COETZER OPTICAL SYSTEMS (Pty) Ltd

Gigabit optical module distance

Overview

SFP 1G LX Transceiver Guide: Specs, Distance & CompatibilitySFP 1G LX modules operate at 1.25Gbps over a 1310nm wavelength and typically support up to 10km.

Key Takeaways

Gigabit optical modules can support distances ranging from a few meters to over 80 kilometers, depending on fiber type, wavelength, and module design.

Short-Range Modules (Multimode Fiber)
• 850nm SFP (SX): Optimized for multimode fiber, typically supports up to 550 meters over OM2 fiber and slightly longer on OM3/OM4 with 1 Gbps speeds .

• Limitations: Modal dispersion in multimode fibers restricts distance; higher data rates reduce maximum reach .

• Use cases: Campus networks, data center interconnects, and short intra-building links.
Medium-Range Modules (Single-Mode Fiber)
• 1310nm SFP (LX): Designed for single-mode fiber, supports up to 10 kilometers at gigabit speeds .

• Advantages: Single-mode fiber allows light to travel in a single path, reducing dispersion and enabling longer distances .

• Use cases: Campus backbones, metropolitan area networks.
Long-Range Modules (Single-Mode Fiber)
• 1550nm SFP (ZX): Supports up to 80 kilometers for long-haul links .

• Extended reach: With DWDM/CWDM and amplification, distances can exceed 200 kilometers in specialized deployments .

• Use cases: Long-haul telecommunications, inter-city fiber links.

Copper and Direct Attach Options

• RJ45 SFP: For 1 Gbps over Cat5e/Cat6 cables, limited to 100 meters.

• Direct Attach Copper (DAC) or Active Optical Cable (AOC): Short-range connections, typically ≤10 meters, used in data centers for server-to-switch links .

Key Factors Affecting Distance

• Fiber type: Single-mode fibers allow longer distances than multimode fibers .

• Wavelength: 850nm for short-range, 1310nm for medium, 1550nm for long-range .

• Optical power budget: Determines how far the signal can travel before attenuation causes errors .

• Installation quality: Connector cleanliness, splicing, and fiber bends can reduce effective distance .

In summary, gigabit optical modules offer multiple distance options, from a few meters with copper or short-range multimode SFPs, to tens of kilometers with single-mode SFPs, and even hundreds of kilometers with specialized long-haul optics. Choosing the right module depends on fiber type, wavelength, and deployment requirements.

Article Content

How to Estimate an Optical Module''s Transmission Distance | FiberMall

Optical modules distinct from one another in their transmission distance, a feature that should be taken into account in

Cisco Transceiver Modules

Cisco Transceiver Modules - Learn product details such as features and benefits, as well as hardware and software specifications.

Small Form-factor Pluggable

A 10 Gigabit Ethernet XFP transceiver, top, and a SFP+ transceiver, bottom The SFP+ (enhanced small form-factor pluggable) is an

What are achievable distances of singlemode vs multimode fibre

Fibre Optic Cable Transmission Distances When choosing a fibre optic cable for a permanent trunk link you should consider three

Wavelength and Transmission Distance of Optical Transceiver Modules

The price of the optical sources and signal converters that are paired with 850nm optical transceiver modules is far lower than the

2.5G SFP 300m□80km Optical Modules (Industrial Grade Optional)

GIGALIGHT''s 2.5G SFP series optical transceiver modules are widely used in synchronous optical networking (SONET OC-48 /

Gigabit Ethernet

1000BASE-LX 1000BASE-LX is an optical fiber Gigabit Ethernet standard specified in IEEE 802.3 Clause 38 which uses a long

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