

EM3399 Android7.1 User Manual

V1.3



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 lighting 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 made 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.



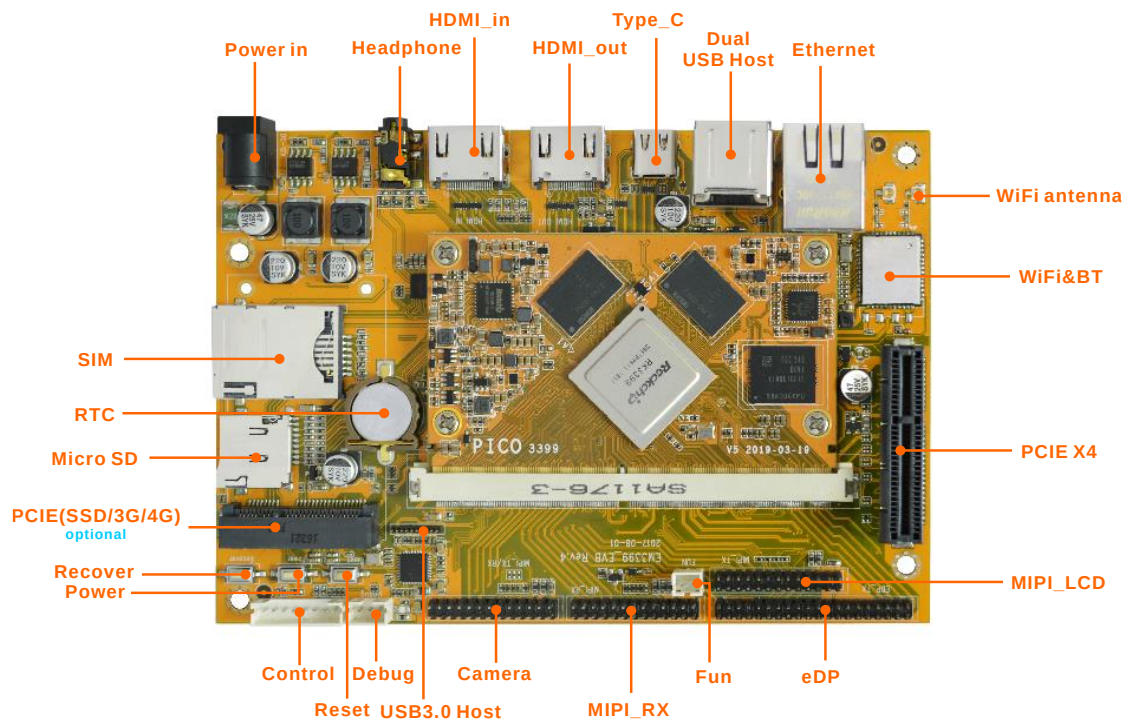
Revision History

Ver	Description	Author	Date
V1.0	Initial version android7.1.2 industry	Qin Xueqin	2019-03-06
V1.1	Support 10.1 inch MIPI LCD	Qin Xueqin	2019-09-03
V1.2	Description update	Zhou Lijun	2019-10-17
V1.3	Compile update	Zhou Lijun	2019-11-25

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1 EM3399 Introduction



Feature	Specifications
CPU	- Rockchip RK3399. Big.Little architecture: Dual Cortex-A72 + Quad Cortex-A53, 64-bit CPU. Frequency is over 1.8GHz (Big cluster) 28nm HKMG process 1MB unified L2 Cache for Big cluster, 512KB unified L2 Cache for Little cluster
GPU	- Mali-T864 GPU, OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 - Supports AFBC (ARM Frame Buffer Compression)
Memory	4GB
Flash	8GB eMMC Flash
Power	DC 12V/3A
USB	2x USB2.0 Host, 1x USB3.0 Host, 1x USB Type-C
UART	1x 3pin connector. For debug.
LCD	1x eDP LCD via 40-pin header interface, 1x 2-CH MIPI
Ethernet	1000M High performance Ethernet (RTL8211E), RJ45 interface
HDMI IN	Adopt Toshiba TC358749XBG bridge device
HDMI OUT	HDMI 1.4 /2.0
MIPI Camera	2-CH MIPI RX, Support 3-D video capture
Audio codec	Adopt ALC5651 Audio chip, 3.5mm Audio I / O interface
RTC	Real Time Clock, powered by external lithium battery
SD card	1x T-Flash card slot



SIM card	1x SIM card slot
Buttons	3x User Buttons, for Recover, Power, Reset
PCI-E x4	Can be used to connect adapter, such as USB, Network card, Disk array, etc.
WIFI&BT	AP6356S, Module. 2.4/5G WiFi, Bluetooth 4.1
3G/4G/ SSD	PCI-E connector
GPIO	5 groups of GPIO (GPIO0~GPIO4), total 122 GPIOs
Dimension	100mm x 145mm

2 Compiler Environment

2.1 Vmware7.0+ubuntu14.04

Install Vmware7.0 in windows OS, and then install ubuntu14.04 in VMware to compile. Please visit the official website <http://www.ubuntu.com/> to download and install ubuntu operating system.

Note: Android7.1 should be compiled on ubuntu 64bit OS, Ubuntu 14.04 is recommended.

2.2 Install JDK

JDK: openjdk-8-jdk

PC OS: ubuntu system

Network: online

Permission: root

```
# sudo apt-get update
```

```
# sudo apt-get install openjdk-8-jdk
```

For example, the installation path is `/usr/lib/jvm/java-8-openjdk-amd64`.

Configure the environment variable at the terminal by executing commands

```
# export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
```

```
# export PATH=$JAVA_HOME/bin:$PATH
```

```
# export CLASSPATH=.:$JAVA_HOME/lib:$JAVA_HOME/lib/tools.jar
```

Execute the command to check if the **jdk** has been installed successfully and view the revised version

```
# java -version
```

```
openjdk version "1.8.0_121"
```

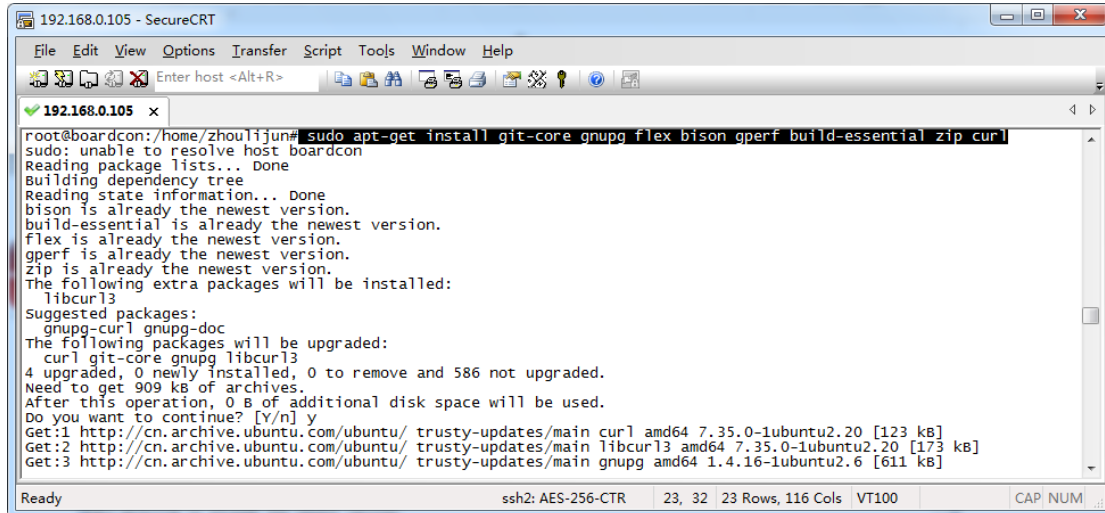
```
OpenJDK Runtime Environment (build 1.8.0_121-8u121-b13-0ubuntu1.16.04.2-b13)
```

```
OpenJDK 64-Bit Server VM (build 25.121-b13, mixed mode)
```

2.3 Install Tools

Root user execute the commands to install necessary tools.

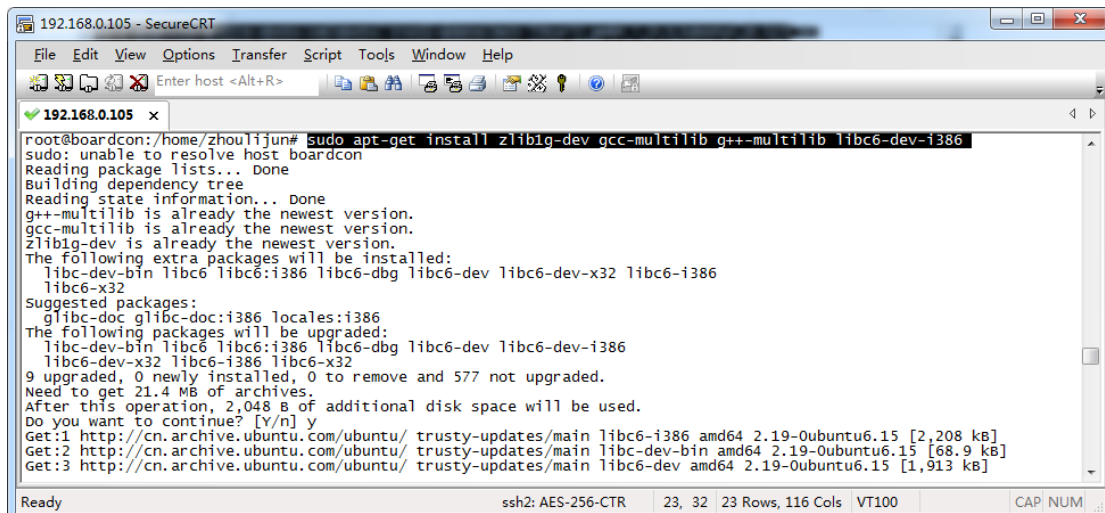
`sudo apt-get install git-core gnupg flex bison gperf build-essential zip curl`



```

root@boardcon:/home/zhoulifun# sudo apt-get install git-core gnupg flex bison gperf build-essential zip curl
sudo: unable to resolve host boardcon
Reading package lists... Done
Building dependency tree
Reading state information... Done
bison is already the newest version.
build-essential is already the newest version.
flex is already the newest version.
gperf is already the newest version.
zip is already the newest version.
The following extra packages will be installed:
  libcurl3
Suggested packages:
  gnupg-curl gnupg-doc
The following packages will be upgraded:
  curl git-core gnupg libcurl3
4 upgraded, 0 newly installed, 0 to remove and 586 not upgraded.
Need to get 909 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main curl amd64 7.35.0-1ubuntu2.20 [123 kB]
Get:2 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main libcurl3 amd64 7.35.0-1ubuntu2.20 [173 kB]
Get:3 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main gnupg amd64 1.4.16-1ubuntu2.6 [611 kB]
  
```

`sudo apt-get install zlib1g-dev gcc-multilib g++-multilib libc6-dev-i386`



```

root@boardcon:/home/zhoulifun# sudo apt-get install zlib1g-dev gcc-multilib g++-multilib libc6-dev-i386
sudo: unable to resolve host boardcon
Reading package lists... Done
Building dependency tree
Reading state information... Done
g++-multilib is already the newest version.
gcc-multilib is already the newest version.
zlib1g-dev is already the newest version.
The following extra packages will be installed:
  libc6-dev libc6-dev-i386 libc6-dev-x32 libc6-x32
Suggested packages:
  glibc-doc glibc-doc:i386 locales:i386
The following packages will be upgraded:
  libc6-dev-bin libc6 libc6:i386 libc6-dbg libc6-dev libc6-dev-i386
  libc6-dev-x32 libc6-i386 libc6-x32
9 upgraded, 0 newly installed, 0 to remove and 577 not upgraded.
Need to get 21.4 MB of archives.
After this operation, 2,048 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main libc6-i386 amd64 2.19-0ubuntu6.15 [2,208 kB]
Get:2 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main libc6-dev-bin amd64 2.19-0ubuntu6.15 [68.9 kB]
Get:3 http://cn.archive.ubuntu.com/ubuntu/ trusty-updates/main libc6-dev amd64 2.19-0ubuntu6.15 [1,913 kB]
  
