What are the models of pluggable optical modules

Overview

Pluggable Transceivers: Types, Uses, and Best PracticesDiscover what pluggable transceivers are, compare SFP/SFP+/SFP28/QSFP form factors, and learn practi.

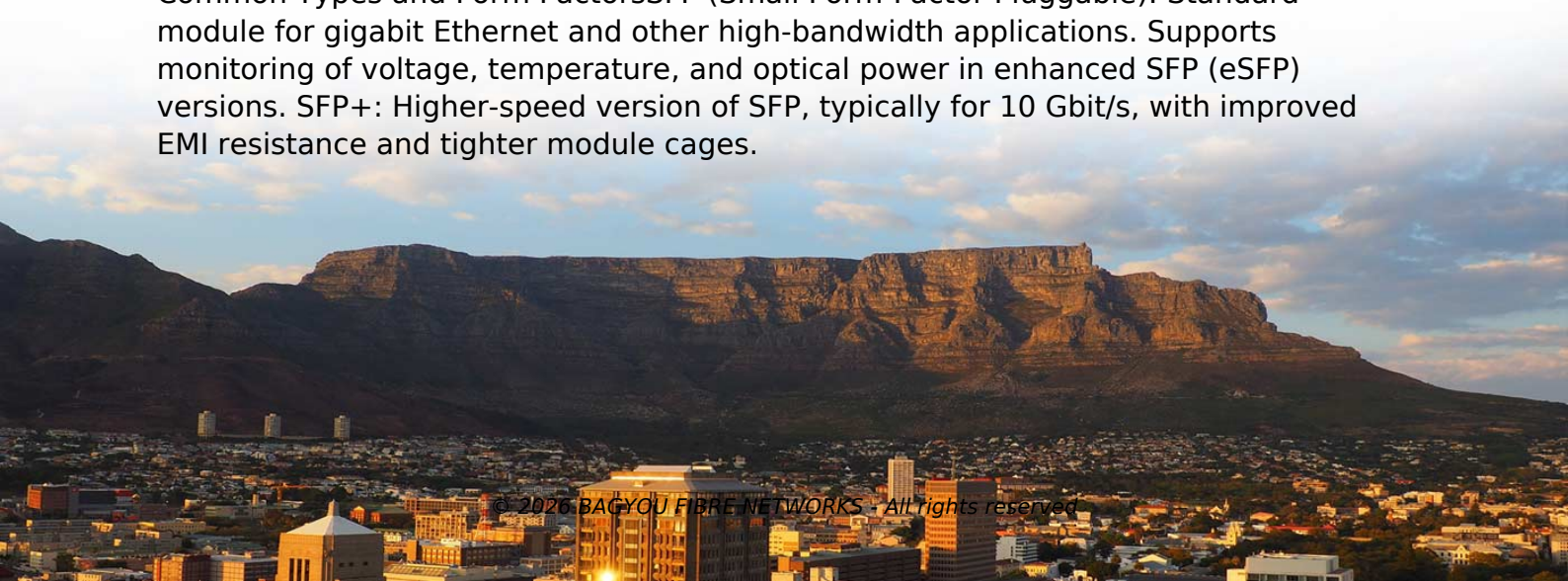
Key Takeaways

Pluggable optical modules are compact, hot-swappable transceivers that convert electrical signals to optical signals and vice versa, enabling flexible, high-speed fiber optic connectivity in networking and data center environments.

Overview

Pluggable optical modules, also known as small form-factor pluggables (SFPs), are removable modules that allow network devices such as switches, routers, and servers to connect to fiber optic networks. They convert high-speed electrical signals into light pulses for transmission and convert received light back into electrical signals. Introduced in the early 2000s, SFPs replaced larger GBIC modules, enabling higher port density and easier upgrades without replacing the entire device.

Common Types and Form FactorsSFP (Small Form-Factor Pluggable): Standard module for gigabit Ethernet and other high-bandwidth applications. Supports monitoring of voltage, temperature, and optical power in enhanced SFP (eSFP) versions. SFP+: Higher-speed version of SFP, typically for 10 Gbit/s, with improved EMI resistance and tighter module cages.



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SFP28: Same interface size as SFP+, supports 25 Gbit/s or backward-compatible 10 Gbit/s modules. QSFP+ / QSFP28: Quad small form-factor pluggable modules supporting 40 Gbit/s and 100 Gbit/s, respectively, often using MPO fiber connectors. QSFP-DD (Double Density): High-speed, four-channel module for 400 Gbit/s, using 8-channel electrical interfaces with NRZ or PAM4 modulation.

XF

P: 10 Gbit/s module with LC fiber connectors, larger than SFP+.

CF

P / CFP2 / CFP4: High-speed modules for data and telecom applications, supporting 100 Gbit/s and beyond.

CX

P: High-density parallel optics transceiver for short multimode links, providing 12 channels in each direction.

CSF

P: Compact SFP with two bidirectional channels for high-density deployments.

OSF

P / OSFP-XD: Octal small form-factor pluggable modules supporting 400 Gbit/s to 1. 6 Tbps, used in high-performance data centers.

