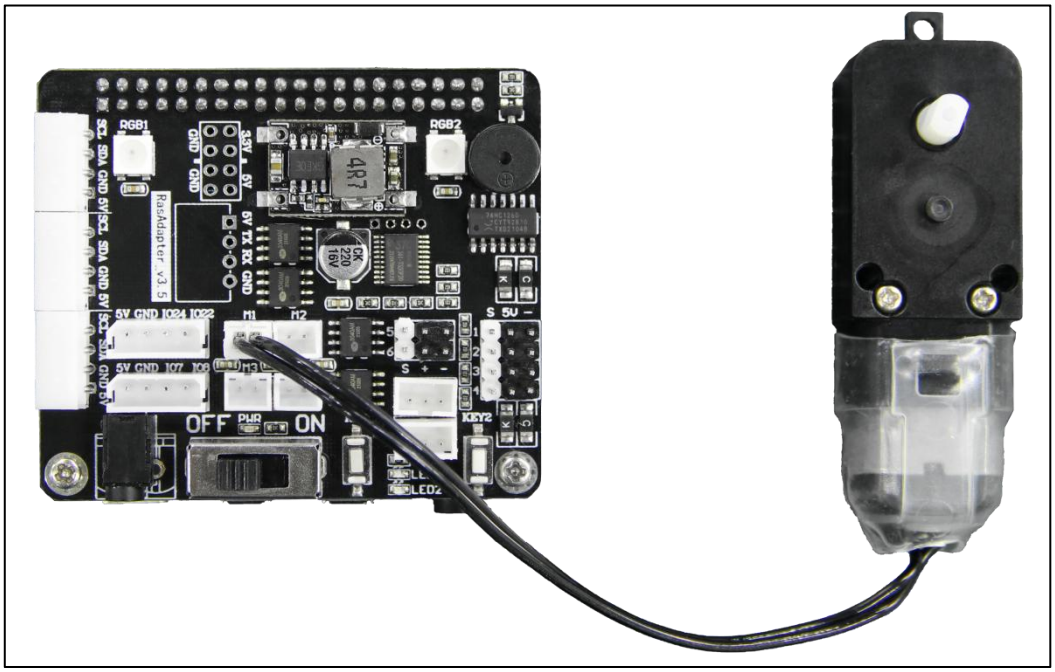
Lesson 5 Motor Control

1. Getting Ready

Connect motor to M1 port of Raspberry Pi expansion board, as the figure shown below:



Note: 2PIN wire uses anti-reverse plug. Please do not insert forcefully.

2. Working Principle

Set motor parameter through program. When the value is positive, motor will rotate clockwise; when the value is negative, motor will rotate counterclockwise.

The source code of program is located in **/home/pi/MasterPi/HiwonderSDK/MotorControlDemo.py**

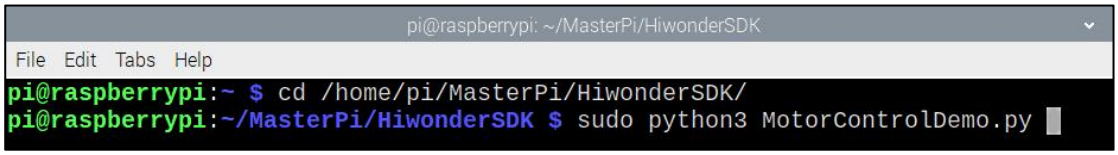
```
    start = False
    print('Closing...')
    MotorStop()  # close all the motors


signal.signal(signal.SIGINT, Stop)

if __name__ == '__main__':

    while True:
        Board.setMotor(1, 35)  #set the speed of No.1 servo to 35
        time.sleep(1)
        Board.setMotor(1, 60)  #set the speed of No.1 servo to 60
        time.sleep(2)
        Board.setMotor(1, 90)  #set the speed of No.1 servo to 90
        time.sleep(3)

        if not start:
            MotorStop()  # turn off all the motors
            print('closed')
            break
```

3. Operation Steps

1) Click  or press “Ctrl+Alt+T” to open LX terminal.

2) Enter “cd /home/pi/MasterPi/HiwonderSDK/” command in LX terminal and press “Enter” to come to the directory of game programs.

3) Then, enter “sudo python3 MotorControlDemo.py” command and press “Enter” to start game.



4) If want to exit the program, you can press “Ctrl+C”.

4. Project Outcome

After starting program, DC motor will repeatedly rotate clockwise at the speed of 35 for 1 second first, then rotate clockwise at the speed of 60 for 2 seconds, finally rotate clockwise at the speed of 90 for 3 seconds.

