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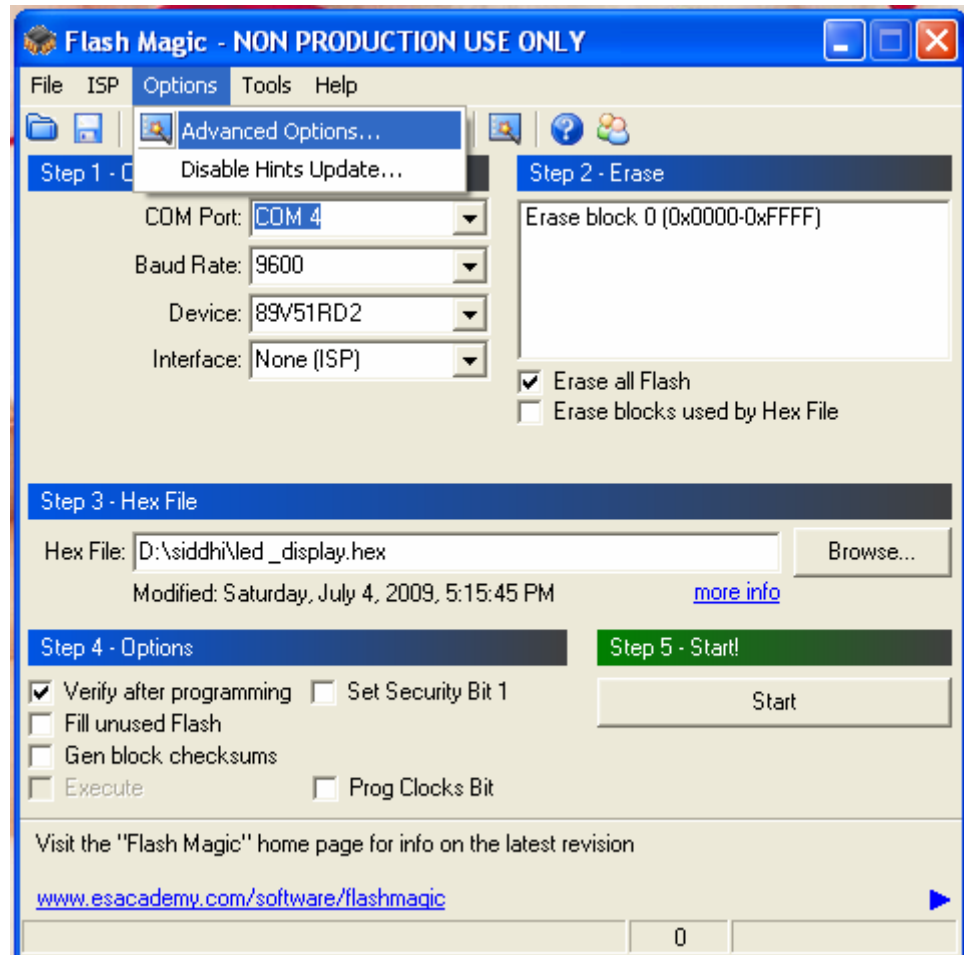
1. KIT INCLUDES

- a. **One - DB9 Serial cable straight** : used to connect to PC or any other DCE(Data Communication Equipments)/DTE(Data Terminal Equipments)
- b. **Eight - LED's**: can be used as an indication display, used by programmer. For more read “using LED in program”
- c. **Two - seven segment displays**: can be used as hex number display, used by programmer. For more read “using 7-segment display”
- d. **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”
- e. **Hex keypad**: can be used to read user input to process some event, used by programmer. For more read “using HEX Keypad”
- f. **Serial port DB9 female**: used to connect to any DTE/DCE, used by programmer. For more read “using Serial Port”
- g. **CD ROM**: includes Flash Magic software to download the HEX File into Board and some examples used in this kit.
- h. **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. **Proximity Sensor Modules – IR, Photo, and ultra sonic**
 - vi. **BISDL_OS V1.02 RTOS**

