

SBC3576 Android14 User Manual

V1.0



Boardcon Embedded Designer

Overview

The content of this document is intended solely for the SBC3576 development board, aiming to help users quickly understand, apply, and test the SBC3576 development board.

System Support

Development Board	Android14
MINI3576 V1	Y
SBC3576-V2	

Revision History

Version	Date	Author	Revision History
V1.0	2025-10-11	Wugk	Initial version

Disclaimer

The information in this manual is for reference only. While Boardcon strives to ensure its accuracy, no guarantees are made regarding its completeness or correctness. All content is subject to change without prior notice. Boardcon reserves the right to revise the content of this manual without prior notification.

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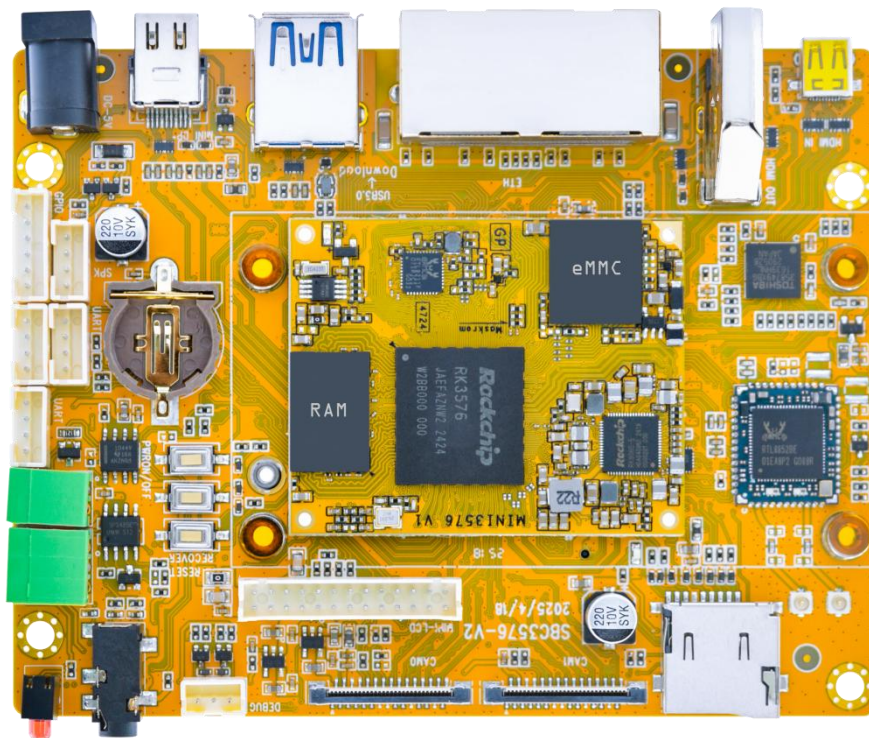
1.Introduction

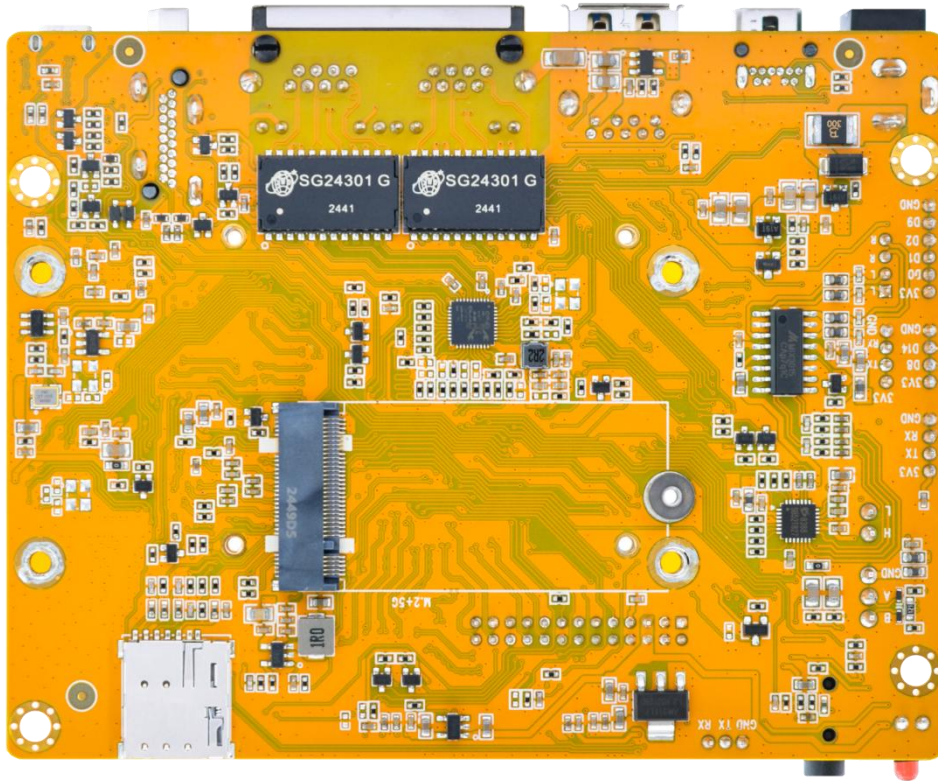
1.1 Overview

The SBC3576 development board is equipped with the RK3576 processor, featuring a quad-core Cortex-A72 and a quad-core Cortex-A53 architecture, providing powerful computing performance for smart devices and edge computing.

The 6 TOPS for INT8 operations integrated AI computing unit supports popular neural network frameworks and offers robust inference capabilities to meet AI application needs. It also support for high-resolution displays and smooth video playback.

The separation of the baseboard and core board allows for easy upgrades and customization, ensuring that the SBC3576 remains relevant and adaptable to future technological advancements. Additionally, its compact form factor makes it an excellent fit for space-constrained environments. The board is equipped with a variety of peripheral interfaces, allowing flexible expansion and supporting diverse application scenarios to meet the requirements of different devices and applications.





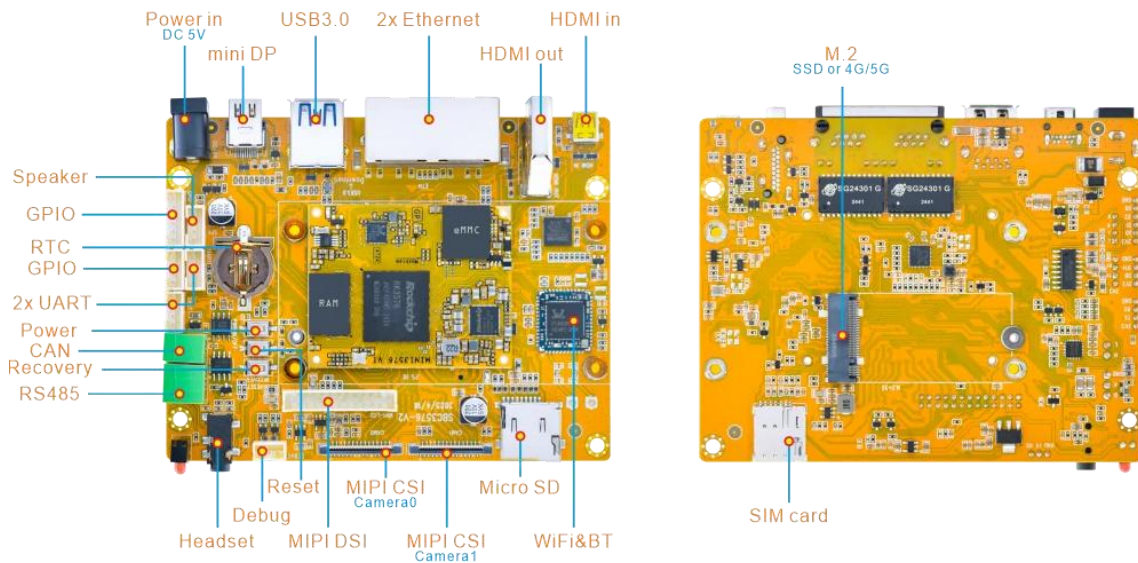
1.2 Product Parameters

Basic Parameters	
SOC	RK3576
CPU	<ul style="list-style-type: none"> • Octa-core 64-bit architecture (Quad-core Cortex-A72 + Quad-core Cortex-A53)
GPU	<ul style="list-style-type: none"> • ARM Mali-G52 MC3 • Support OpenGL ES 1.1/2.0/3.2 • Support Vulkan 1.1 • Support OpenCL 2.0 • Support AFBC
NPU	<ul style="list-style-type: none"> • 6 TOPS for INT8 operations. • Supports int4, int8, int16, FP16, BF16, TF32 operation
Video	Decoder <ul style="list-style-type: none"> • Supports up to 8K@30fps for H.265/HEVC, VP9, AVS2, and AV1 video decoding

		<ul style="list-style-type: none"> • Supports up to 4K@120fps for H.265/HEVC, VP9, AVS2, and AV1 video decoding • Supports up to 4K@60fps for H.264/AVC and MVC video decoding
	Encoder	<ul style="list-style-type: none"> • Supports H.264/H.265 video encoding up to 4K@60fps
RAM	4GB LPDDR4X	
ROM	32GB eMMC	
Support system	Android, Debian, Buildroot	
Hardware Parameters		
Extended Storage	<ul style="list-style-type: none"> • Support 1x M.2 PCIe2.1 SSD (optional. multiplexed with 4G module) • Support 1x MicroSD Card 	
Display	<ul style="list-style-type: none"> • Support 1x HDMI2.1 output, up to 4K@120fps • Support 1xMIPI output, up to 2560x1600@60fps • Support 1x DP AIT mode output, up to 4K@120fps 	
Audio	<ul style="list-style-type: none"> • Support 1x HDMI TX audio output • Support 1x DP AIT mode audio output • Support 1x Headphone output/input • Support 1x HDMI IN audio input • Support 1x Speaker audio output 	
USB	<ul style="list-style-type: none"> • Support 1x USB3.0 	
Network	<ul style="list-style-type: none"> • Support 2x Gigabit Ethernet • Support 1x WIFI/BT module • Support 1x 4G module(optional. multiplexed with SSD) 	
Camera	<ul style="list-style-type: none"> • Support 2x IMX415 Camera 	
Peripheral communication	<ul style="list-style-type: none"> • Support 1x CAN • Support 1x RS485 • Support 2x UART 	

Other parameters	Support 1x Debug, 1x RTC, 6x GPIO
Electrical Parameters	
Power supply input voltage	5V/3A
RTC input voltage	3V/0.6uA
Operating temperature	0~70°
Storage temperature	-40~85°
Structural Parameters	
Core board dimensions	50.0mm x 40.0mm
Motherboard dimensions	110.0mm x 85.0mm

1.3 Hardware Interface Introduction



Interface parameters	
Power in DC 12V	5V/3A DC power input interface
2x Camera	2-channel camera input interface
HDMI	HDMI2.1 TX interface

HDMI IN	HDMI in interface
2x Ethernet	Gigabit Ethernet RJ45 interface
Mini DP	DP interface
USB Host	USB3.0/download interface
Speaker	4-pin connector for speaker
Headset	Audio in/out interface
RS485	RS485 communication interface
CAN	CAN communication interface
Micro SD	Micro SD card slot
M.2	M.2 interface for connecting SSD/4G
SIM card	Nano SIM card
MIPI DSI	MIPI DSI interface
GPIO	General Purpose Input/Output pins
Debug	debug the serial port
UART	<ul style="list-style-type: none"> • UART10, TTL level serial interface • UART11, TTL level serial interface
WIFI&BT	WIFI&Bluetooth module
RTC	RTC coin cell connector
Recovery	Recovery key
Reset	Reset key
Power	Power key

2. Install Drivers and Tool

To download firmware and debug in the terminal, the following drivers and software need to be installed (for Windows computers):

Number	Driver name	Driver	Use
--------	-------------	--------	-----

1	RK Driver Assitant	DriverInstall.exe	OTG USB driver installation assitant
2	CH9102x	SETUP.EXE	Serial port debugging driver
3	Serial Terminal Tool	SecureCRT.exe	Debugging tool

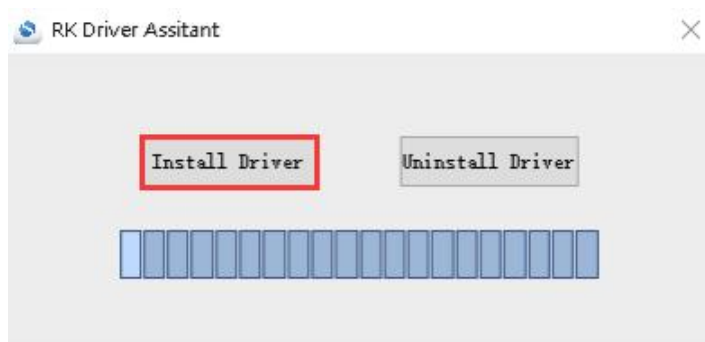
2.1 Install RK Driver Assitant

Step 1: Open *DriverAssitant_v5.1.3/DriverInstall.exe*.

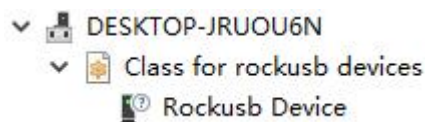
Step 2: To avoid driver conflicts, click “**Uninstall Driver**” to uninstall the driver.



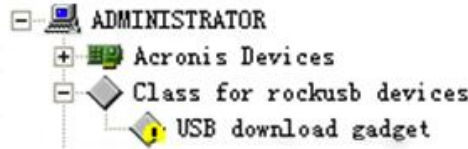
Step 3: Click button “**Install Driver**” to install.



Step 4: After the installation is complete, connect the board and PC with Type_C USB cable and press the **Recovery** key and hold then power the board, the following information is displayed in the Computer **Device Manager**, indicating that the USB driver was successfully installed.

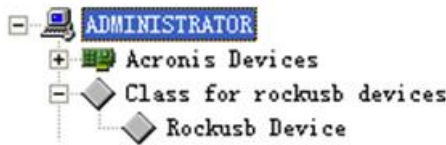


Step 5: If the following device information appears in the **Device Manager** after the operation in Step 4, user need to proceed to the next step.



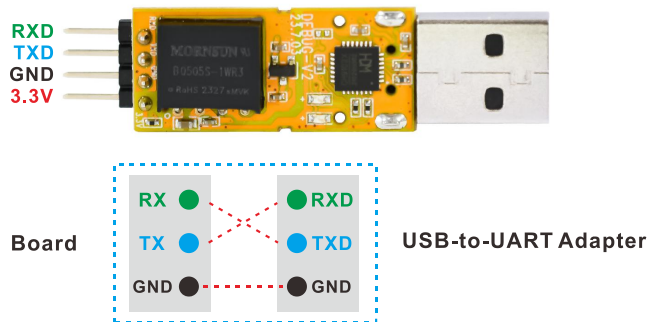
Step 6: The WINDOW will pop up found New Hardware Wizard dialog box, choose to install from the specified location, and then select: *DriverAssitant_v5.1.1/ADBDriver*.

Step 7: After the installation is completed, the following device information can be seen in the Computer **Device Manager**.



2.2 Install CH9102X Driver

2.2.1 How to Connect the Serial Port Tool



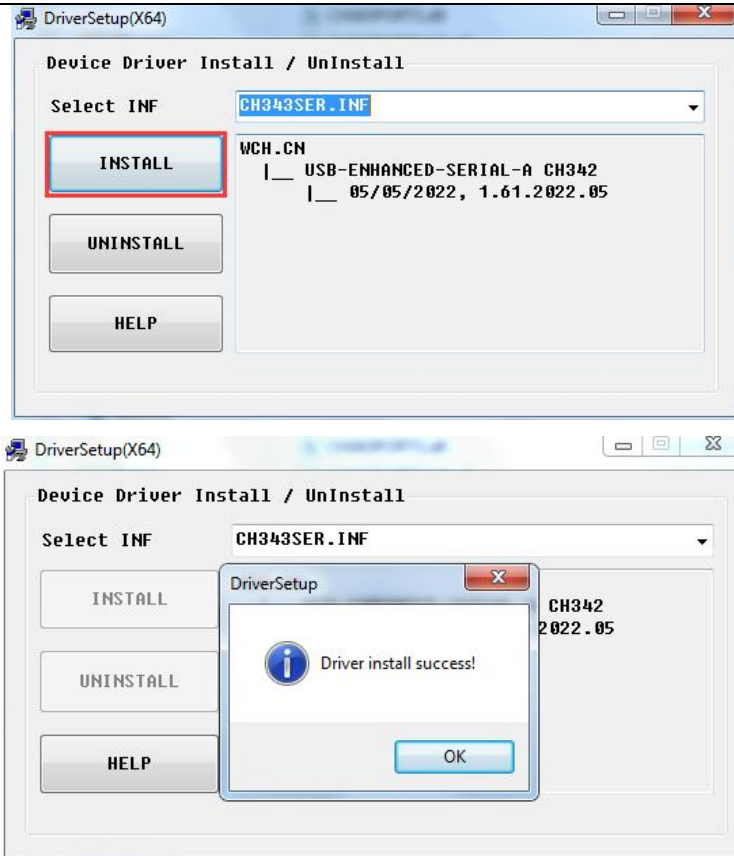
Pin	Connection Description
RXD	Receive, connect to TX pin of the board.
TXD	Transmit, connect to RX pin of the board.
GND	Ground, connect to GND pin of the board.
3V3	No need to connect.

