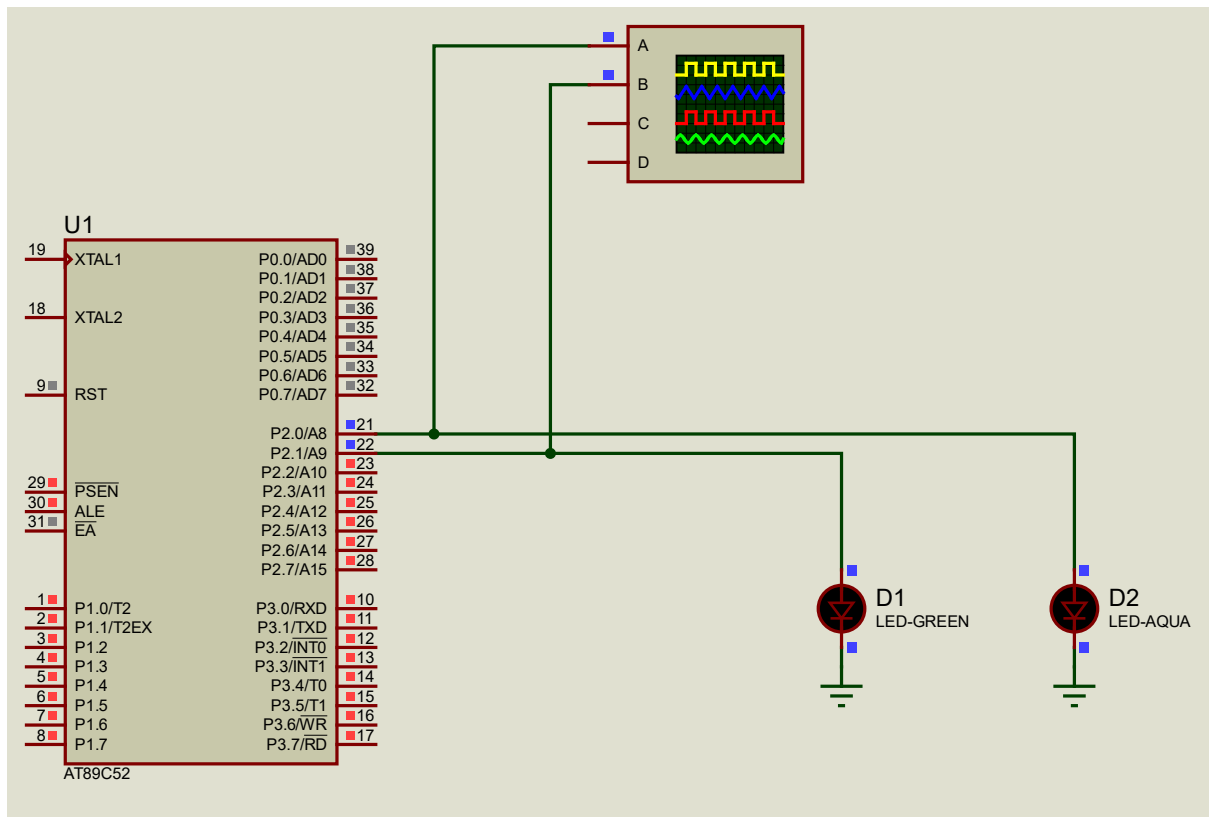


Experiment 1: Led blink/time delay generation

```
#include<reg52.h>
void delay(int x);
sbit led1 = P2^0;
sbit led2= P2^1;

void main()
{
    int i=0;
    int j=0;
    while(1)
    {
        for( i=0;i<10;i++)
        {
            led1 = 1;
            delay(30);
            led1 = 0;
            delay(30);
        }
        for( j = 0;j<10;j++)
        {
            led2 = 1;
            delay(60);
            led2 = 0;
            delay(60);
        }
    }
}

void delay(int x)
{
    int i,j;
    for(i=0;i<x;i++)
    {
        for(j=0;j<1000;j++);
    }
}
```



