

SBC1126B Linux6.1 User Manual

V2.1



Boardcon Embedded Design

Overview

This document applies only to the SBC1126B development board. It is intended to help users quickly understand the hardware interfaces of the board and provides guidance for environment setup, source code compilation, firmware flashing, and functional testing of onboard hardware interfaces.

System Support

Development Board	Debian12	Buildroot
Tiny1126B-V2 + SBC1126B-V2	Y	Y

Revision History

Version	Date	Author	Revision History
V2.1	2026-07-09	Liu Yuan	Update vision

Disclaimer

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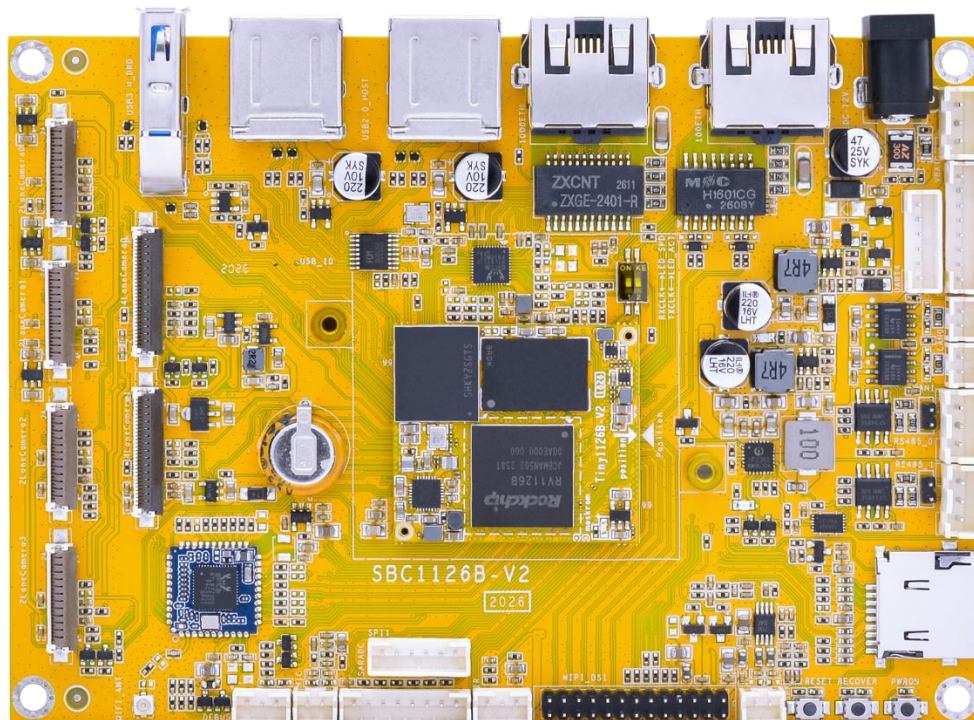
1. Introduction

1.1 Overview

SBC1126B is an embedded AI vision development board based on the Rockchip RV1126B processor. It uses the removable Tiny1126B core board and is suitable for AI vision, intelligent recognition, security monitoring, industrial control, and edge computing applications.

The board provides rich peripheral interfaces for product development and integration, including four camera inputs, MIPI DSI display output, USB3.0 DRD, dual USB2.0, 100M/1000M Ethernet, Wi-Fi/BT, CAN, RS485, UART, SPI, ADC, GPIO, IR, MicroSD, RTC battery, MIC input, speaker output, and audio loopback support.

With its core-board and carrier-board design, SBC1126B offers good flexibility and maintainability. The removable Tiny1126B core board allows easier replacement, maintenance, and future upgrades, making it suitable for both development evaluation and product deployment.

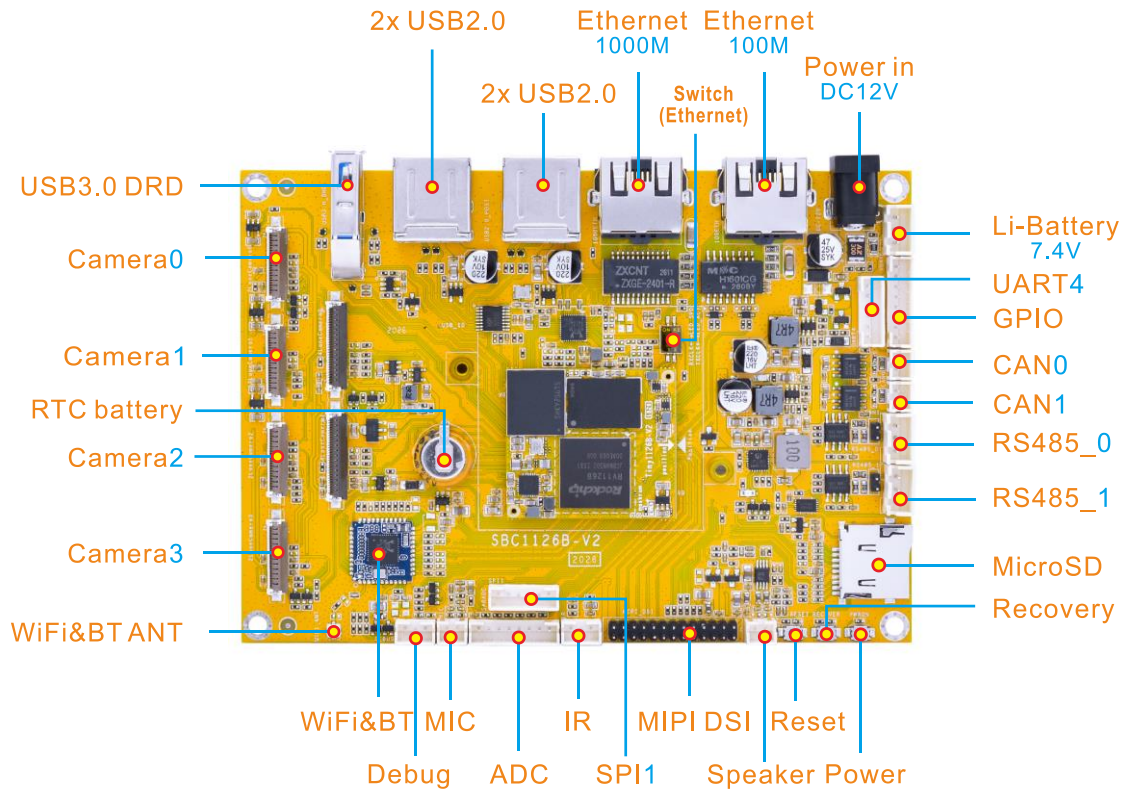


1.2 Product Parameters

Basic Parameters		
SOC		RV1126B
CPU		• Quad-core Arm Cortex-A53 64-bit processor • Neon SIMD and FPU support • 32 KB I-cache and 32 KB D-cache per core • 512 KB unified L2 cache
NPU		• Up to 3 TOPS AI computing power • Supports INT4, INT8, INT16, and FP16 operations • Supports mainstream AI frameworks, including TensorFlow, Caffe, TFLite, PyTorch, ONNX NN, and Android NN
Video	Decoder	• H.265/H.264 video decoding up to 3840×2160@30fps • JPEG decoding
	Encoder	• H.265/H.264 video encoding up to 3840×2160@30fps • JPEG encoding
AI-ISP		• Built-in AI-ISP engine • Supports up to 8MP@30fps • Supports AI-assisted image enhancement and spatial noise reduction
RAM		2GB LPDDR4x (up to 4GB)
ROM		8GB eMMC (up to 256GB)
Support system		Debian, Buildroot
Hardware Parameters		
Extended Storage		• Support 1x MicroSD Card
Display		• Support 1x DSI MIPI
Audio		• Support 1x Speaker

	• Support 1x MIC
USB	• Support 4x USB2.0 • Support 1x USB3.0 DRD
Network	• Support 1x 100M Ethernet • Support 1x 1000M Ethernet • Support 1x WIFI/BT module
Camera	• Support 4x Camera
Peripheral communication	• Support 1x SPI • Support 2x RS485 • Support 1x UART • Support 2x CAN
Other parameters	Support 1xDebug UART, 1xADC, 1xIR, 1xRTC, 1x Lion Battery connector
Electrical Parameters	
Power supply input voltage	12V/3A
RTC input voltage	3V/0.6uA
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C
Structural Parameters	
Core board dimensions	34.0mm x 30.0mm
Motherboard dimensions	135.0mm x 95.0mm

1.3 Hardware Interface Introduction



Interface parameters	
Power in DC 12V	12V DC power input interface
Ethernet 100M	100M Ethernet RJ45 interface
Switch(Ethernet)	100Mbps/1000Mbps Ethernet Speed Switch
Ethernet 1000M	1000M Ethernet RJ45 interface
2x USB2.0	Dual-layer USB2.0 HOST interface
2x USB2.0	Dual-layer USB2.0 HOST interface
USB3.0 DRD	USB 3.0 DRD interface, supporting Host and Device modes
Camera0	Camera0 interface
Camera1	Camera1 interface
Camera2	Camera2 interface
Camera3	Camera3 interface

RTC battery	RTC battery interface
WIFI&BT	WIFI and Bluetooth module
WIFI&BT ANT	Wi-Fi/Bluetooth antenna interface
Debug	Debug serial port
MIC	Differential microphone input
ADC	ADC interface
IR	IR interface
SPI1	SPI interface
MIPI DIS	MIPI display interface
Speaker	Speaker output
Reset	Reset key
Power	Power key
Recovery	Recovery key
Mirco SD	MicroSD card slot
RS485_1	RS485 communication interface 1
RS485_0	RS485 communication interface 0
CAN1	CAN1 communication interface
CAN0	CAN0 communication interface
GPIO	GPIO expansion interface
UART4	UART4 serial communication interface
Li-Battery 7.4V	7.4V Lion Battery interface

2. Install Drivers and Tools

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 Assistant	DriverInstall.exe	OTG USB driver installation assistant
2	CH9102x	SETUP.EXE	Serial port debugging driver
3	Serial Terminal Tool	SecureCRT.exe	Debugging tool

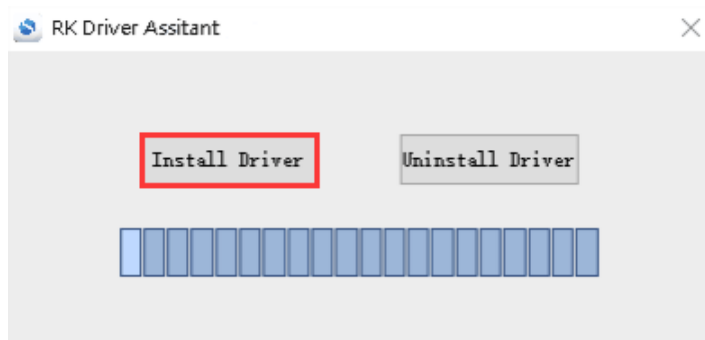
2.1 Install RK Driver Assistant

Step 1: Open [DriverAssistant/DriverInstall.exe](#).

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

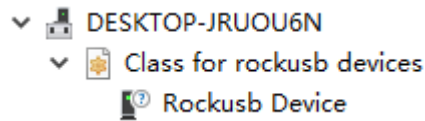


Step 3: Click button “**Install Driver**” to install.

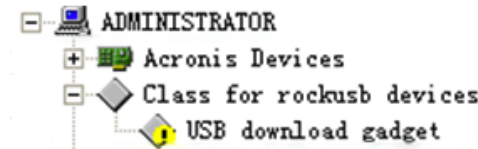


Step 4: After the installation is complete, connect the board and PC with USB_A cable and press the **Recovery** key and hold then power the board, the following information is displayed in the Computer **Device Manager**, indicating that the USB driver was

successfully installed.

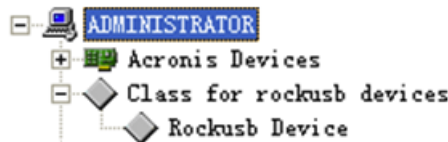


Step 5: If the following device information appears in the **Device Manager** after the operation in Step 4, user need to proceed to the next step.



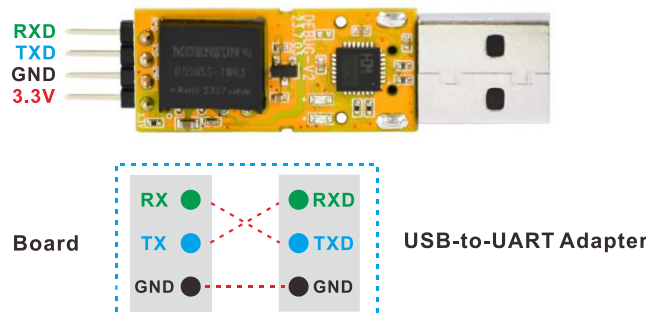
Step 6: The WINDOW will pop up found New Hardware Wizard dialog box, choose to install from the specified location, and then select: *DriverAssistant/ADBDriver*.

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



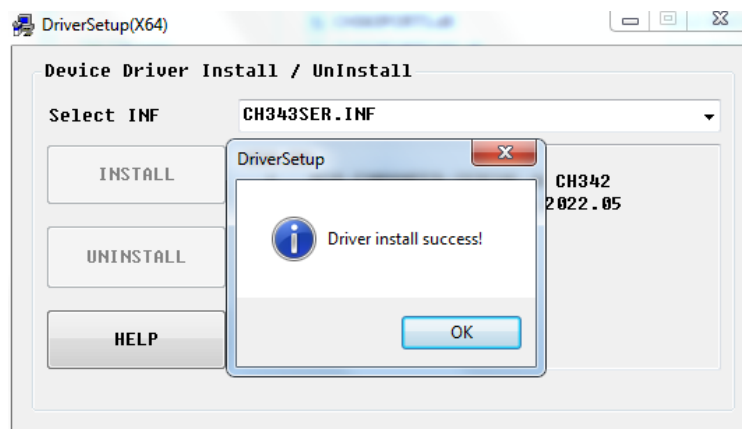
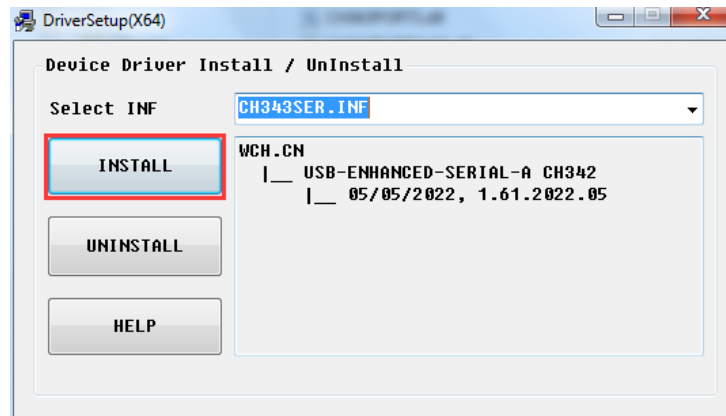
Pin	Connection Description
RXD	Receive, connect to TX pin of the board.
TXD	Transmit, connect to RX pin of the board.
GND	Ground, connect to GND pin of the board.
3V3	No need to connect.

2.2.2 Install Driver

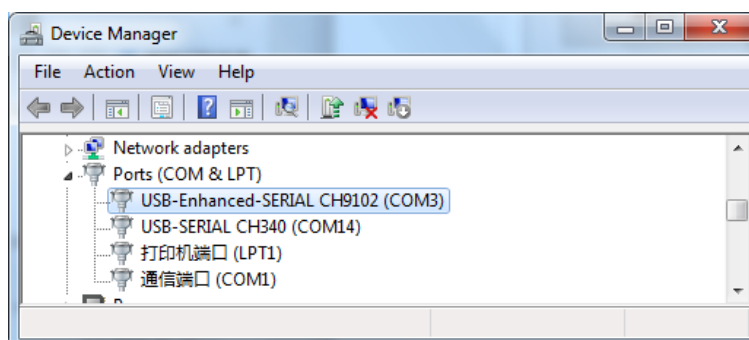
Step 1: Connect the CH9102X module to the PC.

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.

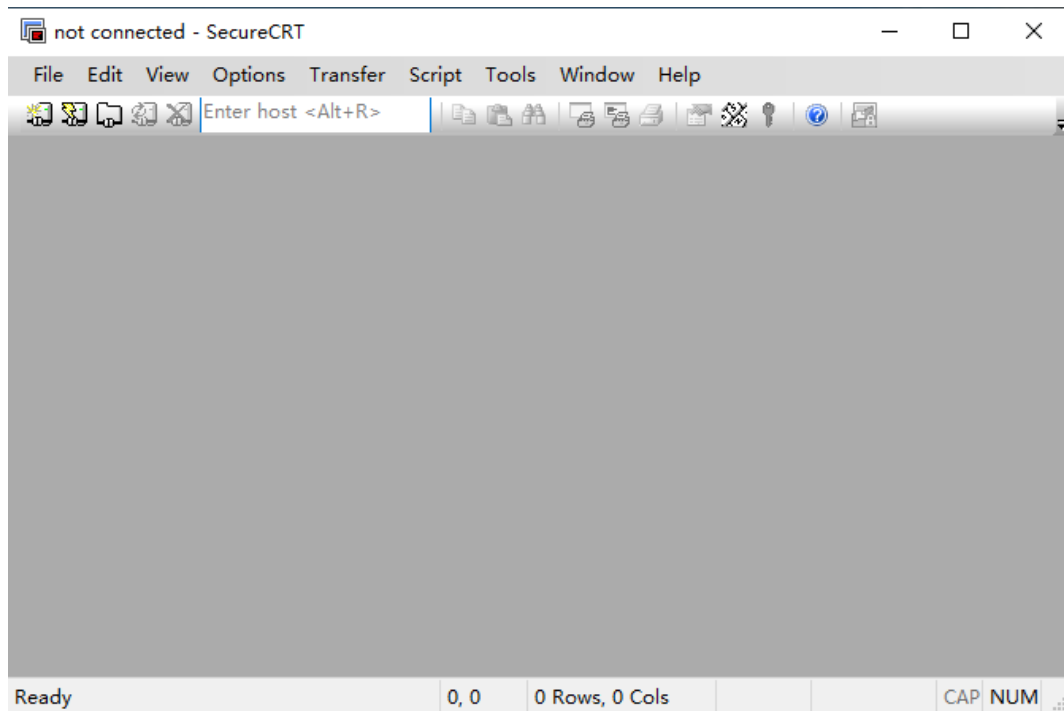


2.3 Install Serial Terminal Tool

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

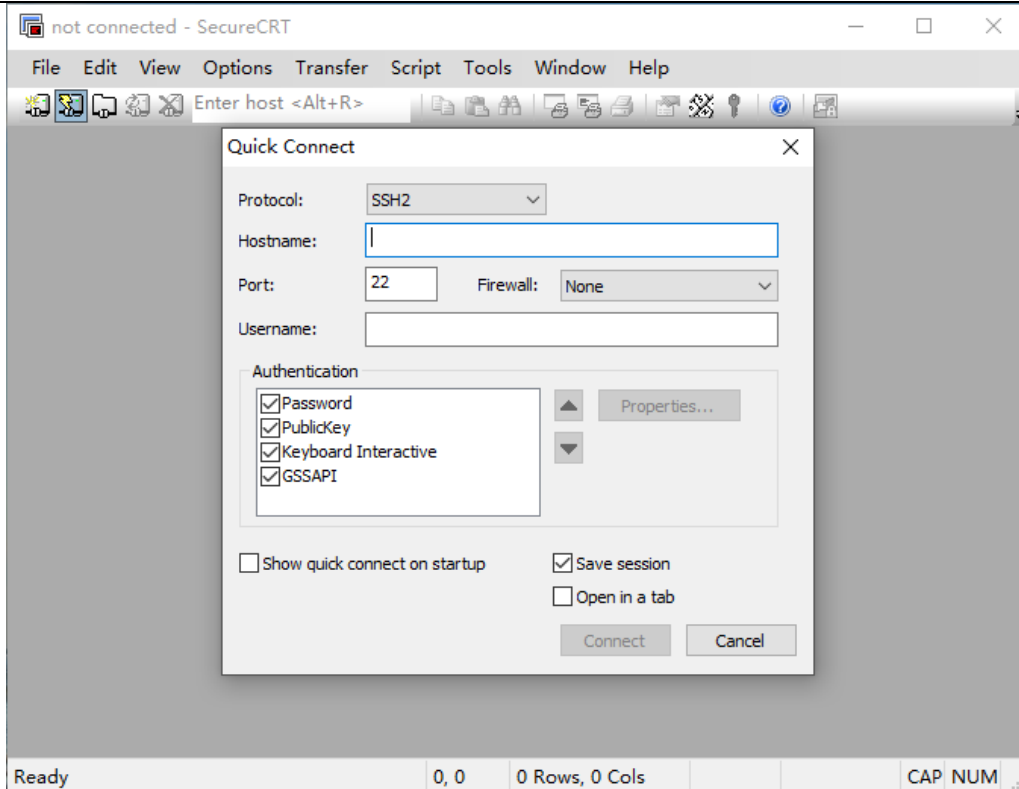
Step 1: Unzip *Platform/SecureCRT.rar* on PC.

