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□□VLSI□□□□ - Erik Brunvand 2009

Low Power Design Essentials - Jan Rabaey 2009-04-21

This book contains all the topics of importance to the low power designer. It first lays the foundation and then goes on to detail the design process. The book also discusses such special topics as power management and modal design, ultra low power, and low power design methodology and flows. In addition, coverage includes projections of the future and case studies.

Multi-Net Optimization of VLSI Interconnect - Konstantin Moiseev 2014-11-07

This book covers layout design and layout migration methodologies for optimizing multi-net wire structures in advanced VLSI interconnects. Scaling-dependent models for interconnect power, interconnect delay and crosstalk noise are covered in depth, and several design optimization problems are addressed, such as minimization of interconnect power under delay constraints, or design for minimal delay in wire bundles within a given routing area. A handy reference or a guide for design methodologies and layout automation techniques, this book provides a foundation for physical design challenges of interconnect in advanced integrated circuits.

Basic VLSI Design - Douglas A. Pucknell 1985

Communication, Software and Networks - Vikrant Bhateja 2022-12-08

This book highlights a collection of high-quality peer-reviewed research papers presented at the 7th International Conference on Information System Design and Intelligent Applications (INDIA 2022), held at BVRIT Hyderabad College of Engineering for Women, Hyderabad, Telangana, India, from February 25-26, 2022. It covers a wide range of topics in computer science and information technology, from wireless networks, social networks, wireless sensor networks, information and network security, to web security, Internet of Things, bioinformatics, geoinformatics, and computer networks.

Digital Integrated Circuits - Jan M. Rabaey 1996

Beginning with discussions on the operation of electronic devices and analysis of the nucleus of digital design, the text addresses: the impact of interconnect, design for low power, issues in timing and clocking, design methodologies, and the effect of design automation on the digital design perspective.

CMOS VLSI Design - Neil H. E. Weste 2005

Details techniques for the design of complex and high performance CMOS Systems-on-Chip. This edition explains practices of chip design, covering transistor operation, CMOS gate design, fabrication, and layout, at level accessible to anyone with an elementary knowledge of digital electronics.

Artificial Intelligence Perspectives in Intelligent Systems - Rajat Subh 2016-04-26

This volume is based on the research papers presented in the 5th Computer Science On-line Conference. The volume Artificial Intelligence Perspectives in Intelligent Systems presents modern trends and methods to real-world problems, and in particular, exploratory research that describes novel approaches in the field of artificial intelligence. New algorithms in a variety of fields are also presented. The Computer Science On-line Conference (CSOC 2016) is intended to provide an international forum for discussions on the latest research results in all areas related to Computer Science. The addressed topics are the theoretical aspects

and applications of Computer Science, Artificial Intelligences, Cybernetics, Automation Control Theory and Software Engineering.

Integrated Circuit and System Design: Power and Timing Modeling, Optimization and Simulation - Monteiro 2010-02-06

This book constitutes the thoroughly refereed post-conference proceedings of 19th International Workshop on Power and Timing Modeling, Optimization and Simulation, PATMOS 2009, featuring Integrated Circuit and System Design, held in Delft, The Netherlands during September 9-11, 2009. The 26 revised full papers and 10 revised poster papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on variability & statistical timing, circuit level techniques, power management, low power circuits & technology, system level techniques, power & timing optimization techniques, self-timed circuits, low power circuit analysis & optimization, and low power design studies.

VLSI Design - Debaprasad Das 2016-01-15

The second edition of VLSI Design is a comprehensive textbook designed for undergraduate students of electrical, electronics, and electronics and communication engineering. It provides a thorough understanding of the fundamental concepts and design of VLSI systems.

