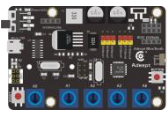# Lesson 1 How to control the Servo

In this lesson, we will learn how to control the Servo.

1.1 Components used in this course

Components	Quantity	Picture
Adeept Arm Drive Board	1	
Micro USB Cable	1	
Servo	1	

## 1.2 The introduction of the Servo

1.2.1. Servo

Servo motor refers to the engine that controls mechanical component operation in the servo system. It is a kind of auxiliary motor indirect transmission device. The servo motor is a gear motor that can rotate only 180 degrees. It is controlled by sending pulses from the microcontroller. These pulses control where the motor turns. The servo motor system includes housing, circuit board, non-core motor, gearing and position detection. Servo motor is shown in the figure:
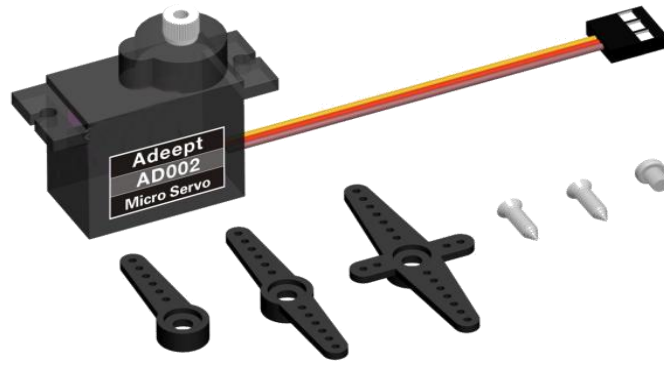
1.2.2. The working principle of the Servo

The servo mechanism is an automatic control system that enables the object's position, orientation, state and other output-controlled quantities to follow arbitrary changes in the input target (or given value). The servo mainly depends on Pulsefor location. Basically, it can be understood that the servo motor receives an impulse and rotates the angle corresponding to the impulse to realize displacement. Because the servo motor itself has the function of sending out pulses, the servo motor rotates every time at an angle, and a corresponding number of pulses will be sent out. In this way, the pulses received by the servo motor form a response, or a closed loop. In this way, the system will know how many pulses are sent to the servo motor and how many pulses are received. In this way, it is possible to precisely control the rotation of the motor, thereby achieving precise positioning.

Adeept Arm Drive Board sends a PWM signal to a servomotor, which is then processed by an IC on the circuit board to calculate the rotation direction of the drive motor, which is then transmitted through a reduction gear to the swing arm. At the same time, the position detector returns a position signal to determine whether the set position has been reached or not.

| pulse width (frequency=50Hz)		Rotation angle	
	0.5ms		0°
	1ms		45°
	1.5ms		90°
	2ms		135°
	2.5ms		180°
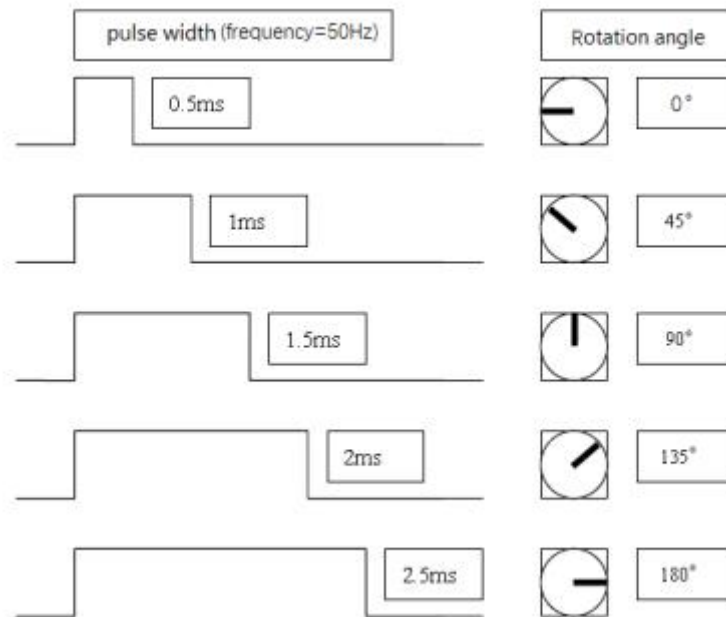
1.2.3. The principle of write () function

