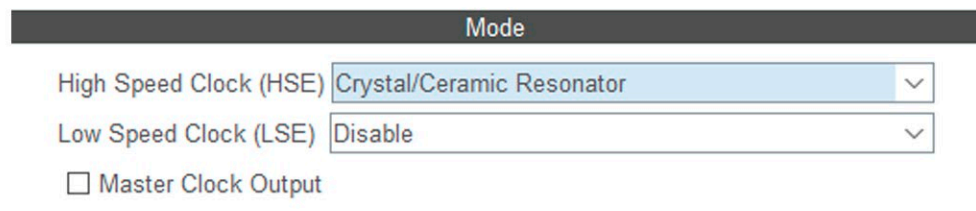
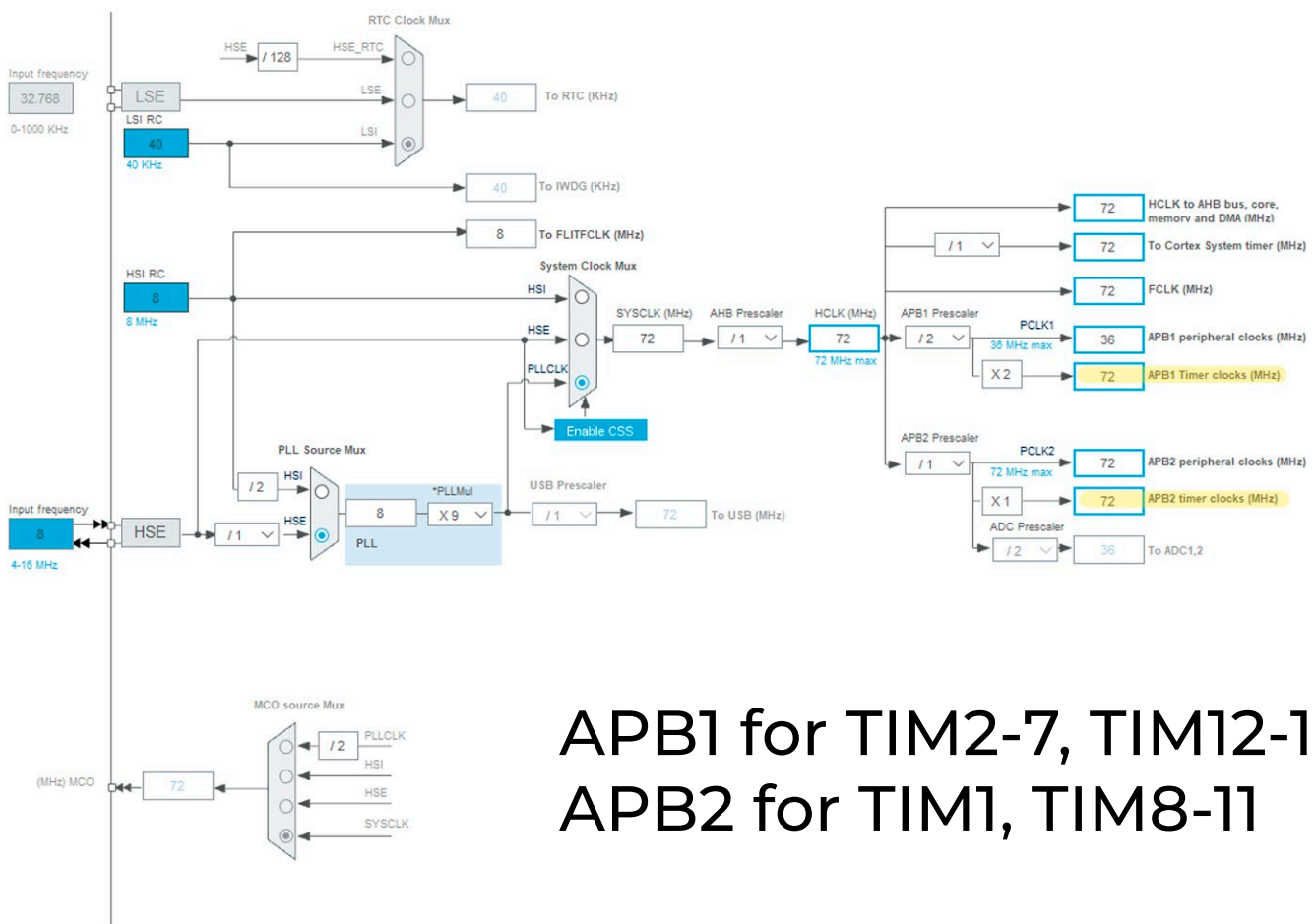


