Computer Communications and Networks

The QUINTESSENTIAL PIC® MICROCONTROLLER deals with the central 'intelligence' of most smart embedded digital systems and aims to give the reader the confidence to design, construct and program a real working system using the industrial standard and popular Microchip PIC family of devices as the exemplar.

Aimed specifically at a readership with no prior knowledge of software, electronics or logic design, this book is suitable for both industrial engineers and hobbyists. Students of Electronic Engineering and Computer Science, taking relevant courses or engaged in project work at either an under- or postgraduate level, will find it an ideal textbook.

The second edition has been extensively rewritten to both rationalize and clarify the introductory chapters and to update and extend the core material. Whilst the thrust remains with the Mid-range devices, an additional chapter has also been added on the Extended-range family.

Key features include:

- The use of current real-world hardware and software products to illustrate the material
- Numerous fully worked examples as well as self-assessment questions
- An associated web site providing solutions, further examples, listings and useful resources at http://www.eng.ulst.ac.uk/sidk/quintessential
- Clear and concise presentation of key points and underlying concepts.

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Katzen

The Quintessential PIC® Microcontroller

Second Edition

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PART I

The Fundamentals

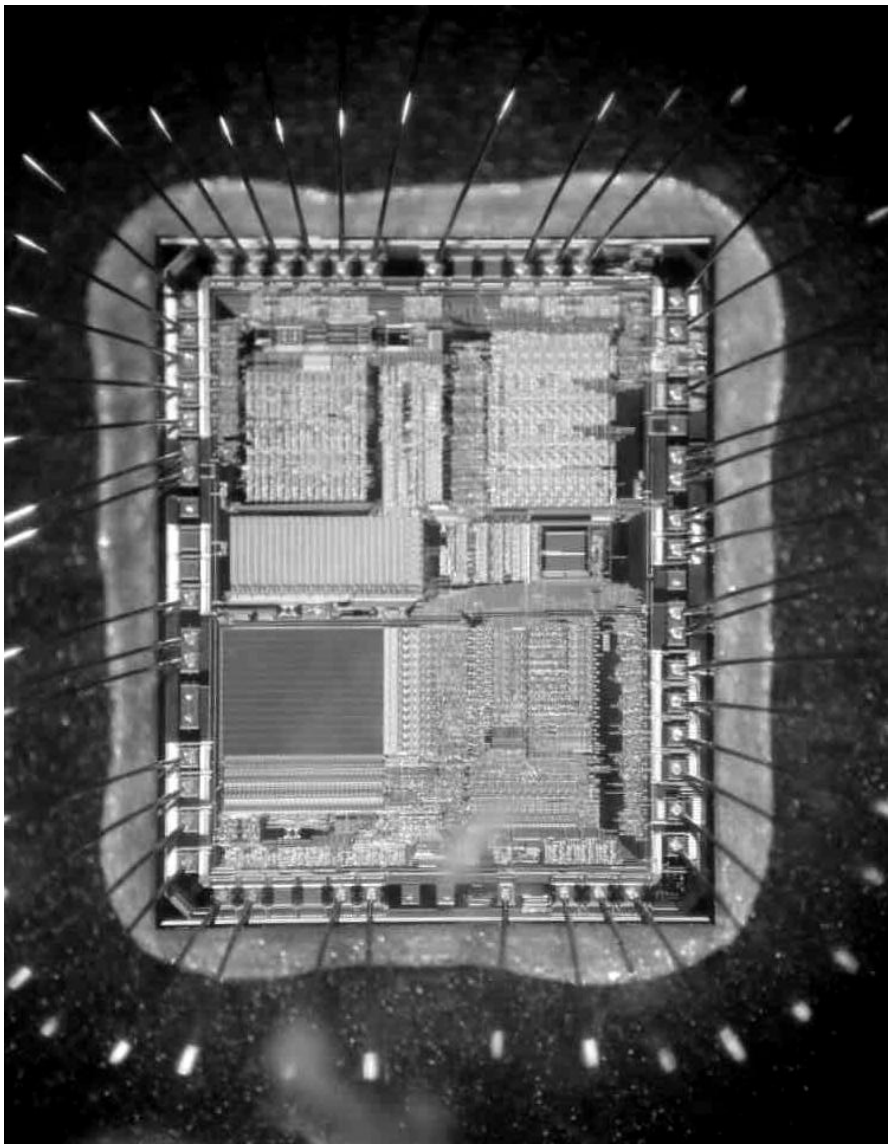
This book is about microcontrollers (MCUs). These are digital engines modeled after the architecture of a stored-program computer and integrated onto a single very largescale integrated circuit together with support circuitry, memories and peripheral interface devices. Although the microcontroller is often confused with its better-known cousin, the microprocessor, in its role as the driving force of the ubiquitous personal computer, the vast majority of both microprocessors and microcontrollers are embedded into a variety of other digital components. The first microprocessors in the early 1970s were marketed as an alternative way of implementing digital circuitry. Here the task would be determined by a series of instructions encoded as binary code groups in read-only memory. This is more flexible than the alternative approach of wiring hardware integrated circuits in the appropriate manner. The microcontroller is simply the embodiment of this original role of the integrated computer.

We will look at embedded microcontrollers in a general digital processing context in Parts II and III. Here our objective is to lay the foundation for this material. We will be covering:

- Digital code patterns.
- Binary arithmetic.
- Digital circuitry.
- Computer architecture and programming.

This will by no means be a comprehensive review of the subject, but there are many other excellent texts in this area[1] which will launch you into greater depths.

[1] Such as S.J. Cahill's *Digital and Microprocessor Engineering*, 2nd ed., Prentice Hall, Englewood Cliffs, NJ, 1993.



Peeking into the silicon.