Embedded Systems Hardware for Software Engineers

By Ed Lipiansky

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A PRACTICAL GUIDE TO HARDWARE FUNDAMENTALS

Embedded Systems Hardware for Software Engineers describes the electrical and electronic circuits that are used in embedded systems, their functions, and how they can be interfaced to other devices.

Basic computer architecture topics, memory, address decoding techniques, ROM, RAM, DRAM, DDR, cache memory, and memory hierarchy are discussed. The book covers key architectural features of widely used microcontrollers and microprocessors, including Microchip's PIC32, ATMEL's AVR32, and Freescale's MC68000. Interfacing to an embedded system is then described. Data acquisition system level design considerations and a design example are presented with real-world parameters and characteristics. Serial interfaces such as RS-232, RS-485, PC, and USB are addressed and printed circuit boards and high-speed signal propagation over transmission lines are covered with a minimum of math. A brief survey of logic families of integrated circuits and programmable logic devices is also contained in this in-depth resource.

COVERAGE INCLUDES:

- Architecture examples
- Memory
- Memory address decoding
- Read-only memory and other related devices
- Input and output ports
- Analog-to-digital and digital-to-analog converters
- Interfacing to external devices
- Transmission lines
- Logic families of integrated circuits and their signaling characteristics
- The printed circuit board
- Programmable logic devices
- Test equipment: oscilloscopes and logic analyzers

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Editorial Review

About the Author

Eduardo Lipiansky is a hardware design engineer for the Platforms Power Group of Google, Inc. Previously, he worked at Sun Microsystems, Cisco Systems, Tandem Computers (now an HP company), and Varian Associates. Mr. Lipiansky has a variety of work experience in analog and digital systems design, networking, high-speed digital design, electronic instrumentation design, and power engineering. He has 20+ years of teaching experience at the University Extensions of Berkeley and Santa Cruz, California where he taught courses on microprocessors, digital design, operational amplifiers, circuit analysis, electronic devices, advanced microprocessor-based interfacing techniques.

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