UNC Charlotte, ECGR 4892/6185, Spring 2006: Lab 4

MicroC/OS-II on Renesas.

Learning Objectives

This lab will have students increase their experience with uC/OS-II.

General Information

The general steps for this lab are:

1. Generate a new project for the Renesas Board. Name your new project Lab4.
2. Open and edit your main.c file to perform the lab functions.
3. Program the lab. Don’t forget the necessary include files to get the correct functionality.
4. Compile the code into a .mot file, and load onto the board.
5. Test the program and repeat steps 2, 3, and 4 until the program works as required.
6. Write your lab report.
7. Demonstrate for the professor and turn in your report and files.

Prelab Activity

Read the main.c file in the test folder to gain a better understanding of the MicroC/OS II port for the Renesas board. You are allowed (and encouraged) to modify this file for the lab.

Laboratory Assignments - Steps Required:

This port is a modified port of Hubert Kronenberg for M16C family to run on the SKP16C62P.
Tools needed to complete this project:

1. NC30 compiler version 5.3 release 2- a trial version can be downloaded from http://download.sg.renesas.com/evaluation_software/compilers/m16c/
2. MicroC/OS-II source files- all source files in the companion CD-ROM with MicroC/OS-II book
3. Flash over USB (version 2.4)-setup is in the companion CD of SKP16C62P kit.
4. The project code

Steps needed to complete this project:

1. Downloading ports from http://www.ucos-ii.com/
2. Modifying the code.
3. Copying the OS (version 2.52) files to folder “V270”.
4. Making necessary changes to the path in uCOS_II.C file.
5. Installing NC30 Compiler to C:\renesas\NC30WA\
6. Making necessary changes in mk.bat and set it for the default path.
7. Executing the mk.bat.
8. Loading main.mot on microcontroller using flash over USB(version 2.4)

Requirements

Req. 1 – The code generated is written in C for the MSV30626-SKP
Req. 2 – The code is well commented and easy to follow
Req. 3 – Your lab report should include the final build output from the builder
Req. 4 – You will need two Renesas boards to finish this lab.

Req. 5 – uC/OS-II will be running on both the boards
Req. 6 – Board one: one task should toggle the red LED every 1.0 seconds
Req. 7 – Board one: Receive from Board two a one-byte value which represents the Fahrenheit temperature on the range of 0 to 256 degrees (although the actual value will be closer to room temperature). Store this value in a global variable protected by a semaphore.
Req. 8 – Board one: The first temperature value received from board two is the base value, and should be stored separately (it does not need to be protected by a semaphore). This will serve as the center point in our "stepper-driven thermometer".
Req. 9 – Board one: Every 0.5 seconds, read the temperature value variable. Compare it to the based value. Adjust the position of the stepper using the formula:
new_postion = base_position + 3.75(new_temp – base_temp)*
Req. 10 – Board two: Set the ADC to continually sample the thermistor.
Req. 11 – Board two: One task should toggle the green LED every one second.
Req. 12 – Board two: One task should send the thermistor temperature, in a one byte value, to board one every two seconds.
Req. 13 – Communicate between boards via a UART running at 19200 bps, 8 data bits, no parity, 1 stop bit. There only needs to be a transmit line from board 2 to board 1.

Lab Report

Include in your lab report observations and procedure like the following:
The general learning objectives of this lab were . . .
Pre-lab question answers
The general steps needed to complete this lab were . . .
Some detailed steps to complete this lab were . . . .

1. *Step one*
2. *Step two*
3. *. . . .*

Code generated for this lab…
Some important observations while completing/testing this lab were . . .
In this lab we learned . . . .

Send the code the .map file, and the report to Sami via email.