

RIVO MULTITRADE OPTICAL SYSTEMS

Active Optical Cable Product Introduction



Overview

Introduction As data rates rise and datacentre clusters grow in size, copper cabling technology is getting stretched to its limits.

Key Takeaways

Active Optical Cables (AOCs) are high-speed communication cables that convert electrical signals to optical signals for long-distance, low-latency data transmission, combining the simplicity of copper cables with the performance of fiber optics.

Active Optical Cables (AOCs) are advanced cabling assemblies that integrate fiber optic technology with active electronic components to enable high-speed data transmission over distances that traditional copper cables cannot achieve . Unlike passive cables, AOCs use optical transceivers at both ends to convert electrical signals into optical signals for transmission and then back into electrical signals at the receiving end . This allows for longer reach, higher bandwidth, and lower power consumption compared to copper solutions .

Structure and Components

An AOC typically consists of:

- Optical transceivers permanently attached to each end of the fiber cable, often sealed in ruggedized connectors compatible with industry-standard form factors such as SFP+, QSFP+, QSFP28, QSFP-DD, and OSFP .

- Fiber optic cable, usually multi-mode for data center applications, providing minimal attenuation and immunity to electromagnetic interference (EMI) and radio frequency interference (RFI), .
 - Laser diodes or VCSELs at the transmit end to convert electrical signals into optical signals.
 - Photodiodes at the receive end to convert optical signals back into electrical signals . The fiber and connectors are bonded into a single assembly, making the cable plug-and-play like a copper DAC cable but with the advantages of optical transmission .
- Performance and Advantages
- High data rates: AOCs support speeds from 10 Gbps up to 800 Gbps, with newer generations reaching multi-terabit capacities .
 - Long transmission distances: Unlike copper cables limited to 5–7 meters, AOCs can reliably transmit over 100 meters, with some configurations reaching 300 meters .
 - Low latency and precise timing: In HPC and supercomputing, AOCs are manufactured with fibers cut to exact lengths to minimize signal skew between channels .
 - Lightweight and flexible: Easier to install and manage than bulky copper cables .
 - Low power consumption: Active components reduce the need for high electrical drive power over long distances .
 - EMI/RFI immunity: Optical transmission ensures signal integrity in electrically noisy environments .
 - Compatibility: Works with standard electrical interfaces while providing optical performance .

Applications

AOCs are widely used in:

- Data centers: High-density interconnects for servers, switches, and storage systems .
- High-performance computing (HPC): Supercomputers and clusters requiring precise timing and low-latency communication .
- Enterprise and hyperscale networks: Plug-and-play solutions for long-reach connections .
- Audio/Video systems: Transmission of high-resolution video signals (up to 8K60 Hz) over long distances without bulky copper cabling .

Summary

Active Optical Cables combine the ease of use of copper cables with the high performance of fiber optics, offering a scalable, low-latency, and energy-efficient solution for modern high-speed communication needs. Their ability to support long distances, high bandwidth, and EMI-free transmission makes them ideal for data centers, HPC, enterprise networks, and AV applications .

Article Content

Active Optical Cables

This white paper will explain what Active Optical Cables (AOCs) are and detail why they are superior to traditional copper solutions in

Active Optical Cables (AOC) – MapYourTech

What is an Active Optical Cable? An Active Optical Cable is an advanced cabling assembly that integrates fiber optic

Active Optical Cable Introduction

Active optical cable AOC is a new type of communication cable. Compared with passive cables or cable-based systems, it has the

Active Optical Cables

Active Optical Cables (AOC) are the all-in-one cable solution that provides ultra-high-bandwidth data transmission over short and

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Active Optical Cables (AOCs), The Rising Star in Transceiver

Introduction As data rates rise and datacentre clusters grow in size, copper cabling technology is getting stretched to its limits.

Active Optical Cables (AOCs): Everything You Need to Know

Conclusion Active Optical Cables offer a compelling alternative to traditional copper cables, providing faster speeds, longer

Why Use an Active Optical Cable?

Learn why active optical cables support high speed networking and data centers with extended reach, low signal loss,

Active cable

Active cables are copper or fiber-optic cables used for data transmission that use an electronic circuit to boost their performance.

Active Optical Cable Introduction

40G AOC cable full range of product knowledge March 13. 2024 As an important component of high-speed data transmission, 40G

6 Things You Should Know About Active Optical Cable (AOC)

Active optical cable (AOC) is essentially a transceiver product permanently embedded in a fiber optic cable. AOC

Active Optical Cable & Extender Market Size, Share, Industry Report

The global active optical cable & extender market size in terms of revenue was estimated to be worth \$3.3 billion in

Understanding Active Optical Cable: The Future of High-Speed Data ...

Active Optical Cables (AOCs) are an innovative type of data transmission technology that has come forth to fill the

Detailed Guide on AOC (Active Optical Cable): From Beginner to Expert

What is Active Optical Cable? Active optical cable (AOC) is a fibre optic cabling technology that enables devices to

What is an Active Optical Cable and How Does It Work

An active optical cable uses built-in transceivers to convert electrical signals to light, enabling high-speed, long-distance

Active Optical Cables (AOCs), The Rising Star in Transceiver

Active Optical Cable is the type of optical cable or technology which uses the electrical inputs similar to the traditional copper lines.

What Is an Active Optical Cable (AOC)?

Learn what an active optical cable is, how AOCs work, and how they compare with DACs and separate fiber optics for

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