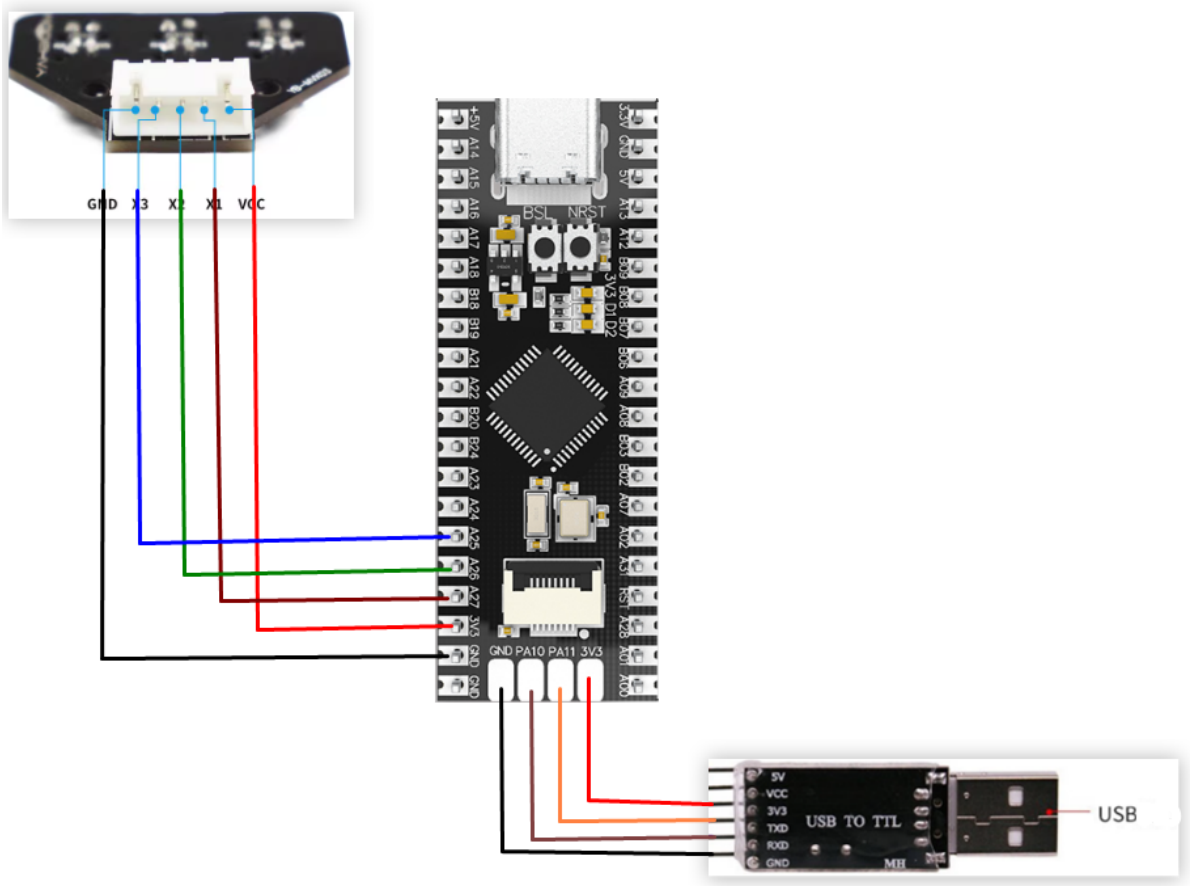
Serial port print analog value

1. Learning Objectives

Print the values of the three-way line patrol module through the serial port and transmit them to the computer's serial port assistant for display.

2. Hardware Connection

Three-way line patrol module, USB to TTL and MSPM0G3507 wiring



Note: If you don't have a TTL module, you can also use the type-c serial port directly

3. Program Description

- usart.c

```
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);
}
```

USART_Init: Initialization function of the system and serial port.

- adc.c

```
//读取ADC的数据  Read ADC data
unsigned int adc_getValue(uint8_t ch)
{
        unsigned int gAdcResult = 0;

        //软件触发ADC开始转换   Software triggers ADC to start conversion
        DL_ADC12_startConversion(ADC12_0_INST);
        //如果当前状态为正在转换中则等待转换结束   If the current state is in
transition, wait for the transition to end.
        while (false == gCheckADC) {
            __WFE();
        }
        //获取数据  Get data
        gAdcResult = DL_ADC12_getMemResult(ADC12_0_INST, ch);

        //清除标志位 Clear flag
        gCheckADC = false;

        return gAdcResult;
}

//获取通道ch的转换值    Get the conversion value of channel ch
//取times次,然后平均  Take times and then average
uint16_t T_Get_Adc_Average(uint8_t ch,uint8_t times)
{
    uint32_t temp_val=0;
    uint8_t t;
    for(t=0;t<times;t++)
    {
        temp_val+=adc_getValue(ch);
        delay_ms(5);
    }
    return temp_val/times;
}
```

- adc_getValue: triggers the ADC conversion and obtains the ADC data of the corresponding channel.

