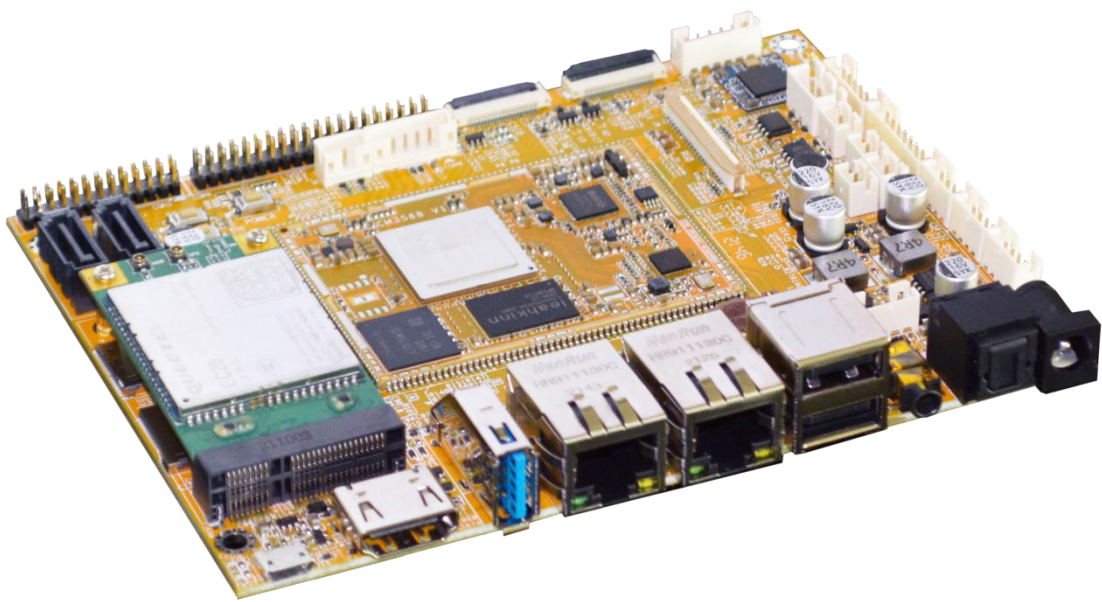


EM3568 Debian10 User Manual

V1.0



Boardcon Embedded Design

www.boardcon.com

1. Introduction

1.1. About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2. Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website (www.boardcon.com , www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence, If you have questions, comments, or concerns about your product or project, please no hesitate to contact us at support@armdesigner.com.

1.3. Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lightning or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit. In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this product.

Repairs make after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.



Revision History

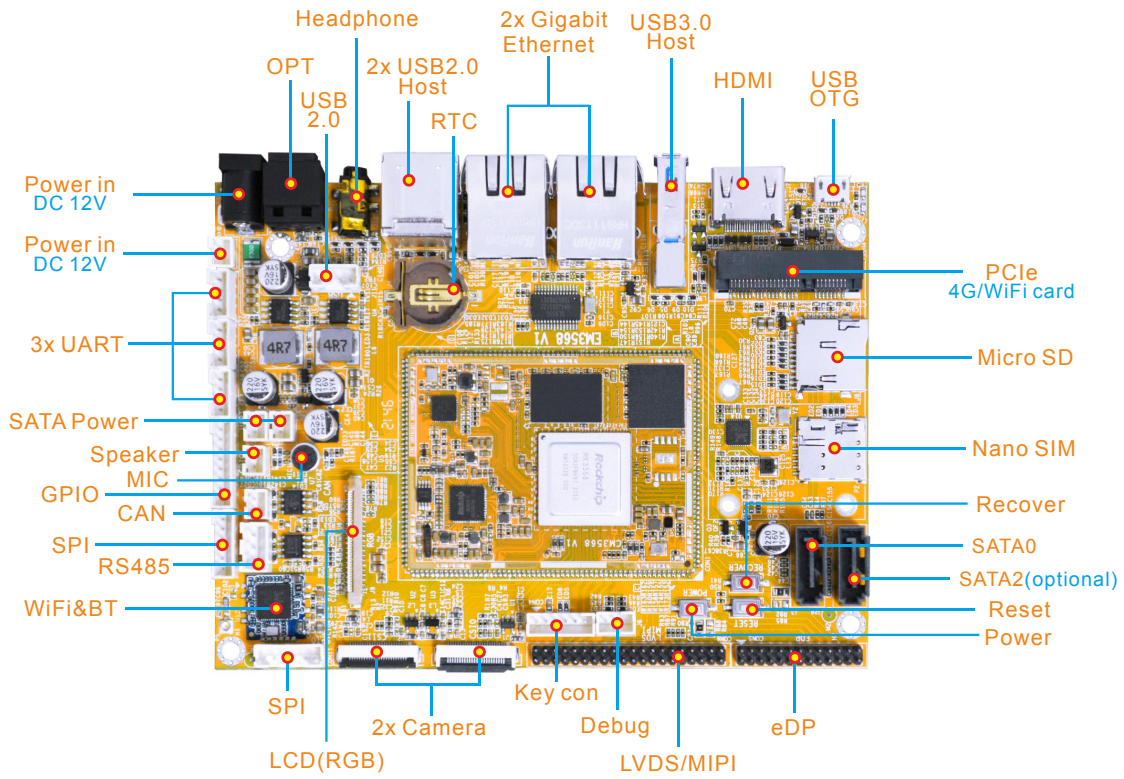
Ver	Description	Author	Date
V1.0	Initial version	Zhou Lijun	2022-04-11



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1 EM3568 Introduction



Specifications	
CPU	Rockchip RK3568 Quad-core Cortex-A55 @ up to 2.0 GHz
GPU	ARM Mali-G52 GPU with support for OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1
NPU	0.8 TOPS
Storage	8GB eMMC flash (up to 128GB) MicroSD card slot 2x SATA3.0 (SATA2 shared with PCIe2.0)
Power Supply	12V/3A DC input jack
USB	1x USB OTG 2.0 3x USB Host 2.0 (USB-AF or 4-pin connector) 1x USB 3.0
Connectivity	2x Gigabit Ethernet RJ45 ports via Realtek RTL8211F-CG controller 2.4G WiFi (802.11b/g/n) with Bluetooth 4.0 PCIe socket with Nano SIM card port to support 4G modules (PCIe socket integrated PCIe2.0 for WiFi Card)



Serial	1x Serial port for debug, 3-pin connector 3x UART, 4-pin connectors 1x RS485, 3-pin connector
Video	HDMI 2.0, 4Kp60 MIPI DSI/LVDS, 1080p60 (40-pin header) EDP 1.3, 2560x1600@60Hz (30-pin header) RGB, up to 1920x1080@60Hz (40-pin FPC connector)
Audio	3.5mm audio I/O jack 8-channel audio via HDMI SPDIF out Speaker (2-pin connector) MIC
Camera(optional)	2x MIPI Cameras, 24-pin FPC connector.
Keys	Recover, Reset, Power
Other features	RTC with battery connector; GPIO&I2C; CAN; Key connector(PWM3_IR/Reset / Recover /Power)
Dimension	Based board - 135mm x 100mm; CPU module - 45mm x 60mm

2 Compiler Environment

2.1 Vmware10.0+ubuntu18.04

Install Vmware10.0 in windows OS, and then install ubuntu18.04 in VMware to compile. Please visit the official website <http://www.ubuntu.com/> to download and install ubuntu operating system.

Note: Debian should be compiled by ubuntu 64bit OS.

2.2 Install Tools

PC OS: ubuntu system

Network: online

Permission: root

```
$ sudo apt-get install build-essential zlib1g-dev flex libx11-dev gperf libncurses5-dev bison lsb-core lib32z1-dev g++-multilib lib32ncurses5-dev uboot-mkimage g++-4.4-multilib repo git ssh make gcc libssl-dev libz4-tool expect g++ patchelf chrpath gawk texinfo chrpath diffstat binfmt-support qemu-user-static live-build bison flex fakeroot cmake gcc-multilib g++-multilibdevice-tree-compiler python-pip ncurses-dev pyelftools unzip
```

3 Compile Source

Step 1, unzip the source and set the compile board

```
$ tar xvf sdk-1.1.tar.gz  
$ cd sdk-1.1
```

Step 2, compile uboot

```
$ ./build.sh uboot
```

Step 3, compile kernel

```
$ ./build.sh kernel
```

Debian10 kernel.img and resource.img are included in boot.img

Step 4, compile recovery

```
$ ./build.sh recovery
```

Step 5, compile Debian

```
$ sudo apt-get install binfmt-support qemu-user-static live-build  
$ sudo dpkg -i ubuntu-build-service/packages/*  
$ sudo apt-get install -f  
$ RELEASE=buster TARGET=desktop ARCH=arm64 ./mk-base-debian.sh  
$ VERSION=debug ARCH=arm64 ./mk-rootfs-buster.sh  
$ ./mk-image.sh
```

After compile, you will get the **linaro-rootfs.img** image in the debian directory.

Step 6, Generated image file

```
$ ./mkfirmware.sh  
$ ./build.sh updateimg (packaged in the update.img)  
$ cd rockdev  
$ ls
```

The update.img are generated in current directory.

4 Images Operation

4.1 Pack Image

Step 1, copy all the files in debian directory **rockdev** to the windows **RKDevTool/rockdev/Image**

Step 2, enter **RKDevTool/rockdev/**, double-click to run **mkupdate.bat**.

Step 3, the **update.img** will be generated in **rockdev** directory.

CD ▶ EM3568 ▶ debian ▶ Tools ▶ RKDevTool ▶ rockdev ▶ Image

工具(T) 帮助(H)

共享 ▼ 新建文件夹

名称	修改日期	类型	大小
boot.img	2022/4/22 12:15	光盘映像文件	22,378 KB
MiniLoaderAll.bin	2022/4/22 12:15	KuaiZipMount.bin	455 KB
misc.img	2022/4/22 12:15	光盘映像文件	48 KB
oem.img	2022/4/22 12:18	光盘映像文件	17,408 KB
parameter.txt	2022/4/22 12:15	文本文档	1 KB
recovery.img	2022/4/22 12:15	光盘映像文件	29,125 KB
rootfs.img	2022/4/22 12:18	光盘映像文件	3,668,956...
uboot.img	2022/4/22 12:15	光盘映像文件	4,096 KB
userdata.img	2022/4/22 12:18	光盘映像文件	5,120 KB

EM3568 ▶ debian ▶ Tools ▶ RKDevTool ▶ rockdev ▶

搜索 rockdev

(V) 工具(T) 帮助(H)

包含到库中 ▼ 共享 ▼ 新建文件夹

名称	修改日期	类型	大小
Image	2022/4/22 14:44	文件夹	
AFPTool.exe	2021/8/25 20:23	应用程序	229 KB
mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
package-file	2021/8/25 20:23	文件	1 KB
px3se-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
px3se-package-file	2021/8/25 20:23	文件	1 KB
px30-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
px30-package-file	2021/8/25 20:23	文件	1 KB
recover-script	2021/8/25 20:23	文件	1 KB
rk312x-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
rk312x-package-file	2021/8/25 20:23	文件	1 KB
rk356x-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
rk356x-package-file	2021/8/25 20:23	文件	1 KB
rk1808-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
rk1808-package-file	2021/8/25 20:23	文件	1 KB
rk3036-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
rk3036-package-file	2021/8/25 20:23	文件	1 KB
rk3128h-mkupdate.bat	2021/8/25 20:23	Windows 批处理...	1 KB
rk3128h-package-file	2021/8/25 20:23	文件	1 KB


```

c:\. Android Firmware Package Tool v1.65
当文件已存在时, 无法创建该文件。

E:\CD\EM3568\debian\Tools\RKDevTool\rockdev>afptool -pack ./ Image\update.img
Android Firmware Package Tool v1.65
----- PACKAGE -----
Add file: .\package-file
Add file: .\package-file done,offset=0x800,size=0x332,userspace=0x1
Add file: .\Image\MiniLoaderAll.bin
Add file: .\Image\MiniLoaderAll.bin done,offset=0x1000,size=0x719c0,userspace=0xe4
Add file: .\Image\parameter.txt
Add file: .\Image\parameter.txt done,offset=0x73000,size=0x1f4,userspace=0x1
Add file: .\Image\uboot.img
Add file: .\Image\uboot.img done,offset=0x73800,size=0x400000,userspace=0x801
Add file: .\Image\boot.img
Add file: .\Image\boot.img done,offset=0x474000,size=0x15da600,userspace=0x2bb5
Add file: .\Image\rootfs.img
Add file: .\Image\rootfs.img done,offset=0x1a4e800,size=0xdfef7000,userspace=0x1bfdef
Add file: .\Image\recovery.img
Add file: .\Image\recovery.img done,offset=0xe1946000,size=0x1c71400,userspace=0x38e3
Add file: .\Image\oem.img
Add file: .\Image\oem.img done,offset=0xe35b7800,size=0x1100000,userspace=0x2201

Add file: .\Image\userdata.img
Add file: .\Image\userdata.img done,offset=0xe46b8000,size=0x500000,userspace=0xa01
Add CRC...
Make firmware OK?
----- OK -----

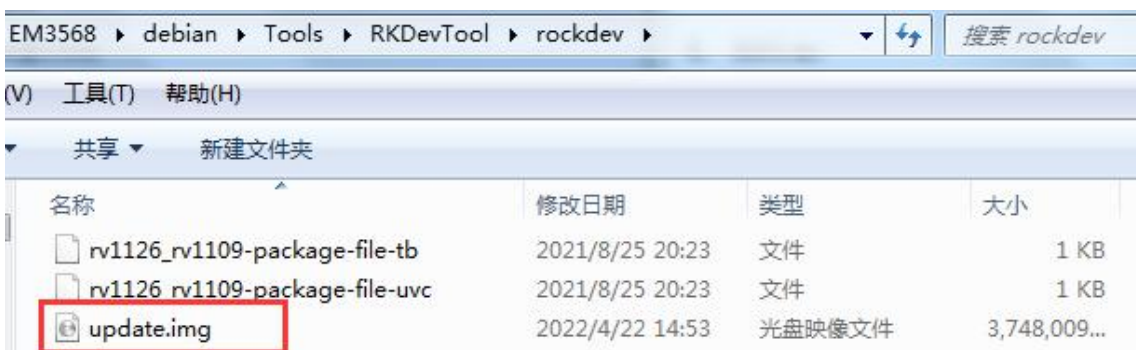
E:\CD\EM3568\debian\Tools\RKDevTool\rockdev>RKImageMaker.exe -RK3568 Image\MiniLoaderAll.bin Image\update.img update.img -os_type:androidos
*****RKImageMaker ver 1.66 *****
Generating new image, please wait...
Writing head info...
Writing boot file...
Writing firmware...
Generating MD5 data...
MD5 data generated successfully!
New image generated successfully!

E:\CD\EM3568\debian\Tools\RKDevTool\rockdev>rem update.img is new format, Image\update.img is old format, so delete older format

E:\CD\EM3568\debian\Tools\RKDevTool\rockdev>del Image\update.img

E:\CD\EM3568\debian\Tools\RKDevTool\rockdev>pause
请按任意键继续. . .

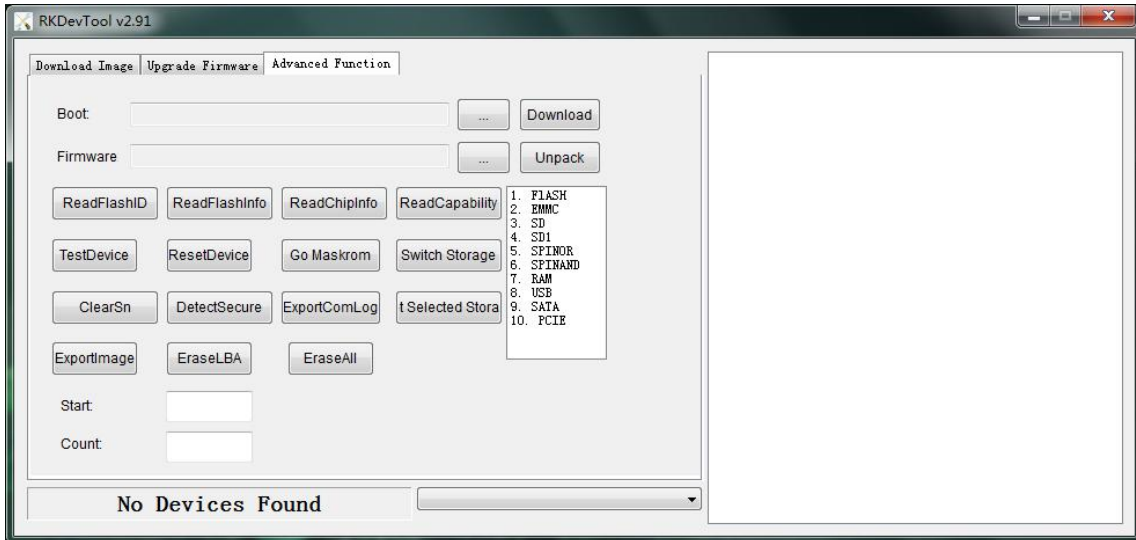
```



