



# Design of High-Performance Microprocessor Circuits

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## Design of High-Performance Microprocessor Circuits

This book covers the design of next generation microprocessors in deep submicron CMOS technologies. The chapters in *Design of High Performance Microprocessor Circuits* were written by some of the world's leading technologists, designers, and researchers. All levels of system abstraction are covered, but the emphasis rests squarely on circuit design. Examples are drawn from processors designed at AMD, Digital/Compaq, IBM, Intel, MIPS, Mitsubishi, and Motorola.

Each topic of this invaluable reference stands alone so the chapters can be read in any order. The following topics are covered in depth:

- Architectural constraints of CMOS VLSI design
- Technology scaling, low-power devices, SOI, and process variations
- Contemporary design styles including a survey of logic families, robust dynamic circuits, asynchronous logic, self-timed pipelines, and fast arithmetic units
- Latches, clocks and clock distribution, phase-locked and delay-locked loops
- Register file, cache memory, and embedded DRAM design
- High-speed signaling techniques and I/O design
- ESD, electromigration, and hot-carrier reliability
- CAD tools, including timing verification and the analysis of power distribution schemes
- Test and testability

*Design of High-Performance Microprocessor Circuits* assumes a basic knowledge of digital circuit design and device operation, and covers a broad range of circuit styles and VLSI design techniques. Packed with practical know-how, it is an indispensable reference for practicing circuit designers, architects, system designers, CAD tool developers, process technologists, and researchers. It is also an essential text for VLSI design courses.

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