

## ECGR 4101/5101, Fall 2008: Lab 7

### Round Robin Scheduling

### Learning Objectives

This lab will introduce you to using Round Robin Scheduling, UARTs and interrupts on our Renesas board, and new C programming concepts.

### Laboratory Assignments

In this lab you will be generating two main.c files from scratch. The program will transmit information between boards, read data from one board and display data on a second board's LCD using UARTs.

### Requirements

- Req. 1. The code generated is written in C for the SKP16C62P.
- Req. 2. The code is well commented and easy to follow.
- Req. 3. Board 1 must run with Round Robin Scheduling – you should determine the best priority for the tasks.
- Req. 4. Board 1: Toggle the Green LED every 0.1 seconds (0.1 seconds on, 0.1 seconds off).
- Req. 5. Board 1: Toggle the Yellow LED every 0.25 seconds (0.25 seconds on, 0.25 seconds off).
- Req. 6. Board 1: Toggle the Red LED every 0.5 seconds (0.5 seconds on, 0.5 seconds off).
- Req. 7. Board 1: Configure the board to continually update the thermistor ADC value.
- Req. 8. Board 1: Every 1.0 seconds, read the temperature value, convert it to ASCII, and send the ASCII values to Board 2.
- Req. 9. Board 1: With the value read from the thermistor, convert it into a temperature as an ASCII string with the format “xxx.x”, which is the temperature in Fahrenheit.
- Req. 10. Board 1 & 2: Serial communications must be handled with interrupts and queues.
- Req. 11. Board 2: When ASCII data is received, display it on the LCD.
- Req. 12. Communicate at 1200 baud, even parity, one stop bit
- Req. 13. Connect two data lines and one ground line between the two boards.
- Req. 14. The code should be as compact as possible. Lab scores will be based on the size of the compiled object file. Smaller compiled code will result in a better score.
- Req. 15. Your final report should show a one-second Mixed Signal Oscilloscope trace showing all LEDs and one serial communication.
- Req. 16. Your larger file must be submitted to Blackboard.

## Lab Report

Include in the checkout part of your lab report the lines:

- 1. LEDs are all synchronized \_\_\_\_\_
- 2. Temperature changes when thermistor heated/cooled \_\_\_\_\_
- 3. Correct format of temperature \_\_\_\_\_
- 4. MSO trace shown \_\_\_\_\_
- 5. Round Robin used \_\_\_\_\_
- 6. Comments written as specified in requirements \_\_\_\_\_
- 7. Size of code (rank) \_\_\_\_\_/\_\_\_\_\_

Include in your lab report observations and procedure like the following:

*The general learning objectives of this lab were . . .*

*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 or modified to complete this lab...*

*No need to include all the files for the lab. Just include the modified code.*

*Some important observations while completing/testing this lab were . . .*

*Here include the memory report given at the end of the compile process (map file).*

*We are **especially** interested in seeing the map file.*

*In this lab we learned . . . .*