



Application Note

Laser Multimode Splitters and Couplers

Keywords

1000Base, Application, Coupler, Ethernet, Fiber optics, Gigabit, Laser, Multimode, VCSEL

Summary

Newer, high-speed, multimode links use lasers. For example, Gigabit Ethernet applications, such as 1000Base-SX, use an 850-nm VCSEL (Vertical Cavity Surface Emitting Laser). VCSELs do not overfill the fiber core, like LEDs. Therefore, specialized splitters and couplers are required.

Scenario

Traditionally, LEDs overfilled the multimode fiber core (i.e. some light entered the cladding). Multimode splitters and couplers transferred the light in the cladding, to the secondary fiber, at the specified split ratio. However, with the advent of gigabit data links, lasers have replaced LEDs as the transmitter. Lasers illuminate only a small central area of the multimode core. Conventional multimode splitters no longer work properly with these sources.

Question

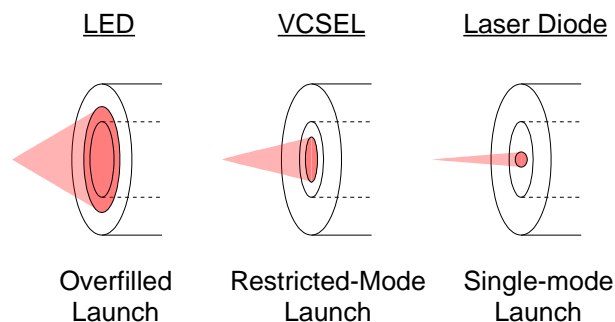
How can one monitor/sample a multimode link, which uses a laser transmitter?

Notes/Answer

Use Fiberdyne's new "Laser Multimode" Splitters.

LEDs are not capable of the fast pulse rates, which are required for gigabit links. Therefore, lasers are used in gigabit applications, even over multimode fiber. Gigabit, multimode transmitters use a VCSEL or a Laser Diode. VCSELs are less expensive than LEDs and laser diodes. So, VCSELs are typically used in 850-nm applications, such as 1000Base-SX (i.e. Gigabit Ethernet).

In earlier, multimode links, the LED illuminated the core and the cladding (i.e. Overfilled Launch). Multimode splitters transferred a sample of the light, from the cladding, to the secondary fiber. However, in laser links (i.e. using VCSEL or laser diode transmitters), the cladding is not illuminated. Therefore, traditional multimode splitters and couplers do not function as expected. The typical result is a lower-than-expected, split ratio (i.e. less light is coupled into the secondary fiber).



Just like a single-mode fiber launch, the multimode, VCSEL output is coupled into the fiber core – not the cladding. Modern, gigabit, multimode links have a "restricted" mode structure. Therefore, multimode splitters and couplers must be specifically designed for these laser applications. To fill this need, Fiberdyne has created a special class of splitters/couplers, called "Laser Multimode Splitters/Couplers." These splitters/couplers properly divide/combine VCSEL outputs.