MaaXBoard Mini

Android User Manual

V1.0

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Regulatory Compliance:

- MaaXBoard Mini single board computer has passed the CE, FCC & SRRC certification.

Revision History

Rev.	Description	Author	Date
V1.0	Initial version	Sandy	20200519

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Chapter 1Introduction

1.1 Package Content

The content of software release package is subject to the actual release sources. For the file structure and instructions, refer to the following table:

Release Folder tree

```
├─01Doc
│   ├─RN
│   │       MaaXBoard_Mini-Android-ReleaseNote-Vxx.pdf
│   └─UM
│            MaaXBoard_Mini-Android-UserManual-Vxx.pdf
│            MaaXBoard_Mini-Android-DevelopmentGuide-Vxx.pdf
└─02Android
    ├─01AndroidSourceCode
    │       readme.txt
    ├─02AndroidShipmentImage
    │       MaaXBoard_Mini-AndroidShipmentImage-Vxxx.img
    └─03AndroidTools
            xxx.sh
```

01Doc	**Description**
MaaXBoard_Mini-Android-ReleaseNote-Vxx.pdf	Release Note
MaaXBoard_Mini-Android-UserManual-Vxx.pdf	User Manual
MaaXBoard_Mini-Android-DevelopmentGuide-Vxx.pdf	Development Guide
01AndroidSourceCode	**Description**
Readme.txt/xx.tar.gz	Git Library path or Source Code package
02AndroidShipmentImage	**Description**
MaaXBoard_Mini-AndroidShipmentImage-Vxxx.img	Android system image file
03AndroidTools	**Description**
xxx.sh	Shell script to generate Android Image, etc.

1.2 Feature List

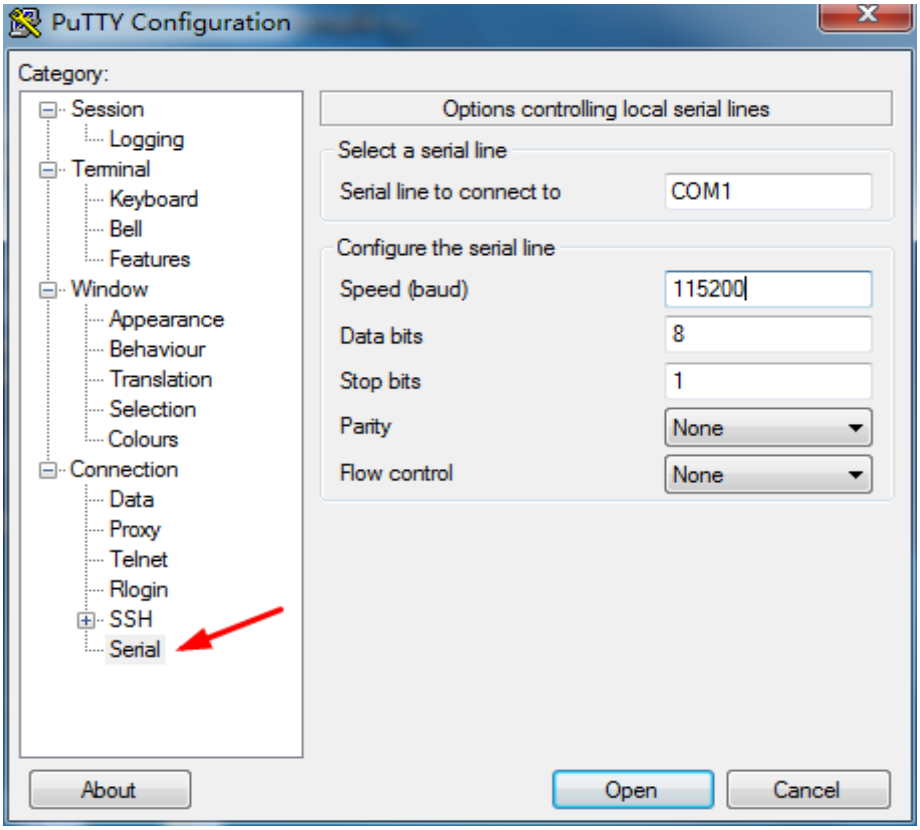
- U-Boot version: 2018.03
- Kernel version: 4.14.98
- Evaluation image Android P(9)
- Development based on NXP i.MX 8M Mini
- Micro SD boot
- 1 Gigabit Ethernet (RJ45)
- 4 USB 2.0 can work in Host or Device mode
- 2 UART (TTL) include debug port
- External interfaces (I2C, UART, SPI, SAI and GPIO)
- WIFI & BLE 4.2
- MIPI-DSI Display
- MIPI camera and USB Camera
- Bluetooth audio
- USB audio

Chapter 2Quick Start

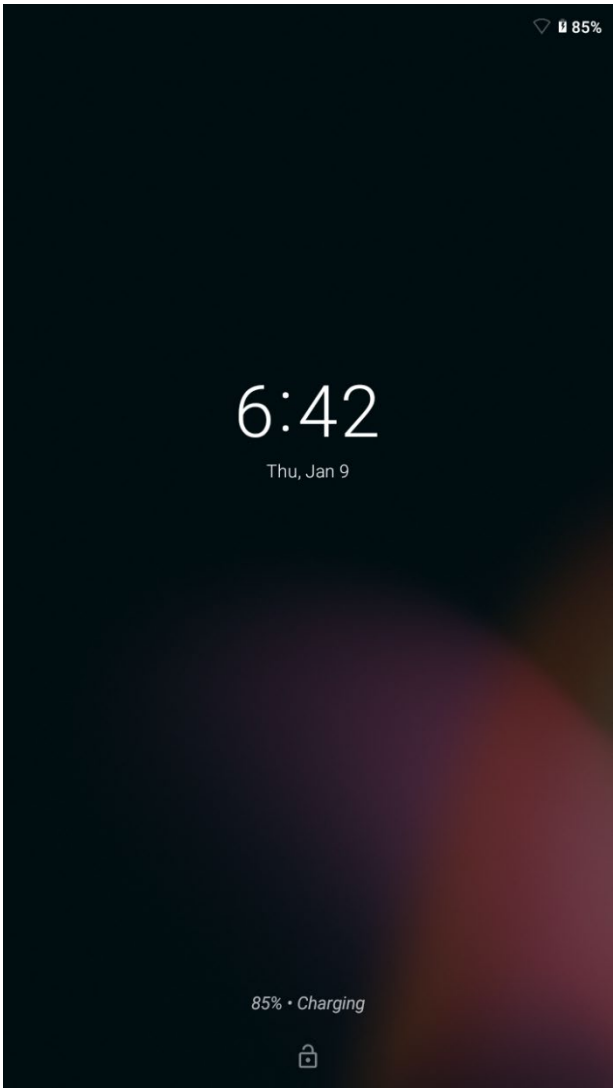
The default version of MaaXBoard Mini support boot up from SD Card only. To burn the image to SD Card, refer to Chapter 4. For the hardware connection and accessories details, please check the QSG.

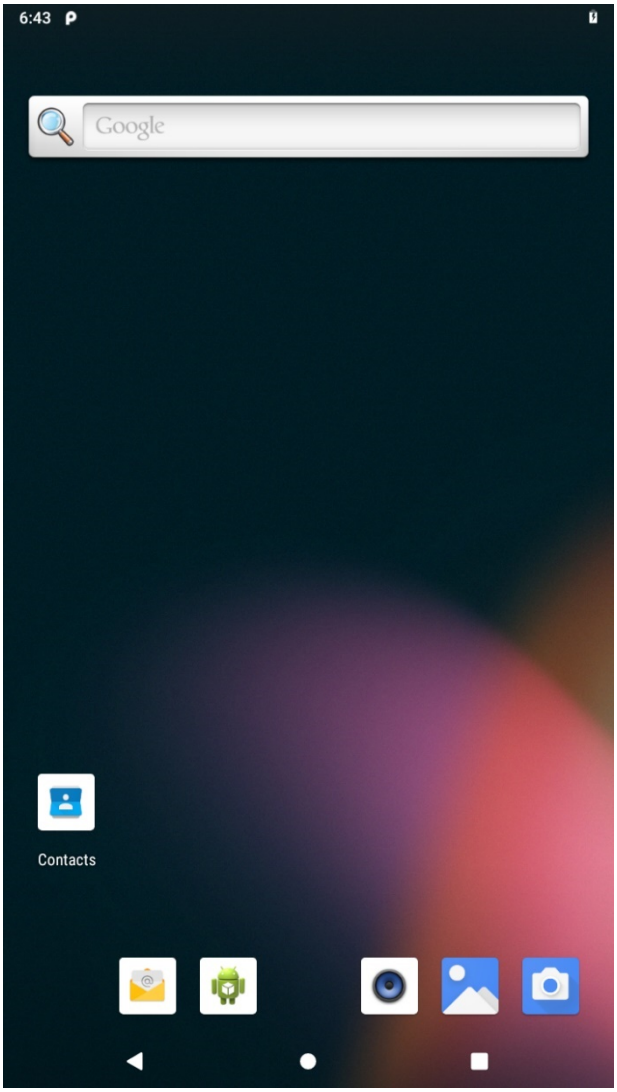
2.1 Boot from SDCard

- Install the Serial Communication software (e.g. PUTTY), select the corresponding port number, baudrate as 115200, data bits as 8, stop bits as 1, parity as none.



- Connect the debug interface to PC with USB to TTL converter. Pin 6, 8 and 10 of J1 to the GND, RXD and TXD pin of the USB to TTL converter. (optional)
- Connect MIPI-DSI screen to J7
- Insert the SD card (with pre-burned image) into the card slot J10.
- Powered the board with a 5V, 2A, Type-C interface power (to J11).
- When the system start up, the screen will show the Android boot up GUI.
- After the boot, the screen will display the Android lock screen wallpaper.
- Slide up to unlock the screen and enter HOME page.


85%
6:42
Thu, Jan 9
85% • Charging


6:43
Google
Contacts

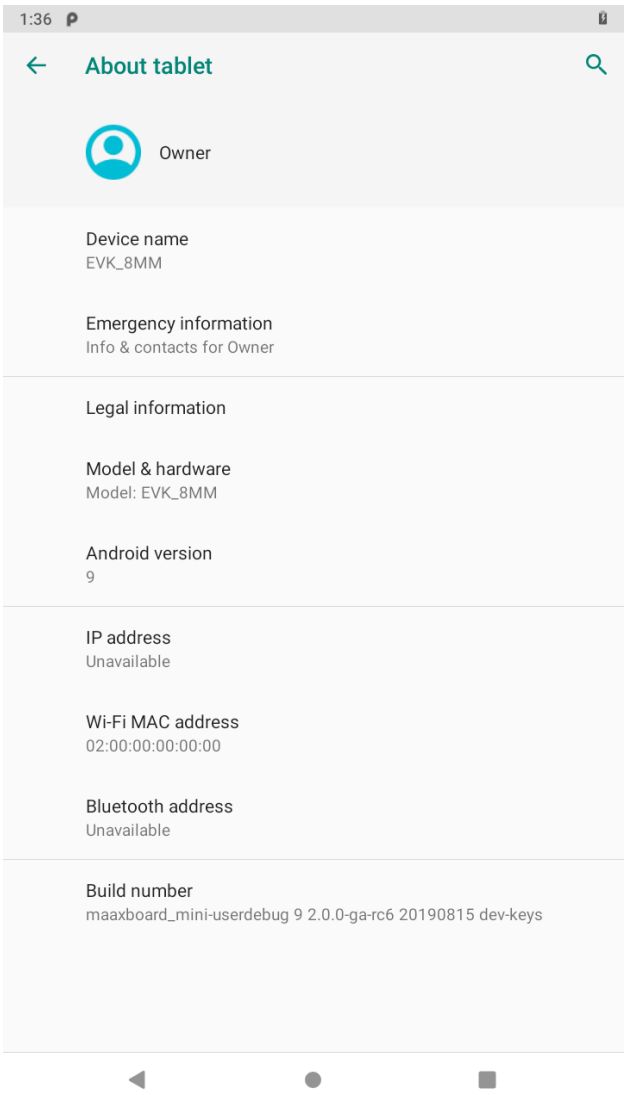
Chapter 3Feature Configuration & Introduction

This section will use MIPI-DSI screen version as example, introduces how to configure or use each function of MaaXBoard Mini in Android OS.

First of all, please refer to the previous chapter and boot up the system. Then configure or use the functions according to the following guidance.