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

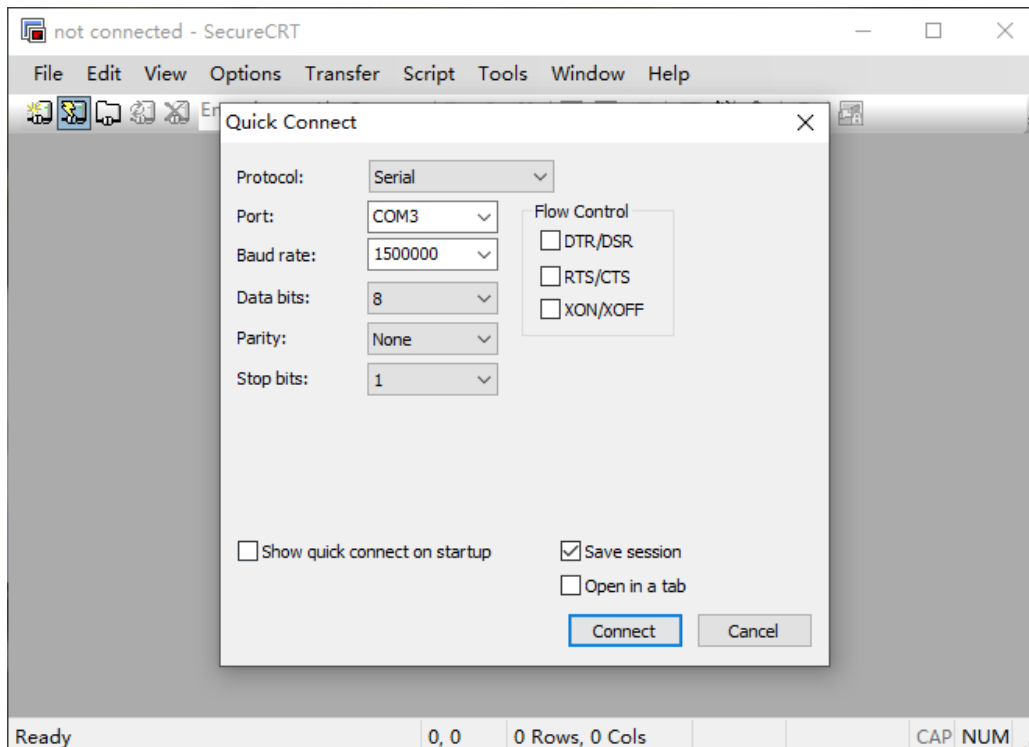


Step 3: Confirm that the CH9102X driver has been installed and the CH9102X module is connected to the PC.

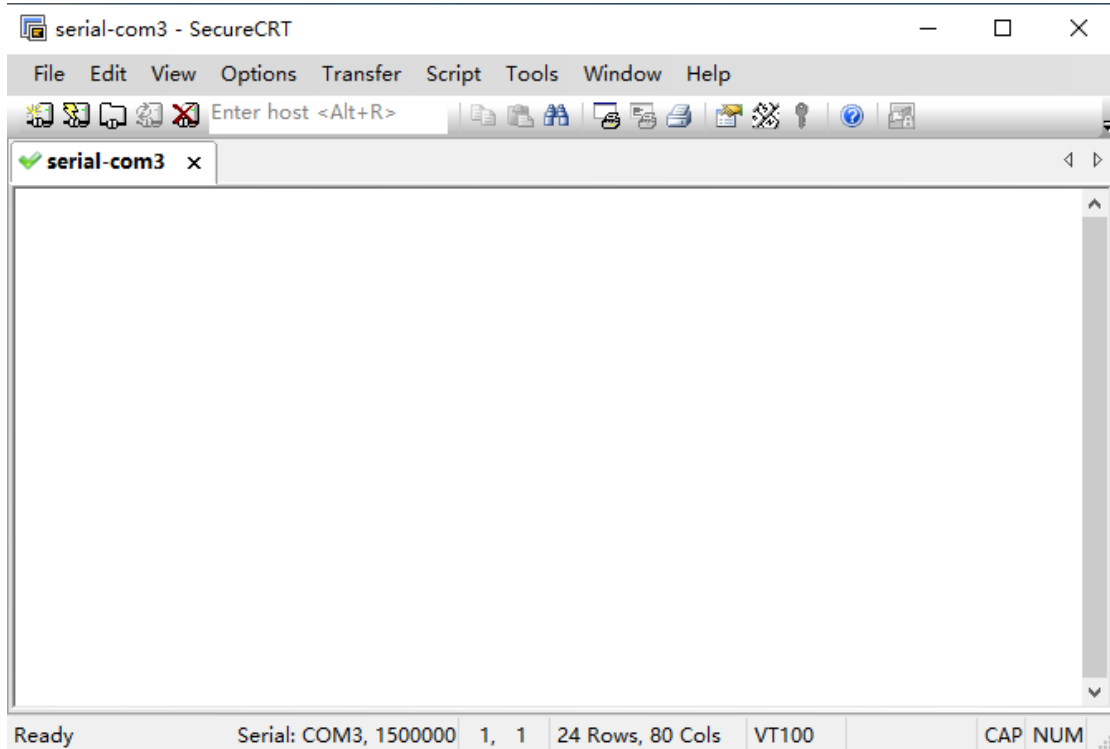
Step 4: Click the “**Quick Connect**” button to go to the Quick Connect configuration screen.



Step 5: Configure as shown in the following figure.



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



3. Upgrade Introduction

3.1 Upgrade Mode

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

1. Loader Mode:

Loader Mode is the standard mode used for firmware upgrade.

2. MaskRom Mode:

MaskRom Mode is a recovery mode used when the device cannot enter Loader Mode or fails to boot properly. Entering MaskRom Mode requires hardware operation and may involve certain risks. It is recommended to use this mode only when Loader Mode is unavailable.

Prerequisite:

Before upgrading the firmware via USB cable, make sure the required USB driver has been installed on the PC. For driver installation instructions, refer to the section [2.1 Install](#)

RK Driver Assistant.

3.1.1 How to Enter Loader Mode

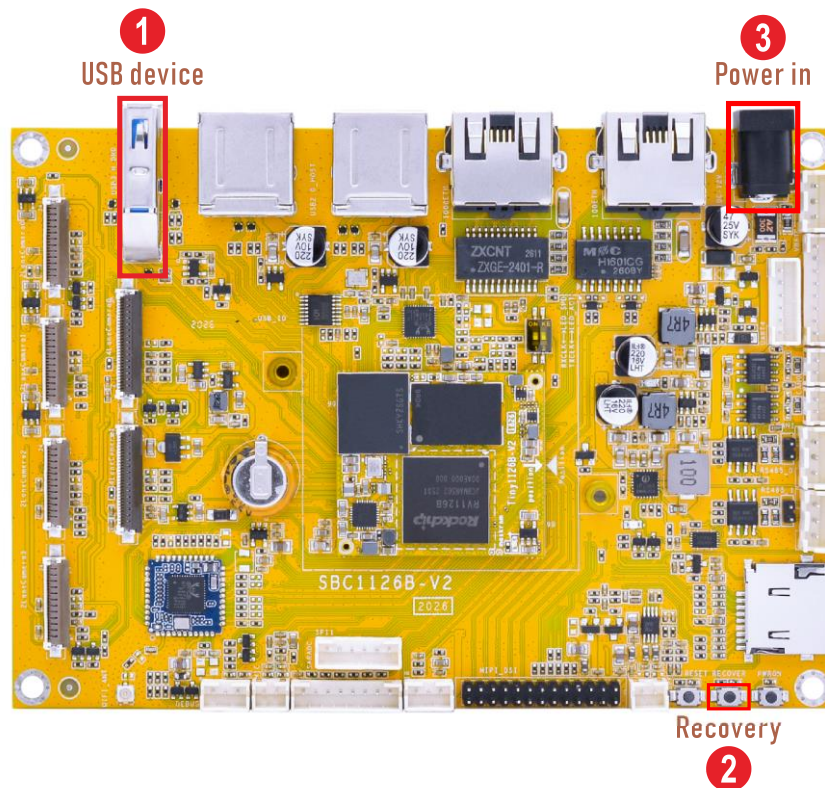
3.1.1.1 Hardware

Step 1: Disconnect the power adapter.

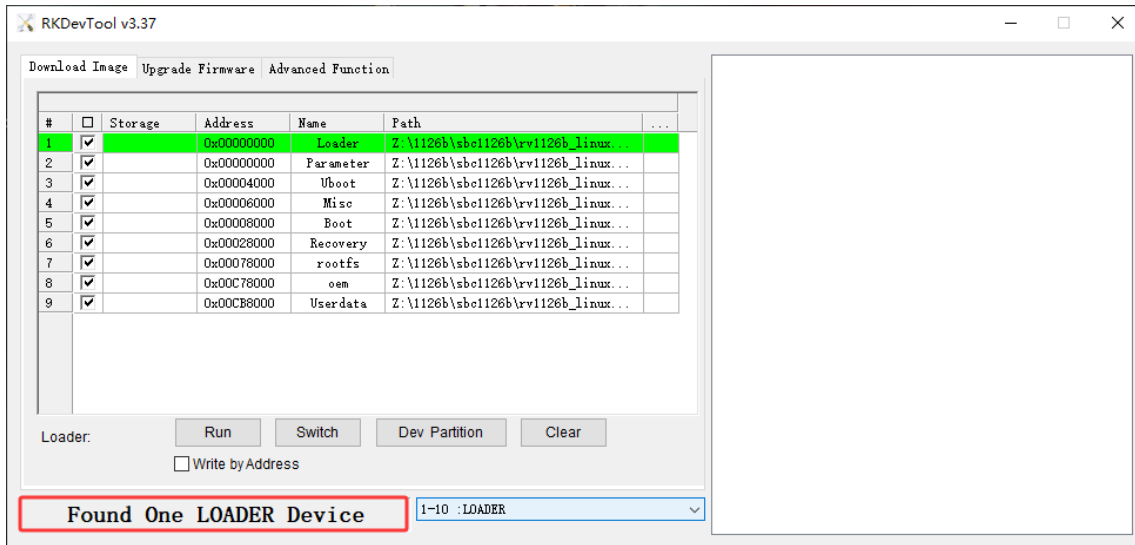
Step 2: Connect one end of the USB-A cable to the host PC and the other end to the development board.

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 Method

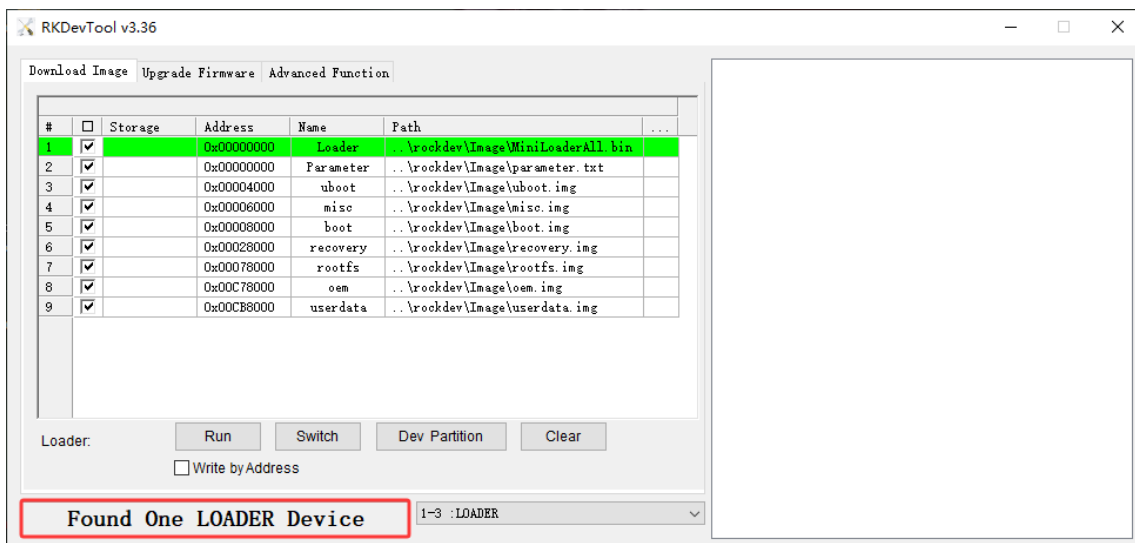
After the USB_A cable is connected and the board is powered on, run the following command from the serial debug terminal or ADB shell:

```
# reboot loader
```

3.1.1.3 Serial Terminal Method

Step 1: Connect one end of the USB_A cable to the host PC and the other end to the development board, then open the serial debug terminal.

Step 2: Press and hold **Ctrl + D** in the serial terminal, then power on the board. Release **Ctrl + D** when the flashing tool shows “**Found one LOADER Device**”.

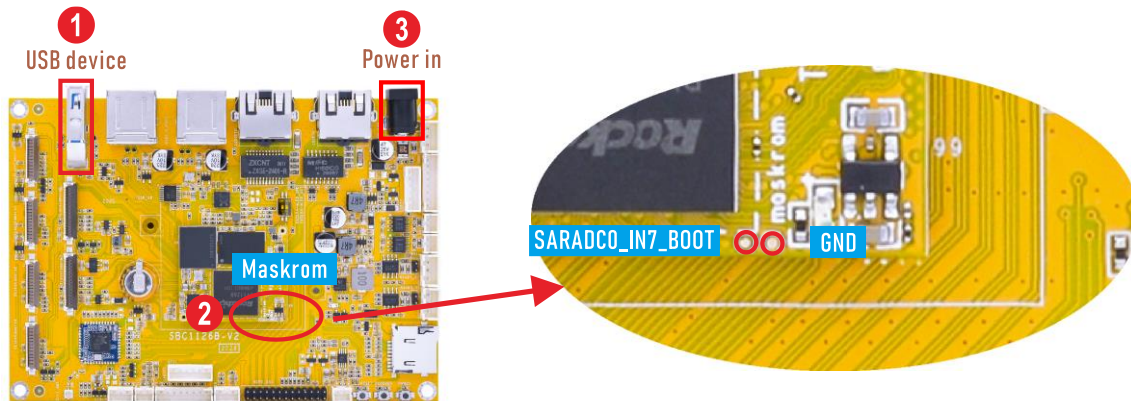


3.1.2 How to Enter MaskRom Mode

Step 1: Disconnect the power adapter.

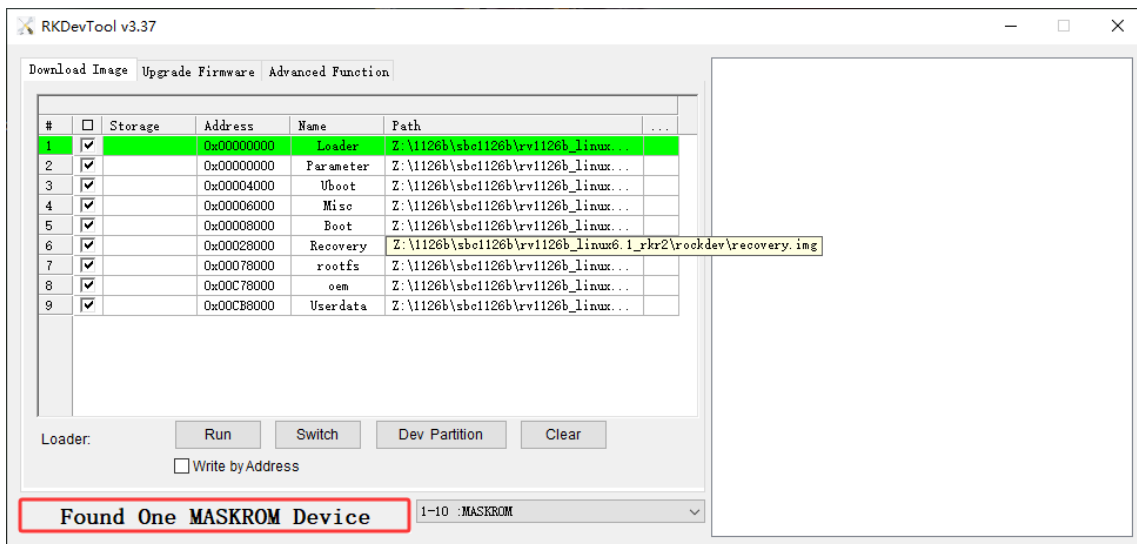
Step 2: Connect one end of the USB-A cable to the host PC and the other end to the development board.

Step 3: Use tweezers to short the two MaskRom test points on the Tiny1126B.



Step 4: While keeping the test points shorted, connect the power supply.

Step 5: After the flashing tool shows “**Found one MASKROM Device**”, release the tweezers. The device has now entered MaskRom mode.

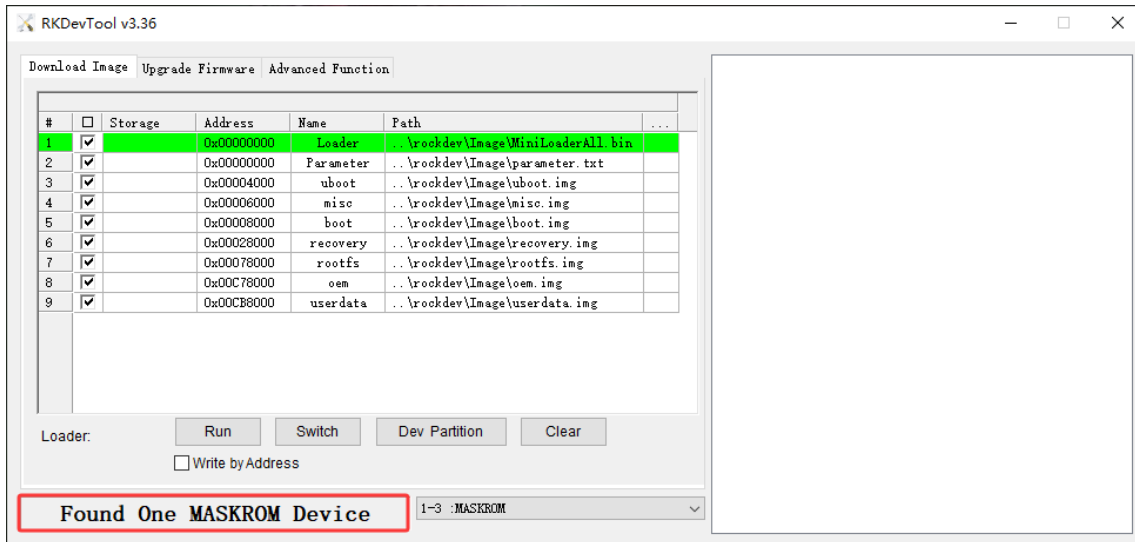


3.1.2.2 Serial Terminal Method

Step 1: Connect one end of the USB_A cable to the host PC and the other end to the development board, then open the serial debug terminal.

Step 2: Press and hold **Ctrl + B** in the serial terminal, then power on the board. Release

Ctrl + B when the flashing tool shows “Found one MASKROM Device”.

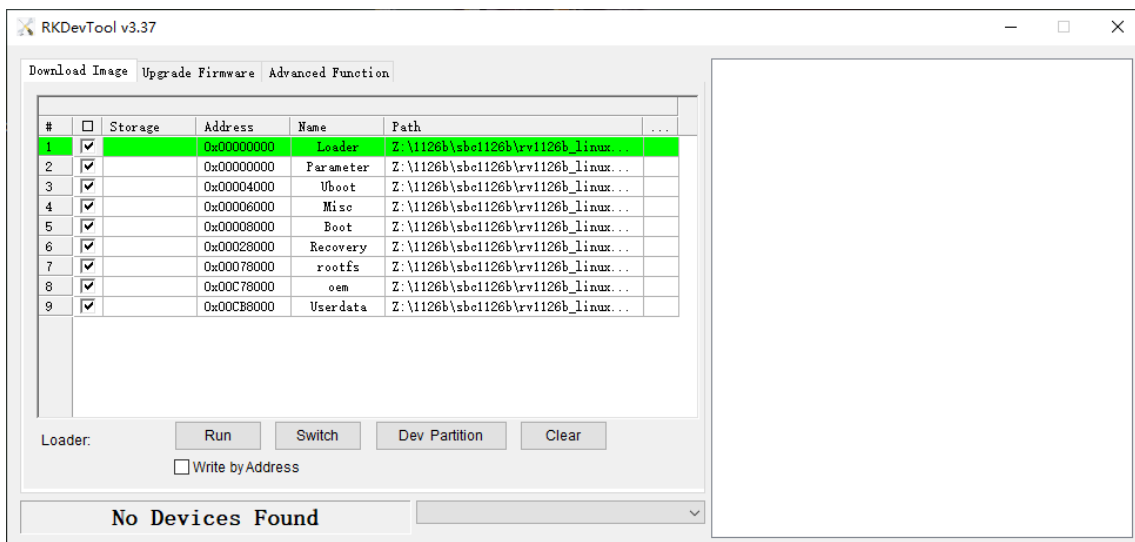


3.2 Firmware Flashing

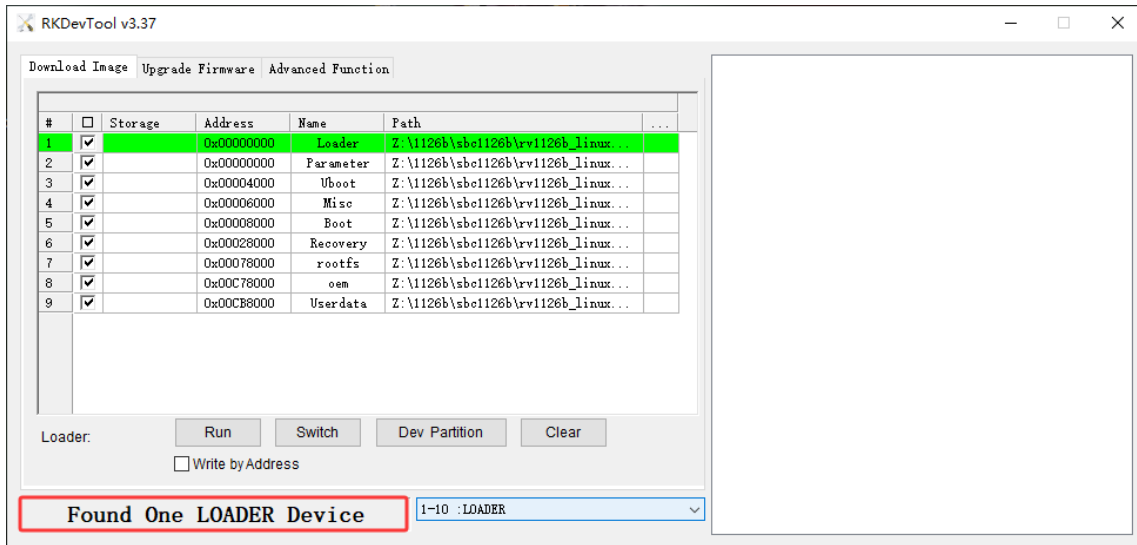
Environment: Windows OS

3.2.1 Flash Full Firmware Image

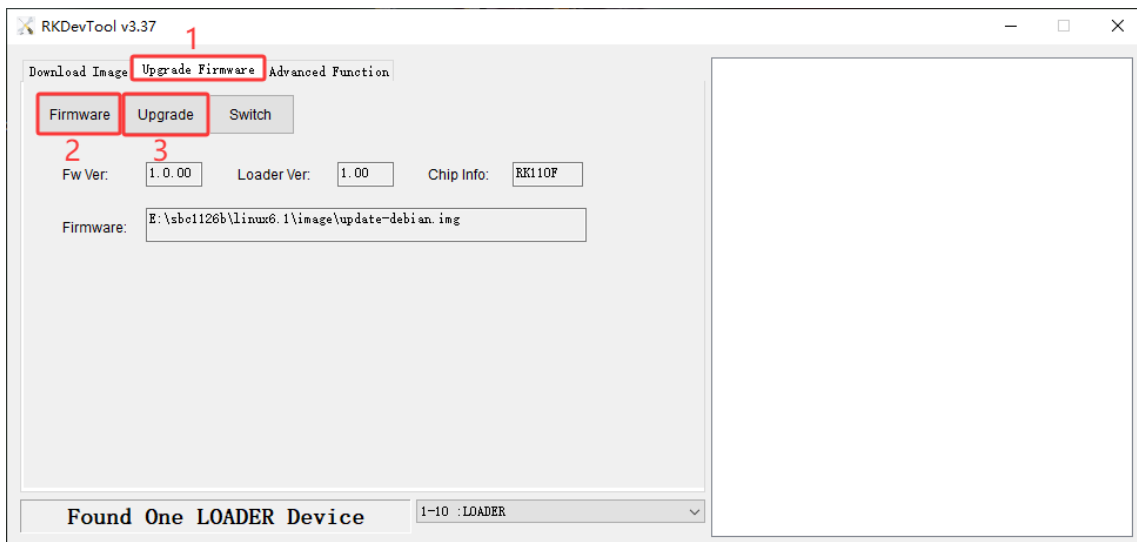
Step 1: Open [RKDevTool\RKDevTool_Release\RKDevTool.exe](#).



