

Maximum transmission distance of 10 Gigabit optical modules



AI Overview

10G optical modules have standardized transmission distances ranging from 300 meters to 80 kilometers, depending on module type, wavelength, and fiber type.

Common 10G SFP+ Module Types and Distances

- 10GBASE-SR (Short Reach): Designed for multimode fiber (MMF), typically OM3 or OM4, with a maximum reach of up to 300 meters. Ideal for data center and high-density applications where short distances are sufficient .
- 10GBASE-LRM (Long Reach Multimode): Supports up to 220 meters over standard multimode fiber (OM1/OM2/FDDI-grade) and requires a mode conditioning patch cord for older fiber types .
- 10GBASE-LR (Long Reach): Operates over single-mode fiber (SMF) at 1310 nm, with a maximum distance of 10 km, suitable for campus networks or metro-area connections .
- 10GBASE-ER (Extended Reach): Uses SMF at 1550 nm and supports distances up to 40 km, designed for metro-scale or inter-building links where signal attenuation and reliability are critical .
- 10G BiDi (Bidirectional): Transmits 10 Gb/s over a single strand of SMF using wavelength-division multiplexing (WDM), effectively halving fiber usage. Distances vary depending on the module, typically up to 10 km .

Wavelength and Fiber Considerations...

Article Content

Aug 20, 2025

SFP-10G-SR vs LRM vs LR: Which 10G Module Should

Compare SFP-10G-SR, LRM, and LR modules by distance, fiber type, and cost to find the

Oct 06, 2025

What is the maximum 10G distance for OM3 multimode fiber?

OM3 vs OM4 Distance The transmission distance of OM3 and OM4 fiber cables varies when they are applied to

May 13, 2026

10GBASE-ER SFP Module Explained: Distance, Specs & Use Cases

? What Is a 10GBASE-ER SFP Module? A 10GBASE-ER SFP module is a 10Gbps Ethernet optical transceiver designed for long

Feb 05, 2026

10 Gigabit Ethernet Fiber Design Considerations

This paper has introduced some basic fiber related concepts and outlined some of the key points to understand and consider when

Jan 16, 2026

Fiber Optic Cable Range: Comprehensive Guide

In this comprehensive guide, we'll explore fiber optic transmission distances, the factors

Jul 12, 2026

Multimode Fiber and 10GE

Multimode Fiber and 10 Gigabit Ethernet The IEEE 802.3ae 10 Gigabit Ethernet specification includes a serial interface referred to as

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What Is 10GBASE-LR? SMF 1310nm 10km SFP+ Explained

The "LR" designation stands for Long Reach, meaning it is engineered to reliably transmit 10 Gbit/s Ethernet signals over single

Nov 25, 2025

10GB ethernet on singlemode fiber distance limitations

Cisco Cisco Transceiver Modules - Cisco SFP Modules for Gigabit Ethernet... This data sheet describes the benefits,

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What is the longest transmission distance of a 10G SFP+ module?

There is a variation of ranges, Technically ZR modules are the longest and can transmit data over single-mode fiber

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What Are the Key Parameters of Optical Modules

Understand the key parameters of optical modules, including transmission rate, distance, wavelength, and fiber

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The relationship between wavelength and transmission distance of ...

When paired with multimode, the maximum transmission distance is 2km, and when paired with single-mode, the maximum

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10 Gbit/s SFP+ Optical Modules

10 Gbit/s SFP+ optical modules apply to 10 GE optical ports. The wavelength can be 850 nm, 1310 nm, or 1550 nm, and the

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10 Gigabit Ethernet

Multiple vendors introduced single-strand, bi-directional 10 Gbit/s optics capable of a single-mode fiber connection functionally

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10G Optical Modules: Short-Range vs. Long-Range

Understand short-range and long-range 10G optical modules in terms of distance, budget,

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Multimode SFP+: 10GBASE-SR Specs, Fiber Types and Use Cases

The difference mainly involves the fiber type, optical wavelength, and maximum transmission distance supported by

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Maximum transmission distances for fibre ethernet

Table showing a comparison of the maximum rated transmission distances for the various types of Digital Video

Jun 14, 2026

SFP+ Single Mode LC Module (10km)

Transmission distance of up to 10km (6.21 mi.) Duplex LC optical interface Supports data rates of up to

Dec 11, 2025

SFP 10G LR transceivers deliver reliable 10Gbps links over 10 km

As enterprise networks, data centers, and service provider infrastructures continue to scale, the demand for reliable 10-Gigabit

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Understand the Distance Limitations and Application Considerations of ...

Application considerations of Gigabit and 10 Gigabit Ethernet Select a suitable transmission medium For Gigabit and 10 Gigabit

Mar 10, 2026

Cisco 10GBASE SFP+ Modules Data Sheet

The Cisco ® 10GBASE SFP+ modules (Figure 1) give you a wide variety of 10 Gigabit

Jun 09, 2026

SFP Distance Explained: Real-World Range, Limits, and Optics

Understand SFP distance, fiber optic range, and real-world limits of SR/LR modules. Learn how wavelength, fiber

Sep 25, 2025

10G 1G Multimode Transceiver Distance by Fiber Type | EDGE Optical ...

Compare 10GBASE-SR and 1G SFP multimode transceiver distances on OM2, OM3, OM4 fiber types. Maximize

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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

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What is the longest transmission distance of a 10G SFP+ module?

The conservative design constraints we used to use was 1,000m for MM fiber and 60km for SM fiber as a max. The

Aug 30, 2025

How Far Can 10GbE Run by 10GBASE-T SFP+ or Fiber to Ethernet

It is specified for a max transmission distance of 80 meters at 10Gbps over Cat6a or Cat7 cables, which is the

Apr 27, 2026

What is the maximum 10g multimode fiber distance?

What is the maximum 10g multimode fiber distance? 10G multimode fiber (MMF) is a type of fiber optic cable that is capable of

Nov 08, 2025

How far can 10G travel on OM4□

The distance that a 10 Gigabit Ethernet (10G) signal can travel over OM4 (Optical Multimode 4) fiber optic cable

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SFP 10G LR transceivers deliver reliable 10Gbps links over 10 km

SFP 10G LR (10GBASE-LR SFP+) modules are high-speed, long-reach fiber optic transceivers designed for 10 Gbps Ethernet over

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Optical Fiber and 10 Gigabit Ethernet

Introduction As 10 Gigabit Ethernet (10GbE) is introduced into networks the physical limitations and properties of optical fiber

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