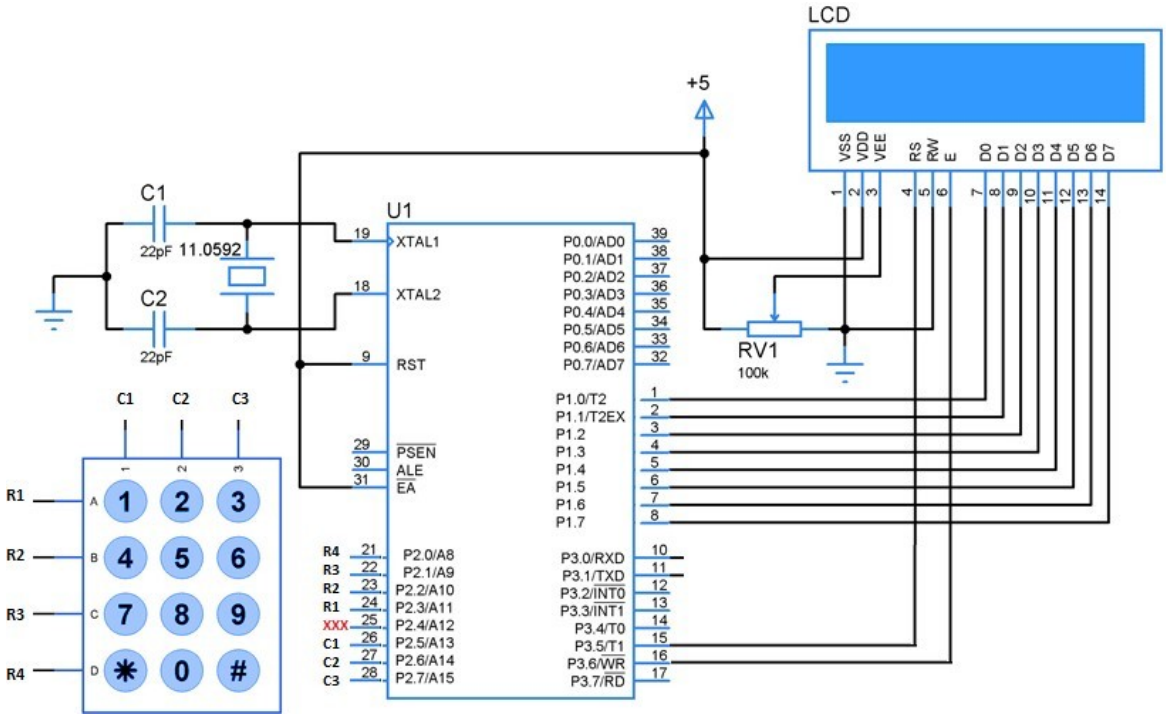
Experiment No : 6

Aim : To interface a keypad with 8051.

Theory :



Circuit Connections:

• A 4×3 matrix keypad is interfaced to the microcontroller, which is a 12-key keypad consisting of four rows and three columns.

• The upper pins of port 1, i.e., pin 1.0 to pin 1.3 of the microcontroller are connected to the row lines of the keypad and lower pins (pin 1.4 to pin 1.6) are connected to the column lines.

Circuit Working

◦ Make sure that the all the rows of port 1 high in order to give the signal to microcontroller when any key is pressed.

◦ The working of the keypad goes like this: If any of the keys in row1 of the matrix keypad is pressed, the corresponding column line will give low and similarly if the second key is pressed in row1, then the column line 2 will give low. This process is repeated for all the rows.

◦ When the circuit is powered and any key is pressed, then corresponding pins of the port 1 get enabled.

Complete the following 8051 assembly programs in EDSIM.
1. WAP to use the keypad to store an integer from 0-11 in register R3.

```
Start:
        mov r3,#0
        setb p0.3
        clr p0.0
        call col_scan
        jb f0,finish

        setb p0.0
        clr p0.1
        call col_scan
        jb f0,finish

        setb p0.1
        clr p0.2
        call col_scan
        jb f0,finish

        setb p0.2
        clr p0.3
        call col_scan
        jb f0,finish
        jmp start
finish:
        jmp $
col_scan:
        jnb p0.4,key_found
        inc r3
        jnb p0.5,key_found
        inc r3
        jnb p0.6,key_found
        inc r3
        ret
key_found:setb f0
        ret
```

2. WAP to accept two numbers from 0-11 via the keypad, store them in registers and add the numbers and store the result in a register.

```
mov r0,#2
mov a,#0
start:mov r3,#0
        setb p0.3
        clr p0.0
        call col_scan
        jb f0,finish

        setb p0.0
        clr p0.1
        call col_scan
        jb f0,finish

        setb p0.1
        clr p0.2
        call col_scan
        jb f0,finish

        setb p0.2
        clr p0.3
        call col_scan
        jb f0,finish
        jmp start
finish:
        add a,r3
        mov p0,#0FFh
        mov r1,#20h
        djnz r1,$
        clr f0
        djnz r0,start
        jmp $
col_scan:jnb p0.4,key_found
        inc r3
        jnb p0.5,key_found
        inc r3
        jnb p0.6,key_found
        inc r3
        ret
key_found:setb f0
```

ret

Conclusion : Programs to study Timer were successfully implemented.

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