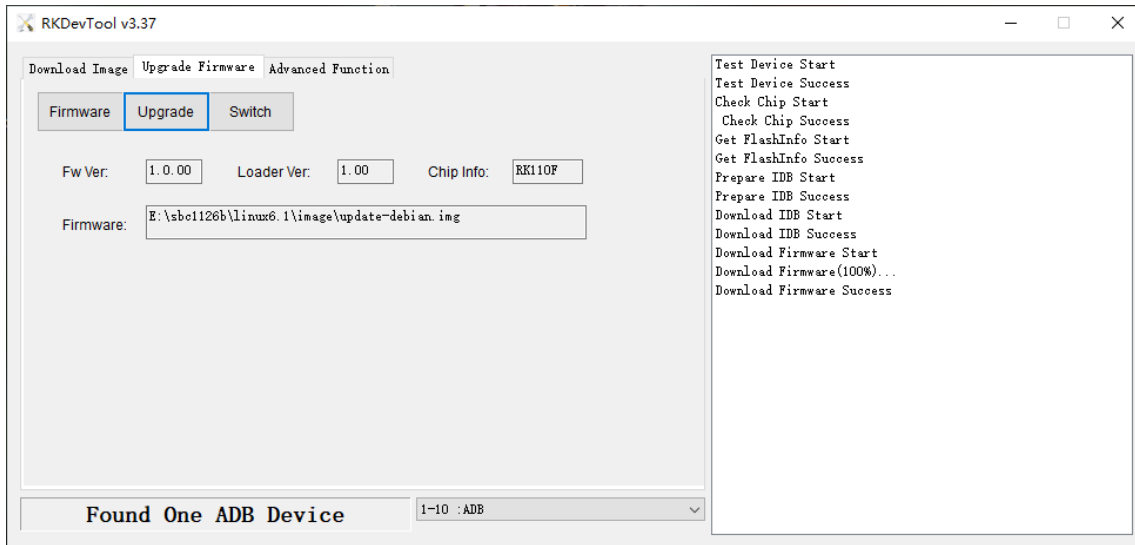
Step 2: Put the board into Loader mode. For details, refer to Section [3.1.1 How to Enter Loader Mode](#).



Step 3: Click **Upgrade Firmware** -> **Firmware**, select **update.img**, and then click **Upgrade** to start flashing.



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



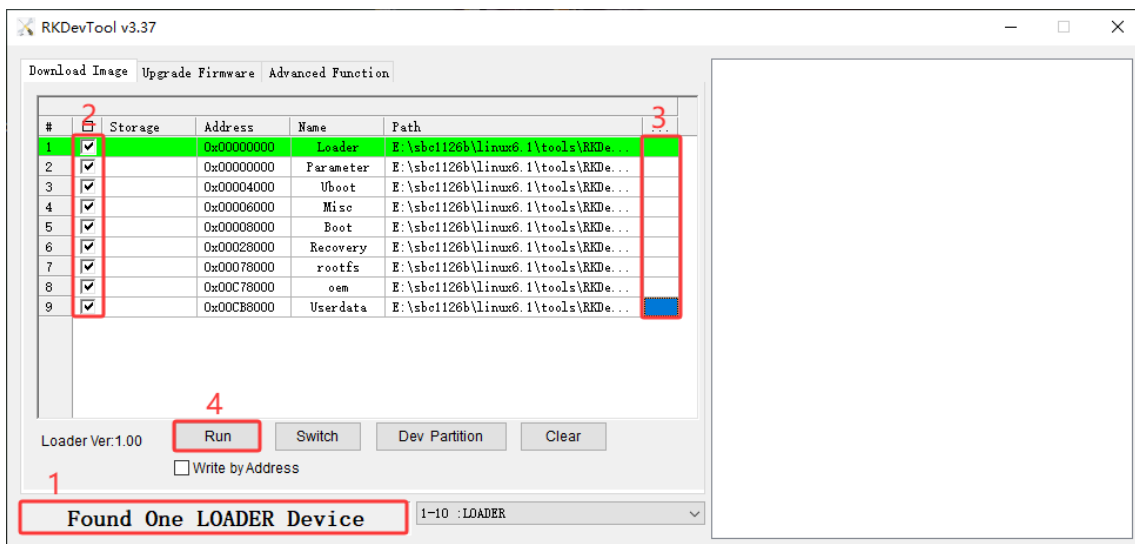
3.2.2 Flash Separate Partition Images

Step 1: Put the board into Loader mode. For details, refer to Section [3.1.1 How to Enter Loader Mode](#).

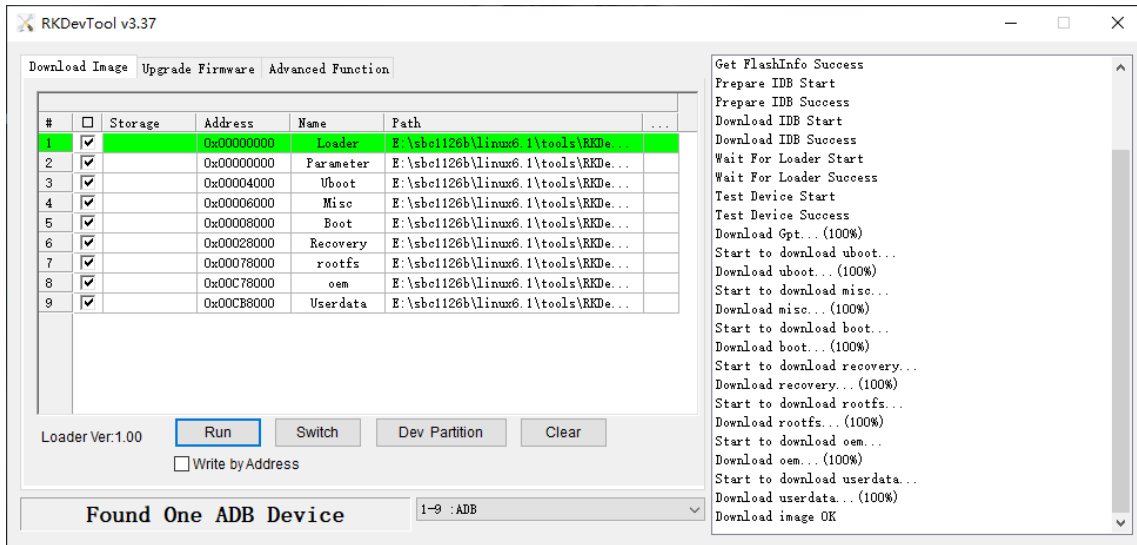
Step 2: Select the partitions to be flashed. Multiple partitions can be selected.

Step 3: Make sure the image file paths are correct. If necessary, click the blank cell next to each path to reselect the corresponding image file.

Step 4: Click **Run** to start flashing.



After flashing is complete, the board will automatically reboot.



4. Development Environment

4.1 Preparing the Development Environment

Ubuntu 22.04 or later is recommended for SDK compilation. If an error occurs during compilation, check the error message and install the required software packages accordingly. For other Linux distributions, the package names or installation commands may need to be adjusted.

In addition to the operating system requirements, the following hardware and software requirements should be met:

Hardware requirements	Software requirements
64-bit system, hard disk space should be greater than 200G. If you do multiple builds, you will need more hard drive space.	Ubuntu 22.04

4.2 Installing Libraries and Toolkits

This section provides the commands for installing the software packages required to build the SDK compilation environment. Other tools, such as Samba and SSH, should be installed as needed.

PC OS	Network	Permission
Ubuntu 22.04	online	root

To install the required tools, execute the following commands:

```
$ sudo apt-get install git ssh make gcc libssl-dev liblz4-tool libmpc-dev
$ sudo apt-get install expect g++ patchelf chrpath gawk texinfo chrpath diffstat
$ sudo apt-get install binfmt-support live-build bison flex fakeroot libgmp-dev
$ sudo apt-get install cmake gcc-multilib g++-multilib unzip device-tree-compiler
$ sudo apt-get install ncurses-dev libgucharmap-2-90-dev bzip2 expat gpgv2
$ sudo apt-get install cpp-aarch64-linux-gnu g++-aarch64-linux-gnu
$ sudo apt install python2 python-is-python3
```

5. Compile Source Code

Step 1: Extract the Source Code

To extract the source code package, execute the following commands:

```
$ tar xvf rv1126b_linux6.1_rk*.tar.bz2
$ cd rv1126b_linux6.1_rkr2
```

Step 2: Configure the Target Board

To configure the target board, execute the following command:

```
$ ./build.sh lunch
```

After running **./build.sh lunch**, the system will list available defconfig files.

For the Buildroot system, select the corresponding configuration according to the required version:

- **GStreamer version:**

2. **boardcon_sbc1126b_defconfig**

- **Rockit version:**

4. **boardcon_sbc1126b_multi_ipc_64_defconfig**

Note:

Only the Buildroot system provides both the GStreamer version and the Rockit version.

For the Debian system, use the GStreamer version.

The following steps use the GStreamer version as an example:

```
##### Rockchip Linux SDK #####
Manifest: rv1126b_linux6.1_release_v1.2.0_20251220.xml
GIT commit: "41613ab rv1126b: update wifibt to RK960 on rv1126bp evb1 board"
Log colors: message notice warning error fatal
Log saved at /home/qinxueqin/1126b/sbc1126b/rv1126b_linux6.1_rkr2-v2/output/sessions/2026-06-12_09-53-39
Pick a defconfig:
1. rockchip_defconfig
2. boardcon_sbc1126b_defconfig
3. boardcon_sbc1126b_ipc_64_defconfig
4. boardcon_sbc1126b_multi_ipc_64_defconfig
5. rockchip_rv1126b_dv_64_evb1_v10_defconfig
6. rockchip_rv1126b_dv_64_evb1_v12_defconfig
7. rockchip_rv1126b_evb1_v10_defconfig
8. rockchip_rv1126b_evb4_v10_defconfig
9. rockchip_rv1126b_fastboot_defconfig
10. rockchip_rv1126b_ipc_32_evb1_v10_defconfig
11. rockchip_rv1126b_ipc_64_evb1_v10_defconfig
12. rockchip_rv1126b_robot_defconfig
13. rockchip_rv1126b_tiny_32_evb2_v10_defconfig
14. rockchip_rv1126bp_evb1_v10_defconfig
15. rockchip_rv1126bp_fastboot_defconfig
16. rockchip_rv1126bp_ipc_32_evb1_v10_defconfig
17. rockchip_rv1126bp_ipc_64_evb1_v10_defconfig
18. rockchip_rv1126bp_robot_defconfig
Which would you like? [1]:2
```

Step 3: Compile U-Boot

To compile U-Boot, execute the following command:

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

Step 4: Compile the Kernel

To compile the kernel, execute the following command:

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

Step 5: Compile Recovery

To compile recovery, execute the following command:

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

Step 6: Compile rootfs

(1) Compile Debian12

Root privileges are required to compile Debian12. Execute the following command:

```
$ sudo ./build.sh debian
```

After compilation is complete, [linaro-rootfs.img](#) will be generated in the debian directory.

Note:

The required dependencies must be installed before compiling Debian12.

```
$ cd debian
$ sudo apt-get install binfmt-support qemu-user-static live-build
$ sudo dpkg -i ubuntu-build-service/packages/*
$ sudo apt-get install -f
```

(2) Compile Buildroot

To compile buildroot, execute the following command:

```
$ ./build.sh buildroot
```

Step 7: Generate and Package Firmware Images

To generate and package the firmware images, execute the following command:

```
$ ./build.sh firmware
```

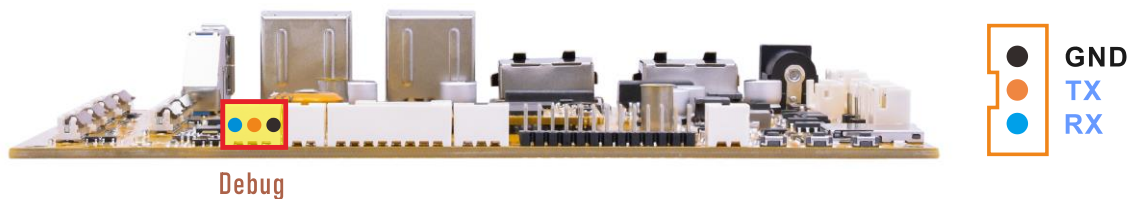
After the command is completed, the image files and [update.img](#) will be generated in the [rockdev/](#) directory.

6. Debian12 Test

Account: [linaro](#)
 Password: [linaro](#)

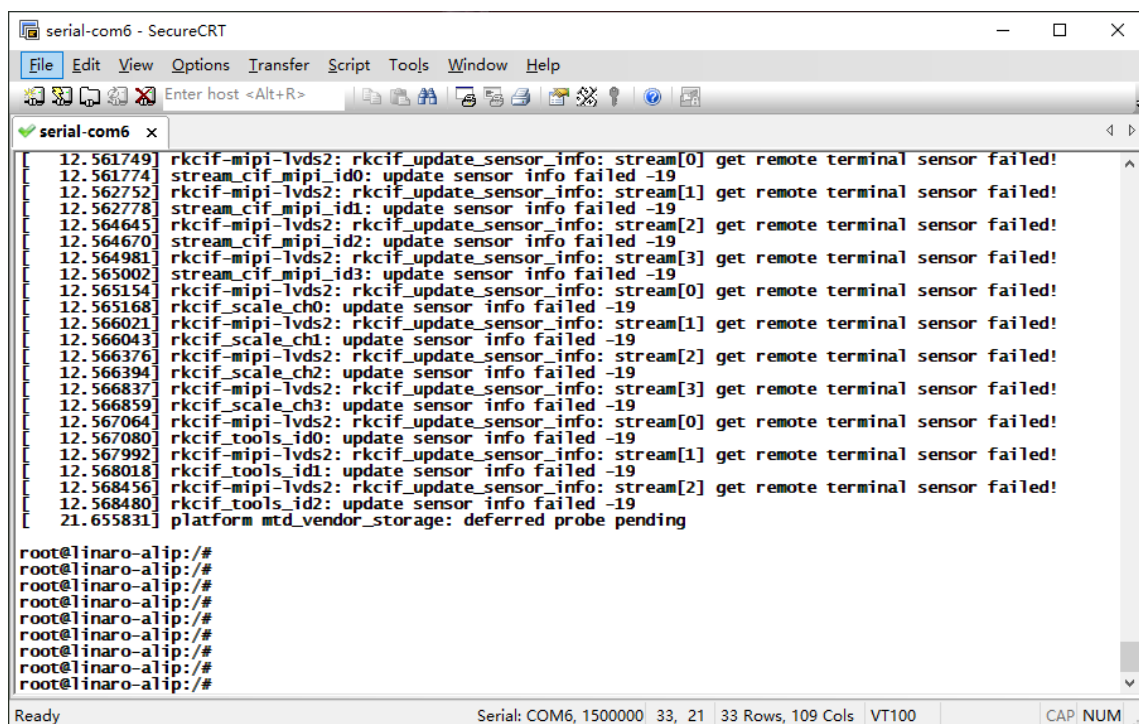
6.1 Serial Terminal

Step 1: Connect the USB-to-serial module to the PC and connect the other end to the Debug UART interface on the board.



Step 2: Open a serial terminal tool on the PC, select the corresponding serial port, and set the baud rate to 1500000.

Step 3: Power on the board and check whether the boot log is displayed in the serial terminal.



```

serial-com6 - SecureCRT
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
serial-com6 x
12.561749 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[0] get remote terminal sensor failed!
12.561774 stream_cif_mipi_id0: update sensor info failed -19
12.562752 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[1] get remote terminal sensor failed!
12.562778 stream_cif_mipi_id1: update sensor info failed -19
12.564645 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[2] get remote terminal sensor failed!
12.564670 stream_cif_mipi_id2: update sensor info failed -19
12.564981 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[3] get remote terminal sensor failed!
12.565002 stream_cif_mipi_id3: update sensor info failed -19
12.565154 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[0] get remote terminal sensor failed!
12.565168 rkcf_scale_ch0: update sensor info failed -19
12.566021 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[1] get remote terminal sensor failed!
12.566043 rkcf_scale_ch1: update sensor info failed -19
12.566376 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[2] get remote terminal sensor failed!
12.566394 rkcf_scale_ch2: update sensor info failed -19
12.566837 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[3] get remote terminal sensor failed!
12.566859 rkcf_scale_ch3: update sensor info failed -19
12.567064 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[0] get remote terminal sensor failed!
12.567080 rkcf_tools_id0: update sensor info failed -19
12.567992 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[1] get remote terminal sensor failed!
12.568018 rkcf_tools_id1: update sensor info failed -19
12.568456 rkcf-mipi-lvds2: rkcf_update_sensor_info: stream[2] get remote terminal sensor failed!
12.568480 rkcf_tools_id2: update sensor info failed -19
21.655831 platform mtd_vendor_storage: deferred probe pending

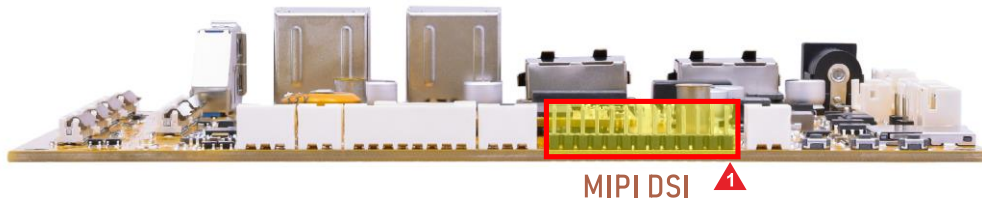
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
root@linaro-alip:/#
Ready Serial: COM6, 1500000 33, 21 33 Rows, 109 Cols VT100 CAP NUM
  
```

For details about installing and using the serial terminal tool, please refer to Section [2.2](#)

[Install CH9102X Driver](#) and [2.3 Install Serial Terminal Tool](#).

6.2 Display

The default MIPI display resolution of the SBC1126B is 800×1280@60 Hz.



The display output is shown in the following figure:



6.3 USB

6.3.1 USB OTG

The USB OTG port of the SBC1126B is configured as Device mode by default after system startup.



