

# STM32 COURSE



Activar Windows  
Ve a Configuración para activar Windows

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002 GPIO In Out

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# SECTION 2

## 002 GPIO In Out



### What will we learn?

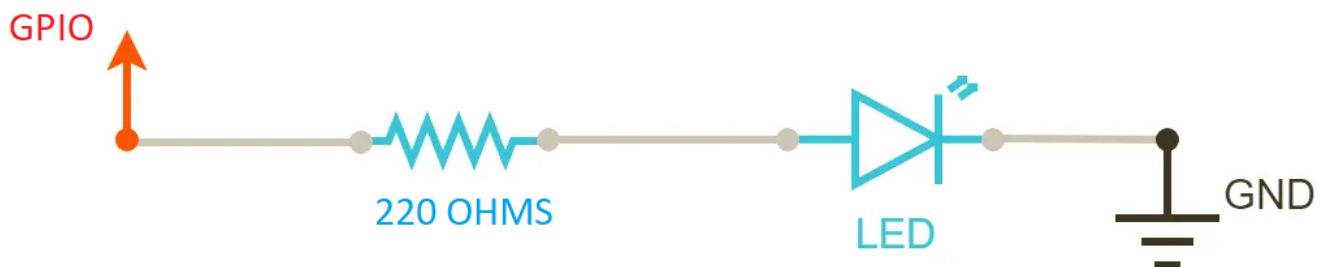
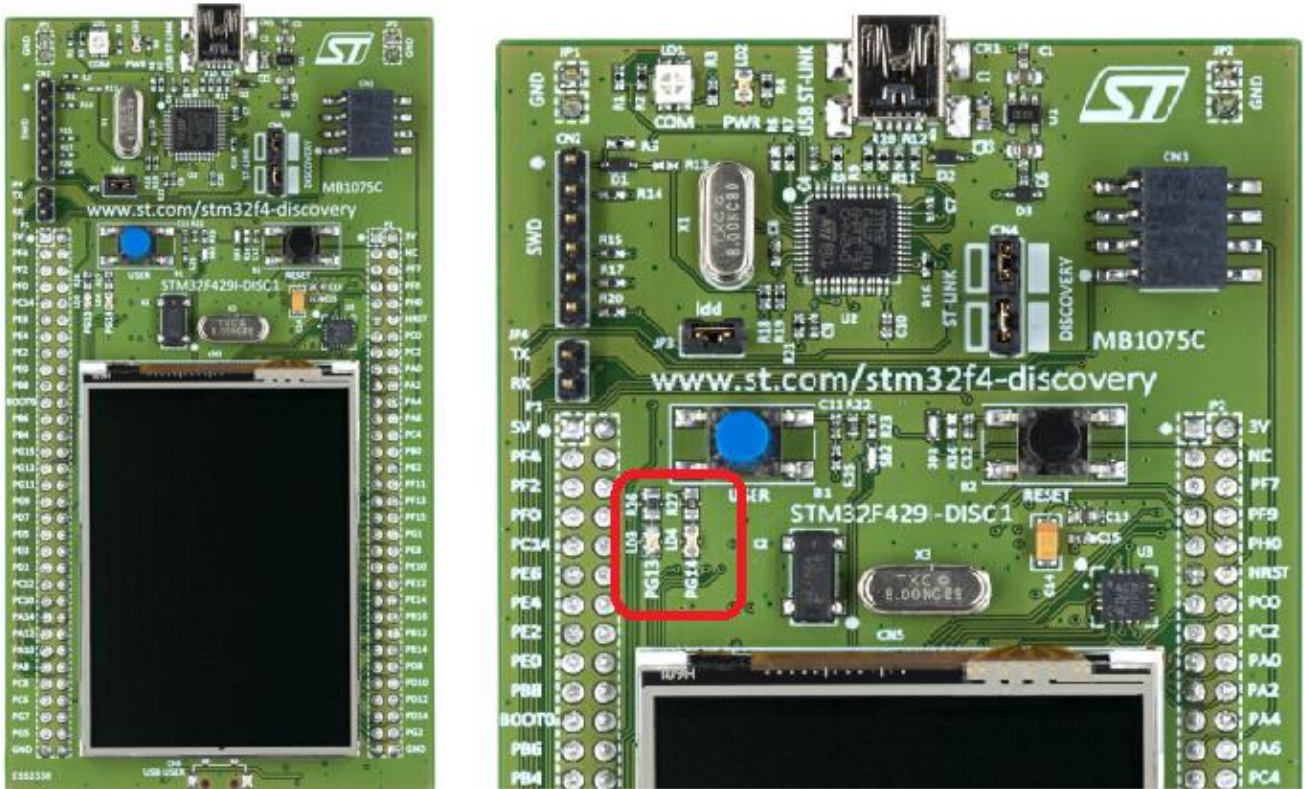
In this video we will generate from scratch a program to test the functionality of the GPIOs in digital function, to demonstrate the operation of the outputs we will use the LED diode of the STM32F429 Discovery card (Almost all STM32 cards have an LED diode connected to one of their outputs and a Push Button to another GPIO), in addition to the Push Button (Blue Button) of the same.

