The Problem: Extended Network Distance Requirements Require Expensive Solutions

As fiber optic networks extend across entire cities, network builders need to ensure that transmissions between these geographically disparate points are both reliable and secure. Because digital signals depend on the presence or absence of voltage, they tend to dissipate quickly and need frequent repeating. Digital signals also pick up jitter and noise which affect the integrity of the data as it passes through the network. To reliably send signals across long distances, jitter must be removed and the signal regenerated as it moves from device to device.

Traditionally, repeaters have been used to extend network distances. A repeater is "a device that receives a signal on an electromagnetic or optical transmission medium, amplifies the signal, and then retransmits it along the next leg of the medium."[1] Digital signal repeaters must comply with all IEEE specifications in clause 9 of the 802.3 standard which states that "you can have up to five segments in series, with up to four repeaters, and no more than three 'mixing' segments" (the 5-4-3-rule) and "segment lengths are limited to the lesser of 316 meters or the maximum transmission distance of the segment media type". These specifications greatly limit the number of repeaters that can be used and the segment length between repeaters, thus making the build-out of the network both complicated and expensive.

The Solution: Optical Ethernet Connectivity and Media Conversion with Regeneration Capabilities

Not only are repeaters expensive and difficult to maintain, but they can be unreliable over longer distances. Some media converter solutions, on the other hand, can also act as repeaters by enabling signal regeneration as well as providing the inherent benefits of copper-to-fiber conversion to support much longer distances within legacy networks.

Metrobility's Gigabit media converters remove jitter and regenerate signals to provide distance extension in the most demanding application and at a cost well below conventional repeaters. In fact, only Metrobility has tested these devices in a daisy-chained configuration to reliably transmit data up to 280km using five devices to support four 70km segments (see figure 1).
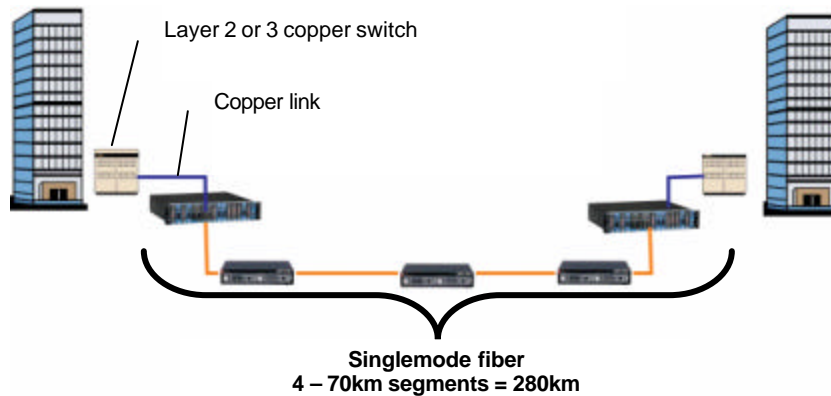
---

[1] Whatis.com

Figure 1

The Benefit: Longer network fiber optic segments simplify network design and management

By incorporating signal re-generation along with media conversion, installers are allowed a greater tolerance in their design and simpler implementation. There are also fewer points of failure to simplify management and troubleshooting. In fact, with features such as Link Loss Carry Forward and Link Loss Return, network administrators can detect link failure through the locally managed device to minimize unnecessary truck rolls to distant sites. And, of course, no "fork-lift" upgrade is needed, and a total lower cost of ownership is the result.

Product Information

Metrobility has the most extensive Gigabit Ethernet offering in the industry, including both media conversion and wavelength conversion options. All line cards are available for the Radiance R5000, R1000 and R400 chassis as well as the Lancast® Intelligent 7500 chassis and can be managed through Metrobility's workstation-based NetBeacon™ or browser-based WebBeacon™ Element Manager.

Available models follow on Page 3.

Gigabit Ethernet Product Line

Radiance Line Cards	Stand-alone	Description
Copper to Fiber		
R152-1A	2152-1A	1000M TX to SX MM/SC
R152-1K	2152-1K	1000M TX to SX MM/LC
R152-1D	2152-1D	1000M TX to LX SM/SC
R152-1M	2152-1M	1000M TX to LX SM/LC
R152-1F	2152-1F	1000M TX to LX SM/SC (25km)
R152-17	2152-17	1000M TX to LX SM/SC (40km)
R152-1J	2152-1J	1000M TX to LX SM/SC (70km)
Singlemode-to-Multimode		
R151-AD	2151-AD	1000M SX MM/SC to LX SM/SC
R152-AA	2152-AA	1000M SX MM/SC to SX MM/SC
R152-AD	2152-AD	1000M SX MM/SC to LX SM/SC
R152-KM	2152-KM	1000M SX MM/LC to LX SM/LC
R152-AF	2152-AF	1000M SX MM/SC to LX SM/SC (25km)
R152-A7	2152-A7	1000M SX MM/SC to LX SM/SC (40km)
R152-AJ	2152-AJ	1000M SX MM/SC to LX SM/SC (70km)
Singlemode-to-Singlemode		
R152-DD	2152-DD	1000M LX SM/SC (10km) to LX SM/SC (10km)
R152-DF	2152-DF	1000M LX SM/SC (25km) to LX SM/SC (25km)
R152-D7	2152-D7	1000M LX SM/SC (10km) to LX SM/SC (40km)
R152-77	2152-77	1000M LX SM/SC (40km) to LX SM/SC (40km)
R152-DJ	2152-DJ	1000M LX SM/SC (10km) to LX SM/SC (70km)
R152-JJ	2152-JJ	1000M LX SM/SC (70km) to LX SM/SC (70km)

Note: Actual segment length is dependent on the quality of fiber cable plant and loss budget of each device.

For additional information Metrobility's products, contact Metrobility Optical Systems at 1.877.526.2278 or 1.603.880.1833, or visit us at www.metrobility.com.