6、Bind the device ID

When the robot uses two or more USB serial devices, the corresponding relationship between the device name and the device is not fixed, but is allocated according to the order in which the devices are connected to the system. Inserting one device first and then another device can determine the relationship between the device and the device name, but it is very troublesome to plug and unplug the device every time the system starts. The serial port can be mapped to a fixed device name. No matter what the insertion order is, the device will be mapped to the new device name. We only need to use the new device name to read and write the device.

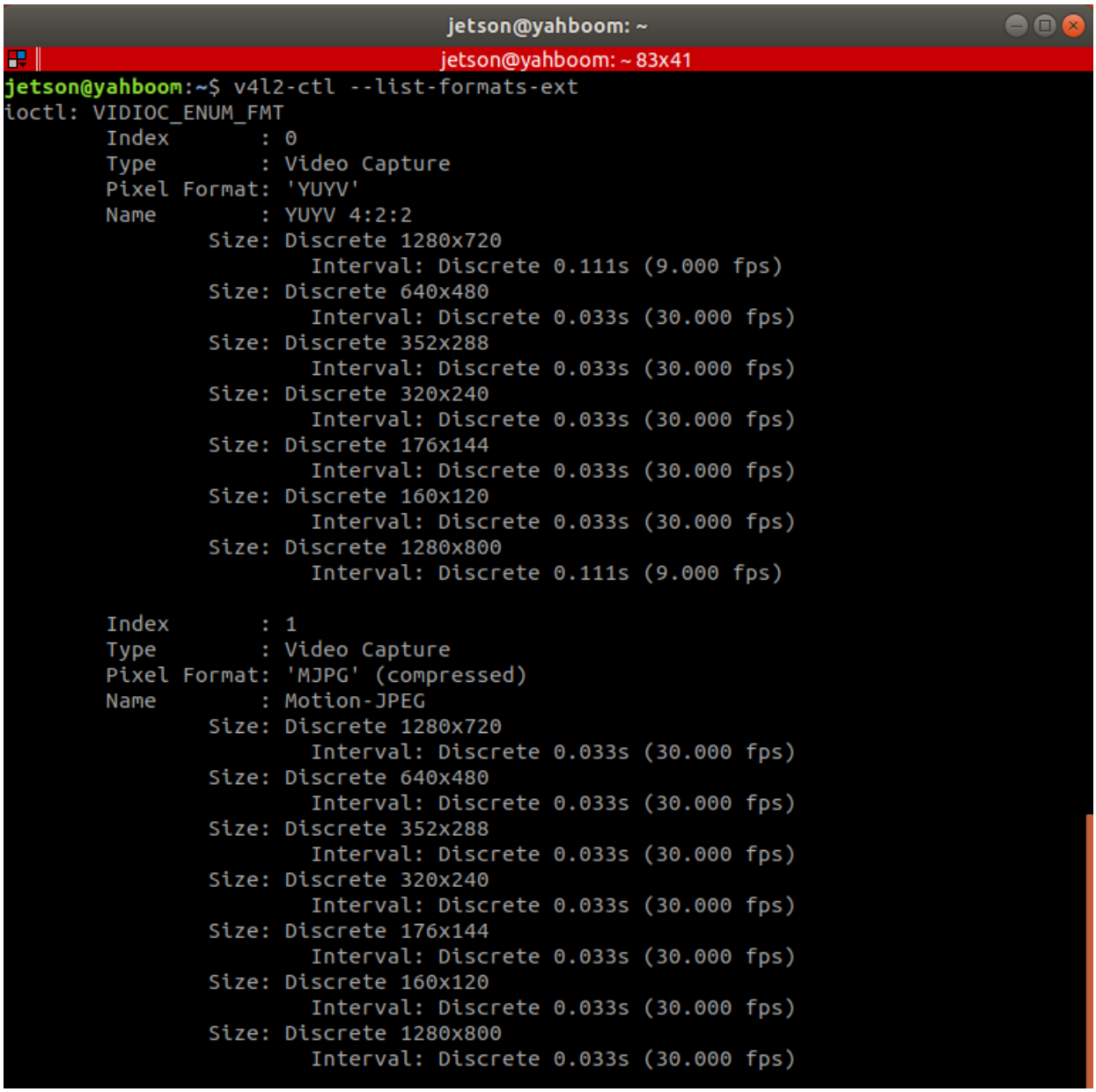
Note: The equipment used below is just an example. Please modify the corresponding content according to the actual equipment parameters.

