

Optimized Design of Optical Receiver

Overview

Recent research revealed that low-noise, high-gain, and low- power CMOS optical receivers can be designed by limiting the bandwidth of the front-end followed by equalization tech- niques that benefit from good switching characteristics offered by CMOS technologies. Abstract—The integration of optical receivers in nanoscale CMOS technologies is challenging due to less intrinsic gain and more noise compared to SiGe BiCMOS technologies. OSNR for each level and for complete signal can be defined The signal at the output of an optical amplifier in response to a noise free signal at the input is The following formulation accounts for all noise terms that can be treated as Gaussian. Sara Radfar A Thesis in The Department of Electrical and Computer Engineering Presented in Partial Fulfillment of the Requirements for the Degree of Master of Applied Science (Electrical Engineering) at Concordia University Montréal, Québec, Canada July 2025 © Sara Radfar, 2025 CONCORDIAUNIVERSITY. This paper presents an optimized design methodology for an inductor-less 28-Gb/s NRZ optical receiver (ORx) analog front-end (AFE) using the Berkeley Analog Generator (BAG) in 28-nm CMOS technology. With the increasing demand for high-speed data transmission in optical inter-connects, achieving an. In the intensity-modulation/direct-detection (IM-DD) system, the intensity modula-tion means that information is carried only by the intensity or power of the transmitted lightwave, not by its frequency or phase. The term direct detection refers to the receiver configuration, where the received.



Article Content

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Optical Receiver Front-End Integrated Circuit Design

In this chapter, we will introduce the basic concept of a high-speed receiver, the integrated circuit (IC) technique of the front-end.

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Optical Receivers | part of Fiber-Optic Communication Systems

The design of an optical receiver depends on the modulation format used by the transmitter. The chapter deals with various noise

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Optical Receivers

The design of an optical receiver depends on the modulation format used by the transmitter. The chapter deals with

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In the design of an optical fiber communication system, whether for use in long distance communication [4.1-8] or for bussing of data

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Receivers

Receivers The SPIE Digital Library offers a comprehensive range of content on receivers, encompassing various aspects of their

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An Inductor-Less 28-Gb/s NRZ Optical Receiver Analog Front-End ...

Abstract - This paper presents an optimized design methodology for an inductor-less 28-Gb/s NRZ optical receiver (ORx) analog

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Optical Communication Receiver Design

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Receiver design for optical fiber systems

This paper is a tutorial review of the theory and practice of receiver design for optical fiber communication systems. Topics discussed

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Optical Receiver

Since the performance of an optical receiver depends not only on the photodetector but also on the components and design chosen

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In this chapter we consider issues related to the design of optical receivers. As signals travel in a fiber, they are

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Fiber Optic Receiver and its major design criteria

One of the goals in designing an efficient fiber optic receiver is to optimize and fine tune the sensitivity of receiver. Receiver noise

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Optical Receiver Design

The design of an optical receiver depends on the modulation format used by the transmitter. Since most lightwave systems employ

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The optical receiver is a critical element of an optical communication system since it often determines the overall system

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Design and Optimization of High-Speed Receivers for 6G Optical

To achieve multi-Gb/s data rates in 6G optical wireless access networks based on narrow infrared (IR) laser beams, a

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High-speed imaging receiver design for 6G optical wireless ...

Beam-steering laser-based optical multiuser systems, which are capable of supporting up to 128 beams carrying up to 112 Gbit/s per

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Laser communication transmitter and receiver design

Furthermore, the combination of excess bandwidth and average-power-limited optical transmitters has led to a new paradigm in

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High-Speed Imaging Receiver Design for 6G Optical Wireless ...

The design of a compact high-speed and wide field of view (FOV) receiver is challenging due to the presence of two well-known

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Design and Implementation of a Linear Optical Receiver

In the following sections, we will examine one of the most commonly used inverter-based main amplifiers in optical receivers and

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Optical Receiver Front-End Integrated Circuit Design

The optical receivers have key roles in high-speed optical fiber communications, in high-speed chip-to-chip interconnections in

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Ultra Low-Power Receiver Design for Dense Optical Interconnects

Dense arrays of optical detectors require very low-power, sensitive, and compact optical receiver circuits. Existing designs for the

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Design and Optimisation of High-Speed Receivers for 6G Optical

composed of compound parabolic concentrators (CPCs) coupled with p arrays for laser-based optical wireless communication

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Optimal Imaging Receiver Design for High-Speed Mobile Optical

The optical receivers suitable for the next generation of optical wireless networks need to be ultra-high-speed while having a wide

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Optical Receiver Operation | Springer Nature Link

Abstract The design of an optical receiver can be quite sophisticated because the receiver must be able to detect

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Optical Receiver

An optical receiver usually consists of a photodetector and an electrical circuit for transimpedance amplification and signal

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Optimum Design of a Composite Optical Receiver by Taguchi and

This paper investigates a composite optical receiver for an indoor visible light communication (VLC) system. The optical gain,

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Optical Receiver Design Project

The goal of this design project is to design a fast, high gain, low noise, and low power optical receiver in an inexpensive CMOS process.

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Optimal Optical Receivers in Nanoscale CMOS: A Tutorial

Section IV reviews recent advances in optical receiver design with emphasis on 4-PAM optical receivers, where we also look at

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Lecture 15: Receiver Design

Define: Receiver Sensitivity is the minimum average power needed to achieve a certain BER at a given bit-rate. The receiver

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Optical Transmitter and Receiver Circuit Design

A light source with a driver is called an optical transmitter. By completing the photodiode with the following preamplifier, an optical

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Optimal Optical Receivers in Nanoscale CMOS: A Tutorial

The integration of optical receivers in nanoscale CMOS technologies is challenging due to less intrinsic gain and more

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Receiver design for optical fiber communication systems

The purpose of this chapter is to provide the reader with a basic understanding of the optical receiver and the interplay

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Receiver design for high-speed optical-fiber systems

This paper re-examines the optical receiver design in view of these different requirements, namely, high receiver sensitivity, wide

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