**EXPERIMENT NO - 4** BUSHRA SHAHZAD

20BCS046

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**AIM-**

Design and implement an embedded system that interfaces an 8051 Micro-controller by taking input from switch and then completes its cycle (4-bit counter) with a buzzer at the completion of counter.

**Hardware Used** - Computer System, 8051 Microcontroller kit, USB connectors.

**Software Used** - Keil Micro-vision IDE, Flash Magic tool.

**Pins Used -**

|  |  |  |  |
| --- | --- | --- | --- |
| LED | PORT | VARIABLE | USE |
| D1 | P3.0 | RxD | Serial Data Receive Pin |
| D2 | P3.1 | TxD | Serial Data Transmit Pin |
| D3 | P3.6 | WR | External Memory Read |
| D4 | P3.7 | RD | External Memory Write |
| SW1 | P3.2 | INT0 | Switch 1 |
| SW2 | P3.3 | INT1 | Switch 2 |
| SW3 | P3.4 | T0 | Switch 3 |
| SW4 | P3.5 | T1 | Switch 4 |

**Procedure -**

* The C Code checks for the switch configuration on the 8051 micro-controller.
* Based on the switches pressed as binary 1/0, number is calculated which acts as a starting point for 4-bit counter.
* On completion of one round, buzzer beep is heard and again begins the 4 bit counter.
* Brute force approach has been used to make 4-bit counter.

**C Code**

#include<p89v51rx2.h>

sbit buzzer = P0^3;

void delay(unsigned int dela){

    unsigned int i, j;

    for(i =0; i<=1000; i++)

    for(j=0; j<= dela; j++);

}

void main(void)

    {

            RxD = 1;

            TxD = 1;

            WR = 1;

            RD = 1;

        while(1)

        {

            delay(200);

            if( RxD == 1 && TxD == 1 && WR == 1 && RD == 1 && !(INT0 ==1 && INT1==1 && T1==1 && T0==1) )

            {

                buzzer = 0;

                delay(50);

                buzzer = 1;

                delay(100);

                RxD = INT0;

                TxD = INT1;

                WR = T0;

                RD = T1;

            }

            else if(RD == 0)

            {

                #T1=1;

                RD=1;

            }

            else if(WR == 0)

            {

                #T0=1;

                WR=1;

                #T1=0;

                RD =0;

            }

            else if(TxD == 0)

            {

                #INT1=1;

                TxD =1;

                #T0=0;

                WR=0;

                #T1=1;

                RD =0;

            }

            else if(RxD == 0)

            {

                #INT0 =1;

                RxD =1;

                #INT1=0;

                TxD =0;

                #T0=1;

                WR=0;

                #T1=0;

                RD =0;

            }

        }

    }

**Result**

Above C program checks for the switches and executes the counter and buzzer accordingly.

**Output**

 A red electronic device with a green display

Description automatically generated