

# Orange Pi Zero

## Ubuntu Core User Manual

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## 1 . Ubuntu Core introduction

Ubuntu Core is a condensed version system based on Ubuntu , released by Canonical on 2016. It not only provides safety update system at regular intervals, also provides service for app store at intelligent Internet Devices. Ubuntu Core has been widely used in industrial gateways, home gateways, wireless access networks, digital signage, robots, vending machines, wireless communication base stations and unmanned aerial vehicles. Ubuntu Core fully built with Snap, a safe, easy to update open source Linux packaging format. Meanwhile, Ubuntu Core provides a secure support platform for the rapid creation of IOT devices and embedded devices.

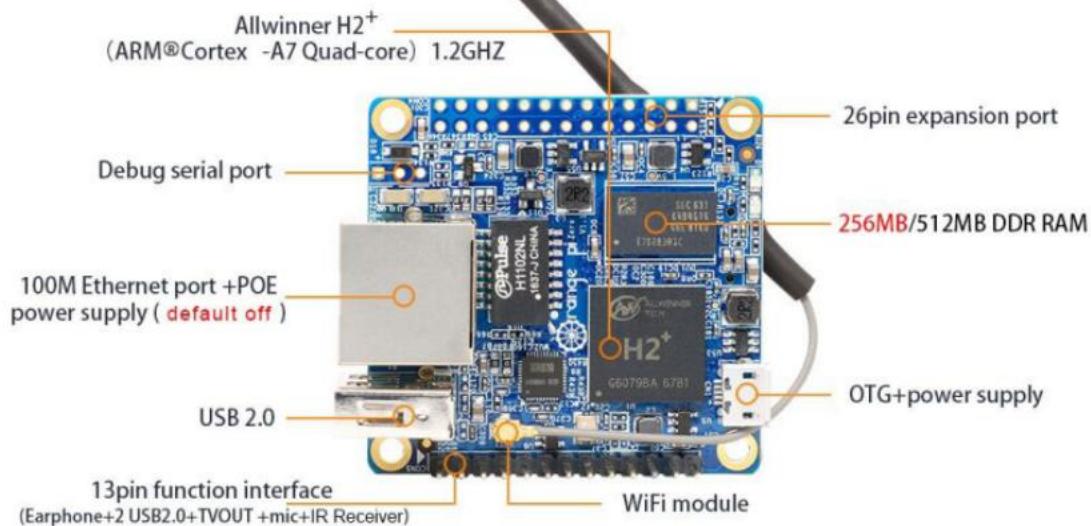
Main specification of Ubuntu Core :

- Security: automatic, controllable updates, timely recovery to repair high-risk security vulnerabilities.  
Dependability: transactional (rollback) update mechanism.
- Convenience: easier to deploy software stores and access huge amounts of applications.

