

Optical Module and Interface Card



Overview

This chapter describes the optical interface module (OIM) cards and optical interface module light emitting diode (OIM-LED) cards.

Key Takeaways

Interface cards and optical modules are key components in high-speed networking, enabling electrical-to-optical signal conversion and interconnection between network devices.

Interface Cards

Interface cards, such as Optical Interface Module (OIM) cards, are hardware components installed in network chassis to manage connections between different system modules. For example, in a Cisco CRS multishelf system, OIM cards connect Fabric Control Cards (FCCs) and Line Card Chassis (LCCs) using optical array cables.

Each OI

M card has multiple connectors, called bulkhead array adapters (BAAs), which terminate the fabric cables and distribute fibers to ASICs on the system's fabric cards.

OI

Ms are typically passive devices that provide fiber cross-connect functionality and are essential for cabling and interconnection in multishelf systems.



Optical Modules

Optical modules are hot-pluggable transceivers that convert electrical signals from network devices into optical signals for transmission over fiber optic cables, and vice versa. They usually have an electrical interface connecting to the network card or system board and an optical interface connecting to fiber cables. Optical modules come in various form factors and standards, such as SFP, SFP+, XFP, CFP, and newer high-bandwidth modules like OSFP and XPO, supporting speeds from 10 Gbps to over 12 Tbps.

They can be installed in front-panel sockets or directly on the board, and some designs integrate digital signal processors (DSPs) for coherent optics applications.

Key Differences

Feature	Interface Card	Optical Module	Function
Connects system modules internally, manages fiber distribution	Installed in chassis or network system	Pluggable into network cards or on-board sockets	Active/Passive
Often passive (e.g., OIM)	Active, contains lasers, photodiodes, and sometimes DSPs	Standards	Vendor-specific or system-specific
Multi-source agreements (MSAs) like SFP, XFP, CFP, OSFP, XPO	Use Case	Multi-shelf system interconnection	High-speed data communication, data centers, telecom networks

Practical Applications

Data Centers: Optical modules like XPO or OSFP enable ultra-high bandwidth interconnects for AI and cloud workloads, supporting modular upgrades without replacing entire switches.

Network Cards: Modules such as SFP+ or XFP are installed on NICs to provide fiber connectivity, with tools like ethtool in Linux used to monitor module status, link speed, and configuration.

Design Considerations: Modern optical modules require careful power management, precise laser control, and photodiode sensing to maintain signal integrity at high speeds.

In summary, interface cards manage internal system connectivity, while optical modules handle the conversion and transmission of data over fiber, both being critical for high-performance networking and scalable data center infrastructure.

Article Content

Optical Interface Modules and Optical Interface Module LED Card

This chapter describes the optical interface module (OIM) cards and optical interface module light emitting diode (OIM-LED) cards. It includes these sections: OIM cards are used to connect the FCC

Optical module

Overview

- Electrical Interface Types
- Optical modulation and multiplexing types
- In-module components
- Electrical cable equivalent
- Front panel optical module MSAs
- On-Board Optical module MSAs
- Users of Optical Modules

There have been multiple variants of the electrical interface of optical modules that have been used over the years. The earliest forms of optical modules had an analog NRZ electrical interface. In the transmit direction, the optical module would directly drive the laser or LED with the analog signal coming from the front system card. In the receive direction, the module would directly drive the receive electrical interface with the o

Linear Drive Pluggable Optics

The Host ASIC could be an Ethernet switch ASIC, a NIC cards ASIC and have a 56GBd SerDes interface towards the optical module. On the right-hand side, a retimed optical module is illustrated

Optical Line Cards

Optical line cards are a critical element in setting up high-speed data and network connections, as they link the router to an external network through an optical fiber interface.

The Most Comprehensive Guide Of Optical Modules

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right module for your fiber network.

BRKOPT-2699

High-Speed Interconnects: Backend network requires high speed 100G/200G or 800G optics to connect servers and network switches. These high bandwidth connections are essential for handling the data

Small Form-factor Pluggable

The advantage of using SFPs compared to fixed interfaces (e.g. modular connectors in Ethernet switches) is that individual ports can be equipped with different types

Are The Optical Interface Cards, Modules, & Cables All Compatible?

Are the Optical Interface Cards, Modules, and Cables all Compatible With Each Other? The optical interface cards and modules for the WE7031/WE7032/WE7033/WE7034 instruments and the new

How To View Optical Transceiver Information On Huawei Switches

Optical modules are commonly used in switches, network cards, routers and other communications equipment, in the process of using the optical module information can be read to

Cisco 400G QSFP-DD Ultra Long Haul Coherent Optics Module Data

The module contains a printed circuit board with a 76-contact card-edge electrical interface to external host-side logic. The media interface is a duplex LC connector over single-mode

Optical Fingerprint Reader Sensor Module – AS608 User's Guide

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HTF DWDM equipment, OTN Solution, QSFP28 OSFP

HTFuture offers industry-leading fiber optic products and WDM system solutions with global recognition for excellence and innovation.

The Ultimate Guide to SFP Modules (2026): Types, Speeds

Confused by SFP vs SFP+? Read the definitive 2026 guide on SFP modules. We explain Single Mode vs Multimode, DDM diagnostics, and how to choose the right transceiver for Cisco, Juniper, and more.

Cisco 400G Digital Coherent Optics QSFP-DD Optical Modules

Cisco offers a comprehensive range of pluggable optical modules in the Cisco® pluggables portfolio. The wide variety of modules gives you flexible and cost-effective options for all types of interfaces.

XFP transceiver

Intel XFP Transceiver (MultiMode Fiber Optics) The XFP (10 gigabit small form-factor pluggable) is a standard for transceivers for high-speed computer network and telecommunication links that use

Cisco 200G QSFP56 Cables and Transceiver Modules

The Cisco® family of QSFP modules provide solutions for AI/ML data center applications, Network Interface Cards (NICs) on servers, and for

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Networking Purpose-Built for the Era of AI Factories AI factories now span tens of thousands of GPUs—and soon, millions—operating as a single distributed computing engine. To keep

Cisco SFP and SFP+ Transceiver Module Installation Notes

This installation note provides the installation instructions for the Cisco small form-factor pluggable (SFP) and SFP+ transceiver modules. These transceiver modules are hot-swappable

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

