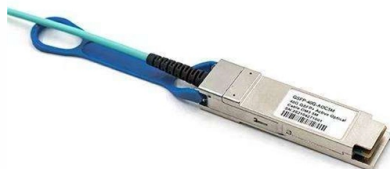


Common Types of Optical Cables



AI Overview

The most common optical cables are single-mode fiber (SMF) and multimode fiber (MMF), each designed for specific transmission distances and network applications.

Single-Mode Fiber (SMF) Single-mode fiber cables have a very thin core, typically 8–10 microns in diameter, allowing only one light path (mode) to travel through the fiber. This design minimizes signal dispersion, making SMF ideal for long-distance, high-speed transmission such as telecommunications, undersea cables, and large campus networks. SMF is further divided into:

- OS1:** Tight-buffered, mainly for indoor use, supporting distances up to 10 km and speeds up to 100 Gbps, more affordable and suitable for data centers.
- OS2:** Loose-tube construction for outdoor or long-haul applications, supporting distances over 40 km and speeds up to 100 Gbps, capable of multiple wavelengths for advanced technologies like WDM, and more durable for harsh environments.

Multimode Fiber (MMF) Multimode fiber has a larger core, typically 50–62.5 microns, allowing multiple light paths simultaneously. This enables high-speed data transmission over shorter distances, commonly used in enterprise LANs, data centers, and building interconnects. MMF is generally less expensive than SMF but is limited in distance due to modal dispersion, typically effective for up to 2 km depending on the network speed.

Other Considerations

- Indoor vs Outdoor Cables:** Indoor cables are often tight-buffered for easier handling and installation, while outdoor cables use loose-tube construction to protect fibers from environmental stress and allow expansion or contraction.
- Core and Cladding:** All optical fibers have a core (transmitting light) and cladding (reflecting light back into the core), with protective coatings to prevent damage and maintain signal integrity.
- Connector Types:** Different connectors (e.g., LC, SC, ST) are used depending on space constraints, network equipment, and performance requirements.

Summary The main types of optical cables are: Single-mode fiber (SMF) – long-distance, high-spee...

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