Multi-Function Digital Alarm Clock

ECE 153B Final Project Proposal

by Brian Schulte & Kyle Kangyin Chen

OVERVIEW

We propose to write a multi-function digital alarm clock for the LPC4008 Microprocessor and a 1.5 inch RGB OLED display. The clock will display current time in regular format on the display. It will have day, month and year information as well. The user will use the push buttons located on the develop board to select different functions of the clock. The functions that the clock will provide are: time and date adjusting, alarm setting, thermometer, stopwatch, calendar(optional). We will use push buttons to interact with the clock functions. We may add extra features in additional to the ones mentioned above if we have extra time in future.

Peripherals

1. 1.5" RGB OLED display(with SPI protocol)
2. Push switches(on the board)
3. Buzzer(on the board with I2C protocol)
4. Temperature sensor(on the board with I2C protocol)
5. Trimpot(on the board but it's optional)

Software Design

- While loop will check for ALARM, stopwatch, or user data input flags.
- GPIO interrupt will set flags for user input mode and initialize other interrupts including those responsible for the stopwatch and ALARM.
- RTC, and Temperature readings will constantly be taking place though depending on the current state output to LCD.
- Use provided LCD library functions to implement a beautiful graphical user interference. Design state machines to implement different functions. Set up push buttons to trigger events relating to user selected functions.

Goals

1. Display Current Time in regular format.
2. Allow user to set time, date, and alarms.
3. Alert the user when alarms are reached (via both the display and buzzer sounds)
4. Measure the current room temperature.
5. Provide stopwatch to record time.
6. (Optional)Have a detailed calendar or another extra feature.

Group Responsibilities

Kyle is responsible for programing the RGB OLED display module and temperature sensor. He will help with the user interface. Brian is responsible setting up the RTC, triggering alarms, and setting off the buzzer. Both members will work on the stopwatch function and time/date adjusting function.