3.1 Software version

Go to HOME page, slide up to show the APP list. Go to “Setting” -> “System” -> “About tablet”. Then you will find software version as follows:

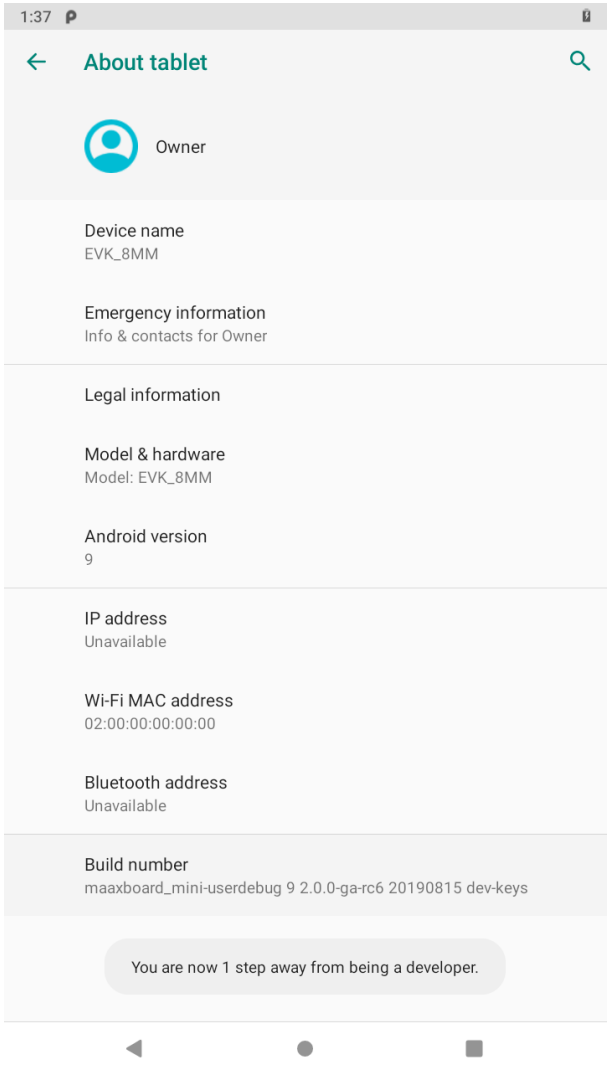


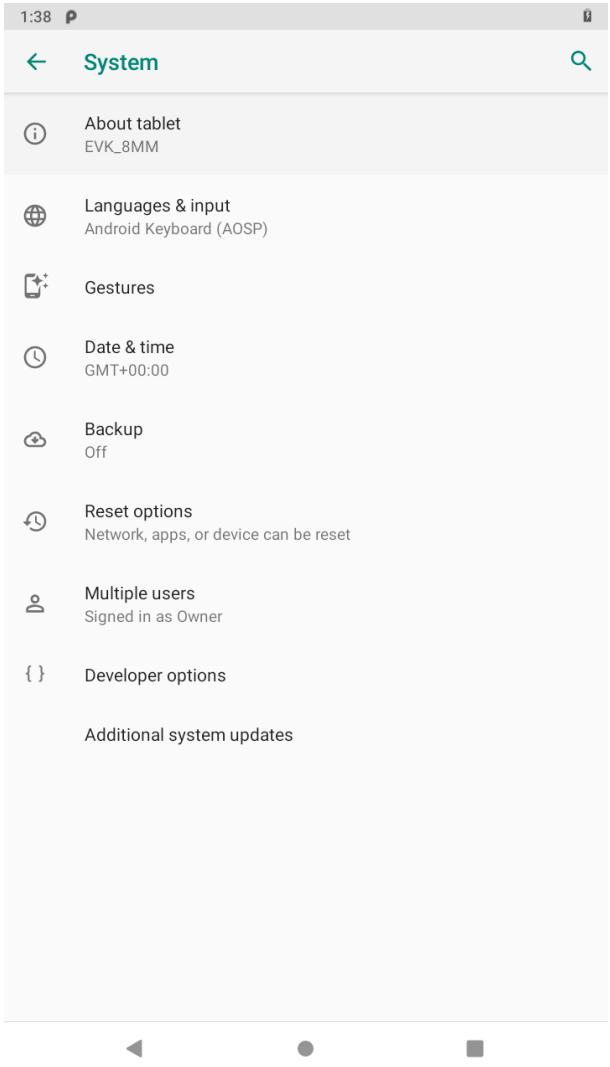
3.2 Developer options

3.2.1 Enable Developer options

Develop options screen is hidden by default, to make it visible, go to “Setting” -> “System” -> “About tablet” and tap “Build number” for 7 times. When you tap the option, it will prompt: You are now x steps away from being a developer. Continue tap, until the system prompt: You are now a developer! Then go back to the “System” page, you will find “Developer options”. Tap on this option, then you can enable or disable the developer mode.

Note: After disable the Developer options, system settings screen will hide it again.

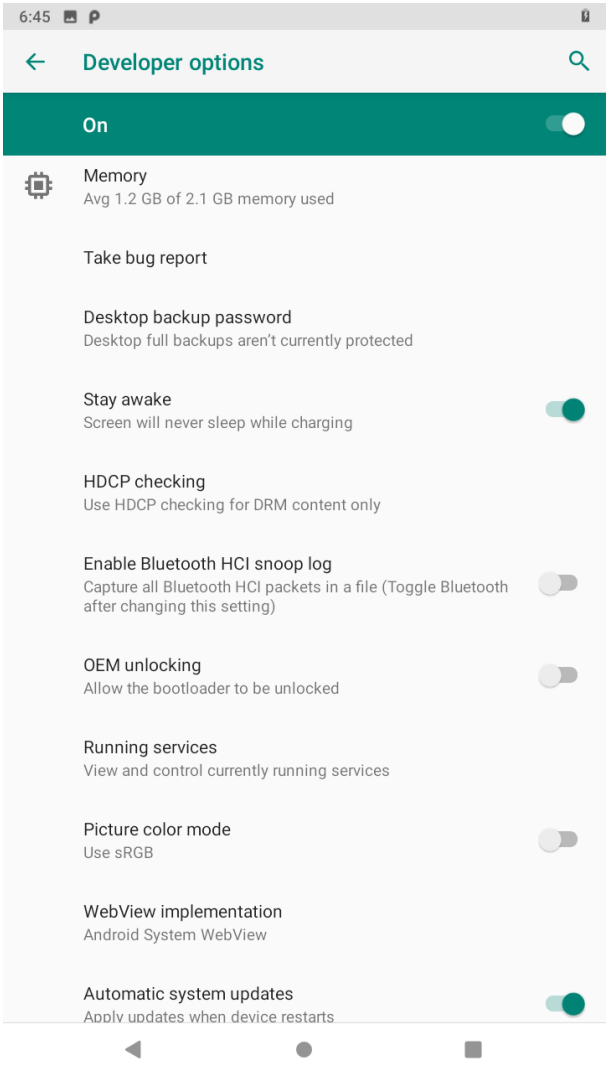


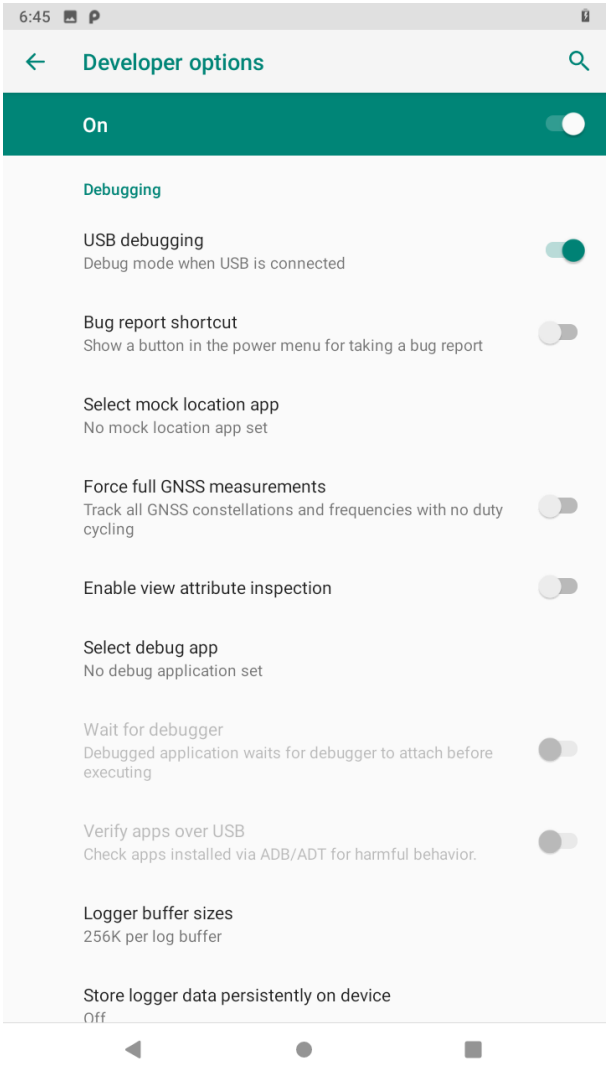


3.2.2 Common Important Options

Developers options include some important settings, while ordinary users may not need, but very important for developers, such as:

- Stay awake
- USB debugging
- Default USB configuration
- Input
- Drawing
- Apps





3.3 USB Debug

In Android development, we often use the USB debug mode to connect development board. There are many kinds of USB Debug applications on PC. Here we will with Android ADB and WIN7 as an example, to introduce how to use the USB debugging capabilities.

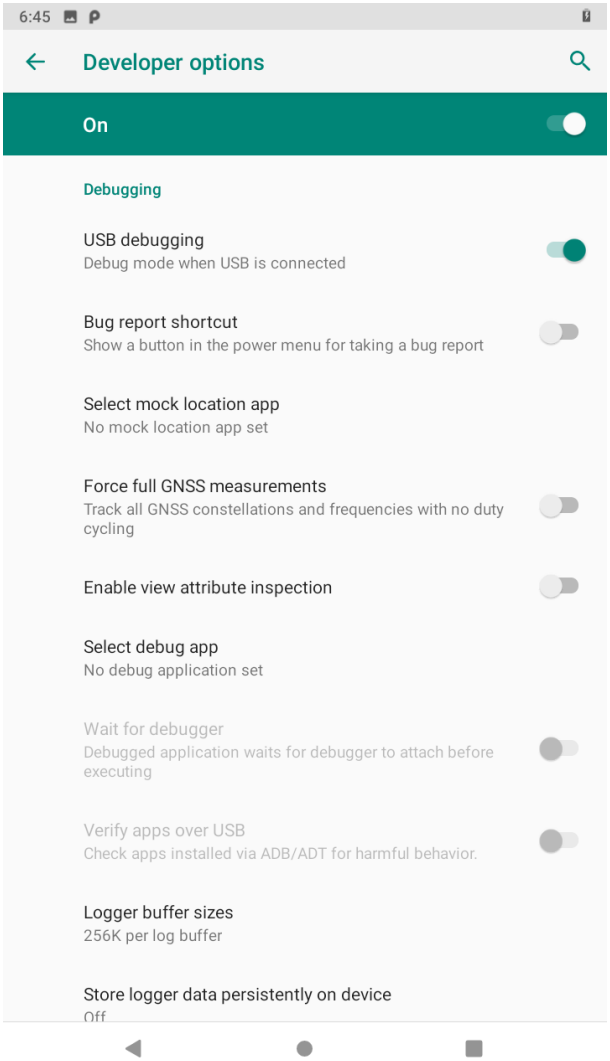
Download address: https://developer.android.com/studio/releases/platform-tools

Or download directly from: https://dl.google.com/android/repository/platform-tools-latest-windows.zip

Reference Usage: https://developer.android.com/studio/command-line/adb

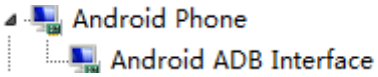
3.3.1 Enable USB Debugging

Enable USB Debugging in Developer options screen:



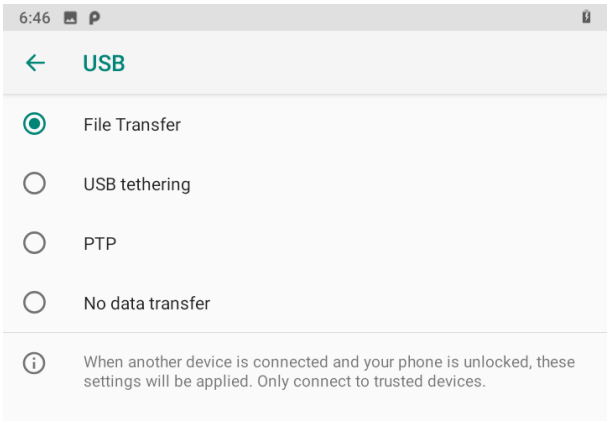
3.3.2 Connect to device

After system set up, connect USB0 (the lower one in USB interface J2) to PC, Windows will install the driver automatically, when done, you will find Android ADB Interface in device manager.



If the installation failed, operate the following:

1. Set the default USB connection to File Transfer in Developer options:



2. Windows will install the USB driver automatically. After that, you will find the following 2 devices in device manager.

3.3.3 Start and Connect ADB

Run command line tool in Windows, go to the path of adb tool, execute adb devices to know what device instances are connected to the adb server.

```
D:\work\platform-tools>adb devices
* daemon not running. starting it now on port 5037 *
* daemon started successfully *
List of devices attached
193aca09dab45d9e        device
```

3.3.4 Issuing ADB Commands

You can issue adb commands to the board. The usage is:

```
adb [-d | -e | -s serial_number] command
```

If there's only one device connected, the adb command is sent to that device by default. Otherwise, you need to use the -d, -e, or -s option to specify the target device to which the command should be directed. For example:

```
D:\work\platform-tools>adb -s 193aca09dab45d9e pull sdcard/ ./sdcard2
sdcard/: 5 files pulled, 0 skipped. 0.8 MB/s (464703 bytes in 0.565s)
```

This operation copies the sdcard folder from the device (serial number: 193aca09dab45d9e) to the develop machine, path of adb tool, sdcard2 folder.

3.3.5 Issue shell commands

You can use the shell command to issue device commands through adb, or to start an interactive shell. To issue a single command use the shell command like this:

```
adb shell shell_command
```

for example:

```
D:\work\platform-tools>adb shell df -h
Filesystem                Size    Used Avail Use% Mounted on
/dev/root                 1.6G    1.0G   613M   65% /
tmpfs                     993M    448K   993M    1% /dev
tmpfs                     993M       0   993M    0% /mnt
/dev/block/dm-1           244M     57M   182M   24% /vendor
/dev/block/mmcblk0p12 8.6G     86M   8.4G    1% /data
/data/media               8.6G     86M   8.4G    1% /storage/emulated
```

To start an interactive shell on a device:

```
adb shell
```

For example:

```
D:\work\platform-tools>adb shell
maaxboard_mini:/ $ su
su
maaxboard_mini:/ # ls
ls
acct            dev                 init.usb.rc          product
bin             etc                 init.zygote32.rc     res
bugreports      init                init.zygote64_32.rc  sbin
cache           init.environ.rc     lost+found           sdcard
charger         init.rc             mnt                  storage
```

```
config          init.recovery.freescale.emmc.rc odm                 sys
d               init.recovery.freescale.rc      oem                 system
data            init.recovery.freescale.sd.rc   postinstall         ueventd.rc
default.prop    init.usb.configfs.rc            proc                vendor
maaxboard_mini:/ #
```

To exit an interactive shell, press Control + D or type exit.

```
D:\work\platform-tools>adb shell
maaxboard_mini:/ $ ^D
D:\work\platform-tools>adb shell
maaxboard_mini:/ $ exit
```

3.3.6 Install an app

Execute commands:

```
adb install path_to_apk
```

For example:

```
D:\work\platform-tools>adb install D:\work\apk\com.shenyaocn.android.usbcamera.apk
Performing Streamed Install
Success
```

3.3.7 Uninstall an app

1. Check the installed apps

```
adb shell pm list packages
```

For example:

```
D:\work\platform-tools>adb shell pm list packages
package:com.android.cts.priv.ctsshim
package:com.android.internal.display.cutout.emulation.corner
package:com.example.android.livecubes
package:com.android.internal.display.cutout.emulation.double
package:com.android.providers.telephony
package:com.android.providers.calendar
......
package:com.shenyaocn.android.usbcamera
```

2. Uninstall the app

Execute commands:

```
adb uninstall package name
```

For example:

Search the package name for the app in above result, such as com.shenyaocn.android.usbcamera:

```
D:\work\platform-tools>adb uninstall com.shenyaocn.android.usbcamera
Success
```

3.3.8 Copy files to/from a device

Use the pull and push commands to copy files to and from a device.

