ECE 218

EXERCISE 8. I2C KEYPAD INTERFACE WITH EXTERNAL INTERRUPTS

This exercise will introduce you to external "Change Notification" interrupts as well as two-dimensional arrays in C by applying both to a keypad interface.

HARDWARE SETUP

We will input values from a keypad, and display them on the serial monitor. We will be using a 3x4 membrane style matrix keypad. The following pins will be used for the connections.

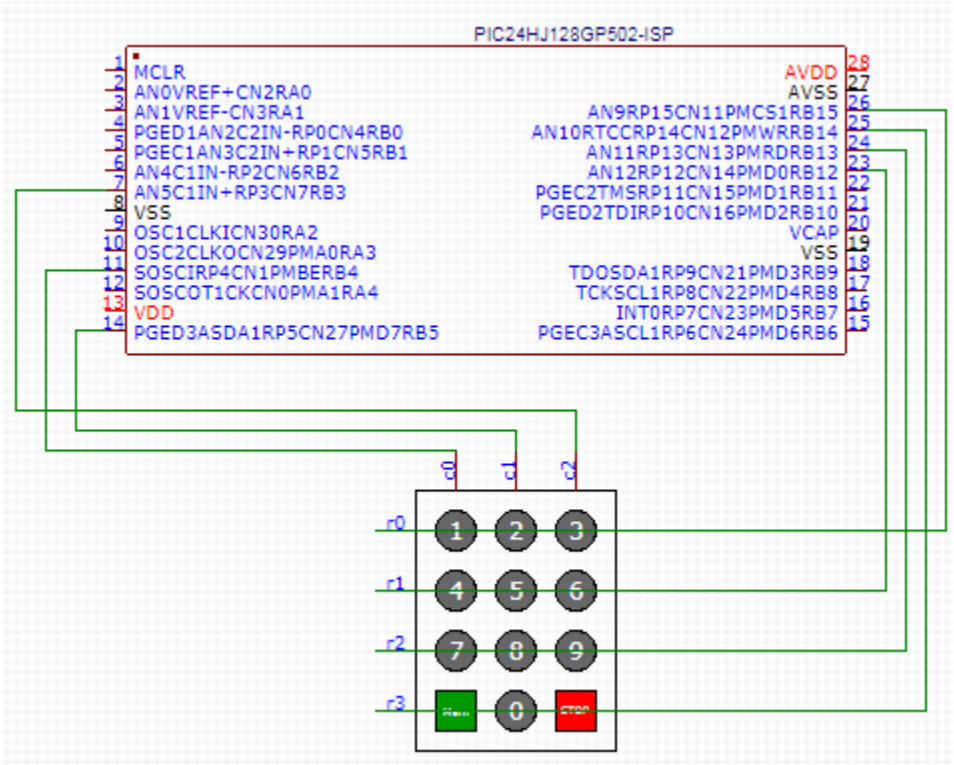

Figure 1. Hardware Setup

SOFTWARE

The goal of the system is to print the key that is pressed to the serial terminal.

You may find it convenient to define a 2-dimensional array of characters to help decode the keypad:

```
char keypad_table[NUM_ROWS][NUM_COLS] =
{  {'1','2','3'},
   {'4','5','6'},
   {'7','8','9'},
   {'*','0','#'}};
```

There are several configurations that need to take place in the main program to prepare the PIC24 for this application.

- the usual clock configuration
- the UART1 to display the key pressed
- the port pins connected to the keypad
    - Column pins are digital outputs
    - Row pins are digital input (CNx) with pullups and interrupts enabled
    - Note that RB15-RB12 share with analog functionality, so be sure to set the AD1PCFGL register appropriately.

You may find it convenient to put the configuration of the port pins in a function that is called from the main program.

You will need to write a main loop that drives one of the columns low at a time. And you will need to write an interrupt service routine to respond to a button pressed. See the prep slides as background.