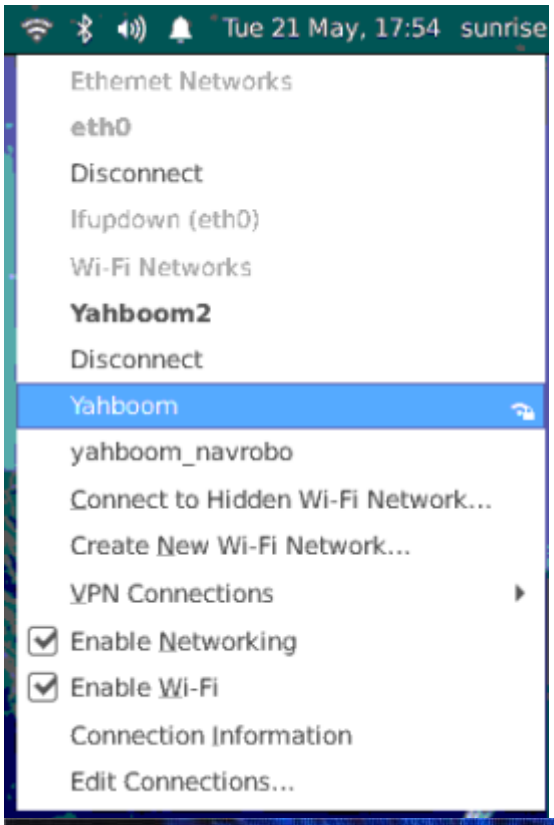
网络配置

1. 连接Wi-Fi

- **桌面系统**

使用菜单栏右上角的Wi-Fi管理工具连接Wi-Fi，如下图所示，点击需要连接的Wi-Fi名，然后在弹出的对话框中输入Wi-Fi密码。



- **命令行**

  对于使用Ubuntu Server版本系统的用户，可通过命令行完成无线网络配置，步骤如下：

```
sudo nmcli device wifi rescan        # 扫描wifi网络
sudo nmcli device wifi list          # 列出找到的wifi网络
```

输入如下指令即可连接到指定的wifi网络，

```
sudo wifi_connect "SSID" "PASSWD"
```

等到终端返回信息“successfully activated"就说明WIFI连接成功。
如果连接热点后，返回如下信息，说明热点没有找到，可以执行sudo nmcli device wifi rescan命令重新扫描后再次连接

```
root@ubuntu:~# sudo wifi_connect "WiFi-Test" "12345678"
Error: No network with SSID 'WiFi-Test' found.
```

2. 有线网络

开发板有线网络默认采用静态IP配置，初始IP地址为"192.168.1.10"
开发板静态网络配置保存在`/etc/network/interfaces`文件中，通过修改`address`、`netmask`、`gateway`等字段，可完成对静态IP配置的修改，`metric`是网络优先级配置，设置为`700`是为了让有线网络的优先级更低，当有线和无线网络同时使能时优先会使用无线网络，例如：

```
sudo vim /etc/network/interfaces
```

```
# interfaces(5) file used by ifup(8) and ifdown(8)
# Include files from /etc/network/interfaces.d:
source-directory /etc/network/interfaces.d
auto eth0
iface eth0 inet static
    address 192.168.1.10
    netmask 255.255.255.0
    gateway 192.168.1.1
    metric 700
```

