# QUICK-TURNAROUND ASIC DESIGN IN VHDL

Core-Based Behavioral Synthesis

## **Quick Turnaround Asic Design In Vhdl**

Jose Mira, Juan V. Sanchez-Andres

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Quick-Turnaround ASIC Design in VHDL N. Bouden-Romdhane, Vijay Madisetti, J.W. Hines, 2012-12-06 From the Foreword Modern digital signal processing applications provide a large challenge to the system designer Algorithms are becoming increasingly complex and yet they must be realized with tight performance constraints Nevertheless these DSP algorithms are often built from many constituent canonical subtasks e g IIR and FIR filters FFTs that can be reused in other subtasks Design is then a problem of composing these core entities into a cohesive whole to provide both the intended functionality and the required performance In order to organize the design process there have been two major approaches The top down approach starts with an abstract concise functional description which can be guickly generated On the other hand the bottom up approach starts from a detailed low level design where performance can be directly assessed but where the requisite design and interface detail take a long time to generate In this book the authors show a way to effectively resolve this tension by retaining the high level conciseness of VHDL while parameterizing it to get good fit to specific applications through reuse of core library components Since they build on a pre designed set of core elements accurate area speed and power estimates can be percolated to high level design routines which explore the design space Results are impressive and the cost model provided will prove to be very useful Overall the authors have provided an up to date approach doing a good job at getting performance out of high level design. The methodology provided makes good use of extant design. tools and is realistic in terms of the industrial design process. The approach is interesting in its own right but is also of direct utility and it will give the existing DSP CAD tools a highly competitive alternative The techniques described have been developed within ARPAs RASSP Rapid Prototyping of Application Specific Signal Processors project and should be of great interest there as well as to many industrial designers Professor Jonathan Allen Massachusetts Institute of Technology

Engineering Applications of Bio-Inspired Artificial Neural Networks Jose Mira, Juan V. Sanchez-Andres, 1999-05-19 This book constitutes together with its compagnion LNCS 1606 the refereed proceedings of the International Work Conference on Artificial and Neural Networks IWANN 99 held in Alicante Spain in June 1999 The 91 revised papers presented were carefully reviewed and selected for inclusion in the book This volume is devoted to applications of biologically inspired artificial neural networks in various engineering disciplines The papers are organized in parts on artificial neural nets simulation and implementation image processing and engineering applications Computer-Aided Design Techniques for Low Power Sequential Logic Circuits José Monteiro, Srinivas Devadas, 2012-12-06 Rapid increases in chip complexity increasingly faster clocks and the proliferation of portable devices have combined to make power dissipation an important design parameter The power consumption of a digital system determines its heat dissipation as well as battery life For some systems power has become the most critical design constraint Computer Aided Design Techniques for Low Power Sequential Logic Circuits presents a methodology for low power design The authors first present a survey of

techniques for estimating the average power dissipation of a logic circuit At the logic level power dissipation is directly related to average switching activity A symbolic simulation method that accurately computes the average switching activity in logic circuits is then described This method is extended to handle sequential logic circuits by modeling correlation in time and by calculating the probabilities of present state lines Computer Aided Design Techniques for Low Power Sequential Logic Circuits then presents a survey of methods to optimize logic circuits for low power dissipation which target reduced switching activity A method to retime a sequential logic circuit where registers are repositioned such that the overall glitching in the circuit is minimized is also described The authors then detail a powerful optimization method that is based on selectively precomputing the output logic values of a circuit one clock cycle before they are required and using the precomputed value to reduce internal switching activity in the succeeding clock cycle Presented next is a survey of methods that reduce switching activity in circuits described at the register transfer and behavioral levels Also described is a scheduling algorithm that reduces power dissipation by maximising the inactivity period of the modules in a given circuit Computer Aided Design Techniques for Low Power Sequential Logic Circuits concludes with a summary and directions for future research **Encyclopedia of Microcomputers** Allen Kent, James G. Williams, 1997-05-21 Visual Fidelity Designing Multimedia Interfaces for Active Learning to Xerox Corporation A Platform-Centric Approach to System-on-Chip (SOC) Design Vijay Madisetti, Chonlameth Arpnikanondt, 2006-06-28 Increasing system complexity has created a pressing need for better design tools and associated methodologies and languages for meeting the stringent time to market and cost constraints Platform centric and platfo based system on chip SoC design methodologies based on reuse of software and hardware functionality has also gained increasing exposure and usage within the Electronic System Level ESL design communities The book proposes a new methodology for realizing platform centric design of complex systems and presents a detailed plan for its implementation. The proposed plan allows component vendors system integrators and product developers to collaborate effectively and efficiently to create complex products within budget and schedule constraints This book focuses more on the use of platforms in the design of products and not on the design of platforms themselves Platform centric design is not for everyone as some may feel that it does not allow them to differentiate their offering from competitors to a significant degree However its proponents may claim that the time market and cost advantages of platform centric design more than compensate for any drawbacks The Digital Signal Processing Handbook VIJAY MADISETTI, 1997-12-29 The field of digital signal processing DSP has spurred developments from basic theory of discrete time signals and processing tools to diverse applications in telecommunications speech and acoustics radar and video This volume provides an accessible reference offering theoretical and practical information to the audience of DSP users This immense compilation outlines both introductory and specialized aspects of information bearing signals in digital form creating a resource relevant to the expanding needs of the engineering community It also explores the use of computers and special purpose digital hardware in

