

# WS281x

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## Table of contents

### Contents

<b>1</b>	<b>How to use</b>	<b>2</b>
1.1	Required .ioc configuration . . . . .	2
1.2	Adding library . . . . .	2
1.3	Configuration file . . . . .	3
<b>2</b>	<b>Code description</b>	<b>3</b>

# 1 How to use

## 1.1 Required .ioc configuration

Make sure you have these set in your .ioc file:

- In project manager tick *Generate peripheral initialization as pair of '.c/.h' files per peripheral*
- Choose timer and channel which can use DMA
- Timer must be in mode *PWM Generation CHx* where x is number of chosen channel
- Set frequency to 800kHz (1.25  $\mu$ s period) on your timer using *Counter Period*. It's not recommended to have prescaler active.
- Add DMA request in DMA settings, choose direction to *Memory to Peripheral*, make sure data width is *Half Word* in Peripheral and Memory. Mode should be *Normal*
- if you use inverting logic level shifter, switch *CH Polarity* to Low

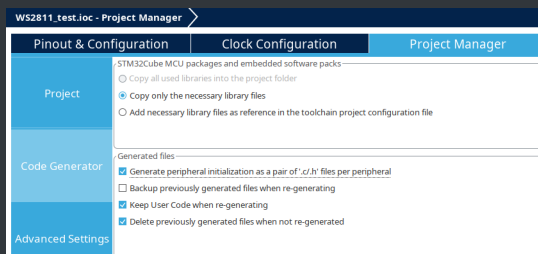


Figure 1: How to generate separated files

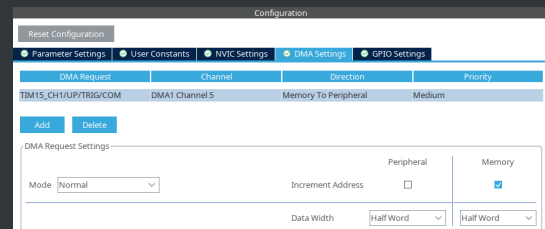


Figure 2: Sample DMA configuration

## 1.2 Adding library

Just follow these steps:

1. In command line (can be git bash or linux terminal) type:

```
1 git init
2 git submodule add https://github.com/MaciejZb66/ws281x.git
```

2. Refresh project by clicking F5
3. Add library path to build
  - 3.1. Left click on project and choose properties
  - 3.2. On left side choose *C/C++ General*, then *Paths and Symbols* and *includes*
  - 3.3. Click on add button and find folder **ws281x**
  - 3.4. In *Source Location* (still *C/C++ General* and *Paths and Symbols*) add folder **ws281x**
4. In file *main.h* add this line:

```
1 #include "led.h"
```

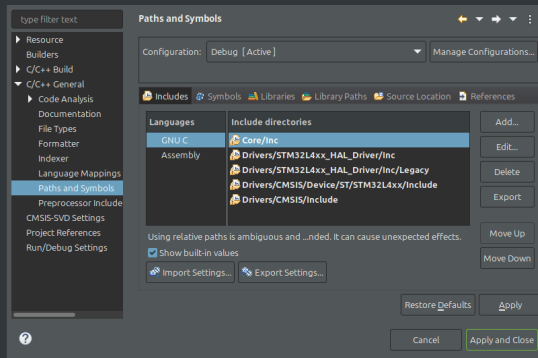


Figure 3: Add path to folder in includes

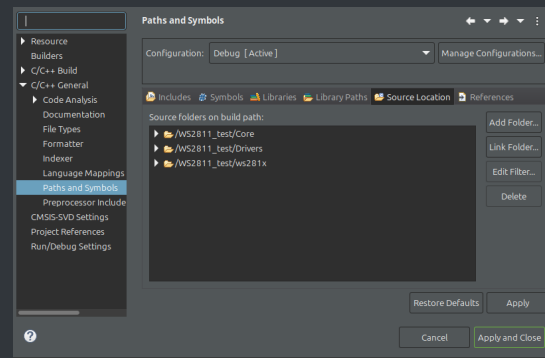


Figure 4: Add to source location

### 1.3 Configuration file

This library is default configured in *sample\_config.h* where we have:

```
1 #define STM_FAMILY_L4
2 #define WS_TIM_15
3 #define WS_CHANNEL_1
4 #define user_leds 24
```

To redefine configuration create your own configuration file. There must be defined:

- STM family
- used timer
- used channel of chosen timer
- number of LEDs (WS drivers connected to LEDs)
- `#define WS_CONFIG //required to exclude sample_config.h`

## 2 Code description

to be described later