

EE333 Microcontroller Engineering

Oregon Tech Portland, Fall 2013

Lab Assignment #5 - Operator Input 1

Due November 21

Objectives:

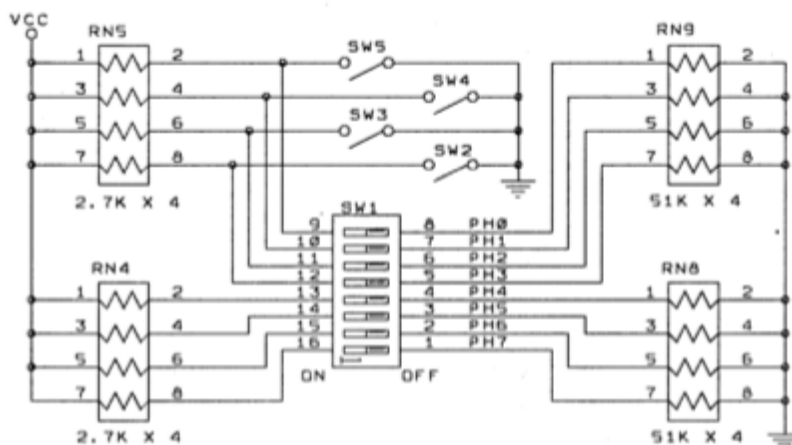
Learn how to write an interrupt service routine. Obtain operator input (in the first of three ways we will do this term) using Key Interrupts.

Equipment Required:

Your working lab 4 assignment

Background Information:

In this assignment we will be reading the push buttons (SW2-SW5) on the Dragon-12 board. The relevant part of the schematic is:



The DIP switch, SW1 should have all switches in their ON position. Then when the push buttons are not depressed, there is a 2.7K resistor to VCC and a 51K resistor to ground. The Port H pins will be at roughly 4.75 volts which will insure a high logic level. When a pushbutton is depressed the corresponding Port H pin voltage will drop to 0 volts, a low logic level. PH3 through PH0 are used for SW2 through SW5 respectively.

From the 68HCS12 side you will need to use the Key Interrupts on Port H so that an interrupt will occur when any of PH3 through PH0 goes low, corresponding to one of the buttons being pressed.

Assignment:

You are to light up LEDs PB3 through PB0 when SW2 through SW5 respectively is pressed. The LED should stay lit until another push button is pressed. You will need to light the LEDs by storing into variable displ, as you did in the earlier lab

assignments. You will need to disable using the LEDs for displaying the illumination level. You can most easily do this by commenting out the existing instruction that stores into displ. There is no reason to remove any other code. You might want it later!

In the program area for initialization code, add instructions to enable key interrupts for the falling edge on port pins PH3, PH2, PH1, and PH0. Add the instruction to specify an interrupt service routine for the Port H interrupt. (Look near the top of registers.inc to find the name of the vector location to put the address of your routine.)

You need to add an interrupt service routine. No place for this is marked in the code but you can safely put the routine after the "jmp idle" instruction and before the RTI interrupt service routine. Remember that you must not jump into or out of the interrupt service routine — it is only accessed by the hardware when an interrupt occurs and it must end with the rti instruction.

In the interrupt service routine you need to read port H to get the switch values, complement, and then store into displ. You must also clear the port H interrupt flag bits before returning.

Test the program and verify it works.

To turn in:

- Documented program listing.
- Description of how you tested the program.
- Discussion of any problems you had

This should all be placed in a single file (PDF format preferred, Word or Open Office formats also acceptable).