

Replacement for CPO optical modules





Overview

NPO, or Near-Packaged Optics, is a highly integrated optical interconnect solution that falls between traditional pluggable optical modules and CPO. From Jensen Huang showcasing CPO switches at GTC 2025 to a wide range of vendors demonstrating optical engines integrated inside ASIC packages at OFC 2025, CPOs are everywhere. However, it's worth noting that Andy Bechtolsheim, co-founder of Arista and a long-standing visionary in data centre. Its core concept is to remove digital processing units such as DSPs and CDRs from the module, constructing a purely analog "linear direct-drive" optical link. Co-packaged optics (CPO) technology, a key enabler for next-generation data center architectures, promises unprecedented bandwidth density and power efficiency by tightly integrating optical engines with switch silicon. Understanding the key differences between NPO and CPO is crucial for anyone involved in planning the future of data centers and high-performance computing. This article will serve as your definitive guide, exploring what NPO and CPO are, how they compare, and where they fit in the evolving. C114 News October 14 (Shui Yi) Recently, LightCounting, a market research organization in the optical communications industry, said that the 2025 European Optical Fiber Communication Exhibition (ECOC 2025) was relatively quiet, but also had many valuable contents.



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Optical Communication Industry Trends 2026: AI, 800G/1.6T Optical

Explore optical communication industry trends in 2026, driven by AI infrastructure, 800G and 1.6T optical modules, silicon photonics, and next-generation data center connectivity solutions.

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Optical-First Data Centers: CPO vs NPO vs XPO in 2026 · KAD

CPO, NPO, and XPO redefine data center connectivity in 2026, shifting from copper to optical-first architectures for AI-scale infrastructure.

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NPO vs CPO: Decoding the Future of Optical Networking

NPO vs CPO: Compare optics placement, data speed, upgrade flexibility, and power efficiency for your data center needs.

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Next-Gen Optics Need Next-Gen Materials: CPO

As data centers continue to evolve, Co-Packaged Optics (CPO) technology is gradually replacing traditional pluggable optical modules, emerging

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Deep, \$TSEM: SiPho Capacity Inflection Drives Multi-Fold Growth

Separately, we have highlighted the rapid progression of Optical Scale-Up, with volume production expected to commence in 2027. Delivering over 10x the optical bandwidth of traditional



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

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Silicon photonics and co-packaged optics at the heart of

While linear-drive pluggable modules remain competitive, CPO is expected to offer unmatched customization and scalability, with large-scale

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ECOC 2025 CPO becomes the focus again, Nvidia says it will



For example, Nvidia's keynote address at ECOC 2025 offered its clearest stance yet on CPO. "We believe that as AI systems continue to scale, CPO will gradually replace pluggable optical

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The Rise of Co-Packaged Optics: A Deep Dive into CPO

A CPO optical module integrates optical and electronic components to boost data center speed, efficiency, and bandwidth while reducing power use.

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CPO will soon replace pluggable optical modules, and Rubin will

CPO packages silicon photonics devices with ASICs, and is about to replace traditional pluggable optical modules, improving energy efficiency by 3.5 times and deployment speed by 1.3 times compared to

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Co-Packaged Optics - End of Pluggables? What It Is,

Repairability and Maintenance: Because the optics are built into the switch package itself, replacing failed components isn't as simple as swapping a

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GlobalFoundries accelerates adoption of co-packaged optics for

MALTA, N.Y., May 4, 2026 - GlobalFoundries (Nasdaq: GFS) (GF) today announced the introduction of its SCALE(TM) optical module solution for co-packaged optics (CPO). GF's SCALE solution, or Silicon

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All AI Data Center Interconnects Will Be Optical Within 5 Years



All AI Data Center Interconnects Will Be Optical Within 5 Years InP and SiPho join CMOS as critical technologies. Lasers, CPO and OCS will be everywhere (indium phosphide, silicon

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LightCounting :: Scale-up networks in AI Clusters is a

A surge in AI development created a new wave in demand for optical connectivity in 2023-2025 and it will sustain the market's growth through 2030. The Figure below

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Samsung Foundry Reportedly Wins Optical Module Order,

As a result, optical transmission technologies are becoming increasingly important. TrendForce forecasts that co-packaged optics (CPO) will steadily increase their share of optical

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Co-Packaged Optics -- a deep dive , APNIC Blog

A failure in an optical engine might require replacing an entire CPO switch line card or server board rather than just swapping a pluggable module. Developing robust testing, diagnostics,

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

Check out our webinar, Scalable Fiber Solutions for Co-Packaged Optics (CPO) Applications, in which industry experts from Corning and Broadcom explore key

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Traction of embedded optical modules highlighted in

Embedded or integrated semiconductor optical modules are starting to gain traction,



with the shipments of On-Board Optics (OBO), Near-Packaged

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

Co-Packaged Optics (CPO) is a technology and design approach where optical components, such as lasers and photodetectors, are integrated alongside

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Optical Interconnect Technology Analysis: LPO, NPO, CPO

If the optical component fails, the optical engine can be replaced individually without replacing the entire GPU or switching chip. This design

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Samsung Electronics Launches Silicon Photonics Foundry Business

Samsung plans to launch turnkey CPO services in 2029. CPO integrates optical modules directly into switch chip packages, eliminating the need for separate modules and reducing power

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GlobalFoundries accelerates adoption of co-packaged optics for

SCALE CPO solution is the industry's first OCI MSA capable platform and built with GF's proven silicon photonics technology MALTA, N.Y., May 04, 2026 (GLOBE NEWSWIRE) --

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Co-Packaged Optics (CPO)Co-Packaged Optics (CPO)

Traditional pluggable optical modules are increasingly constrained by signal loss, power consumption, and latency because they require long electrical traces



Optical Modules Market Research Report 2034

The optical modules market was valued at \$14.8 billion in 2025 and is projected to reach \$39.6 billion by 2034, growing at a CAGR of 11.5%.

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GlobalFoundries Accelerates Adoption of Co-Packaged Optics for

GlobalFoundries (Nasdaq: GFS) (GF) today announced the introduction of its SCALE(TM) optical module solution for co-packaged optics (CPO). GF's SCALE solution, or Silicon photonics Co-packaged

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AI drives demand for optical transceivers, LPO, CPO -

The Figure below presents LightCounting's forecast for sales of optical transceivers, LPO and CPO for scale-out and scale-up networks used in AI

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Where co-packaged optics (CPO) technology stands in

In November 2025, Ayar Labs announced that it has integrated its optical engines into GUC's advanced packaging and ASIC workflow, a critical

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The Rise of Co-Packaged Optics

In this scenario, Co-Packaged Optics (CPO) is now gaining momentum, emerging mainly as an alternative to the pluggable optical modules

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GlobalFoundries' Unveils Optical Module Solution Targeting CPO

The SCALE CPO solution uses both coarse and dense wavelength-division multiplexing (CWDM and DWDM) for bi-directional data transmission over each optical fiber, delivering significant

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