***“We will use HAL Drivers, which will help us greatly to port and recycle code routines from one processor of one Family to another of another Family.”.***



## Key points

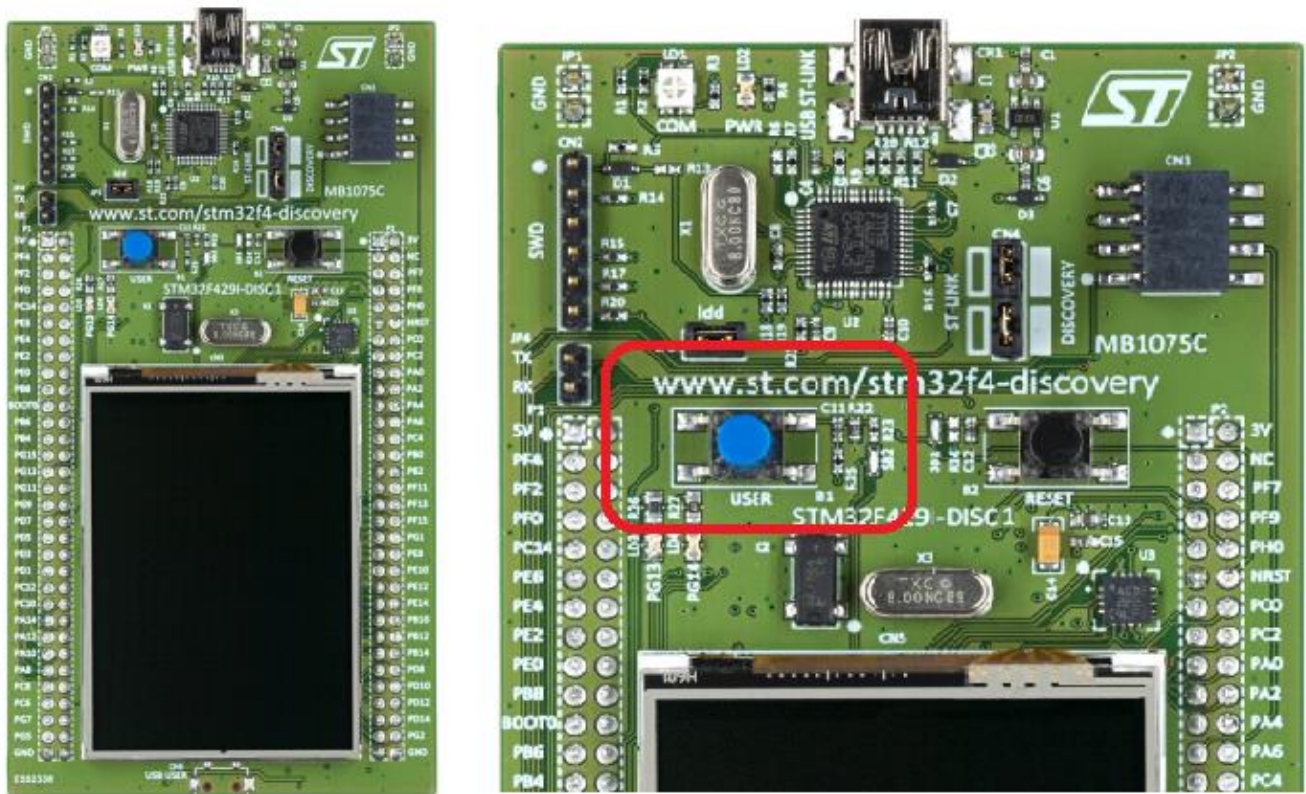
### LED OF THE BOARD OR CIRCUIT TO BE MADE



