ECGR 3/5/6090, Fall 2003: Lab 5

Interrupt-based serial I/O of the MSV30262-SKP

Learning Objectives

This lab will introduce you to using interrupts to perform serial I/O available on the MSV30262-SKP board.

General Information

The general steps for this lab are:

1. Create a new folder for lab 5. Copy your files from lab4 into the new folder.
2. Generate a new project using the files you just copied. Name your new project Lab5.
3. Open and edit your files to perform the lab functions.
4. Program the lab. Don't forget the necessary include files to get the correct functionality.
5. Compile the code into an .x30 file, and load onto the board.
6. Test the program and repeat sets 4, 5, and 6 until the program works as required.
7. Write your lab report.
8. Demonstrate for a TA and turn in your report.

Prelab Activity

You may use the PCs in Smith 347 or your own PC to do this lab experiment. The machines in Smith 347 already have the software tools loaded.

1. What does the #pragma do?
2. Why do we care what the percent error is for a given baud rate?
3. What advantages/disadvantages do interrupts have over polling for serial communications?
4. Write the pseudo code for this lab.

Laboratory Assignments

In this lab you will be performing serial communications with interrupts. This lab will use the on-board UART to communicate with a PC via Hyperteminal. This lab will use the same structure as Lab 4 but will be powered by interrupts. The commands will be strings of characters that will toggle the LEDs. This lab will be tested by the TA's using test software loaded on a development board.

Just like with the last lab, you will be expected to listen for several different commands. All valid commands will be transmitted in uppercase, and should be echoed back to the PC in lowercase. You must check for the validity of the command before processing. If a command is invalid, the LCD should display the invalid command and "invalid" should be transmitted.

Steps

1. Follow the steps given in lab 2 for generating a new project.
2. Modify any files that will help to add the correct functionality. Include commenting along the way.
3. Build your program slowly, testing along the way. Perform compiles and solve each requirement one at a time. Make sure comments are written as you progress.
4. Continue to build and test the program until all of the requirements have been met. Did we mention you should write your comments as you progress, not at the end?
5. If you run into problems, use the break point functionality of KD30 to step through the code until you find the problem.
6. Once all the requirements have been met, ensure that everything works.
7. Finish lab write-up and demonstrate for a Lab TA.
8. Include your main.c and .map file files in the lab write-up.

Requirements

Req. 1 – The code generated is written in C for the MSV30262-SKP
Req. 2 – The code is well commented and easy to follow
Req. 3 – The serial communications should operate at 115200 baud
Req. 4 – The program handles all invalid commands
Req. 5 – If “RED” is received then “red” should be transmitted and the red led inverted
Req. 6 – If “YELLOW” is received then “data” should be transmitted and the yellow led inverted
Req. 7 – If “GREEN” is received then a “green” should be transmitted and the green led inverted
Req. 8 – If “USERID” is received then “userid” should be transmitted and both user id's should be displayed on the LCD.
Req. 9 – If "RYG" is received then "ryg" should be transmitted and all LED's should be turned on
Req. 10 – If "YG" is received then "yg" should be transmitted and the yellow and green led should be turned on and the red led turned off
Req. 11 – Any other command received will be an invalid command and all leds should be turned off and an "invalid" transmitted.

Lab Report

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