Servo indicator

1. Learning target

1.1 In this course, we will learn how to use pins of the Raspberry Pi Pico board.

1.2 How to use potentiometer module, RGB light ring module and servo to make a servo indicator light.

2. Preparation

Raspberry Pi Pico board *1

Pico sensor expansion board *1

PC *1

USB data cable *1

Potentiometer module *1

Servo *1

RGB hale module *1

Female-to-male DuPont line *3

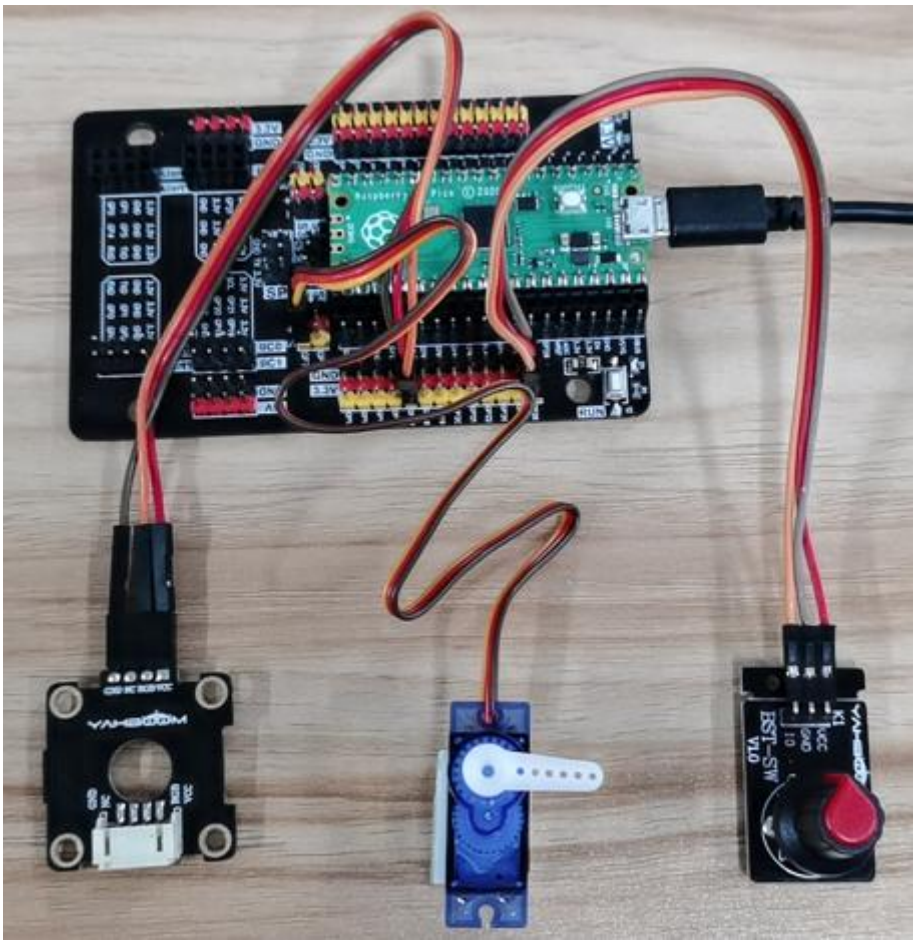
Male-to-male DuPont line *3

3. About wiring

Potentiometer module	Pico sensor expansion board
IO	GP28
VCC	3.3V
GND	GND

Servo	Pico sensor expansion board
IO	GP7
VCC	3.3V
GND	GND

RGB halo module	Pico sensor expansion board
RGB	GP17
VCC	3.3V
GND	GND



4. About code

Thonny programming

About how to using ThonnyIDE, please check the tutorials in【2.Development environment】

```
import utime
import ws2812b
import random
from machine import Pin

ring_pin = 17 # RGB halo pin
numpix     = 8    # Number of RGB lights
strip = ws2812b.ws2812b(numpix, 0, ring_pin)

# Close all lights
strip.fill(0,0,0)
strip.show()

rp = machine.ADC(28)

conver_180 = 181 / (65535)
servo = machine.PWM(machine.Pin(7))
servo.freq(50)
```

```
def my_map(x, in_min, in_max, out_min, out_max):
    return int((x - in_min) * (out_max - out_min) / (in_max - in_min) + out_min)

def servo_control(value):
    duty = my_map(value, 0, 180, 500000, 2500000)
#       print(duty)
    servo.duty_ns(duty)

utime.sleep(.1)

while True:
    # Convert the read potentiometer value into [0, 180]
    val_rp = int(rp.read_u16() * conver_180)
    utime.sleep(.01)
    print(val_rp)
    servo_control(val_rp)
    if val_rp < 180/3:
        strip.fill(val_rp, 0, 0)
    elif val_rp < 180/3*2:
        strip.fill(0, val_rp, 0)
    else:
        strip.fill(0, 0, val_rp)
    strip.show()
```

Before running this program, you need to load ws2812 library, please check the specific steps in 【2.Development environment】

5. Phenomenon

Click the green run button  of Thonny IDE to start running the program. Click the red stop button  to stop the program. When the program is running, we can turn the potentiometer manually, we can see that the servo will adjust the angle and the RGB light ring will change color in real time according to the position of the potentiometer module.