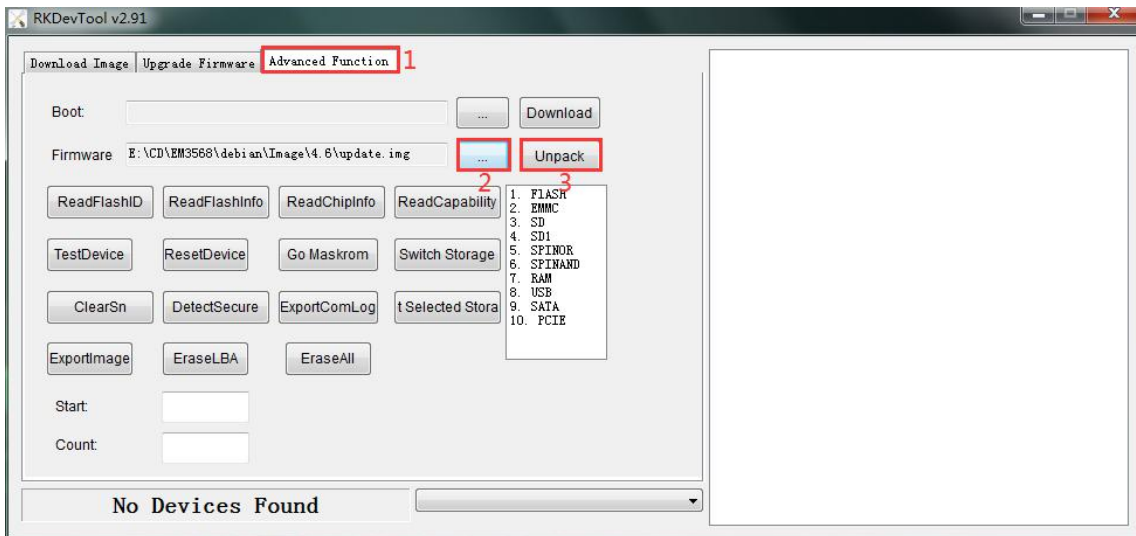
4.2 Unzip Firmware

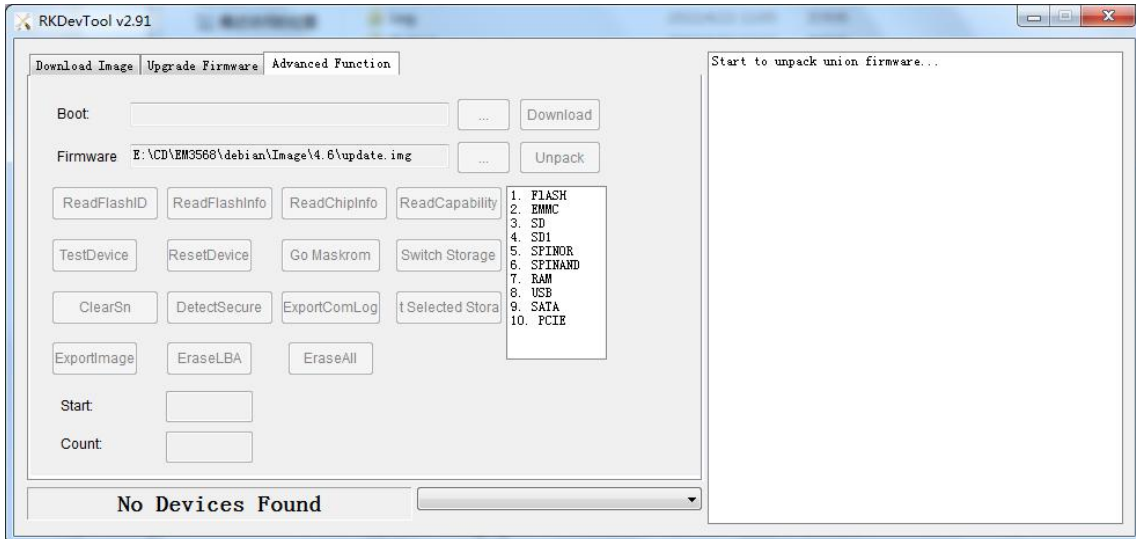
Unzip Firmware in windows.

Step 1, open **RKDevTool.exe** (*Path:RKDevTool_Release\RKDevTool.exe*)

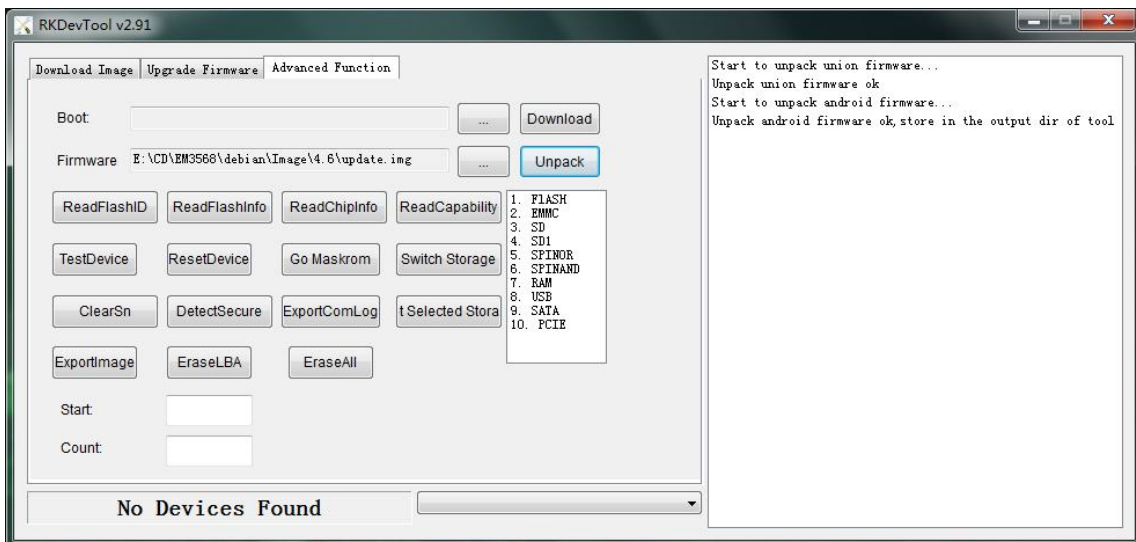


Step 2, click **Advanced Function** -> **Firmware**, select **update.img**. Click **Unpack** to Unzip.

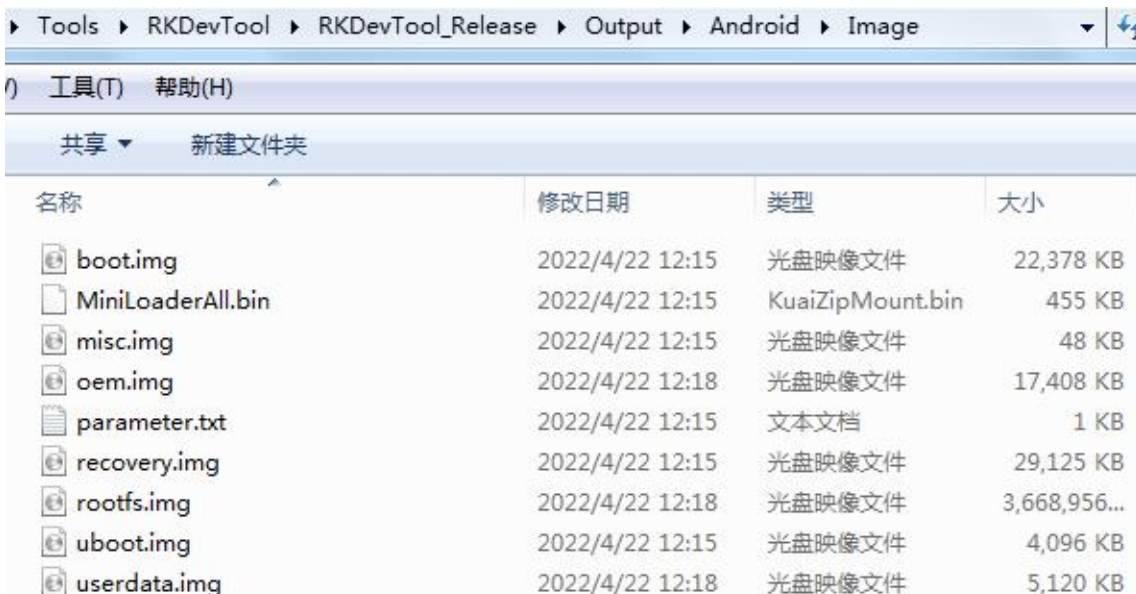




Step 3, Unpack finish as follow:



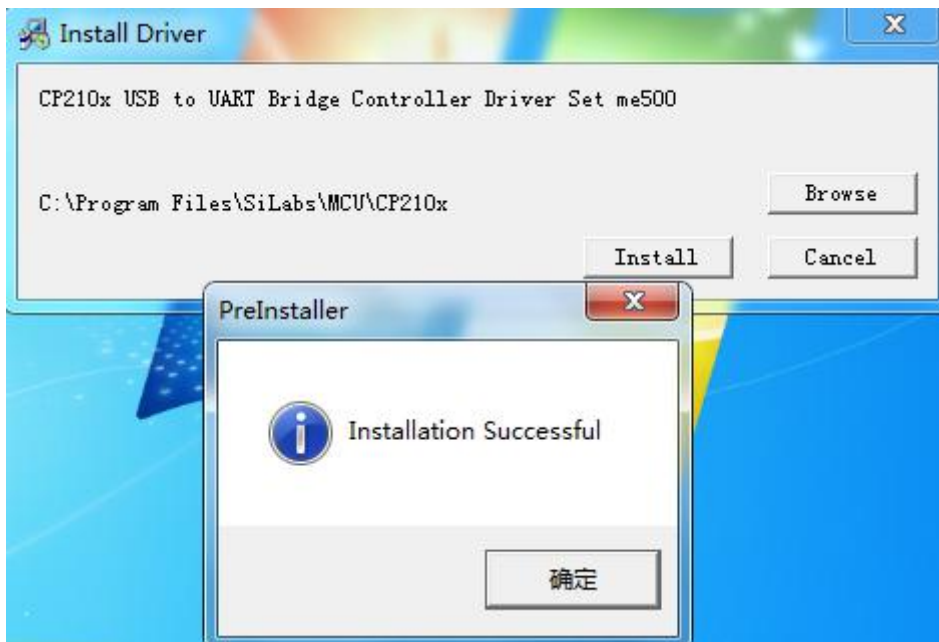
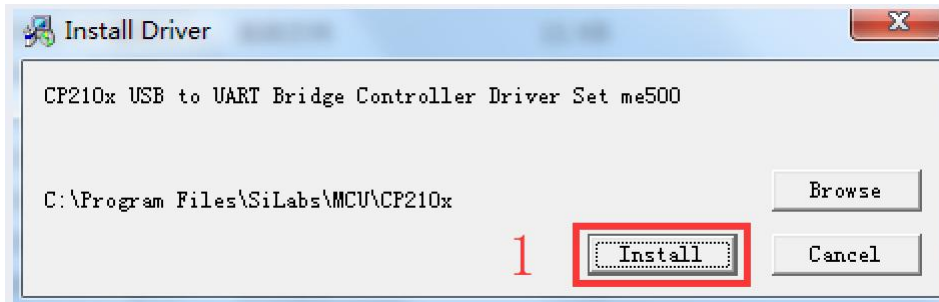
The unzip files will be generated in `\\RKDevTool\\RKDevTool_Release\\Output\\Android\\Image` directory.



5 Install Tools

5.1 Install CP2102 Driver

Plug the **USB-to-UART cable CP2102** to the PC, unzip **CP2102WIN7.rar** on Windows, then click **preInstaller.exe** to install

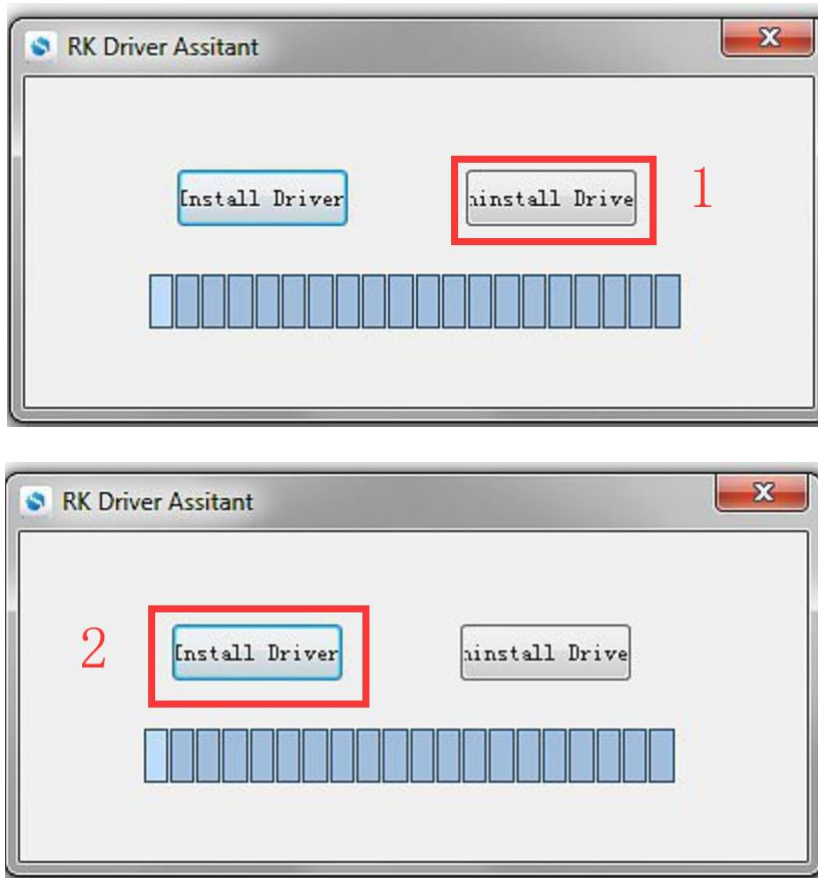


Now the device will be listed under **Device Manager** -> **PORTS** with unique serial port assigned

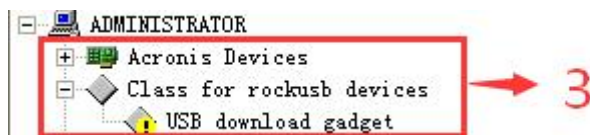
 CP210x USB to UART Bridge Controller (COM5)

5.2 Install Rockchip Driver Assistant

Path: *DriverAssitant_v5.1.1/DriverInstall.exe*



After the installation is complete, connect the board and PC with Micro USB cable and press the “Recover” key and hold then power the board, in *Computer Management* can see the following information:



The WINDOW will pop up found New Hardware Wizard dialog box, choose to install from the specified location, and then select *\\DriverAssitant_v5.11\\DriverAssitant_v5.1.1\\ADBDriver*.

