

**OPTIMIZATION OF RECEIVER FIFO FOR IEEE
802.3ba 40GBASE PCS SUBLAYER**

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Degree of Master of Science

Department of Electronic and Telecommunication Engineering

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University of Moratuwa

Sri Lanka

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Declaration of the Candidate and the Supervisor

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Abstract

Keywords: FIFO, IEEE802.3, PCS Sub layer, 40GBASE-R, 10GBASE-X

Local Area Networks (LAN) are based on Ethernet technology. Commonly used 10 and 40 Gigabit Ethernet systems are adopting IEEE 802.3 standards.

The aim of this dissertation is to optimize the FIFO design for the receiver of Physical Coding Sub layer (PCS) specified by IEEE 802.3 standards. This dissertation is having two phases. In the first phase, optimal FIFO for IEEE 802.3ae 10GBASE-X PCS receiver is designed and implemented. Proper operation of the proposed design is verified with simulation results. In the second phase, possible optimization for receiver FIFO of IEEE 802.3ba 40GBASE-R PCS layer is identified. Potential implementation for 40GBASE-R PCS is simulated with proposed FIFO design, to verify the proper functionality.

Proposed designs will save gate count, power and the silicon area of ASIC design considerably. As future work it is suggested to emulate the proposed design with a suitable hardware.



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LIST OF ABBREVIATIONS

Abbreviation	Description
ASIC	Application Specific Integrated Circuit
BIP	Bit Interleave Parity
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
DTE	Data Terminal Equipment
FCS	Frame Check Sequence
FIFO	First In First Out
HDL	Hardware Description Language
IP	Internet Protocol
IPG	Inter Packet Gap
LAN	Local Area Network
MAC	Media Access Control
OSI	Open System Interconnection
PCS	Physical Coding Sub layer
PHY	PHysical Layer
PMA	Physical Medium Attachment
RS	Reconciliation Sub layer
RXC	Receive Control signals
TXC	Transmit Control signals
UI	Unit Interval
XAUI	10 Gigabit Attachment Unit Interface
XGMII	10 Gigabit Media Independent Interface
XGXS	Extender Sub layer
XLGMII	40Gb/s Media Independent Interface



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