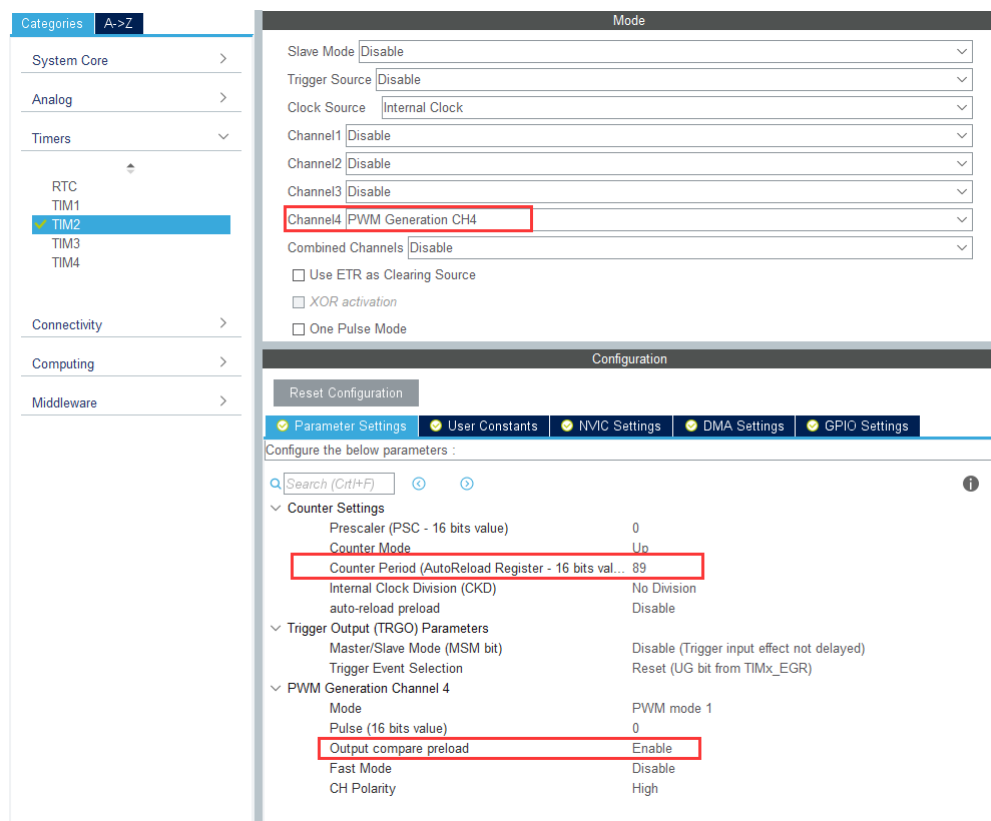


ws2812库使用说明

WTR——欧阳俊源 2020/1/29

思路：通过PWM的输出比较事件或更新事件来触发DMA请求，DMA搬运数据到定时器的CCRx。

CubeMx配置



配置定时器某个通道的PWM，周期为1.25us，尽量不要让ARR<50，记得使能输出比较的预装载。

Slave Mode

Disable

Trigger Source

Disable

Clock Source

Internal Clock

Channel1

Disable

Channel2

Disable

Channel3

Disable

Channel4

PWM Generation CH4

Combined Channels

Disable

☐ Use ETR as Clearing Source

☐ XOR activation

☐ One Pulse Mode

Configuration

Reset Configuration

Parameter Settings

User Constants

NVIC Settings

DMA Settings

GPIO Settings

DMA Request	Channel	Direction	Priority
TIM2_CH2/CH4	DMA1 Channel 7	Memory To Peripheral	High

Add

Delete

DMA Request Settings

Mode

Circular

Increment Address

☐

Peripheral

☐

Memory

☒

Data Width

Half Word

Half Word

配置DMA

代码

添加ws2812.c和.h。

在ws2812.h中宏定义LED_NUM 设置LED个数

```

#ifndef WS2812_H_OUYJY
#define WS2812_H_OUYJY

#include "dma.h"
#include "tim.h"

/*
*使用说明:
*init参数: 定时器句柄, 定时器通道
*亮度:0-100;
*/
#define LED_NUM 3

typedef enum
{
    WS2812_STATE_OK=0x00,
    WS2812_STATE_IDX_ERROR,
}WS2812_STATE;

typedef struct
{
    TIM_HandleTypeDef *htim;
    uint32_t tim_channel;
    int led_num;
    uint8_t errorcode;

    void (*init)(TIM_HandleTypeDef *htimx,uint32_t tim_channel);
    void (*start)(void);
    void (*setone)(int led_idx,uint32_t color,uint8_t brightness);
    void (*all_off)(void);
    void (*all_set)(uint32_t color,uint8_t brightness);
}WS2812_HandleTypeDef;

extern WS2812_HandleTypeDef hws2812;

static void WS2812_INIT(TIM_HandleTypeDef *htimx,uint32_t tim_channel);
uint32_t RGB(uint32_t r,uint32_t g,uint32_t b);
#endif

```

拥有句柄hws2812

hws2812.init()进行初始化，参数为定时器句柄和pwm对应的定时器通道。

hws2812.all_set(uint32_t,uint8_t) 输入rgb和亮度。r、g、b: 0-255, 亮度: 0-100。使用RGB(r,g,b)得到对应的32位rgb

hws2812.start()。开始DMA传输

```
MX_DMA_Init();
MX_TIM2_Init();
/* USER CODE BEGIN 2 */
hws2812.init(&htim2,TIM_CHANNEL_4);
/* USER CODE END 2 */
hws2812.all_set(RGB(255,0,255),10);
hws2812.start();
/* Infinite loop */
/* USER CODE BEGIN WHILE */
while (1)
{
    for(int i=0;i<100;++i)
    {
        hws2812.all_set(RGB(255,0,255),i);
        HAL_Delay(100);
    }

    /* USER CODE END WHILE */

    /* USER CODE BEGIN 3 */
```

此外还有

hws2812.setone(32位颜色代号, 亮度), RGB(r,g,b)得到对应32位颜色代码

hws2812.all_off()关闭所有LED。