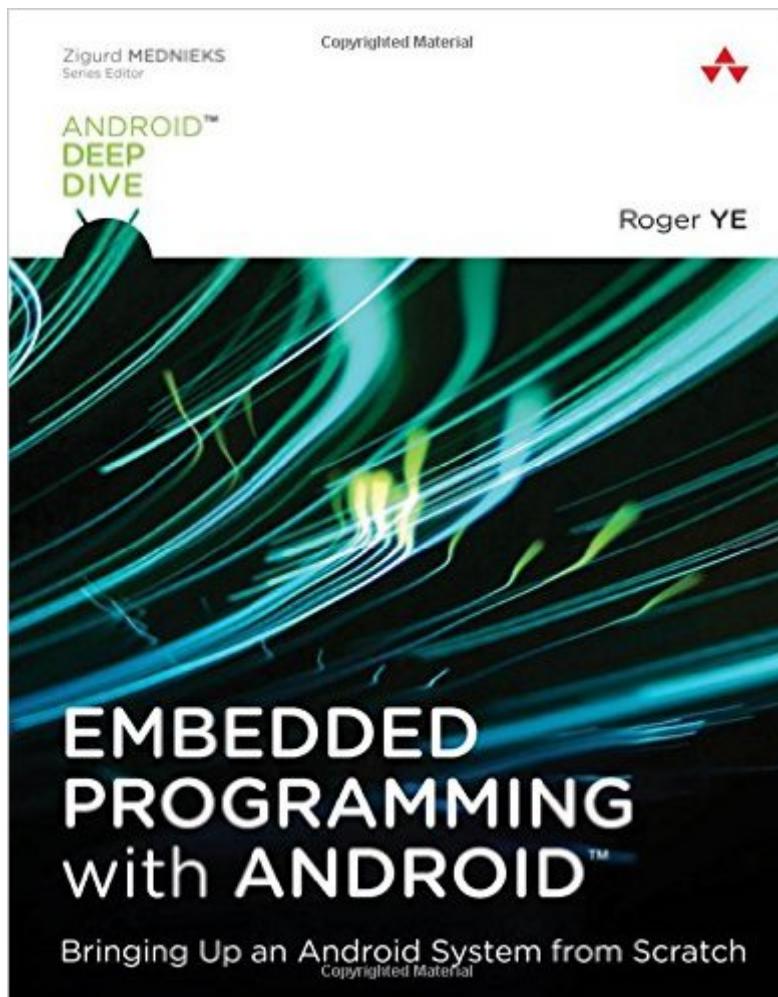


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# Embedded Programming With Android: Bringing Up An Android System From Scratch (Android Deep Dive)



## Synopsis

The First Practical, Hands-On Guide to Embedded System Programming for Android

Today, embedded systems programming is a more valuable discipline than ever, driven by fast-growing, new fields such as wearable technology and the Internet of Things. In this concise guide, Roger Ye teaches all the skills you'll need to write the efficient embedded code necessary to make tomorrow's Android devices work.

The first title in Addison-Wesley's new *Android Deep Dive* series for intermediate and expert Android developers, *Embedded Programming with Android* draws on Roger Ye's extensive experience with advanced projects in telecommunications and mobile devices. Step by step, he guides you through building a system with all the key components Android hardware developers must deliver to manufacturing. By the time you're done, you'll have the key programming, compiler, and debugging skills you'll need for real-world projects.

First, Ye introduces the essentials of bare-metal programming: creating assembly language code that runs directly on hardware. Then, building on this knowledge, he shows how to use C to create hardware interfaces for booting a Linux kernel with the popular U-Boot bootloader. Finally, he walks you through using filesystem images to boot Android and learning to build customized ROMs to support any new Android device. Throughout, Ye provides extensive downloadable code you can run, explore, and adapt.

You will

- Build a complete virtualized environment for embedded development
- Understand the workflow of a modern embedded systems project
- Develop assembly programs, create binary images, and load and run them in the Android emulator
- Learn what it takes to bring up a bootloader and operating system
- Move from assembler to C, and explore Android's goldfish hardware interfaces
- Program serial ports, interrupt controllers, real time clocks, and NAND flash controllers
- Integrate C runtime libraries
- Support exception handling and timing
- Use U-Boot to boot the kernel via NOR or NAND flash
- Processess
- Gain in-depth knowledge for porting U-Boot to new environments
- Integrate U-Boot and a Linux kernel into an AOSP and CyanogenMod source tree
- Create your own Android ROM on a virtual Android device

## Book Information

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## Customer Reviews

Roger Ye has generally done a good job writing this book. The book deals with constructing an Android system from scratch. Not having a lot of experience in embedded developing but as a Software developer, I found many useful things I did not know about the process, and how Android internally deals with daily problematics (such memory mapping or exception handling). In that sense, Android developers can certainly benefit from the book, even if they are not doing Embedded Programming. Although some parts are more dense than others, there is generally a good initial job of explaining some concepts that might be oxidized for developers, such as memory management. Building a custom CyanogenMod is a good closure for the book to see a practical example of what you can do, rather than only theoretical information. Some minor cons: some overuse of source code (is better to showcase a small section and point out to the repository with all the code) and based the development on a environment such as Eclipse - although I am not an expert in which alternatives are available. I can generally recommend this book for anybody interested in learning Embedded Programming.

Android is a nearly perfect system to use for small hardware projects. Whether you are a Maker, building a project for Single-board computer or an entrepreneur with a product for the burgeoning IoT market, there couldn't be a better OS than Android. Unfortunately, until now, there has been only one book for developers looking to embed Android on a new device, Karim Yaghmour's excellent "Embedded Android". Roger Ye's "Embedded Programming with Android" is the perfect prequel. It addresses an incredibly difficult topic: bootstrapping new hardware. The book manages to divide the subject -- intrinsically specific to the particular target tool-chain and hardware -- into several manageable and generalizable steps. The hands-on exercises make clever use of Android's QEMU emulator and lay out the process of taking hardware from bare metal, to running

bootloader. Make no mistake, bringing up new hardware is not for the faint of heart. This is not a beginner's book. Even an experienced developer with some experience programming close to hardware will have to use some ingenuity to work through the exercises. Working through them, however is a huge step towards porting Android to your own board.

If you want to get into embedded development this is a primer. It assumes that you have some knowledge of computer architecture, assembly, C, and gnu tool chain experience. In the beginning the author walks you through all the tools he will be using, and a brief explanation of why he uses those tools. There isn't much in the way of walking you through installation and configuration of the development tools. But if you need that there is always plenty of information on the internet. Sometimes it is hard just to know where to start when you want to get into a new field. This book answers it.

I really enjoy how direct this book is. It has all the code you need and if you build yourself a nice ubuntu vm with vmware tools installed you can use bluestacks on your host pc, then add the kindle app, open this book then copy and paste a lot of the code to your ubuntu vm.. That is if you feel you don't need the extra typing practice. :P Leaving you the time to read and comprehend what the code is doing and adding to the machine you are building. Thank you to the author for the awesome tutorial and completeness of it.

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