

- b. Explain what GPIO pins need to be configured in order to use the center and left switches on the joystick as inputs.
We need to configure GPIO PA0 and GPIO PA1. We can tell this from looking at the diagram.
- c. Explain what needs to be configured on each of the GPIO pins.
We have to enable the clock (RCC_AHB2ENR_GPIOAEN), configure the mode as input (GPIO_MODER for GPIOA), and we need to make sure all pins are pull down (using PUPDR).

2) You will need to configure a timer to support the stopwatch. We are going to use Timer 16 and set it to interrupt every 100ms. The system clock and the timer clock will be set to 20MHz. What values should be used for the prescaler and the counter period registers?
Once every 100ms = 10hz; x=prescaler, y=counter period; both must be 0 < here < 65535.

$$20000000/(2*(xy))=10 \rightarrow xy=1000000$$

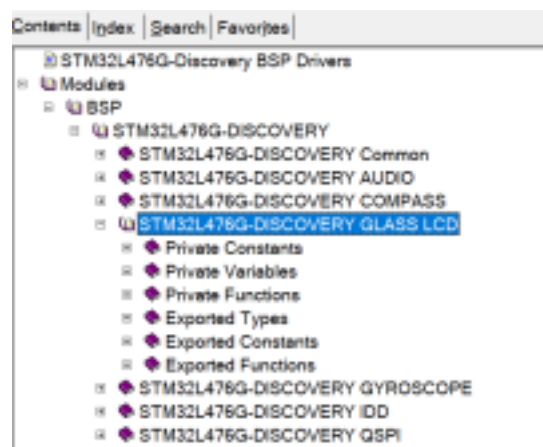
I choose $x = 20000$, and $y = 50$. But we have to do the minus one thing so the actual value in the registers is: **prescaler = 19999**, and **counter period = 49**.

- 3) You are also going to use the LCD. We are going to access it through the BSP libraries. The BSP LCD driver specifications are in the BSP manual. It is super finicky though. I suggest you copy the entire BSP directory to your own computer or account and use your local copy.

The manual is a file that you should be able to open with a browser. The file is called `BSP\STM32L476G-Discovery\STM32L476G-Discovery_BSP_User_Manual.chm` If you cannot get it to work, there is a PDF version (`BSP Glass Documentation.pdf`) in the Lab Handouts directory.

Open that manual and find the section on Glass LCD

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Go to the Exported Functions section. These are the functions we will use.

Answer the following questions:

- 1) How many functions are exported in the BSP_LCD_GLASS API?

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2) What parameters must be supplied to BSP_LCD_GLASS_Init() ?

None; it is void yo.

3) Which of those functions write to the frame buffer? List them.

BSP_LCD_GLASS_BarLevelConfig

This is the only function that actually says it WRITES to the frame buffer: “Configure the bar level on LCD by writing bar value in LCD frame buffer”. Other functions deal with frame buffer or RAM buffer but only BarLevelConfig writes to the frame buffer.