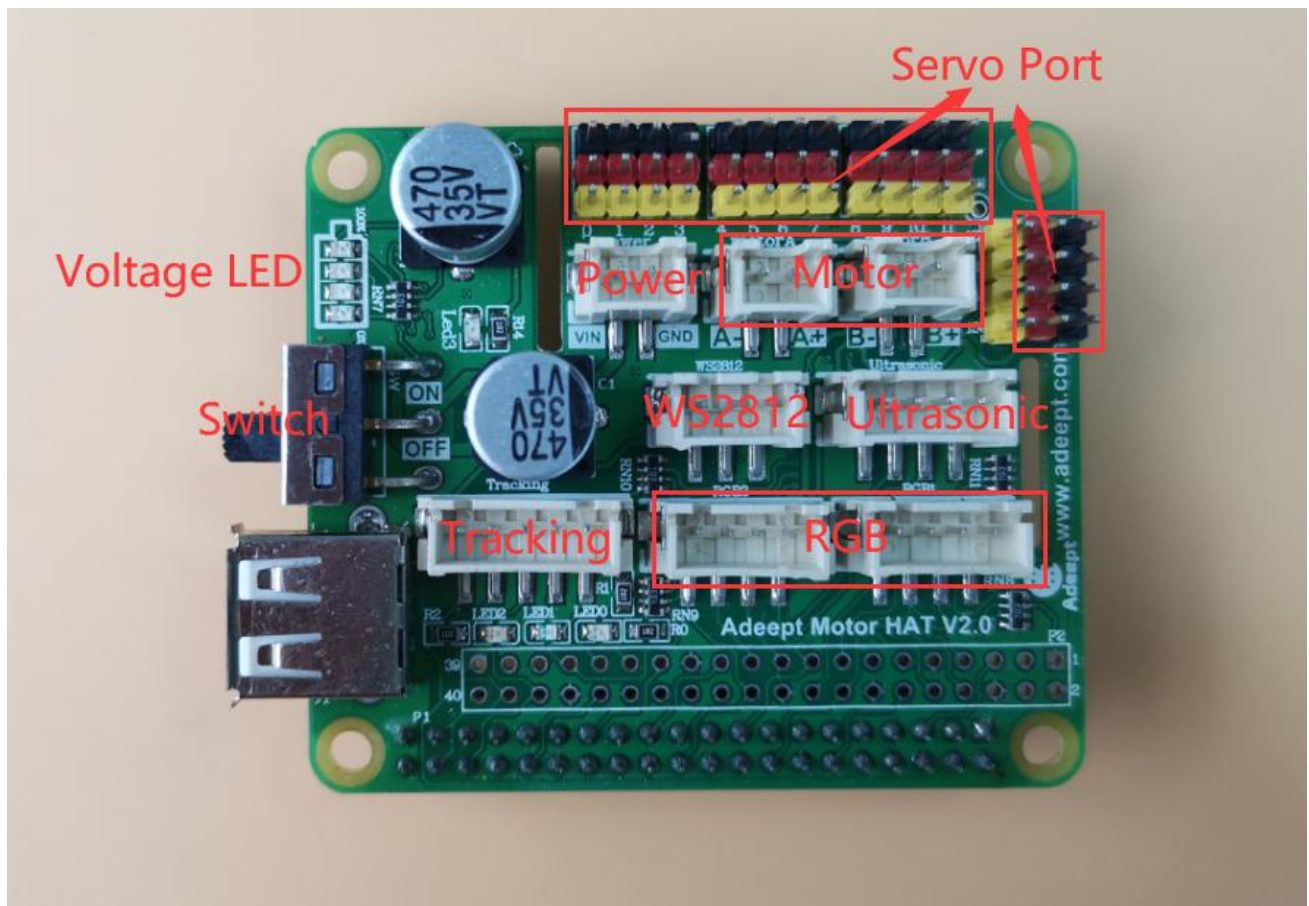


Introduction of Motor HAT

Motor HAT

When you get the robot product, you will see a board with its name printed inside: Adept Motor HAT, which is an important part of the robot. There are many interfaces on the Motor HAT. You can connect sensors and electronic hardware modules to the board by those interfaces to realize more functions. This robot works on the Raspberry Pi. Let's first get to know the Motor HAT.