Advances in Smart Communication and Imaging Systems - Rajeev Agrawal 2021-04-13

This book presents select and peer-reviewed proceedings of the International Conference on Smart Communication and Imaging Systems (MedCom 2020). The contents explore the recent technological advances in the field of next generation communication systems and latest techniques for image processing, analysis and their related applications. The topics include design and development of smart, secure and reliable future communication networks; satellite, radar and microwave techniques for intelligent communication. The book also covers methods and applications of GIS and remote sensing; medical image analysis and its applications in smart health. This book can be useful for students, researchers and professionals working in the field of communication systems and image processing.

CMOS Digital Integrated Circuits - Sung-Mo Kang 2002

The fourth edition of CMOS Digital Integrated Circuits: Analysis and Design continues the well-established tradition of the earlier editions by offering the most comprehensive coverage of digital CMOS circuit design, as well as addressing state-of-the-art technology issues highlighted by the widespread use of nanometer-scale CMOS technologies. In this latest edition, virtually all chapters have been re-written, the transistor model equations and device parameters have been revised to reflect the significant changes that must be taken into account for new technology generations, and the material has been reinforced with up-to-date examples. The broad-ranging coverage of this textbook starts with the fundamentals of CMOS process technology, and continues with MOS transistor models, basic CMOS gates, interconnect effects, dynamic circuits, memory circuits, arithmetic building blocks, clock and I/O circuits, low power design techniques, design for manufacturability and design for testability.

Principles of CMOS VLSI Design - Neil West 2000-12-01

This book conveys an understanding of CMOS technology, circuit design, layout, and system design sufficient to the designer. The book deals with the technology down to the layout level of detail, thereby

providing a bridge from a circuit to a form that may be fabricated. The early chapters provide a circuit view of the CMOS IC design, the middle chapters cover a sub-system view of CMOS VLSI, and the final section illustrates these techniques using a real-world case study.

Design and Modeling of Low Power VLSI Systems - Sharma, Manoj 2016-06-06

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 VLSI 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.

Algorithms for VLSI Physical Design Automation - Naveed A. Sherwani 2013-06-29

Algorithms for VLSI Physical Design Automation is a core reference text for graduate students and CAD professionals. It provides a comprehensive treatment of the principles and algorithms of VLSI physical design. Algorithms for VLSI Physical Design Automation presents the concepts and algorithms in an intuitive manner. Each chapter contains 3-4 algorithms that are discussed in detail. Additional algorithms are presented in a somewhat shorter format. References to advanced algorithms are presented at the end of each chapter. Algorithms for VLSI Physical Design Automation covers all aspects of physical design. The first three chapters provide the background material while the subsequent chapters focus on each phase of the physical design cycle. In addition, newer topics like physical design automation of FPGAs and MCMs have been included. The author provides an extensive bibliography which is useful for finding advanced material on a topic. Algorithms for VLSI Physical Design Automation is an invaluable reference for professionals in layout, design automation and physical design.

Digital System Test and Testable Design - Zainalabedin Navabi 2010-12-10

This book is about digital system testing and testable design. The concepts of testing and testability are treated together with digital design practices and methodologies. The book uses Verilog models and testbenches for implementing and explaining fault simulation and test generation algorithms. Extensive use of Verilog and Verilog PLI for test applications is what distinguishes this book from other test and testability books. Verilog eliminates ambiguities in test algorithms and BIST and DFT hardware architectures, and it clearly describes the architecture of the testability hardware and its test sessions. Describing many of the on-chip decompression algorithms in Verilog helps to evaluate these algorithms in terms of hardware overhead and timing, and thus feasibility of using them for System-on-Chip designs. Extensive use of testbenches and testbench development techniques is another unique feature of this book. Using PLI in developing testbenches and virtual testers provides a powerful programming tool, interfaced with hardware described in Verilog. This mixed hardware/software environment facilitates description of complex test programs and test strategies.

