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An Innovative Optical Transceiver Architecture for High Speed Data Interconnectivity Using CMOS IC for Optical Interconnects

Abstract: The high cost of the opto-electronics components which are typically used for the long-haul communication is prohibitive in the Fiber to the Home and Passive Optical Networks. This cost prone limitation can be easily optimized to some extent by reducing the cost of the electronics components used in the design of the transceiver and thereby, reducing the packaging cost. The ICs are designed in house and fabricated on a standard CMOS wafer with 0.18µm technology. These devices can operate at 1.8V and are low power in nature, thus reducing the demand on power dissipation. The transceiver module consists of an un-cooled and direct modulated laser diode driven, a high speed PIN photo-diode with amplifier and CMOS ICs. The CMOS ICs are attached on a transceiver substrate that is compliant with the small form-factor pluggable package multisource agreement and coupled to a 1310nm FP laser TOSA and a PIN ROSA with LC connector. This integrated transceiver is characterized up to 2.5-Gbps and can be applied in the high speed data transfer rate. The interconnect architectures which leverage high-bandwidth optical channels offer a promising solution to address the increasing chip-to-chip I/O bandwidth demands from the end user. A low-voltage integrating and double-sampling optical transceiver’s front-end provides an adequate sensitivity in terms of power efficient simply, by avoiding linear high-gain elements common in conventional transimpedance amplifiers. The phenomenon of clock recovery is performed with a dual-loop architecture which employs the baud-rate phase detection and feedback interpolation so as to achieve the reduced power consumption, while high-precision phase spacing is ensured at both the transmitter and receiver end through adjustable delay clock buffers. The increase in computing power enabled by CMOS scaling has created an increased demand for chip-to-chip I/O bandwidth. Unfortunately, the inter-chip electrical channel bandwidth has not scaled similarly to on-chip performance, causing current high-speed I/O link design to be channel limited that require sophisticated equalization circuitry which in turn increases the power consumption.

Keywords: 2.5-Gbps SFP, optical transceiver, 0.18µm CMOS technology, FTTH, GPON, Clock and data recovery, equalization, laser driver, optical interconnects, optical receiver, serial transceiver, VCSEL, 1.25G 1310nm optic transceiver; SFP; Signal Integrity; Circuit design, SDH, SONET, FEC, OTN.

1. References

Design Strategy for Barrel Shifter Using Mux at 180nm Technology Node

Abstract: The reversible logic has the promising applications in emerging computing paradigm such as quantum computing, quantum dot cellular automata, optical computing, etc. In reversible logic gates there is a unique one-to-one mapping between the inputs and outputs. Barrel shifter is an integral component of many computing systems due to its useful property that it can shift and rotate multiple bits in a single cycle. The design methodologies considered in this work targets 1.) Reversible logical right shifter, 2.) Reversible universal right shifter that supports logical right shift, arithmetic right shift and the right rotate, 3.) Reversible bidirectional logical shifter, 4.) Reversible bidirectional arithmetic and logical shifter, 5.) Reversible universal bidirectional shifter that supports bidirectional logical and arithmetic shift and rotate operations.

Keywords: Low power, Power Dissipation.

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11. Saurabh Kotiyal, “Design Methodology for Reversible Logic Based Barrel Shifters,” University of South Florida, in year

Authors: N. Snehalatha, S. Angeline Julia, Paul Rodrigues

Paper Title: Survey of Bandwidth Management Techniques

Abstract: Today in the modern communication world, the traffic that exists in the internet is becoming more and more abnormal. This was mainly due to an increase in the number of users day by day which results in bandwidth congestion, poor response time for end users. The most efficient solution to this problem is to manage and allocate the existing bandwidth almost equally using suitable queuing disciplines and filters that exist as quality of service. It is a full featured technology which may reduce the cost and improve the network performance. This study comprehensively surveys various bandwidth management techniques. This paper gives the brief overview of bandwidth management system and bandwidth management techniques.

Keywords: Bandwidth, techniques, parameter.