# Installing of a WS2812b library

1. Start your CubeMX Project, set debug and set RCC to External resonator.



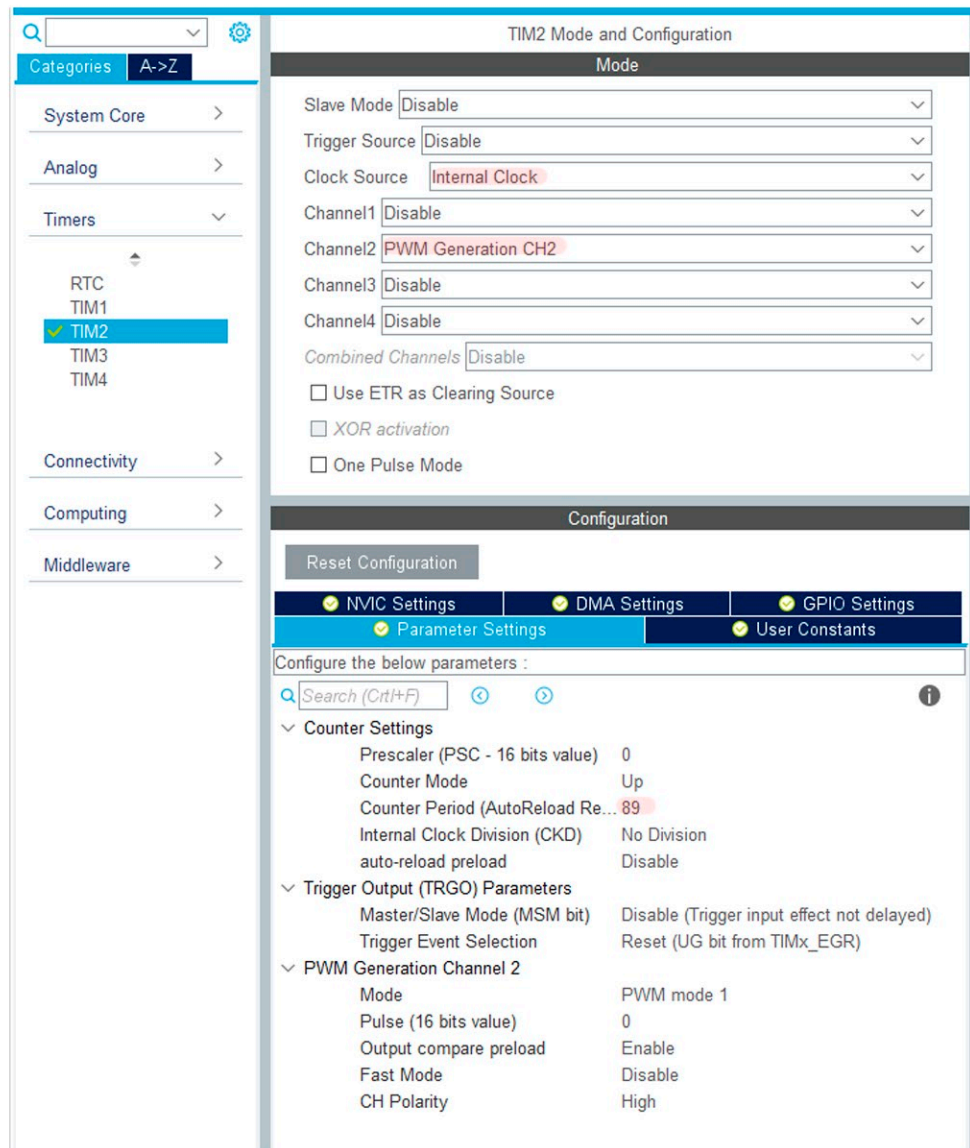
2. Set APBx clocks to 72 MHz



APB1 for TIM2-7, TIM12-14  
APB2 for TIM1, TIM8-11

# Installing of a WS2812b library

3. Configure preferred timer and channel.
4. Set Timer counter to 89.

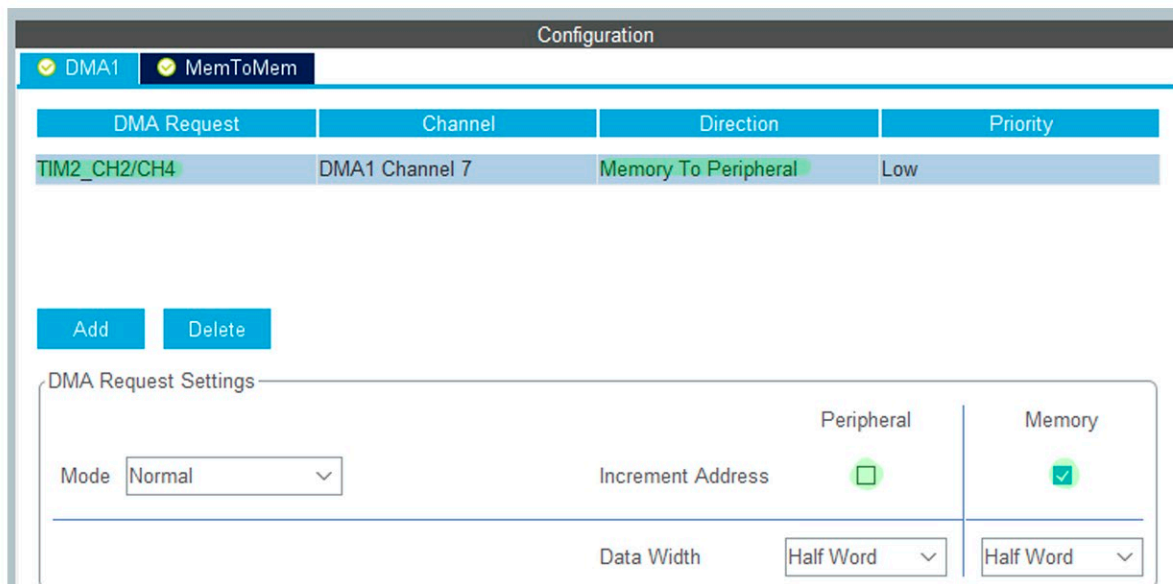


