

How to calculate the length of a communication optical cable



Overview

A cable length calculator allows you to estimate the total amount of cable required for your specific layout.

Key Takeaways

The length of an optical cable can be measured using an Optical Time-Domain Reflectometer (OTDR), a Visual Optical Length Tester (VOLT), or direct physical measurement, with correction factors applied for cable construction.

Direct Measurement

For short or accessible cables, you can uncoil the cable and measure it with a tape measure or measuring wheel. Some bulk cable spools have footage markings on the jacket, allowing you to subtract the start and end readings to determine the length. This method is simple but less accurate for long or installed cables and requires careful handling to avoid damage.

Indirect Measurement

If the cable is coiled, you can measure the coil diameter and number of turns and calculate the approximate length using geometry. This method is approximate and depends on consistent coiling.



Using OTDR

An Optical Time-

Domain Reflectometer (OTDR) is the most accurate method for installed or inaccessible cables.

The OTD

R sends light pulses down the fiber and measures the time it takes for reflections to return from the end or any faults. The device calculates the fiber length based on the speed of light in the fiber. Correction Factor: Because fibers may be helically wound inside the cable, the fiber length can slightly exceed the cable length.

A correction factor, often determined by field testing, is applied to convert fiber length to actual cable length. For example, stranded loose tube designs may have 2-3% excess fiber length, while central tube designs have minimal excess. Setup: Use a launch cable to ensure accurate detection of the fiber start, select the appropriate wavelength and pulse width for the fiber type, and review the OTDR trace to identify the end of the cable and any events along the path.

Visual Optical Length Tester (VOLT) For certain applications, a VOLT device can measure the round-trip time of light in a looped fiber and divide by two to estimate the cable length. This is cost-effective but less precise than an OTDR.

Practical Considerations

Slack and Service Loops: When planning installations, account for extra cable length for service loops or future reconfigurations, typically 10-20% additional length.

Safety: Handle fibers carefully, wear gloves and eye protection, and avoid bending or twisting the cable excessively. Verification: After measurement, test the cable for performance using a power meter or OTDR to ensure the measured length corresponds to functional fiber performance.

By selecting the appropriate method based on cable accessibility, length, and required precision, you can accurately determine the length of a communication optical cable.

Article Content

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Estimating Cable Length with OTDR

This Applications Engineering Note (AE Note) addresses estimating cable length or event distance using an optical time domain reflectometer (OTDR). This AE Note does not provide operating instructions

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The FOA Reference For Fiber Optics

Use Of Cable Ties Fiber optic cables, like all communications cables, are sensitive to compressive or crushing loads. Cable ties used with many cables, especially

WHAT IS RETURN LOSS, AND WHY I SHOULD MEASURE IT

It is a good practice use only continuous lengths of coaxial cable on any given cable run, rather than to splice a cable in the middle of a run for these reasons. The following table shows the relationship

The FOA Reference For Fiber Optics-Installing Fiber Optic Cable

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