X5 remote control servo gimbal

Note: esp32 camera needs to be burned with factory firmware. If you have not flashed the firmware after receiving the esp32 camera, it does not need to be burned. The factory default firmware is

1. Experimental preparation

- ESP32 camera
- X5 development board
- 2-DOF gimbal
- 24-channel servo driver board

2. Wiring diagram

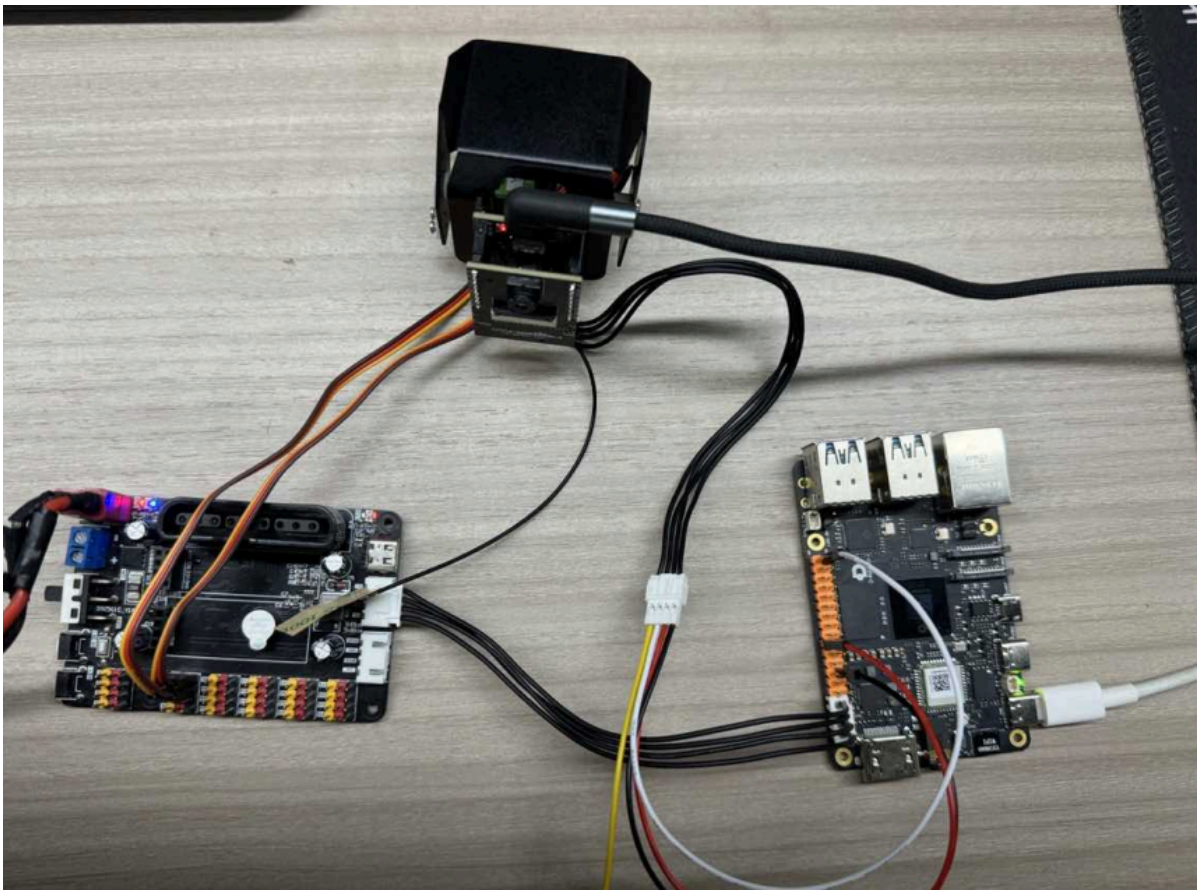
Note: Due to insufficient voltage, esp32 camera and 24-channel servo driver board need additional power supply via type-c data cable

x5 motherboard	esp32 camera
GPIO22	RX
GPIO25	TX
GND	GND
n'c	5V

X5 motherboard	24-channel servo driver board
BOARD8	RX
BOARD10	TX
GND	GND
5V	5V

24-way servo driver board	Servo
s5	Vertical servo
s6	Horizontal servo

Physical connection diagram:



x5 pin diagram:

X5 RDK 40Pin 功能对照表

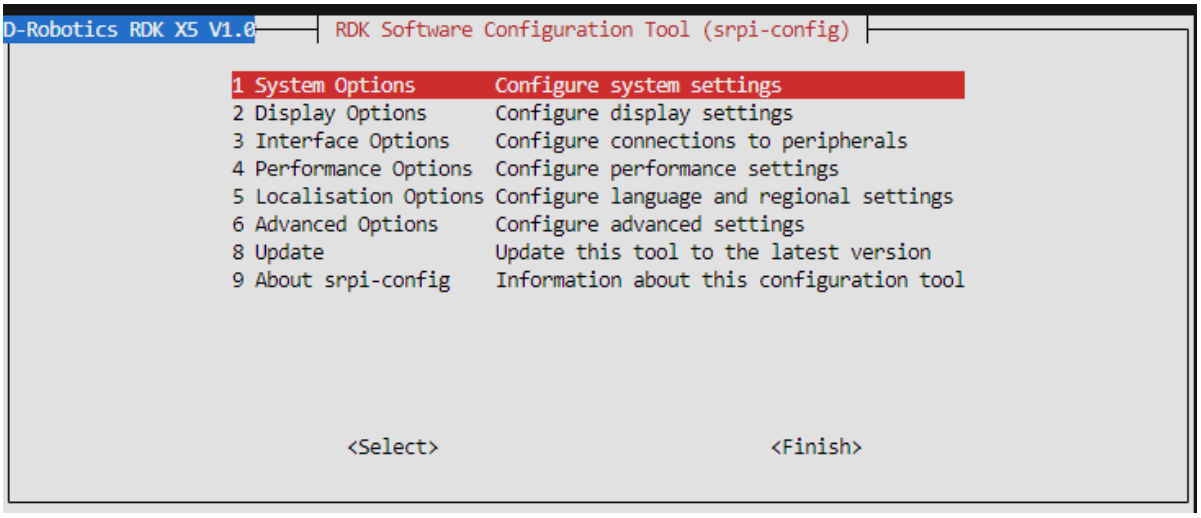
X5 管脚号	BCM 编码	CVM 功能名	物理引脚 BOARD编码		CVM 功能名	BCM 编码	X5 管脚号	功能说明
		VDD_3V3	1	2	VDD_5V			5V电源信号
390	2	I2C5_SDA	3	4	VDD_5V			5V电源信号
389	3	I2C5_SCL	5	6	GND			地信号
420	4	I2S1_MCLK	7	8	UART_TXD	14	383	UART1发送信号
		GND	9	10	UART_RXD	15	384	UART1接收信号
380	17	GPIO17	11	12	I2S1_BCLK	18	421	I2S1 BCLK时钟信号
379	27	GPIO27	13	14	GND			地信号
388	22	GPIO22	15	16	GPIO23	23	382	GPIO23信号
		VDD_3V3	17	18	GPIO24	24	402	GPIO24信号
398	10	SPI1_MOSI	19	20	GND			地信号
397	9	SPI1_MISO	21	22	GPIO25	25	387	GPIO25信号
395	11	SPI1_SCLK	23	24	SPI1_CSN1	8	394	SPI1 SSN1信号
		GND	25	26	SPI1_CSN0	7	396	SPI1 SSN0信号
355	0	I2C0_SDA	27	28	I2C0_SCL	1	354	I2C0时钟信号
399	5	GPIO5	29	30	GND			地信号
400	6	GPIO6	31	32	PWM6	12	356	PWM6信号
357	13	PWM7	33	34	GND			地信号
422	19	I2S1_LRCK	35	36	GPIO16	16	381	
401	26	GPIO26	37	38	I2S1_SDIN	20	423	I2S1 DI信号
		GND	39	40	I2S1_SDOUT	21	424	I2S1 DO信号

