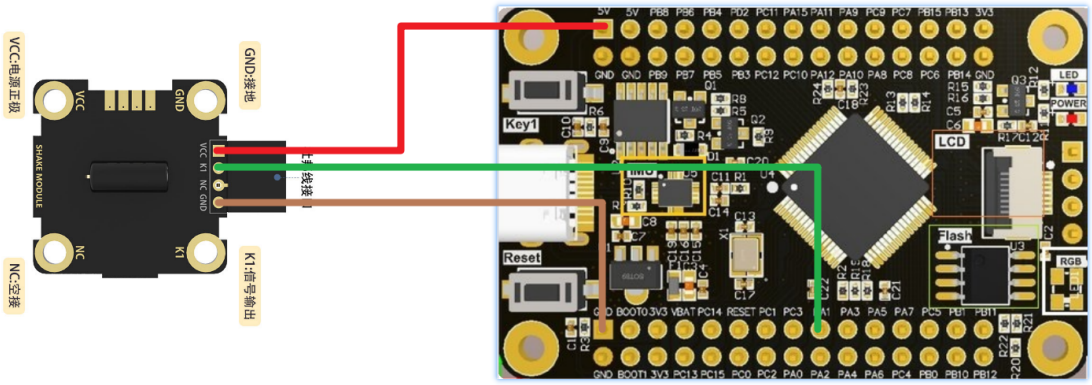
Vibration sensor module: External interrupt control LED

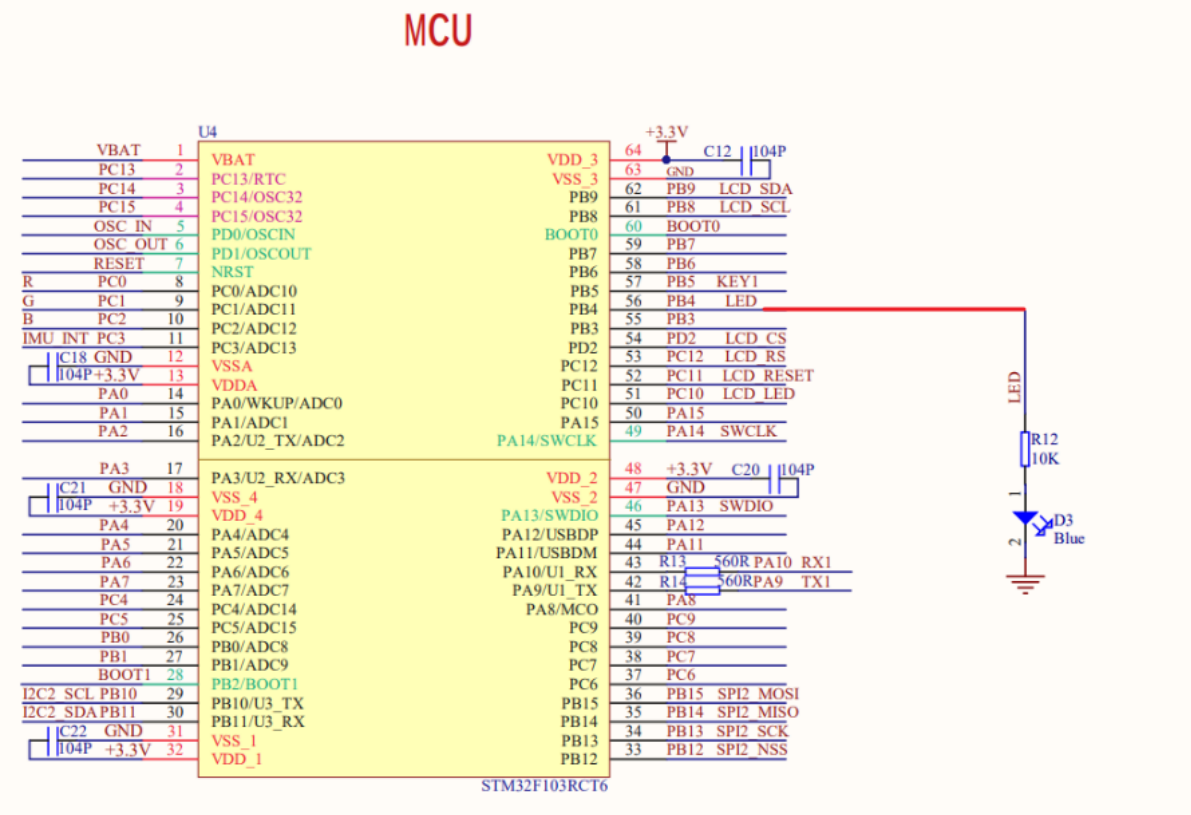
Hardware wiring



Vibration sensor module	STM32F103RCT6
VCC	3.3V/5V
K1	PA1
NC	
GND	GND

Brief principle

Circuit schematic



The LED is connected to the PB4 pin, you need to pay attention to the pin configuration of PB4 (see the code for the specific configuration):

PB4 output high level, LED on;

PB4 output low level, LED off;

Manually tapping the vibration sensor module generates a vibration signal, and K1 outputs a level change.

When K1 generates a falling edge signal, an external interrupt is entered, at which point the Num variable is incremented by 1.

