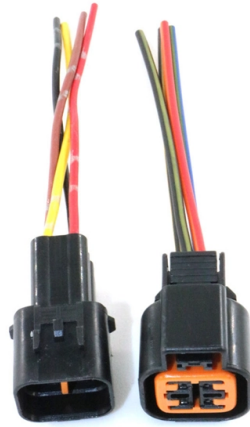


Optical Module Interface Techniques



Article Overview

Optical modules interface with systems through standardized electrical and optical connections, converting electrical signals to optical signals and vice versa for high-speed data transmission.

Electrical Interface

Optical modules typically have an electrical interface that connects to the host system, such as a switch, router, or server motherboard. This interface can be analog or digital, depending on the module's design and data rate. Early modules used analog NRZ electrical interfaces, directly driving the laser or LED with the system's analog signal. Modern modules use retimed digital interfaces, such as the Common Electrical Interface (CEI) defined by the Optical Internetworking Forum (OIF), which ensures high-speed signal integrity and interoperability across devices . Electrical interfaces are often standardized through Multi-Source Agreements (MSAs), which define pinouts, voltage levels, and signaling protocols for form factors like SFP, SFP+, XFP, QSFP, and OSFP .

Optical Interface

The optical interface connects the module to fiber optic cables. It includes the Transmitter Optical Sub-Assembly (TOSA) and Receiver Optical Sub-Assembly (ROSA). The TOSA converts electrical signals into modulated light using laser diodes (LDs) or LEDs, while the ROSA converts incoming optical signals back into electrical signals using photodetectors such as PIN diodes or avalanche photodiodes (APDs) . The optical interface is standardized for plug-and-play compatibility, with connectors lik...

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Contact Us

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