3. Experimental steps and experimental results

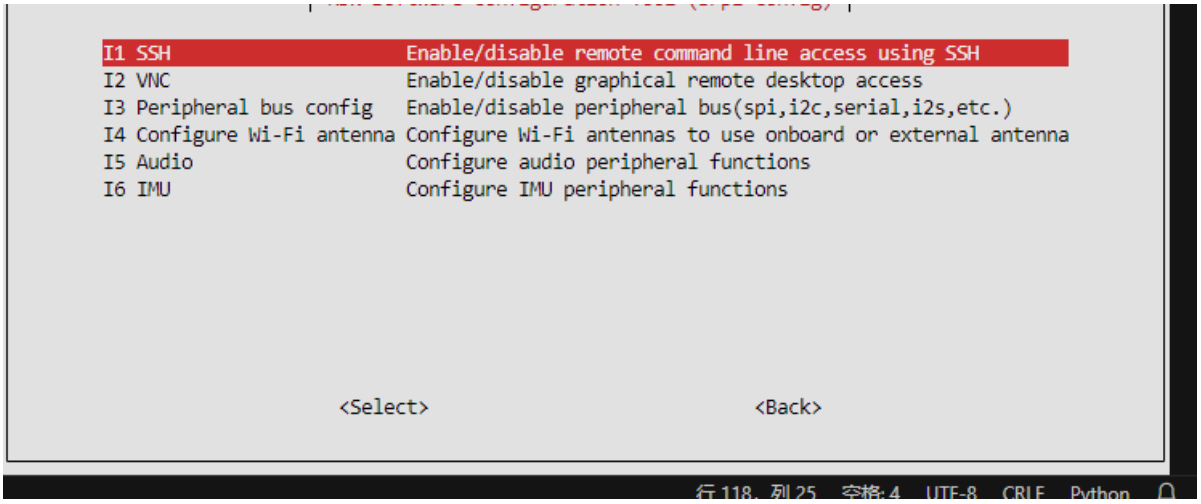
Quick method: You can directly connect to the wifi opened by esp32. The name of this experiment is ESP32_WIFI_TEST. Then the IP address camera information of the mobile app is 192.169.4.1. You can use the app to control the servo

1. Upload the provided program source code "sunrise_servo.py" file to your own x5 motherboard.
2. The official image of the x5 motherboard only opens serial port 1 by default. Now you need to open serial port 2 as well. Enter in the terminal,

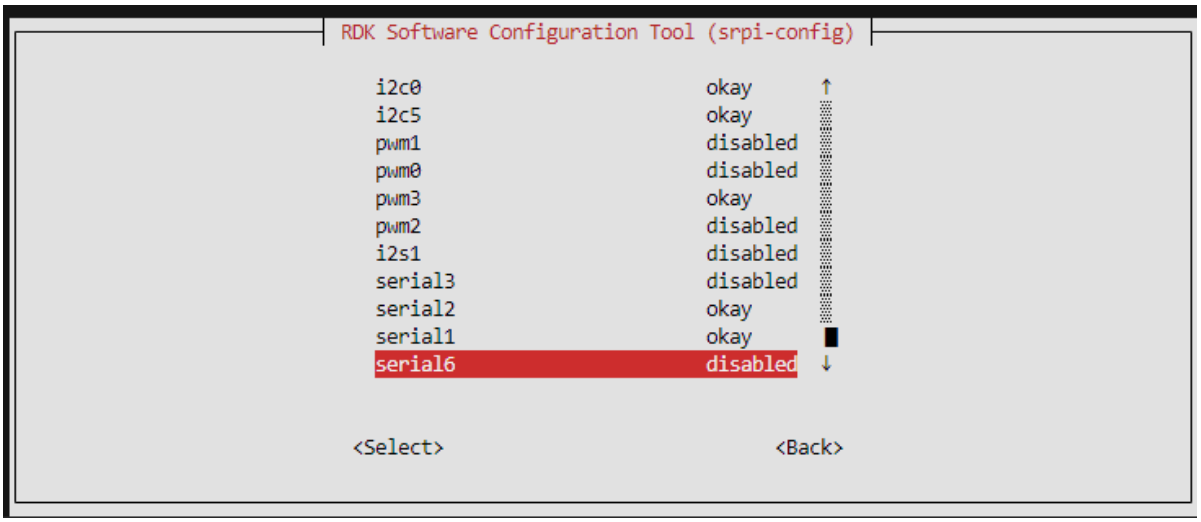
```
sudo srpi-config
```



Select Interface Options,



Select I3 Peripheral bus config, look down and see if the serial2 suffix is okay. If not, press Enter to enable it. Then restart the x5 and it will be ready for use.