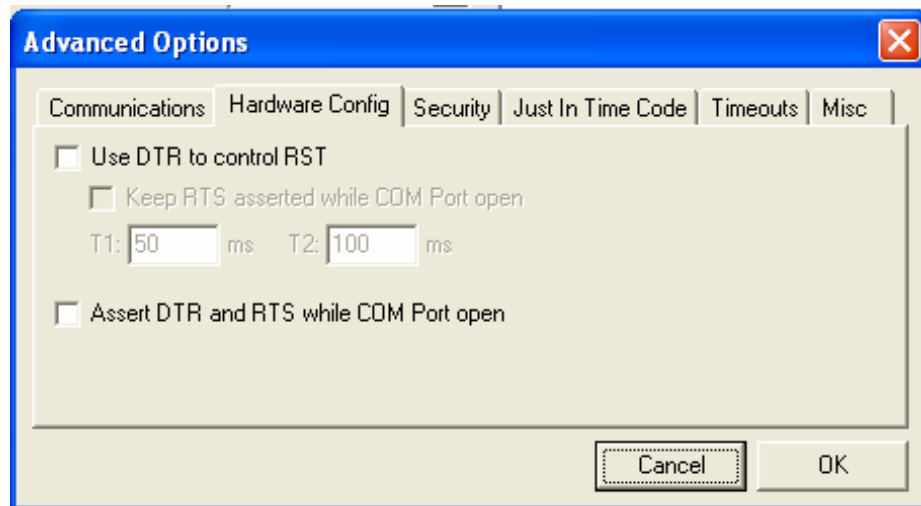
2. Interfacing kit with PC and downloading Hex File

a. Configuring and using flash magic

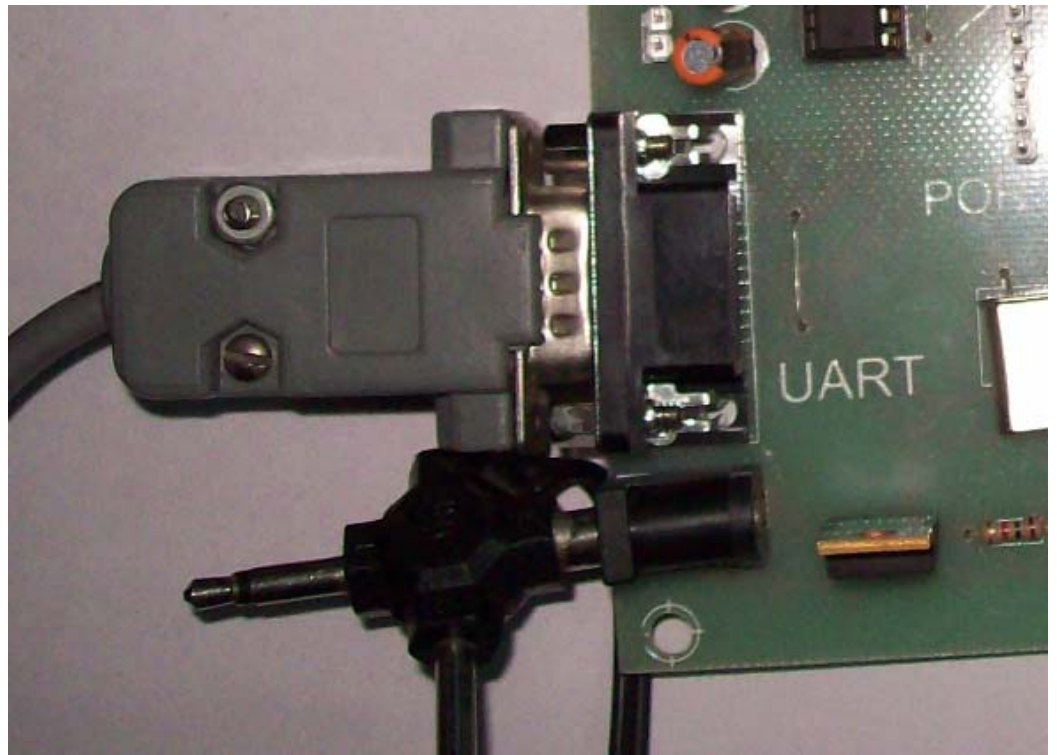
i. Go to Options, select Advanced options