To copy a file or directory and its sub-directories from the device, execute the command: adb pull remote local, for example:

```
D:\work\platform-tools>adb -s pull sdcard/ ./sdcard2
sdcard/: 5 files pulled, 0 skipped. 0.8 MB/s (464703 bytes in 0.565s)
```

To copy a file or directory and its sub-directories to the device, execute the command: adb push local remote, for example:

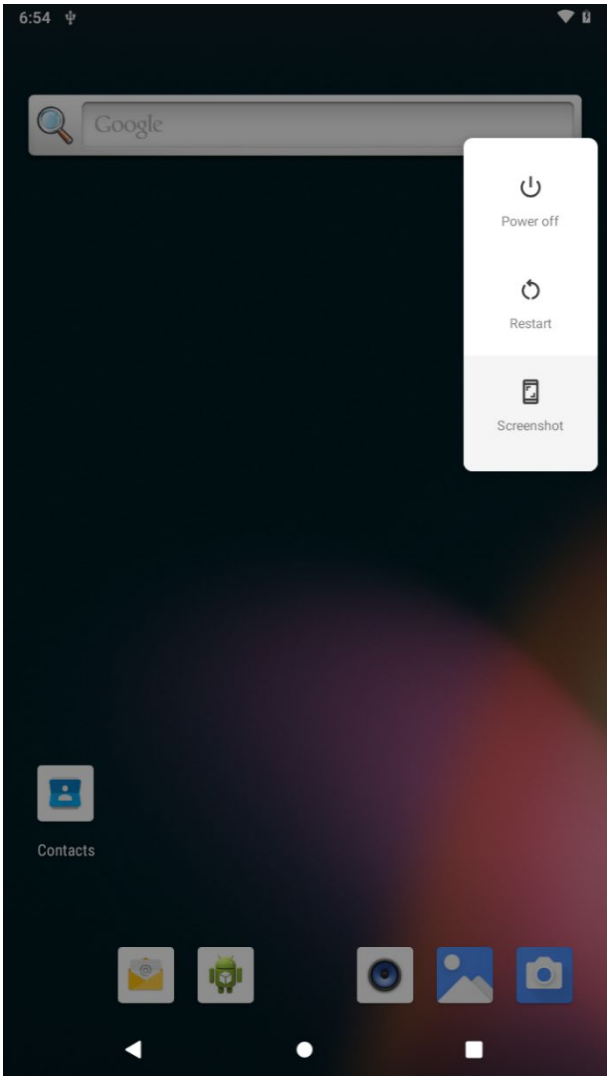
```
D:\work\platform-tools>adb push D:\work\apk\com.shenyaocn.android.usbcamera.apk /sdcard
D:\work\apk\com.shenyaocn.android.usbcamera.apk: 1 file pushed, 0 skipped. 0.3 MB/s (21895207 bytes in 61.445s)
```

3.4 Button

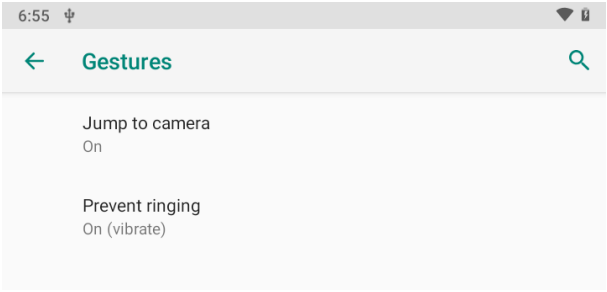
MaaXBoard Mini support 3 physical buttons: BACK, HOME and PWR.

3.4.1 PWR

1. Short press PWR button, system will enter sleep mode, press PWR again, the system will resume from sleep mode.
2. Long press PWR, it will prompt 3 option on the right side of screen, “Power off”, “Restart”, and “Screenshot”.



3. In screen “Settings” -> “System” -> “Gestures”, enable option “Jump to camera”, then you can open the system application: “Camera” quickly by press PWR twice.



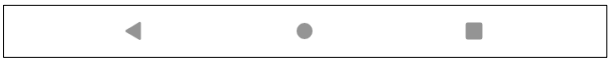
3.4.2 BACK & HOME

HOME: Back to HOME page

BACK: Back to last screen

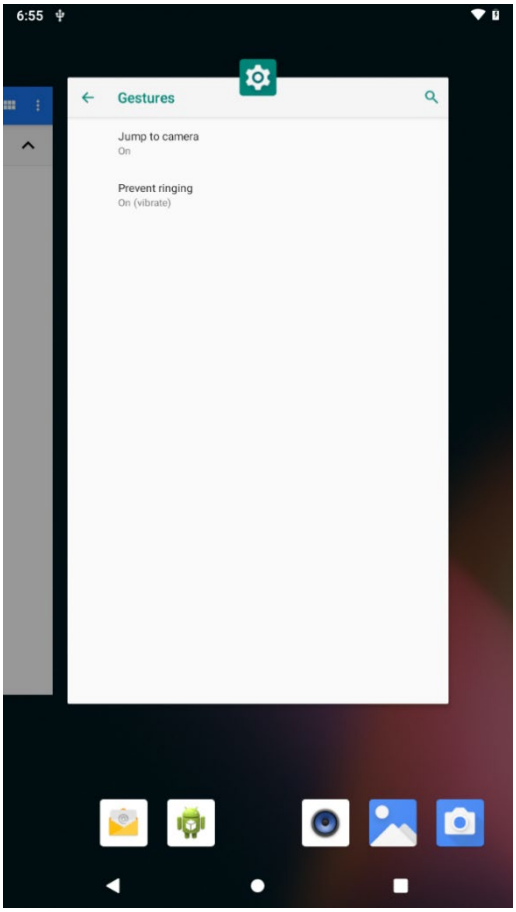
3.4.3 Virtual Button

In the bottom of the screen, there are three virtual buttons, in turn, “BACK” “HOME” “TASK”.



The function of BACK and HOME is the same with psychical button.

Tap TASK button to open recent task list, the you can switch to or clear all running applications.



3.5 Display

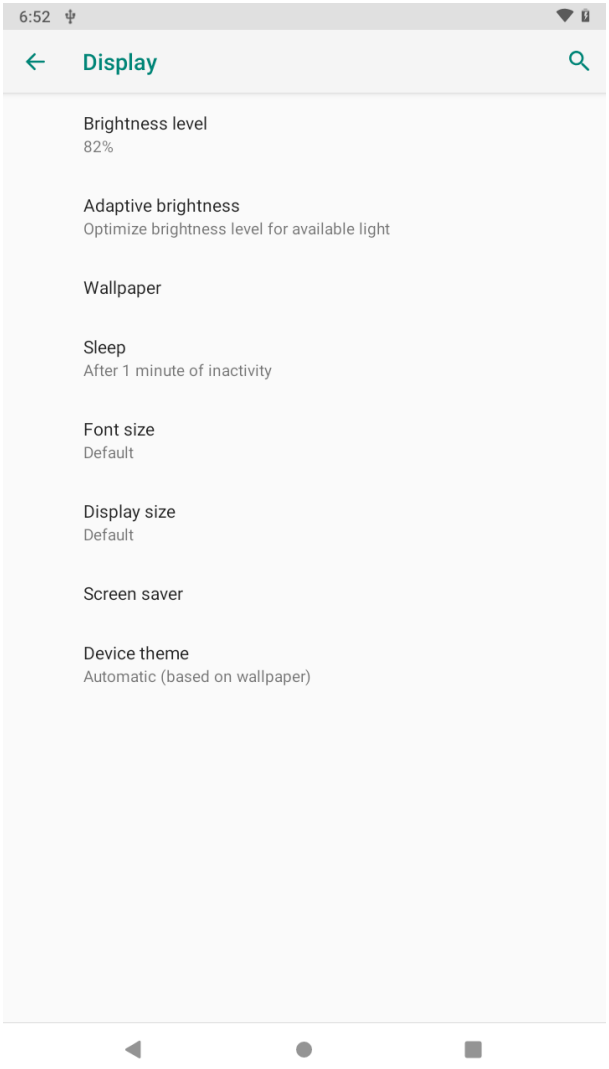
3.5.1 Displayer

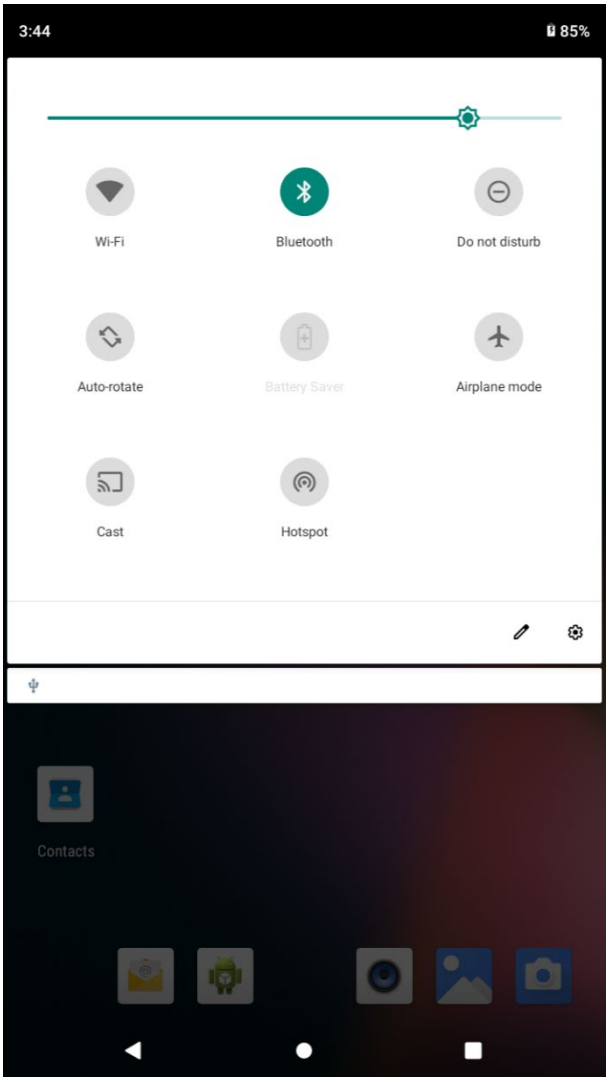
MaaXBoard Mini Android system supports MIPI-DSI screen. Users can connect the screen to J7 on MaaXBoard Mini, select corresponding system image before boot up the system.

MIPI-DSI screen is portrait screen, the resolution is 720P. It supports touch screen and backlight brightness adjustment.

3.5.2 Display Settings

Go to “Settings” -> “Display” to configure displayer. In this screen, user could adjust Brightness level, Sleep, Font size, Display size, Screen saver, etc. You can also adjust brightness level by slide down from the top of screen.

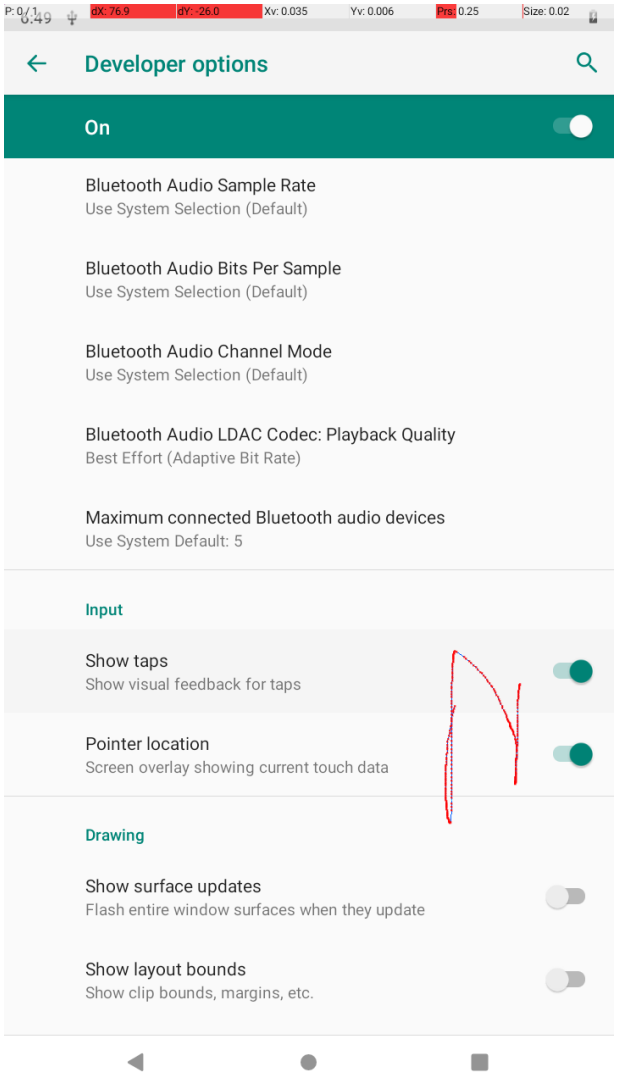




3.6 Touch Screen

MIPI-DSI screen support multi-touch function, tap the screen to operate the system.

- In Developer options screen, enable “Show taps” to display taps when you touch the screen. A circle appears under your finger or stylus and follows you as you move around the screen.
- Enable “Pointer Location” to show the pointer (tap) location on the device with cross-hairs. A bar appears across the top of the screen to track the cross-hair coordinates. As you move the pointer, the coordinates in the bar track the cross-hair location and the pointer path draws on the screen.



3.7 Audio

3.7.1 Audio Devices

MaaXBoard Mini support USB Audio and Bluetooth audio.

