

# UNC Charlotte, ECGR 4892/6185/8185, Spring 2005: Lab 5

## Optical Communications

### Learning Objectives

To learn about optical communications concepts.

### General Information

The general steps for this lab are:

1. Generate a new project for the MSP430 Board. Name your new project Lab5.
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 an executable 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

None.

### Laboratory Assignments

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. In this lab you will be utilizing onboard timers and I/O ports of the Renesas board and timers and I/O ports on the MSP430 board.

The goal is to transmit one ASCII character repeatedly from one Renesas board across an optical fiber cable to another via two mechanisms:

- A) UART running at 19200, 8 data bits, one start bit, one stop bit, even parity
- B) Through a digital port running as fast as possible, 8 data bits, one start bit, one stop bit, even parity

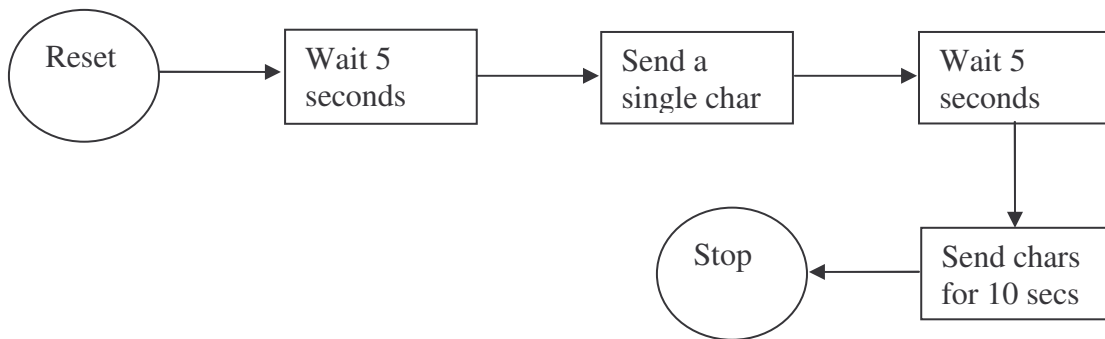
### Steps

1. Modify the main.c file and include the appropriate files. Include commenting along the way.
2. 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.
3. 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?
4. If you run into problems, use the break point functionality of KD30 to step through the code until you find the problem.
5. Once all the requirements have been met, ensure that everything works.
6. Finish lab write-up and demonstrate for the professor or TA.
7. **Submit your report, C code (\*.c) and .map files** on a floppy disk, CD ROM, or email.

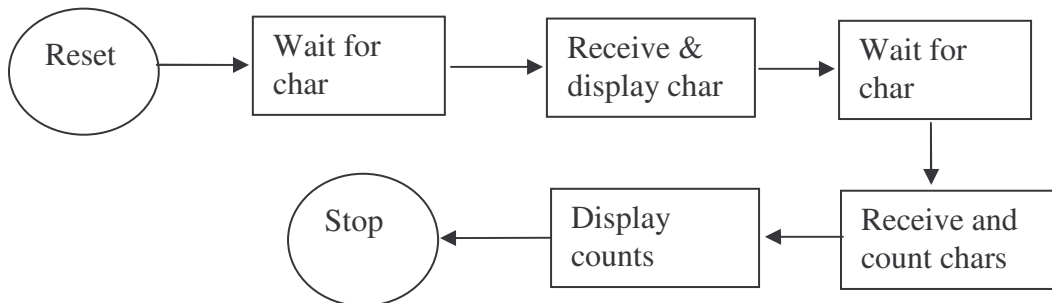
## Requirements

- 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 – You will demonstrate the transmission of data from one board to another using an Optical transmitter and receiver. There is no feedback between the boards.
- Req. 4 – You will transmit a random character repeatedly between the boards. If you reset the board, the character should never be the same as the last time.
- Req. 5 – Demonstrate one version of your code using the UART connection running at 19200 baud, 8 data bits, one start bit, and one stop bit, and even parity.
- Req. 6 – Demonstrate another version of your code using an output port running as fast as possible, with 8 data bits, one start bit, and one stop bit, and even parity.
- Req. 7 – The second Renesas board should receive the data and display the character on the LCD.
- Req. 8 – After ten seconds of transmission, display on the LCD (in thousands) how many of the characters were received, and how many were received incorrectly.
- Req. 9 – Each board should follow the flow shown below.
- Req. 10 – Each lab group will be ranked by the speed of their second implementation. Performance points will be awarded.

### Sender



### Receiver



## 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.