



Fiber Optic Cable Replaces Copper Throughout the Network

Contractors can win more jobs by managing installations effectively

Introduction

Network installation contractors are key players in the “digital transformation” movement that is affecting virtually every corner of the world economy. They are installing and updating the network infrastructures that enable businesses and organizations to adopt aggressive, new business models. The networks they build are supporting complex online transactions, mobile applications and transmitting Big Data to support power analytical applications. Rapid increases in data processing are rendering legacy infrastructures and architectures obsolete while also fueling demand for data center and network improvements. Bandwidth limitations are unacceptable, and engineers are specifying fiber optic cabling in place of copper throughout network backbones and even to the desktop.

Contractors who are prepared to install fiber optics quickly and cost-effectively are perfectly positioned to seize the opportunities that digital transformation creates for the network installation industry.

Companies Look to 'Transform' Through Better Data Processing

Installation contractors can gain a competitive advantage by positioning themselves as vital partners in the digitization movement that is on the minds of business leaders everywhere. Businesses are moving with urgency to upgrade digital performance, and those that successfully transform their operations gain a significant advantage over digitally immature competitors.

Today's consumers expect that all information and transactions will be available online and, particularly on smartphones. Business leadership, meanwhile, is requiring lines of business (LOBs) to improve operational performance and gain business insight by leveraging Big Data and analytics. Companies are gathering data from the Internet of Things and breaking down data silos to enable powerful analysis that helps them predict the future and make better decisions.

These high-performing applications require more data processing, larger capacities, and new network architectures. As computing capacity becomes a core business concern, organizations look to build powerful, high-capacity networks enabled by a robust physical layer, including cabling that can support 100 Gigabit Ethernet — with higher capacities to follow. The only choice for many new networks is fiber optic.



New Architectures Demand New Expertise

The data center used to operate as an essential but obscure department with little direct connection to business leadership, and network upgrades were regular events that did not draw the attention of the Board of Directors. As long as the applications performed and the users — typically employees — had reliable access to their data, network contractors were low-profile support players.

But simple network upgrades using traditional designs have given way to cloud platforms, hybrid environments, software-defined networks, data lakes, edge processing and other advanced architectures that require high performance from end to end. With data processing playing a far more essential role in business, data centers are emerging from obscurity, and installation contractors are becoming vital technology partners.

Contractors need to stay abreast of these new topologies and the complexities that come with them, including the increasing use of fiber optic cable. In many new installations, fiber optics are used in place of copper throughout plants, data centers, campuses and everywhere where future upgrades are anticipated. Organizations are looking to deploy quickly, and they don't want to endure long project lead-times or delays.






Fiber Optics Are More Widely Used

As organizations demand more of their networks and data centers, they specify servers and appliances with ever-higher capacities and speeds. To support the ever-increasing volumes and speeds, they also specify faster cable that also delivers improved security. The solution of choice for more and more projects is fiber optic cable.

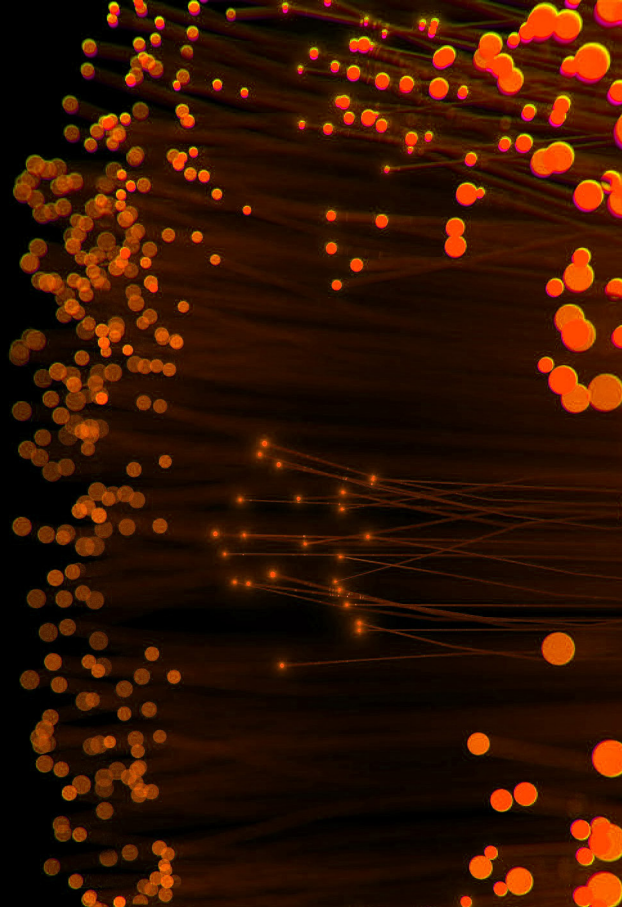
Fiber optic is more expensive to install than copper and demands higher expertise from contractors, but the benefits to the organization are clear. As data centers increase density and consolidate computing power, the generous bandwidth of fiber optic facilitates the rapid processing that today's applications require. Contractors are installing fiber optic in backbones, campus interconnections, VOIP deployments and even to the desktop.

