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 fine 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-eeprom-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 repace `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 uaxwwww | 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 parpare work:insall 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 connetc status on compute
```
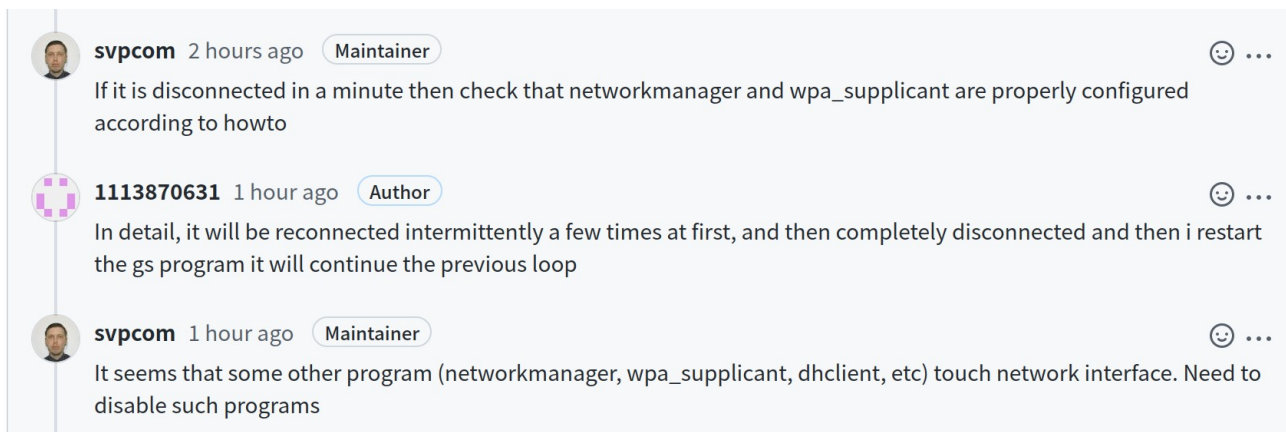
```
wfb-cli drone is also ok more see
```
https://github.com/svpcom/wifibroadcast/discussions/212

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 uaxwwww | grep wlan

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

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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 uaxwwww | 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
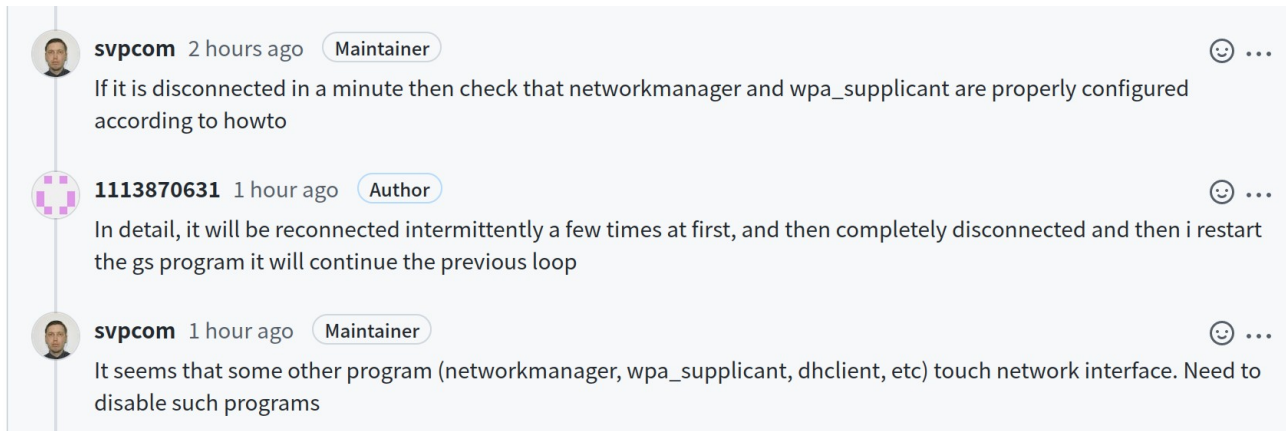
你也能用 ffmpeg 产生和播放视频流，但是我失败了

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 rtl8812au 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 uaxwwww | grep wlan` 来查看干扰情况

更多：

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

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