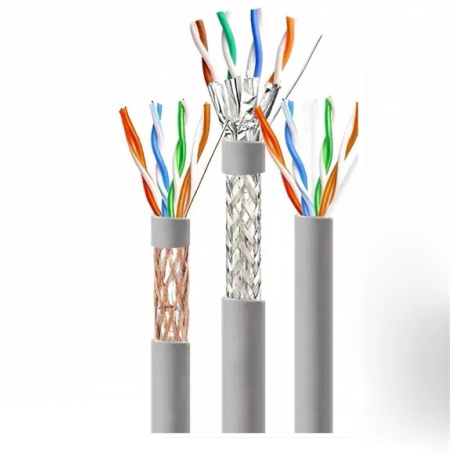
LPO Optical Switches Available Now



Overview

Revolutionizing Data Centers with a Linear Pluggable Dell has launched support for pure LPO connectivity between the switch and the server, LPO-MSAThe focu.

Key Takeaways

Linear Pluggable Optics (LPO) switches are currently available from vendors like Dell and FS, offering high-speed, low-latency, and energy-efficient solutions for modern data centers and AI/HPC environments.Overview of LPO Technology

Linear Pluggable Optics (LPO) are optical transceivers that eliminate the DSP (digital signal processor) inside the module, replacing it with high-linearity analog components such as transimpedance amplifiers (TIA) and driver chips. This shifts signal processing to the host ASIC in the switch or NIC, resulting in lower power consumption, reduced latency, and improved efficiency compared to traditional DSP-based optics . LPO modules are particularly suited for short-reach, high-density connections in AI/ML clusters, GPU fabrics, and hyperscale data centers .

Available LPO Switches and Modules
• Dell PowerSwitch LPO Solutions: Dell offers server-to-switch LPO solutions compatible with Broadcom 57608 Thor 2 NICs. Examples include the 800G-O112-2DR4-LPO optics in the Dell PowerSwitch Z9864F-ON and 400G-Q112-DR4-LPO optics for Broadcom Thor 2 NICs. These modules support incremental deployment, allowing gradual LPO adoption while maintaining interoperability with DSP-based optics .

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• FS 800G LPO Module: FS has launched an 800G DR8 OSFP LPO module designed for AI/HPC data centers. It operates at 8.5W maximum power, roughly 50% lower than comparable DSP-based 800G modules, offering ultra-low latency and high energy efficiency. This module is optimized for dense GPU clusters and AI workloads, reducing cooling requirements and operational costs .
Interoperability and Standards

LPO modules follow open standards defined by the LPO MSA, ensuring multi-vendor interoperability across electrical and optical technologies. Modules start at 100 Gb/s per lane and are designed to work with supported switches and NICs, with DSPLPO-certified optics indicating compatibility with remote LPO endpoints . Proper qualification is essential to ensure performance and stability, as LPO relies on host ASICs for digital signal processing .

Advantages of LPO Switches
• Lower Power Consumption: Eliminating DSP chips reduces energy usage and thermal load .

• Reduced Latency: Shifting signal processing to the host improves synchronization in AI/ML training .

• Cost Efficiency: Simplified modules lower per-link costs and enable higher port density .

• Scalability: Ideal for hyperscale data centers, leaf-spine networks, and GPU fabrics .
Summary

LPO optical switches are currently available and actively deployed in high-performance and AI-focused data centers. Vendors like Dell and FS provide modules ranging from 400G to 800G, optimized for low power, low latency, and high-density deployments. These solutions are particularly beneficial for AI/ML clusters, HPC environments, and hyperscale data centers, offering a cost-effective and energy-efficient alternative to traditional DSP-based optics .

Article Content

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by Carol Cao and Vlad Kozlov September 26, 2024 HiSilicon and LightCounting jointly hosted a session titled

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Benchmark testing on fully populated switches confirmed system power savings of more than 40% compared to

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With fewer components and a simpler architecture, LPOs support lower BOM and manufacturing costs. LPOs are now formally

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As data center infrastructures upgrade to transition to higher bandwidths, LPOs are emerging as a promising solution

Linear Pluggable Optics – Streamlining Data Center Efficiency

The leaf-and-spine network architecture, prevalent in modern data centers, relies on fiber optic connections between

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