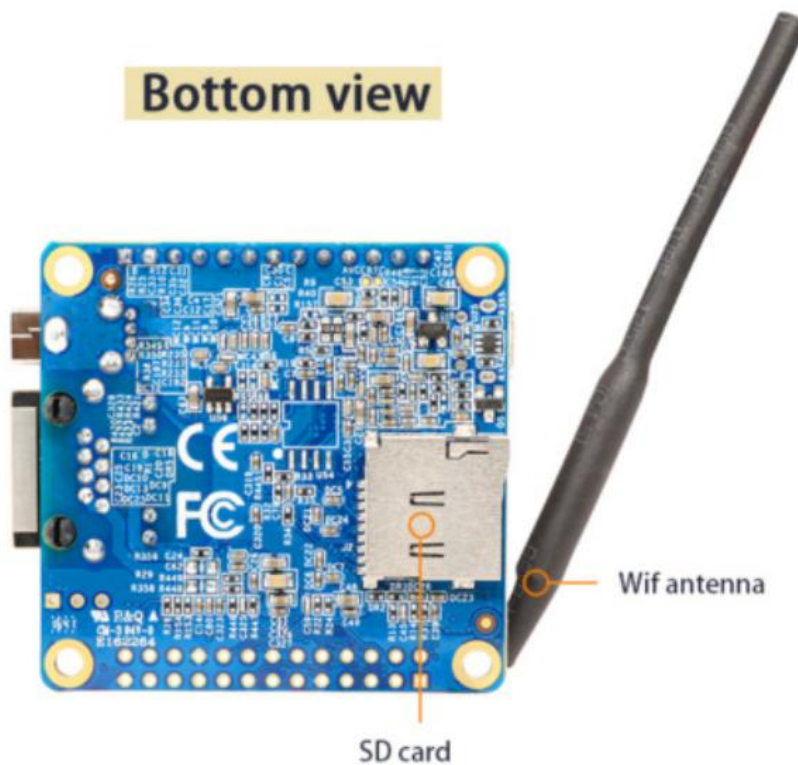
## 2 . Before booting Ubuntu Core

Hardware specification of Orange Pi Zero :

## Top view



## Bottom view



- Wire cable, power supply, TTL to USB cable and SD card preparing  
For now, the first time to boot Ubuntu Core on Orange Pi Zero could only realize via Ethernet port configuration.

- Download Ubuntu Core image

Here is the website to download: <http://www.orangepi.org/downloadresources/>

- Write the downloaded image into SD card

- Unzip the image

```
1. $ unrar -x OrangePi zero UbuntuCore 1604 V0 0 1.rar
```

- Write Ubuntu Core image into SD card

```
1. $ umount /dev/sdx
2. $ sudo dd bs=4M if=orangepi-zero.img of=/dev/sdx (sdx according to the
    actual situation)
```

- Register an Ubuntu One account

- Here is the website to register: <https://login.ubuntu.com/+login>.
- Select the *I am a new Ubuntu One user*, register according to the prompts



[Log in or Create account](#)

## One account to log in to everything on Ubuntu

Ubuntu One → log in

Please type your email:

☐ I am a new Ubuntu One user  
☒ I am a returning user and my password is:

[Log in](#)
[Forgot your password?](#)

Ubuntu One is the single account you use to log in to all services and sites related to Ubuntu.

If you have an existing Ubuntu Single Sign On account, this is now called your Ubuntu One account. [Read More >](#)

- After register, import the *ssh public key* on the system(PC)(the path on Linux is `~/.ssh/id_rsa.pub`)of *SSH Keys* into Ubuntu One account like the following:



testopi [My account](#) | [Log out](#)

Personal details

Applications

**SSH keys**

Account activity

## SSH keys

☐ orangepi

**Type:** ssh-rsa

**Text:** AAAAB3NzaC1yc2EAAAADAQABAAQAC16YfSGo8DwnShhXa...

- If there is no the above file generated, you could use the following command:

```
1. $ ssh-keygen -t rsa -C "orangepi"
```

- Ubuntu Core is defaulted no console to login, only device with ssh key has the right to ssh remote login Ubuntu Core system.

### 3 . Ubuntu Core start up configuration process

After prepared the Step2 before booting, we could boot the system and configure corresponding setting.

