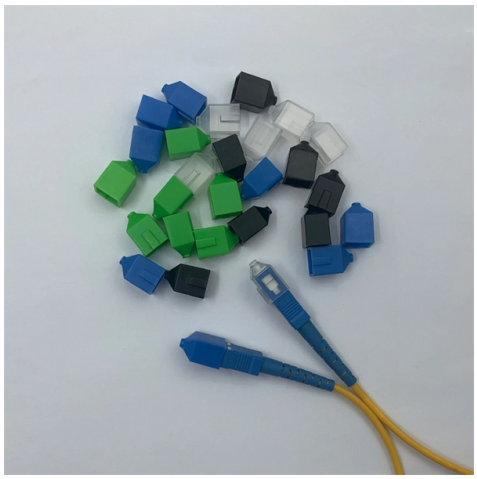
Energy-efficient optical receivers for the Internet of Things



Overview

Emerging ultra-low-power solutions integrate high-sensitivity photodetectors, low-power Digital Signal Processor (DSP), and efficient modulation to support 28Gbps+ channels. To address the power consumption challenges in optical modules, industry has developed DSP or. In this dissertation, design techniques to implement such high-sensitivity IM-DD optical receivers are presented. In the first technique, a high-sensitivity optical receiver is implemented using a combination of a low bandwidth transimpedance amplifier (TIA) and a 4-tap decision feedback equalizer. Optical transceiver based on micro-ring resonator is an effective approach bridging optical channel's THz bandwidth and electrical circuit's GHz running speed, but has increased design complexity.

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Article Content

Energy-Efficient Phase-Domain RF Receivers for Internet-of-Things

This paper includes a die-stacked sensor platform composed of an ARM cortex M0 processor, energy harvester, power management unit, solar cell, optical receiver, sensor layer, and

Energy Efficiency Analysis of MIMO Wideband RF Front

Energy-efficiency is crucial for modern radio-frequency (RF) receivers dedicated to Internet of Things applications. Energy-efficiency enhancements

Design of Energy-Efficient Optical Transceivers

This dissertation presents three designs focusing on power-efficient short-reach optical communication up to hundreds of meters, including one wire-boned optical receiver and two 3D-integrated optical

Design of Energy Efficient Receiver and Transmitter for Optical ...

In this paper, the main aim of the author is to design an energy efficient [11-14] transceiver for wireless optical communication. Figure 1 represents the different modes of communication.

(PDF) AquaE-lite Hybrid-Solar-Cell Receiver-Modality

Our goal is to develop an energy-autonomous solar cell receiver that can be integrated with a variety of smart devices to implement the Internet of

Survey of energy-autonomous solar cell receivers for satellite–air ...

In recent years, driven by the rapid escalation of requirements of energy saving, researchers have extensively explored the application of solar cells to novel energy-efficient

An ultra-low power 4×28Gbps linear optical receiver for short-reach ...

The surge in global data traffic driven by AI and cloud computing demands energy-efficient optical interconnects. Traditional optical modules face high power consumption, escalating

Energy efficient optical receivers for next generation non-terrestrial ...

Abstract Conventional free-space optical receivers carry out the beam tracking and symbol detection functions in two separate units inside the receiver. This leads to a more complex receiver

High Speed Energy Efficient Optical Receiver

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Abstract This paper describes the design techniques of high speed, energy efficient optical receivers, covering from the front-end amplifier to the post clock and data recovery circuit (CDR). An integration

Energy-Efficient CMOS Optical Receiver for Short-Reach Data Center ...

This thesis focuses on the design of energy-efficient CMOS four-level pulse amplitude modulation (PAM-4) optical receivers (ORXs) for short-reach data center applications.

Energy Harvesting in GPON Fiber Optic Receivers With

This paper deals with a Gigabit Passive Optics Network (GPON) FO system that incorporates an EH unit to harvest energy while transmitting data.

Receivers for energy efficient optical interconnects | IDEALS

A comparison study is performed between NRZ, duobinary sampling, and PAM4 modulation formats, for IM-DD optical receivers for highest data rate operation with maximum

A Monolithic O-Band Coherent Optical Receiver for Energy-Efficient ...

The coherent optical receiver (CORX) leverages a monolithic 45-nm CMOS SOI photonic-enabled process to realize an energy-efficient quadrature phase shift keying (QPSK) demodulation. Co

Design of energy-efficient optical receiver | IDEALS

Design of energy-efficient optical receiver Li, Yongxin This item is only available for download by members of the University of Illinois community. Students, faculty, and staff at the U of I

Energy efficient optical receivers for next generation non-terrestrial ...

In this chapter, a detector array receiver is proposed that integrates the beam tracking and symbol detection functions in one single unit. This not only simplifies the receiver architecture but also leads

AquaE-lite Hybrid-Solar-Cell Receiver-Modality for Energy

Our goal is to develop an energy-autonomous solar cell receiver that can be integrated with a variety of smart devices to implement the Internet of Things in next-generation applications.

Energy-Efficient Phase-Domain RF Receivers for Internet-of-Things

An energy-efficient single-channel phase-domain receivers based on a sliding-IF phase-to-digital conversion (SIF-PDC) loop is presented. It equivalently transforms the signal processing from analog

(PDF) Optical Wireless Communication for the Internet

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One of the rising connectivity technologies that can potentially benefit the IoT deployment is Optical Wireless Communication (OWC) technology. In

(PDF) Optical Wireless Communication for the Internet

Abstract and Figures div>The continuous development of the Internet of Things (IoT) calls for innovative solutions and technologies to realize the IoT

Energy Harvesting in GPON Fiber Optic Receivers With SLIPT for the ...

Finally, proposed GPON fiber optic receivers with SLIPT energy harvesting system numerical results are presented to evaluate the performance.

Receivers for energy efficient optical interconnects | IDEALS

The recent exponential increase in internet traffic has created the need for more powerful data centers in which thousands of servers are connected with high bandwidth interconnects. Optical

Optical Transceiver

These factors include the demand for energy efficiency, the focus on delivering advanced connectivity, and the rise of new technologies such as the Internet of

Low-Power Wake-Up Receivers for Resilient Cellular

Smart Cities leverage large networks of wirelessly connected nodes embedded with sensors and/or actuators. Cellular IoT, such as NB-IoT and 5G

Instructions for Preparing Camera-ready Manuscripts for

The main findings show that the VCSEL system performs better and has higher energy efficiency. Keywords: Optical Wireless Communication Networks, Vertical Cavity Surface Emitting Lasers, Zero

IEEE INTERNET OF THINGS JOURNAL A High Efficiency, Simple

A High Efficiency, Simple-Structure, Compact Wideband Microwave Energy Harvester for Wirelessly-Powered IoT Receivers Jiupei Shi, Student Member, IEEE, Chaoyun Song ...

Energy Harvesting in GPON Fiber Optic Receivers With SLIPT for the ...

A Gigabit Passive Optics Network (GPON) FO system that incorporates an EH unit to harvest energy while transmitting data and numerical results are presented to evaluate the performance. The new

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