5. Function Extension

5.1 Speed and Direction Adjustment

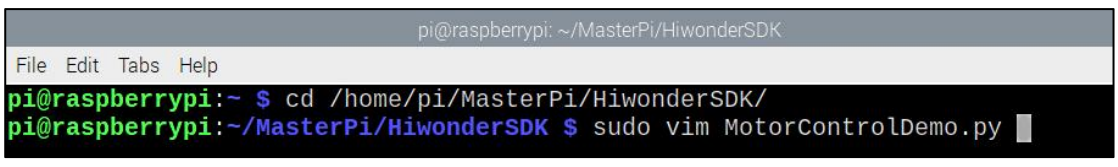
Note: The range of motor speed is between -100 and 100. Please note that the set value does not exceed this range to avoid motor damage.

If want to modify the rotation speed and direction of motor, you can refer to the following steps to operate:

This part will control motor connected to No.1 port to rotate clockwise at the speed of 80 for 2 seconds, then rotate counterclockwise at the speed of 60 for 2 seconds, finally rotate clockwise at the speed of 80 for 3 seconds as example.

1) Enter “cd /home/pi/MasterPi/HiwonderSDK/” command and press “Enter” to come to the directory of game programs.

2) Enter “sudo vim MotorControlDemo.py” command and press “Enter” to open program file.



3) Find the code shown in the following red box.

```
    while True:
        Board.setMotor(1, 35)  #set the speed of No.1 servo to 35
        time.sleep(1)
        Board.setMotor(1, 60)  #set the speed of No.1 servo to 60
        time.sleep(2)
        Board.setMotor(1, 90)  #set the speed of No.1 servo to 90
        time.sleep(3)

        if not start:
            MotorStop()  # turn off all the motors
            print('closed')
            break
```

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

```
        Board.setMotor(1, 35)  #set the speed of No.1 servo to 35
        time.sleep(1)
        Board.setMotor(1, 60)  #set the speed of No.1 servo to 60
        time.sleep(2)
        Board.setMotor(1, 90)  #set the speed of No.1 servo to 90
        time.sleep(3)

        if not start:
            MotorStop()  # turn off all the motors
            print('closed')
            break


-- INSERT --                                          60,1          97%
```

5) Modify the parameter shown in the figure below. Please note that when the value is positive, motor will rotate clockwise. The bigger the value, the faster the clockwise rotation of motor. When the value is negative, motor will rotate counterclockwise. The smaller the value, the faster the counterclockwise rotation of motor.

```
    while True:
        Board.setMotor(1, 80)  #set the speed of No.1 servo to 80
        time.sleep(1)
        Board.setMotor(1, -60)  #set the speed of No.1 servo to -60
        time.sleep(2)
        Board.setMotor(1, 80)  #set the speed of No.1 servo to 80
        time.sleep(3)

        if not start:
            MotorStop()  # turn off all the motors
            print('closed')
-- INSERT --                                          60,29         91%
```

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

```
55      while True:
56          Board.setMotor(1, 80)  #set the speed of No.1 servo to 80
57          time.sleep(1)
58          Board.setMotor(1, -60)  #set the speed of No.1 servo to -60
59          time.sleep(2)
60          Board.setMotor(1, 80)  #set the speed of No.1 servo to 80
61          time.sleep(3)
62
63          if not start:
64              MotorStop()  # turn off all the motors
65              print('closed')
:wq
```

5.2 Change Motor Connection Port

The default motor connection port is M1. This section will modify the servo connection port M1 to M2 as example and the operation steps are as follow:

1) According to the operation steps in “5.1 Speed and Direction Adjustment”, open program file, enter editing mode and find the code shown in the figure below:

```
55      while True:
56          Board.setMotor(1, 35)  #set the speed of No.1 servo to 35
57          time.sleep(1)
58          Board.setMotor(1, 60)  #set the speed of No.1 servo to 60
59          time.sleep(2)
60          Board.setMotor(1, 90)  #set the speed of No.1 servo to 90
61          time.sleep(3)
62
63          if not start:
64              MotorStop()  # turn off all the motors
65              print('closed')
66              break
```

2) Modify all the parameter values “1” in “Board.setMotor” to “2”, as the figure shown below:

```
55      while True:
56          Board.setMotor(2, 35)  #set the speed of No.2 servo to 35
57          time.sleep(1)
58          Board.setMotor(2, 60)  #set the speed of No.2 servo to 60
59          time.sleep(2)
60          Board.setMotor(2, 90)  #set the speed of No.2 servo to 90
61          time.sleep(3)
62
63          if not start:
64              MotorStop()  # turn off all the motors
65              print('closed')
66              break
```

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

```
60          Board.setMotor(2, 90)  #set the speed of No.2 servo to 90
61          time.sleep(3)
62
63          if not start:
64              MotorStop()  # turn off all the motors
65              print('closed')
66              break
67
68
69
:wq
```