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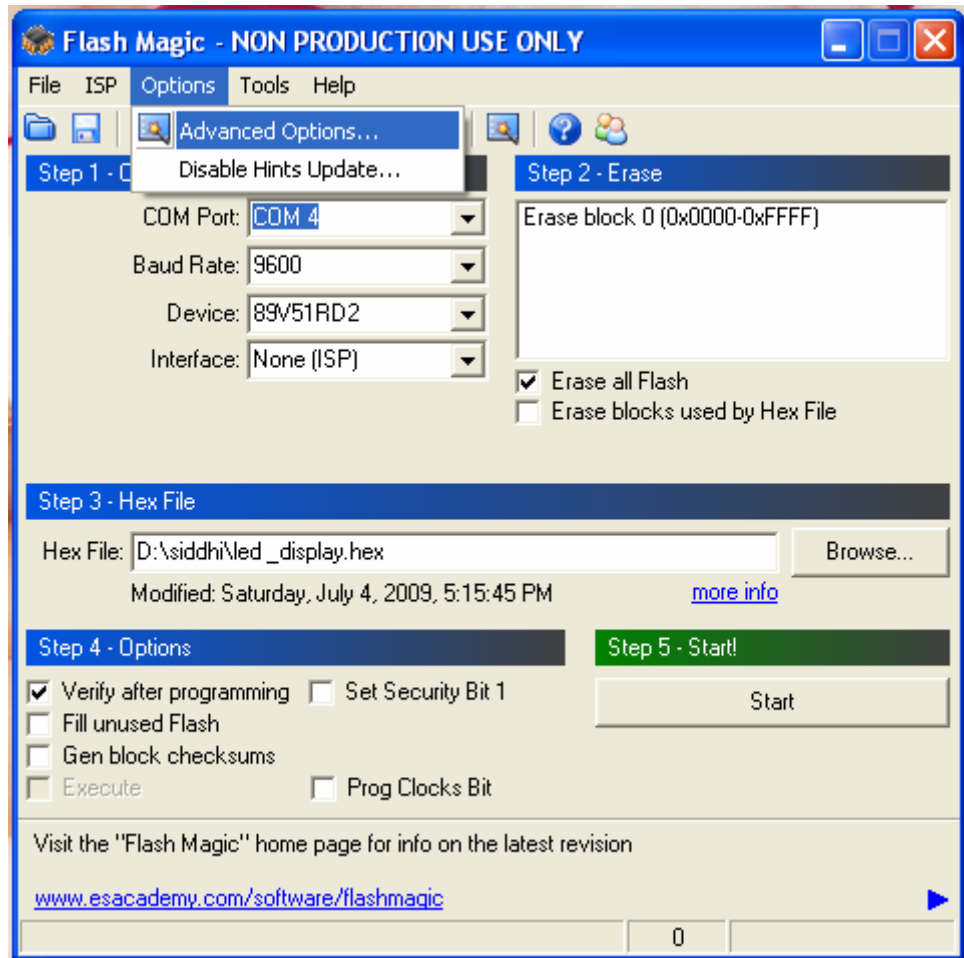
1. KIT INCLUDES

- a. **One - DB9 Serial cable straight** : used to connect to PC or any other DCE(Data Communication Equipments)/DTE(Data Terminal Equipments)
- b. **Four - LED's**: can be used as an indication display, used by programmer. For more read "using LED in program"
- c. **One -LCD Connector and one 16x2 LCD Module**: can be used to display alphanumeric characters or string, used by programmer. For more read "using LCD"
- d. **Linear keypad**: can be used to read user input to process some event, used by programmer. For more read "using HEX Keypad"
- e. **Serial port DB9 female**: used to connect to any DTE/DCE, used by programmer. For more read "using Serial Port"
- f. **CD ROM**: includes Flash Magic software to download the HEX File into Board and some examples used in this kit.
- g. **Recommended Accessories by BISD Labs**: you can use the following accessories with this Development Board
 - i. **12V/750mA regulated power supply**
 - ii. **Motor Driving card – stepper and geared**
 - iii. **ADC Card with Temperature sensor and Trim pot**
 - iv. **I2C Card with RTC, and EEPROM**
 - v. **Hex Key Pad module**
 - vi. **4 digit 7-segment module**
 - vii. **Proximity Sensor Modules – IR, Photo, and ultra sonic**
 - viii. **BISDL_OS V1.02 RTOS**