[Power]: The vin interface is an interface for external power supply.

[Switch]: Switch is to turn the Motor HAT ON/OFF.

[Tracking]: The pin interface of Tracking Module.

[WS2812]: The pin interface of WS2812 Module.

[Servo port]: Servo interface.

[motor]: Divided into motor 1 and motor 2 interfaces.

[Ultrasonic]: Ultrasonic interface.

[Voltage LED]: Display battery level.

[USB]: USB power supply can be used when the voltage requirement is not high.

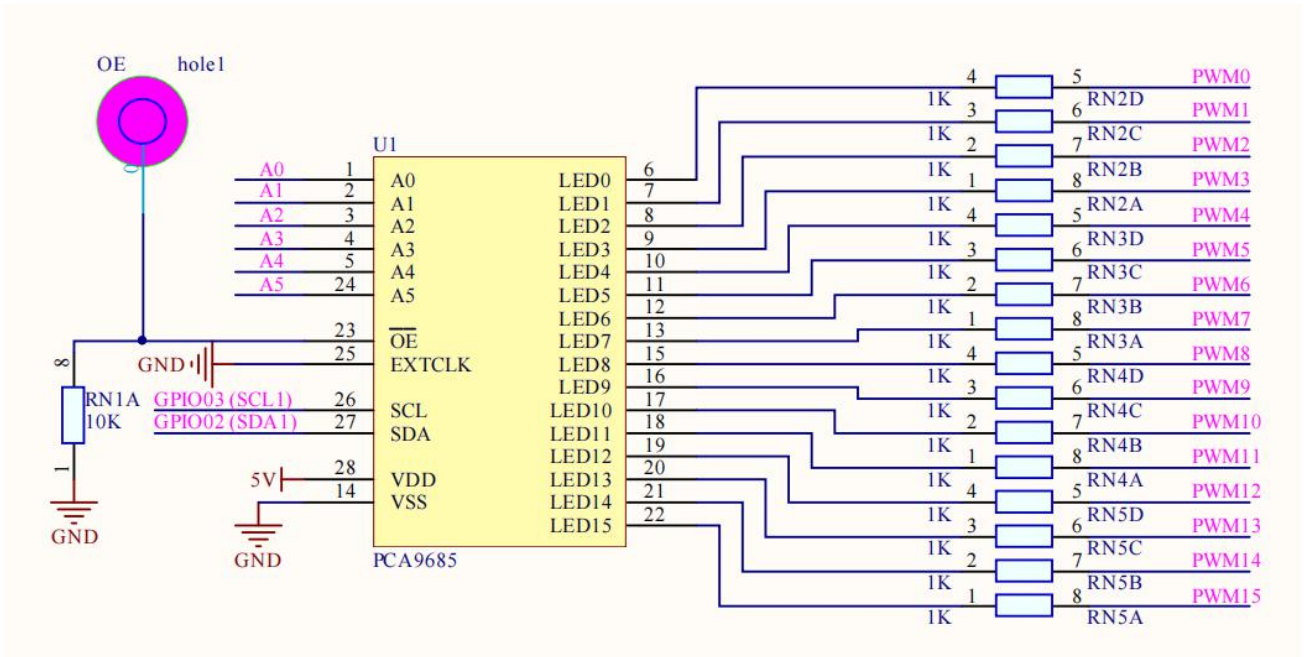
Interface Introduction

Servo port

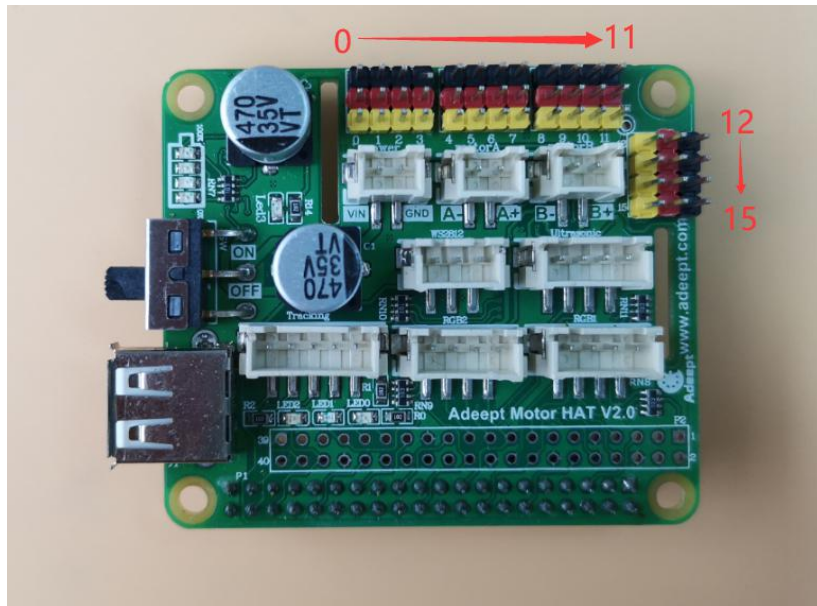
PCA9685 chip, using I2C bus can control 16 steering gears.

Circuit schematic diagram:

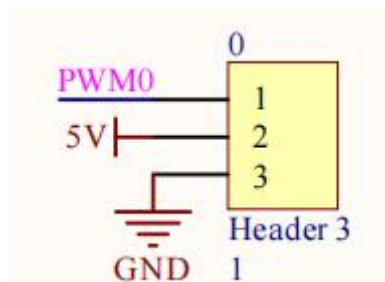