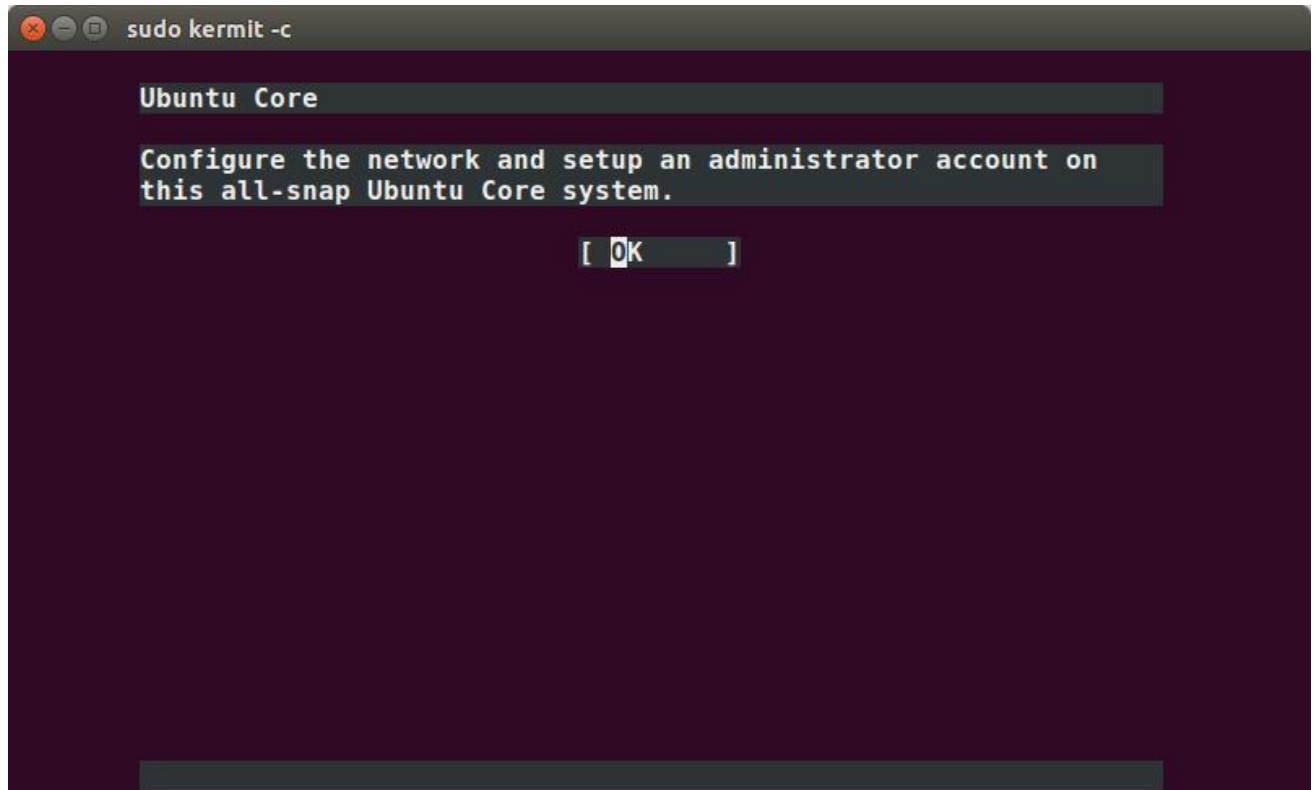
- Insert SD card into Orange Pi Zero with written image, connect wire cable, TTL to USB cable and power it on. There will print out the following information on the terminal:

```
sudo kermi -c
[ OK ] Started Raise network interfaces.
[ OK ] Started Login Service.
[ OK ] Reached target Network.
        Starting /etc/rc.local Compatibility...
        Starting Set console scheme...
        Starting Snappy daemon...
[ OK ] Started /etc/rc.local Compatibility.
[ OK ] Started Set console scheme.
[ OK ] Started Getty on tty1.
[ OK ] Started Serial Getty on ttyS0.
