

Article Overview

Single-fiber bidirectional (BiDi) optical modules enable full-duplex communication over a single fiber strand, reducing fiber usage and simplifying network deployment.

Overview of BiDi Optical Modules

BiDi optical modules are transceivers that transmit and receive data simultaneously over a single optical fiber by using two distinct wavelengths, typically via a WDM (wavelength-division multiplexing) filter integrated into the module . This allows full-duplex communication without requiring separate fibers for upstream and downstream traffic, effectively halving fiber usage and reducing cabling costs .

Key Benefits

- o Fiber Efficiency: Saves over 50% of fiber resources, which is critical in fiber-limited environments .
- o Cost Reduction: Reduces the need for new fiber installation or leasing, lowering both capital and operational expenses .
- o Simplified Management: Fewer physical connections reduce potential failure points and streamline network upgrades .
- o Scalability: Supports network expansion without major infrastructure changes, suitable for campus networks, metro rings, and data center interconnects .

Technical Features

- o Wavelength Configuration: Common pairs include 1310nm/1490nm for 1.25 Gbps modules and 1270nm/1330nm for 25G SFP28 modules .
- o Connector Types: Standard modules use SC or LC receptacles .
- o Module Components: Typically include a laser emitter (FP or DFB), a photodiode receiver (PIN or APD), and an integrated WDM filter for dual-wavelength operation .
- o Power and Safety: Many modules are Class 1 laser products, requiring standard optical safety precautions .

Product Examples

- o Ubiquiti 1G BiDi SFP: Supports 1 Gbps over single-mode fiber up to 3 km with a simplex LC UPC connector .
- o GigaTech BiDi Transceivers: Offer 25G serial optical data communications using 1270nm/1330nm wavelengths, ideal for 5G mobile networks and Ethernet applications .
- o HighPower BIDI(R) Modules: Include integrated visible light service channels and support 1.25-2.5 Gbps



Single-fiber bidirectional optical module products

full-duplex communication over a single fiber .

o FS.com FMT Series: Provides flexible WDM solutions for DWDM single-fiber systems, suitable for optical line protection and monitoring applications .

Applications

o Data Centers: Reduces fiber cabling complexity and supports high-speed interconnects.

o Telecom Networks: Enables 4G/5G RRU upgrades using existing fiber infrastructure .

o Campus and Metro Networks: Efficiently doubles capacity without installing new fiber lines .

o Video and Broadcast: Triport BiDi modules can carry analog video alongside digital data over a single fiber . Single-fiber bidirectional optical modules are a cost-effective, fiber-saving solution for modern networks, providing high-speed, full-duplex communication while minimizing infrastructure requirements and operational complexity.

Learn the differences between BIDI single-fiber and dual-fiber bidirectional optical modules:

CloudEngine 12800 and 12800E Series Switches Hardware Description This document provides an overall description of the

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics

Enter the 10G BiDi (bidirectional) SFP+ module --an elegant solution that enables full-duplex communication over a

Discover BIDI SFP optical transceivers, the single-fiber bidirectional modules that optimize fiber usage. Learn how they

BiDi SFP (Bidirectional Small Form-Factor Pluggable) transceivers have emerged as a powerful solution, enabling full

CLASS 1 LASER PRODUCT, IEC/EN 60825-1:2014 Do not look into the ends of the fiber optic cable or SFP module while converters

A BiDi SFP module is a bidirectional fiber optic transceiver that enables simultaneous transmit and receive over a single strand of

The design of BIDI SFP optical modules with single-fiber bidirectional functionality greatly simplifies the wiring process. Where two

Single-fiber bidirectional optical module products

Single-fiber optical modules and dual-fiber optical modules are two common types of optical modules. They all play an important role

FS 10G BiDi SFP+ modules are a powerful tool for network engineers seeking to boost bandwidth without doubling

Single-fiber bidirectional SFP modules for OC-3/STM-1 and 100M Ethernet applications. Operating in matched A/B wavelength pairs,

BiDi transceivers have become synonymous with reliable and high-performance networks, enabling bidirectional fiber

This data sheet describes the benefits, specifications, and ordering information for the

SFP transceiver that supports 1G connections up to 3 km using single-mode fiber with a simplex LC UPC

Enjoy reliable bandwidth with your fiber installations with the Bi-Directional Single-Mode LC SFP Transceiver Kit from Ubiquiti

Web: <https://www.kremgroup.co.za>

