

RIVO MULTITRADE OPTICAL SYSTEMS

Nordic Enterprise-Grade Optical Router NRZ



Overview

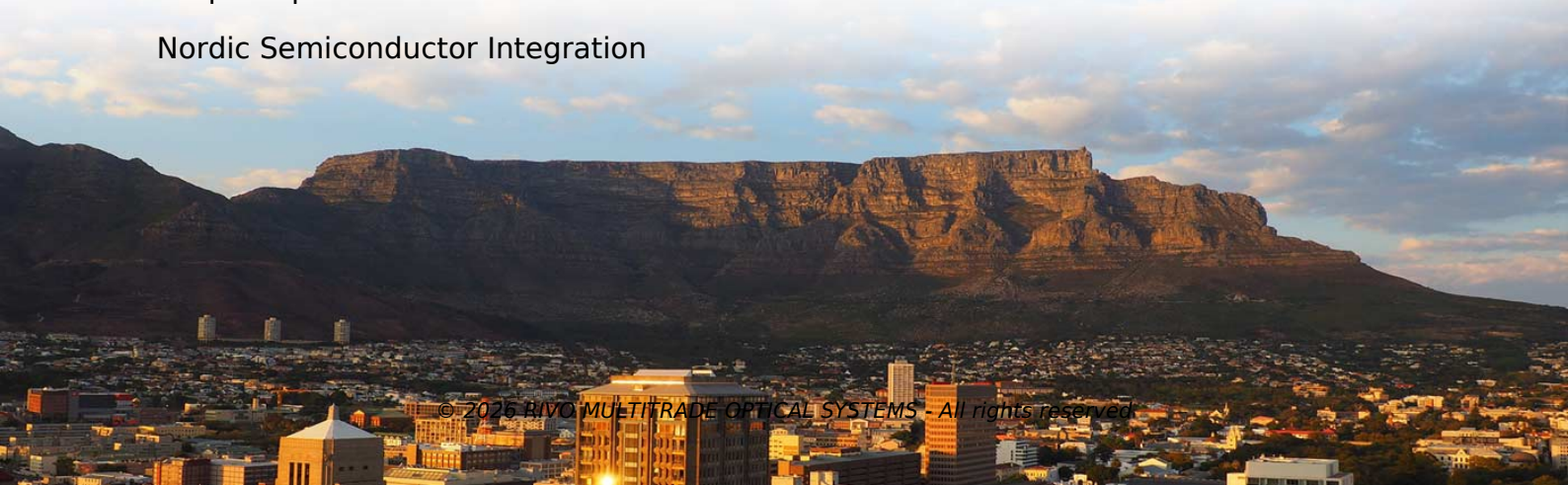
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Key Takeaways

The Nordic Enterprise-Grade Optical Router NRZ leverages Non-Return-to-Zero (NRZ) modulation for reliable binary optical data transmission, integrating Nordic Semiconductor's low-power networking expertise for enterprise and IoT applications. Overview of NRZ Modulation

NRZ (Non-Return-to-Zero) is a fundamental binary modulation scheme widely used in optical communication systems. In NRZ encoding, each bit is represented by a constant voltage level throughout its duration: a high voltage for a logical "1" and a low voltage for a logical "0". This simplicity allows for straightforward implementation and reliable signal interpretation, making it suitable for enterprise-grade optical routers where stability and low error rates are critical. Unlike more complex schemes like PAM4, NRZ transmits one bit per symbol, which limits maximum data rates but ensures robust performance over longer distances and simpler optical hardware.

Nordic Semiconductor Integration



Nordic Semiconductor is known for its low-power wireless solutions, including Wi-Fi and IoT connectivity, with strong integration into their nRF Connect SDK . While Nordic primarily focuses on wireless SoCs and SiPs, their expertise in low-power, high-efficiency networking can be applied to enterprise optical routers, particularly in hybrid systems combining optical backhaul with wireless access. Nordic's solutions emphasize easy integration, robust security (WPA3), and strong developer support, which can enhance the deployment of optical routers in enterprise networks .

Advantages of NRZ in Enterprise Optical Routers

- **Simplicity and Reliability:** NRZ's binary encoding reduces complexity in optical transceivers, lowering the risk of signal distortion and inter-symbol interference .
- **Compatibility:** NRZ is widely supported in existing optical networking equipment, facilitating interoperability in enterprise datacenters.
- **Lower SNR Requirements:** NRZ generally requires a higher signal-to-noise ratio for error-free transmission compared to PAM4, but it is less sensitive to implementation imperfections, making it suitable for stable enterprise environments .
- **Cost Efficiency:** NRZ-based optical modules are typically less expensive than PAM4 modules, which can be advantageous for large-scale enterprise deployments.

Considerations

While NRZ is robust, it has limitations in bandwidth efficiency. For very high data rates (e.g., 400G+), PAM4 modulation may be preferred due to its ability to encode two bits per symbol, effectively doubling throughput without increasing the optical bandwidth . However, for many enterprise-grade optical routers, NRZ provides a balanced solution between performance, cost, and reliability.

Conclusion

The Nordic Enterprise-Grade Optical Router NRZ combines Nordic's low-power networking expertise with NRZ optical modulation to deliver a reliable, secure, and cost-effective solution for enterprise optical networks. It is particularly suitable for applications requiring stable binary data transmission, integration with Nordic's SoCs, and straightforward deployment in datacenter or IoT environments .

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