RK3399-PPC-1xxW-Debian9

User Manual

V1.0.0

Contents

1 About Manual

Thank you for using Advantech product and rk3399-ppc-1xxw-debian9. This manual is a user manual of rk3399-ppc-1xxw-debain9. This manual may be copied and distributed in any medium, either commercially or non-commercially.

2 Introduction

2.1 Overview

rk3399-ppc-1xxw-debian9 is developed for Advantech devices based on debian9. It is customized to satisfy users' requirements and to add new functions and features.

2.2 Device support list

We currently support the following products:

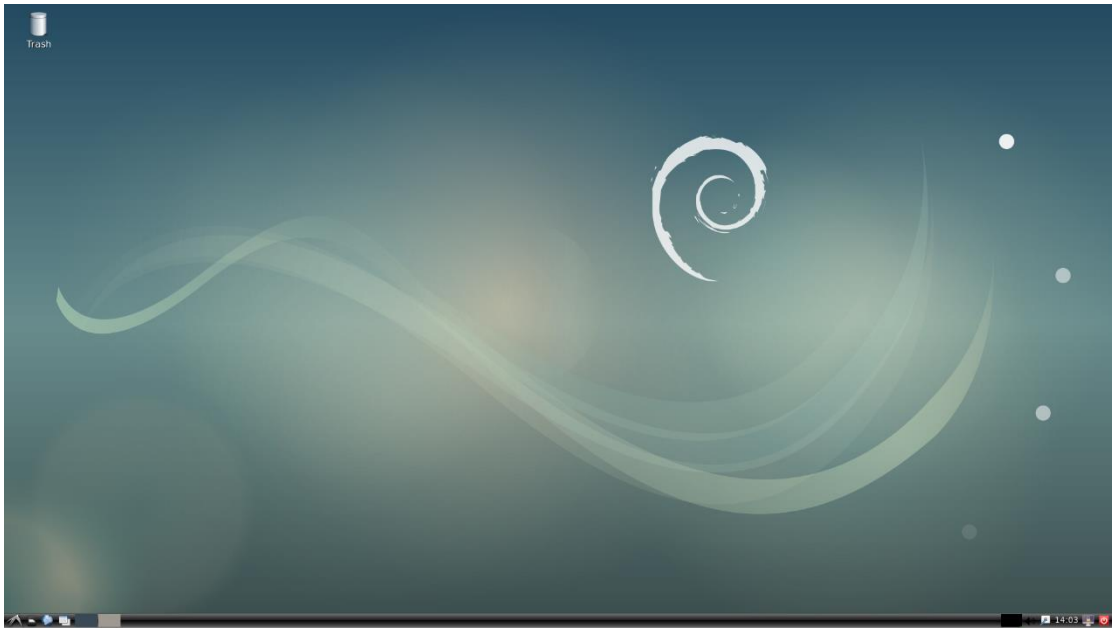
PPC-112W PPC-115W

2.3 User and Password

The system default user is linaro, and the password of linaro is :123456.

2.3 Preview

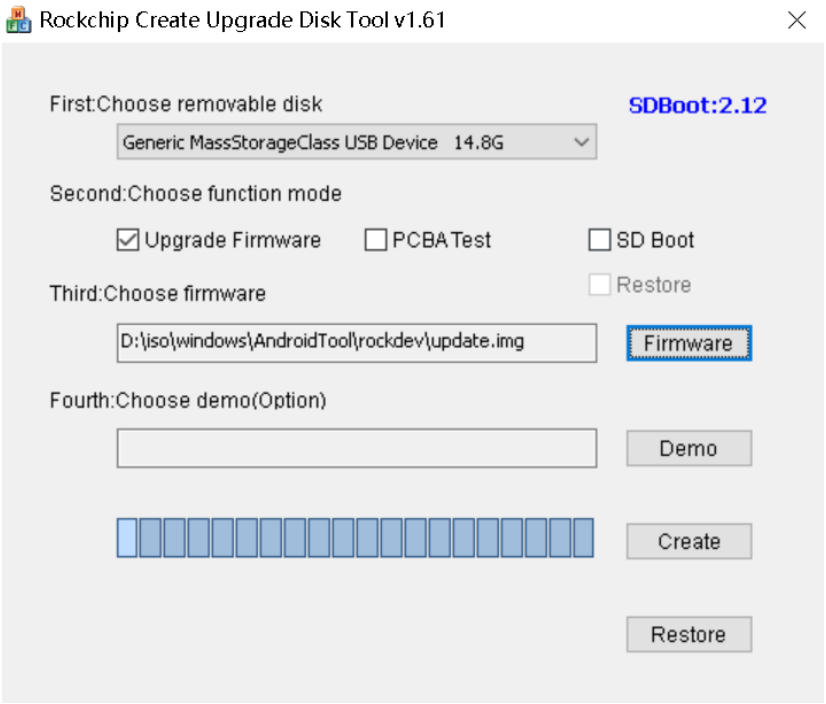
After installation, you can see as follow:



3 Installation

It is easy to install rk3399-ppc-1xxw-debian9 on a hard disk.

3.1 Prepare an Installtion sdcard



You should click the “Create” button to burn the sdcard.