3.7.1.1 USB AUDIO DEVICE

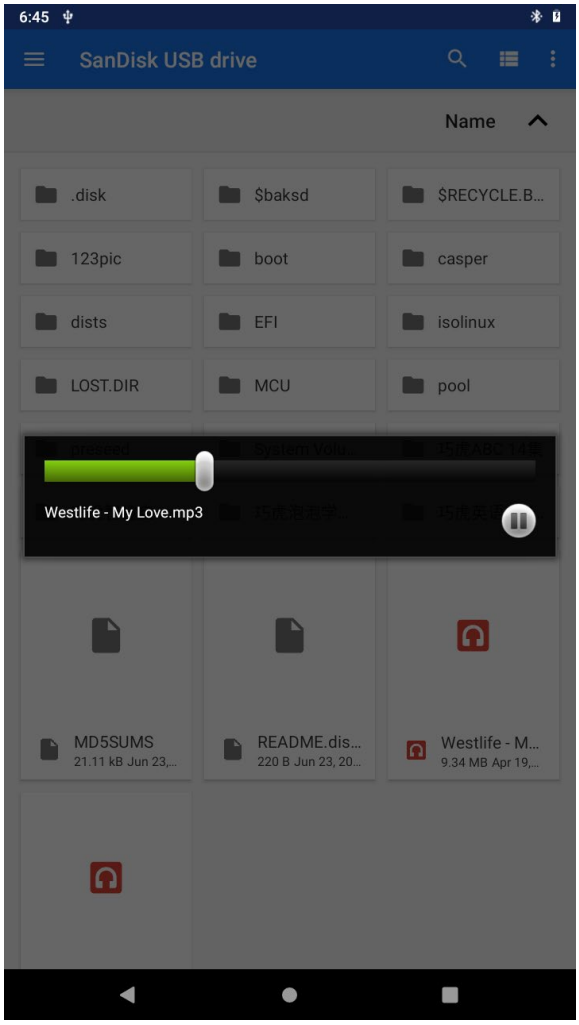
MaaXBoard Mini could support USB audio device (which do not need specified driver) to play audio. Connect USB audio device to USB 1~3, you can play audio from USB audio device.

3.7.1.2 BLUETOOTH AUDIO

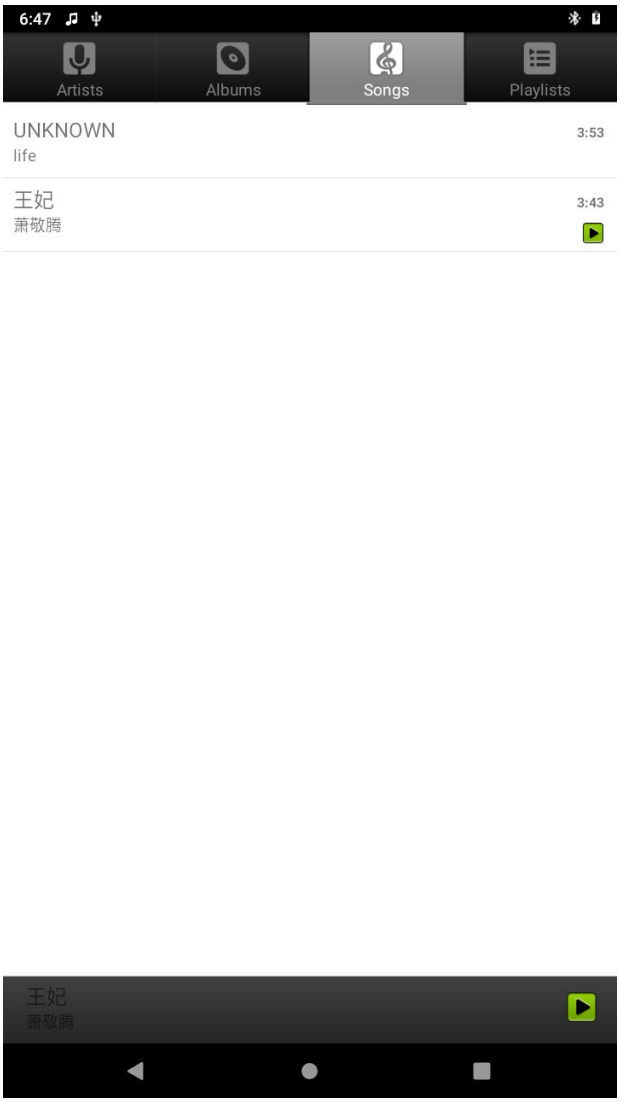
MaaXBoard Mini also support play audio files via the Bluetooth audio device such as Bluetooth headset and speaker. To connect the Bluetooth device, refer to Bluetooth 5.0.

3.7.2 Play Audio

Copy wav or mp3 files to a U-disk, connect it to USB1, then open “Settings” -> “Storage” -> “SanDisk USB drive”, double click the audio file to play it.

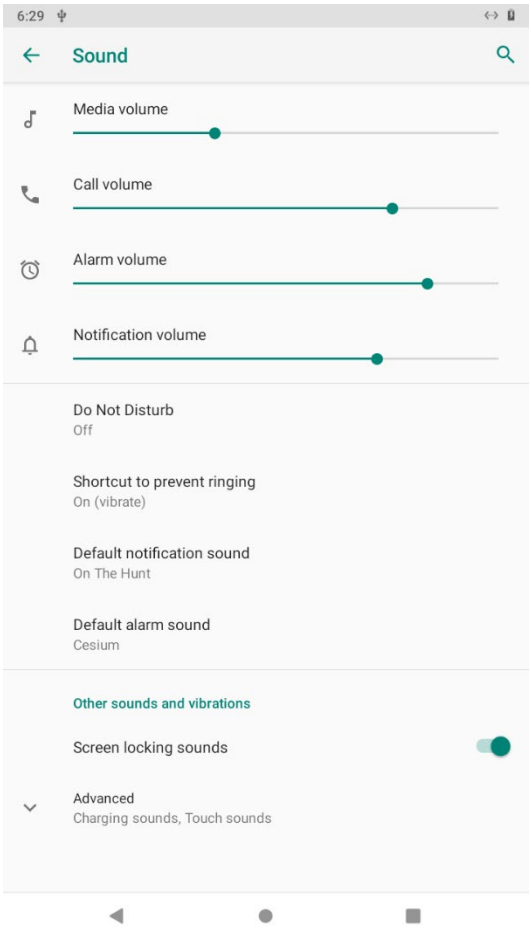


You can also copy the audio file to the Music folder of Android internal storage, open “Music” application to play the music.



3.7.3 Volume Adjustment

Go to “Settings” -> “Sound”, drag the volume bar to adjust it.



3.8 Camera

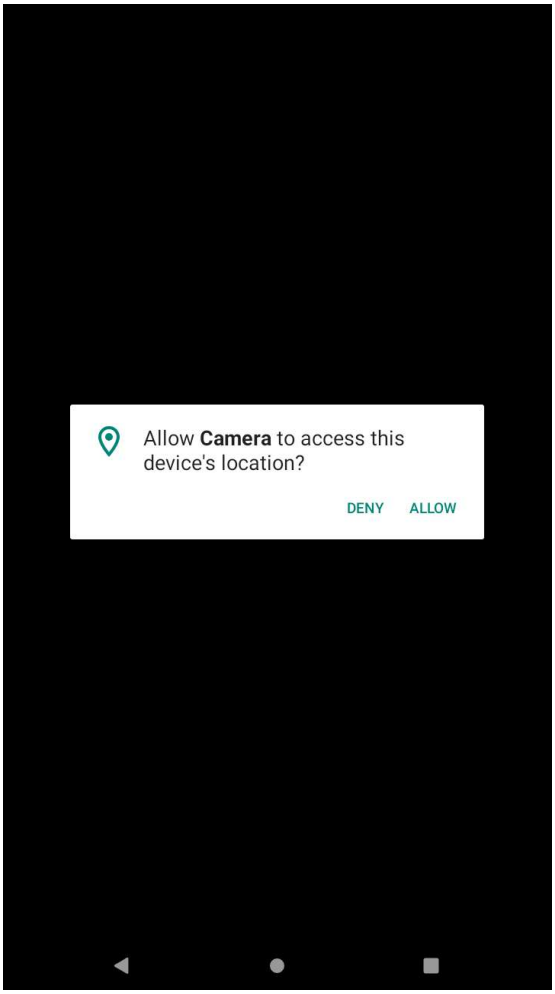
MaaXBoard Mini support USB Camera and MIPI-CSI Camera.

3.8.1 MIPI-Camera

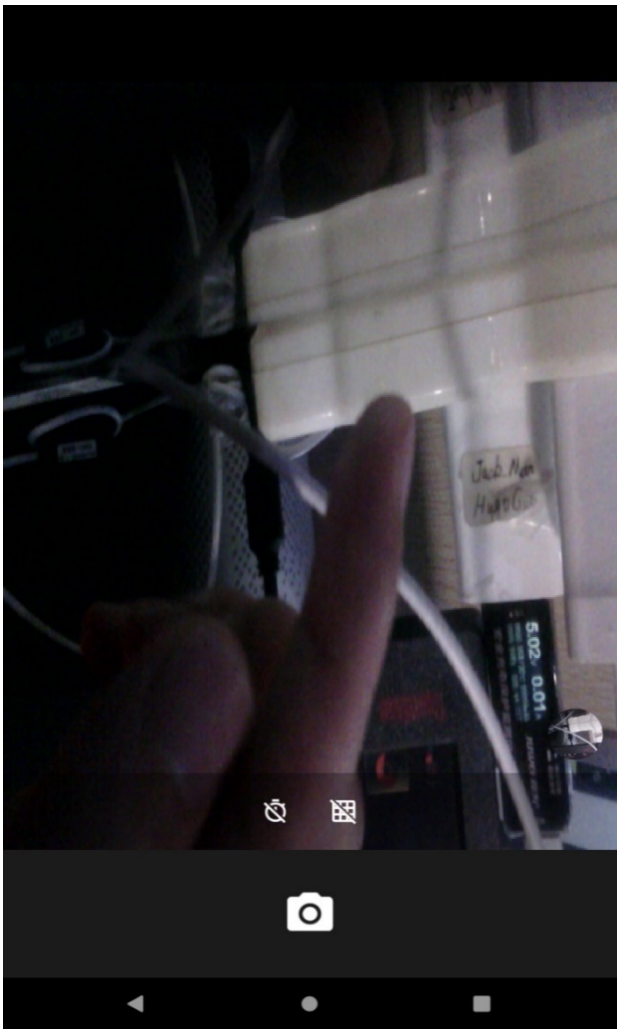
Connect the Camera module to J3 before system boot up. The Android system provide a Camera application, which could be used with MIPI Camera to catch photos.

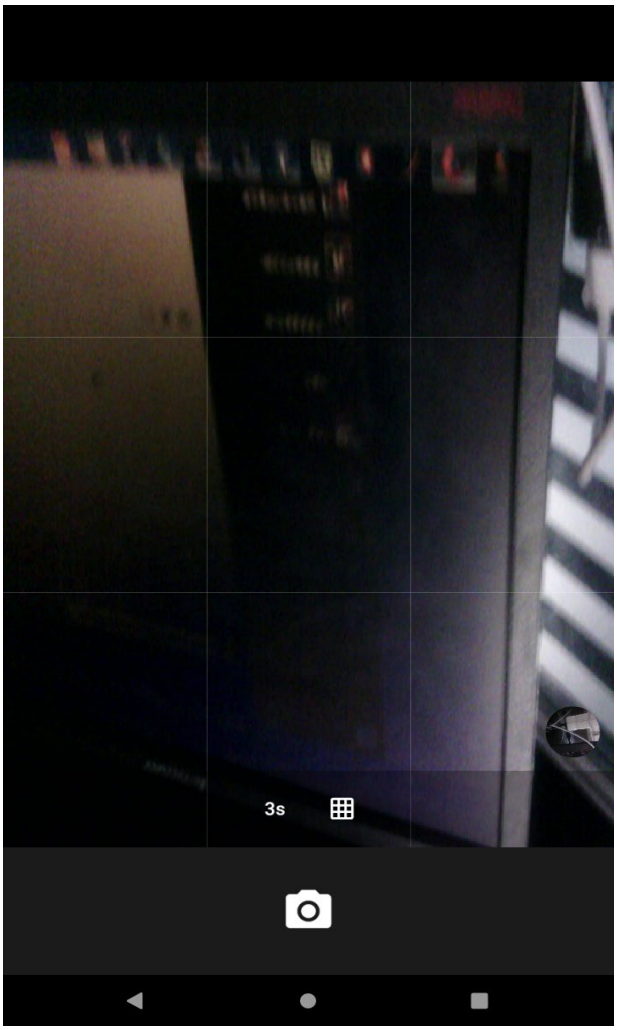
3.8.1.1 PREVIEW AND CATCH PHOTOS

1. Open the Camera APP, choose “Allow” in the Pop-up windows, then come into the UI of preview.
2. Click catch key to catch a photo.



3. Click the option button in the lower right corner to use the delay-catch mode and show gridlines in preview pictures.





4. The path of the photos: /sdcard/DCIM/Camera

3.8.1.2 RECORD VIDEO (TBD)

In current version, the Audio input device is not supported yet, so MIPI camera could not record video.

3.8.2 USB Camera

Connect USB Camera to any USB interface except USB0 after system start up.

If you connect the MIPI Camera and USB Camera to one board, open the default Camera APP, the USB Camera is used as Secondary Camera. You could switch to the USB Camera in the “Camera” APP.

As the default Camera APP of Android system could not support USB camera independently, we suggest to use another USB Camera APP, you should install it at the first. The reference link as below:

Refer link: http://app.mi.com/details?id=com.shenyaocn.android.usbcamera

Open that APP, it could preview, catch a photo and record video.