USB3.0 DRD
 Device/Host

- To switch the USB OTG port to Host mode, execute the following command:

```
# echo host > /sys/kernel/debug/usb/21500000.usb/mode
```

```
root@linaro-alip:/# echo host > /sys/kernel/debug/usb/21500000.usb/mode
root@linaro-alip:/# [12017.541944] dwc3 21500000.usb: request 00000000dc84b3cd was not queued to
ep0out
[12017.543220] android_work: did not send uevent (0 0 0000000000000000)
[12017.580107] read descriptors
[12017.580140] read strings
[12017.648351] phy phy-21400000.usb2-phy.2: illegal mode
[12017.648388] xhci-hcd xhci-hcd.1.auto: xHCI Host Controller
[12017.648632] xhci-hcd xhci-hcd.1.auto: new USB bus registered, assigned bus number 3
[12017.648773] xhci-hcd xhci-hcd.1.auto: hcc params 0x0220fe64 hci version 0x110 quirks
0x0002008022010010
[12017.648815] xhci-hcd xhci-hcd.1.auto: irq 81, io mem 0x21500000
[12017.648926] xhci-hcd xhci-hcd.1.auto: xHCI Host Controller
[12017.649176] xhci-hcd xhci-hcd.1.auto: new USB bus registered, assigned bus number 4
[12017.649205] xhci-hcd xhci-hcd.1.auto: Host supports USB 3.0 SuperSpeed
[12017.649351] usb usb3: New USB device found, idVendor=1d6b, idProduct=0002, bcdDevice= 6.01
[12017.649365] usb usb3: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[12017.649372] usb usb3: Product: xHCI Host Controller
[12017.649378] usb usb3: Manufacturer: Linux 6.1.141 xhci-hcd
[12017.649384] usb usb3: SerialNumber: xhci-hcd.1.auto
[12017.649857] hub 3-0:1.0: USB hub found
[12017.649918] hub 3-0:1.0: 1 port detected
[12017.650390] usb usb4: We don't know the algorithms for LPM for this host, disabling LPM.
[12017.650501] usb usb4: New USB device found, idVendor=1d6b, idProduct=0003, bcdDevice= 6.01
[12017.650512] usb usb4: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[12017.650519] usb usb4: Product: xHCI Host Controller
[12017.650524] usb usb4: Manufacturer: Linux 6.1.141 xhci-hcd
[12017.650530] usb usb4: SerialNumber: xhci-hcd.1.auto
[12017.650963] hub 4-0:1.0: USB hub found
[12017.651005] hub 4-0:1.0: 1 port detected
[12018.032123] usb 4-1: new SuperSpeed USB device number 2 using xhci-hcd
[12018.061656] usb 4-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[12018.061687] usb 4-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[12018.061696] usb 4-1: Product: OnlyDisk
[12018.061703] usb 4-1: Manufacturer: Netac
[12018.061710] usb 4-1: SerialNumber: C0E8BFA3EC38F796
[12018.063818] usb-storage 4-1:1.0: USB Mass Storage device detected
[12018.064352] scsi host0: usb-storage 4-1:1.0
[12019.809647] scsi 0:0:0:0: Direct-Access Netac OnlyDisk 8.01 PQ: 0 ANSI: 6
[12019.813201] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[12019.813803] sd 0:0:0:0: [sda] Write Protect is off
[12019.814173] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO
or FUA
[12019.819871] sda: sda1
[12019.820429] sd 0:0:0:0: [sda] Attached SCSI removable disk
```

- To switch the USB OTG port back to Device mode, execute the following command:

```
# echo device > /sys/kernel/debug/usb/21500000.usb/mode
```

```

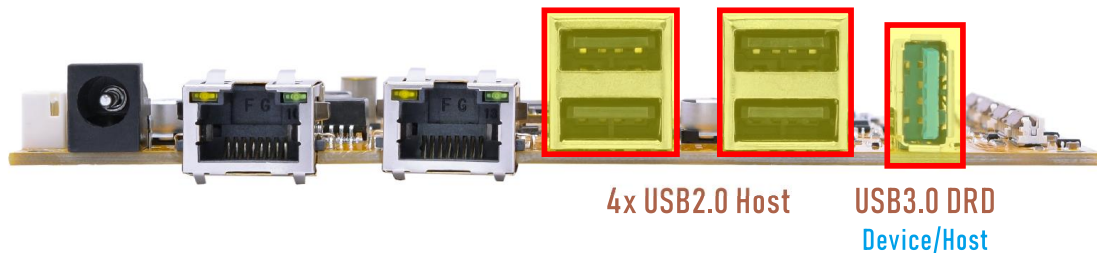
root@linaro-alip:/# echo device > /sys/kernel/debug/usb/21500000.usb/mode
[12144.179398] xhci-hcd xhci-hcd.1.auto: remove, state 4
[12144.179443] usb usb4: USB disconnect, device number 1
root@linaro-alip:/# [12144.180796] xhci-hcd xhci-hcd.1.auto: USB bus 4 deregistered
[12144.181207] xhci-hcd xhci-hcd.1.auto: remove, state 4
[12144.181239] usb usb3: USB disconnect, device number 1
[12144.182573] xhci-hcd xhci-hcd.1.auto: USB bus 3 deregistered
[12145.427080] read descriptors
[12145.427118] read strings
[12145.800547] dwc3 21500000.usb: device reset
[12145.887580] android_work: sent uevent USB_STATE=CONNECTED
[12145.918452] android_work: sent uevent USB_STATE=CONFIGURED
  
```

6.3.2 USB HOST

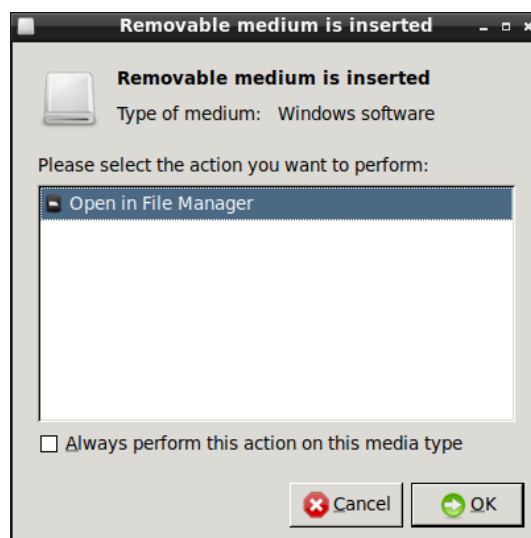
The SBC1126B provides USB 2.0 Host interfaces and one USB 3.0 OTG interface. The USB Host interfaces can be used to connect USB peripherals, such as a USB mouse, USB keyboard, USB flash drive, and other USB devices.

Note:

The USB 3.0 interface is an OTG interface. To use it as a Host interface, switch it to Host mode first. For details, refer to Section [6.3.1 USB OTG](#).

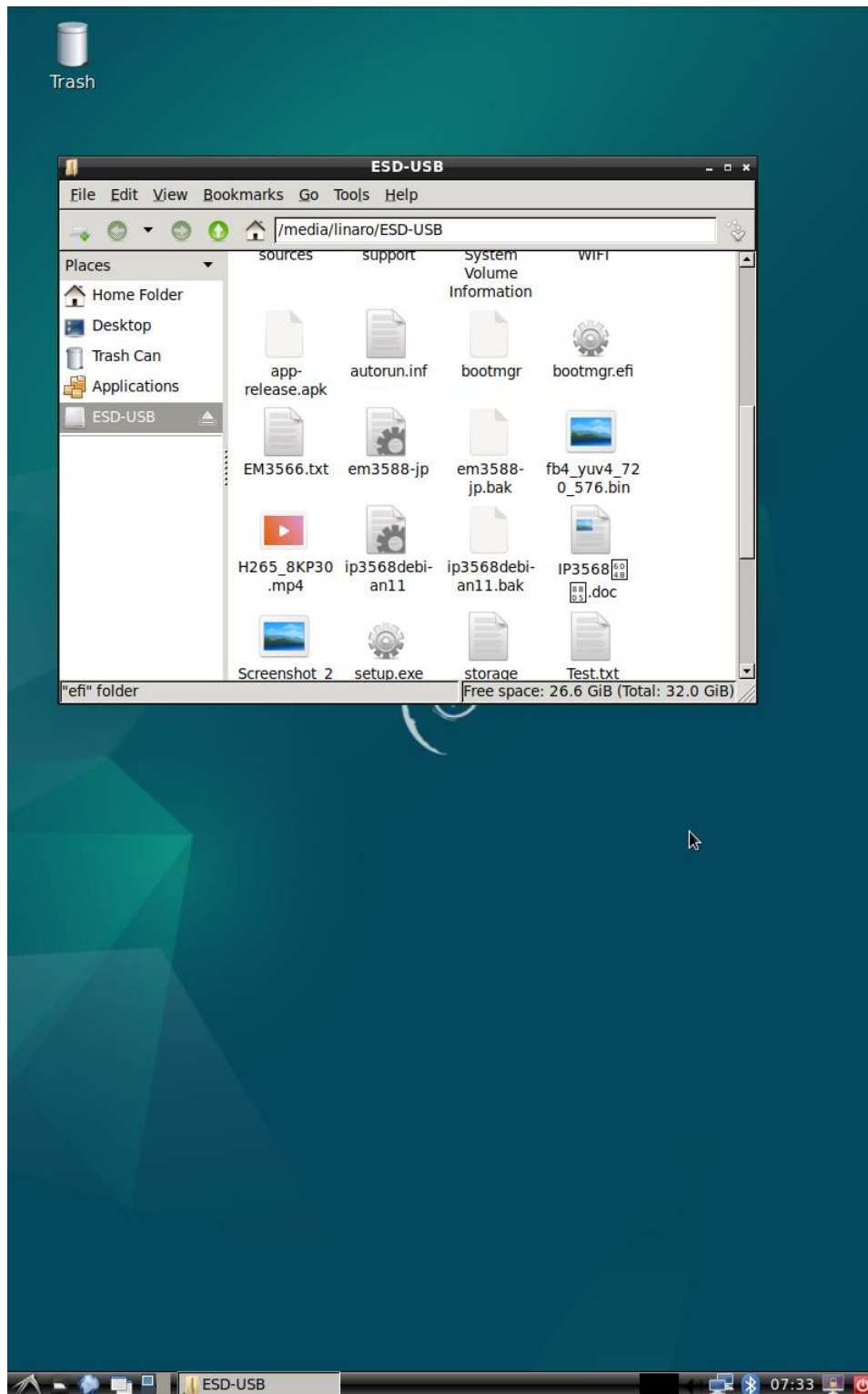


After a USB flash drive is inserted and recognized successfully, a removable media dialog box will pop up automatically.



Keep “Open in File Manager” selected and click “OK”. The system will then open the

USB flash drive directory, and users can access the files on the USB flash drive.



The current USB connection speed can be checked from the kernel log.

- When the device operates in USB 2.0 mode, the log usually shows “**high-speed**”:

```

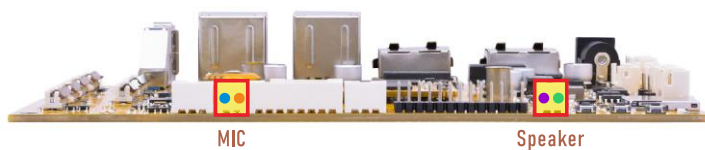
root@linaro-alip:/# [ 29.129173] usb 1-1.4: new high-speed USB device number 4 using ehci-platform
[ 29.271041] usb 1-1.4: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[ 29.271084] usb 1-1.4: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 29.271103] usb 1-1.4: Product: OnlyDisk
[ 29.271117] usb 1-1.4: Manufacturer: Netac
[ 29.271132] usb 1-1.4: SerialNumber: C0E8BFA3EC38F796
[ 29.272832] usb-storage 1-1.4:1.0: USB Mass Storage device detected
[ 29.273819] scsi host0: usb-storage 1-1.4:1.0
[ 30.369514] scsi 0:0:0:0: Direct-Access Netac OnlyDisk 8.01 PQ: 0 ANSI: 6
[ 30.375530] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[ 30.376532] sd 0:0:0:0: [sda] Write Protect is off
[ 30.377264] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[ 30.385346] sda: sda1
[ 30.385745] sd 0:0:0:0: [sda] Attached SCSI removable disk
[ 30.739171] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will be
case sensitive!
[ 30.746158] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run fsck.
  
```

- When the device operates in USB 3.0 mode, the log usually shows “SuperSpeed”:

```

[12018.032123] usb 4-1: new SuperSpeed USB device number 2 using xhci-hcd
[12018.061656] usb 4-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[12018.061687] usb 4-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[12018.061696] usb 4-1: Product: OnlyDisk
[12018.061703] usb 4-1: Manufacturer: Netac
[12018.061710] usb 4-1: SerialNumber: C0E8BFA3EC38F796
[12018.063818] usb-storage 4-1:1.0: USB Mass Storage device detected
[12018.064352] scsi host0: usb-storage 4-1:1.0
[12019.809647] scsi 0:0:0:0: Direct-Access Netac OnlyDisk 8.01 PQ: 0 ANSI: 6
[12019.813201] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[12019.813803] sd 0:0:0:0: [sda] Write Protect is off
[12019.814173] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[12019.819871] sda: sda1
[12019.820429] sd 0:0:0:0: [sda] Attached SCSI removable disk
  
```

6.4 Audio I/O



6.4.1 Audio Output Test

Step 1: Set the DAC digital volume.

Execute the following command:

```
# amixer -c 0 cset name='DAC Digital Volume' 250,250
```

Step 2: Play the audio file.

Execute one of the following commands according to the actual audio file path:

```
# aplay -D hw:0,0 /media/linaro/F3AB-0FF3/video/music/2.wav
```

```
root@linaro-alip:/# amixer -c 0 cset name='DAC Digital Volume' 250,250
numid=47,iface=MIXER,name='DAC Digital Volume'
; type=INTEGER,access=rw---R--,values=2,min=0,max=510,step=0
: values=250,250
| dBscale-min=-956.25dB,step=3.75dB,mute=0
root@linaro-alip:/#
root@linaro-alip:/# aplay -D hw:0,0 /media/linaro/F3AB-0FF3/video/music/2.wav
Playing WAVE '/media/linaro/F3AB-0FF3/video/music/2.wav' : Signed 16 bit Little Endian, Rate 44100
Hz, Stereo
```

6.4.2 Audio Input Test

Function	Description
MIC recording	Captures external sounds, such as voice, for storage, transmission, or voice command applications.
Loopback	Captures the device's internal playback signal as a reference signal. It is mainly used for Acoustic Echo Cancellation (AEC) and audio monitoring, not for recording environmental sounds.

6.4.2.1 MIC Recording Test

Step 1: Select MIC as the recording input source.

Execute the following command:

```
# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'
```

Step 2: Set the audio codec digital gain.

Execute the following command:

```
# amixer -c 0 cset name='ACodec Digital Gain Volume' 100
```

Step 3: Record audio from MIC.

Execute the following command:

```
# arecord -D hw:0,0 -f cd -t wav test.wav
```

Step 4: Play the recorded audio through the speaker.

Execute the following command:

```
# aplay -D hw:0,0 test.wav
```

```
root@linaro-alip:/# amixer -c 0
cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'e Select' 'From SDI0'
numid=29,iface=MIXER,name='SAI2 Receive PATH0 Source Select'
; type=ENUMERATED,access=rw-----,values=1,items=4
; Item #0 'From SDI0'
; Item #1 'From SDI1'
; Item #2 'From SDI2'
; Item #3 'From SDI3'
: values=0
root@linaro-alip:/# amixer -c 0 cset name='ACodec Digital Gain Volume' 100
numid=44,iface=MIXER,name='ACodec Digital Gain Volume'
; type=INTEGER,access=rw---R--,values=1,min=0,max=127,step=0
: values=100
| dBscale-min=-95.00dB,step=0.75dB,mute=0
root@linaro-alip:/#
root@linaro-alip:/# arecord -D hw:0,0 -f cd -t wav test.wav
Recording WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
^CAborted by signal Interrupt...
root@linaro-alip:/#
root@linaro-alip:/# aplay -D hw:0,0 test.wav
Playing WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

6.4.2.2 MIC and Loopback Simultaneous Recording Test

Step 1: Select MIC and Loopback as the recording input sources.

Execute the following commands:

```
# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'
# amixer -c 0 cset name='SAI2 Receive PATH1 Source Select' 'From SDI1'
```

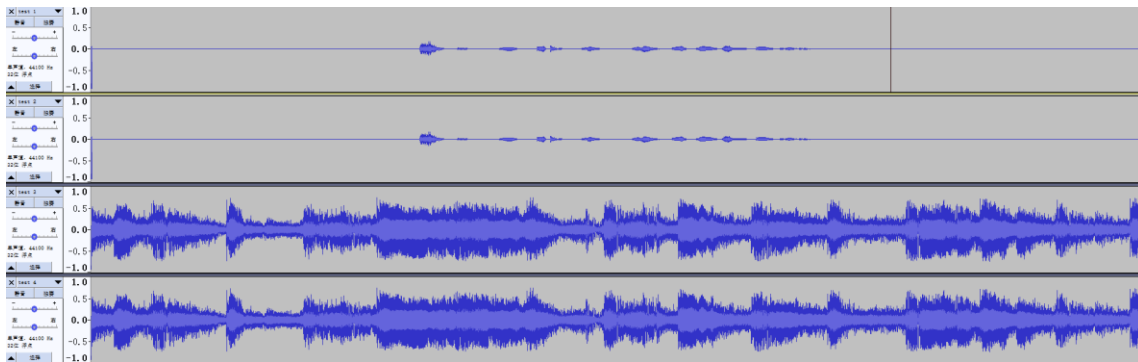
Step 2: Record 4-channel audio.

Execute the following command:

```
# aplay -D hw:0,0 /media/linaro/F3AB-0FF3/video/music/2.wav & arecord -D hw:0,0 -
f S16_LE -r 44100 -c 4 /test.wav
```

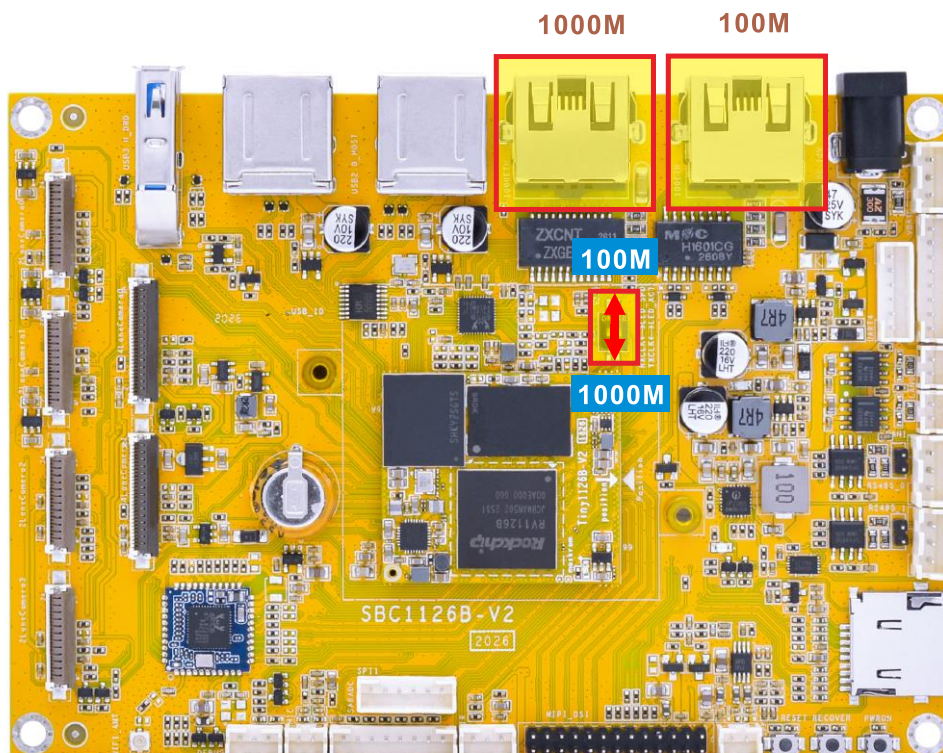
```
root@linaro-alip:/# amixer -c
0 cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'
numid=29,iface=MIXER,name='SAI2 Receive PATH0 Source Select'0 Source Select' 'From SDI0'
; type=ENUMERATED,access=rw-----,values=1,items=4
; Item #0 'From SDI0'
; Item #1 'From SDI1'
; Item #2 'From SDI2'
; Item #3 'From SDI3'
: values=0
root@linaro-alip:/# amixer -c 0
cset name='SAI2 Receive PATH1 Source Select' 'From SDI1'
numid=28,iface=MIXER,name='SAI2 Receive PATH1 Source Select'1 Source Select' 'From SDI1'
; type=ENUMERATED,access=rw-----,values=1,items=4
; Item #0 'From SDI0'
; Item #1 'From SDI1'
; Item #2 'From SDI2'
; Item #3 'From SDI3'
: values=1
root@linaro-alip:/# aplay -D hw:0,0 /media/linaro/F3AB-0FF3/video/music/2.wav & arecord -D hw:0,0
-f S16_LE -r 44100 -c 4 /test.wav
[1] 2282
root@linaro-alip:/# aplay -D hw:0,0 /media/linaro/F3AB-0FF3/video/music/2.wav & arecord -D hw:0,0
-f S16_LE -r 44100 -c 4 /test.wav
Recording WAVE '/test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Channels 4
Playing WAVE '/media/linaro/F3AB-0FF3/video/music/2.wav' : Signed 16 bit Little Endian, Rate 44100
Hz, Stereo
```

Step 3: Copy the recorded file to the PC and verify the MIC and Loopback channels using audio software.



6.5 Ethernet

The 100M Ethernet and 1000M Ethernet interfaces on the SBC1126B are multiplexed and cannot be used at the same time. When switching between them, the corresponding firmware image must be updated in software, and the hardware selection must also be changed using the DIP switch on the development board.



DTS Configuration Switching Instructions

File path: `kernel-6.1/arch/arm64/boot/dts/rockchip/boardcon-sbc1126b.dts`

When using 100M Ethernet:

```
//#include "boardcon-sbc1126b-gephy.dtsi" //1000M
#include "boardcon-sbc1126b-fephy.dtsi" //100M
```

When using 1000M Ethernet:

```
#include "boardcon-sbc1126b-gephy.dtsi" //1000M
//#include "boardcon-sbc1126b-fephy.dtsi" //100M
```

6.5.1 100M Ethernet

Step 1: Connect the network cable to the 100M Ethernet port, and set the DIP switch to the 100M position.

According to the log, it can be seen that the 100M Ethernet recognition is successful.

```
root@linaro-alip:/# [ 447.452298] rk_gmac-dwmac 21c70000.ethernet end0: Link is Up - 100Mbps/Full - flow
control rx/tx
[ 447.452318] IPv6: ADDRCONF(NETDEV_CHANGE): end0: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig end0
```

```
root@linaro-alip:/# ifconfig end0
end0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.175 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::f0f0:b7ba:cb75:eea prefixlen 64 scopeid 0x20<link>
    ether 2e:cd:2f:8a:a1:64 txqueuelen 1000 (Ethernet)
    RX packets 40745 bytes 29660674 (28.2 MiB)
    RX errors 0 dropped 2195 overruns 0 frame 0
    TX packets 6682 bytes 428612 (418.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 79
```

Step 3: Test the network connection.

Execute the following command:

```
# ping -I end0 www.armdesigner.com
```

```
root@linaro-alip:/# ping -I end0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (18.64.122.52) from 192.168.0.175 end0: 56(84) bytes of data.
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=1 ttl=242 time=163 ms
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=2 ttl=242 time=163 ms
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=3 ttl=242 time=163 ms
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=4 ttl=242 time=163 ms
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=5 ttl=242 time=162 ms
64 bytes from server-18-64-122-52.nrt12.r.cloudfront.net (18.64.122.52): icmp_seq=6 ttl=242 time=163 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 14406ms
rtt min/avg/max/mdev = 162.277/162.577/162.765/0.157 ms
```

6.5.2 1000M Ethernet

Step 1: Connect the network cable to the 1000M Ethernet port, and set the DIP switch to the 1000M position.

According to the log, it can be seen that the 1000M Ethernet recognition is successful.