References:

Authors: K. Shivaranayana, G. Anil, K. Srividya Savitri

Paper Title: Simulation of Four Quadrant Operation & Speed Control of BLDC Motor on Matlab / Simulink

Abstract: BLDC motors have been gaining attention from various Industrial and household appliance manufacturers, because of its high efficiency, high power density and low maintenance cost. After many research and developments in the fields of magnetic materials and power electronics, their applications to electric drives have increased to a significant extent. In this paper, the modeling of Brushless DC motor drive system along with control system for speed and current has been presented using MATLAB/ SIMULINK. In order to evaluate the model, various cases of simulation studies are carried out. Test results thus obtained show that, the model performance is satisfactory.

Keywords: BLDC, MATLAB/SIMULINK, DC.

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Authors: Everette Adams, Shaoliang Jia

Paper Title: An Overview of Estimation Methods within Wireless Sensor Networks

Abstract: This paper is a review of some publications that considered estimation issues within wireless sensor networks. Byzantine attacks on sensors, sensor position uncertainty, and calculation error times are some of the issues that falsify data within a wireless sensor network. Therefore, the implementation of new systematic methods that outperformed previous methods solved each estimation issue as described.

Keywords: Binary Symmetric Channel (BSC), Byzantine Attack, Cramer-Rao Lower Bound (CRLB), Weighted Average (WA).

References:
1. Z. X. Lao, “Anti-attack and Channel Aware Target Localization in Wireless Sensor Networks Deployed in Hostile...
Abstract: The technological advancement and innovations needs more bandwidth, large capacities and high performance devices. Compression on digital images plays an important role in data compression as a typical multimedia technique. Wavelet Packet Decomposition is one of the image compression technique in which both approximation and detail coefficients of an image are extracted repeatedly up to a filtering level. Deciding the best topology of the wavelet packets can be considered as a structural optimization problem. Swarm intelligence has been popularly used for solving the optimization problems: Artificial Bee Colony (ABC) is the most recently proposed algorithm based on the systematic foraging behavior of honey bees. In this paper Wavelets Packet Decomposition is applied to JPEG images using various Wavelet families. Once coefficients are generated, the optimum threshold values are determined using Artificial Bee Colony (ABC) algorithm to obtain the best reconstructed image. The results are compared on the basis of some control parameters. It is observed that Wavelet Packet optimization using Daubechies filter is better that the other filters.

Keywords: Artificial Bee Colony Algorithm (ABC), Ant Colony Optimization (ACO), Particle Swarm Optimization (PSO), Wavelet Packet Decomposition (WPD).

References:
3. Z. Wang, A. C. Bovik, H. R. Sheikh, and E. P. Simoncelli, Image quality assessment: From error measurement to

Authors: Nasim A Shah, Nandana Prabhu

Paper Title: Performance Analysis of Control Parameters of Artificial Bee colony Algorithm for JPEG Images
8. B Akay, D Karaboga - Information Sciences, A modified Artificial Bee Colony algorithm for real-parameter optimization 2012 – Elsevier, Department of Computer Engineering, Erciyes University, 38039 Melikgazi, Kayseri, Turkey

**Authors:** K. Sai Krishna Chaitanya, E. Lokesh Reddy, P. V. Praneeth Reddy

**Paper Title:** Generating Dual Tone for Creating Our Own Communication Channel

**Abstract:** When we dial land number or Mobile number on our phones, it gives a ring to the person we need to contact, this is possible by the concept of DUAL TONE – MULTIPLE FREQUENCY (DTMF). The DTMF is a popular signalling method between telephone and switching centres. It is also used for signalling between the telephone network and computer network. DTMF signals are the superposition of two sine waves with different frequencies. In this the key stroke we give is converted to frequency and this sine wave is decode by the decoder and switching centre connects our line to the desired destination. In recent days when we call to customer care, instead of person of person computer is able to solve our query. This is possible by programming the sound card of computer with the frequencies generated by phone. This paper mainly deals about dtmf, their working, verification using mat lab and their application.