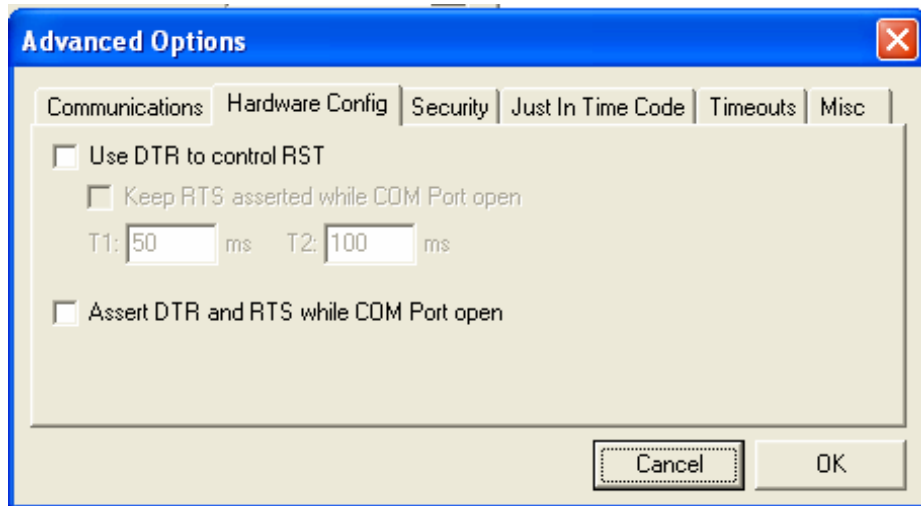
2. Interfacing kit with PC and downloading Hex File

a. Configuring and using flash magic

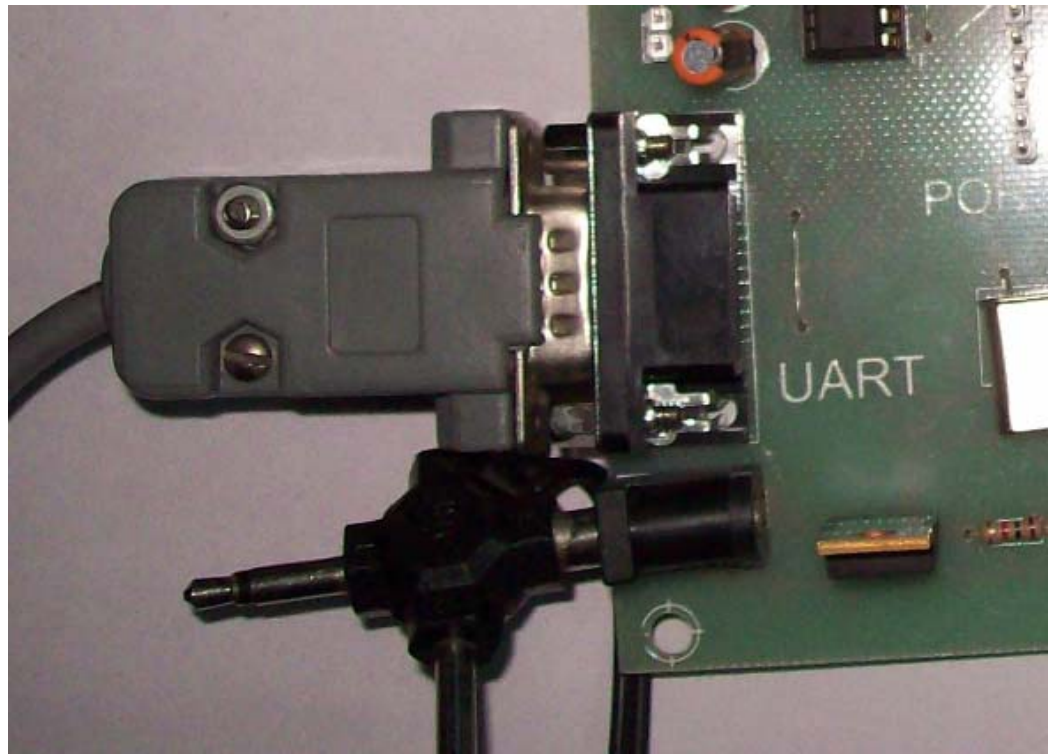
i. Go to Options, select Advanced options



