How to use switches and optical splitters

Overview

This guide demystifies fiber optic splitters, explaining their design, operating principles, types, key specifications, and real-world applications.

Key Takeaways

Switches that can use optical splitters are typically OLTs or multi-port Ethernet switches designed for Passive Optical Networks (PONs), connecting to ONTs via splitters in FTTH or passive optical LAN deployments.

Overview of Compatibility

Optical splitters are passive devices that divide a single optical signal into multiple outputs or combine multiple signals into one, without requiring power. Switches that interface with splitters must support single-mode fiber connections and the PON protocols used in the network, such as GPON (Gigabit PON) or EPON (Ethernet PON). These switches are usually located at the central office, data center, or main equipment room and serve as the aggregation point for multiple endpoints.

Types of Switches

Optical Line Terminals (OLTs)OLTs are specialized switches that connect to optical splitters in PON networks. They transmit downstream signals to multiple Optical Network Terminals (ONTs) and receive upstream signals combined by the splitter.

OL

Ts support split ratios ranging from 1x8 to 1x64, depending on network design and splitter type.

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Multi-

Port Ethernet Switches with Fiber UplinksIn Passive Optical LANs (POLs), standard multi-port gigabit Ethernet switches can act as ONTs or aggregation devices. These switches connect to splitters to distribute signals to multiple endpoints, including computers, phones, or triple-play devices. They must support bidirectional single-fiber operation using wavelength-division multiplexing (WDM) to handle upstream and downstream traffic on the same fiber.

Deployment Considerations

Centralized vs Distributed Splitting: Switches can connect to splitters in centralized locations (co-located with multiple splitters) or distributed locations (splitters in closures or pedestals near users),. Splitter Type: PLC splitters are preferred for high-channel counts (1x32, 1x64) due to uniform signal distribution, while FBT splitters are cost-effective for small splits (1x2, 1x4),. Insertion Loss and Split Ratio: Switches must account for signal attenuation caused by the splitter.

Higher split ratios increase insertion loss, which may require switches with higher optical power budgets.

Summary

Switches that can use optical splitters are primarily OLT devices in PON networks or multi-port Ethernet switches in passive optical LANs. They must support single-mode fiber connections, PON protocols, and bidirectional communication. The choice of splitter type, split ratio, and deployment architecture influences the switch selection and network performance.

Article Content

Fiber Optic Splitter: How It Works & Types Guide

This guide demystifies fiber optic splitters, explaining their design, operating principles, types, key specifications, and real-world applications.

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An optical splitter is a crucial passive fiber optic device that splits and combines optical signals. It can distribute the optical energy transmitted through

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