3.9 ETH

Connect the network cable to J8, after connecting the network cable, MaaXBoard Mini will automatically obtain the IP by default. You can use the **ifconfig** command to view the IP information and use the following command to perform the network test:

```
maaxboard_mini:/ $ su
maaxboard_mini:/ # ifconfig
eth0      Link encap:Ethernet  HWaddr ba:28:85:8e:5f:61  Driver fec
          inet addr:192.168.22.164  Bcast:192.168.22.255  Mask:255.255.255.0
          inet6 addr: fe80::c0bd:771:629f:8c78/64 Scope: Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:10 errors:0 dropped:0 overruns:0 frame:0
          TX packets:15 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1407 TX bytes:1723
lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope: Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 TX bytes:0
maaxboard_mini:/ # ping www.bing.com
PING cn-0001.cn-msedge.net (202.89.233.100) 56(84) bytes of data.
64 bytes from 202.89.233.100: icmp_seq=1 ttl=118 time=22.0 ms
64 bytes from 202.89.233.100: icmp_seq=2 ttl=118 time=23.7 ms
^C
--- cn-0001.cn-msedge.net ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 22.075/22.922/23.769/0.847 ms
```

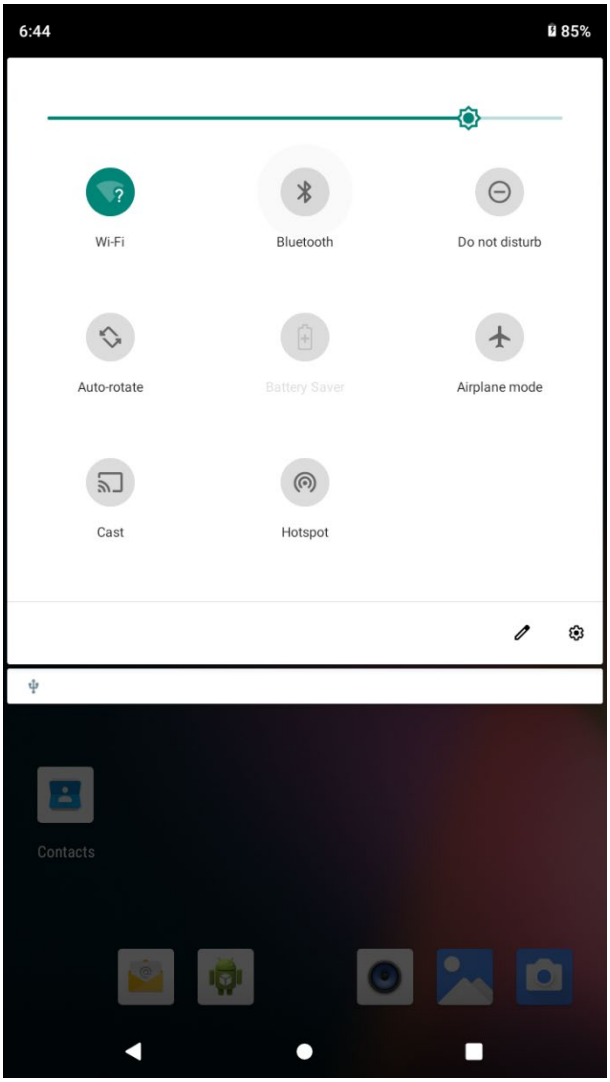
You could also use the “WebView Browser Tester” APP to browse website. Input the address in the address bar.

3.10 Wi-Fi

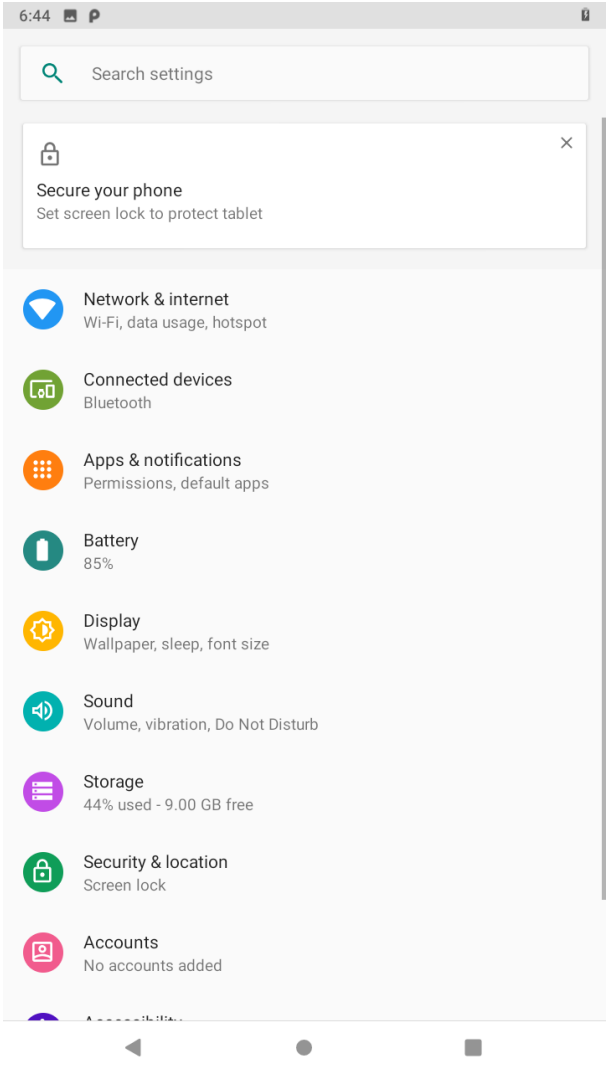
The on-board Wi-Fi module support 2.4G/5G network and hotspot.

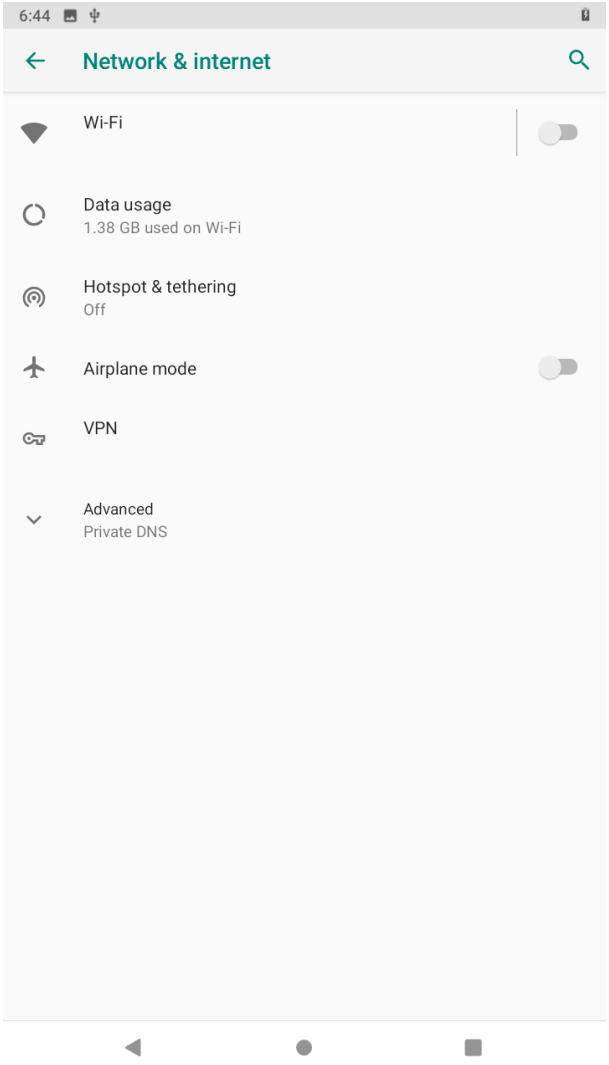
3.10.1 Enable and Disable Wi-Fi

There are 2 kinds of way to enable and disable the Wi-Fi, the first one is to click the Wi-Fi icon in the system drop-down box



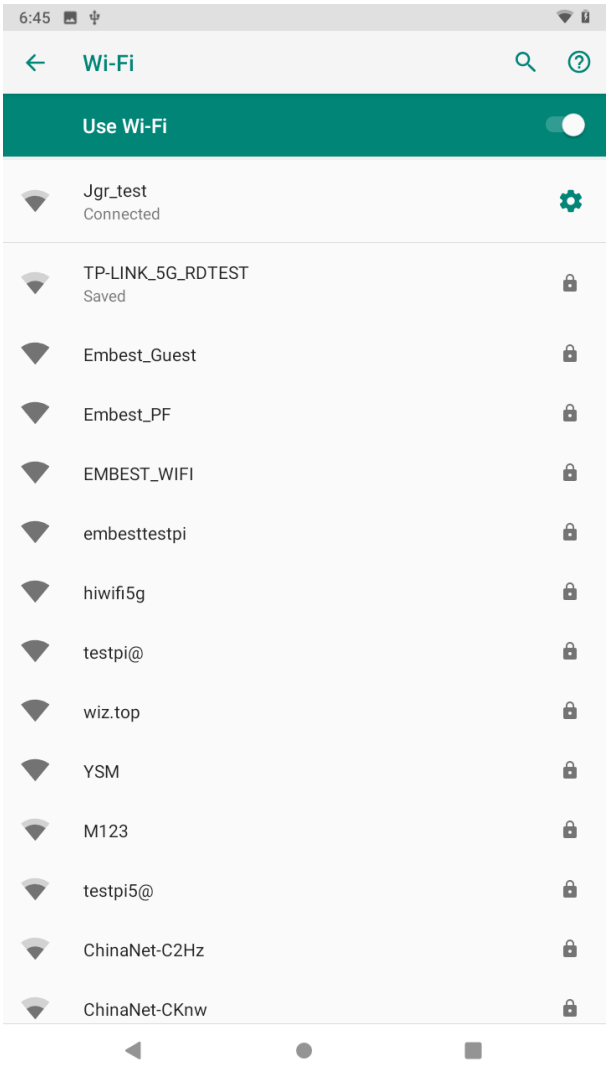
You also could open the Wi-Fi at Settings APP, steps as below:

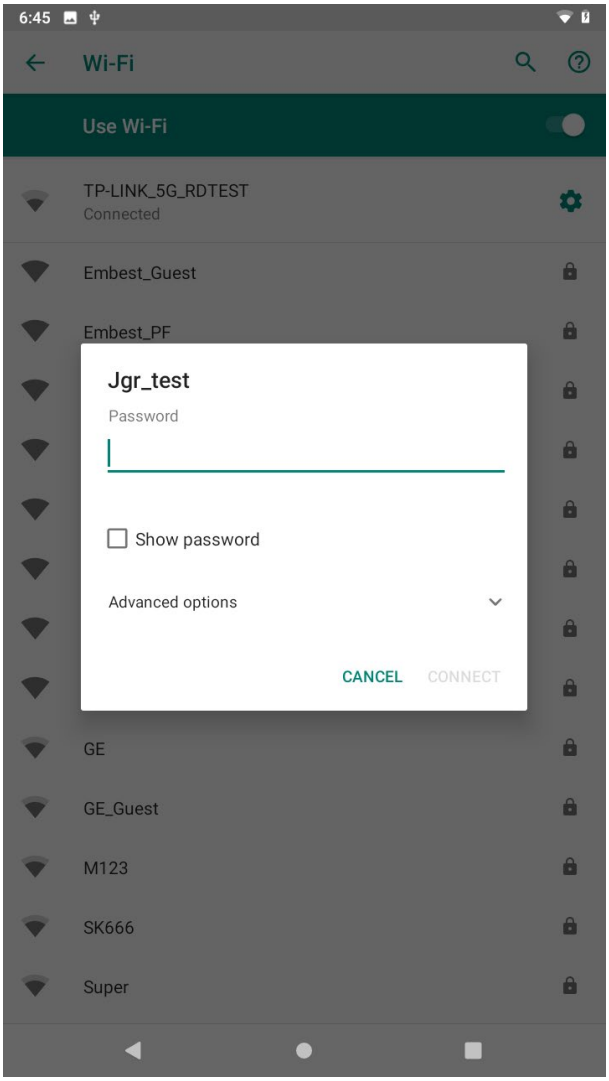




3.10.2 Connect the Wi-Fi Network

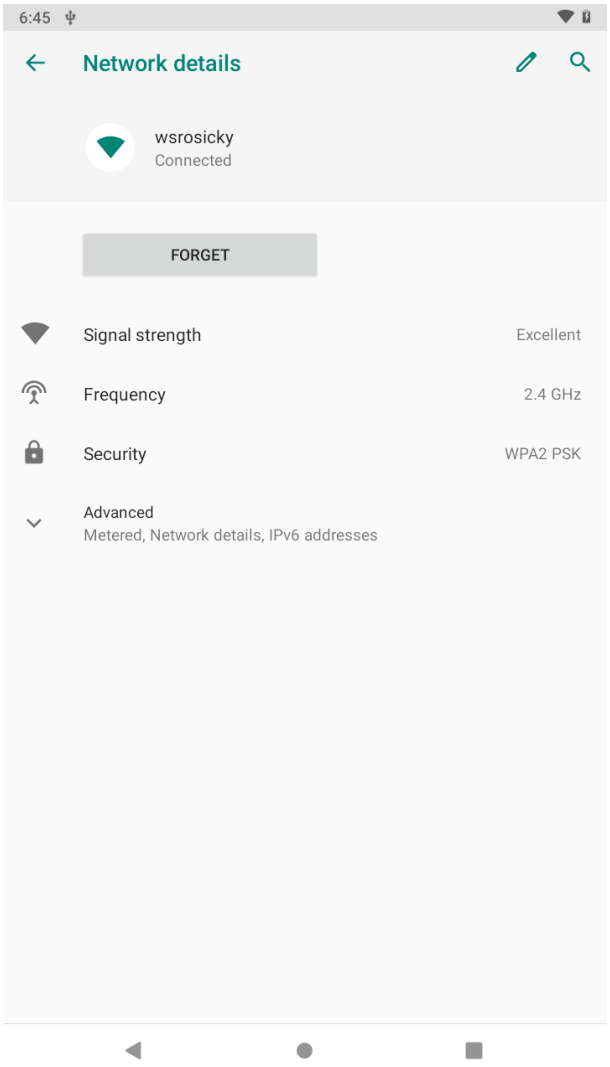
Click the Wi-Fi, enable “Use Wi-Fi”, it could auto scan the available Wi-Fi networks, click the network you want to connect and input the password, then you could using the Wi-Fi network.





3.10.3 Delete the network

Click the network details, and click the FORGET key.

