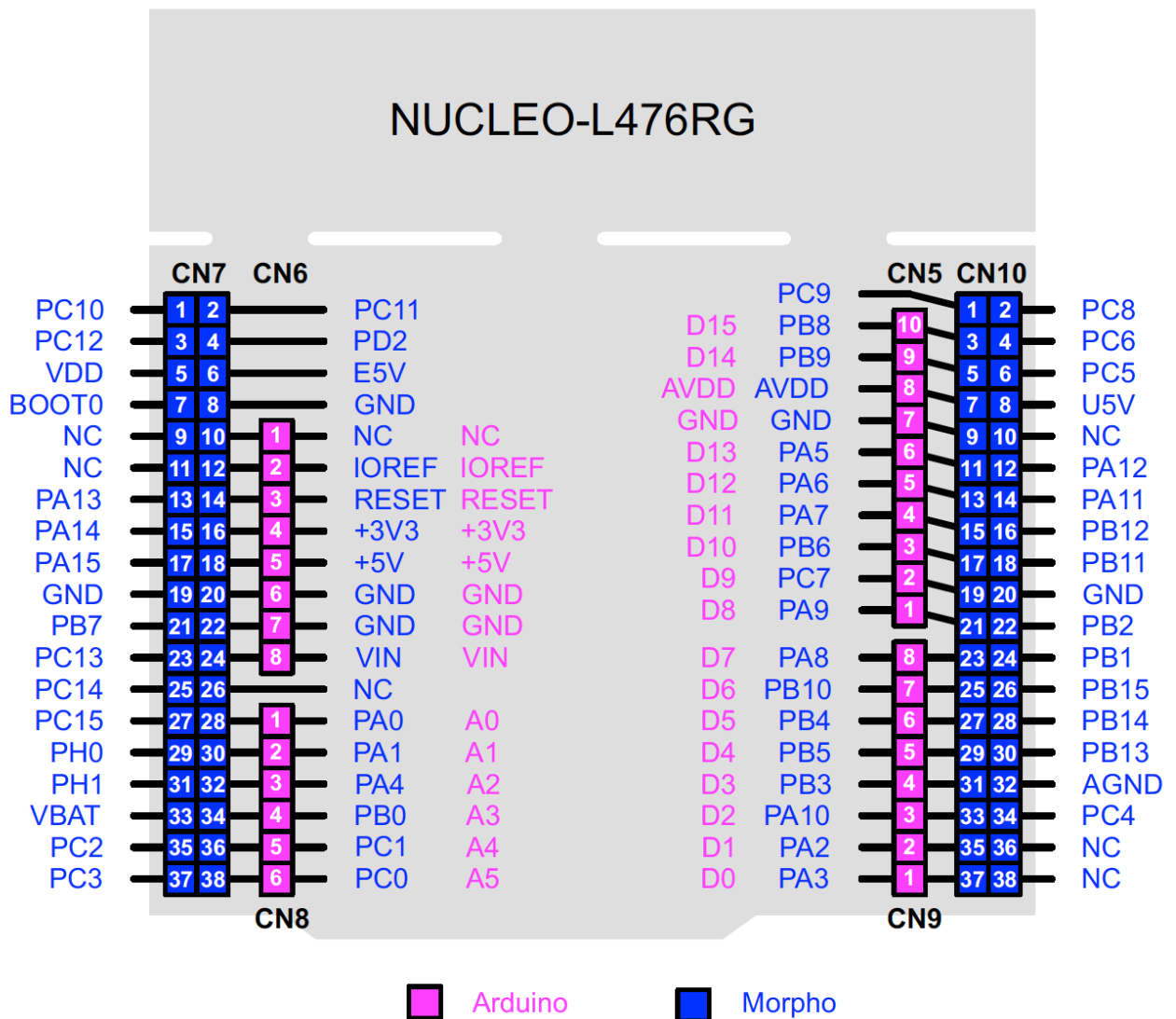


Appendix A: Pin Connections on Nucleo-64 board

This diagram is common for both Nucleo-L476RG and Nucleo-L446RE

Board Component	Microcontroller Pin	Comment
Green LED	PA 5	SB42 closed and SB29 open by default
Blue user button	PC 13	Pulled up externally
Black reset button	NRST	Connect to ground to reset
ST-Link UART TX	PA 2	STLK_TX
ST-Link UART RX	PA 3	STLK_RX
ST-Link SWO/TDO	PB 3	Trace output pin/Test Data Out pin
ST-Link SWDIO/TMS	PA 13	Data I/O pin/Test Mode State pin
ST-Link SWDCLK/TCK	PA 14	Clock pin/Test Clock pin

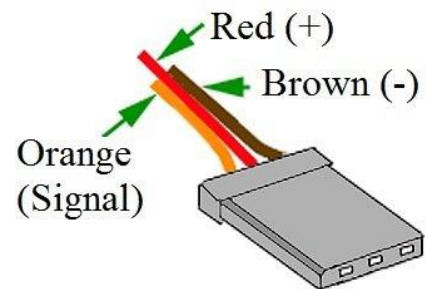


Appendix B: Servo Motor

The green LED is connected to the GPIO pin PA 5. The following table shows the Alternate functions available for the pin. PA 5 can work as TIM2_CH1, TIM2_ETR, TIM8_CH1N, or LPTIM2_ETR. In

The key difference between a servo motor and a stepper motor is that the servo motor is controlled by a closed-loop system that uses position feedback to perform self-adjusting. A servo motor has an internal position sensor, which continuously provides position feedback. However, a stepper motor typically is an open-loop system which no built-in position sensor.

A servo motor is preferred in applications that require higher speed. A stepper motor is often used in applications that need higher holding torque.



In this lab, we will use SG90 servo motor. It can rotate approximately 180 degrees, with 90 degrees in each direction. The operating speed is 0.12sec/60 degrees (4.8V, no load). The motor has three wires, red wire for +5V, brown for ground, and orange for the PWM control signal.

The position is controlled by the pulse width, as shown below.

- A pulse of 1.5 ms makes the motor return to the middle (0 degree)
- A pulse of ~1 ms makes it rotate all the way to the left (-90 degrees)
- A pulse of ~2 ms makes it rotate all the way to the right (90 degree)