In the program, we use the write() function to control the rotation of the servo. For standard servos, the write() function will rotate the servo axis to the corresponding angular position. For the continuous rotation type of servo, the write() function can set the rotation speed of the servo (0 indicates that the servo rotates at full speed in one direction, 180 indicates that the servo rotates at full speed in another direction, and 90 indicates that the servo is stationary). The servo which is used this time is a standard servo.
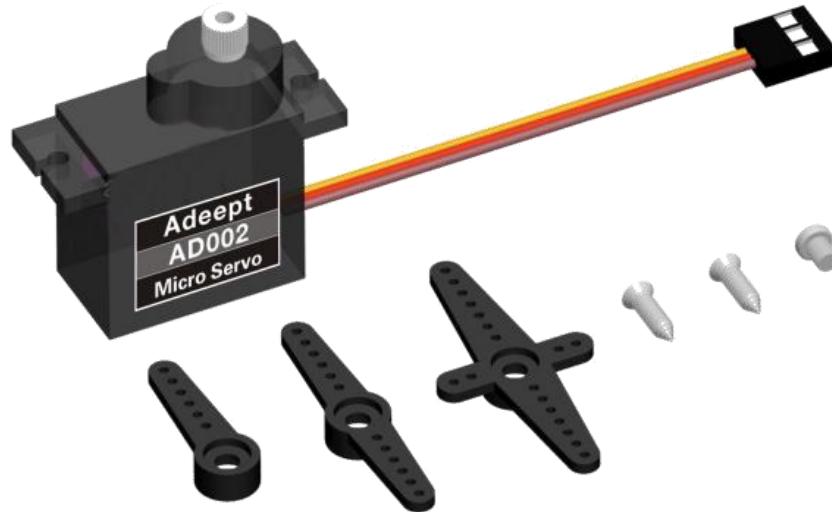
1.3 Wiring diagram (Circuit diagram)

Connect Servo to the servo port on the Adeept Arm Drive Board, as shown below:
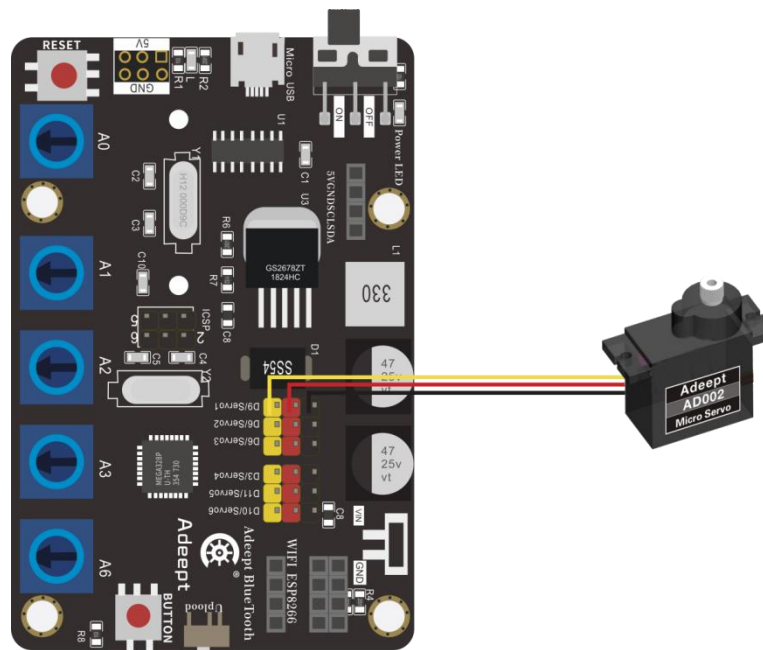
## 1.4 How to control Servo

1. Before performing the following steps, make sure that the "block_py.ino" program has been uploaded. (If not, please upload the "block_py.ino" program)

2. Connecting GwBlock graphical editor. (See" 1 Building the GwBlock Graphical Programming Development Environment")

http://www.adeept.com/gwblock/?hd_mo=ADA031

3. Import the program in GwBlock

3.1 After successfully connecting to the GwBlock graphical editor, you need to click the drop-down button in the upper right corner, as shown bellow:
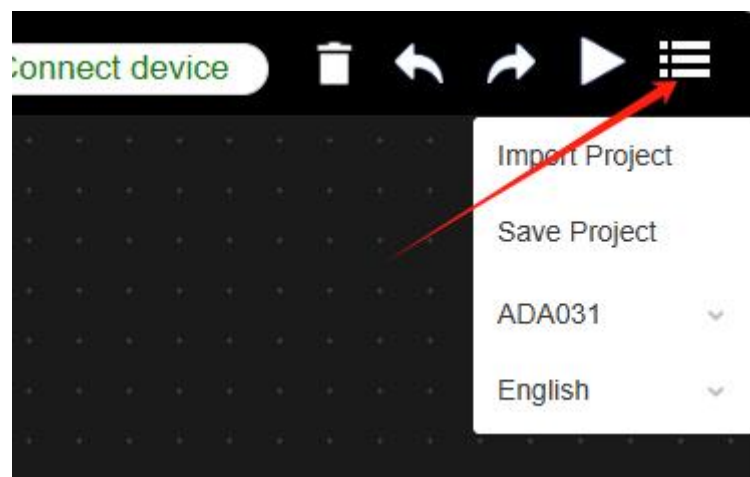

