Digital Vlsi Chip Design With Cadence And Synopsys Cad

Tools

Practical Low Power Digital VLSI Design emphasizes the optimization and trade-off techniques that involve power dissipation, in the hope that the

readers are better prepared the next time they are presented with a low power design problem. The book highlights the basic principles, methodologies and techniques that are common to most CMOS digital designs. The

advantages and disadvantages of a particular low power technique are discussed. Besides the classical area-performance trade-off, the impact to design cycle time, complexity, risk, testability and

reusability are discussed. The wide impacts to all aspects of design are what make low power problems challenging and interesting. Heavy emphasis is given to top-down structured design style, with occasional

coverage in the semicustom design methodology. The examples and design techniques cited have been known to be applied to production scale designs or laboratory settings. The goal of Practical Low Power

Digital VLSI Design is to permit the readers to practice the low power techniques using current generation design style and process technology. Practical Low Power Digital VLSI Design considers a wide range of design

abstraction levels spanning circuit, logic, architecture and system. Substantial basic knowledge is provided for qualitative and quantitative analysis at the different design abstraction levels. Low power

techniques are presented at the circuit, logic, architecture and system levels. Special techniques that are specific to some key areas of digital chip design are discussed as well as some of the low power

techniques that are just appearing on the horizon. Practical Low Power Digital VLSI Design will be of benefit to VLSI design engineers and students who have a fundamental knowledge of CMOS digital

design.

A systematic description of microelectronic device design. Topics range from the basics to low-power and ultralow-voltage designs, subthreshold current reduction, memory subsystem

designs for modern DRAMs, and various on-chip supply-voltage conversion techniques. It also covers process and device issues as well as design issues relating to systems, circuits, devices and processes, such as

signal-to-noise and redundancy. Top-down approach to practical, tool-independent, digital circuit design, reflecting how circuits are designed.

Handbook of VLSI Chip Design and Expert Systems provides

information pertinent to the fundamental aspects of expert systems, which provides a knowledge-based approach to problem solving. This book discusses the use of expert systems in every possible

subtask of VLSI chip design as well as in the interrelations between the subtasks. Organized into nine chapters, this book begins with an overview of design automation, which can be identified as

Computer-Aided Design of Circuits and Systems (CADCAS). This text then presents the progress in artificial intelligence, with emphasis on expert systems. Other chapters consider the impact of design

automation, which exploits the basic capabilities of computers to perform complex calculations and to handle huge amounts of data with a high speed and accuracy. This book discusses as well the characterization of

microprocessors. The final chapter deals with interactive I/O devices. This book is a valuable resource for system design experts, circuit analysts and designers, logic designers, device engineers, technologists,

and application-specific designers.

OBDD - Foundations and Applications

Concepts, Methodologies, and Tools

From VLSI Architectures to

CMOS Fabrication
A Comprehensive Guide
A Design Manual for Implementation of Projects on FPGAs and ASICs Using Verilog
A Practical Approach to VLSI System on Chip (SoC) Design

The modern electronic testing has a forty year history. Test professionals hold some fairly large conferences and numerous workshops, have a journal, and there are over one hundred books on testing. Still, a full course on testing is offered only at a few

universities, mostly by professors who have a research interest in this area. Apparently, most professors would not have taken a course on electronic testing when they were students. Other than the computer engineering curriculum being too crowded,

the major reason cited for the absence of a course on electronic testing is the lack of a suitable textbook. For VLSI the foundation was provided by semiconductor device techn- ogy, circuit design, and electronic testing. In a computer engineering

curriculum, therefore, it is necessary that foundations should be taught before applications. The field of VLSI has expanded to systems-on-a-chip, which include digital, memory, and mixed-signalsubsystems. To our

knowledge this is the first textbook to cover all three types of electronic circuits. We have written this textbook for an undergraduate “foundations” course on electronic testing. Obviously, it is too voluminous for a one-semester course and a

teacher will have to select from the topics. We did not restrict such freedom because the selection may depend upon the individual expertise and interests. Besides, there is merit in having a larger book that will retain its usefulness for the owner even

after the completion of the course. With equal tenacity, we address the needs of three other groups of readers.

