24-channel servo driver board

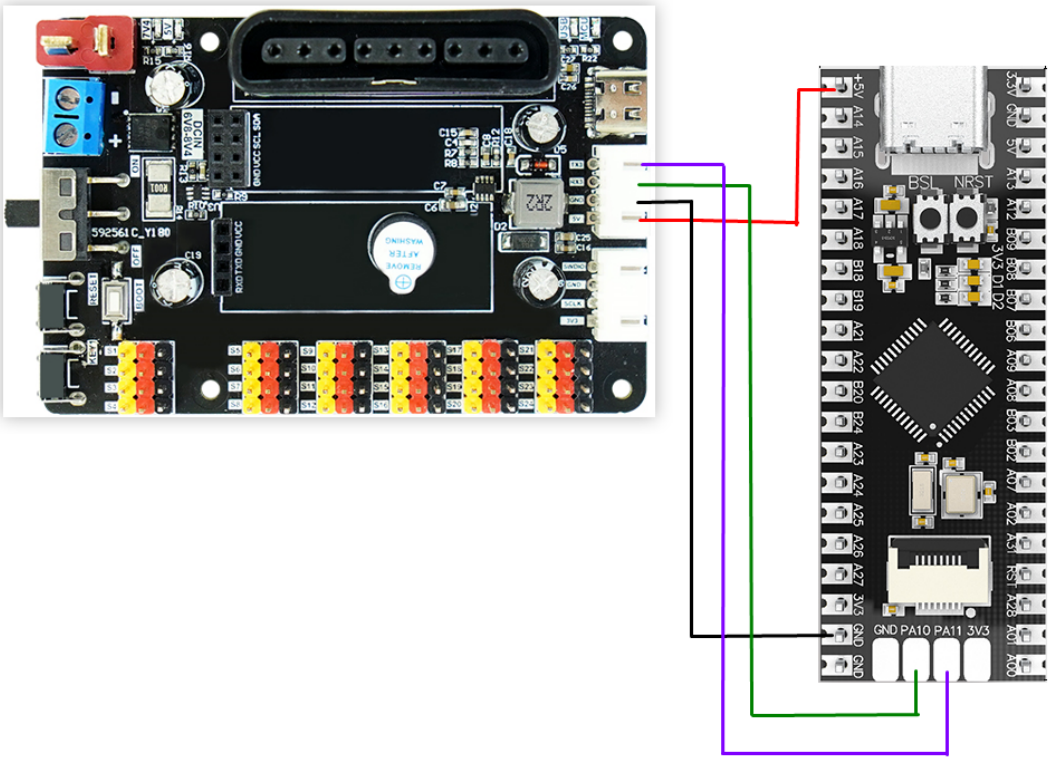
1. Learning objectives

Drive 180-degree servos through the serial port of the 24-channel servo driver board

2. Hardware connection

The servo used in this case is a 180-degree servo, which is connected to the S1 pin of the 16-channel servo driver board

24-channel servo driver board and MSPM0G3507 wiring



3. Program description

- usart.h

```
#ifndef __USART_H__
#define __USART_H__

#include "ti_msp_dl_config.h"


void USART_Init(void);

void USART_SendData(unsigned char data);

#endif
```

Header file that defines serial port transmission data

- usart.c

```
#include "usart.h"
#include "stdio.h"

#define RE_0_BUFF_LEN_MAX   128

volatile uint8_t  recv0_buff[RE_0_BUFF_LEN_MAX] = {0};
volatile uint16_t recv0_length = 0;
volatile uint8_t  recv0_flag = 0;

void USART_Init(void)
{
    // SYSCFG初始化
    // SYSCFG initialization
    SYSCFG_DL_init();
    //清除串口中断标志
    //Clear the serial port interrupt flag
    NVIC_ClearPendingIRQ(UART_0_INST_INT_IRQN);
    //使能串口中断
    //Enable serial port interrupt
    NVIC_EnableIRQ(UART_0_INST_INT_IRQN);
}

//串口发送一个字节
//The serial port sends a byte
static void USART_SendData(unsigned char data)
{
    //当串口0忙的时候等待
    //Wait when serial port 0 is busy
    while( DL_UART_isBusy(UART_0_INST) == true );
    //发送
    //send
    DL_UART_Main_transmitData(UART_0_INST, data);
}

//串口的中断服务函数
//Serial port interrupt service function
void UART_0_INST_IRQHandler(void)
{
```

```
    uint8_t receivedData = 0;

    //如果产生了串口中断
    //If a serial port interrupt occurs
    switch( DL_UART_getPendingInterrupt(UART_0_INST) )
    {
        case DL_UART_IIDX_RX://如果是接收中断  If it is a receive interrupt

            // 接收发送过来的数据保存  Receive and save the data sent
            receivedData = DL_UART_Main_receiveData(UART_0_INST);

            // 检查缓冲区是否已满    Check if the buffer is full
            if (recv0_length < RE_0_BUFF_LEN_MAX - 1)
            {
                recv0_buff[recv0_length++] = receivedData;
            }
            else
            {
                recv0_length = 0;
            }

            // 标记接收标志   Mark receiving flag
            recv0_flag = 1;

            break;

        default://其他的串口中断   Other serial port interrupts
            break;
    }
}
```

Define the serial port initialization function, the function to send one byte of data, and the serial port interrupt service function.