```
root@linaro-alip:/# [ 58.028698] rk_gmac-dwmac 21c70000.ethernet end0: Link is Up - 1Gbps/Full - flow
control rx/tx
[ 58.028767] IPv6: ADDRCONF(NETDEV_CHANGE): end0: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig end0
```

```
root@linaro-alip:/# ifconfig end0
end0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.13 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::4fdb:71:e173:88c prefixlen 64 scopeid 0x20<link>
    ether da:62:08:a4:46:df txqueuelen 1000 (Ethernet)
    RX packets 261 bytes 24104 (23.5 KiB)
    RX errors 0 dropped 30 overruns 0 frame 0
    TX packets 118 bytes 10487 (10.2 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 79
```

Step 3: Test the network connection.

Execute the following command:

```
# ping -I end0 www.armdesigner.com
```

```
root@linaro-alip:/# ping -I end0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (13.32.99.13) from 192.168.0.13 end0: 56(84) bytes of data.
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=1 ttl=246 time=196 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=2 ttl=246 time=197 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=3 ttl=246 time=197 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=4 ttl=246 time=196 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=5 ttl=246 time=196 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=6 ttl=246 time=196 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5003ms
rtt min/avg/max/mdev = 196.192/196.388/196.552/0.121 ms
```

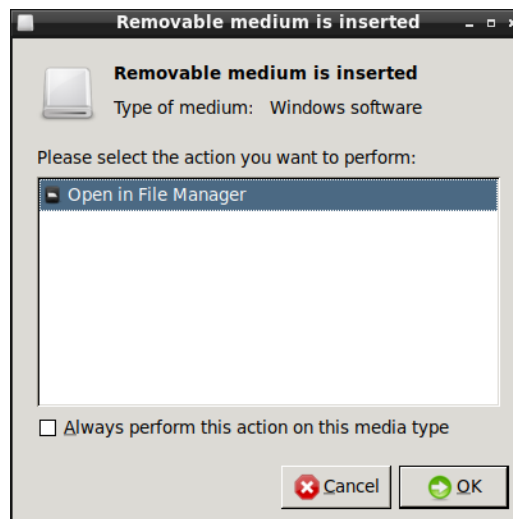
6.6 SD Card

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

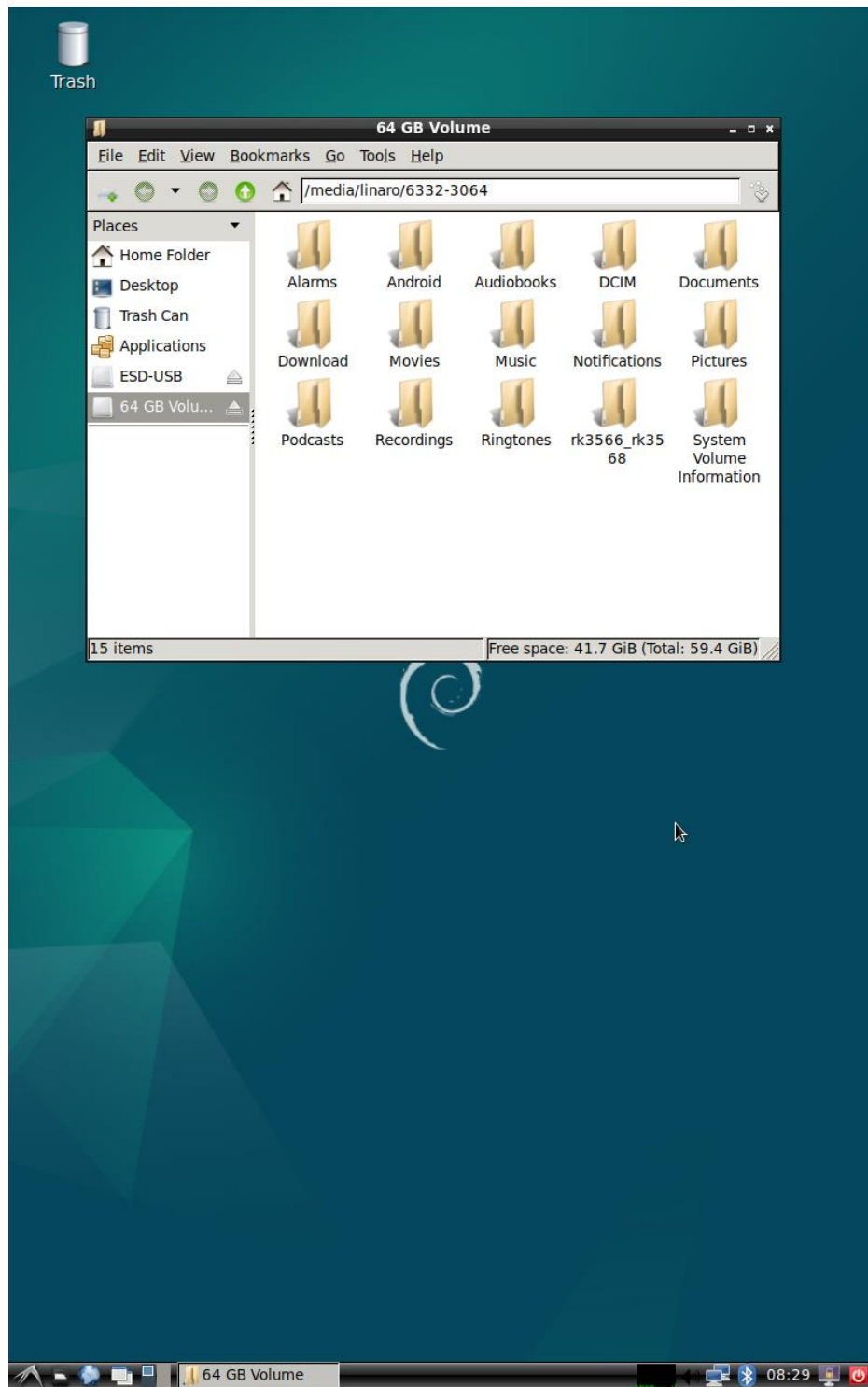


Micro SD

After the micro SD card is inserted and recognized successfully, a removable media dialog box will pop up automatically.

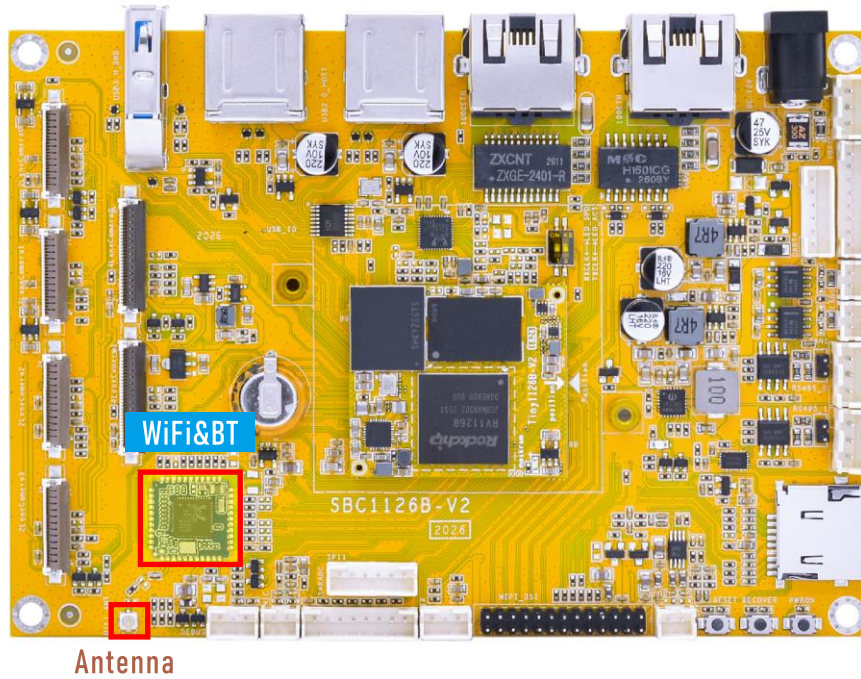


Step 2: Keep “Open in File Manager” selected and click “OK”. The system will then open the micro SD card directory, and users can access the files on the micro SD card.



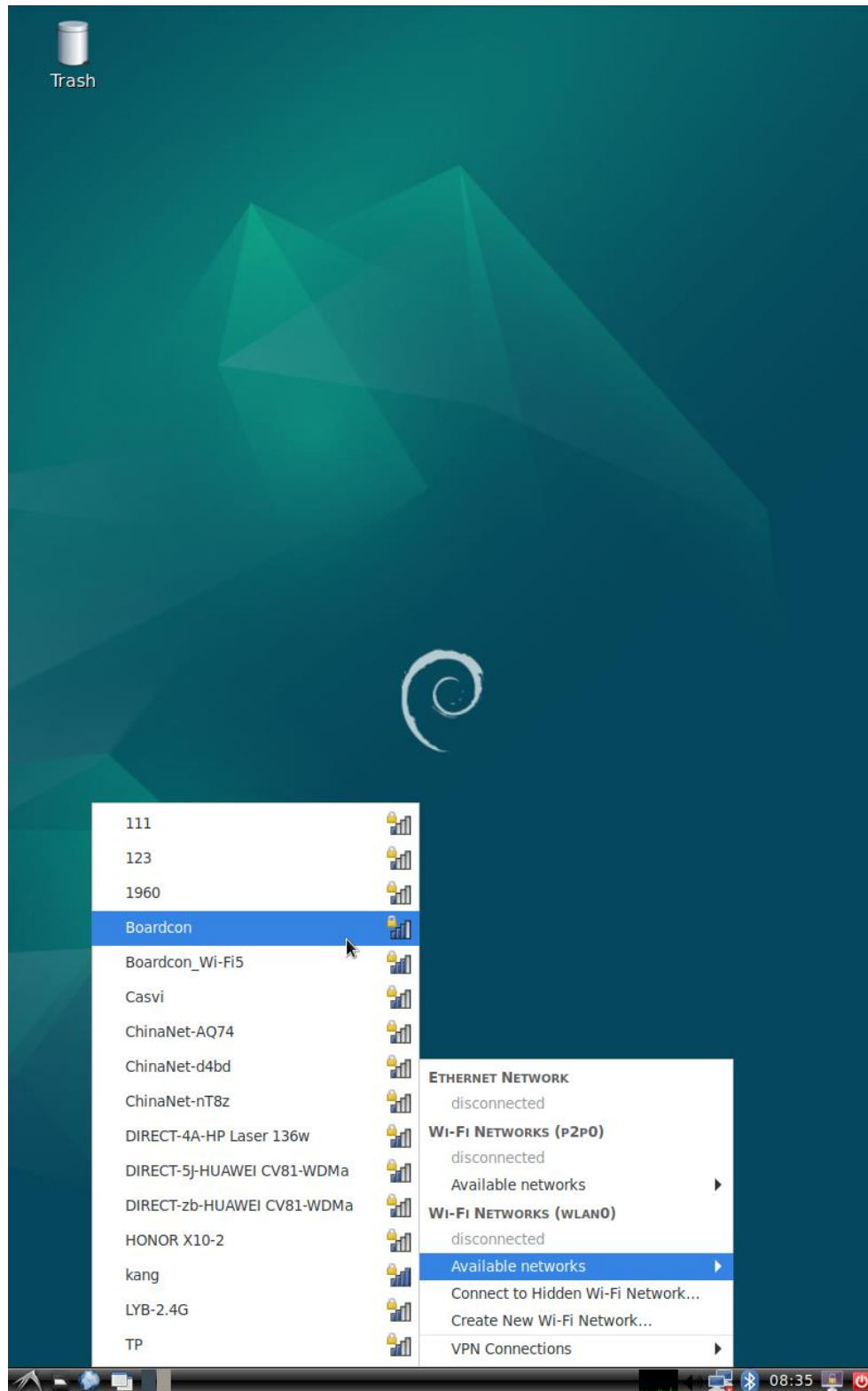
6.7 WiFi & Bluetooth

To use the WiFi and Bluetooth functions properly, make sure the antenna is connected.



6.7.1 WiFi

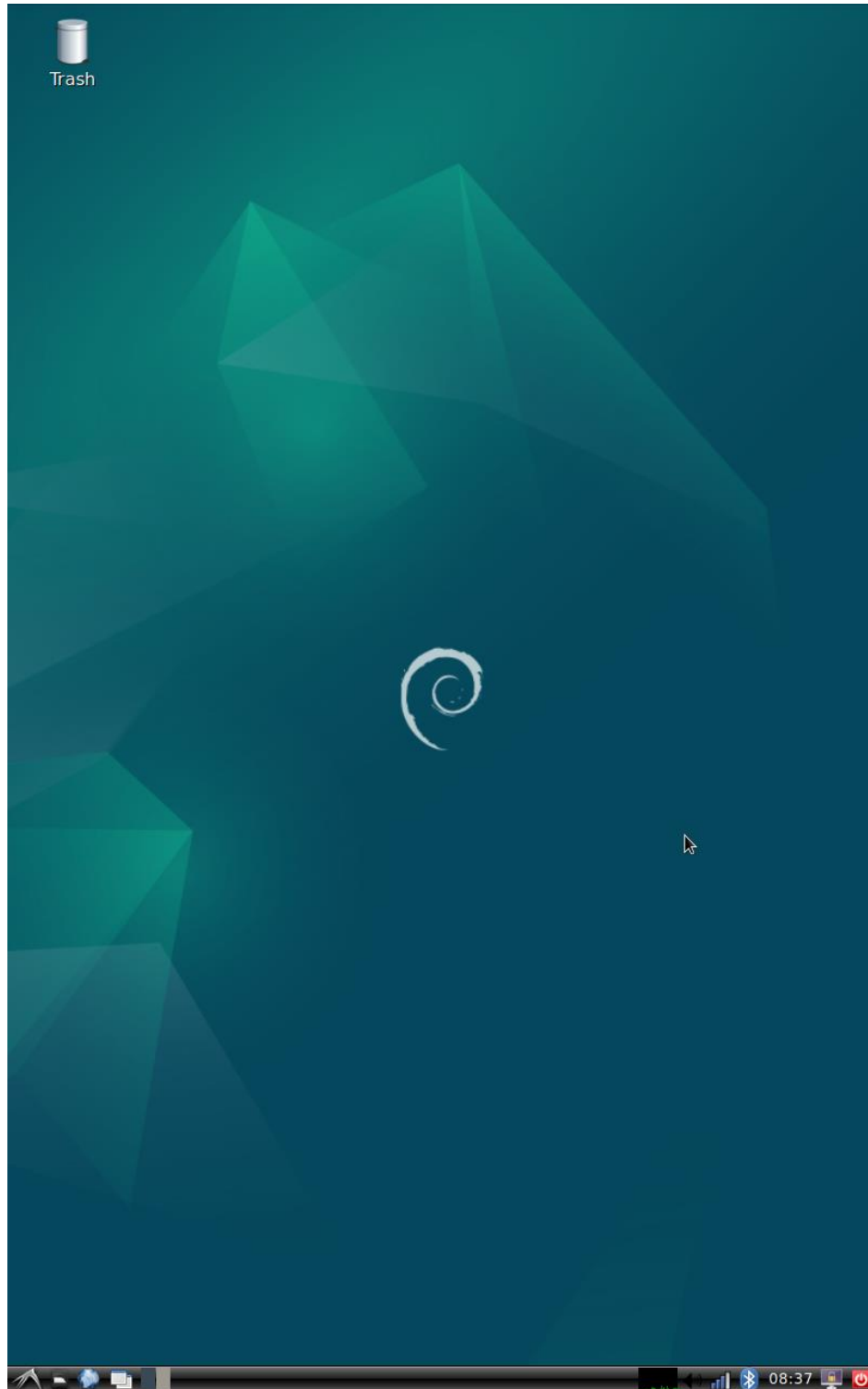
Step 1: Click the network icon in the lower-right corner of the desktop, then select "Available Networks" to view the list of available WiFi hotspots.



Step 2: Select the target SSID from the available network list and enter the password.



Step 3: After the WiFi connection is established successfully, the corresponding network status icon will be displayed in the lower-right corner of the desktop.



Step 4: Verify the network connection.

(1) View network interface information.

Execute the following command:

```
# ifconfig
```

```
root@linaro-alip:/# ifconfig wlan0
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.172 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::9f0e:88bd:7f5:9c7 prefixlen 64 scopeid 0x20<link>
    ether 84:fc:14:f9:69:64 txqueuelen 1000 (Ethernet)
    RX packets 62 bytes 8964 (8.7 KiB)
    RX errors 0 dropped 4 overruns 0 frame 0
    TX packets 55 bytes 6351 (6.2 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

(2) Test network connectivity.

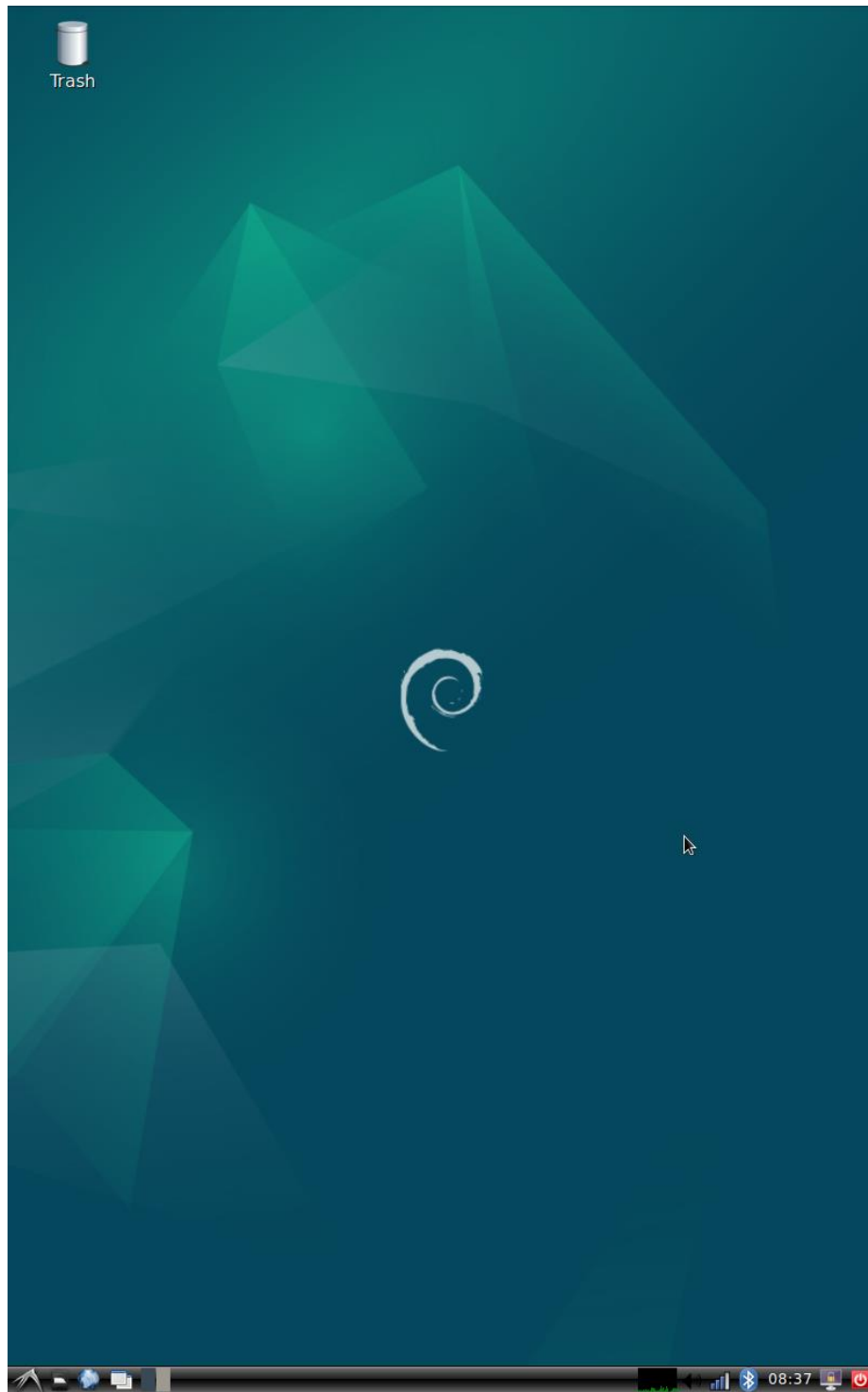
Execute the following command:

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

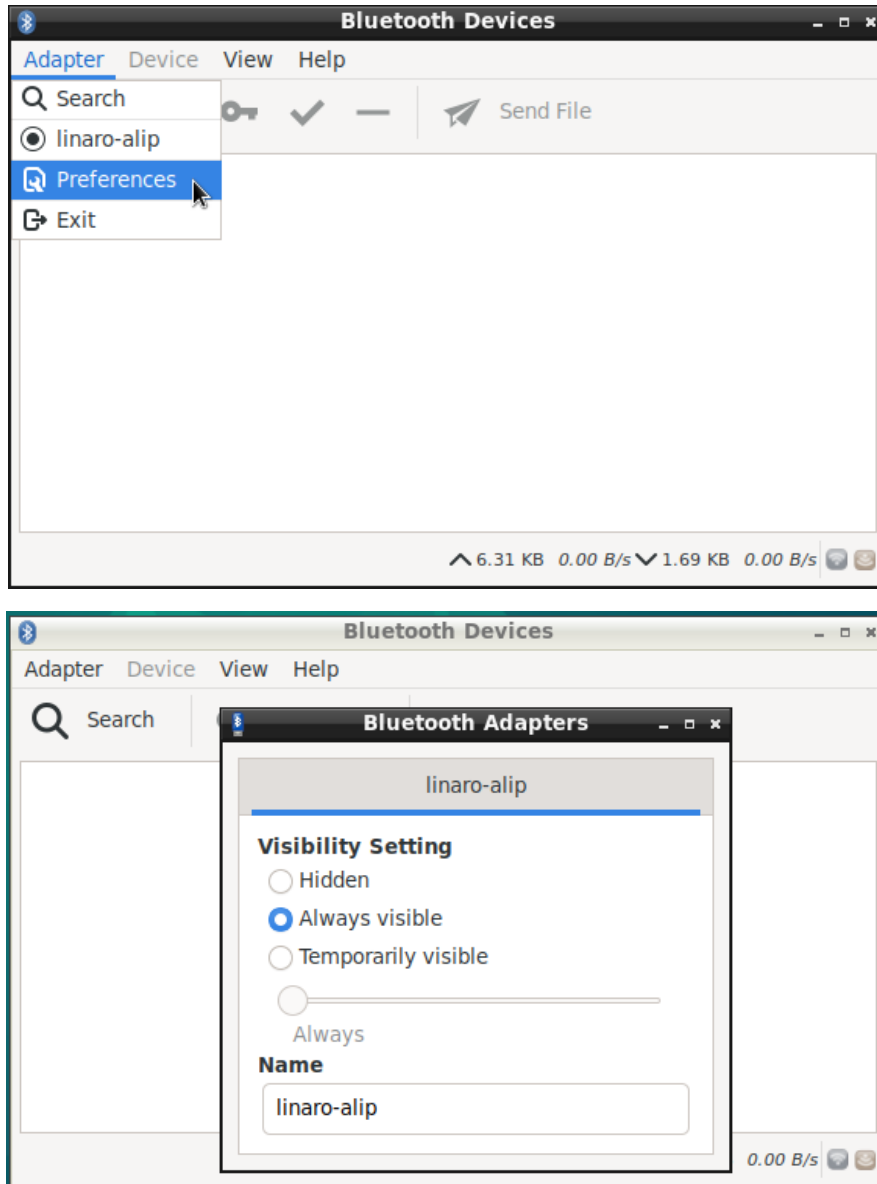
```
root@linaro-alip:/# ping -I wlan0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (13.32.99.13) from 192.168.0.172 wlan0: 56(84) bytes of data.
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=1 ttl=246 time=311 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=2 ttl=246 time=311 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=3 ttl=246 time=247 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=4 ttl=246 time=224 ms
64 bytes from server-13-32-99-13.fra60.r.cloudfront.net (13.32.99.13): icmp_seq=5 ttl=246 time=260 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 14610ms
rtt min/avg/max/mdev = 223.599/270.629/311.285/35.143 ms
```

6.7.2 Bluetooth

Step 1: Click the Bluetooth icon in the lower-right corner of the desktop.



