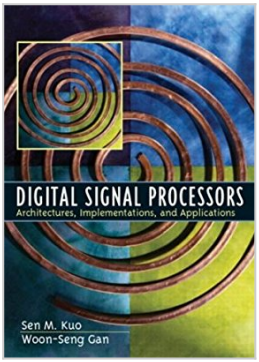

Digital Signal Processors: Architectures, Implementations, and Applications

By Sen M. Kuo, Woon-Seng S. Gan

Digital Signal Processors: Architectures, Implementations, and Applications
By Sen M. Kuo, Woon-Seng S. Gan

This book offers learners a hands-on approach to understanding architecture and programming of DSP processors, and the design of real-time DSP systems. It contains real-world applications, and implementation of DSP algorithms using both the fixed-point and floating-point processors. **KEY TOPICS** Other topics include FIR Filtering, IIR Filtering, Fast Fourier Transforms. and Adaptive Filtering. For use as a desktop reference for practicing engineers to learn DSP concepts and to develop real-time applications at work.

Digital Signal Processors: Architectures, Implementations, and Applications

By Sen M. Kuo, Woon-Seng S. Gan

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan

This book offers learners a hands-on approach to understanding architecture and programming of DSP processors, and the design of real-time DSP systems. It contains real-world applications, and implementation of DSP algorithms using both the fixed-point and floating-point processors. **KEY TOPICS** Other topics include FIR Filtering, IIR Filtering, Fast Fourier Transforms. and Adaptive Filtering. For use as a desktop reference for practicing engineers to learn DSP concepts and to develop real-time applications at work.

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan Bibliography

- Sales Rank: #2884892 in Books
- Published on: 2004-04-05
- Ingredients: Example Ingredients
- Original language: English
- Number of items: 1
- Dimensions: 9.68" h x 1.22" w x 7.06" l, 2.36 pounds
- Binding: Hardcover
- 624 pages

Editorial Review

Real-time digital signal processing (DSP) using general-purpose digital signal processors is a very hot subject and challenging work in today's engineering fields. Real-time DSP provides an effective way for designing and implementing a variety of DSP algorithms for real-world applications. In fact, many universities and industrial companies are currently engaged in real-time DSP research, education, and development. With DSP penetrating into various applications, the demand for high-performance digital signal processors has expanded rapidly in recent years. It has become increasingly important for today's students and practicing engineers to master not only the theory of DSP, but also the techniques involved in real-time DSP system design and implementation.

Digital Signal Processors: Architectures, Implementations, and Applications offers readers a hands-on approach to understanding the architecture and programming of DSP processors, the design of real-time DSP systems and real-world applications, and the implementation of DSP algorithms using both fixed-point and floating-point processors, including the TMS320C2000, TMS320C54x, TMS320C55x, TMS320C62x, TMS320C64x, TMS320C3x, and TMS320C67x. This book is intended as a text for senior/graduate-level college students. With its emphasis on DSP implementation, experiments, and applications, this book can also serve as a desktop reference for practicing engineers who want to learn DSP concepts and develop real-time DSP applications at work. The minimum prerequisite requirements are a basic understanding of the concepts of signals and systems, the C language, and assembly programming.

This book gives an overview of real-time DSP technologies. To illustrate the hands-on aspects of real-time DSP applications effectively, MATLAB and Simulink are introduced for use in the design, analysis, and implementation of DSP algorithms. In addition, Code Composer Studio (CCS) for the TMS320C54x and TMS320C55x is used for lab experiments, projects, and applications. These useful tools effectively illustrate the concepts of real-time DSP and bridge the gap between theoretical signal processing and real-time implementation. By completing the hands-on exercises and problems, readers can gain practical knowledge of real-time implementation issues. In using the advanced DSP architecture for fast software development and maintenance, the mixing of C and assembly programs is emphasized.

