

ECGR4101/5101, Fall 2009: Lab 4

Serial I/O

Learning Objectives

You are to write a program that runs on both of your QSK62P Plus boards that transmits serial data.

Laboratory Assignments

In this lab you will be performing serial communications. This lab will use the on-board UART and RS232C driver chip to communicate between a board and a PC. The LCD can be used to display debugging information. This lab must be demonstrated to the TA.

You will transmit the temperature to a PC when a switch is pressed. Use the mixed signal scope to monitor the communications lines as you debug your program. Include a screen shot in your report.

1. The QSK62P Plus board has two available serial I/O ports, but one of these is connected to the RS232C driver chip. Document in your lab report the one port/bits used. NOTE: Users of the QSK62P board will need to build their own driver board. See the ECE Technician for parts.
2. See the ECE technician for RS232-C 9-pin D-shell connectors for your board. Check out a serial cable and a scope probe for the lab.
3. Write and develop your program to meet the requirements, below.
4. Complete your lab report.
5. Bring the board to the lab TA and demonstrate the code (without the HEW application running). When the TA checks your board, he will also take your lab report. You **will** need to include a printout or soft copy all of the code – there should not be much.
6. Include the printout of the .map file. Ensure it is a small font.

Requirements

- Req. 1. The code generated is written in C for the QSK62P or QSK62P Plus.
- Req. 2. The code is well commented and easy to follow.
- Req. 3. You do not need to use the LCD, but it may be helpful while you debug your code.
- Req. 4. The serial communications should operate at 2400 baud, odd parity, 8 data bits, one stop bit.
- Req. 5. Run a serial communications tool like Hyperterm on a PC.
- Req. 6. When SW1 is pressed on the QSK board, send the following ASCII string from the board to the PC: *Temperature: xxx.x F*`<cr><lf>`, where *xxx.x* is the temperature in Fahrenheit.
- Req. 7. The temperature measured by the board and reported should be accurate within 2 degrees F.
- Req. 8. 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. 9. Include in the report a scope trace of the voltage and signals AFTER the UART signal is level-shifted by the RS232 chip.

Lab Report

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

1. Message sent on SW1 press _____
2. Correct format (including <cr><lf> _____
3. Temperature accurate _____
4. 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.. (do not include the LCD 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.*

*Include a scope trace showing one byte of the transmission. Use **the scope probe, not the logic probes!***

In this lab we learned