

EE 2920 - Week 3 Lab: LCD Interfacing

1 dedicated lab period, 2 lab periods to complete

Name: _____

Objectives

- Interfacing to the LCD
- Using library programs

Prelab

- Review the LCD Guide
- Review the Phillips 8544 spec
- Review the MSOE_Lib Overview
- Follow the directions in Library Setup to include the MSOE_LIB library in your project

student
check off

Assignment

Part 1: a) Wire up your LCD

- b) Write a function to count up (1 sec intervals) from a provided integer value your instructor will give you the starting number
- c) Write a main program to
Display "EE2920 LAB3" on the first line of the display
Display the current value of the count on the second line of the display.

9 lines for main
4 lines for start value request fn
3 lines for display title fn
3 lines for display count fn
1 line for count fn

Part 2: a) Add 2 switches to your design, tied to 2 digital inputs

- b) Display the state of switch 1 at the far right of line 3 (0=open, 1= closed)
- c) Display the state of switch 2, 2 spaces to the right of your count value (0=open, 1= closed)
- d) Use switch 1 to enable counting, set the direction of the count with switch 2 (no count = open, count = closed) (count up = open, count down = closed)

9 lines for main
*4 lines for start value request fn
*3 lines for display title fn
3 lines for sw setup fn
2 lines for sw read fn
*1 line – modified cnt fn
15 lines for LCD update fn

Note that with the count down capability, it is possible for the count to go negative

Part 3: a) Display "Debounced" on the first line of your display

- b) Debounce 2 buttons (you cannot use the built-in buttons) using either HW or a function
- c) Create a new counter that records the number of button presses
Pressing button 1 increments the counter by 1 when button 2 is not pressed
Pressing button 1 decrements the counter by 1 when button 2 held down
- d) Display "count=" and the current counter value on line 4

11 lines for main
*4 lines for start value request fn
*3 lines for display title fn
*3 lines for btn setup fn
*2 lines for btn read fn
**8 lines for btn_pressed fn
*1 line – modified cnt fn
*15 lines for LCD update fn

Check Off

You must demonstrate your working design(s) prior to the end of the 2nd lab period

- Demo your Part 1 40% _____
- Demo your Part 2 20% _____
- Demo your Part 3 20% _____

Lab Report (informal)

- Due at 4:00 pm, 1 day after the second lab period – in the box outside my office
- Include this cover sheet
- Include a properly documented informal lab report. 20% _____

Strategy

**** Create a program Flow Diagram for each part ****

** I suggest you create 3 different programs – do not overwrite prog x to make prog y **

Part 1: There is an LCD_test.c file in the MSOE_Lib that you have added to the project. This program runs through a series of LCD displays. Use this file to test your LCD wiring. If nothing shows up, try using the LCD_contrast() function from the library to increase the display brightness.

Part 2: Get the switches to operate first – you can look at the inputs in debug, print them, or display them on the LCD. Once the switches are working, use them to control the count function from part 1 (note, you may need to modify the count function a little bit) – again verify the count by using debug, printf or the LCD. Finally, test the count for small and large positive and negative numbers – you will find you may need to modify the positioning of switch 2 output based on the count display.

Part 3: Get the buttons to operate – you already have a debounce strategy from Lab2 – use debug, printf or the LCD to display the button state(s). Copy and modify your program from Part2 to use the buttons to update the count instead of having it done automatically.