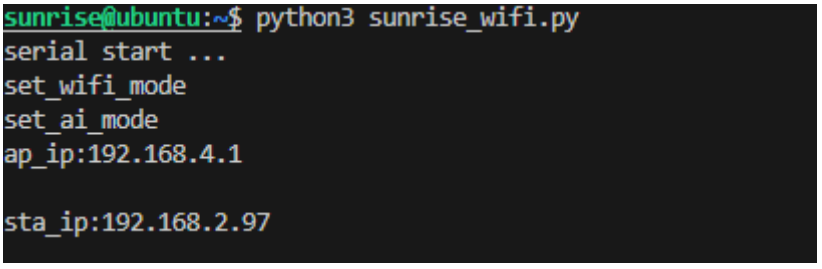
3. Open the code just uploaded, and change it to the name and password of the wifi you want to connect to. You can also change the name of the hotspot and the corresponding wifi mode.

```
Sta_wifi_ssid = "Yahboom2"        #sta的wifi名称 wifi name of sta
Sta_wifi_pd = "yahboom890729"          #sta的wifi名称 wifi name of sta

AP_wifi_ssid = "ESP_WIFI_TEST"  #ap的WiFi名称 The WiFi name of the ap
AP_wifi_pd = ""                 #ap的wifi密码 ap's wifi password
```

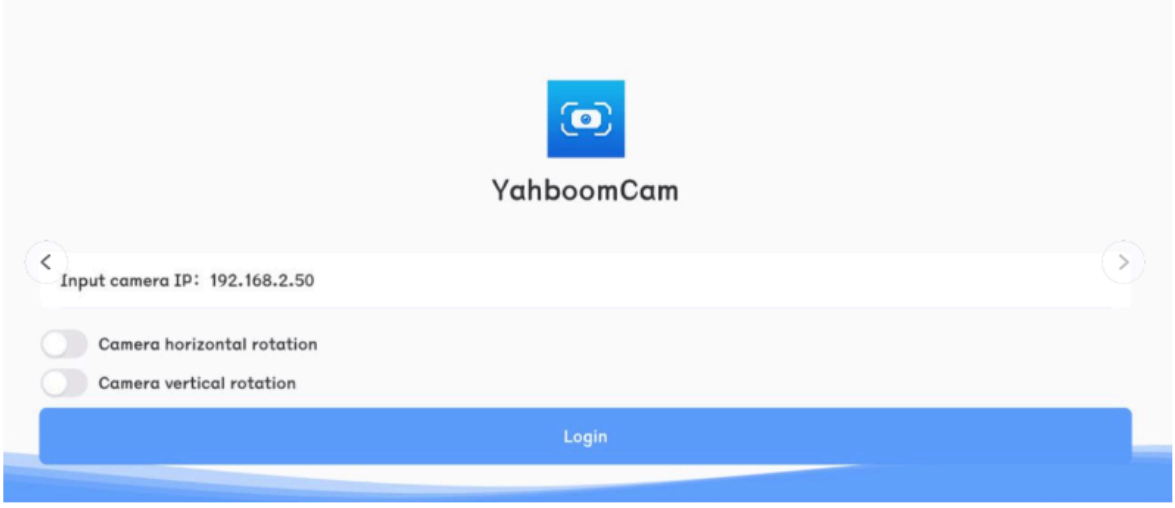
4. Run the program in the terminal, and it will return the IP address of the current network connection and the address of the hotspot.

```
python3 sunrise_servo.py
```

