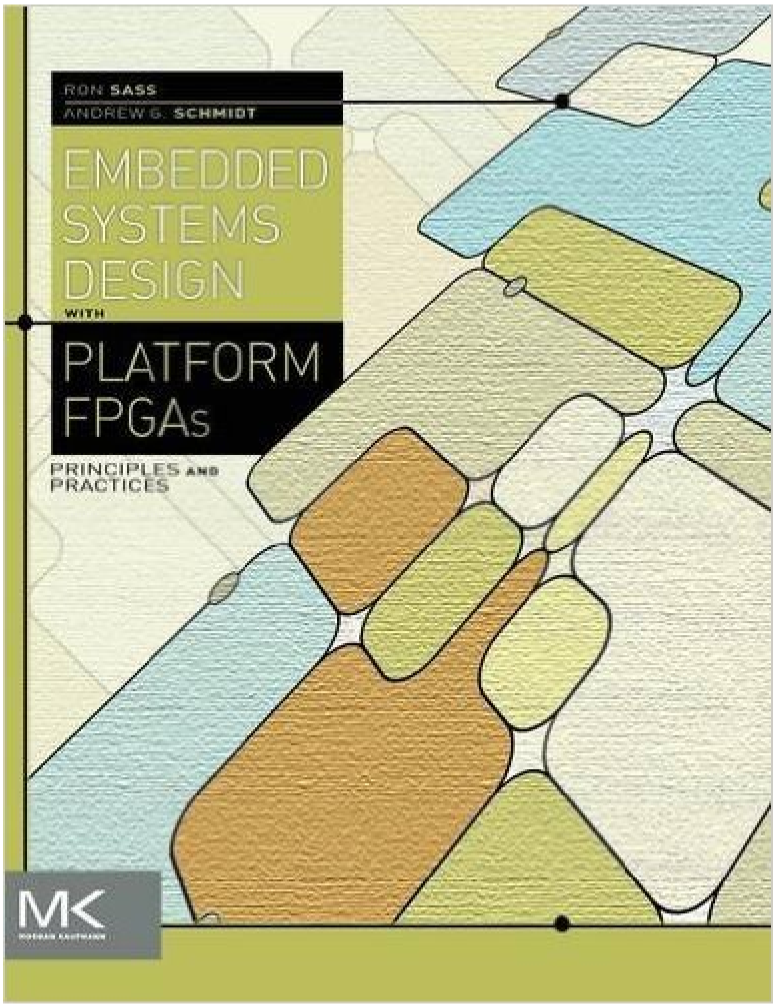
Embedded Systems Design With Platform FPGAs: Principles And Practices



Synopsis

This book will introduce professional engineers and students alike to system development using Platform FPGAs. The focus is on embedded systems but it also serves as a general guide to building custom computing systems. The text describes the fundamental technology in terms of hardware, software, and a set of principles to guide the development of Platform FPGA systems. The goal is to show how to systematically and creatively apply these principles to the construction of application-specific embedded system architectures. There is a strong focus on using free and open source software to increase productivity. The organization of each chapter in the book includes two parts. The white pages describe concepts, principles, and general knowledge. The gray pages include a technical rendition of the main issues of the chapter and show the concepts applied in practice. This includes step-by-step details for a specific development board and tool chain so that the reader can carry out the same steps on their own. Rather than try to demonstrate the concepts on a broad set of tools and boards, the text uses a single set of tools (Xilinx Platform Studio, Linux, and GNU) throughout and uses a single developer board (Xilinx ML-510) for the examples.Explains how to use the Platform FPGA to meet complex design requirements and improve product performancePresents both fundamental concepts together with pragmatic, step-by-step instructions for building a system on a Platform FPGAIncludes detailed case studies, extended real-world examples, and lab exercises