Why 89? You have 800 kHz LED signal freq. You need to divide APB clock by signal fq. APB speed is 72 MHz, i.e  $72 \times 10^6$  Hz.

$$\frac{72 \times 10^6 \text{ Hz}}{8 \times 10^5 \text{ Hz}} = 90 \Rightarrow 89, \text{ coz' variable starts from 0}$$

# Installing of a WS2812b library

## 5. Set up DMA channel.



## 6. Now save .ioc file and generate code.

## 7. Add the library to your source destination.

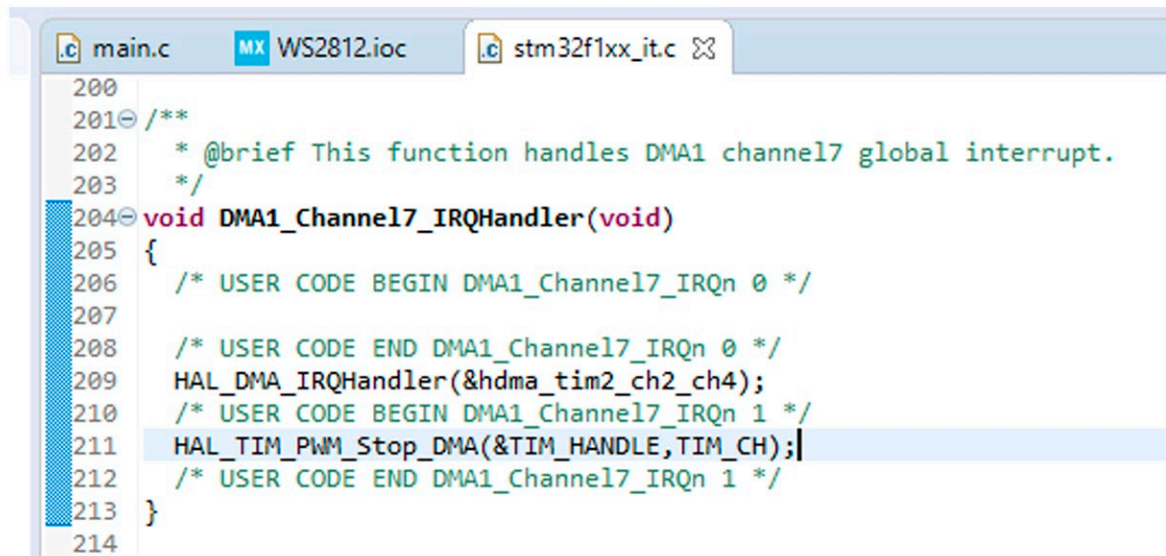
## 8. Search for stm32xxxx.c file.

