Lesson 13 Control Multiple PWM Servos

1. Working Principle

Control PWM servo by sending pulse signal. We can control multiple servos to rotate by setting the parameters of servo ports. The source code of program is located in:

/home/ubuntu/armpi_pro/src/armpi_pro_demo/expansion_board_demo/PWMServo_

Double.py

```
#!/usr/bin/python3
# coding=utf8
import sys
import time
import Board as Board

print('''
**********************************************************
*****Function: Hiwonder Raspberry Pi expansion board. Multiple Servo Control Routine******
**********************************************************
----------------------------------------------------------
Official website:https://www.hiwonder.com
Online mall:https://hiwonder.tmall.com
----------------------------------------------------------
Tips:
 * Press "Ctrl+C" to close the running program. If fail to close, please try several times!
----------------------------------------------------------
''')

if sys.version_info.major == 2:
    print('Please run this program with python3!')
    sys.exit(0)


if __name__ == '__main__':
    for i in range(5):
        Board.setPWMServoPulse(1, 1500, 1000) # No.1 servo roates to 1500 in 1000ms
        time.sleep(1)
        Board.setPWMServoPulse(1, 2500, 1000) # No.1 servo roates to 2500 in 1000ms
        time.sleep(1)

        Board.setPWMServoPulse(2, 1500, 1000) # No.2 servo roates to 1500 in 1000ms
        time.sleep(1)
        Board.setPWMServoPulse(2, 2500, 1000) # No.2 servo roates to 2500 in 1000ms
        time.sleep(1)
```

Control bus servo by calling setPWMServoPulse() function under Board library. Take the code “Board.setPWMServoPulse(1, 500, 1000)” as example:

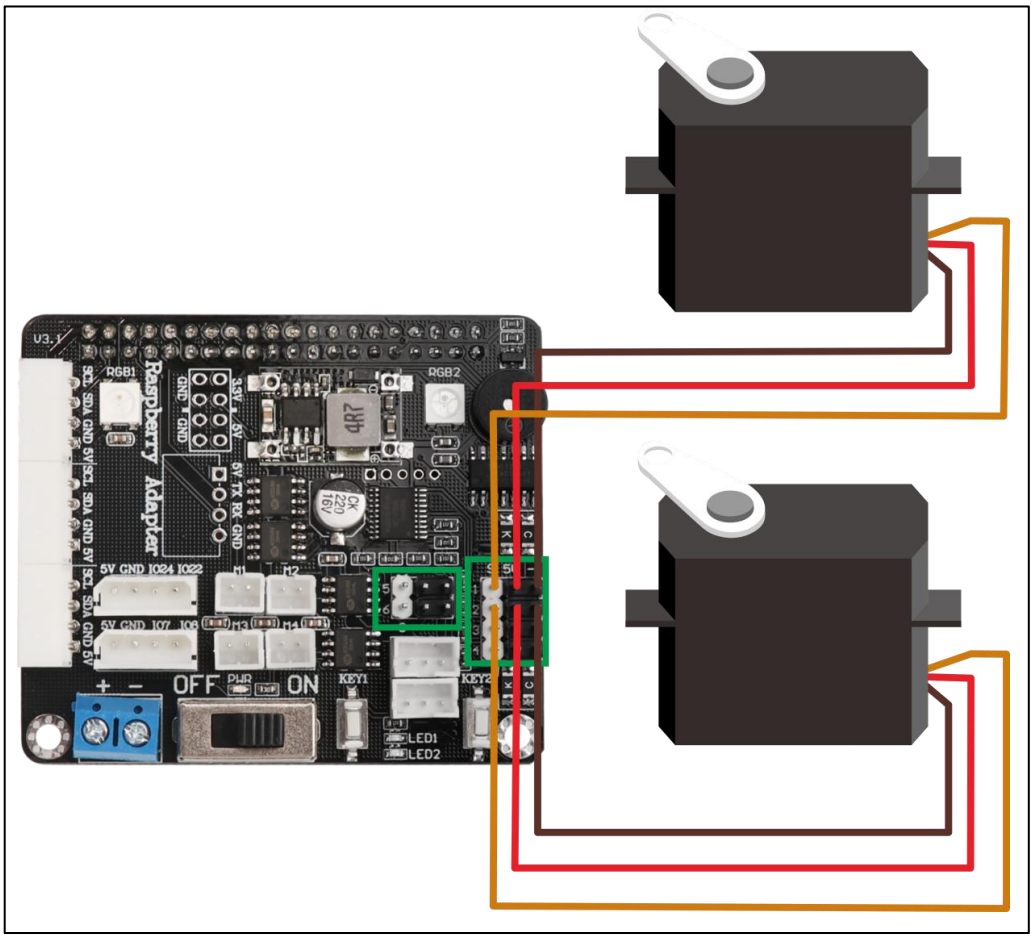
The first parameter “1” is the port number of the connected PWM servo. The port number here is 1.

