

## EE 371 LAB 6 F05

### LED and Pushbutton Operation

*Is it better to have loved a short girl than to have never loved a tall?*

Schedule: Oct 10,11: Do the lab  
**Oct 19,20: Lab midterm exam.**  
Oct 26,27: Last chance to demo the lab.

Name \_\_\_\_\_

Meeting Day \_\_\_\_\_ HR \_\_\_\_\_

Demo \_\_\_\_\_

1. We will be outputting to LED1-LED4 and inputting from pushbutton switch PB1 for this weeks lab.
2. You are to output a rotating bit pattern whose direction is controlled by Pushbutton PB1 to LED1-LED4  
IF PB1 is NOT pressed, the LEDs are to be display the pattern LED1, then LED2, then LED3 then LED4 and then repeating.  
When one LED is on, all other LEDs are off.  
If PB1 is pressed, the LEDs are to display in the reverse order - LED4, LED3, LED2, LED1, and then repeating.  
If PB1 changed during any display state, the display direction is to immediately reverse. E.G. PB1 not pressed, LED1, LED2, LED3, PB1 pressed, LED2, LED1, LED4, etc.
3. Helping Hands: LEDs1-4 and PB1-PB4 are directly connected to the CSM12C32 module through some FET transistors (U6 on the SLK page 2/3 schematic). The LEDs and Pushbuttons are enabled by enabling this FET switch.  
To enable the LEDs: Port T, Bit-4 must be set as an output (DDRT4 = 1) and Port T, bit-4 must be asserted low (PTT4 = 0).  
To enable the Pushbuttons, Port T, Bit-5 must be set as an output (DDRT5=1) and Port T, bit-4 must be asserted low (PTT5 = 0).  
LEDs1-4 are connected to the A/D Port bits 4-7 (PTAD4-7).  
To output to the LEDs you must initialize DDRAD bits4-7 = 1. You may then output data on PTAD bits 7-4 to control the state of the LEDs.  
Pushbutton 1 is connected to Port P, bit-5. You may read the switch by reading this port.  
Make sure the jumpers on the board at JP10 for PB and LED are on the jumper.  
  
Here are some equates:  
DDRAD: EQU BASE+\$0272 ; Data direction for A/D port  
PTAD: EQU BASE+\$0270 ; Port address for A/D I/O port  
DDRP: EQU BASE+\$025A ; Data direction for Port P  
PTP: EQU BASE+\$0258 ; Port P I/O port  
DDRT: EQU BASE+\$0242 ; Data direction for Port T  
PTT: EQU BASE+\$0240 ; Port T I/O Port
4. Other Helping Hands: You will need some sort of delay program to have the LEDs change state at 1 Hz. I will put In N:\EE371\modules a simple, quick and dirty delay program called delay\_X\_ms.asm. This delays the number of milliseconds given in the X register. I will also put the include files portad.inc, portp.inc, bits.inc, base.inc and portt.inc there as well. These should have all the equates you need for this lab.
5. Grading: Demo 10 points (-2 points for each demo not working 100% correctly), program.