Raspberry Pi GPIO uses **BCM** encoding.



Servo port position:



Port 0 refers to the three pins in the first column, which are **black GND, red 5V, and yellow signal pins**. Port 1 represents the three ports in the second column. By analogy, a total of 16 servo ports can be used.



Download the test code:

```
sudo git clone https://www.github.com/adeept/adeept_HAT.git
```

To test the servo code,

Motor HAT Interface	Module Interface
GND	GND
5V	VCC
Signal pin	Signal pin

Run on the Raspberry Pi command line:

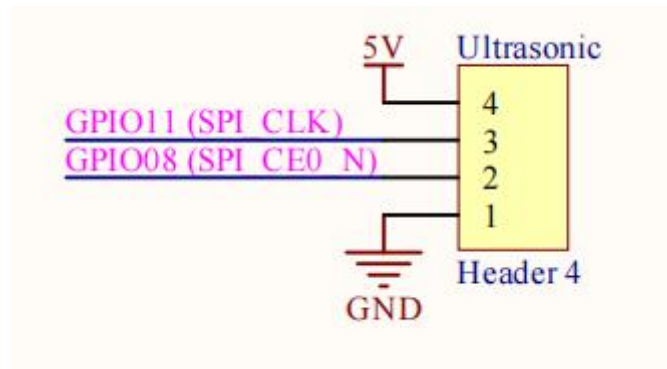
```
sudo python3 adeept_HAT/MotorHAT/01_servo.py
```

The steering gear will rotate to 0°, 90°, and 180° every 1s.