6.1、Device view command

View camera device parameters

Enter the following command in the terminal to view the corresponding relationship between the camera's pixel size and frame rate.

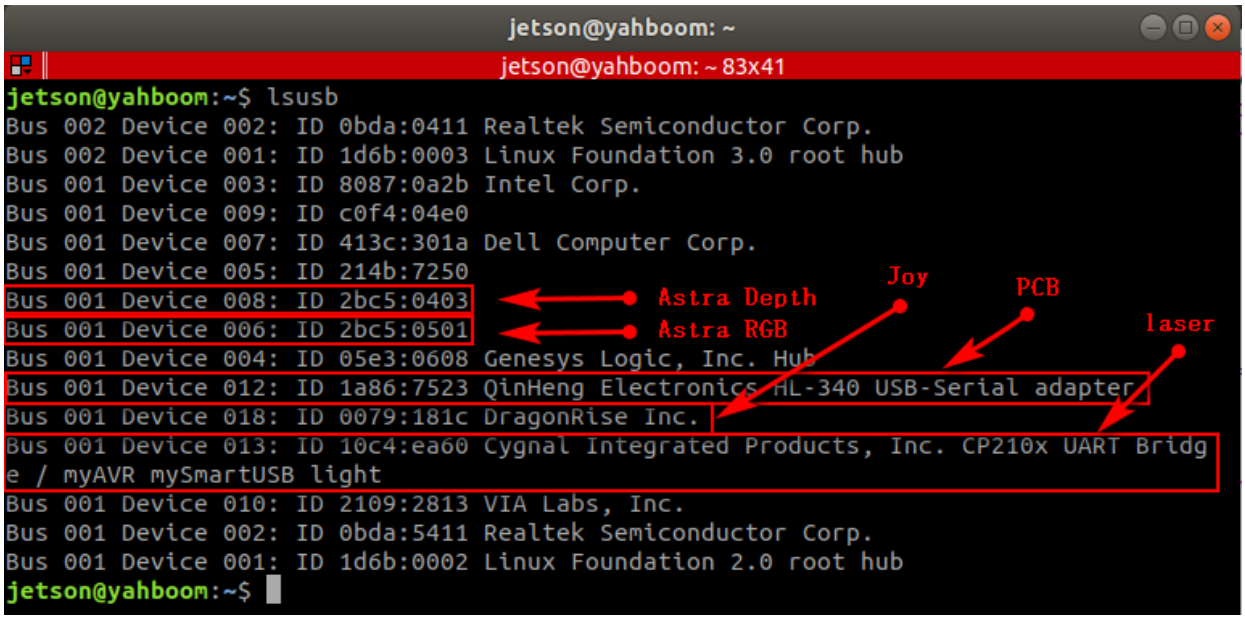
```
v4l2-ctl --list-formats-ext
```



Device ID view

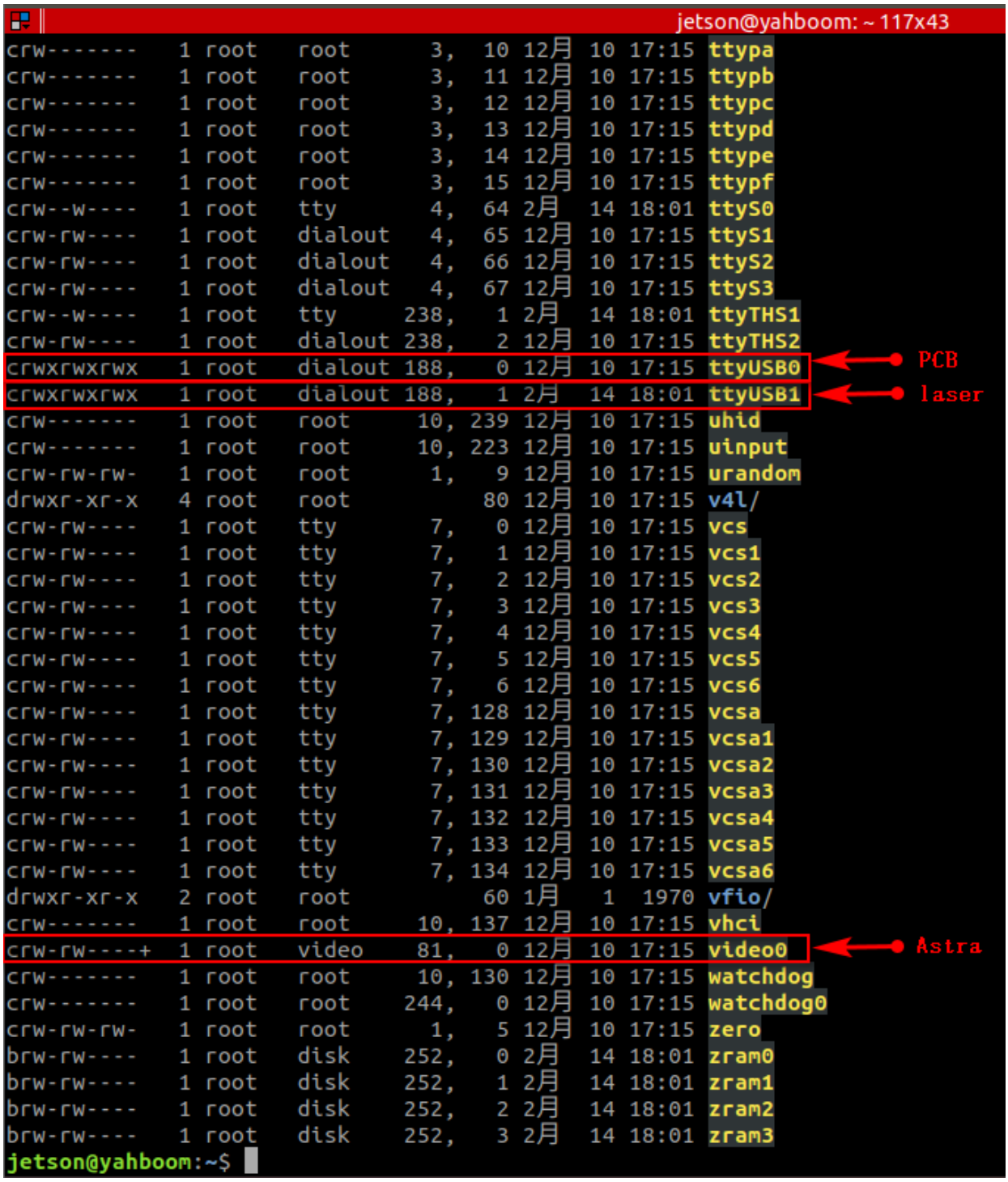
```
lsusb
```

As can be seen from the figure below, the ID number of each device, Astra has the official file for binding the device, the handle generally does not need to be bound, and the main binding is PCB and radar.



View device number

```
ll /dev/
```



6.2、Establish port mapping relationship

6.2.1、Device binding

- **Astra binding**

There is a create_udev_rules file in the scripts folder under the astra_camera function package. Run this file to automatically bind it. Run the command as follows

```
./create_udev_rules
```

Enter the rules.d directory

```
cd /etc/udev/rules.d/
```

You can find the 56-orbbec-usb.rules file, which is the Astra camera device binding file.

- PCB and radar binding

Enter the rules.d directory

```
cd /etc/udev/rules.d/
```

Create a new rplidar.rules file

```
sudo touch rplidar.rules
sudo chmod 777 rplidar.rules
```

Open the rplidar.rules file

```
sudo vim rplidar.rules
```

Write the following

```
KERNEL=="ttyUSB*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523", MODE:="0777",
SYMLINK+="myserial"
KERNEL=="ttyUSB*", ATTRS{idVendor}=="10c4", ATTRS{idProduct}=="ea60", MODE:="0777",
SYMLINK+="rplidar"
```

After saving the text, exit and enter the following command to make the rules take effect.

```
sudo udevadm trigger
sudo service udev reload
sudo service udev restart
```

Re-plug the USB device and check whether the device number binding is normal.

