Common Ratios for Optical Splitters



Overview

Learn about optical splitter split ratios (1:N, 2:N), centralized vs. cascaded architectures, and how to choose the right setup for FTTH PON networks.

Key Takeaways

Optical splitters commonly use ratios such as 1x2, 1x4, 1x8, 1x16, 1x32, and 1x64, with some odd ratios like 1x3 or 1x5 used in specific scenarios.

Standard Split Ratios

Optical splitters divide a single optical signal into multiple outputs, and the split ratio defines how the power is distributed among these outputs. Commonly used ratios include: 1x2 – Splits one input into two outputs, often used for small-scale or short-distance networks. 1x4 – Divides one input into four outputs, suitable for small subscriber clusters.

1x8 – Widely used in PON networks for moderate subscriber density. 1x16 – Common in medium-density deployments, balancing fiber usage and signal strength. 1x32 – Frequently used in North American G-PON networks and for larger subscriber groups.

1x64 – Used in high-density areas or with XGS-PON networks for maximum efficiency. Odd ratios (1x3, 1x5, etc.) – Occasionally deployed for specialized network designs or uneven subscriber distribution. Splitter Types and Their SuitabilityFBT (Fused Biconical Taper) splitters – Cost-effective for small splits like 1x2 or 1x4, but less uniform for large splits.

PL

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C (Planar Lightwave Circuit) splitters – Provide uniform output and stability, ideal for large ratios such as 1x32 or 1x64.

Deployment Architectures

Centralized (single-level) splitting – A large splitter (e.g., 1x32 or 1x64) is placed at the central office, sending one fiber to each subscriber after the split. This simplifies maintenance but requires more feeder fibers. Cascaded (multi-level) splitting – Smaller splitters (e.g., 1x4 followed by 1x16) are deployed in stages to achieve the desired overall ratio, reducing feeder fiber count and improving flexibility for wide or less dense areas.

Considerations for Network Design

Signal strength – Higher split ratios reduce power per output, so careful selection is needed to maintain acceptable signal levels. Scalability – Cascaded designs allow easier expansion without major network overhauls. Cost and maintenance – Centralized splitting simplifies management but may increase initial fiber deployment costs, while cascaded splitting can optimize fiber usage but adds field complexity.

By understanding these common ratios and deployment strategies, network designers can optimize FTTH and PON networks for cost, performance, and scalability.

Article Content

Optical Splitters: Split Ratios, Splitting Architectures & PON Network ...

Learn about optical splitter split ratios (1:N, 2:N), centralized vs. cascaded architectures, and how to choose the right setup for FTTH PON networks.

Basic understanding on Tap ratio for Splitter/Coupler

They serve as the backbone of passive optical networks (PONs), CATV distribution systems, and dense wavelength division multiplexing (DWDM) networks. Understanding the

Basic Knowledge about Split Ratio and Insertion Loss of Optical Splitter

Expressed as a ratio or percentage, the splitter ratio indicates the division of optical power among the output ports. For instance, a 1:8 splitter ratio signifies an equal distribution of incoming

Ultimate Guide to Optical Splitters for FTTH & GPON

Whether you are designing a GPON network, planning an Optical Distribution Network (ODN), or selecting components for a new FTTx deployment, understanding optical splitters is

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Split Ratios and Splitting Level of Optical Splitters

At the same time, higher split ratio splitters reduce bandwidth per ONU (optical network unit). And there will be increased optics cost either at OLT or ONU or both to achieve large optical

Introduction to Passive Optical Network Splitter Architectures

A fiber broadband provider typically determines and overall split ratio for the network, such as 1x32 or 1x64, and uses combinations of splitters to meet that ratio with each PON port.

Optimising FTTH Design: Split Levels & Split Ratios

The real design trade-offs lie in how you split the optical signals, where you locate the splitters, and the ratio you choose for subscriber sharing. Let''s dive into the key considerations.

Understanding Optical Splitter Loss

Understanding splitter ratios and insertion loss is fundamental to building a reliable fibre optic network. The key takeaway is that every split reduces optical power, and this loss must be

How to Design FTTH Network Split Level and Split Ratio?

Learn how to design an efficient FTTH network by optimizing split levels and split ratios. Get deployment strategies for high-performance fiber networks.

PLC Splitters For FTTH: Ratios, Loss Budget & Quick

A complete engineering guide to PLC splitters in FTTH networks. Learn splitter ratios, insertion loss, cascade design, FAT & closure integration,

Beam splitter

Beam splitters A beam splitter or beamsplitter is an optical device that splits a beam of light into a transmitted and a reflected beam. It is a crucial part of many optical

What are Beamsplitters?

Types of Beamsplitters Standard Beamsplitters are commonly used with unpolarized light sources, such as natural or polychromatic, in applications where polarization state is not important. They are

The FOA Reference For Fiber Optics

Testing Fiber Optic Couplers, Splitters Or Other Passive Devices A passive device used to split or combine signals on fiber optics may be called a splitter, combiner or coupler, but splitter is the most

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How to Design FTTH Network Split Level and Split Ratio?

PLC vs FBT Splitters: How to Choose Selecting the right splitter is crucial for building a reliable fiber optic network. PLC splitters are based on planar lightwave circuit technology, ensuring

Beam Splitters – optical power splitter, beamsplitter, thin-film ...

What are Beam Splitters? A beam splitter (or beamsplitter, power splitter) is an optical device which can split an incident light beam (e.g. a laser beam) into two (or sometimes more) beams, which may or

Optical Splitter Insertion Loss Table | PDF

Optical Splitter Insertion Loss Table The document contains tables listing the insertion loss in dBm for various splitting ratios of an optical splitter, ranging from 1% to 99%. It also includes formulas for

Understanding the Split Ratios and Splitting Level of Optical Splitters

Split Ratios There are a multitude of split ratios available. The most common splitters deployed in a PON system is a uniform power splitter with a 1:N or 2:N splitter ratio, where N is the

Split Ratios and Splitting Level of Optical Splitters

This article has reviewed some information about the split ratios and splitting level of fiber optic splitters. It is very essential to make clear all these different configurations, or the network performance will be

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