1.Preparation

In this course, we mainly use serial communication. RDK series board sends instructions to the drive board through the serial port to control the rotation angle of the servo.

2.Hardware

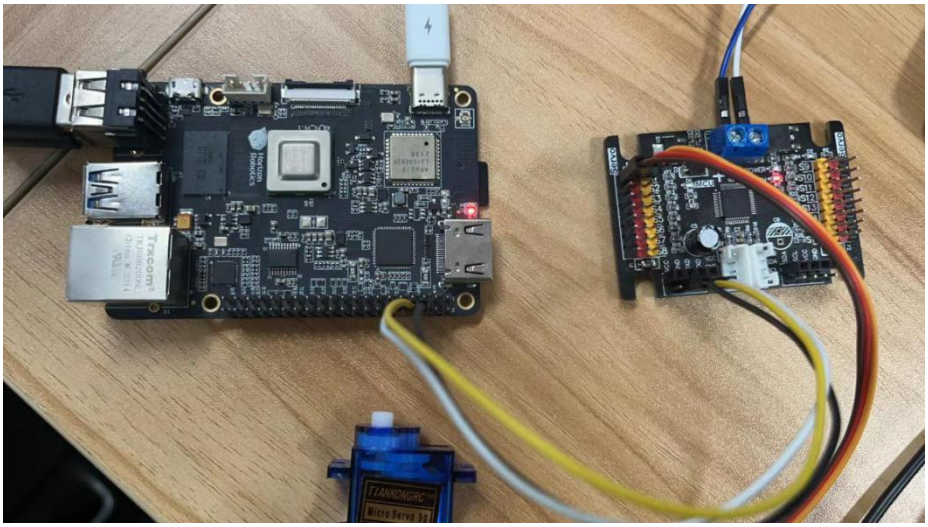
RDK series board *1

Servo *1

DuPont line *1

16-channel servo drive board *1

3. Wiring



RDK series board	16-channel servo drive board		Servo
UART_TXD	RX	S1	Brown line
UART_RXD	TX		Red line
GND	GND		Yellow line

Note:

The yellow line of the servo is connected to the yellow pin of the drive board S1;

The red line of the servo is connected to the red pin of the drive board S1;

The brown line of the servo is connected to the black pin of the drive board S1;

4. Code

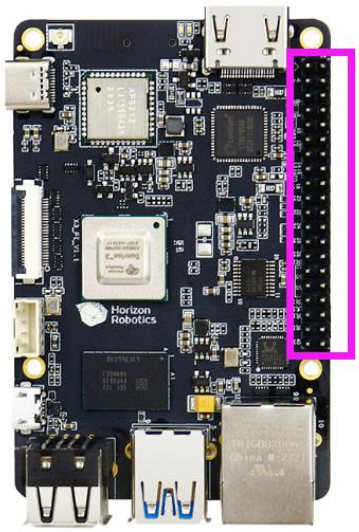
First, you need to open the serial port.

According to the communication protocol of the 16-channel servo drive board, the baud rate needs to be set to 9600.

Protocol				
IIC communication				
Address	0x2D			
	Number	Angle		
Data	1-16	0-180		
Serial communication (baud rate 9600)				
	Start bit	Servo number	Servo angle	End bit
Data	'$'	'A-P'	'0-180'	'#'
Eg	Servo1 turn to180°：$A180#			

According to the pin diagram of RDK X3, we use UART3 port.

		VDD_3V3	1	2	VDD_5V		
9	2	I2C0_SDA	3	4	VDD_5V		
8	3	I2C0_SCL	5	6	GND		
101	4	I2S0_MCLK	7	8	UART_TXD	14	111
		GND	9	10	UART_RXD	15	112
6	17	GPIO6	11	12	I2S0_BCLK	18	102
5	27	GPIO5	13	14	GND		
30	22	GPIO30	15	16	GPIO27	23	27
		VDD_3V3	17	18	GPIO7	24	7
12	10	SPI2_MOSI	19	20	GND		
13	9	SPI2_MISO	21	22	GPIO29	25	29
14	11	SPI2_SCLK	23	24	SPI2_CSN	8	15
		GND	25	26	GPIO28	7	28
106	0	I2S1_BCLK	27	28	I2S1_LRCK	1	107
119	5	GPIO119	29	30	GND		
118	6	GPIO118	31	32	PWM4	12	25
4	13	PWM0	33	34	GND		
103	19	I2S0_LRCK	35	36	GPIO3	16	3
105	26	GPIO105	37	38	I2S0_SDIO	20	104
		GND	39	40	I2S1_SDIO	21	108



The code corresponding to opening the serial port is as follows.

