Fiber Optic Splitter PLC Splitting

Article Overview

A PLC (Planar Lightwave Circuit) splitter is a passive optical device that divides a single input optical signal into multiple outputs with high uniformity and low insertion loss, enabling efficient distribution in fiber optic networks.

What is a PLC Splitter?

A PLC splitter is a passive optical component used in fiber optic networks to split one optical signal into multiple outputs. It is based on planar waveguide technology, where light is guided through lithographically patterned waveguides on a silica substrate. PLC splitters are widely used in FTTH (Fiber to the Home), GPON, and EPON networks, providing stable and uniform signal distribution to multiple end users . Unlike traditional FBT (Fused Biconical Taper) splitters, PLC splitters offer better uniformity, wavelength independence (1260-1650 nm), and temperature stability .

How PLC Splitters Work

The incoming optical signal enters the splitter through a single input fiber. Inside the device, the signal is routed through a planar waveguide circuit, which evenly divides the light into the desired number of output fibers. This ensures high uniformity, meaning each output receives nearly equal optical power, which is critical for consistent network performance . PLC splitters are bidirectional, allowing them to split signals downstream and combine signals upstream in PON networks. They are passive, requiring no external power and offering high reliability .

Common Configurations and Split Ratios

PLC splitters are available in various split ratios, such as:

o 1x2, 1x4, 1x8, 1x16, 1x32, 1x64 - indicating one input fiber split into multiple outputs
o 2xN splitters - two input fibers split into N outputs for redundancy or load balancing

Higher split ratios reduce the optical power per output, so insertion loss increases with more outputs. Typical insertion loss ranges from 3.5 dB for 1x2 splitters to around 20 dB for 1x64 splitters .

Packaging Types and Installation

PLC splitters come in multiple packaging types to suit different environments:

o Bare Fiber: Exposed fibers, used in splice trays or modules

o Blockless: Compact, flexible, suitable for tight spaces
o ABS Box: Plastic enclosure for rack or cabinet installation
o LGX Module: Fits into LGX chassis for easy management
o Rack-Mounted / 1U Rack: For high-density central office setups
o Tray or Cassette: Used in fiber distribution frames (FDFs) or patch panels

They are also designed for indoor or outdoor use, with outdoor versions offering IP-rated waterproof enclosures for harsh conditions .

Key Performance Specifications

When selecting a PLC splitter, consider:

o Split Ratio: Determines the number of outputs and power distribution
o Insertion Loss: Lower values maintain stronger signals across outputs
o Uniformity: Ensures even power distribution among outputs
o Return Loss: Minimizes reflected light back to the source
o Wavelength Compatibility: Ensures proper operation across network wavelengths, especially in WDM systems

Applications

PLC splitters are essential in:

o FTTH networks: Distributing signals from OLT to multiple ONTs
o GPON/EPON networks: Supporting high-density user connections
o Data centers and metropolitan networks: Efficient fiber utilization and multi-user access
o Telecom backbone systems: High-split ratios for large-scale deployments

Summary

A fiber optic PLC splitter is a critical component for modern optical networks, providing efficient, uniform, and reliable signal splitting. Its passive design, wide wavelength compatibility, and flexible packaging make it ideal for residential, enterprise, and telecom applications, supporting split ratios from 1x2 up to 1x64 or more. Choosing the right splitter involves evaluating split ratio, insertion loss, uniformity, packaging type, and environmental suitability to ensure optimal network performance.

Splitter & WDM T&S PLC optical splitters deliver low insertion loss and stable performance, making them ideal for FTTX signal

PLC Splitters Overview PLC Splitters (Planar Lightwave Circuit Splitter) is a fiber optic splitter based on optical

PLC splitters play a crucial role in fiber optic networks by splitting light signals into multiple channels. This article will

Are you building or upgrading a fiber optic network? You have to know about a small but vital component: the PLC

2. Overview of PLC Optical Splitters PLC optical splitters are fabricated using semiconductor

The working principle of fiber splitters is relatively simple, and the signal distribution is achieved through the principle

Learn how to choose the right fiber optic splitter for FTTH and FTTX deployments.

Fiber optic splitters, also referred to as optical splitter, or beam splitter, is an integrated wave guide optical power

Discover the importance and working principle of PLC splitters in fiber optic networks. Learn about the types, benefits,

PLC (planar lightwave circuit) splitters regulate the power of optical signals via splitting and routing, delivering reliable light

A fiber-optic splitter, also known as a beam splitter, is based on a quartz substrate of an integrated waveguide optical power

Optical splitters, including FBT (Fused Biconical Taper) couplers and PLC (Planar Lightwave Circuit) splitters, are common passive

Also known as PLC splitter, fiber PLC splitter, or optical PLC splitter, this device efficiently

Discover the key differences between FS''s six types of PLC Splitters, including bare fiber,

A complete engineering guide to PLC splitters in FTTH networks. Learn splitter ratios,

Fiber splitters are divided into FBT and PLC splitters. They differ in wavelength, port, splitting ratio, failure rate,

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