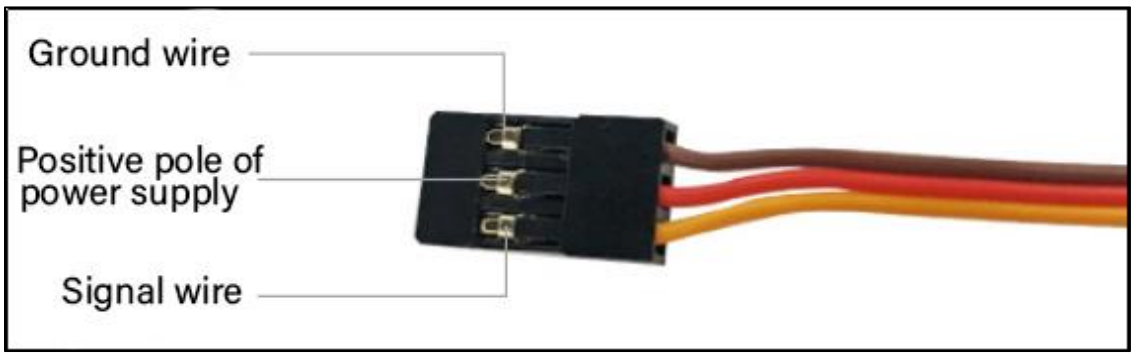
The second parameter “1500” is the rotation position, which is converted by angle conversion formula.

The third parameter “1000” is the rotation time (the unit is ms). Here is 1000ms.

2. Preparation

Connect two PWM servos to PWM servo ports on Raspberry Pi expansion board. Take LFD-01 servo (5V) as example, The wiring method is as the figure shown below:





Note:

1. No.1-No.6 are PWM servo ports. The working voltage of No.1-No.4 servo ports are 5V. The working voltage of No.5-No.6 servo ports are the same as that of power supply ports.

2. Please take notice of the wiring direction when connecting servo, otherwise it is easy to burn out servo (the white interfaces on the expansion board are the signal terminal).

3. Operation Steps

1) Please refer to the tutorial in “6.Raspberry Pi and Expansion Board Lessons/2.Raspberry Pi Expansion Board/Lesson 4 Set Environment Development” to remotely connect through NoMachine.

2) Open the terminal. Click 

in the lower left corner and select 

to enter the terminal.

3) 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/
```

4) Then enter command “sudo python3 PWMServo_Double.py” and press

"Enter" to start the game.

```
ubuntu@ubuntu:~/armpi_pro/src/armpi_pro_demo/expansion_board_demo$
sudo python3 PWMServo_Double.py
```

5) If want to exit the program, you can press "Ctrl+C". If fail to exit, please try it multiple times.

4. Project Outcome

When the program is running, the servo connected to No.1 port rotates to 90°, then 180°; the servo connected No.2 servo rotates to 90°, then 180°. After 5 cycles, both servos will stop rotating and exit program automatically.

5. Function Extension

In program, the connected port of servos is No.1 and No.2 by default. If want to change the connected port, we can modify the program. Take changing the connected PWM servo port from No.1 and No.2 ports to No.3 and No.4 ports.

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 PWMServo_Double.py" and press "Enter" to open the program file.

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

3) Find the code shown in the figure below.

```
26 if __name__ == '__main__':
27     for i in range(5):
28         Board.setPWMServoPulse(1, 1500, 1000)
29         time.sleep(1)
30         Board.setPWMServoPulse(1, 2500, 1000)
31         time.sleep(1)
32
33         Board.setPWMServoPulse(2, 1500, 1000)
34         time.sleep(1)
35         Board.setPWMServoPulse(2, 2500, 1000)
36         time.sleep(1)
```

4) Press “i” key. When “INSERT” word appears, which means it has been switched to the editing mode.

```
36         time.sleep(1)
-- INSERT --
```

5) Change No.1 servo port to No.3 servo port, No.2 servo port to No.4 servo port.

```
26 if __name__ == '__main__':
27     for i in range(5):
28         Board.setPWMServoPulse(3, 1500, 1000)
29         time.sleep(1)
30         Board.setPWMServoPulse(3, 2500, 1000)
31         time.sleep(1)
32
33         Board.setPWMServoPulse(4, 1500, 1000)
34         time.sleep(1)
35         Board.setPWMServoPulse(4, 2500, 1000)
36         time.sleep(1)
```

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

```
36         time.sleep(1)
37
38
39
40
:wq
```

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

outcome.