

100G optical module DSP



Overview

PAM4 DSPs MaxLinear's highly integrated PAM4 DSPs offer superior link-margin performance and low power to enable 100G, 400G, 800G, and 100G to 1.6T Optical.

Key Takeaways

In a 100G optical module, the DSP (Digital Signal Processor) acts as the “brain” that processes high-speed optical signals, compensates for transmission impairments, and enables reliable long-distance data transfer. Role of DSP in 100G Optical Modules

A Digital Signal Processor (DSP) in a 100G optical module is a specialized chip that performs real-time digital computation on optical signals. Its primary purpose is to correct distortions, improve signal quality, and enable advanced modulation formats necessary for high-speed data transmission over fiber networks ().

Key Functions

- **Signal Recovery and Error Correction** DSP algorithms extract the original signal from degraded optical signals by filtering noise, correcting errors, and maintaining phase and amplitude accuracy. This is critical for coherent detection systems where both amplitude and phase carry information ().
- **Dispersion Compensation** Optical signals spread over long distances due to chromatic dispersion. DSP digitally reverses this effect, eliminating the need for bulky optical compensators and preserving signal integrity ().
- **Noise Suppression** DSP improves the signal-to-noise ratio (SNR) by applying noise reduction algorithms, enabling reliable transmission even in electrically noisy environments ().

- Advanced Modulation and Demodulation Coherent 100G modules use complex formats like DP-QPSK or 16QAM to increase data rates. The DSP handles both modulation at the transmitter and demodulation at the receiver, ensuring accurate encoding and decoding of signals ().
- Channel Equalization DSP applies adaptive filters to counteract impairments such as amplitude fading and phase shifts, maintaining consistent signal quality across the link ().
- Forward Error Correction (FEC) DSP implements FEC algorithms to detect and correct bit errors caused by noise or attenuation, enhancing link reliability and tolerance to lower optical signal-to-noise ratios ().

DSP in 100G ZR QSFP28 Modules

In modern 100G ZR QSFP28-DCO transceivers, such as those built around the Coherent Steelerton DSP, the DSP is optimized for low power consumption ().

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A Digital Signal Processor in optical transceivers enables fast data rates, advanced modulation, and real-time signal

Cisco Digital 100G CFP2 Pluggable Optical Module Data Sheet

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BCM87101 Product Brief

Broadcom's advanced DSP technology and equalization techniques compensate for optical impairments while maintaining the

NTT Technical Review, Vol. 14, No. 9, Sept. 2016

This article introduces beyond 100G (beyond 100 Gbit/s per channel) digital coherent optical transmission technology, which is a key

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