Step 2: The Bluetooth device name is hidden by default. To make it visible to other Bluetooth devices, select **Adapter -> Preferences -> Always visible**.



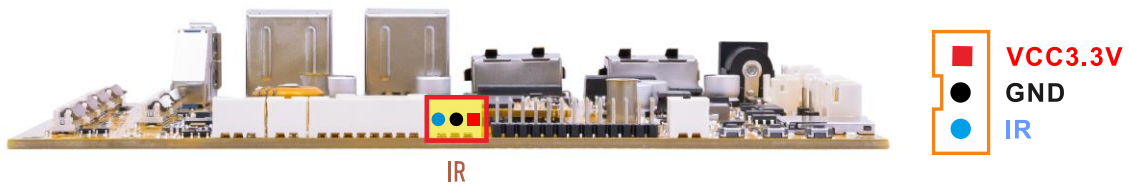
Step 3: Click "Search" to scan for nearby Bluetooth devices, then select the target device from the list and start pairing.



After the pairing is completed successfully, the Bluetooth device can be used normally.

6.8 IR

Step 1: Connect the IR receiver.



Step 2: Enable IR debug logs.

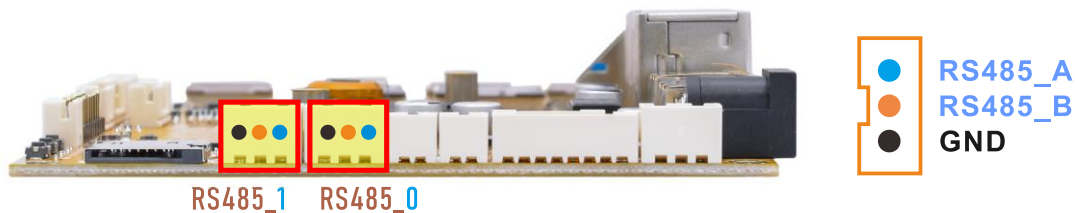
Execute the following command:

```
# echo 1 > /sys/module/rockchip_pwm_remotectl/parameters/code_print
```

Step 3: Point the remote control at the IR receiver and press a button. The corresponding key value will be printed in the log.

```
root@linaro-alip:/# echo 1 > /sys/module/rockchip_pwm_remotectl/parameters/code_print
root@linaro-alip:/# [ 1274.657882] USERCODE=0xc00
[ 1274.683832] RMC_GETDATA=33
[ 1276.005540] USERCODE=0x1818
[ 1276.032607] RMC_GETDATA=99
[ 1276.492593] USERCODE=0xc00
[ 1276.517441] RMC_GETDATA=32
[ 1276.983249] USERCODE=0x300
[ 1278.009855] USERCODE=0xc001
[ 1278.238809] USERCODE=0x1
[ 1278.392047] USERCODE=0x1818
[ 1278.419176] RMC_GETDATA=e5
[ 1279.067142] USERCODE=0x6061
[ 1279.092109] RMC_GETDATA=98
[ 1280.516314] USERCODE=0xc00
[ 1280.540109] RMC_GETDATA=8c
[ 1283.429417] USERCODE=0x1818
[ 1283.456604] RMC_GETDATA=98
```

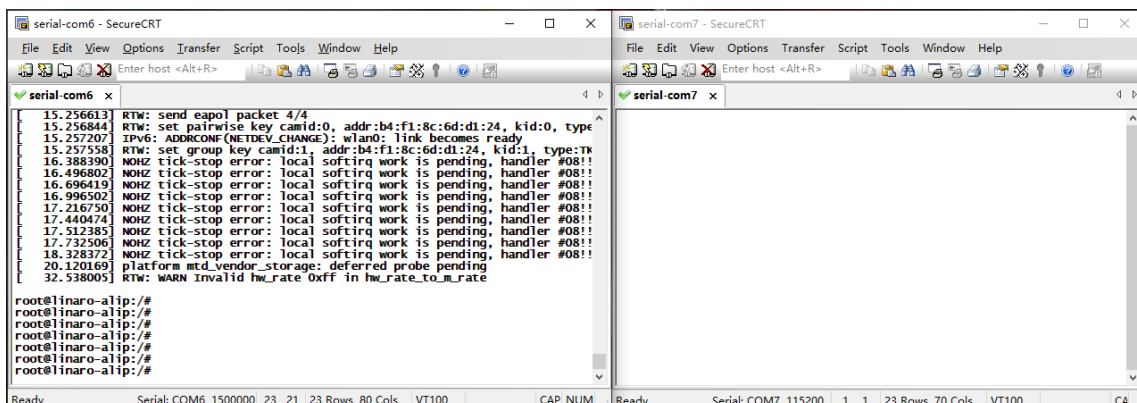
6.9 RS485



Step 1: Connect the RS485 test tool to the development board as shown in the diagram.



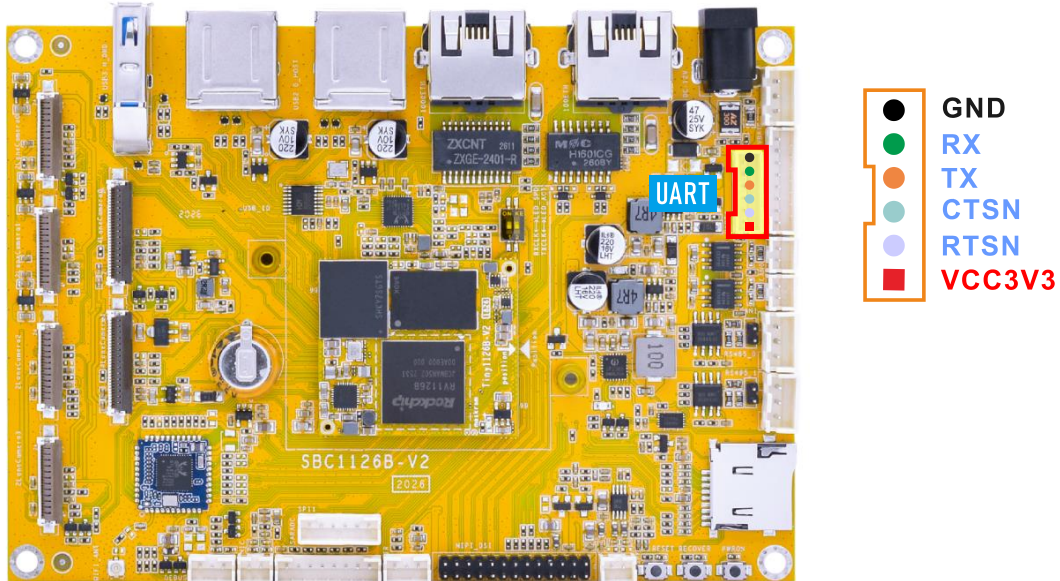
Step 2: Open two serial terminal windows. Set the debug serial port baud rate to 1500000, and set the RS485 serial port baud rate to 115200.



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

RS485_0:

Step 1: Connect the RX and TX pins of the UART interface together to create a loopback connection.



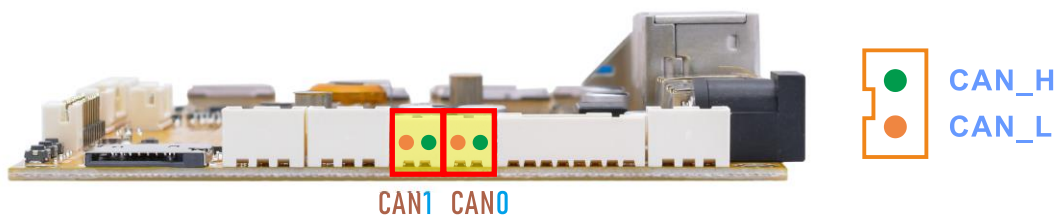
Step 2: Test UART loopback communication.

Execute the following command:

```
# com /dev/ttyS4 115200 8 0 1
```

```
root@linaro-alip:/# com /dev/ttyS4 115200 8 0 1
port = /dev/ttyS4
baudrate = 115200
cs = 8
parity = 0
stopb = 1
uiuiuiuiui
RECV: uiuiuiuiui
23232232323
RECV: 23232232323
yuyuyuyuyuy
RECV: yuyuyuyuyuy
nnnnnnnn
RECV: nnnnnnnn
yyy
RECV: yyy
```

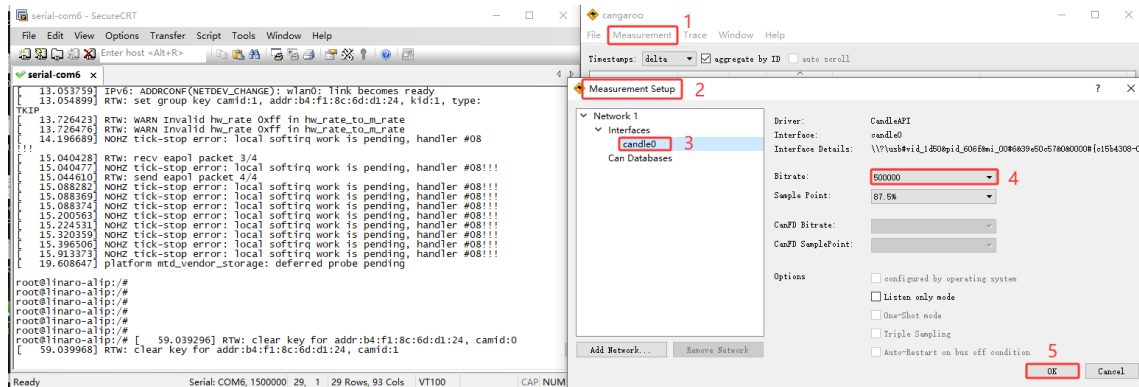
6.11 CAN



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.



6.11.1 CAN0 Test

Step 1: Configure and enable the CAN0 interface on the board with a bitrate of 500000.

Execute the following command:

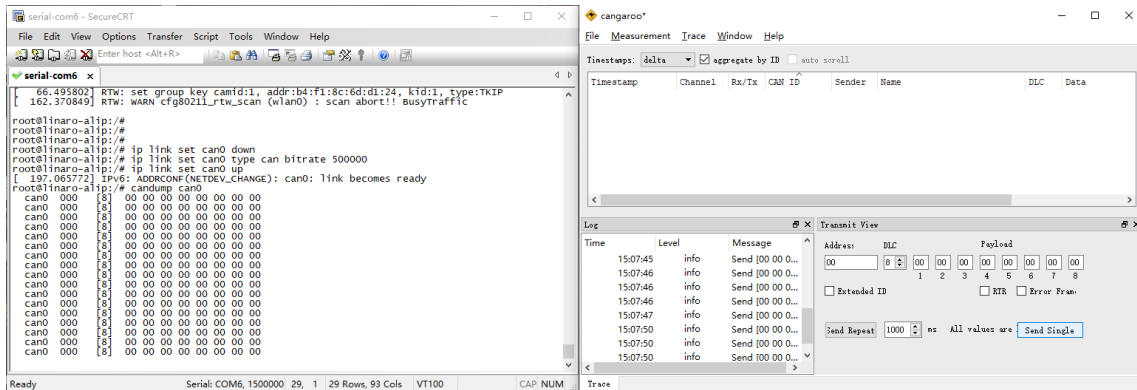
```
# ip link set can0 down
# ip link set can0 type can bitrate 500000
# ip link set can0 up
```

Step 2: Test CAN0 receiving.

Configure the CAN test tool as the sender, and configure CAN0 on the board as the receiver.

Execute the following command:

```
# candump can0
```

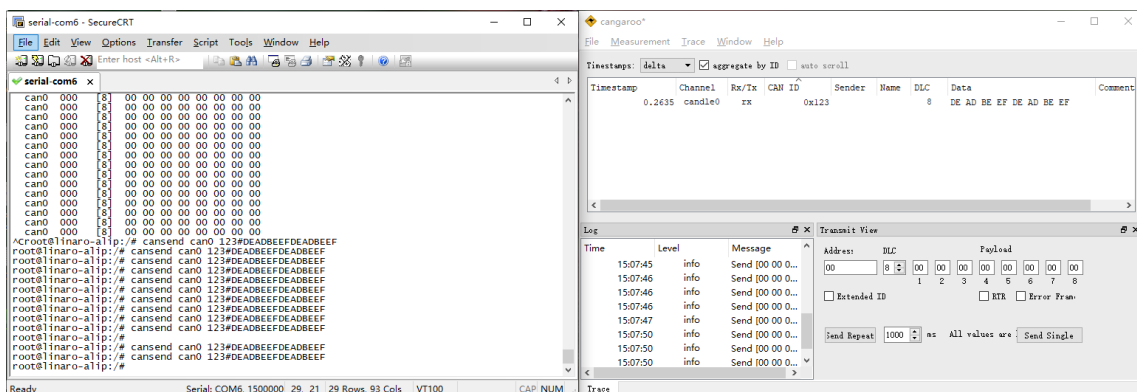


Step 3: Test CAN0 sending.

Configure the CAN test tool as the receiver, and configure CAN0 on the board as the sender.

Execute the following command:

```
# cansend can0 123#DEADBEEFDEADBEEF
```



6.11.2 CAN1 Test

Step 1: Configure and enable CAN1 with a bitrate of 500000.

Execute the following command:

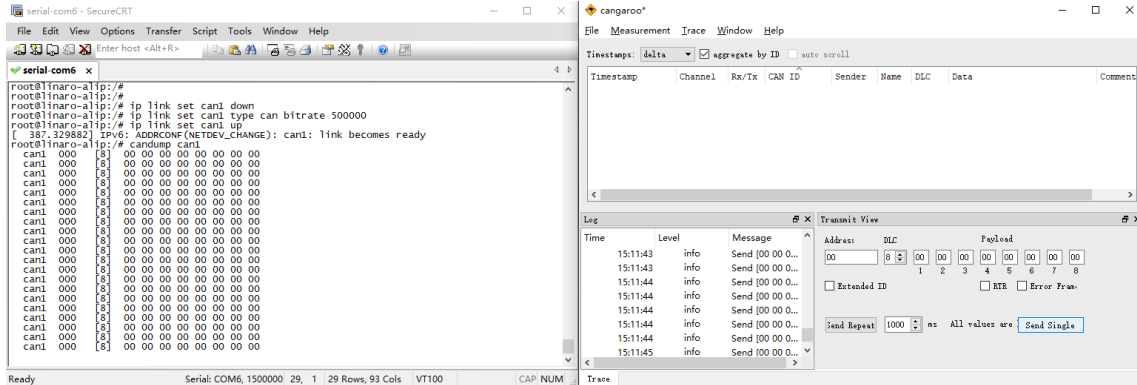
```
# ip link set can1 down
# ip link set can1 type can bitrate 500000
# ip link set can1 up
```

Step 2: Test CAN1 receiving.

Configure the CAN test tool as the sender, and configure CAN1 on the board as the receiver.

Execute the following command:

```
# candump can1
```

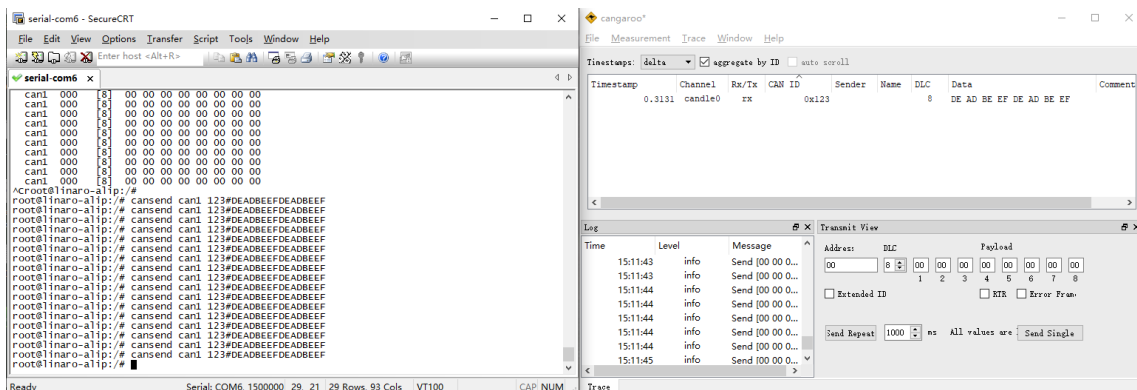


Step 3: Test CAN1 sending.

Configure the CAN test tool as the receiver, and configure CAN1 on the board as the sender.

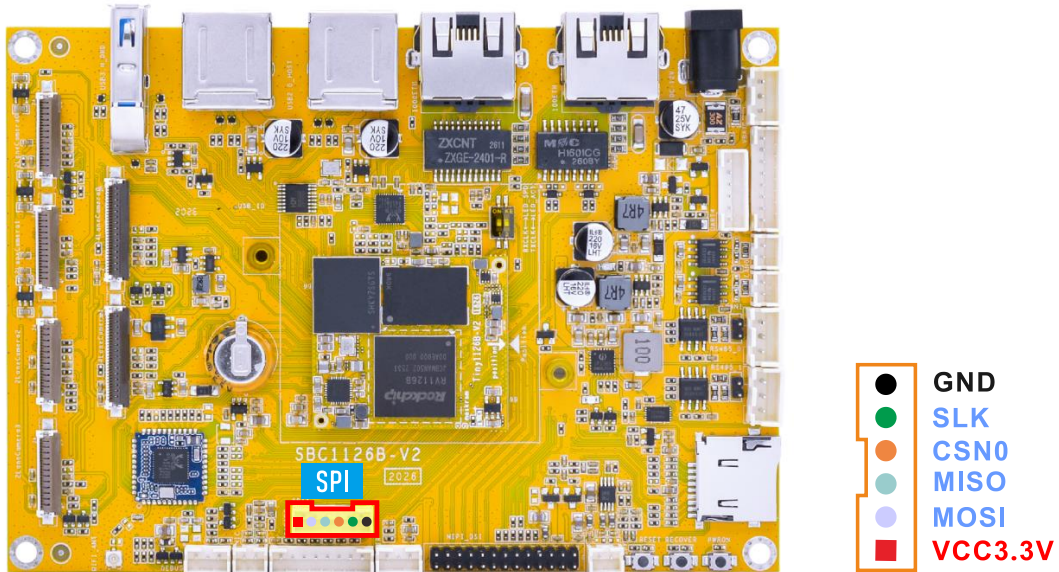
Execute the following command:

```
# cansend can1 123#DEADBEEFDEADBEEF
```



6.12 SPI

Step 1: Short the MOSI and MISO pins of the SPI interface to create a loopback connection.



Step 2: Execute the following command to perform the SPI loopback test:

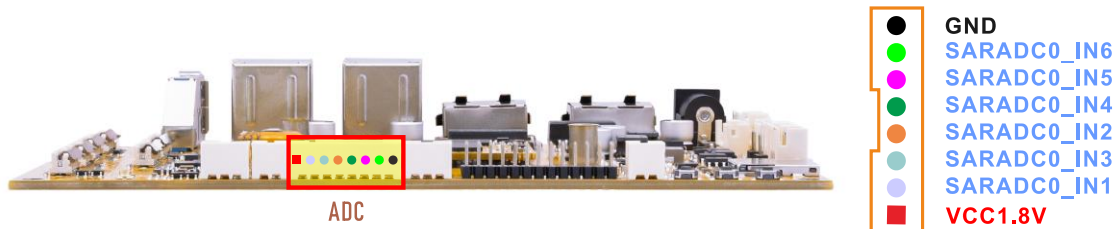
```
# test_spi 1 0
```

```
root@linaro-alip:/# test_spi 1 0
device= /dev/spidev1.0
spi mode: 0
bits per word: 8
max speed: 5000000 Hz (5000 KHz)

FF FF FF FF FF FF
40 00 00 00 00 95
FF FF FF FF FF FF
FF FF FF FF FF FF
FF FF FF FF FF FF
DE AD BE EF BA AD
F0 0D
```

6.13 ADC

The board provides six ADC input interfaces: ADC1, ADC2, ADC3, ADC4, ADC5, and ADC6.