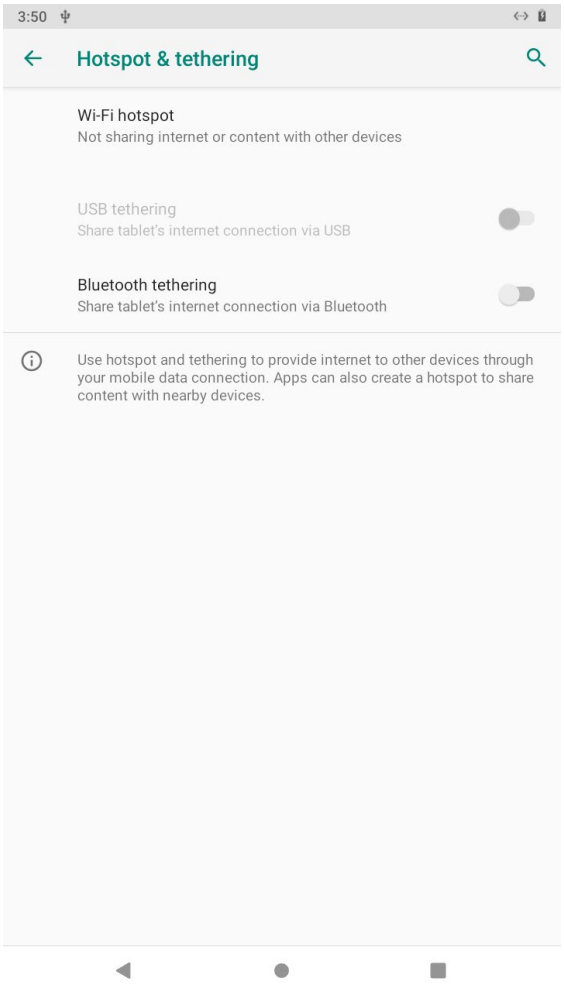


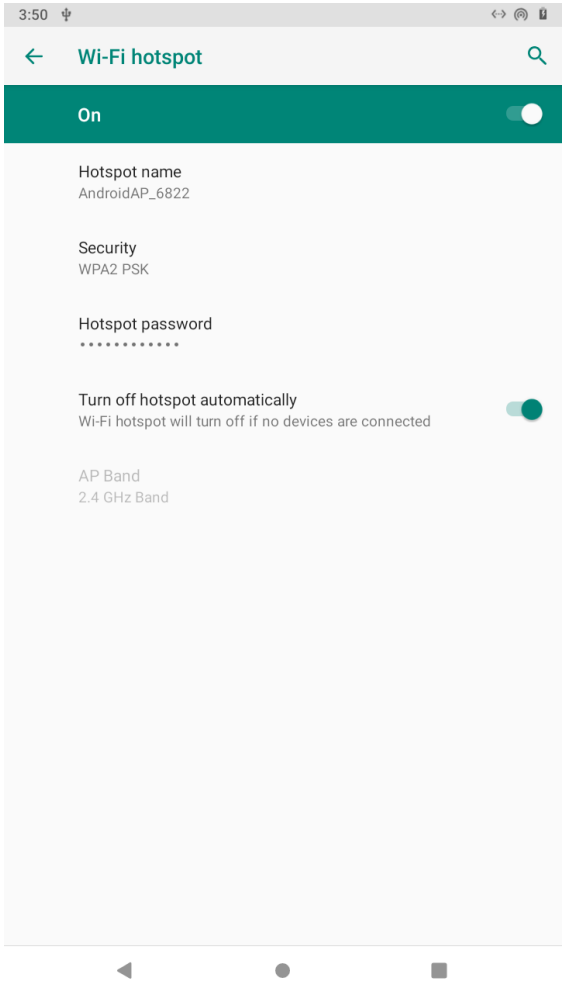
3.10.4 Wi-Fi Hotspot

Before using the Hotspot, you must disconnect the Wi-Fi, and connect the cable to the Ethernet interface. Then start the Settings APP and click into the “Network & internet” to start the configuration of Wi-Fi Hotspot

1. Enable the Hotspot

Click the Hotspot & tethering into the Hotspot configuration. Then click into the Wi-Fi hotspot and slide the enable key to “On”, the Wi-Fi hotspot is enabled.





2. Disable the Hotspot

Slide the enable key to “Off”, and the Wi-Fi Hotspot would be disable。

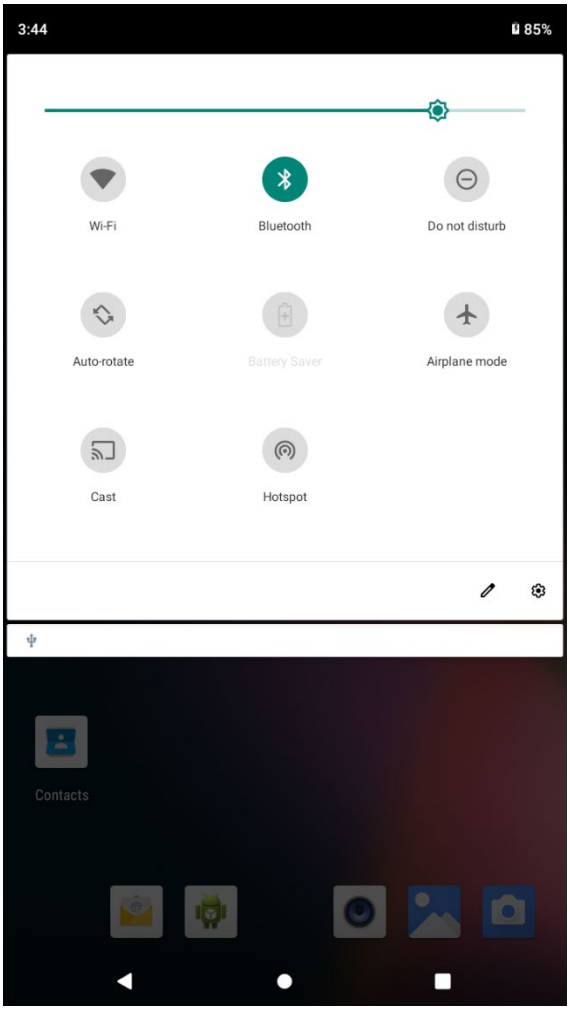
3. The configuration parameter

Setup the Hostname，Security and Hotspot Password as SSID，Security Mode and Password in proper sequence。

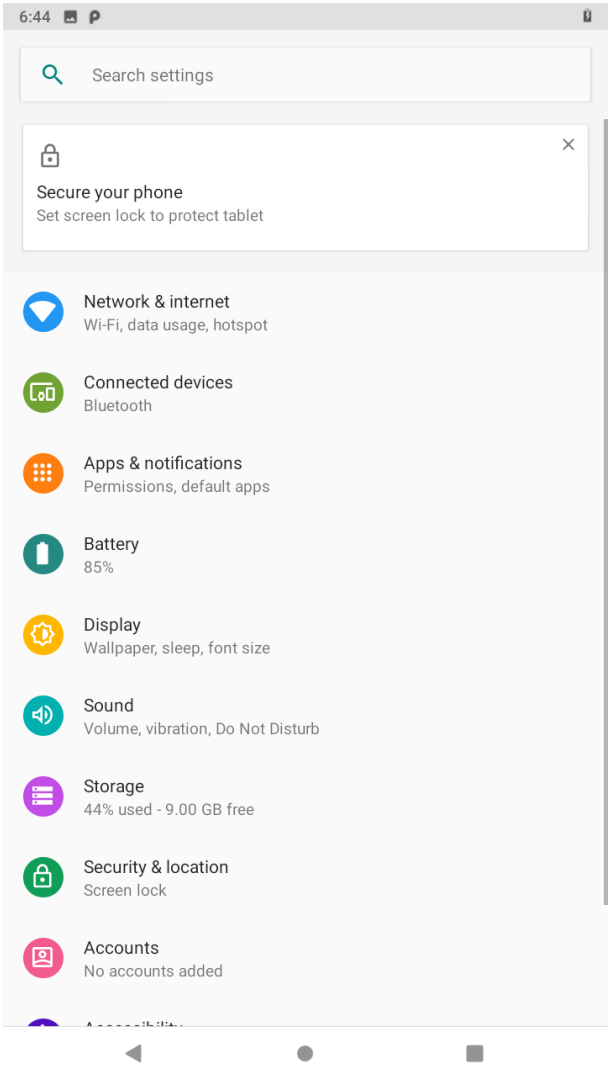
3.11 Bluetooth 4.2

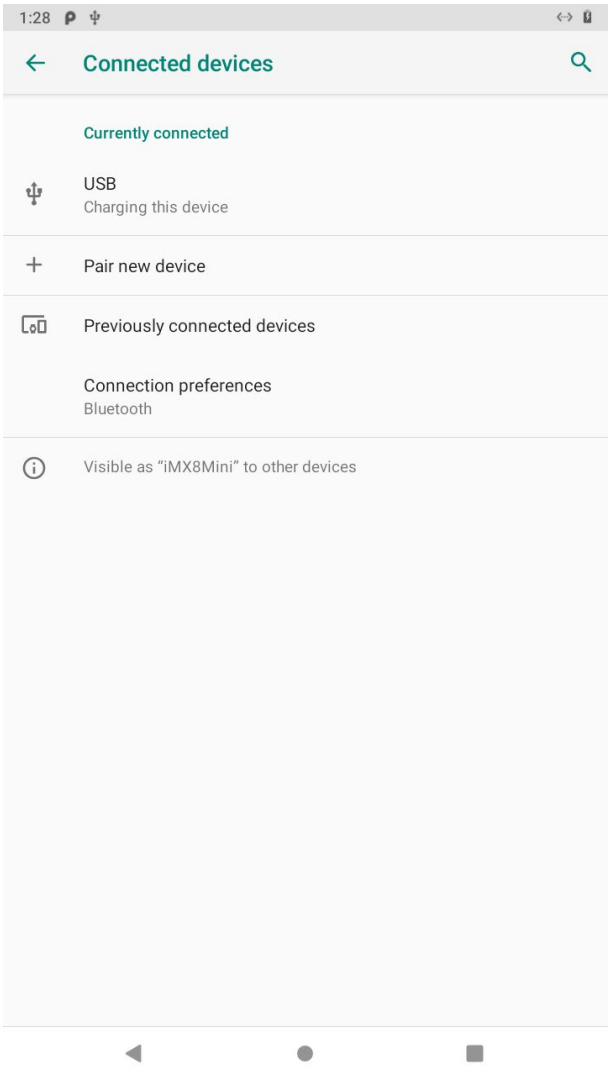
3.11.1 Start Bluetooth

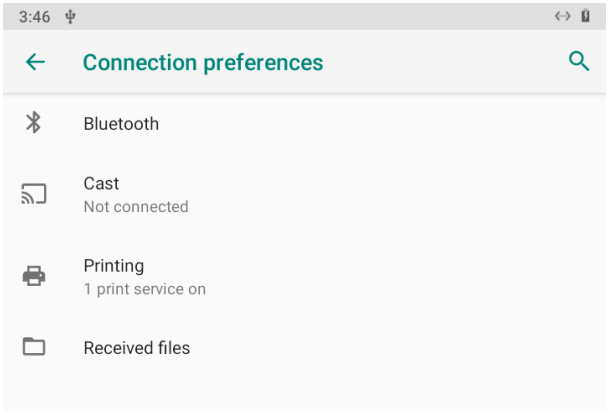
There is 2 ways to open the Bluetooth, first way is the Bluetooth icon of the system drop-down box

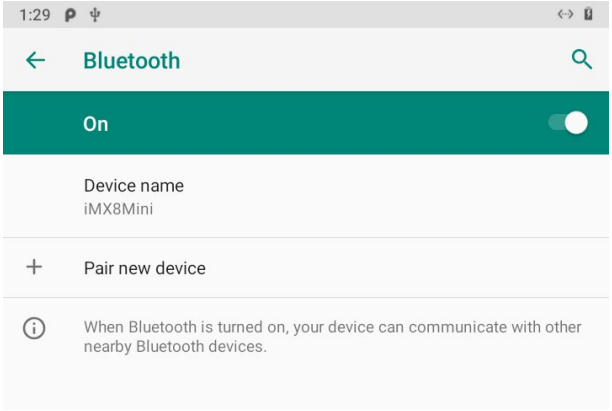


1. Another way is using Settings APP, start the APP , go to the Connected Device , Connection preferences in proper sequence and slide the key to “ON”, then the Bluetooth is enabled.



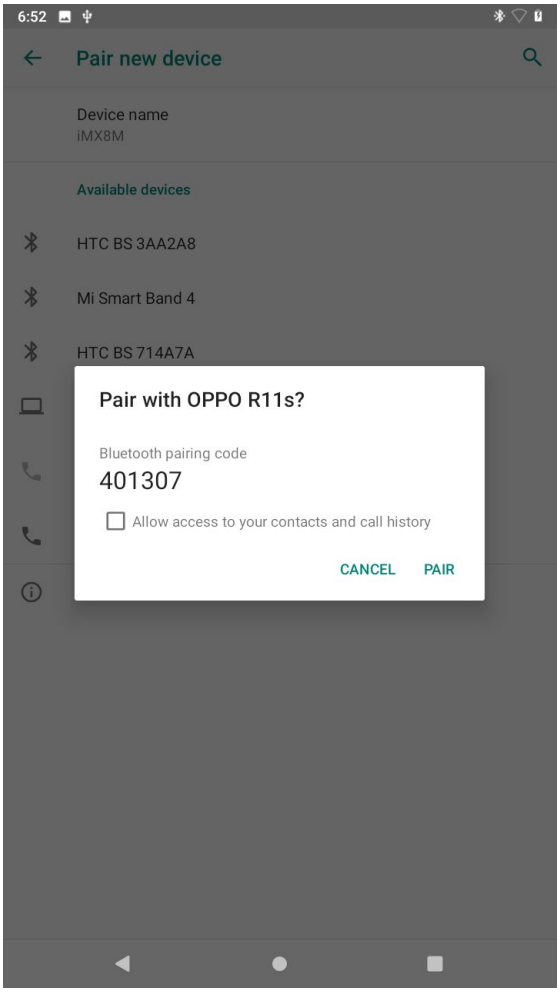






3.11.2 Scan and Connect the Bluetooth Devices

Click the Pair new device, system could scan the Bluetooth device, click the device you want connect in the available devices list. The board support the Bluetooth earphone, sound box and mobile phone



3.12 LED

User can control the 2 single color LED indicators, LED0 and LED1 (corresponding to usr_led and sys_led) on MaaXBoard Mini Board. Execute the following instructions in terminal to control them. Users could also write their own applications to control the LED.

