

# Transmission distance of ordinary single-mode optical fiber



## Overview

Single-mode fiber is the best choice for long-distance data transmission, such as 100 kilometers (60 miles), due to the small signal attenuation caused by a single optical mode. Dispersion limits fiber optic transmission distance by causing signal distortion and is classified into chromatic dispersion, modal dispersion, and polarization mode dispersion (PMD). For example, a fiber optic cable with a distance of 1km supports a bandwidth of 500MHz, while a fiber optic cable with a distance of 2km can only support a bandwidth of 250MHz. There are three main reasons for this: First, high-bandwidth. There are two primary types of optical fiber cable: single-mode fiber and multimode fiber. This guide dissects their technical nuances, evolution, and real-world applications.



## Article Content

Sep 29, 2025

### Single -mode optical fiber transmission distance

The light propagating in the optical fiber contains many modes, each mode represents an electromagnetic field distribution, and corresponds to a certain ray described in geometric optics. The ...

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### Fiber Optic Cables How Far Is Too Far

In summary, fiber optic cables are capable of transmitting data over impressive distances, with single-mode fibers routinely covering up to 120 miles in real-world applications, and ...

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### A Guide to Choosing the Right SM and MM Fiber Optic Cable

Single-mode fiber is the best choice for long-distance data transmission, such as 100 kilometers (60 miles), due to the small signal attenuation caused by a single optical mode. The single ...

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### Is there a minimum distance for single-mode fiber?

In general, single-mode fiber can support much longer distances compared to multimode fiber. It is capable of transmitting data over tens or even hundreds of kilometers without any significant loss of ...

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### Fiber Optic Transmission Distance: Single Mode vs. Multimode Guide

Q: What is the maximum transmission distance of single mode fiber? A: Single mode fiber can typically transmit up to 160 km, and with dispersion compensation, it can exceed 200 km.

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### OS1, OS2 vs OM1-OM5 Fiber Cables: Differences, Speeds, and ...

Explore the differences between OS1, OS2 (single-mode) and OM1, OM2, OM3, OM4, OM5 (multimode) fibers. Learn their speeds, distances, and ideal uses for data centers and telecom networks.

Nov 18, 2025

## Fiber Optic Cable Range: Comprehensive Guide

Single mode fiber can transmit light signals over 100+ kilometers without amplification, making it ideal for long distance communication, campus backbones, and metropolitan area networks.

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## Fiber Optic Cable Distance: A Comprehensive Guide

Single-mode fiber optic cables are more suitable for long-distance, high-speed transmission than multimode fiber optics. For most applications, the maximum distance of a single ...

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What is the maximum distance of single mode fiber?

However, in general, single mode fiber is capable of transmitting data over much longer distances than multi-mode fiber. It is not uncommon for single mode fiber to support distances of up ...

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## Fiber Optic Cable Distance: A Comprehensive Guide

In this guide, we'll explore how fiber optic cables function, the maximum distances for different types of fiber optics, and tips for optimizing signal transmission over long distances.

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## Fiber Optic Cable Range: Comprehensive Guide

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