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Neil

Weste

Principle

s Of Cmos

2nd

Edition

Appropriate for use
as a graduate text or
a professional

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reference,
Languages for
Digital Embedded
Systems is the first
detailed, broad
survey of hardware
and software
description
languages for
embedded system
design. Instead of
promoting the one

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language that will solve all design problems (which does not and will not ever exist), this book takes the view that different problems demand different languages, and a designer who knows the spectrum of available languages

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has the advantage
over one who is
trapped using the
wrong language.
Languages for
Digital Embedded
Systems concentrates
on successful, widely-
used design
languages, with a
secondary emphasis
on those with

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significant
theoretical value.

The syntax,
semantics, and
implementation of
each language is
discussed, since
although hardware
synthesis and
software compilation
technology have
steadily improved,

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coding style still matters, and a thorough understanding of how a language is synthesized or compiled is generally necessary to take full advantage of a language. Practicing designers, graduate students, and

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advanced

undergraduates will
all benefit from this
book. It assumes
familiarity with some
hardware or
software languages,
but takes a practical,
descriptive view that
avoids formalism.

Arming readers with
both theoretical and

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practical knowledge,
Advanced Linear
Algebra for
Engineers with
MATLAB®
provides real-life
problems that
readers can use to
model and solve
engineering and
scientific problems in
fields ranging from

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signal processing and
communications to
electromagnetics and
social and health
sciences. Facilitating
a unique
understanding of
rapidly evolving
linear algebra and
matrix methods, this
book: Outlines the
basic concepts and

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definitions behind
matrices, matrix
algebra, elementary
matrix operations,
and matrix
partitions, describing
their potential use in
signal and image
processing
applications
Introduces concepts
of determinants,

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inverses, and their use in solving linear equations that result from electrical and mechanical-type systems Presents special matrices, linear vector spaces, and fundamental principles of orthogonality, using an appropriate blend

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of abstract and
concrete examples
and then discussing
associated
applications to
enhance readers '
visualization of
presented concepts
Discusses linear
operators,
eigenvalues, and
eigenvectors, and

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explores their use in
matrix

diagonalization and
singular value
decomposition

Extends presented
concepts to define
matrix polynomials
and compute
functions using
several well-known
methods, such as

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Sylvester's

expansion and

Cayley-Hamilton

Introduces state

space analysis and

modeling techniques

for discrete and

continuous linear

systems, and

explores applications

in control and

electromechanical

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systems, to provide a complete solution for the state space equation Shows readers how to solve engineering problems using least square, weighted least square, and total least square techniques Offers a rich selection of

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exercises and

MATLAB®

assignments that
build a platform to
enhance readers '
understanding of the
material Striking the
appropriate balance
between theory and
real-life applications,
this book provides
both advanced

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students and professionals in the field with a valuable reference that they will continually consult.

This volume contains the proceedings from the workshops held in conjunction with the IEEE International

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Parallel and
Distributed
Processing
Symposium, IPDPS
2000, on 1-5 May
2000 in Cancun,
Mexico. The
workshops provide a
forum for bringing
together
researchers, practiti-
ers, and designers

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from various
backgrounds to
discuss the state of
the art in parallelism
. They focus on di-
eren-
taspectsofparallelism,
fromruntimesystems
to formal methods,
from optics to
irregular problems,
from biology to
networks of personal

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computers, from
embedded systems to
programming
environments; the
following workshops
are represented in
this volume: {
Workshop on
Personal Computer
Based Networks of
Workstations {
Workshop on

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Advances in Parallel
and Distributed
Computational
Models { Workshop
on Par. and Dist.
Comp. in Image,
Video, and
Multimedia {
Workshop on High-
Level Parallel Prog.
Models and
Supportive Env. {

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Workshop on High
Performance Data
Mining { Workshop
on Solving
Irregularly
Structured Problems
in Parallel {
Workshop on Java
for Parallel and
Distributed
Computing { Works
hop on Biologically Ins

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pired Solutions to Par
allel Processing Proble
ms { Workshop on
Parallel and
Distributed Real-
Time Systems {
Workshop on
Embedded HPC
Systems and
Applications {
Recon gurable
Architectures

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Workshop {
Workshop on
Formal Methods for
Parallel
Programming {
Workshop on Optics
and Computer
Science { Workshop
on Run-Time
Systems for Parallel
Programming {
Workshop on Fault-

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Tolerant Parallel
and Distributed
Systems All papers
published in the
workshops
proceedings were
selected by the p-
gram committee on
the basis of referee
reports. Each paper
was reviewed by
independent referees

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who judged the papers for originality, quality, and consistency with the themes of the workshops.