Proceedings of 2nd International Conference on Micro-Electronics, Electromagnetics and Telecommunications - Suresh Chandra Satapathy 2017-09-06

The book is a collection of best papers presented in the Second International Conference on Microelectronics Electromagnetics and Telecommunication (ICMEET 2016), an international colloquium, which aims to bring together academic scientists, researchers and research scholars to discuss the recent developments and future trends in the fields of microelectronics, electromagnetics and telecommunication. Microelectronics research investigates semiconductor materials and device physics for developing electronic devices and integrated circuits with data/energy efficient performance in terms of speed, power consumption, and functionality. The book discusses various topics like analog, digital and mixed signal circuits, bio-medical circuits and systems, RF circuit design, microwave and millimeter wave circuits, green circuits and systems, analog and digital signal processing, nano electronics and giga scale systems, VLSI circuits and systems, SoC and NoC, MEMS and NEMS, VLSI digital signal processing, wireless communications, cognitive radio, and data communication.

CMOS - R. Jacob Baker 2008

This edition provides an important contemporary view of a wide range of analog/digital circuit blocks, the BSIM model, data converter architectures, and more. The authors develop design techniques for both long- and short-channel CMOS technologies and then compare the two.

Adiabatic Logic - Philip Teichmann 2011-10-29

Adiabatic logic is a potential successor for static CMOS circuit design when it comes to ultra-low-power energy consumption. Future development like the evolutionary shrinking of the minimum feature size as well as revolutionary novel transistor concepts will change the gate level savings gained by adiabatic logic. In addition, the impact of worsening degradation effects has to be considered in the design of adiabatic circuits. The impact of the technology trends on the figures of merit of adiabatic logic, energy saving potential and optimum operating frequency, are investigated, as well as degradation related issues. Adiabatic logic benefits from future devices, is not susceptible to Hot Carrier Injection, and shows less impact of Bias Temperature Instability than static CMOS circuits. Major interest also lies on the efficient generation of the applied power-clock signal. This oscillating power supply can be used to save energy in short idle times by disconnecting circuits. An efficient way to generate the power-clock is by means of the synchronous 2N2P LC oscillator, which is also robust with respect to pattern-induced capacitive variations. An easy to implement but powerful power-clock gating supplement is proposed by gating the synchronization signals. Diverse implementations to shut down the system are presented and rated for their applicability and other aspects like energy reduction capability and data retention. Advantageous usage of adiabatic logic requires compact and efficient arithmetic structures. A broad variety of adder structures and a Coordinate Rotation Digital Computer are compared and rated according to energy consumption and area usage, and the resulting energy saving potential against static CMOS proves the ultra-low-power capability of adiabatic logic. In the end, a new circuit topology has to compete with static CMOS also in productivity. On a 130nm test chip, a large scale test vehicle containing an FIR filter was implemented in adiabatic logic, utilizing a standard, library-based design flow, fabricated, measured and compared to simulations of a static CMOS counterpart, with measured saving factors compliant to the values gained by simulation. This leads to the conclusion that adiabatic logic is ready for productive design due to compatibility not only to CMOS technology, but also to electronic design automation (EDA) tools developed for static CMOS system design.

Design of High-Performance Microprocessor Circuits - Anantha Chandrakasan 2001

The authors present readers with a compelling, one-stop, advanced system perspective on the intrinsic issues of digital system design. This invaluable reference prepares readers to meet the emerging challenges of the device and circuit issues associated with deep submicron technology. It incorporates future trends with practical, contemporary methodologies.

Introduction to VLSI Systems - Carver Mead 1978

Introduction to VLSI Systems - Ming-Bo Lin 2011-11-28

With the advance of semiconductors and ubiquitous computing, the use of system-on-a-chip (SoC) has become an essential technique to reduce product cost. With this progress and continuous reduction of feature sizes, and the development of very large-scale integration (VLSI) circuits, addressing the harder problems requires fundamental understanding of circuit and layout design issues. Furthermore, engineers can often develop their physical intuition to estimate the behavior of circuits rapidly without relying predominantly on computer-aided design (CAD) tools. Introduction to VLSI Systems: A Logic, Circuit, and System Perspective addresses the need for teaching such a topic in terms of a logic, circuit, and system design perspective. To achieve the above-mentioned goals, this classroom-tested book focuses on: Implementing a digital system as a full-custom integrated circuit Switch logic design and useful paradigms that may apply to various static and dynamic logic families The fabrication and layout designs of complementary metal-oxide-semiconductor (CMOS) VLSI Important issues of modern CMOS processes, including deep submicron devices, circuit optimization, interconnect modeling and optimization, signal integrity, power integrity, clocking and timing, power dissipation, and electrostatic discharge (ESD) Introduction to VLSI Systems builds an understanding of integrated circuits from the bottom up, paying much attention to logic circuit, layout, and system designs. Armed with these tools, readers can not only