修改完成后，命令行输入`sudo restart_network`命令让配置生效。

3. Soft AP模式

开发板无线网络默认运行在Station模式下，如需使用Soft AP模式，请按照以下步骤进行配置：

1. 安装`hostapd`和`isc-dhcp-server`

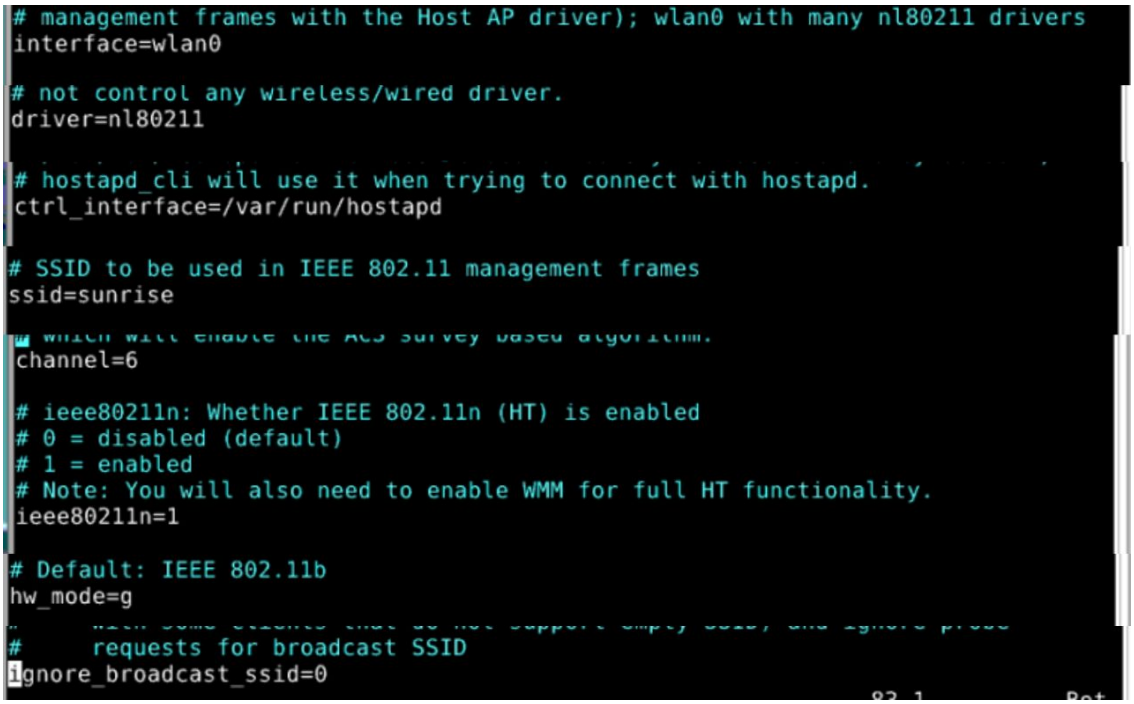
```
sudo apt update
sudo apt install hostapd
sudo apt install isc-dhcp-server
```

```
sunrise@ubuntu:~$ sudo apt update
Hit:1 http://mirrors.tuna.tsinghua.edu.cn/ubuntu-ports focal InRelease
Hit:2 http://sunrise.horizon.cc/ubuntu-rdk focal InRelease
Hit:3 http://mirrors.tuna.tsinghua.edu.cn/ubuntu-ports focal-security InRelease
Hit:4 http://mirrors.tuna.tsinghua.edu.cn/ubuntu-ports focal-updates InRelease
Hit:5 http://mirrors.tuna.tsinghua.edu.cn/ubuntu-ports focal-backports InRelease
Get:6 https://mirrors.tuna.tsinghua.edu.cn/ros2/ubuntu focal InRelease [4,685 B]
