Programming Embedded Systems 2018 / JB

Exercise 1 / 10.9.2018 / Deadline for submitting report 24.9.2018

Return report electronically on address: https://abacus.abo.fi/ro.nsf. If you do not have an ÅA account, please email jerker.bjorkqvist@abo.fi

Advisor: Jerker Björkqvist

Equipment and tools

Equipment used:

a)   Texas Instruments LaunchPad **MSP430G2** development card
b)   Own laptop

Objective

The objective of today is to set up the development environment and do some basic programming. The development tools used are GCC for building on Texas instruments.

Task

The task is to implement a super-loop structured task in software. The Super-loop structured task should do the following:

- Switch the red led on the development platform on and off with internals of 1 second (the period of a on/off-cycle being 1 s)
- The delay should (in this exercise) be created using a delay loop
- Make an alternative; alternate between green and red led
- Find out on which hardware address the input of Port 1 on the microcontroller can be read; find also out which include file is used for the microcontroller

Description

In order to build the software, we need a development environment. In this course, we use the GCC version for the MSP430 (alternative would be TI CodeComposer Studio, but we will stick to GCC).

GCC for MSP430 is available at TI home page, however; local versions are available

windows: http://users.abo.fi/jbjorkqv/msp430-gcc-windows.exe
linux: http://users.abo.fi/jbjorkqv/msp430-gcc-linux.run

Download and install in a directory of your choice <INSTALL_DIR> in your laptop. In order to install drivers for USB connection; go to directory <INSTALL_DIR>/emulation/drivers/msp430/DPInst.

For details on how to use the compiler look on directory <INSTALL_DIR>/docs.

1. Start by compiling the example file (note; on a windows machine, you need the tool "make" and make it available in the path, one easy one for windows is available at users.abo.fi/jbjorkqv/make.exe)
2. Execute the program, this is dne by
   a. download the package users.abo.fi/jbjorkqv/mspdebug.zip
   b. unpack into for instance folder c:\ti
   c. run the command (from command prompt (win+r ◊ cmd) mspdebug tilib
   d. program using command prog <path_to_.out-file>
   e. run
3. Verify that the blinking of led is OK

NOTES!

1. The default software enables the watchdog timer in the device. Unless properly handled, the watchdog timer will reset the device every 2-3 seconds. To disable the watchdog timer, the watchdog control register WDTCTL is given value WDTPW|WDTHOLD.

   Datasheet for uC can be found at
   users.abo.fi/jbjorkqv/msp430g2553.pdf

Document what you have done, and submit the documentation and the code you have produced electronically to the address give above.

General rules for documenting projects:

Please note that we are using a learning journal in this course. The report of the labs will be parts of the learning journal. So please update your learning diary, and submit the lab reports in the new versions of the learning journal.

Each report should include:

- Title
- Name
- Date / timeframe when exercise performed
- Group (if not done individually)
- Assumptions on knowledge of the reader
- Own contribution (if performed in group)
- Description of the task / exercise
- Description of the equipment used
- Description of performed work
- Achieved results