

5. Bind the device ID

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When the robot uses two or more USB serial port devices, the corresponding relationship between the device name and the device is not fixed, but is assigned according to the order in which the device is connected to the system. Inserting a device and then another device can determine the relationship between the device and the device name, but each time the system starts, you need to insert and remove the device, which is very troublesome. The serial port can be mapped to a fixed device name, regardless of the insertion order, the device will be mapped to the new device name, we only need to use the new device name to read and write operations on the device.

Note: The ID of the matching device has been bound to the system image. The following steps can be used for binding new devices.

5.1 Device view

After SSH connects to the car, terminal input,

```
lsusb
```

Astra has an official binding of the ID number of each device file, the handle generally does not need to be bound, the main binding PCB and radar can be.

```
root@ubuntu:/etc/udev/rules.d# lsusb
Bus 002 Device 002: ID 2109:0817 VIA Labs, Inc. USB3.0 Hub
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 007: ID 2109:8817 VIA Labs, Inc.
Bus 001 Device 025: ID 2bc5:0403 Astra depth
Bus 001 Device 024: ID 2bc5:0501 USB 2.0 Hub Astra RGB
Bus 001 Device 023: ID 05e3:0608 Genesys Logic, Inc. Hub
Bus 001 Device 027: ID 1a86:7523 QinHeng Electronics HL-340 USB-Serial adapter PCB
Bus 001 Device 004: ID 2109:2817 VIA Labs, Inc.
Bus 001 Device 028: ID 045e:028e Microsoft Corp. Xbox360 Controller Joy
Bus 001 Device 026: ID 1a86:55d4 QinHeng Electronics USB 2.0 Hub Oradar
Bus 001 Device 002: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

Device number view

```
ls /dev/
```

```

CfW--W---- 1 root tty      4,  7 May 29 16:10 tty7
CfW--W---- 1 root tty      4,  8 May 29 16:10 tty8
CfW--W---- 1 root tty      4,  9 May 29 16:10 tty9
CfWxGfWxGfWx 1 root dialout 166, 0 May 29 16:10 ttyACM0 ← Oradar
CfW----- 1 root root      5,  3 May 29 16:10 ttyprintk
CfW--W---- 1 root tty      240, 0 May 29 16:10 ttyS0
CfW-fW---- 1 root dialout 240, 1 May 29 16:10 ttyS1
CfW-fW---- 1 root dialout 240, 3 May 29 16:10 ttyS3
CfWxGfWxGfWx 1 root dialout 188, 0 May 29 16:10 ttyUSB0 ← PCB
CfW----- 1 root root      236, 0 May 29 16:10 ubi0
CfW----- 1 root root      480, 0 May 29 16:10 ubi10

```

```

CfW-fW----+ 1 root video    81,  8 May 29 16:10 video3
CfW-fW----+ 1 root video    81,  9 May 29 16:10 video4
CfW-fW----+ 1 root video    81, 10 May 29 16:10 video5
CfW-fW----+ 1 root video    81, 11 May 29 16:10 video6
CfW-fW----+ 1 root video    81, 12 May 29 16:10 video7
CfW-fW----+ 1 root video    81, 13 May 29 16:10 video8 ← Astra
CfW-fW---- 1 root root      504,  0 May 29 16:10 vio_bind_info

```

5.2. Device Binding

5.2.1 Astra Camera Binding

The binding rules file for the Astra camera is [56-orbbec-usb.rules], provided by the Astra manufacturer and demonstrated here with Astra Pro.

Place the [56-orbbec-usb.rules] file in the following directory in the cart:

```
/etc/udev/rules.d/56-orbbec-usb.rules
```

Run the following command on the terminal to refresh the USB rules to bind Astra camera.

```
sudo udevadm control --reload-rules && sudo udevadm trigger
```

After the binding is complete, enter the following command,

```
ll /dev/astra*
```

```

root@ubuntu:~# ll /dev/astra*
lrwxrwxrwx 1 root root 6 May 29 15:16 /dev/astra -> video8
lrwxrwxrwx 1 root root 15 May 29 15:16 /dev/astra_pro -> bus/usb/001/012
lrwxrwxrwx 1 root root 15 May 29 15:16 /dev/astrauvc -> bus/usb/001/011

```

If the output is as follows, the binding is successful.

5.2.2 PCB and radar binding

The car terminal executes the following command,

```

#进入rules.d目录
# Go to the rules.d directory
cd /etc/udev/rules.d/
#新建rules文件并编辑
# Create new rules file and edit it
sudo vim yahboomcar.rules

```

Write the following (see tutorial [Linux Basics] for vim command usage)

```
KERNEL=="ttyUSB*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523",  
MODE:="0777", SYMLINK+="myserial"  
KERNEL=="ttyACM*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="55d4",  
MODE:="0777", SYMLINK+="oradar"
```

Save and exit to make the rule take effect. Perform the following operations:

```
sudo udevadm control --reload-rules && sudo udevadm trigger
```

After the binding is complete, enter the following command,

```
ll /dev/myserial #PCB  
ll /dev/oradar #雷达 # Radar
```

```
root@ubuntu:/etc/udev/rules.d# ll /dev/myserial  
lrwxrwxrwx 1 root root 7 May 29 17:13 /dev/myserial -> ttyUSB0  
root@ubuntu:/etc/udev/rules.d# ll /dev/oradar  
lrwxrwxrwx 1 root root 7 May 29 17:13 /dev/oradar -> ttyACM0
```

If the output is as follows, the binding is successful.

5.3 Introduction to Rule file syntax

```
KERNEL=="ttyUSB*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523",  
MODE:="0777", SYMLINK+="myserial"  
KERNEL=="ttyACM*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="55d4",  
MODE:="0777", SYMLINK+="oradar"
```

Parsing

KERNEL	# 匹配事件的设备名 # Name of the device that matches the event
ATTR{filename}	# 匹配事件设备的sysfs属性。 # Matches the sysfs attribute of the event device.
idVendor	# 生产商编号 # Manufacturer ID
idProduct	# 产品号 # Product number
SYMLINK	# 为/dev/下的设备文件产生符号链接。就是给这个设备取一个别名。 # Generate symbolic links for device files in /dev/. Just give the device an alias.
MODE	# 为设备设定权限。 # Sets permissions for the device.

From [6.1], it can be seen that the device number of the PCB is [ttyUSB0], which is easy to jump, and the ID number is [1a86, 7523], which is fixed. [ttyUSB*] means that no matter the device number becomes [ttyUSB] in the future, it is followed by [0, 1, 2, 3, 4,...]. Both are bound to [myserial]; Radar equipment [ttyACM0] the same; The same applies to binding other devices.

Note: When using an alias, do not use some device names that already exist in the system. Otherwise, it will fail.