Experiment 2a: DC motor control

```
#include<reg52.h>

sbit motor_pin_1 = P2^0;
sbit motor_pin_2 = P2^1;
sbit motor_pin_3 = P2^2;
sbit motor_pin_4 = P2^3;
sbit button1 = P0^0;
sbit button2 = P0^1;

void Rotate_Clockwise()
{
    motor_pin_1 = 1;
    motor_pin_2 = 0; //Rotates Motor1 Clockwise
    motor_pin_3 = 0;
    motor_pin_4 = 1; //Rotates Motor2 Clockwise
}

void Rotate_Anticlockwise()
{
    motor_pin_1 = 0;
    motor_pin_2 = 1; //Rotates Motor1 Anticlockwise
    motor_pin_3 = 1;
    motor_pin_4 = 0; //Rotates Motor2 Anticlockwise
}
```

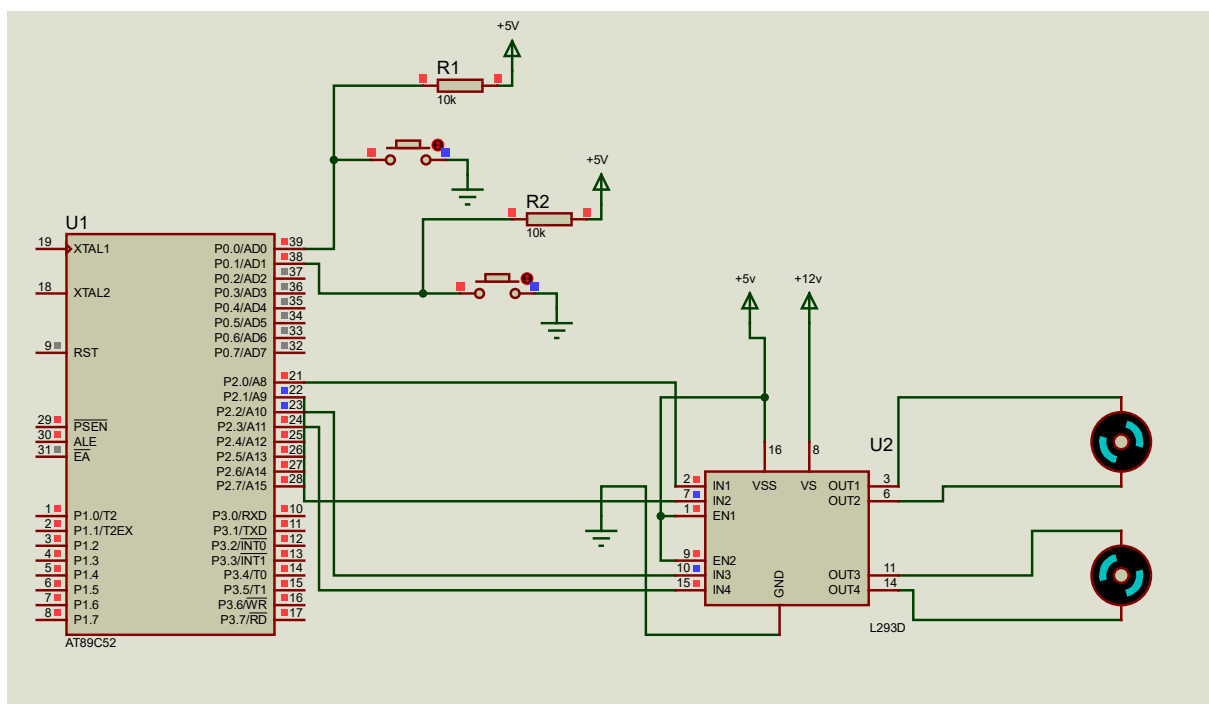
```

}
void Stop()
{
    motor_pin_1 = 0;
    motor_pin_2 = 0; //Stops Motor1
    motor_pin_3 = 0;
    motor_pin_4 = 0; //Stops Motor2
}
void main()
{
    while (1)
    {

        if (button1==0)
        {
            Rotate_Anticlockwise();
        }
        else if (button2==0)
        {
            Stop();
        }
        else
        {
            Rotate_Clockwise();
        }

    }
}

