OLED 显示模块

硬件概述

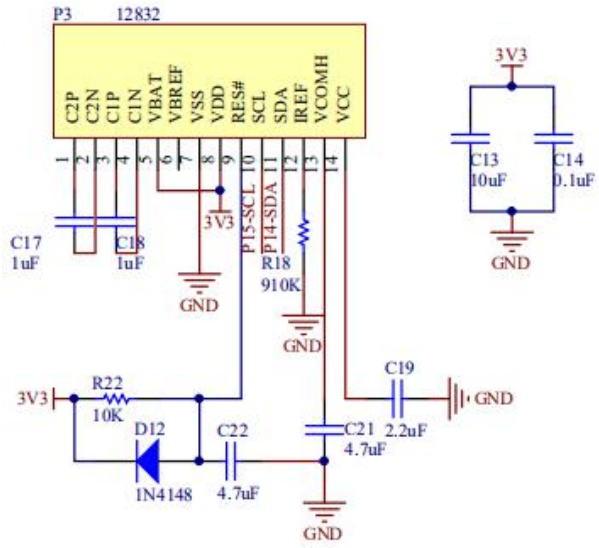
OLED，即有机发光二极管（Organic Light-Emitting Diode），又称为有机电激光显示(Organic Electroluminesence Display，OELD)。OLED 同时具备自发光，不需背光源、对比度高、厚度薄、视角广、反应速度快、可用于挠曲性面板、使用温度范围广、构造及制程较简单等优异之特性。模块具有一下特点：

(1) 尺寸小，显示尺寸为 0.91 寸,屏幕尺寸 30mm*11.5mm。
(2) 高分辨率，分辨率为 128*32。
(3) 使用 IIC 通信，只需 2 根线即可控制 OLED。

引脚定义

标号	符号	引脚说明
1	C2P	电容 2 正极
2	C2N	电容 2 负极
3	C1P	电容 1 正极
4	C1N	电容 1 负极
5	VBAT	DC/DC 转换电路电源
6	VBREF	保留引脚
7	VSS	电源地
8	VDD	电源正极
9	RES#	控制器和驱动器的电源复位
10	SCL	IIC 的时钟脚
11	SDA	IIC 的数据脚
12	IREF	电流参考亮度调整
13	VCOMH	电压输出 COM 高电平
14	VCC	OLE 面板电源