- T_Get_Adc_Average: ch is the ADC channel value to be converted. Pass ch as a parameter to the adc_getValue function to obtain the ADC value of the corresponding channel.

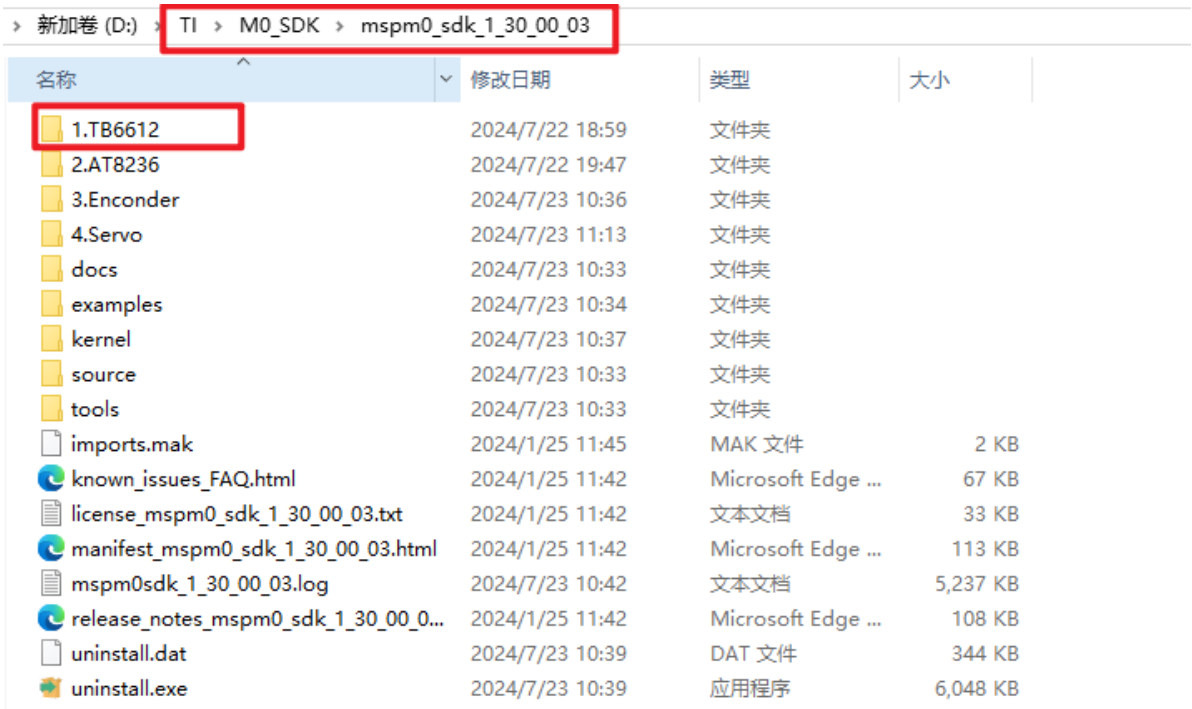
- empty.c

```
int main(void)
{
    uint16_t adcx1,adcx2,adcx3;

    USART_Init();
    //开启ADC中断    Enable ADC interrupt
    NVIC_EnableIRQ(ADC12_0_INST_INT_IRQN);
    while (1)
    {
        //面对三路巡线模块的灯珠，从左往右数，第一个为X1，第二个是X2，第三个是X3
        //Facing the three-way line patrol module, count from left to right, the
first one is X1, the second one is X2, and the third one is X3

        //在白底黑线的背景下，假设X1在黑线上，X2X3在白色上，X1的模拟量会是最大的。输出电平为
高电平
        //In the background of white background and black line, assuming X1 is
on the black line, X2X3 is on the white line, the analog value of X1 will be the
largest. The output level is high level

        adcx1=T_Get_Adc_Average(ADC12_0_ADCMEM_X1,10);
        adcx2=T_Get_Adc_Average(ADC12_0_ADCMEM_X2,10);
        adcx3=T_Get_Adc_Average(ADC12_0_ADCMEM_X3,10);
        printf("X1:%d  X2:%d, X3:%d \n\r",adcx1,adcx2,adcx3);
        delay_ms(50);
    }
}
```

Initialize the serial port, enable the ADC interrupt function, then continue to obtain the analog values of the three-way line patrol module in the while loop, and print the data on the serial port every 50 milliseconds.

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 Phenomena

Burn the program to MSPM0G3507, connect the wires according to the wiring diagram. Close other programs occupying the serial port, open the serial port assistant on the computer, select the serial port number, and set the baud rate to 115200. In the serial port assistant, you can see the printed data of the three-way line patrol module probe.