

## Article Overview

Direct sales of CPO and LPO are growing, driven by data center expansion, AI workloads, and the need for high-bandwidth, energy-efficient interconnects, though adoption is influenced by technical complexity and ecosystem maturity.

## Market Overview

The co-packaged optics (CPO) market is projected to grow from USD 15 million in 2023 to USD 49 million by 2028, at a CAGR of 26.5%, fueled by investments in mega data centers, AI/ML workloads, and 5G network deployment . CPO integrates optical components directly with electronic components like processors and memory, offering higher bandwidth density and lower latency compared to traditional pluggable optics . Limited deployments are expected to expand significantly by 2028-2029, particularly for 1.6T and 3.2T interconnects in multi-rack AI clusters . Linear Pluggable Optics (LPO), introduced by Macom and NVIDIA in 2022, removes onboard digital signal processors (DSPs) and clock data recovery circuits, creating a purely analog linear direct-drive optical link. LPO modules consume 30-50% less power than traditional pluggable optics and are particularly suitable for closed-system environments . They are currently favored for 800G and higher-speed deployments, though they face challenges with insertion loss and signal integrity at higher SerDes speeds .

## Technical and Deployment Considerations

- o CPO Advantages: High bandwidth, low latency, and energy efficiency for large-scale AI and HPC clusters. Ideal for multi-rack interconnects where copper cabling becomes impractical .
- o CPO Challenges: Complex fabrication, higher cost, reduced serviceability, and limited interoperability between vendors. Faulty ports embedded in the package are difficult to replace, impacting switch throughput .
- o LPO Advantages: Lower power consumption, simpler analog design, and faster deployment in single-vendor or closed systems .
- o LPO Challenges: Limited error correction, shorter transmission distance, and early-stage standardization, making multi-vendor deployment more difficult .

## Market Drivers

- o Expansion of mega data centers and AI/ML workloads requiring high-speed interconnects .
- o Growth of 5G networks and ultra-high-definition video streaming, increasing demand for low-latency, high-bandwidth optical links .
- o Focus on energy efficiency, as CPO and LPO reduce power consumption compared to traditional DSP-based pluggable optics .

## Sales and Adoption Outlook

Direct sales of CPO and LPO are currently limited but expected to increase as technology matures. CPO adoption is likely to accelerate in large-scale AI clusters and HPC environments by 2028-2029, while LPO remains a competitive alternative for early deployments where power efficiency and analog simplicity are prioritized. Vendors and data center operators are evaluating both technologies based on cost, scalability, and ecosystem readiness, with CPO offering long-term advantages for ultra-high-speed interconnects and LPO providing near-term energy savings. In summary, direct sales of CPO and LPO are poised for growth, driven by AI, HPC, and 5G demands, but adoption depends on balancing technical complexity, cost, and ecosystem maturity.

Key demand drivers for Co-Packaged Optics (CPO) Technology stem from the insatiable appetite for data processing and

Co-Packaged Optics (CPO) may be the only option to provide for tens of thousands of high-speed interconnects in a 4-8 rack

Placing optics into one package with ASICs offers a solution for the future. This approach creates a new set of products known as Co

Lumentum expects continued growth in ultra-high-power lasers for co-packaged optics, with a significant ramp scheduled for late

Placing on-board optics into one package with ASICs offers a solution for the future. This approach creates a new set of products

In the rapidly evolving landscape of data center optical interconnects, the competition between LPO (Laser Phased

The global co-packaged optics (CPO) market size is evaluated at USD 95.04 million in 2025 and is predicted to hit

Co-packaged optics market to grow from USD 161.43M in 2026 to USD 748.62M by 2031, driven by AI/ML bandwidth,

The forecast is segmented by application: Ethernet, DWDM, Wireless Fronthaul/Backhaul, FTTx, and product

These pressures are driving renewed momentum behind co-packaged optics (CPO). According to LightCounting, sales

While Co Packaged Optics (CPO) technology is widely acknowledged as the

This LightCounting market report contains material that is a confidential, privileged, company product for the sole use

LightCounting Product intelligence adds micro-level relevance to the macro context of our market analysis, bringing our clients real

Optics Primer, Part 3: Co-Packaged Optics (CPO) From EML lasers and DSPs to silicon photonics and external CW

Unlike its predecessor, Co-Packaged Optics (CPO), which integrates optical components directly into the electrical

A new LightCounting report reveals that optical transceiver sales and the adoption of linear pluggable optics (LPO) and co-packaged

Web: <https://in-au.co.za>

