

# Use of PWM on Microcontroller

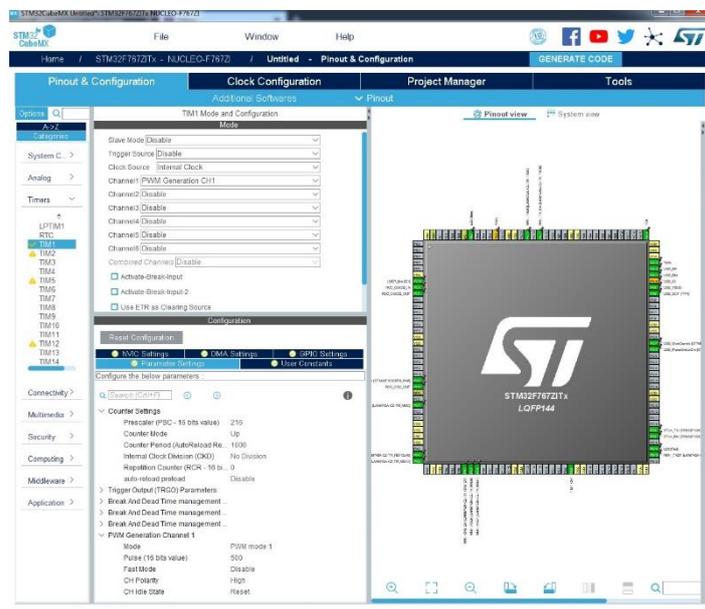
**Targeted competences:** Use of PWM for motor and/or servo motor control.

**Hardware:** STM32F7 Nucleo board

**Framework:** Atollic TrueStudio and CubeMX from STMicroelectronics

The aim of this example is to study how use a timer in PWM mode in order to control a servomotor. To change the angle rotation of the servo, we program a function that modifies the value of the PWM ratio.

The first step is to create the CubeMx project for the board that we will use. Here we use the NUCLEO STM32F767ZI board. We choose the channel 1 of the timer 1 to realize the PWM.



**FIGURE 1: CONFIGURATION OF THE TIMER 1**

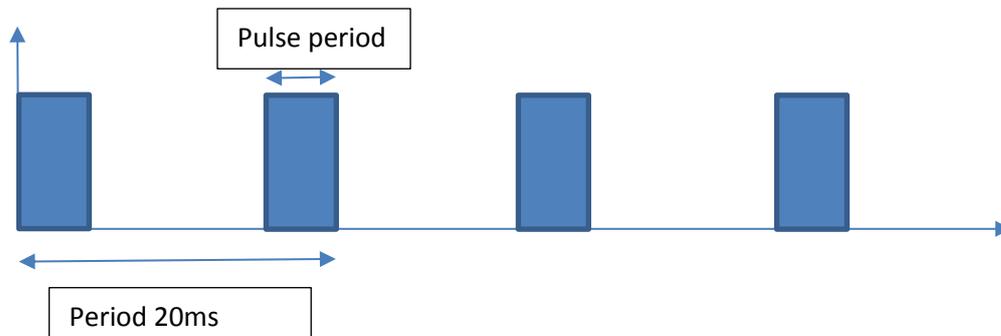
Here we must configure the value of the timer in order to generate a PWM frequency of 10KHz.

A video of the code behavior can be found here: <https://youtu.be/iJzUbFoKiw>

**Hardware:** STM32L053 Nucleo board

**Framework:** MDK ARM and CubeMX from STMicroelectronics

If you want to configure a PWM in order to pilot a servo you need to change the frequency of the generated signal and also change the pulse parameter to change the duty cycle. Often the PWM for a servo is the following:



For generic servo the frequency of the PWM is equal to 50Hz and for:

- Pulse of 1ms the angle is equal to  $0^\circ$
- Pulse of 1.5ms the angle is equal to  $90^\circ$
- Pulse of 2ms the angle is equal to  $180^\circ$

You need to read the datasheet of the servo in order to find the good values of the pulse parameter. In the servo PWM folder, you can find an example for a Fitec FS90 servo. In this example, I change the pulse value in order to obtain an angle value of  $-60^\circ$  then  $+60^\circ$  and finally  $0^\circ$ ; this pattern will be done all the time.

A video of the code behavior can be found here: <https://www.youtube.com/watch?v=XCW6yGi8-6w>