

Single-fiber optical module compatibility



Overview

Cisco Transceiver Modules - Some links below may open a new browser window to display the document you selected.

Key Takeaways

Single-fiber (BiDi) SFP modules require complementary wavelength pairing and vendor-verified compatibility to ensure proper operation. Understanding Single-Fiber (BiDi) SFP Modules

Single-fiber SFP modules, also known as BiDi (bidirectional) transceivers, transmit and receive data over a single optical fiber by using two different wavelengths—one for transmitting (Tx) and one for receiving (Rx). For example, one end may use Tx 1310 nm / Rx 1490 nm, while the opposite end uses Tx 1490 nm / Rx 1310 nm . This complementary wavelength pairing is essential; mismatched wavelengths will prevent the link from establishing.

Key Compatibility Considerations



1. **Vendor and Equipment Compatibility** Not all SFP modules are universally compatible. Some network devices enforce proprietary firmware checks, which can reject third-party modules . To avoid errors such as “unsupported transceiver,” either use OEM-branded modules or verify that third-party modules are vendor-tested and certified for your switch or router .

2. **Fiber Type** Single-fiber SFPs are typically single-mode (SMF) due to the long-distance and low-attenuation requirements. Ensure your existing fiber infrastructure matches the SFP type. Using a single-mode BiDi SFP on multimode fiber can result in link loss or reduced distance .

3. **Wavelength Matching** Each BiDi SFP must have a complementary wavelength at the opposite end. Standard pairs include 1310/1490 nm or 1490/1310 nm. Incorrect pairing will prevent communication .

4. **Data Rate and Protocol Support** Ensure both ends of the link support the same data rate (1G, 10G, etc.) and protocol (1000BASE-X, 10GBASE-R, etc.). Auto-negotiation may not work between different optical modules, so manual verification is critical .

5. **Connector Type** Most SFPs use LC connectors, but SC or MPO variants exist. The fiber patch cable must match the SFP interface to maintain signal integrity .

6. **Inline Attenuation for Short Links** For short single-mode fiber spans, an inline optical attenuator may be required to prevent receiver overload, especially on high-power SFPs .

Practical Deployment Tips

- Always check the switch or router documentation for supported SFP models.
- Use MSA-compliant modules to ensure physical and electrical compatibility .
- Test the link in a controlled environment before full deployment to verify wavelength pairing, data rate, and signal quality.
- Consider environmental factors such as temperature and ruggedness if deploying in industrial or outdoor settings . By following these guidelines, you can ensure that single-fiber optical modules operate reliably, maintain high performance, and avoid common deployment issues such as link failures or port errors.

Article Content

Cisco Optics-to-Device Compatibility Matrix

Comprehensive compatibility information for Cisco optical transceivers and network devices
 Disclaimer: Cisco makes the data in this

Cisco SFP Modules for Gigabit Ethernet Applications Data Sheet

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

Optical Transceiver Interoperability and Compatibility Guide

Countless compatible fiber optic transceivers have been employed in network deployments. However, there still exists

Cisco Optics-to-Device Compatibility Matrix

Cisco Optics-to-Device Compatibility Matrix Comprehensive compatibility information for Cisco optical transceivers and network

Complete Guide to Choosing the Right 100M Optical Transceiver

In the vast ecosystem of network infrastructure, the humble 100M optical transceiver (or 100M SFP module) remains a

Comprehensive Guide to Optical Transceiver Interoperability and ...

Wavelength and Fiber Type: Single-mode or multimode fiber compatibility, wavelength (850nm, 1310nm, 1550nm), and

SFP Module: What's It and How to Choose It?

The SFP transceiver module is not standardized by any official standards body but rather by a multi-source agreement

Optic Modules Datasheet

Features and Benefits The following table lists the different pluggable optic modules and supported platforms, along with the

Extreme Networks SFP Modules

Each module provides 100 Mbps or 1000 Mbps optical connections. The type of switch, router, or other component determines the

Cisco Transceiver Modules

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10G Optical Module Selection Guide: LRM, SR, LR, ER, ZR Compatibility ...

The following are several popular 10G SFP+ dual-fiber optical modules from ETU-LINK: The selection of 10G SFP+

SFP Compatibility Guide and How to Use a Compatible SFP Module?

With the advancements in fiber optic technology, there's been a surge in the use of compatible SFP transceiver modules in data

10G Optical Module Selection Guide: LRM,SR,LR,ER,ZR Compatibility

The 10G SFP+ dual-fiber optical module is a small pluggable optical transceiver that adopts a dual-fiber bidirectional

Sophos Firewall, UTM, and Switch: Sophos and third ...

It is recommended to use QSFP+ with fiber cables. 40G to 4x10G breakout cables are not supported with the 2x40G Flexi Port

Optical Transceiver Interoperability and Compatibility Guide

Will the optical transceivers I purchased work smoothly with my other modules? Will the modules be compatible and

Comprehensive Guide to Optical Transceiver Interoperability and ...

Discover the essential guide to optical transceiver interoperability and compatibility. Learn how to ensure seamless

U®Fiber Modules and FiberCable Datasheet

For long-distance single-mode runs, use the UF-SM-10G for distances of up to 10 km at 10 Gbps, or use the UF-SM-1G for distances

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