The Complete, Modern Tutorial on Practical VLSI Chip Design, Validation, and Analysis As microelectronics engineers

design complex chips using existing circuit libraries, they must ensure correct logical, physical, and electrical properties, and prepare for reliable foundry fabrication. VLSI Design Methodology Development focuses on the

design and analysis steps needed to perform these tasks and successfully complete a modern chip design. Microprocessor design authority Tom Dillinger carefully introduces core concepts, and then guides engineers through modeling,

functional design validation, design implementation, electrical analysis, and release to manufacturing. Writing from the engineer's perspective, he covers underlying EDA tool algorithms, flows, criteria for assessing project status, and key tradeoffs

and interdependencies. This fresh and accessible tutorial will be valuable to all VLSI system designers, senior undergraduate or graduate students of microelectronics design, and companies offering internal courses for engineers at all

levels. Reflect complexity, cost, resources, and schedules in planning a chip design project Perform hierarchical design decomposition, floorplanning, and physical integration, addressing DFT, DFM, and DFY requirements Model functionality

and behavior, validate designs, and verify formal equivalency Apply EDA tools for logic synthesis, placement, and routing Analyze timing, noise, power, and electrical issues Prepare for manufacturing release and bring-up, from mastering ECOs to

qualification This guide is for all VLSI system designers, senior undergraduate or graduate students of microelectronics design, and companies offering internal courses for engineers at all levels. It is applicable to engineering teams undertaking

new projects and migrating existing designs to new technologies.

For Electrical Engineering and Computer Engineering courses that cover the design and technology of very large scale integrated (VLSI) circuits and

systems. May also be used as a VLSI reference for professional VLSI design engineers, VLSI design managers, and VLSI CAD engineers. Modern VSLI Design provides a comprehensive "bottom-up" guide to the design of VSLI systems, from the

physical design of circuits through system architecture with focus on the latest solution for system-on-chip (SOC) design. Because VSLI system designers face a variety of challenges that include high performance, interconnect delays, low power,

low cost, and fast design turnaround time, successful designers must understand the entire design process. The Third Edition also provides a much more thorough discussion of hardware description languages, with introduction to both Verilog

and VHDL. For that reason, this book presents the entire VSLI design process in a single volume.

Digital VLSI Chip Design with Cadence and Synopsys CAD ToolsAddison Wesley Longman

A Conceptual Taxonomy

Handbook of VLSI Chip Design and Expert Systems

Harnessing VLSI System Design with EDA Tools

Introduction to VLSI Circuits and Systems

Circuits for Emerging Applications

Power Distribution Network Design for VLSI

Recently the world celebrated the 60th anniversary of the invention of the first transistor. The first integrated circuit (IC) was built a decade later, with the first

microprocessor designed in the early 1970s. Today, ICs are a part of nearly every aspect of our daily lives. They help us live longer and more comfortably, and do more, faster. All this is possible because of the relentless search for new

materials, circuit designs, and ideas happening on a daily basis at industrial and academic institutions around the globe. Showcasing the latest advances in very-large-scale integrated (VLSI) circuits, VLSI: Circuits for Emerging Applications

provides a balanced view of industrial and academic developments beyond silicon and complementary metal–oxide–semiconductor (CMOS) technology. From quantum-dot cellular automata (QCA) to

chips for cochlear implants, this must-have resource: Investigates the trend of combining multiple cores in a single chip to boost performance of the overall system Describes a novel approach to enable physically unclonable

functions (PUFs) using intrinsic features of a VLSI chip Examines the VLSI implementations of major symmetric and asymmetric key cryptographic algorithms, hash functions, and digital signatures Discusses nonvolatile memories

such as resistive random-access memory (Re-RAM), magneto-resistive RAM (MRAM), and floating-body RAM (FB-RAM) Explores organic transistors, soft errors, photonics, nanoelectromechanical (NEM) relays, reversible