[ OK ] Reached target Login Prompts.
[ OK ] Started Snappy daemon.
        Starting Auto import assertions from block devices...
[ OK ] Started Auto import assertions from block devices.
[ OK ] Started Generate sshd host keys.
        Starting OpenBSD Secure Shell server...
[ OK ] Started OpenBSD Secure Shell server.
[ OK ] Reached target Multi-User System.
[ OK ] Reached target Graphical Interface.
        Starting Update UTMP about System Runlevel Changes...
[ OK ] Started Update UTMP about System Runlevel Changes.

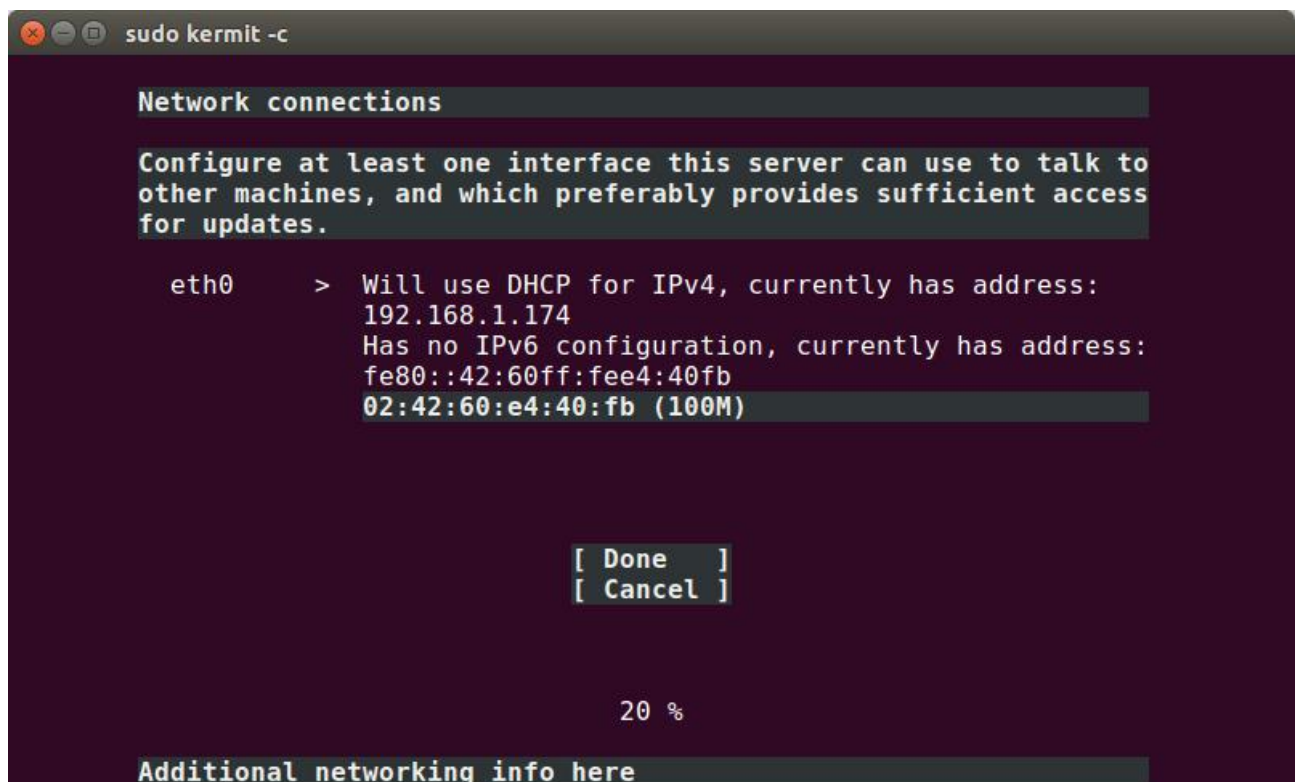
Press enter to configure.