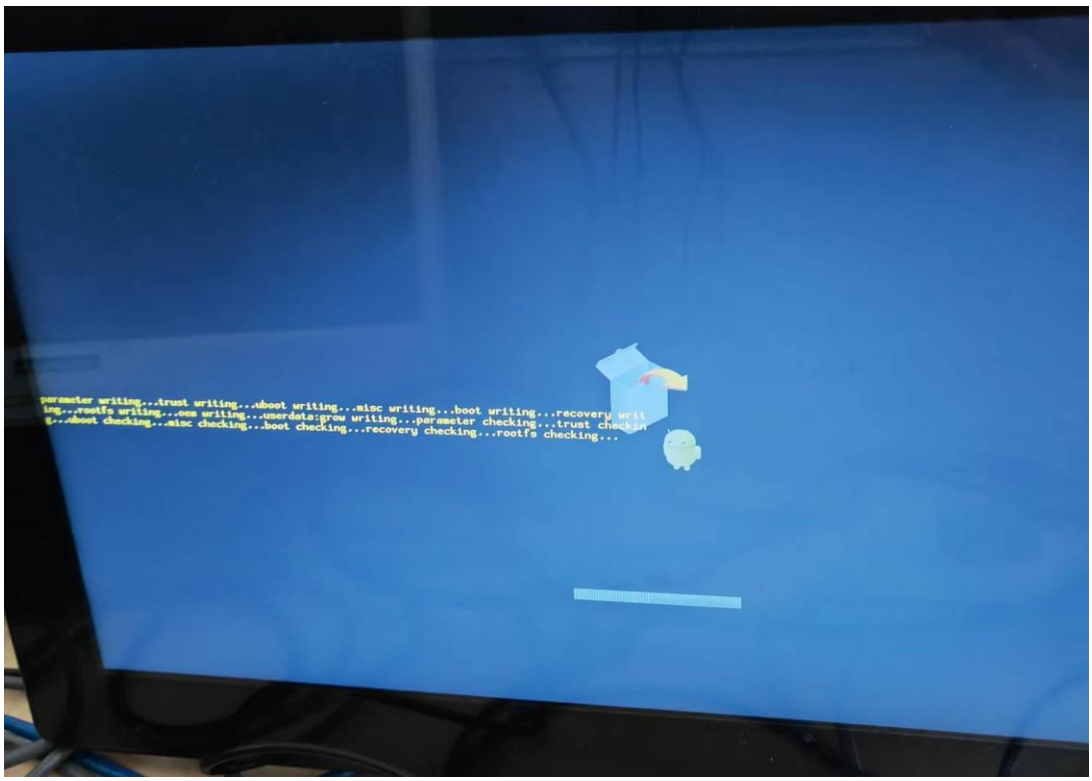
3.2 Install rk3399-ppc-1xxw-debian9

Step 1 : Please power off in PPC1XX.

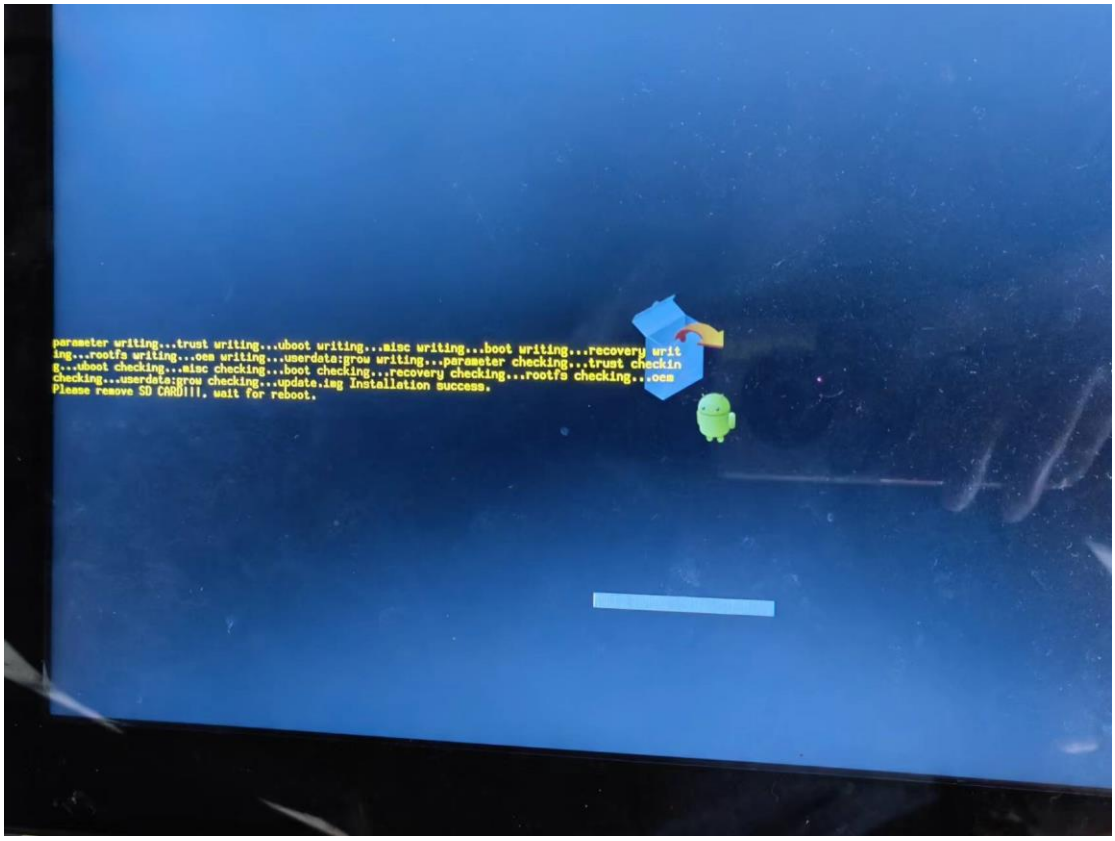
Step 2 : Insert the SD card.

Step 3 : Power on in PPC1XX.

Step 4 : Installing system update



Step 5 : Please Remove the SD Card when PPC1XX show the message "Doing Action succeeded. please remove the sdcard.....".



Step 6 : Remove SD card.

The rk3399-ppc-1xxw-debian9 will be auto-install.

3.3 Hardware Requirements

The following information represents the requirements necessary to install

rk3399-ppc-1xxw-debian9 successfully.

