

**EE 371 LAB 9 - F05**  
**Interrupts II**

*Men's Rules:*

*Christopher Columbus did not need directions, and neither do we.*

Name \_\_\_\_\_  
Partner \_\_\_\_\_  
Demo (1) \_\_\_\_\_  
Extra: \_\_\_\_\_

Schedule: Nov 9,10: Do the lab  
Nov 16,17: Last time to demo lab.

1. You are to add another interrupt service routine to the program you created for last week.

Foreground Task:

The foreground task is to be a simple typing program. Using getchar and putchar from the serial I/O routines, you should be able to continuously type characters on the keyboard and display them on the screen. Continue doing this forever. The only exception to simply echoing the character returned by getchar is that if a carriage return or a line feed character is received, your program should output a carriage return/line feed pair. This allows the user to hit the enter key and return to the next line for typing. If the user enters more than 80 characters hyperterm will automatically wrap the line so don't worry about that.

Additional Requirement: If the user types a 'N' or 'n' (upper or lower case N), a 500 Hz noise is to be created by the buzzer on the SLK board. The buzzer is attached to Port T, bit-0 and a 500 Hz square wave output on Port T bit-0 will make a lovely noise. After the user types N or n and the noise is turned on, any other character is to turn the noise off until the next N or n is typed.

Background Task 1: (same as last week)

The background task is to be actuated by pressing the push button 1 (PB1) on the SLK board. It is connected to Port P, bit 5. When the switch is pressed, an interrupt service routine is to be entered and a 4-bit counter, displayed on LED1-LED4 is to be incremented. The counter should start at 0, step up to 15 and then wrap around.

Background Task 2:

Use the output compare timer channel 0 to generate interrupts to create the 500 Hz square wave on Port T bit-0.

Overall Program Characteristics:

- a. (Same as last week)

Helping Hand #1:

Chapter S-10.3 covers the output compare features of the timer. I gave you a handout in class with the up-to-date addresses for the registers and interrupt vectors. Be sure to check out the "Output Compare Bit Operation" starting on page 311.

Helping Hand #2:

The EE371 web page has a copy of the new timer chapter in several pdf files.

<http://www.coe.montana.edu/ee/courses/ee/ee371/ee371hpg.htm#timer>

2. Extra credit: Instead of just making a 500 Hz tone, make the noise be an ascending tone that ramps from 500 Hz to 2 kHz and then repeats. (I will probably regret this.)
3. Grading: 10 points demo; 10 points extra credit