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

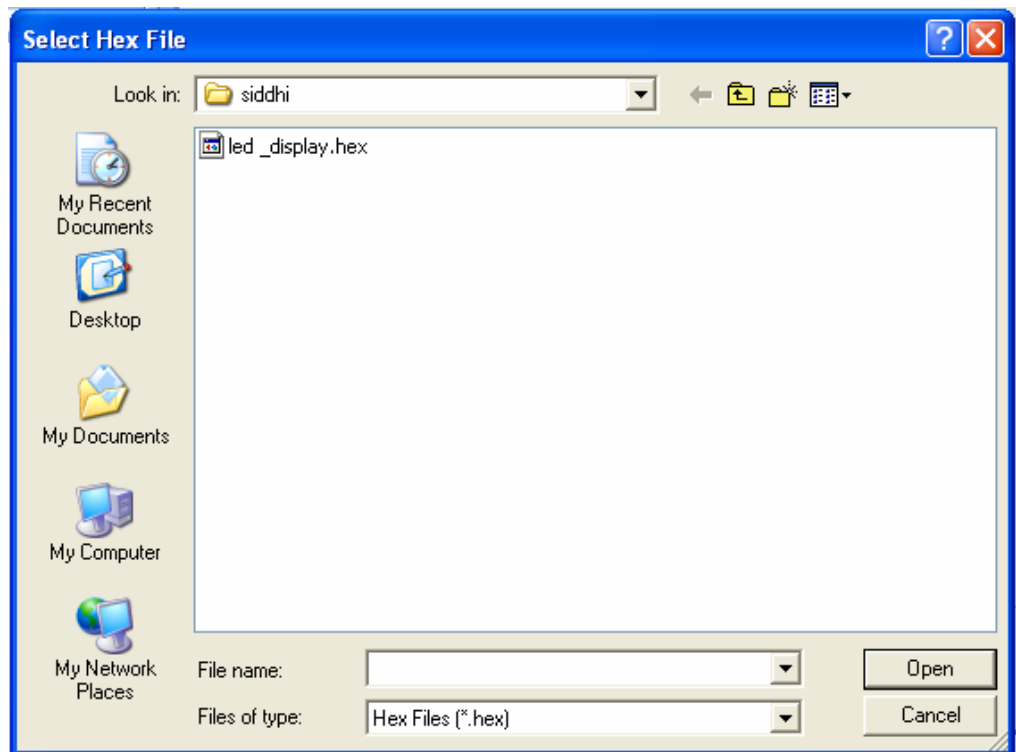


- iii. **In Step 1 – Communications**, select COM port from which we have connected serial cable. You can find the port no. from device manager. Next select baud rate for downloading the hex file preferable 9600 bps. Next select the device from the list 89V51RD2. At last Interface to none ISP.



- 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 port zero (pin no.32 to 39) and common terminal of every LED is connected to +5V through PNP transistor whose base is controlled through P1.2. Also shot the jumper near transistors.