This book uses a two-level approach in the hands-on exercises. First, we introduce the software tools and guide readers step by step in designing, simulating, verifying, and finally developing programs in both floating- and fixed-point formats. Then, we provide additional exercises and problems in order to reinforce readers' understanding of these topics. The MATLAB, Simulink, C, and assembly programs that implement many DSP examples and applications are listed throughout the book and are available on the companion CD and at **www.prenhall.com/kuo** and **www.ntu.edu.sg/home/ewsgan/book.htm**. Several real-world data files for some practical applications introduced in the book can also be found at this website. The use of the Web allows the authors to continuously update the program and data files referenced in the book as the software and/or its interface is updated.

This book is organized into three main sections: application, architecture and implementation. (1) The application section (Chapters 1-3) introduces DSP algorithms and applications, processor architectures, peripheral components, and real-time implementation issues. (2) The architecture section (Chapters 4 and 5) gives detailed descriptions of fixed-point and floating-point processors with a focus on software

development. (3) The implementation section (Chapters 6-9) uses a top-down approach in the design, simulation, verification, and final implementation of commonly used DSP algorithms on both fixed- and floating-point processors. Additional hands-on experiments and practical applications using MATLAB, C, and CCS are given in Appendix B. Relevant coding issues and design examples that address connections of peripheral devices with DSP processors for certain applications are introduced in Appendix C.

Chapter 1 gives an overview of real-time DSP systems and applications, processor architectures, software and hardware development issues, and system-design considerations. This chapter lays out the framework for subsequent chapters. The experiment in the last section introduces CCS, an integrated software development tool, in a step-by-step manner. Chapter 2 reviews some fundamental DSP concepts, which are used to explain the topics given in subsequent chapters. This chapter only summarizes key points; as such, readers who are already familiar with DSP theories may skip Chapter 2. However, this chapter does provide numerous useful examples that serve as an introduction to using MATLAB and C to solve DSP problems, and it also introduces some advanced features of CCS that are useful for experiments given in subsequent chapters. Chapter 3 introduces a real-time implementation of DSP algorithms. Several practical topics are explained, such as fixed-point and floating-point number representations and arithmetic, programming issues to satisfy real-time constraints, and peripherals linked to DSP processors. In addition, a hands-on approach using fixed-point C programming in CCS is used to show some important fixed-point implementation issues.

Chapters 4 and 5 introduce architecture, instruction set, programming, and system-design issues for several fixed-point and floating-point DSP processors. These two chapters provide a comprehensive understanding of how to program different DSP processors, and they highlight the strengths and weaknesses of each processor. Examples and experiments demonstrate important differences between fixed-point and floating-point processors. Due to their complexity and length, the instruction sets of the major DSP processors used in this book are not included in the appendices. However, these instruction sets are readily available in the **Help** menu of CCS and on the websites listed in Appendix E.

Chapters 6, 7, 8, and 9 introduce the design, analysis, and software implementation of some commonly used DSP algorithms, which include finite-impulse response (FIR) filtering, infinite-impulse response (IIR) filtering, the fast Fourier transform (FFT), and adaptive filtering using fixed-point and floating-point DSP processors. Implementation of these algorithms on different processors serves to emphasize many of the important characteristics and features involved in programming different processors. It is important to note that a systematic approach is developed to guide readers through the different stages of DSP software development. We begin with floating-point C on general-purpose computers, and we continue with fixed-point C on C5000 processors, fixed-point C using C5000 intrinsics, and assembly programming. Finally, we use fixed-point C to call assembly-optimized routines in C5000 DSP libraries.

A quick reference guide on the use of MATLAB with DSP-related toolboxes and on the use of Simulink with supporting DSP blocksets is given in Appendix A. This appendix helps familiarize readers with these useful MATLAB tools for signal processing. We also introduce two powerful interactive tools, the Signal Processing Tool and the Filter Design and Analysis Tool, which are very effective in the design and evaluation of DSP algorithms for both fixed-point and floating-point implementations. Appendix B provides additional hands-on experiments, practical applications, and in-depth design projects. Appendix C discusses integrated system-design problems involving DSP processors with peripheral components. Appendix D lists and describes all of the program and data files used in this book, and Appendix E lists many websites that provide useful information on DSP.