```

`sudo apt-get install lib32ncurses5-dev x11proto-core-dev libx11-dev`



```
192.168.0.105 - SecureCRT
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
192.168.0.105 x
root@boardcon:/home/zhoulifun# sudo apt-get install lib32ncurses5-dev x11proto-core-dev libx11-dev
sudo: unable to resolve host boardcon
Reading package lists... Done
Building dependency tree
Reading state information... Done
lib32ncurses5-dev is already the newest version.
x11proto-core-dev is already the newest version.
x11proto-core-dev set to manually installed.
The following extra packages will be installed:
  libx11-6
The following packages will be upgraded:
  libx11-6 libx11-dev
2 upgraded, 0 newly installed, 0 to remove and 575 not upgraded.
Need to get 1.194 kB of archives.
After this operation, 2,048 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://cn.archive.ubuntu.com/ubuntu/trusty-updates/main libx11-dev amd64 2:1.6.2-1ubuntu2.1 [632 kB]
Get:2 http://cn.archive.ubuntu.com/ubuntu/trusty-updates/main libx11-6 amd64 2:1.6.2-1ubuntu2.1 [561 kB]
Fetched 1.194 kB in 6s (178 kB/s)
(Reading database ... 263336 files and directories currently installed.)
Preparing to unpack .../libx11-dev_2%3a1.6.2-1ubuntu2.1_amd64.deb ...
Unpacking libx11-dev:amd64 (2:1.6.2-1ubuntu2.1) over (2:1.6.2-1ubuntu2) ...
Preparing to unpack .../libx11-6_2%3a1.6.2-1ubuntu2.1_amd64.deb ...
```

sudo apt-get install lib32z-dev ccache libgl1-mesa-dev libxml2-utils

```
192.168.0.105 - SecureCRT
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
192.168.0.105 x
root@boardcon:/home/zhoulifun# sudo apt-get install lib32z-dev ccache libgl1-mesa-dev libxml2-utils
sudo: unable to resolve host boardcon
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'lib32z1-dev' instead of 'lib32z-dev'
lib32z1-dev is already the newest version.
libgl1-mesa-dev is already the newest version.
Suggested packages:
  distcc
The following NEW packages will be installed:
  ccache
The following packages will be upgraded:
  libxml2-utils
1 upgraded, 1 newly installed, 0 to remove and 574 not upgraded.
Need to get 113 kB of archives.
After this operation, 262 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://cn.archive.ubuntu.com/ubuntu/trusty/main ccache amd64 3.1.9-1 [77.8 kB]
Get:2 http://cn.archive.ubuntu.com/ubuntu/trusty-updates/main libxml2-utils amd64 2.9.1+dfsg1-3ubuntu4.13 [34.8 kB]
Fetched 113 kB in 3s (34.8 kB/s)
Selecting previously unselected package ccache.
(Reading database ... 263336 files and directories currently installed.)
```

sudo apt-get install xsltproc unzip

```
192.168.0.105 - SecureCRT
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
192.168.0.105 x
Setting up libxml2-utils (2.9.1+dfsg1-3ubuntu4.13) ...
root@boardcon:/home/zhoulifun# sudo apt-get install xsltproc unzip
sudo: unable to resolve host boardcon
Reading package lists... Done
Building dependency tree
Reading state information... Done
unzip is already the newest version.
The following packages will be upgraded:
  xsltproc
1 upgraded, 0 newly installed, 0 to remove and 573 not upgraded.
Need to get 13.6 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://cn.archive.ubuntu.com/ubuntu/trusty-updates/main xsltproc amd64 1.1.28-2ubuntu0.2 [13.6 kB]
Fetched 13.6 kB in 0s (25.4 kB/s)
(Reading database ... 263351 files and directories currently installed.)
Preparing to unpack .../xsltproc_1.1.28-2ubuntu0.2_amd64.deb ...
Unpacking xsltproc (1.1.28-2ubuntu0.2) over (1.1.28-2ubuntu0.1) ...
Processing triggers for man-db (2.6.7.1-1ubuntu1) ...
Setting up xsltproc (1.1.28-2ubuntu0.2) ...
root@boardcon:/home/zhoulifun#
```


3 Compile Source

Unzip the source.

```
# tar zxvf em3399-android7.1-industry.tar.gz
```

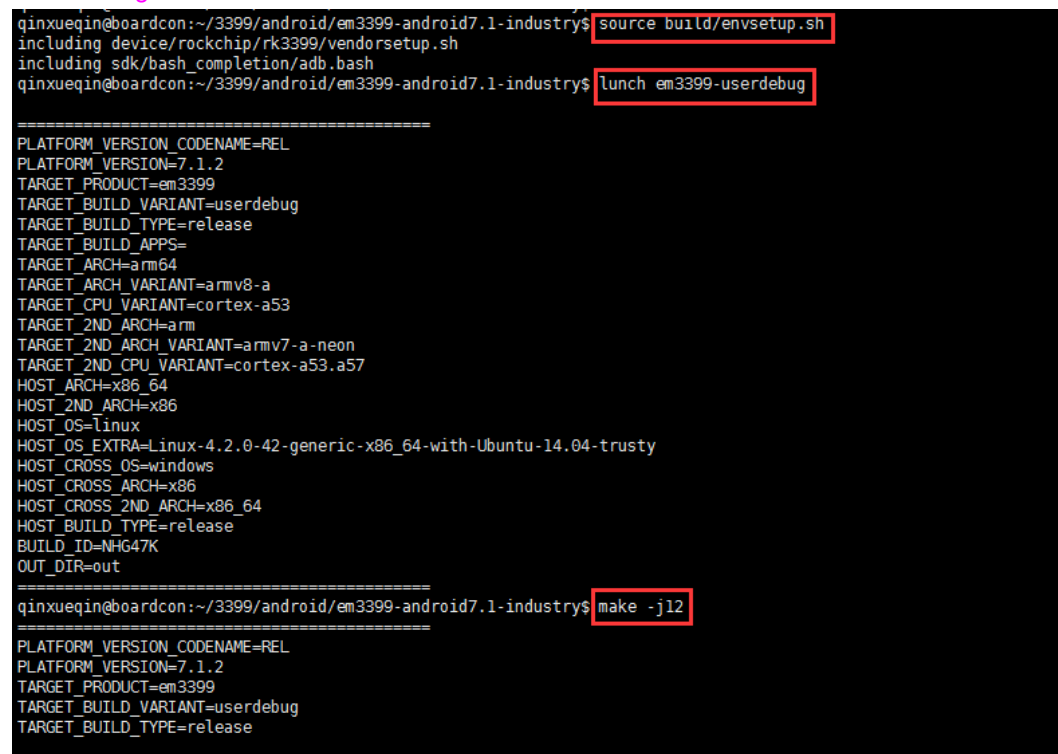
3.1 Compile Kernel

```
# cd em3399-android7.1-industry/kernel/  
# make ARCH=arm64 boardcon_defconfig -j8  
# make ARCH=arm64 em3399-boardcon.img -j12
```

kernel.img and **resource.img** are generated in current directory.

3.2 Compile Android

```
# cd em3399-android7.1-industry /  
# source build/envsetup.sh  
# lunch em3399-userdebug  
# make -j12  
# ./mkimages.sh
```



```
qinxueqin@boardcon:~/3399/android/em3399-android7.1-industry$ source build/envsetup.sh  
including device/rockchip/rk3399/vendorsetup.sh  
including sdk/bash_completion/adb.bash  
qinxueqin@boardcon:~/3399/android/em3399-android7.1-industry$ lunch em3399-userdebug  
=====
```

```
PLATFORM_VERSION_CODENAME=REL  
PLATFORM_VERSION=7.1.2  
TARGET_PRODUCT=em3399  
TARGET_BUILD_VARIANT=userdebug  
TARGET_BUILD_TYPE=release  
TARGET_BUILD_APPS=  
TARGET_ARCH=arm64  
TARGET_ARCH_VARIANT=armv8-a  
TARGET_CPU_VARIANT=cortex-a53  
TARGET_2ND_ARCH=arm  
TARGET_2ND_ARCH_VARIANT=armv7-a-neon  
TARGET_2ND_CPU_VARIANT=cortex-a53.a57  
HOST_ARCH=x86_64  
HOST_2ND_ARCH=x86  
HOST_OS=linux  
HOST_OS_EXTRA=Linux-4.2.0-42-generic-x86_64-with-Ubuntu-14.04-trusty  
HOST_CROSS_OS=windows  
HOST_CROSS_ARCH=x86  
HOST_CROSS_2ND_ARCH=x86_64  
HOST_BUILD_TYPE=release  
BUILD_ID=NHG47K  
OUT_DIR=out  
=====
```

```
qinxueqin@boardcon:~/3399/android/em3399-android7.1-industry$ make -j12  
=====
```

```
PLATFORM_VERSION_CODENAME=REL  
PLATFORM_VERSION=7.1.2  
TARGET_PRODUCT=em3399  
TARGET_BUILD_VARIANT=userdebug  
TARGET_BUILD_TYPE=release
```

Generated image file

```
# cd rockdev/Image-em3399  
# ls
```

Images are generated in current directory.

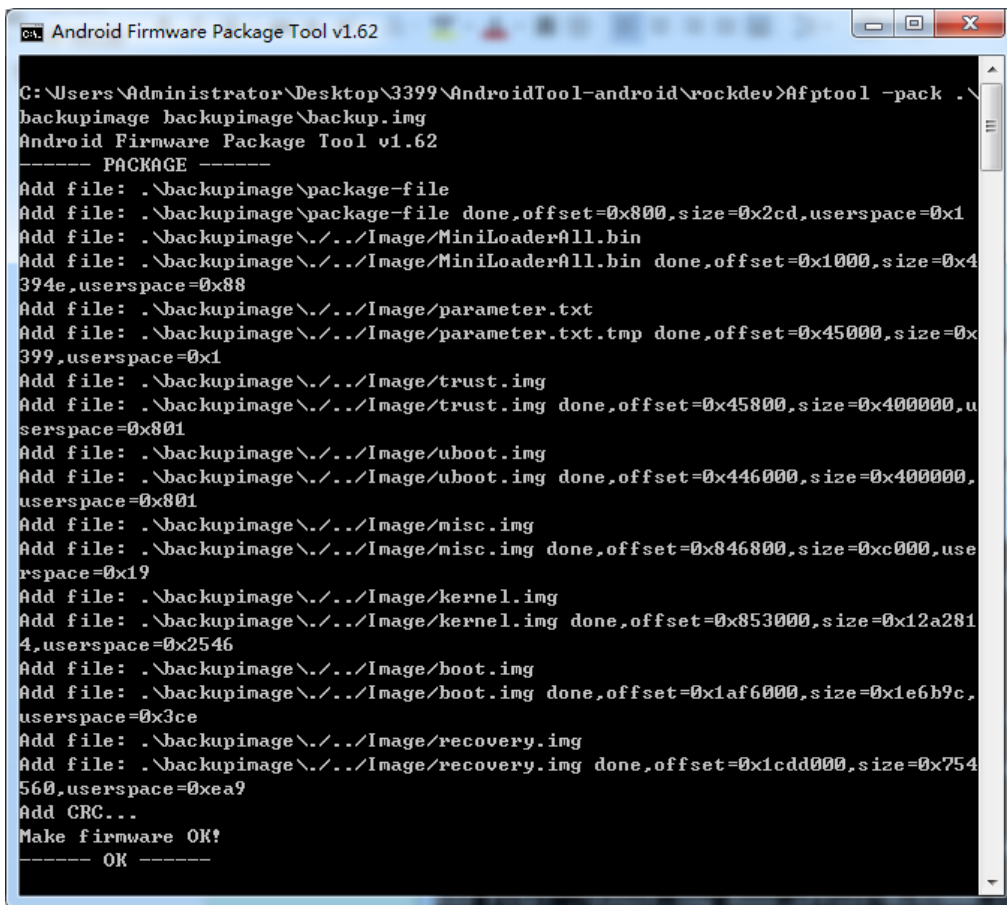
4 Images Operation

4.1 Pack Image

Step 1, unzip **AndroidTool.rar** in windows.

Step 2, copy all the files in the Android root directory **rockdev/Image-em3399** to the development tools **rockdev/Image** directory.

Step 3, enter the directory **AndroidTool/rockdev/Image**, and then double-click to run **mkupdate.bat**.



```

C:\Users\Administrator\Desktop\3399\AndroidTool-android\rockdev>afptool -pack .\
backupimage backupimage\backup.img
Android Firmware Package Tool v1.62
----- PACKAGE -----
Add file: .\backupimage\package-file
Add file: .\backupimage\package-file done,offset=0x800,size=0x2cd,userspace=0x1
Add file: .\backupimage\...\Image\MiniLoaderAll.bin
Add file: .\backupimage\...\Image\MiniLoaderAll.bin done,offset=0x1000,size=0x4
394e,userspace=0x88
Add file: .\backupimage\...\Image\parameter.txt
Add file: .\backupimage\...\Image\parameter.txt.tmp done,offset=0x45000,size=0x
399,userspace=0x1
Add file: .\backupimage\...\Image\trust.img
Add file: .\backupimage\...\Image\trust.img done,offset=0x45800,size=0x40000,u
serspace=0x801
Add file: .\backupimage\...\Image\uboot.img
Add file: .\backupimage\...\Image\uboot.img done,offset=0x446000,size=0x40000,
userspace=0x801
Add file: .\backupimage\...\Image/misc.img
Add file: .\backupimage\...\Image/misc.img done,offset=0x846800,size=0xc000,use
rspace=0x19
Add file: .\backupimage\...\Image/kernel.img
Add file: .\backupimage\...\Image/kernel.img done,offset=0x853000,size=0x12a281
4,userspace=0x2546
Add file: .\backupimage\...\Image/boot.img
Add file: .\backupimage\...\Image/boot.img done,offset=0x1af6000,size=0x1e6b9c,
userspace=0x3ce
Add file: .\backupimage\...\Image/recovery.img
Add file: .\backupimage\...\Image/recovery.img done,offset=0x1cdd000,size=0x754
560,userspace=0xea9
Add CRC...
Make firmware OK!
----- OK -----
  
```



```
Android Firmware Package Tool v1.62
6
Add file: .\Image/boot.img
Add file: .\Image/boot.img done,offset=0x1b38800,size=0x1e6b9c,userspace=0x3ce
Add file: .\Image/recovery.img
Add file: .\Image/recovery.img done,offset=0x1d1f800,size=0x754560,userspace=0xea9
Add file: .\Image/system.img
Add file: .\Image/system.img done,offset=0x2474000,size=0x458058b8,userspace=0x8b00c
Add file: .\backupimage/backup.img
Add file: .\backupimage/backup.img done,offset=0x47c7a000,size=0x2431804,userspace=0x4864
Add file: .\update-script
Add file: .\update-script done,offset=0x4a0ac000,size=0x3a5,userspace=0x1
Add file: .\recover-script
Add file: .\recover-script done,offset=0x4a0ac800,size=0x10a,userspace=0x1
Add CRC...
Make firmware OK!
----- OK -----

C:\Users\Administrator\Desktop\3399\AndroidTool-android\rockdev>RKImageMaker.exe
-RK330C Image MiniLoaderAll.bin Image\update.img update.img -os_type:androidos

*****RKImageMaker ver 1.62 *****
Generating new image, please wait...
Error:Create new image file failed!

C:\Users\Administrator\Desktop\3399\AndroidTool-android\rockdev>rem update.img is
new format, Image\update.img is old format, so delete older format

C:\Users\Administrator\Desktop\3399\AndroidTool-android\rockdev>del Image\update.
img

C:\Users\Administrator\Desktop\3399\AndroidTool-android\rockdev>pause
请按任意键继续. . .
```

Step 4, **update.img** will be generated in **rockdev** directory.