```

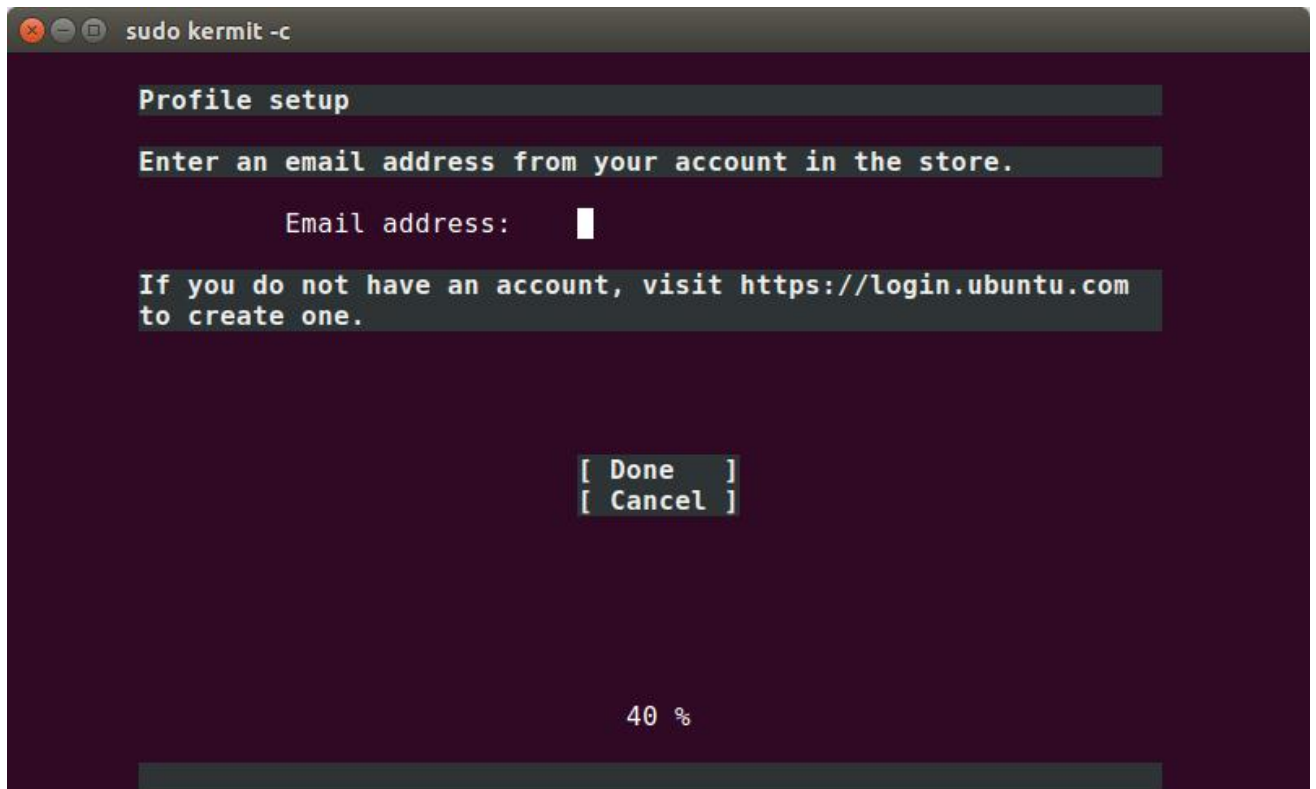
- Press *Enter* into the configuration interface like the following:



- Press *Enter* into the following network configure interface, if the network connect normally then it would distribute IP address.



- Use the arrow keys to position of *[Done]* the cursor on the above interface, press *Enter* key into the following *Profile Setup* configure interface.



- Enter the email address when register Ubuntu One, press Enter key and your system would configure ssh login, after it succeed, there would be prompt like the following. You could login Ubuntu Core via ssh now.

```
sudo kermi -c

Configuration Complete

This device is registered to orangepi@aliyun.com.

Remote access was enabled via authentication with SSO user
<testopi>.
Public SSH keys were added to the device for remote access.

orangepi@aliyun.com can connect remotely to this device via
SSH:

ssh testopi@192.168.1.174

[ Finish ]

View configured user and device access methods
```

- Reopen a terminal with the ssh command prompts on the above: ssh testopi@192.168.1.174 to login the system, after login successful, there would be prompt like the following:

```
testopi@localhost: ~
xunlong@xunlong:/home/xunlong
$ ssh testopi@192.168.1.174
The authenticity of host '192.168.1.174 (192.168.1.174)' can't be established.
ECDSA key fingerprint is 59:1d:b0:1e:b8:46:c0:5e:6b:9a:5a:22:5a:25:3b:ab.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.1.174' (ECDSA) to the list of known hosts.
Welcome to Ubuntu Core 16 (GNU/Linux 4.9-orangepi-zero armv7l)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

Welcome to Snappy Ubuntu Core, a transactionally updated Ubuntu.

 * See https://ubuntu.com/snappy

It's a brave new world here in Snappy Ubuntu Core! This machine
does not use apt-get or deb packages. Please see 'snap --help'
for app installation and transactional updates.

testopi@localhost:~$
```