2.2.2 Install Driver

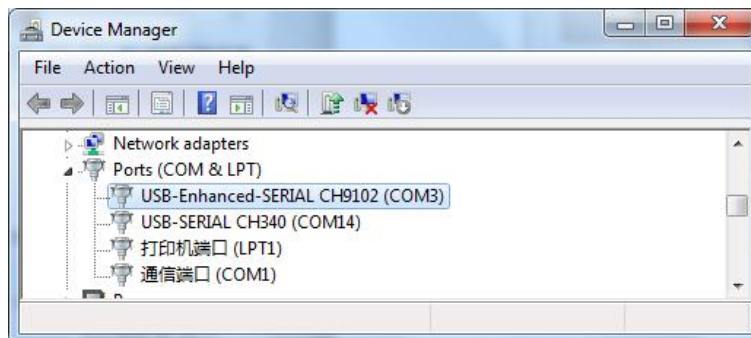
Step 1: Plug the CH9102X Module to the PC

Step 2: Unzip *CH343SER.ZIP* on Windows.

Step 3: Select and install the corresponding *SETUP.EXE* according to the computer properties.



Step 4: After the installation is completed, the device will be listed under **Device Manager** ports with unique serial port assigned.

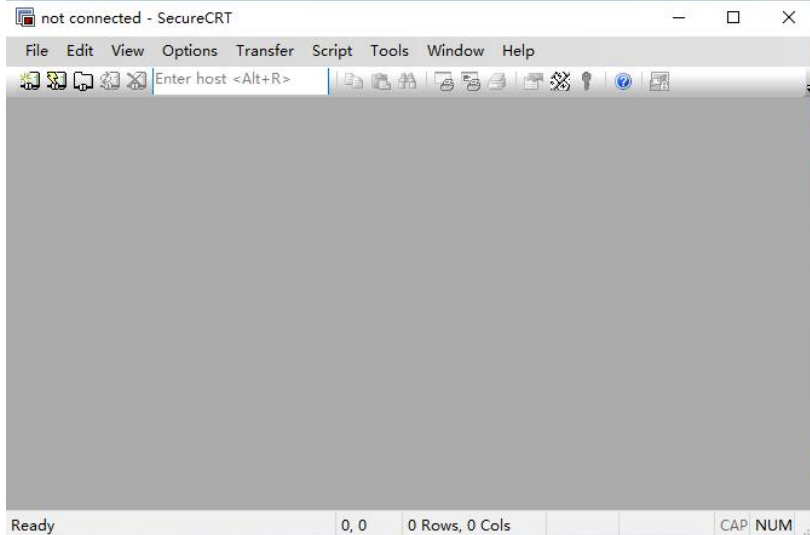


2.3 Install Serial Terminal Tool

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

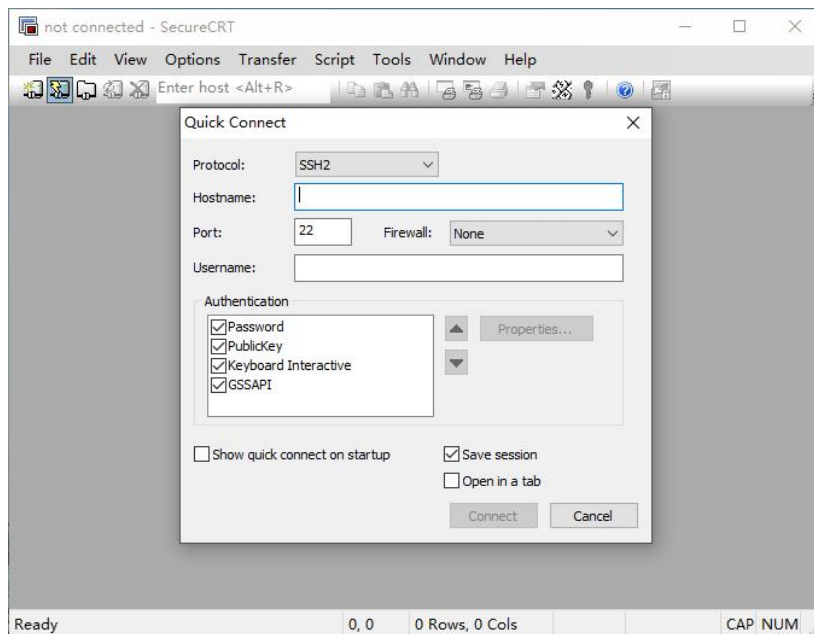
Step 1: Unzip *Platform/SecureCRT.rar* on PC.

Step 2: Click *SecureCRT/SecureCRT.exe* open the SecureCRT.

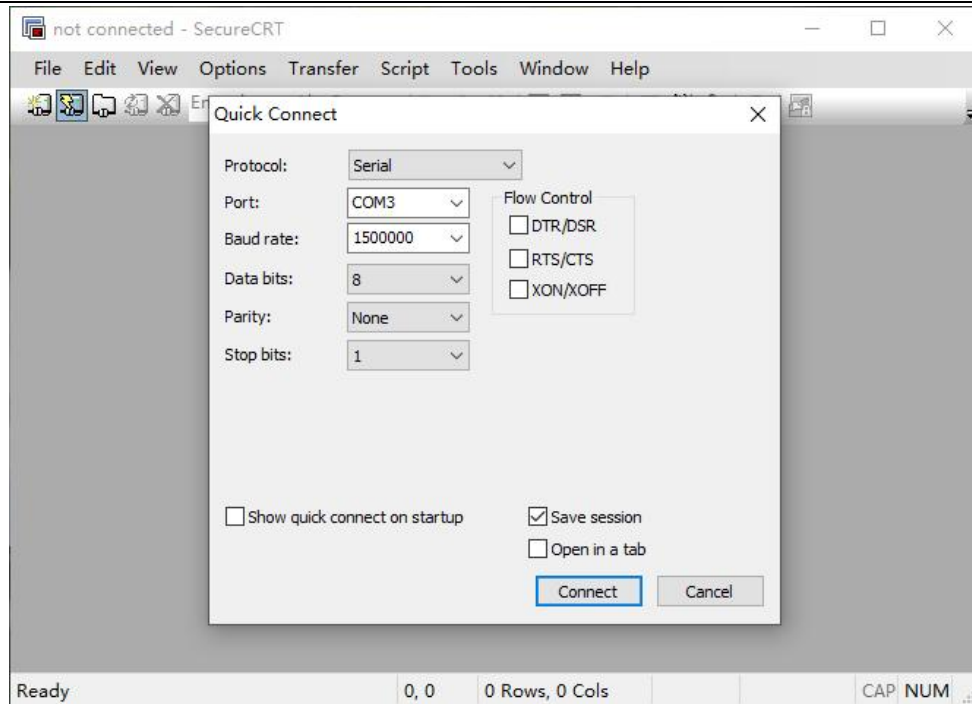


Step 3: Confirm that the CH9102X driver has been installed and the CH9102X module is connecting to the PC.

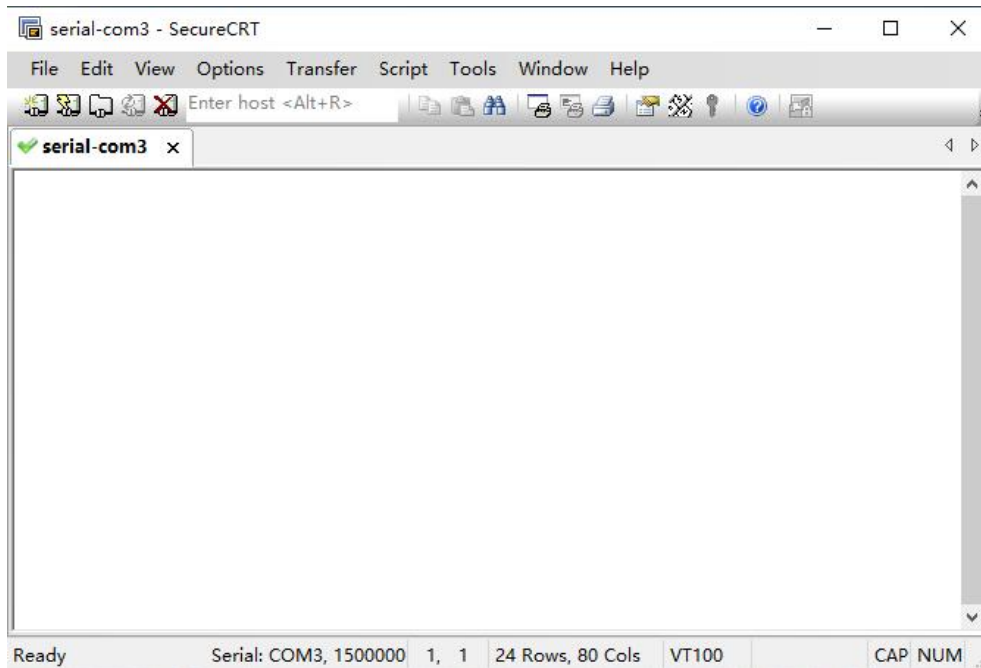
Step 4: Click the “Quick Connect” button to go to the Quick Connect configuration screen.



Step 5: Configure as shown in the following figure.



Step 6: After clicking “**Connect**” button, the terminal serial interface will be successfully accessed.



3. Upgrade Introduction

3.1 Upgrade Mode

The firmware can be upgraded via USB cable in two modes:

1. Loader Mode:

The standard mode used for firmware upgrades.

2. MaskRom Mode:

A last-resort mode used when the device is bricked. Entering MaskRom mode requires hardware manipulation, which involves certain risks. It should only be attempted if Loader mode is unavailable.

• Prerequisite

Before upgrading the firmware via USB cable, ensure that the necessary drivers are installed. For installation instructions, refer to the section [Install RK Driver Assistant](#).

3.1.1 How to Enter Loader Mode

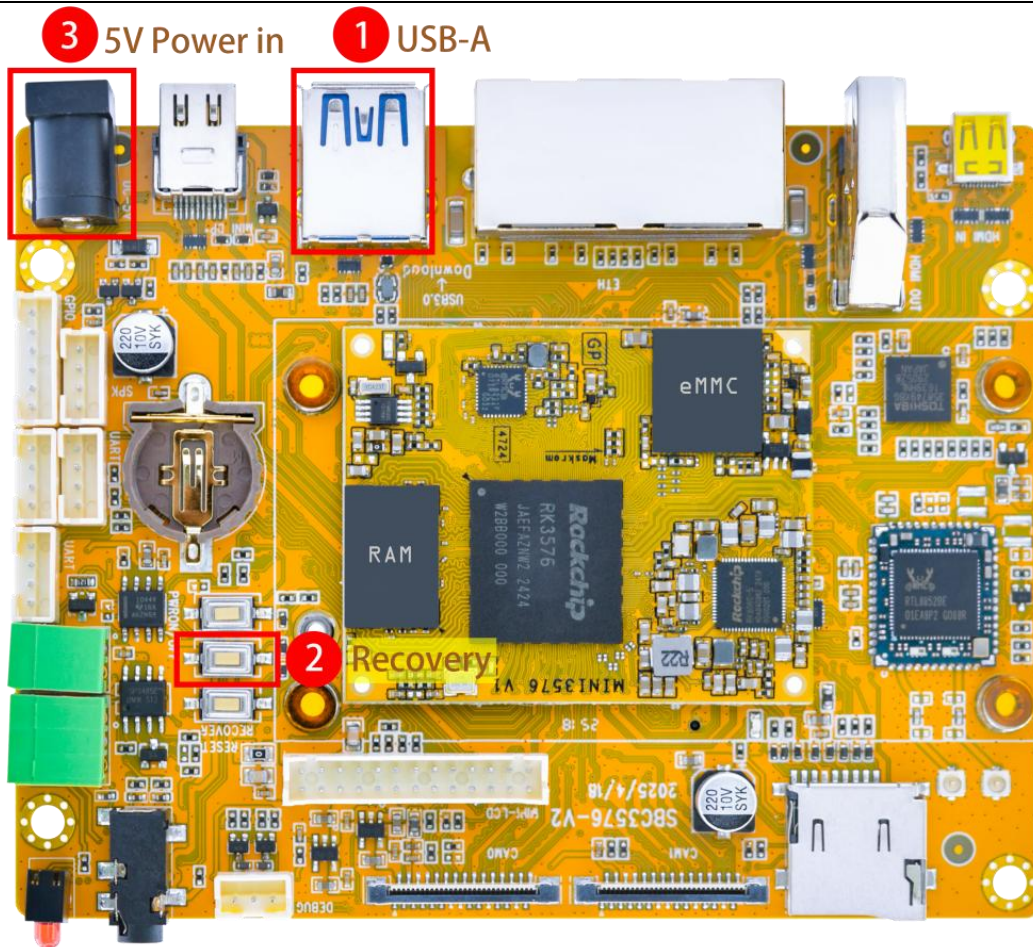
3.1.1.1 Hardware

Step 1: Disconnect the power adapter.

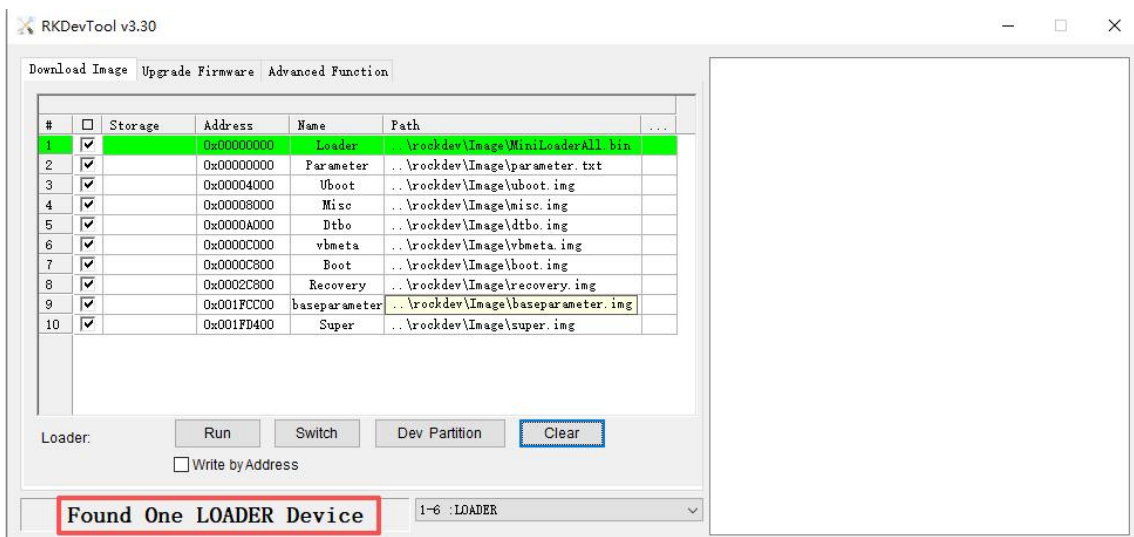
Step 2: Connect one end of the USB cable to the host and the other end to the development board.

Step 3: Press and hold the **Recovery** button on the board

Step 4: Connect the power supply.



Step 5: After a few seconds, release the **Recovery** button when the flashing tool shows **“Found one LOADER Device”**.



3.1.1.2 Software

After connecting the USB cable, execute the following command in the serial debug terminal or adb shell.