Note: If an error occurs, it may be in the script is not the same bootloader version, follow the prompts to modify the file **mkupdate.bat** and **package-file** the same version of the current directory.

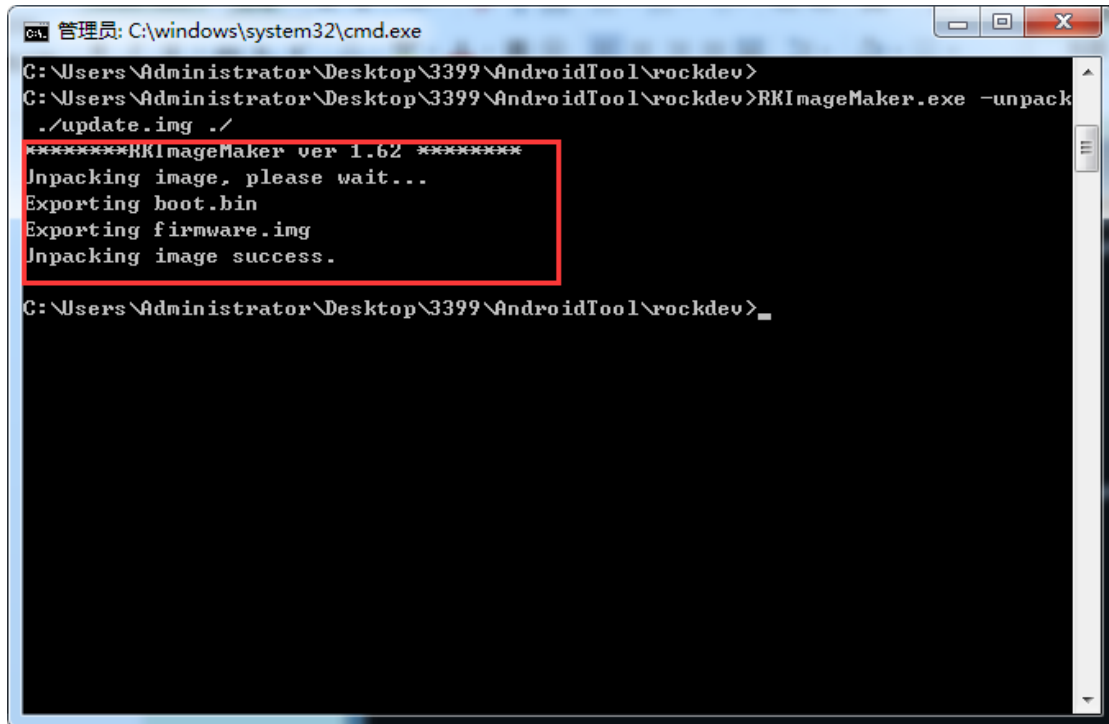
4.2 Unzip Firmware

Step 1, enter the directory **AndroidTool \rockdev** in CMD, unzip **update.img**.

Enter the following command

```
RKImageMaker.exe -unpack ./update.img ./
```

Then unzip the file to get the files **boot.bin** and **firmware.img**.



```

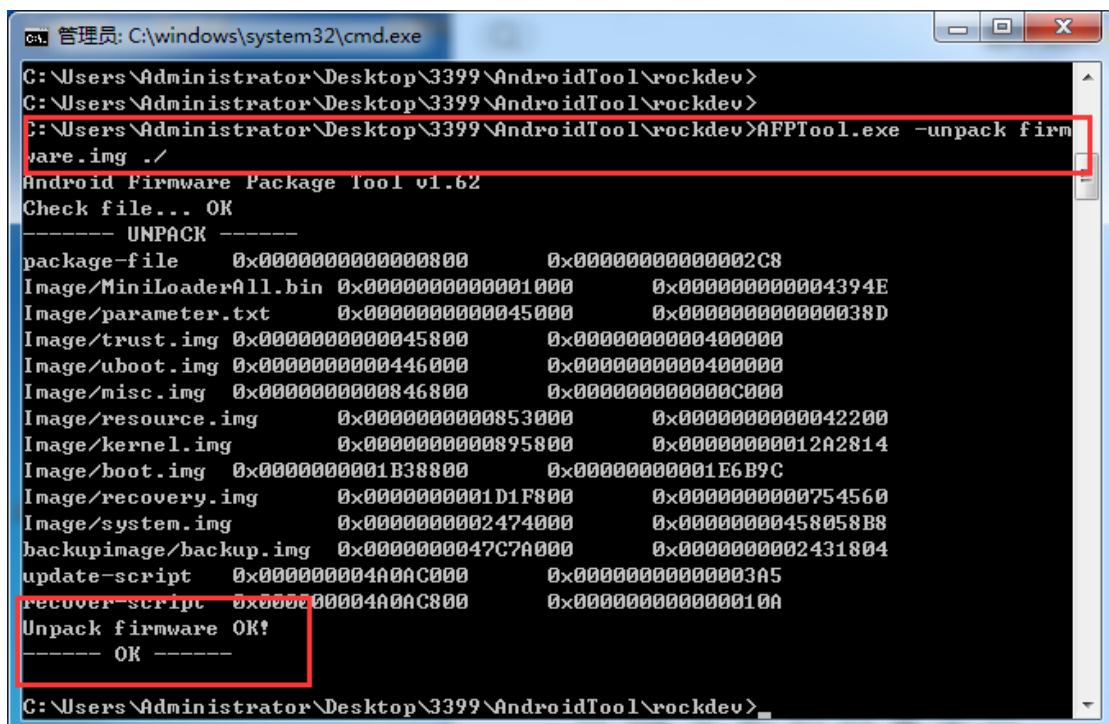
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>RKImageMaker.exe -unpack
./update.img ./
*****RKImageMaker ver 1.62 *****
Unpacking image, please wait...
Exporting boot.bin
Exporting firmware.img
Unpacking image success.
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>

```

Step 2, unzip **firmware.img**.

Execute the command

AFPTool.exe -unpack firmware.img ./



```

C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>AFPTool.exe -unpack firm
ware.img ./
Android Firmware Package Tool v1.62
Check file... OK
----- UNPACK -----
package-file 0x0000000000000800 0x00000000000002C8
Image/MiniLoaderAll.bin 0x0000000000001000 0x0000000000004394E
Image/parameter.txt 0x00000000000045000 0x0000000000000038D
Image/trust.img 0x00000000000045800 0x00000000000040000
Image/uboot.img 0x000000000000446000 0x00000000000040000
Image/misc.img 0x000000000000846800 0x0000000000000C000
Image/resource.img 0x000000000000853000 0x00000000000042200
Image/kernel.img 0x000000000000895800 0x00000000000012A2814
Image/boot.img 0x000000000001B38800 0x000000000001E6B9C
Image/recovery.img 0x000000000001D1F800 0x000000000000754560
Image/system.img 0x000000000002474000 0x000000000000458058B8
backupimage/backup.img 0x0000000000047C7A000 0x0000000000002431804
update-script 0x000000000004A0AC000 0x000000000000003A5
recovery-script 0x000000000004A0AC800 0x0000000000000010A
Unpack firmware OK!
----- OK -----
C:\Users\Administrator\Desktop\3399\AndroidTool\rockdev>

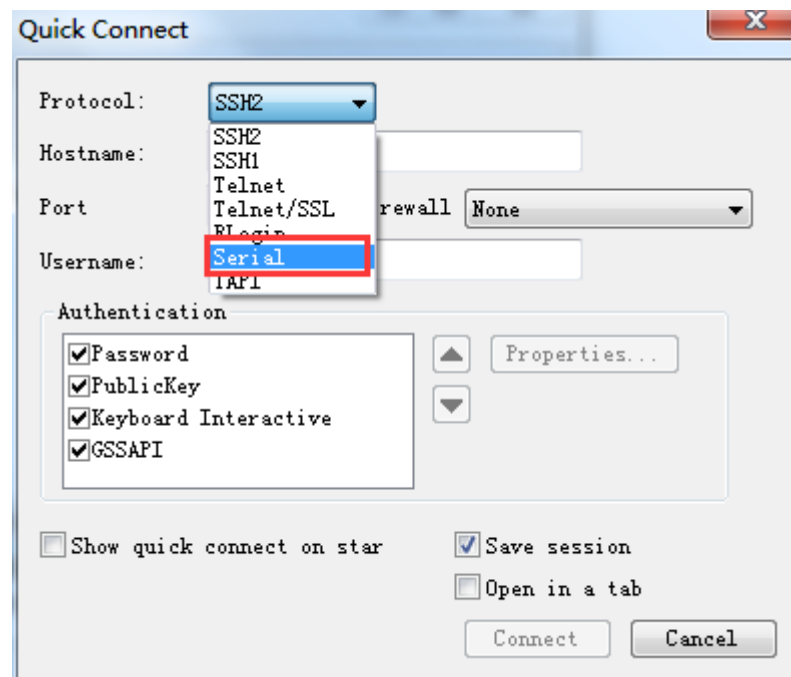
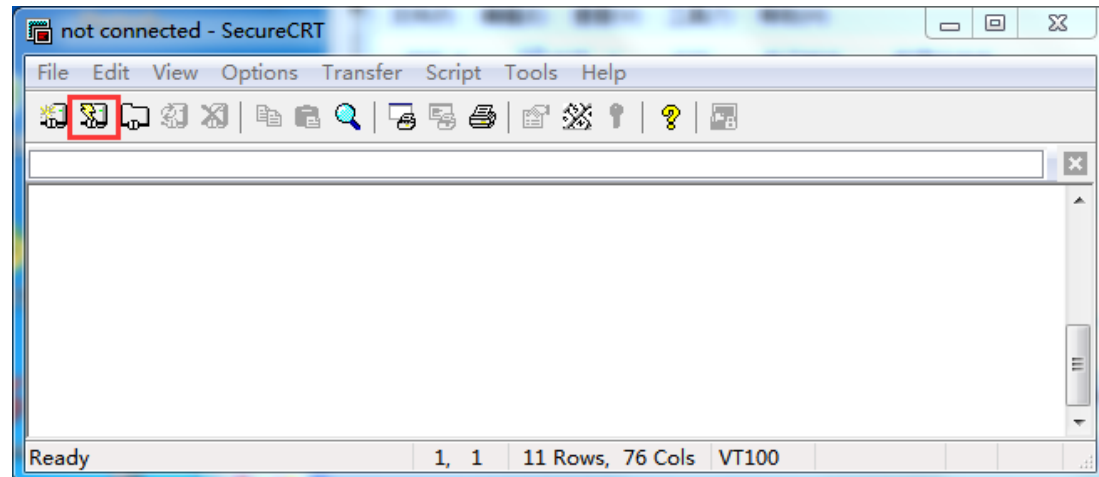
```

The unzip files will be generated in the directory **AndroidTool\rockdev\Image**.