6.2.2、Introduction to rule file syntax

```
KERNEL=="ttyUSB*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523", MODE:="0777",
SYMLINK+="myserial"
KERNEL=="ttyUSB*", ATTRS{idVendor}=="10c4", ATTRS{idProduct}=="ea60", MODE:="0777",
SYMLINK+="rplidar"
```

Parse

```
KERNEL          # The device name that matches the event
ATTR{filename}  # Match the sysfs attribute of the event device.
idVendor        # Vendor ID
idProduct       # product number
SYMLINK         # Generate symbolic links for device files under /dev/. Just give
this device an alias.
MODE            # Set permissions for the device.
```

From [6.1], it is easy to see that the device number of the PCB is [ttyUSB0], and the ID number is [1a86, 7523], which is fixed. 0, 1, 2, 3, 4, ...] are all bound to [myserial]; the same is true for radar device [ttyUSB1]; the same is true for other devices that need to be bound.

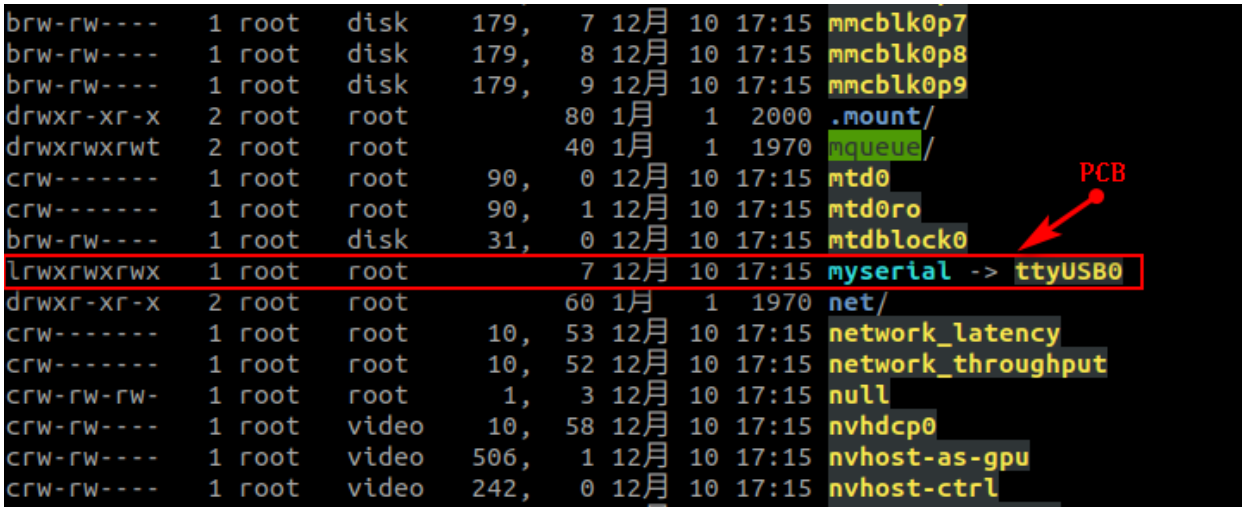
Note: When taking an alias, do not take some device names that already exist in the system, otherwise it will fail.