This book can be used for courses with different emphases. A course on DSP algorithms and applications might begin with Appendix A, proceed with Chapters 1, 3, and end with the materials and experiments in Chapters 6-9. A course on DSP architecture might focus on Chapters 1, 3, 4, and 5 and on Appendix C. The

experiments at the end of Chapters 6-9 and at Appendix B also give more insight into the characteristics of DSP processors. Finally, a course that concentrates on real-time DSP system design might start with Chapters 1 and 3, continue with a focus on the C5000 DSP architectures in Chapters 4 and 5, and end with the design and implementation of DSP algorithms using C5000 processors in Chapters 6-9 and in Appendices B and C. The end-of-chapter problems are separated into two groups: Part A includes computer-related problems that use MATLAB, C, and CCS, and part B consists of traditional paper-and-pencil problems that reinforce basic DSP principles.

The intention of this book is to provide wide coverage of real-time DSP in a practical manner without relying too heavily on the use of mathematics. A unique feature of this book is its recurring links between the floating-point world of simulation and the fixed-point world of real-time implementation using C and assembly programs. Readers can select different topics, processors, and experiments and can work toward an understanding of the important concepts of architectures, implementations, and applications in real-time DSP.

Throughout this book, we use several software tools in examples, experiments, and problems. These software tools are commonly used in universities and industrial companies. These tools and their respective versions are listed next in alphabetical order:

- Code Composer Studio™ Version 2.10 from Texas Instruments
- DSP Blockset Version 5.0 from The MathWorks
- Embedded Target for Texas Instruments TMS320C6000™ DSP Platform Version 1.0 from The MathWorks
- Fi...

Users Review

From reader reviews:

James Alvarez:

As people who live in often the modest era should be up-date about what going on or details even knowledge to make these individuals keep up with the era that is certainly always change and move forward. Some of you maybe will probably update themselves by reading through books. It is a good choice to suit your needs but the problems coming to a person is you don't know what kind you should start with. This Digital Signal Processors: Architectures, Implementations, and Applications is our recommendation to cause you to keep up with the world. Why, as this book serves what you want and want in this era.

Kurt Haney:

This Digital Signal Processors: Architectures, Implementations, and Applications usually are reliable for you who want to become a successful person, why. The explanation of this Digital Signal Processors: Architectures, Implementations, and Applications can be one of many great books you must have is usually giving you more than just simple looking at food but feed an individual with information that maybe will shock your prior knowledge. This book is actually handy, you can bring it everywhere you go and whenever your conditions at e-book and printed types. Beside that this Digital Signal Processors: Architectures, Implementations, and Applications giving you an enormous of experience for instance rich vocabulary, giving you trial of critical thinking that we realize it useful in your day activity. So , let's have it and revel in reading.

Victor Loy:

This Digital Signal Processors: Architectures, Implementations, and Applications is great guide for you because the content and that is full of information for you who all always deal with world and possess to make decision every minute. This specific book reveal it data accurately using great manage word or we can say no rambling sentences included. So if you are read this hurriedly you can have whole details in it. Doesn't mean it only provides you with straight forward sentences but difficult core information with attractive delivering sentences. Having Digital Signal Processors: Architectures, Implementations, and Applications in your hand like having the world in your arm, facts in it is not ridiculous a single. We can say that no reserve that offer you world within ten or fifteen minute right but this book already do that. So , this really is good reading book. Hello Mr. and Mrs. active do you still doubt which?

Deborah Walker:

As we know that book is significant thing to add our know-how for everything. By a reserve we can know everything we wish. A book is a list of written, printed, illustrated or perhaps blank sheet. Every year has been exactly added. This reserve Digital Signal Processors: Architectures, Implementations, and Applications was filled regarding science. Spend your spare time to add your knowledge about your scientific research competence. Some people has diverse feel when they reading the book. If you know how big benefit from a book, you can sense enjoy to read a guide. In the modern era like at this point, many ways to get book that you simply wanted.

Read Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan for online ebook

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan books to read online.

Online Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan ebook PDF download

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan Doc

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan Mobipocket

Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan EPub

TR9WN0VDCPB: Digital Signal Processors: Architectures, Implementations, and Applications By Sen M. Kuo, Woon-Seng S. Gan