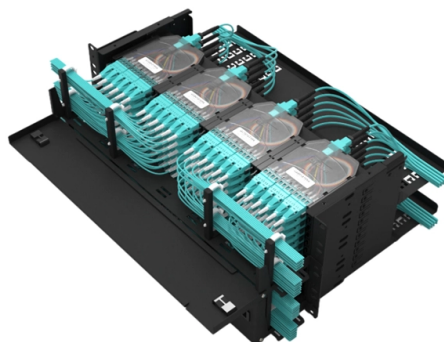


## Transmission distance of single-mode gigabit optical module



### Overview

Gigabit single-mode single-core fiber optic module Optical signals are transmitted directly without repeater amplification. Gigabit single-mode single-core.

### Key Takeaways

Gigabit single-mode optical modules typically support transmission distances ranging from 10 km up to 120 km, depending on the module type and wavelength. Typical Transmission Distances

Gigabit single-mode SFP modules are designed for long-distance fiber optic communication. Common transmission distances include:

- 10 km: Standard 1000BASE-LX/LH modules operating at 1310 nm on single-mode fiber .
- 15 km to 40 km: Extended reach modules for enterprise or metro networks .
- 80 km: Long-reach SFP modules, often using 1310 nm wavelength with high transmit power and sensitive receivers .



- 120 km or more: Ultra-long-reach modules, typically using 1550 nm wavelength for minimal signal attenuation over very long distances .

#### Factors Affecting Transmission Distance

- Wavelength: Modules operating at 1310 nm are common for standard distances (up to 10-80 km), while 1550 nm modules are preferred for ultra-long distances due to lower fiber attenuation .

- Transmit Power and Receiver Sensitivity: Higher optical output power and more sensitive receivers extend the achievable distance.

- Fiber Quality and Type: Standard single-mode fiber (SMF, G.652) is used for long-distance links. Fiber loss, splices, and connectors can reduce effective distance.

- Environmental Conditions: Temperature, bending, and installation quality can impact signal integrity and maximum reach.

#### Practical Considerations

- SFP Compatibility: Ensure the module is compatible with the switch or router port and supports the required standard (e.g., 1000BASE-LX/LH, 1000BASE-BX10).

- Single-Strand vs Dual-Strand: Some modules, like 1000BASE-BX10-D/U, operate over a single fiber strand using different wavelengths for transmit and receive .

- Digital Optical Monitoring (DOM): Many modules support DOM to monitor real-time optical power, temperature, and other parameters, which helps maintain reliable long-distance links . In summary, Gigabit single-mode optical modules provide flexible long-distance connectivity, with distances ranging from 10 km for standard modules up to 120 km or more for high-power, long-reach modules, depending on wavelength, fiber quality, and module specifications .

## Article Content

Gigabit single-mode single-core fiber optic module

Optical signals are transmitted directly without repeater amplification. Gigabit single-mode single-core optical fiber

SFP 1G LX Transceiver Guide: Specs, Distance & Compatibility

SFP 1G LX modules operate at 1.25Gbps over a 1310nm wavelength and typically support up to 10km over single-mode fiber,

Omxid Optical Module 1.25Gb Sfp Single Mode 10km Lc Interface

Core Features & Specifications: Data Rate: Supports a transmission rate of 1.25Gb/s, ideal for Gigabit Ethernet applications.

Ultimate Guide to 1G SFP Module Selection

Learn how to choose the right 1G SFP module for your network. Our guide covers compatibility, distance, fiber type, cost, and vendor

Cisco SFP Modules for Gigabit Ethernet Applications Data Sheet

The 1000BASE-ZX SFP operates on standard single-mode fiber-optic link spans of up to approximately 70 km in

SFP Single Mode LC Module (80km)

Fiber Mode/Distance Single mode SFP transceiver spans distances up to 80km (49.7 mi.) at gigabit speeds.

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Gigabit Optical Module > Single mode double fiber > LC port > 1310nm sending, and 1310nm receiving >

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1G single mode can be adapted to a 1G optical port or 10 Gigabit optical port that can be backward compatible with

#### Understanding Single-mode and Multi-mode SFP Optical Modules

A SFP single-mode optical modules and SFP multi-mode optical modules are incompatible. If you mix SFP single-mode optical

#### Singlemode Fibre | Comms InfoZone

Single-mode fibre is recommended over multimode fibre when planning for Gigabit Ethernet. The multiple light modes found in

#### Fiber Modules

Please select the fiber cable according to the module type. The multi-mode module corresponds to the multi-mode fiber, and the

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