3.2 Then click Import project file to import the external project file. After opening it, a blank page will appear. You need to make a modification in the lower right corner and select All Files, as shown below:
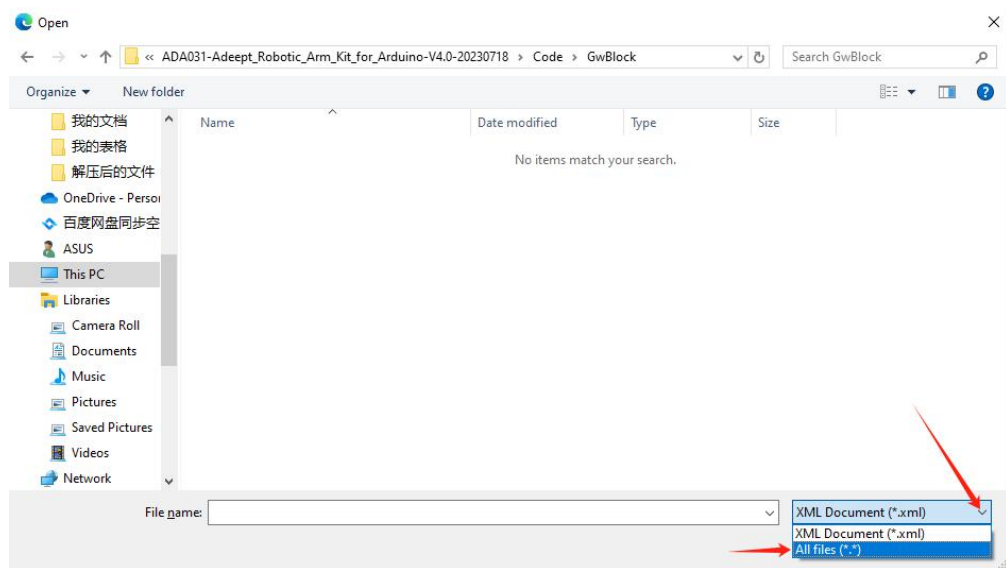
3.3 Then the folder will be displayed and find the user folder
"Adeept_Robotic_Arm_Kit_for_Arduino-V4.0\Code\GwBlock". Open the
GwBlock folder and select the "1_Servo_Control.gwblock" file. This file is our
graphical code program for this lesson. Click "Open" in the lower right corner.
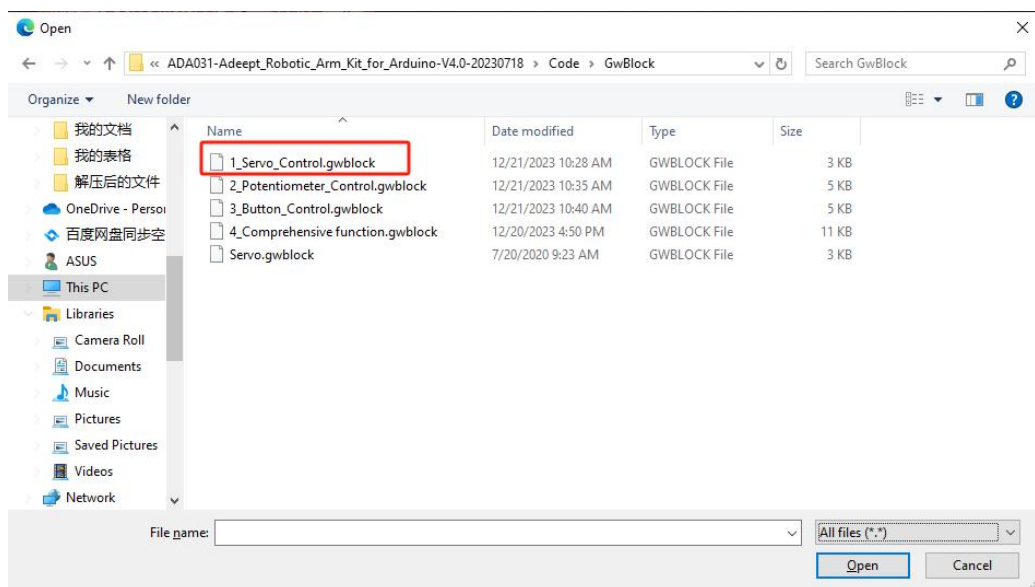
3.4 Click OK.

www.adeept.com says

The imported project file will replace the current programming area
content. Do you want to replace it?

OK   Cancel

Setup
Initialize Servo Motor : ID 0 , PIN 9
Initialize Servo Motor : ID 1 , PIN 6
Initialize Servo Motor : ID 2 , PIN 5
Initialize Servo Motor : ID 3 , PIN 3
Initialize Servo Motor : ID 4 , PIN 11
Delay 1 Second (s)
Servo Motor Control : ID 0 , Angle 0
Servo Motor Control : ID 1 , Angle 40
Servo Motor Control : ID 2 , Angle 180
Servo Motor Control : ID 3 , Angle 90
Servo Motor Control : ID 4 , Angle 70
repeat 5 times
do
Servo Motor Control : ID 0 , Angle 90
Delay 1 Second (s)
Servo Motor Control : ID 0 , Angle 0
Delay 1 Second (s)

1.5 Run

Click the button in the upper right corner, after successfully running the program, you can see all servo angles are 90 degrees, and then the servo underneath rotates back and forth. Exit the program after 5 seconds.