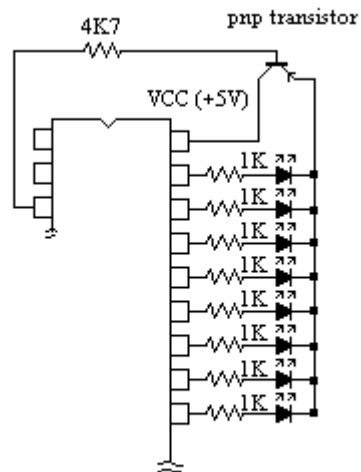


fig 3.1 LED interfacing circuit

- b. **Example program**

```

sfr PORT=0x80;
sbit led_sel=0x92;

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

```

4. USING 7-SEGMENT DISPLAY

a. Circuit diagram

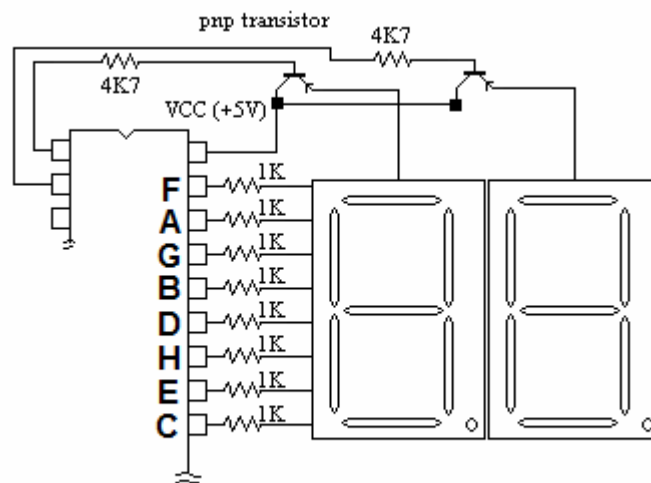


fig 3.2 7-segment interfacing circuit

b. Example program

```
#include<reg51.h>

sbit sel0=P1^0;
sbit sel1=P1^1;

sfr PORT=P0;

void delay(void);

unsigned char arr[10]={0x24,0x77,0xa1,0x61,0x72,0x68,0x28,0x75,0x20,0x60};

main()
{
    while(1)
    {
        sel0=0;
        sel1=1;
        PORT0=arr[0];
        delay();
        sel0=1;
        sel1=0;
        PORT=arr[1];
        delay();
    }
}

void delay()
{
    unsigned char i;
    for(i=0;i<=200;i++);
}
```