computation, bioinformatics, asynchronous logic, and more VLSI: Circuits for Emerging Applications presents cutting-edge research, design architectures, materials, and uses for VLSI circuits, offering valuable insight

into the current state of the art of micro- and nanoelectronics.
This book provides some recent advances in design nanometer VLSI chips. The selected topics try to present some open problems and challenges with important

topics ranging from design tools, new post-silicon devices, GPU-based parallel computing, emerging 3D integration, and antenna design. The book consists of two parts, with chapters such as: VLSI design for multi-sensor smart systems on a

chip, Three-dimensional integrated circuits design for thousand-core processors, Parallel symbolic analysis of large analog circuits on GPU platforms, Algorithms for CAD tools VLSI design, A multilevel memetic algorithm for large SAT-

encoded problems, etc.

This book teaches the principles of physical design, layout, and simulation of CMOS integrated circuits. It is written around a very powerful CAD program called Microwind that is available on the

accompanying CD-ROM. Featuring a friendly interface, Microwind is both educational and useful for designing CMOS chips.
Aimed primarily for undergraduate students pursuing courses in VLSI design, the book emphasizes the

physical understanding of underlying principles of the subject. It not only focuses on circuit design process obeying VLSI rules but also on technological aspects of Fabrication. VHDL modeling is discussed as the design engineer is

expected to have good knowledge of it. Various Modeling issues of VLSI devices are focused which includes necessary device physics to the required level. With such an in-depth coverage and practical approach practising engineers can

also use this as ready reference.

VLSI Circuit Design Methodology Demystified

VLSI Design of Neural Networks

Design and Modeling of Low Power VLSI Systems

Digital VLSI Systems Design

The Application of VLSI Design Principles to a Digital Lock Chip

Computer System Design

With the proliferation of VHDL, the reference material also grew in the same order. Today there is

good amount of scholarly literature including many books describing various aspects of VHDL. However, an indepth review of these books reveals a different story. Many of them have

emerged simply as an improved version of the manual. While some of them deal with the system design issues, they lack appropriate exemplifying to illustrate the

concepts. Others give large number of examples, but lack the VLSI system design issues. In nutshell, the fact which gone unnoticed by most of the books, is the growth

of the VLSI is not merely due to the language itself, but more due to the development of large number of third party tools useful from the FPGA or semicustom ASIC

realization point of view. In the proposed book, the authors have synergized the VHDL programming with appropriate EDA tools so as to present a full proof system design to the

readers. In this book along with the VHDL coding issues, the simulation and synthesis with the various toolsets enables the potential reader to visualize the final

design. The VHDL design codes have been synthesized using different third party tools such as Xilinx Web pack Ver.11, Modelsim PE, Leonrado Spectrum and

Synplify Pro. Mixed flow illustrated by using the above mentioned tools presents an insight to optimize the design with reference to the spatial, temporal and power

metrics.

Low-Power Digital VLSI Design: Circuits and Systems addresses both process technologies and device modeling. Power dissipation in CMOS

circuits, several practical circuit examples, and low-power techniques are discussed. Low-voltage issues for digital CMOS and BiCMOS circuits are emphasized.

The book also provides an extensive study of advanced CMOS subsystem design. A low-power design methodology is presented with various power minimization techniques at

the circuit, logic, architecture and algorithm levels. Features: Low-voltage CMOS device modeling, technology files, design rules Switching activity

concept, low-power guidelines to engineering practice Pass-transistor logic families Power dissipation of I/O circuits Multi- and low-VT CMOS logic, static power

reduction circuit techniques State of the art design of low-voltage BiCMOS and CMOS circuits Low-power techniques in CMOS SRAMS and DRAMS Low-power on-chip voltage down

converter design Numerous advanced CMOS subsystems (e.g. adders, multipliers, data path, memories, regular structures, phase-locked loops) with several design options trading

power, delay and area Low-power design methodology, power estimation techniques Power reduction techniques at the logic, architecture and algorithm levels More than 190

circuits explained at the transistor level.
One of the main problems in chip design is the enormous number of possible combinations of individual chip elements

within a system, and the problem of their compatibility. The recent application of data structures, efficient algorithms, and ordered binary decision diagrams

