

# 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

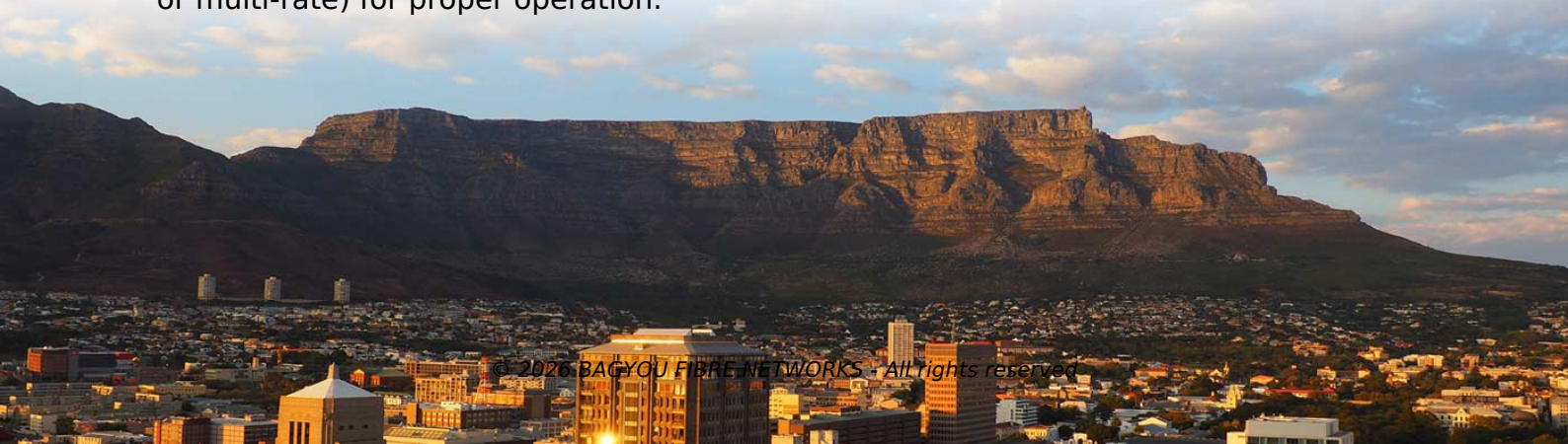
120km optical modules are high-power SFP/SFP+ transceivers designed for ultra-long-reach single-mode fiber links, compatible across multiple vendors when wavelength, optical budget, and interface standards are matched.

## 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 Interface Modules 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.



## 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 Technology EML (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.

## 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,

#### 120km SFP Sourcing: Critical Factors for Long-Haul Fiber

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

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

FS 800G Coherent Optical Modules for AI Networks

AI-driven traffic growth is placing increasing demands on optical transport networks for greater capacity, longer reach, and higher efficiency. Built for next-generation DCI and metro deployments ...

180km~200km 100Mbps SFP Optical Transceiver with 1550nm DFB

C-LIGHT 180km~200km 100Mbps SFP optical transceivers feature 1550nm DFB laser, APD receiver, and high optical budget for long-distance industrial Ethernet, power, railway, and telecom

400G QDD-400G-ZR-L Tunable DWDM Transceiver 120KM SMF LC

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,

## 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.