comprehensively understand the features and limitations of modern VLSI technologies, but also have enough background to adapt to this ever-changing field.

Low-Power High-Level Synthesis for Nanoscale CMOS Circuits - Saraju P. Mohanty 2008-05-31

This self-contained book addresses the need for analysis, characterization, estimation, and optimization of the various forms of power dissipation in the presence of process variations of nano-CMOS technologies. The authors show very large-scale integration (VLSI) researchers and engineers how to minimize the different types of power consumption of digital circuits. The material deals primarily with high-level (architectural or behavioral) energy dissipation.

Low-Power Digital VLSI Design - Abdellatif Bellaouar 2012-12-06

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.

VLSI Design- K. Lal Kishore 2013-12-30

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. Key features: Numerous practical examples. Questions with solutions that reflect the common doubts a beginner encounters. Device Fabrication Technology. Testing of CMOS device BiCMOS Technological issues. Industry trends. Emphasis on VHDL.

Verilog Digital System Design - Zainalabedin Navabi 2005-10-24

This rigorous text shows electronics designers and students how to deploy Verilog in sophisticated digital systems design. The Second Edition is completely updated -- along with the many worked examples -- for Verilog 2001, new synthesis standards and coverage of the new OVI verification library.

VLSI DESIGN - Dr. Udutha Rajender 2022-03-15

VLSI DESIGN BOOK WAS Written BY Dr. Udutha Rajender, Mr. Srikanth Parikibandla, Dr. Arunkumar Madupu

Advances in Information Security and Assurance - James (Jong Hyuk) Park 2009-06-18

Welcome to the Third International Conference on Information Security and Assurance (ISA 2009). ISA 2009 was the most comprehensive conference focused on the various aspects of advances in information security and assurance. The concept of security and assurance is emerging rapidly as an exciting new paradigm to provide reliable and safe life services. Our conference provides a chance for academic and industry professionals to discuss recent progress in the area of communication and networking including modeling, simulation and novel applications associated with the utilization and acceptance of computing devices and systems. ISA 2009 was a successor of the First International Workshop on Information Assurance in Networks (IAN 2007, Jeju-island, Korea, December, 2007), and the Second International Conference on Information Security and Assurance (ISA 2008, Busan, Korea, April 2008). The goal of this conference is to bring together researchers from academia and industry as well as practitioners to share ideas, problems and solutions relating to the multifaceted aspects of information technology. ISA 2009 contained research

papers submitted by researchers from all over the world. In order to guarantee high-quality proceedings, we put extensive effort into reviewing the papers. All submissions were peer reviewed by at least three Program Committee members as well as external reviewers. As the quality of the submissions was quite high, it was extremely difficult to select the papers for oral presentation and publication in the proceedings of the conference.

