

## Lesson 6 Adjust Bus Servo Speed

### 1. Working Principle

On the basis of communication protocol, send ID, rotation angle or time commands to control the rotation speed of bus servo.

Then adjust the speed by modifying the angle and time parameters, so that when the rotation angle of servo is the same, the less the time, the faster the rotation speed.

The source code of program is located in

`/home/ubuntu/arduino_pro/src/arduino_pro_demo/expansion_board_demo/BusServo_Speed.py`.

```
1 import time
2 import Board
3
4 print("""
5 *****
6 *****Function: Hiwonder Raspberry Pi expansion board. Servo Variable Speed Routine*****
7 *****
8
9 Official website:https://www.hiwonder.com
10 Online mail:https://hiwonder.tmall.com
11
12 Tips:
13 * Press "Ctrl+C" to close the running program. If fail to close, please try several times!
14
15 """)
16
17 while True:
18     # Parameter: parameter 1: servo ID; parameter 2: position; parameter 3: running time
19     # The rotation of servo ranges 0°-240° corresponding to 0-1000, that is, the range of parameter 2 is 0-1000.
20
21     Board.setBusServoPulse(2, 800, 1200) # The ID2 servo rotates to 800 in 1200ms
22     time.sleep(0.5) # delay 0.5s
23
24     Board.setBusServoPulse(2, 200, 300) # The ID2 servo rotates to 200 in 300ms
25     time.sleep(0.5) # delay 0.5s
```

Control bus servo by calling `setBusServoPulse()` function under Board library.

Take the code “`Board.setBusServoPulse(2, 800, 1200)`” as example:

The first parameter “2” is the port number of the connected bus servo. The port number here is 2.

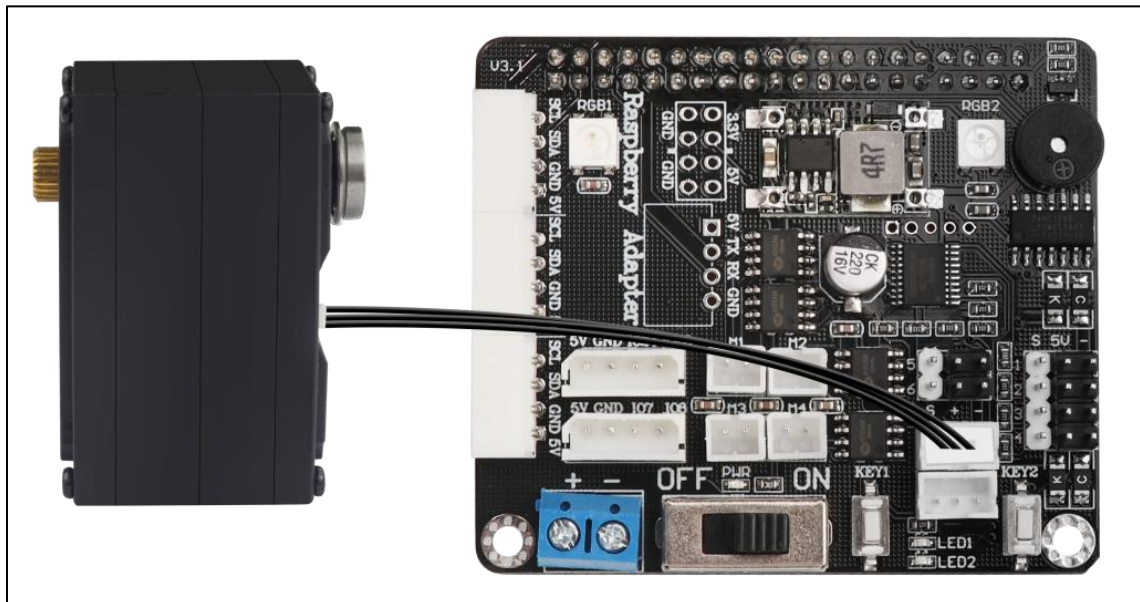
The second parameter “800” is the rotation position, which is converted by angle conversion formula.

The third parameter “100” is the rotation angle (the unit is ms). Here is 1000ms. Control the rotation speed of servo by setting the rotation time. The shorter the time, the faster the rotation speed.

## 2. Preparation

### 2.1 Hardware Wiring

Connect single bus servo only to one of bus servo ports on expansion board. Take LX-15D servo as example.



**Reminder: The wire of bus servo uses anti-reverse plug. Please do not insert it forcefully.**

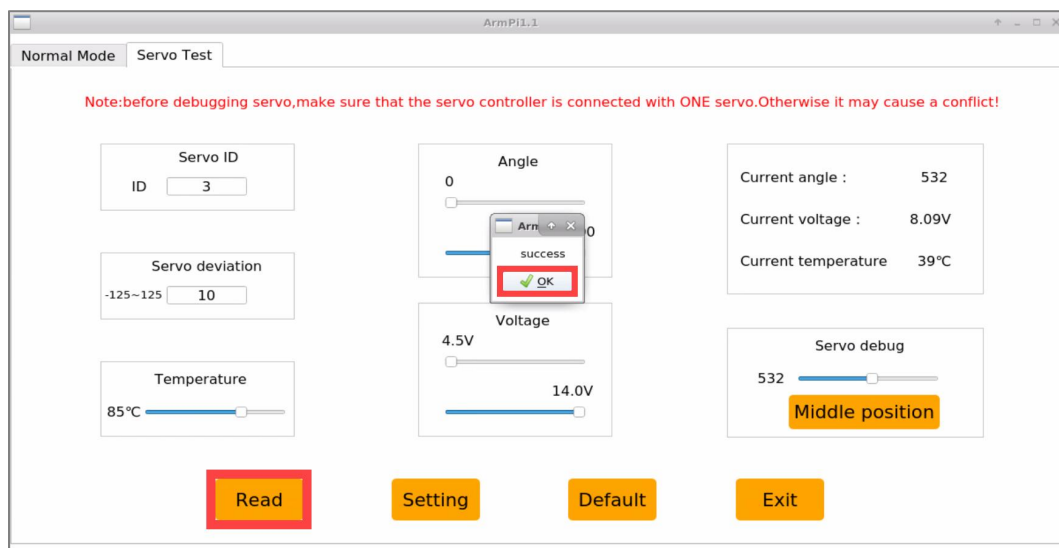
### 2.2 Set ID

Take controlling ID2 servo as example. Set Servo ID in “Servo Test Tool” in ArmPi Pro PC software.