(OBDDs) has proven vital in designing the computer chips of tomorrow. This book provides an introduction to the foundations of this interdisciplinary research

area, emphasizing its applications in computer aided circuit design. KEY BENEFIT: This hands-on book leads readers through the complete process of building a ready-to-

fabricate CMOS integrated circuit using popular commercial design software. KEY TOPICS: The VLSI CAD flow described in this book uses tools from two vendors: Cadence

Design Systems, Inc. and Synopsys Inc. Detailed tutorials include step-by-step instructions and screen shots of tool windows and dialog boxes. MARKET: A useful reference

for chip designers.
Digital VLSI Chip Design with Cadence and Synopsys CAD Tools
Mixed Analog-digital VLSI Devices and Technology
VLSI Design Methodology

Development
Top-Down Digital VLSI Design
Three-dimensional Integrated Circuit Design
Chip Design for Submicron VLSI

Very large scale integration (VLSI) technologies are now maturing with a current emphasis toward submicron structures and sophisticated applications combining digital as well as analog circuits on a

single chip. Abundant examples are found on today's advanced systems for telecom munications, robotics, automotive electronics, image processing, intelli gent sensors, etc .. Exciting new

applications are being unveiled in the field of neural computing where the massive use of analog/digital VLSI technologies will have a significant impact. To match such a fast technological trend

towards single chip ana logi digital VLSI systems, researchers worldwide have long realized the vital need of producing advanced computer aided tools for designing both digital and analog circuits and

systems for silicon integration. Ar chitecture and circuit compilation, device sizing and the layout genera tion are but a few familiar tasks on the world of digital integrated circuit design which can be

efficiently accomplished by matured computer aided tools. In contrast, the art of tools for designing and producing analog or even analogi digital integrated circuits is quite primitive and still lack ing the

industrial penetration and acceptance already achieved by digital counterparts. In fact, analog design is commonly perceived to be one of the most knowledge-intensive design tasks and analog circuits are

still designed, largely by hand, by expert intimately familiar with nuances of the target application and integrated circuit fabrication process. The techniques needed to build good analog circuits seem to

exist solely as expertise invested in individual designers.

During the last decade, CMOS has become increasingly attractive as a basic integrated circuit technology due to its

low power (at moderate frequencies), good scalability, and rail-to-rail operation. There are now a variety of CMOS circuit styles, some based on static complementary con ductance properties, but

others borrowing from earlier NMOS techniques and the advantages of using clocking disciplines for precharge-evaluate se quencing. In this comprehensive book, the reader is led systematically

through the entire range of CMOS circuit design. Starting with the in dividual MOSFET, basic circuit building blocks are described, leading to a broad view of both combinatorial and sequential

circuits. Once these circuits are considered in the light of CMOS process technologies, impor tant topics in circuit performance are considered, including characteristics of interconnect, gate delay,

device sizing, and I/O buffering. Basic circuits are then composed to form macro elements such as multipliers, where the reader acquires a unified view of architectural performance through par

allelism, and circuit performance through careful attention to circuit-level and layout design optimization. Topics in analog circuit design reflect the growing tendency for both analog and digital

circuit forms to be combined on the same chip, and a careful treatment of BiCMOS forms introduces the reader to the combination of both FET and bipolar technologies on the same chip to provide improved

performance.

