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Embedded Systems Design with the Amtel AVR Microcontroller

Steven F. Barrett

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ABSTRACT

This textbook provides practicing scientists and engineers an advanced treatment of the Atmel AVR microcontroller. This book is intended as a follow on to a previously published book, titled "Atmel AVR Microcontroller Primer: Programming and Interfacing." Some of the content from this earlier text is retained for completeness. This book will emphasize advanced programming and interfacing skills. We focus on system level design consisting of several interacting microcontroller subsystems. The first chapter discusses the system design process. Our approach is to provide the skills to quickly get up to speed to operate the internationally popular Atmel AVR microcontroller line by developing systems level design skills. We use the Atmel ATmega164 as a representative sample of the AVR line. The knowledge you gain on this microcontroller can be easily translated to every other microcontroller in the AVR line. In succeeding chapters, we cover the main subsystems aboard the microcontroller, providing a short theory section followed by a description of the related microcontroller subsystem with accompanying software for the subsystem. We then provide advanced examples exercising some of the features discussed. In all examples, we use the C programming language. The code provided can be readily adapted to the wide variety of compilers available for the Atmel AVR microcontroller line. We also include a chapter describing how to interface the microcontroller to a wide variety of input and output devices. The book concludes with several detailed system level design examples employing the Atmel AVR microcontroller.

KEYWORDS

Atmel microcontroller, Atmel AVR, ATmega164, microcontroller interfacing, embedded systems design

Contents

Acknowledgments xv

Preface xvii

1 Embedded Systems Design 1

1.1 What is an embedded system? 1
1.2 Embedded system design process 1
1.2.1 Problem Description 3
1.2.2 Background Research 3
1.2.3 Pre-Design 3
1.2.4 Design 5
1.2.5 Implement Prototype 6
1.2.6 Preliminary Testing 7
1.2.7 Complete and Accurate Documentation 7
1.3 Example: Kinesiology and Health Laboratory Instrumentation 7
1.4 Summary 14
1.5 Chapter Problems 14

References 14

2 Atmel AVR Architecture Overview 15

2.1 ATmega164 Architecture Overview 15
2.1.1 Reduced Instruction Set Computer—RISC 15
2.1.2 Assembly Language Instruction Set 16
2.1.3 C Operator Size 17
2.1.4 Bit Twiddling 17
2.1.5 ATmega164 Architecture Overview 18