Fetched 4,685 B in 2s (2,367 B/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
140 packages can be upgraded. Run 'apt list --upgradable' to see them.
sunrise@ubuntu:~$ sudo apt install hostapd
Reading package lists... Done
Building dependency tree
Reading state information... Done
hostapd is already the newest version (2:2.9-1ubuntu4.3).
The following package was automatically installed and is no longer required:
  libdbus-glib-1-2
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 140 not upgraded.
sunrise@ubuntu:~$ sudo apt install isc-dhcp-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libdbus-glib-1-2
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  isc-dhcp-common libirs-export161 libisccfg-export163
Suggested packages:
  isc-dhcp-server-ldap policycoreutils
The following NEW packages will be installed:
  isc-dhcp-common isc-dhcp-server libirs-export161 libisccfg-export163
0 upgraded, 4 newly installed, 0 to remove and 140 not upgraded.
Need to get 534 kB of archives.
After this operation, 1,992 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

2. 运行 `sudo vim /etc/hostapd.conf` 命令来配置 `hostapd.conf`
    - 无密码的热点配置

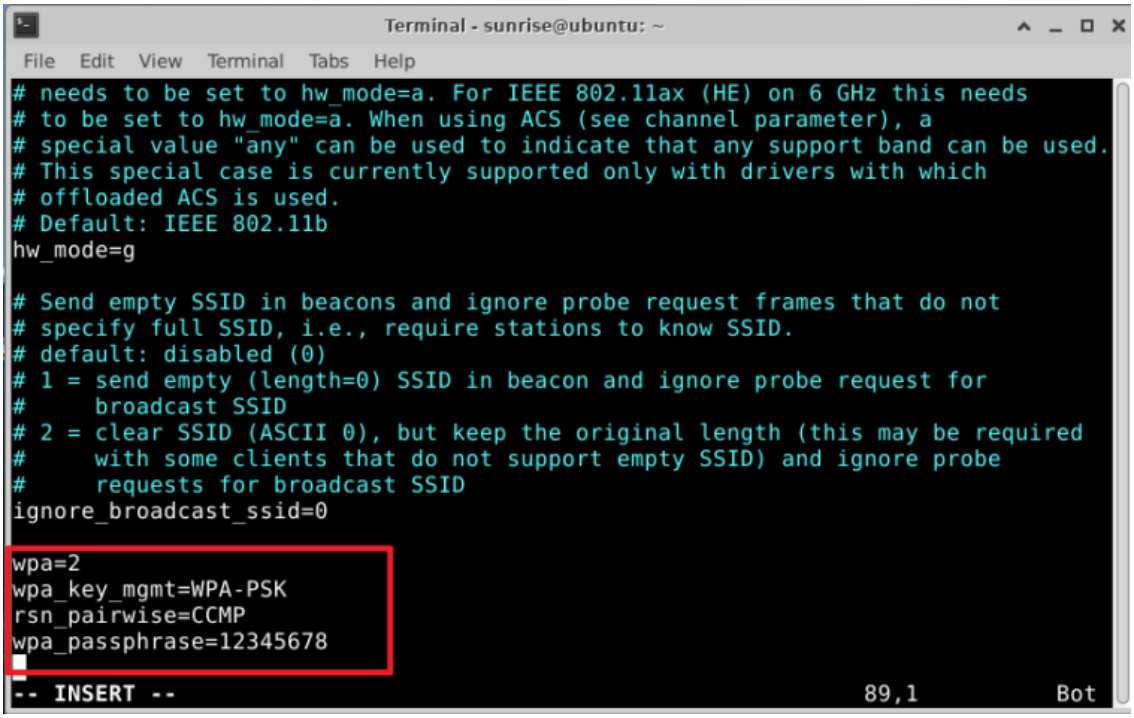
```
interface=wlan0
driver=nl80211
ctrl_interface=/var/run/hostapd
ssid=sunrise
channel=6
ieee80211n=1
hw_mode=g
ignore_broadcast_ssid=0
```

hostapd.conf文件打开默认如图：（配置无密码的热点，可以不用修改）



- 有密码的热点配置