Sdcard Size

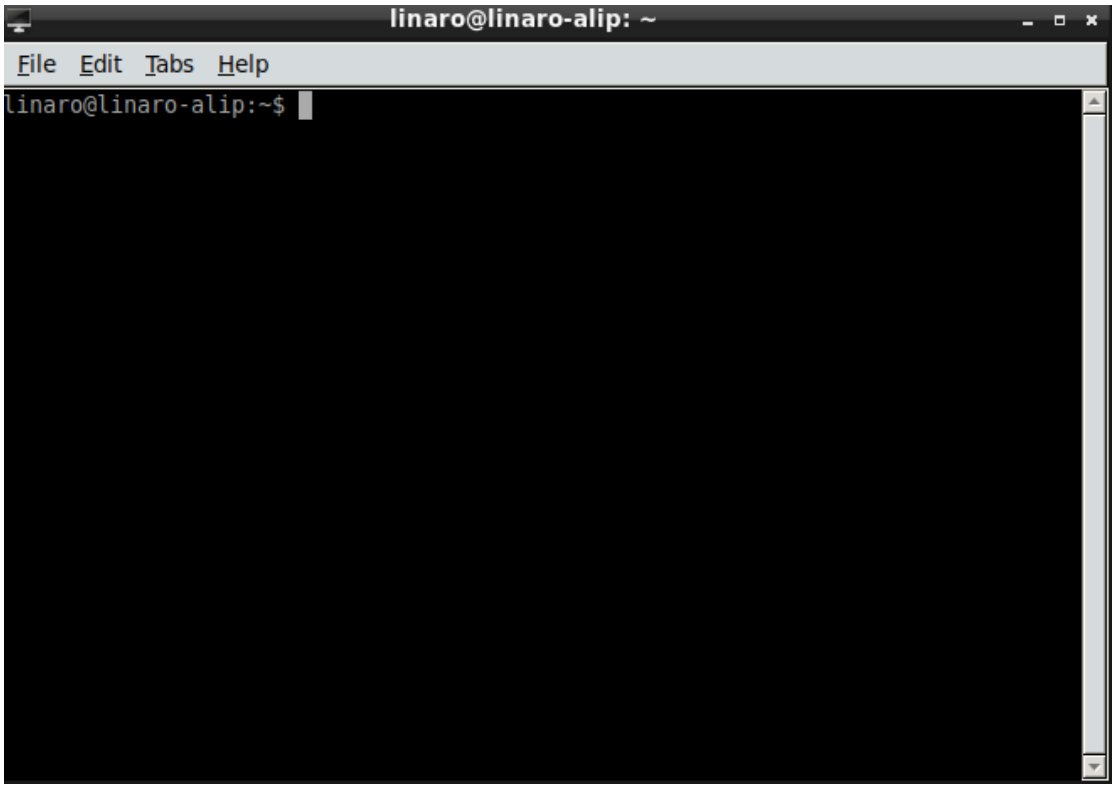
- Recommended : 16 G or more

4 Usage

rk3399-ppc-1xxw-debian9 provides many tools based on X-Windows. Here we mainly introduce some important tools that the user may use frequently.

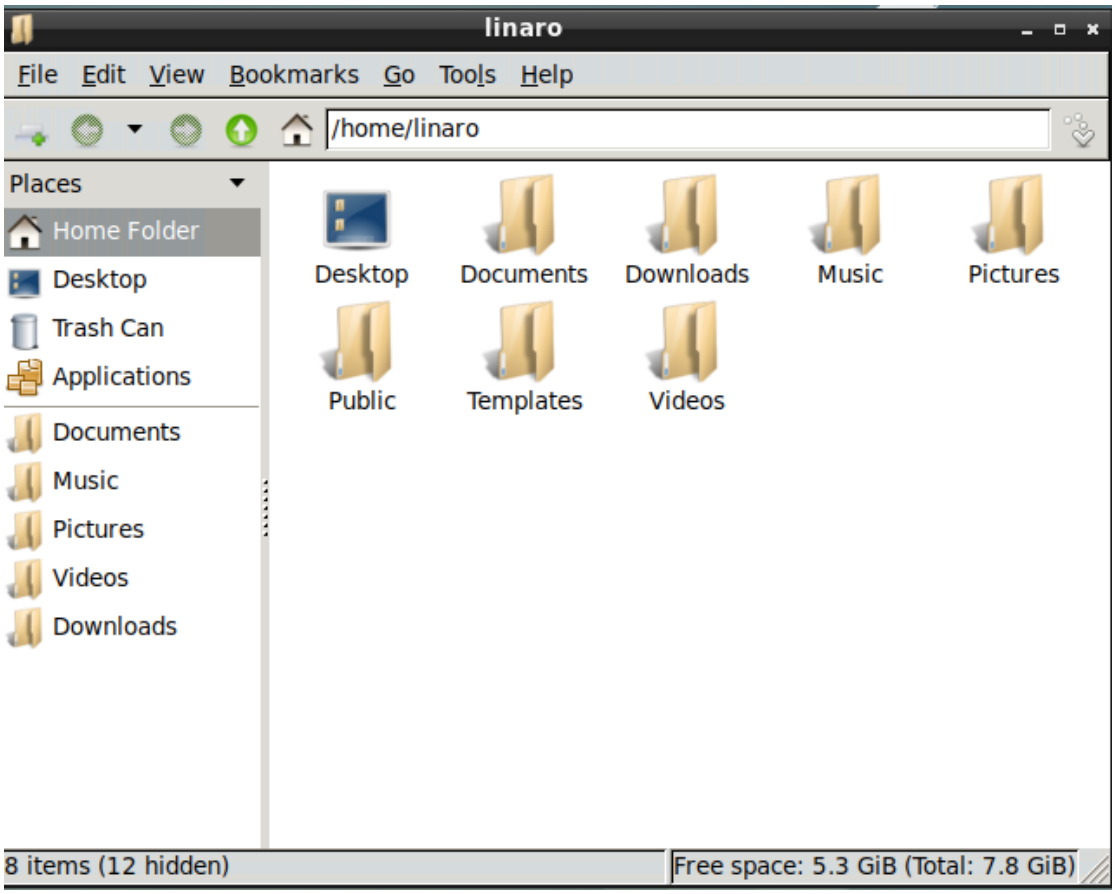
4.1 LXTerminal

Start-System Tools-LXTerminal, open LXTerminal as follows:



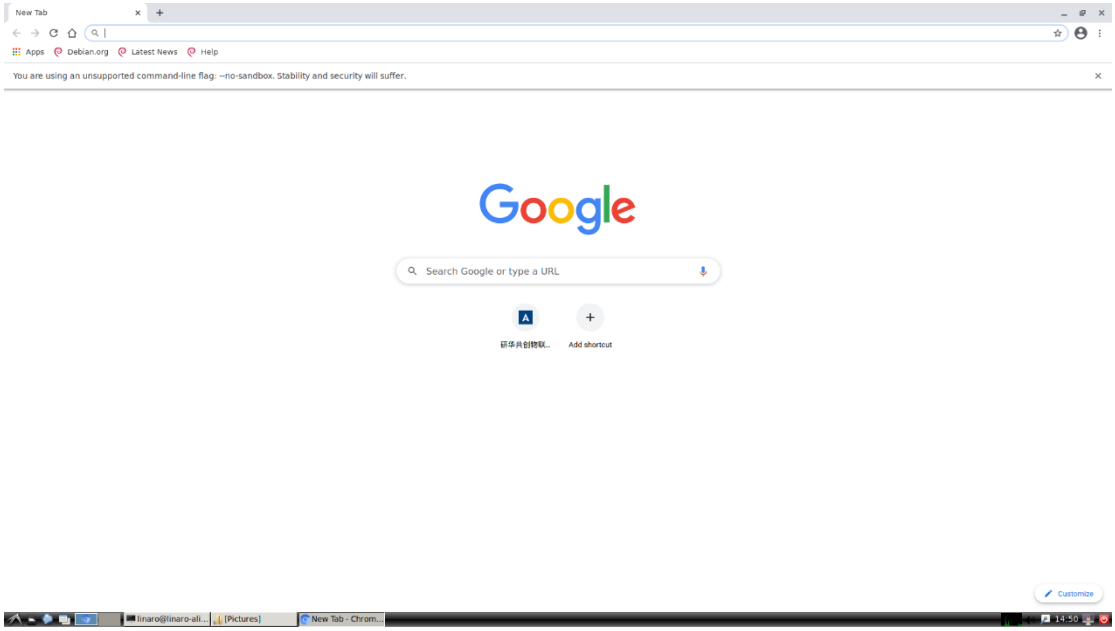
4.2 File Manager

Start-System Tools-File Manager PCManFM, open File Manager as follows:



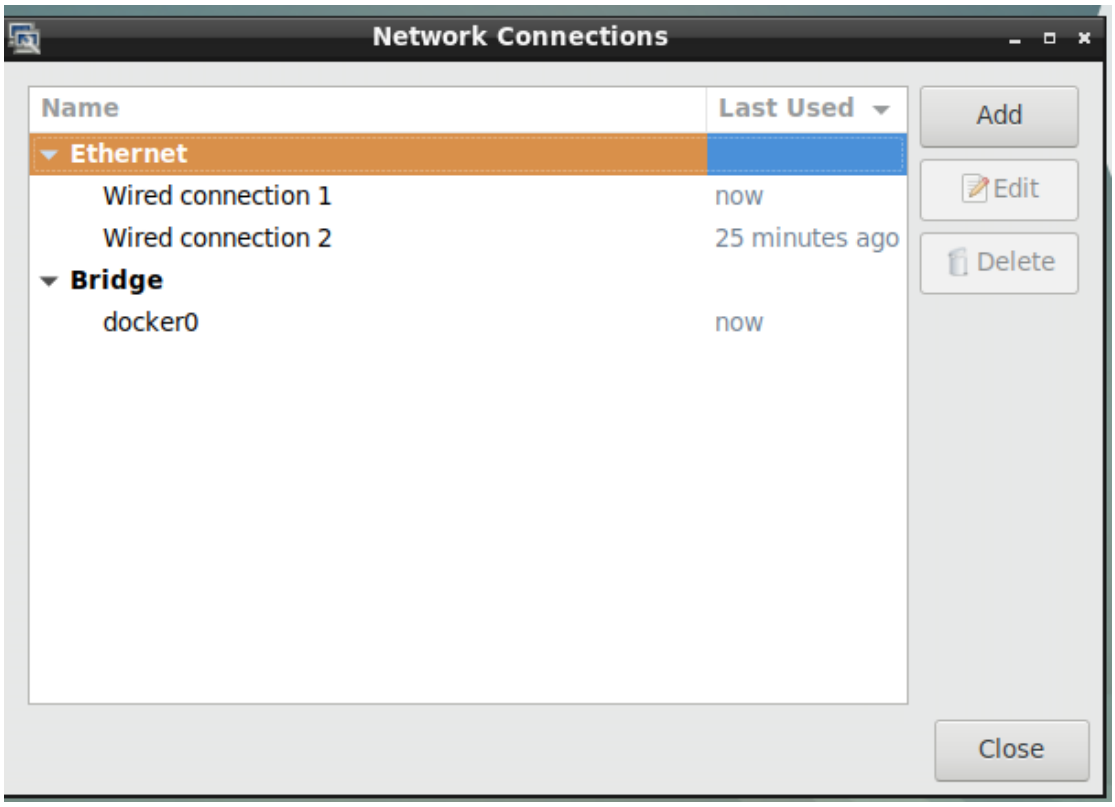
4.3 Browser

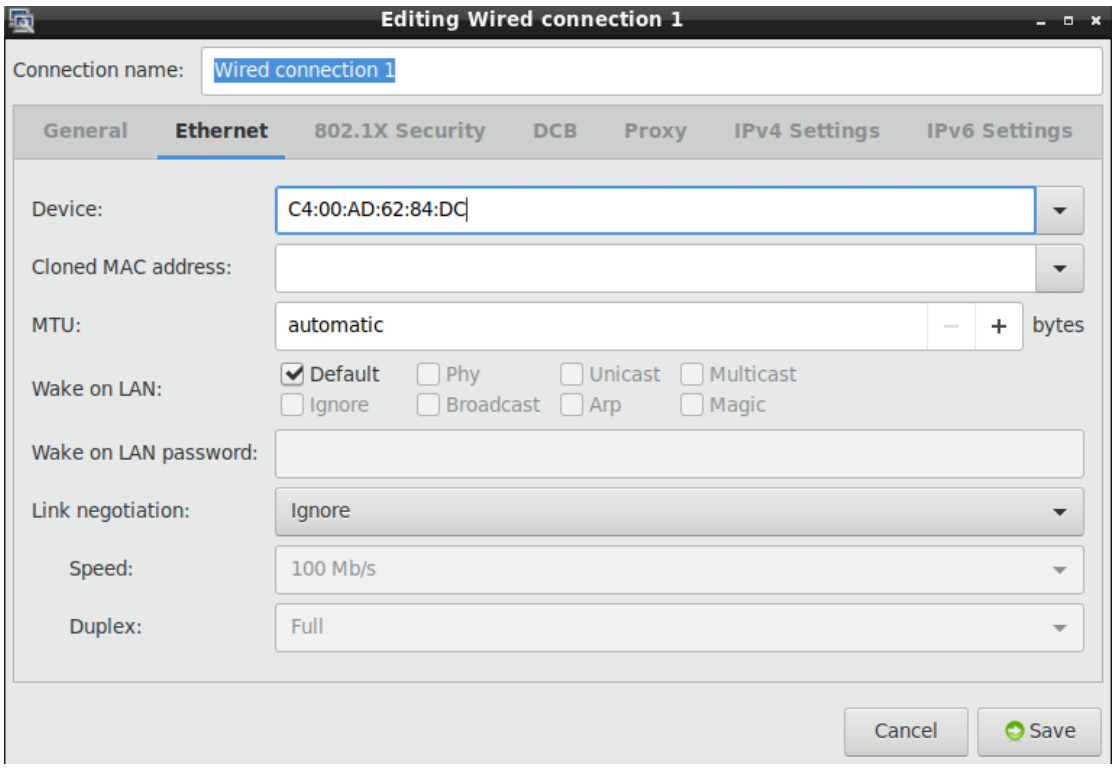
Chromium browser:



