

Article Overview

Active Optical Cables (AOCs) and Linear Pluggable Optics (LPO) are high-speed, fiber-based interconnect solutions designed for longer distances and high-density data center environments, offering flexibility, low latency, and energy efficiency.

Active Optical Cables (AOC)

AOCs are fiber optic cables with built-in transceivers at both ends that convert electrical signals into optical signals and back, enabling high-speed data transmission over longer distances than copper DACs . Key features include:

- o Distance and Speed: Support data rates from 10G up to 400G or more, with transmission distances up to 100 meters or beyond .
- o Flexibility and Density: Thinner, lighter, and more flexible than copper, ideal for dense server racks and complex cabling layouts .
- o EMI Immunity: Optical fiber is immune to electromagnetic interference, ensuring signal integrity in high-density environments .
- o Plug-and-Play: Pre-terminated and validated for seamless operation with major vendors like Cisco, Juniper, Arista, and Dell .
- o Applications: Commonly used for Leaf-to-Spine, Top-of-Rack (ToR) to server, and switch-to-switch connections in modern data centers .

Linear Pluggable Optics (LPO)

LPO modules are a newer optical solution designed to reduce power consumption and latency compared to traditional DSP-based optics:

- o Design: LPO removes complex DSP/CDR circuitry, using linear analog components with TIA and driver chips for signal equalization .
- o Power Efficiency: Reduces per-port power consumption by approximately 25%, making it suitable for energy-conscious data centers .
- o Use Cases: Optimized for short-distance connections within data centers, such as server-to-switch or GPU interconnects in HPC environments .
- o Trade-offs: While LPO offers lower power and latency, it may have slightly higher bit error rates and shorter maximum distances compared to full DSP optics .

Comparison with DAC



AOC Active Optical Cable LPO for Data Centers

o DAC (Direct Attach Cable): Copper-based, ultra-low latency, cost-effective, and ideal for very short runs (

As data centers demand higher bandwidth, lower latency, and greater efficiency, selecting the right interconnect

Answer first: choose DAC, active copper or AEC, AOC, or discrete optics from exact endpoints, electrical

Greater cable flexibility and longer reach Our active optical cable assembly portfolio provides greater cable flexibility and longer

High-performance AOC solutions from 1G to 800G for data centers & enterprise networks. 100%

What are the differences between AOC, DAC, ACC, and AEC cables in network connectivity? This article breaks

Modern data centers supporting AI training, cloud computing, and high-performance computing (HPC) require ultra

Today, when it comes to data centers, it is important to have convenient and stable connectivity for better performance

Modern data centers are evolving to support AI workloads, hyperscale cloud services, and

An Active Optical Cable (AOC) is a high-performance fiber optic interconnect used for short-range, high

The three most common physical links found within hyperscale data centers are: Direct Attach Copper (DACs) cables, Active Optical

The copper wires in many data centers aren't enough to meet demands. Let's find out how

Learn AOC advantages and limitations, and how they compare to DAC and optical

Active Optical Cables (AOC) Explore Amphenol's high-speed Active Optical Cables

AOC cables have a short bend radius and are much thinner than most DAC cables. This makes them easier to deploy

AOC Active Optical Cable LPO for Data Centers

Discover the differences between DAC, AEC, and AOC cables for data centers. Compare length, speed,

While AOC reaches can extend to the limits of the optical technology used (100-200 meters), installing a long 100

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