5. USING LCD

a. Circuit diagram

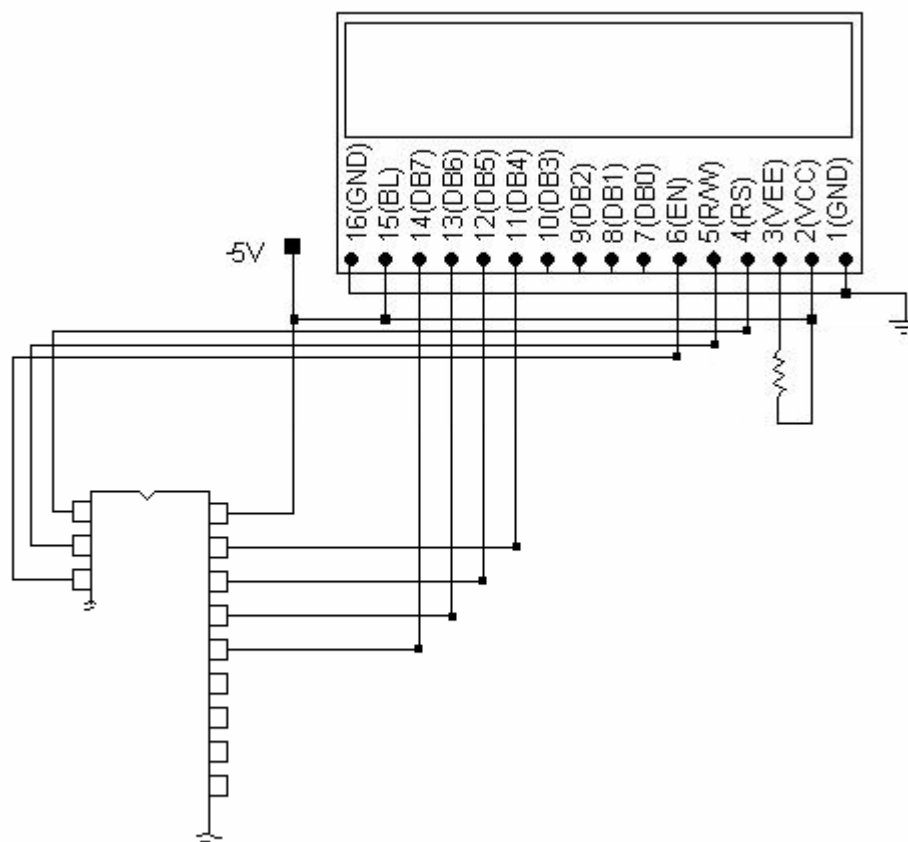


fig 5.1 LCD interfacing

b. Example program

```
#include<reg51.h>

sbit RS=P1^0;
sbit RW=P1^1;
sbit EN=P1^2;

sfr PORT=P0;

void lcd_write(unsigned char);

char str[9]="BISD Labs";

main()
{
    RW=0;
    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;
    PORT=(ch&0xf0)>>4;
    EN=0;
    EN=0;
    EN=1;
    PORT=ch&0x0f;
    EN=0;
    for(itime=0;itime<250;itime++);
}
```

6. 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.

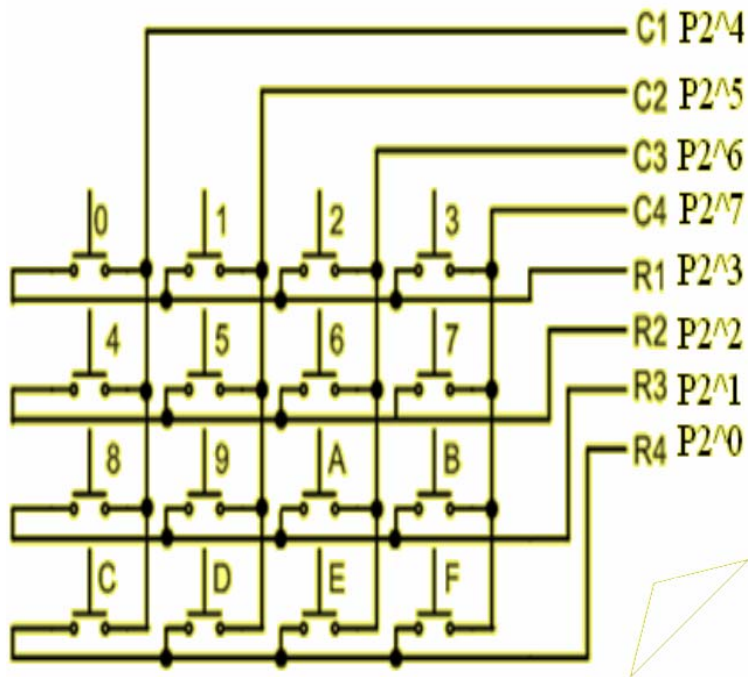
- b. **Example program**

```
#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(;;);
}
```

7. USING HEX KEYPAD

a. Circuit diagram



b. Example program

```
#include<reg51.h.
```

```
  sbit rw0=P2^3;
```

```
  sbit rw1=P2^2;
```

```
  sbit rw2=P2^1;
```

```
  sbit rw3=P2^0;
```

```
  sbit cl0=P2^4;
```

```
  sbit cl1=P2^5;
```

```
  sbit cl2=P2^6;
```

```
  sbit cl3=P2^7;
```

```
  sbit LED_PORT=P0;
```

```
  sbit LED_SEL;
```