Light out LED:

```
maaxboard_mini:/ # echo 0 | tee /sys/class/leds/usr_led/brightness
maaxboard_mini:/ # echo 0 | tee /sys/class/leds/sys_led/brightness
```

Light up LED:

```
maaxboard_mini:/ # echo 1 | tee /sys/class/leds/usr_led/brightness
maaxboard_mini:/ # echo 1 | tee /sys/class/leds/sys_led/brightness
```

3.13 UART

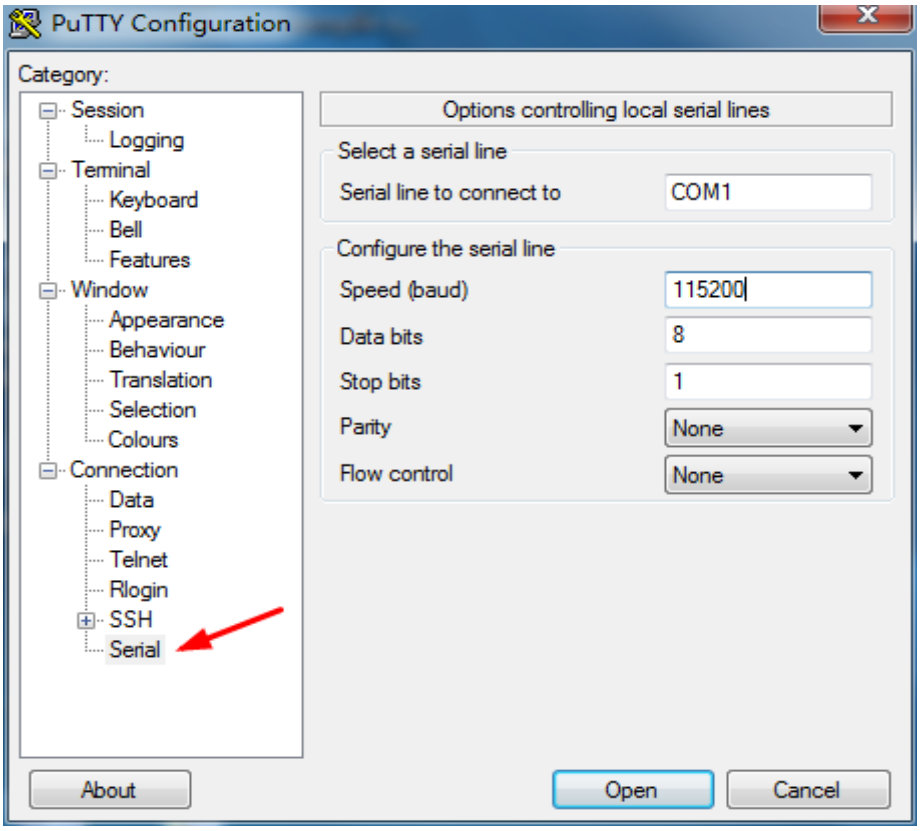
MaaXBoard Mini supports 2 UART interface.

MaaXBoard Mini (CPU)	Interface Type
UART1	UART TTL (Debug Interface)
UART2	UART TTL

3.13.1 UART1

UART1 is the default debug interface for Android OS, which can be used to login the shell environment of MaaXBoard Mini. Connection methods:

1. Connect the debug interface to PC with USB to TTL converter. Pin 6, 8 and 10 of J1 to the GND, RXD and TXD pin of the USB to TTL converter.
2. Install the Serial Communication software (e.g. PUTTY), select the corresponding port number, baudrate as 115200, data bits as 8, stop bits as 1, parity as none.



3. In default, you are login with ordinary account permission, if you need permission for root, type su command:

```
MaaxBoard_mini:/ $ ls sdcard
ls: sdcard: Permission denied
1|MaaxBoard_mini:/ $ su
MaaxBoard_mini:/ # ls sdcard
Alarms Download Music              Pictures Ringtones
DCIM     Movies     Notifications Podcasts
```

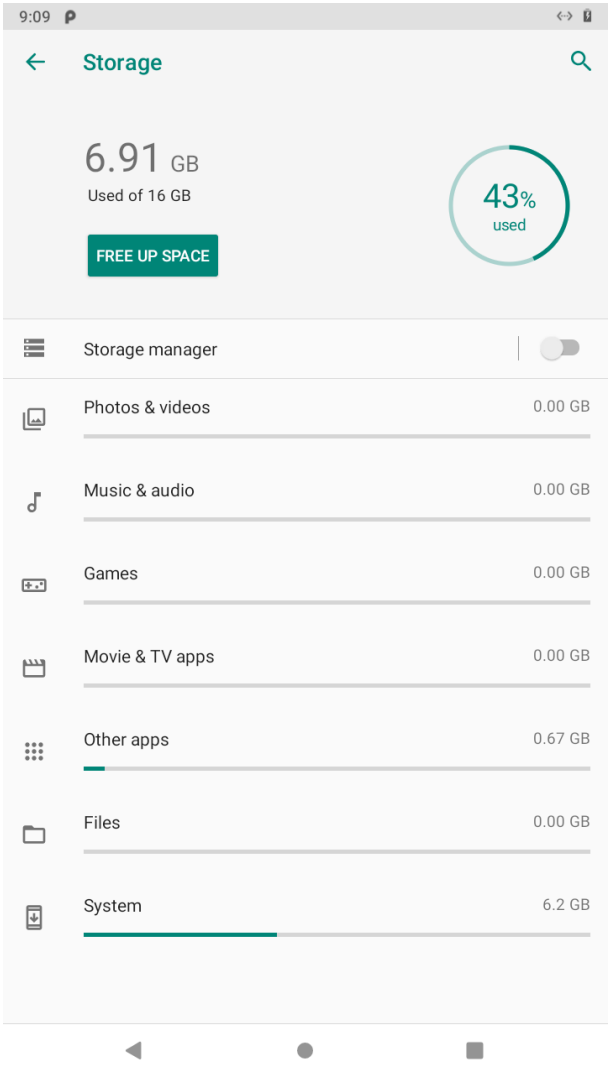
3.13.2 UART2

In the Android system, the node for UART2 is /dev/ttymxc1. Users could also write their own applications to control it.

3.14 Storage

The system image size is 16GB, to query storage amount, go to “Settings” -> “Storage”.

In this screen, you can also “FREE UP SPACE” or use “Storage manger” to manage storage.



If you need to write or read files from the storage, use Files app.

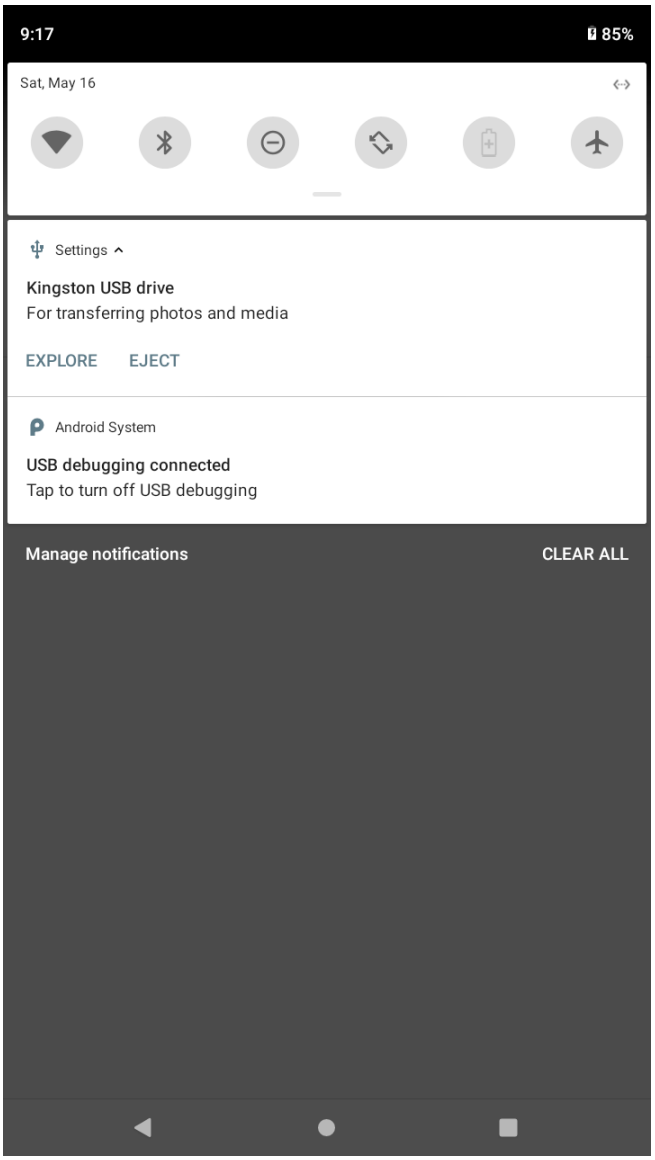
3.15 USB 2.0 Interface

There are 4 USB 2.0 interface on MaaXBoard Mini, the lower one in J2 is USB0.USB 0 support USB Device function. The other 3 USB interface support USB HOST function.

3.15.1 USB Host

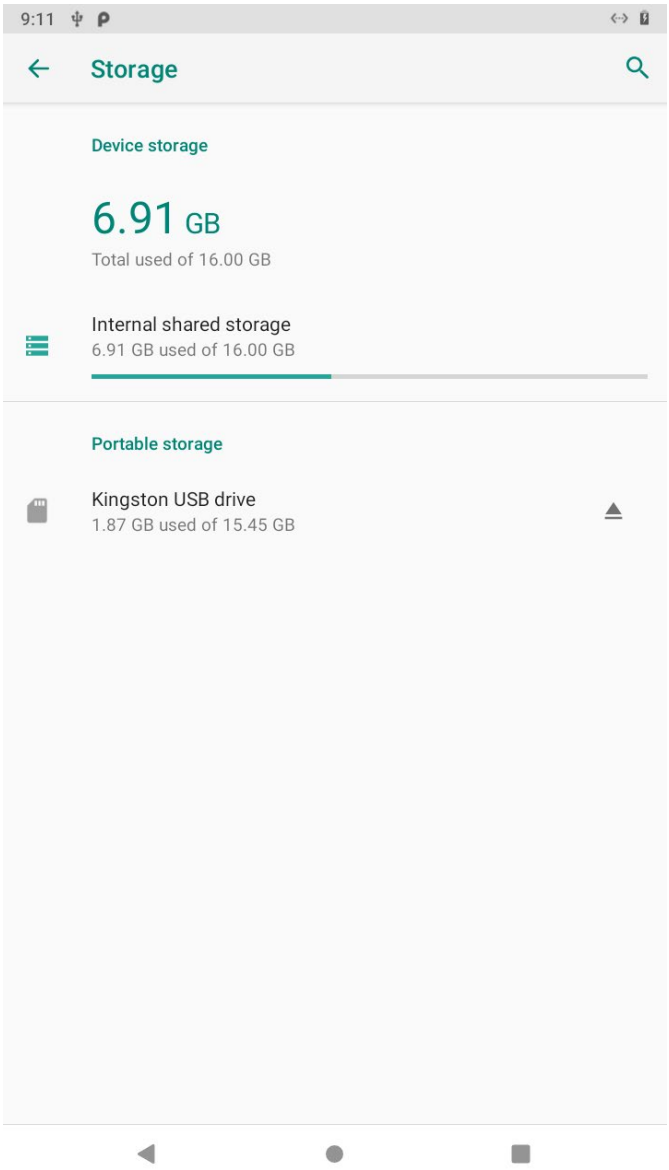
USB Host Interface (USB 1~3) supports USB device such as USB HUB, U disk, USB Camera, key board, mouse, etc.

Insert a U-disk to USB1, system will mount the storage device automatically. In drop-down list, it will display as follows:



Users could open U disk to explore the files or eject the U-disk.

In “Settings” -> “Storage” screen, you will find portable storage



In this screen, click device name to open the U disk, eject or mount the device.

3.15.2 USB Device

USB0 support USB Device function could be used to burn the system image, USB debug or transfer files. For USB debug guide, refer to USB Debug.

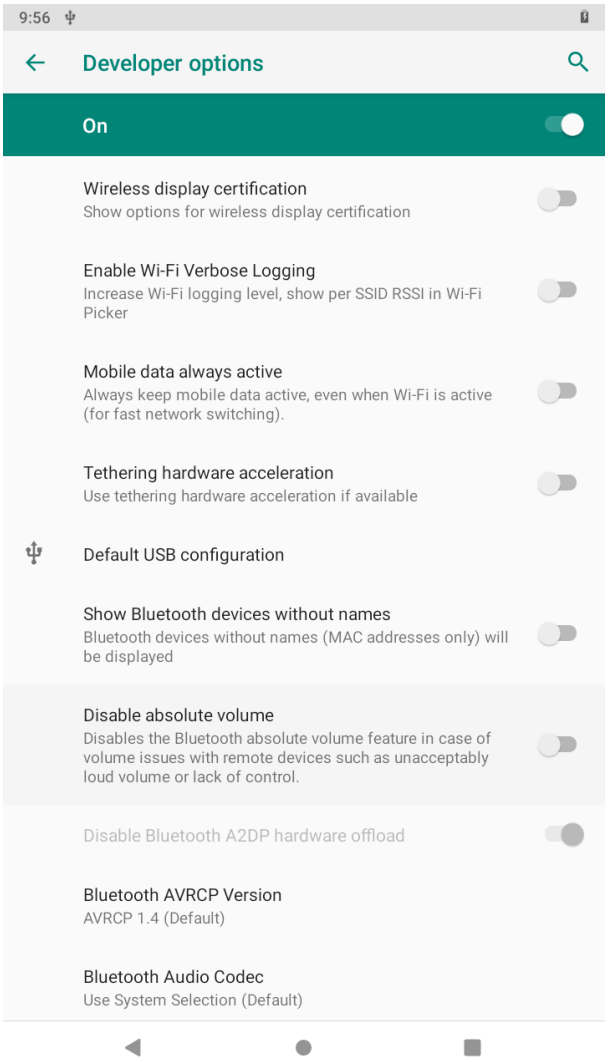
Note: Connect USB0 and PC after the system start up.