5 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:

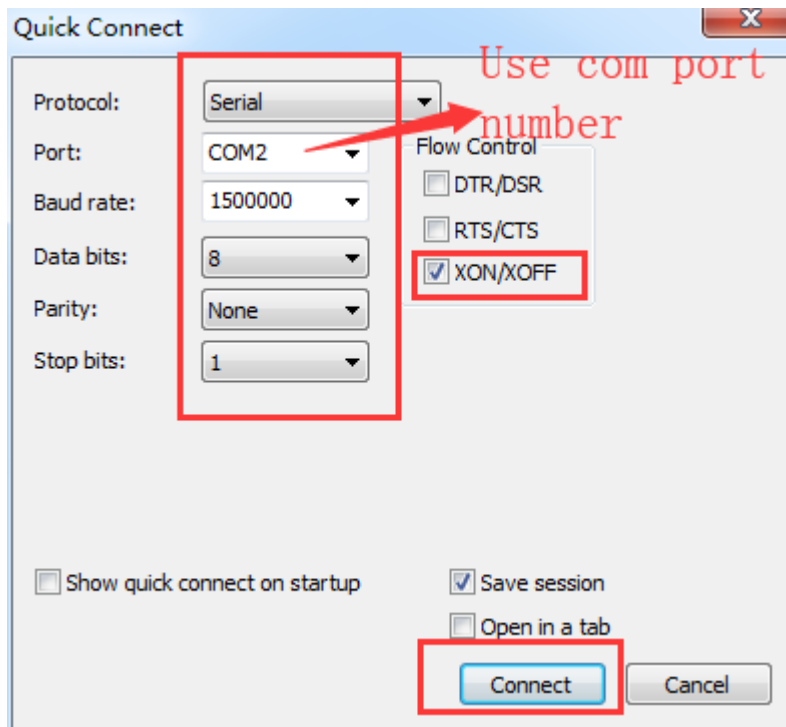
Protocol: Serial

Port: To be specified by user PC

Baud rate: 1500000

Please check XON/XOFF but not RTS/CTS

Check Save session



After all, click **connect**

Illusion1: If open more than one serial terminal tools, and they use the same serial port, there will be reported **the port is busy**.

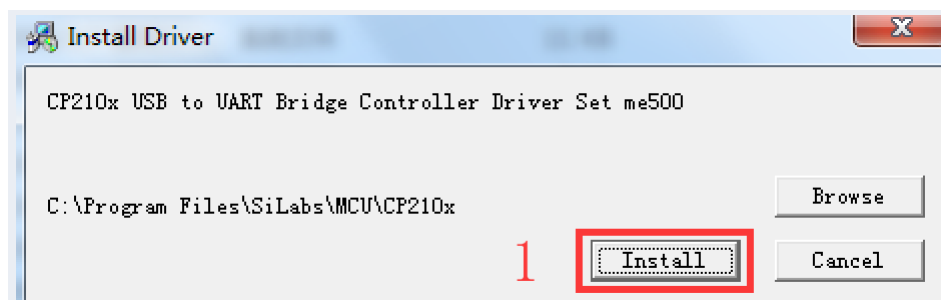
Solution: Turn off the serial tool that unnecessary.

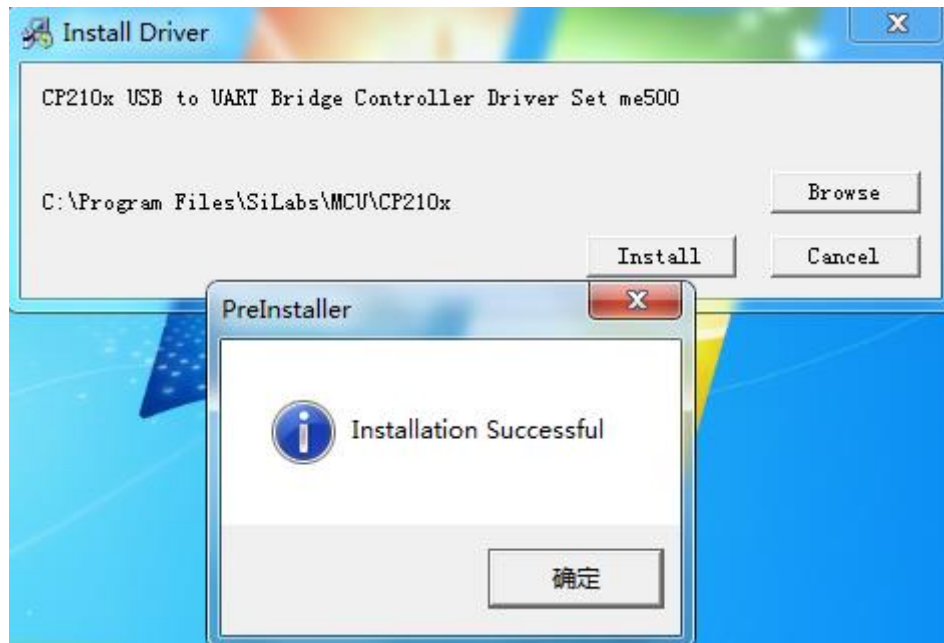
6 Burn Images

6.1 Install Driver

Step 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

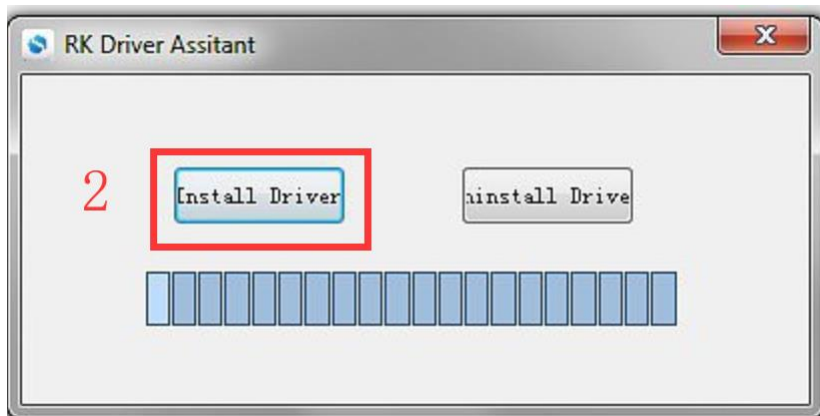
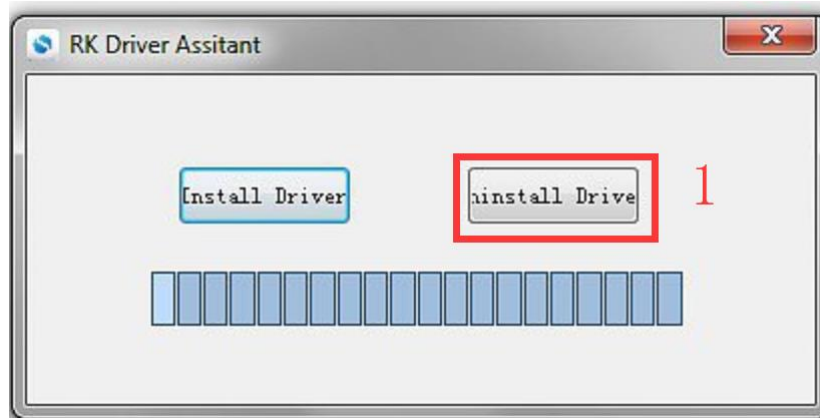




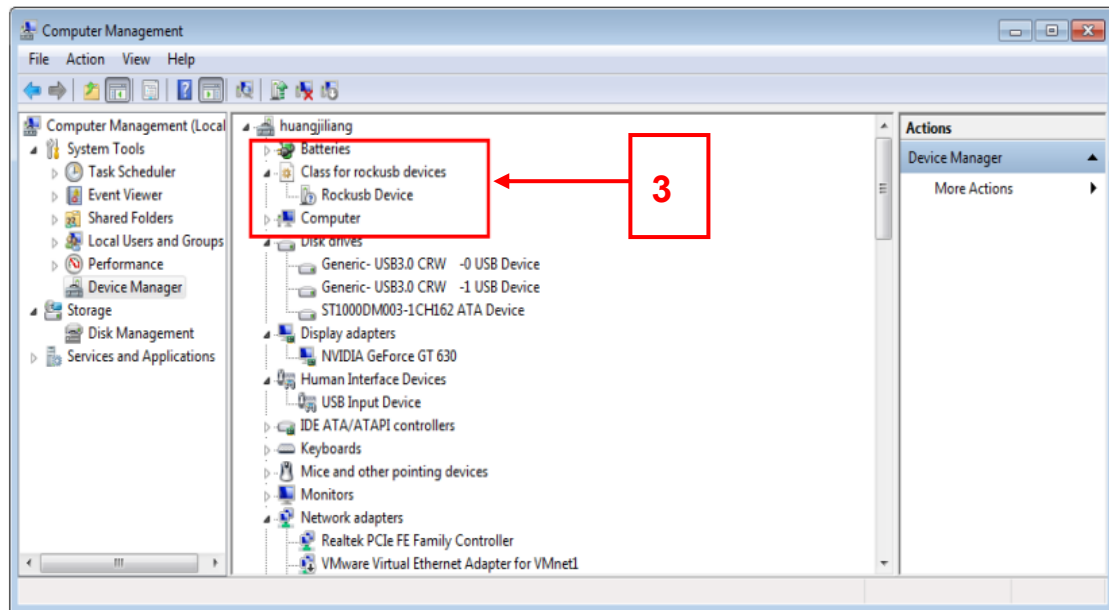
Now the device will be listed under **Device Manager -> PORTS** with unique serial port assigned

CP210x USB to UART Bridge Controller (COM5)

Step 2, Install **Rockchip Driver Assistant** (Path: Release_DriverAssitant/DriverInstall.exe)



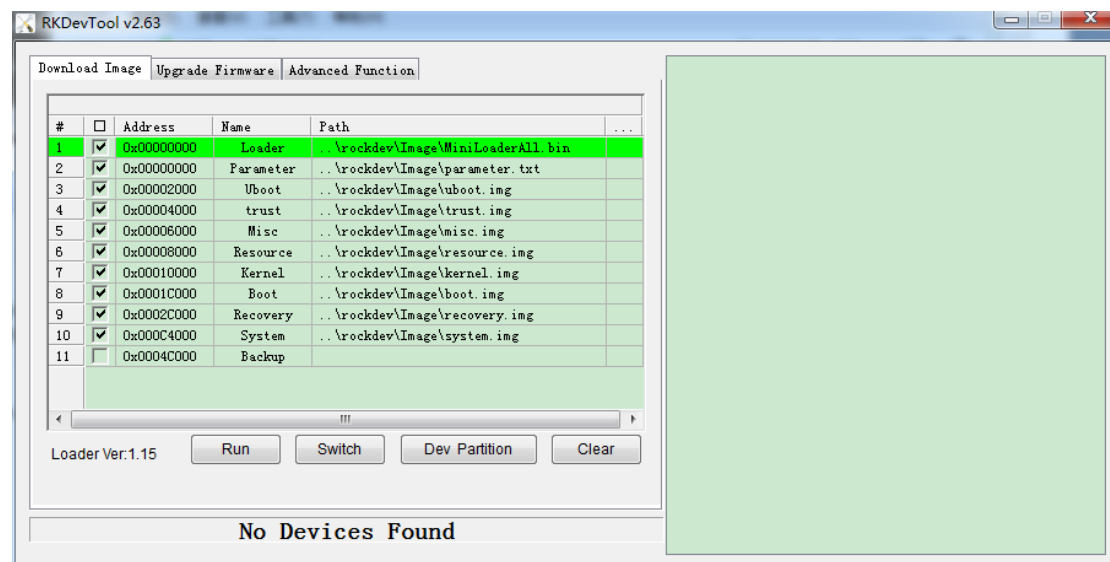
Step 3, After the installation is complete, connect the board and PC with USB Type-C cable, then power on, in **Computer Management** can see the following information:



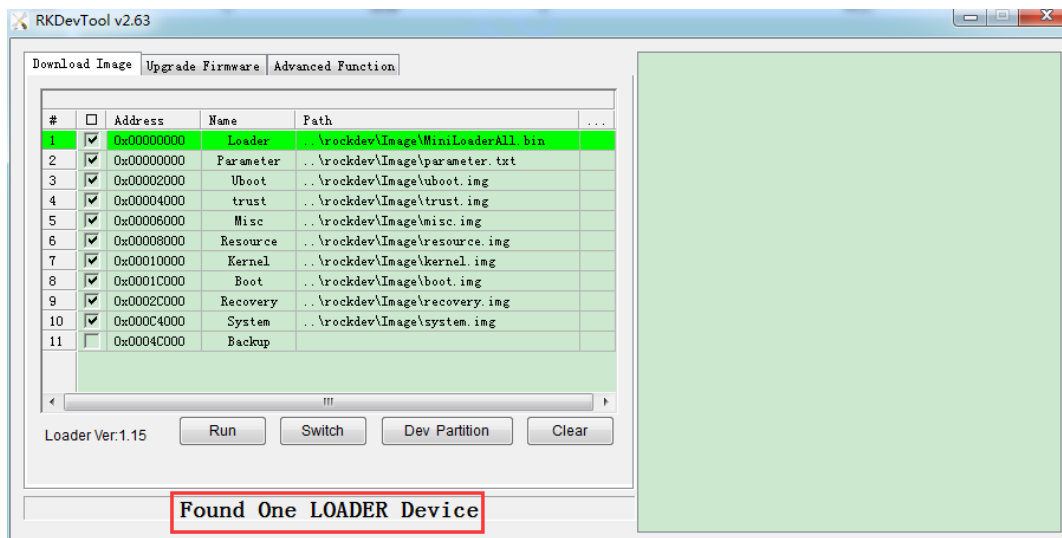
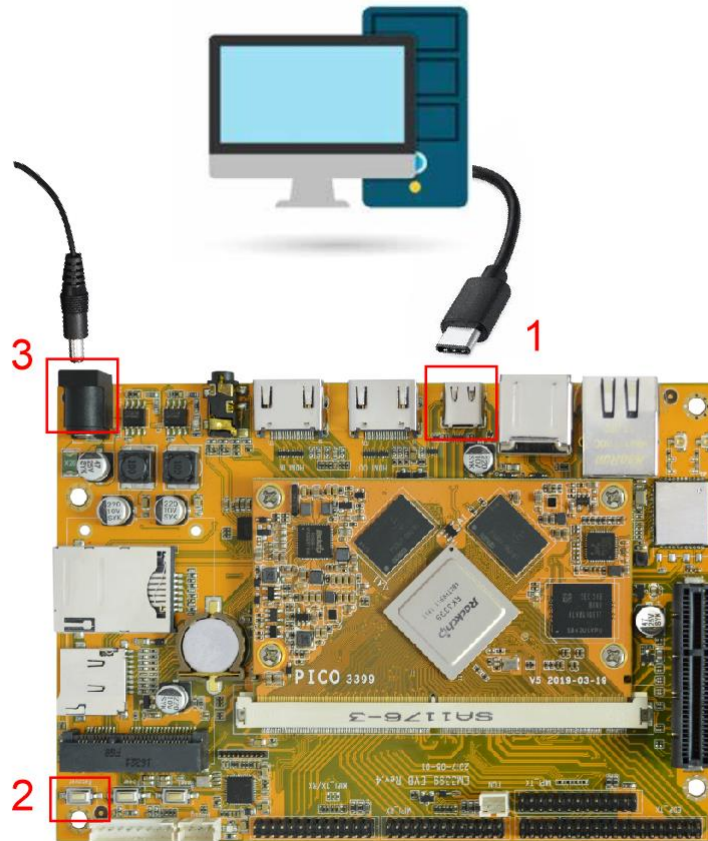
6.2 Upgrade Uniform Firmware

Step 1, unzip **AndroidTool_Release_v2.63** on Windows.

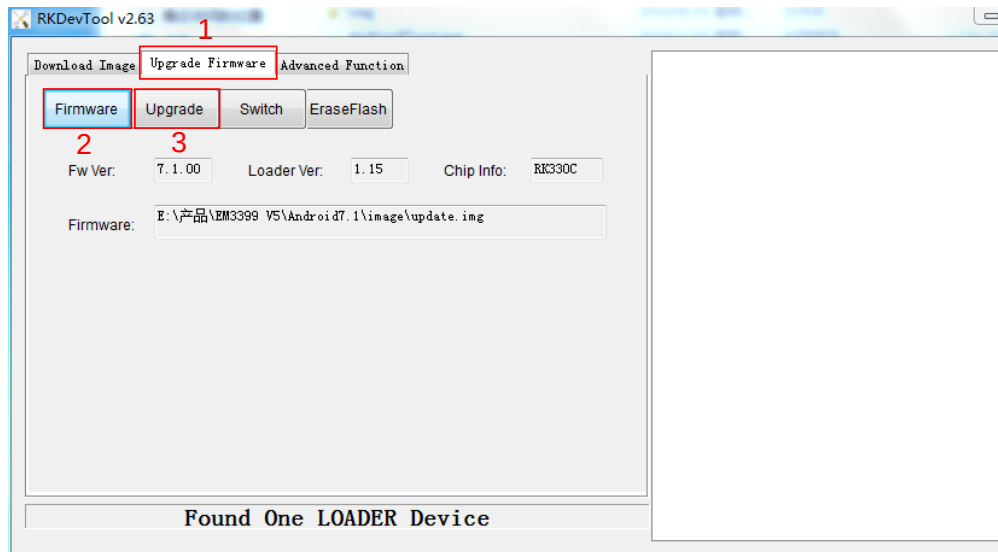
Step 2, open **AndroidTool.exe** (Path: **AndroidTool\AndroidTool_Release_v2.63\AndroidTool.exe**)



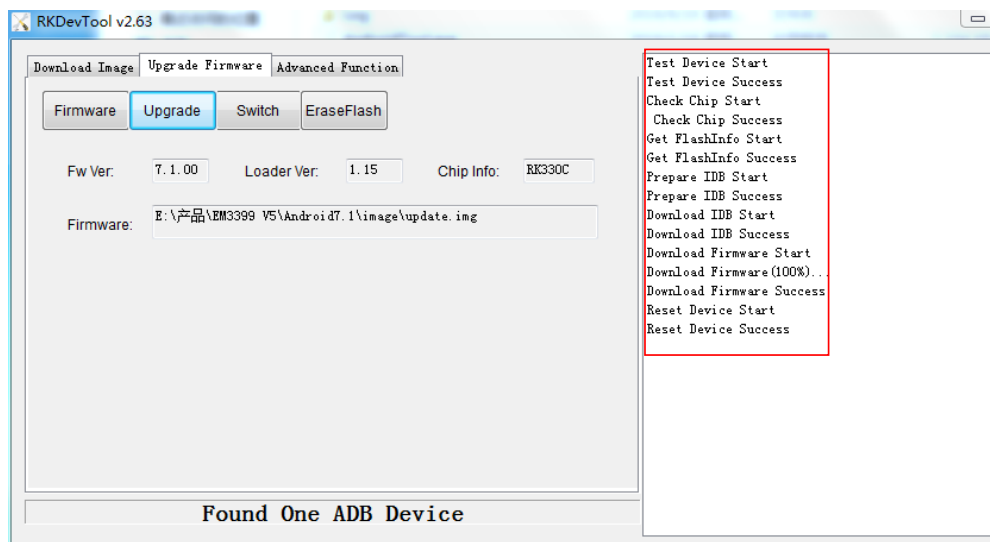
Step 3, connect PC and development board with USB Type-C cable, keep pressing the **Recover Key** and power on, until the windows PC shows **Found one LOADER Device**.



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



Download completed.

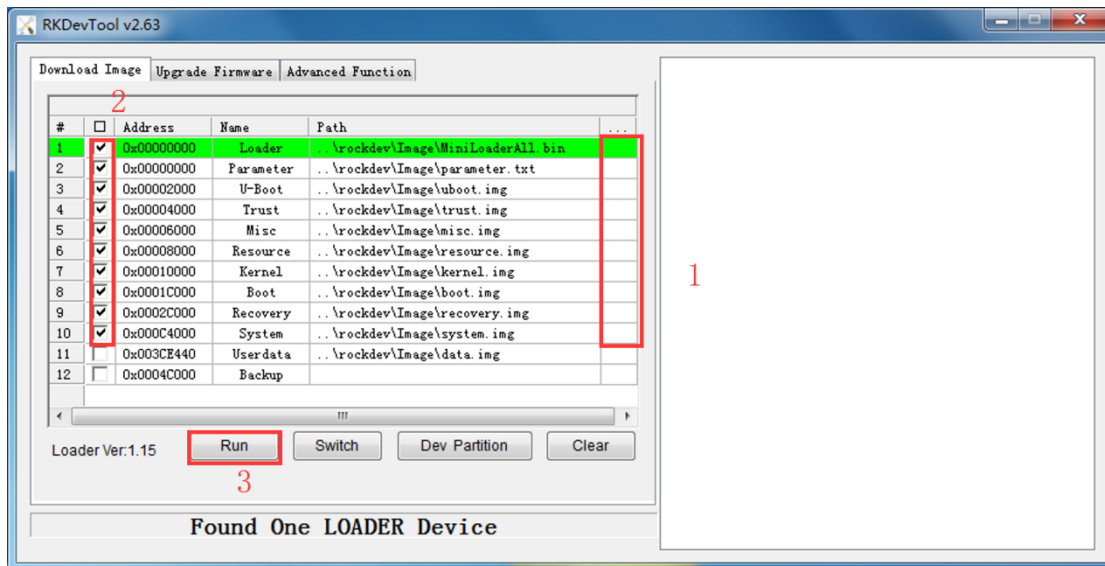


If necessary, user can choose to update the firmware separating.

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.

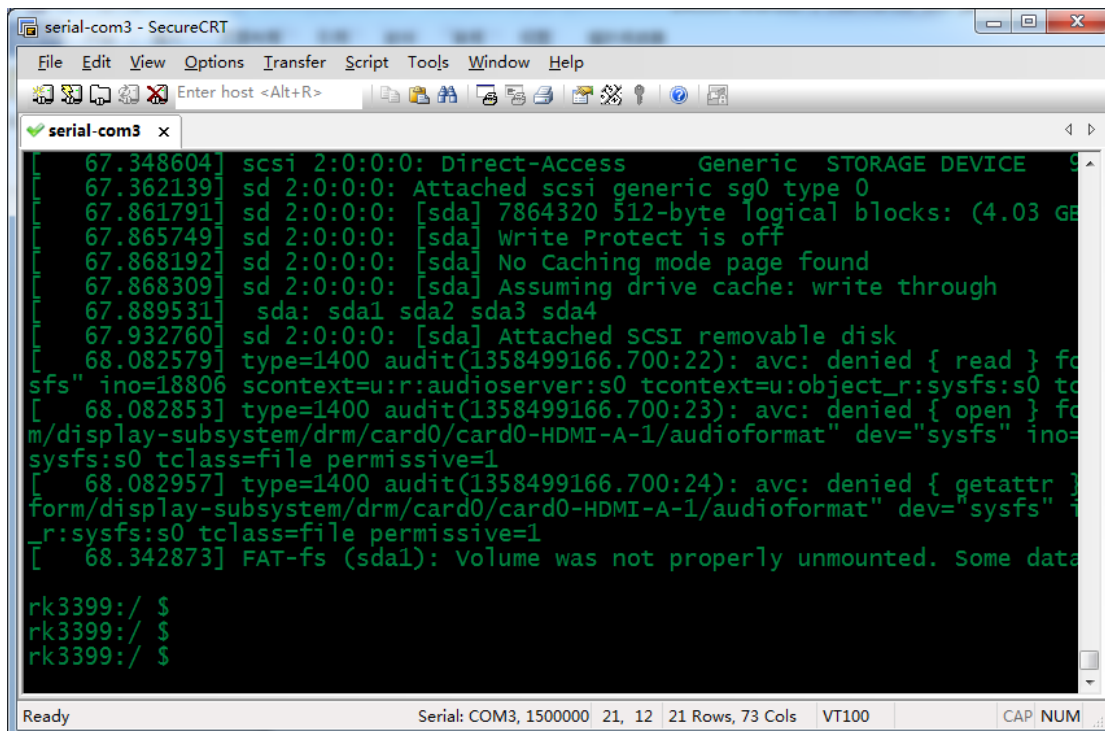
Step 3, Click “run” to flash the image.



7 Android Application

7.1 Serial Terminal

Connect the board and PC with USB Serial cable, then power on, the terminal will output startup information.



7.2 ADB

Execute the follow commands to turn off verity of system partition before enable ADB.

```
# adb root
```

```
# adb disable-verity
```

```
# adb reboot (reboot the board)
```

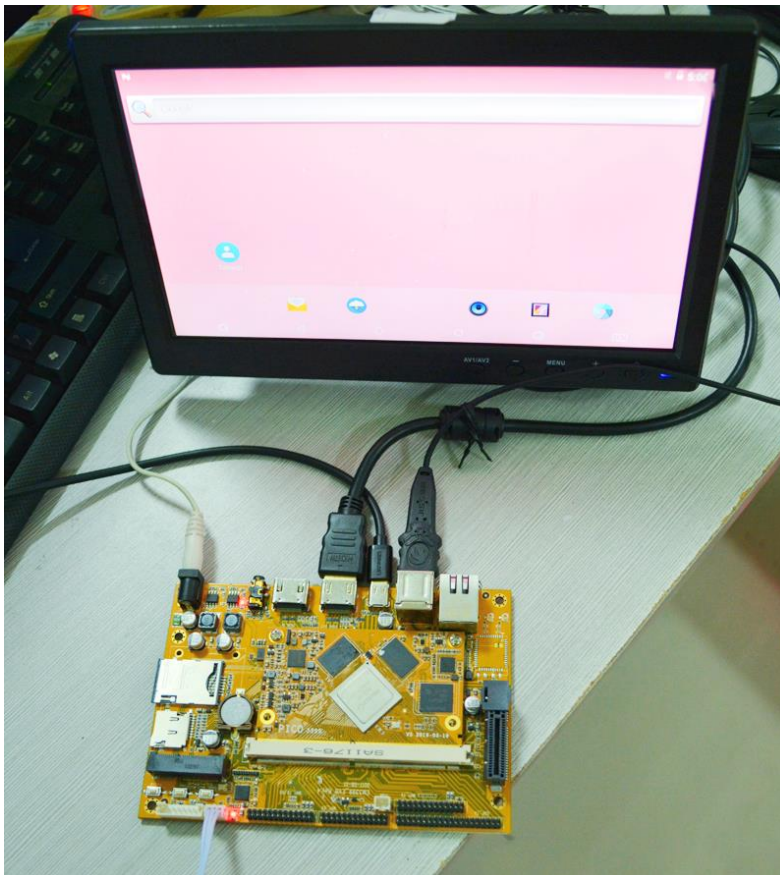
```
# adb root (after boot system)
```

```
# adb remount
```

Now you can use adb to push file to the board.