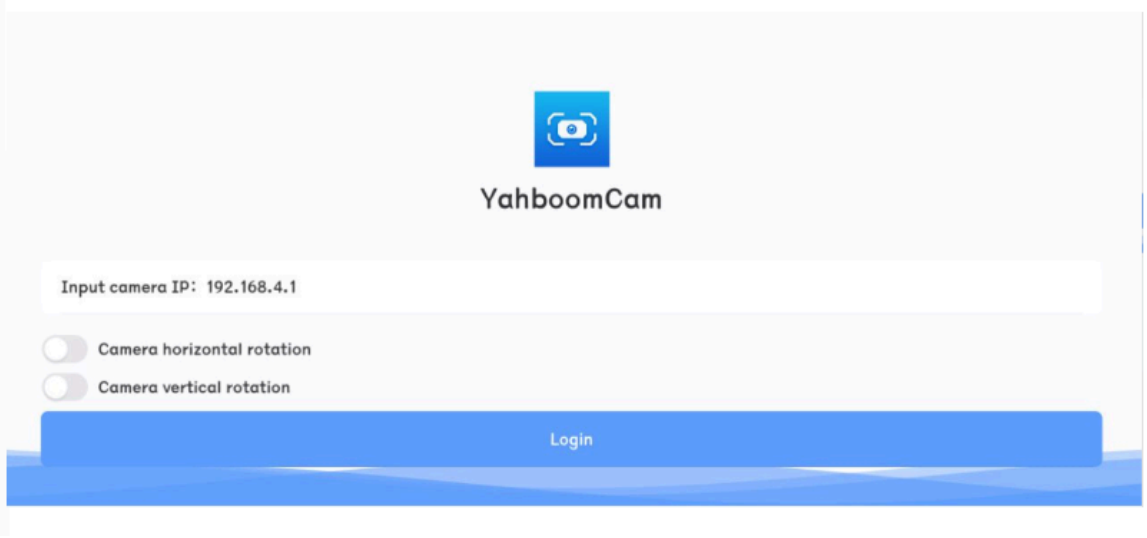


5. Use the app to control the movement of the car. After installing the "ESP32Cam" app, open it.

- On the login page, set it according to the IP obtained by the serial port assistant. If the IP obtained by the serial port assistant is "192.168.2.110", then the configuration is as follows

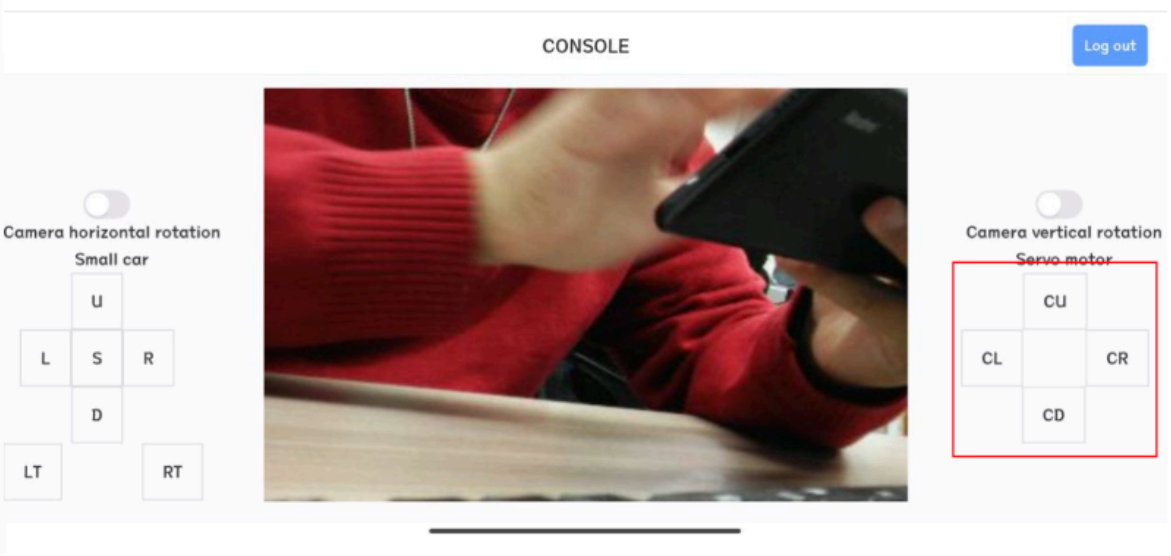


- Then click login directly
- (Optional) If you want to connect to the hotspot of the wifi camera, the IP address must be set to 192.168.4.1, as shown in the figure



- When the IP address is configured correctly and connected successfully, you can control the servo gimbal through the app console page

Horizontal screen



Note: Every time you restart the app, you need to click the exit button in the upper right corner, then exit and reconfigure the IP address information before logging in