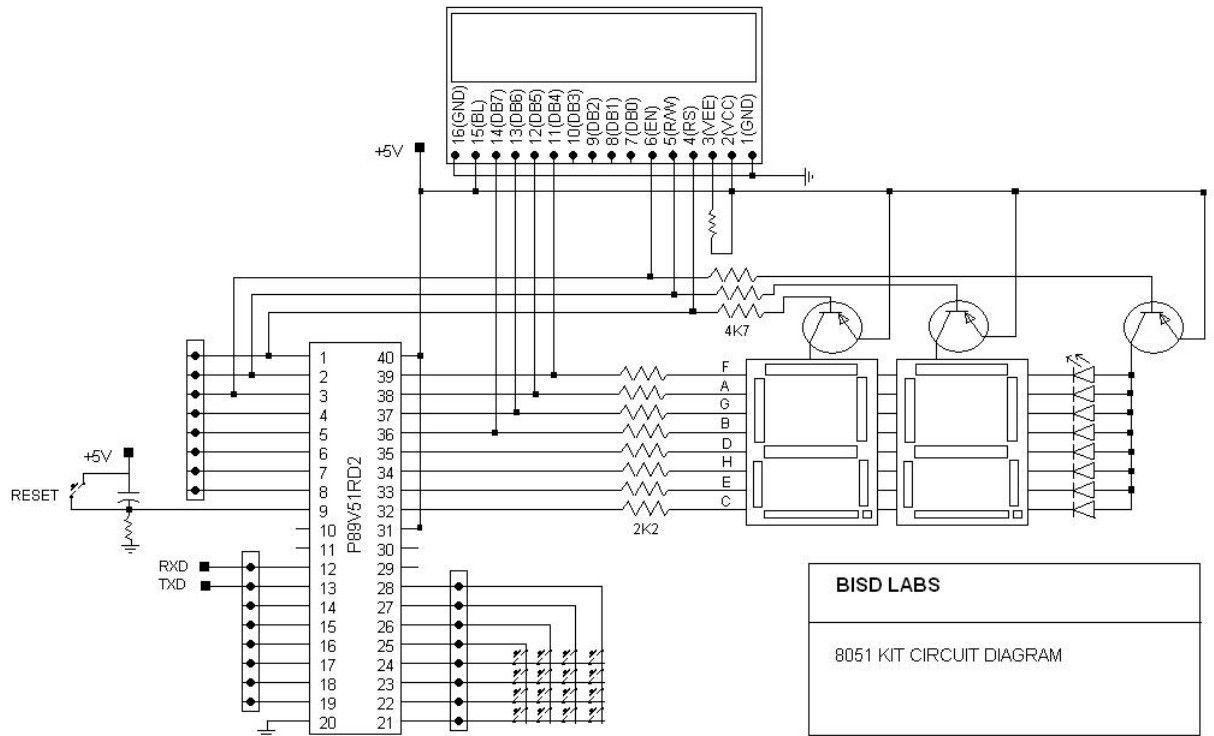
```
main()
{
    LED_SEL=0;
    while(1)
    {
        rw0=0;
        rw3=1;
        if(cl0==0)
            LED_PORT=0x00;
        if(cl1==0)
            LED_PORT=0x01;
        if(cl2==0)
            LED_PORT=0x02;
        if(cl3==0)
            LED_PORT=0x03;

        rw0=1;
        rw1=0;
        if(cl0==0)
            LED_PORT=0x04;
        if(cl1==0)
            LED_PORT=0x05;
        if(cl2==0)
            LED_PORT=0x06;
        if(cl3==0)
            LED_PORT=0x07;

        rw1=1;
        rw2=0;
        if(cl0==0)
            LED_PORT=0x08;
        if(cl1==0)
            LED_PORT=0x09;
        if(cl2==0)
            LED_PORT=0x0a;
        if(cl3==0)
            LED_PORT=0x0b;
    }
}
```

```

        rw2=1;
        rw3=0;
        if(cl0==0)
            LED_PORT=0x0c;
        if(cl1==0)
            LED_PORT=0x0d;
        if(cl2==0)
            LED_PORT=0x0e;
        if(cl3==0)
            LED_PORT=0x0f;
    }
}
    
```



BISD LABS
 8051 KIT CIRCUIT DIAGRAM