120km optical module compatibility



Overview

Learn how SFP+ 10G ZR modules enable stable 120km+ long distance transmission with high link budget, low power design, wide compatibility, and DOM monitoring.

Key Takeaways

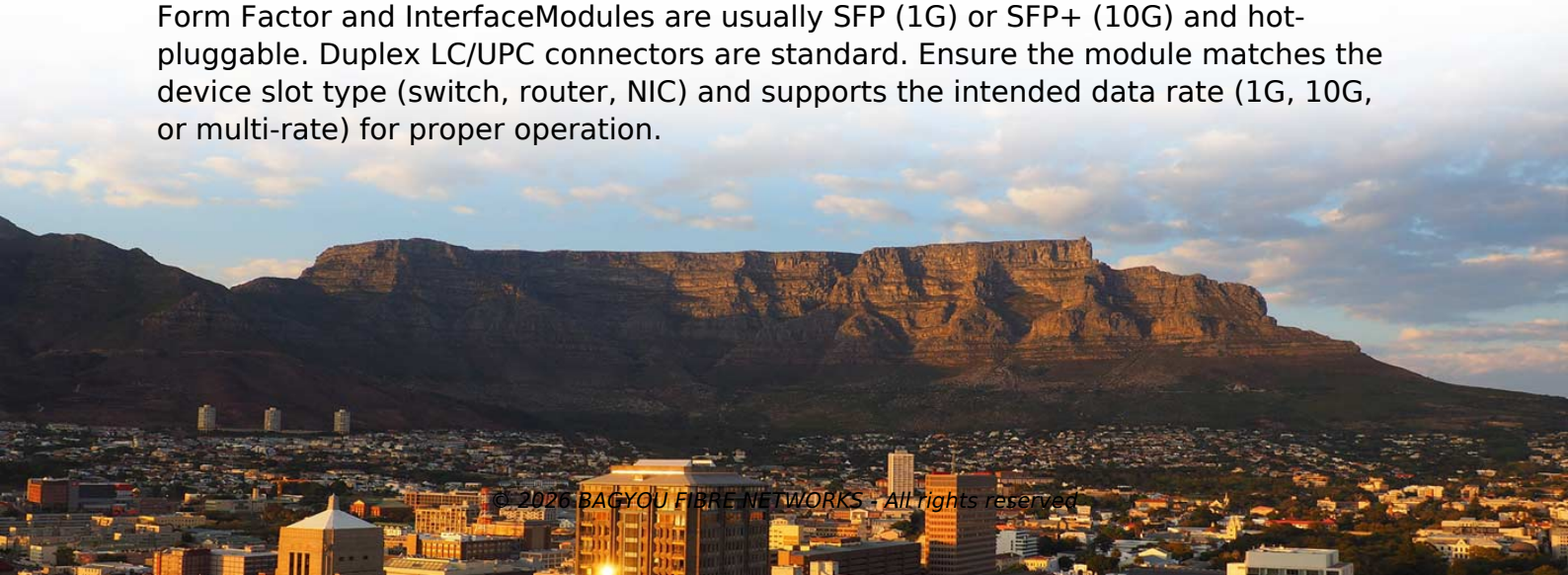
120km optical modules are high-power SFP/SFP+ transceivers designed for ultra-long-reach single-mode fiber links, compatible across multiple vendors when wavelength, optical budget, and interface standards are matched.

Overview

A 120km optical module is a high-performance transceiver engineered to transmit and receive data over single-mode fiber (SMF) for distances up to 120 kilometers. These modules are commonly used in long-haul networks, metro area networks, data center interconnects, and enterprise backbone links. They typically operate at 1550nm wavelength, which minimizes fiber attenuation, and use high-power transmitters (EML or CFL lasers) with high-sensitivity APD receivers to maintain signal integrity over extended distances.

Key Compatibility Factors

Form Factor and InterfaceModules are usually SFP (1G) or SFP+ (10G) and hot-pluggable. Duplex LC/UPC connectors are standard. Ensure the module matches the device slot type (switch, router, NIC) and supports the intended data rate (1G, 10G, or multi-rate) for proper operation.



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Optical Budget

The optical budget (difference between transmitter power and receiver sensitivity) must accommodate fiber attenuation, splices, and connectors. 120km modules typically provide 28–32 dB link budget, sufficient for ultra-long spans without repeaters or amplifiers. Laser and Receiver TechnologyEML (Electro-absorption Modulated Laser) or CFL (Cooled Fiber Laser) transmitters provide stable wavelength and low chirp.

AP

D (Avalanche Photodiode) receivers enhance sensitivity for long-distance links.

Wavelength and Standards

Operate at 1550nm, compatible with standard single-mode fiber (OS2, G. 652D). Compliant with SFP/SFP+ MSA, IEEE 802.

3ae, SFF-8431/8432 ensures multi-vendor interoperability.