If there is prompt of error like the following, you could enter the following command to delete the previous record and re-login.

```
1.      ssh-keygen -f "/home/xunlong/.ssh/known hosts" -R 192.168.1.174
```

```
xunlong@xunlong: ~
xunlong@xunlong:/home/xunlong
$ ssh testopi@192.168.1.174
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@    WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!     @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!
It is also possible that a host key has just been changed.
The fingerprint for the ECDSA key sent by the remote host is
59:1d:b0:1e:b8:46:c0:5e:6b:9a:5a:22:5a:25:3b:ab.
Please contact your system administrator.
Add correct host key in /home/xunlong/.ssh/known_hosts to get rid of this messag
e.
Offending ECDSA key in /home/xunlong/.ssh/known_hosts:1
  remove with: ssh-keygen -f "/home/xunlong/.ssh/known_hosts" -R 192.168.1.174
ECDSA host key for 192.168.1.174 has changed and you have requested strict check
ing.
Host key verification failed.
xunlong@xunlong:/home/xunlong
$
```

- Login console with system configure

The configure interface at the first time booting named *console-conf*, it would logout after configured. It would run with *getty* and provide login interface. If you donot want to use ssh, you could configure console to login the system.

- You could set the password after login system with ssh.

```
1. $ sudo passwd ${USER}
```

- Back the the terminal of serial port and press Enter to logout console-conf, and you will enter into the following prompt of console. You could login with your account and password into Ubuntu Core.

```
sudo kermi -c
The host key fingerprints are:

RSA      SHA256:BDTuzoU4JABuKznGvyaftyo/bukEngQIrmxK5mIgH8
DSA      SHA256:5M30HpzUWJ2uss4qMwL//f0PXUzJLp0aSxQpg6l8sbY
ECDSA    SHA256:pETlgAGTLsUnvPXJPSH0oG291+RxcdDDwvc89Zkde/o
ED25519  SHA256:TPBSaupQTHYEV3Gj0d7A1teWv4jR6fjeZMKdF0foQMY

To login:

ssh testopi@192.168.1.174

Personalize your account at https://login.ubuntu.com.

Ubuntu Core 16 on 192.168.1.174 (ttyS0)
localhost login: 
```

## 4 . Using example of Ubuntu Core

You could run Ubuntu Core after finished the previous configuration.

- Install and run your first Snaps — Hello, enter the following command:

```
1. $ sudo snap install hello
2. $ hello
```

- You could refer to the official website about how to develop and use Ubuntu Core
  - Snaps and snapcraft file: <https://snapcraft.io/docs/>
  - Ubuntu Core file: <https://docs.ubuntu.com/core/en/>

## 5 . Test example for Ubuntu Core driver

User Snappy wiringop-zero to test the function of GPIO

- Install wiringop-zero(for now it is on edge channel) from Orange Pi store

```
1. $ sudo snap install wiringop-zero --edge
```

- Connect plug-in unit of wiringop-zero and core

```
1. $ snap connect wiringop-zero:physical-memory-control
   core:physical-memory-control
2. $ snap connect wiringop-zero:physical-memory-observe
   core:physical-memory-observe
```

- Test the function of GPIO (same as other images)

```
1. $ sudo wiringop-zero.gpio mode 2 out
2. $ sudo wiringop-zero.gpio write 8 0
3. $ sudo wiringop-zero.gpio write 8 1
4. $ sudo wiringop-zero.gpio read 8
```

- Test the function of playback and recording

- Install alsa-utils

```
1. $ sudo snap install alsa-utils
```

- Use the relevant commands

```
1. $ sudo aplay -l
2. $ sudo alsamixer
3. $ sudo aplay test.wav
```