When K1 generates 5 falling edge signals, the LED on and off state will flip once.

Main code

main.c

```
#include "stm32f10x.h"
#include "LED.h"
#include "EXTI.h"

int main(void)
{
    LED_Init();//LED初始化(PB4)
    EXTI1_Init();//外部中断1初始化(PA1 EXTI1)

    while(1)
    {

            if(Num >= 5)
        {
                Num = 0;
```

```
                /* Toggle LED(PB4) */
                /* 反转LED(PB4)状态 */
                GPIO_WriteBit(GPIOB, GPIO_Pin_4, (BitAction)(1 -
GPIO_ReadOutputDataBit(GPIOB, GPIO_Pin_4)));
        }
    }
}
```

LED.c

```
#include "LED.h"

void LED_Init(void)//LED初始化(PB4)
{
    GPIO_InitTypeDef GPIO_InitStructure;

    /* Enable GPIOB and AFIO clocks */
    /* 使能GPIOB和功能复用IO时钟 */
    RCC_APB2PeriphClockCmd(RCC_APB2Periph_GPIOB | RCC_APB2Periph_AFIO, ENABLE);

    /* JTAG-DP Disabled and SW-DP Enabled */
    /* 禁用JTAG 启用SWD */
    GPIO_PinRemapConfig(GPIO_Remap_SWJ_JTAGDisable, ENABLE);

    /* Configure PB4 in output pushpull mode */
    /* 配置PB4 推挽输出模式 */
    GPIO_InitStructure.GPIO_Pin = GPIO_Pin_4;
    GPIO_InitStructure.GPIO_Mode = GPIO_Mode_Out_PP;
    GPIO_InitStructure.GPIO_Speed = GPIO_Speed_50MHz;
    GPIO_Init(GPIOB, &GPIO_InitStructure);

    /* Set the GPIOB port pin 4 */
    /* 设置PB4端口数据位 */
    GPIO_WriteBit(GPIOB, GPIO_Pin_4, Bit_RESET);
}
```

LED.h

```
#ifndef __LED_H__
#define __LED_H__

#include "stm32f10x.h"

void LED_Init(void);//LED初始化(PB4)

#endif
```

EXTI.c

```
#include "EXTI.h"

unsigned int Num = 0;
```

```
void EXTI1_Init(void)//外部中断1初始化(PA1 EXTI1)
{
   EXTI_InitTypeDef   EXTI_InitStructure;
   GPIO_InitTypeDef   GPIO_InitStructure;
   NVIC_InitTypeDef   NVIC_InitStructure;

   /* Enable GPIOA and AFIO clock */
   /* 使能GPIOA AFIO时钟 */
   RCC_APB2PeriphClockCmd(RCC_APB2Periph_GPIOA | RCC_APB2Periph_AFIO, ENABLE);

   /* Configure PA1 pin as input floating */
   /* 配置PA1上拉输入模式 */
   GPIO_InitStructure.GPIO_Pin = GPIO_Pin_1;
   GPIO_InitStructure.GPIO_Mode = GPIO_Mode_IPU;
   GPIO_Init(GPIOA, &GPIO_InitStructure);

   /* Connect EXTI1 Line to PA1 pin */
   /* 连接EXTI1到PA1引脚 */
   GPIO_EXTILineConfig(GPIO_PortSourceGPIOA, GPIO_PinSource1);

   /* Configure EXTI1 line */
   /* 配置EXTI1 */
   EXTI_InitStructure.EXTI_Line = EXTI_Line1;
   EXTI_InitStructure.EXTI_Mode = EXTI_Mode_Interrupt;
   EXTI_InitStructure.EXTI_Trigger = EXTI_Trigger_Falling;
   EXTI_InitStructure.EXTI_LineCmd = ENABLE;
   EXTI_Init(&EXTI_InitStructure);

   /* Enable and set EXTI1 Interrupt to the lowest priority */
   /* 使能和配置EXTI1优先级及中断向量入口地址 */
   NVIC_InitStructure.NVIC_IRQChannel = EXTI1_IRQn;
   NVIC_InitStructure.NVIC_IRQChannelPreemptionPriority = 0x00;
   NVIC_InitStructure.NVIC_IRQChannelSubPriority = 0x00;
   NVIC_InitStructure.NVIC_IRQChannelCmd = ENABLE;
   NVIC_Init(&NVIC_InitStructure);
}

 void EXTI1_IRQHandler(void)
 {
   if(EXTI_GetITStatus(EXTI_Line1) != RESET)
   {
            Num++;
            /* Clear the  EXTI line 1 pending bit */
            /* 清除EXTI1中断标志位 */
            EXTI_ClearITPendingBit(EXTI_Line1);
   }
}
```

EXTI.h

```
#ifndef __EXTI_H__
#define __EXTI_H__

#include "stm32f10x.h"

extern unsigned int Num;

void EXTI1_Init(void);//外部中断1初始化(PA1 EXTI1)

#endif
```

Experimental phenomenon

After downloading the program, press the Reset key once, and the downloaded program will run.

Constantly tapping the vibration module will find that the LED on and off state changes.
Sometimes two taps will find that the status of the LED light is flipped, because one tap produces multiple vibrations and outputs multiple falling edge signals.