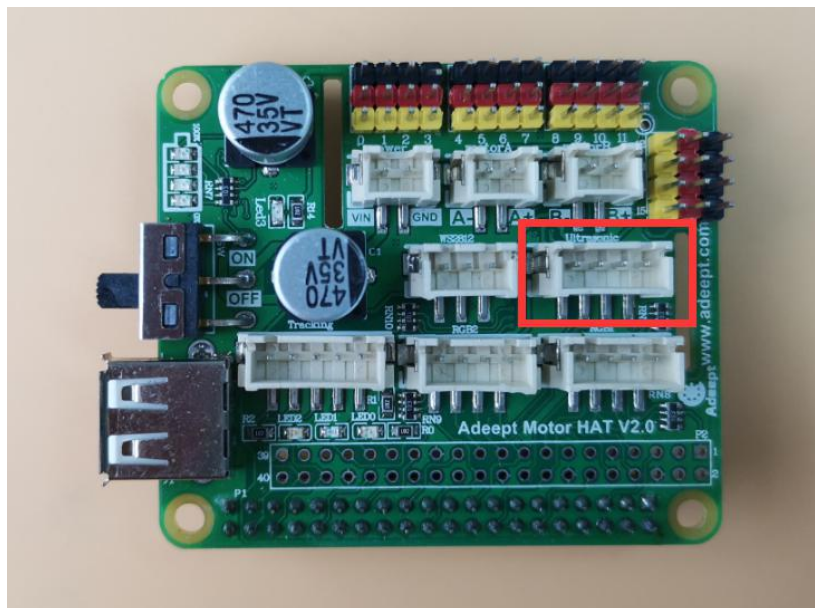
Ultrasonic

Used to control the ultrasonic module, for example: HC-SR04.

Circuit schematic diagram:



Ultrasonic interface location:



The ultrasonic interface pins are from left to right: **5V**, **GPIO11**, **GPIO08**, **GND**.

To test the ultrasonic code,

Motor HAT Interface	Module Interface
GND	GND
GPIO08	Echo
GPIO11	Trig
5V	VCC

Run on the Raspberry Pi command line:

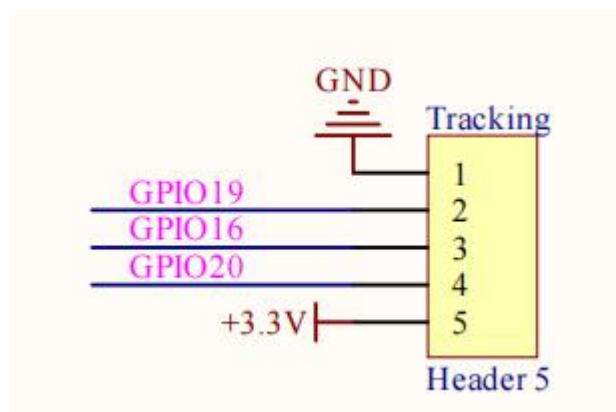
```
sudo python3 adept_HAT/MotorHAT/02_ultra.py
```

You will see the distance of the ultrasonic detection printed out.

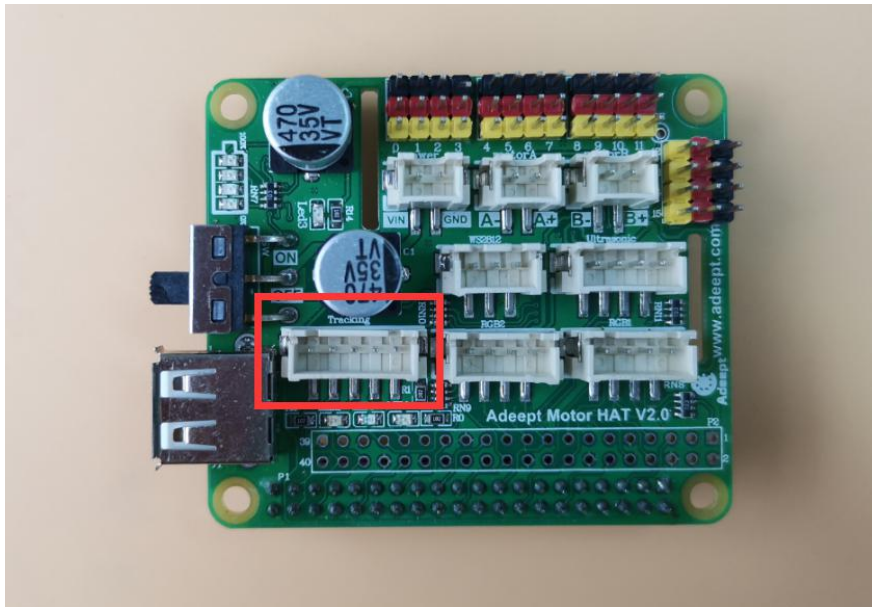
Tracking

Used to control the 3-way line patrol module.

