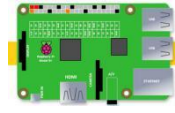
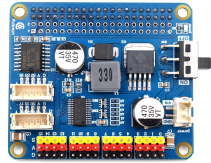
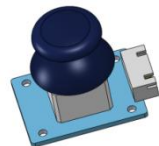


## Lesson 5 How to Control the Joystick

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

### 5.1 Components used in this course

Components	Quantity	Picture
Raspberry Pi	1	
Arm HAT	1	
Joystick	1	

### 5.2 Introduction of the Joystick

This PS2 game dual axis joystick module is made of high quality metal PS2 joystick potentiometer, with (X, Y) 2 axis analog output, (Z) 1 button digital output.

## 5.3 Wiring diagram (Circuit diagram)

**GND:** Connect to the negative pole of the power supply.

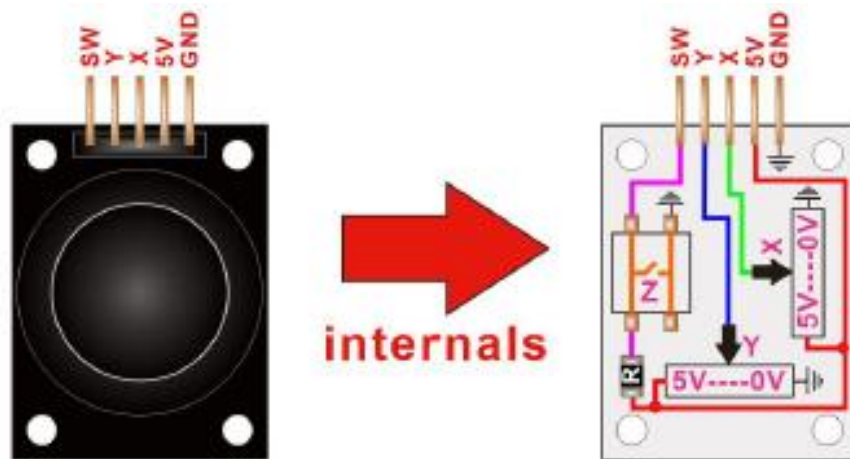
**5V:** connected to the positive pole of the power supply.

**X:** X axis analog value output.

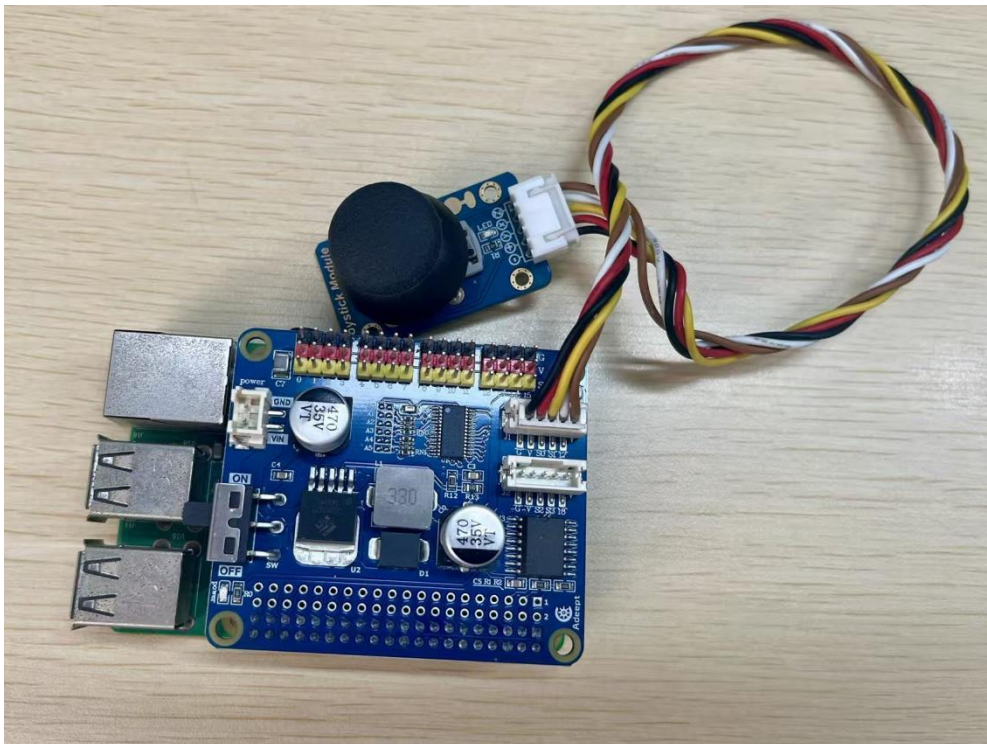
**Y:** Y-axis analog value output.

