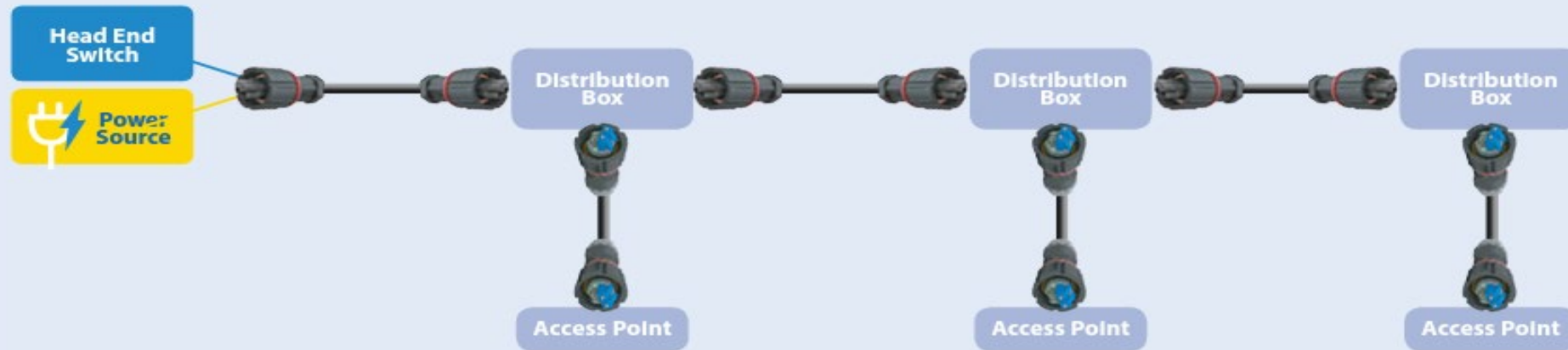


Applications utilizing Hybrid connectors

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Daisy Chain Network

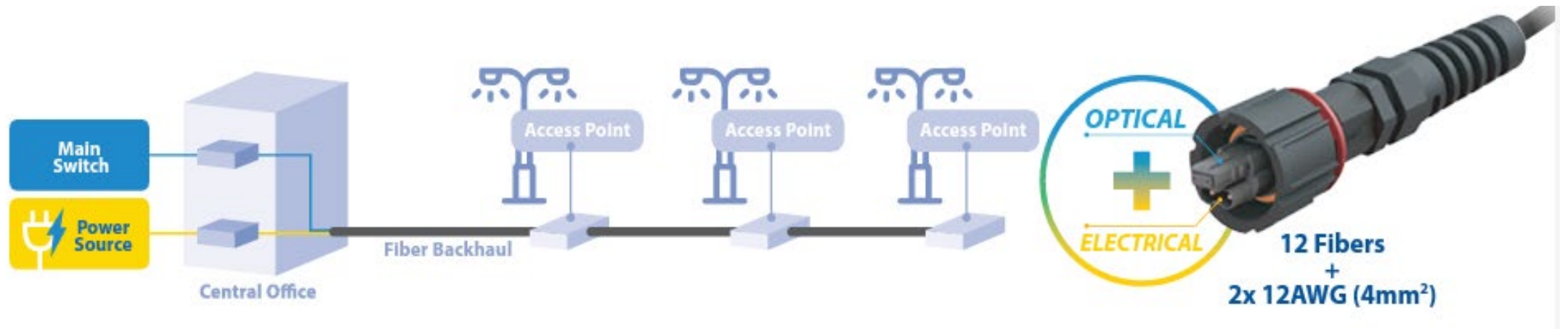
A daisy chain network is deployed where the access points can be connected in a sequential link. A series of patch cables and distribution boxes are connected to link the access points along the route. This type of deployment is suitable in the situation where the ability to install multiple cables is limited. An example is the installation of access points onto a series of lamp posts.



Applications utilizing Hybrid connectors

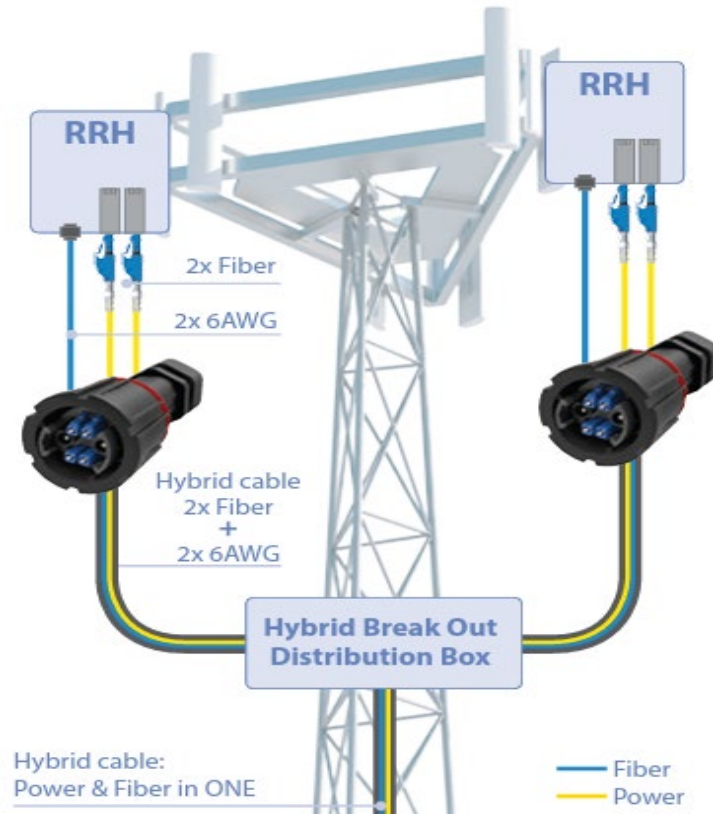
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Small Cell & Distributed Antenna System (DAS)



Applications utilizing Hybrid connectors cont....

Macro cells



Thank You !!!

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