

Signal Loss in Multimode and Single-Mode Fiber-Optic Cable for MX Series Routers

Multimode fiber is large enough in diameter to allow rays of light to reflect internally (bounce off the walls of the fiber). Interfaces with multimode optics typically use LEDs as light sources. LEDs are not coherent sources, however. They spray varying wavelengths of light into the multimode fiber, which reflects the light at different angles. Light rays travel in jagged lines through a multimode fiber, causing signal dispersion. When light traveling in the fiber core radiates into the fiber cladding, higher-order mode loss (HOL) results. Together these factors limit the transmission distance of multimode fiber compared to single-mode fiber.

Single-mode fiber is so small in diameter that rays of light can reflect internally through one layer only. Interfaces with single-mode optics use lasers as light sources. Lasers generate a single wavelength of light, which travels in a straight line through the single-mode fiber. Compared with multimode fiber, single-mode fiber has higher bandwidth and can carry signals for longer distances. It is consequently more expensive.

For information about the maximum transmission distance and supported wavelength range for the types of single-mode and multimode fiber-optic cable used by DPCs, MPCs, MICs, or PICs on the MX Series routers, see the *MX Series Ethernet Services Routers Line Card Guide*. Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission.

- Related Topics**
- Fiber-Optic and Network Cable Specifications for MX Series Routers
 - Attenuation and Dispersion in Fiber-Optic Cable on M Series, MX Series, and T Series Routers

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