This document outlines essential safety rules and best practices to help you protect your STM32 and some other electrical components from accidental damage. By following these guidelines, you will reduce the risk of hardware failure, keep your workspace safe, and maintain a smooth workflow throughout the workshop.

Short Circuit:

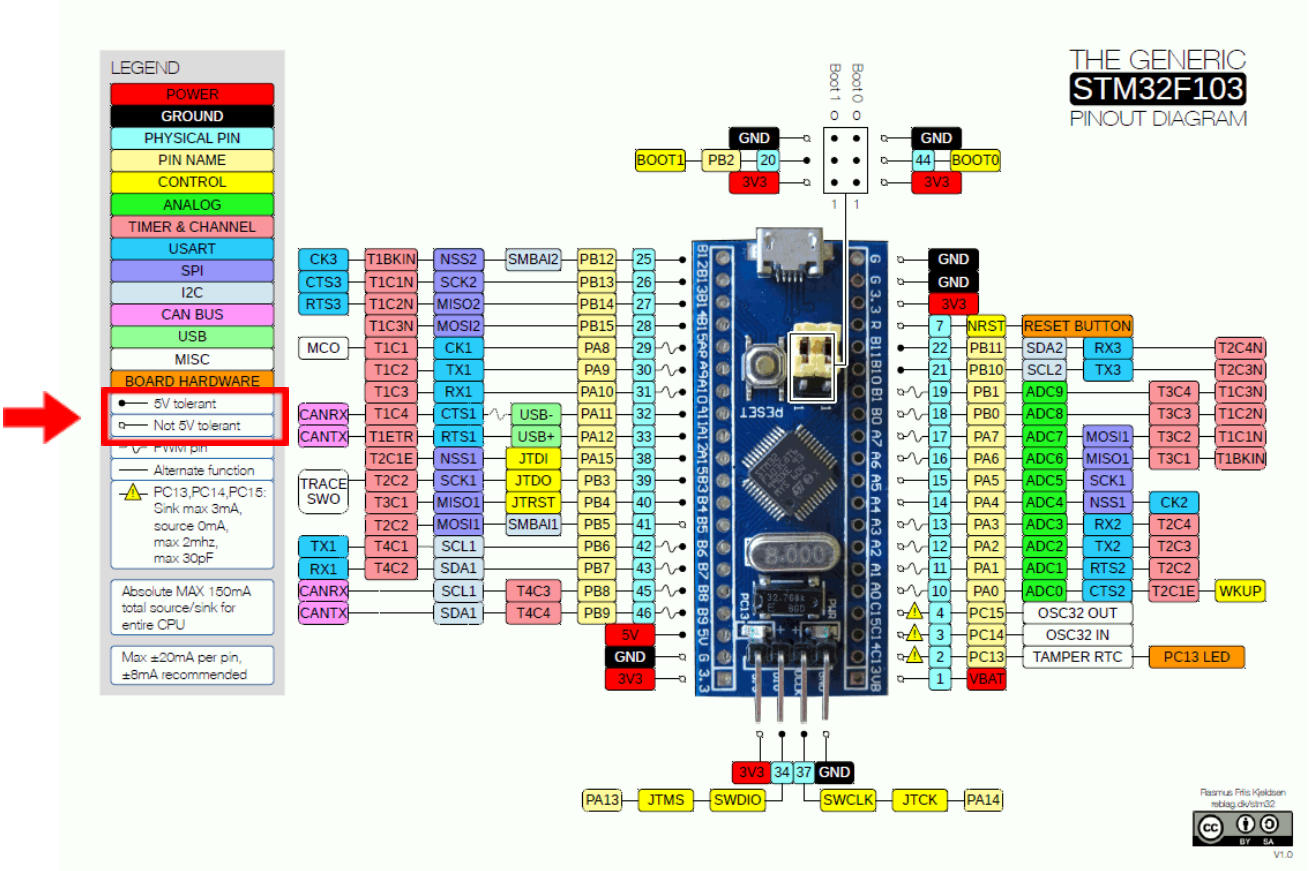
A short circuit happens when the power line (Vcc) is directly connected to the ground line (GND) without passing through any load (like a resistor or component). This causes a sudden high current flow, which can overheat components, cause fire, and burn the electrical components.

