

Optical module equipment in the computer room



Overview

In this article, ETU-LINK will introduce the application of optical modules in the data center computer room.

Key Takeaways

Optical modules are essential components in computer rooms and data centers, enabling high-speed data transmission by converting electrical signals into optical signals and vice versa.

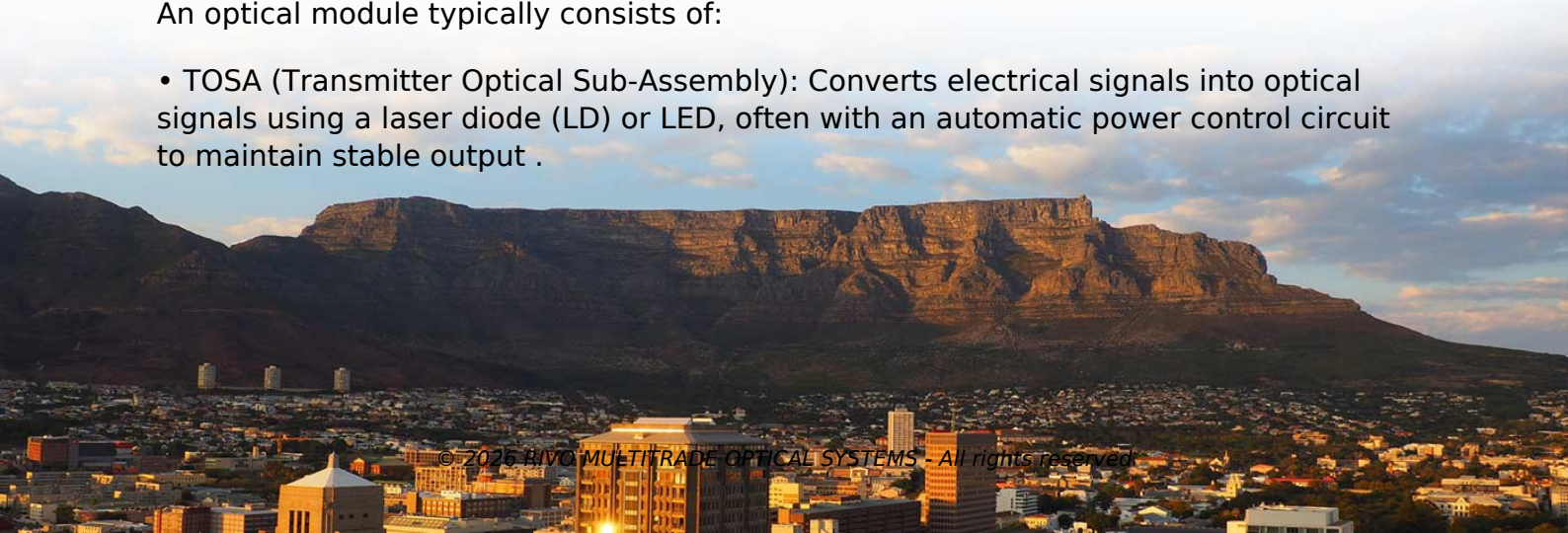
Function and Role

Optical modules, also known as optical transceivers, perform optoelectronic conversion, allowing servers, switches, and storage devices to communicate over fiber optic networks. They have an electrical interface connecting to internal systems and an optical interface connecting to fiber cables, supporting high-bandwidth data transmission and interconnection within the computer room. They are often hot-pluggable, enabling easy replacement or upgrades without shutting down equipment.

Structure and Components

An optical module typically consists of:

- TOSA (Transmitter Optical Sub-Assembly): Converts electrical signals into optical signals using a laser diode (LD) or LED, often with an automatic power control circuit to maintain stable output.



- ROSA (Receiver Optical Sub-Assembly): Converts incoming optical signals back into electrical signals using a photodetector and preamplifier .
- Functional circuits and PCBA: Manage signal processing and module control.
- Housing and interfaces: Provide mechanical protection and connectivity to fiber cables .

Types and Applications

Optical modules vary by transmission rate, wavelength, fiber type, and distance. Common types include:

- Active Optical Cables (AOC): Integrated optical modules for short-range server-to-switch connections.
- Direct Attach Cables (DAC): Copper or hybrid cables for short distances.
- Single-mode and multimode modules: Single-mode supports longer distances, while multimode is used for shorter intra-rack connections .
- High-speed modules: CWDM4, PSM4, and DR4 modules are used in 100G and 400G networks for medium to long-distance interconnections .

Application in Data Centers

In modern data centers, optical modules are critical for:

- Server-to-switch and switch-to-switch interconnections, ensuring low-latency, high-bandwidth communication .
- Internal data center communications, which account for over 70% of total data traffic .
- Scalable network design, allowing flexible upgrades as data rates increase and network topologies evolve .

Considerations for Deployment

When deploying optical modules in a computer room, it is important to:

- Assess network topology and required bandwidth.
 - Choose modules compatible with existing switches and servers.
 - Select appropriate fiber type and transmission distance.
 - Consider future scalability and potential upgrades to higher-speed modules .
- Optical modules are thus a cornerstone of modern computer room infrastructure, enabling efficient, high-speed, and reliable data transmission across servers, switches, and storage systems.

Article Content

Application of optical module in data center computer room

In this article, ETU-LINK will introduce the application of optical modules in the data center computer room. As we all

The optical modules used in the computer room

An optical module is a typically hot-pluggable optical transceiver used in high-bandwidth data communications applications. As the

optical module application equipment

As an important component of optical fiber communication, optical modules have a wide range of applications in various fields such

How to Customize Optical Modules in Data Centers? |FiberMall

It is necessary to combine the network environment of the data center and carry out in-depth design optimization of

The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right

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Optical Module Production Technical Requirements

This article focuses on the key points of optical module processing and manufacturing process control, and how to

How to Choose Optical Modules Correctly?

Components of an Optical Module s An optical modules typically integrates an optical transmitting device (TOSA, with

What is Optical Module?

Explore the working principles, structures, and performance metrics of optical modules, essential components of

Understanding Optical Modules: Types and Troubleshooting Guide

An optical module is mainly composed of optoelectronic devices (including the optical transmitter and optical receiver), functional

Optical Module: A Comprehensive Analysis from Source to Terminal

The end-to-end process from demand to the completion of optical module design. This article describes the end-to-end

What Is An Optical Module?

An optical module is an important part of today's data systems. It helps send data using light signals through fiber optic

Optical module

Optical modules typically have an electrical interface on the side that connects to the inside of the system and an optical interface on

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