After the installation is complete in *Computer Management* can see the following information:

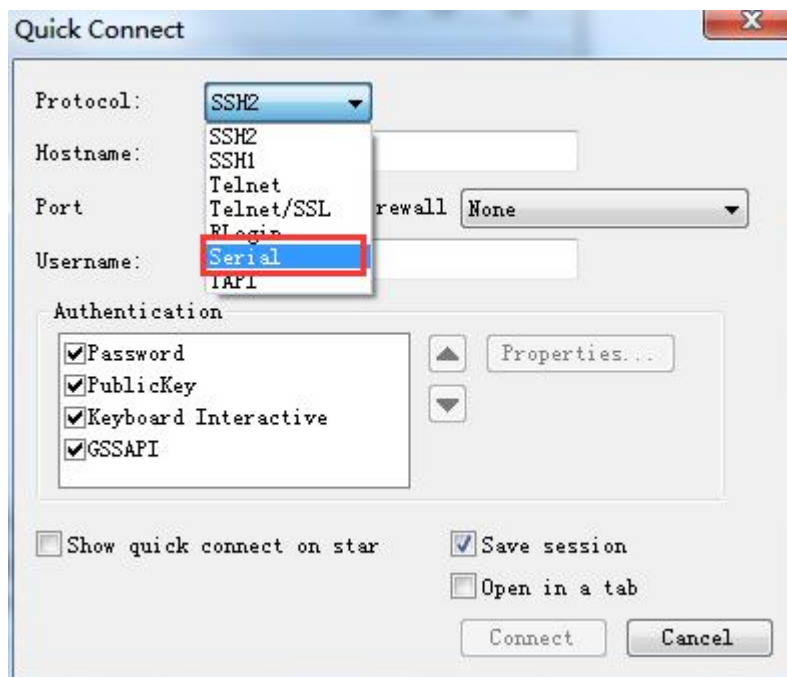
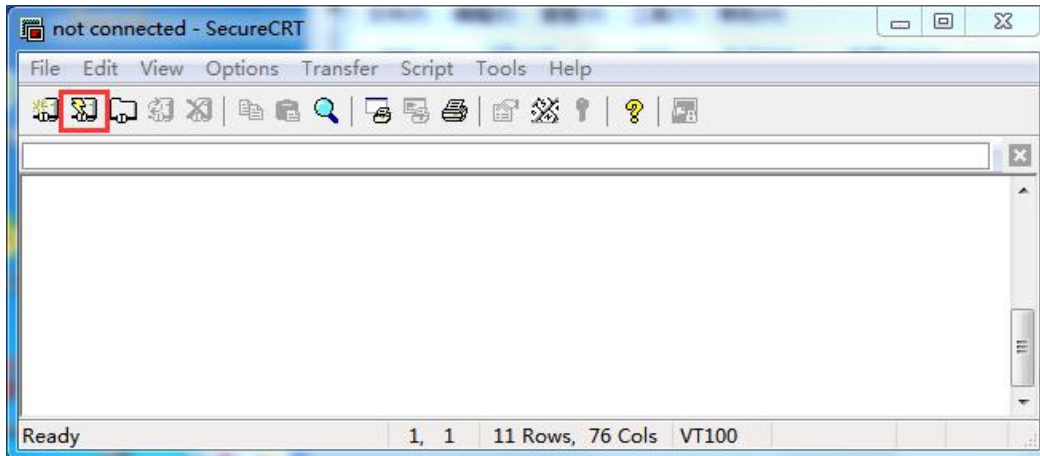


5.3 Install Serial Terminal Tool

The serial terminal SecureCRT is used for debugging. It can be used directly after decompression.

Open SecureCRT.exe after copy to PC (path: tools\windows\SecureCRT.exe), then click the icon

Quick Connect to config



Set the parameters as follow:

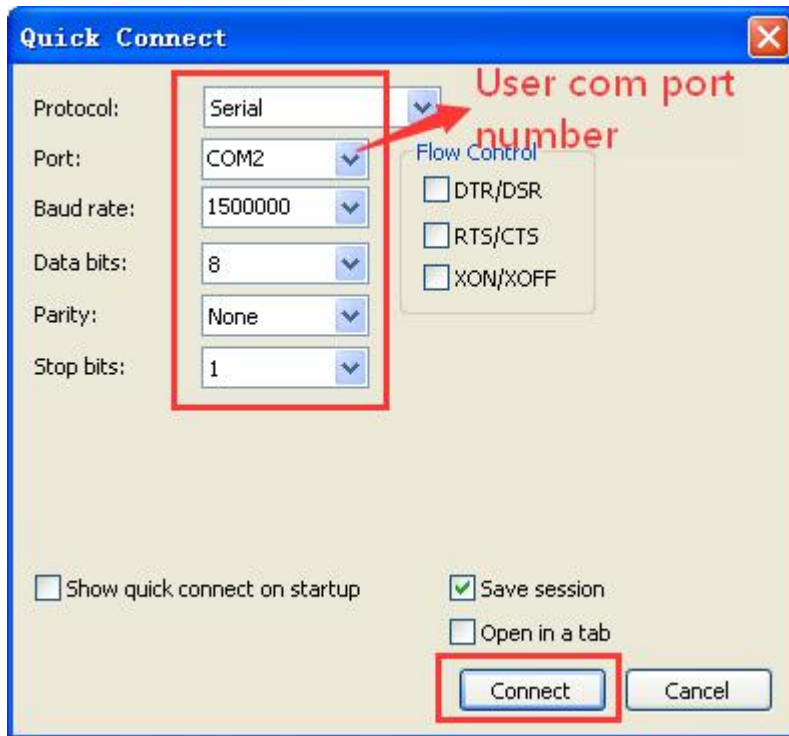
Protocol: Serial

Port: To be specified by user PC

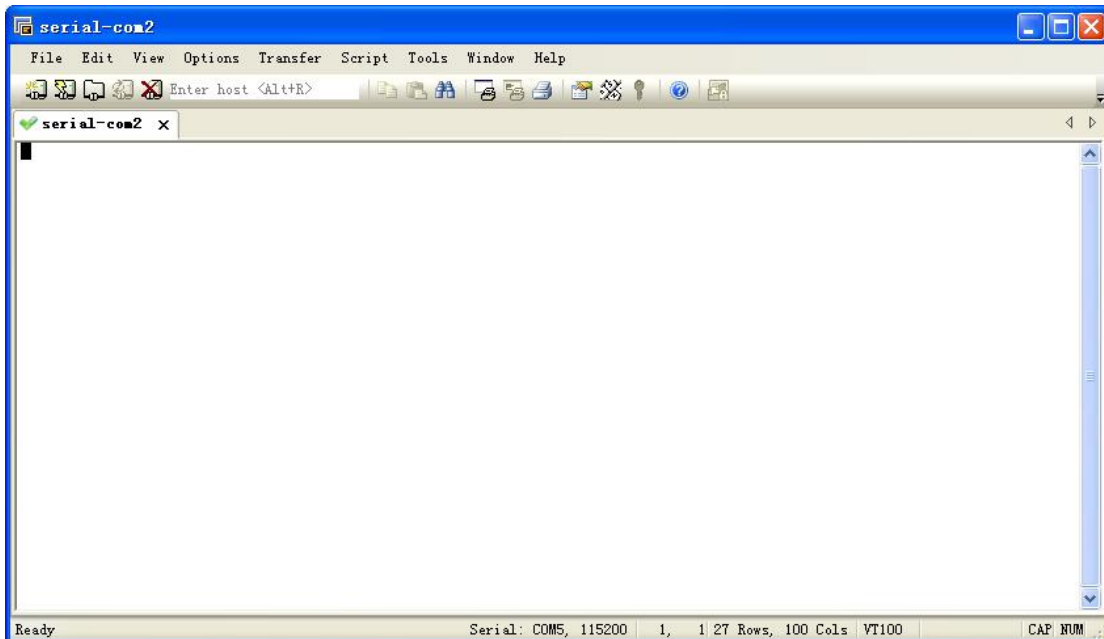
Baud rate: 1500000

Please check XON/XOFF not selected

Check Save session is selected



After all, click **connect**



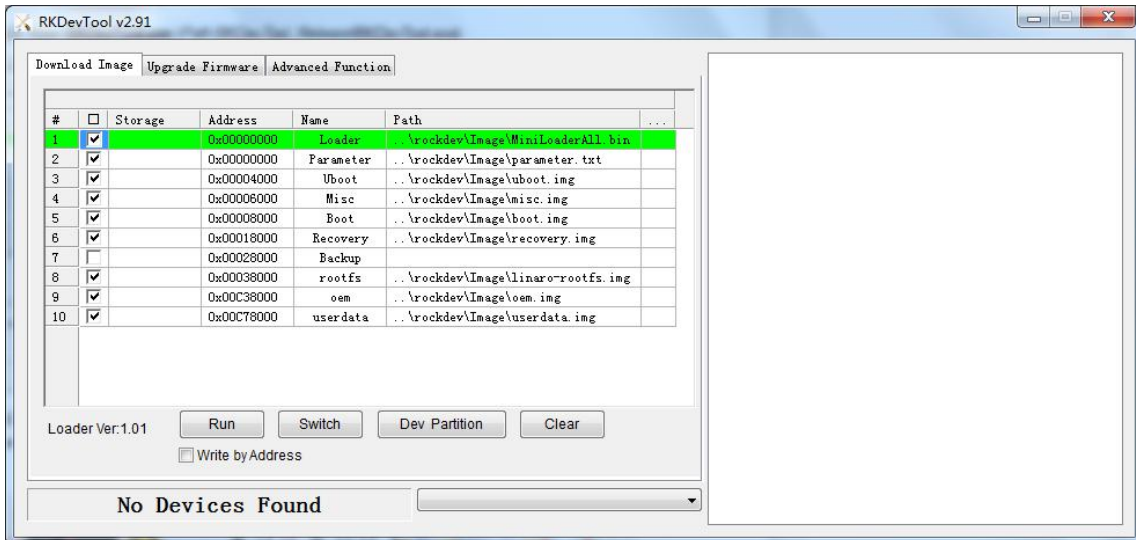
Illusion: If open more than one serial terminal tools, and they use the same serial port, there will be reported **the port is busy**.

Solution: Turn off the serial tool that unnecessary.

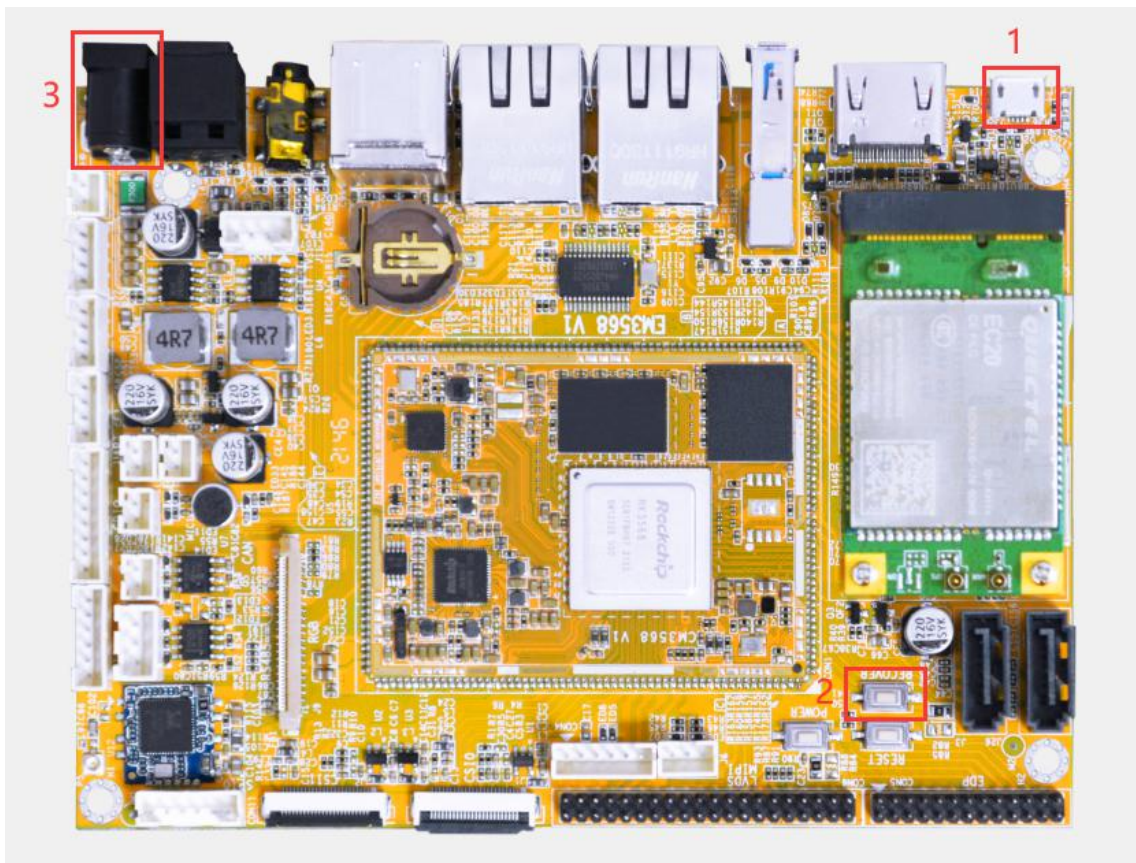
6 Burn Images

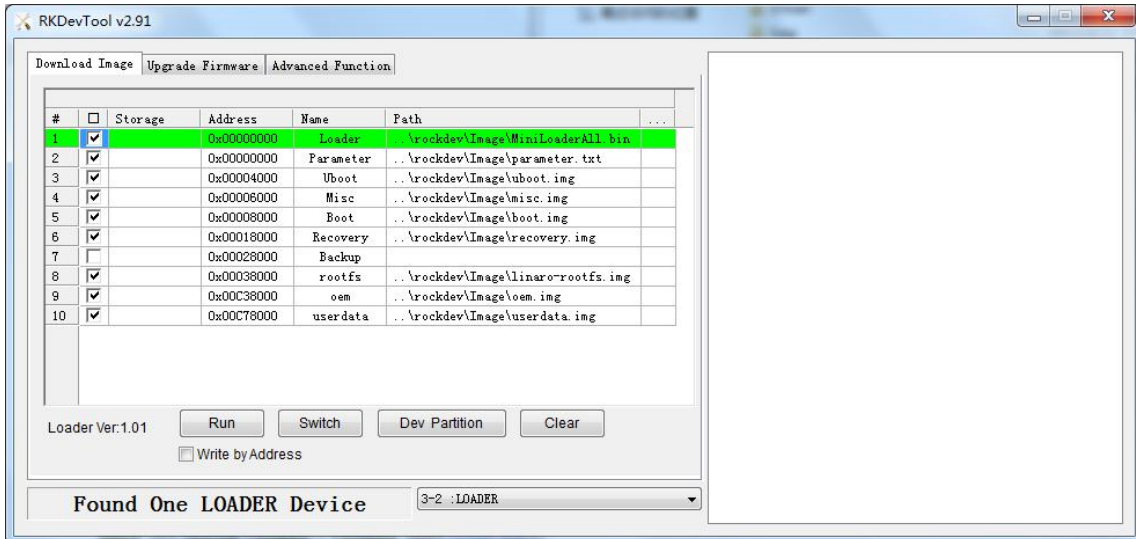
Step 1, unzip **RKDevTool.zip** on Windows.

