

# 网络配置

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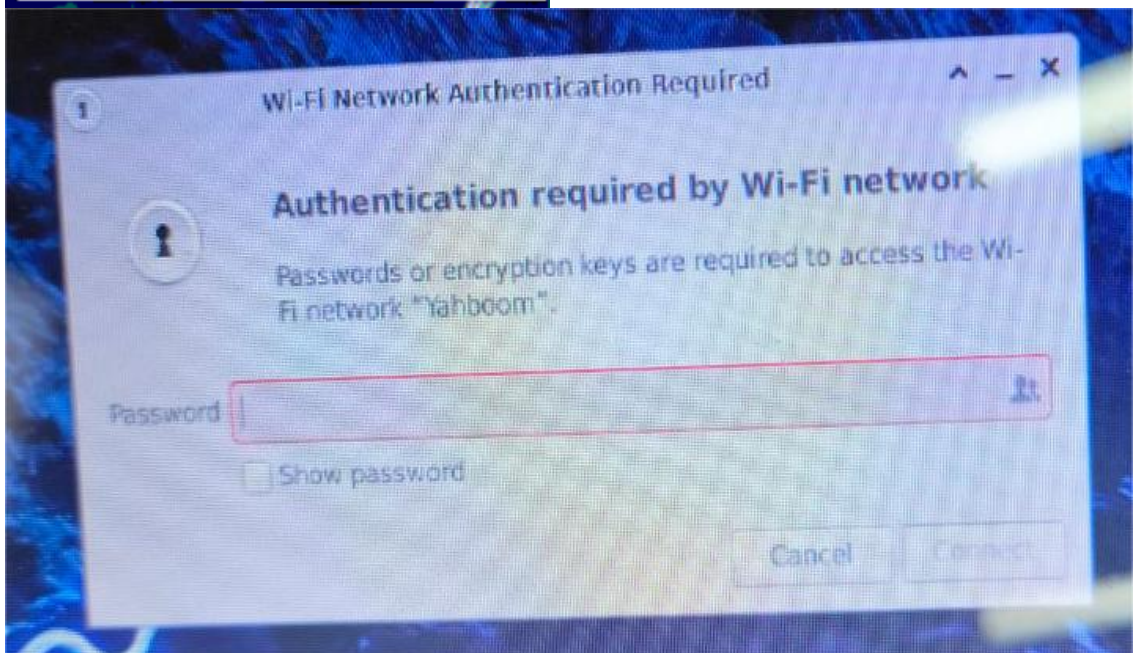
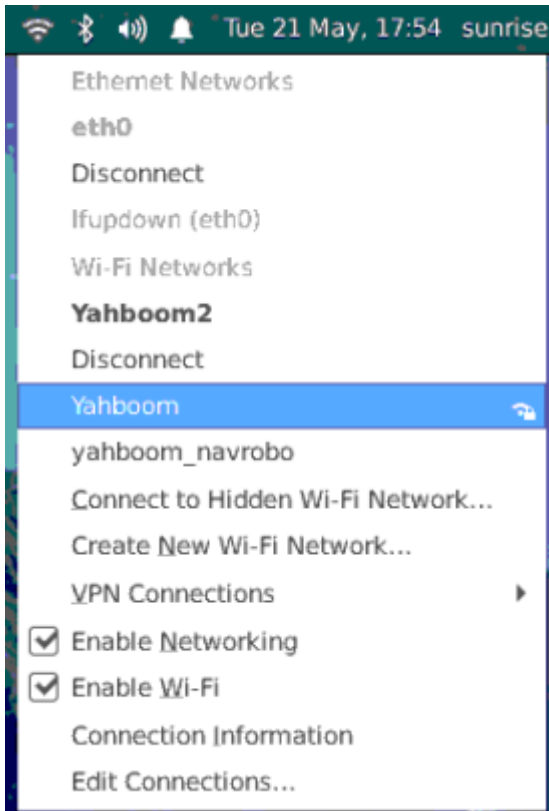
1. 连接Wi-Fi
2. 有线网络
3. Soft AP模式

