8、Gimbal Tracking Color

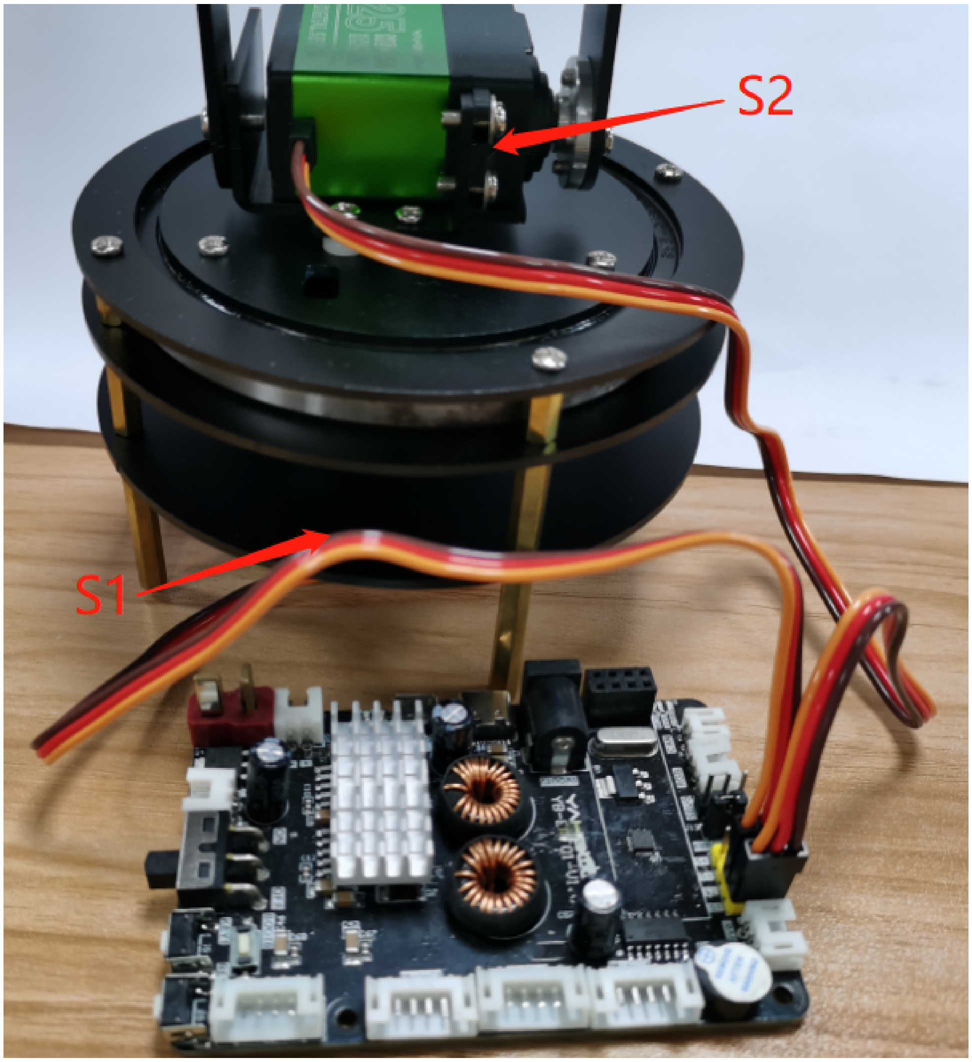
8.1、Experiment Description

Note: This experiment is an expansion experiment and needs to be used with other external devices. The car chassis and ROS expansion board used here are not part of the K210 development board kit, so the effect of this experiment is for reference only. If there is no corresponding device, it cannot be used. Use this example code directly.

The ROS expansion board needs to flash the firmware in advance: ROS-CAR.hex

The corresponding interface for connecting the gimbal servo to the ROS expansion board is:

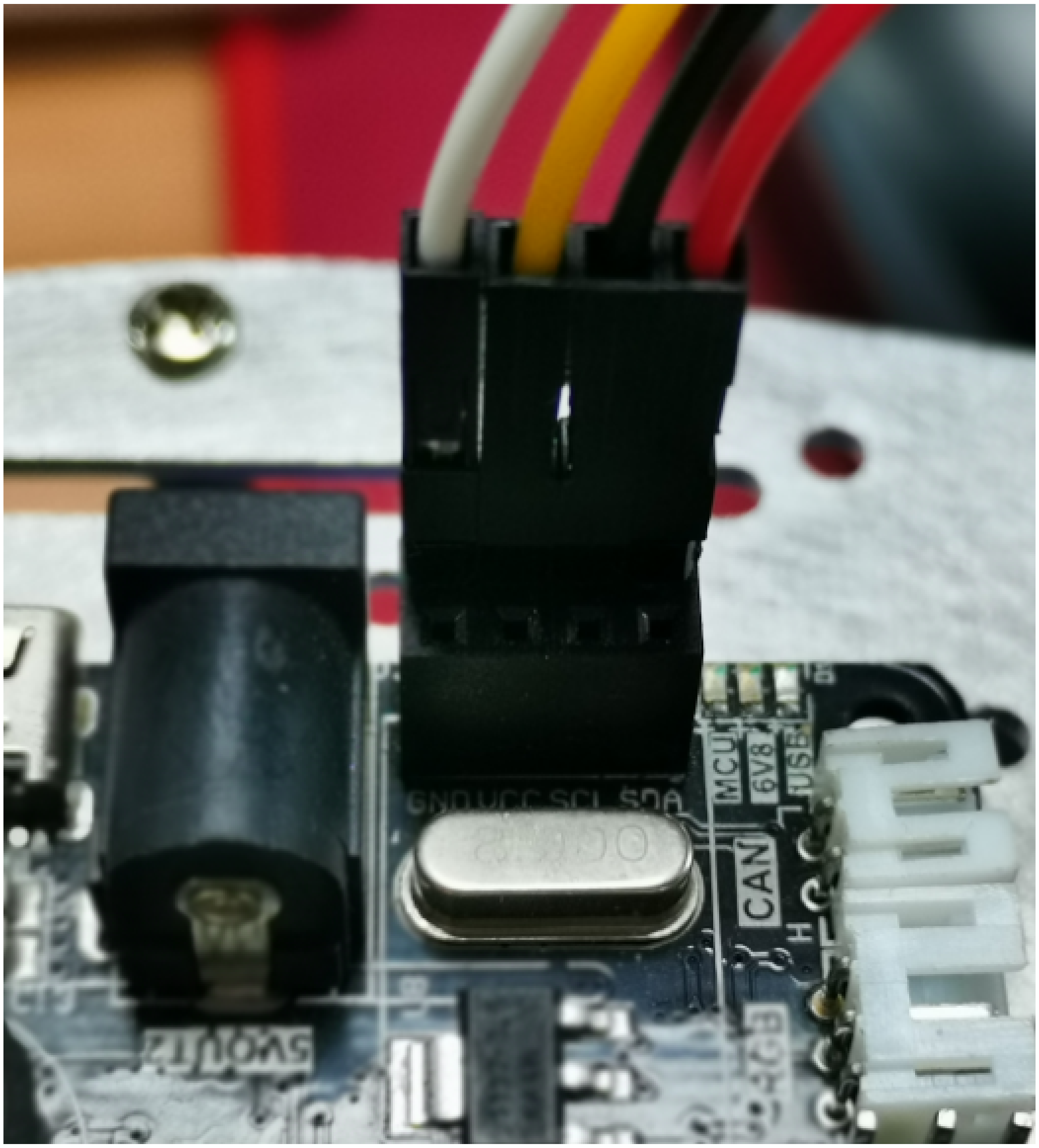
S1 is connected to the X-axis servo, and S2 is connected to the Y-axis servo. The yellow wire is the signal, the red wire is VCC, and the black wire is GND.



The wiring sequence of the connection between the K210 development board and the ROS expansion board is shown in the figure below:

The white wire is connected to GND, the yellow wire is connected to VCC, the black wire is connected to SCL, and the red wire is connected to SDA.

It should be noted here that the logo in the diagram is the I2C line sequence logo, but the K210 uses serial port communication. Since the burned ROS-CAR.hex file has changed this interface to a serial port signal, the actual ROS expansion board The corresponding relationship of the interface is: SCL is actually TX, and SDA is actually RX.



8.2、Experimental goal

This lesson mainly learns the function of K210 development board and car chassis for visual line inspection.

The reference code path for this experiment is： 06-export\tracking_color.py

8.3、Experimental steps

1. ROS expansion board flash firmware: ROS-CAR.hex
2. Insert the RGB light bar into the RGB light interface of the ROS expansion board.
3. Please download the trolley driver library and PID control library in the 06-export\library directory to the root directory of the memory card in advance.
4. Open the CanMV IDE, open the tracking_color.py code and download it to the K210 development board.

5. Connect the K210 development board to the ROS expansion board through the 4PIN cable
6. Put the gimbal on a white or black background, and then turn on the power of the ROS expansion board.
7. A white box is displayed in the middle of the screen, put the color to be tracked into the box, wait for the box to turn green, then start learning the color, wait for the green box to disappear, then the learning is complete, and the gimbal will follow the color just learned.

8.4、Experimental effect

After the system initialization is completed, the K210 development board will follow the color immediately after learning the color. You can move the color block up, down, left or right. The gimbal will track the movement of the color block and keep the color block as close as possible. middle of the screen.

If the tracking response is too fast or too slow, you can properly modify the PID parameters in the program.

```
PIDx = (50, 0, 3)
PIDy = (50, 0, 2)
SCALE = 1000.0

PID_x = PID(
    160,
    PIDx[0] / 1.0 / (SCALE),
    PIDx[1] / 1.0 / (SCALE),
    PIDx[2] / 1.0 / (SCALE))

PID_y = PID(
    120,
    PIDy[0] / 1.0 / (SCALE),
    PIDy[1] / 1.0 / (SCALE),
    PIDy[2] / 1.0 / (SCALE))
```

8.5、Experiment summary

The gimbal tracking color method is based on the color recognition function. The position coordinates of the recognized colors are calculated by the PID algorithm to calculate the position where the gimbal needs to move, so that the gimbal can track the color block in motion. Due to frame rate and recognition limitations, the movement of color blocks cannot be too fast, otherwise the gimbal may not be able to keep up with the response.