Design and optimization of integrated circuits are essential to the creation of new semiconductor chips, and physical optimizations are becoming more prominent as a

result of semiconductor scaling. Modern chip design has become so complex that it is largely performed by specialized software, which is frequently updated to address advances in semiconductor

technologies and increased problem complexities. A user of such software needs a high-level understanding of the underlying mathematical models and algorithms. On the other hand, a developer of

such software must have a keen understanding of computer science aspects, including algorithmic performance bottlenecks and how various algorithms operate and interact. "VLSI

Physical Design: From Graph Partitioning to Timing Closure" introduces and compares algorithms that are used during the physical design phase of integrated-circuit design, wherein a

geometric chip layout is produced starting from an abstract circuit design. The emphasis is on essential and fundamental techniques, ranging from hypergraph partitioning and circuit

placement to timing closure. The first of two volumes in the Electronic Design Automation for Integrated Circuits Handbook, Second Edition, Electronic Design Automation for IC System Design,

Verification, and Testing thoroughly examines system-level design, microarchitectural design, logic verification, and testing. Chapters contributed by leading experts authoritatively

discuss processor modeling and design tools, using performance metrics to select microprocessor cores for integrated circuit (IC) designs, design and verification languages, digital simulation,

hardware acceleration and emulation, and much more. New to This Edition: Major updates appearing in the initial phases of the design flow, where the level of abstraction keeps rising to

support more functionality with lower non-recurring engineering (NRE) costs Significant revisions reflected in the final phases of the design flow, where the complexity due to smaller and

smaller geometries is compounded by the slow progress of shorter wavelength lithography New coverage of cutting-edge applications and approaches realized in the decade since publication of the

previous edition—these are illustrated by new chapters on high-level synthesis, system-on-chip (SoC) block-based design, and back-annotating system-level models Offering improved depth and modernity,

Electronic Design Automation for IC System Design, Verification, and Testing provides a valuable, state-of-the-art reference for electronic design automation (EDA) students, researchers, and

professionals.

VLSI Design

An Artificial Intelligence Approach to VLSI Design

VLSI Memory Chip Design

CMOS VLSI Design: A Circuits

and Systems Perspective

System-on-Chip Design

The art of transforming a circuit idea into a chip has changed permanently. Formerly, the electrical, physical and geometrical

tasks were predominant. Later, mainly net lists of gates had to be constructed. Nowadays, hardware description languages (HDL) similar to programming languages are central to digital circuit

design. HDL-based design is the main subject of this book. After emphasizing the economic importance of chip design as a key technology, the book deals with VLSI design (Very Large Scale

Integration), the design of modern RISC processors, the hardware description language VERILOG, and typical modeling techniques. Numerous examples as well as a VERILOG training simulator

are included on a disk.

A hands-on troubleshooting guide for VLSI network designers The primary goal in VLSI (very large scale integration) power network design is to provide enough

power lines across a chip to reduce voltage drops from the power pads to the center of the chip. Voltage drops caused by the power network's metal lines coupled with transistor switching

currents on the chip cause power supply noises that can affect circuit timing and performance, thus providing a constant challenge for designers of high-performance chips. Power Distribution

Network Design for VLSI provides detailed information on this critical component of circuit design and physical integration for high-speed chips. A vital tool for professional engineers

(especially those involved in the use of commercial tools), as well as graduate students of engineering, the text explains the design issues, guidelines, and CAD tools for the power distribution of the

VLSI chip and package, and provides numerous examples for its effective application. Features of the text include: * An introduction to power distribution network design * Design perspectives, such as

power network planning, layout specifications, decoupling capacitance insertion, modeling, and analysis * Electromigration phenomena * IR drop analysis methodology * Commands and

user interfaces of the VoltageStorm(TM) CAD tool * Microprocessor design examples using on-chip power distribution * Flip-chip and package design issues * Power network measurement

techniques from real silicon The author includes several case studies and a glossary of key words and basic terms to help readers understand and integrate basic concepts in VLSI design and power

distribution.

CD-ROM contains: AIM SPICE (from AIM Software) -- Micro-Cap 6 (from Spectrum Software) -- Silos III Verilog Simulator (from Simucad) -- Adobe Acrobat Reader 4.0

(from Adobe).

