
Lab Experiment 1

C Blinky, System Clock, General Purpose I/O and Crossbar

Learning Objectives/Tasks

- Get familiar with the Silicon Laboratories IDE and learn how to use it.
- Set ports as input/output.
- Make the LED at P5.4 blink at regular intervals.
- Control the speed of a blinking LED using delays.
- Enable/disable internal and external system clock source.
- Program to run the internal clock at different frequencies (2 to 16 MHz).
- Configure port pins for input/output operations.
- Read from input port pins and write data to output port pins.
- Enable the digital crossbar.
- Enable/disable watchdog timer.
- Enable/disable missing clock detector .
- Control the speed of a blinking LED using
 - Delays
 - Different clock speeds

Exercise A

Write a program that makes the LED on P5.4 blink. Use a delay loop to control the blinking (on/off) period. The external crystal is used for the system clock. Type the program in the SiLab IDE and try it out. Use the following code to start off.

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```
// Filename : Lab1A.c
// This program flashes the green LED on the C8051F020 target board

#include <C8051F020_defs.h>          // SFR declarations

//-----
// Function PROTOTYPES
//-----

void init_Clock(void);              // System clock initialisation
void init_Port(void);              // General system (ports) initialization

//-----
// main() Routine
//-----
void main(void)
{
    WDTCN = 0xDE;                  // Disable watchdog timer
    WDTCN = 0xAD;

    init_Clock();
    init_Port();
    while (1)
    {
        // Your code goes here. You can use
        // additional functions if you want to
    }
}
```


Exercise B

Modify the program from Exercise A such that the internal oscillator is used to generate a system clock of 8 MHz.

Exercise C

Write a program that checks the status of Push Buttons (PB) connected to port pins P5.0 to P5.3 and turns on/off the corresponding LED connected to port pins P5.4 to P5.7 (If the PB on P5.0 is pressed then the LED (D1) at P5.4 is lit. If the PB on P5.1 is pressed then the LED (D2) at P5.5 is lit. If the PB on P5.2 is pressed then the LED (D3) at P5.6 is lit. If the PB on P5.3 is pressed then the LED (D4) at P5.7 is lit). Once the PB is released the LED is turned off.

Exercise D

Write a program that makes the 4 green LEDs (on P5.4 to P5.7) **blink** individually if the corresponding Push Buttons (on P5.0 to P5.3) are pressed and held (If the PB on P5.0 is pressed and held then the LED (D1) at P5.4 starts blinking. If the PB on P5.1 is pressed and held then the LED (D2) at P5.5 starts blinking. If the PB on P5.2 is pressed and held then the LED (D3) at P5.6 starts blinking. If the PB on P5.3 is pressed and held then the LED (D4) at P5.7 starts blinking). Use delay loops to control the blinking (on/off) period. Use the external crystal oscillator.

Exercise E

Write a program that checks the status of DIP Switches (SW) connected to port pins P4.4 to P4.7 and turns on the corresponding LED connected to port pins P5.4 to P5.7 (If the SW on P4.4 is on then the LED (D1) at P5.4 is lit. If the SW on P4.5 is on then the LED (D2) at P5.5 is lit. If the SW on P4.6 is on then the LED (D3) at P5.6 is lit. If the SW on P4.7 is on then the LED (D4) at P5.7 is lit).

Hint: Make sure you initialize Port 4 before you use DIP switches in the `init_Port` function.