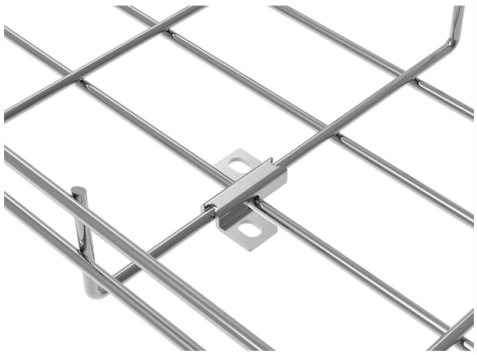
The fiber optic transceiver is connected via a pigtail



Overview

Understand fiber optic pigtails — definition, types, and how they differ from patch cords. Learn why pigtails ensure reliable, low-loss fiber terminations.

Key Takeaways

A fiber optic pigtail connects a transceiver to a fiber network by splicing its bare fiber end to the network cable while the factory-terminated connector plugs into the transceiver or optical module. What is a Fiber Optic Pigtail? A fiber optic pigtail is a short length of optical fiber with a factory-installed connector on one end and a bare fiber on the other.

The connector end plugs directly into network equipment, such as a fiber optic transceiver, patch panel, or optical distribution frame (ODF), while the bare fiber end is designed for fusion or mechanical splicing to the incoming fiber cable in the field. Unlike patch cords, which have connectors on both ends, pigtails provide a low-loss, permanent joint with the network cable, ensuring reliable signal transmission.

Connecting Pigtails to Transceivers

Connector Type Matching: The pigtail connector must match the transceiver interface. Common types include LC, SC, ST, and FC, with polish options like UPC (Ultra Physical Contact) or APC (Angled Physical Contact).

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C connectors are popular for high-density data center applications, while SC and ST are widely used in telecom and older networks. Fiber Mode Compatibility: Ensure the pigtail fiber mode matches the network cable and transceiver. Single-mode (OS2, 9/125µm) is used for long-distance, high-bandwidth links, while multimode (OM3/OM4, 50/125µm or 62.

5/125µm) is used for shorter distances. Mixing modes can cause high signal loss and link failure. Splicing the Bare End: The bare fiber end is fusion spliced or mechanically spliced to the network cable.

Fusion splicing provides the lowest insertion loss and highest reliability, while mechanical splicing is faster but slightly higher in loss. The splice is typically housed in a splice tray or fiber terminal box for protection and organization. Plugging into the Transceiver: Once the pigtail is spliced, the connectorized end is inserted into the transceiver module.

This creates a complete optical path from the network cable to the active equipment, enabling data transmission.

Practical Considerations

Color Coding: Pigtails are often color-coded to indicate fiber type and polish: yellow for single-mode, aqua or orange for multimode, blue for UPC, and green for APC. Cable Management: Pigtails are usually unjacketed and routed in splice trays to prevent bending or stress on the fiber. Testing: After splicing and connection, test the link for insertion loss and return loss to ensure optimal performance.

Summary

Fiber optic pigtails provide a factory-quality connector for transceivers while allowing custom-length splicing to network cables. Proper selection of connector type, fiber mode, and splicing method is essential for low-loss, reliable connections in data centers, telecom networks, and FTTH deployments.

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