extracting information or transforming signals in advantageous ways Impacted areas presented include Telecommunications Computer engineering Acoustics Seismic data analysis DSP software and hardware Image and video processing Remote sensing Multimedia applications Medical technology Radar and sonar applications This authoritative collaboration written by the foremost researchers and practitioners in their fields comprehensively presents the range of DSP from theory to application from algorithms to hardware Application Specific Processors Earl E. Swartzlander Jr., 2012-12-06 Application Specific Processors is written for use by engineers who are developing specialized systems application specific systems Traditionally most high performance signal processors have been realized with application specific processors The explanation is that application specific processors can be tailored to exactly match the usually very demanding application requirements The result is that no processing power is wasted for unnecessary capabilities and maximum performance is achieved A disadvantage is that such processors have been expensive to design since each is a unique design that is customized to the specific application In the last decade computer aided design systems have been developed to facilitate the development of application specific integrated circuits The success of such ASIC CAD systems suggests that it should be possible to streamline the process of application specific processor design Application Specific Processors consists of eight chapters which provide a mixture of techniques and examples that relate to application specific processing The inclusion of techniques is expected to suggest additional research and to assist those who are faced with the requirement to implement efficient application specific processors The examples illustrate the application of the concepts and demonstrate the efficiency that can be achieved via application specific processors. The chapters were written by members and former members of the application specific processing group at the University of Texas at Austin The first five chapters relate to specific arithmetic which often is the key to achieving high performance in application specific processors. The next two chapters focus on signal processing systems and the final chapter examines the interconnection of possibly disparate elements to create systems Hardware-Software Co-Design of Embedded Systems F. Balarin, 1997-05-31 Embedded systems are informally defined as a collection of programmable parts surrounded by ASICs and other standard components that interact continuously with an environment through sensors and actuators The programmable parts include micro controllers and Digital Signal Processors DSPs Hardware Software Co Design of Embedded Systems The POLIS Approach is intended to give a complete overview of the POLIS system including its formal and algorithmic aspects and will be of interest to embedded system designers automotive electronics consumer electronics and telecommunications micro controller designers CAD developers and students **ASIC System Design with VHDL: A Paradigm** Steven S. Leung, Michael A. Shanblatt, 2012-12-06 Beginning in the mid 1980 s VLSI technology had begun to advance in two directions Pushing the limit of integration ULSI Ultra Large Scale Integration represents the frontier of the semiconductor processing technology in the campaign to conquer the submicron realm The application of ULSI however is at present largely confined in the area of

memory designs and as such its impact on traditional microprocessor based system design is modest If advancement in this direction is merely a natural extrapolation from the previous integration generations then the rise of ASIC Application Specific Integrated Circuit is an unequivocal signal that a directional change in the discipline of system design is in effect In contrast to ULSI ASIC employs only well proven technology and hence is usually at least one generation behind the most advanced processing technology In spite of this apparent disadvantage ASIC has become the mainstream of VLSI design and the technology base of numerous entrepreneurial opportunities ranging from PC clones to supercomputers Unlike ULSI whose complexity can be hidden inside a memory chip or a standard component and thus can be accommodated by traditional system design methods ASIC requires system designers to master a much larger body of knowledge spanning from processing technology and circuit techniques to architecture principles and algorithm characteristics Integrating knowledge in these various areas has become the precondition for integrating devices and functions into an ASIC chip in a market oriented environment But knowledge is of two kinds Digital Signal Processing Handbook on CD-ROM VIJAY MADISETTI, Douglas Williams, 1999-02-26 A best seller in its print version this comprehensive CD ROM reference contains unique fully searchable coverage of all major topics in digital signal processing DSP establishing an invaluable time saving resource for the engineering community Its unique and broad scope includes contributions from all DSP specialties including telecommunications computer engineering acoustics seismic data analysis DSP software and hardware image and video processing remote sensing multimedia applications medical technology radar and sonar applications

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