Circuit schematic diagram:



Interface location:



The pins of the three-way line inspection interface are from left to right: **3.3V**, **GPIO20**, **GPIO16**, **GPIO19**, **GND**.

Test the Raspberry Pi line module code,

Motor HAT Interface	Module Interface
3.3V	3.3V
GPIO20	Signal pin 1
GPIO16	Signal pin 2
GPIO19	Signal pin 3
GND	GND

run on the Raspberry Pi command line:

```
sudo python3 adeept_HAT/MotorHAT/03_findline.py
```

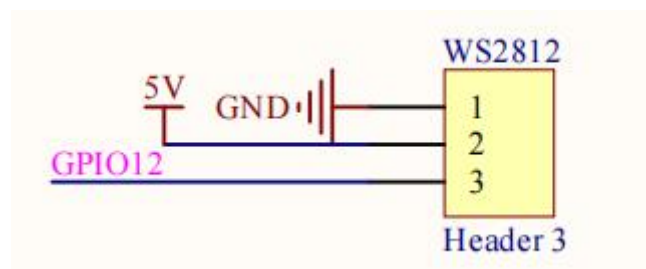
You will see the 3 test results of the line-following module printed out.

```
LF3: 1   LF2: 1   LF1: 0
LF3: 1   LF2: 1   LF1: 0
LF3: 1   LF2: 1   LF1: 0
LF3: 1   LF2: 1   LF1: 0
LF3: 1   LF2: 1   LF1: 0
LF3: 1   LF2: 1   LF1: 0
```

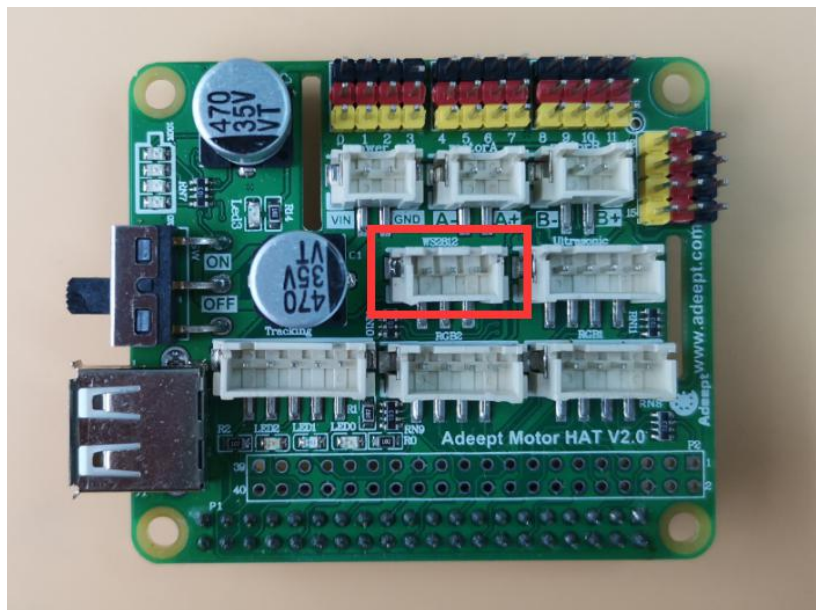
WS2812

Used to control ws2812 lights.

Circuit schematic diagram:



Interface location:



The ws2812 interface pins are from left to right: **GPIO12**, **5V**, and **GND**.

