



*Leading Optical Innovations*

## FIBER FAQs

# Fiber or Copper?

Making the Right Choice for  
Your Premises Network



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## Making the Right Choice for Your Premises Network

### Why would I consider installing fiber in a premises network?

For use in local-area networks (LANs) and other premises applications, fiber offers a number of important advantages compared to copper. First, it has much greater bandwidth to help you meet the demands of busy data communications networks - today and well into the future. In fact, for distances greater than 15 meters, it's the only medium approved for the 10 Gigabit Ethernet standard. What's more, fiber can transmit these higher data rates over longer distances, allowing you to cut your electronics and maintenance costs significantly. Plus, it's immune to EMI/RFI signals that can plague copper networks.

### In the past, copper has given me more than enough bandwidth. What's different today?

If your organization is like most, your network is trying to serve an unquenchable thirst for information. Simply put, today's networks are asking for more than copper can provide. Many copper-based networks are reaching the limits of their bandwidth capacity. Fiber, by comparison, can meet the demand for increased bandwidth at higher speeds without requiring expensive and time-consuming installations of new cable. Transmission bottlenecks, high error rates, and lots of downtime are just a few of the signs that it may be time to move to a fiber-based network.

### What applications should fiber be considered for?

Optical fiber has proven itself in many critical applications. For years, it has been the standard choice for LAN backbones. More recently, it has gained greater acceptance in horizontal applications because of its capacity to provide higher bandwidth for current needs and future network growth. In fact, many network managers are now specifying fiber all the way to the desktop. For these same reasons, fiber should be considered as the transmission medium for short-distance, high-bandwidth applications such as central offices, data centers, and storage area networks (SANs).

### But isn't fiber much more expensive than copper?

At one time, that may have been true. But over the past several years, optical fiber costs have dropped significantly. Today, the costs of installing fiber solutions in the LAN backbone are comparable to those of unshielded twisted pair (UTP) copper. But don't take our word for it. Take a look at the latest cost model prepared by the Fiber Optic LAN Section (FOLS) of the Telecommunications Industry Association (TIA). It shows how an all-fiber solution can offer a lower total initial cost than a comparable UTP-fiber network for 12 different installation scenarios. To see the numbers for yourself, visit their website at [www.fols.org](http://www.fols.org).

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## Optical fiber is made of glass. Isn't it too fragile to use in the real world?

Not at all. In fact, many people are surprised to learn that glass is an inherently strong material. But that alone is not enough to withstand the stresses of cabling, pulling, and handling. That's why drawn fiber is given a two-layer protective coating - a soft inner coating that cushions the fiber and a hard outer coating to guard against nicks, scratches and other injuries. This two-part jacket provides mechanical protection for handling, while also protecting the pristine glass surface from contaminants.

Before it is shipped, fiber is tested to ensure that it has a minimum tensile strength of 100,000 pounds per square inch (psi) - stronger than copper (and even steel) strands of the same diameter. The strength and durability of the fiber is further enhanced when cabling companies apply their own protective coatings, jackets, and strength members.

## Is it harder to install and test optical fiber?

Actually, fiber can be installed in the same amount of time as copper cable - or less. Remember, optical fiber cables are stronger, lighter and smaller than comparable copper cable designs. And as copper cable network designs grow more complicated, it's becoming more difficult and time-intensive to install copper. Compared to newer grades of copper cable, the methods by which optical cable is pulled and terminated actually have fewer regulations. In addition, there's no need to worry about the location of EMI/RFI sources during installation of fiber cable.

Another important factor in these fiber installation trends is the growing popularity of small form factor (SFF) connectors, a new generation of devices that are as small as (and sometimes smaller than) traditional copper-based connectors, enabling the user to put more connections in a given area. Not only does the use of SFF connectors require fewer hubs and switches, patch-panels, enclosures and jumpers. It also reduces the time required to make each connection, helping to make fiber installation quicker and less expensive.

It's also very easy to test fiber. All that's required on a Gigabit Ethernet link, for example, are simple tests for continuity and attenuation. Compare that to a Category 5e link, where technicians must measure more than 20 parameters, such as cable length, crosstalk and propagation delay. What's more, they have to measure attenuation and near-end crosstalk (NEXT) across the entire frequency range of 1-100 megahertz or higher. Fiber performance, by comparison, is unaffected by changes in frequency.

And for 10 Gb/s operation, it's likely that copper cables will have to be measured for alien crosstalk (AXT), which is crosstalk between cables, adding yet another layer of testing complexity. There are no crosstalk issues or measurements required for fiber. A simple optical loss test is all that's required following installation of an optical fiber link.



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## We have security concerns about our copper network. Can fiber help there?

Optical fiber is an outstanding choice for applications where security is a requirement. Fiber transmits light rather than electricity. Therefore, there are no electromagnetic emissions that can be intercepted. Unlike a copper network, you can't tap into a fiber network without first disrupting the signal.

## What about the new "Cat-6e" copper cable application they're working on? Can't I use that for 10 Gigabit Ethernet networks?

There is some work being done on an "enhanced" CAT-6 cabling system to support 10 Gigabit Ethernet up to 100 meters. But anyone who may be considering this technology for future use should be careful. The development of IEEE and ISO specifications for 10 Gigabit Ethernet over UTP is, at this writing, just getting underway and will take several years to complete. These specifications are likely to change before the final version is reached, meaning that if you act now you could be left with a non-compliant network and find yourself well short of the 100-meter support you expected. A wiser solution is to specify a fully standardized multimode fiber system that will support future transmission rates beyond 10 Gb/s, and longer distances up to 300 meters, with cost-effective centralized cabling architectures.

For additional information please contact your sales representative. You can also visit our website at [www.ofsoptics.com/ofsfiber](http://www.ofsoptics.com/ofsfiber) or call 1-888-fiberhelp. For regional assistance, contact:

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