```



Experiment 2b: Stepper motor control

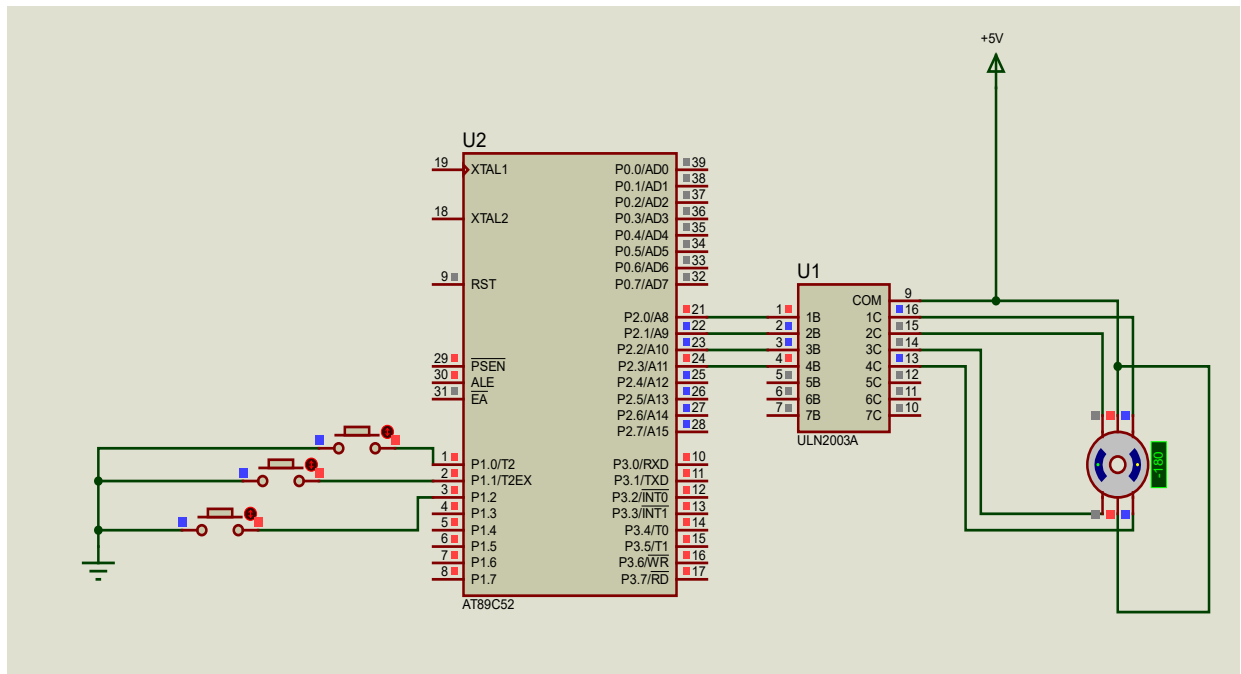
```
#include<reg52.h>
void delay(int k);
sbit SW1 =P1^0;
sbit SW2 =P1^1;
sbit SW3 =P1^2;
void main()
{
    while (1)
    {
        if (SW1 == 0)// Wave Drive
        {
            P2=0x01; //0001
            delay(100);
            P2=0x02; //0010
            delay(100);
            P2=0x04; //0100
            delay(100);
            P2=0x08; //1000
            delay(100);
        }
        if (SW2 == 0) // Full Drive
        {
            P2 = 0x03; //0011
            delay(1000);
            P2 = 0x06; //0110
            delay(1000);
            P2 = 0x0C; //1100
            delay(1000);
            P2 = 0x09; //1001
            delay(1000);
        }
        if (SW3 == 0) // Half Drive
        {
            P2=0x01; //0001
            delay(1000);
            P2=0x03; //0011
            delay(1000);
            P2=0x02; //0010
            delay(1000);
            P2=0x06; //0110
            delay(1000);
            P2=0x04; //0100
            delay(1000);
            P2=0x0C; //1100
            delay(1000);
            P2=0x08; //1000
            delay(1000);
        }
    }
}
```

```

        P2=0x09; //1001
        delay(1000);
    }
}

void delay(int k)
{
    int i,j;
    for(i=0;i<k;i++)
    {
        for(j=0;j<100;j++)
        {}
    }
}