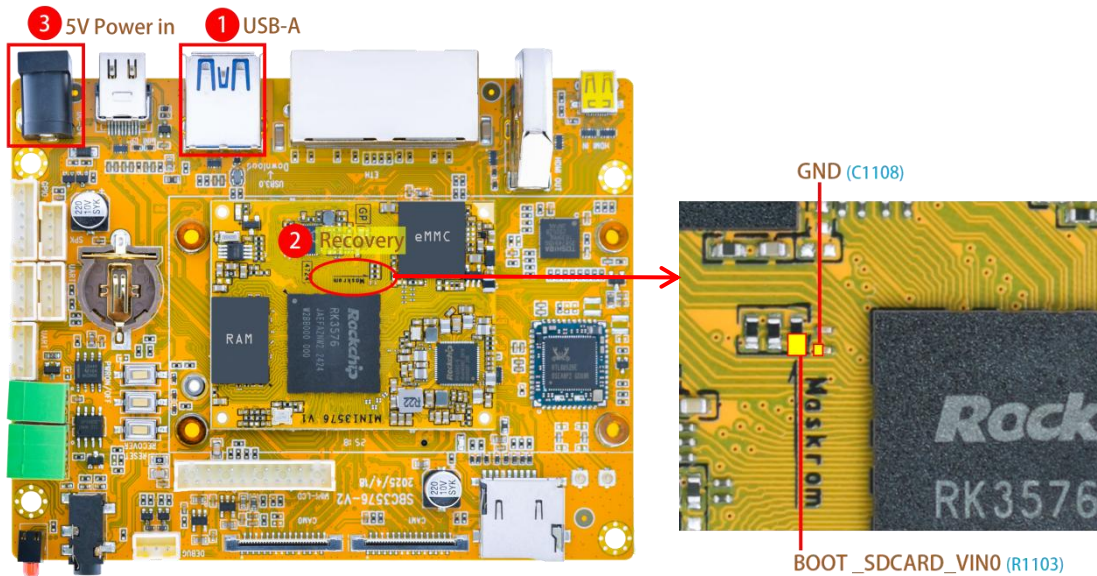
```
# reboot loader
```

3.1.2 How to Enter MaskRom Mode

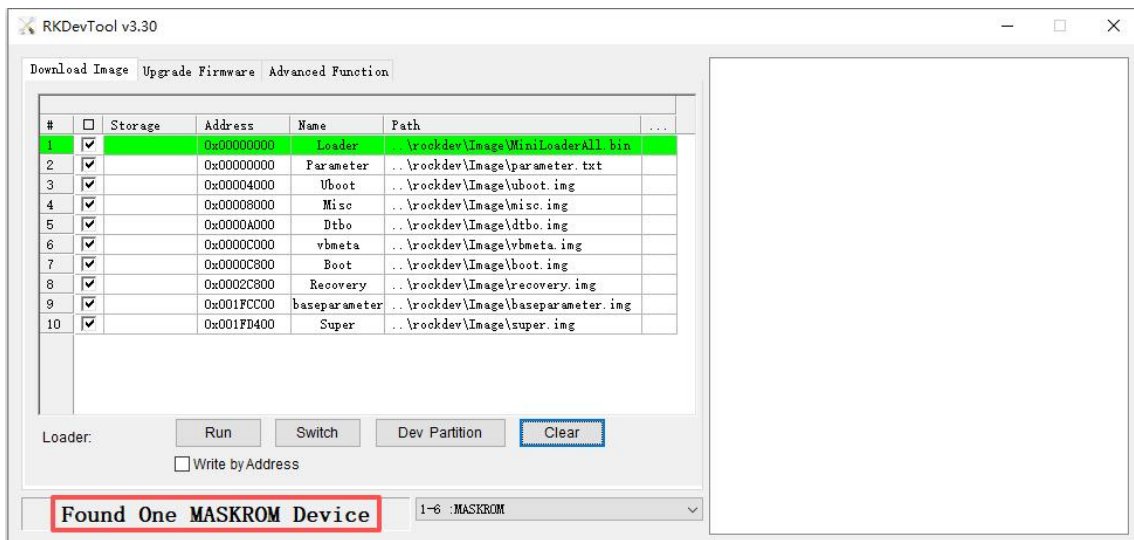
Step 1: Disconnect the power adapter.

Step 2: Connect one end of the Type_C cable to the host and the other end to the development board.

Step 3: Use tweezers to short the two test points on the CM3576.



Step 4: After connecting the power cable, the device will enter MaskRom mode.



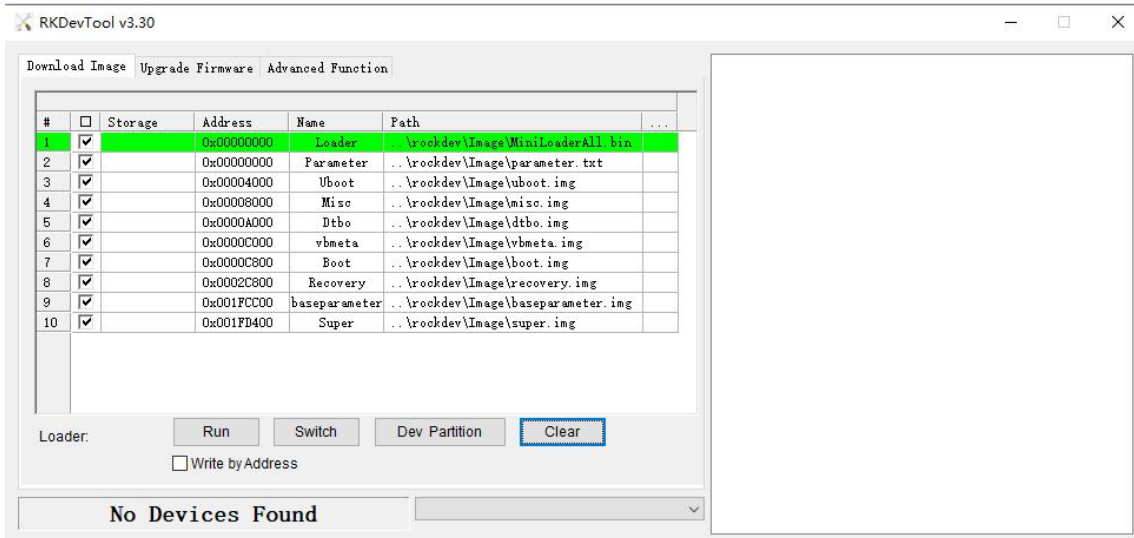
3.2 Burn firmware

Environment: Windows OS (Operating System).

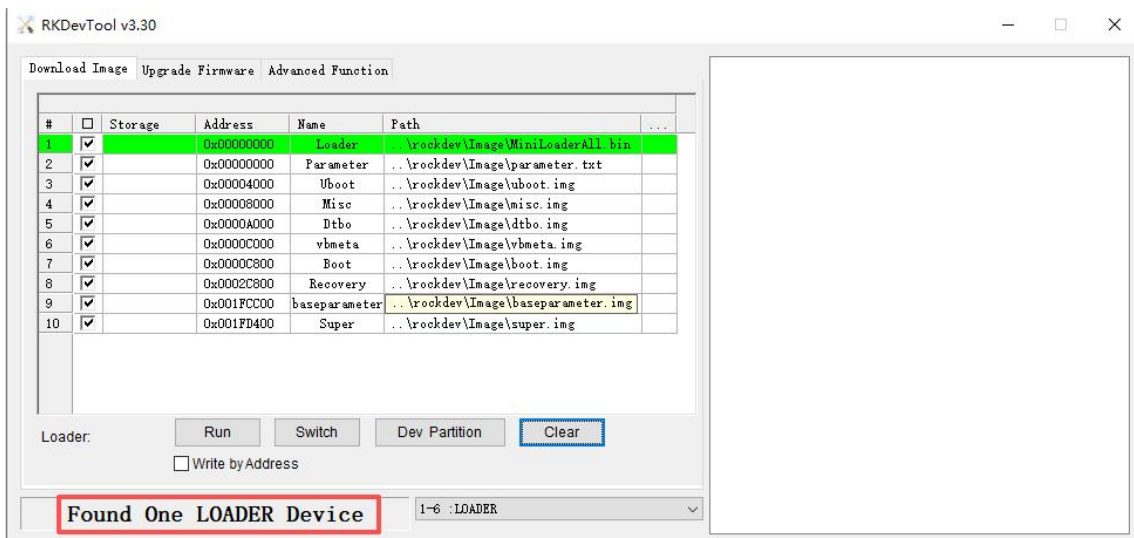
3.2.1 Burn Update.img Firmware

Step 1: Unzip *RKDevTool.rar* on Windows.

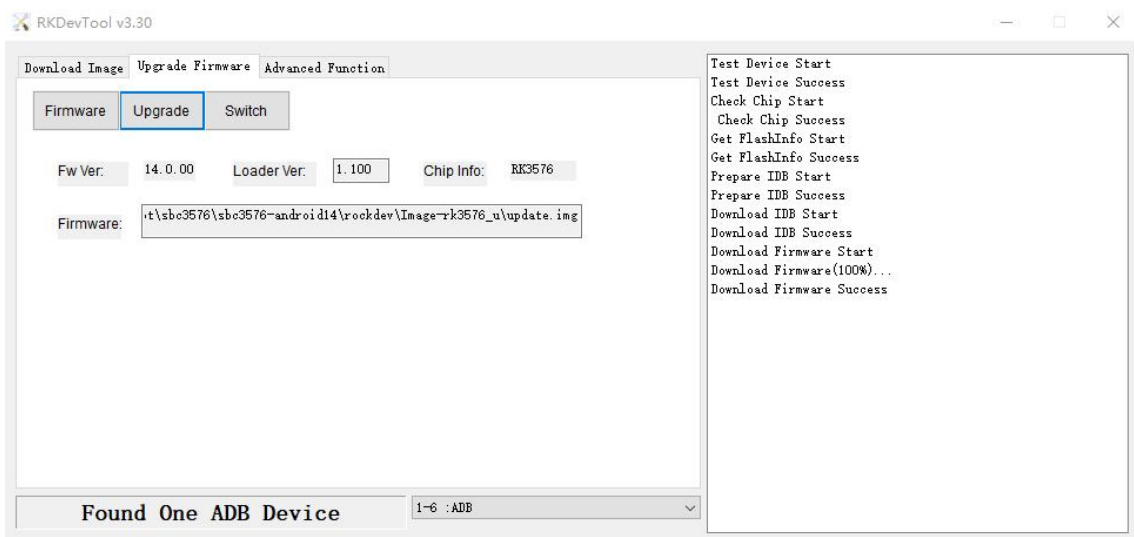
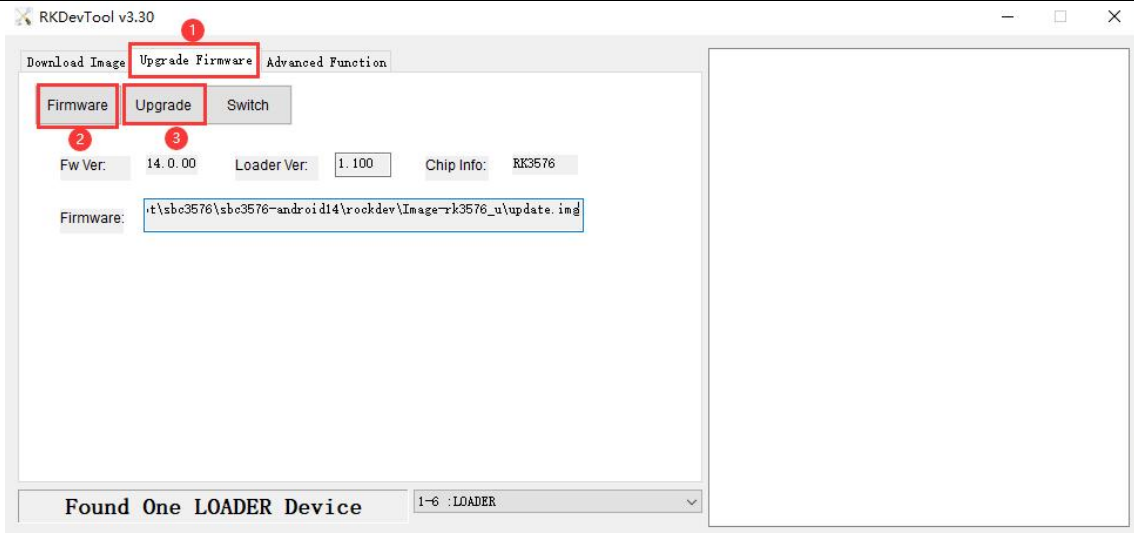
Step 2: Open *RKDevTool\RKDevTool_Release\RKDevTool.exe*.



Step 3: Switch to loader mode. ([How to Enter Loader Mode](#))



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



After the flashing is complete, the board will automatically reboot.

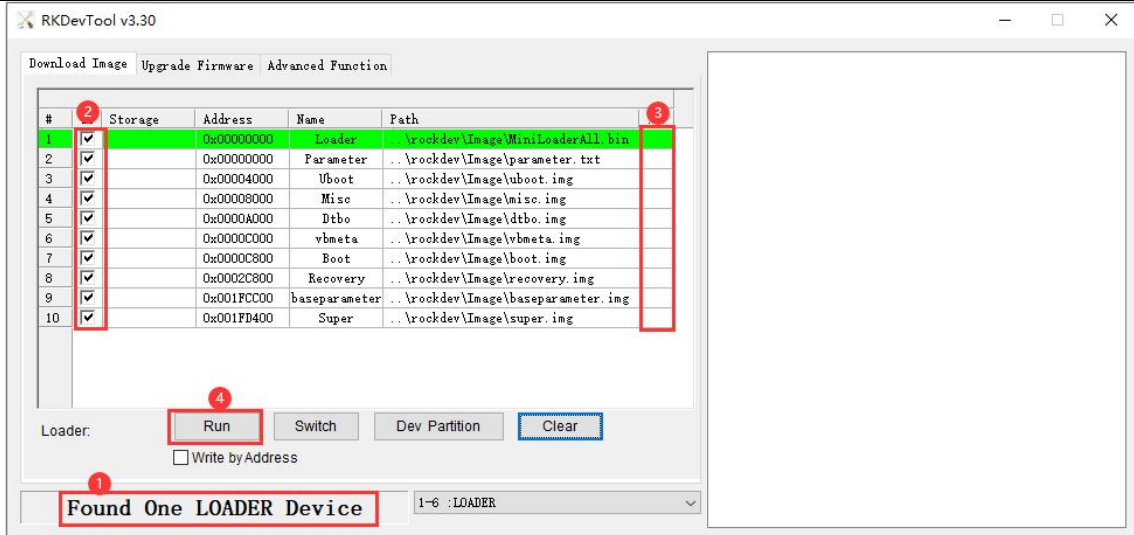
3.2.2 Burn Split Firmware

Step 1: Switch to **Loader mode**.

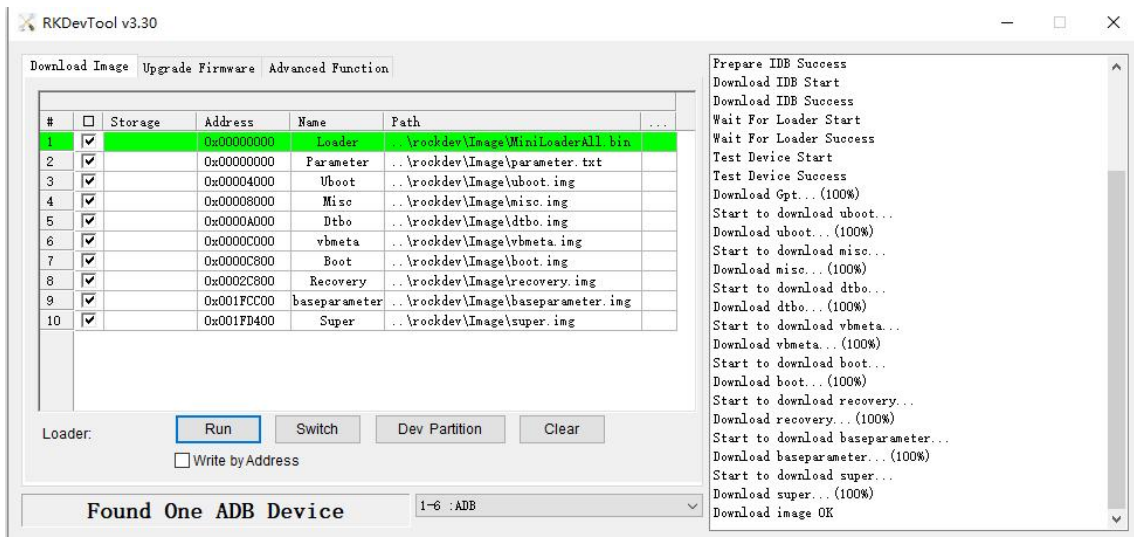
Step 2: Check the partitions to be flashed, multiple partitions can be selected.

Step 3: Ensure the image file path is correct. If necessary, click the blank cell next to the path to reselect it.

Step 4: Click the **Run** button to flash the image.



After the flashing is complete, the board will automatically reboot.



Note

① Without burning the [parameter.txt](#) file, please check the "Write by Address" checkbox, otherwise the flashing may fail with the "Image is larger than partition size" error.

4. Development Environment

4.1 Preparing the Development Environment

It is recommended to use Ubuntu 22.04 or higher version for compilation. If you

encounter an error during compilation, user can check the error message and install the corresponding software packages accordingly. Other Linux versions may need to adjust the software package accordingly. In addition to the system requirements, there are other hardware and software requirements.

Hardware requirements	Software requirements
64-bit system, hard disk space should be greater than 60G. If you do multiple builds, you will need more hard drive space.	Ubuntu 22.04

4.2 Installing Libraries and Toolkits

The contents of this directory only provide the software package installation commands that are needed to build the compiled SDK environment. Please install other tools such as samba and ssh yourself.

PC OS	Network	Permission
Ubuntu 22.04	online	root

To install the required tools, execute the following commands:

```
$ sudo apt-get install u-boot-tools

$ sudo apt-get install git gnupg flex bison gperf build-essential zip curl libc6-dev
libncurses5-dev:i386 x11proto-core-dev libx11-dev:i386 libreadline6-dev:i386
libgl1-mesa-dri:i386 libgl1-mesa-dev g++-multilib tofrodos libxml2-utils xsltproc
zlib1g-dev:i386 dpkg-dev

$ sudo apt-get install libncurses5-dev

$ sudo apt-get install libstdc++11.2-dev

$ sudo apt-get install lib32z-dev ccache

$ sudo apt-get install python3-pyelftools

$ sudo apt-get install libssl-dev

$ sudo apt-get install liblz4-tool

$ sudo ln -s /usr/bin/python3 /usr/bin/python

$ sudo apt-get install device-tree-compiler

$ sudo apt install apt-file

$ sudo apt-file update

$ sudo apt install libncurses5

$ sudo apt-file find libncurses.so.5

$ sudo apt-get install binfmt-support qemu-user-static live-build
```

5. Compile Source

Step 1: Unzip the Source

To extract the source files, execute the following commands:

```
$ tar xvf rk3576_android14_sdk-*.tar.gz
$ cd rk3576_android14_sdk
```

Step 2: Configure the Compiled Board

Execute the following commands to configure the board:

```
$ source build/envsetup.sh  
$ lunch rk3576_u-userdebug
```

Step 3: One key compiling

```
$ ./build.sh -AUCKu
```

Step 4: Compile U-Boot

Execute the following command to compile uboot:

```
$ ./build.sh -U
```

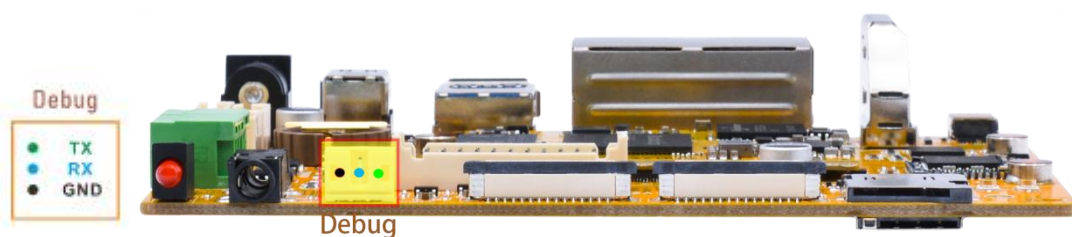
Step 5: Compile Kernel

Execute the following command to compile kernel:

```
$ ./build.sh -K
```

6. Android14 Test

6.1 Serial Terminal



Connect the board and PC with USB Serial cable, then power on, the terminal will output boot information. The default baudrate is 1500000.



