Preface

A microcontroller (MCU) is a system-on-chip that you can find in all MCUs integrate a processor core, kinds of embedded systems. memory, and several programmable peripherals such as input/output ports, timers, analogue-to-digital converters, digital-toanalogue converters, parallel and serial communications, and more onto a single chip. This higher integration allows an engineer to reduce the size, cost, and power consumption (for battery powered, efficient applications). This makes the microcontrollers the best possible choice to provide the control for many different applications.

In fact, microcontrollers are so useful and efficient that if you were to make a list and count how many microcontrollers you use in a typical day, you would see that almost every electronic object you touch contains at least one. Most cell phones have 2-3 (the latest smart phones have as many as 6), your car has at least three, and even your toaster will usually have one. Generally speaking, most people interact with around 300 microcontrollers every day without ever realizing it!

The technology and innovation enabled by microcontrollers has led to many of the greatest features and advancements of the human race. Without microcontrollers there would be no cell phones, computers, video games, robotics, air bags, power locks, remote keyless entry, or even modern air conditioning to name but a few of the thousands of applications. Today's newest microcontrollers, like the MSP430, are opening the path to a safer and greener society by making everyday objects smarter, more efficient, and can even enable them to run off of the energy of the world around them.

This CD-ROM has been designed to provide supplementary material to help educators and academics in the teaching of microcontrollers (MCUs), using devices from the Texas Instruments MSP430 family.

In addition, the tutorials can be used as student guides to a series of modules and laboratory exercises. Each module is dedicated to a specific facet of the device, including the description of a range of peripherals. These materials also include the step-by-step project development using different software development tools and the description of the hardware starter kits available to perform the platforms exercises. The supported laboratory are the MSP430FG4618 (MSP430FG4618/F2013 Experimenter's board), the MSP430F2013 and the MSP430F2274 (eZ430-F2013 and eZ430-RF2500 MSP430 USB Stick Development Tool).

The use of these teaching materials requires a basic knowledge of microprocessor architecture and programming using C and Assembly languages. For those new to C programming, some basic topics are reviewed, the same material may also be useful to more experienced students, in this case being used as a refresher course.

It is also important to note that, while much of the information in these materials is already available from existing TI documentation (User's Guides and Application Reports), these materials should be seen as a supplement.

The laboratories have been developed using Code Composer Essentials v3 and code is provided in the C programming language, which strikes a good balance between easy to develop, structured, portable, readable code and direct control of the hardware.

The CD-ROM contains the eBook containing chapters from 1 to 15, and describes the MSP430 devices themselves. Appendices to the CD-ROM include a useful list of some additional resources.

This CD-ROM Teaching material includes a fully searchable eBook version of:

- The full text of fifteen chapters (Adobe PDF format and Microsoft Word);
- □ A slide presentation for each chapter (Microsoft PowerPoint);
- □ The source code for the design laboratories;
- □ Appendix A: MSP430 User's Guides;
- □ Appendix B: Data sheets;
- □ Appendix C: Software Development Tools;
- □ Appendix D: Hardware Development Tools User's Guides;
- □ Appendix E: Application Reports and Presentations.

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