EE 335 Advanced Microcontroller Engineering
Oregon Tech Portland, Winter 2014

Lab Assignment #5 - *I2C and Digital Clock*
Due February 13

Objectives:

Explore and use the I2C bus in accessing a clock IC. Learn to use a subroutine library.

Equipment Required:

Your Dragon12 board, ds1307.asm, iic.asm (or iic.c if you are using C language).

Background Information:

The goal is to make a digital clock, much like the example in the book, but using the clock chip instead of dividing down the system crystal frequency and displaying the time on the terminal instead of the LED display. In addition the speaker is to be beeped ever second.

Read the DS1307 data sheet to see how it is organized. It looks like a memory array that contains the continuously updating time. The ds1307.asm file contains a program to set the clock. You will need to edit the program for the current time, assemble and then run the program. You will need to re-run the program if the board has been without power for more than a few hours.

If you are using the C language, the IIC driver subroutines are in the file iic.c. The C code includes a timer so that an error value is returned rather than the code "hanging" when an error occurs. It also has a main function to initialize everything. Use this file as the starting point for your program.

Assignment:

Write a program which will read the time from the DS1307, hours, minutes, and seconds, and write the hours and minutes to the terminal. The writing should occur once per minute, whenever the time changes.

Each second (based on the seconds in the time changing) have speaker on the board produce a 500 Hz tone for 1/10th of a second. Since the speaker can be connected to the timer module (pin PT5), this can be accomplished by adding a timer channel 5 interrupt service routine to generate a 500 Hz tone. If the routine counts the number of interrupts and turns off the interrupt enable after 100 have occurred, it will produce the tone for 1/10th of a second.

Don't forget the heartbeat monitor!

To turn in:

- Commented program listing
- Discussion of what you did