

1.Project information

transport the binocular camera view to the computer in order to do binocular ranging on the computer by opencv

the drone :Raspberry Pi 4B with rtl8812au network card

the gs : computer with rtl8812au network card (AMD 4800u)

2.compile the rtl8812au patched driver

Computer(gs):

```
//get the patched rtl8812au driver source code
git clone https://github.com/svpcom/rtl8812au.git
//get into the source code
cd rtl8812au
//compile
make
//Install the patched rtl8812au driver module
sudo insmod 88XXau_wfb.ko
```

Now plug in the rtl8812au network card on the computer

```
//viewing network card information
ifconfig -a
```

you will find there's an extra network card like this (the name maybe is not same depend on you device)

```
wlxbcec238b9c99: flags=4098<BROADCAST,MULTICAST> mtu 2312
    ether bc:ec:23:8b:9c:99 txqueuelen 1000 (以太网)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
// look the network card driver information ( the right driver version information is null (maybe) )
//wlanXX is your network card name
ethtool -i wlanXX
```

```
rtl8812au > ethtool -i wlxbcec238b9c99
driver: rtl88XXau_wfb
version:
firmware-version:
expansion-rom-version:
bus-info: 1-1.1:1.0
supports-statistics: no
supports-test: no
supports-eeprom-access: no
supports-register-dump: no
supports-priv-flags: no
```

Raspberry Pi 4B (drone):

//install kernel headers you will get the latest headers ,if you kernel is old ,update it. Use command:

//apt update

//apt upgrade

```
sudo apt-get install raspberrypi-kernel-headers
```

```
//Get the patched rtl8812au driver source code
```

```
git clone https://github.com/svpcom/rtl8812au.git
```

```
//Get into the source code
```

```
cd rtl8812au
```

```
//Setting the configuration file for Raspberry Pi 4B (arm 64 )
```

```
sed -i 's/CONFIG_PLATFORM_I386_PC = y/CONFIG_PLATFORM_I386_PC = n/g' Makefile
```

```
sed -i 's/CONFIG_PLATFORM_ARM64_RPI = n/CONFIG_PLATFORM_ARM64_RPI = y/g' Makefile
```

```
//Compile
```

```
make
```

```
//Install the patched rtl8812au driver module
```

```
sudo insmod 88XXau_wfb.ko
```

Now plug in the rtl8812au network card on theRaspberry Pi 4B

```
//viewing network card information
```

```
ifconfig -a
```

you will fine there's an extra network card like this (the name maybe is not same depend on you device)

```
wlan1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 2312
    inet6 fe80::2cfb:2332:dde2:a8c9 prefixlen 64 scopeid 0x20<link>
    ether bc:ec:23:8b:9c:8a txqueuelen 1000 (Ethernet)
    RX packets 29 bytes 1650 (1.6 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8 bytes 1505 (1.4 KiB)
    TX errors 0 dropped 3 overruns 0 carrier 0 collisions 0
```

```
// look the network card driver information wlanXX is your network card name
```

```
ethtool -i wlanXX
```

```
pi@raspberrypi:~/rtl8812au$ ethtool -i wlan1
driver: rtl88XXau_wfb
version: 5.15.32-v8+
firmware-version:
expansion-rom-version:
bus-info: 1-1.1:1.0
supports-statistics: no
supports-test: no
supports-eprom-access: no
supports-register-dump: no
supports-priv-flags: no
```

3.Install the wifibroadcast

Drone and gs :

```
//get the wifibroadcast source code
```

```
Git clone https://github.com/svpcom/wifibroadcast.git
```

```
//Get into the source code
```

```
cd wifibroadcast
```

```
// Generating installation packages
```

```
make deb
```

```
//get into the deb directory
```

```
cd deb_dist
```

```
//install wifibroadcast deb
```

```
dpkg -i wifibroadcast_22.3.31.48818-1_all.deb (the name maybe is not same.insall the deb both computer and Raspberry Pi4B)
```

set configuration file and other operating :

On computer or on Pi4B just choose one :

```
//Get into the source code
```

```
cd wifibroadcast
```

```
// generate the key
```

```
./wfb_keygen
```

you will get the drone.key and gs.key on the wifibroadcast directory

cp the gs.key to the computer's /etc and cp drone.key to the Raspberry Pi 4B 's /etc(you can use the ftp or something)

Create /etc/wifibroadcast.cfg with following content: common part for gs and drone:

```
[common]
```

```
wifi_channel = 161 # 161 -- radio channel @5825 MHz, range: 5815–5835 MHz, width 20MHz
```

```
# 1 -- radio channel @2412 Mhz,
```

```
# see https://en.wikipedia.org/wiki/List\_of\_WLAN\_channels for reference
```

```
wifi_region = 'BO' # Your country for CRDA (use BO or GY if you want max tx power)
```