- empty.c

```
void UART_Servo(unsigned char servonum,unsigned char angle)
{
    servonum = 64 + servonum;
    date1 = angle/100 + 48;
    date2 = (angle%100)/10 + 48;
    date3 = angle%10 + 48;
    USART_SendData(0x24);//发送包头          Sending packet header
    USART_SendData(servonum);//发送舵机编号   Send servo number
    USART_SendData(date1);//发送角度    Send angle
    USART_SendData(date2);//发送角度    Send angle
    USART_SendData(date3);//发送角度    Send angle
    USART_SendData(0x23);//发送包尾     Send packet tail
    delay_ms(100);
}

int main(void)
{
    USART_Init();
    while (1)
```

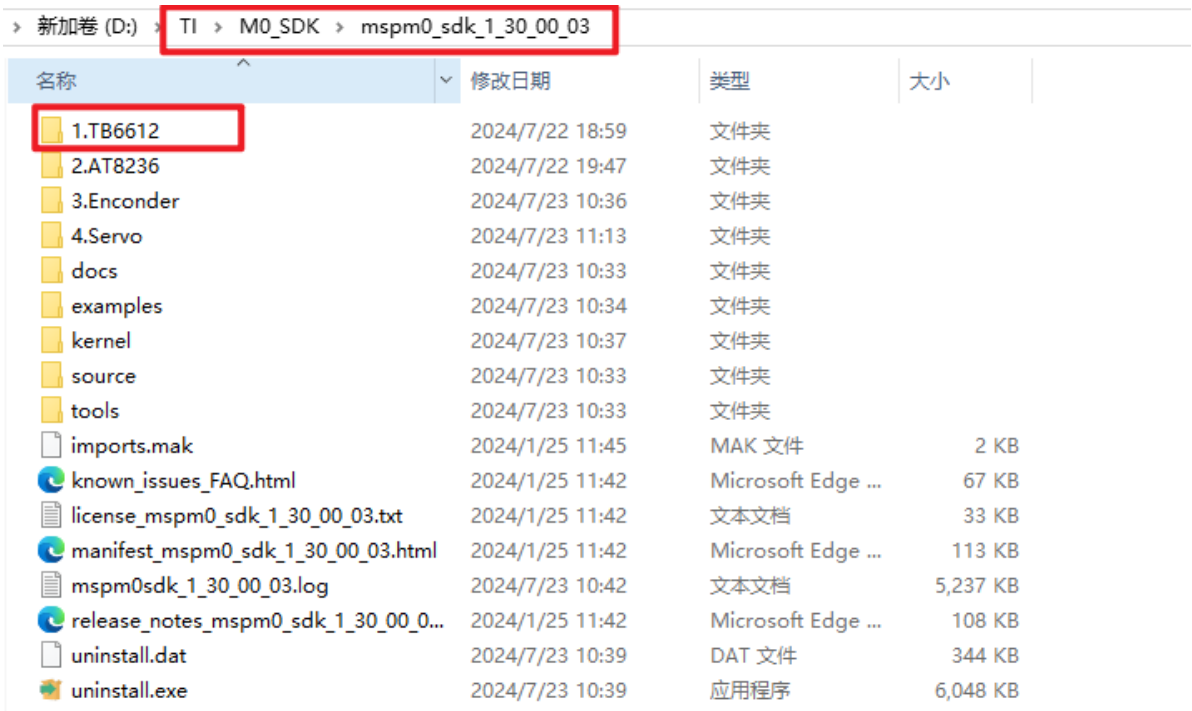
```
    {
        for(i = 0;i<180;i+=5)
        {
            UART_Servo(1,i);
            if(i>180) i=0;
        }

    }
}
```

Define the serial port control function UART_Servo, where the parameter servonum has a value range of (1-24) and angle has a value range of (0-270). In the main function, assign values to the serial port control function. Use loops to achieve 0-180 value changes.

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



4. Experimental phenomenon

Connect the servo to the S1 interface of the 24-way servo driver board, and burn the program to MSPM0G3507. After burning, connect the MSPM0G3507 to the 24-way servo driver board according to the wiring diagram. After power on, you will see the servo rotate from 0-180 degrees. Finally, it returns to 0 degrees.