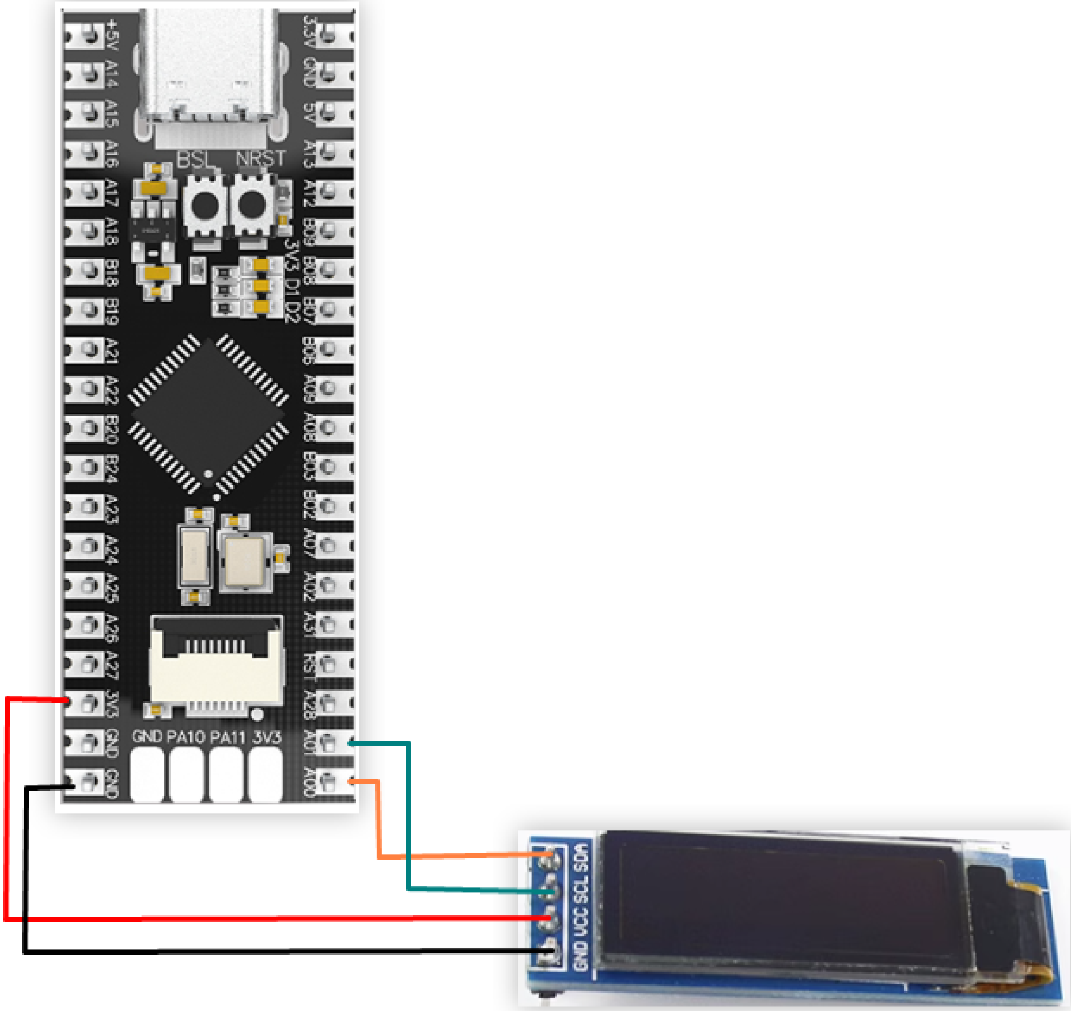
0.91-inch OLED screen

1. Learning objectives

Print characters through the OLED screen.

2. Hardware connection

0.91-inch OLED and MSPM0G3507 wiring



3. Program description

- oled.h

```
#ifndef _oled_h_
#define _oled_h_

#include <stdint.h>
#define OLED_ADDRESS 0x3c

void I2C_Configuration(void);
void I2C_WriteByte(uint8_t addr,uint8_t data);
void WriteCmd(unsigned char I2C_Command);
void WriteData(unsigned char I2C_Data);
void OLED_Init(void);
void OLED_SetPos(unsigned char x,unsigned char y);
void OLED_Fill(unsigned char Fill_Data);
void OLED_CLS(void);
void OLED_ON(void);
void OLED_OFF(void);
void OLED_ShowStr(unsigned char x,unsigned char y,unsigned char ch[],unsigned
char TextSize);

#endif
```