Please note that radio band (2.4 or 5.8 GHz) depends on your wifi adapter model and used antennas!

add to gs:

```
[gs_mavlink]
```

```
peer = 'connect://127.0.0.1:14550' # outgoing connection
```

```
# peer = 'listen://0.0.0.0:14550' # incoming connection
```

```
[gs_video]
```

```
peer = 'connect://127.0.0.1:5600' # outgoing connection for
```

```
    # video sink (QGroundControl on GS)
```

add to drone:

```
[drone_mavlink]
```

```
# use autopilot connected to /dev/ttyUSB0 at 115200 baud:
```

```
peer = 'serial:ttyUSB0:115200'
```

```
# Connect to autopilot via malink-router or mavlink-proxy:
```

```
# peer = 'listen://0.0.0.0:14550' # incoming connection
```

```
# peer = 'connect://127.0.0.1:14550' # outgoing connection
```

```
[drone_video]
```

```
peer = 'listen://0.0.0.0:5602' # listen for video stream (gstreamer on drone)
```

See `telemetry/conf/master.cfg` for all available options and default values.

More see <https://github.com/svpcom/wifibroadcast/wiki/Setup-HOWTO>

DISABLE other software interfere with the network interface(such as NetworkManager, wpa_supplicant and so on)

both drone and gs need

Edit `/etc/default/wifibroadcast` and repaace `wlan0` with proper wifi interface name. Also add to `/etc/NetworkManager/NetworkManager.conf` following section(if you have installed the NetworkManager):

```
[keyfile]
```

```
unmanaged-devices=interface-name:wlan0
```

to ignore WFB interface. **Disable wpa_supplicant and other daemons on WFB wlan interface!**
Use `ps uaxwww | grep wlan` to check. Double check that card is in **unmanaged state** in `nmcli` output and `ifconfig wlanXX` **doesn't show any address and card state is down.**

TEST:

Now you have finished all the prepare work: install rlt8812au driver, install wifibroadcast, set wifibroadcast config file, disable other software interfere with the rlt8812au interface for wifibroadcast;

now we have a test;

start wifibroadcast(sure the config file's channels is same)

```
//start wifibroadcast
```

```
//on Pi 4B (change the wlan1 with you wlan name):
```

```
sudo python3 -m telemetry.server drone wlan1
```

```
//on computer(change the wlan2 with you wlan name):
```

```
sudo python3 -m telemetry.server gs wlan2
```

Generate a video stream and accept

```
// Generate a video stream on Pi4B (the port=5602 is according  
//to your config file /etc/wifibroadcast.cfg on pi4b)
```

```
gst-launch-1.0 videotestsrc ! video/x-raw,format=NV12,framerate=30/1 ! x264enc  
bitrate=4000 tune=zerolatency ! rtph264pay mtu=1400 config-interval=1 ! udpsink  
host=127.0.0.1 port=5602
```

```
//Accept a video stream on computer(the port=5600 is according  
//to your config file /etc/wifibroadcast.cfg on computer)
```

```
gst-launch-1.0 udpsrc do-timestamp=true port=5600 caps='application/x-rtp,  
media=(string)video, clock-rate=(int)90000, encoding-name=(string)H264' ! rtph264depay !  
avdec_h264 ! xvimagesink sync=false
```