This test is used to check whether the ADC raw value changes according to the input voltage.

Step 1: Apply a voltage level to the ADC input pin.

Connect the ADC pin to GND for a low level, or connect it to 1.8 V for a high level.

Step 2: Read the ADC raw value.

Example for **ADC1**:

```
# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
```

```
root@linaro-alip:/# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
8191
root@linaro-alip:/# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
7
```

For other ADC read commands, refer to the ADC read command description below:

```
Single-channel read commands:
ADC1 : cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
ADC2 : cat /sys/bus/iio/devices/iio:\device0/in_voltage2_raw
ADC3 : cat /sys/bus/iio/devices/iio:\device0/in_voltage3_raw
ADC4 : cat /sys/bus/iio/devices/iio:\device0/in_voltage4_raw
ADC5 : cat /sys/bus/iio/devices/iio:\device0/in_voltage5_raw
ADC6 : cat /sys/bus/iio/devices/iio:\device0/in_voltage6_raw

To read all ADC1-ADC6 raw values, execute the following command:
for i in 1 2 3 4 5 6; do
    echo -n "ADC$i: "
    cat /sys/bus/iio/devices/iio:\device0/in_voltage${i}_raw
done
```

6.14 RTC

The RTC on the SBC1126B is powered by a supercapacitor.

Step 1: Set the system time manually, for example:

```
# date -s "2026-05-20 17:56:00"
```

Note: If the network is connected, the system time may be synchronized automatically to the current UTC time.

Step 2: Write the system time to the hardware clock:

```
# hwclock -w
```

Step 3: Read the current hardware clock time:

```
# hwclock
```

```
root@linaro-alip:/# date -s "2026-05-20 17:56:00"
Wed May 20 17:56:00 UTC 2026
root@linaro-alip:/# hwclock -w
root@linaro-alip:/# hwclock
[ 1268.024494] Alarm by: rockchip_rtc_alarm_irq
2026-05-20 17:56:07.157369+00:00
root@linaro-alip:/# hwclock
[ 1278.023913] Alarm by: rockchip_rtc_alarm_irq
2026-05-20 17:56:17.829853+00:00
```

Step 4: Power off the board and disconnect the main power supply. Wait for a period of time, then power on the board again.

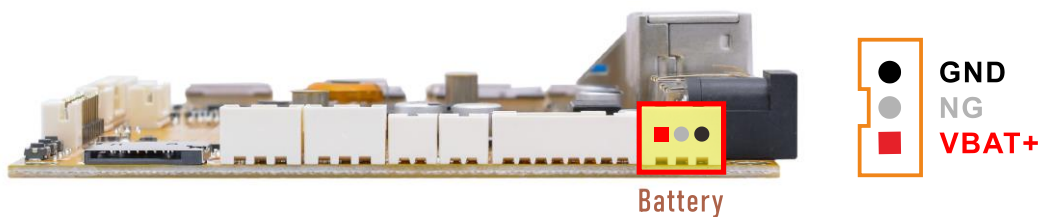
Step 5: Read the hardware clock time again:

```
root@linaro-alip:/# hwclock
[ 45.677955] Alarm by: rockchip_rtc_alarm_irq
2026-05-20 18:10:27.655881+00:00
root@linaro-alip:/# hwclock
[ 68.677033] Alarm by: rockchip_rtc_alarm_irq
2026-05-20 18:10:50.377517+00:00
root@linaro-alip:/# hwclock
[ 82.676580] Alarm by: rockchip_rtc_alarm_irq
2026-05-20 18:11:04.409603+00:00
```

If the RTC is working properly, the hardware clock time should be retained and continue running after power-off.

6.15 Battery supply

Step 1: Connect the 7.4V Li-ion battery, then press and hold the power button to turn on the board.



Step 2: Read the current battery capacity percentage.

```
# cat /sys/class/power_supply/cw221X-bat/capacity
```

```
root@linaro-alip:/# cat /sys/class/power_supply/cw221X-bat/capacity
50
```

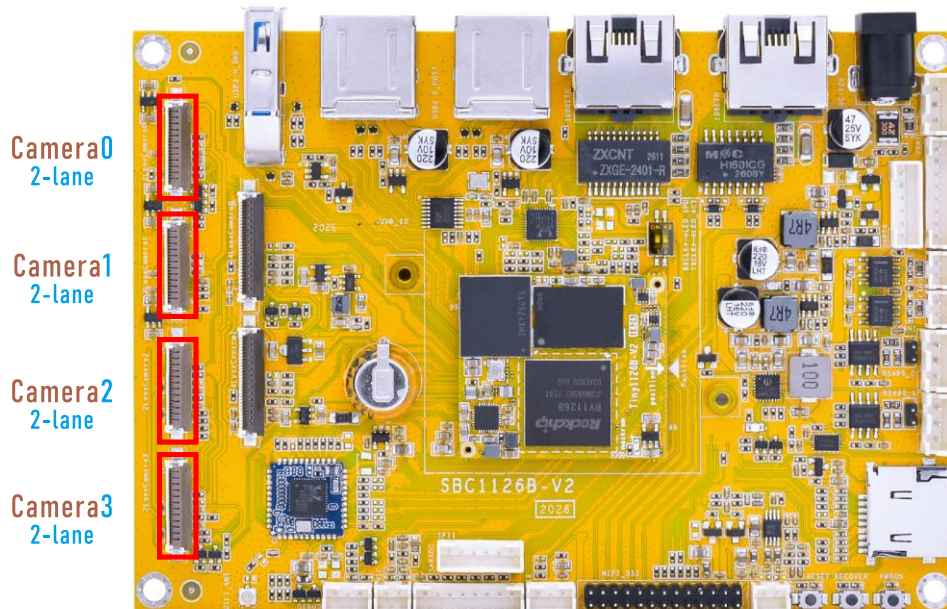
Step 3: Read the current battery voltage.

```
# cat /sys/class/power_supply/cw221X-bat/voltage_now
```

```
root@linaro-alip:/# cat /sys/class/power_supply/cw221X-bat/voltage_now
3463000
```

6.16 Camera

Step 1: Connect the camera module, then power on the board.



Step 2: Check the camera preview device nodes.

Execute the following command:

```
# grep "" /sys/class/video4linux/v*/name | grep mainpath
```

```
root@linaro-alip:/# grep "" /sys/class/video4linux/v*/name | grep mainpath
/sys/class/video4linux/video44/name:rkisp_mainpath
/sys/class/video4linux/video52/name:rkisp_mainpath
/sys/class/video4linux/video60/name:rkisp_mainpath
/sys/class/video4linux/video68/name:rkisp_mainpath
```

Step 3: Preview the camera.

Camera0:

```
# gst-launch-1.0 v4l2src device=/dev/video44 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! kmssink
```



```
root@linaro-alip:/# gst-launch-1.0 v4l2src device=/dev/video44 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! kmssink
mpp[3153]: mpp_info: mpp version: 520ab553 author: Herman Chen 2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
rate=25/1 ! kmssink
mpp[3153]: mpp_info: mpp version: 520ab553 author: Herman Chen 2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[3153]: mpp_info: mpp version: 520ab553 author: Herman Chen 2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[3153]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[3153]: mpp_info: mpp version: 520ab553 author: Herman Chen 2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
[ 163.521393] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)
[ 164.273559] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 164.353646] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 164.355762] rkCIF-mipi-lvds: stream[0] start streaming
[ 164.356019] rockchip-mipi-csi2 mipi0-csi2: stream on, src_sd: 00000000860eb766, sd_name:rockchip-csi2-dphy1
[ 164.356040] rockchip-mipi-csi2 mipi0-csi2: stream ON
[ 164.356088] rockchip-csi2-dphy1: dphy1, data_rate_mbps 742
[ 164.356117] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
[ 164.356130] sc200ai 5-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:27.0 / 99:99:99.
```

Camera1:

```
# gst-launch-1.0 v4l2src device=/dev/video52 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! kmssink
```

```
root@linaro-alip:/# gst-launch-1.0 v4l2src device=/dev/video52 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! kmssink
[ 254.595943] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)width=1920,height=1080, framerate=25/1 ! kmssink
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 254.673186] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 254.675289] rkCIF-mipi-lvds1: stream[0] start streaming
[ 254.675555] rockchip-mipi-csi2 mipi1-csi2: stream on, src_sd: 00000000a0550fb3, sd_name:rockchip-csi2-dphy2
[ 254.675578] rockchip-mipi-csi2 mipi1-csi2: stream ON
[ 254.675626] rockchip-csi2-dphy2: dphy2, data_rate_mbps 742
[ 254.675658] rockchip-csi2-dphy csi2-dphy2: csi2_dphy_s_stream stream on:1, dphy2, ret 0
[ 254.675670] sc200ai 3-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:14.8 / 99:99:99.
```

Camera2:

```
# gst-launch-1.0 v4l2src device=/dev/video60 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! kmssink
```

```
root@linaro-alip:/# gst-launch-1.0 v4l2src device=/dev/video60 ! video/x-raw,format=NV16,width=1920,height=1080,framerate=25/1 ! kmssink
[ 321.049480] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)width=1920,height=1080,framerate=25/1 ! kmssink
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 321.126121] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 321.128269] rkCIF-mipi-lvds3: stream[0] start streaming
[ 321.128519] rockchip-mipi-csi2 mipi3-csi2: stream on, src_sd: 00000000a7852602, sd_name:rockchip-csi2-dphy5
[ 321.128539] rockchip-mipi-csi2 mipi3-csi2: stream ON
[ 321.128583] rockchip-csi2-dphy5: dphy5, data_rate_mbps 742
[ 321.128613] rockchip-csi2-dphy csi2-dphy5: csi2_dphy_s_stream stream on:1, dphy5, ret 0
[ 321.128625] sc200ai 4-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:12.6 / 99:99:99.
```

Camera3:

```
# gst-launch-1.0 v4l2src device=/dev/video68 ! video/x-raw,format=NV16,width=1920,height=1080,framerate=25/1 ! kmssink
```

```
root@linaro-alip:/# gst-launch-1.0 v4l2src device=/dev/video68 ! video/x-raw,format=NV16,width=1920,height=1080,framerate=25/1 ! kmssink
[ 370.255992] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)width=1920,height=1080,framerate=25/1 ! kmssink
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 370.333262] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 370.335203] rkCIF-mipi-lvds2: stream[0] start streaming
[ 370.335461] rockchip-mipi-csi2 mipi2-csi2: stream on, src_sd: 000000000660794f, sd_name:rockchip-csi2-dphy4
[ 370.335479] rockchip-mipi-csi2 mipi2-csi2: stream ON
[ 370.335524] rockchip-csi2-dphy4: dphy4, data_rate_mbps 742
[ 370.335553] rockchip-csi2-dphy csi2-dphy4: csi2_dphy_s_stream stream on:1, dphy4, ret 0
[ 370.335566] sc200ai 1-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:05.5 / 99:99:99.
```

6.17 Video Playback

(1) Use the built-in video test scripts.

Execute the following command:

```
# /rockchip-test/video/test_gst_video.sh
```

```

root@linaro-alip:/# ./rockchip-test/video/test_gst_video.sh
[ 130.441969] dw9714 3-000c: cmd 0x80685600 not supported
[ 130.442393] dw9714 4-000c: dw9714_set_power(1046) on(1)
[ 130.479174] dw9714 4-000c: cmd 0x80685600 not supported
[ 130.502451] dw9714 4-000c: dw9714_set_power(1046) on(0)
[ 130.504096] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...
Redistribute latency...
mpp[2161]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2161]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2161]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2161]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[2161]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2161]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
Redistribute latency...
mpp[2161]: h264d_api: is_avcC=1
mpp[2161]: mpp_buf_slot: mismatch h_stride_by_pixel 1472 - 1280
mpp[2161]: mpp_buf_slot: mismatch h_stride_by_byte 1472 - 1280
mpp[2161]: mpp_buf_slot: mismatch size_total 1589760 - 1843200
mpp[2161]: mpp_buf_slot: mismatch h_stride_by_pixel 1472 - 1280
mpp[2161]: mpp_buf_slot: mismatch h_stride_by_byte 1472 - 1280
mpp[2161]: mpp_buf_slot: mismatch size_total 1589760 - 1843200
Pipeline is PREROLLED ...
Prerolled, waiting for async message to finish...
Setting pipeline to PLAYING ...
Redistribute latency...
New clock: GstSystemClock
0:00:02.9 / 0:00:29.5 (10.0 %)

```

(2) Play videos using the gst-play-1.0 command.

Execute the following command:

```

# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
# gst-play-1.0 --flags=3 --videosink="kmssink plane-id=74" /media/linaro/F3AB-
0FF3/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4 --audiosink="alsasink
device=hw:0,0"

```

```

root@linaro-alip:/# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1                gst-play-1.0 --flags=3 --
videosink="kmssink plane-id=74" /media/linaro/F3AB-0FF3/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4 --
audiosink="alsasink device=hw:0,0"INK-DDU-DU_DDU-DU.mp4 --audiosink="alsasink device=hw:0,0"
Press 'k' to see a list of keyboard shortcuts.
Now playing /media/linaro/F3AB-0FF3/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4
Redistribute latency...
mpp[2887]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2887]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2887]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2887]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[2887]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[2887]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
Redistribute latency...
mpp[2887]: h264d_api: is_avcC=1
mpp[2887]: mpp_buf_slot: mismatch h_stride_by_pixel 4032 - 3840
mpp[2887]: mpp_buf_slot: mismatch h_stride_by_byte 4032 - 3840
mpp[2887]: mpp_buf_slot: mismatch size_total 13063680 - 16588800
mpp[2887]: mpp_buf_slot: mismatch h_stride_by_pixel 4032 - 3840
mpp[2887]: mpp_buf_slot: mismatch h_stride_by_byte 4032 - 3840
mpp[2887]: mpp_buf_slot: mismatch size_total 13063680 - 16588800
WARNING No volume control found
WARNING debug information: ../gst/playback/gstplaysink.c(2908):   gen_audio_chain   ():
/GstPlayBin:playbin/GstPlaySink:playsink:
Volume/mute is not available
Redistribute latency...
Redistribute latency...
[ 931.560710] [drm:vop_plane_atomic_check] *ERROR* Invalid source: 3840x2160. max input: 1920x1920
Redistribute latency...
0:00:07.3 / 0:03:28.8

```

Command explanation:

- `export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1`: Open AFBC.
- `--videosink="kmssink plane-id=74"`: Specifies the plane. Which can be viewed using the command: `cat /sys/kernel/debug/dri/0/state | grep "plane\["`.
- `/media/linaro/F3AB-0FF3/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4`: The media file path to be played.
- `--audiosink="alsasink device=hw:0,0"`: Specifies the audio output device as `hw:0,0`.

7. Buildroot Test

In the Buildroot rockit version, the rkipc service starts automatically after system boot.

To avoid conflicts during function tests, stop the rkipc service before testing other functions.

Stop the rkipc service:

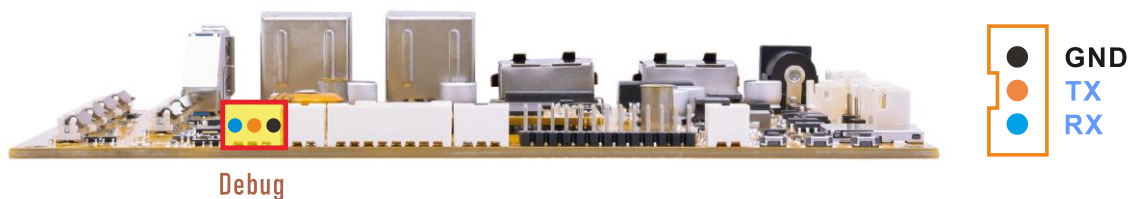
```
# RkLunch-stop.sh
```

Restart the rkipc service after testing:

```
# RkLunch.sh
```

7.1 Serial Terminal

Step 1: Connect the USB-to-serial module to the PC and connect the other end to the Debug UART interface on the board.



Step 2: Open a serial terminal tool on the PC, select the corresponding serial port, and set the baud rate to 1500000.

Step 3: Power on the board and check whether the boot log is displayed in the serial terminal.

```

serial-com6 - SecureCRT
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
serial-com6 x
7.622155] android_work: sent uevent USB_STATE=CONFIGURED
7.735427] RTW: [RF_PATH] ver_id.RF_TYPE:RF_1T1R
7.735461] RTW: [RF_PATH] HALSPEC's rf_reg_trx_path_bmp:0x11, rf_reg_path_avail_num:1, ma
7.735468] RTW: [RF_PATH] PG's trx_path_bmp:0x00, max_tx_cnt:0
7.735473] RTW: [RF_PATH] Registry's trx_path_bmp:0x00, tx_path_lmt:0, rx_path_lmt:0
7.735477] RTW: [RF_PATH] HALDATA's trx_path_bmp:0x11, max_tx_cnt:1
7.735482] RTW: [RF_PATH] HALDATA's rf_type:RF_1T1R, NumTotalRFPATH:1
7.735488] RTW: [TRX_NSS] HALSPEC - tx_nss:1, rx_nss:1
7.735494] RTW: [TRX_NSS] Registry - tx_nss:0, rx_nss:0
7.735498] RTW: [TRX_NSS] HALDATA - tx_nss:1, rx_nss:1
7.735504] RTW: txpath=0x1, rxpath=0x1
7.735509] RTW: txpath_1ss:0x1, num:1
7.735935] RTW: rtw_regsty_chk_target_tx_power_valid return _FALSE for band:0, path:0, rs
7.737766] RTW: rtw_ndev_init(wlan0) if1 mac_addr=84:fc:14:f9:69:64
7.738739] RTW: rtw_ndev_init(p2p0) if2 mac_addr=86:fc:14:f9:69:64
7.740752] RTW: module init ret=0
Enabling p2p0...
Enabling wlan0...
Successfully init wi-fi for RTL8723DS!
Done
Successfully initialized wpa_supplicant
rfkill: Cannot open RFKILL control device
[ 17.819317] platform mtd_vendor_storage: deferred probe pending

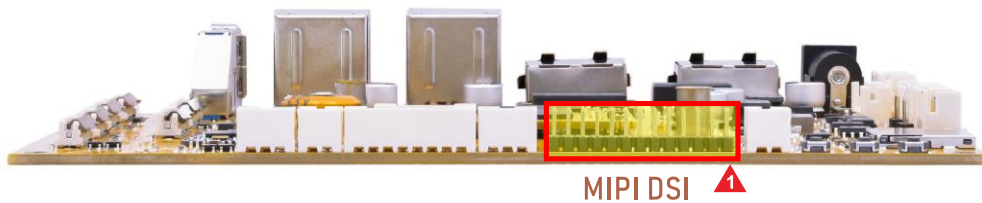
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#

```

For details about installing and using the serial terminal tool, please refer to Section [2.2 Install CH9102X Driver](#) and [2.3 Install Serial Terminal Tool](#).

7.2 Display

The default MIPI display resolution of the SBC1126B is 800×1280@60 Hz.



The Buildroot system provides two versions: the GStreamer version and the Rockit version. The display output may vary depending on the firmware version.

7.2.1 GStreamer Version

After the GStreamer version is started, the display output is shown in the following figure:



7.2.2 Rokit Version

After the system boots with the Rokit version, if four cameras are connected before power-on, the system displays a combined preview of the four camera channels on the screen by default.

If the four cameras are not connected, the desktop UI will not be displayed after boot-up.

7.3 USB

7.3.1 USB OTG

The USB OTG port of the SBC1126B is configured as Device mode by default after system startup.



- To switch the USB OTG port to Host mode, execute the following command:

```
# echo host > /sys/kernel/debug/usb/21500000.usb/mode
```

```

root@rv1126b-buildroot:/# echo host > /sys/kernel/debug/usb/21500000.usb/mode
root@rv1126b-buildroot:/# [ 199.870692] dwc3 21500000.usb: request 0000000012171de9 was not queued
to ep0out
[ 199.870899] android_work: did not send uevent (0 0 0000000000000000)
[ 199.915049] read descriptors
[ 199.915084] read strings
[ 199.979460] phy phy-21400000.usb2-phy.2: illegal mode
[ 199.979502] xhci-hcd xhci-hcd.1.auto: xHCI Host Controller
[ 199.979728] xhci-hcd xhci-hcd.1.auto: new USB bus registered, assigned bus number 3
[ 199.979871] xhci-hcd xhci-hcd.1.auto: hcc params 0x0220fe64 hci version 0x110 quirks
0x0002008022010010
[ 199.979914] xhci-hcd xhci-hcd.1.auto: irq 81, io mem 0x21500000
[ 199.980024] xhci-hcd xhci-hcd.1.auto: xHCI Host Controller
[ 199.980325] xhci-hcd xhci-hcd.1.auto: new USB bus registered, assigned bus number 4
[ 199.980355] xhci-hcd xhci-hcd.1.auto: Host supports USB 3.0 SuperSpeed
[ 199.980499] usb usb3: New USB device found, idVendor=1d6b, idProduct=0002, bcdDevice= 6.01
[ 199.980510] usb usb3: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[ 199.980517] usb usb3: Product: xHCI Host Controller
[ 199.980523] usb usb3: Manufacturer: Linux 6.1.141 xhci-hcd
[ 199.980529] usb usb3: SerialNumber: xhci-hcd.1.auto
[ 199.980940] hub 3-0:1.0: USB hub found
[ 199.980980] hub 3-0:1.0: 1 port detected
[ 199.981465] usb usb4: We don't know the algorithms for LPM for this host, disabling LPM.
[ 199.981610] usb usb4: New USB device found, idVendor=1d6b, idProduct=0003, bcdDevice= 6.01
[ 199.981620] usb usb4: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[ 199.981627] usb usb4: Product: xHCI Host Controller
[ 199.981633] usb usb4: Manufacturer: Linux 6.1.141 xhci-hcd
[ 199.981639] usb usb4: SerialNumber: xhci-hcd.1.auto
[ 199.982096] hub 4-0:1.0: USB hub found
[ 199.982136] hub 4-0:1.0: 1 port detected
[ 200.367365] usb 4-1: new SuperSpeed USB device number 2 using xhci-hcd
[ 200.397970] usb 4-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[ 200.398014] usb 4-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 200.398033] usb 4-1: Product: OnlyDisk
[ 200.398047] usb 4-1: Manufacturer: Netac
[ 200.398061] usb 4-1: SerialNumber: C0E8BFA3EC38F796
[ 200.400871] usb-storage 4-1:1.0: USB Mass Storage device detected
[ 200.401285] scsi host0: usb-storage 4-1:1.0
[ 200.959119] read descriptors
[ 200.959157] read strings
[ 201.466095] scsi 0:0:0:0: Direct-Access Netac OnlyDisk 8.01 PQ: 0 ANSI: 6
[ 201.471402] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[ 201.471927] sd 0:0:0:0: [sda] Write Protect is off
[ 201.472282] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO
or FUA
[ 201.477398] sda: sdal
[ 201.477738] sd 0:0:0:0: [sda] Attached SCSI removable disk
[ 201.669040] FAT-fs (sdal): utf8 is not a recommended IO charset for FAT filesystems, filesystem
will be case sensitive!
[ 201.672998] FAT-fs (sdal): Volume was not properly unmounted. Some data may be corrupt. Please
run fsck.

