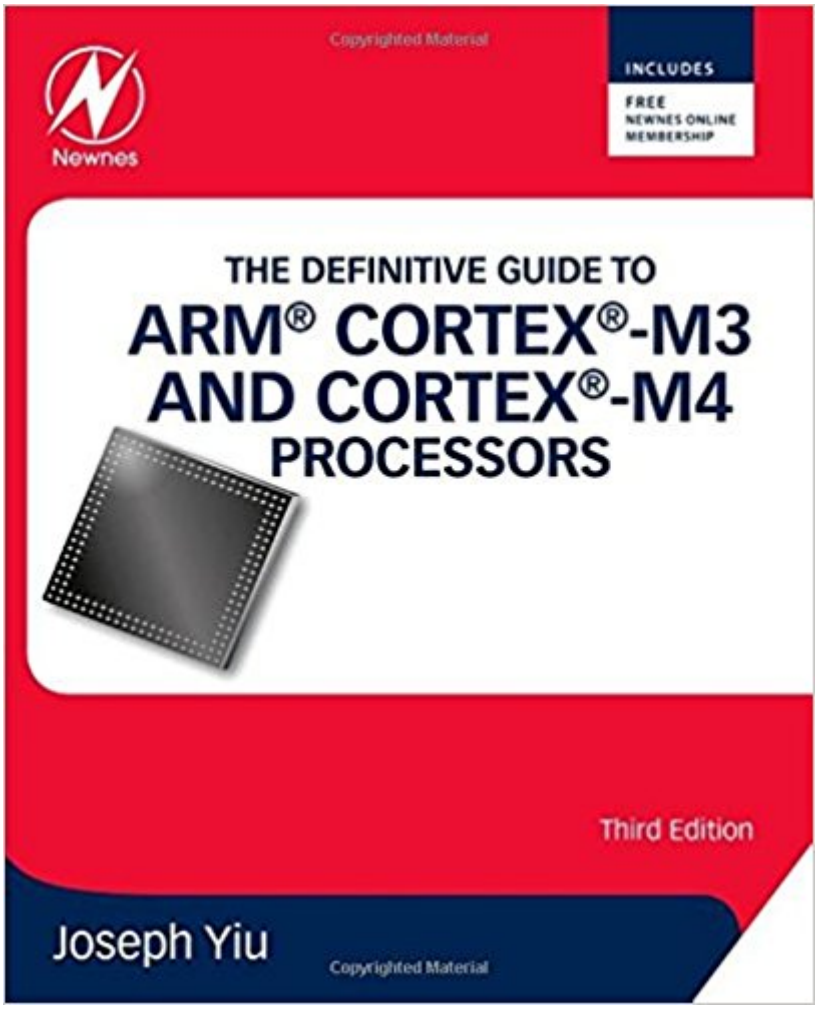
The Definitive Guide To ARMÃ‚Â® CortexÃ‚Â®-M3 And CortexÃ‚Â®-M4 Processors, Third Edition



Synopsis

This new edition has been fully revised and updated to include extensive information on the ARM Cortex-M4 processor, providing a complete up-to-date guide to both Cortex-M3 and Cortex-M4 processors, and which enables migration from various processor architectures to the exciting world of the Cortex-M3 and M4. This book presents the background of the ARM architecture and outlines the features of the processors such as the instruction set, interrupt-handling and also demonstrates how to program and utilize the advanced features available such as the Memory Protection Unit (MPU). Chapters on getting started with IAR, Keil, gcc and CooCox CoIDE tools help beginners develop program codes.Ã Â Coverage also includes the important areas of software development such as using the low power features, handling information input/output, mixed language projects with assembly and C, and other advanced topics.Two new chapters on DSP features and CMSIS-DSP software libraries, covering DSP fundamentals and how to write DSP software for the Cortex-M4 processor, including examples of using the CMSIS-DSP library, as well as useful information about the DSP capability of the Cortex-M4 processor A new chapter on the Cortex-M4 floating point unit and how to use it A new chapter on using embedded OS (based on CMSIS-RTOS), as well as details of processor features to support OS operations Various debugging techniques as well as a troubleshooting guide in the appendix topics on software porting from other architectures A full range of easy-to-understand examples, diagrams and quick reference appendices

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Design

Customer Reviews

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Joseph Yiu joined ARM in 2001 and has been involved in a wide range of projects including development of ARM Cortex-M processors and various on-chip system level and debug components. In addition to in-depth knowledge of the processors and microcontroller system design, Joseph also has extensive knowledge in related areas including software development for the ARM Cortex-M microcontrollers, FPGA development and System-on-Chip design technologies.