wait for a while you will see the video on my computer

you can also use the ffmpeg to generate a video stream but I have failed

you can use the `wfb-cli gs` to check the connect status on computer

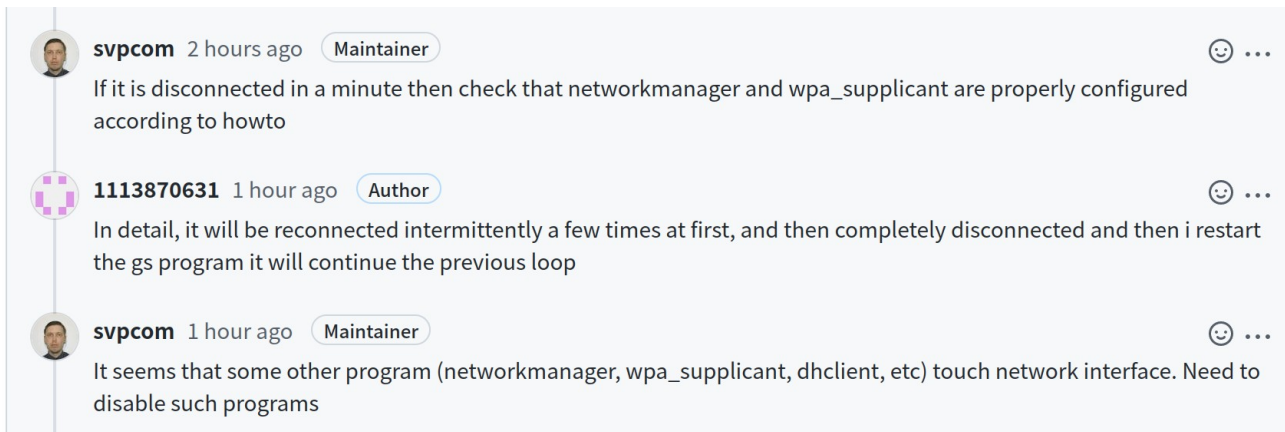
`wfb-cli drone` is also ok more see

<https://github.com/svpcom/wifibroadcast/discussions/212>

you can also test it by one computer with two rlt8812au

See <https://github.com/svpcom/wifibroadcast/discussions/198>

if you connection is not stable check if other software interfere with the network interface(such as NetworkManager, wpa_supplicant and so on) Use `ps uaxwww | grep wlan`



The screenshot shows a GitHub discussion thread with three messages. The first message is from user 'svpcom' (Maintainer) posted 2 hours ago, stating: 'If it is disconnected in a minute then check that networkmanager and wpa_supplicant are properly configured according to howto'. The second message is from user '1113870631' (Author) posted 1 hour ago, stating: 'In detail, it will be reconnected intermittently a few times at first, and then completely disconnected and then i restart the gs program it will continue the previous loop'. The third message is from user 'svpcom' (Maintainer) posted 1 hour ago, stating: 'It seems that some other program (networkmanager, wpa_supplicant, dhclient, etc) touch network interface. Need to disable such programs'.

For more :

<https://github.com/svpcom/wifibroadcast/discussions/212>

<https://github.com/svpcom/wifibroadcast/discussions/198>

<https://github.com/svpcom/wifibroadcast/wiki>

the last but not least thank for the help from svpcom

<https://github.com/svpcom>

By 1113870631

<https://github.com/1113870631>

1.项目信息

通过 wifibroadcast 把图像从树梅派 4B 传到电脑上

飞行器端：树梅派 4B
地面端： 电脑 (amd4800u)
网卡： rtl8812au

2.编译 修改过的 rtl8812au 网卡驱动

电脑端：

```
//克隆源码  
git clone https://github.com/svpcom/rtl8812au.git  
//进入源码目录  
cd rtl8812au  
//编译  
make  
//安装网卡驱动  
sudo insmod 88XXau_wfb.ko
```

把 rtl8812aau 网卡插进电脑

```
ifconfig -a
```

你就能看到出现了一个新网卡接口，如图所示（名字可能不同）

```
wlxbcec238b9c99: flags=4098<BROADCAST,MULTICAST> mtu 2312  
    ether bc:ec:23:8b:9c:99 txqueuelen 1000 (以太网)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

查看网卡驱动信息，如果 version 信息为空就是正确的，如图所示

```
ethtool -i wlanXX
```

```
rtl8812au > ethtool -i wlxbcec238b9c99  
driver: rtl88XXau_wfb  
version:  
firmware-version:  
expansion-rom-version:  
bus-info: 1-1.1:1.0  
supports-statistics: no  
supports-test: no  
supports-eeprom-access: no  
supports-register-dump: no  
supports-priv-flags: no
```

树梅派 4B (drone) :

//安装内核头文件，如果内核比较旧，先更新内核用如下命令

```
//apt update
```

```
//apt upgrade
```

```
sudo apt-get install raspberrypi-kernel-headers
```

```
//得到驱动源码
git clone https://github.com/svpcom/rtl8812au.git
//进入源码目录
cd rtl8812au
//设置配置文件 Raspberry Pi 4B (arm 64 位系统)
sed -i 's/CONFIG_PLATFORM_I386_PC = y/CONFIG_PLATFORM_I386_PC = n/g' Makefile
sed -i 's/CONFIG_PLATFORM_ARM64_RPI = n/CONFIG_PLATFORM_ARM64_RPI = y/g' Makefile
//编译
make
//安装驱动
sudo insmod 88XXau_wfb.ko
```

把网卡插到 Pi 4B