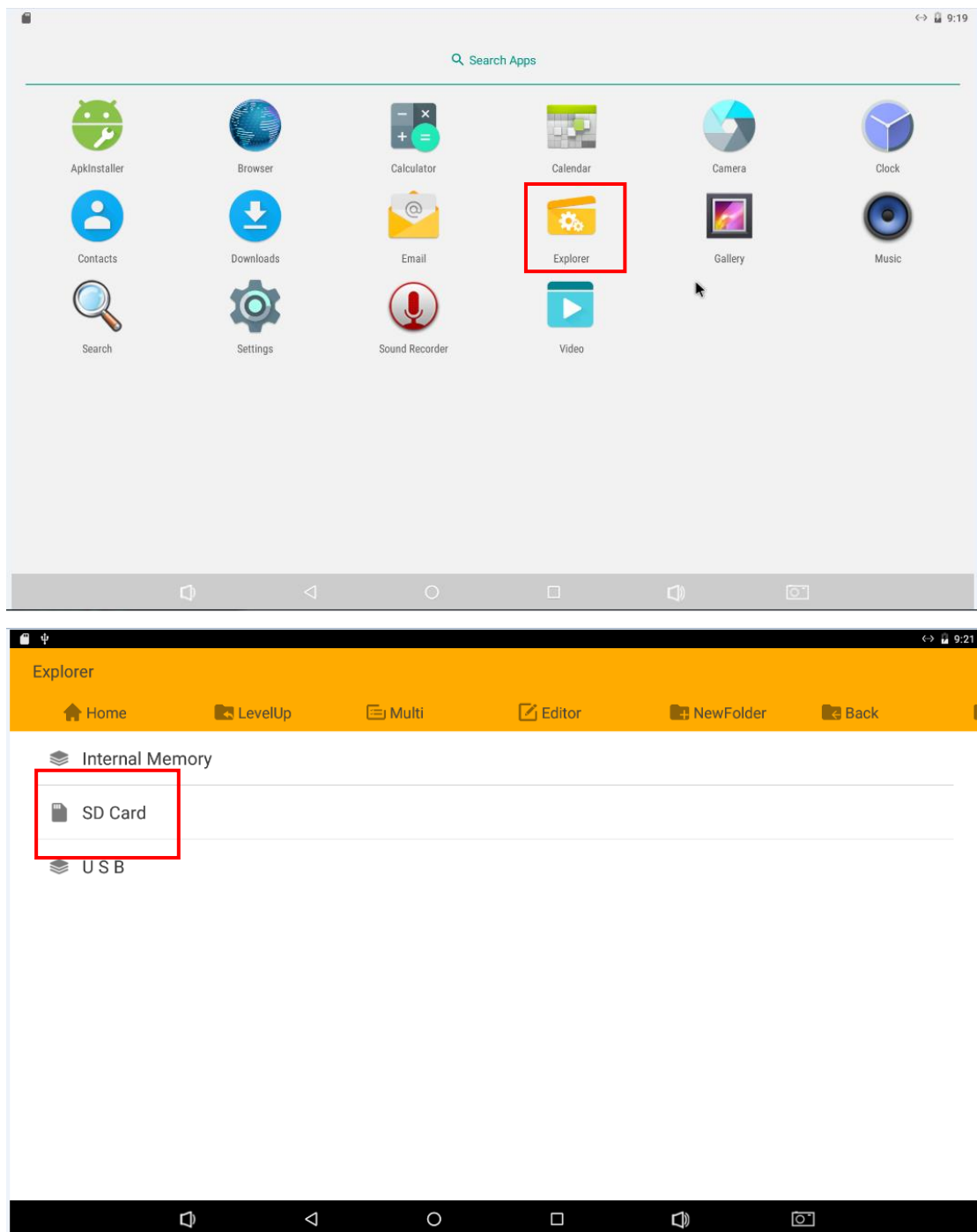
7.3 HDMI Display

Connect HDMI-OUT and monitor with a HDMI cable, then start up the board.



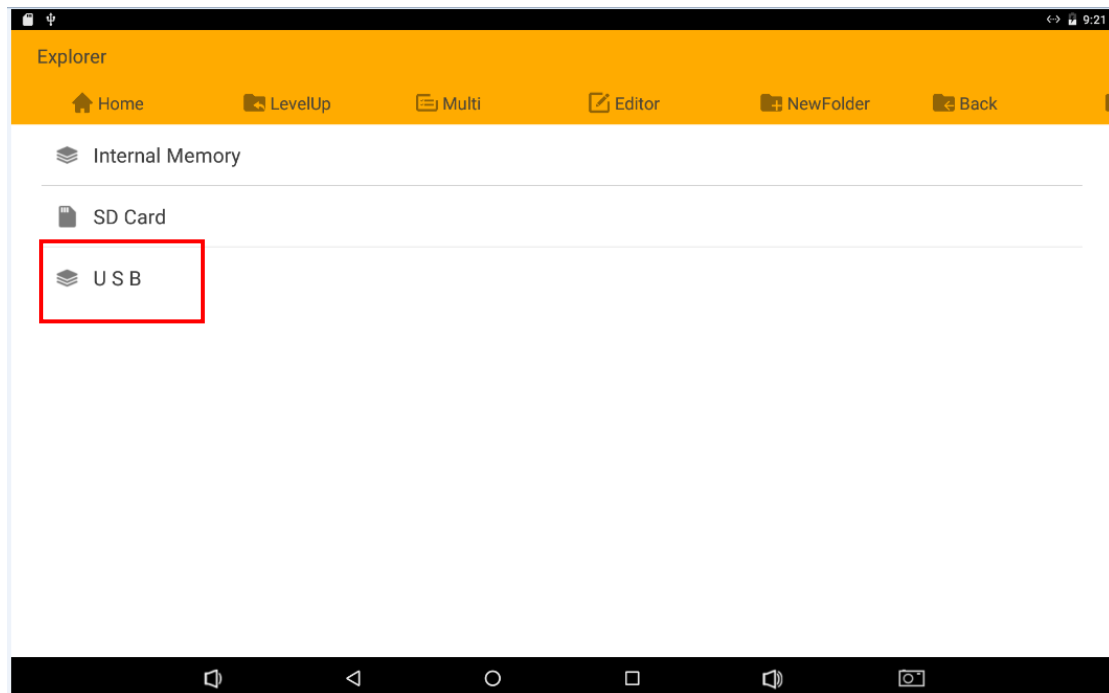
7.4 SD Card

EM3399 supports SD Hot-plug.



7.5 USB Host

The USB Host can be used to connect USB mouse, USB keyboard, U-Disk or other USB devices.

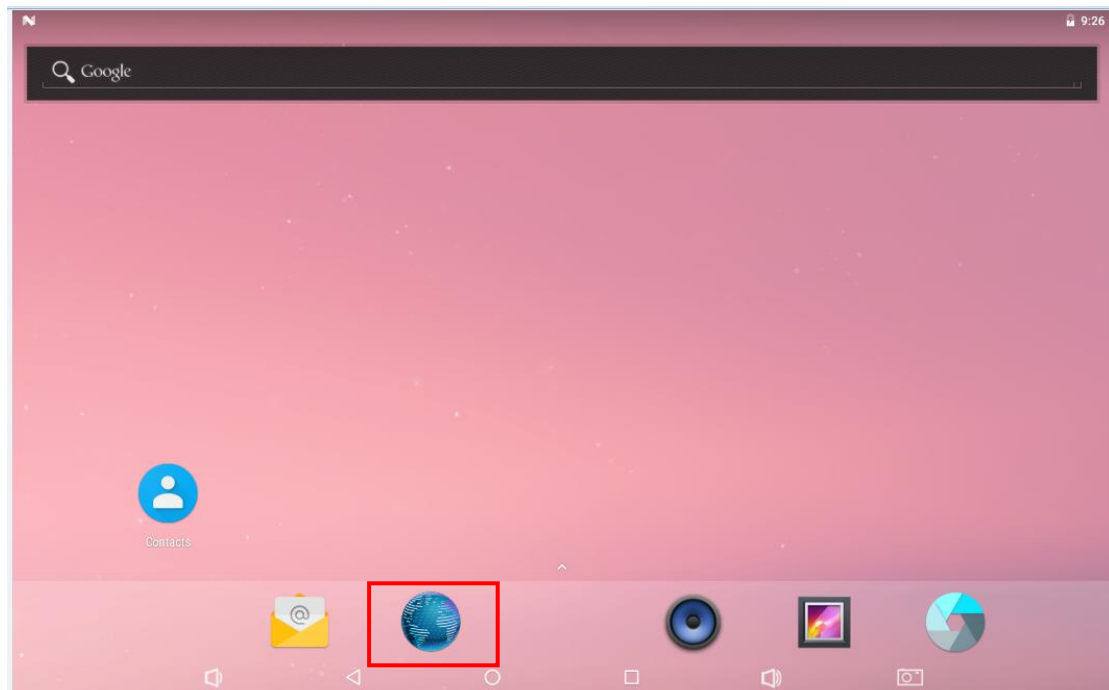


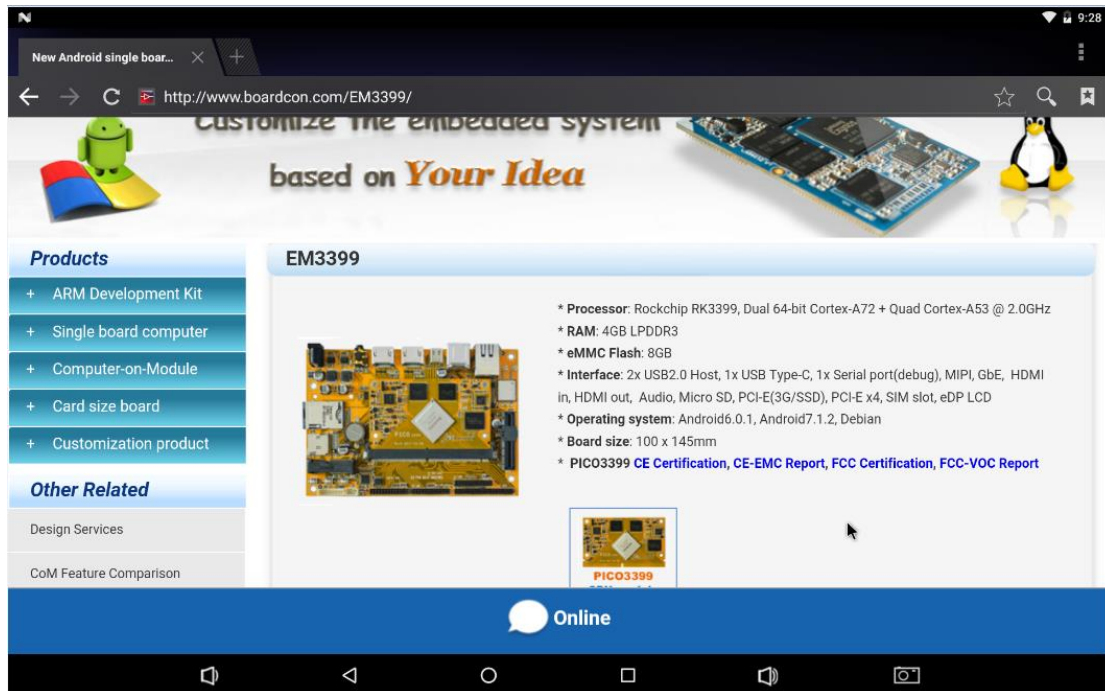
7.6 Ethernet

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.

su

ping www.boardcon.com

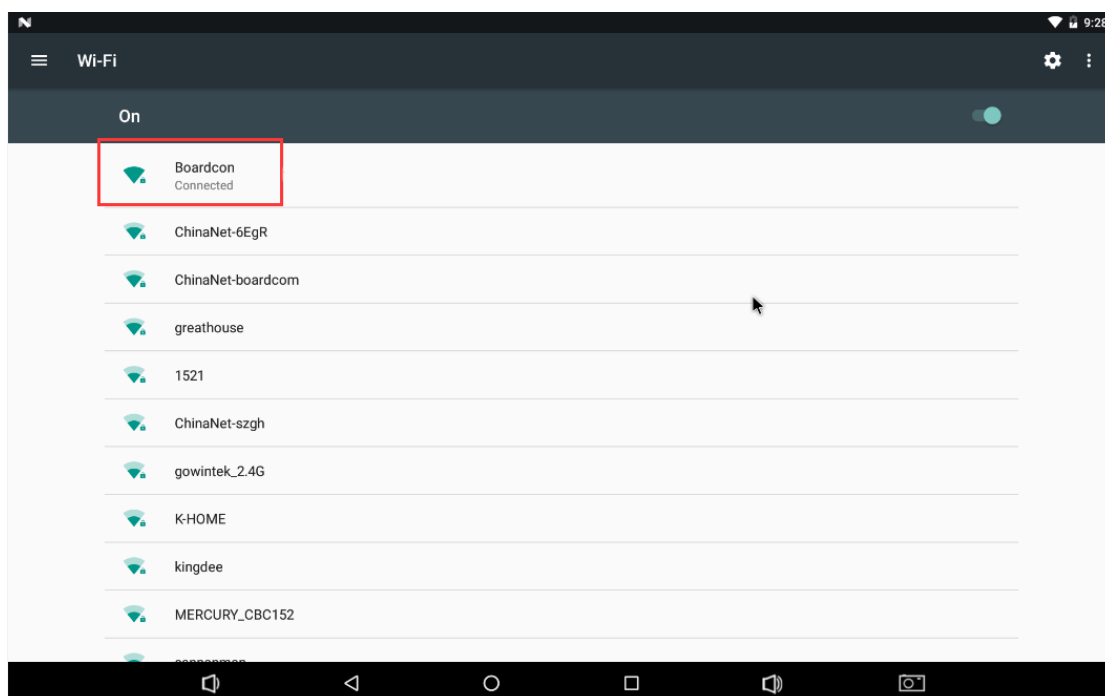




7.7 WiFi

Connect the WiFi antenna, then click **Settings -> WiFi -> turn on**, select the SSID from the list of available networks and enter the password.