6.3 USB 3.0(Loader/ADB/USB3.0)



6.3.1 ADB

Step 1: Connect the board and PC host with USB cable.

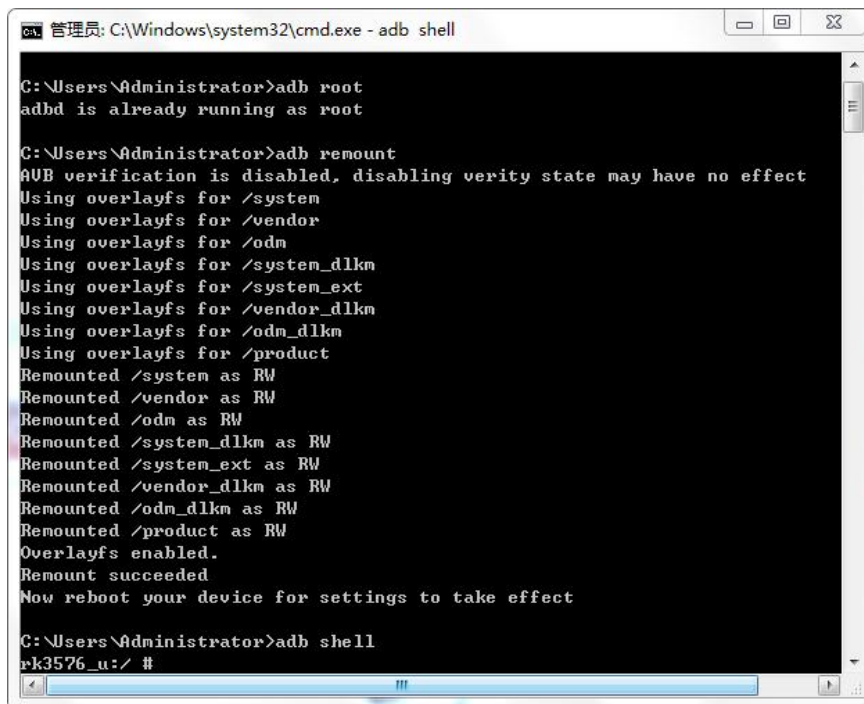


Step 2: Install ADB driver on Windows system.

Step 3: Press **Windows + R** to open the Run program. Type “cmd” and press Enter.

Step 4: Execute the following command to enable ADB.

```
# adb root  
  
# adb remount  
  
# adb shell
```



```
管理员: C:\Windows\system32\cmd.exe - adb shell  
  
C:\Users\Administrator>adb root  
adb is already running as root  
  
C:\Users\Administrator>adb remount  
A/B verification is disabled, disabling verity state may have no effect  
Using overlays for /system  
Using overlays for /vendor  
Using overlays for /odm  
Using overlays for /system_dkms  
Using overlays for /system_ext  
Using overlays for /vendor_dkms  
Using overlays for /odm_dkms  
Using overlays for /product  
Remounted /system as RW  
Remounted /vendor as RW  
Remounted /odm as RW  
Remounted /system_dkms as RW  
Remounted /system_ext as RW  
Remounted /vendor_dkms as RW  
Remounted /odm_dkms as RW  
Remounted /product as RW  
Overlays enabled.  
Remount succeeded  
Now reboot your device for settings to take effect  
  
C:\Users\Administrator>adb shell  
rk3576_u:/ #
```

6.3.2 USB3.0

After the SBC3576 is powered on, when the system is running normally, USB3.0 OTG defaults to USB3.0 Device mode. Through software method, force USB3.0 OTG to work in Host mode or Device mode without being affected by USB hardware circuit.

(1) Force Host mode

```
# echo host >  
/sys/devices/platform/2602e000.syscon/2602e000.syscon\:usb2-phy@0/otg_mode
```

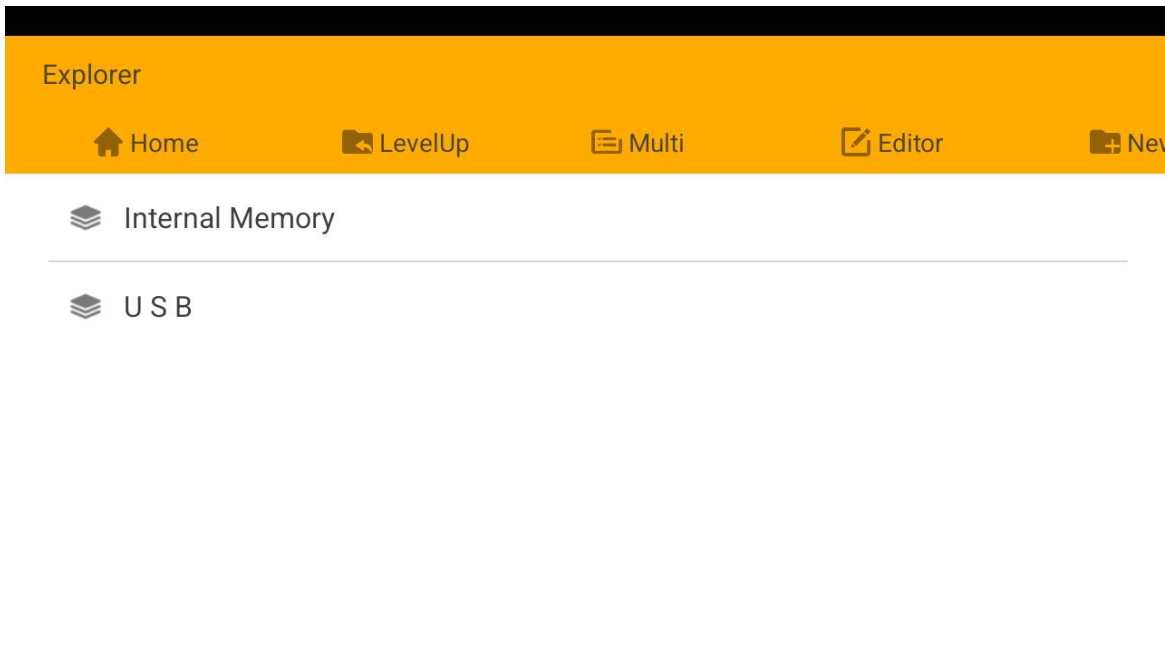
```

console:/ # echo host > /sys/devices/platform/2602e000.syscon/2602e000.syscon\:usb2-phy@0/otg_mode
console:/ # [ 211.807764][ T21] dwc3 23000000.usb: request 0000000000000000 was not queued to ep0out
[ 211.811254][ T2114] android_work: did not send uevent (0 0 0000000000000000)
[ 211.917264][ T21] phy phy-2602e000.syscon:usb2-phy@0.0: illegal mode
[ 211.917316][ T21] xhci-hcd xhci-hcd.10.auto: xHCI Host Controller
[ 211.918103][ T21] xhci-hcd xhci-hcd.10.auto: new USB bus registered, assigned bus number 3
[ 211.918273][ T21] xhci-hcd xhci-hcd.10.auto: hcc params 0x0220fe64 hci version 0x110 quirks
0x000080002010010
[ 211.918313][ T21] xhci-hcd xhci-hcd.10.auto: irq 63, io mem 0x23000000
[ 211.918695][ T21] xhci-hcd xhci-hcd.10.auto: xHCI Host Controller
[ 211.919394][ T21] xhci-hcd xhci-hcd.10.auto: new USB bus registered, assigned bus number 4
[ 211.919436][ T21] xhci-hcd xhci-hcd.10.auto: Host supports USB 3.0 SuperSpeed
[ 211.919633][ T21] usb usb3: New USB device found, idVendor=1d6b, idProduct=0002, bcdDevice= 6.01
[ 211.919649][ T21] usb usb3: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[ 211.919661][ T21] usb usb3: Product: xHCI Host Controller
[ 211.919671][ T21] usb usb3: Manufacturer: Linux 6.1.99 xhci-hcd
[ 211.919682][ T21] usb usb3: SerialNumber: xhci-hcd.10.auto
[ 211.920997][ T21] hub 3-0:1.0: USB hub found
[ 211.921070][ T21] hub 3-0:1.0: 1 port detected
[ 211.922110][ T21] usb usb4: We don't know the algorithms for LPM for this host, disabling LPM.
[ 211.922260][ T21] usb usb4: New USB device found, idVendor=1d6b, idProduct=0003, bcdDevice= 6.01
[ 211.922276][ T21] usb usb4: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[ 211.922288][ T21] usb usb4: Product: xHCI Host Controller
[ 211.922298][ T21] usb usb4: Manufacturer: Linux 6.1.99 xhci-hcd
[ 211.922308][ T21] usb usb4: SerialNumber: xhci-hcd.10.auto
[ 211.923698][ T21] hub 4-0:1.0: USB hub found
[ 211.923767][ T21] hub 4-0:1.0: 1 port detected
[ 212.176731][ T2114] usb 3-1: new high-speed USB device number 2 using xhci-hcd
[ 212.328861][ T2114] usb 3-1: New USB device found, idVendor=0951, idProduct=1666, bcdDevice= 2.00
[ 212.328962][ T2114] usb 3-1: New USB device strings: Mfr=2, Product=3, SerialNumber=4
[ 212.329007][ T2114] usb 3-1: Product: DataTraveler 3.0
[ 212.329045][ T2114] usb 3-1: Manufacturer: Kingston
[ 212.329082][ T2114] usb 3-1: SerialNumber: E0D55EA573F8194168681327
[ 212.332196][ T2114] usb-storage 3-1:1.0: USB Mass Storage device detected
[ 212.333625][ T2114] scsi host0: usb-storage 3-1:1.0
[ 213.366462][ T10] scsi 0:0:0:0: Direct-Access Kingston DataTraveler 3.0 0000 PQ: 0 ANSI: 4
[ 213.367486][ T10] scsi 0:0:0:0: Attached scsi generic sg0 type 0
[ 213.368906][ T10] sd 0:0:0:0: [sda] 121077760 512-byte logical blocks: (62.0 GB/57.7 GiB)
[ 213.369284][ T10] sd 0:0:0:0: [sda] Write Protect is off
[ 213.369574][ T10] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO
or FUA
[ 213.370140][ T283] type=1400 audit(1760350760.028:390): avc: denied { create } for comm="kdevtmpfs"
name="sda" scontext=u:r:kernel:s0 tcontext=u:object_r:device:s0 tclass=blk_file permissive=0
[ 213.374330][ T10] sda: sda1
[ 213.374834][ T283] type=1400 audit(1760350760.032:391): avc: denied { create } for comm="kdevtmpfs"
name="sda1" scontext=u:r:kernel:s0 tcontext=u:object_r:device:s0 tclass=blk_file permissive=0
[ 213.376517][ T10] sd 0:0:0:0: [sda] Attached SCSI removable disk
[ 213.918709][ T1] init: Untracked pid 2930 received signal 15
[ 213.918778][ T1] init: Untracked pid 2930 did not have an associated service entry and will not be
reaped
[ 213.924728][ T1472] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please
run fsck.

```

Then the USB3.0 OTG has been switched to host mode. The USB host can be used to connect devices such as USB mouse, USB keyboards, USB flash drives, and other USB peripherals.

After connecting the USB flash drive, if the device is successfully recognized, Can Browse USB flash drive files through the file browser “**Explorer**”.



(2) Force peripheral mode

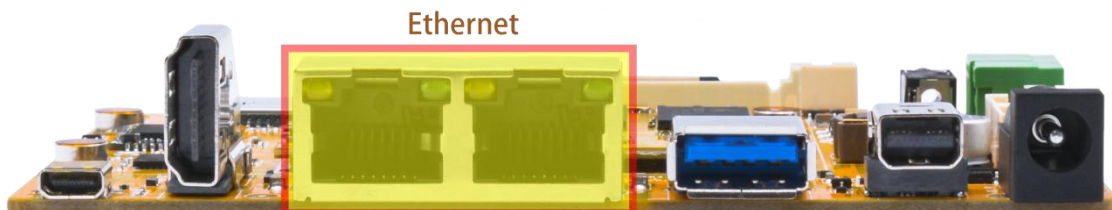
```
# echo peripheral >
/sys/devices/platform/2602e000.syscon/2602e000.syscon\:usb2-phy@0/otg_mode
```

Then the USB3.0 OTG has been restored to Device mode, and features such as LOADER and ADB can be used.

```
console:/ # echo peripheral > /sys/devices/platform/2602e000.syscon/2602e000.syscon\:usb2-phy@0/otg_mode
console:/ # [ 387.270220][ T21] xhci-hcd xhci-hcd.10.auto: remove, state 4
[ 387.270268][ T21] usb usb4: USB disconnect, device number 1
[ 387.271107][ T21] xhci-hcd xhci-hcd.10.auto: USB bus 4 deregistered
[ 387.271417][ T21] xhci-hcd xhci-hcd.10.auto: remove, state 4
[ 387.271441][ T21] usb usb3: USB disconnect, device number 1
[ 387.272359][ T21] xhci-hcd xhci-hcd.10.auto: USB bus 3 deregistered
[ 387.600983][ T3508] dwc3 23000000.usb: device reset
[ 387.690401][ T21] android_work: sent uevent USB_STATE=CONNECTED
[ 387.721990][ T21] android_work: sent uevent USB_STATE=CONFIGURED
```

6.4 Ethernet

Step 1: Connect the network cable to the Ethernet port.



According to the log, it can be seen that the Gigabit Ethernet recognition is successful.

```
[ 2225.079020][ T6766] rk_gmac-dwmac 2a220000.ethernet eth0: Link is Up - 1Gbps/Full - flow control rx/tx
```

Step 2: View network interface information.

```
# ifconfig
```

```
eth0      Link encap:Ethernet  HWaddr 6e:80:fc:bf:d5:18  Driver rk_gmac-dwmac
inet addr:192.168.0.191  Bcast:192.168.0.255  Mask:255.255.255.0
inet6 addr: fe80::d12f:7f4c:66dd:63d/64  Scope: Link
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:367  errors:0  dropped:0  overruns:0  frame:0
TX packets:70  errors:0  dropped:0  overruns:0  carrier:0
collisions:0  txqueuelen:1000
RX bytes:43184  TX bytes:8400
Interrupt:55
```

Step 3: Users can test network connectivity using the desktop's built-in browser or verify it through the following command method.

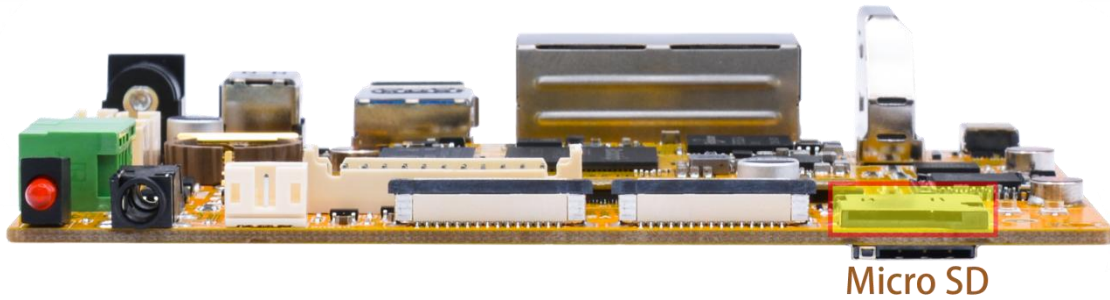
```
# ping -I eth0 www.armdesigner.com
```

```
console:/ # ping -I eth0 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 192.168.0.191 eth0: 56(84) bytes of data.
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=2 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=3 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=4 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=5 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=6 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=7 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=8 ttl=48 time=203 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=9 ttl=48 time=202 ms
64 bytes from www.armdesigner.com (67.222.54.196): icmp_seq=11 ttl=48 time=203 ms
```

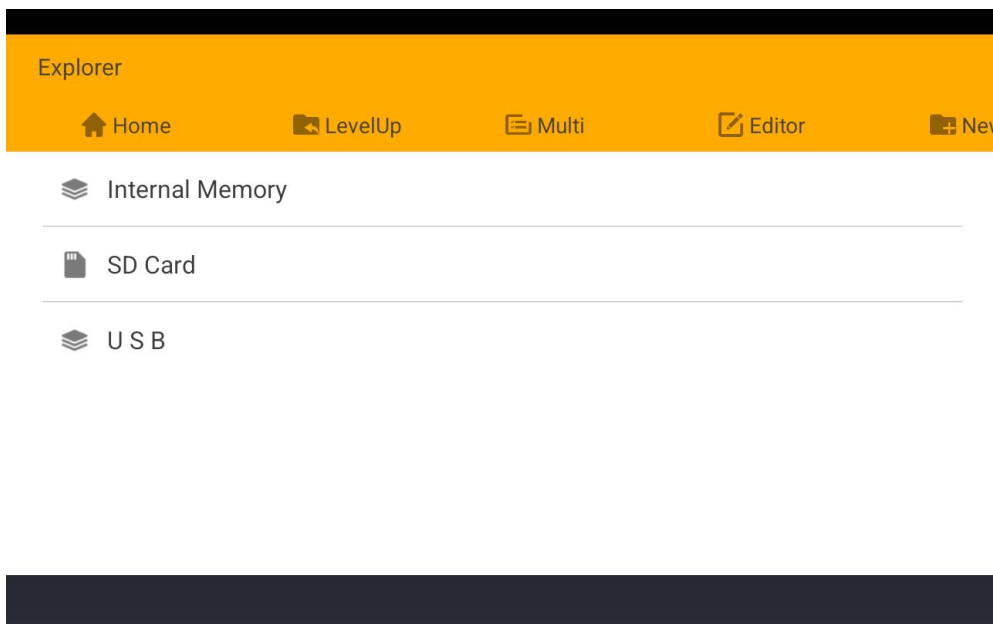
The testing method for the network card of eth1 is the same as that for eth0

6.5 SD Card

Step 1: Insert the micro SD card into the card slot.