Low-Power Digital VLSI Design: Circuits and Systems addresses both process technologies and device

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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

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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

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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

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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

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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

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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.

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Advanced Topics in
Microelectronics and
System Design
CMOS Circuit
Design for RF
Sensors
Cmos Vlsi Design: a
Circuits and Systems
Perspective
Principles of VLSI
CMOS Design
Fundamentals of

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Modern VLSI
Devices

Analog BiCMOS
Design

*Aimed primarily for
undergraduate
students pursuing
courses in VLSI
design, the book
emphasizes the
physical
understanding of*

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*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

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Of Cmos 2nd
Edition

*practical approach
practising engineers
can also use this as
ready reference.*

*As advances in
technology and
circuit design boost
operating
frequencies of
microprocessors,
DSPs and other fast
chips, new design*

challenges continue to emerge. One of the major performance limitations in today's chip designs is clock skew, the uncertainty in arrival times between a pair of clocks. Increasing clock frequencies

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*are forcing many
engineers to rethink
their timing budgets
and to use skew-
tolerant circuit
techniques for both
domino and static
circuits. While
senior designers
have long developed
their own
techniques for*

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*reducing the
sequencing
overhead of domino
circuits, this
knowledge has
routinely been
protected as trade
secret and has
rarely been shared.
Skew-Tolerant
Circuit Design
presents a*

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*systematic way of
achieving the same
goal and puts it in
the hands of all
designers. This book
clearly presents
skew-tolerant
techniques and
shows how they
address the
challenges of
clocking, latching,*

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*and clock skew. It provides the practicing circuit designer with a clearly detailed tutorial and an insightful summary of the most recent literature on these critical clock skew issues. * Synthesizes the most recent*

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Edition

*advances in skew-
tolerant design in
one cohesive
tutorial * Provides
incisive instruction
and advice
punctuated by
humorous
illustrations *
Includes exercises
to test
understanding of*

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*key concepts and
solutions to selected
exercises*

*Ultra-wideband
Radio Frequency
Identification
Systems describes
the essentials of
radio frequency
identification
(RFID) systems as
well as their target*

markets. The book covers a study of commercially available RFID systems and characterizes their performance in terms of read range and reliability in the presence of conductive and dielectric materials.

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*The capabilities and
limitations of
commercial RFID
systems are reported
followed by
comprehensive
discussions of the
advantages and
challenges of using
ultra-wideband
(UWB) technology
for tag/reader*

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communications.

The book presents practical aspects of RFID system such as: EPC global and ISO standards, implementation, and target markets in a simple and easy to understand language.

Modern

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*microelectronic
design is*

*characterized by the
integration of full
systems on a single
die. These systems
often include large
high performance
digital circuitry,
high resolution
analog parts, high
driving I/O, and*

*maybe RF sections.
Designers of such
systems are
constantly faced
with the challenge
to achieve
compatibility in
electrical
characteristics of
every section: some
circuitry presents
fast transients and*

large consumption spikes, whereas others require quiet environments to achieve resolutions well beyond millivolts. Coupling between those sections is usually unavoidable, since the entire system shares the same

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*silicon substrate
bulk and the same
package.*

*Understanding the
way coupling is
produced, and
knowing methods to
isolate coupled
circuitry, and how
to apply every
method, is then
mandatory*

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*knowledge for every
IC designer.*

*Analysis and
Solutions for
Switching Noise
Coupling in Mixed-
Signal ICs is an in-
depth look at
coupling through
the common silicon
substrate, and noise
at the power supply*

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Edition

lines. It explains the elementary knowledge needed to understand these phenomena and presents a review of previous works and new research results. The aim is to provide an understanding of the reasons for

*these particular
ways of coupling,
review and suggest
solutions to noise
coupling, and
provide criteria to
apply noise
reduction. Analysis
and Solutions for
Switching Noise
Coupling in Mixed-
Signal ICs is an*