Step 2, open **RKDevTool.exe** (Path:RKDevTool_Release\RKDevTool.exe)

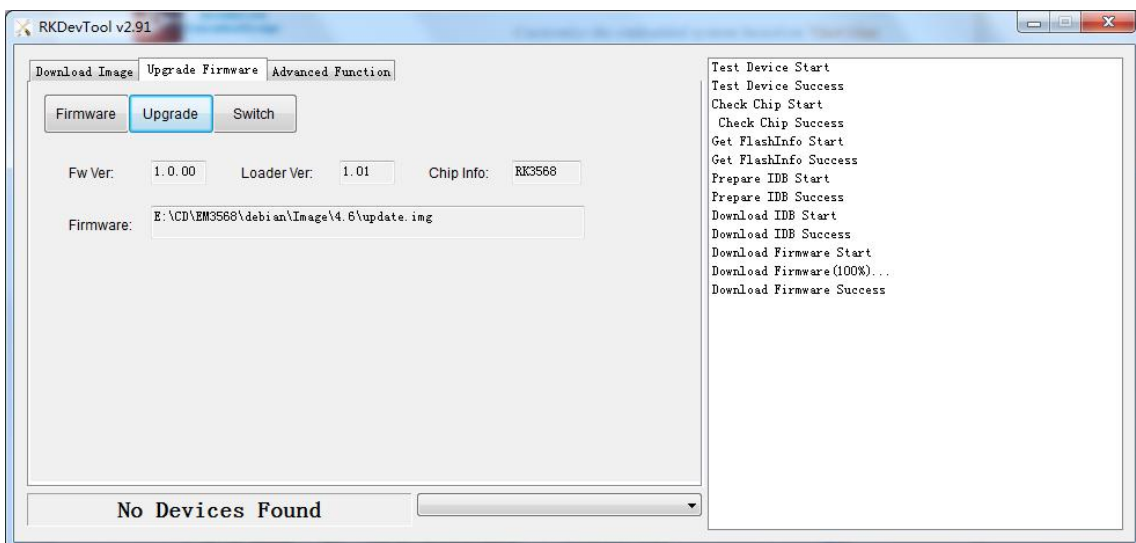
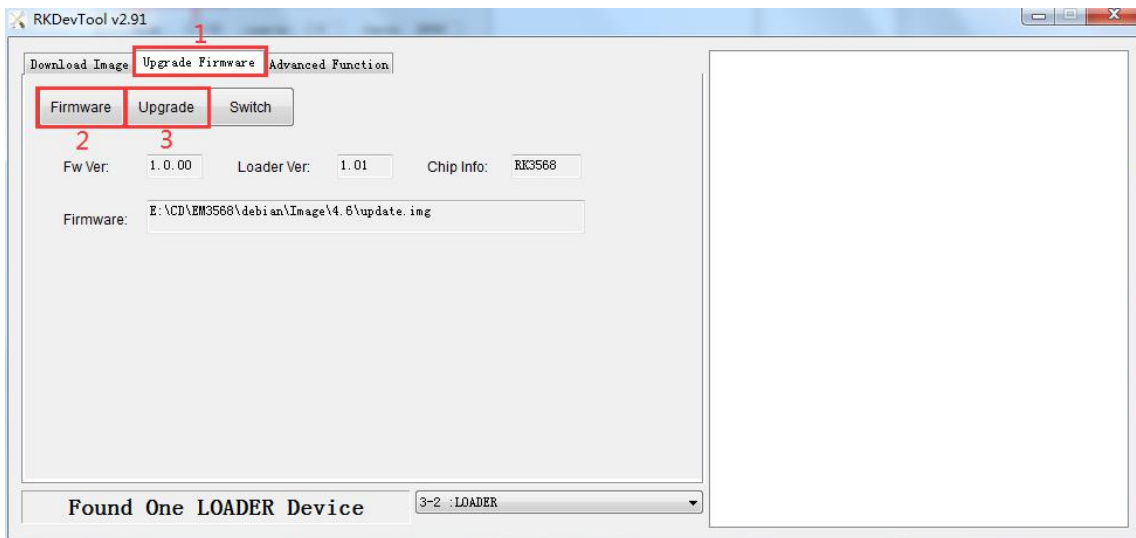


Step 3, connect PC and development board with Micro USB cable, keep pressing the **Recover Key** and power the board until the windows PC shows **Found one LOADER Device**.





Step 4, click **Upgrade Firmware** -> **Firmware**, select **update.img**. Click **Upgrade** to flash.

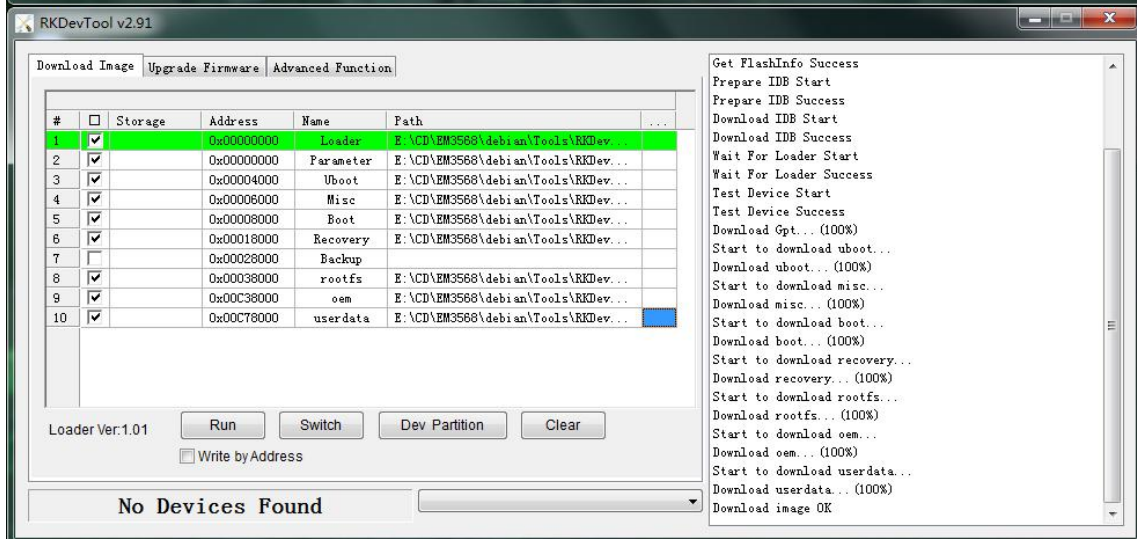
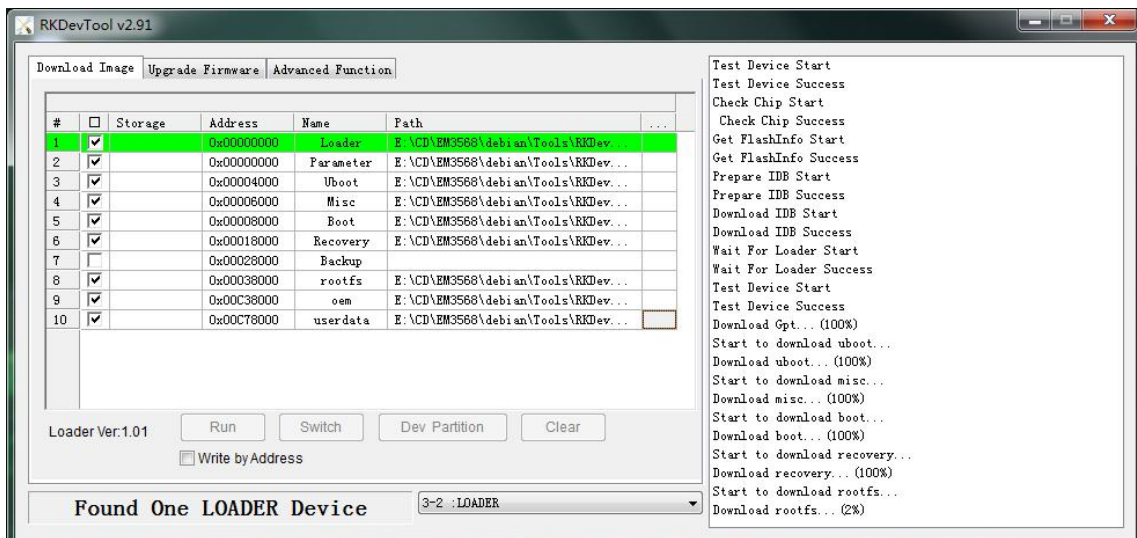
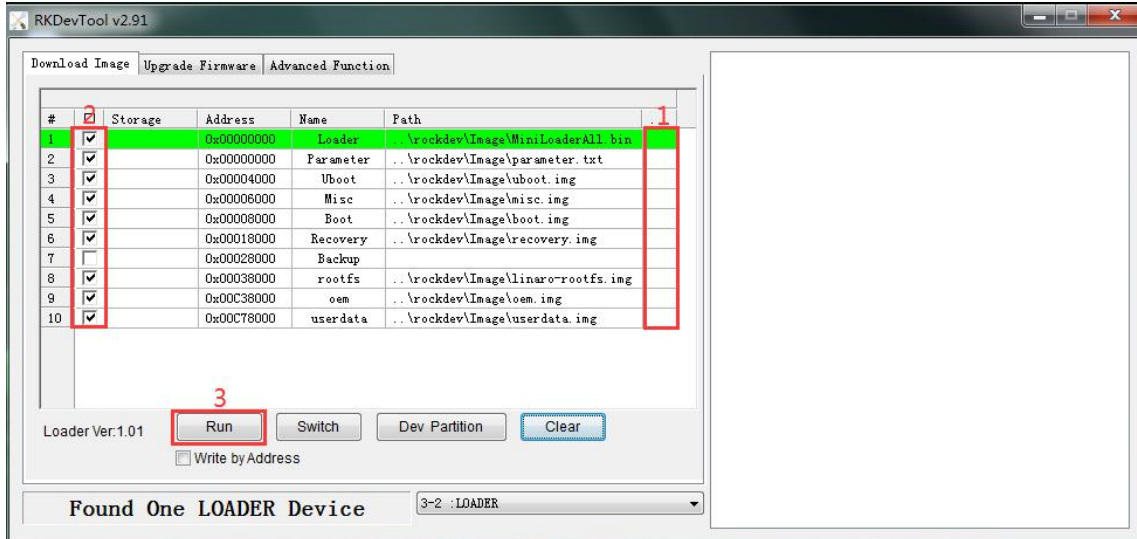


User can also update the firmware separately.

Step 1, Click the column on the right side for the path of the file want to flash.

Step 2, Select the checkbox on the left.

Step 3, Click “run” to flash the image.



7 Debian Application

7.1 Display

Connect the board and monitor with a HDMI cable and connect a 10.1 inch LVDS LCD , then start up.

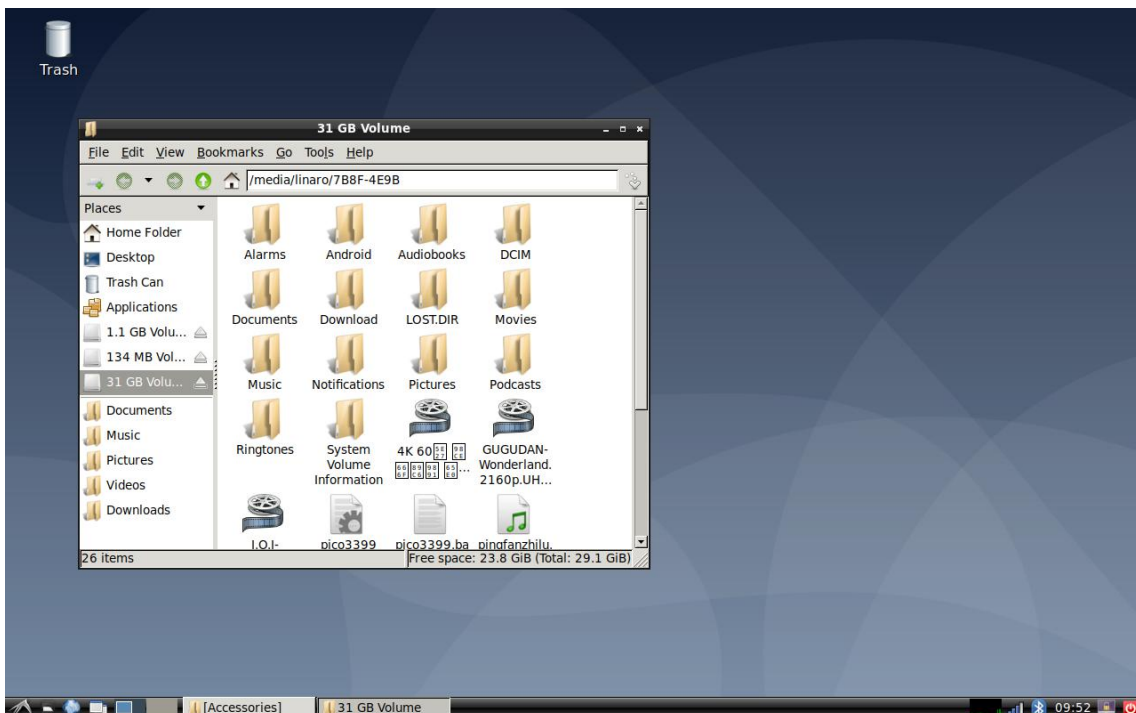
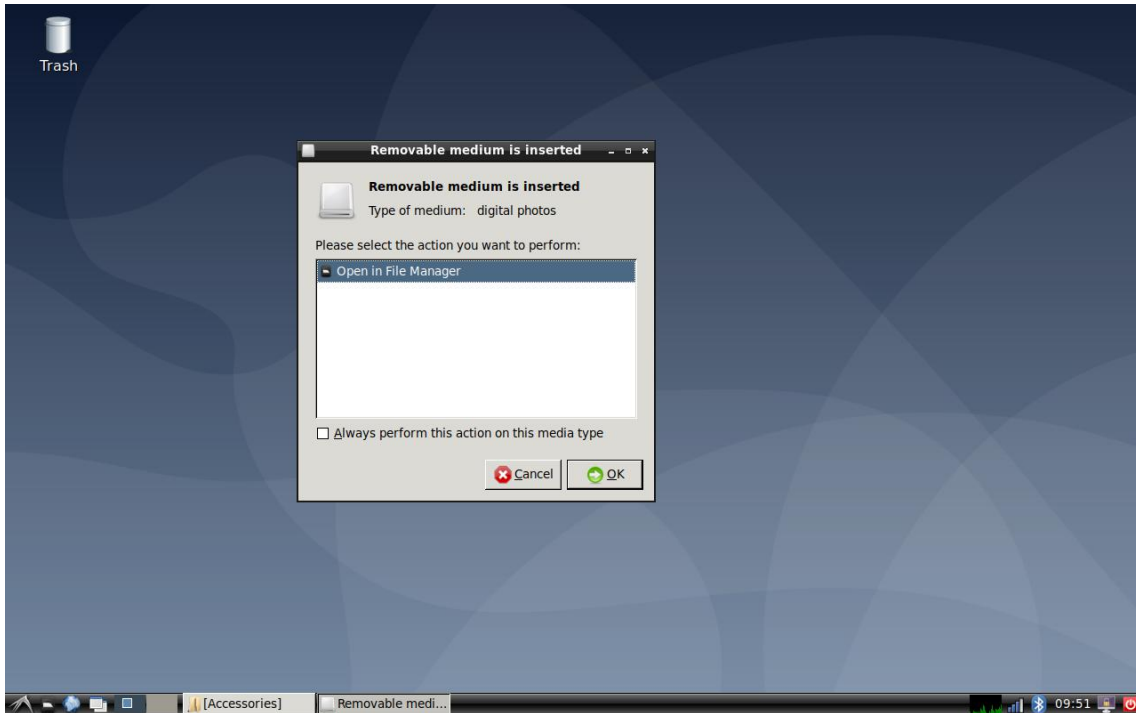


Note: The system default support HDMI and LVDS asynchronous display.

