Gigabit Single-Mode Optical Module Selection Guide



Overview

Learn how to choose the right 1G SFP module for your network. Our guide covers compatibility, distance, fiber type, cost, and vendor selection for optimal performance.

Key Takeaways

Gigabit single-mode optical modules are primarily categorized by fiber configuration, wavelength, and transmission distance, including single-fiber BiDi and dual-fiber SFPs for long-distance network connectivity. Fiber Configuration1.

Dual-

Fiber SFP Modules

Use two fibers: one for transmitting and one for receiving. Typically have duplex LC interfaces. Compatible with single-mode fiber (SMF) for long-distance links.

Transmission distances range from 10 km to 40 km, depending on the module type and wavelength ( ). Common standards include 1000BASE-LX/LH for 10 km and 1000BASE-ZX for 40 km ( ). 2.

Single-

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Fiber Bi

Di (Bidirectional) SFP ModulesUse one fiber for both transmitting and receiving by employing different wavelengths for each direction. Interface types are usually LC or SC. Transmission distances can reach up to 160 km with OS2 single-mode fiber ( ).

Ideal for scenarios where fiber availability is limited or cost reduction is needed. Wavelength and Standards1000BASE-LX/LH: Operates at 1310 nm, suitable for long-distance single-mode links up to 10 km ( ). 1000BASE-ZX: Operates at 1550 nm, supports distances up to 40 km ( ).

1000BASE-BX10-D/U: BiDi modules using single-strand SMF, with distances typically up to 10 km ( ). 1000BASE-BX40-D/U: BiDi modules for 40 km single-fiber links ( ).

Temperature Ratings

Commercial (0°C to 70°C): Suitable for indoor environments like enterprise computer rooms. Extended (-20°C to 85°C) and Industrial (-40°C to 85°C): Designed for outdoor or harsh environments with wide temperature fluctuations ( ).

Applications

Gigabit single-mode SFP modules are widely used in switches, routers, firewalls, servers, and storage devices. They are suitable for data center interconnections, campus networks, and metropolitan area networks.

Bi

Di modules are particularly useful for fiber-limited deployments or FTTx applications ( ).

Summary

Gigabit single-mode optical modules offer flexibility in fiber usage, wavelength, and distance, allowing network engineers to select the appropriate module for long-distance, high-reliability, and cost-efficient deployments. Choosing between dual-fiber and single-fiber BiDi modules depends on fiber availability, distance requirements, and environmental conditions.

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Article Content

Ultimate Guide to 1G SFP Module Selection

Learn how to choose the right 1G SFP module for your network. Our guide covers compatibility, distance, fiber type, cost, and vendor selection for optimal performance.

Cisco SFP Modules for Gigabit Ethernet Applications

This data sheet describes the benefits, specifications, and ordering information for the Cisco SFP Modules for Gigabit Ethernet Applications.

SFP GE SFP Guide

Single-Mode Optical 1000BaseLX SFP Interface per ODU Speed: 1 G Mode: Single Wavelength: 1310nm Kit Contents: SFP Module, Cable Gland (P16 Long), Licence Key document Spare Glands:

1000BASESX SFP: How to Select the Right Optical Module

A complete 1000BASESX SFP buying guide — understand specs, compatibility, fiber requirement, and installation tips to ensure seamless Gigabit connections.

Singlemode and Multimode Fiber Selection Guide

Single-mode fiber (SMF) allows only a single light mode to be transmitted in the fiber, and the light source is a laser light source. The cable color is mostly yellow, and the transmission

Cisco SFP Modules for Gigabit Ethernet Applications

The 1000BASE-ZX SFP operates on standard single-mode fiber-optic link spans of up to approximately 70 km in length. The SFP provides an optical link budget of 21 dB, but the precise link span length

SFP Guide

Unlock seamless connectivity with Cambium Networks'' SFP Guide, your go-to resource for selecting the right Small Form-Factor Pluggable (SFP) modules.

SFP Module Selection Guide

Complete SFP module selection guide. Learn about SFP, SFP+, SFP28, QSFP types, 1G/10G/25G/40G/100G speed selection, single-mode/multimode transmission distances, and

Recommendation ITU-T G.652 (08/2024)

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This document outlines the specifications for a single-mode optical fiber and cable designed for use around the 1310 nm zero-dispersion wavelength, suitable for both the 1310 nm and 1550 nm regions,

Optic Modules Datasheet

Data Sheet 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.

What Are The Types Of Gigabit Optical Modules

The single fiber optical module is very suitable for long-distance backbone and man applications, and its wiring cost will be relatively low. Gigabit optical modules are mainly used in

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

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

SFP Optical Module Selection Guide for 2025: Key

Explore our comprehensive SFP optical module selection guide for 2025. Learn about crucial factors like data rate, distance, fiber type, and

Cisco Transceiver Modules

Cisco Transceiver Modules - Learn product details such as features and benefits, as well as hardware and software specifications.

2025 SFP Transceivers Buying Guide: What Fits Your Network?

If you are considering upgrading your switches and are unsure how to select the right 1G SFP optical modules, this blog aims to provide practical guidance. It will assist you in choosing an

100G QSFP28 Optical Module Selection Guide: Medium to Long

Both modules use single-mode optical fiber for transmission, which can ensure signal transmission stability and low signal attenuation in long-distance transmission. You can check the

SFP-1G-SX vs SFP-1G-LX Multimode or Single-mode for Your Network

SFP-1G-SX vs SFP-1G-LX: Compare multimode and single-mode SFPs to choose the right module for your network''s distance, fiber type, and budget.

How to choose the right optical module

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For users, choosing the right optical module for their applications can be a major challenge. This article will provide readers with valuable references and suggestions from multiple

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African project coordination: Umhlanga Ridge, Durban, KwaZulu-Natal, South Africa

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

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