**Keywords:** Dual Tone Multiple Frequency, Rotary Dial, Encoding, Decoding.

**References:**
1. Schenker, L (1960), 'Pushbutton Calling with a Two-Group Voice-Frequency Code'
2. ITU’s recommendations for implementing DTMF services (PDF)

**Authors:** Shweta Rathour

**Paper Title:** Review of 3-D Secure Protocol

**Abstract:** Banks worldwide are starting to authenticate online card transactions using the ‘3-D Secure’ protocol, which is branded as Verified by Visa and MasterCard Secure Code. This has been partly driven by the sharp increase in online fraud that followed the deployment of EMV smart cards (EMV comes from the initial letters of Euro-pay, MasterCard, VISA) for cardholder-present payments. 3-D Secure has so far escaped academic scrutiny; yet it might be a textbook example of how not to design an authentication protocol. It ignores good design principles and has significant vulnerabilities, some of which are already being exploited. Also, it provides a fascinating lesson in security economics. While other single sign-on schemes such as OpenID, InfoCard and Liberty came up with decent technology they got the economics wrong, and their schemes have not been adopted. 3-D Secure has lousy technology, but got the economics right (at least for banks and merchants); it now boasts hundreds of millions of accounts. The 3-Domain Secure protocol specification defines an architecture and protocol for verifying cardholder account ownership during a purchase transaction in the remote environment. After initiating the final purchase action, the cardholder is placed into a dialog with his issuing financial institution. The Issuer authenticates the cardholder and sends a confirmation of identity back to the merchant; the merchant completes the transaction.

**Keywords:** Access Control Server (ACS), Address Verification Service (AVS), Payment Cards Industry Data Security Standard (PCIDSS), SSL/TLS Secure Socket Layer/Transport Layer Security, Secure Electronic Transaction (SET).

**References:**
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**Abstract:** Wireless Sensor and Actor Networks (WSANs) are heterogeneous form of Wireless Sensor Networks (WSNs) with nodes of differing capabilities. Sensor nodes are small and static devices with limited power, computation, and communication capabilities that are largely used in environmental monitoring applications. The actor nodes are relatively resource rich nodes that can move and perform appropriate actions. The combination of these types of nodes brings closed loop operation in the monitoring applications. There are three specific challenges in WSAN: (i) delivery of the event detection report to the actor within a specified deadline, (ii) energy constrains of the sensor nodes and (iii) the reliable delivery of the sensed report. In this paper we propose a real-time, energy aware, routing protocol. Our protocol works in three phases: (i) route establishment, (ii) route maintenance and (iii) route deletion. During the establishment of routes between sensors and actors, the RREQ control packet is embedded with the information such as route, remaining power level, average traffic and current time. At the destination, the route with the maximum remaining power is chosen for transmission. In the maintenance phase, if any intermediate link fails, then RREQ process takes place. The route deletion phase is entered, if the remaining power of a route is below a threshold, thus removing the route entry the routing table. While sending a packet, the node calculates the current remaining power of the route using the previously received packets from that route. If the current remaining power is below a threshold, then the route is not chosen for transmission, the node tries with other route or starts new route establishment process. In our protocol, the intermediate nodes forward the packet based on the deadline associated with them, thus making it suitable for real time nature of WSAN. The performance of the proposed protocols is evaluated through extensive simulations and compared with that of Ad hoc On Demand Distance Vector (AODV) and Greedy Rumor Forwarding Routing (GRFR) protocols in terms of packet delivery ratio, deadline miss ratio, and lifetime of the network.

**Keywords:** Wireless Sensor Networks, energy efficiency, routing protocol.

**References:**

10. Anju, Performance Comparison of Vedic Multiplier and Booth Multiplier

**Abstract:** The performance of the any processor will depend upon its power and delay. The power and delay should be less in order to get a effective processor. In processors the most commonly used architecture is multiplier. If the power and delay of the multiplier is reduced then the effective processor can be generated. In this paper Vedic Multiplier and Booth Multiplier are implemented on FPGA platform and comparative analysis is done. The comparison of these Architectures is carried out to know the best architecture for multiplication w. r. t. power and delay characteristics. The designs are implemented using VHDL in Modelsim 10.1 b and synthesis is done in Xilinx 8.2i ISE.

