



Co-verification of hardware and software for ARM SoC design [

Andrews, Jason R.

Elsevier Newnes,
c2005

Electronic books

Monografía

Hardware/software co-verification is how to make sure that embedded system software works correctly with the hardware, and that the hardware has been properly designed to run the software successfully -before large sums are spent on prototypes or manufacturing. This is the first book to apply this verification technique to the rapidly growing field of embedded systems-on-a-chip(SoC). As traditional embedded system design evolves into single-chip design, embedded engineers must be armed with the necessary information to make educated decisions about which tools and methodology to deploy

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Título: Co-verification of hardware and software for ARM SoC design [electronic resource] by Jason R. Andrews

Editorial: Burlington, MA Elsevier Newnes c2005

Descripción física: 1 online resource (286 p.)

Mención de serie: Embedded technology series

Nota general: Includes index

Contenido: Cover; Contents; Foreword; Preface; Why Is This Book Important?; Audience; Prerequisite Knowledge; About Hardware/Software Co-Verification; Acknowledgments; About the Author; About Verisity; Chapter 1: Embedded System Verification: An Introduction; What's an Embedded System?; Embedded Systems Are Everywhere; Consumer Electronics; Wireless; Medical; Networking; Security; Imaging; Storage; Automotive; Design Constraints; Cost; Memory; Power; Real-Time Response; Performance; System Size; Reliability; Time-to-Market; Embedded Systems Decomposition; Microprocessors, Chips and Boards Embedded System Classifications Little or No Custom Hardware Design; A Lot of Custom Hardware - SoB Design; A Lot of Custom Hardware - SoC Design; Embedded System Design Process; Requirements; System Architecture; Microprocessor Selection; Hardware Design; Software Design; Hardware and Software Integration; Verification and Validation; Verification: Does it Work?; Validation: Did We Build the Right Thing?; Human Interaction; What is this Book About?; Scope and Outline; Chapter 2: Hardware and Software Design Process; Three Components of SoC Verification; Verification Platform Software Engineer's View of the World Hardware Engineer's View of the World;

Example; Software Development Tools; Editor; Source Code Revision Control; Compiler; Debugger; Simulator; Development Board; Integrated Development Environment (IDE); Software Debugging Connections; JTAG; Stub; Direct Connection; Types of Software; System Initialization and HAL; Diagnostic Suite; Real-Time Operating System (RTOS); Device Drivers and Application Software; Software Development Process; Hardware Development Tools; Editor; Source Code Revision Control; Lint Tools; Code Coverage; Debugging Tools Verification Languages Assertions; Debugging Defined; Memory Models; Microprocessor Models; Hardware Design Process; Microprocessor Review; Hardware and Software Interaction; Software Debugging Characteristics; Hardware Debugging Characteristics; Chapter 3: SoC Verification Topics for the ARM Architecture; ARM Background; ARM Architecture; ARM Architectures, Families, and CPU Cores; Thumb Instruction Set; Programming Model; Instruction Set; Data Transfer Instructions; Coprocessor Instructions; Exceptions and Interrupts; Memory Layout and Byte Order; ARM Bus Interface Protocols ARM7TDMI Bus Protocol AMBA Specification; Introduction to AMBA Protocols; AMBA ASB; AMBA AHB; AMBA APB; AMBA 3.0 and AXI; Summary of ARM CPU Bus Interfaces; AHB Tutorial; Configuration at Reset; Phases of AHB Transfer; AHB Arbitration; AHB Address Phase; AHB Data Phase; AHB-Lite; Single-Layer and Multilayer AHB; ARM926EJ-S Example; Interrupt Signals; Instruction and Data Caches; Tightly Coupled Memory (TCM); ARM Summary; Chapter 4: Hardware/Software Co-Verification; History of Hardware/Software Co-Verification; Commercial Co-Verification Tools Appear; Co-Verification Defined; Definition Benefits of Co-Verification

Lengua: English

ISBN: 1-281-00972-5 9786611009724 0-08-047690-2 1-4175-4435-X

Materia: Integrated circuits- Verification Computer software- Verification Systems on a chip

Enlace a formato físico adicional: 0-7506-7730-9

Punto acceso adicional serie-Título: Embedded technology series

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