To test the ws2812 code,

Motor HAT Interface	Module Interface
GPIO12	Signal pin
5V	VCC
GND	GND

run on the Raspberry Pi command line:

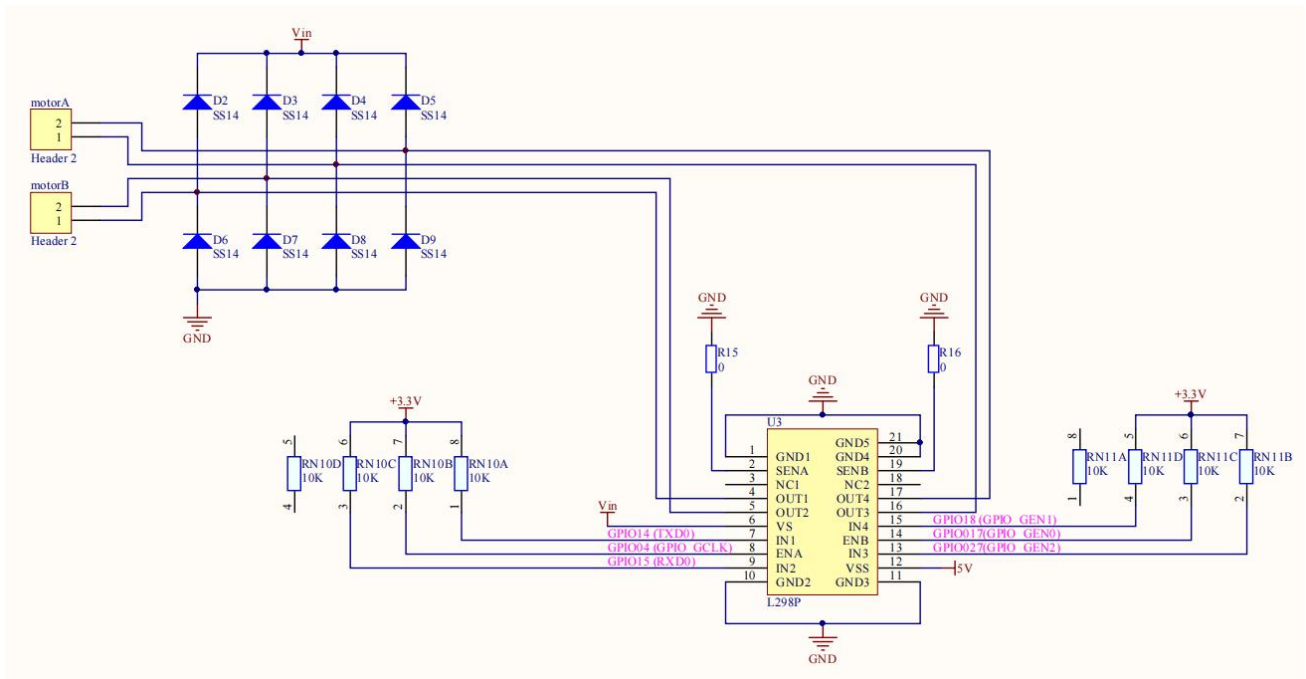
```
sudo python3 adeept_HAT/MotorHAT/04_ws2812.py
```

You can see that the first three lights of the ws2812 light are on blue, green, and red, and turn off every 1s.

Motor

Use the L298P chip to control the motor.

Circuit schematic diagram:



Interface location:



Two motor interface pins A and B, the left end of each interface is connected to the negative pole of the motor, and the right end is connected to the positive pole of the motor.