This is a monumental work. It covers everything from a high-level overview of the company (ARM) and how they do business (a fab-less IP company) to the low-level instructions offered by each of their microcontroller families (M0-M4).I was wondering how different this update would be to the 2nd edition. It is not just a cursory update with references changed to include the M4 (although there is some of that). There is a large amount of new material, including the new floating point and DSP

instructions available on the Cortex M4. Lot’s of other new material has been included.There is a great introduction about why ARM, and specifically the Cortex matter. It is *very* well-done and includes a huge set of diagrams.There is a lot to like:* Typeset well, clearly laid out* Interesting background (ARM, processors, differences between families)* Cortex M4 coverage* Good overview diagrams (such as a single page diagram showing the M0, M0+, M1, M3, and M4 instruction differences).* Breadth (high-level overviews, all the way down to very low-level processor details)* Sample code (how to utilize certain instructions to build an OS, for example)The code examples are especially surprising and welcome. A lot of effort was put into showing how certain features would be used: the SysTick timer, shadowed stack pointer, MPU, FPU, DSP, Sleep (WFE/WFI), etc. Actual C code is given (and explained), showing how to utilize each of these features (and others). C is used where possible, but mixed assembly is used where it makes sense. For example, on page 342 of the Context Switching example.This is an impressive work. But is there any room for improvement? Of course there would be some small things, such as improving the grammar (such as when software code is repeatedly called "software codes"), reformatting some diagrams to fit better (p545-48, p551-58, 618, ...) are unnecessarily in landscape orientation, yet do not utilize the extra space), and some examples in the SIMD section. The M4 has a large number of SIMD and saturating instructions, most of them duplications because of operand size or such. It would be helpful to have an explanation of which ones to use when.The index is good for reference and is almost too detailed. One issue is that the entry for CMSIS-RTOS gives only a single page (p48), with no mention to p607 section 19.1.3 "Role of CMSIS-RTOS".Reviews of other editions have noted that there are a lot of references to Keil tools. Those references are still here in this update, but IAR is also mentioned in a couple of places. Although it does get old seeing "Keil" mentioned repeatedly, GCC is also covered at times. Very nice.The breadth of this book is impressive. From the excellent new DSP coverage, to debugging support and techniques, to the Advanced Topics and Software Porting chapters, there is such a wealth of useful information that this 3rd edition feels more like a new book than just an update.

I’m on my maiden voyage into the ARM world. I’ve got a project using an Atmel SAM4E microcontroller that sports a Cortex M4 inside. I thought this book would be better suited to the folks who are looking at incoporating the ARM IP into a microcontroller, but it was great for me too. My copy is full of highlights and notes -- good thing its digital!

This book has a significant number of typos and the text directs the readers to Appendixes that do

not exist.Because of the errors in the text that I can easily identify, I'm suspicious of the other data.

I have the earlier version on the Cortex M3 from Mr. Yiu and the new version is significantly better. With the addition of the M4 discussion the book is very complete. Also the additional sections on development tools and examples is very helpful in understanding how to use the processors and the development options that are available.

This book is great. I was looking for a good all-in-one resource to learn the ins and outs of ARM microcontroller programming, and this is surely it. If you understand C, assembly, and have a bit a software architecture under your belt, this book will enable you to master the use of these tiny processors. I'm really so glad I bought this one over the others.

Just what it says on the tin. A definitive and user friendly guide. Reading this before delving into M3/M4-development enabled me to reason myself out of every mystifying behaviour I encountered. Highly recommended.

This is a good read if you're looking to dive deeper into the ARM architecture and learn the instruction set.

It is clear that the author has a firm grasp on the material presented.

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