Define the header file for i2c transmission and oled display

- oled.c

```
void OLED_ShowStr(unsigned char x,unsigned char y,unsigned char ch[],unsigned
char TextSize)
{
        unsigned char c = 0,i = 0,j = 0;

        switch(TextSize)
        {
            case 1:
            {
                    while(ch[j] != '\0')
                    {
                            c = ch[j] - 32;
                            if(x>126)
                            {
                                    x = 0;
                                    y++;
                            }

                            OLED_SetPos(x,y);

                            for(i=0;i<6;i++)
                            {
                                    WriteData(F6x8[c][i]);
                            }
                            x+=6;
                            j++;
                    }
            }
            break;

            case 2:
            {
                    while(ch[j] != '\0')
                    {
                            c = ch[j] - 32;

                            if(x>120)
                            {
                                    x = 0;
                                    y++;
                            }

                            OLED_SetPos(x,y);

                            for(i=0;i<8;i++)
                            {
                                    WriteData(F8X16[c*16+i]);
                            }

                            OLED_SetPos(x,y+1);

                            for(i=0;i<8;i++)
                            {
                                    WriteData(F8X16[c*16+i+8]);
                            }
                            x+=8;
                            j++;
                    }
            }
            break;
        }
}

//填充整个屏幕    Fill the entire screen
void OLED_Fill(unsigned char Fill_Data)
{
        unsigned char m,n;

        for(m=0;m<8;m++)
        {
                WriteCmd(0xb0+m);
                WriteCmd(0x00);
                WriteCmd(0x10);

                for(n=0;n<128;n++)
                {
                        WriteData(Fill_Data);
                }
        }
}
```

Implement oled display characters and screen filling function

- delay.h

```
#ifndef _DELAY_H
#define _DELAY_H

#include <stdint.h>
#include "ti_msp_dl_config.h"

void delay_us(unsigned long __us);
void delay_ms(unsigned long ms);


#endif
```

Define millisecond and microsecond function header files

- delay.c

```
#include "delay.h"

volatile unsigned int delay_times = 0;

//搭配滴答定时器实现的精确us延时  Accurate us delay with tick timer
void delay_us(unsigned long __us)
{
    uint32_t ticks;
    uint32_t told, tnow, tcnt = 38;

    // 计算需要的时钟数 = 延迟微秒数 * 每微秒的时钟数
    //The number of clocks required for calculation = the number of microseconds of delay * the number of clocks per microsecond
    ticks = __us * (32000000 / 1000000);

    // 获取当前的SysTick值
    //Get the current SysTick value
    told = SysTick->VAL;

    while (1)
    {
        // 重复刷新获取当前的SysTick值
        //Repeatedly refresh to get the current SysTick value
        tnow = SysTick->VAL;

        if (tnow != told)
        {
            if (tnow < told)
                tcnt += told - tnow;
            else
                tcnt += SysTick->LOAD - tnow + told;

            told = tnow;

            // 如果达到了需要的时钟数，就退出循环
            //If the required number of clocks is reached, exit the loop
            if (tcnt >= ticks)
                break;
        }
    }
}
//搭配滴答定时器实现的精确ms延时
//Accurate ms delay with tick timer
void delay_ms(unsigned long ms)
{
    delay_us( ms * 1000 );
}

//滴答定时器中断处理 Tick timer interrupt handling
void SysTick_Handler(void)
{
    if(delay_times != 0)
    {
        delay_times--;
    }
}
```

