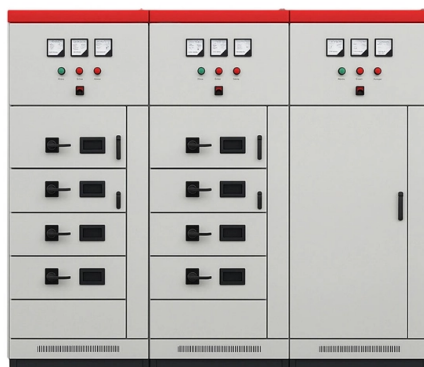


Aerospace Electronics Grade AOC Active Optical Cable EML Selection Guide



Overview

AirBorn FOCuS Rugged Active Optical Cables | Molex Available in both space-rated active optical cables and ruggedized active optical cables versions, AirBor.

Key Takeaways

Aerospace-grade Active Optical Cables (AOC) with EML technology provide high-speed, EMI-immune data transmission for harsh environments, supporting up to 14Gbps per lane with ruggedized, space-rated designs. Overview of Aerospace AOC with EML

Active Optical Cables (AOC) integrate electrical-to-optical transceivers directly into the cable ends, converting signals to light for transmission and back to electrical signals at the receiver. EML (Electro-absorption Modulated Laser) technology enhances high-speed performance and signal integrity over long distances, making these cables ideal for aerospace, defense, and space applications where reliability under extreme conditions is critical .

Key Benefits

- High Data Rates: Supports up to 14Gbps per lane, with multi-channel configurations achieving aggregate speeds of 50Gbps or higher .
- EMI Immunity: Optical transmission inherently resists electromagnetic interference, crucial for sensitive avionics and defense systems .

- **Weight and Space Savings:** Lighter and thinner than equivalent copper cables, reducing payload weight and simplifying cable routing .
- **Harsh Environment Durability:** Radiation-hardened, vibration-resistant, and outgassing-compliant for space-rated applications .
- **Factory Pre-Terminated:** Eliminates field fiber polishing or cleaning, reducing installation errors and foreign object debris (FOD) risks .

Selection Criteria

- **Data Rate Requirements:** Choose cables based on per-lane speed and aggregate bandwidth needed for your system. For example, AirBorn FOCuS AOCs support 12.5Gbps per channel with four channels for 50Gbps aggregate .
- **Connector Compatibility:** Ensure compatibility with aerospace-grade connectors such as MIL-DTL-83513 Micro-D, MIL-DTL-32139 Nano-D, or hybrid assemblies. Options include vertical board-mount, right-angle, I/O panel, and cable-to-cable configurations .
- **Environmental Compliance:** Verify radiation hardening, outgassing compliance, and ingress protection ratings for space or defense applications .
- **Cable Length and Flexibility:** Consider installation constraints; AOCs can span tens to hundreds of meters without signal degradation, unlike copper cables .
- **EMI and Crosstalk Requirements:** Optical transmission reduces EMI and crosstalk, critical for high-density avionics and mission-critical systems .
- **Thermal and Mechanical Robustness:** Evaluate tensile strength, metal backshell durability, and multiple points of contact to withstand vibration, shock, and temperature extremes .

Best Practices

- Use common pinout configurations to allow copper and fiber assemblies to be interchangeable, simplifying retrofits and upgrades .
- Select factory-terminated, dust-protected cables to minimize contamination and installation errors .
- Confirm laser safety compliance (Class I laser products) and adhere to FDA and IEC standards for optical components .
- For long-term reliability, prioritize radiation-hardened and non-outgassing components in spaceflight applications .

Recommended Applications

- Spacecraft and satellite data links
- Military avionics and radar systems
- High-speed aerospace communication networks

- Rugged industrial and defense systems requiring EMI immunity and high data integrity By following these selection criteria and best practices, engineers can ensure reliable, high-speed, and environmentally robust AOC deployment in aerospace and defense systems .

Article Content

Rugged Active Optical Cables

Amphenol develops a range of custom Active Optical Cable (AOC) solutions for harsh environment. USB3 AOC allows copper less

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AirBorn's space-rated active optical cable (SAOC®) assembly is engineered to withstand the harsh conditions of space and replaces

Space-Rated Active Optical Cable

Choose an assembly that fits your needs. Then, we'll build to your specs. Custom cable assemblies can be built to order. We built a

SFP AOC Active Optical Cable Application Guide

It integrates an optical cable of a specified length with two optical modules to form a convenient transmission channel,

Rugged Active Optical Cables

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