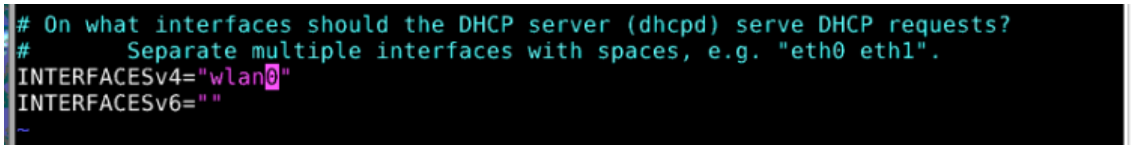
```
interface=wlan0
driver=nl80211
ctrl_interface=/var/run/hostapd
ssid=Sunrise
channel=6
ieee80211n=1
hw_mode=g
ignore_broadcast_ssid=0
wpa=2
wpa_key_mgmt=WPA-PSK
rsn_pairwise=CCMP
wpa_passphrase=12345678
```



按i进入编辑模式，编辑后按Esc退出编辑模式，按：wq写入并关闭

3. 配置`isc-dhcp-server`文件，步骤如下：
   - 执行`sudo vim /etc/default/isc-dhcp-server`修改`isc-dhcp-server`文件，添加如下定义的网络接口：

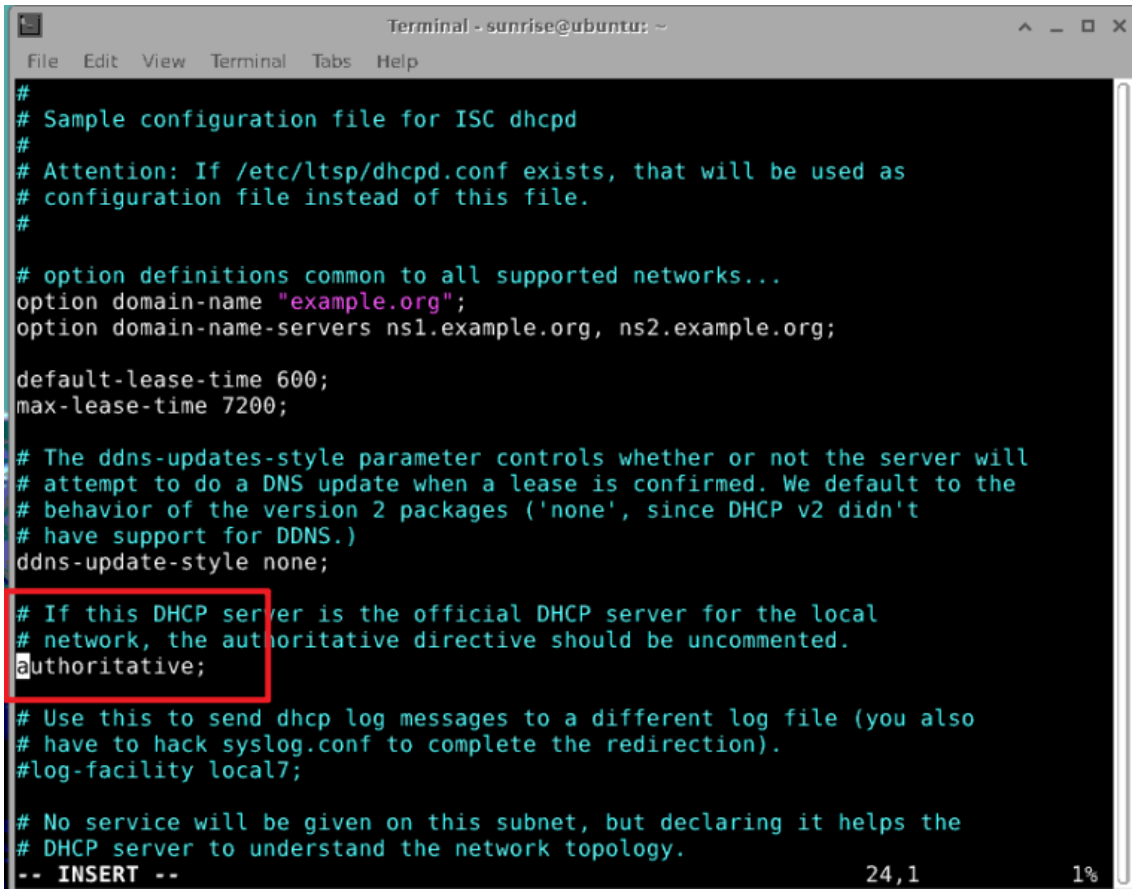
```
INTERFACESv4="wlan0"
```



按i进入编辑模式，编辑后按Esc退出编辑模式，按：wq写入并关闭。

   - 执行`sudo vim /etc/dhcp/dhcpd.conf`修改`dhcpd.conf`文件， 取消以下字段的注释：

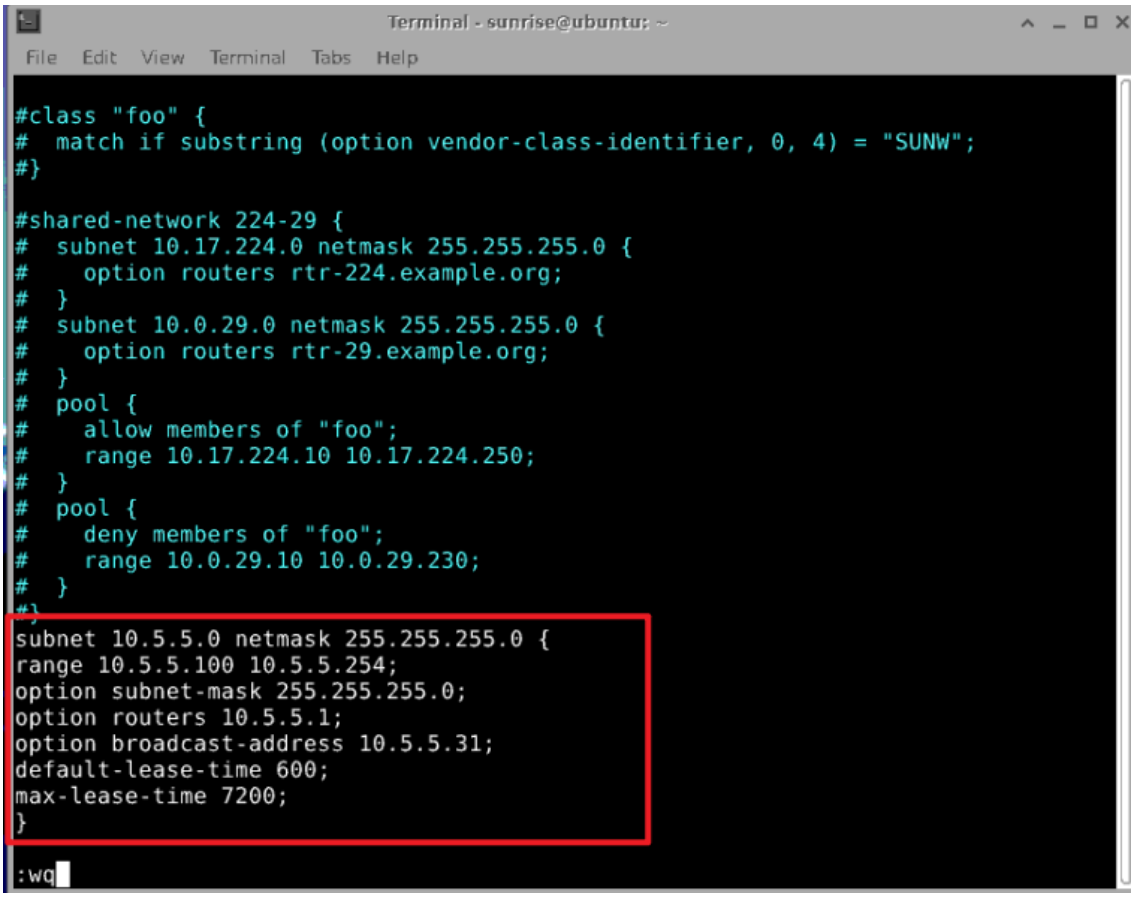
```
  authoritative;
```



按i进入编辑模式，编辑后按Esc退出编辑模式，按：wq写入并关闭。

   - 然后在`/etc/dhcp/dhcpd.conf`文件末尾增加以下配置：