## 1. 连接Wi-Fi

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- 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-lubuntu4.3).
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 libiscconf-export163
Suggested packages:
  isc-dhcp-server-ldap policycoreutils
The following NEW packages will be installed:
  isc-dhcp-common isc-dhcp-server libirs-export161 libiscconf-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）

```
# management frames with the Host AP driver); wlan0 with many nl80211 drivers
interface=wlan0

# not control any wireless/wired driver.
driver=nl80211

# hostapd_cli will use it when trying to connect with hostapd.
ctrl_interface=/var/run/hostapd

# SSID to be used in IEEE 802.11 management frames
ssid=sunrise

# which will enable the ACS survey based algorithm.
channel=6

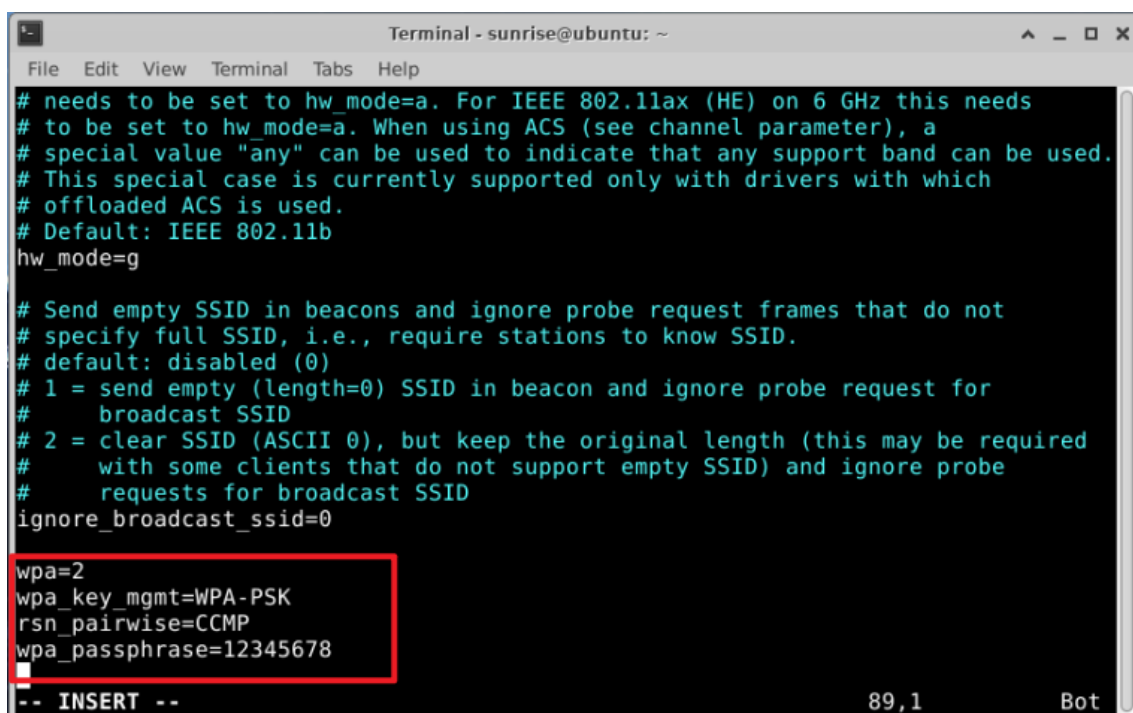
# ieee80211n: Whether IEEE 802.11n (HT) is enabled
# 0 = disabled (default)
# 1 = enabled
# Note: You will also need to enable WMM for full HT functionality.
ieee80211n=1

# Default: IEEE 802.11b
hw_mode=g

# requests for broadcast SSID
ignore_broadcast_ssid=0
```

- 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
```



```
Terminal - sunrise@ubuntu: ~
File Edit View Terminal Tabs Help

# needs to be set to hw_mode=a. For IEEE 802.11ax (HE) on 6 GHz this needs
# to be set to hw_mode=a. When using ACS (see channel parameter), a
# special value "any" can be used to indicate that any support band can be used.
# This special case is currently supported only with drivers with which
# offloaded ACS is used.
# Default: IEEE 802.11b
hw_mode=g