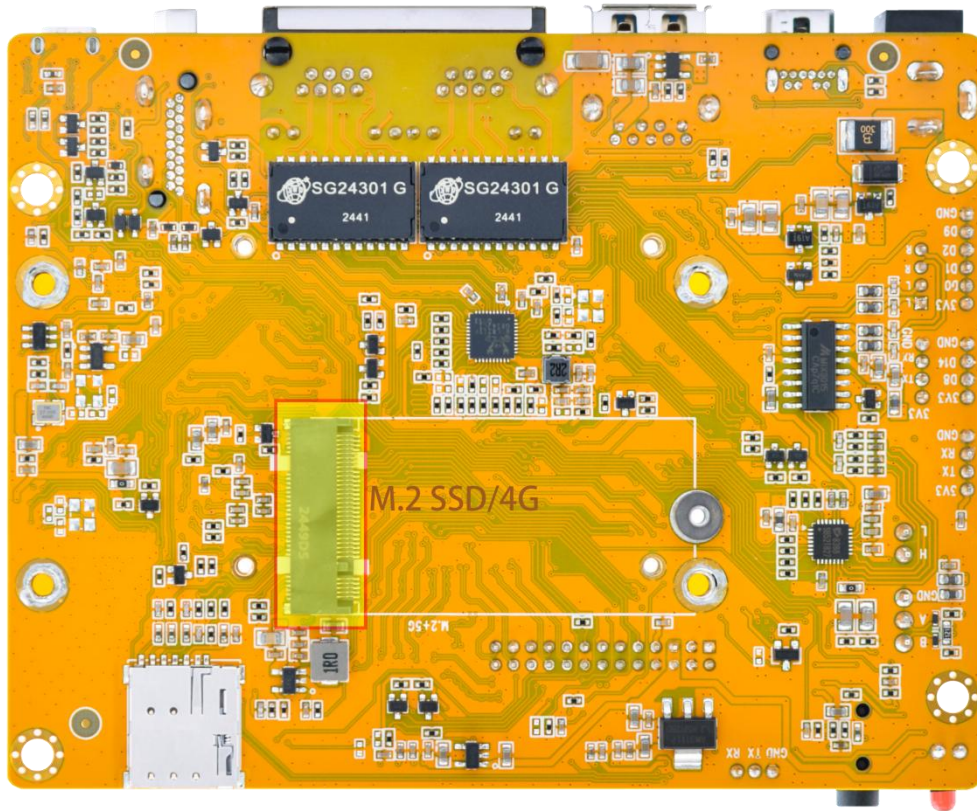


Step 2: After inserting the SD card, if it is recognized successfully, User can Browse SATA device files through the file browser “**Explorer**”. SBC3576 supports SD Hot-plug.



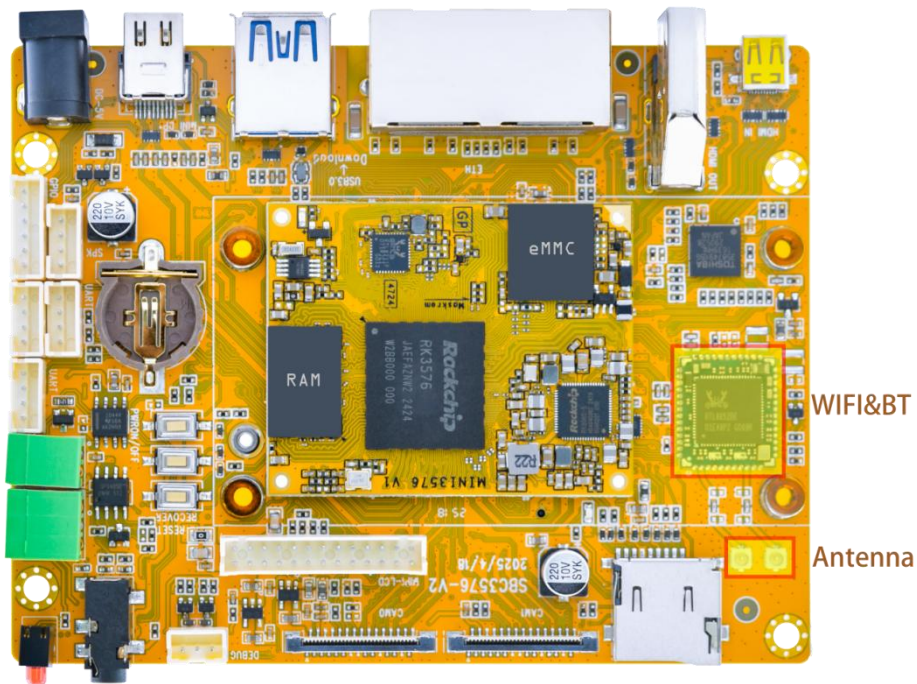
6.6 M.2 NVME SSD (Multiplexed with 4G)

Step 1: Connect the SSD, then power on.



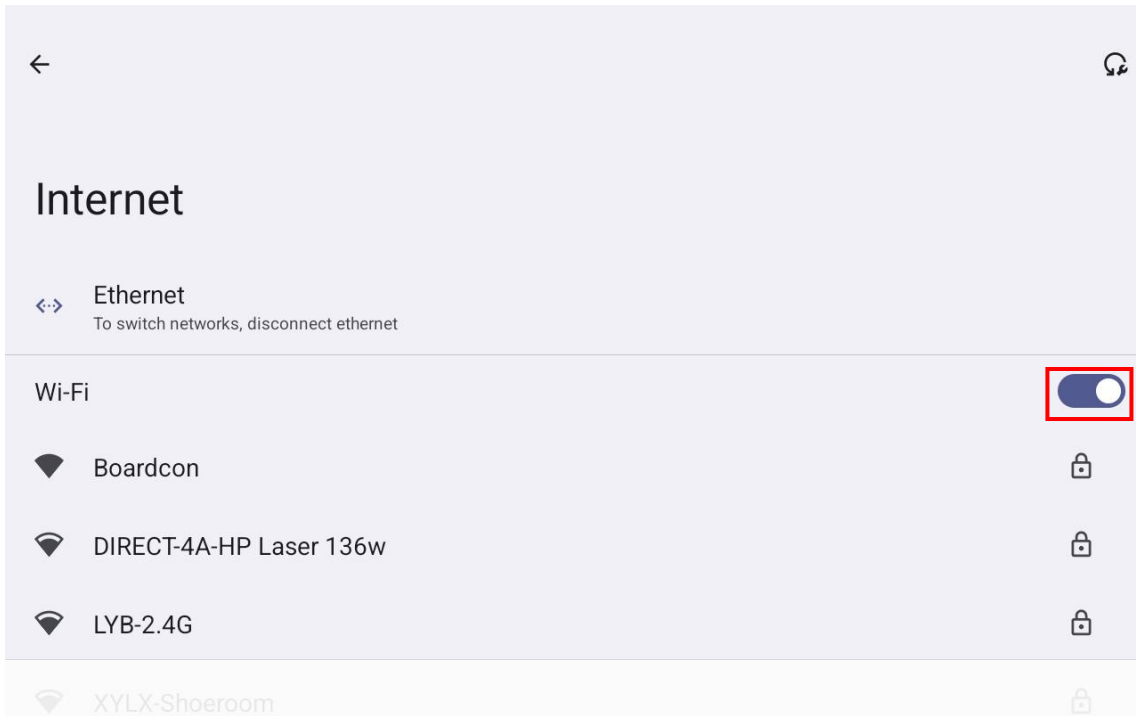
6.7 WiFi & Bluetooth

To use Wi-Fi and Bluetooth functions properly, the antenna needs to be connected.

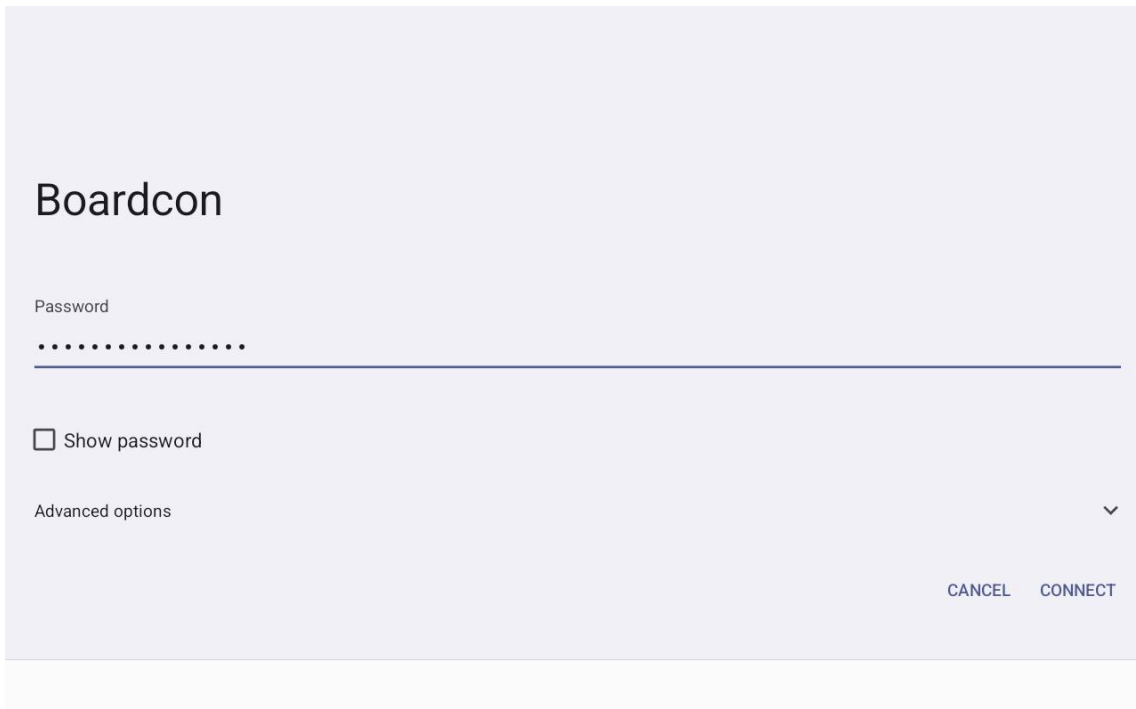


6.7.1 WiFi

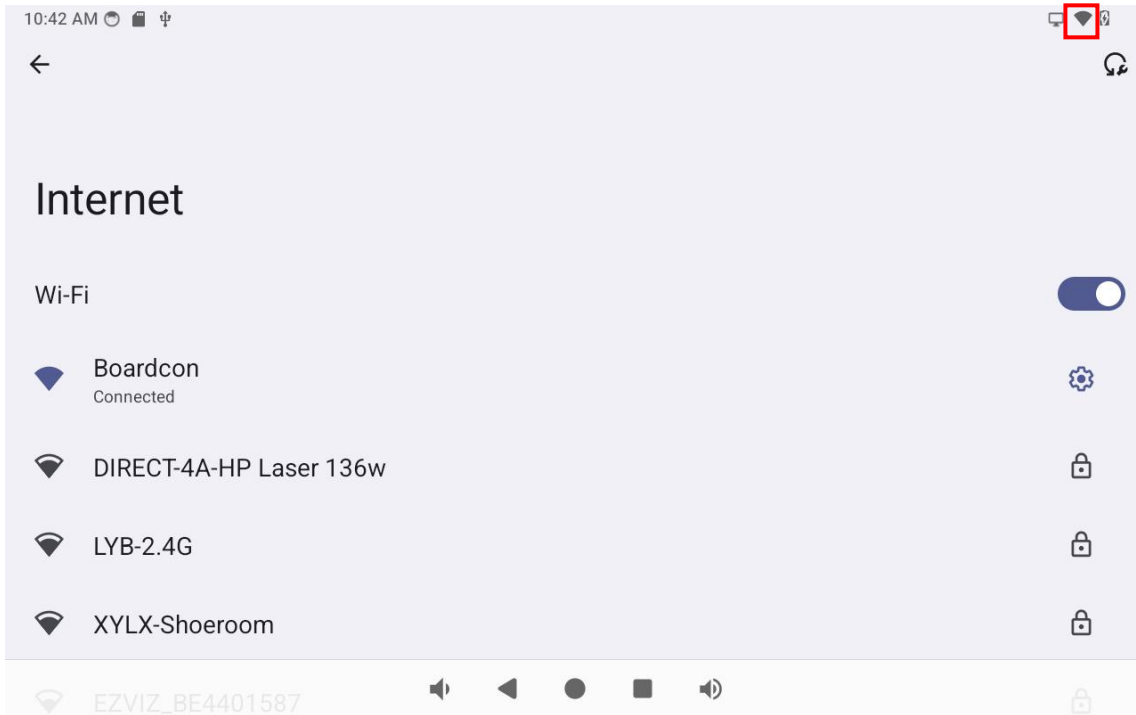
Step 1: Open “Settings > Network & internet > Internet > Wi-Fi” turn on and connect WIFI.



Step 2: Select the SSID from the list of available networks and enter the password.



Step 3: After the WiFi successfully connects to the SSID, the system will display the corresponding connection status icon in the top right corner.



Step 4: Users can test network connectivity using the UI browser or verify it through the following command method.

(1) View network interface information.

```
# ifconfig
```

```

console:/ # ifconfig
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:2 errors:0 dropped:0 overruns:0 frame:0
        TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:106 TX bytes:106

dummy0  Link encap:Ethernet HWaddr 4a:b1:e3:60:12:91
        inet6 addr: fe80::48b1:e3ff:fe60:1291/64 Scope: Link
        UP BROADCAST RUNNING NOARP  MTU:1500  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:5 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:0 TX bytes:350

eth0    Link encap:Ethernet HWaddr 6e:95:7b:2b:8a:ff  Driver rk_gmac-dwmac
        UP BROADCAST MULTICAST  MTU:1500  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
        Interrupt:63

wlan0   Link encap:Ethernet HWaddr 38:7a:cc:2a:09:33  Driver rtl88x2cs
        inet addr:192.168.0.144  Bcast:192.168.0.255  Mask:255.255.255.0
        inet6 addr: fe80::4b77:5637:e9c3:7d69/64 Scope: Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:322 errors:0 dropped:1 overruns:0 frame:0
        TX packets:111 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:61593 TX bytes:15157

console:/ #
  
```

(2) Network connection test.