6.3、Verify View

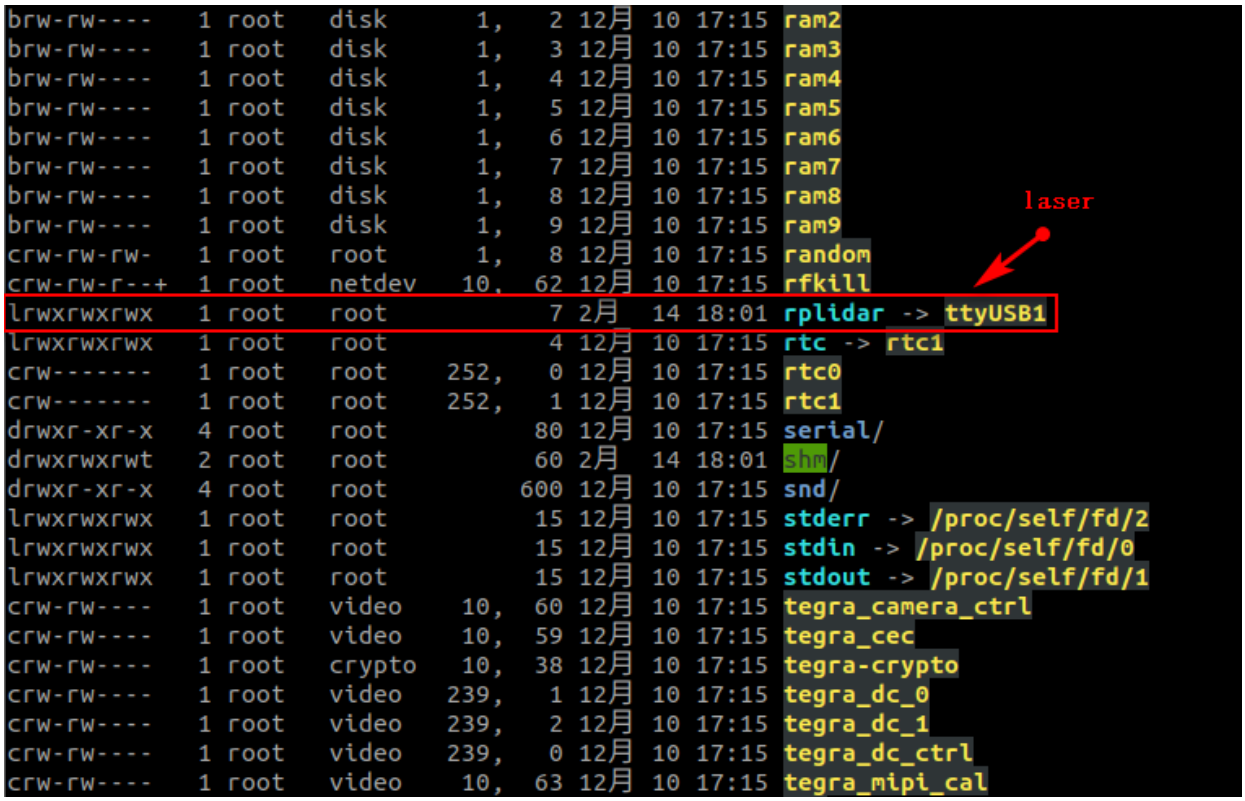
Device number view

```
ll /dev/
```

PCB



laser



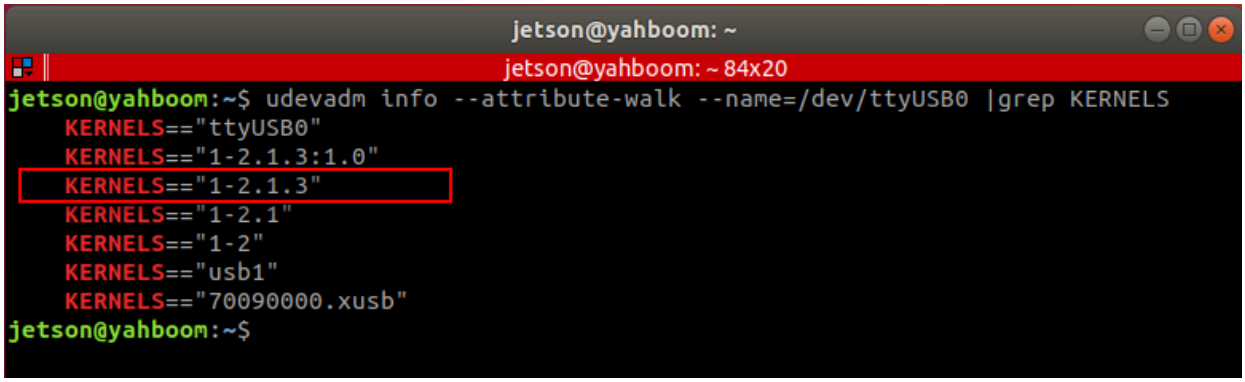
6.4、Binding the USB port

The above situations are all different ID numbers. If the ID numbers of the radar and the PCB are the same, or there are two or more PCBs (radars) with the same ID, the above binding will be confused.

Then, we need to bind the USB port. After binding, the **cannot be changed at will** , and each device **can only be linked to a fixed** USB port.

Binding method, take [ttyUSB0] as an example, check the port of the device at this time .

```
udevadm info --attribute-walk --name=/dev/ttyUSB0 |grep KERNELS
```



What we need is to modify the rules for myserial in the Rules file:

```
# KERNEL=="ttyUSB*", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523",
MODE:="0777", SYMLINK+="myserial"    # before modification:
KERNELS=="1-2.1.3", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523", MODE:="0777",
SYMLINK+="myserial"     # after modification:
```