电路原理图



图形化模块

1. 初始化 OLED

2. OLED 关闭显示

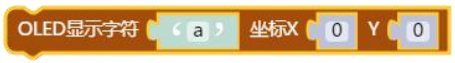
3. OLED 更新显示

4. OLED 清屏

5. OLED 在坐标 X,Y 显示一个像素点

6. OLED 在坐标 X,Y 清除像素点

7. OLED 在坐标 X,Y 显示一个字符



8. OLED 在坐标 X,Y 显示一个字符串

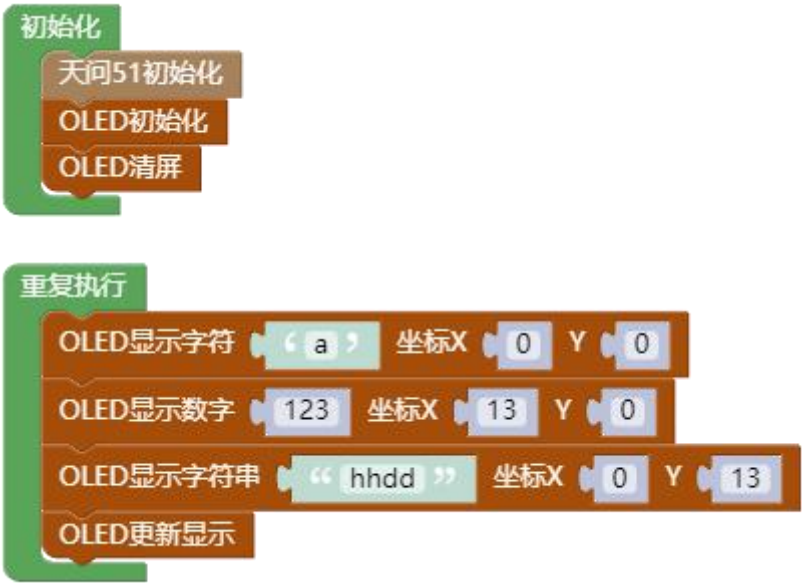
9. OLED 在坐标 X,Y 显示一个数值

10. OLED 在坐标 X,Y 显示一个指定字体大小的汉字

11. OLED 在一个范围内显示图片

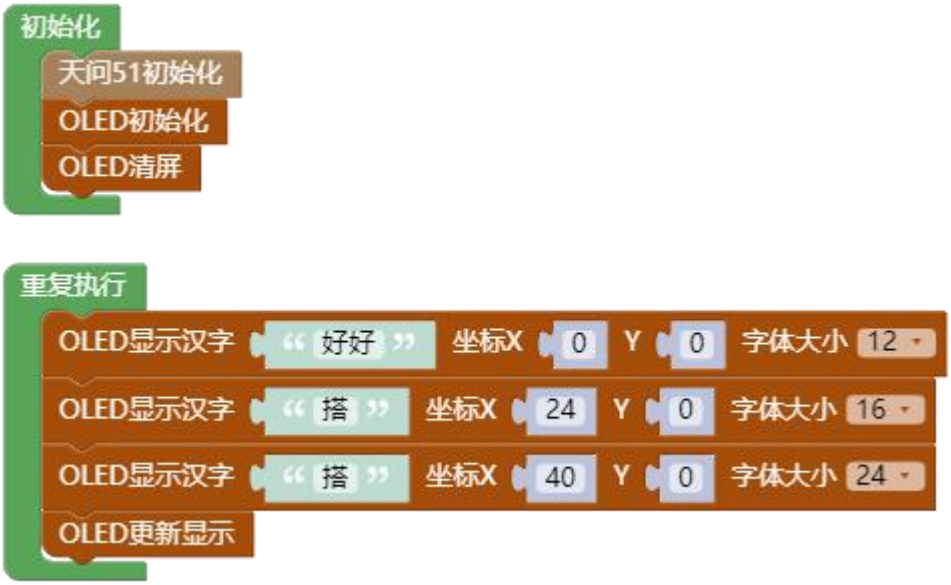
示例代码 1

OLED 显示字符“a”在坐标(0,0)，显示数字“123”在坐标(13,0)，显示字符串在坐标(0,13)。



示例代码 2

OLED 显示 12*12 字体大小的汉字“好好”在坐标(0,0)，显示 16*16 字体大小的汉字“搭”在坐标(24,0)，显示 24*24 字体大小的汉字“搭”在坐标(40,0)。



示例代码 3

OLED 显示转换过的 BMP 图片。

调用函数代码

```
引入头文件

#include "lib/oled.h"
```

```
void oled_init()//OLED 初始化函数，参数无
```

```
void oled_display_off()//关闭 OLED 函数，参数无
```

```
void oled_display()//OLED 更新显示函数，参数无
```

```
void oled_clear()//OLED 清屏函数，参数无
```

```
void oled_set_pixel(uint8 x, uint8 y,uint8 pixel)
//OLED 设置点,参数 x,y 为要显示的坐标,参数 pixel 写 1 该点亮，写 0 灭
```

```
void oled_show_char(int8 x,int8 y,uint8 chr)
//OLED 显示单个字符(字符高 8 宽 5),参数 x,y 为要显示的坐标,参数 y 为显示的字符
```

```
void oled_show_string(int8 x,int8 y,uint8 *chr)
//OLED 在指定位置显示字符串(字符高 8，间距 8),参数 x,y 为要显示的坐标,参数 chr 为
//显示的字符串
```

```
void oled_show_font12(const uint8* hz,int x,int y)
//OLED 在指定位置显示 12x12 汉字,参数 hz 为要显示的汉字，参数 x,y 为要显示的坐标
```

```
void oled_show_font16(const uint8* hz,int x,int y)
//OLED 在指定位置显示 16x16 汉字,参数 hz 为要显示的汉字，参数 x,y 为要显示的坐标
```

```
void oled_show_font24(const uint8* hz,int x,int y)
//OLED 在指定位置显示 24x24 汉字,参数 hz 为要显示的汉字，参数 x,y 为要显示的坐标
```

```
void oled_show_bmp(uint8 x0, uint8 y0,uint8 x1, uint8 y1,uint8* BMP)
//显示转换过的 BMP 图片，参数 x0,y0 为起点坐标，参数 x1,y1 为终点坐标，参数 BMP
//为要显示的图片
```

