

How to connect two pigtails to the main optical fiber



Overview

Remove the outer coating carefully to expose the fiber. Use alcohol wipes to remove dust and debris.

Key Takeaways

The most reliable way to connect two fiber optic pigtails is by fusion splicing, which permanently joins the bare ends of the fibers with minimal signal loss. Step-by-Step Guide

1. Prepare the Fiber Ends Carefully strip the outer jacket and protective coating from the fiber pigtails and the main cable to expose the bare glass. Clean the fibers with isopropyl alcohol wipes to remove dust and debris, as even tiny particles can cause signal loss or damage during splicing .
2. Cleave the Fibers Use a precision fiber cleaver to make a clean, perpendicular cut on each fiber end. Proper cleaving ensures optimal alignment and low-loss fusion .
3. Align the Fibers Place the bare ends of the pigtail and the main fiber into a fusion splicer. The splicer aligns the fibers under a microscope to ensure the cores are perfectly matched .
4. Fusion Splicing Activate the fusion splicer to create an electric arc that melts and fuses the two fibers together. This produces a permanent, nearly invisible joint with very low insertion loss (typically 0.02–0.05 dB) , .
5. Protect the Splice Slide a heat-shrink sleeve over the splice and apply heat to protect the joint from mechanical stress and environmental factors .
6. Test the Connection Use an OTDR (Optical Time-Domain Reflectometer) or a power meter to verify the splice quality and ensure minimal signal loss .

Alternative Methods

- **Mechanical Splice:** Aligns two bare fibers inside a plastic housing with index-matching gel. Easier and reversible but slightly higher loss (0.1–0.5 dB), .
- **Coupler/Adapter:** Connects pre-terminated pigtails without splicing. Simple and reversible, but adds more loss (0.2–0.5 dB) and is less suitable for long-distance or high-performance links .

Tips for Success

- Always use pre-tested, high-quality pigtails to reduce errors .
- Keep tools and fibers clean and dust-free.
- Avoid mixing connector types (e.g., APC with UPC) unless using a hybrid coupler .
- For permanent installations, fusion splicing is preferred due to its low loss and long-term reliability . By following these steps, you can ensure a strong, low-loss connection between two fiber optic pigtails and maintain network performance and reliability.

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