4.4 IP configuration

rk3399-ppc-1xxw-debian9 gets IP according to DHCP default. If you want to get IP by static, you can use “Network Connections”. To set static IP.





5 Test tools

5.1 eMMC Test

Test eMMc read:

```
root@linaro-alip:~# dd if=/dev/mmcblk1 of=/tmp/data bs=1 count=1024
1024+0 records in
1024+0 records out
1024 bytes (1.0 kB, 1.0 KiB) copied, 16.4029 s, 0.1 kB/s
```

Test eMMc write:

```
root@linaro-alip:~# dd if=/tmp/data of=/dev/mmcblk1 bs=1 count=1024
1024+0 records in
1024+0 records out
1024 bytes (1.0 kB, 1.0 KiB) copied, 0.0109707 s, 93.3 kB/s
root@linaro-alip:~#
```

5.2 SD Test

Step 1: **When booting from eMMC**, you would see only below directories

```
root@linaro-alip:~# ls -l /dev/mmcblk*
brw-rw---- 1 root disk 179,   0 May 13 11:17 /dev/mmcblk1
brw-rw---- 1 root disk 179,  32 May 13 11:17 /dev/mmcblk1boot0
brw-rw---- 1 root disk 179,  64 May 13 11:17 /dev/mmcblk1boot1
brw-rw---- 1 root disk 179,   1 May 13 11:17 /dev/mmcblk1p1
brw-rw---- 1 root disk 179,  10 May 13 11:17 /dev/mmcblk1p10
brw-rw---- 1 root disk 179,   2 May 13 11:17 /dev/mmcblk1p2
brw-rw---- 1 root disk 179,   3 May 13 11:17 /dev/mmcblk1p3
brw-rw---- 1 root disk 179,   4 May 13 11:17 /dev/mmcblk1p4
brw-rw---- 1 root disk 179,   5 May 13 11:17 /dev/mmcblk1p5
brw-rw---- 1 root disk 179,   6 May 13 11:17 /dev/mmcblk1p6
brw-rw---- 1 root disk 179,   7 May 13 11:17 /dev/mmcblk1p7
brw-rw---- 1 root disk 179,   8 May 13 11:17 /dev/mmcblk1p8
brw-rw---- 1 root disk 179,   9 May 13 11:17 /dev/mmcblk1p9
brw-rw---- 1 root disk 179,  96 May 13 11:17 /dev/mmcblk1rpmb
```

Step 2: Insert SD card to SD card slot and check your device again. You should be able to see more directories.

```
root@linaro-alip:~# ls -l /dev/mmcblk*
brw-rw---- 1 root disk 179, 128 May 13 11:24 /dev/mmcblk0
brw-rw---- 1 root disk 179, 129 May 13 11:24 /dev/mmcblk0p1
brw-rw---- 1 root disk 179,   0 May 13 11:17 /dev/mmcblk1
brw-rw---- 1 root disk 179,  32 May 13 11:17 /dev/mmcblk1boot0
brw-rw---- 1 root disk 179,  64 May 13 11:17 /dev/mmcblk1boot1
brw-rw---- 1 root disk 179,   1 May 13 11:17 /dev/mmcblk1p1
brw-rw---- 1 root disk 179,  10 May 13 11:17 /dev/mmcblk1p10
brw-rw---- 1 root disk 179,   2 May 13 11:17 /dev/mmcblk1p2
brw-rw---- 1 root disk 179,   3 May 13 11:17 /dev/mmcblk1p3
brw-rw---- 1 root disk 179,   4 May 13 11:17 /dev/mmcblk1p4
brw-rw---- 1 root disk 179,   5 May 13 11:17 /dev/mmcblk1p5
brw-rw---- 1 root disk 179,   6 May 13 11:17 /dev/mmcblk1p6
brw-rw---- 1 root disk 179,   7 May 13 11:17 /dev/mmcblk1p7
brw-rw---- 1 root disk 179,   8 May 13 11:17 /dev/mmcblk1p8
brw-rw---- 1 root disk 179,   9 May 13 11:17 /dev/mmcblk1p9
brw-rw---- 1 root disk 179,  96 May 13 11:17 /dev/mmcblk1rpmb
root@linaro-alip:~#
```

Step 3: Erase and write

```
root@linaro-alip:~# dd if=/dev/zero of=/dev/mmcblk0 bs=1024 count=1
1+0 records in
1+0 records out
1024 bytes (1.0 kB, 1.0 KiB) copied, 0.000310334 s, 3.3 MB/s
root@linaro-alip:~# dd if=/tmp/data of=/dev/mmcblk0 bs=1 count=1024
1024+0 records in
1024+0 records out
1024 bytes (1.0 kB, 1.0 KiB) copied, 0.0111125 s, 92.1 kB/s
root@linaro-alip:~#
```

Note!