To test the motor interface code, run on the Raspberry Pi command line:

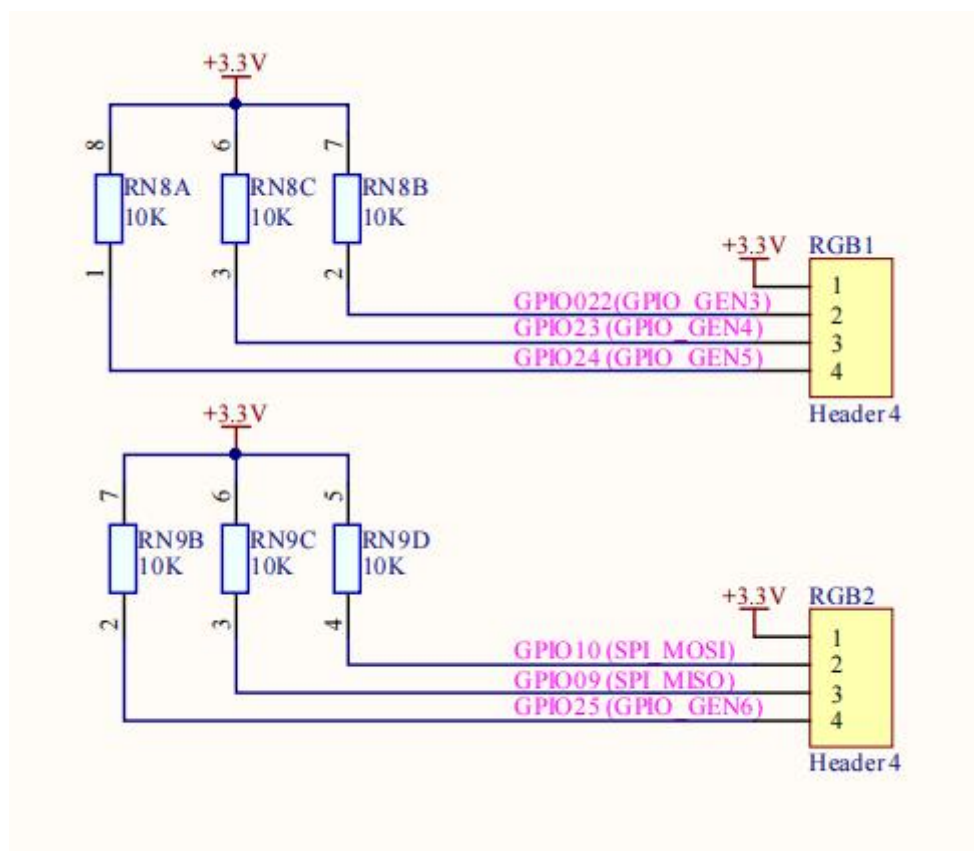
```
sudo python3 adeept_HAT/MotorHAT/05_motor.py
```

You can see that the motor rotates forward for 3 seconds and then pauses, then reverses for 3 seconds.

RGB

Used to control RGB LED.

Circuit schematic diagram:



Interface location:



The interface pins from left to right are:

RGB1: GPIO24, GPIO23, GPIO22, 3.3V.

RGB2: GPIO25, GPIO09, GPIO10, 3.3V.

To test the LED interface code,

Robot HAT Interface	Module Interface
GPIO24	B
GPIO23	G
GPIO22	R
3.3V	VCC

run on the Raspberry Pi command line:

```
sudo python3 adeept_HAT/MotorHAT/06_RGB.py
```

After running successfully, you will see the RGB LED flashing in different colors.

Precautions for Using the Motor HAT

Different Raspberry Pi models have specific requirements for current. For example, the Raspberry Pi 3B needs at least 2A to boot up, yet the Raspberry Pi 4 needs 3A to boot normally. When you use the power adapter to power the Raspberry Pi, you can check the specifications of your power adapter.

If your robot reboots automatically after booting, or disconnects and reboots at the moment it starts to move after normal booting, it is likely that your power supply does not provide enough current.

It is recommended to choose the 18650 battery with the maximum continuous discharge current exceeding 4A, or the 18650 battery with "high rate discharge".

You may also power the Motor HAT with high energy li-ion battery; Motor HAT can be supplied by a power source under 15V.