Book Information

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Customer Reviews

This book is built around a novel concept. In white pages the authors present concepts and materials that are likely to be true for several years to come. In grey pages they present material more focused on specific tools, operating systems, and a Xilinx FPGA. This should extend the shelf life of the book, making it easier for profs to tell their classes what to read & skip.In the book the authors cover a sweeping array of topics, presenting real-world issues that are often not encountered in logic design and computer architecture books. Principles of system design, partitioning, speedup thru hardware, all of these topics and more are addressed. This makes the book useful for a senior level class so that students have some understanding of these important issues before they enter the workforce.The book also give an introduction to how to configure and use the Xilinx Virtex 5 family of FPGAs. It has quite detailed instructions on how to set up the Xilinx evaluation board and configure the part. It culminates in a simple design example of a simple adder interfacing to a CPU core. I wish the example had been a bit more involved, including accessing data from an external device and then performing a computation since this is a more likely real-world scenario.In order to get the most out of this book I think students would need to have already completed a programming class, a digital design class, and a computer architecture class. The high level concepts introduced in the book are important for students to learn, but on the flip side the more limited presentation of the Xilinx FPGA specific topics doesn't provide enough detail for the practicing engineer to read the book and then be able to design systems taking full advantage of the FPGA family.

When I was in school for electrical engineering, my selected option was computer architecture. One of the main concentrations included programmable logic devices or PLD's back then in the 80's. We had a crude DOS based program called CUPL that took logical statements that had been reduced, did some further reduction on them, and then created a logical burn pattern. It automatically selected a chip size and configuration from a series of existing burn once chips. Then printed out a crude ascii art diagram of the chip selected. The goal then was more keeping the logic simple and small enough to fit on an economical chip. The logic was designed in advance, and it did not change without a redesign of the system to fix or change the function.For those of you that don't get the idea on how these chips work, the real design is simple, but the variations and kinds of storage are flexible. Since everything in the digital world breaks down to one or zero, on or off, there or not, up or down, 12V, or ZVR, etc. etc., you have only to represent the underlying logic of your system in this manner. Simple logic like AND, OR, NOT, NAND, NOR, XOR, etc. can be represented by a simple combination of a few transistors where if the inputs match the logic the current flows. Inside the chip there are mechanisms where inputs in a large, or even massive array of these transistors can be changed to represent logic. In burn once chips, this meant a series of fuses are burned (blown) internally so that what's left to conduct the current is only the inputs and outputs that represent the logic. Once burned that can't change.However, other methods imprinting the logic pattern were not so final, some could temporarily remove the inputs, and UV light would restore them.

Embedded Systems Design with Platform FPGAs: Principles and Practices Embedded Core Design with FPGAs (McGraw-Hill Electronic Engineering) Design Patterns for Embedded Systems in C: An Embedded Software Engineering Toolkit DSP Software Development Techniques for Embedded and Real-Time Systems (Embedded Technology) Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers (Embedded Technology) Learning FPGAs: Digital Design for Beginners with Mojo and Lucid HDL Applied Control Theory for Embedded Systems (Embedded Technology) Analog Interfacing to Embedded Microprocessor Systems, Second Edition (Embedded Technology Series) Real-Time UML Workshop for Embedded Systems, Second Edition (Embedded Technology) Computers as Components, Third Edition: Principles of Embedded Computing System Design (The Morgan Kaufmann Series in Computer Architecture and Design) Computers as Components: Principles of Embedded Computing System Design (The Morgan Kaufmann Series in Computer Architecture and Design) Programming FPGAs: Getting Started with Verilog FPGAs: Instant Access FPGAs: World Class Designs Linux for Embedded and Real-time Applications, Third Edition (Embedded Technology) Linux for Embedded and Real-time Applications (Embedded Technology) Linux for Embedded and Real-time Applications, Second Edition (Embedded Technology) Designing Embedded Systems with PIC Microcontrollers, Second Edition: Principles and Applications Designing Embedded Systems with PIC Microcontrollers: Principles and Applications Designing Embedded Systems with PIC Microcontrollers: Principles and Applications by Tim Wilmshurst (24-Oct-2006) Paperback