Connection of trunk cables and optical fibers

Overview

Trunk cables are one of the essential elements in any fiber optic communication network, since they serve as a physical conduit, pipeline or circuit for an optical fiber connection.

Key Takeaways

Trunk cables serve as the backbone of fiber optic networks, connecting multiple optical fibers via pre-terminated connectors like MPO/MTP, LC, or SC for high-speed, reliable data transmission.

Overview of Trunk Cables

Fiber optic trunk cables are multi-fiber assemblies designed to carry large volumes of data over long distances, forming the backbone of structured cabling systems in data centers and telecom networks. They typically consist of multiple optical fibers enclosed in a protective sheath, often reinforced with aramid yarn for tensile strength, and terminated with connectors at both ends for plug-and-play deployment. Trunk cables can support single-mode (OS2) or multimode fibers (OM1–OM5), with higher-grade fibers like OM3–OM5 optimized for longer distances and higher bandwidths.

Types of Connectors

Trunk cables use pre-terminated connectors to simplify installation and ensure consistent performance: MPO/MTP connectors: Multi-fiber push-on connectors that allow high-density connections, commonly used in 40G, 100G, and 400G networks.

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MT

P is a high-performance variant of MPO with improved alignment, durability, and signal integrity. MPO/MTP trunks often come in Base-8, Base-12, or Base-16 configurations, supporting 8–16 fibers per connector row.

L

C connectors: Small form-factor connectors with a 1. 25 mm ferrule, ideal for high-density racks due to their compact size.

S

C connectors: Larger 2. 5 mm ferrule connectors with a push-pull mechanism, suitable for both single-mode and multimode applications.

Connection Methods

Trunk cables are typically pre-terminated and factory-tested, allowing rapid deployment without field splicing. The connection process involves: Routing the trunk cable through conduits, cable trays, or raised floors. Aligning connectors with patch panels, cassettes, or transceivers, ensuring proper polarity and minimal insertion loss.

Using harness or fan-out cables when a multi-fiber trunk needs to be split into individual fibers for connection to transceivers or end devices. For example, an MPO-to-LC harness converts a multi-fiber trunk into multiple single-fiber connections. Securing and protecting connectors with factory-installed pulling eyes or protective sleeves to prevent damage during installation.

Practical Considerations

Polarity management is critical to ensure correct signal flow between transmitters and receivers. Insertion loss and return loss must be minimized, especially in high-speed networks, with ultra-low-loss trunks (≤0. 25 dB) recommended for 400G/800G deployments.

Connector type selection depends on space constraints, fiber count, and network architecture.

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C connectors are preferred for high-density racks, while MPO/MTP trunks are ideal for backbone links.

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Summary

Connecting trunk cables and optical fibers involves selecting the appropriate fiber type, connector, and trunk configuration, routing the cable securely, and using pre-terminated or fan-out assemblies to interface with network equipment. Proper installation ensures high-speed, reliable, and scalable network performance across data centers and telecom infrastructures.

Article Content

Trunk cables & preassembled installation cables

Trunk cables are one of the essential elements in any fiber optic communication network, since they serve as a physical conduit, pipeline or circuit for an optical fiber connection.

MTP®/MPO Cables Explained: Types, Applications,

This article introduces their basis first, then breaks down MTP®/MPO cable types by cable structure, fiber polarity, fiber count, cable mode, and jacket

How to Connect Fiber Optic Cable: Comprehensive Guide

This article will guide you through the necessary tools, materials, and methods on how to connect fiber optic cables effectively, ensuring you achieve

What Is MPO Trunk Cable? Structure, Types, and

MPO Trunk cable integrates multiple optical fibers within a single pre-terminated cable — one deployment carries dozens to hundreds of high

Trunk Cable vs Harness Cable in Fiber Optic Networks

Technical comparison of fiber trunk cables and harness cables, explaining structure, connectivity roles, and correct use in FTTH and data center deployments.

Fiber optic trunk cable

Discover our wide range of U-DQ trunk cables as variant with LC or SC connectors, for example, in categories OS2, OM2, OM3, OM4 and OM5.

MTP®/MPO Jumper, Harness, and Trunk Fiber Cables: What Are the ...

This article introduces the structural characteristics and application differences of these three cable types to help select the appropriate solution when planning fiber optic cabling.

High Fiber Count Trunks Applications Guide

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To meet the need for high fiber count cable and connectivity solutions, various implementation options are available. Depending upon the application space as well as deployment

OptoTrunk Cables | Molex

OptoTrunk Cables combine multiple cables into one, using high-density connectors like 144F Expanded Beam Optical (EBO) and LC cartridges to enable efficient,

Fiber Optic Cable Types: Single-Mode, Multimode, and

A fiber optic cable (frequently shortened to “fiber cable”) is a specialized transmission medium crafted to carry data as light pulses through

Fiber Optic Color Code: The Ultimate TIA-598-C Guide

Master the TIA-598-C fiber optic color code standard. Read our complete guide and use our free interactive calculator to easily identify 1-144 core cables.

Fiber Optic Connector Types: Full Comparison

Fiber Optic Connector Types: Full Comparison & Selection Guide LC, SC, FC, ST, MPO/MTP compared: ferrule sizes, polishing types, insertion loss,

576 Core SMC-Cabinet outdoor Fiber optic (SC/APC Complete set)

SMC Optical Cross Connect Cabinet, short for OCC, is specially designed for optical fiber cross-connection and termination between trunk cables and distribution cables in FTTH network.

Data Center High-Density Fiber Cabling: Why MPO/MTP Became the

Trunk cables: Pre-terminated MPO assemblies run from a main distribution area (MDA) to intermediate distribution areas (IDAs) or zone enclosures. Patch cords: LC or MPO patch cords

Fiber Polarity Basics for Duplex Applications

Fiber polarity is the direction that light signals travel from one end of a fiber optic cable (link) to the other. A link''s transmit signal (Tx) must match its corresponding receiver (Rx) at the other

Fiber optic cable outer sheath material

Therefore, the use of OFNP flame retardant fiber optic cables is The best choice; Riser/PVC fiber optic cables are suitable for use in vertical trunk wiring areas to provide connections

Fiber Optic Cable Types: A Complete Guide

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The plethora of fiber optic cable types can seem overwhelming, but choosing the right cable for the job is important. Read on to learn what fiber optic

MPO MTP 24F SM Fiber Optic Patchcord for Data Center Cabling

MPO MTP Patchcord SM Trunk Cable 24F Fiber Optic MPO/MTP fiber optic patch cords feature connectors at both ends of fiber optic cables, enabling active connections between optical network

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