Introduction

The purpose of this document is to enable a student to quickly create a project under CCS for assembling, and linking a C file for the MSP430. To complete this tutorial you will need one file: MSP430F2012_Blink_LED.c which can be found on our senior design website. After obtaining this, copy it to your desktop. MSP430F2012_Blink_LED.c is an elementary C program that blinks and LED attached to Port1 bit0.

Procedure

1. This tutorial assumes that you already have Code Composer Studio installed and have set your workspace directory location on your hard disk. For more information on this topic see the first tutorial that details how to install Code Composer Studio.

2. Open CCS and create a new project via the following commands: **File > New > CCS Project**

Type in your Project Name. i.e. **F2012 Blink LED in C**  If you don’t want your project in the default directory as selected during the installation, uncheck the box “Use default location” to place the project in another location other than your TI designated workspace folder.

3. Select your Project Type: **MSP430** and press Next.

4. Skip through the *Additional Project Settings* window by pressing **Next** again.

5. In the *CCS Project Settings* window, select the **MSP430F2XXX** and **MSP430F2012** in the Device Variant fields as shown below and press **Finish**.
6. The target file (*.ccxml) was automatically created which is used to tell where the code will be run (simulation or actual device) and the linker file (*.cmd) has also been created that tells all the addresses of memory available in the device and where code should be placed. i.e. Flash, EPROM, SRAM, etc.

7. We will now add the source code to the project. Type **File > New > File** and type in “F2012_Blink_LED.c” at the bottom of the window in the file name field. Next type **Finish**.

   **Note:** Make sure to type the .c extension following your file name to indicate a C source program. Failure to do this will generate an error when trying to compile your code.

8. Copy and paste the code from **MSP430F2012_Blink_LED.c** to your new C file in the project. You should see the instructions color coded for directive type. Next, save your new file.

9. We now can compile our project and run it in pure simulation mode (no external hardware required) or debug the software in an attached MSP430F2012 device using an MSP430-FET USB Programmer. Double click on the target file (*.ccxml) and you should see that the connection is **TI MSP430 USB1** and that the **Board or Device** is **MSP430F2012**. This indicates that the target is to program a F2012 via the MSP430-FET Programmer. Close this file.

We will now assume that you don’t have a programmer available, so we will create a new target file for simulation pressing **File > New > Target Configuration File**. Name the new target file **F2012 Simulator Only.ccxml** and leave the shared location box checked. Next, press **Finish**. Now, scroll down and press **Texas Instruments Simulator** and check the **F283X CPU Cycle Accurate Simulator** and press **Save** and close the window. Compare to that shown below.
Notice that it says Active next to the active target configuration file. To change to the other target file that is used to program the actual F2012, you have to right click the file in the project file list and select Set As Active Target Configuration.

10. Finally we are ready to build (compile & link) the project. Press Project > Build Active Project or simply press the icon on the toolbar (recommended to save time since you will do this several thousand times in this class) that corresponds to Build Active Project nearby the printer (print) icon. You should see zero errors and warnings and the machine code output file is placed in the Debug directory.

11. To debug your code, you simply have to press the icon that looks like a small bug. This ends the project creation/build tutorial. Refer to the debug tutorial to run & test machine code that you have created here.

FAQ Relating to ASM Project Creation & Build:

1. I would like to create a project for assembly (ASM) code, how do I do it?

*Instead of creating a *.C file, as was performed earlier, create a file that ends in .asm and build as described. i.e. ex0.asm*

2. Do I always have to save my C or ASM file every time I make a change before building?

*No, every time you press the Build Active Project icon, your C or ASM file is automatically saved first.*

3. Do I need to create a new workspace for every project or application?

*No, you can (and should) create all you projects, experiments and labs in the same workspace. You can just hide the projects you are not using by pressing the “-” symbol to the left of the project name.*

4. Can I create two or more projects in the same directory?

*No, you need to save each project in a different directory. If you try to save two projects in the same folder, an error message indicating that your new project overlaps the location of another project will be shown in the screen. It is recommended that you create a directory for each lab (i.e. labs 1-9) or experiment.*

6. When I have multiple projects open, how do I choose which project is active?

*This is performed by right clicking on the project that you want to make active and select Set as active project. All other projects will be ignored when you build the active one.*