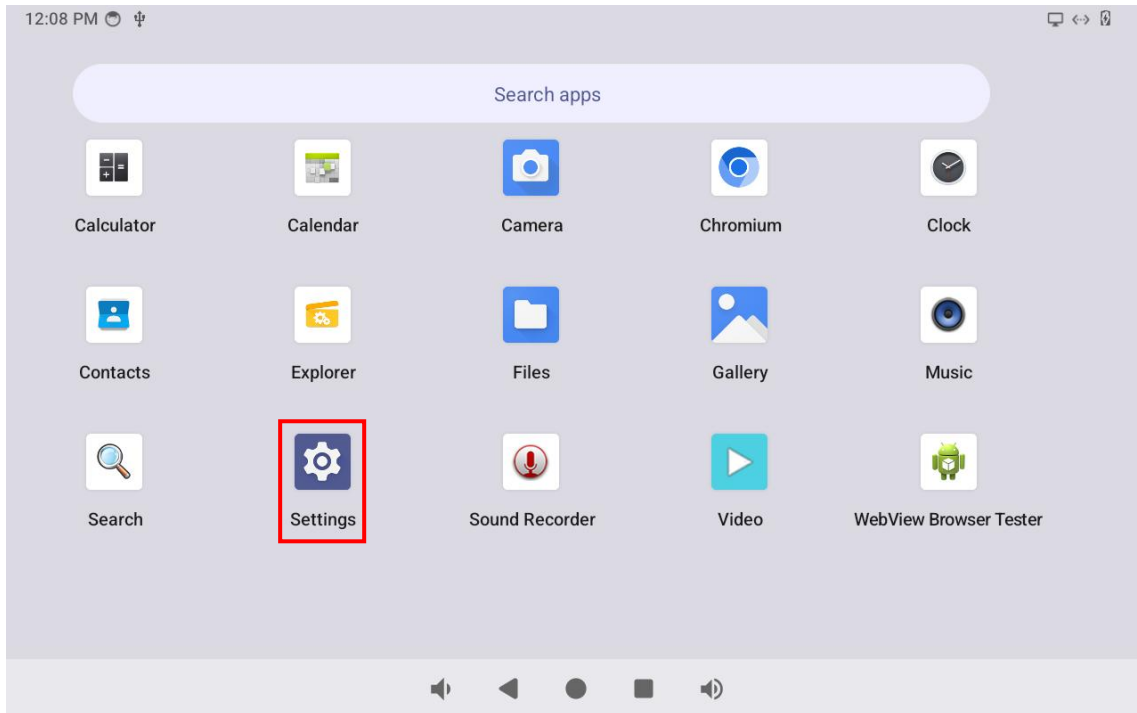
```
# ping -I wlan0 www.armdesigner.com
```

```

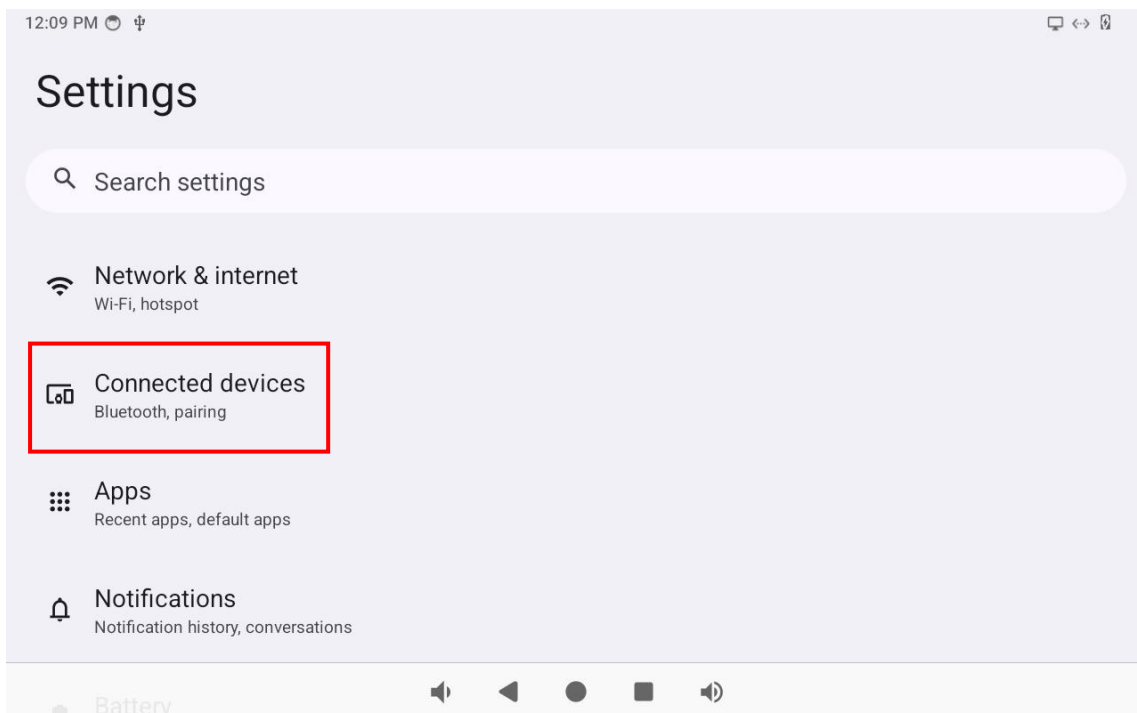
console:/ # ping -I wlan0 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 192.168.0.144 wlan0: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=48 time=196 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=48 time=189 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=48 time=189 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=48 time=225 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=48 time=248 ms
^C
--- www.armdesigner.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4464ms
rtt min/avg/max/mdev = 189.233/209.876/248.002/23.195 ms
console:/ #
  
```

6.7.2 Bluetooth

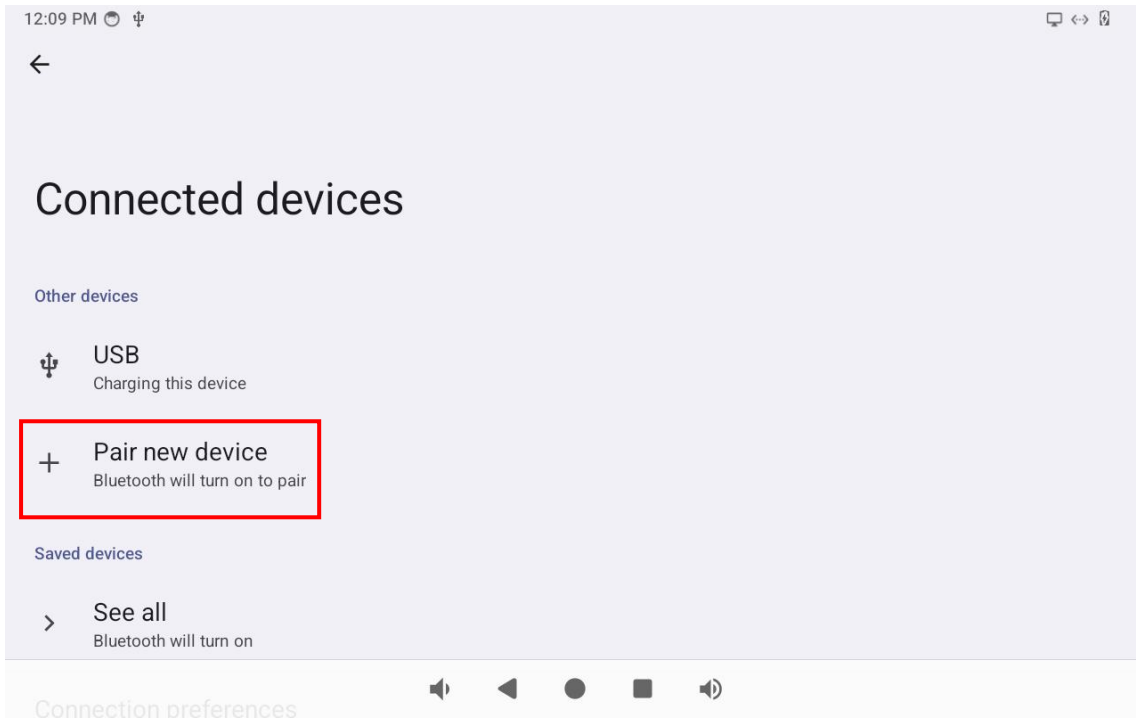
Step 1: Open the **Settings** app.



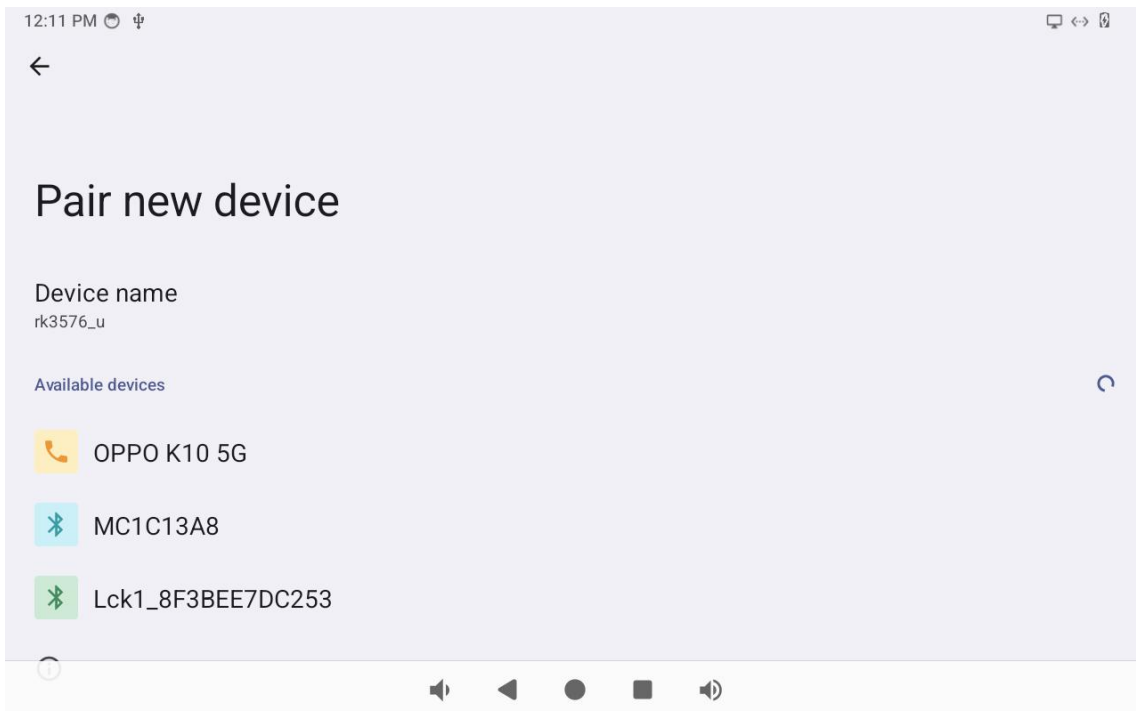
Step 2: Open the "Connected devices" option.



Step 3: Open the "Pair new device" option, and start scanning for devices.



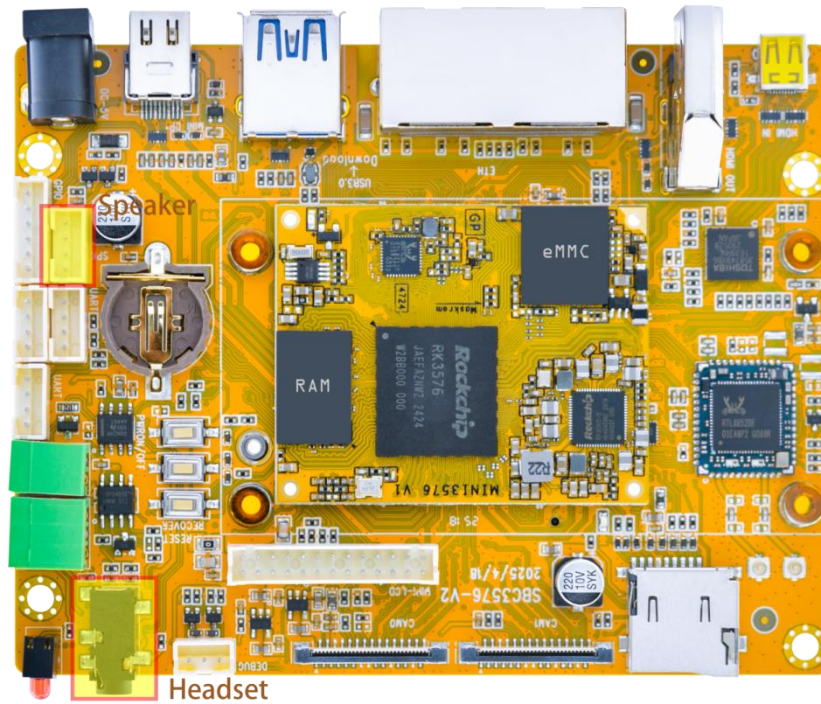
Step 4: User can pair themselves in the Bluetooth device list.



After successful configuration, Bluetooth devices can communicate with each other directly.

6.8 Audio

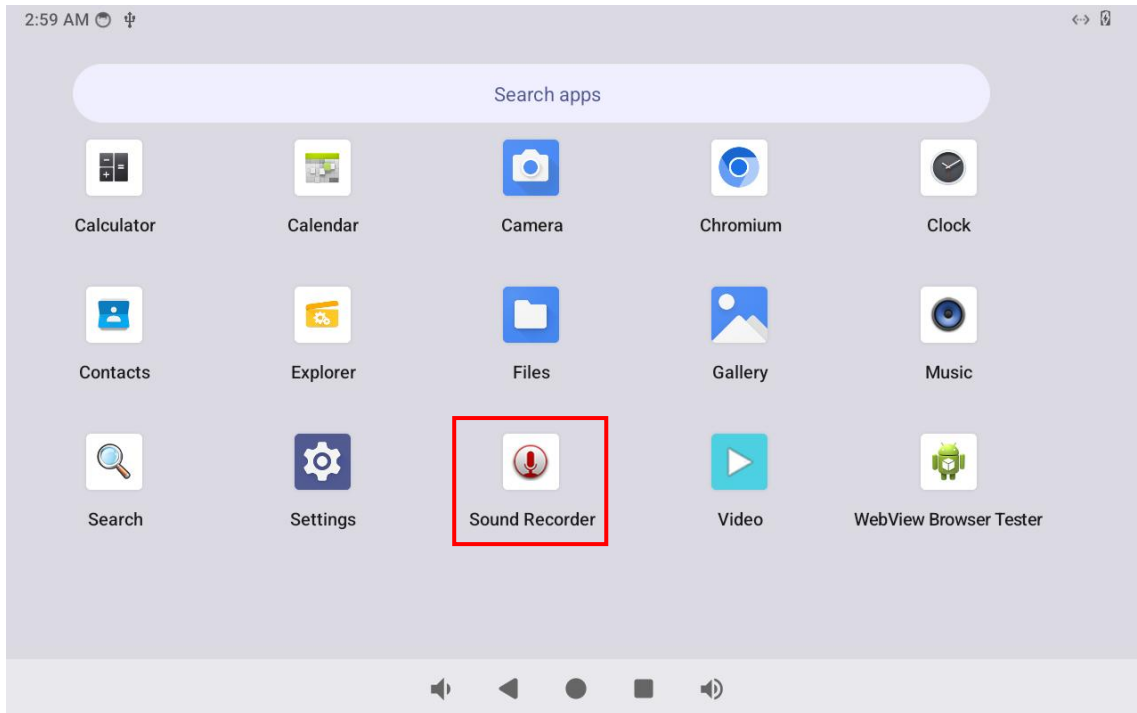
The audio input supports one channels: headset. And audio output supports two channels: headset and speaker.



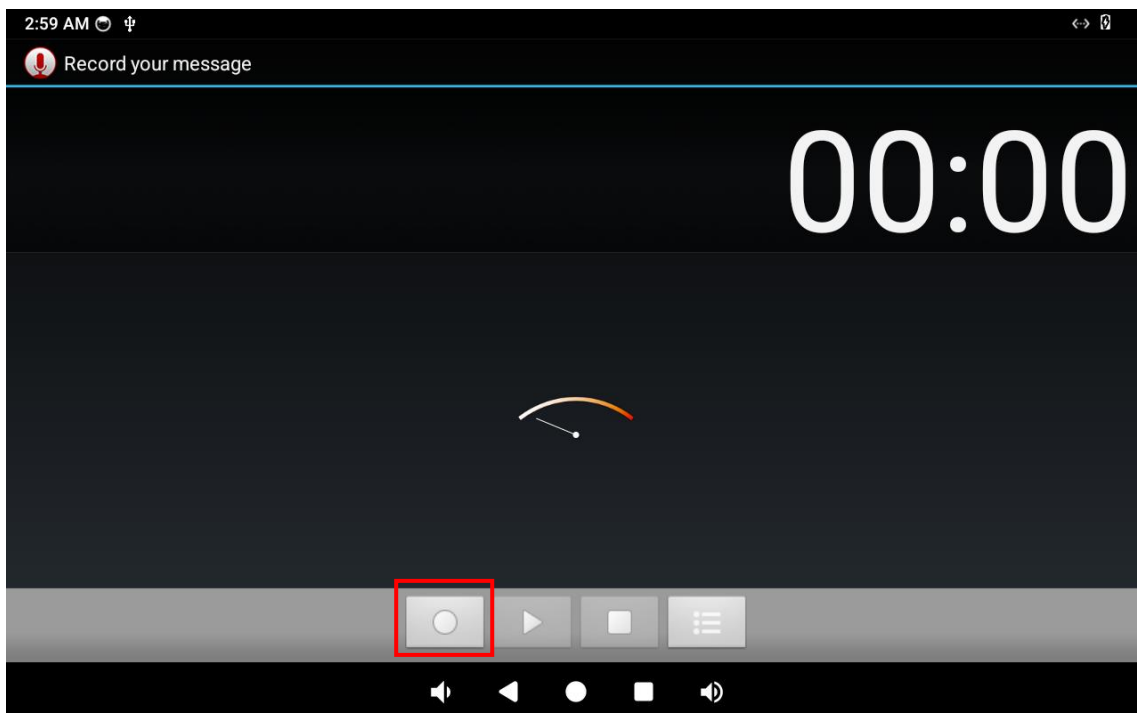
6.8.1 Audio input

Step 1, Connect MIC to the board.

