

Dedicated Digital Processors: Methods in Hardware/Software Co-Design

By F. Mayer-Lindenberg

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The recent evolution of digital technology has resulted in the design of digital processors with increasingly complex capabilities. The implementation of hardware/software co-design methodologies provides new opportunities for the development of low power, high speed DSPs and processor networks. Dedicated digital processors are digital processors with an application specific computational task.

Dedicated Digital Processors presents an integrated and accessible approach to digital processor design principles, processes, and implementations based upon the author's considerable experience in teaching digital systems design and digital signal processing. Emphasis is placed on presentation of hardware/software co-design methods, with examples and illustrations provided throughout the text. System-on-a-chip and embedded systems are described and examples of high speed real-time processing are given. Coverage of standard and emerging DSP architectures enable the reader to make an informed selection when undertaking their own designs.

- Presents readers with the elementary building blocks for the design of digital hardware systems and processor networks
- Provides a unique evaluation of standard DSP architectures whilst providing up-to-date information on the latest architectures, including the TI 55x and TigerSharc chip families and the Virtex FPGA (field-programmable gate array)
- Introduces the concepts and methodologies for describing and designing hardware
- VHDL is presented and used to illustrate the design of a simple processor
- A practical overview of hardware/software codesign with design techniques and considerations illustrated with examples of real-world designs

Fundamental reading for graduate and senior undergraduate students of computer and electronic engineering, and Practicing engineers developing DSP applications.

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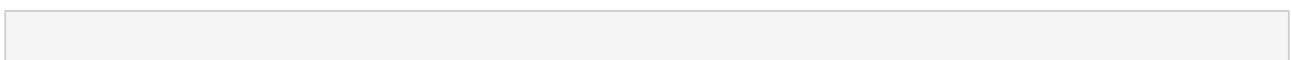
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Editorial Review

Review

"...the comprehensive coverage and accessible presentation...make this book an attractive resource for engineers working in the field." (*Computing Reviews.com*, September 20, 2004)

From the Back Cover

The evolution of digital technology has resulted in the design of digital processors with increasingly complex capabilities. Intended as an introduction to the subject, this book presents an integrated and accessible approach to the design and implementation of digital processors. *Dedicated Digital Processors* emphasizes the common aspects of hardware and software structures, explaining the opportunities provided for developing low-power, high-speed processors and processor networks.

Features include:

- An introduction to the technological basics of digital computers, including transistor circuits and the properties of current integrated chips.
- Discussions on complexity issues such as minimization, the timing and synchronization of computations and techniques used to boost performance in modern high-speed processors.
- The presentation of a programmable processor design, including the handling of input and output, interrupt processing and DMA.
- A detailed evaluation of standard DSP architectures including up-to-date information on TI 67xx, Analog Devices, Sharc processors and Virtex FPGA (field programmable gate arrays).
- VHDL examples and exercises that can be simulated and synthesized with free design tools provided by FPGA companies.

Based on the author's considerable experience in teaching digital systems design and digital signal processing, this book is an excellent reference for graduate and senior undergraduate students in electronic and computer engineering. Practising engineers and professionals developing DSP applications will appreciate the guidance to designing digital systems.

Users Review

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Robert Young:

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