University of Notre Dame
Department of Electrical Engineering

EE 30321 **Embedded Systems** **Stevenson**

Final Project
An Embedded System

The object of this assignment put together a complete embedded system. The system will be a thermostat controller with an output display. The system will have the following major components

1. A PIC24 microcontroller
2. A DS1631 temperature sensor
3. A LCD display panel
4. Two pushbutton switches
5. A RGB LED
6. A serial interface

Details

1. The DS1631 should sense air temperate and the PIC24 should determine if heating or cooling is needed to keep the air temperature within a user settable range. If cooling is needed (i.e. temperature is above the high set point) the LED should be blue, if heating is needed (i.e. temperature is below the low set point) the LED should be red, and if the temperature is within the set range the LED should be green.
2. When not being used to set the range, the LCD should provide the system state information, e.g. the current temperature in large characters and some indication if heating, cooling or off.
3. The pushbuttons and LCD panel should be used to allow a user to input high and low temperature set points. For example, press both buttons to enter programing mode, first set low set point using one button as up and one button as down. Press both buttons again to move to setting the high set point. A third double press will exit programming mode and return the LCD to displaying the state information.
4. The serial port should be used to log all system events (e.g. temperature changes, button presses, etc.) so that a serial monitor can be attached to the system to monitor operation.

An Excellent Project Will Include:

- A properly wired and functioning system

- A useable and stable user interface
- A logging system that clearly records all significant system events
- Proper use of interrupts
- A demonstration of all major functionality
- Well commented source code

This is your final project for the class, **ALL** the work turned in (commented source code and demo) should represent your own work. You may discuss with your fellow students, the TA and me the functional operation of the PIC24 and the attached components (e.g. anything is the device data sheets), but you should not be reviewing other students' source code or copying their code. You may copy any of the source code presented in class or up on Sakai. If you want help with your code, limited help is available from the TA or me.

For any credit you must also return the PICKit3 programmer and cable to Dr. Stevenson.