Device Compatibility

Many 120km modules are multi-vendor compatible, but testing in the target network device is recommended. Modules like EDGE 10G-SFP-120, Mellanox SFP-10G-ZR120, and Cisco GLC-EZX-SM-120 have been verified for interoperability across switches, routers, and NICs.

Deployment Considerations

Fiber Quality: Use low-loss single-mode fiber (OS2 or G. 652D) with clean connectors. Attenuation Management: For shorter links, optical attenuators may be required to prevent receiver overload.

Dispersion Tolerance: Modules typically tolerate chromatic dispersion up to 2400 ps/nm, ensuring signal integrity over long distances. Environmental Conditions: Check operating temperature ranges (commonly 0–70°C) and compliance with RoHS or other standards.

Summary

To ensure compatibility of 120km optical modules, match the form factor, data rate, wavelength, optical budget, and interface standards with your network devices. Multi-vendor modules are widely available, but real-world testing is recommended to confirm interoperability and performance over the intended fiber span. Proper fiber selection, attenuation management, and adherence to optical standards are critical for reliable ultra-long-haul transmission.

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Article Content

How to Achieve Long Distance Transmission Beyond 120km: SFP

Learn how SFP+ 10G ZR modules enable stable 120km+ long distance transmission with high link budget, low power design, wide compatibility, and DOM monitoring.

10G Base ZR+ SFP+ 120km | 1550nm | 28dB Link Budget

Operating at 1550nm wavelength over 120km single-mode fiber, this 10G Base ZR+ module provides industry-leading distance performance. Supporting multi-rate transmission from 1.25 to 11.32 Gbps,

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Need 120km SFP for long-haul fiber? Learn about technical specs, performance evaluation, and sourcing tips to ensure reliable connectivity.

10G SFP+ ZR Optical Module: 120km Reach for Long-Haul Transmission

Engineered for metro-area networks, data center interconnections, and other bandwidth-intensive applications, Svelol''s 10G SFP+ 1550nm dual-fiber optical module delivers reliable, high

HW SFP-10G-ZR120 Compatible 10GBASE-ZR120 SFP+ 1550nm

The 10GBASE-ZR120 SFP+ is designed to meet the challenges of long-distance connections in 10G networks, allowing users to achieve an ultralong link distance of 120km without requiring additional

100G DWDM QSFP28 80 vs 120: Complete Comparison Guide

Compare 100G DWDM QSFP28 80km vs 120km modules. Learn differences in optical budget, power, DCM requirements, and best applications.

Mellanox SFP-10G-ZR120 Compatible 10GBASE-ZR120 SFP

The 10GBASE-ZR120 SFP+ is designed to meet the challenges of long-distance connections in 10G networks, allowing users to achieve an ultralong link distance of 120km without requiring additional

LS-SM551G-A2C Review: LINK-PP''s 120km SFP Module for Long

When it comes to long-haul fiber connectivity, not all SFP modules are created equal. LINK-PP''s LS-SM551G-A2C SFP module delivers exceptional 120km transmission distance,

Cisco CWDM-SFP-1530-120 Compatible SFP 1000BASE-CWDM

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Use the Compatibility Tool to verify FS transceiver compatibility with your device and access test reports. The Cisco CWDM-SFP-1530-120 Compatible SFP transceiver supports up to 120km link

Long Distance 120km SFP Optical Fiber Module Bidi LC 1.25g Sfp

They are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and Digital diagnostics functions are available via the 2-wire serial bus specified in SFF-8472.

The Ultimate Guide to ZTE SFP Module Distance and Wavelength

For long-distance connectivity between sites, a 1000BASE-ZX (1550nm, 80-120km) module is deployed, often with optical attenuators to ensure the received power remains within the receiver''s sensitivity

1000BASE-SX vs 1000BASE-LX, EX, ZX & BX SFP Guide

1000BASE-SX, 1000BASE-LX, 1000BASE-EX, 1000BASE-ZX and 1000BASE-BX are all Gigabit Ethernet fiber optic module terms, but they are not the same type of link. They differ in fiber

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400G QDD-400G-ZR-L Tunable DWDM Transceiver 120KM SMF LC Interface Long Haul Optical Module Compatible Cisco H3C

SFP Transceivers | 1G, CWDM, DWDM, BiDi | EDGE Optical Solutions

BiDi 1.25G SFP Modules (LC Connector) Single-fiber bidirectional Gigabit SFP transceivers utilizing wavelength division to transmit and receive on separate wavelengths over one fiber strand. Available

SFP Module – Optcore

SFP Module SFP module is a small form factor, compact, hot-pluggable optical transceiver, also called mini-GBIC. Our SFP module comply with the SFF-8472 MSA (Multi-Sourcing Agreement), CE, FCC,

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400G Optical Modules Explained: SR4 Vs. DR4 Vs. FR4 Vs. LR4

Key differences between SR4, DR4, FR4, and LR4 400G optical modules. Expert advice from Asterfusion engineers to optimize your data center network.

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

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