XP

O (eXtra-dense Pluggable Optics): Next-generation AI-focused modules delivering up to 12. 8 Tbps per module with liquid-cooled designs, enabling high front-panel density and pay-as-you-grow deployment. Key FeaturesHot-swappable: Modules can be added, removed, or upgraded without powering down the device.

Monitoring: Many modules support real-time monitoring of temperature, voltage, and optical power. Flexibility: Allows network operators to start with lower-cost setups and upgrade individual modules as bandwidth needs increase. High-density support: Enables more ports per device, critical for data centers and high-performance computing environments.

Applications

Pluggable optical modules are widely used in: Data centers: For high-speed interconnects and cloud infrastructure. Enterprise networks: Campus and metropolitan-area networks. Telecommunications: Long-haul and metro fiber networks.

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AI and HP

C environments: High-bandwidth, low-latency interconnects for GPUs and AI accelerators.

Recent Developments

Recent innovations focus on higher data rates, increased density, and AI-optimized designs: Kyocera OSFP-XD modules support PCIe 6. 0 interfaces for high-speed CPU/GPU interconnects, enhancing flexibility and power efficiency in data centers.

Arista XP

O modules deliver 12. 8 Tbps per module with liquid cooling, enabling up to 204. 8 Tbps in a single rack unit, addressing AI data center bandwidth demands while maintaining field pluggability.

Pluggable optical modules continue to evolve, balancing speed, density, and operational flexibility, making them essential for modern networking and high-performance computing infrastructures.

Article Content

Pluggable Transceivers: Types, Uses, and Best Practices

Discover what pluggable transceivers are, compare SFP/SFP+/SFP28/QSFP form factors, and learn practical selection, compatibility, and deployment best practices for modern networks.

Complete Guide to Pluggable Optical Transceivers

What are Pluggable Optical Transceivers? Pluggable optical transceivers are compact, hot-swappable network interface modules that serve as the critical bridge between electronic and

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

Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the right transceiver for Cisco, Juniper, and more.

Pluggable Optical Modules: Transceivers for the Cisco

The table below lists the Cisco Pluggable modules in the Cisco ONS family that have reached end-of-sale or end-of-life status, followed by their

Pluggable Optical Modules – GIGALIGHT

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GIGALIGHT provides 100G, 200G, 400G and 800G pluggable digital coherent optical transceiver modules (DCO) and non-coherent transceivers for data center interconnection (DCI), 5G backhaul,

Cisco Optics | Transform Your Network

Get the highest quality, performance-leading optical transceivers for any network architecture. Find the transceiver model to fit your network.

Understanding Pluggable Optical Modules

According to the encapsulation type, optical modules are classified into SFP, eSFP, SFP+, XFP, SFP28, QSFP28, QSFP+, CXP, CFP and CSFP. SFP: small form-factor pluggable. eSFP: enhanced small

400G, 800G, and Terabit Pluggable Optics:

Equipment and electrical serdes can evolve through 3 generations (25 Gb/s, 50 Gb/s or 100 Gb/s) without changing the optical interface that interconnects your equipment.

Linear Pluggable Optics – An Overview

Comparison to CPO g the need for a standalone module. Although CPO is becoming increasingly popular, LPO is seen as a natural evolutionary path for pluggables, offering lower risk compared to

SFP Optical Transceiver | SFP Optical Module | Perle

For example, by simply replacing the pluggable optical transceiver, a media converter that was originally used in a multimode network can be re-configured

Why Arista''s New Optical Transceiver Is a Big Deal

Every module is equipped with its own liquid-cooled cold plate. As to density, Arista says in a white paper that XPO can deliver "4X the front-panel density of OSFP, enabling up to 204.8Tbps

NVIDIA Optical Interconnect 2026, $500M Ayar Labs Round

The optical interconnect market is at a technology inflection point, transitioning from mature but power-intensive pluggable modules to the early commercialization of more integrated and efficient solutions

OFC 2026 Special: Arista Leads XPO Launch as Three

XPO MSA (eXtra Dense Pluggable Optics): Led by Arista Networks, this is the standout reveal of the season, introducing a revolutionary next

What Is an SFP and How It Works Explained

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What Are SFP Modules? What are SFP Modules? Small form-factor pluggable (SFP) transceivers are a core technology in many networks, providing communication between switches and important

RETN migrates 50% of its IP/MPLS traffic onto 400G ZR+ optics

In 2025, RETN completed a large-scale deployment of 400G coherent pluggable optics, with hundreds of modules operating across backbone links ranging from 300 to 950 kilometers.

SFP Optical Transceiver Modules for Long Distance: A Complete

Discover everything you need to know about SFP optical transceiver modules for long-distance fiber transmission. Compare LX, EX, ZX models and choose the right module for your

Pluggable Optical Modules: Transceivers for the Cisco

Cisco offers a comprehensive range of pluggable optical modules for the Cisco ONS family of multiservice platforms. The wide variety of modules

The Evolution of Optical Modules: 400G → 800G → 1.6T – A Strategic ...

Discover the evolution from 400G to 800G and 1.6T optical modules. Learn key technologies, CPO vs pluggable, and upgrade strategies for future-ready data centers.

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