```
ifconfig -a
```

你将看到一个新的网卡（名字可能不同）如图所示

```
wlan1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 2312
    inet6 fe80::2cfb:2332:dde2:a8c9 prefixlen 64 scopeid 0x20<link>
    ether bc:ec:23:8b:9c:8a txqueuelen 1000 (Ethernet)
    RX packets 29 bytes 1650 (1.6 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8 bytes 1505 (1.4 KiB)
    TX errors 0 dropped 3 overruns 0 carrier 0 collisions 0
```

```
// 查看网卡驱动信息
```

```
ethtool -i wlanXX
```

```
pi@raspberrypi:~/rtl8812au$ ethtool -i wlan1
driver: rtl88XXau_wfb
version: 5.15.32-v8+
firmware-version:
expansion-rom-version:
bus-info: 1-1.1:1.0
supports-statistics: no
supports-test: no
supports-eeprom-access: no
supports-register-dump: no
supports-priv-flags: no
```

3.安装 wifibroadcast

电脑和树梅派相同的操作（gs & drone）：

```
//克隆 wifibroadcast 源码
```

```
Git clone https://github.com/svpcom/wifibroadcast.git
```



```
//进入源码目录
cd wifibroadcast
// 生成 deb 安装包
make deb
//进入安装包目录
cd deb_dist
//安装安装包
dpkg -i wifibroadcast_22.3.31.48818-1_all.deb (Pi 4B 和电脑端都要进行编译安装)
```

设置配置文件和其他操作：

选择在电脑上或者树梅派上进行如下操作:

```
//进入 wifibroadcast 源码
```

```
cd wifibroadcast
```

```
// 生成 key
```

```
./wfb_keygen
```

你将在当前目录得到 drone.key 和 gs.key

复制 gs.key 到电脑的/etc 目录下，复制 drone.key 到 Pi 4B 的/etc 目录(可以用 ftp 或者 u 盘拷贝)

创建 /etc/wifibroadcast.cfg 文件在树梅派和电脑端 添加如下内容

相同部分（树梅派和电脑都要添加）：

```
[common]
```

```
wifi_channel = 161 # 161 -- radio channel @5825 MHz, range: 5815–5835 MHz, width 20MHz
```

```
    # 1 -- radio channel @2412 Mhz,
```

```
    # see https://en.wikipedia.org/wiki/List\_of\_WLAN\_channels for reference
```

```
wifi_region = 'BO' # Your country for CRDA (use BO or GY if you want max tx power)
```

用 2.4 还是 5.8 GHz 取决于你的网卡是否支持

地面端（电脑）添加如下内容：

```
[gs_mavlink]
```

```
peer = 'connect://127.0.0.1:14550' # mavlink 地址 无人机的一种通信协议 我没用到
```

```
# peer = 'listen://0.0.0.0:14550' # incoming connection
```

```
[gs_video]
```

```
peer = 'connect://127.0.0.1:5600' # 视频流接受地址  
# video sink (QGroundControl on GS)
```

添加如下内容到树梅派 (drone)

```
[drone_mavlink]
```

```
# use autopilot connected to /dev/ttyUSB0 at 115200 baud:我没用到注释了
```

```
#peer = 'serial:ttyUSB0:115200'
```

```
# Connect to autopilot via malink-router or mavlink-proxy:
```

```
# peer = 'listen://0.0.0.0:14550' # incoming connection
```

```
# peer = 'connect://127.0.0.1:14550' # outgoing connection
```

```
[drone_video]
```

```
peer = 'listen://0.0.0.0:5602' # 视频流发送地址 用 gstreamer 将视频流推送到该地址 进行传输
```

看 `telemetry/conf/master.cfg` 获取更多配置信息

更多信息: <https://github.com/svpcom/wifibroadcast/wiki/Setup-HOWTO>

关闭其他软件对 wifibroadcast 网卡接口的控制(如 such as NetworkManager, wpa_supplicant and so on), drone 和 gs 都要设置

编辑 `/etc/default/wifibroadcast` 替换 `wlan0` 用你的网卡接口名字.

添加如下内容到

```
[keyfile]
```

```
unmanaged-devices=interface-name:wlan0
```

`/etc/NetworkManager/NetworkManager.conf` 文件 (如果你装了 NetworkManager)

用 `ps uaxwww | grep wlan` 来检查. 用 `nmcli` 检查 不现实任何 ip 地址

测试:

现在你已经完成了网卡驱动的安装, wifibroadcast 的安装, wifibroadcast 配置文件的设置, 禁用其他软件对网卡的干扰, 现在开始测试

启动 wifibroadcast(确保你的配置文件里的频道信息是相同的否则连不上)