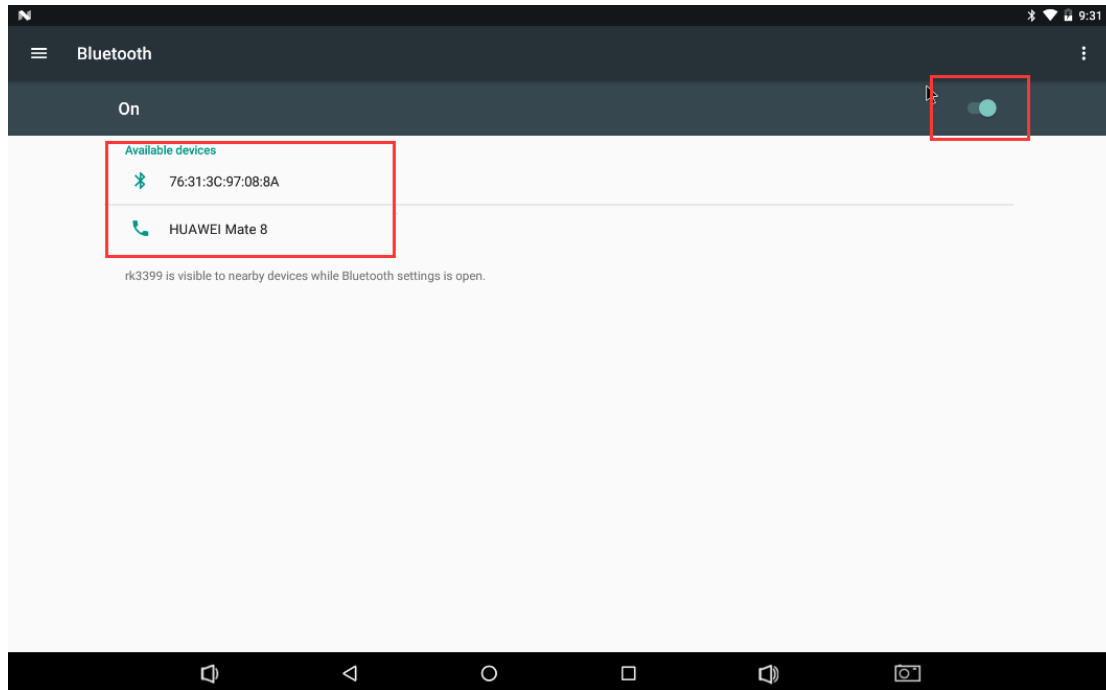
After connected, user can open the browser to browse the web.



7.8 Bluetooth

Click **Settings -> Bluetooth -> turn on**

Select the available device in the list to pair.



After pairing, devices can connect with each other automatically

7.9 4G Network

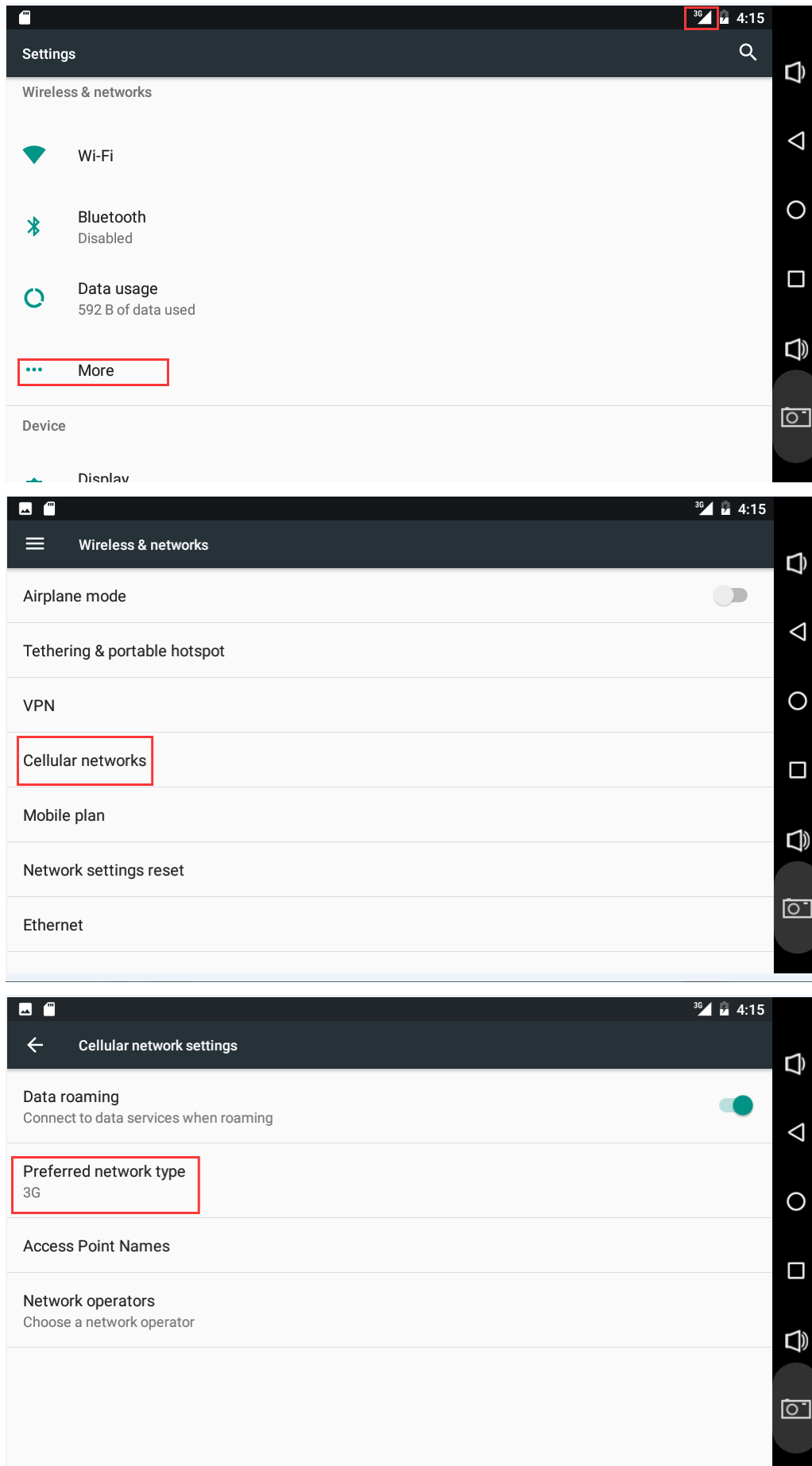
Step 1, Insert 4G module to PCI-E slot (4G model:EC20).

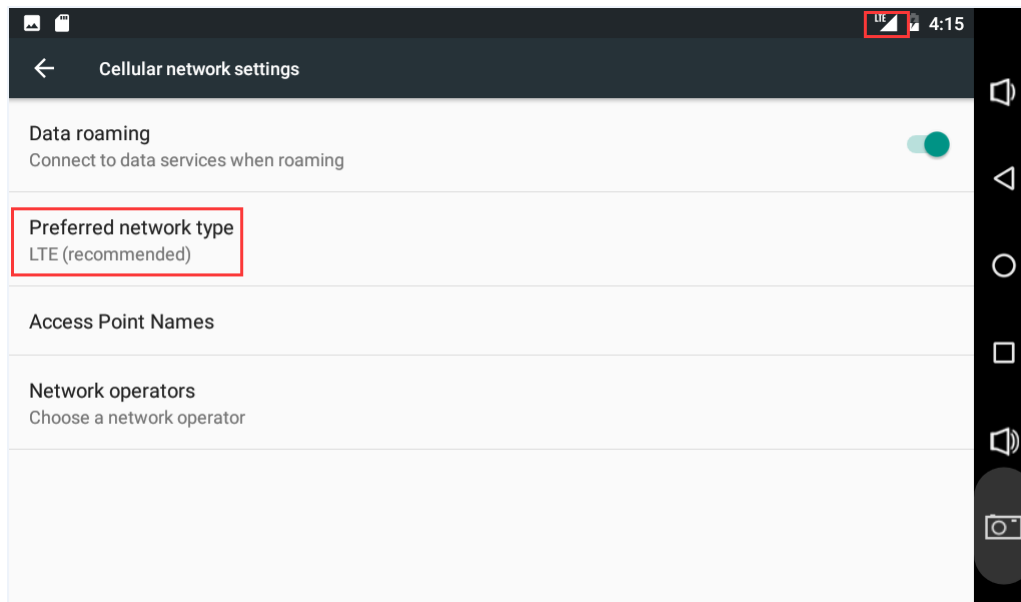
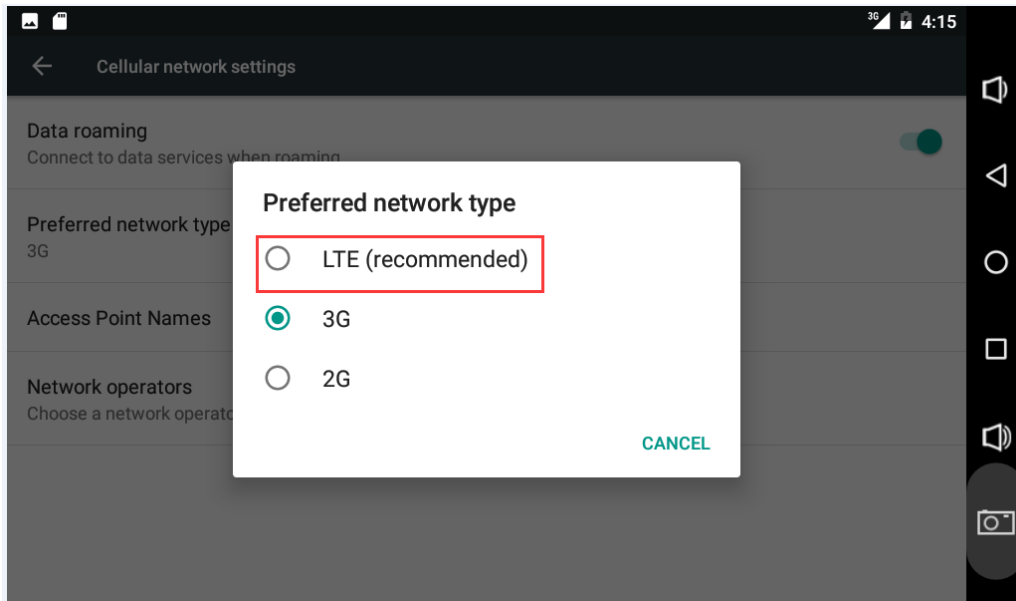
Step 2, Connect antenna and insert SIM card.

Step 3, The default connection is 3G network after power on.