**SW:** Z-axis output (button).

The joystick is made up of two passive potentiometers (variable resistors) and a push button, it is made by mounting two potentiometers at a 90 degrees angle. The potentiometers are connected to a short stick centered by springs. This module produces an output of around 2.5V from X and Y when it is in resting position. Moving the joystick will cause the output to vary from 0v to 5V depending on its direction. This joystick also has a select button that is actuated when the joystick is pressed down.



Link the joystick to the interface on the upper side of the Arm HAT.



## 5.3 How to control the joystick

### Run the code

1. Remotely log in to the Raspberry Pi and use the following command to stop the auto-running program:

```
sudo killall python3
```

```
adeept@raspberrypi:~$ sudo killall python3
adeept@raspberrypi:~$
```

2. Enter the command and press Enter to enter the folder where the program is located:

```
cd Adeept_Robotic_Arm_for_RPi/Server/
```

```
adeept@raspberrypi:~$ cd Adeept_Robotic_Arm_for_RPi/Server/
adeept@raspberrypi:~/Adeept_Robotic_Arm_for_RPi/Server$
```

3. View the contents of the current directory file:

```
ls
```

```
adeept@raspberrypi:~/Adeept_Robotic_Arm_for_RPi/Server $ ls
app.py  dist  info.py  joystickControl.py  joystick.py  PCF8591.py  plan.json  __pycache__  RPiServo.py  servo.py  WebServer.py
adeept@raspberrypi:~/Adeept_Robotic_Arm_for_RPi/Server $
```

4. Enter the command and press Enter to run the program:

```
sudo python3 joystick.py
```

```
adeept@raspberrypi:~/Adeept_Robotic_Arm_for_RPi/Server $ sudo python3 joystick.py
home
up
home
down
home
left
home
right
home
```

5. After running the program successfully, Move the joystick and you will see the corresponding direction printed out.

6. When you want to terminate the running program, you can press the shortcut key "**Ctrl + C**" on the keyboard.

## 5.4 The main code program

Complete code refer to [joystick.py](#) .

```
01 import gpiozero
02 import PCF8591 as ADC
03 import time
04
05 btn = gpiozero.Button(
06     17,
07     pull_up=True
08 )
09
```

```
10 STATE_LIST = ['home', 'down', 'up', 'left', 'right', 'pressed']
11
12 def setup():
13     # Initialize PCF8591 ADC (address 0X48)
14     ADC.setup(0X48)
15
16 def direction():
17     i = 0
18
19     adc_ch0 = ADC.read(0)
20     if adc_ch0 <= 5:
21         i = 1 # down
22     elif adc_ch0 >= 200:
23         i = 2 # up
24
25     adc_ch1 = ADC.read(1)
26     if adc_ch1 <= 5:
27         i = 3 # left
28     elif adc_ch1 >= 200:
29         i = 4 # right
30
31     if btn.is_pressed:
32         i = 5 # pressed
33
34     adc_ch2 = ADC.read(2)
35     if not btn.is_pressed and (-15 < adc_ch1 - 125 < 15) and adc_ch2 == 255:
36         i = 0
37
38     return STATE_LIST[i]
39
40 def loop():
41     current_status = ""
42     while True:
43         new_status = direction()
44         if new_status and new_status != current_status:
45             print(new_status)
46             current_status = new_status
47             time.sleep(0.1) # reduce loop frequency
48
49 def destroy():
50     btn.close()
51
```

```
52 if __name__ == '__main__':  
53     try:  
54         setup()  
55         loop()  
56     except KeyboardInterrupt: # Capture Ctrl+C to exit  
57         destroy()  
58     print("\nProgram exited, resources cleaned up")
```