```
//开启 wifibroadcast
```

```
//在 Pi 4B(drone) (换 wlan1 用你自己的网卡接口名字):
```

```
sudo python3 -m telemetry.server drone wlan1
```

```
//在电脑端 (gs) (换 wlan2 用你自己的网卡接口名字):
```

```
sudo python3 -m telemetry.server gs wlan2
```

生成视频流接收视频流

// 在树梅派执行如下命令 在 Pi4B 生成视频流 (这个 port=5602 根据你树梅派上的配置文件写)

```
gst-launch-1.0 videotestsrc ! video/x-raw,format=NV12,framerate=30/1 ! x264enc  
bitrate=4000 tune=zerolatency ! rtph264pay mtu=1400 config-interval=1 ! udpsink  
host=127.0.0.1 port=5602
```

// 在电脑执行如下命令在电脑上接收视频流并播放(这个 port=5602 根据你电脑上的配置文件写)

```
gst-launch-1.0 udpsrc do-timestamp=true port=5600 caps='application/x-rtp,  
media=(string)video, clock-rate=(int)90000, encoding-name=(string)H264' ! rtph264depay !  
avdec_h264 ! xvimagesink sync=false
```

等一会你将看到接受的视频窗口弹出

你也能用 ffmpeg 产生和播放视频流, 但是我失败了

在电脑端 (gs) 用 `wfb-cli gs` 检查连接情况

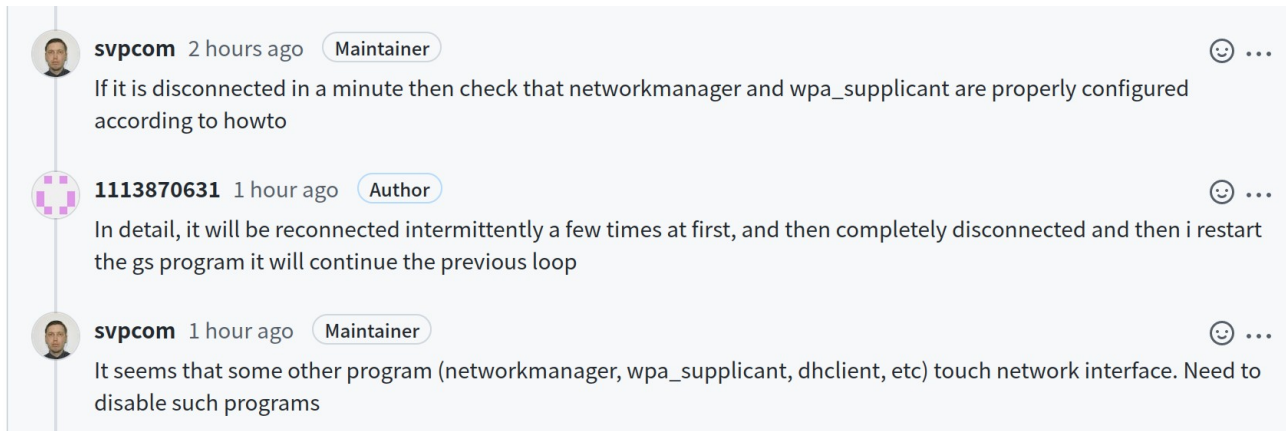
在树梅派用 `wfb-cli drone` 检查连接情况不过 drone 端的连接信息是默认关闭的开启请查看 <https://github.com/svpcom/wifibroadcast/discussions/212>

你也能用一台电脑和两个 rt18812au 测试

参考 <https://github.com/svpcom/wifibroadcast/discussions/198>

如果你的连接不稳定经常断开，请检查是否有其他软件干扰网口(如 NetworkManager, wpa_supplicant 等) 用 `ps uaxwww | grep wlan` 来查看干扰情况

更多：



The screenshot shows a GitHub discussion thread with three messages. The first message is from user 'svpcom' (Maintainer) posted 2 hours ago, stating that if disconnected in a minute, one should check the configuration of networkmanager and wpa_supplicant. The second message is from user '1113870631' (Author) posted 1 hour ago, explaining that the connection will be reconnected intermittently before being completely disconnected and then restarted. The third message is from user 'svpcom' (Maintainer) posted 1 hour ago, suggesting that other programs like networkmanager, wpa_supplicant, or dhclient might be touching the network interface and should be disabled.

<https://github.com/svpcom/wifibroadcast/discussions/212>

<https://github.com/svpcom/wifibroadcast/discussions/198>

<https://github.com/svpcom/wifibroadcast/wiki>

最后非常感谢 **svpcom** 提供的帮助

<https://github.com/svpcom>

By 1113870631

<https://github.com/1113870631>