示例代码 1

```
#include <STC8HX.h>
uint32 sys_clk = 24000000;
//系统时钟确认
#include "lib/hc595.h"
#include "lib/rgb.h"
#include "lib/delay.h"
#include "lib/oled.h"

void twen_board_init()
{
  hc595_init();//HC595 初始化
```

```
  hc595_disable();//HC595 禁止点阵和数码管输出

  rgb_init();//RGB 初始化

  delay(10);

  rgb_show(0,0,0,0);//关闭 RGB

  delay(10);
}

void setup()
{
  twen_board_init();
  oled_init();//OLED 初始化
  oled_clear();//OLED 清屏
}

void loop()
{
  oled_show_char(0,0,'a');
  oled_show_num(13,0,123);
  oled_show_string(0,13,"hhdd");
  oled_display();//OLED 更新显示
}

void main(void)
{
  setup();
  while(1){
    loop();
  }
}
```

示例代码 2

```
#include <STC8HX.h>
uint32 sys_clk = 24000000;
//系统时钟确认
#include "lib/hc595.h"
#include "lib/rgb.h"
#include "lib/delay.h"
#include "lib/oled.h"
```

```
void twen_board_init()
{
  hc595_init();
  hc595_disable();
  rgb_init();
  delay(100);
  rgb_show(0,0,0,0);//熄灭 RGB
  delay(100);
}

void setup()
{
  twen_board_init();
  oled_init();//OLED 初始化
  oled_clear();//OLED 清屏
}

void loop()
{
  oled_show_font12("好好",0,0);
  oled_show_font16("搭",24,0);
  oled_show_font24("搭",40,0);
  oled_display();//OLED 更新显示
}

void main(void)
{
  setup();
  while(1){
    loop();
  }
}
```