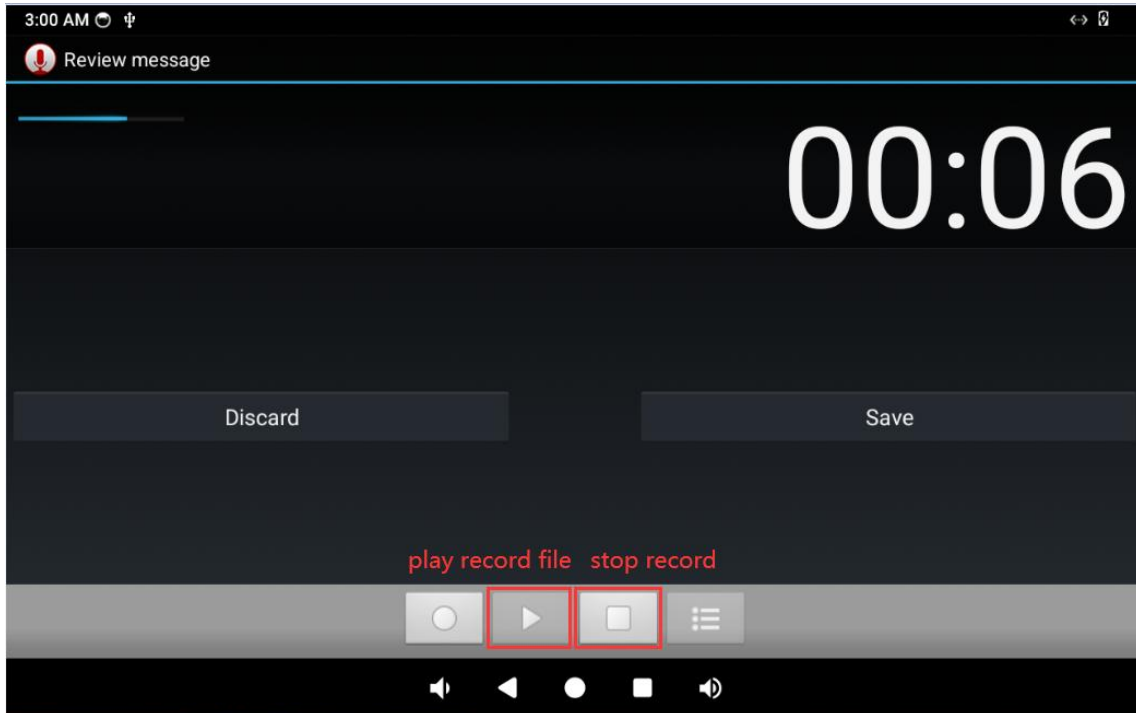
Step 2, open the **Sound Recorder** app for a recording test.



Step 3, Click the button as shown below to start recording.



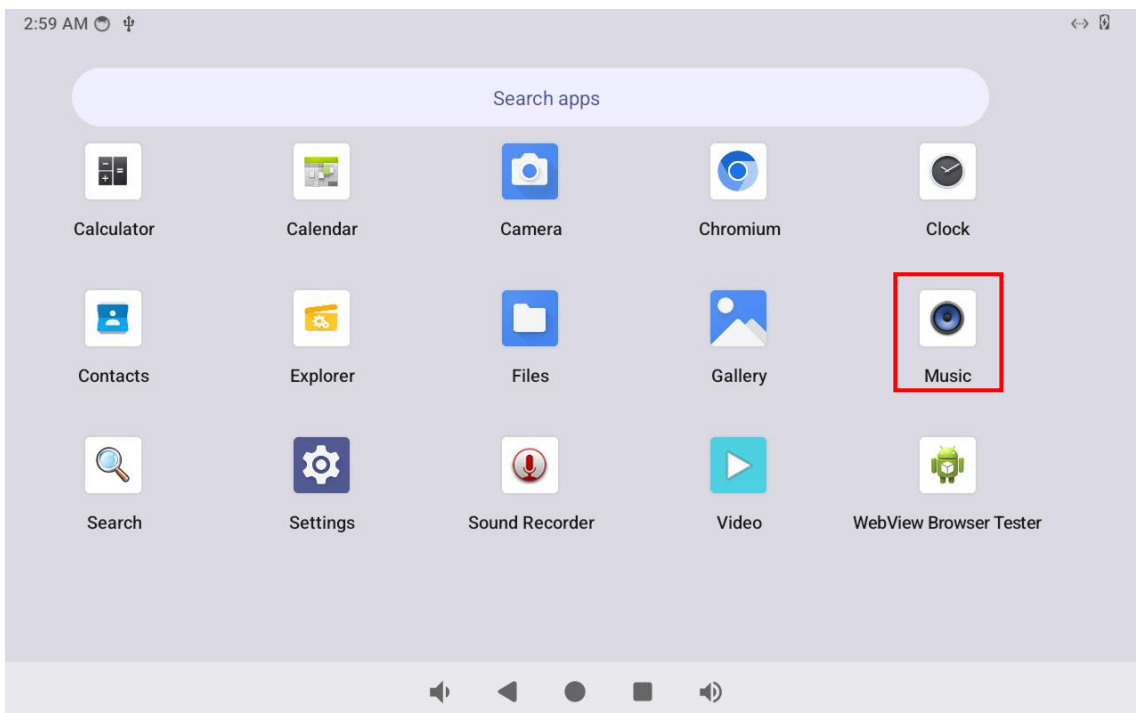
Step 4, click the button as shown below to stop recording and play.

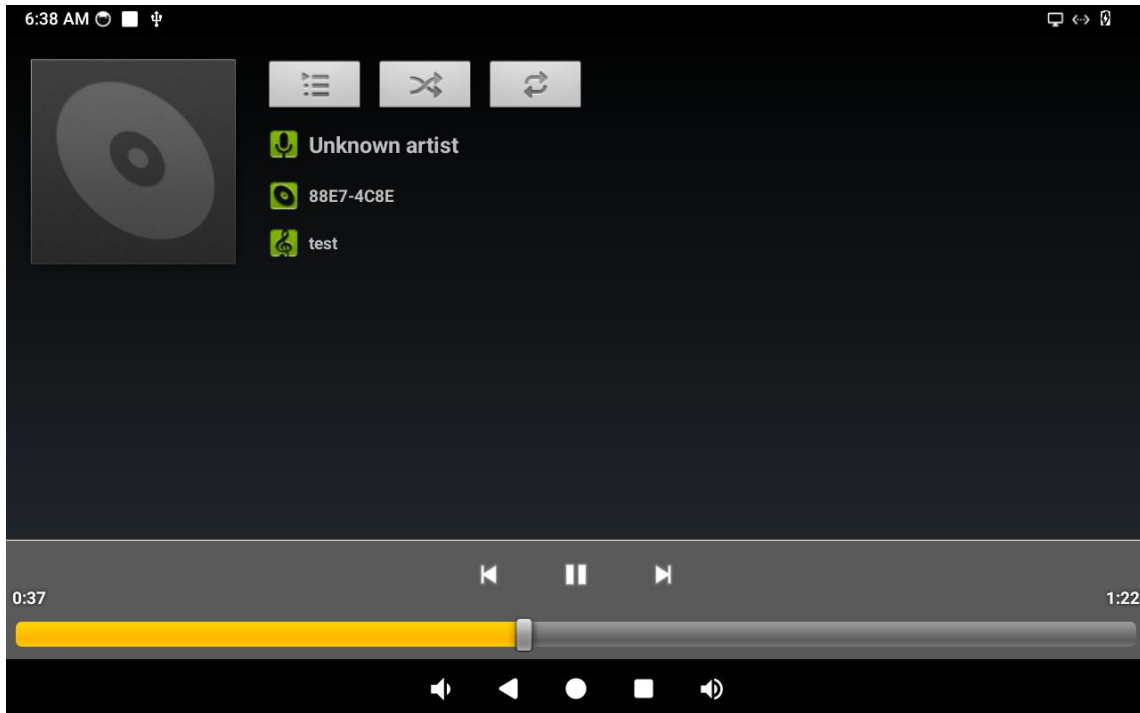


6.8.2 Audio output

- Test by APP

Open the **Music** app for a audio test.





6.9 RTC

Step 1: Install the coin cell battery.



Step 2: Set the system time.

```
# date -s "2025-06-24 09:45:00"
```

Step 3: Write the system time to the hardware clock.

```
# hwclock -w
```

Step 4: Display the current hardware clock time.

```
# hwclock
```

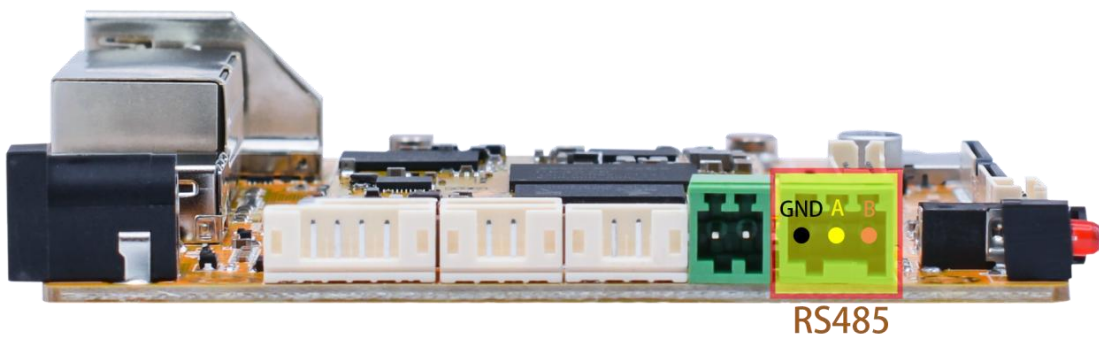
```
console:/# date -s "2025-06-24 09:45:00"
Tue Jun 24 09:45:00 AM UTC 2025
console:/# hwclock -w
console:/# hwclock
2025-06-24 09:45:07.797747+00:00
console:/# hwclock
2025-06-24 09:45:08.735005+00:00
console:/# hwclock
2025-06-24 09:45:09.686362+00:00
console:/# hwclock
2025-06-24 09:45:10.693603+00:00
console:/# hwclock
2025-06-24 09:45:11.773295+00:00
console:/#
```

Step 5: Power off, after a period of time to turn on the power again, check whether the time is saved.

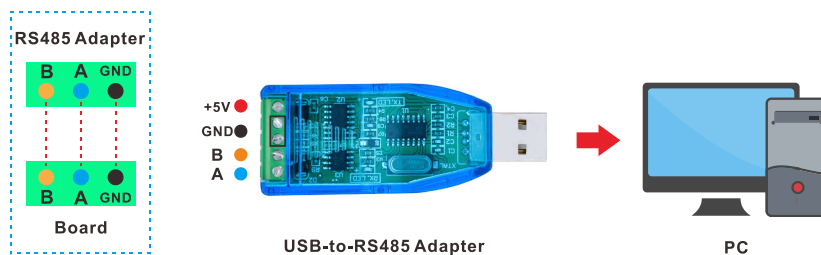
```
console:/# hwclock
2025-06-24 09:48:15.229967+00:00
console:/# hwclock
2025-06-24 09:48:16.782520+00:00
console:/# hwclock
2025-06-24 09:48:17.785984+00:00
console:/# hwclock
2025-06-24 09:48:18.779956+00:00
console:/#
```

The system time is automatically synchronized with the network time, execute “`hwclock -w`” the RTC time is synchronized with the system time.

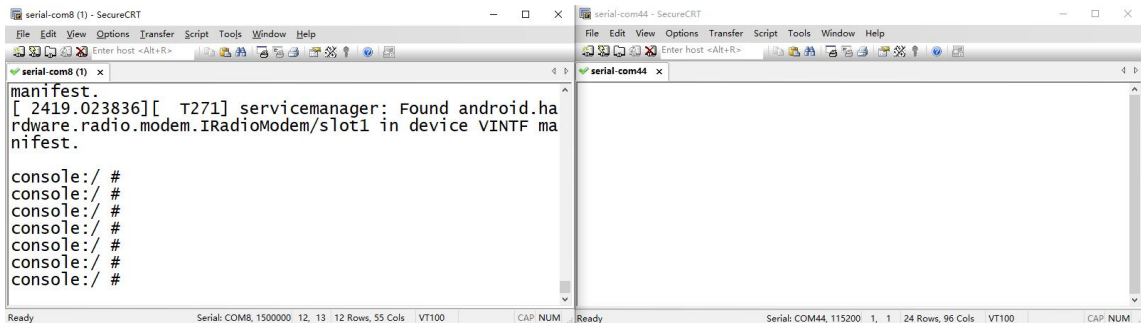
6.10 RS485



Step 1: As shown in the diagram, connect the RS485 test tool to the development board.

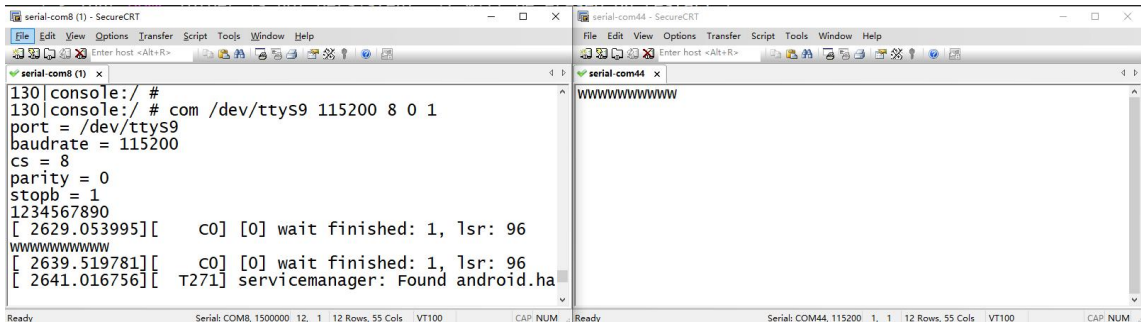


Step 2: Open the corresponding serial terminal, set the baud rate of the board to 1500000, and set the baud rate of the RS485 test tool to 115200.



Step 3: Execute the following command on the board to test the RS485 transmission and reception functionality.

```
# com /dev/ttyS9 115200 8 0 1
```



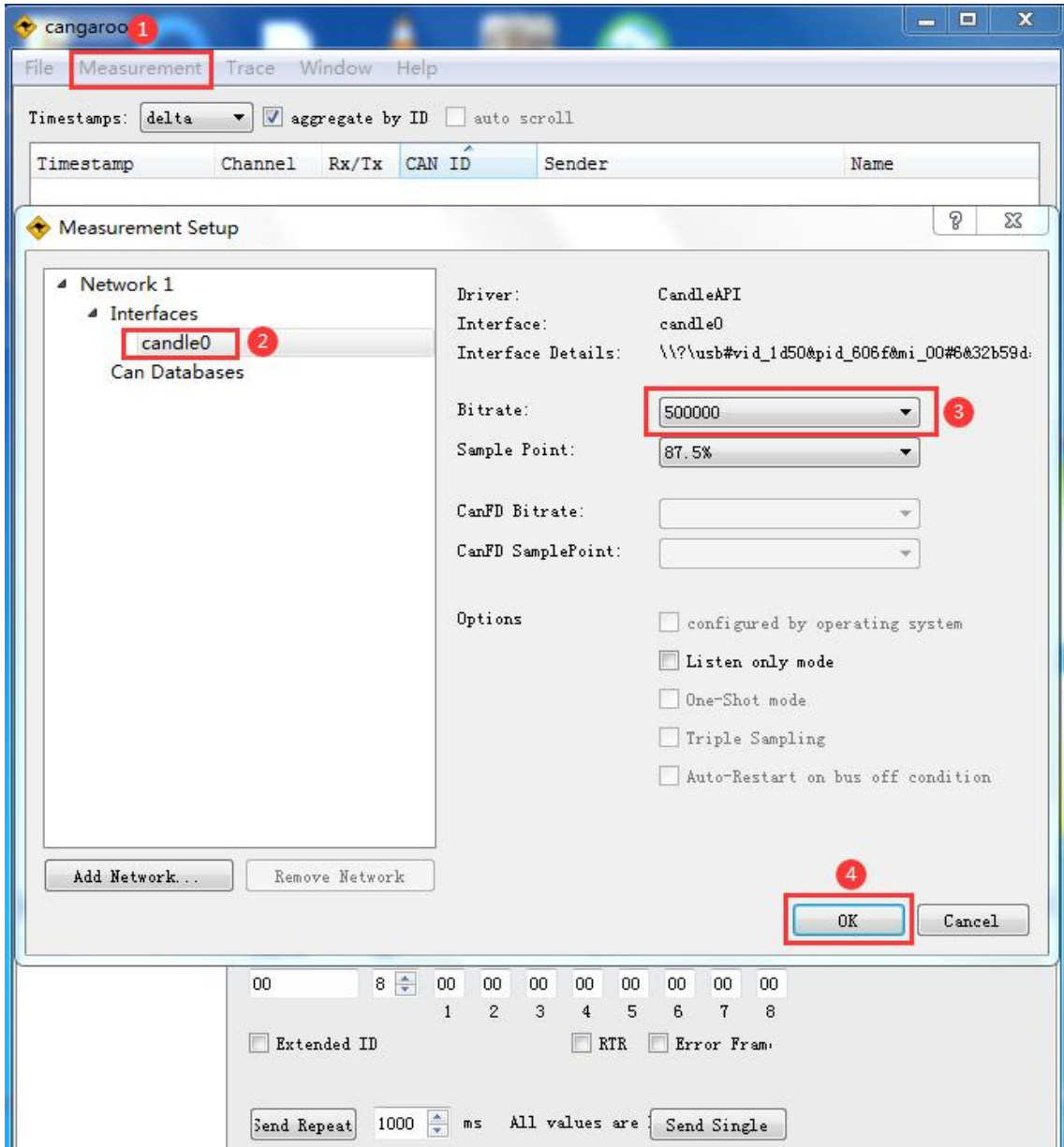
6.11 CAN



Step 1: Connect the CAN test tool to the board as shown in the diagram below.