## 9. Include lib header file.

```
main.c  WS2812.ioc  stm32f1xx_it.c
19  /* USER CODE END Header */
20
21  /* Includes -----
22  #include "main.h"
23  #include "stm32f1xx_it.h"
24  /* Private includes -----
25  /* USER CODE BEGIN Includes */
26  #include "ws2812.h"
27  /* USER CODE END Includes */
28
```

# Installing of a WS2812b library

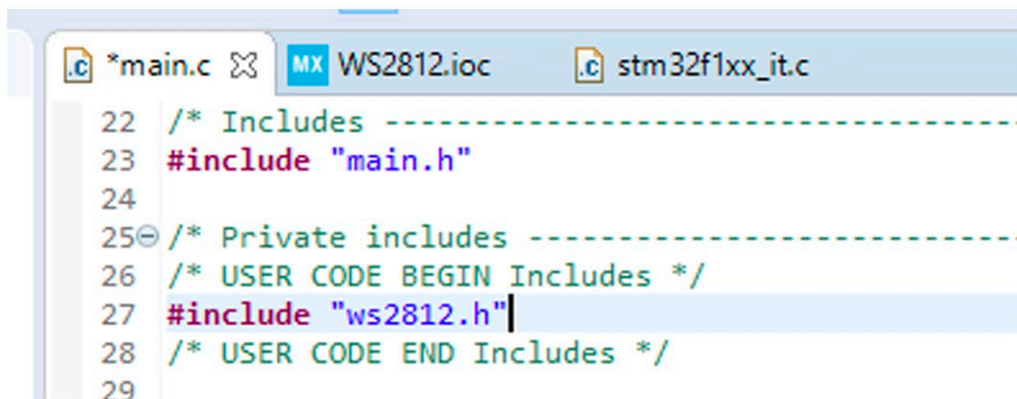
10. Search for your IRQ Handler and add:



```
.c main.c  MX WS2812.ioc  .c stm32f1xx_it.c  ⌕
200
201 /**
202  * @brief This function handles DMA1 channel7 global interrupt.
203  */
204 void DMA1_Channel7_IRQHandler(void)
205 {
206     /* USER CODE BEGIN DMA1_Channel7_IRQn 0 */
207
208     /* USER CODE END DMA1_Channel7_IRQn 0 */
209     HAL_DMA_IRQHandler(&hdma_tim2_ch2_ch4);
210     /* USER CODE BEGIN DMA1_Channel7_IRQn 1 */
211     HAL_TIM_PWM_Stop_DMA(&TIM_HANDLE, TIM_CH);
212     /* USER CODE END DMA1_Channel7_IRQn 1 */
213 }
214
```

`HAL_TIM_PWM_Stop_DMA(&TIM_HANDLE, TIM_CH);`

11. Add library to your main.c file.



```
.c *main.c  ⌕  MX WS2812.ioc  .c stm32f1xx_it.c
22  /* Includes -----
23  #include "main.h"
24
25  /* Private includes -----
26  /* USER CODE BEGIN Includes */
27  #include "ws2812.h"
28  /* USER CODE END Includes */
29
```

12. Now it is ready to work!

# Settings of a WS2812b library

1. All settings located in header file.
2. To change settings search for string 22.

```
21 //-----  
22 /*USR SETTINGS*/  
23 #define LED_COUNT 12           // Count of led in your strip  
24 #define BRIGHT 10             // 0-255  
25 #define TIM_HANDLE htim2      // use "htimX", where X is number of ur timer  
26 #define TIM_CH TIM_CHANNEL_2  // use "TIM_CHANNEL_X", where X is number of ur channel  
27 //-----  
--
```

3. In string 23 set up number of your LEDs.
4. In string 24 you can change brightness.
5. String 25 defines your timer handler, change only number of timer.

For example: if you use TIM2, it'll be htim2

6. String 26 defines number of your channel in HAL format.
7. Function reference located in readme.md