10 Gigabit Optical Module Interface Standard

Overview

10GBASE-LR is a 10-gigabit Ethernet optical standard that operates at 1310 nm over single-mode fiber (SMF), supporting link distances of up to 10 km.

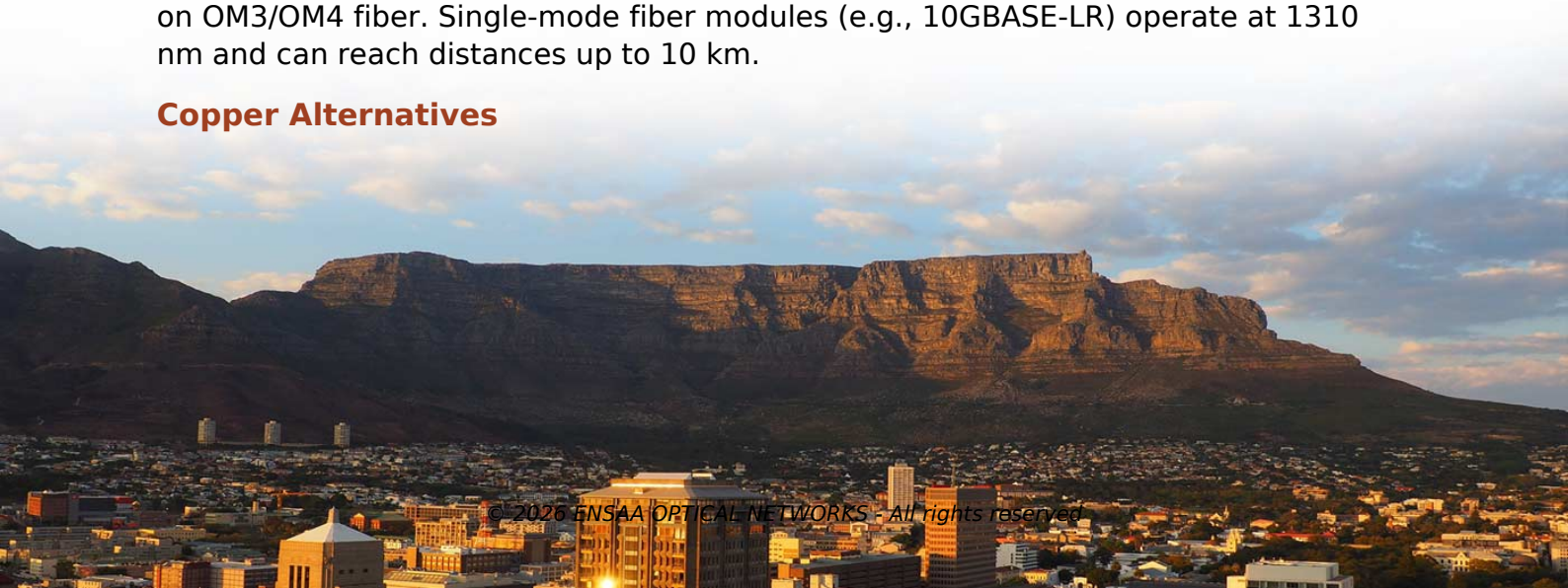
Key Takeaways

A 10 Gigabit optical module typically uses the SFP+ (Small Form-factor Pluggable Plus) interface with LC duplex connectors for fiber connections. Overview10 Gigabit optical modules, commonly referred to as 10G SFP+ modules, are designed to support 10 Gigabit Ethernet (10GbE) connections. They are small, hot-swappable transceivers that plug into SFP+ ports on switches, routers, or network interface cards, providing high-speed connectivity for data centers, enterprise networks, and telecom applications.

Connector and Fiber Type

Fiber SFP+ modules use LC duplex connectors, which are standard for both multimode fiber (MMF) and single-mode fiber (SMF). Multimode fiber modules (e.g., 10GBASE-SR) operate at 850 nm and support short distances up to 300–400 meters on OM3/OM4 fiber. Single-mode fiber modules (e.g., 10GBASE-LR) operate at 1310 nm and can reach distances up to 10 km.

Copper Alternatives



© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

For short-range connections, 10G SFP+ modules can also use Direct Attach Copper (DAC) cables with twinax connectors, supporting distances up to 7–15 meters depending on whether the DAC is passive or active. Some copper SFP+ modules use RJ-45 connectors for 10GBASE-T, suitable for CAT6A/CAT7 cabling over short distances.