1. *This operation **may damage the data stored** in SD card. Please make sure there is no critical data in the SD card being used for this test.*

5.3 LAN Test

Setting: Check current IP config.

```
root@linaro-alip:~# ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:6e:e0:f5:1d  txqueuelen 0  (Ethernet)
        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

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.21.73.59  netmask 255.255.255.0  broadcast 172.21.73.25
        inet6 fe80::4c09:22d0:33b7:b6e2  prefixlen 64  scopeid 0x20<link
        ether c4:00:ad:7e:36:4b  txqueuelen 1000  (Ethernet)
        RX packets 455668  bytes 31841973 (30.3 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 615  bytes 73597 (71.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 24

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1  (Local Loopback)
        RX packets 338  bytes 22910 (22.3 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 338  bytes 22910 (22.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@linaro-alip:~#
```

Setting: Enable eth0 with static IP, such as 192.168.1.84

Modify /etc/network/interfaces file as follows,

```
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
auto eth0 #开启自动连接网络
iface lo inet loopback
allow-hotplug eth0
iface eth0 inet static
address 192.168.1.104 # IP
netmask 255.255.255.0 # 子网掩码
gateway 192.168.1.1 # 网关
```

And then restart network service or reboot system, then ip address will be 192.168.1.184.

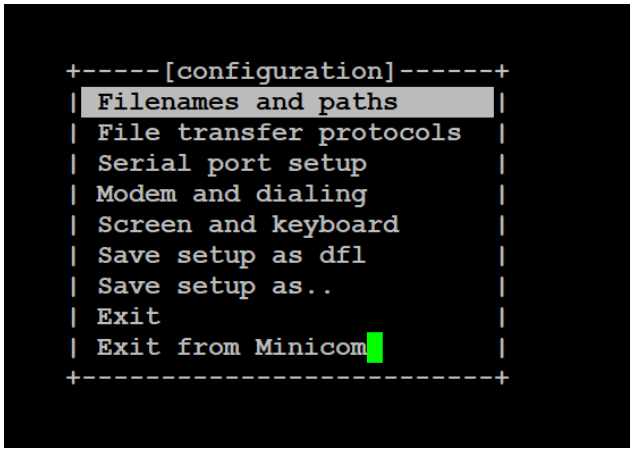
5.4 UART Test

Test COM1 rs-232,the identified node is /dev/ttyS4.

Users can use “minicom” tool to test the transceiver between two serial ports.

root@linaro-alip:~# minicom -s

and then user can see:



Select “Serial port setup”, and then user can see:

```
+-----------------------------------------------------------------------+
| A -    Serial Device      : /dev/modem                                |
| B - Lockfile Location     : /var/lock                                 |
| C -   Callin Program      :                                           |
| D -  Callout Program      :                                           |
| E -    Bps/Par/Bits       : 115200 8N1                                |
| F - Hardware Flow Control : Yes                                       |
| G - Software Flow Control : No                                        |
|                                                                       |
|    Change which setting?                                              |
+-----------------------------------------------------------------------+
```

Input A, change serial device to “/dev/ttyS4”, and user can also change other settings. Finished the setting then save as default.

```
+-----[configuration]------+
| Filenames and paths      |
| File transfer protocols  |
| Serial port setup        |
| Modem and dialing        |
| Screen and keyboard      |
| Save setup as dfl        |
| Save setup as..          |
| Exit                     |
| Exit from Minicom        |
+--------------------------+
```

The same settings are made for the other device which serial is tested with the PPC-1xxw device serial port. And then user can input any character with the keyboard at the ppc-1xxw,the other device’s console will receive the character. And user input any character with the keyboard at the other device, the ppc-1xxw will also receive the character.

5.5 Brightness Test

Get brightness value:

```
root@linaro-alip:~# cat /sys/class/backlight/backlight0/brightness
200
```

Set brightness value: You can set the value from 0~255. Please notice that value 0 will let the screen be black.:

Set 0：

```
root@linaro-alip:~# echo 0 >/sys/class/backlight/backlight0/brightness
```

set 255：

```
root@linaro-alip:~# echo 255 >/sys/class/backlight/backlight0/brightness
```

5.6 USB Test

Step 1: Insert USB flash disk then assure it is in ppc-1xxW device list

Step 2: Erase and check

```
root@linaro-alip:~# dd if=/dev/zero of=/dev/sda bs=1024 count=1 seek=25118
1+0 records in
1+0 records out
root@linaro-alip:~# hexdump -C /dev/sda -s 25720832 -n 16
01887800 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |................|
```

Step 3: Write and check

```
root@linaro-alip:~# echo -n "0123456789ABCDEF" | dd of=/dev/sda bs=1024 count=1
seek=25118
0+1 records in
0+1 records out
root@linaro-alip:~# hexdump -C /dev/sda -s 25720832 -n 16
01887800 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 |0123456789ABCDEF|
```

Note! 1，*This operation **may damage the data stored** in USB flash disk.Please make sure there is no critical data in the USB flash disk being used for this test.*

5.7 Date and time configuration

Set system time (2019/01/01 13:25:00):

```
root@linaro-alip:~# date -s “2019/01/01 13:25:00”
```

Synchronize time from the NTP server:

```
root@linaro-alip:~# ntpdate <NTPSERVERIP>
```

Reset RTC hardware clock time (use current system time):

```
root@linaro-alip:~# hwclock -w
```

Reset system time (use RTC hardware clock time):

```
root@linaro-alip:~# hwclock -s
```

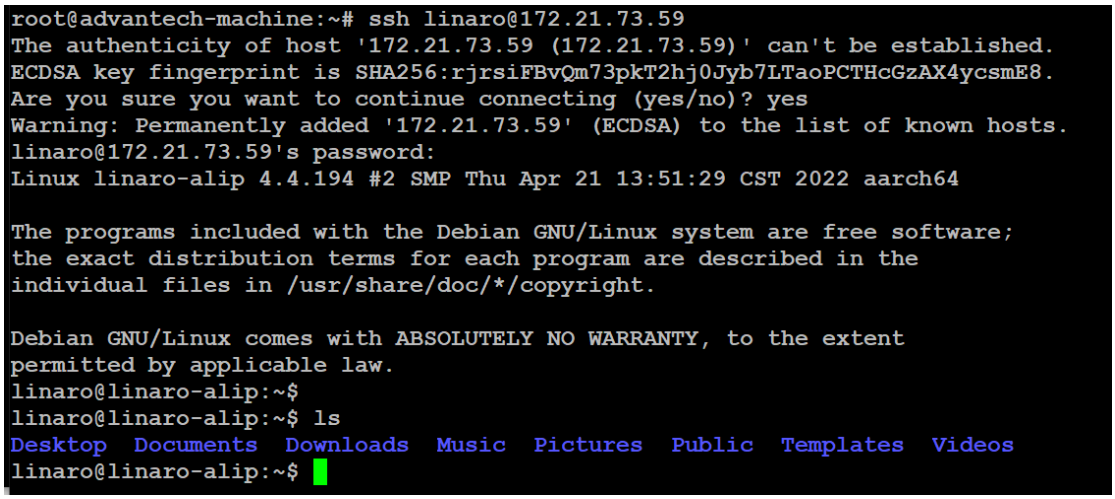
Set system time zone (use Shanghai time):

```
root@linaro-alip:~# cp /usr/share/zoneinfo/Asia/Shanghai /etc/localtime

root@linaro-alip:~# sync
```