Top-Down VLSI Design: From Architectures to Gate-Level Circuits and FPGAs represents a unique approach to learning digital design. Developed from more than 20

years teaching circuit design, Doctor Kaeslin’s approach follows the natural VLSI design flow and makes circuit design accessible for professionals with a background in systems

engineering or digital signal processing. It begins with hardware architecture and promotes a system-level view, first considering the type of intended application and letting that guide your design

choices. Doctor Kaeslin presents modern considerations for handling circuit complexity, throughput, and energy efficiency while preserving functionality. The book focuses on application-

specific integrated circuits (ASICs), which along with FPGAs are increasingly used to develop products with applications in telecommunications, IT security, biomedical,

automotive, and computer vision industries. Topics include field-programmable logic, algorithms, verification, modeling hardware, synchronous clocking, and more. Demonstrates a top-

down approach to digital VLSI design. Provides a systematic overview of architecture optimization techniques. Features a chapter on field-programmable logic devices, their technologies and

architectures. Includes checklists, hints, and warnings for various design situations. Emphasizes design flows that do not overlook important action items and which include alternative

options when planning the development of microelectronic circuits.

Circuits and Systems

Modern VLSI Design

VLSI Physical Design: From Graph Partitioning to Timing

Closure

Circuit Design for CMOS VLSI

CMOS IC Layout

Algorithms and Data Structures in VLSI Design

This book includes basic methodologies, review of basic

electrical rules and how they apply, design rules, IC planning, detailed checklists for design review, specific layout design flows, specialized block design, interconnect design, and also additional information on design

limitations due to production requirements. *Practical, hands-on approach to CMOS layout theory and design *Offers engineers and technicians the training materials they need to stay current in circuit design

technology. *Covers manufacturing processes and their effect on layout and design decisions

Very Large Scale Integration (VLSI) has become a necessity rather than a specialization for

electrical and computer engineers. This unique text provides Engineering and Computer Science students with a comprehensive study of the subject, covering VLSI from basic design techniques to working

principles of physical design automation tools to leading edge application-specific array processors. Beginning with CMOS design, the author describes VLSI design from the viewpoint of a digital circuit engineer. He

develops physical pictures for CMOS circuits and demonstrates the top-down design methodology using two design projects - a microprocessor and a field programmable gate array. The author then discusses VLSI

testing and dedicates an entire chapter to the working principles, strengths, and weaknesses of ubiquitous physical design tools. Finally, he unveils the frontiers of VLSI. He emphasizes its use as a tool to develop innovative

algorithms and architecture to solve previously intractable problems. VLSI Design answers not only the question of "what is VLSI," but also shows how to use VLSI. It provides graduate and upper level undergraduate

students with a complete and congregated view of VLSI engineering.

Improve your circuit-design potential with this expert guide to the devices and technology used in mixed analog-digital VLSI chips

for such high-volume applications as hard-disk drives, wireless telephones, and consumer electronics. The book provides you with a critical understanding of device models, fabrication technology, and layout as they

apply to mixed analog-digital circuits.You will learn about the many device-modeling requirements for analog work, as well as the pitfalls in models used today for computer simulators such as Spice. Also included is

information on fabrication technologies developed specifically for mixed-signal VLSI chips, plus guidance on the layout of mixed analog-digital chips for a high degree of analog-device matching and minimum digital-to-

analog interference.This reference book features an intuitive introduction to MOSFET operation that will enable you to view with insight any MOSFET model ? besides thorough discussions on valuable large-

signal and small-signal models.Filled with practical information, this first-of-its-kind book will help you grasp the nuances of mixed-signal VLSI-device models and layout that are crucial to the design of high-

performance chips.

This book provides a comprehensive overview of the VLSI design process. It covers end-to-end system on chip (SoC) design, including design methodology, the design

environment, tools, choice of design components, handoff procedures, and design infrastructure needs. The book also offers critical guidance on the latest UPF-based low power design flow issues for deep

submicron SOC designs, which will prepare readers for the challenges of working at the nanotechnology scale. This practical guide will provide engineers who aspire to be VLSI designers with the techniques and

tools of the trade, and will also be a valuable professional reference for those already working in VLSI design and verification with a focus on complex SoC designs. A comprehensive practical guide for VLSI designers; Covers end-to-end

VLSI SoC design flow; Includes source code, case studies, and application examples.