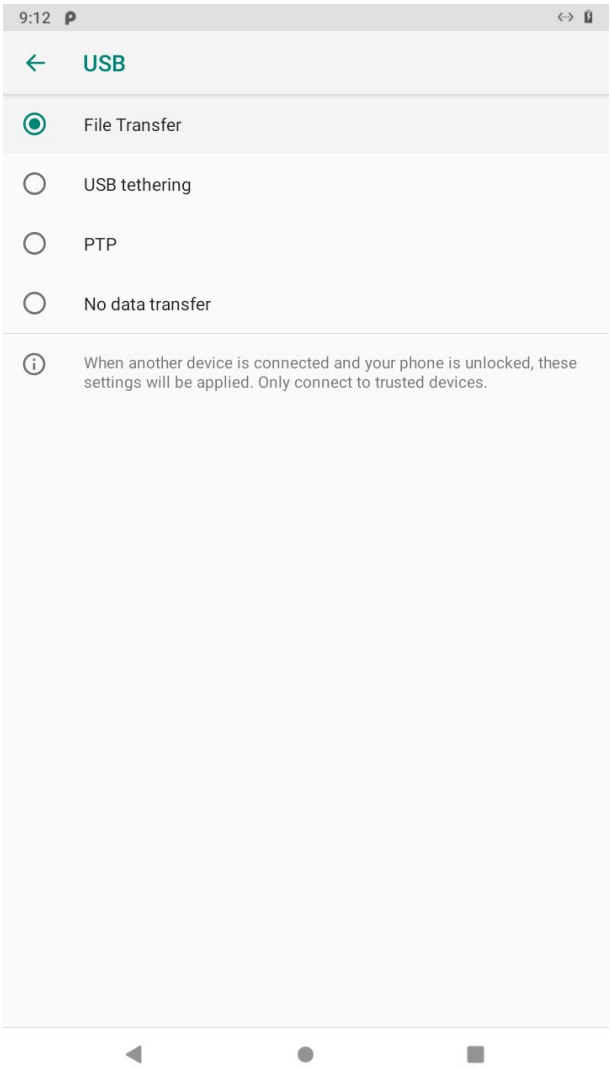
3.15.2.1 BURNING MODE

Connect USB0 and PC before power on the board. The system will not boot normally, it will enter burning mode. Then users could burn the system image to the development board using uuu tools. For the detail information, refer to MaaXBoard Mini UUU burning Guide.

3.15.2.2 TRANSFER FILES

Start up the system, then connect USB0 and PC, open default USB configuration option in Developer options.

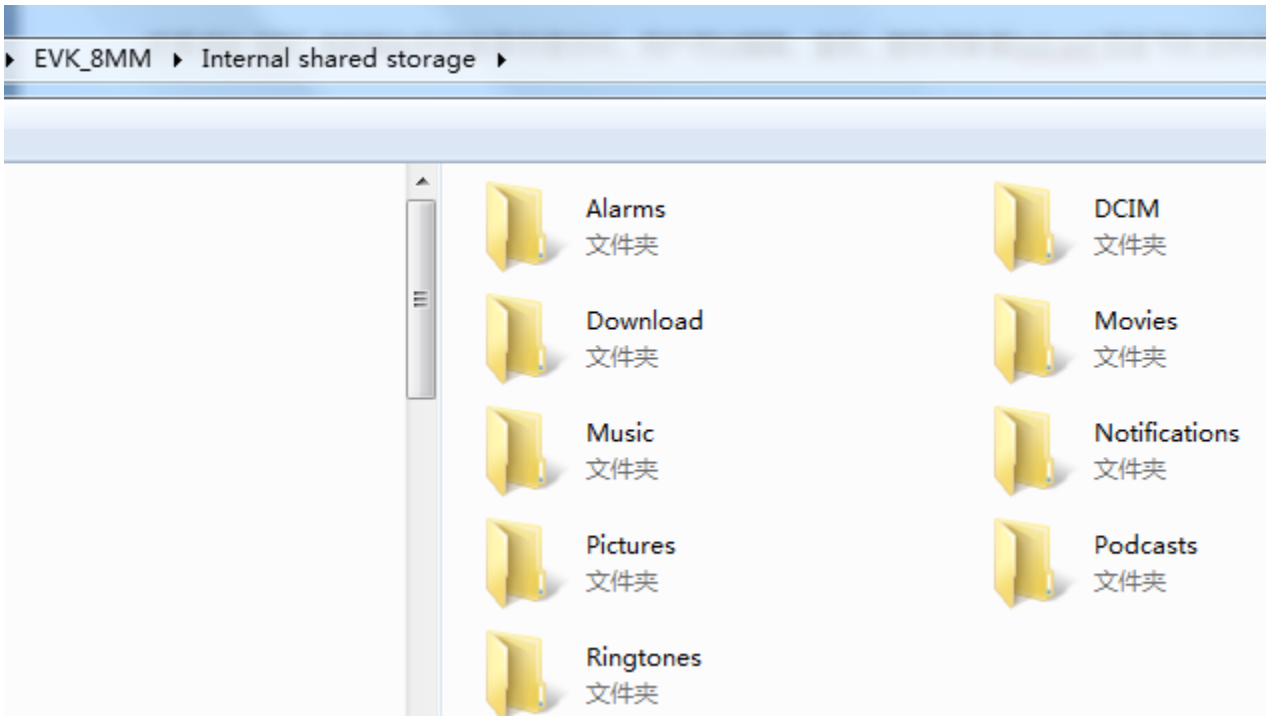




1. Choose “File Transfer”

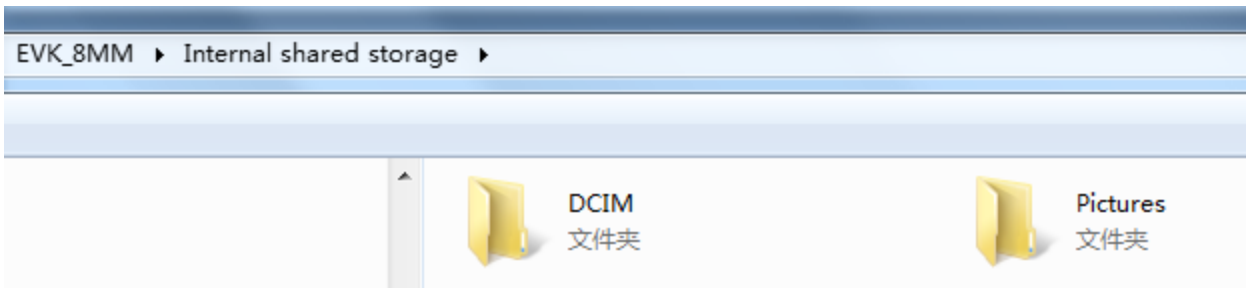
The device manager on the computer will show portable device: EVK_8MM, open computer, you will find EVK_8MM.

Open EVK_8MM, users could edit all the files / folders under /sdcard of the board.



2. Choose “PTP”

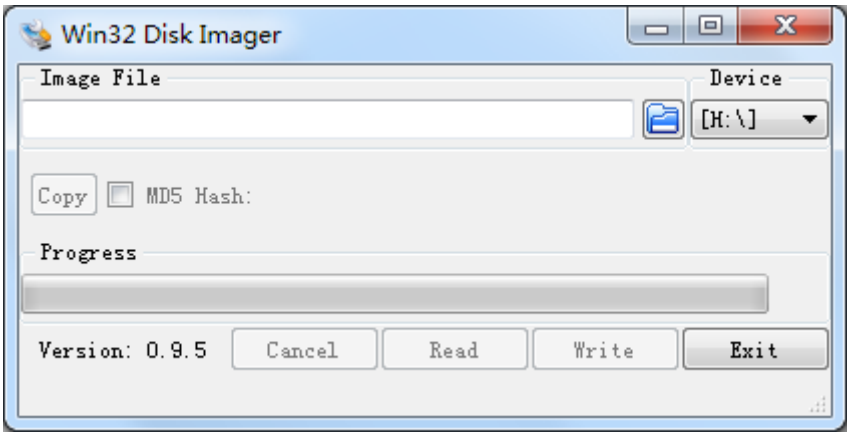
EVK_8MM will be listed in device manager and computer. Users could visit /sdcard/Pictures and /sdcard/DCIM on the board, edit the files / folders.



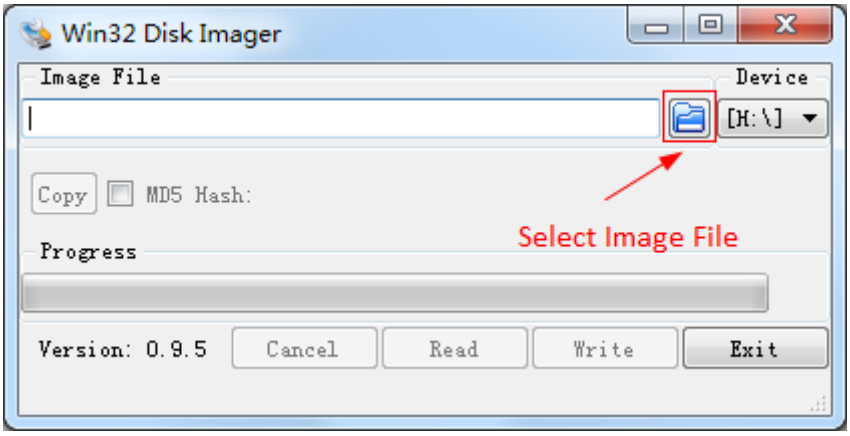
Chapter 4 Burn or update the system Image

4.1 Burn the System Image to SD Card under Windows OS

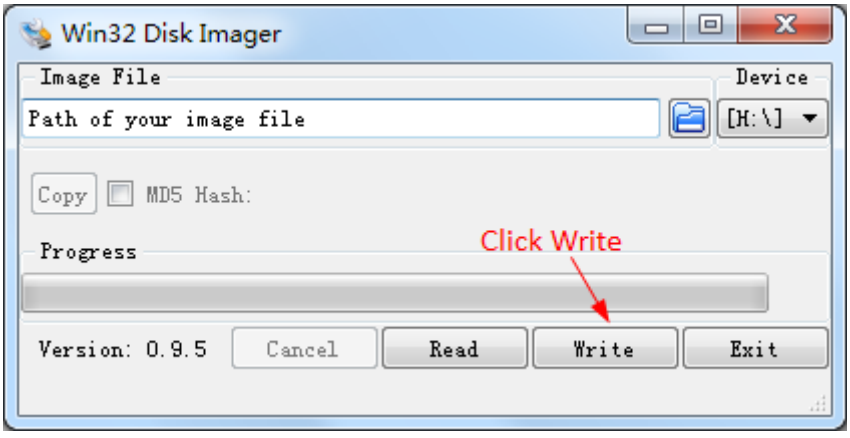
1. Firstly, you should prepare a SD card, which is no less than 16GB.
2. Then, download and install “Win32 Disk Imager” from: https://sourceforge.net/projects/win32diskimager/.



3. Select the system images file: eg: MaaXBoard_Mini-AndroidShipmentImage-SDcard-MIPI-V1.0.1r02.img



4. Click “Write” button to burn the images:



4.2 Burn the System Image to SD Card under Android OS

In Ubuntu or Debian OS, you can use bmap-tool to burn the image to SD Card. Here we use MaaXBoard_Mini-AndroidShipmentImage-SDcard-MIPI-V1.0.1r02.img as an example:

1. Install bmap-tools

```
$ sudo apt install bmap-tools
```

2. Enter the following instructions in command line to check the SD Card ID, in this example is: sdc

```
$ ls /dev/sd*
/dev/sda    /dev/sda2  /dev/sdb    /dev/sdb2  /dev/sdc    /dev/sdc2
/dev/sda1   /dev/sda5  /dev/sdb1   /dev/sdb5  /dev/sdc1
```

3. If SD Card is mounted, umount it.

```
$ sudo umount /dev/sdc1
$ sudo umount /dev/sdc2
```

4. Burn the SD card with following instructions:

```
$ bmaptool create -o burn.map
MaaXBoard_Mini-AndroidShipmentImage-SDcard-MIPI-V1.0.1r02.img
$ sudo bmaptool copy --bmap burn.map
MaaXBoard_Mini-AndroidShipmentImage-SDcard-MIPI-V1.0.1r02.img /dev/sdc
```

Chapter 5Appendix

5.1 Hardware

For the detail hardware introduction, please refer to MaaXBoard Mini Hardware User Manual.

5.2 Software

MaaXBoard Mini support Linux Debian system and Android system, for the detail software introduction, please refer to related user manual.

- **Linux**
  - MaaXBoard Mini Linux Software Release Note
  - MaaXBoard Mini Linux Software User Manual
  - MaaXBoard Mini Linux Software Development Guide
- **Android**
  - MaaXBoard Mini Android Software Release Note
  - MaaXBoard Mini Android Software User Manual
  - MaaXBoard Mini Android Software Development Guide

5.3 Android Develop

- https://android.googlesource.com/
- https://developer.android.com

Chapter 6Technical Support and Warranty

6.1 Technical Support

Avnet Manufacturing Services provides its product with one-year free technical support including:

- Providing software and hardware resources related to the embedded products of Avnet Manufacturing Services;
- Helping customers properly compile and run the source code provided by Avnet Manufacturing Services;
- Providing technical support service if the embedded hardware products do not function properly under the circumstances that customers operate according to the instructions in the documents provided by Avnet Manufacturing Services;
- Helping customers troubleshoot the products.
- The following conditions will not be covered by our technical support service. We will take appropriate measures accordingly:
  - Customers encounter issues related to software or hardware during their development process;
  - Customers encounter issues caused by any unauthorized alter to the embedded operating system;
  - Customers encounter issues related to their own applications;
  - Customers encounter issues caused by any unauthorized alter to the source code provided by Avnet Manufacturing Services.

6.2 Warranty Conditions

- 12-month free warranty on the PCB under normal conditions of use since the sales of the product;
- The following conditions are not covered by free services; Avnet Manufacturing Services will charge accordingly:
  - Customers fail to provide valid purchase vouchers or the product identification tag is damaged, unreadable, altered or inconsistent with the products;
  - Not according to the user's manual operation causes damage to the product;
  - Products are damaged in appearance or function caused by natural disasters (flood, fire, earthquake, lightning strike or typhoon) or natural aging of components or other force majeure;

- Products are damaged in appearance or function caused by power failure, external forces, water, animals or foreign materials;
- Products malfunction caused by disassembly or alter of components by customers or, products disassembled or repaired by persons or organizations unauthorized by Avnet Manufacturing Services, or altered in factory specifications, or configured or expanded with the components that are not provided or recognized by Avnet Manufacturing Services and the resulted damage in appearance or function;
- Product failures caused by the software or system installed by customers or inappropriate settings of software or computer viruses;
- Products purchased from unauthorized sales;
- Warranty (including verbal and written) that is not made by Avnet Manufacturing Services and not included in the scope of our warranty should be fulfilled by the party who committed. Avnet Manufacturing Services has no any responsibility.

- Within the period of warranty, the freight for sending products from customers to Avnet Manufacturing Services should be paid by customers; the freight from Avnet Manufacturing Services to customers should be paid by us. The freight in any direction occurs after warranty period should be paid by customers;
- Please contact technical support if there is any repair request.
- **Avnet Manufacturing Services will not take any responsibility on the products sent back without the permission of the company.**

Chapter 7Contact Information

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