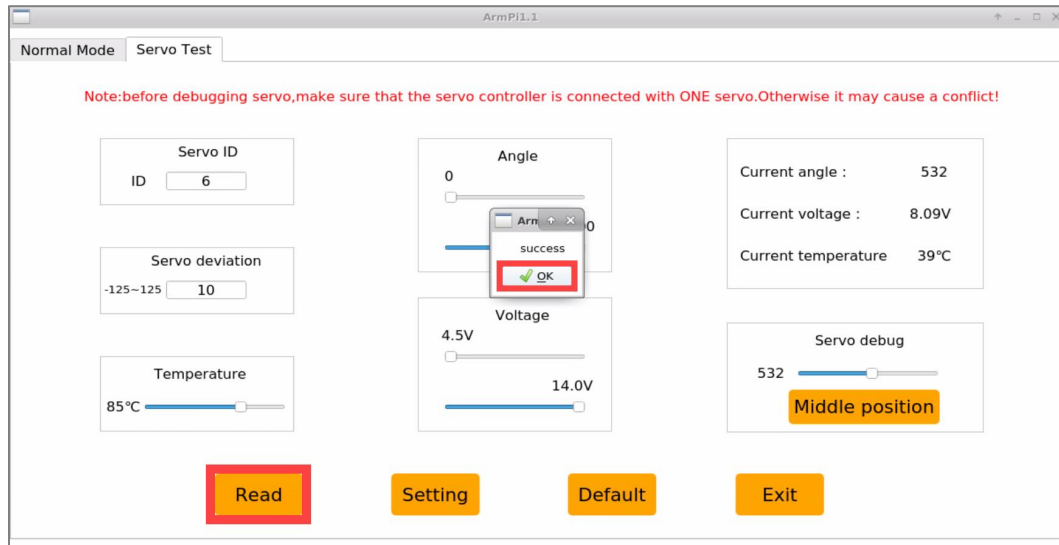
- 1) Click “**PC\_Software**” to open ArmPi Pro PC software.





- 2) Click “Servo Test” menu bar, click “Read” , and wait for the prompt “success”.



- 3) In the “Servo ID” area, input “2” for servo ID, click “Set” button, and wait for the prompt “success”.



### 3. Operation Steps

- 1) Open the terminal. Click  in the lower left corner and select  to enter the terminal.
- 2) In the opened interface, enter the command “`cd armpi_pro/src/armpi_pro_demo/expansion_board_demo/`” and press “Enter” to access to game programmings directory.
 

```
ubuntu@ubuntu:~$ cd armpi_pro/src/armpi_pro_demo/expansion_board_demo/
```
- 3) Then enter command “`sudo python3 BusServo_Speed.py`” and press “Enter” to start the game.
 

```
ubuntu@ubuntu:~/armpi_pro/src/armpi_pro_demo/expansion_board_demo$ sudo python3 BusServo_Speed.py
```
- 4) If want to exit the program, you can press “Ctrl+C”. If fail to exit, you can try multiple times.

## 4. Project Outcome

After running program, bus servo will rotate at a certain speed.

## 5. Function Extension

If want to modify the rotation speed of servo, you can modify program to realize it. Take speeding up the rotation as example.

1) Enter command “cd armpi\_pro/src/armpi\_pro\_demo/expansion\_board\_demo/” and press “Enter” to access to the game programmings directory.

```
ubuntu@ubuntu:~$ cd armpi_pro/src/armpi_pro_demo/expansion_board_demo/
```

2) Enter command “sudo vim BusServo\_Speed.py” and press “Enter” to open the program file.

```
ubuntu@ubuntu:~/armpi_pro/src/armpi_pro_demo/expansion_board_demo$ sudo vim BusServo_Speed.py
```

3) Find the program block in the red box, as the figure shown below.

```
21 Board.setBusServoPulse(2, 800, 1200)
22 time.sleep(0.5) # delay 0.5s
23
24 Board.setBusServoPulse(2, 200, 300)
25 time.sleep(0.5) # delay 0.5s
```

4) Press “i” on keyboard. When “INSERT” appears, it has switched to the editing mode.

```
25 time.sleep(0.5) # delay 0.5s
-- INSERT --
```

5) We just need to change its running time which corresponds to the rotation speed (Board.setServoPulse(2, 800, 1000). The first parameter is ID number.

The second parameter is pulse width. The third parameter is running time.

```
21 Board.setBusServoPulse(2, 800 600)
22 time.sleep(0.5) # delay 0.5s
23
24 Board.setBusServoPulse(2, 200 400)
25 time.sleep(0.5) # delay 0.5s
```

6) After modifying, press “Esc” and input “:wq”. Then press “Enter” to save and exit.

```
25 time.sleep(0.5) # Delay 0.5s
:wq
```

7) After saving program, please refer to “3.Operation Steps” to check the outcome.