Summary

Interface Type: SFP+Fiber Connector: LC duplex for optical modulesSupported Fiber: Multimode (SR) or Single-mode (LR/ER/ZR)Alternative Copper Interface: Twinax DAC or RJ-45 (10GBASE-T)Applications: High-speed links between switches, routers, servers, and data center interconnects This interface standard ensures interoperability, hot-swappability, and scalability, making SFP+ the dominant choice for 10GbE optical deployments.

Article Content

What Is 10GBASE-LR? SMF 1310nm 10km SFP+ Explained

10GBASE-LR is a 10-gigabit Ethernet optical standard that operates at 1310 nm over single-mode fiber (SMF), supporting link distances of up to 10 km.

10 Gigabit Ethernet

OverviewPhysical layer modulesOptical fiberCopperWAN PHY (10GBASE-W)

To implement different 10GbE physical layer standards, many interfaces consist of a standard socket into which different physical (PHY) layer modules may be plugged. PHY modules are not specified in an official standards body but by multi-source agreements (MSAs) that can be negotiated more quickly. Relevant MSAs for 10GbE include XENPAK (and related X2 and XPAK), XFP and SFP+. When choosing a PHY

Cisco 10GBASE SFP+ Modules Data Sheet

The Cisco 10GBASE-LRM Module supports link lengths of 220m on standard Fiber Distributed Data Interface (FDDI) grade Multimode Fiber (MMF). To make sure that specifications are met over FDDI

Introduction to IEEE 802.3ae (10G Ethernet): Standards, Evolution,

Discover IEEE 802.3ae: the foundation of 10 Gigabit Ethernet. Learn its standards, physical layers, and how LINK-PP 10G SFP+ modules ensure compliance.

10GE SFP+ Optical Modules

Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXU1 must be used with SFP-10G-BXD1.

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

Cisco 10GBASE SFP Modules Data Sheet

The Cisco® 10GBASE SFP+ modules (Figure 1) give you a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise wiring closet, and service provider transport applications.

Optic Modules Datasheet

datasheet is intended to guide the user through the various options available when choosing an optic module for a given platform depending on the architecture. The following table lists the different

XFP transceiver

The XFP (10 gigabit small form-factor pluggable) is a standard for transceivers for high-speed computer network and telecommunication links that use optical fiber.

10 Gbit/s SFP+ Optical Modules

10 Gbit/s SFP+ optical modules apply to 10 GE optical ports. The wavelength can be 850 nm, 1310 nm, or 1550 nm, and the transmission distance ranges from 0.5 km (0.31 mi) to 80 km (49.71 mi).

10G BiDi SFP+ 20km Tx1270/Rx1330

10GBASE-BX20 10G BiDi SFP+, 20km single fiber, Tx1270/Rx1330nm, 9dB budget, DOM. Matched-pair module. EU stock + lifetime warranty. €16.33.

K6097: Specifications of the Fiber Gigabit Ethernet SFP, XFP, SFP+ ...

Topic The following specifications are for the available Fiber Gigabit Ethernet modules and the platforms that support those modules. Important: The end user must ensure suitability of

Types of Optical Modules

For single-mode optical modules, single-mode optical splitters are not recommended due to considerations on the IEEE standard link budget and the impact of single-mode optical splitters on

Gigabit Ethernet

Varieties 1000BASE-T–capable network interface card made by Intel, which connects to a computer via PCI-X There are five physical layer standards for

Ubiquiti Compatible XGSPON ONU SFP+ 1270nm-TX/1577nm-RX

Overview The XGS-SFP-ONT-MAC-I is an SFP+ transceiver module engineered for 10-Gigabit capable symmetric passive optical network (XGS-PON) systems. It utilizes bidirectional transmission over a

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved

Ethernet

Fiber optic variants of Ethernet (that commonly use SFP modules) are also very popular in larger networks, offering high performance, better electrical isolation and longer distance (tens of kilometers

SFP-10G-LR-10 Avanis

About this product 10/5/2.5 Gigabit Fiber LR SFP+ Module, TX: 1310nm, RX: 1310nm, with SM LC 10 km, DDM functionality, temperature range 0~70 °C

Cisco 40 Gigabit Modules

Cisco offers a broad range of 40 Gigabit Ethernet interfaces to meet the high-performance connectivity requirements of campus, data center, and cloud deployments. Our latest innovation, the QSFP BiDi

100GBASE QSFP-100G Modules Data Sheet

QSFP-100G Optical modules Features and benefits of Cisco QSFP modules Hot-swappable input/output device that plugs into a 100G Gigabit

Contact Us

Continue your research online:

Website: https://ensaa.es
Technical inquiry: https://ensaa.es/contact.html

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

© 2026 ENSAA OPTICAL NETWORKS - All rights reserved