In fact, fiber optic cabling is often more future-proof than the servers and appliances it connects, because it can meet bandwidth demands for several generations of computing equipment. As such, it offers lower total cost of ownership (TCO) than copper, because it stays in place longer.

Here are the five important advantages that fiber optic delivers when it is used in place of copper.

-  **1. Higher Bandwidth:** Fiber moves more data at higher speeds than copper cable. In fact, optic signals move through fiber at 70% of the speed of light.
-  **2. Greater Distance:** Attenuation is lower with fiber optic than with copper cable, which means there is less signal loss, and data can travel farther.
-  **3. Higher Security:** Optic signals cannot be hacked like electrical ones can be, so data transmission is more secure.
-  **4. No Electric Power:** Fiber optic cable is not subject to electromagnetic interference (EMI), which means the signals maintain higher quality because they are not prone to interference and degradation due to EMI.
-  **5. Lighter Weight:** Fiber optic cables are lighter than copper and easier to handle. They provide higher density at lower diameters, which means more cabling can fit in a tray, and there is more room for air to flow, which makes cooling more efficient.

As companies raise their expectations for data center and network performance, fiber optic cable becomes ever more ubiquitous throughout network architecture. Usage is no longer limited to longer runs but is now pervasive in the horizontal. Fiber is being used widely in network backbones and even too many desktops.



Single Mode or Multi-Mode?

The most important choice facing engineers and network designers who specify cable is which type of fiber optics to choose: Single Mode Fiber (SMF) or Multi-Mode Fiber (MMF). SMF is primarily used for providing high bandwidth over long distances, while MMF is used for shorter cable runs, such as within a network.



Single Mode Fiber

SMF can carry signals for up to 10,000 meters, using cables with a smaller core and narrower wavelength than MMF, making it ideal for long runs between data centers. The cables and components used in SMF are more expensive than MMF products. SMF cables carry laser light, while MMF uses LED light.



Multi-Mode Fiber

MMF is limited to transmission of 600 meters and is frequently chosen for server and backbone connections. Some engineers are choosing SMF more often for the superior bandwidth it provides, but there are many factors to consider, such as the inefficiency of using too many power-hungry laser lights.






The Basics of Fiber Optic Networking

With demand for fiber optic cable increasing for networks of all types, contractors and their technicians need a solid understanding of the most widely used fiber optic cables and connectors.

Here is a brief review of the products and categories that are specified on most on-premises jobs.

MMF cable grades: The most widely used fiber optic cables are OM1, OM2, OM3 and OM4.

- OM1 supports 1 Gigabit Ethernet (1G) up to 275 meters and 10G up to 33 meters and is most commonly used in short-haul networks and LANs.
- OM2 supports 1G up to 550 meters and 10G up to 82 meters and is most commonly used in short-haul networks and LANs.
- OM3 supports 10G up to 300 meters and 40G/100G up to 100 meters, and is most commonly used for larger private networks.
- OM4 supports 10G up to 550 meters and 40G/100G up to 150 meters and is used in high-speed networks such as data centers and corporate campuses.




Indoor/Outdoor: Cables rated for outdoor use or indoor/outdoor use have water blocking qualities not found in an indoor-only cable.