7.2 SD Card

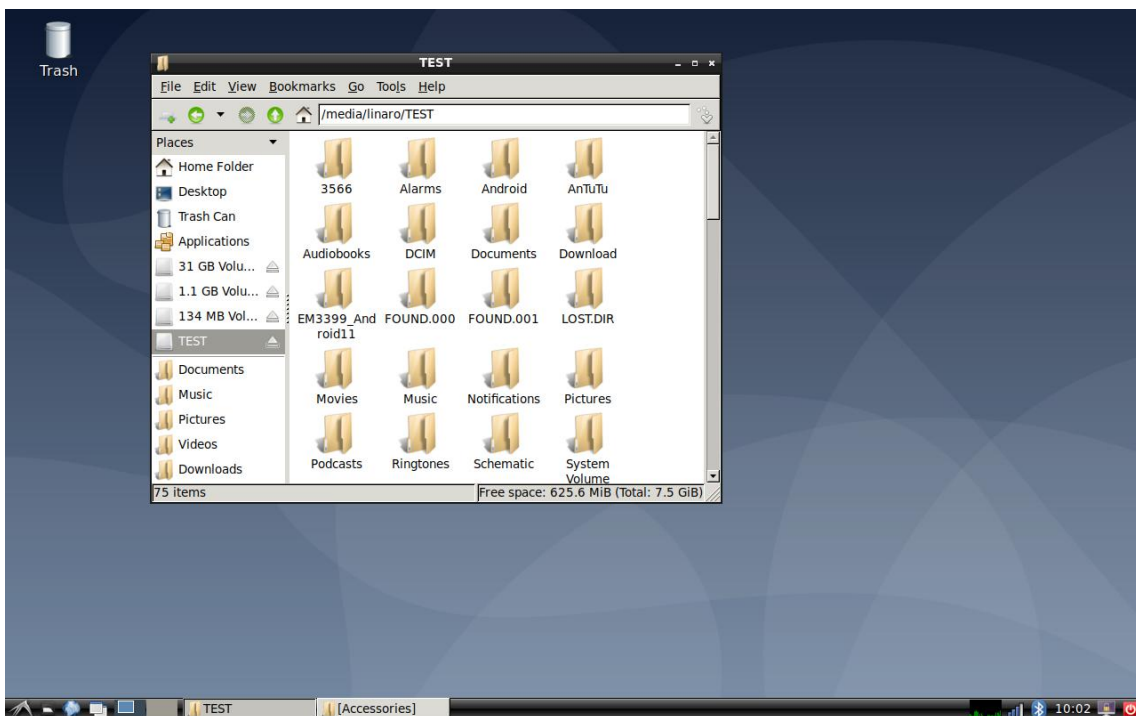
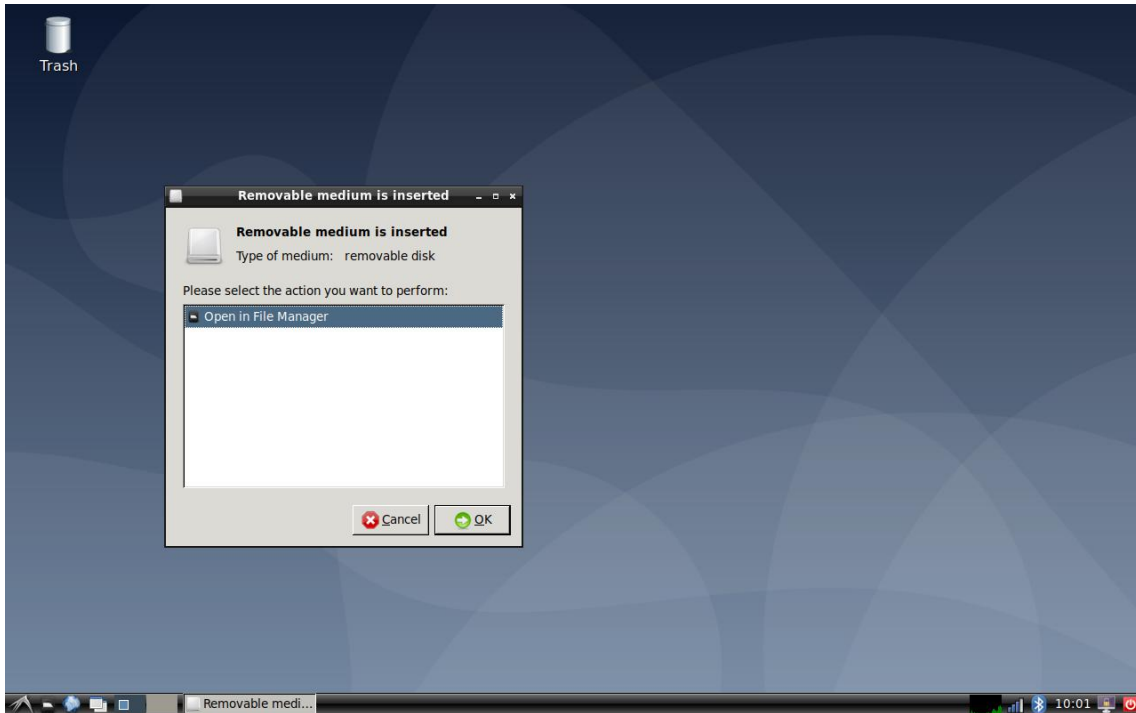
EM3568 supports SD Hot-plug.

```
Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/# cd /media/linaro/
root@linaro-alip:/media/linaro# ls
16b8dcd0-99e7-44f5-b9d9-a7b19d9ffd0b  8dd906f3-1c7a-4936-842a-20317ab52423
7B8F-4E9B
root@linaro-alip:/media/linaro# ls 7B8F-4E9B/
'4K 60宬?椽崖椽璠璠  鏃犺狄汉鏈洪媿鏄? 4kmee鎬修om.mp4'
Alarms
Ready          Serial: COM3    7, 33    7 Rows, 76 Cols    VT100    NUM
```



7.3 USB Host

The USB Host can be used to connect USB mouse, USB keyboard, U-Disk or other USB devices. EM3568 also supports SD Hot-plug.



Note: The USB2.0 and USB3.0 interfaces are separate.

7.4 Audio Player

Copy Audio file to sdcard/udisk then insert it to the board. After system boot execute follow command to play.

`# aplay -l`

(View audio hardware devices)

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/# aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: rockchiprk809co [rockchip,rk809-codec], device 0: fe410000.i2s-rk817-hifi rk817-hifi-0 [fe410000.i2s-rk817-hifi rk817-hifi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: ROCKCHIPSPDIF [ROCKCHIP,SPDIF], device 0: fe460000.spdif-dit-hifi dit-hifi-0 [fe460000.spdif-dit-hifi dit-hifi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 2: rockchiphdmi [rockchip,hdmi], device 0: rockchip,hdmi i2s-hifi-0 [rockchip,hdmi i2s-hifi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
root@linaro-alip:/#
Ready Serial: COM3 17, 21 17 Rows, 93 Cols VT100 NUM

```

Execute follow command to play in earphone and speaker:

aplay test.wav

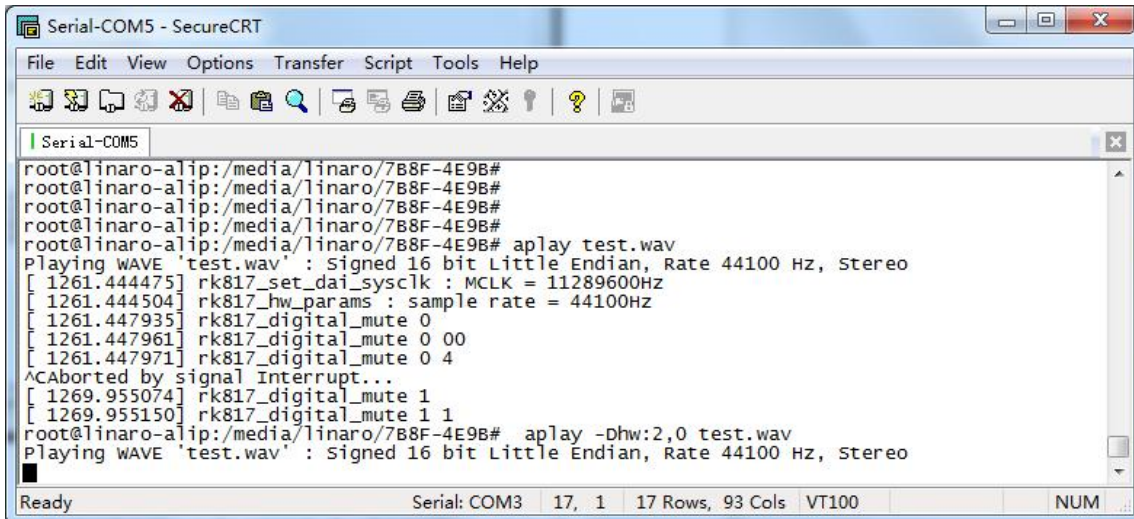
Execute follow command to play in HDMI:

aplay -Dhw:2,0 test.wav

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/media/linaro/7B8F-4E9B# ls
'4K 60帧?棕崖檀瑞咪  獾狄汉锤烘魏鏖? 4kmee钹修om.mp4'
Alarms
Android
Audiobooks
DCIM
Documents
Download
GUGUDAN-wonderland.2160p.UHDTV.H265.ts
Go-home.mp3
I.O.I-Dream.Girl.2160p.UHDTV.H265.ts
LOST.DIR
Movies
Music
Notifications
Pictures
Podcasts
Ringtones
'Screenshot from 2022-04-22 09-51-27.png'
'Screenshot from 2022-04-22 09-52-35.png'
'Screenshot from 2022-04-22 10-01-56.png'
'Screenshot from 2022-04-22 10-02-37.png'
'System volume Information'
pico3399
pico3399.bak
pingfanzhilu.mp3
test.mp4
test.wav
test1
test2
test3
video_file_0c6aa6.mp4
root@linaro-alip:/media/linaro/7B8F-4E9B# [ 1176.688724] dwc3 fcc00000.dwc3: device reset
[ 1176.689003] android_work: sent uevent USB_STATE=DISCONNECTED
Ready Serial: COM3 34, 1 34 Rows, 93 Cols VT100 NUM

```



```

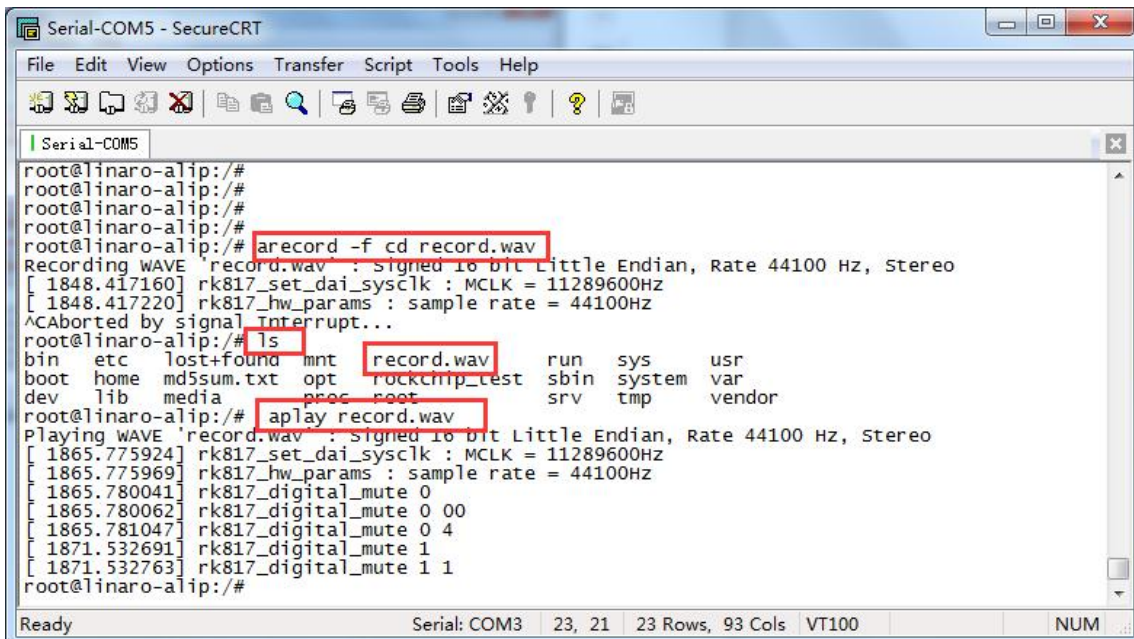
Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/media/linaro/7B8F-4E9B#
root@linaro-alip:/media/linaro/7B8F-4E9B#
root@linaro-alip:/media/linaro/7B8F-4E9B#
root@linaro-alip:/media/linaro/7B8F-4E9B#
root@linaro-alip:/media/linaro/7B8F-4E9B# aplay test.wav
Playing WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
[ 1261.444475] rk817_set_dai_sysclk : MCLK = 11289600Hz
[ 1261.444504] rk817_hw_params : sample rate = 44100Hz
[ 1261.447935] rk817_digital_mute 0
[ 1261.447961] rk817_digital_mute 0 00
[ 1261.447971] rk817_digital_mute 0 4
^CAborted by signal Interrupt...
[ 1269.955074] rk817_digital_mute 1
[ 1269.955150] rk817_digital_mute 1 1
root@linaro-alip:/media/linaro/7B8F-4E9B# aplay -Dhw:2,0 test.wav
Playing WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Ready Serial: COM3 17, 1 17 Rows, 93 Cols VT100 NUM
  
```

7.5 Record

Execute follow command to record in MIC, speech in front of the microphone then can record.

```
# arecord -f cd record.wav
```

```
# aplay record.wav
```



```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/# arecord -f cd record.wav
Recording WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
[ 1848.417160] rk817_set_dai_sysclk : MCLK = 11289600Hz
[ 1848.417220] rk817_hw_params : sample rate = 44100Hz
^CAborted by signal Interrupt...
root@linaro-alip:/# ls
bin  etc  lost+found  mnt  record.wav  run  sys  usr
boot  home  md5sum.txt  opt  rockchip_test  sbin  system  var
dev  lib  media  proc  root  srv  tmp  vendor
root@linaro-alip:/# aplay record.wav
Playing WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
[ 1865.775924] rk817_set_dai_sysclk : MCLK = 11289600Hz
[ 1865.775969] rk817_hw_params : sample rate = 44100Hz
[ 1865.780041] rk817_digital_mute 0
[ 1865.780062] rk817_digital_mute 0 00
[ 1865.781047] rk817_digital_mute 0 4
[ 1871.532691] rk817_digital_mute 1
[ 1871.532763] rk817_digital_mute 1 1
root@linaro-alip:/#
Ready Serial: COM3 23, 21 23 Rows, 93 Cols VT100 NUM
  
```

Note: At present, headphones cannot record, only mic recording, and the recorded audio is only single-channel output.