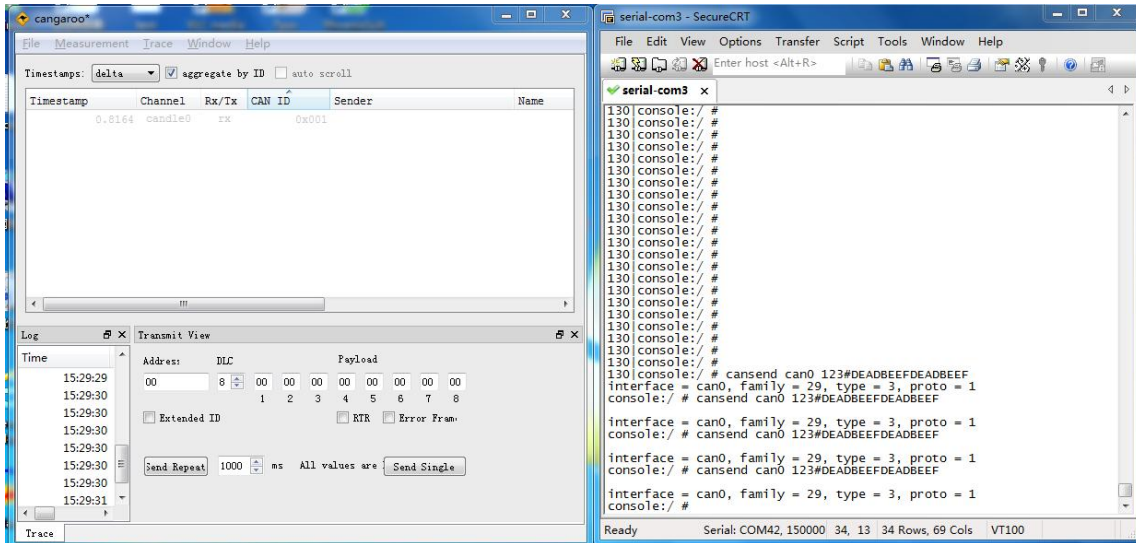


Step 2: Open the CAN test software and set the baud rate to 500000.



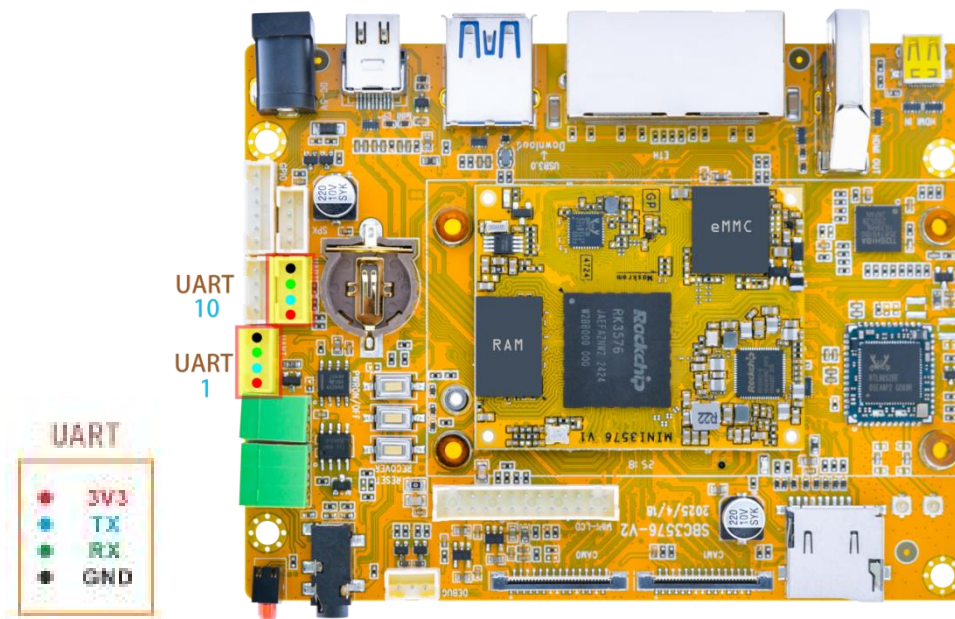
Step 3: Set up and activate the CAN network in CAN FD mode, with a nominal bitrate of 500000 and a data bitrate of 2000000.

```
# ip link set can0 down
# ip link set can0 type can bitrate 500000 dbitrate 2000000 fd on
# ip link set can0 up
```

6.12 UART

Step 1: Short circuit RX and TX pins of UART.



Step 2: UART10 test.

```
# com /dev/ttyS10 115200 8 0 1
```

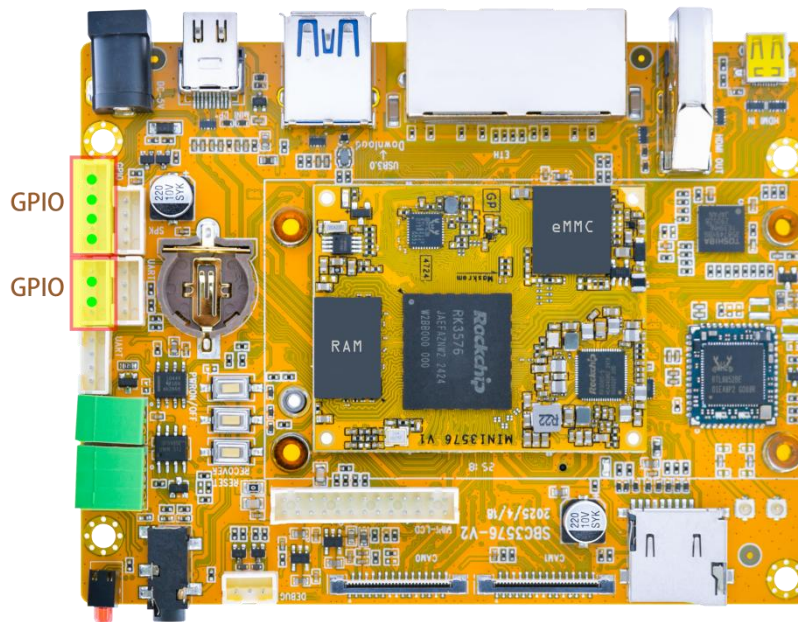
```
console:/# com /dev/ttyS10 115200 8 0 1
port = /dev/ttyS10
baudrate = 115200
cs = 8
parity = 0
stopb = 1
GGGGGGGGG
RECV: GGGGGGGGG
IIIIII2222
RECV: IIIIII2222
5656565656
RECV: 5656565656
UUU
RECV: UUU
```

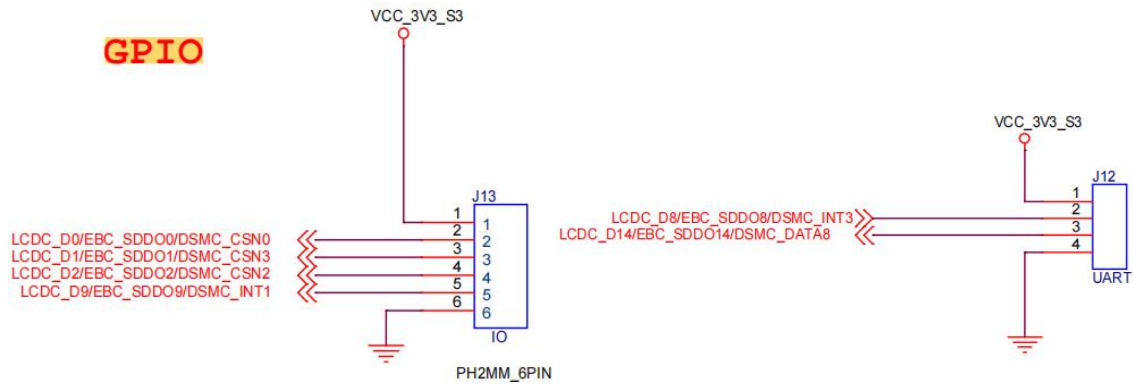
Step 3: UART1 test.

```
# com /dev/ttyS1 115200 8 0 1
```

```
console:/# com /dev/ttyS1 115200 8 0 1
port = /dev/ttyS1
baudrate = 115200
cs = 8
parity = 0
stopb = 1
HHHHHHHHHHHHHHHHHH
RECV: HHHHHHHHHHHHHHHHH
UUUUUUUUUUUUUUUU
RECV: UUUUUUUUUUUUUUU
^C
console:/#
```

6.13 GPIO





LCDDDO0/DSMC_CSN0 -> 114

LCDC_D1/EBC_SDDO1/DSMC_CSN3 -> 121

LCDC_D2/EBC_SDDO2/DSMC_CSN2 -> 122

LCDC_D9/EBC_SDDO9/DSMC_INT1 -> 123

LCDC_D8/EBC_SDDO8/DSMC_INT3 -> 109

LCDC_D14/EBC_SDDO14/DSMC_DATA8 -> 115

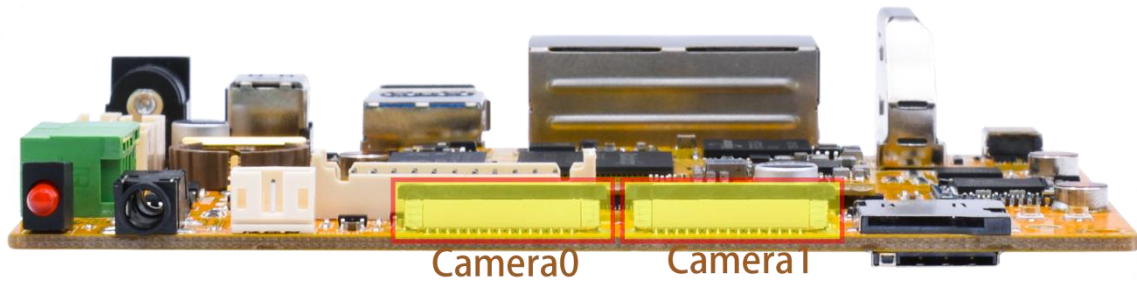
Execute the follow command to test GPIO.

```
# echo 114 > /sys/class/gpio/export
# echo "out" > /sys/class/gpio/gpio114/direction
# echo 0 > /sys/class/gpio/gpio114/value // The GPIO will output low voltage
# echo 1 > /sys/class/gpio/gpio114/value //The GPIO will output high voltage
```

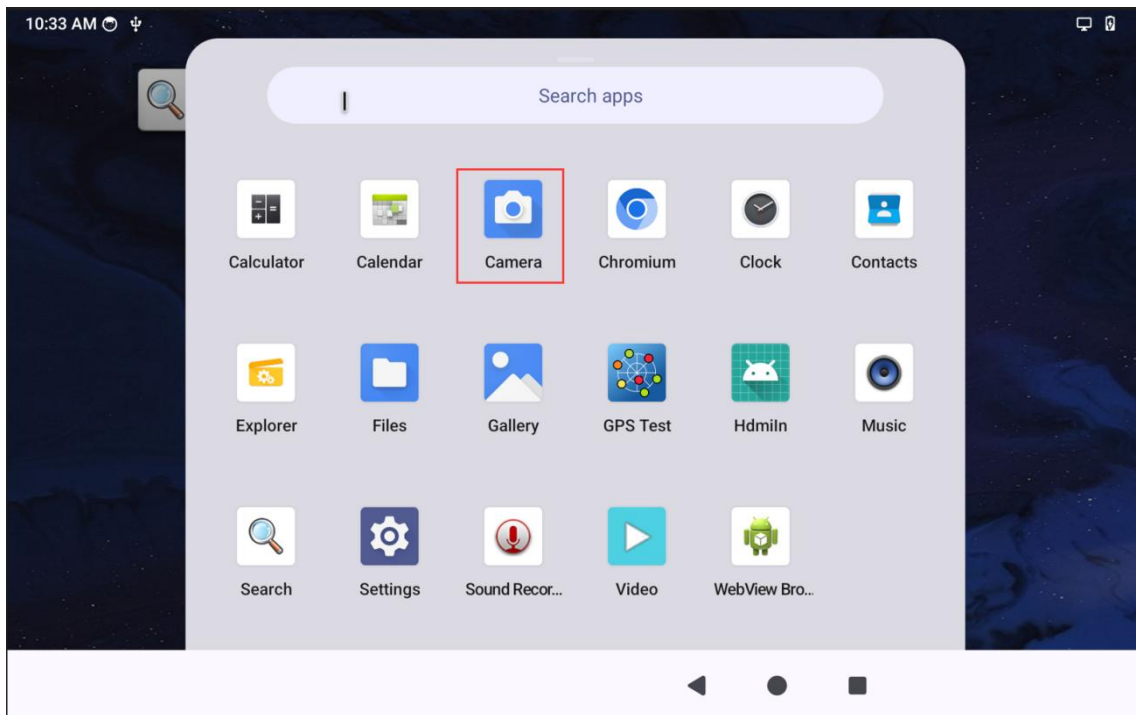
```
console:/# echo 114 > /sys/class/gpio/export
console:/# echo "out" > /sys/class/gpio/gpio114/direction
console:/#
console:/# echo 0 > /sys/class/gpio/gpio114/value
console:/#
console:/# echo 1 > /sys/class/gpio/gpio114/value
console:/# echo 0 > /sys/class/gpio/gpio114/value
```

Other GPIO use same test method.

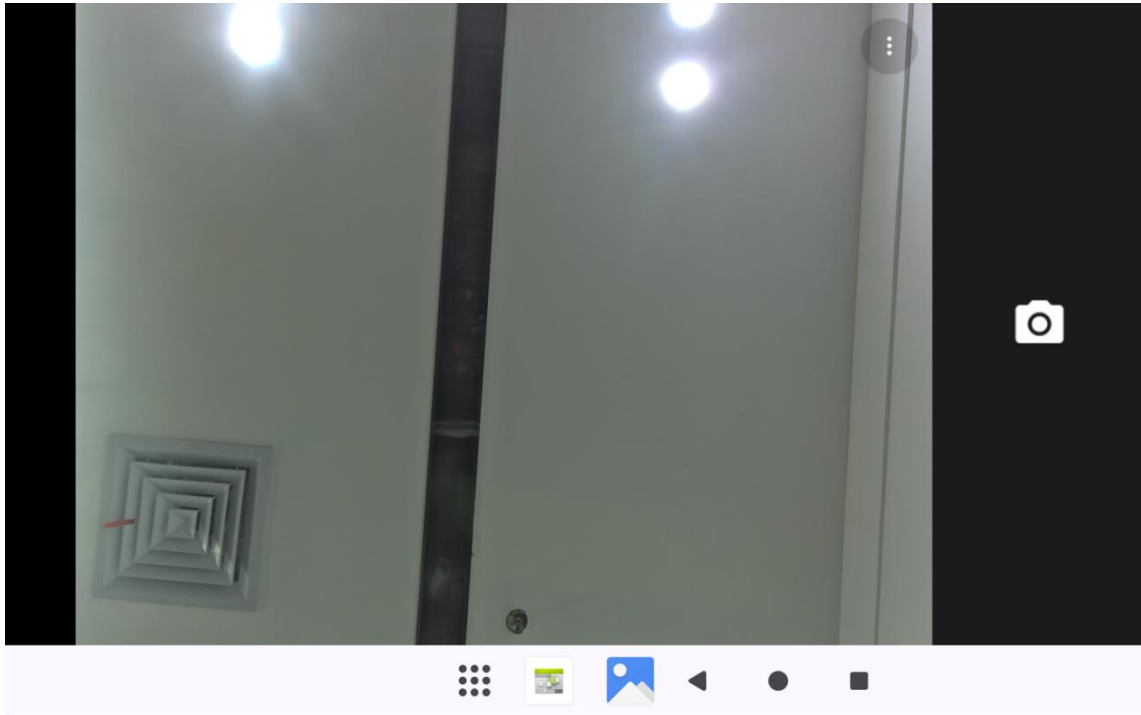
6.14 Camera



Step 1: Open the **Camera** app.

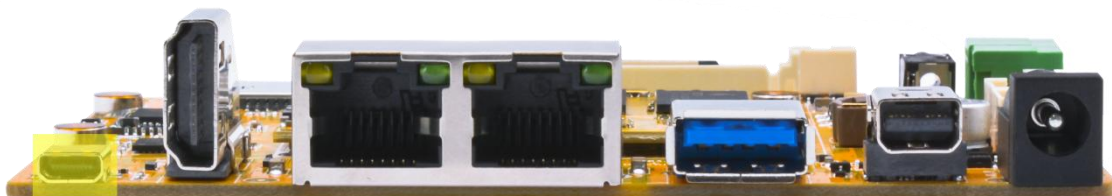


Step 2: Take a picture.



6.15 Video Playback

6.16 HDMI IN



HDMI IN

After connecting the HDMI OUT port of the source device to the HDMI IN port of the SBC3576, The log will show:

```
console:/# [ 141.717188] m03_b_tc35874x 4-000f: tc35874x_format_change: New format: 1920x1080p60.00 (2200x1125)
```

then execute the following commands to start the preview.

- **Video Preview:**

Step 1, open **HdmiIn** application on sbc3576 will display the screen of output device.

