



STREAMLINING EMI PROTECTION IN HIGH-DENSITY NETWORK EQUIPMENT

Molex Optical EMI Shielding Adapters ease space constraints and simplify mechanical designs related to EMI shielding in network equipment including servers, routers and switches.

INDUSTRY FOCUS

Within all electrical systems, electromagnetic interference (EMI) is created by electromagnetic waves. EMI can also interfere with the proper operation of other electronic devices in close proximity. EMI and, more specifically, electromagnetic compatibility (EMC) are often design issues for Molex customers' manufacturing equipment and systems that incorporate fiber optic interconnects. EMC defines the ability of electronic devices to function as designed in a potentially hostile EMI environment, and to avoid generating EMI that could interfere with other devices.

High-performance network equipment found in modern network architecture is packed with high-speed integrated circuits and complex printed circuit boards (PCBs) emitting electromagnetic waves. While optical communication represents a major step forward in high-speed, broad-spectrum digital transmission over a range of distances in demanding network applications, the electronic devices designed to drive the optical signals are not immune to EMI problems. Excessive and unabated EMI leakage through the fiber optic connection elements may result in a host of potential issues, from unexplained data errors to lost data to signal integrity problems.

BUSINESS CHALLENGE

Traditional insulative plastic adapters offer no EMI shielding of the panel cutout, which acts as a window for EMI energy to exit or enter the equipment. The existing industry standards for the design of fiber optic connectors and adapters do not require the inclusion of EMI shielding. As a result, the vast majority of fiber optic connections are constructed of non metallic, insulated polymers, which offer no protection in achieving EMI compliance.

A variety of barrier methods are available to reduce unintentional radiated noise, including Faraday cages, metal shields to improve cage performance, and PCB layout improvements. While these approaches are not without merit, they all drive up the cost and the number of needed components, and they can consume additional PCB real estate inside already space-constrained applications.

EMI problems often do not show up until late in the system verification process, making issues more difficult to identify and costly to correct. Simulation and analysis of EMI during the product design phase are critical to mitigate those challenges. Yet few suppliers fully understand or test connector and cabling components to determine how well a device under test performs to prevent EMI and shield against the effects of external disturbances.



Optical EMI Shielding Adapters



SOLUTION

Addressing the myriad of mechanical design challenges that customers must overcome, Molex Optical EMI Shielding Adapters are ideal for data and telecommunications network equipment applications that require I/O density, EMI containment, streamlined behind-panel fiber routing and eye protection.

The innovative adapters are designed to create the smallest possible EMI aperture, while maintaining optical connector compatibility. The die-cast or conductive polymer body with a gasket minimizes EMI leakage by filling gaps between mounting surfaces and providing a conductive ground path between the adapter and the equipment panel. This is achieved by creating an internal aperture that is just large enough to accept the fiber ferrule cross section, and no larger. By minimizing the opening and blocking or absorbing EMI signals before they escape, the adapter allows shielding to occur at the connection point. Depending on the application, the use of an adapter may entirely eliminate the need for a more costly and space monopolizing cage.

An extensive portfolio of Molex EMI Shielding Adapters has been designed to meet industry standard interfaces such as LC, SC, MPO (MTP) and MXC. The multi-fiber MPO (MTP) front-interface to MPO (MTP), MT or HBMT board-side interconnects bring the optical connectors closer to the panel and protrude less inside the box, optimizing internal space. The LC and MPO interfaces, available in multi-port options, ease space constraints on the panel and increase port density in a smaller package design. Mounting options include simple snap, or more secure screw mounting. A Molex patented laser protection shutter provides reliable eye safety, and provides dust protection and reduces EMI even when no connector is installed.

To assure the efficacy of these products, Molex performs extensive EMI shielding effectiveness testing of its various EMI adapters up to 40 GHz.

Key Features of Molex Optical EMI Shielding Adapters

- Industry-standard interfaces
- Metal die-cast and/or conductive polymer housings—Provide superior EMI protection
- Internal safety shutter—Provides reliable eye safety, with easy insertion and removal of the connector and reduced EMI when no connector is installed
- EMI gaskets—Create a reliable seal between the adapter and mounting surface
- Screw or snap-mount styles—Provide mounting flexibility
- Front or back surface mounting
- Ceramic or phosphor bronze alignment sleeves—Allows single- or multimode performance
- High-density solutions—Ease space constraints on the panel and increase available ports
- Straight or 45° adapter mounting orientation—Allows for a lower cable exit profile
- The half-plastic/half-metal adapter design greatly improves mating durability compared to full metal or plated plastic (patented Molex solution)

ADVANTAGES

Mechanical design requirements are constantly demanding increased density and EMI shielding. Molex is committed to understanding how to effectively mitigate EMI concerns at the optical connector interfaces within telecommunications systems and other high-performance network environments. Building on decades of innovation and expertise in data and telecommunications, Molex develops disruptive technologies and leads the industry in connectivity standards.

A proven portfolio of Molex solutions and approaches for controlling EMI are designed to harden network electronic connections and equipment. Molex High-Density Optical EMI Shielding Adapters deliver improved EMI shielding and better enable equipment designers to comply with EMC standards and regulations when compared to traditional insulative plastic adapters, as validated through an extensive Molex testing regimen. SC, LC, MPO and other industry-standard adapter configurations come in a broad range of mounting options, enabling optimal design flexibility and compatibility with legacy and new equipment designs.



OptoConnect Optical Enclosure

To learn more, visit www.molex.com/product/emiadapters.html

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