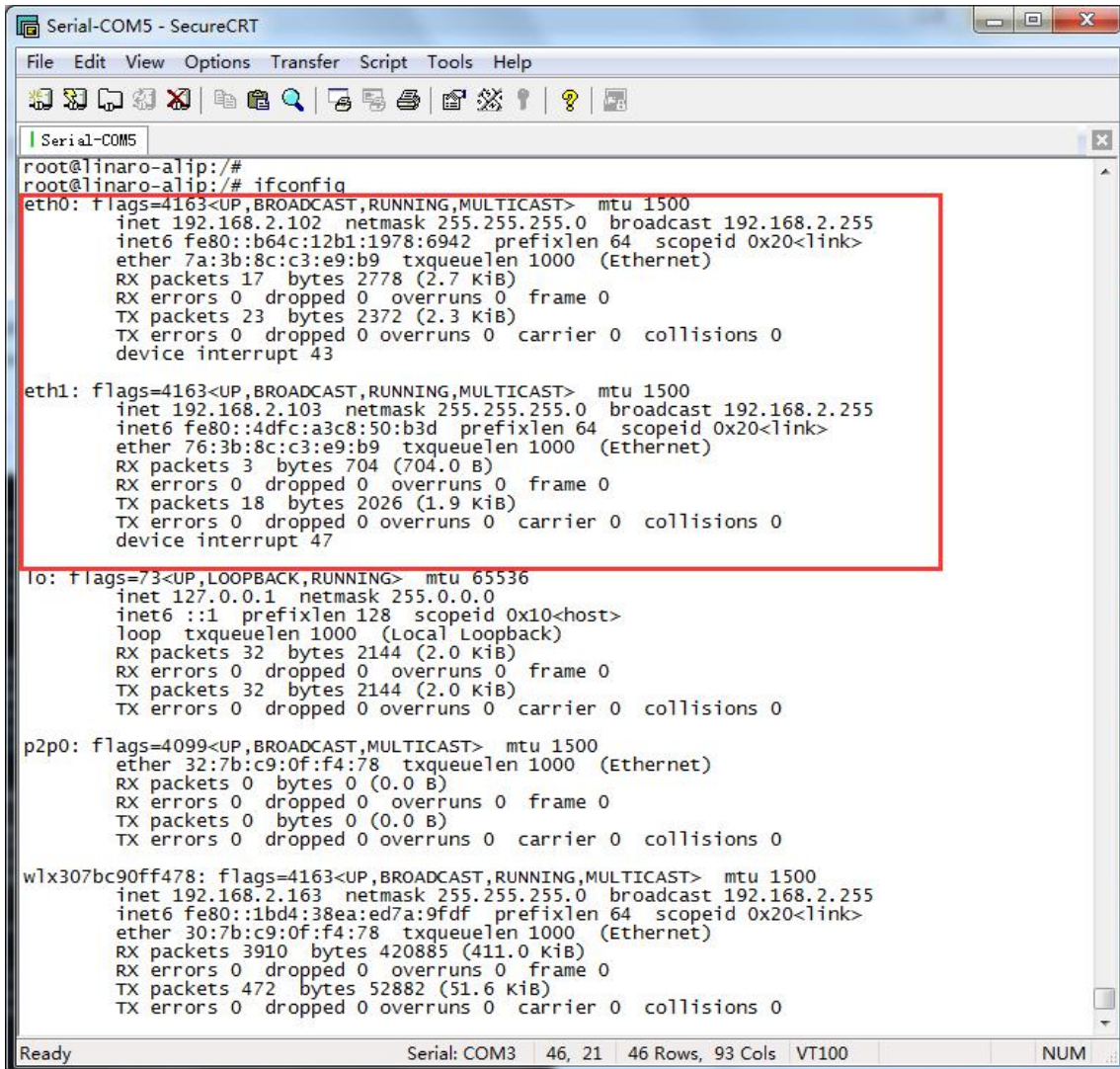
7.6 Ethernet

Connect the Board and router with an Ethernet cable (default DHCP=Yes). User can ping URL/IP at terminal. or open the browser to test Network.

```
# ifconfig
```

```
# ping -I eth0 www.boardcon.com
```

```
# ping -I eth1 www.boardcon.com
```



```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.102 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::b64c:12b1:1978:6942 prefixlen 64 scopeid 0x20<link>
    ether 7a:3b:8c:c3:e9:b9 txqueuelen 1000 (Ethernet)
    RX packets 17 bytes 2778 (2.7 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 23 bytes 2372 (2.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 43

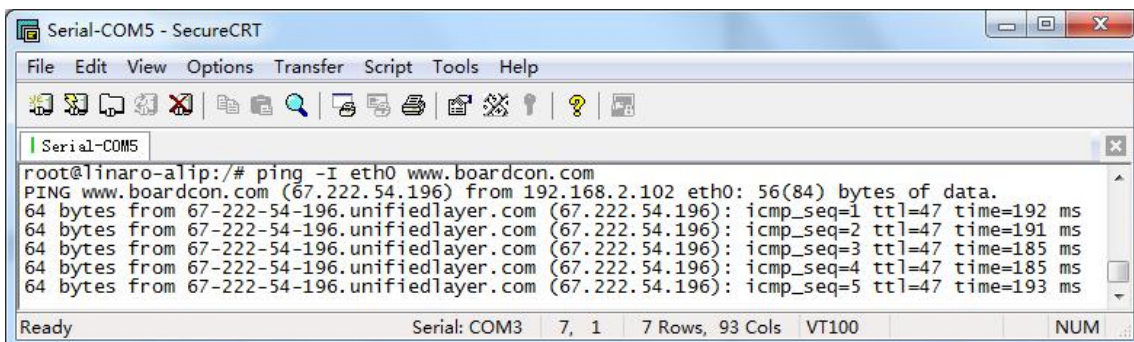
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.103 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::4dfc:a3c8:50:b3d prefixlen 64 scopeid 0x20<link>
    ether 76:3b:8c:c3:e9:b9 txqueuelen 1000 (Ethernet)
    RX packets 3 bytes 704 (704.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 18 bytes 2026 (1.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 47

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 1000 (Local Loopback)
    RX packets 32 bytes 2144 (2.0 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 32 bytes 2144 (2.0 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

p2p0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 32:7b:c9:0f:f4:78 txqueuelen 1000 (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

wlx307bc90ff478: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.163 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::1bd4:38ea:ed7a:9fdf prefixlen 64 scopeid 0x20<link>
    ether 30:7b:c9:0f:f4:78 txqueuelen 1000 (Ethernet)
    RX packets 3910 bytes 420885 (411.0 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 472 bytes 52882 (51.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

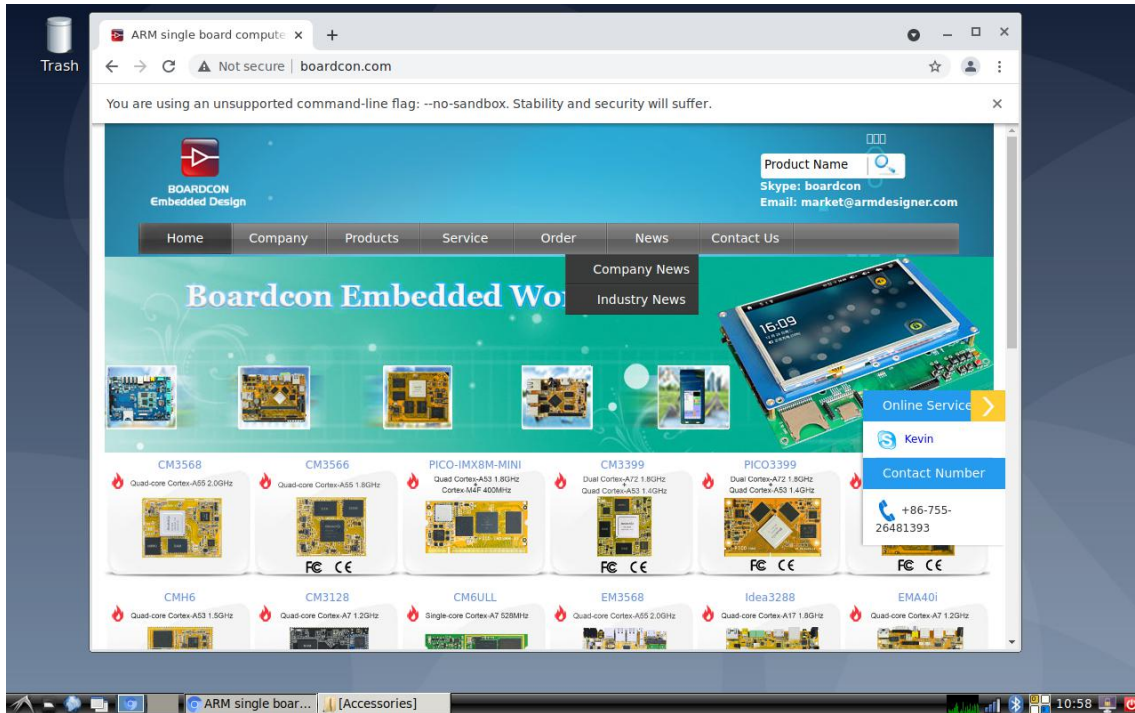
Ready Serial: COM3 46, 21 46 Rows, 93 Cols VT100 NUM
  
```



```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/# ping -I eth0 www.boardcon.com
PING www.boardcon.com (67.222.54.196) from 192.168.2.102 eth0: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=47 time=192 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=47 time=191 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=47 time=185 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=47 time=185 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=47 time=193 ms

Ready Serial: COM3 7, 1 7 Rows, 93 Cols VT100 NUM
  
```

When two Ethernet interfaces are used at the same time, eth0 ping the Internet and eth1 ping the Intranet by default.

7.7 RTC

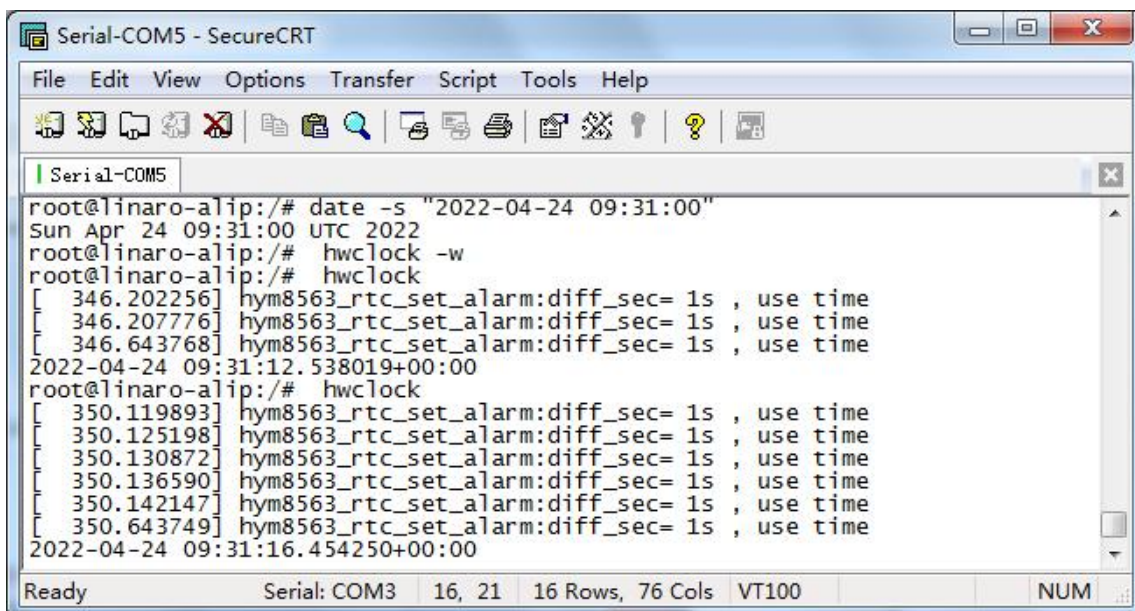
Execute the command **hwclock** at CRT terminal

```
# date -s "2022-04-24 09:31:00" (set the system time)
```

```
# hwclock -w
```

```
# hwclock
```

Wait a minute then run **hwclock** again, it can be seen the time has changed.



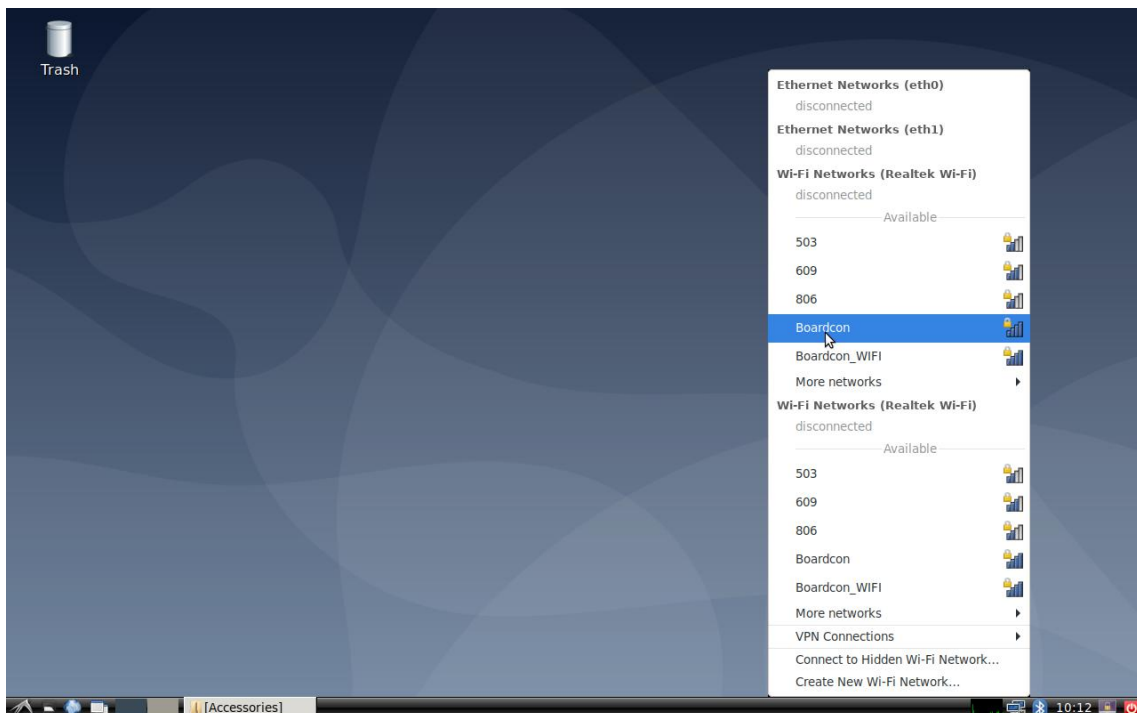
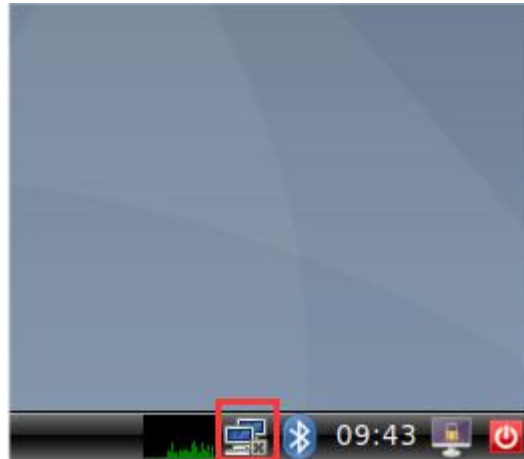
```
Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/# date -s "2022-04-24 09:31:00"
Sun Apr 24 09:31:00 UTC 2022
root@linaro-alip:/# hwclock -w
root@linaro-alip:/# hwclock
[ 346.202256] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 346.207776] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 346.643768] hym8563_rtc_set_alarm:diff_sec= 1s , use time
2022-04-24 09:31:12.538019+00:00
root@linaro-alip:/# hwclock
[ 350.119893] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 350.125198] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 350.130872] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 350.136590] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 350.142147] hym8563_rtc_set_alarm:diff_sec= 1s , use time
[ 350.643749] hym8563_rtc_set_alarm:diff_sec= 1s , use time
2022-04-24 09:31:16.454250+00:00
Ready Serial: COM3 16, 21 16 Rows, 76 Cols VT100 NUM
```