```
    subnet 10.5.5.0 netmask 255.255.255.0 { *#网段和子网掩码*
    range 10.5.5.100 10.5.5.254;*#可获取的IP范围*
    option subnet-mask 255.255.255.0; *#子网掩码*
    option routers 10.5.5.1;*#默认网关*
    option broadcast-address 10.5.5.31;*#广播地址*
    default-lease-time 600;*#默认租约期限，单位秒*
    max-lease-time 7200;*#最长租约期限，单位秒*
  }
```



按i进入编辑模式，编辑后按Esc退出编辑模式，按：wq写入并关闭。

4. 停止 `wpa_supplicant` 服务，并重启 `wlan0`

```
sudo systemctl stop wpa_supplicant
sudo ip addr flush dev wlan0
sleep 0.5
sudo ifconfig wlan0 down
sleep 1
sudo ifconfig wlan0 up
```

5. 按如下步骤启动 `hostapd` 服务
   - 执行 `sudo hostapd -B /etc/hostapd.conf` 命令

     ```
     root@ubuntu:~# sudo hostapd -B /etc/hostapd.conf
     Configuration file: /etc/hostapd.conf
     Using interface wlan0 with hwaddr 08:e9:f6:af:18:26 and ssid "sunrise"
     wlan0: interface state UNINITIALIZED->ENABLED
     wlan0: AP-ENABLED
     ```

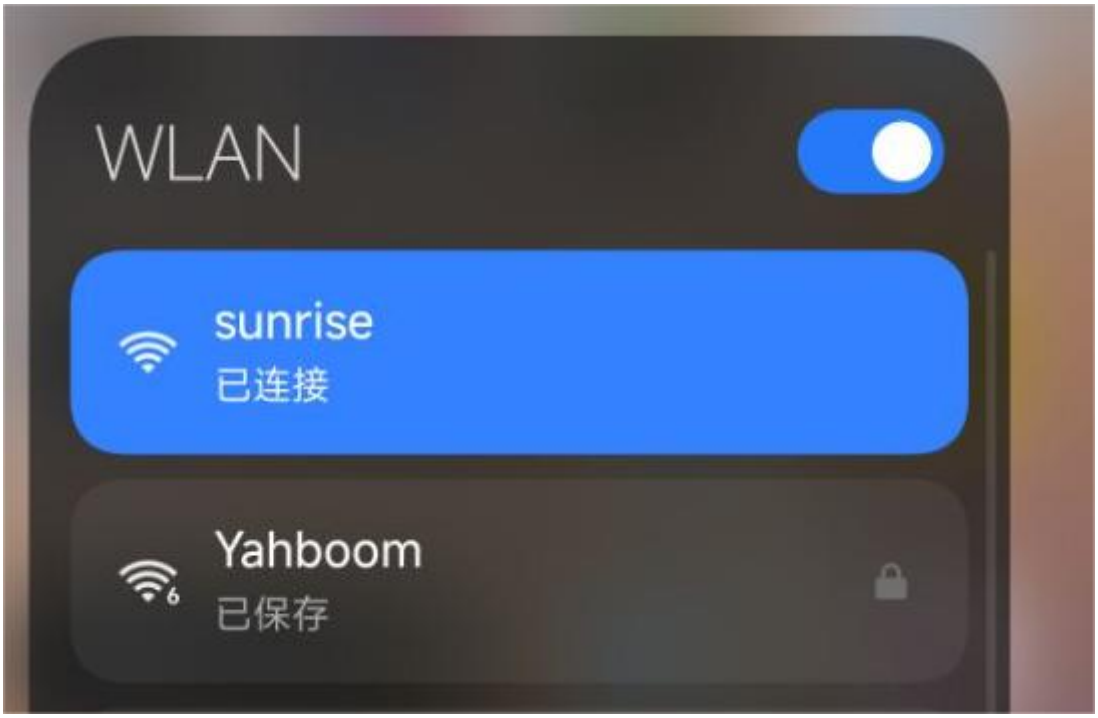
   - 通过ifconfig命令，配置无线接口wlan0的IP和网段，注意要跟第三步的配置保持一致

     ```
     sudo ifconfig wlan0 10.5.5.1 netmask 255.255.255.0
     ```

   - 最后开启dhcp服务器，连上热点会从10.5.5.100到10.5.5.255之间分配一个ip地址给客户端

     ```
     sudo systemctl start isc-dhcp-server
     sudo systemctl enable isc-dhcp-server
     ```

6. 连接开发板热点，`sunrise`



7. 如需切换回`Station`模式，可按如下方式进行：

```
# 停止 hostapd
sudo killall -9 hostapd

# 清除 wlan0 的地址
sudo ip addr flush dev wlan0
sleep 0.5
sudo ifconfig wlan0 down
sleep 1
sudo ifconfig wlan0 up

# 重启 wpa_supplicant
sudo systemctl restart wpa_supplicant
# 连接WiFi，具体操作可以查看 “1.连接WiFi”
```