

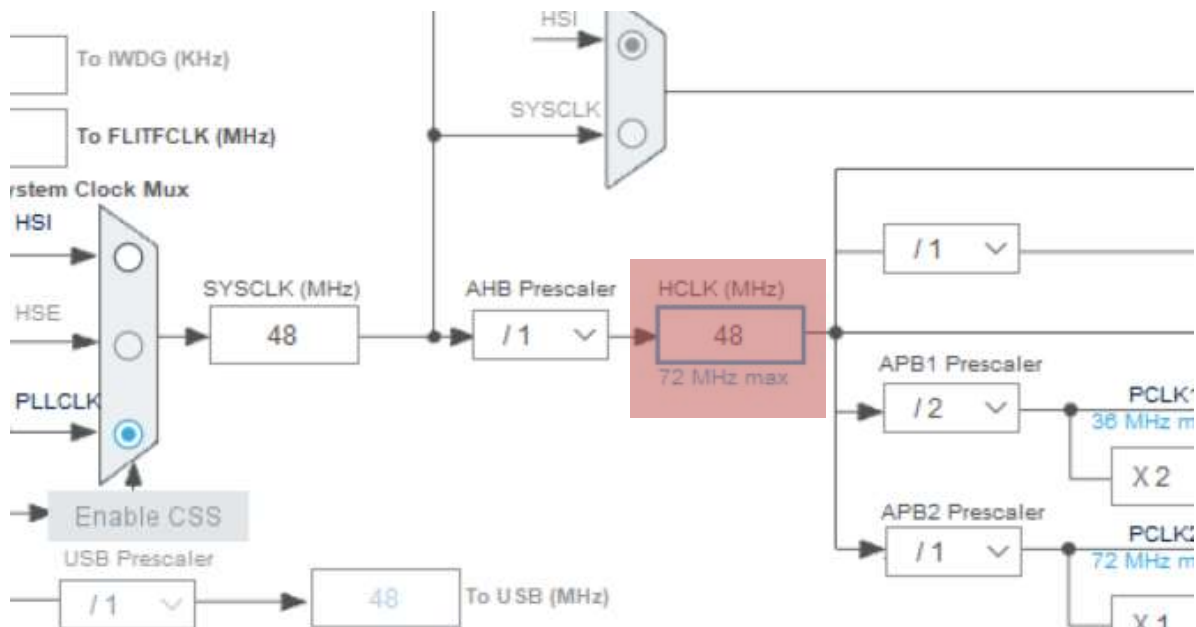


### توضیحات Period و Prescaler در مینی پروژه

به طور کلی در این پروژه ۳ تایمر داریم که با توجه به فرکانس هر کدام و فرمول زیر، مقادیر Period و Prescaler را محاسبه می کنیم.

$$Frequency = \frac{Clock}{(1 + Period) * (1 + Prescaler)}$$

\* Clock در برنامه به مقدار ۴۸ MHz در نظر گرفته شده است.





### توضیحات Prescaler و Period در مینی پروژه

➤ تایمر مربوط به Seven Segment با دوره تناوب ۴ میلی ثانیه

$$Frequency = \frac{Clock}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow \frac{1000}{4} = \frac{48 * 10^6}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow \begin{cases} Period = 191 \\ Prescaler = 999 \end{cases}$$

The screenshot displays the STM32CubeMX interface for configuring the TIM3 timer. On the left, the 'Timers' category is expanded, and TIM3 is selected. The main configuration window is titled 'TIM3 Mode and Configuration'. It is divided into two main sections: 'Mode' and 'Configuration'. In the 'Mode' section, several settings are visible: 'Slave Mode' is set to 'Disable', 'Trigger Source' is 'Disable', 'Clock Source' is 'Internal Clock', and all four channels (Channel1, Channel2, Channel3, Channel4) are set to 'Disable'. 'Combined Channels' are also set to 'Disable'. There are checkboxes for 'ETR IO as Clearing Source', 'XOR activation', and 'One Pulse Mode', all of which are currently unchecked. The 'Configuration' section includes a 'Reset Configuration' button and three tabs: 'User Constants', 'NVIC Settings', and 'DMA Settings'. The 'Parameter Settings' tab is active, showing a search bar and a list of parameters to configure. Under 'Counter Settings', the 'Prescaler (PSC - 16 bits value)' is set to 191, 'Counter Mode' is 'Up', 'Counter Period (AutoReload)' is 999, 'Internal Clock Division (CKD)' is 'No Division', and 'auto-reload preload' is 'Disable'. Under 'Trigger Output (TRGO) Parameters', the 'Master/Slave Mode (MSM bit)' is set to 'Disable (Trigger input effect not delayed)'.



## توضیحات Prescaler و Period در مینی پروژه

➤ تایمر مربوط به Buzzer با فرکانس ۲۰ هرتز

$$Frequency = \frac{Clock}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow 20 = \frac{48 * 10^6}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow \begin{cases} Period = 2399 \\ Prescaler = 999 \end{cases}$$

**TIM6 Mode and Configuration**

**Mode**

- ☒ Activated
- ☐ One Pulse Mode

**Configuration**

Reset Configuration

☒ User Constants ☒ NVIC Settings ☒ DMA Settings

☒ Parameter Settings

Configure the below parameters :

Search (Ctrl+F)

Counter Settings

- Prescaler (PSC - 16 bits value) 2399
- Counter Mode Up
- Counter Period (AutoReload ...) 999
- auto-reload preload Disable

Trigger Output (TRGO) Parameters

- Trigger Event Selection Reset (UG bit from TIMx\_EGR)



## توضیحات Prescaler و Period در مینی پروژه

➤ تایمر مربوط به LED با دوره تناوب ۵ میلی ثانیه

$$Frequency = \frac{Clock}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow \frac{1000}{5} = \frac{48 * 10^6}{(1 + Period) * (1 + Prescaler)}$$

$$\Rightarrow \begin{cases} Period = 239 \\ Prescaler = 999 \end{cases}$$