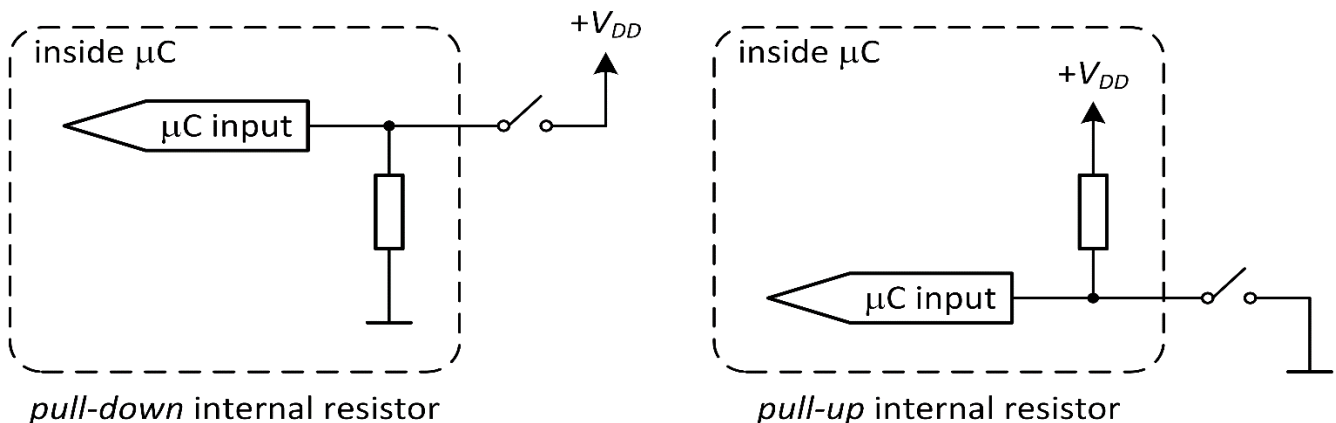
On this card we have 2 LEDs available to turn them on, connected to GPIOs PG13 and PG14, these diodes are ready to be energized and appreciate their brightness (They have their respective current limiting resistor).

If we use a card or a design that does not have a Led for the example, we can implement it with the attached diagram.

## ENTRY BUTTON

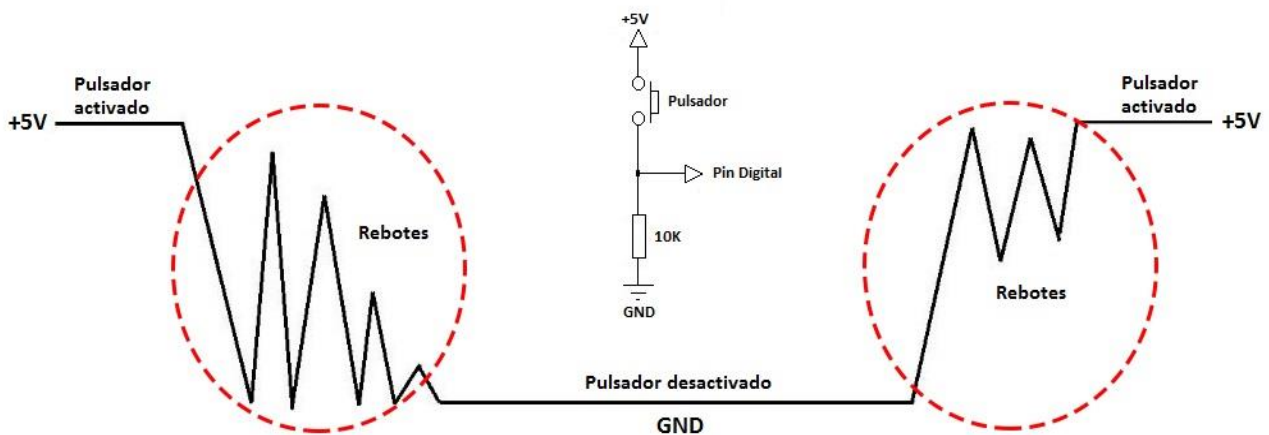


We can also use the Blue Button, the same one that has a Pull Down resistor on the card, despite this, for learning purposes, the internal Pull Down resistor of the microcontroller will be enabled. We can also enable the internal Pull Up (One at a time) which in a design can save us resources, take into account the values of these resistors to consider in your project.



If we use the internal resistors, the test assembly is simplified to the need for only one Button.

## INPUT FILTERING



In the case of reading inputs, precisely after the `HAL_GPIO_ReadPin()` line; a small delay of 50 mS is placed, this delay is to discriminate the noise or rebounds presented by this type of mechanical actuation elements, it is normally considered that a pushbutton takes about 50 mS to fully open or close its internal contact, as we have a high-speed processor these pulse trains could cause problems in a project, we must avoid using this delay that is not efficient at all since while the processor does it, the processor uses it to count time and nothing else which can make We lose events that may occur at that moment, to avoid this waste of processing it is recommended to use input filters by counters that increase or decrease a variable a defined amount of time to really assume if the GPIO has changed state or is simply a problem. small noise from the electrical network that usually present or in turn noise due to faulty buttons.