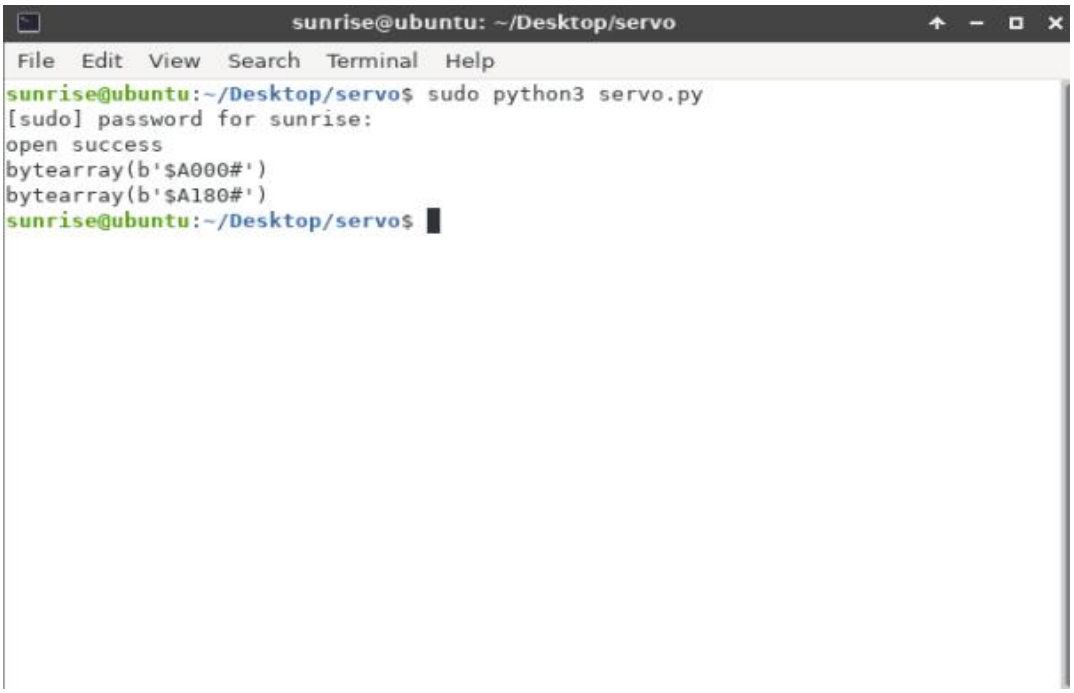
```
# 打开串口
def serial_open(n=0):
    global ser
    ser = serial.Serial("/dev/ttyS3",9600,timeout=1)
    if ser.isOpen():
        print( "open success")
        return 0
    else:
        print("open failed")
        return 255
```

The code for changing the servo rotation angle is as follows:

```python
def UARTServo(servonum, angle):
    servonum = 64 + servonum
    date1 = int(angle/100 + 48)
    date2 = int((angle%100)/10 + 48)
    date3 = int(angle%10 + 48)
    cmd=bytearray([36,servonum,date1,date2,date3,35])
    print(cmd)
    ser.write(cmd)
    time.sleep(0.05)
```

5. Experimental phenomenon

Input command: sudo python3 servo.py



Only one servo is used in this course.

After successfully executing the command, you can see that the servo changes from 0° to 180°.

If you want to connect multiple servo.

You can add multiple UARTServo() functions. The parameter servonum corresponds to the steering gear connected to the drive board.