

Optical Modules of Core Switches



Article Overview

Core switches use high-speed optical modules—ranging from pluggable transceivers to co-packaged optics—to deliver scalable, low-latency, and high-bandwidth connectivity in modern data centers.

Types of Optical Modules

Pluggable Optical Modules: Traditional modules like SFP, SFP+, QSFP28, and OSFP are widely used in core switches for Ethernet connectivity. They support speeds from 1Gbps to 400Gbps and can accommodate various optical architectures such as DR, FR, LR, SR, and ZR, enabling flexible point-to-point or point-to-multipoint connections . Pluggable modules are hot-swappable, allowing quick replacement or upgrades without taking the entire switch offline .

eXtra-dense Pluggable Optics (XPO): XPO modules are designed for next-generation AI data centers, delivering up to 12.8Tbps per module using 64 electrical lanes. They provide extremely high front-panel density, enabling up to 204.8Tbps of switching capacity in a single rack unit, while maintaining field pluggability and operational flexibility .

Co-Packaged Optics (CPO): CPO integrates optical and electronic components directly alongside the ASICs on the same substrate or interposer. This reduces the distance between the optical engine and the switch core, lowering latency, insertion loss, and power consumption. CPO modules are not hot-swappable but offer higher bandwidth density and energy efficiency, making them suitable for hyperscale and AI workloads . The optical engine typically includes photonic integrated circuits (PICs) and electronic ICs (EICs), which can be stacked or co-located on silicon interposers to optimize signal integrity and reduce electrical trace losses .

Key Considerations

Article Content

Gigabit/Hundred Gigabit/Core/PoE/Fiber Switch Selection Guide

The switch is the core equipment for monitoring network transmission. There are many critical technical parameters to

What is Co-Packaged Optics (CPO) Technology? | Corning

Co-Packaged Optics (CPO) Solutions Co-Packaged Optics (CPO) Solutions Today, data centers use a separate approach for optics

Co-Packaged Optics — a deep dive | APNIC Blog

An alternative to conventional CPO with optical engines on the edges is to use photonic interposers or fabrics that are

The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right

Optical Modules for Huawei S Series Switches

A switch must use optical or copper modules that have been certified for use on Huawei switches. Non-certified optical or copper

Fundamentals of an Optical Module

As an important part of fiber-optic communication, an optical module is a photoelectric converter which converts electrical signals into

Core Switch Explained: Key Functions and Benefits

Discover what a Core Switch is, its pivotal role in network architecture, and how it boosts performance and reliability in

All-fiber architecture for high speed core-selective switch for ...

In this work, we present an all-fiber architecture for a high-speed core-selective switch, crucial for efficient signal

What Is an Optical Module and Its FAQs (V200)

What Is an Optical Module and Its FAQs (V200) Describes what an optical module is and FAQs, including the fundamentals,

Opto-mechanical Switch Modules | Coherent

Opto-mechanical Switch Modules Use these modules in diverse tasks in 5G optical access networks, for configurable OADM, optical

All-fiber architecture for high speed core-selective switch for ...

Gabriel Saavedra and colleagues introduce an all-fiber device for rapid core-switching in multi-core fiber systems,

Core Switch vs. Distribution Switch vs. Access Switch

Core Switch vs. Distribution Switch vs. Access Switch: Understand Their Roles in Ethernet Networks Ethernet networks are growing

Optical Switching Basics: Types and Technologies

Explore the fundamentals of optical switching, including space, wavelength, time, and hybrid switching techniques. Learn about core

Common Optical Modules and Interfaces for Switches

Troubleshooting Directions Common problems with optical modules and interfaces include

MEMS Optical Switches | Coherent

Use our custom MEMS optical switches in applications that require continual switching, where their high-reliability and long-lifetimes

Optical Switches Multi Mode

Fiber optical multimode MM switches with fiber core diameters ranging from 50 μm to 600 μm .

Silicon Photonics Networking for Agentic AI | NVIDIA

Dive Into NVIDIA Co-Packaged Optics-Based Switches Take a look inside NVIDIA silicon photonics-based networking switches that

Optical module design resources | TI

View the TI Optical module block diagram, product recommendations, reference designs and start designing.

Optical Fiber

AOC An active optical cable (AOC) is a fixed-length optical fiber with optical modules at both ends. It can be directly connected to an

The difference between switches and routers and optical module ...

Switches and routers are core networking devices in LAN, enterprise network, data center, and broadband access

Optical Components and Modules

Everything you need to build an optical network from end-to-end. Thin-film filter and PLC based AWG for multiplexing, a full suite of

All-fiber architecture for high speed core-selective switch for ...

These results demonstrate, for the first time, a multicore optical fiber switch operating under real-world conditions with speeds far

What Is an Optical Module

An optical module is a device for converting electrical signals to optical signals and vice versa, widely used in telecommunications

Optical Switches

Backed by over 25 years of engineering expertise, we manufacture components, OEM modules, and turnkey systems with

Optical Switch Module

Dimension offers a series of high-performance OSW optical switch modules for automation testing systems.

800G Client Optics in the Data Center

When hyperscale data center operators start deploying a new generation of client optics, they immediately require massive volumes

The Ultimate Guide to SFP Modules (2026): Types,

Confused by SFP vs SFP+? Read the definitive 2026 guide on SFP modules. We explain Single Mode vs

Understanding Optical Modules

Cards Cables Pluggable Modules for Interfaces Important Notes About Using Optical Modules Certified for Huawei

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