# Send empty SSID in beacons and ignore probe request frames that do not
# specify full SSID, i.e., require stations to know SSID.
# default: disabled (0)
# 1 = send empty (length=0) SSID in beacon and ignore probe request for
# broadcast SSID
# 2 = clear SSID (ASCII 0), but keep the original length (this may be required
# with some clients that do not support empty SSID) and ignore probe
# requests for broadcast SSID
ignore_broadcast_ssid=0

wpa=2
wpa_key_mgmt=WPA-PSK
rsn_pairwise=CCMP
wpa_passphrase=12345678

-- INSERT --
89,1 Bot
```

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：

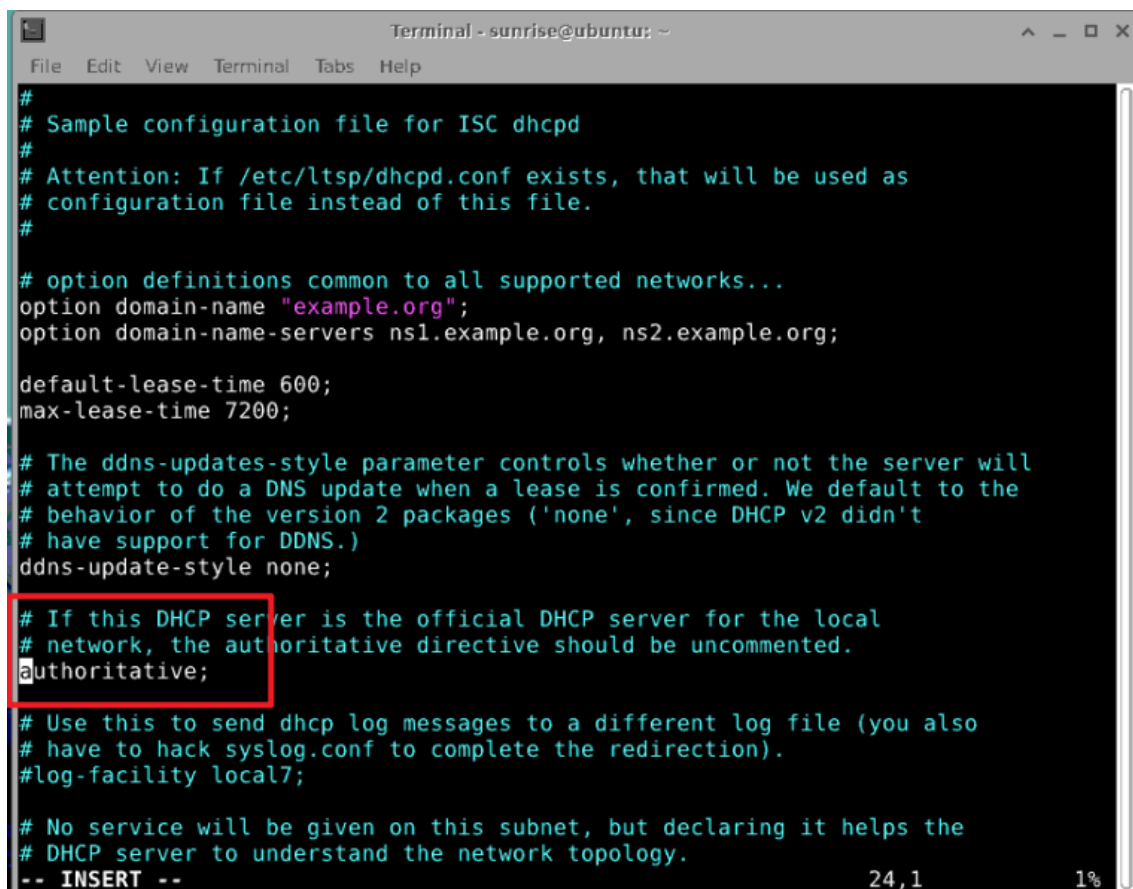
```
INTERFACESv4="wlan0"
```