4G network settings:

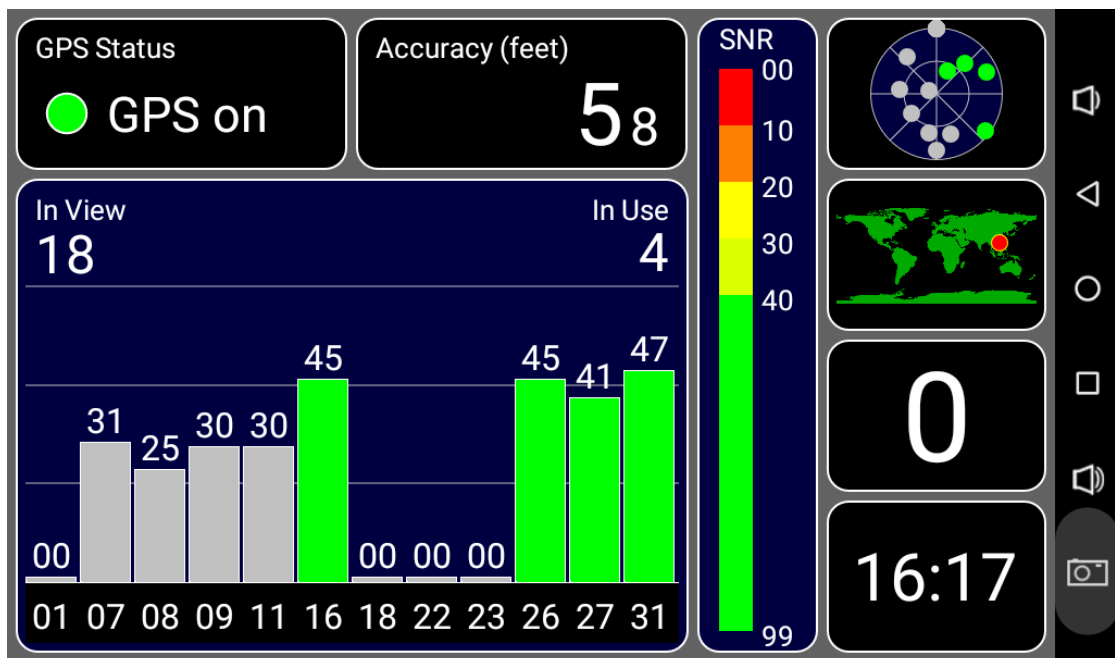
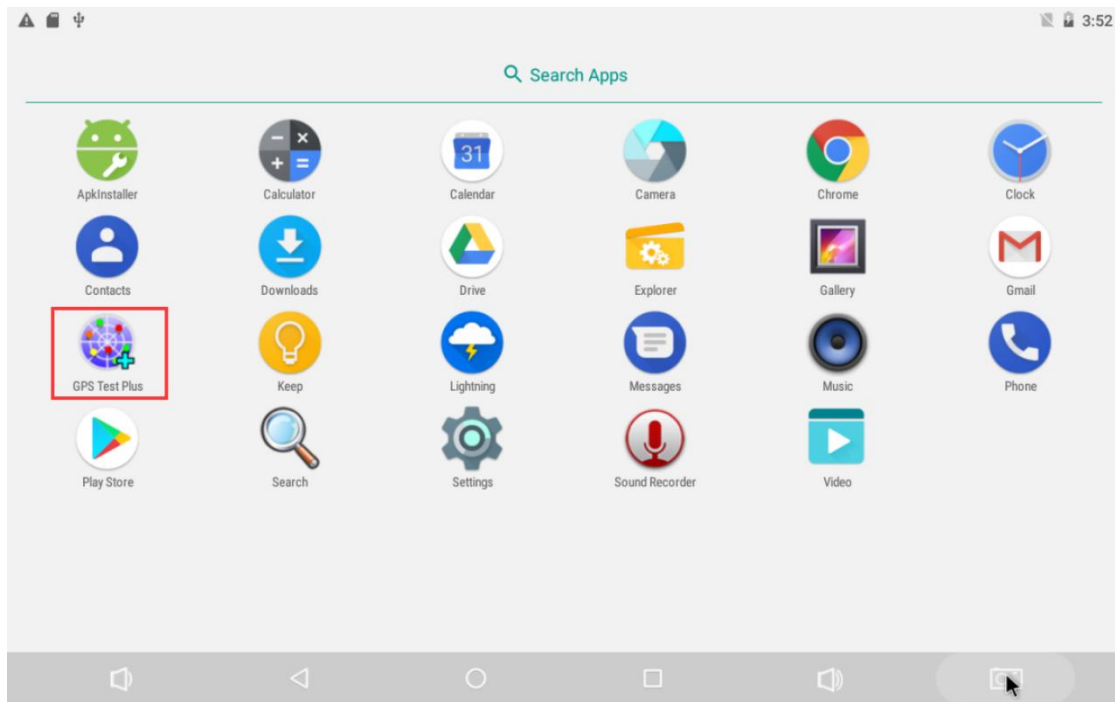
Settings -> Wireless&networks -> More -> Cellular networks -> Preferred network type -> LTE





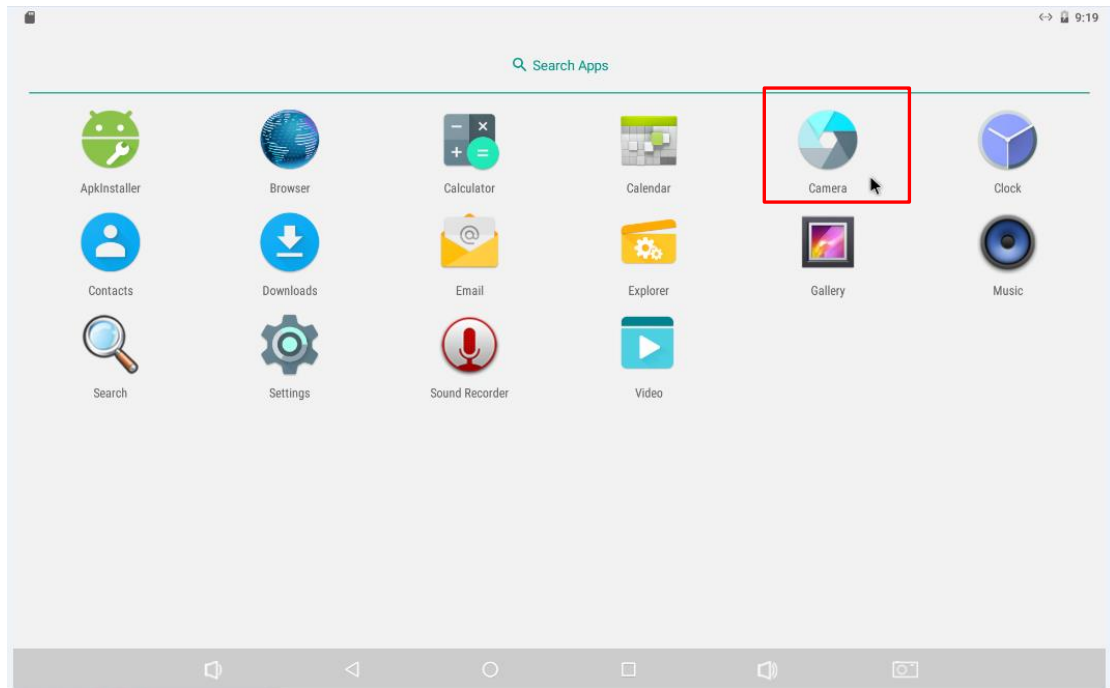
7.10 GPS

Plug the EC20 module and connect GPS antenna, then power on and install the APP **GPS_test1.2.4.apk** (path: CD/Tools/)



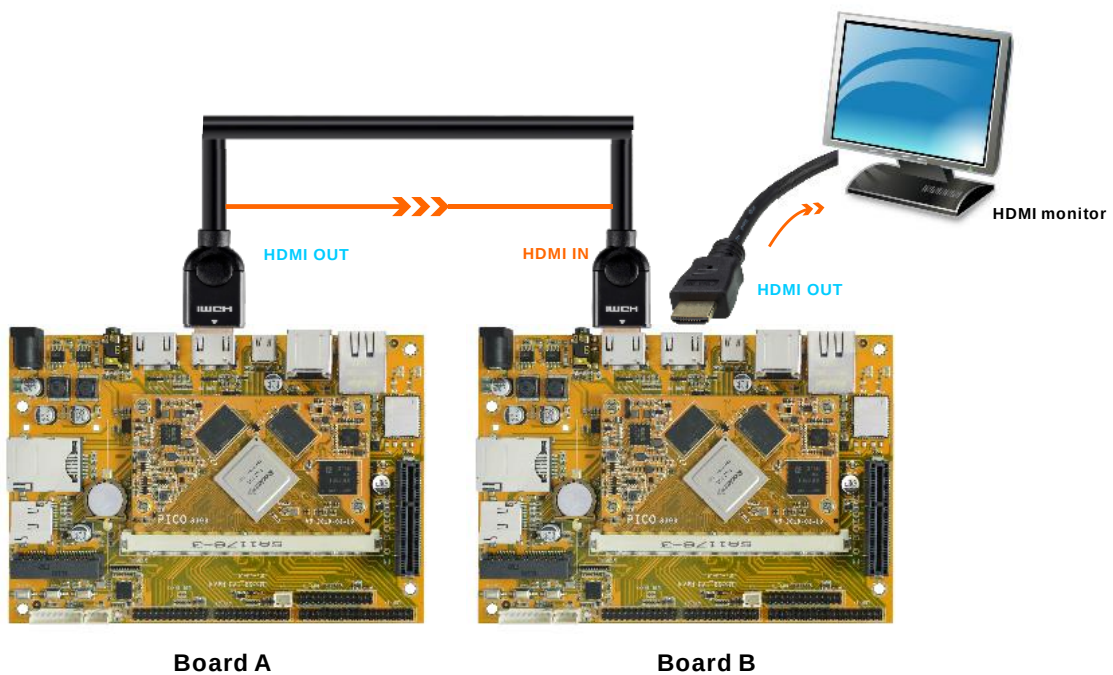
7.11 Camera

Connect the camera module (OV13850) to the development board **before power on**, then click the camera app to test.

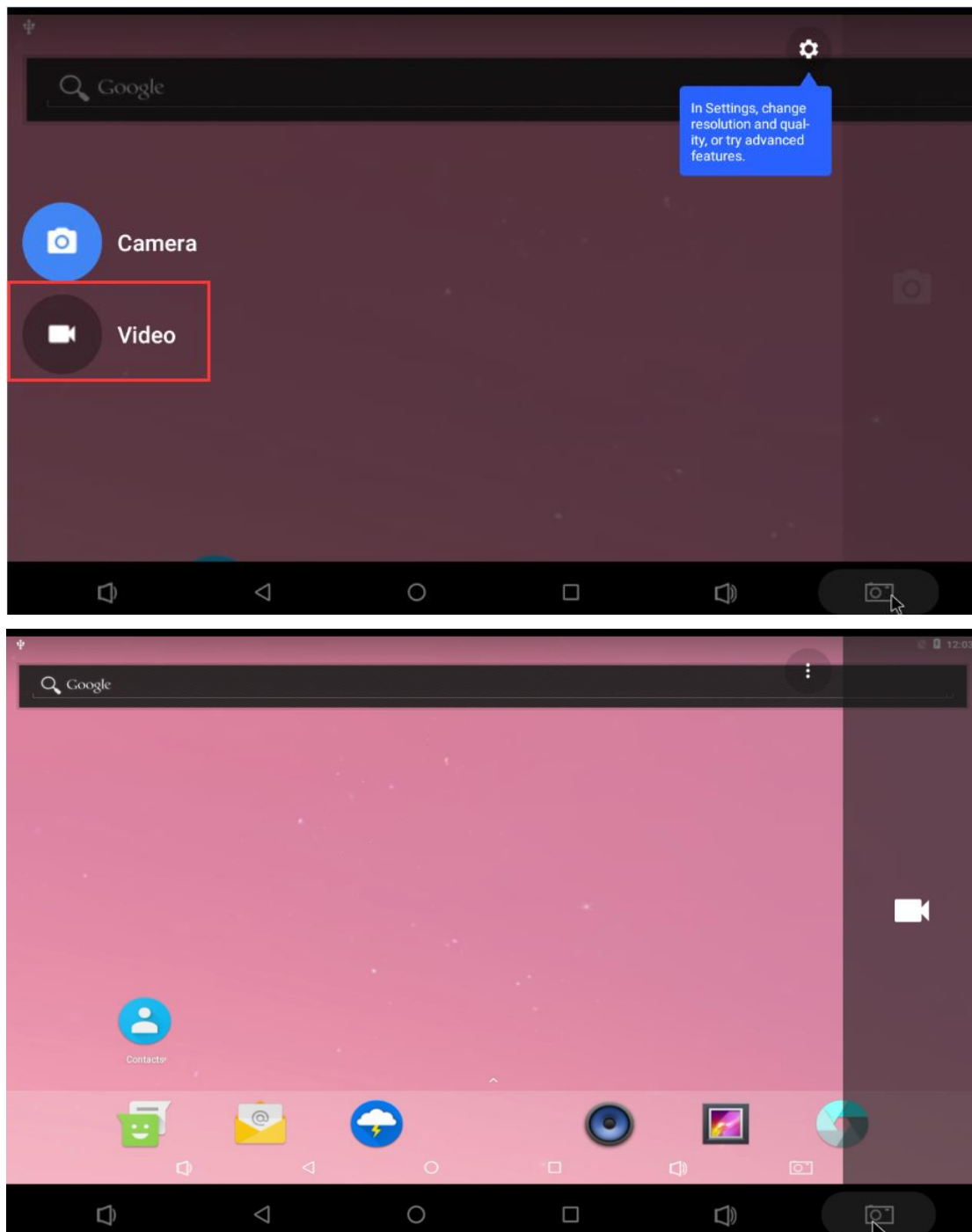


7.12 HDMI IN

Connect two EM3399 board with the HDMI cable and power on.



Open “Camera” application on Board B will display the screen of Board A. Please switch to **Video** mode, otherwise the display is incomplete.



Double-Click the **Back** icon will quit the HDMI IN.

