Rapid BeagleBoard Prototyping with MATLAB and Simulink

Dr Xuewu Dai, Dr Fei Qin

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Leverage the power of BeagleBoard to develop and deploy practical embedded projects

Overview

- Develop and validate your own embedded audio/video applications rapidly with Beagleboard
- Create embedded Linux applications on a pure Windows PC
- Full of illustrations, diagrams, and tips for rapid Beagleboard prototyping with clear, step-by-step instructions and hands-on examples

In Detail

As an open source embedded single-board computer with many standard interfaces, Beagleboard is ideal for building embedded audio/video systems to realize your practical ideas. The challenge is how to design and implement a good digital processing algorithm on Beagleboard quickly and easily without intensive low-level coding

Rapid BeagleBoard Prototyping with MATLAB and Simulink is a practical, hands-on guide providing you with a number of clear, step-by-step exercises which will help you take advantage of the power of Beagleboard and give you a good grounding in rapid prototyping techniques for your audio/video applications.

Rapid BeagleBoard Prototyping with MATLAB and Simulink looks at rapid prototyping and how to apply these techniques to your audio/video applications with Beagleboard quickly and painlessly without intensive manual low-level coding. It will take you through a number of clear, practical recipes that will help you to take advantage of both the Beagleboard hardware platform and Matlab/Simulink signal processing. We will also take a look at building S-function blocks that work as hardware drivers and interfaces for Matlab/Simulink. This gives you more freedom to explore the full range of advantages provided by Beagleboard.

By the end of this book, you will have a clear idea about Beagleboard and Matlab/Simulink rapid prototyping as well as how to develop voice recognition systems, motion detection systems with I/O access, and serial communication for your own applications such as a smart home.

What you will learn from this book

- Understand rapid prototyping on a Windows host, including Matlab/Simulink code generation for Beagleboard
- Set up a cross-development environment on Windows for Beagleboard
- Access Beagleboard's GPIO pins and RS232 communication in Matlab and Simulink
- Develop your own S-function block in Simulink to access Beagleboard's hardware devices
- Create an audio player and equalizer in Simulink, including audio file reading
- Adjust the parameters of your target system on-the-fly for the purpose of performance optimization
- Penetrate into an infrared sensor in Matlab/Simulink for smart home applications
- Build a video motion detection system for security applications

Approach

This book is a fast-paced guide with practical, hands-on recipes which will show you how to prototype Beagleboard-based audio/video applications using Matlab/Simlink and Sourcery Codebench on a Windows host.

Who this book is written for

Rapid BeagleBoard Prototyping with MATLAB and Simulink is great for students and academic researchers who have practical ideas and who want to build a proof-of-concept system on an embedded hardware platform quickly and efficiently. It is also useful for product design engineers who want to ratify their applications and reduce the time-to-market. It is assumed that you are familiar with Matlab/Simulink and have some basic knowledge of computer hardware. Experience in Linux is favoured but not necessary, as our software development is purely on a Windows host.

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