Copper to replace optical modules



Overview

Corning wants to cut copper out of the data centerThere's still plenty of copper wiring lurking in data center server racks. Corning wants to replace those.

Key Takeaways

Optical modules are not being replaced by copper; instead, copper and optical technologies are coexisting, with optics dominating long-distance interconnects and copper remaining essential for short-range, in-rack connections.

Current Role of Copper and Optical Modules

Copper cables continue to play a critical role inside AI server racks due to their low latency, zero power consumption, and high reliability, making them indispensable for short-range connections within a single rack, especially in high-density GPU nodes. Optical modules, on the other hand, are primarily used for long-distance interconnects between racks, where copper's signal attenuation and crosstalk become limiting factors.

Technical Drivers for Optical Adoption

The rise of AI workloads has dramatically increased data rates and rack densities.

Modern GP

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Us, such as NVIDIA's latest architectures, require multi-terabit per second interconnects, which exceed the practical limits of copper over longer distances. Optical fibers provide higher bandwidth, longer reach, and lower signal loss, making them essential for connecting multiple racks and data center backbones. Innovations like hollow-core fiber further reduce latency and nonlinear distortion, enhancing optical performance in AI-centric environments.

Coexistence Strategy

Industry leaders, including Nvidia, emphasize a dual-era approach where copper and optical modules coexist. Copper will remain dominant inside racks at least until 2027, while optical modules gradually penetrate in-rack connections with future platforms like Nvidia's Feynman system expected around 2028. This approach allows data centers to balance power efficiency, latency, and bandwidth requirements while scaling AI infrastructure.

Market and Supply Implications

The demand for optical fibers and modules is growing rapidly, driven by AI data centers. Investments by companies like Nvidia and Meta in optical fiber manufacturing indicate a long-term expansion of optical capacity, but copper supply chains remain critical for in-rack connectivity. The transition is not a replacement but a specialization based on distance and performance needs.

Conclusion

Copper will not replace optical modules, nor will optical modules fully replace copper in the near term. Instead, the future of data center interconnects is a hybrid model, where copper handles short-range, high-reliability connections, and optical modules manage high-bandwidth, long-distance links. This coexistence ensures optimal performance, energy efficiency, and scalability for AI-driven data centers.

Article Content

Corning wants to cut copper out of the data center

There''s still plenty of copper wiring lurking in data center server racks. Corning wants to replace those cables with optical fibers.

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CPO switches are shipping in 2026. Learn how co-packaged optics work, which platforms are live, power savings vs pluggable, and what optics you

All AI Data Center Interconnects Will Be Optical Within

At OFC 2026, Nvidia VP Alexis Bjornlin disclosed a GB Blackwell NVL576 prototype where you can see connections remain copper in-rack but

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Nvidia has invested $6.5B+ in photonics since March, targeting Coherent, Lumentum, Marvell, Corning, and Ayar Labs to replace copper with light in AI data centres.

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Ayar Labs Raises $500M to Replace Copper With Light in AI Chips (2026) Ayar Labs closes $500M Series E at $3.75B valuation to scale optical interconnects for AI chips. Backed by

I replaced my copper links with SFP+ active optical cables, and I won''t ...

A couple of purchases (and days) later, I had new-to-me networking cards and active optical cables to replace the copper wires I was using.

Optics Primer, Part 3: Co-Packaged Optics (CPO)

Optics Primer, Part 3: Co-Packaged Optics (CPO) From EML lasers and DSPs to silicon photonics and external CW lasers. How CPO works and the impact on the optical supply chain.

Silicon Photonics & Co-Packaged Optics: 2026 Analysis

Why co-packaged optics and silicon photonics are reshaping AI data centers in 2026 — the bandwidth wall, power math, incumbents, and what it means.

NVIDIA Optical Interconnects Replace Copper for AI

NVIDIA Architecture Shift Optical Interconnects to Replace Copper in AI Scaling NVIDIA presents its upcoming AI computing rack design which

Displaying Optical Module Information

A switch must use optical or copper modules that have been certified for use on Huawei S switches. Non-certified optical or copper modules cannot ensure transmission reliability and may affect service

Optical module

An optical module is a typically hot-pluggable optical transceiver used in high-bandwidth data communications applications. Optical modules typically have an electrical interface on the side that

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