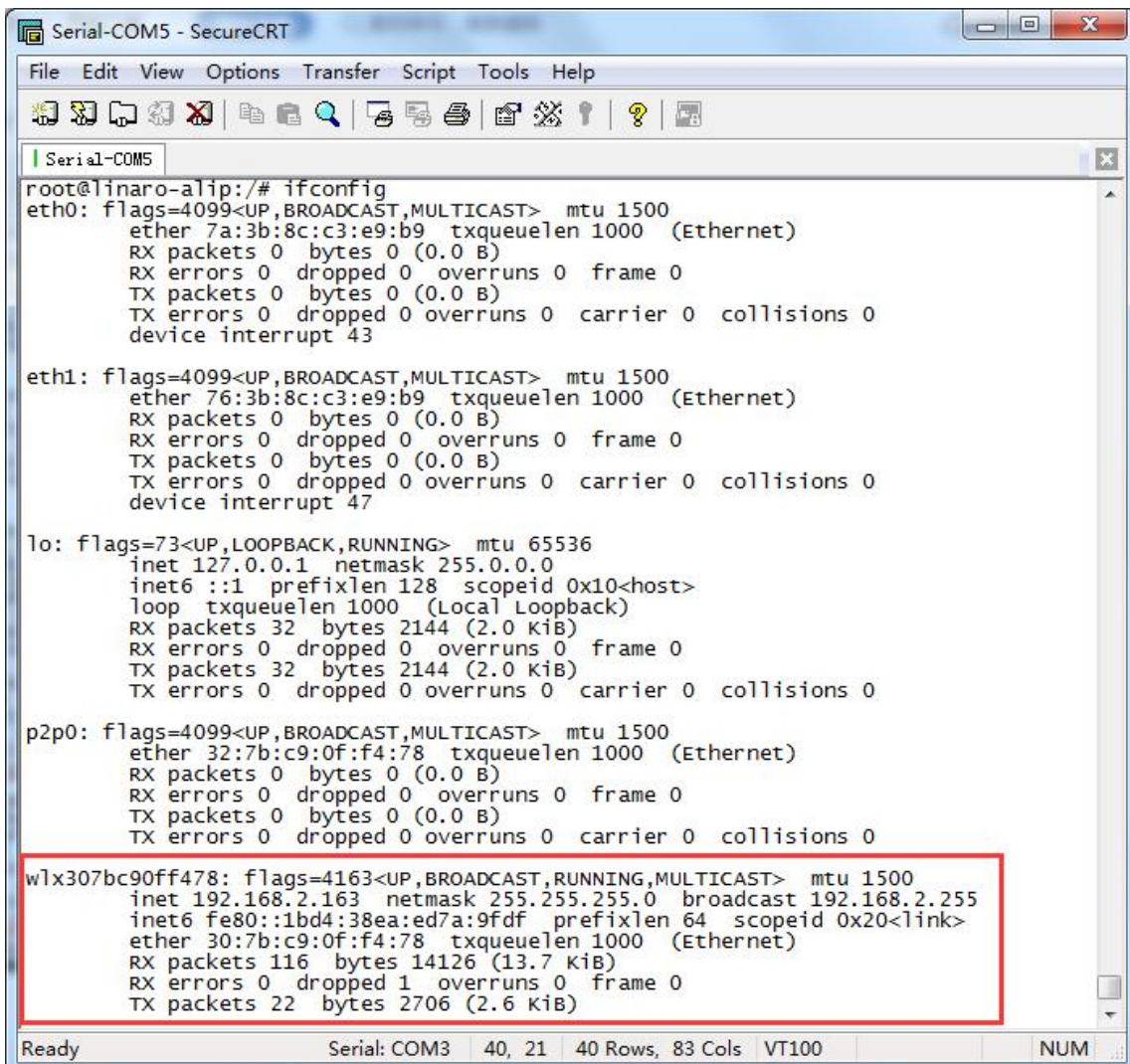
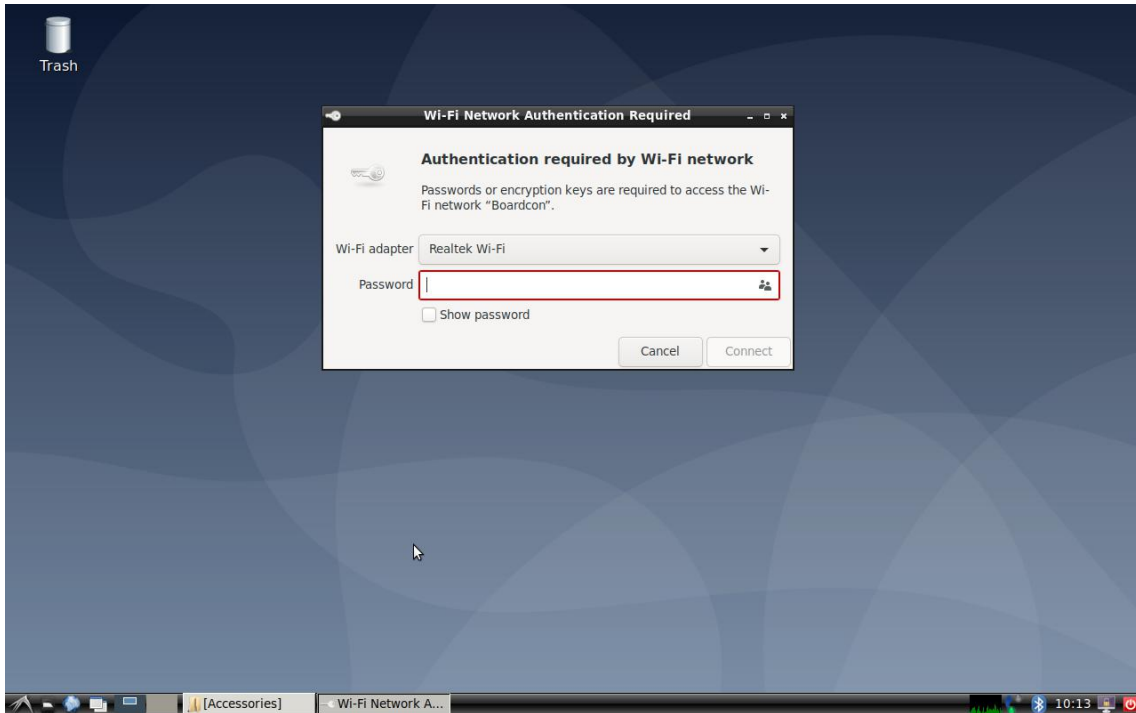
7.8 WiFi

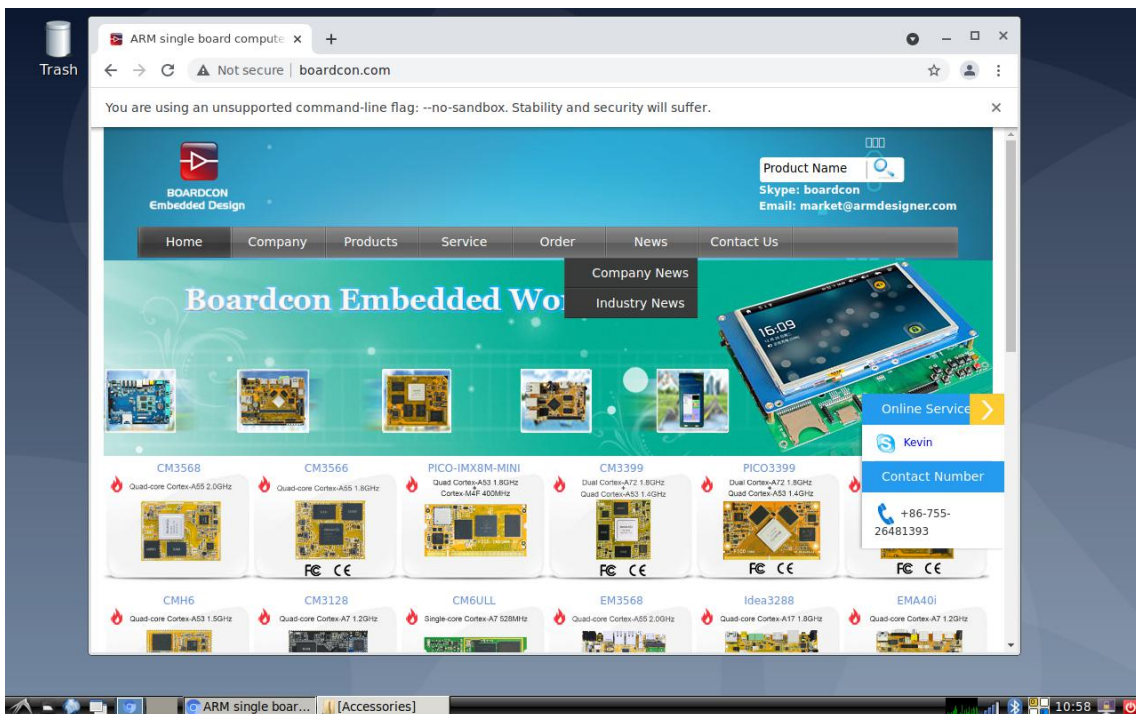
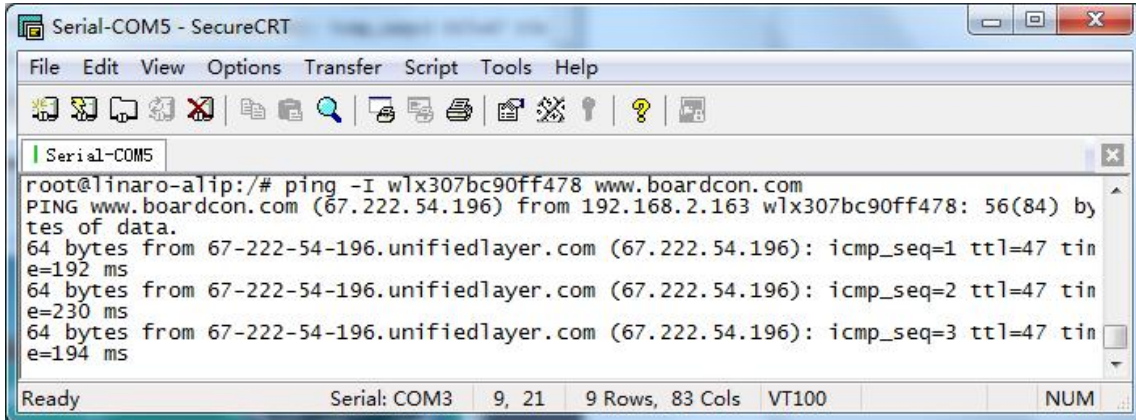
Connect the WiFi antenna, then click **the red box below**, select the SSID from the list of available networks and enter the password.

After connected, user can ping URL/IP at terminal. or open the browser to test Network.

ping -I wlx307bc90ff478 www.boardcon.com

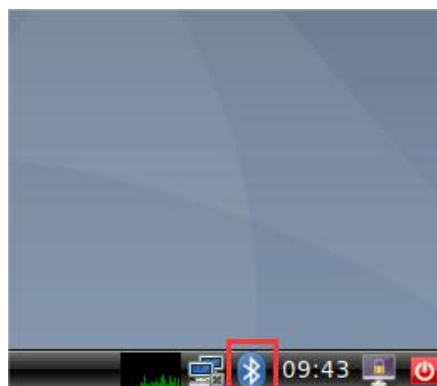




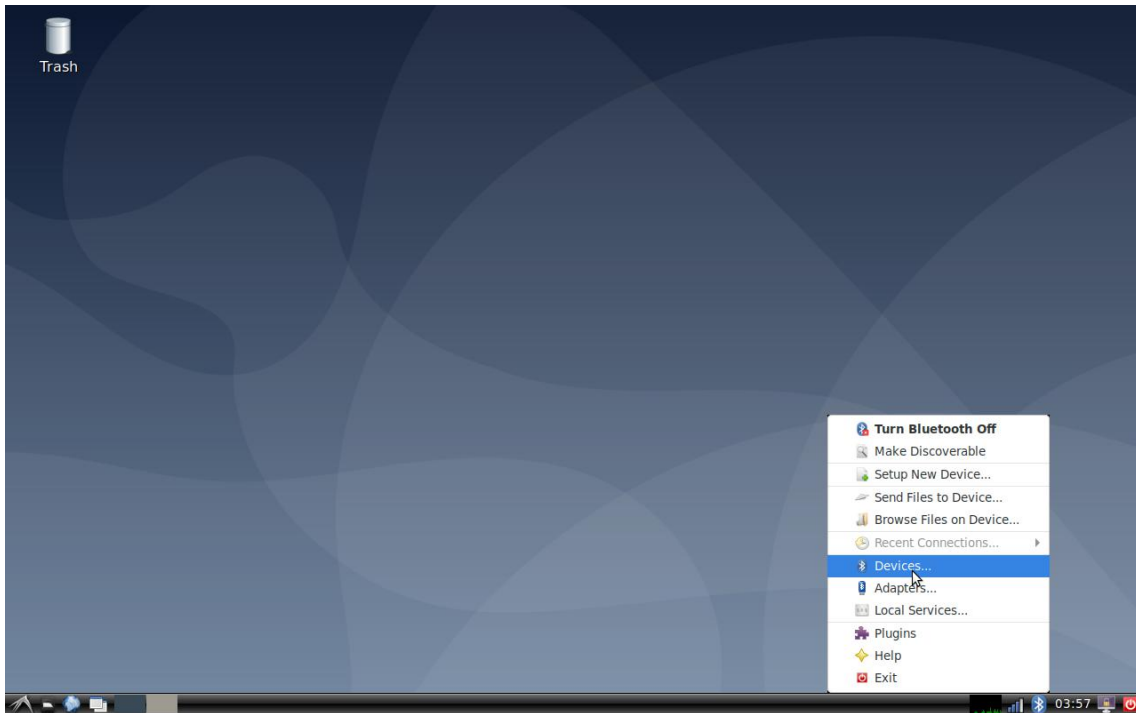


7.9 Bluetooth

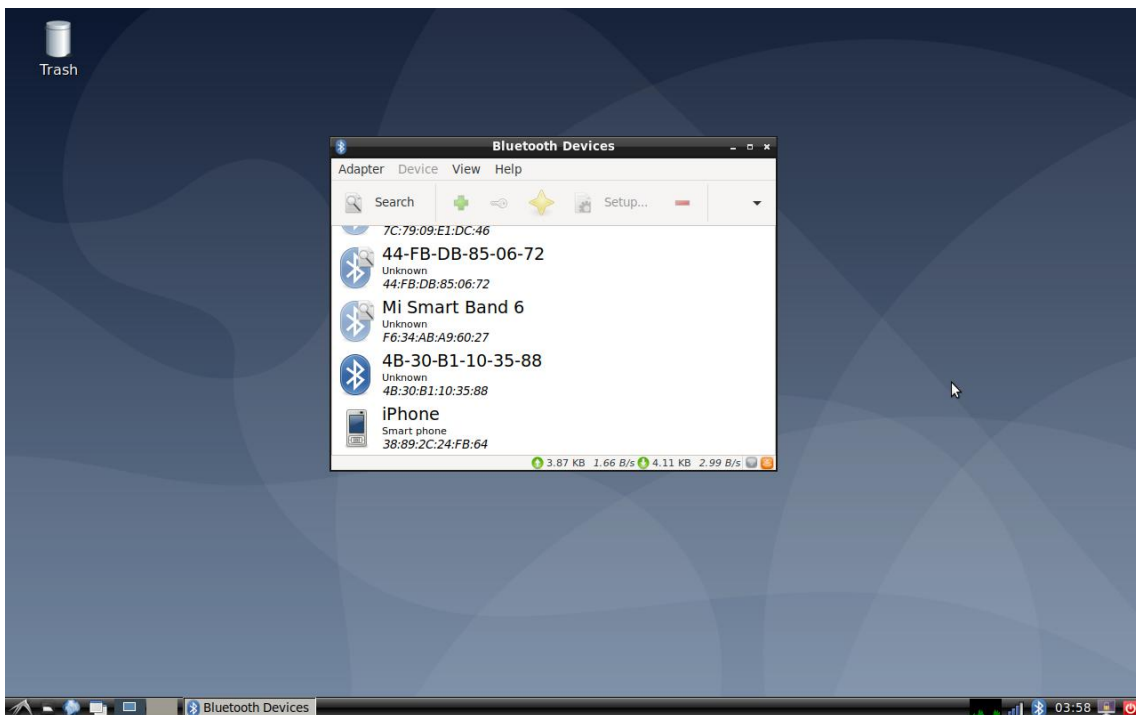
Click the red box below.