**Keywords:** Booth multiplier, Urdhva Tiryagbyham, Vedic multiplier, Xilinx.

**References:**
Chanchal G. Agrawal, J. B. Kulkarni

**Paper Title:** Security in WSN using Polynomial Pool Based Mechanism

**Abstract:** For efficient data accumulation, localized sensor reprogramming, and for distinguishing and revoking compromised sensor mobile sinks (MSs) are necessary in many wireless sensor network (WSN) applications. However, in sensor networks for pair wise key establishment and authentication between sensor nodes and mobile sinks exiting key predistribution schemes are used, the work of mobile sinks for data collection elevates a new security challenge: in the basic probabilistic and q-composite key pre distribution schemes, an attacker can easily obtain a large number of keys by tracing a small fraction of nodes, and hence, by deploying a replicated mobile sink preloaded with some compromised keys gain the control of overall network. A three-tier general framework describe that allow the use of any pair wise key pre distribution scheme as its basic component. This scheme requires two separate key pools, one for the mobile sink to access the network, and one for pair wise key establishment between the sensors. As compared to the polynomial pool-based scheme this security framework has higher network resilience to a mobile sink replication attack.

**Keywords:** Wireless Sensor Network, Random Key Predistribution, Mobile Sink, Hash, Prime, Key Distribution Center.

**References:**


**Authors:** Patil S. N, R. C. Prasad, Member IEEE

**Paper Title:** Designing the Stable Compensation Networks for Buck Boost Converter for Solar Energy System
Abstract: Because of combustion of fossil fuels global warming caused by environmental problems, the raising prices of crude oils and natural gases. They promote continuous effort to improve energy system and its efficiency. There is a need to search for abundant and clean energy sources due to the depleted and increasing prices of oil. Solar energy acts as an alternative renewable energy source. Photovoltaic cells are used as renewable energy system. Photovoltaic (PV) cells can be used to generate dc voltages and given to Buck boost converter. The buck boost converter output is given to battery to inverter and load. Buck boost converter gives constant output which will control by PWM controller and feedback control system. Feedback control system has compensation network with different types and parameters. Depending upon parameters and controlling method, we have to decide stability analysis using Bode Plot. This analysis is carried out by using MATLAB software. It will be used to design buck boost converter with different parameters which gives constant output. It is helpful for optimizing feedback-loop design for the best transient response while maintaining a comfortable margin for stability. Design for highest gain and bandwidth feedback loop. It is useful to study different controlling methods and comparison. It is used to select switching frequency, power inductor, selecting capacitors and verify the quality of the output voltage, harmonic content of the output voltage.

Keywords: Photovoltaic cell model, buck boost converter, compensation network, Design parameters, stability.

References:

Authors: H. P. Narkehede

Paper Title: Review of Image Segmentation Techniques

Abstract: Segmentation is nothing but making the part of image or any object. Pattern recognition and image analysis are the initial steps of image segmentation. In the computer vision domain and image analysis we can done important research topic in the segmentation of video with dynamic background. Image segmentation is most of judging or analyzing function in image processing and analysis. Image segmentation refers to partition of an image into different regions that are homogenous or similar and inhomogenous in some characteristics. Image segmentation results have an effect on image analysis and it following higher order tasks. Image analysis includes object description and representation, feature measurement. Higher order task follows classification of object.. Hence characterization, visualization of region of interest in any image, delineation plays an important role in image segmentation. Using the different algorithms the current methodologies of image segmentation is reviewed so that user interaction is possible for images. In this paper, the review of image segmentation is explained by using different techniques.

Keywords: Image segmentation, image analysis.

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proprietary contents that may later be integrated with the platform being developed, such as, Nigeria Universities Management Information System (NUMIS). Despite the efforts expended, none of these projects could be fully realized. Uwadia C. et al, (2003), pointed out a number of risk factors that posed a serious challenge to realizing an integrated and sustained network for research and education. The researcher modeled a system based on public cloud that will handle problems of cost flights, expertise and availability, as well as, curb problems of project duration and Total Cost of Ownership (TCO).

**Keywords:** NREN, Cloud Computing, Managed Computing, EDUroam, TCO.

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