### WIFI and AV video output

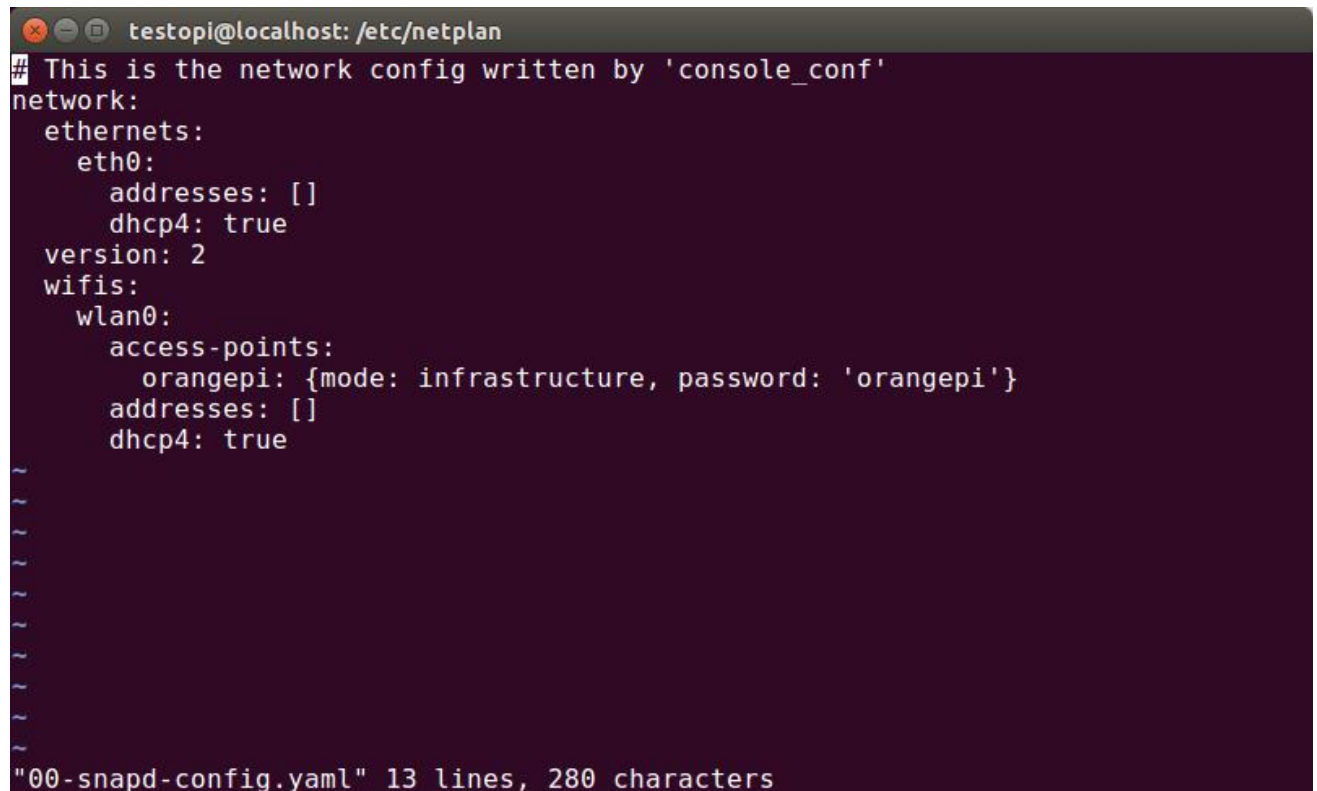
Since there is not enough relevant driver, we have set those two functions on edge channel, you could run them with the following command:

- Reflash orangepi-zero-kernel on edge channel, and reboot the system. You could use WIFI and AV video output.

```
1. $ sudo snap refresh orangepi-zero-kernel --edge
2. $ reboot
```

- WIFI configuration just like the following shows, account and password both are orangepi

Add WIFI configuration on /etc/netplan/00-snapd-config.yaml and reboot it.

A terminal window titled 'testopi@localhost: /etc/netplan' displays a network configuration file. The content is a YAML document for netplan, defining an ethernet interface 'eth0' and a wifi interface 'wlan0'. The wifi configuration includes an access-point named 'orangepi' with mode 'infrastructure' and password 'orangepi'. The terminal shows the file path as '/etc/netplan/00-snapd-config.yaml' and indicates it has 13 lines and 280 characters.

```
testopi@localhost: /etc/netplan
# This is the network config written by 'console_conf'
network:
  ethernets:
    eth0:
      addresses: []
      dhcp4: true
  version: 2
  wifis:
    wlan0:
      access-points:
        orangepi: {mode: infrastructure, password: 'orangepi'}
      addresses: []
      dhcp4: true
~
~
~
~
~
~
~
~
~
~
~
~
~
"00-snapd-config.yaml" 13 lines, 280 characters
```

## 6 . Orange Pi store

Orange Pi has already has its exclusive store, you could use Web page or command to upload your Snaps to Orange Pi store.