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*ideal book, both as
introductory
material to noise-
coupling problems
in mixed-signal ICs,
and for more
advanced designers
facing this problem.*

*From VLSI
Architectures to
CMOS Fabrication
Computer Aids for*

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***VLSI Design
Digital System
Design with VHDL
Analysis and
Solutions for
Switching Noise
Coupling in Mixed-
Signal ICs
VLSI Design
Practices and
Pitfalls***

Past, Present, Parallel

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is a survey of the current state of the parallel processing industry. In the early 1980s, parallel computers were generally regarded as academic curiosities whose natural environment was the research laboratory. Today, parallelism is being used by every

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major computer manufacturer, although in very different ways, to produce increasingly powerful and cost-effective machines.

The first chapter introduces the basic concepts of parallel computing; the subsequent chapters cover different forms

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of parallelism,
including descriptions
of vector
supercomputers,
SIMD computers,
shared memory
multiprocessors,
hypercubes, and
transputer-based
machines. Each
section concentrates
on a different
manufacturer,

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detailing its history
and company profile,
the machines it
currently produces, the
software environments
it supports, the market
segment it is
targetting, and its
future plans.

Supplementary
chapters describe
some of the companies
which have been

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unsuccessful, and discuss a number of the common software systems which have been developed to make parallel computers more usable. The appendices describe the technologies which underpin parallelism. Past, Present, Parallel is an invaluable

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reference work,
providing up-to-date
material for
commercial computer
users and
manufacturers, and for
researchers and
postgraduate students
with an interest in
parallel computing.
Learn the basic
properties and designs
of modern VLSI

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devices, as well as the factors affecting performance, with this thoroughly updated second edition. The first edition has been widely adopted as a standard textbook in microelectronics in many major US universities and worldwide. The internationally

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renowned authors highlight the intricate interdependencies and subtle trade-offs between various practically important device parameters, and provide an in-depth discussion of device scaling and scaling limits of CMOS and bipolar devices.

Equations and

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parameters provided
are checked
continuously against
the reality of silicon
data, making the book
equally useful in
practical transistor
design and in the
classroom. Every
chapter has been
updated to include the
latest developments,
such as MOSFET

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scale length theory,
high-field transport
model and SiGe-base
bipolar devices.

This useful reference
is about CMOS circuit
design for sensor and
actuators to be used in
wireless RF systems. It
places special focus on
the power and data
link in a wireless
system with

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transducers powered
via the RF link,
presenting novel
principles and
methods.

This book first
introduces SOI device
physics and its
fundamental
idiosyncrasies. It then
walks the reader
through realizations of
these mechanisms,

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which are observed in common high-speed microprocessor designs. The book also offers rules of thumb and comparisons to conventional bulk CMOS to guide implementation and describes a number of unique circuit topologies that SOI supports.

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CMOS analog circuit
design

Principles and

Applications

The Practice of Prolog

Basic VLSI Design

Digital Integrated

Circuit Design

Higher-Level

Hardware Synthesis

Power

consumption has

become a major

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design consideration for battery-operated, portable systems as well as high-performance, desktop systems. Strict limitations on power dissipation must be met by the designer while

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*still meeting
ever higher
computational
requirements. A
comprehensive
approach is thus
required at all
levels of system
design, ranging
from algorithms
and
architectures to
the logic styles
and the*

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*underlying
technology.
Potentially one
of the most
important
techniques
involves
combining
architecture
optimization
with voltage
scaling,
allowing a trade-
off between*

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*silicon area and
low-power
operation.*

*Architectural
optimization
enables supply
voltages of the
order of 1 V
using standard
CMOS technology.
Several
techniques can
also be used to
minimize the*

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*switched
capacitance,
including
representation,
optimizing
signal
correlations,
minimizing
spurious
transitions,
optimizing
sequencing of
operations,
activity-driven*

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power down, etc.