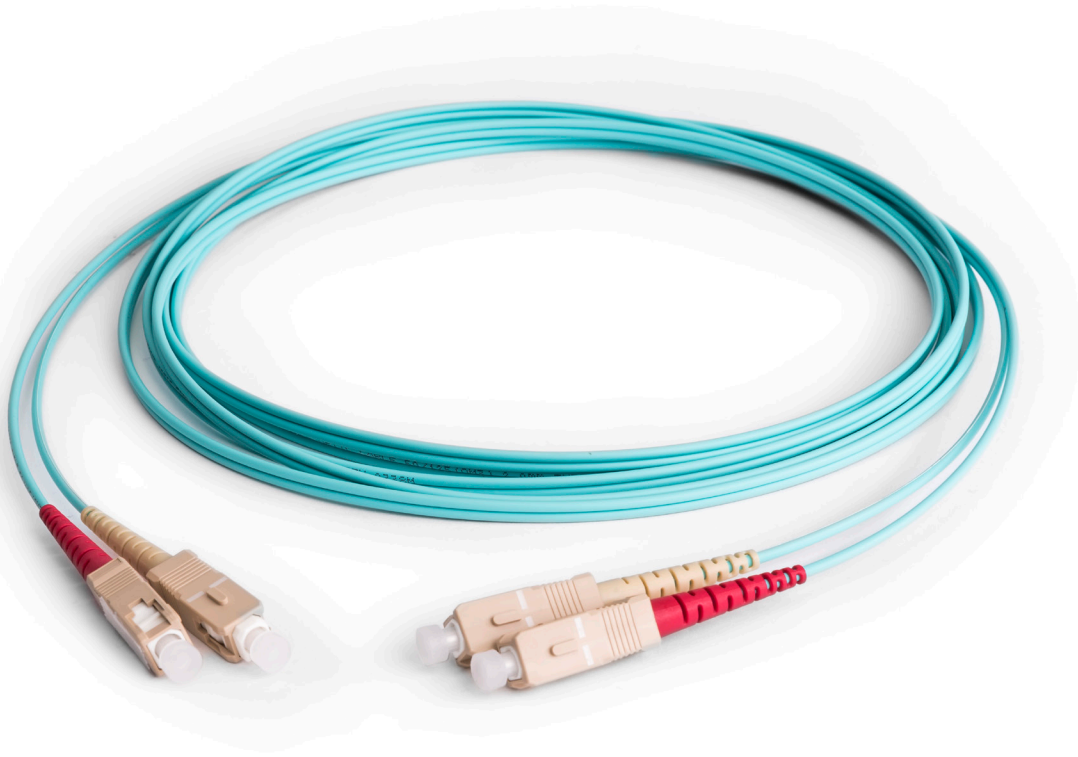
OFNP: Optical Fiber Nonconductive Plenum cables are intended for vertical runs between floors as part of a fiber backbone. They have fire resistance and low smoke production characteristics and can be installed in ducts, plenums and other spaces used for building airflow. OFNP cables can be used as replacements for OFNR.

OFNR: Optical Fiber Nonconductive Riser cables are intended for horizontal runs. They are used in riser areas, which are vertical shafts or runs from one floor to another floor but not in plenum areas, due to lack of fire and smoke rating. They cannot be used in place of OFNP.

SC Connectors: The square-shaped, snap-in connectors use a locking tab to affix a single fiber in a 2.5mm ferrule. They are ideally suited for datacoms and telecoms applications, including point-to-point and passive optical networking.



LC Connectors: The snap-in connectors have a 1.25mm ferrule and a smaller footprint than the SC and use a latch, which works well in datacoms and other high-density patch applications.



Contractors Can Control Fiber Optic Costs and Timelines

Contractors who build their knowledge and competence around fiber optic can gain a substantial advantage over copper-centric competitors. They can handle all installations without heavy reliance on subcontractors and can be involved in all project stages, including design, testing, troubleshooting, documentation, and restoration. They can also help select vendors and product types to ensure high performance and reliability while ensuring that the project uses parts that are familiar to their technicians.

Contractors can gain an edge by gaining mastery of different types of fiber optic cabling, such as MMF networks that use parallel transmission and require complex terminations and single-fiber transmission within LANs.

Costs can be high in fiber optic installations, but a contractor can achieve solid margins by controlling labor costs. One vital factor is using connectors and other components that enable fault-free cabling with a minimum of technician effort. High-grade field mechanical connectors could allow technicians to make connections in two minutes that could take eight to 10 minutes if polishing and epoxy application were required.

When a contractor can acquire cable quickly and complete installation work efficiently, they can win more jobs, improve profitability, and build profitable, long-term relationships.

Hyperline Helps Contractors Succeed with Fiber Optics

As fiber optic cable becomes more widely specified in installations, contractors are under pressure to improve performance on fiber installations. They need a reliable supplier who can deliver fiber optic cable and components quickly and prevent shipment-related delays.

Hyperline is one of the leading choices for a full end to end fiber optic solution. They manufacture a full range of cables and associated parts made available through a network of trusted distributors. Lead times for deliveries are short, and the more common cable types can be shipped immediately on request from Hyperline's Ottawa facility, which maintains an excellent inventory.

Hyperline helps contractors achieve fast, trouble-free fiber optic installation with its line of cables (two strands to 144 strands) and field mechanical connectors (SC and LC) that require no polishing or epoxy and can be installed in two minutes per connection.



Hyperline offers a full line of products for indoor, outdoor and indoor/outdoor installations, and contractors can rely on their staff and distributors for expert assistance in choosing the best cables, connectors, and hardware for every job.

A contractor who partners with a highly reliable manufacturer can purchase all the products for their job, giving them more control over the workflow as well as an additional source of revenue.

For more information,
please visit hyperline.com.