Achieve millisecond and microsecond delays through timer counting

- empty.c

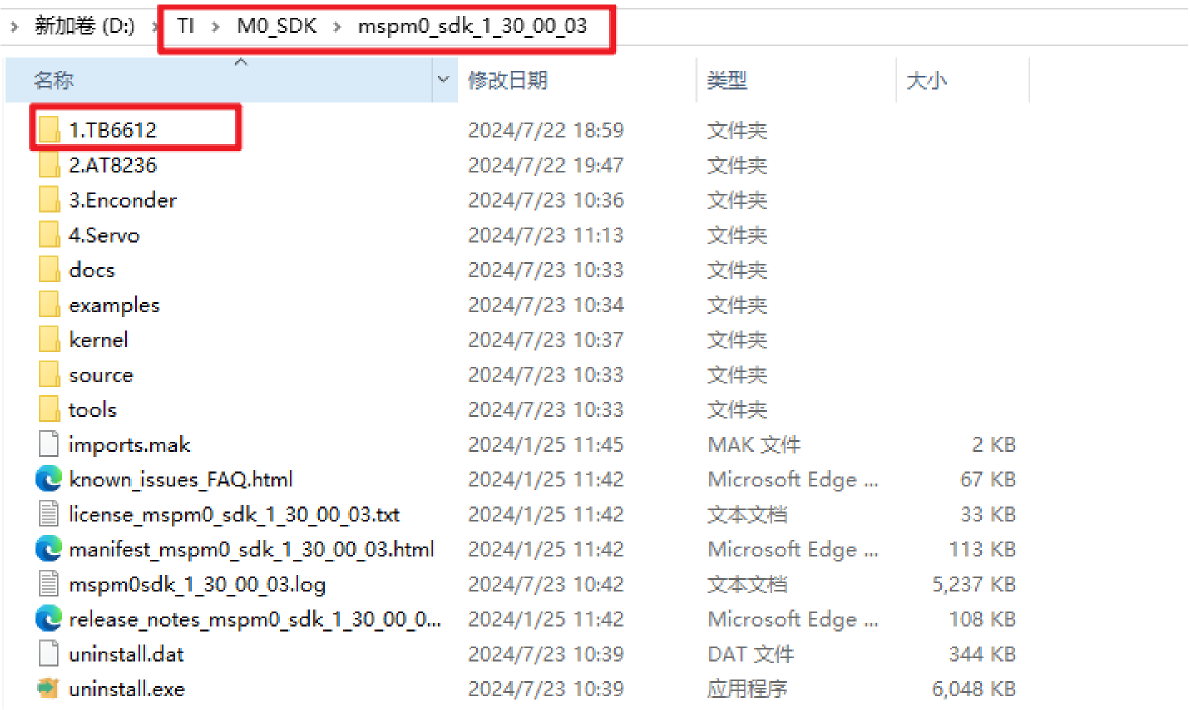
```
int main(void)
{
    SYSCFG_DL_init();
    OLED_Init();    //oled初始化       OLED initialization
//  OLED_Fill(0xFF);//填充白色      Fill with white
    OLED_Fill(0x00);//黑屏            Black screen

    while(1)
    {
        OLED_ShowStr(0,0,"Hello world!!",2);//oled显示hello world! !    oled
displays hello world! !
        OLED_ShowStr(0,3,"yahboom !",2);//oled显示yahboom !                oled
display yahboom!
    }
}
```

Initialize the oled screen and display the preset characters.

Note: The project source code must be placed in the SDK path for compilation,

For example, the path: D:\TI\M0_SDK\mspm0_sdk_1_30_00_03\1.TB6612



新加卷 (D:) › TI › M0_SDK › mspm0_sdk_1_30_00_03

名称	修改日期	类型	大小
1.TB6612	2024/7/22 18:59	文件夹	
2.AT8236	2024/7/22 19:47	文件夹	
3.Enconder	2024/7/23 10:36	文件夹	
4.Servo	2024/7/23 11:13	文件夹	
docs	2024/7/23 10:33	文件夹	
examples	2024/7/23 10:34	文件夹	
kernel	2024/7/23 10:37	文件夹	
source	2024/7/23 10:33	文件夹	
tools	2024/7/23 10:33	文件夹	
imports.mak	2024/1/25 11:45	MAK 文件	2 KB
known_issues_FAQ.html	2024/1/25 11:42	Microsoft Edge ...	67 KB
license_mspm0_sdk_1_30_00_03.txt	2024/1/25 11:42	文本文档	33 KB
manifest_mspm0_sdk_1_30_00_03.html	2024/1/25 11:42	Microsoft Edge ...	113 KB
mspm0sdk_1_30_00_03.log	2024/7/23 10:42	文本文档	5,237 KB
release_notes_mspm0_sdk_1_30_00_0...	2024/1/25 11:42	Microsoft Edge ...	108 KB
uninstall.dat	2024/7/23 10:39	DAT 文件	344 KB
uninstall.exe	2024/7/23 10:39	应用程序	6,048 KB

4. Experimental phenomenon

After burning the program to MSPM0G3507 and connecting the wires according to the wiring diagram. After powering on, the OLED will display "Hello world!! "yahboom!"