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Power and Data White Paper

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Topic: The Difference between Multimode and Single Mode Fiber Optic Cables

Traditionally, multimode has been the most common style of fiber cable used, but more recently single mode is increasingly being used as network administrators need to send data over longer distances, as well as trying to “future-proof” their networks for network growth down the road.

### 1. How does it work?

To get you acquainted with how fiber optic signals work, picture a straight hallway lined with mirrors on all sides. This helps give a representation of the glass inner core of the fiber cable. If you were to shine a flashlight directly down this hallway, the light from the flashlight would eventually lose its strength and die out because it wouldn't be powerful enough to sustain itself over relatively long distances, enough to continue to carry a strong data signal (FIG. 1). Now imagine a similar hallway that has been twisted and curved throughout from beginning to end. If you were to shine the flashlight down this hallway the light would continue to bounce off of the mirrors lining the hallway. The light signal would hold onto the majority of its strength until it reached its final destination (FIG. 2).



FIG. 1



FIG. 2

### 2. Multimode vs. Single Mode

Multimode cables are used to send more than one signal at a time over shorter distances. They are generally less expensive and easier to work with because the core diameter is much wider (usually either 50/125 or 62.5/125 micron) and the tolerance for alignment isn't as critical as it is for single mode. They are used for most general data and voice transmissions up to 550 meters (FIG. 3).

Single Mode cables on the other hand are used for much longer distances, up to 50 times as long as multimode fiber. Since the core is much smaller in diameter (usually 9/125 micron) only one signal can be sent at one time. This also takes away the possibility of cross-signal distortion. Single mode cables are used more and more in applications such as digital cable TV or across a large college campus (FIG. 4).

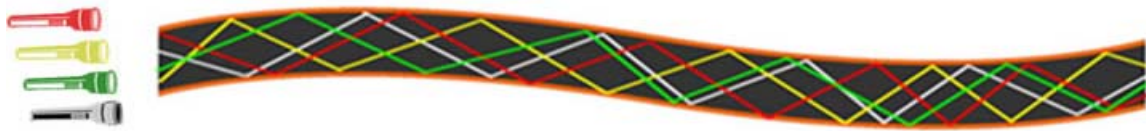


FIG. 3



FIG. 4

### 3. Which fiber is best for my application?

If your network has shorter links and requires less bandwidth, then multimode would generally be used. If you anticipate that you will eventually need to extend your network over much greater distances, then you may want to lay the foundation now with single mode. A popular usage of multimode cable is fiber laid out within a single building, with single mode often used from building to building. Just remember that they are not compatible with each other, so if you are extending a multimode network, you cannot use single mode to build upon it, and vice versa.

Stay Online sells both multimode and single mode fiber cables. Here are some links to our most popular cables:

<http://stayonline.com/lc-lc-fiber-cables.aspx>

<http://stayonline.com/lc-sc-fiber-cables.aspx>

<http://stayonline.com/sc-sc-fiber-cables.aspx>

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