Hardware Security Swarup Bhunia 2018-10-30

Hardware Security: A Hands-On Learning Approach provides a broad, comprehensive and practical overview of hardware security that encompasses all levels of the electronic hardware infrastructure. It covers basic concepts like advanced attack techniques and countermeasures that are illustrated through theory, case studies and well-designed, hands-on laboratory exercises for each key concept. The book is ideal as a textbook for upper-level undergraduate students studying computer engineering, computer science, electrical engineering, and biomedical engineering, but is also a handy reference for graduate students, researchers and industry professionals. For academic courses, the book contains a robust suite of teaching ancillaries. Users will be able to access schematic, layout and design files for a printed circuit board for hardware hacking (i.e. the HaHa board) that can be used by instructors to fabricate boards, a suite of videos that demonstrate different hardware vulnerabilities, hardware attacks and countermeasures, and a detailed description and user manual for companion materials. Provides a thorough overview of computer hardware, including the fundamentals of computer systems and the implications of security risks Includes discussion of the liability, safety and privacy implications of hardware and software security and interaction Gives insights on a wide range of security, trust issues and emerging attacks and protection mechanisms in the electronic hardware lifecycle, from design, fabrication, test, and distribution, straight through to supply chain and deployment in the field

Integrated Circuit Design - Neil H. E. Weste 2011

This edition presents broad and in-depth coverage of the entire field of modern CMOS VLSI Design. The authors draw upon extensive industry and classroom experience to introduce today's most advanced and effective chip design practices.

Semiconductor Technologies in the Era of Electronics Hoon Kang 2014-02-18

Technological advances in the field of materials, devices, circuits, and systems began by the discovery of new properties of objects, or the entrepreneurship with the applications of unique or practical concepts for commercial goods. To implement products using these findings and challenges textbook knowledge is usually sufficient. Semiconductor Technologies in the Era of Electronics therefore does not aim to look deeper in certain areas but it offers a broad and comprehensive overview of the field to: - Experts of specific knowledge who want to expand the overall understanding to different areas - Persons who wish to understand the principle of electronic devices often seen in everyday life - Entrepreneurs interested in the innovations and changes of semiconductor technologies and overall electronics industry A profound and theoretical approach is therefore used and special cases essential to understanding these important concept are presented.

CMOS Processors and Memories - Krzysztof Iniewski 2010-08-09

CMOS Processors and Memories addresses the-state-of-the-art in integrated circuit design in the context of emerging computing systems. New design opportunities in memories and processor are discussed. Emerging materials that can take system performance beyond standard CMOS, like carbon nanotubes, graphene, ferroelectrics and tunnel junctions are explored. CMOS Processors and Memories is divided into two parts: processors and memories. In the first part we start with high performance, low power processor design, followed by a chapter on multi-core processing. They both represent state-of-the-art concepts in current computing industry. The third chapter deals with asynchronous design that still carries lots of promise for future computing needs. At the end we present a "hardware design space exploration" methodology for implementing and analyzing the hardware for the Bayesian inference framework. This particular methodology involves: analyzing the computational cost and exploring candidate hardware components, proposing various custom architectures using both traditional CMOS and hybrid nanotechnology CMOL. The first part concludes with hybrid CMOS-Nano architectures. The second, memory part covers state-of-the-art SRAM, DRAM, and flash memories as well as emerging device

concepts. Semiconductor memory is a good example of the full custom design that applies various analog and logic circuits to utilize the memory cell's device physics. Critical physical effects that include tunneling, hot electron injection, charge trapping (Flash memory) are discussed in detail. Emerging memories like FRAM, PRAM and ReRAM that depend on magnetization, electron spin alignment, ferroelectric effect, built-in potential well, quantum effects, and thermal melting are also described. CMOS Processors and Memories is a must for anyone serious about circuit design for future computing technologies. The book is written by top notch international experts in industry and academia. It can be used in graduate course curriculum.

Pipelined Analog-to-digital Conversion Using Class-AB Amplifiers - Kyung Ryun Kim 2010

