

Article Overview

QSFP-DD (Quad Small Form-factor Pluggable - Double Density) active optical devices enable high-speed 400G and 800G Ethernet connectivity with extended reach and high-density deployment.

Overview

QSFP-DD is a high-density optical transceiver form factor designed for 200G, 400G, and 800G Ethernet applications. The "Double Density" refers to doubling the number of high-speed electrical lanes compared to traditional QSFP modules, allowing eight lanes instead of four, which supports higher aggregate data rates . Active Optical Devices (AODs) or Active Optical Cables (AOCs) in QSFP-DD form integrate optical transceivers with fiber cabling to provide longer reach and improved signal integrity compared to passive copper solutions .

Key Features

- o Data Rates: Supports 200G, 400G, and 800G Ethernet, with PAM4 modulation for 400G/800G (50-100 Gbps per lane) and NRZ for 200G (25 Gbps per lane), .
- o Link Reach: Short-range multimode QSFP-DD modules can reach up to 100 meters over OM4 fiber, while single-mode modules can extend up to 2 km or more depending on the standard .
- o Connectivity: Uses MPO/MTP connectors for multimode fiber and LC duplex for single-mode fiber. Some modules require APC connectors for low-reflection applications .
- o Compatibility: Backward compatible with QSFP+, QSFP28, QSFP56, and QSFP112, allowing upgrades without major hardware changes .
- o Applications: Ideal for data centers, high-performance computing, enterprise core/distribution layers, metro and regional networks, and DCI (Data Center Interconnect) .
- o Security and Standards: Some QSFP-DD modules support AES-256 encryption and comply with IEEE 802.3bs, 400GAUI-8, CEI-56G-VSR-PAM4, and Open ROADM standards .

Advantages of Active Optical QSFP-DD

- o Extended Reach: Optical transmission allows longer distances than copper, reducing signal degradation.
- o High Density: Supports multiple lanes in a compact form factor, enabling high port density in switches and routers.
- o Energy Efficiency: Lower power consumption per bit compared to active copper solutions.
- o Flexibility: Supports breakout configurations, e.g., 400G QSFP-DD can split into 4x100G or 8x50G links .

Use Cases



Bulgarian Active Optical Device QSFP-DD

- o Data Center Interconnects: High-speed links between racks or pods.
 - o Metro and Regional Networks: Coherent QSFP-DD modules support DWDM and ROADM architectures for long-haul transport .
 - o High-Performance Computing: Low-latency, high-bandwidth connections for compute clusters.
 - o Enterprise Networks: Core and distribution layers requiring 400G connectivity with backward compatibility.
- QSFP-DD active optical devices are widely adopted for scalable, high-speed, and secure optical networking, providing a cost-efficient solution for modern 400G and 800G deployments while maintaining interoperability with existing QSFP infrastructure .

The QSFP-DD is the smallest 400G form factor optical module on the market today. It is also the optical module that

400G QSFP-DD to 400G QSFP-DD Active Optical Cable enables low-power, high-reliability and high-speed interconnections over

By plugging Coherent's high transmit output power 400G QSFP-DD-DCO transceivers directly into their

All About QSFP Cables, Connectors, and More 400G QSFP-DD DCO ZR+ Coherent Optical Transceiver QSFP SFP, QSFP, QSFP

It provides a QSFP-DD-to-QSFP-DD copper direct-attach solution. QDD-400-CuxM cables are suitable for very short links and offer a

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Watch Amphenol's expert demonstrate the QSFP-DD Linear Pluggable Optics in action at

Amphenol QSFP DD to QSFP DD 200G Active Optical Cable assemblies increase the number of lanes from 4 to 8 and double the

P-DD MSA Hardware Specification. High speed electrical specifications are compliant with QSFP-DD MSA Hardware Specification

Active Optical Cables (AOC) QSFP+ to QSFP+ CablesActive Optical Cables are made for data transmission over copper cables.

Active Optical Cables (AOC): Incorporate real transceivers with fiber optics, providing longer-distance



Bulgarian Active Optical Device QSFP-DD

The 800G QSFP-DD Active Optical Cable is designed for 800 Gigabit Ethernet links over OM4 multimode fiber. This cable is

By Media Type QSFP DAC: Direct attach copper cable with QSFP+ module on both ends, mainly for very short

QSFP-DD Optical Transceivers deliver up to 800Gbps speeds, offering high bandwidth, energy efficiency, and

It provides a QSFP-DD-to-QSFP-DD copper direct-attach solution. QDD-400-CuxM cables

Versatile Connectivity: Supports copper (DAC), active optical (AOC), and optical transceivers These features

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