Note: avoiding short circuits is not to protect your electrical components, but it is also and more importantly to protect you and your workspace.

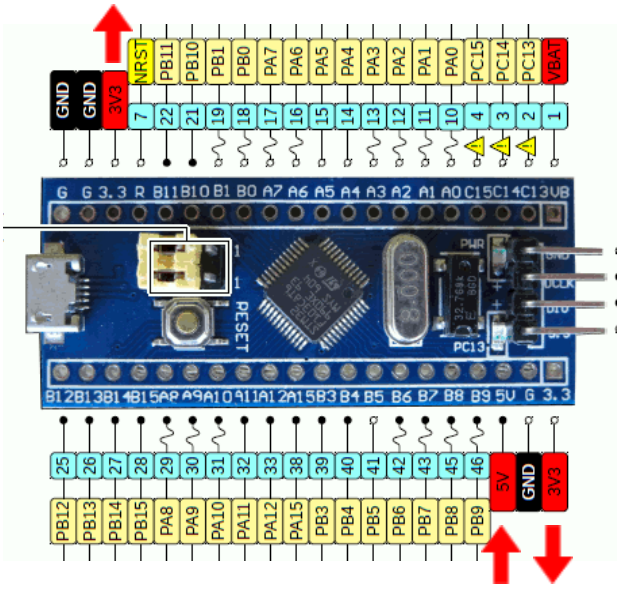
STM32:

- **Avoid Direct Power–Ground Connections:** Never connect any power line (**Vcc**) directly to the ground (**GND**). This will cause a short circuit and may burn the board.
- **Don't Use a Multimeter on a Powered Board:** Avoid measuring resistance or continuity on the board while it is powered on — this can damage the board and the multimeter.
- **Keep the Board Off Metal Surfaces:** Placing the STM32 directly on a metal table or case can cause accidental short circuits. Use a non-conductive surface like wood, plastic, or an anti-static mat.
- **Avoid Multiple Power Sources:** Never power the STM32 from more than one source at the same time (e.g., adapter + TTL cable). This can create voltage conflicts and damage the board.

- **Avoid Overvoltage on Non-5V-Tolerant Pins:** Do not connect a 5V signal source to any STM32 pin that is not 5V-tolerant. Doing so may damage the pin or even the microcontroller's internal circuitry. This may happen when the power supply of the input components (Potentiometer, Joysticks and buttons) is 5V, and the output signal of the component is connected to a Non-5V-Tolerant pin in the STM32.



- **Power source connection:** Take note that you **ONLY** can use the **5V pin** or the **USB port** as the input power supply pin. The 3.3V pins will be used as an output supply from the STM32. You may power the board using one of the following methods:
    - Using the AC-to-DC adapter provided in your KIT (5V).
    - Using the TTL cable provided in your KIT (5V).
    - Using any available micro-USB cable.



Make sure to always keep the 5V and 3.3V power lines separated from each other, as connecting the 5V line to the 3.3V line will damage or burn the 3.3V pin.

Potentiometer:

- When wiring a potentiometer, always connect the **power (Vcc)** and **ground (GND)** along with the **output pin** to the circuit.
- If you connect only power and ground without the output, you create a direct short circuit between Vcc and GND.

Servo motor:

- **Avoid Manually Forcing the Servo Shaft:** Do not try to manually rotate or force the servo motor shaft or gears. Servo motors have delicate internal gears that can break easily when forced by hand.
- **Do Not Block the Servo While Moving:** Avoid physically blocking the servo motor shaft during operation. This can cause the servo to draw its maximum current, potentially overheating and damaging the servo, and in some cases causing overcurrent that may harm the STM32 board.