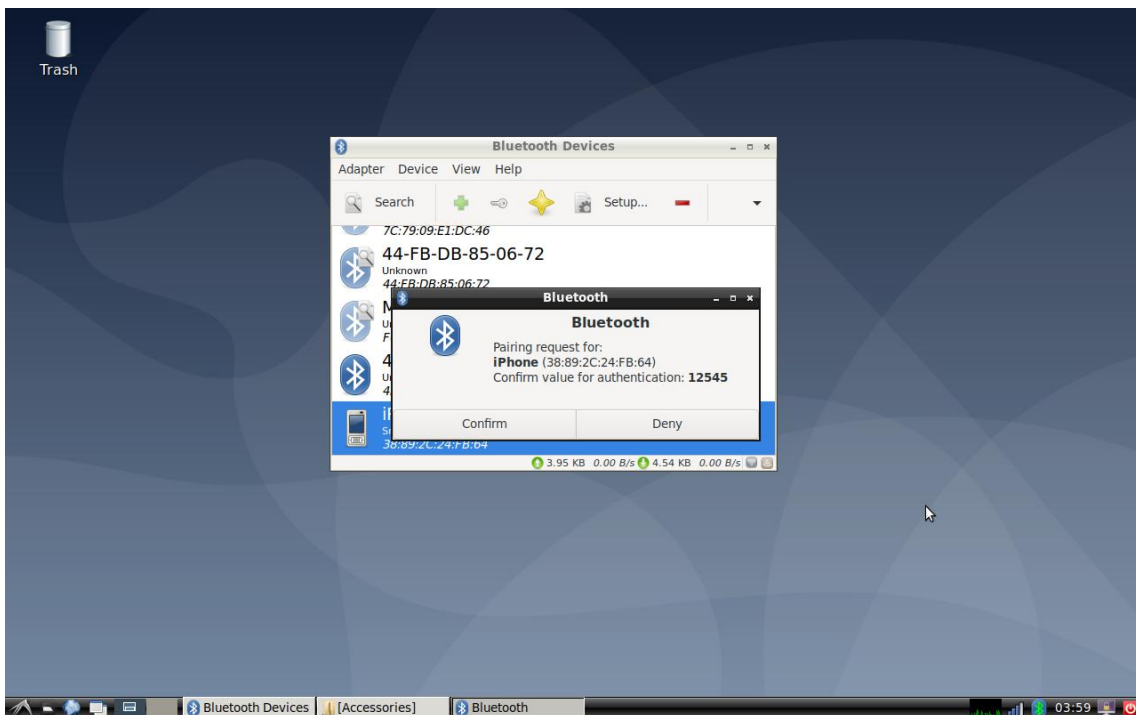
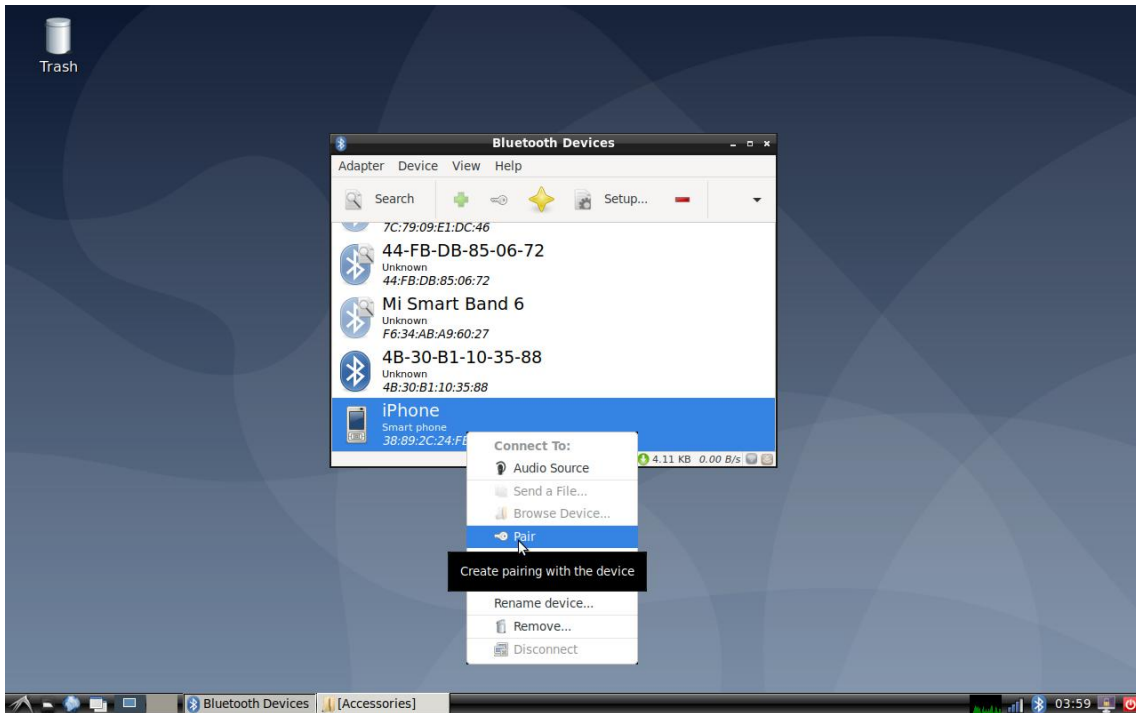
Click "Devices"



Click "Search"



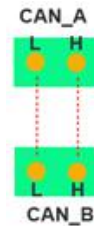
Select the available device in the list to pair.



After pairing, devices can connect with each other automatically.

7.10 CAN

Connect CAN ports of Board A and Board B with the test line.



For Board A, execute the follow commands at **Serial terminal A** to set CAN_A as Receiver.

```
# ip link set can0 down
# ip link set can0 type can bitrate 1000000 dbitrate 3000000 fd on
# ip link set can0 up
# candump can0 (set CAN0 as receive)
```

For Board B, execute the follow commands at **Serial terminal B** to set CAN_B as Transmitter.

```
# ip link set can0 down
# ip link set can0 type can bitrate 1000000 dbitrate 3000000 fd on
# ip link set can0 up
# cansend can0 123##1DEADBEEF (CAN0 send characters 0xDE 0xAD 0xBE 0xEF)
```

The Transmitter and receiver can be converted by execute the command

```
# candump can0 (Receiver)
```

or

```
# cansend can0 123#DEADBEEF (Transmitter)
```

7.11 RS485

Connect the RS485 ports of Board A and B with the test line.



For Board A, execute the follow commands at **Serial terminal A** to set RS485 as Receiver or send.

```
# com /dev/ttyS7 115200 8 0 1
```

For Board B, execute the follow commands at **Serial terminal B** to set RS485 as Receiver or send.

```
# com /dev/ttyS7 115200 8 0 1
```


7.13 SATA

Connect the sata and the sata power to the board(Sata0). Execute follow command to mount SATA after system boot.

```
# ls /dev
```

```
# mount /dev/sda1 /mnt
```

```
# ls /mnt
```

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/# ls /dev
block          media1          tty11          tty51          vcs4
bsg            mem             tty12          tty52          vcs5
bus            memory_bandwidth tty13          tty53          vcs6
cec0           mmcblk0         tty14          tty54          vcs7
char           mmcblk0boot0   tty15          tty55          vcsa
console        mmcblk0boot1   tty16          tty56          vcsa1
cpu_dma_latency mmcblk0p1       tty17          tty57          vcsa2
disk           mmcblk0p2       tty18          tty58          vcsa3
dri            mmcblk0p3       tty19          tty59          vcsa4
fb0            mmcblk0p4       tty2           tty6           vcsa5
fd             mmcblk0p5       tty20          tty60          vcsa6
full           mmcblk0p6       tty21          tty61          vcsa7
fuse           mmcblk0p7       tty22          tty62          vcsu
gpiochip0      mmcblk0p8       tty23          tty63          vcsu1
gpiochip1      mmcblk0rpmb     tty24          tty7           vcsu2
gpiochip2      mpp_service     tty25          tty8           vcsu3
gpiochip3      network_latency tty26          tty9           vcsu4
gpiochip4      network_throughput tty27          ttyFIQ0        vcsu5
gpiochip5      null            tty28          ttyGS0         vcsu6
hdmi_hdcpx     port            tty29          ttys3          vcsu7
hidraw0        ppp             tty3           tty54          vendor_storage
e
hwrng          ptmx            tty30          tty55          vhci
i2c-0          ptp0            tty31          tty57          video-dec0
i2c-1          ptp1            tty32          ubi_ctrl       video-enc0
i2c-2          pts             tty33          uhid           video0
i2c-3          ram0            tty34          uinput         video1
i2c-4          random          tty35          urandom        video10
i2c-6          rfkill          tty36          usb-ffs        video11
iio:device0    rga             tty37          usbmon0        video12
initctl        rtc             tty38          usbmon1        video13
input          rtc0            tty39          usbmon2        video2
kmsg           sda             tty4           usbmon3        video3
log            sda1            tty40          usbmon4        video4
loop-control   stmr            tty41          usbmon5        video5
loop0          snd             tty42          usbmon6        video6
loop1          stderr          tty43          v4l            video7
loop2          stdin           tty44          v4l-subdev0    video8
loop3          stdout          tty45          v4l-subdev1    video9
loop4          tee0            tty46          v4l-subdev2    watchdog
loop5          teepriv0        tty47          v4l-subdev3    watchdog0
loop6          tty             tty48          vcs            zero
loop7          tty0            tty49          vcs1           zram0
mali0          tty1            tty5           vcs2
media0         tty10          tty50          vcs3
root@linaro-alip:/#
Ready          Serial: COM3   48, 21   48 Rows, 70 Cols   VT100   NL

```

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/# mount /dev/sda1 /mnt
[ 313.284767] ntfs: volume version 3.1.
root@linaro-alip:/# ls /mnt
'$RECYCLE.BIN'
'4K 60 審?椽虛樞璠嗶  鏃犳狄汉鏈烘媿鏄? 4kmee鉅修om.mp4'
Alarms
Android
Audiobooks
DCIM
Documents
Download
LOST.DIR
Movies
Music
Notifications
Pictures
Podcasts
Ringtones
'System Volume Information'
channel_84255801_1114361_6f85f53114722d17c7165227b8400301.apk
xiaoxianghaitv.apk
root@linaro-alip:/#
Ready          Serial: COM3   23, 21   23 Rows, 79 Cols  VT100          NUM

```

Note: EM3568 not support Sata Hot-plug.

7.14 4G

Step 1, Insert 4G module to PCIe slot (4G model:EC20).

Step 2, Connect antenna and insert SIM card.

Step 3, Exexute follow command to connect 4G network after power on

pppd call quectel-ppp &

ping -I ppp0 www.boardcon.com

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/# pppd call quectel-ppp &
[1] 1258
root@linaro-alip:/# pppd options in effect:
debug          # (from /etc/ppp/peers/quectel-ppp)
nodetach       # (from /etc/ppp/peers/quectel-ppp)
dump           # (from /etc/ppp/peers/quectel-ppp)
noauth         # (from /etc/ppp/peers/quectel-ppp)
user test      # (from /etc/ppp/peers/quectel-ppp)
password ?????? # (from /etc/ppp/peers/quectel-ppp)
remotename 3gppp # (from /etc/ppp/peers/quectel-ppp)
/dev/ttyUSB3   # (from /etc/ppp/peers/quectel-ppp)
115200         # (from /etc/ppp/peers/quectel-ppp)
lock           # (from /etc/ppp/peers/quectel-ppp)
connect chat -s -v -f /etc/ppp/peers/quectel-chat-connect # (from
/etc/ppp/peers/quectel-ppp)
disconnect chat -s -v -f /etc/ppp/peers/quectel-chat-disconnect # (from
/etc/ppp/peers/quectel-ppp)
nocrtscts     # (from /etc/ppp/peers/quectel-ppp)
modem         # (from /etc/ppp/peers/quectel-ppp)
asynmap 0     # (from /etc/ppp/options)
lcp-echo-failure 4 # (from /etc/ppp/options)
lcp-echo-interval 30 # (from /etc/ppp/options)
hide-password # (from /etc/ppp/peers/quectel-ppp)
Ready          Serial: COM3   23, 21   23 Rows, 79 Cols  VT100          NUM

```

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
221.179.38.7>]
Could not determine remote IP address: defaulting to 10.64.64.64
not replacing default route to wlx307bc90ff478 [192.168.2.1]
local IP address 10.2.251.146
remote IP address 10.64.64.64
primary DNS address 120.196.165.7
secondary DNS address 221.179.38.7
Script /etc/ppp/ip-up started (pid 1270)
Script /etc/ppp/ip-up finished (pid 1270), status = 0x0

root@linaro-alip:/# ping -I ppp0 www.boardcon.com
PING www.boardcon.com (67.222.54.196) from 10.2.251.146 ppp0: 56(84) bytes of c
ata.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=4€
time=831 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=4€
time=647 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=4€
time=1267 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=4€
time=297 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=6 ttl=4€
time=915 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=7 ttl=4€
time=475 ms
^C
--- www.boardcon.com ping statistics ---
8 packets transmitted, 6 received, 25% packet loss, time 100647005ms
rtt min/avg/max/mdev = 296.783/738.542/1266.680/314.016 ms, pipe 2
root@linaro-alip:/# █
Ready Serial: COM3 30, 21 30 Rows, 79 Cols VT100 NUM

```

(The Network priority : Ethernet > WIFI > 4G).

7.15 GPS

Plug the EC20 module and connect GPS antenna, then power on and execute the follow command:

```
# echo -e "AT+QGPS=1\r\n" > /dev/ttyUSB2
```

```
# cat /dev/ttyUSB1
```

```

Serial-COM5 - SecureCRT
File Edit View Options Transfer Script Tools Help
Serial-COM5
root@linaro-alip:/#
root@linaro-alip:/# cat /dev/ttyUSB1
^C
root@linaro-alip:/# echo -e "AT+QGPS=1\r\n" > /dev/ttyUSB2
root@linaro-alip:/# cat /dev/ttyUSB1
$GPVTD,,T,,M,,N,,K,N*2C

$GPGSA,A,1,,,,,,,,,,,,,*1E

$GPGGA,,,,,0,,,,,*66

$GPRMC,,V,,,,,,,,,N*53
Ready Serial: COM3 13, 21 13 Rows, 79 Cols VT100 CAP NUM

```

The screenshot shows a SecureCRT terminal window titled "Serial-COM5 - SecureCRT". The window contains a menu bar (File, Edit, View, Options, Transfer, Script, Tools, Help) and a toolbar with various icons. The main text area displays the following serial data:

```

Serial-COM5
$GPRMC,074310.00,A,2234.075944,N,11353.473701,E,0.0,226.8,240422,2.3,w,A*24
$GPGSA,A,2,03,04,14,17,19,,,,,,,,,1.2,0.9,0.9*3C
$GPGSV,2,1,08,01,04,046,25,03,31,049,40,04,04,101,34,09,,26*40
$GPGSV,2,2,08,14,69,161,30,17,48,005,36,19,40,336,30,20,02,209,32*77
$GPGGA,074311.00,2234.075951,N,11353.473711,E,1,05,0.9,15.8,M,-2.0,M,,*49
$GPVTG,226.8,T,229.1,M,0.0,N,0.0,K,A*25
$GPRMC,074311.00,A,2234.075951,N,11353.473711,E,0.0,226.8,240422,2.3,w,A*20
$GPGSA,A,2,03,04,14,17,19,,,,,,,,,1.2,0.9,0.9*3C
$GPGSV,2,1,08,01,04,046,23,03,31,049,40,04,04,101,34,09,,28*48
$GPGSV,2,2,08,14,69,161,30,17,48,005,34,19,40,336,29,20,02,209,32*7D
$GPGGA,074312.00,2234.075959,N,11353.473720,E,1,05,0.9,15.8,M,-2.0,M,,*40
$GPVTG,226.8,T,229.1,M,0.0,N,0.0,K,A*25
$GPRMC,074312.00,A,2234.075959,N,11353.473720,E,0.0,226.8,240422,2.3,w,A*29
$GPGSA,A,2,03,04,14,17,19,,,,,,,,,1.2,0.9,0.9*3C

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The status bar at the bottom of the window shows: Ready | Serial: COM3 | 30, 1 | 30 Rows, 79 Cols | VT100 | CAP NUM