5.8 SSH service

OpenSSH is the premier connectivity tool for remote login with the SSH protocol. It encrypts all traffic to eliminate eavesdropping, connection hijacking, and other attacks. Usage:



5.9 packages install

Install packages:

 # sudo apt-get install packagename

Remove packages:

 # sudo apt-get remove packagename

6 Debug console

6.1 Prepare

Before testing PPC-1xxW, please install the putty tool on the host PC.

https://www.putty.org/

Connect the PC to PPC-1xxW debug port.

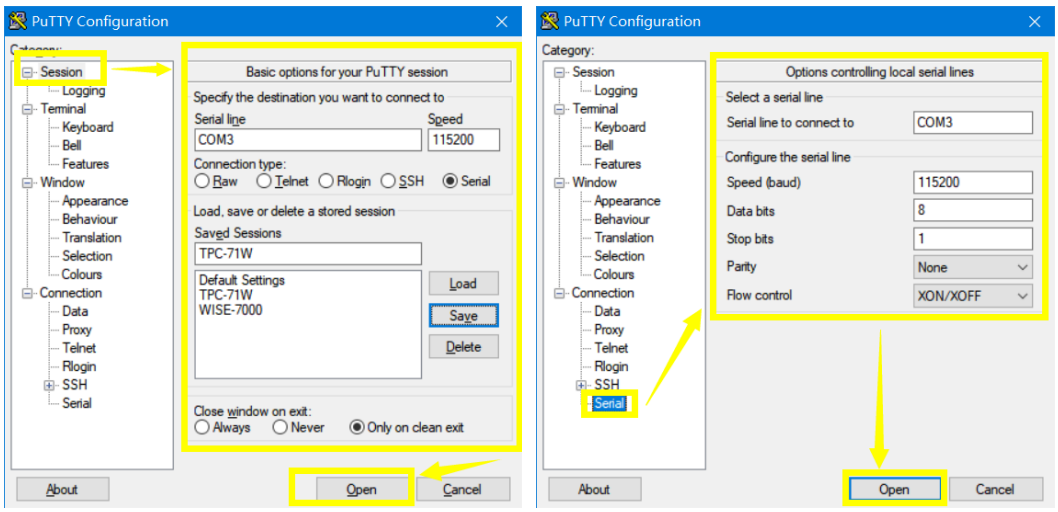
Then you can use putty to connect to the PPC-1xxW in following step.

6.2 Use debug console

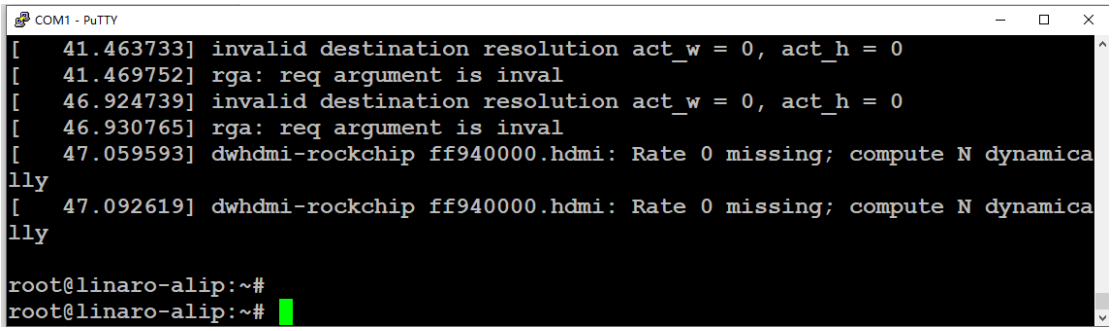
Step1: Check the debug COM port you connect

Desktop -> my computer -> property -> device manager -> COM&LPT

Step2: putty Configure



Step3: Power on PPC-1xxW and login .



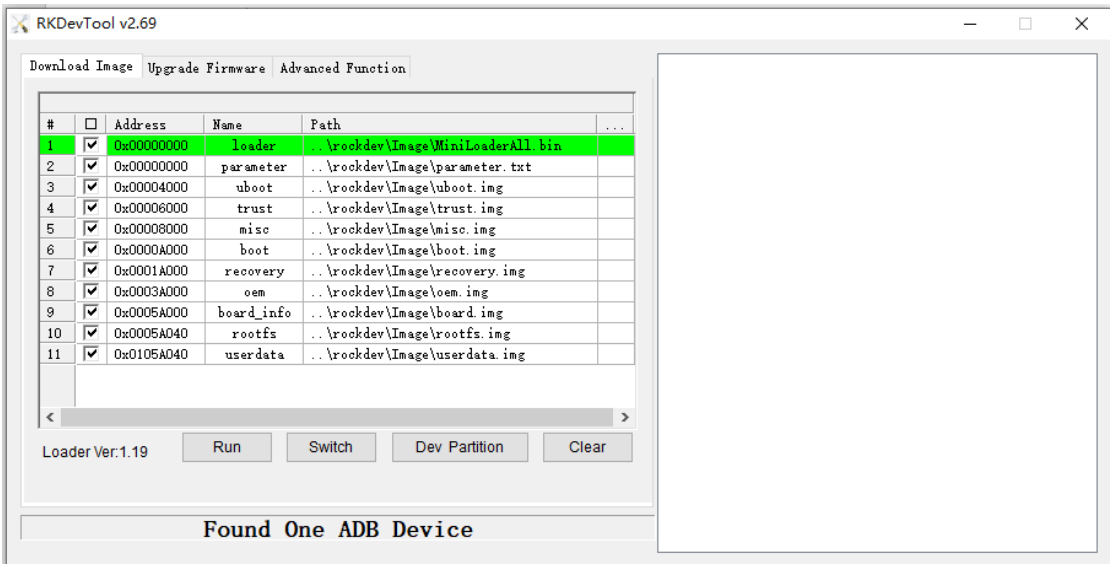
7 System Update

There are two ways to update the system。 One is using AndroidTool to update system, the other is using “UpdateEngin” command to update system.