*The high-
efficiency of DC-
DC converter
circuitry
required for
efficient, low-
voltage and low-
current level
operation is
described by
Stratakos,
Sullivan and
Sanders. The*

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application of various low-power techniques to a chip set for multimedia applications shows that orders-of-magnitude reduction in power consumption is possible. The book also features an

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analysis by
Professor Meindl

*of the
fundamental
limits of power
consumption
achievable at
all levels of
the design
hierarchy.
Svensson, of
ISI, describes
emerging
adiabatic*

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switching techniques that can break the CV^2f barrier and reduce the energy per computation at a fixed voltage. Srivastava, of AT&T, presents the application of aggressive shut-down techniques to

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*microprocessor
applications.*

*Addressed to
readers at
different levels
of programming
expertise, The
Practice of
Prolog offers a
departure from
current books
that focus on
small
programming*

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*examples
requiring
additional
instruction in
order to extend
them to full
programming
projects. It
shows how to
design and
organize
moderate to
large Prolog
programs,*

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providing a
collection of
eight
programming
projects, each
with a
particular
application, and
illustrating how
a Prolog program
was written to
solve the
application.
These range from

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*a simple
learning program
to designing a
database for
molecular
biology to
natural language
generation from
plans and stream
data analysis.*

*Leon Sterling is
Associate
Professor in the
Department of*

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Computer

**Engineering and
Science at Case
Western Reserve
University. He
is the coauthor,
along with Ehud
Shapiro, of The
Art of Prolog.**

**Contents: A
Simple Learning
Program, Richard
O'Keefe.**

Designing a

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*Prolog Database
for Molecular
Biology, Ewing
Lusk, Robert
Olson, Ross
Overbeek, Steve
Tuecke.*

*Parallelizing a
Pascal Compiler,
Eran Gabber.*

*PREDITOR: A
Prolog-Based
VLSI Editor,
Peter B.*

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Reintjes.

Assisting

Register

Transfer Level

Hardware Design,

Paul Drongowski.

Design and

Implementation

of a Partial

Evaluation

System, Arun

Lakhotia, Leon

Sterling.

Natural Language

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Generation from
Plans, Chris

Mellish. Stream
Data Analysis in
Prolog, Stott
Parker.

This volume on
implementation
techniques in
digital signal
processing
systems clearly
reveals the
significance and

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*power of the
techniques that
are available,
and with further
development, the
essential role
they will play
as applied to a
wide variety of
areas. The
authors are all
to highly
commended for
their splendid*

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*contributors to
this volume,
which will
provide a
significant and
unique
international
reference source
for students,
research
workers,
practicing
engineers, and
others for years*

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to come.

Arranged in a
format that
follows the
industry-common
ASIC physical
design flow,
*Physical Design
Essentials*
begins with
general concepts
of an ASIC
library, then
examines

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*floorplanning,
placement,
routing,
verification,
and finally,
testing. Among
the topics
covered are
Basic standard
cell design, tra
nsistor-sizing,
and layout
styles; Linear,
non-linear, and*

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*polynomial chara
cterization;*

*Physical design
constraints and
floorplanning
styles;*

*Algorithms used
for placement;*

Clock Tree

Synthesis;

Parasitic

extraction;

Electronic

Testing, and

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many more.

*Introduction to
VLSI Systems
Skew-tolerant
Circuit Design
Advances in
Theory and
Applications*

*System-on-Chip
Design
Low Power
Interconnect
Design*

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With this revision, Weste 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

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providing a bridge
from a circuit to a
form that may be
fabricated.

The four-volume
set LNCS 2657,
LNCS 2658, LNCS
2659, and LNCS
2660 constitutes
the refereed
proceedings of the
Third International
Conference on

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Computational
Science, ICCS
2003, held
concurrently in
Melbourne,
Australia and in St.
Petersburg, Russia
in June 2003. The
four volumes
present more than
460 reviewed
contributed and
invited papers and

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span the whole
range of
computational
science, from
foundational
issues in computer
science and
algorithmic
mathematics to
advanced
applications in
virtually all
application fields

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making use of
computational
techniques. These
proceedings give a
unique account of
recent results in
the field.

Principles of
CMOS VLSI
Design A Systems
Perspective Addison
Wesley

Covering both the

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classical and
emerging
nanoelectronic
technologies being
used in mixed-
signal design, this
book addresses
digital, analog, and
memory
components.
Winner of the
Association of
American

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Publishers' 2016

PROSE Award in

the

Textbook/Physical

Sciences &

Mathematics

category.