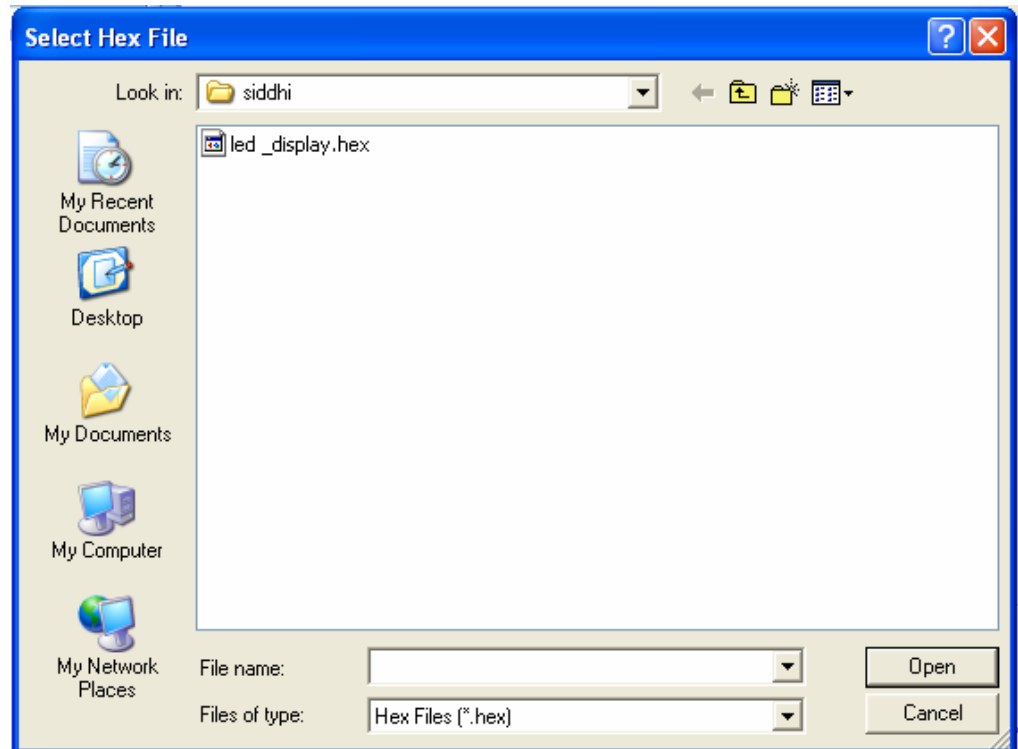
ii. Go to Hardware Configuration tab and uncheck both the check boxes and click OK button



- iii. **In Step 1 – Communications**, select COM port from which we have connected serial cable. You can find the port no. from device manager. Next select baud rate for downloading the hex file preferable 9600 bps. Next select the device from the list 89V51RD2. At last Interface to none ISP.



- iv. **In Step 2 – Erase**, check only the box with Erase blocks used by Hex file.
- v. **In Step 3 – Hex File**, brows the HEX file from the file the desired location in file system.



- vi. **In Step 4 – Options**, check the box Verify after Programming.
- vii. After all of the above settings press the button **Start** to start downloading the HEX file into microcontroller, the following dialog box will prompt which will ask to restart the device into ISP mode, then press the restart button on the target board.





3. USING LED IN PROGRAM

- a. **Circuit diagram:** LED's are connected to lower four bits of port two (pin no.21 to 24) and common terminal of every LED is connected to +5V directly.

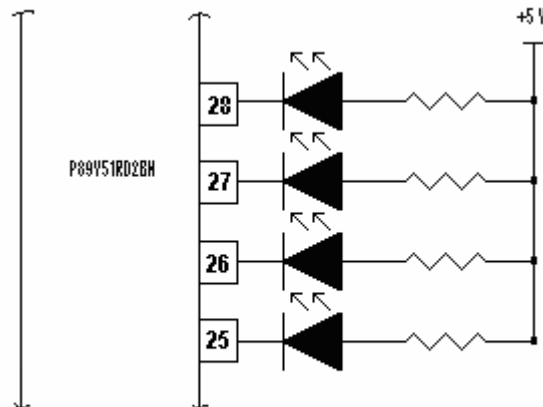


fig 3.1 LED Interfacing circuit

- b. Example program

```

sfr PORT=0xa0;
main()
{
    unsigned char ch;
    unsigned int i;
    ch=0x00;
    while(1)
    {
        PORT=ch;
        ch=~ch;
        for(i=0;i<50000;i++);
    }
}