示例代码 3

```
#include <STC8HX.h>
uint32 sys_clk = 24000000;
//系统时钟确认
#include "lib/hc595.h"
#include "lib/rgb.h"
#include "lib/delay.h"
#include "lib/oled.h"
```

```
code uint8 mylist[1024]={
 0x00,0x03,0x05,0x09,0x11,0xFF,0x11,0x89,0x05,0xC3,0x00,0xE0,0x00,0xF0,
0x00,0xF8,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x44,0x28,0xFF,0x11,0xAA,0x44,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x83,0x01,0x38,0x44,
0x82,0x92,
 0x92,0x74,0x01,0x83,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x7C,0x44,0xFF,
0x01,0x7D,
 0x7D,0x7D,0x01,0x7D,0x7D,0x7D,0x7D,0x01,0x7D,0x7D,0x7D,0x7D,0x7D,0x01,
0xFF,0x00,
 0x00,0x00,0x00,0x00,0x00,0x01,0x00,0x01,0x00,0x01,0x00,0x01,0x00,0x01,
0x00,0x01,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x01,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,0x01,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x01,0x01,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x01,
0x01,0x01,
 0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,
0x01,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x3F,0x3F,
0x03,0x03,
 0xF3,0x13,0x11,0x11,0x11,0x11,0x11,0x11,0x01,0xF1,0x11,0x61,0x81,0x01,
0x01,0x01,
 0x81,0x61,0x11,0xF1,0x01,0x01,0x01,0x01,0x41,0x41,0xF1,0x01,0x01,0x01,
0x01,0x01,
 0xC1,0x21,0x11,0x11,0x11,0x11,0x21,0xC1,0x01,0x01,0x01,0x01,0x41,0x41,
0xF1,0x01,
```

```
 0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x11,0x11,0x11,0x11,0x11,
0xD3,0x33,
 0x03,0x03,0x3F,0x3F,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xE0,0xE0,
0x00,0x00,
 0x7F,0x01,0x01,0x01,0x01,0x01,0x01,0x00,0x00,0x7F,0x00,0x00,0x01,0x06,
0x18,0x06,
 0x01,0x00,0x00,0x7F,0x00,0x00,0x00,0x00,0x40,0x40,0x7F,0x40,0x40,0x00,
0x00,0x00,
 0x1F,0x20,0x40,0x40,0x40,0x40,0x20,0x1F,0x00,0x00,0x00,0x00,0x40,0x40,
0x7F,0x40,
 0x40,0x00,0x00,0x00,0x00,0x60,0x00,0x00,0x00,0x00,0x40,0x30,0x0C,0x03,
0x00,0x00,
 0x00,0x00,0xE0,0xE0,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x07,0x07,
0x06,0x06,
 0x06,0x06,0x04,0x04,0x04,0x84,0x44,0x44,0x44,0x84,0x04,0x04,0x84,0x44,
0x44,0x44,
 0x84,0x04,0x04,0x04,0x84,0xC4,0x04,0x04,0x04,0x04,0x84,0x44,0x44,0x44,
0x84,0x04,
 0x04,0x04,0x04,0x04,0x84,0x44,0x44,0x44,0x84,0x04,0x04,0x04,0x04,0x04,
0x84,0x44,
 0x44,0x44,0x84,0x04,0x04,0x84,0x44,0x44,0x44,0x84,0x04,0x04,0x04,0x04,
0x06,0x06,
 0x06,0x06,0x07,0x07,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x10,0x18,0x14,0x12,0x11,0x00,0x00,0x0F,0x10,
0x10,0x10,
```

```
 0x0F,0x00,0x00,0x00,0x10,0x1F,0x10,0x00,0x00,0x00,0x08,0x10,0x12,0x12,
0x0D,0x00,
 0x00,0x18,0x00,0x00,0x0D,0x12,0x12,0x12,0x0D,0x00,0x00,0x18,0x00,0x00,
0x10,0x18,
 0x14,0x12,0x11,0x00,0x00,0x10,0x18,0x14,0x12,0x11,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x80,0x80,
0x80,0x80,
 0x80,0x80,0x80,0x80,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x7F,0x03,0x0C,0x30,0x0C,0x03,0x7F,0x00,0x00,0x38,0x54,0x54,0x58,
0x00,0x00,
 0x7C,0x04,0x04,0x78,0x00,0x00,0x3C,0x40,0x40,0x7C,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0xFF,0xAA,
0xAA,0xAA,
 0x28,0x08,0x00,0xFF,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,
0x00,0x00,
 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x7F,0x03,0x0C,0x30,0x0C,
0x03,0x7F,
 0x00,0x00,0x26,0x49,0x49,0x49,0x32,0x00,0x00,0x7F,0x02,0x04,0x08,0x10,
0x7F,0x00,
};
```

```
void twen_board_init()
{
  hc595_init();
  hc595_disable();
  rgb_init();
  delay(100);
  rgb_show(0,0,0,0);//熄灭 RGB
  delay(100);
}

void setup()
{
  twen_board_init();
  oled_init();//OLED 初始化
  oled_clear();//OLED 清屏
}

void loop()
{
  oled_show_bmp(0,0,128,32,mylist);
  oled_display();//OLED 更新显示
}

void main(void)
{
  setup();
  while(1){
    loop();
  }
}
```