In high-performance pipelined analog-to-digital converters (ADCs), the residue amplifiers dissipate the majority of the overall converter power. Therefore, finding alternatives to the relatively inefficient, conventional class-A circuit realization is an active area of research. One option for improvement is to employ class-AB amplifiers, which can, in principle, provide large drive currents on demand and improve the efficiency of residue amplification. Unfortunately, due to the simultaneous demand for high speed and high gain in pipelined ADCs, the improvements seen in class-AB designs have so far been limited. This dissertation presents the design of an efficient class-AB amplification scheme based on a pseudo-differential, single-stage and cascode-free architecture. Nonlinear errors due to finite DC gain are addressed using a deterministic digital background calibration that measures the circuit imperfections in time intervals between normal conversion cycles of the ADC. As a proof of concept, a 12-bit 30-MS/s pipelined ADC was realized using class-AB amplifiers with the proposed digital calibration. The prototype ADC occupies an active area of 0.36 mm² in 90-nm CMOS. It dissipates 2.95 mW from a 1.2-V supply and achieves an SNDR of 64.5 dB for inputs near the Nyquist frequency. The corresponding figure of merit is 72 fJ/conversion-step.

Digital VLSI Chip Design with Cadence and Synopsys CAD Tools - Erik Brunvand 2010

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 Integrated Circuit Design - Herbert Kaeslin 2008-04-28

This practical, tool-independent guide to designing digital circuits takes a unique, top-down approach, reflecting the nature of the design process in industry. Starting with architecture design, the book comprehensively explains the why and how of digital circuit design, using the physics designers need to know, and no more.

Low-Power Cmos Vlsi Circuit Design - Kaushik Roy 2009-02-02

This is the first book devoted to low power circuit design, and its authors have been among the first to publish papers in this area. · Low-Power CMOS VLSI Design · Physics of Power Dissipation in CMOS FET

Devices · Power Estimation · Synthesis for Low Power · Design and Test of Low-Voltage CMOS Circuits · Low-Power Static Ram Architectures · Low-Energy Computing Using Energy Recovery Techniques · Software Design for Low Power

Skew-Tolerant Circuit Design - David Harris 2001

Chapter 1 -- Introduction -- Chapter 2 -- Fundamental Concepts -- Chapter 3 -- IP Switching -- Chapter 4 -- Tag Switching -- Chapter 5 -- MPLS Core Protocols -- Chapter 6 -- Quality of Service -- Chapter 7 -- ConstraintUbased routing -- Chapter 8 -- Virtual Private Networks.

Advances in Computer Communication and Computational Sciences - Sanjiv K. Bhatia 2018-08-22

The book includes the insights that reflect 'Advances in Computer and Computational Sciences' from upcoming researchers and leading academicians across the globe. It contains the high-quality peer-reviewed papers of 'International Conference on Computer, Communication and Computational Sciences (IC4S 2017), held during 11-12 October, 2017 in Thailand. These papers are arranged in the form of chapters. The content of this book is divided into two volumes that cover variety of topics such as intelligent hardware and software design, advanced communications, intelligent computing techniques, intelligent image processing, and web and informatics. This book helps the perspective readers' from computer industry and academia to derive the advances of next generation computer and communication technology and shape them into real life applications.

Introduction to VLSI Circuits and Systems - John P. Uyemura 2002

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).

High Performance Integrated Circuit Design - Emre Salman 2012-08-21

The latest techniques for designing robust, high performance integrated circuits in nanoscale technologies Focusing on a new technological paradigm, this practical guide describes the interconnect-centric design methodologies that are now the major focus of nanoscale integrated circuits (ICs). High Performance Integrated Circuit Design begins by discussing the dominant role of on-chip interconnects and provides an overview of technology scaling. The book goes on to cover data signaling, power management, synchronization, and substrate-aware design. Specific design constraints and methodologies unique to each type of interconnect are addressed. This comprehensive volume also explains the design of specialized circuits such as tapered buffers and repeaters for data signaling, voltage regulators for power management, and phase-locked loops for synchronization. This is an invaluable resource for students, researchers, and engineers working in the area of high performance ICs. Coverage includes: Technology scaling Interconnect modeling and extraction Signal propagation and delay analysis Interconnect coupling noise Global signaling Power generation Power distribution networks CAD of power networks Techniques to reduce power supply noise Power dissipation Synchronization theory and tradeoffs Synchronous system characteristics On-chip clock generation and distribution Substrate noise in mixed-signal ICs Techniques to reduce substrate noise