```

4. USING LCD

a. Circuit diagram

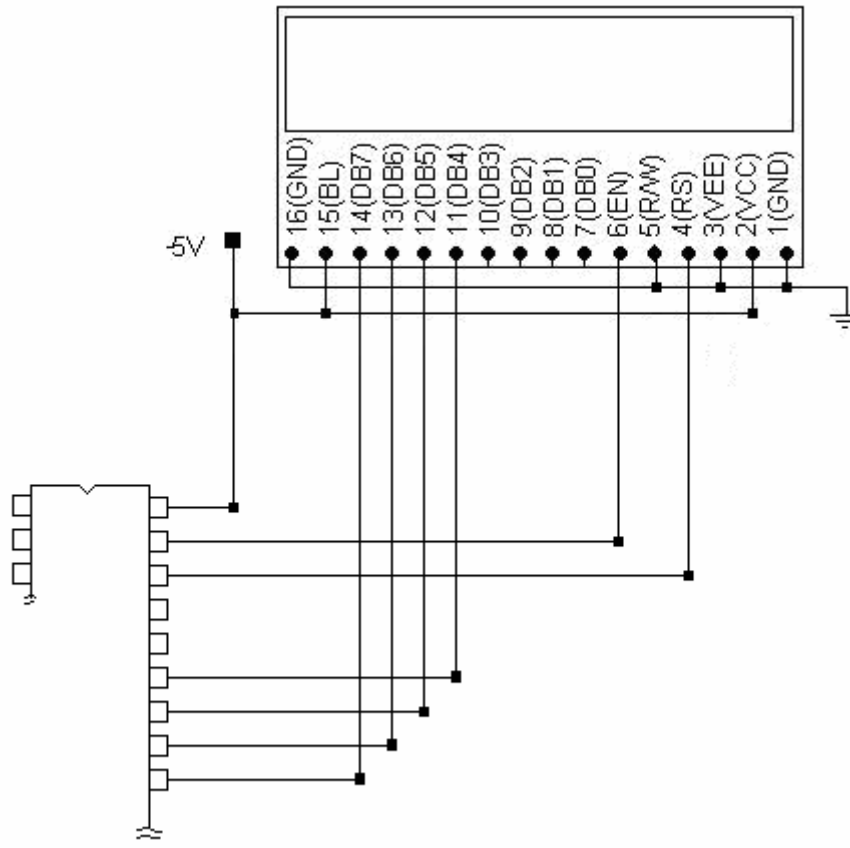


fig 4.1 LCD interfacing

b. Example program

```
#include<reg51.h>

sbit EN = P0^0;

sfr PORT=P0;

unsigned char rs,en;

void lcd_write(unsigned char);

char str[9]="BISD Labs";

main()
{
    rs=0;
    lcd_write(0x33);
    lcd_write(0x32);
    lcd_write(0x28);
    lcd_write(0x08);
    lcd_write(0x01);
    lcd_write(0x06);
    lcd_write(0x0c);
    lcd_write(0x80);
    rs=1;
    for(i=0;i<9;i++)
        lcd_write(str[i]);
    while(1);
}

void lcd_write(unsigned char ch)
{
    unsigned char itime;
    EN=1
    en=1;
    PORT=(ch&0xf0)|(rs<<1)|en;
    EN=0;
    ch=(ch&0x0f)<<4;
    PORT=ch|(rs<<1)|en;
    EN=1;
    EN=0;
    for(itime=0;itime<250;itime++);
}
```

5. USING SERIAL PORT

- a. **Circuit diagram** P3.0 (RXD) and P3.1 (TXD) pin is connected to pin no.2, 3 of DB9 female connector through MAX232 and pin no.5 is connected to ground.

- b. **Example program**

```
#include<reg51.h>

main()
{
    char str[9]="BISD Labs";
    char i;
    TMOD=0x20;
    SCON=0x50;
    TH1=0xfd;
    TR1=1;
    for(i=0;i<9;i++)
    {
        SBUF=str[i];
        while(!TI);
        TI=0;
    }
    for(;;);
}
```

6. Using Linear Key Pad

a. Circuit Diagram

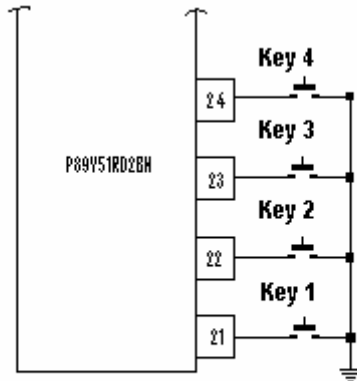


fig 6.1 linear keypad interfacing

b. Example program

```

sbit key1=0xa0;
sbit key2=0xa1;
sbit key3=0xa2;
sbit key4=0xa3;

sbit led1=0xa4;
sbit led2=0xa5;
sbit led3=0xa6;
sbit led4=0xa7;

void delay(void);

main()
{
    while(1)
    {
        if(key1==0)
        {
            while(key1==0);
            delay();
            led1=!led1;
        }
    }
}

```

```
        if(key2==0)
        {
            while(key2==0);
            delay();
            led2=!led2;
        }
        if(key3==0)
        {
            while(key3==0);
            delay();
            led3=!led3;
        }
        if(key4==0)
        {
            while(key4==0);
            delay();
            led4=!led4;
        }
    }
}

void delay()
{
    unsigned int i;
    for(i=0;i<10000;i++);
}
```