

# Programming Embedded Systems in C and C++

By Michael Barr



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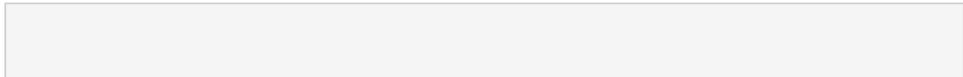
Embedded software is in almost every electronic device designed today. There is software hidden away inside our watches, microwaves, VCRs, cellular telephones, and pagers; the military uses embedded software to guide smart missiles and detect enemy aircraft; communications satellites, space probes, and modern medicine would be nearly impossible without it. Of course, someone has to write all that software, and there are thousands of computer scientists, electrical engineers, and other professionals who actually do.

Each embedded system is unique and highly customized to the application at hand. As a result, embedded systems programming is a widely varying field that can take years to master. However, if you have some programming experience and are familiar with C or C++, you're ready to learn how to write embedded software. The hands-on, no-nonsense style of this book will help you get started by offering practical advice from someone who's been in your shoes and wants to help you learn quickly.

The techniques and code examples presented here are directly applicable to real-world embedded software projects of all sorts. Even if you've done some embedded programming before, you'll still benefit from the topics in this book, which include:

- Testing memory chips quickly and efficiently
- Writing and erasing Flash memory
- Verifying nonvolatile memory contents with CRCs
- Interfacing to on-chip and external peripherals
- Device driver design and implementation
- Optimizing embedded software for size and speed

So whether you're writing your first embedded program, designing the latest generation of hand-held whatchamacalits, or simply managing the people who do, this book is for you.



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### Editorial Review

#### Review

This lively and readable book is the perfect introduction for those venturing into embedded systems software development for the first time. It provides in one place all the important topics necessary to orient programmers to the embedded development process. -- *Lindsey Vereen, Editor-in-Chief, Embedded Systems Programming, 1/99*

#### From the Author

I've set aside an area of my company's website to provide up-to-date information related to this book. This includes a Frequently Asked Questions list about the example programs and online versions of the Embedded Systems Glossary and Bibliography. And if you have any questions that aren't answered there, feel free to write me at [mbarr@netrino.com](mailto:mbarr@netrino.com).

#### About the Author

Michael Barr has been an editor of Embedded Systems Programming since 1999 and a contributor since 1997; he is currently that magazine's editor-in-chief. His book about embedded software development -- Programming Embedded Systems in C and C++ (O'Reilly, 1999) -- has taught tens of thousands of engineers the subject and been translated into several languages. He is also the author of CMP Book's Embedded Systems Dictionary (2003). Michael is a lecturer at the University of Maryland and a popular Embedded Systems Conference instructor and advisor. Software he wrote helps run millions of systems around the world, ranging from satellite base stations to physical therapy equipment. Through the Neutrino Consultants Network, Michael provides design advice and training. He holds MS and BS degrees in electrical engineering.

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