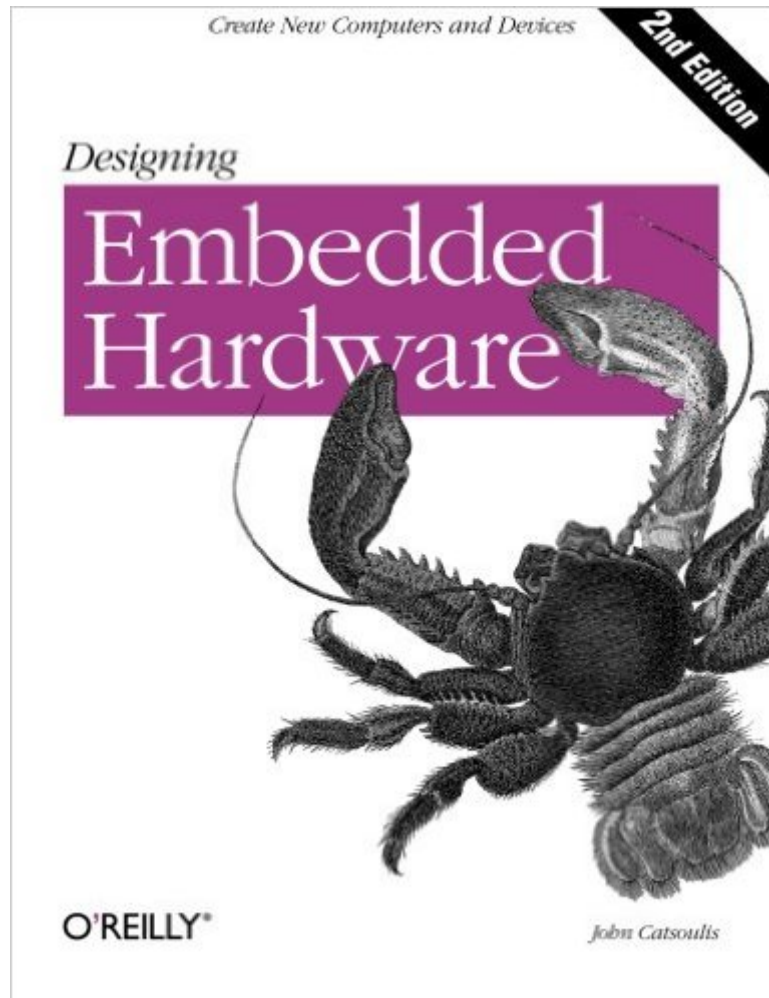


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# Designing Embedded Hardware



## Synopsis

Embedded computer systems literally surround us: they're in our cell phones, PDAs, cars, TVs, refrigerators, heating systems, and more. In fact, embedded systems are one of the most rapidly growing segments of the computer industry today. Along with the growing list of devices for which embedded computer systems are appropriate, interest is growing among programmers, hobbyists, and engineers of all types in how to design and build devices of their own. Furthermore, the knowledge offered by this book into the fundamentals of these computer systems can benefit anyone who has to evaluate and apply the systems. The second edition of *Designing Embedded Hardware* has been updated to include information on the latest generation of processors and microcontrollers, including the new MAXQ processor. If you're new to this and don't know what a MAXQ is, don't worry--the book spells out the basics of embedded design for beginners while providing material useful for advanced systems designers. *Designing Embedded Hardware* steers a course between those books dedicated to writing code for particular microprocessors, and those that stress the philosophy of embedded system design without providing any practical information. Having designed 40 embedded computer systems of his own, author John Catsoulis brings a wealth of real-world experience to show readers how to design and create entirely new embedded devices and computerized gadgets, as well as how to customize and extend off-the-shelf systems. Loaded with real examples, this book also provides a roadmap to the pitfalls and traps to avoid. *Designing Embedded Hardware* includes:

- The theory and practice of embedded systems
- Understanding schematics and data sheets
- Powering an embedded system
- Producing and debugging an embedded system
- Processors such as the PIC, Atmel AVR, and Motorola 68000-series
- Digital Signal Processing (DSP) architectures
- Protocols (SPI and I2C) used to add peripherals
- RS-232C, RS-422, infrared communication, and USB
- CAN and Ethernet networking
- Pulse Width Monitoring and motor control

If you want to build your own embedded system, or tweak an existing one, this invaluable book gives you the understanding and practical skills you need.

## Book Information

Paperback: 398 pages

Publisher: O'Reilly Media; 2 edition (May 26, 2005)

Language: English

ISBN-10: 0596007558

ISBN-13: 978-0596007553

Product Dimensions: 7 x 0.9 x 9.2 inches

Shipping Weight: 1.4 pounds (View shipping rates and policies)

Average Customer Review: 4.5 out of 5 stars [See all reviews](#) (20 customer reviews)

Best Sellers Rank: #363,701 in Books (See Top 100 in Books) #14 in [Books > Computers & Technology > Hardware & DIY > Microprocessors & System Design > DSPs](#) #35 in [Books > Computers & Technology > Hardware & DIY > Microprocessors & System Design > Embedded Systems](#) #66 in [Books > Computers & Technology > Hardware & DIY > Internet & Networking](#)

## Customer Reviews

This is a practical introduction to embedded hardware, so to write software for the hardware presented in this book, you will need to consult other books. This book is only an introduction and if you want to gain more knowledge and experience in the field of hardware design, further study is required. In the first part of the book the author gives an introduction to computer architecture and describes the components that you find in a PC. The author goes on to explain basic electronics, just enough to understand the explanations about the electronic components. There are the basic equations to calculate voltage and current. The functionality of resistors, capacitors, inductors, diodes and crystals is explained. There is advice on how you can build or have built your own integrated circuit board. Some simple microprocessors and micro controllers are described including the currently available and commonly used PIC and AVR micro controllers, the 68000-series microprocessor and a DSP based controller. The functionality of the components is described and it is shown how the component can be used with a few other basic components to exercise a minimum of functionality. The book also covers useful topics like the protocols SPI (Serial Peripheral Interface) and I2C, Inter Integrated Circuit, which show how components can communicate with each other or the outside world. Various serial port and network protocols are discussed like RS232C and USB. Chapter 13 was particularly interesting, covering analog to digital conversion and applications. For example, the book explains how to use an amplifier to connect a digital circuit to a temperature or light sensor, or a motor control. The one thing I did not like about the book was the dedication of an entire chapter to the ancient language of Forth.

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