Nanoelectronic

Mixed-Signal

System Design

offers

professionals and

students a unified

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perspective on the
science,

engineering, and
technology behind
nanoelectronics
system design.

Written by the
director of the
NanoSystem
Design Laboratory
at the University of
North Texas, this
comprehensive

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guide provides a large-scale picture of the design and manufacturing aspects of nanoelectronic-based systems. It features dual coverage of mixed-signal circuit and system design, rather than just digital or analog-

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only. Key topics such as process variations, power dissipation, and security aspects of electronic system design are discussed. Top-down analysis of all stages--from design to manufacturing

Coverage of

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current and
developing
nanoelectronic
technologies--not
just nano-CMOS
Describes the
basics of
nanoelectronic
technology and
the structure of
popular electronic
systems Reveals
the techniques

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required for design
excellence and
manufacturability

Parallel and

Distributed

Processing

Principles of

CMOS VLSI Design

A Systems

Perspective

Low-Power Digital

VLSI Design

SOI Circuit Design

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Concepts
Computational
Science - ICCS
2003. Part 3.

**This textbook,
originally
published in
1987, broadly
examines the
software
required to
design
electronic**

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**circuitry,
including
integrated
circuits.**

**Topics include
synthesis and
analysis tools,
graphics and
user interface,
memory
representation,
and more. The
book also**

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**describes a
real system
called**

"Electric."

**This book takes
an**

**authoritative
introduction to
basic**

**principles of
digital design
and practical
requirements in**

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**both board-
level and VLSI
systems.
Digital Design
covers the most
widespread
logic design
practices while
building a
solid
foundation of
theoretical and
engineering**

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**principles.
This easy-to-
follow book
uses a
practical
writing style.
Includes low
voltage and
LVCMOS/LVTTL.
Coverage of
Complex
Programmable
Logic Devices**

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(CPLDs) and Field-Programmable

Gate Arrays

(FPGAs).

Introduction of

HDL-based

digital design

Covers VHDL as

well as ABEL.

Including

simulation and

synthesis.

This book

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Of Cmos 2nd
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**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**

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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

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**middle chapters
cover a sub-
system view of
CMOS VLSI, and
the final
section
illustrates
these
techniques
using a real-
world case
study.**

Digital System

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**Design with
VHDL is
intended both
for students on
Digital Design
courses and
practitioners
who would like
to integrate
digital design
and VHDL
synthesis in
the workplace.**

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**Its unique
approach
combines the
principles of
digital design
with a guide to
the use of
VHDL. Synthesis
issues are
discussed and
practical
guidelines are
provided for**

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**improving
simulation
accuracy and
performance.
Nanoelectronic
Mixed-Signal
System Design
Ultra-Wideband
Radio Frequency
Identification
Systems
CMOS VLSI
Design: A**

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**Circuits and
Systems**

**Perspective
Digital Design
Principles and
Practices and
Xilinx 4. 2i
Student Package
Physical Design
Essentials**

*This book provides a
superb introduction to
and overview of the MIT*

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*PI System for custom
VLSI placement and
routing. Alan Sher man
has done an excellent job
of collecting and clearly
presenting material that
was previously available
only in various theses,
confer ence papers, and
memoranda. He has
provided here a balanced
and comprehensive
presentation of the key
ideas and techniques*

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used in PI, discussing part of his own Ph. D. work (primarily on the placement problem) in the context of the overall design of PI and the contributions of the many other PI team members. I began the PI Project in 1981 after learning first-hand how difficult it is to manually place modules and route interconnections in a

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custom VLSI chip. In 1980 Adi Shamir, Leonard Adleman, and I designed a custom VLSI chip for performing RSA encryption/decryption [226]. I became fascinated with the combinatorial and algorithmic questions arising in placement and routing, and began active research in these areas. The PI Project

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was started in the belief that many of the most interesting research issues would arise during an actual implementation effort, and secondarily in the hope that a practically useful tool might result. The belief was well-founded, but I had underestimated the difficulty of building a large easily-used software tool for a

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*complex domain; the PI
soft ware should be
considered as a prototype
implementation
validating the design
choices made.*

*This volume covers a
wide area ? from
research topics to the
design and improvement
of integrated circuit
devices, already existing
or to be introduced to the
market.*

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*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*

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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,

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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