```
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?
#       Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACESv4="wlan0"
INTERFACESv6=""
```

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;
```



```
Terminal - sunrise@ubuntu: ~
File Edit View Terminal Tabs Help

#
# Sample configuration file for ISC dhcpd
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
# option definitions common to all supported networks...
option domain-name "example.org";
option domain-name-servers ns1.example.org, ns2.example.org;

default-lease-time 600;
max-lease-time 7200;

# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
# have support for DDNS.)
ddns-update-style none;

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
#log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.
-- INSERT --
24,1 1%
```

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*
}
```



```
Terminal - sunrise@ubuntu: ~
File Edit View Terminal Tabs Help

#class "foo" {
# match if substring (option vendor-class-identifier, 0, 4) = "SUNW";
#}

#shared-network 224-29 {
# subnet 10.17.224.0 netmask 255.255.255.0 {
#   option routers rtr-224.example.org;
# }
# subnet 10.0.29.0 netmask 255.255.255.0 {
#   option routers rtr-29.example.org;
# }
# pool {
#   allow members of "foo";
#   range 10.17.224.10 10.17.224.250;
# }
# pool {
#   deny members of "foo";
#   range 10.0.29.10 10.0.29.230;
# }
#}

subnet 10.5.5.0 netmask 255.255.255.0 {
range 10.5.5.100 10.5.5.254;
option subnet-mask 255.255.255.0;
option routers 10.5.5.1;
option broadcast-address 10.5.5.31;
default-lease-time 600;
max-lease-time 7200;
}

:wq
```

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
```

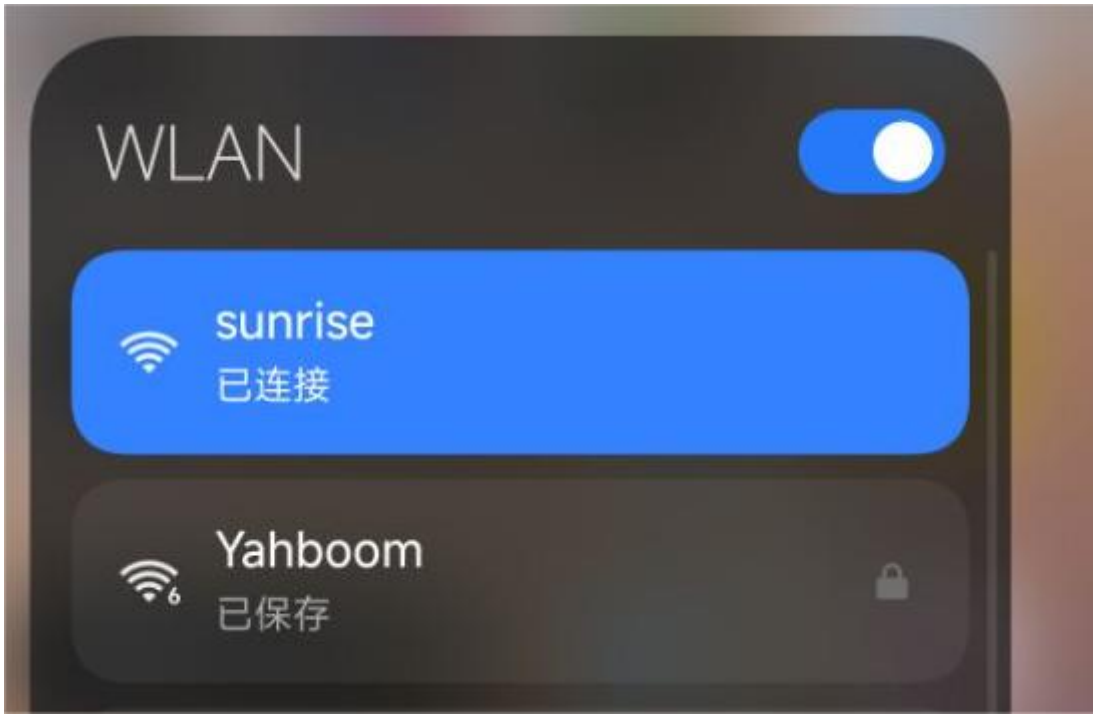
- 通过 `ifconfig` 命令，配置无线接口 `wlan0` 的 IP 和网段，注意要跟第三步的配置保持一致

```
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”
```