

Article Overview

Huawei and Intel both develop advanced optical modules for high-speed data transmission, with Huawei focusing on photonic chips and modulators for ultra-high-speed networks, and Intel pioneering fully integrated optical I/O chiplets for AI and HPC applications.

Huawei Optical Modules

Huawei's optical modules, also known as optical transceivers, convert electrical signals into optical signals and vice versa, enabling high-speed fiber-optic communication at the physical layer of the OSI model . They are widely used in data centers, telecommunications, and AI infrastructure. Huawei offers a variety of module types, including SFP, eSFP, SFP+, SFP28, XFP, QSFP+, QSFP28, and CFP, supporting transmission rates from 10GE to 100GE and beyond . Modules are hot-swappable and come with features like voltage, temperature, and optical power monitoring in enhanced versions (eSFP). Huawei's core optical chip technology includes:

- o oDSP (Optical Digital Signal Processing) chips in the OptiXtreme series, supporting single-wavelength rates from 100G to 600G, with spectrum efficiency up to 8 bit/s/Hz .
- o Thin Film Lithium Niobate (TFLN) modulators, which increase bandwidth by 50% and reduce power consumption by 30% compared to traditional indium phosphide modulators, enabling single-wavelength terabit transmission .
- o System-level innovations like fully peer-to-peer optical interconnects for AI supercomputing clusters, replacing copper with optical cables to interconnect CPUs and AI chips efficiently . Huawei's modules are designed for long-distance, high-capacity transmission, with flagship systems like OSN 9800 M24 supporting single-wave 1.2Tbps and single-fiber capacity up to 96Tbps .

Intel Optical Modules

Intel has developed the first fully integrated optical compute interconnect (OCI) chiplet, co-packaged with an Intel CPU, aimed at AI infrastructure and high-performance computing (HPC) . Key features include:

- o 64 channels of 32 Gbps data transmission in each direction over fiber up to 100 meters.
- o Co-packaged optical I/O reduces power consumption, increases bandwidth density, and lowers latency compared to traditional electrical I/O.
- o Supports scalable CPU/GPU cluster connectivity, coherent memory expansion, and resource disaggregation, addressing the growing demands of AI workloads . Intel's approach emphasizes integration of optical modules directly with processors, enabling more compact, energy-efficient, and high-bandwidth interconnects for next-generation data centers.

Comparison and Applications

Feature
Huawei Fully integrated optical I/O chiplets co-packaged with CPUs
Intel Transmission 100G-1.2Tbps per wavelength, single-fiber up to 96Tbps
Focus 32 Gbps per channel, 64 channels, up to 100m fiber
Applications Data centers, telecom networks, AI clusters
AI infrastructure HPC, CPU/GPU clusters
Innovation TFLN modulators, oDSP chips, peer-to-peer optical interconnects
Co-packaged optics reduced latency, high bandwidth density
Form Factor SFP, SFP+, QSFP28, CFP, etc.
Chiplet integrated with CPU

Both Huawei and Intel are driving the evolution of optical communication, with Huawei excelling in high-capacity backbone networks and modulators, while Intel focuses on co-packaged optical interconnects for AI and HPC workloads, enabling faster, more efficient data movement within modern computing systems .

Looking ahead, Huawei aims to collaborate with industry partners to further research and innovate in data center

Understanding Optical Modules Appearance and Structure of an Optical Module Types of Optical Modules Optical Module Terms

Fundamentals of an Optical Module As an important part of fiber-optic communication, an optical module is a photoelectric converter

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

Huawei S series devices support optical modules of the following encapsulation types: CFP, QSFP+, QSFP28, XFP, SFP, eSFP,

At MWC Barcelona 2025, Huawei introduced the StarryLink optical modules, aimed at creating a network experience

Introduction of Optical Modules on Huawei Switches On an optical network, a sender needs to convert electrical signals into optical

Pluggable Modules Specifications Appendix Understanding Optical Modules Optical Module Appearance and Structure Types of

Huawei's StarryLink optical modules for data center networks offer seamless interconnection from GE to 800GE across all scenarios,

BEIJING, June 7 (Xinhua) -- With the global push for AI computing power unleashing an unprecedented

wave of infrastructure

10GE SFP+ Copper Modules Accessories Understanding Optical Modules What Is an Optical Module Types of Optical Modules

Huawei said that the "networks for AI" concept focuses on adapting optical infrastructure to

In the future, Huawei will continue to deepen the integration of optical chips with AI and quantum technologies to

Optical modules are encapsulated in different modes to provide different structures. Huawei routers support optical modules of the

What Is an Optical Module On an optical network, a sender needs to convert electrical signals into optical signals before sending

At MWC 2025, Huawei introduced StarryLink optical modules, designed to enhance network experiences with qualities like Stability,

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