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Of Cmos 2nd
Edition

*presents the entire VLSI
design process in a single
volume.*

*Top-down approach to
practical, tool-
independent, digital
circuit design, reflecting
how circuits are
designed.*

*A Survey of Available
Parallel Computer
Systems*

*Essentials Of Vlsi
Circuits And Systems*

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*VLSI Placement and
Routing: The PI Project*

Principles of CMOS

VSLI Design

15 IPDPS 2000

*Workshops Cancun,
Mexico, May 1–5, 2000*

Proceedings

*A Systems Perspective
with Verilog/Vhdl*

Manual

Integrated circuits
(ICs) don't always

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work the first time. Many things can and do go wrong in analog circuit designs. There are a number of common errors that often require costly chip redesign and refabrication, all of which can be avoided when designers are aware

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of the pitfalls. To realize success, IC designers need a complete toolbox—a toolbox filled not only with a solid background in electronics, design concepts and analysis skills, but also with the most valuable tool of all: experience. Analog

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BiCMOS Design offers IC design engineers the learning equivalent to decades of practical experience. Culled from the careers of practicing engineers, it presents the most effective methods and the pitfalls most

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frequently encountered in the design of biCMOS integrated circuits. Accessible to anyone who has taken a course in electronics, this book covers the basic design of bandgap voltage references, current mirrors, amplifiers,

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and comparators. It reviews common design errors often overlooked and offers design techniques used to remedy those problems. With its complete coverage of basic circuit building blocks, full details of common design pitfalls, and a

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compendium of
design and layout
problems and
solutions, Analog
BiCMOS Design is
the perfect
reference for IC
designers and
engineers, fledgling
and experienced
alike. Read it to
reinforce your
background, browse

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it for ideas on
avoiding pitfalls, and
when you run into a
problem, use it to
find a solution.

In the mid 1960s,
when a single chip
contained an
average of 50
transistors, Gordon
Moore observed
that integrated
circuits were

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doubling in complexity every year. In an influential article published by Electronics Magazine in 1965, Moore predicted that this trend would continue for the next 10 years. Despite being criticized for its "unrealistic

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optimism, Moore's prediction has remained valid for far longer than even he imagined: today, chips built using state-- the-art techniques typically contain several million transistors. The advances in fabrication technology that

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have supported
Moore's law for four
decades have
fuelled the computer
revolution.

However, this
exponential
increase in
transistor density
poses new design
challenges to
engineers and
computer scientists

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alike. New techniques for managing complexity must be developed if circuits are to take full advantage of the vast numbers of transistors available. In this monograph we investigate both (i) the design of high-level languages for

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hardware
description, and (ii)
techniques involved
in translating these
hi- level languages
to silicon. We
propose SAFL, a
?rst-order functional
language designed
pecially for behavior
al hardware description,
and describe the
mp- mentation of its

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associated silicon compiler. We show that the high-level properties of SAFL allow one to exploit program analyses and optimizations that are not employed in existing synthesis systems. Furthermore, since SAFL fully abstracts the low-level details

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of the
implementation
technology, we
show how it can be
compiled to a range
of different design
styles including fully
synchronous design
and globally
asynchronous
locally synchronous
(GALS) circuits.

The fourth edition of

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the best-selling text details the modern techniques for the design of complex and high-performance CMOS systems on a chip. Covering the fundamentals of CMOS design from the digital systems level to the circuit level, this book

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explains the
fundamental
principles and is a
guide to good
design practices
This book provides
practical solutions
for delay and power
reduction for on-chip
interconnects and
buses. It provides
an in depth
description of the

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problem of signal delay and extra power consumption, possible solutions for delay and glitch removal, while considering the power reduction of the total system.

Coverage focuses on use of the Schmitt Trigger as an alternative

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approach to buffer
insertion for delay
and power reduction
in VLSI

interconnects. In the
last section of the
book, various bus
coding techniques
are discussed to
minimize delay and
power in address
and data buses.

An ASIC Design

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Implementation
Perspective

Past, Present,
Parallel

Low Power Digital
CMOS Design

Digital Signal
Processing

Systems:

Implementation
Techniques

International
Conference,

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Edition
Melbourne,
Australia and St.
Petersburg, Russia,
June 2-4, 2003,
Proceedings,
Principles CMOS
VLSI Design