```



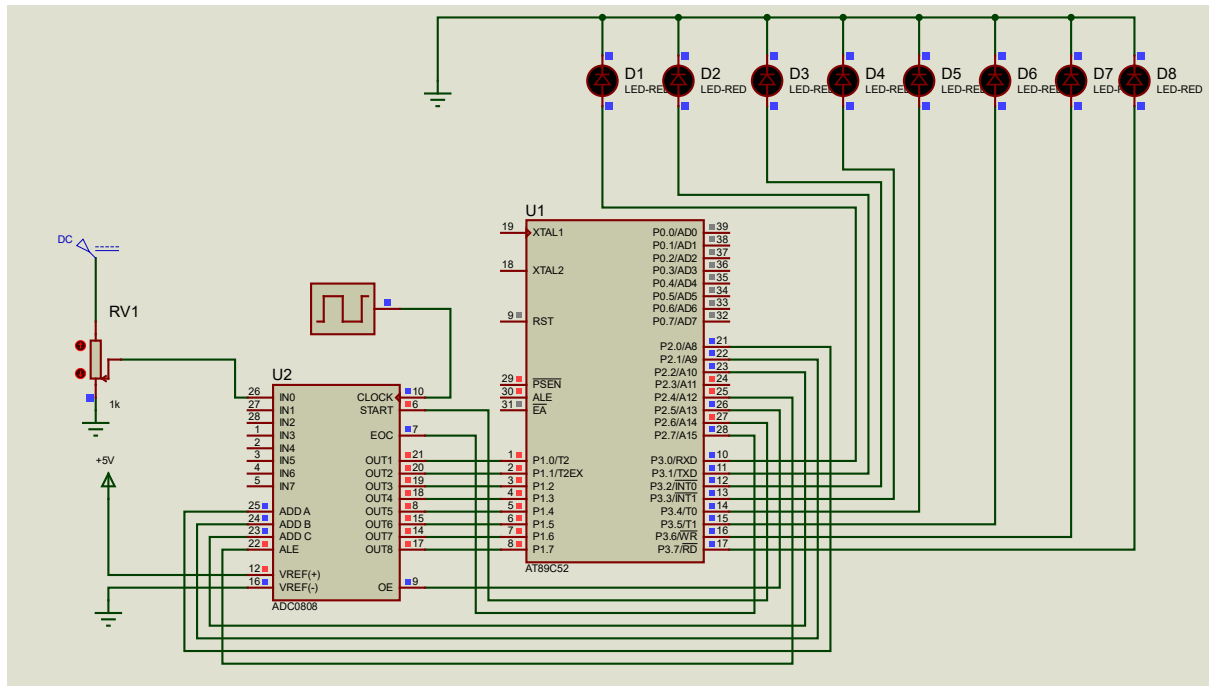
Experiment 3: ADC

```
#include<reg52.h>
sbit ALE = P2^4;
sbit OE = P2^5;
sbit START = P2^6;
sbit EOC = P2^7;
sbit ADDR_A = P2^0;
sbit ADDR_B = P2^1;
sbit ADDR_C = P2^2;
sfr INDATA = 0x90; //Port P1
sfr OUTDATA = 0xB0; //Port P3
void MSDelay(unsigned int x)
{
    unsigned int i,j;
    for(i=0;i<x;i++)
    {
        for(j=0;j<1000;j++)
        {}
    }
}
void main()
{
    unsigned char value;
    INDATA = 0xFF;
    OUTDATA = 0x00;
    EOC = 1;
    ALE = 0;
    OE = 0;
    START = 0;
    while(1)
    {
        ADDR_C = 0;
        ADDR_B = 0;
        ADDR_A = 0;
        MSDelay(2);
        ALE = 1;
        MSDelay(2);
        START = 1;
        MSDelay(1);
        ALE = 0;
        START = 0;
        while(EOC==1);
        while(EOC==0);
        OE=1;
        MSDelay(2);
        value = INDATA;
        OUTDATA = value;
        OE = 0 ;
    }
}
```

```

}
}

```



Experiment 4a: LCD display

```

#include<reg52.h>
sbit RS = P3^0;
sbit RW = P3^1;
sbit EN = P3^2;
sfr PORT2 = 0xA0; //Port P1
void delay_ms(unsigned int k)
{
    unsigned int i,j;
    for(i=0;i<k;i++)
    {
        for(j=0;j<1000;j++)
        {}
    }
}
void lcd_data(unsigned char data1)
{
    PORT2 = data1;
    RS = 1;
    RW = 0;
    EN = 1;
    delay_ms(5);
    EN = 0;
}

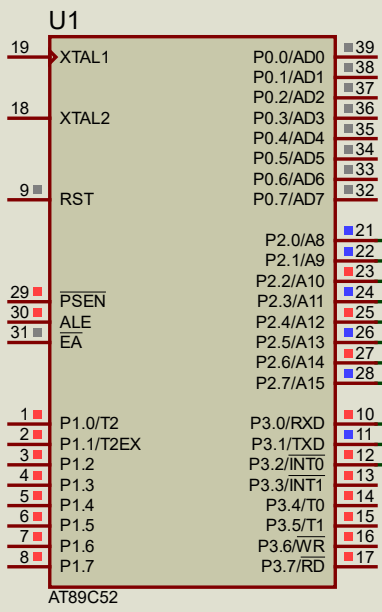
```

```

}
void lcd_command(unsigned char cmd)
{
    PORT2 = cmd;
    RS = 0;
    RW = 0;
    EN = 1;
    delay_ms(5);
    EN = 0;
}
void lcd_string(unsigned char string[],unsigned int len)
{
    unsigned int i;
    for(i=0;i<len;i++)
    {
        lcd_data(string[i]);
    }
}
void lcd_initialize()
{
    lcd_command(0x38);
    lcd_command(0x06);
    lcd_command(0x0C);
    lcd_command(0x01);
}
void main()
{
    PORT2=0x00;
    lcd_initialize();
    while(1)
    {
        lcd_command(0x80);
        lcd_string("WELCOME TO",10);
        lcd_command(0xC0);
        lcd_string("SBCE PATTOOR",12);
    }
}