Digital Integrated Circuit Design

An Introduction Based on a Large RISC Processor Design

Digital Vlsi Design

Electronic Design Automation for IC System Design, Verification, and Testing

Essentials of Electronic Testing for Digital, Memory and Mixed-Signal VLSI Circuits

Physical Design of CMOS

Integrated Circuits Using L-Edit

The award-winning VLSI design guide is now fully updated to reflect the latest advances in chip design

"Physical Design of CMOS

Integrated Circuits Using L-Edit is the first book/software package that enables engineering students and professionals to perform full IC layout on an

inexpensive personal computer. The Student Version of L-Edit, included with the book on a 3.5-inch disk, is a full-featured layout editor that runs on MS-

DOS compatible computers with minimal hardware requirements (640K RAM, a mouse, and an EGA or better color monitor). L-Edit allows the user to implement the physical

design of an integrated circuit at the silicon level, and provides output for circuit simulation on SPICE. The entire process of chip design - once the

exclusive province of workstation-based CAD systems - can now be performed on a PC." "Database files for many standard MOSIS CMOS processes are provided

on disk, including Orbit and HP 2.0 and 1.2-micron technology base definitions. The program provides for circuit extraction (translating the layout

to a SPICE-compatible text file), and design rule checking using predefined MOSIS rules or custom-designed sets. It also features a unique cross-sectional

viewer that constructs the side view layering from the layoutthis viewer helps users visualize the link between layout drawings and the device

structure. Circuit designs created on the Student Version of L-Edit can be translated to GDS II or CIF format for submission to a fabrication foundry

using the Professional Version of L-Edit."--BOOK JACKET.Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

This text is intended for the undergraduate engineering students in Electrical and Electronics Engineering, Electronics and Communication

Engineering, and Electronics and Instrumentation Engineering, and those pursuing postgraduate courses in Applied Electronics and VLSI

Design. With the electronic devices and chips becoming smaller and smaller, the sizes of circuits and transistors on the microchips are

approaching atomic levels. And so, Very Large-Scale Integration (VLSI) Design refers to the process of placing hundreds of thousands of electronic components on

a single chip which nearly all modern computer architectures employ, and this technology has assumed a significant role in today's tech savvy

world. This well-organized, up-to-date and compact text explains the basic concepts of MOS technology including the fabrication methods, MOS

characteristic behaviour, and design processes for layouts, etc. in a crisp and easy-to-learn style. The latest and most advanced techniques for

maximising performance, minimising power consumption, and achieving rapid design turnarounds are discussed with great skill by the authors.

Key Features Gives an in-depth analysis of MOS structure, device characteristics, modelling and MOS device fabrication techniques. Provides detailed

description of CMOS design of combinatorial, sequential and arithmetic circuits with emphasis on practical applications. ? Offers an insight into the CMOS

testing techniques for the design of VLSI circuits. ? Gives a number of solved problems in VHDL and Verilog languages. ? Provides a number of

short answer questions to help the students during examinations. The early era of neural network hardware design (starting at 1985) was mainly technology

driven. Designers used almost exclusively analog signal processing concepts for the recall mode. Learning was deemed not to cause a problem because the

number of implementable synapses was still so low that the determination of weights and thresholds could be left to conventional computers. Instead,

designers tried to directly map neural parallelity into hardware. The architectural concepts were accordingly simple and produced the so

called interconnection problem which, in turn, made many engineers believe it could be solved by optical implementation in adequate fashion only.

Furthermore, the inherent fault-tolerance and limited computation accuracy of neural networks were claimed to justify that little effort is to be spend on

careful design, but most effort be put on technology issues. As a result, it was almost impossible to predict whether an electronic neural network would

function in the way it was simulated to do. This limited the use of the first neuro-chips for further experimentation, not to mention that real-world

applications called for much more synapses than could be implemented on a single chip at that time. Meanwhile matters have matured. It is recognized that isolated

definition of the effort of analog multiplication, for instance, would be just as inappropriate on the part ofthe chip designer as determination of the

weights by simulation, without allowing for the computing accuracy that can be achieved, on the part of the user.

