

Task 5. PWM (Pulse-Width Modulation)

AMM embedded course

Links

- stm32_reference_manual.pdf - 17.3.10 PWM mode (Advanced-Control Timers)
- https://en.wikipedia.org/wiki/Pulse-width_modulation
- <http://microtechnics.ru/stm32-uchebnyj-kurs-tajmery-chast-2/>
- <http://visualgdb.com/tutorials/arm/stm32/pwm/>
- http://chipSPACE.ru/httpchipSPACE-rustm32-general-purpose-timers-3-pwm-stdperiph_lib/

Timer with PWM mode

- Pulse Width Modulation mode allows you to generate a signal with a frequency determined by the value of the TIMx_ARR register and a duty cycle determined by the value of the TIMx_CCRx register:
- In the PWM mode the timer controls the output of 1 or more output channels. When the counter value reaches 0, maximum or a **compare value** defined for each channel, the output value of the channel can be changed. Various configuration options define which events change the value and how it is changed.

Task 5.1. Different LED brightness without PWM

- Use usual scheme of LED output
- Use delay cycle to control brightness (turn LED on – delay – turn LED off)
- Decrease delay by pressing the button

Task 5.2. Different LED brightness with PWM

- Find appropriate pin for Alternate Function output – Timex X Channel Y (check STM32F4 datasheet)
- Init the pin with AF mode (GPIO_PinAFConfig())
- Init timer for this pin+channel with OCmode == TIM_OCMode_PWM1 (TIM_OC1Init(), TIM_OC1PreloadConfig(), TIM_ARRPreloadConfig(), TIM_Cmd())
- Regulate the brightness via TIMx->CCRx value