```


LCD1
LM016L



Experiment 4b: LCD display with keypad interface

```
#include<reg51.h>
sbit RS = P3^0;
sbit RW = P3^1;
sbit EN = P3^2;
sbit C1 = P2^0;
sbit C2 = P2^1;
sbit C3 = P2^2;
sbit C4 = P2^3;
sbit R1 = P2^4;
sbit R2 = P2^5;
sbit R3 = P2^6;
sbit R4 = P2^7;
sfr PORT1 = 0x90; //Port P1
sfr PORT2 = 0xA0; //Port P2
void delay_ms(unsigned int k)
{
    unsigned int i,j;
    for(i=0;i<k;i++)
    {
        for(j=0;j<100;j++)
        {}
    }
}
void lcd_data(unsigned char data1)
{
    PORT1 = data1;
    RS = 1;
    RW = 0;
    EN = 1;
    delay_ms(5);
    EN = 0;
}
void lcd_command(unsigned char cmd)
{
    PORT1 = cmd;
    RS = 0;
    RW = 0;
    EN = 1;
    delay_ms(5);
    EN = 0;
}
void lcd_string(unsigned char string[],unsigned int len)
{
    unsigned int i;
    for(i=0;i<len;i++)
    {
        lcd_data(string[i]);
    }
}
```

```

    }
}
void keypad_press()
{
    //Colomn 1
    C1=0;C2=1;C3=1;C4=1;
    if(R1==0)
    {
        lcd_data('7');
        while (R1==0);
    }
    if(R2==0)
    {
        lcd_data('4');
        while (R2==0);
    }
    if(R3==0)
    {
        lcd_data('1');
        while (R3==0);
    }
    if(R4==0)
    {
        lcd_data('C');
        while (R4==0);
    }
    //Colomn 2
    C1=1;C2=0;C3=1;C4=1;
    if(R1==0)
    {
        lcd_data('8');
        while (R1==0);
    }
    if(R2==0)
    {
        lcd_data('5');
        while (R2==0);
    }
    if(R3==0)
    {
        lcd_data('2');
        while (R3==0);
    }
    if(R4==0)
    {
        lcd_data('0');
        while (R4==0);
    }
}

```

```

//Colomn 3
C1=1;C2=1;C3=0;C4=1;
if(R1==0)
{
    lcd_data('9');
    while (R1==0);
}
if(R2==0)
{
    lcd_data('6');
    while (R2==0);
}
if(R3==0)
{
    lcd_data('3');
    while (R3==0);
}
if(R4==0)
{
    lcd_data('=');
    while (R4==0);
}
//Colomn 4
C1=1;C2=1;C3=1;C4=0;
if(R1==0)
{
    lcd_data('/');
    while (R1==0);
}
if(R2==0)
{
    lcd_data('X');
    while (R2==0);
}
if(R3==0)
{
    lcd_data('-');
    while (R3==0);
}
if(R4==0)
{
    lcd_data('+');
    while (R4==0);
}
}
void lcd_initialize()
{
    lcd_command(0x02);

```

```

    lcd_command(0x38);
    lcd_command(0x06);
    lcd_command(0x0C);
    lcd_command(0x01);
}
void main()
{
    PORT1=0x00;
    PORT2=0xF0;
    lcd_initialize();
    while(1)
    {
        lcd_command(0x80);
        lcd_string("KEY PRESSED IS:",15);
        lcd_command(0xC0);
        keypad_press();
    }
}

```