VLSI Chip Design with the Hardware Description

Language VERILOG

IP-based Design

Low-Power Digital VLSI Design

Practical Low Power Digital VLSI Design

VLSI

From Architectures to Gate-Level Circuits and FPGAs

This book was written to arm engineers qualified and knowledgeable in the area of VLSI circuits with the essential knowledge they need to get into this

exciting field and to help those already in it achieve a higher level of proficiency. Few people truly understand how a large chip is developed, but an understanding of the whole process is necessary to appreciate the importance of each part

of it and to understand the process from concept to silicon. It will teach readers how to become better engineers through a practical approach of diagnosing and attacking real-world problems.

Very Large Scale Integration (VLSI)

Systems refer to the latest development in computer microchips which are created by integrating hundreds of thousands of transistors into one chip. Emerging research in this area has the potential to uncover further applications for VSLI technologies in

addition to system advancements. Design and Modeling of Low Power VLSI Systems analyzes various traditional and modern low power techniques for integrated circuit design in addition to the limiting factors of existing techniques and methods for

optimization. Through a research-based discussion of the technicalities involved in the VLSI hardware development process cycle, this book is a useful resource for researchers, engineers, and graduate-level students in computer science and engineering.

This book provides step-by-step guidance on how to design VLSI systems using Verilog. It shows the way to design systems that are device, vendor and technology independent. Coverage presents new material and theory as well as synthesis of recent

work with complete Project Designs using industry standard CAD tools and FPGA boards. The reader is taken step by step through different designs, from implementing a single digital gate to a massive design consuming well over 100,000 gates. All the design codes

developed in this book are Register Transfer Level (RTL) compliant and can be readily used or amended to suit new projects.

The next generation of computer system designers will be less concerned about details of processors and

memories, and more concerned about the elements of a system tailored to particular applications. These designers will have a fundamental knowledge of processors and other elements in the system, but the success of their design will depend on the skills in making

system-level tradeoffs that optimize the cost, performance and other attributes to meet application requirements. This book provides a new treatment of computer system design, particularly for System-on-Chip (SOC), which addresses the issues mentioned above.

It begins with a global introduction, from the high-level view to the lowest common denominator (the chip itself), then moves on to the three main building blocks of an SOC (processor, memory, and interconnect). Next is an overview of what makes SOC unique

(its customization ability and the applications that drive it). The final chapter presents future challenges for system design and SOC possibilities.

Introduction to Analog VLSI Design Automation

CMOS Layout and Simulation

System-on-Chip

With vastly increased complexity and functionality in the "nanometer era" (i.e. hundreds of millions of transistors on one chip), increasing the performance of integrated

circuits has become a challenging task. Connecting effectively (interconnect design) all of these chip elements has become the greatest determining factor in overall performance. 3-D integrated circuit design may

offer the best solutions in the near future. This is the first book on 3-D integrated circuit design, covering all of the technological and design aspects of this emerging design paradigm, while proposing effective solutions to

specific challenging problems concerning the design of 3-D integrated circuits. A handy, comprehensive reference or a practical design guide, this book provides a sound foundation for the design of 3-D integrated

circuits. * Demonstrates how to overcome "interconnect bottleneck" with 3-D integrated circuit design...leading edge design techniques offer solutions to problems (performance/power

consumption/price) faced by all circuit designers * The FIRST book on 3-D integrated circuit design...provides up-to-date information that is otherwise difficult to find * Focuses on design issues key to the product

development cycle...good design plays a major role in exploiting the implementation flexibilities offered in the 3-D * Provides broad coverage of 3-D integrated circuit design, including interconnect prediction models,

thermal management techniques, and timing optimization...offers practical view of designing 3-D circuits