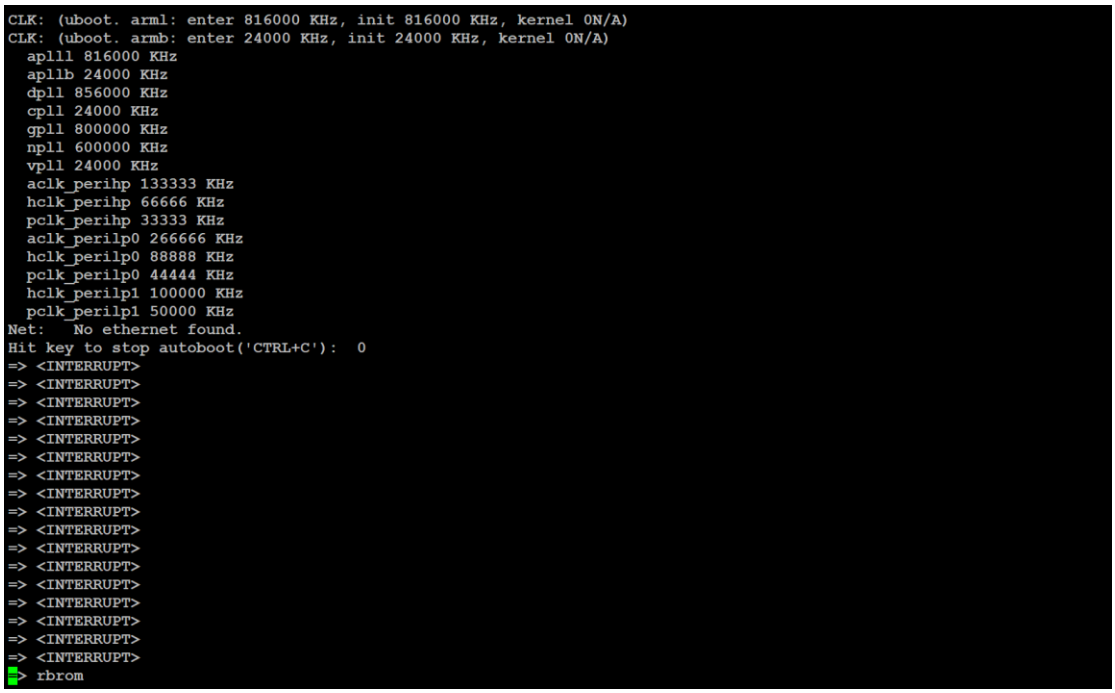
7.1 AndroidTool update system

Step 1 : Use USB OTG to connect PPC-1xx device and PC

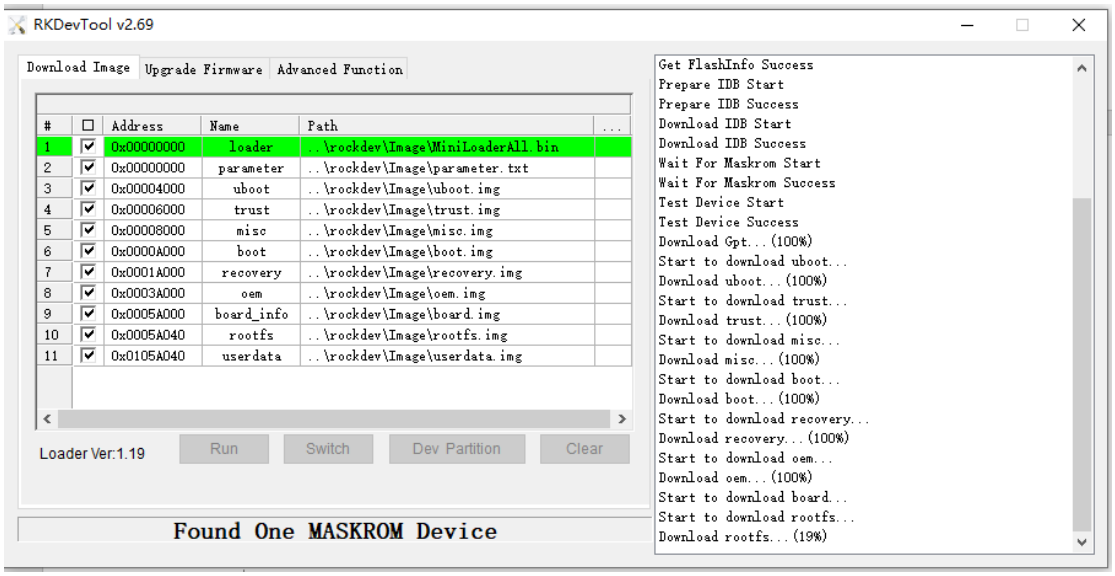
Step 2 : Open AndroidTool.exe



Step 3 : Reboot ppc-1xx,and enter uboot, then input “rbrom” command



Step 4 : Click the execute button, In AndroidTool



Step 5: Then wait for update, The system will restart automatically after the update is completed.

7.2 updateEngine update system

Step 1 : Copy the update.img to /userdata directory.

Step 2 : Execute the following command

```
updateEngine --image_url=/userdata/update.img --misc=update --
savepath=/userdata/update.img --reboot &
```

Step 3 :Then wait for update, The system will restart automatically after the update is completed.

8 User development

Users can use gcc to develop their own applications on the rk3399-ppc-1xxw-debian9。

For example, a simple demo as follows, Write a simple program demo.c

```
#include <stdio.h>
int main()
{
        printf("hello word\n");
        return 0;
}
~
~
```

And then write a “Makefile” file as follow：

```
all:
        gcc -o demo demo.c
clean:
        rm -rf demo
```

Then you can perform as follows:

```
root@linaro-alip:~# ls
demo.c  makefile
root@linaro-alip:~# make
gcc -o demo demo.c
root@linaro-alip:~# ls
demo  demo.c  makefile
root@linaro-alip:~# ./demo
hello word
root@linaro-alip:~#
```

The file “demo” is the executable file user developed.