

Fiber Optic Enterprise Router NRZ



Overview

Cisco Enterprise Router Selector Explore our router selector to swiftly identify and migrate to the Cisco enterprise router that best fits your Jordan Consu.

Key Takeaways

Enterprise fiber optic routers using NRZ modulation provide reliable 100G connectivity with binary optical signaling, suitable for high-speed data center and enterprise networks. Overview of NRZ in Enterprise Routers

NRZ (Non-Return-to-Zero) is a binary modulation scheme where the light intensity represents either a 0 or 1, making it the traditional choice for lower-speed and many 100G optical links . NRZ is simpler than PAM4, which uses four amplitude levels to encode two bits per symbol, and is less sensitive to amplitude noise, making it highly reliable for enterprise deployments .

Single-Lambda 100G Optics

Modern enterprise routers often use single-lambda 100G optical modules, which transmit 100Gbps over a single wavelength using either NRZ or PAM4 modulation . Single-lambda optics reduce component complexity, lower power consumption, and allow higher port density, making them ideal for enterprise and data center networks . These modules are compatible with QSFP28 ports and can connect to 400G switches gradually without sacrificing bandwidth .

Deployment Considerations

- **Distance and Fiber Type:** NRZ-based 100G optics typically support short to medium distances (up to 500m on single-mode fiber for 100GBASE-DR), while long-reach modules like QSFP-100G-ZR4-S can extend up to 80 km for enterprise or service provider networks .
- **Error Correction:** NRZ optics often include forward error correction (FEC), equalization, and clock recovery circuits to maintain signal integrity over longer distances .
- **Compatibility:** These modules are designed to work with standardized pluggable ports, ensuring interoperability across multiple router and switch platforms .

Enterprise Use Cases

- **Data Center Interconnects:** Connecting leaf-spine architectures with 100G links using NRZ optics for reliable, low-latency communication .
- **Campus and Enterprise Networks:** High-speed backbone links between buildings or remote offices, leveraging single-mode fiber and NRZ transceivers for cost-effective deployment .
- **Scalable Upgrades:** Enterprises can start with NRZ 100G optics and later transition to PAM4 or 400G platforms without replacing the entire infrastructure .

Summary

Using NRZ-based fiber optic modules in enterprise routers provides a stable, cost-effective, and scalable solution for high-speed networking. Single-lambda 100G optics simplify deployment, reduce power and component costs, and support gradual upgrades to higher-speed networks while maintaining compatibility with existing infrastructure . This makes NRZ optics a practical choice for enterprise and data center environments.

Article Content

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Enterprise optical network-all-optical access-FTTR-SME

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