Upload your Snaps to Orange Pi store on Web page:

- Open Ubuntu store: <https://dashboard.snapcraft.io/dev/snaps/>
- Use Ubuntu One account to login:

snap for the Ubuntu store.

- Set *Developer namespace* and *Country Region* on *Account details*



## Your account details

Full name

Your **Ubuntu One** account full name.

Ubuntu One email

Your **Ubuntu One** account primary email.

Snap account-id

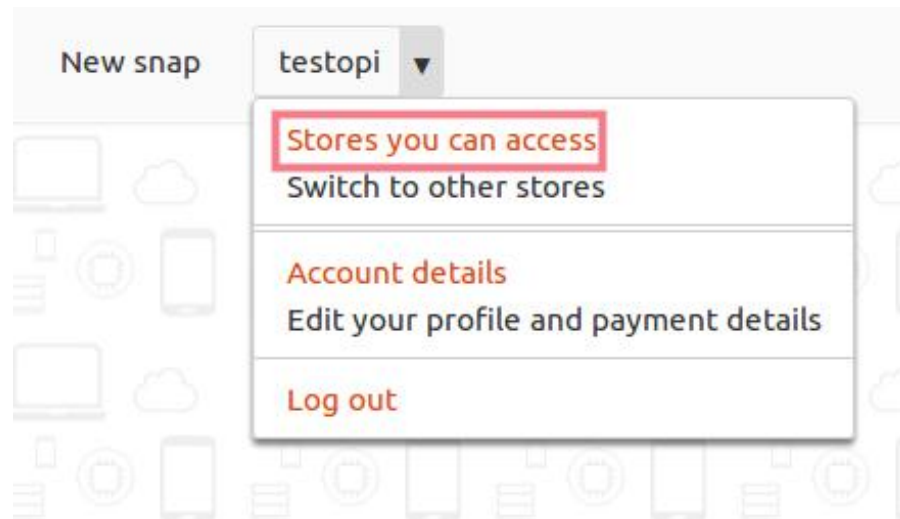
Your snap account-id, used as a unique reference to this account. It is automatically generated as you interact with the Store and will never change.

The namespace cannot be removed once set and cannot be changed while you have active packages.

Developer namespace\*

Enter a value consisting of lower-case letters, numbers or hyphens. Hyphens can not occur at the start or end of the chosen value.

- Enter into Store list on Stores you can access



## Current store **Ubuntu (ubuntu)**

You can switch and upload snaps to these stores:

Public

LimeNET (LimeNET)

LimeSDR (LimeSDR)

Orange Pi (orange-pi)

Ubuntu Demo Store (demo)

You can review snaps in these stores:

No stores in this category.

You can manage and change settings in these stores:

No stores in this category.

- After select Orange Pi store, there would be a name of Orange Pi on the top left corner, you could upload Snaps into Orange Pi store with Submit to the store

## Submit your application to the Orange Pi store

[Not the store you want?](#)

Your package\*

No file selected, click to select a file.

This should be a snap for Ubuntu Core; upload will begin as soon as a valid file is selected.

Series

☒ 16

License\*

The license(s) under which you will release your application. Multiple licenses can be selected to indicate alternative choices.

Support URL\*

A URL users can go to for support for this application. Allows http(s); and mailto: schemes.

Submit to the store

The form will be enabled for submission once a package has been uploaded.

- You also need to snap app register a Snaps account on New snap page. Please note that the



name of Snaps is unique.

Shenzhen Xunlong Software Co., Limited

## Register a package name

Before you can add your package to the store, its name must be registered by submitting the form below.

If you have already registered the name of your package, [proceed directly to upload](#).

Snap name\*

Enter a value consisting of lower-case letters, numbers or hyphens. Hyphens can not occur at the start or end of the chosen value.

☐

Is this package private?

Package privacy can be changed at any time after the initial upload.

Registrant comment

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Enjoy it !