

What optical modules are used for short-distance connections in a data center



Article Overview

Short-range SFP (Small Form-factor Pluggable) modules are the most commonly used optical transceivers for short-distance connections in data centers, typically operating over multimode fiber at 850 nm.

Overview of Short-Range Optical Modules

Short-range SFP modules are compact, hot-swappable transceivers designed for high-speed communication over multimode fiber (MMF). They are ideal for intra-rack, rack-to-rack, or floor-level connections where devices are located close to each other, usually within 100–400 meters depending on the Ethernet standard and fiber type . These modules convert electrical signals from switches, routers, or servers into optical signals and back, enabling reliable, low-latency data transmission .

Key Characteristics

- Wavelength: Typically 850 nm, using VCSEL (Vertical-Cavity Surface-Emitting Laser) technology for efficient short-distance transmission .
- Fiber Type: Multimode fiber types such as OM2, OM3, or OM4 are commonly used, with OM3 and OM4 supporting higher data rates and longer distances .
- Data Rates: Standard short-range modules include 1000BASE-SX SFP for Gigabit Ethernet and 10GBASE-SR SFP+ for 10-Gigabit Ethernet .
- Distance Range: Usually from 100 meters up to 400 meters, depending on the module and fiber type

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Many edge data centers now use optical connections for real-time uses, which shows how important optical modules

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The Ultimate Guide to SFP Modules (2026): Types, Speeds

Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the

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Optical Interconnects for Data Centers

Discover the benefits and applications of optical interconnects in modern data centers, enhancing performance and

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Understanding the applications of optical modules in a data center

Therefore, the next generation optical modules are designed to deliver data connectivity up to a distance of 500m or 2

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