```

- To switch the USB OTG port back to Device mode, execute the following command:

```
# echo device > /sys/kernel/debug/usb/21500000.usb/mode
```

```

root@rv1126b-buildroot:/# echo device > /sys/kernel/debug/usb/21500000.usb/mode
root@rv1126b-buildroot:/# [ 259.214532] xhci-hcd xhci-hcd.1.auto: remove, state 4
[ 259.214576] usb usb4: USB disconnect, device number 1
[ 259.215731] xhci-hcd xhci-hcd.1.auto: USB bus 4 deregistered
[ 259.215959] xhci-hcd xhci-hcd.1.auto: remove, state 4
[ 259.215980] usb usb3: USB disconnect, device number 1
[ 259.216912] xhci-hcd xhci-hcd.1.auto: USB bus 3 deregistered
[ 260.126638] read descriptors
[ 260.126674] read strings
[ 260.397830] dwc3 21500000.usb: device reset
[ 260.484309] android_work: sent uevent USB_STATE=CONNECTED
[ 260.511748] android_work: sent uevent USB_STATE=CONFIGURED

```

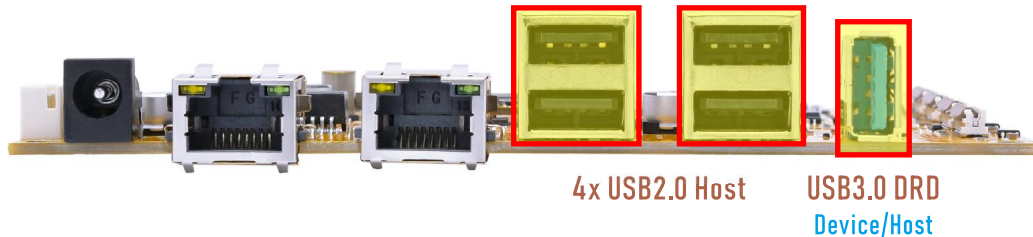
7.3.2 USB HOST

The SBC1126B provides USB 2.0 Host interfaces and one USB 3.0 OTG interface. The USB 2.0 Host interfaces can be used to connect USB peripherals, such as a USB mouse,

USB keyboard, USB flash drive, and other USB devices.

Note:

The USB 3.0 interface is an OTG interface. To use it as a Host interface, switch it to Host mode first. For details, refer to Section [6.3.1 USB OTG](#).



The current USB connection speed can be checked from the debug log.

- When the USB device operates in USB 2.0 mode, the log usually shows “high-speed”:

```
root@rv1126b-buildroot:/# [ 552.554828] usb 1-1.2: new high-speed USB device number 4 using ehci-platform
[ 552.664069] usb 1-1.2: New USB device found, idVendor=21c4, idProduct=0cc7, bcdDevice= 1.00
[ 552.664090] usb 1-1.2: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 552.664097] usb 1-1.2: Product: USB Flash Drive
[ 552.664102] usb 1-1.2: Manufacturer: Lexar
[ 552.664108] usb 1-1.2: SerialNumber: 0410280000031D7
[ 552.665690] usb-storage 1-1.2:1.0: USB Mass Storage device detected
[ 552.666647] scsi host0: usb-storage 1-1.2:1.0
[ 553.692095] scsi 0:0:0:0: Direct-Access Lexar USB Flash Drive 1.00 PQ: 0 ANSI: 4
[ 553.694492] sd 0:0:0:0: [sda] 120861886 512-byte logical blocks: (61.9 GB/57.6 GiB)
[ 553.695307] sd 0:0:0:0: [sda] Write Protect is off
[ 553.696107] sd 0:0:0:0: [sda] No Caching mode page found
[ 553.696128] sd 0:0:0:0: [sda] Assuming drive cache: write through
[ 553.702618] sda: sda1
[ 553.703327] sd 0:0:0:0: [sda] Attached SCSI removable disk
[ 554.227536] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will be
case sensitive!
[ 554.233156] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run
fsck.
```

- When the USB device operates in USB 3.0 mode, the log usually shows “SuperSpeed”:

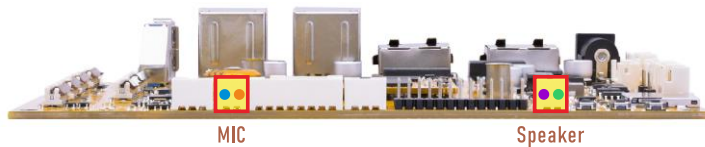
```
root@rv1126b-buildroot:/# [ 500.487295] usb 4-1: new SuperSpeed USB device number 3 using xhci-hcd
[ 500.517057] usb 4-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[ 500.517096] usb 4-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 500.517115] usb 4-1: Product: OnlyDisk
[ 500.517129] usb 4-1: Manufacturer: Netac
[ 500.517143] usb 4-1: SerialNumber: C0E8BFA3EC38F796
[ 500.518668] usb-storage 4-1:1.0: USB Mass Storage device detected
[ 500.519204] scsi host0: usb-storage 4-1:1.0
[ 501.594068] scsi 0:0:0:0: Direct-Access Netac OnlyDisk 8.01 PQ: 0 ANSI: 6
[ 501.597160] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[ 501.597653] sd 0:0:0:0: [sda] Write Protect is off
[ 501.597914] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[ 501.602848] sda: sda1
[ 501.603279] sd 0:0:0:0: [sda] Attached SCSI removable disk
[ 501.773323] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will be
case sensitive!
[ 501.777260] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run
fsck.
```

After a USB flash drive is connected, it will be mounted automatically. Run the following command to check the mount path of the USB flash drive:

```
# df -h
```

```
root@rv1126b-buildroot:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        5.9G  445M   5.3G   8% /
devtmpfs         959M    0   959M   0% /dev
tmpfs            987M  548K   986M   1% /run
tmpfs            987M  212K   987M   1% /var/log
tmpfs            987M    0   987M   0% /dev/shm
tmpfs            987M  136K   987M   1% /tmp
/dev/mmcblk0p7   124M   5.3M   118M   5% /oem
/dev/mmcblk0p8   936M  292K   936M   1% /userdata
/dev/sda1        58G   57G   1.9G  97% /mnt/udisk
/dev/mmcblk1p1   30G   4.6G   26G  16% /mnt/sdcard
```

7.4 Audio I/O



7.4.1 Audio Output Test

Step 1: Set the DAC digital volume.

Execute the following command:

```
# amixer -c 0 cset name='DAC Digital Volume' 250,250
```

Step 2: Play the audio file.

Execute one of the following commands according to the actual audio file path:

```
# aplay -D hw:0,0 /mnt/udisk1/video/music/2.wav
```

```
root@rv1126b-buildroot:/# amixer -c 0 cset name='DAC Digital Volume' 250,250
numid=47,iface=MIXER,name='DAC Digital Volume'
; type=INTEGER,access=rw---R--,values=2,min=0,max=510,step=0
: values=250,250
| dBscale-min=-956.25dB,step=3.75dB,mute=0
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/# aplay -D hw:0,0 /mnt/udisk1/video/music/2.wav
Playing WAVE '/mnt/udisk1/video/music/2.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

7.4.2 Audio Input Test

Function	Description
MIC recording	Captures external sounds, such as voice, for storage, transmission, or voice command applications.
Loopback	Captures the device's internal playback signal as a reference signal. It is mainly used for Acoustic Echo Cancellation (AEC) and audio monitoring, not for recording environmental sounds.

Note:

For the **Rockit** version, the audio recording test may conflict with the rkipc service. Before performing the audio input test, stop rkipc first.

Execute the following command:

```
# RkLunch-stop.sh
```

To start rkipc again after the test, execute the following command:

```
# RkLunch.sh
```

7.4.2.1 MIC Recording Test

Step 1: Select MIC as the recording input source.

Execute the following command:

```
# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'
```

Step 2: Set the audio codec digital gain.

Execute the following command:

```
# amixer -c 0 cset name='ACodec Digital Gain Volume' 100
```

Step 3: Record audio from MIC.

Execute the following command:

```
# arecord -D hw:0,0 -f cd -t wav test.wav
```

Step 4: Play the recorded audio through the speaker.

Execute the following command:

```
# aplay -D hw:0,0 test.wav
```

```
root@rv1126b-buildroot:/#  
t' 'From SDI0'uildroot:/# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select  
numid=29,iface=MIXER,name='SAI2 Receive PATH0 Source Select'  
; type=ENUMERATED,access=rw-----,values=1,items=4  
; Item #0 'From SDI0'  
; Item #1 'From SDI1'  
; Item #2 'From SDI2'  
; Item #3 'From SDI3'  
: values=0  
root@rv1126b-buildroot:/# amixer -c 0 cset name='ACodec Digital Gain Volume' 100  
numid=44,iface=MIXER,name='ACodec Digital Gain Volume'c Digital Gain Volume' 100  
; type=INTEGER,access=rw--R--,values=1,min=0,max=127,step=0  
: values=100  
| dBscale-min=-95.00dB,step=0.75dB,mute=0  
root@rv1126b-buildroot:/#  
root@rv1126b-buildroot:/# arecord -D hw:0,0 -f cd -t wav test.wav  
Recording WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo  
^CAborted by signal Interrupt...  
root@rv1126b-buildroot:/#  
root@rv1126b-buildroot:/# aplay -D hw:0,0 test.wav  
Playing WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

7.4.2.2 MIC and Loopback Simultaneous Recording Test

Step 1: Select MIC and loopback as the recording input sources.

Execute the following commands:

```
# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select' 'From SDI0'  
# amixer -c 0 cset name='SAI2 Receive PATH1 Source Select' 'From SDI1'
```

Step 2: Record 4-channel audio.

Execute the following command:

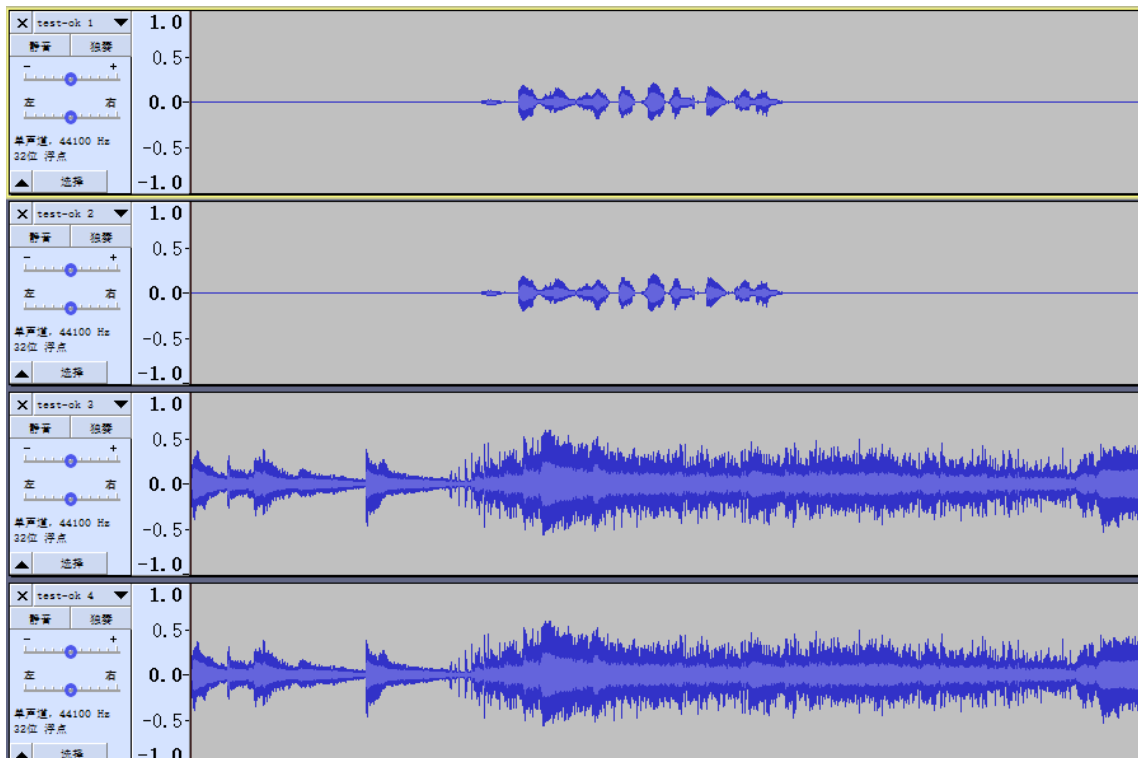
```
# aplay -D hw:0,0 /mnt/udisk/video/music/2.wav & arecord -D hw:0,0 -f S16_LE -r  
44100 -c 4 /test.wav
```

```

root@rv1126b-buildroot:/# amixer -c 0 cset name='SAI2 Receive PATH0
t' 'From SDI0'^Cldroot:/# amixer -c 0 cset name='SAI2 Receive PATH1 Source Select
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
root@rv1126b-buildroot:/#
t' 'From SDI0'uildroot:/# amixer -c 0 cset name='SAI2 Receive PATH0 Source Select
numid=29,iface=MIXER,name='SAI2 Receive PATH0 Source Select'
; type=ENUMERATED,access=rw-----,values=1,items=4
; Item #0 'From SDI0'
; Item #1 'From SDI1'
; Item #2 'From SDI2'
; Item #3 'From SDI3'
: values=0
root@rv1126b-buildroot:/#
t' 'From SDI1'uildroot:/# amixer -c 0 cset name='SAI2 Receive PATH1 Source Select
numid=28,iface=MIXER,name='SAI2 Receive PATH1 Source Select'
; type=ENUMERATED,access=rw-----,values=1,items=4
; Item #0 'From SDI0'
; Item #1 'From SDI1'
; Item #2 'From SDI2'
; Item #3 'From SDI3'
: values=1
root@rv1126b-buildroot:/#
-D hw:0,0 -f S16_LE -r 44100 -c 4 /test.wavnt/udisk/video/music/2.wav & arecord
[1] 2036
Recording WAVE '/test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Channels 4
Playing WAVE '/mnt/udisk/video/music/2.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo

```

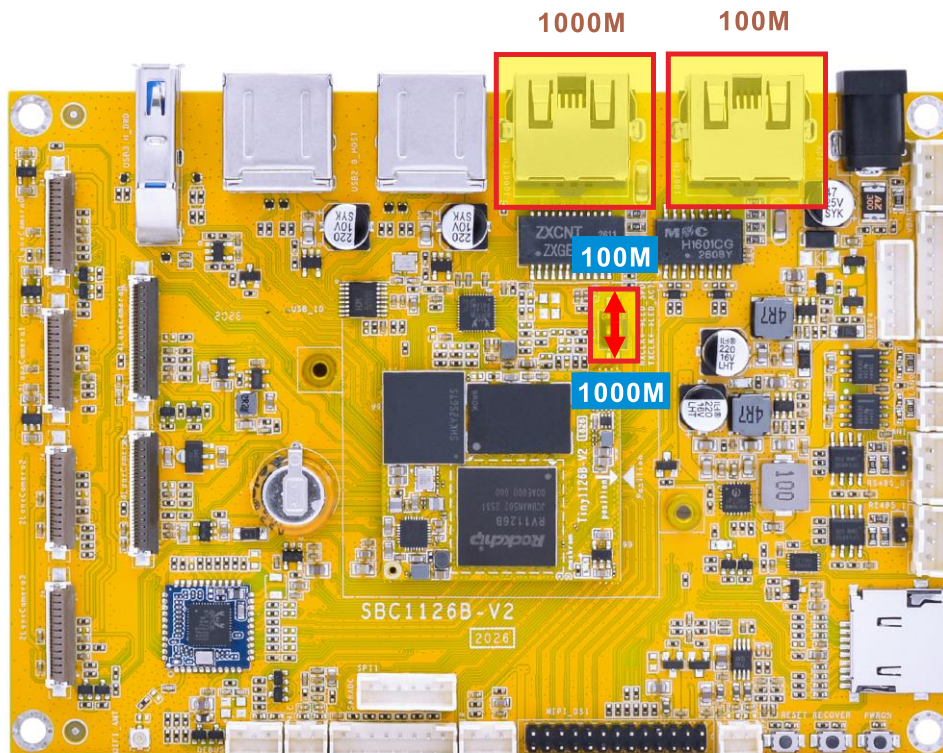
Step 3: Copy the recorded file to the PC and verify the MIC and Loopback channels using audio software.



7.5 Ethernet

The 100M Ethernet and 1000M Ethernet interfaces on the SBC1126B are multiplexed and cannot be used at the same time. When switching between them, the corresponding

firmware image must be updated in software, and the hardware selection must also be changed using the DIP switch on the development board.



DTS Configuration Switching Instructions

File path: *kernel-6.1/arch/arm64/boot/dts/rockchip/boardcon-sbc1126b.dts*

When using 100M Ethernet:

```
//#include "boardcon-sbc1126b-gephy.dtsi" //1000M
#include "boardcon-sbc1126b-fephy.dtsi" //100M
```

When using 1000M Ethernet:

```
#include "boardcon-sbc1126b-gephy.dtsi" //1000M
//#include "boardcon-sbc1126b-fephy.dtsi" //100M
```

7.5.1 100M Ethernet

Step 1: Connect the network cable to the 100M Ethernet port, and set the DIP switch to the 100M position.

According to the log, it can be seen that the 100M Ethernet recognition is successful.

```
root@rv1126b-buildroot:/# [ 2239.711481] rk_gmac-dwmac 21c70000.ethernet eth0: Link is Up - 100Mbps/Full
- flow control rx/tx
[ 2239.711505] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig eth0
```

```
root@rv1126b-buildroot:/# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 2E:CD:2F:8A:A1:64
          inet addr:192.168.0.175  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::b786:555a:8922:5eb2/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:231 errors:0 dropped:28 overruns:0 frame:0
          TX packets:11 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:20498 (20.0 KiB)  TX bytes:1410 (1.3 KiB)
          Interrupt:79
```

Step 3: Test the network connection.

Execute the following command:

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

```
root@rv1126b-buildroot:/# ping -I eth0 www.armdesigner.com
PING d3dsoj86mhkk6.cloudfront.net (108.138.246.8) from 192.168.0.175 eth0: 56(84) bytes of data.
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=1 ttl=246 time=155 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=2 ttl=246 time=155 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=3 ttl=246 time=151 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=4 ttl=246 time=155 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=5 ttl=246 time=154 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=6 ttl=246 time=150 ms
^C
--- d3dsoj86mhkk6.cloudfront.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5007ms
rtt min/avg/max/mdev = 150.276/153.243/154.972/1.845 ms
```

7.5.2 1000M Ethernet

Step 1: Connect the network cable to the 1000M Ethernet port, and set the DIP switch to the 1000M position.

According to the log, it can be seen that the 1000M Ethernet recognition is successful.

```
root@rv1126b-buildroot:/# [ 80.044336] rk_gmac-dwmac 21c70000.ethernet eth0: Link is Up - 1Gbps/Full -
flow control rx/tx
[ 80.044406] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig eth0
```

```
root@rv1126b-buildroot:/# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr DA:62:08:A4:46:DF
          inet addr:192.168.0.13  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::576d:2dbc:1626:b158/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:213 errors:0 dropped:0 overruns:0 frame:0
          TX packets:21 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:17986 (17.5 KiB)  TX bytes:1902 (1.8 KiB)
          Interrupt:79
```

Step 3: Test the network connection.

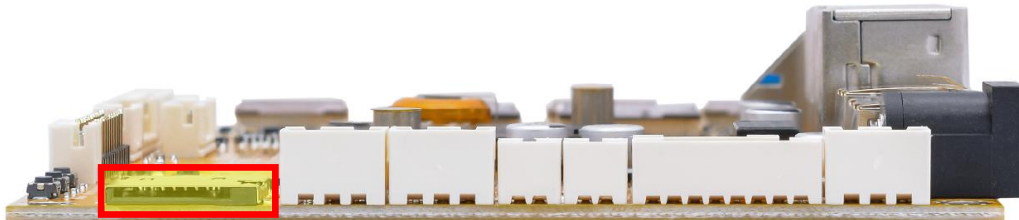
Execute the following command:

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

```
root@rv1126b-buildroot:/# ping -I eth0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (108.138.246.80) from 192.168.0.13 eth0: 56(84) bytes of data.
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=1 ttl=245 time=159 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=2 ttl=245 time=160 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=3 ttl=245 time=159 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=4 ttl=245 time=159 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=5 ttl=245 time=159 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=6 ttl=245 time=160 ms
64 bytes from www.armdesigner.com (108.138.246.80): icmp_seq=7 ttl=245 time=159 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6009ms
rtt min/avg/max/mdev = 159.143/159.499/160.308/0.387 ms
```

7.6 SD Card

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



Micro SD

After the SD card is recognized, it will be mounted automatically.

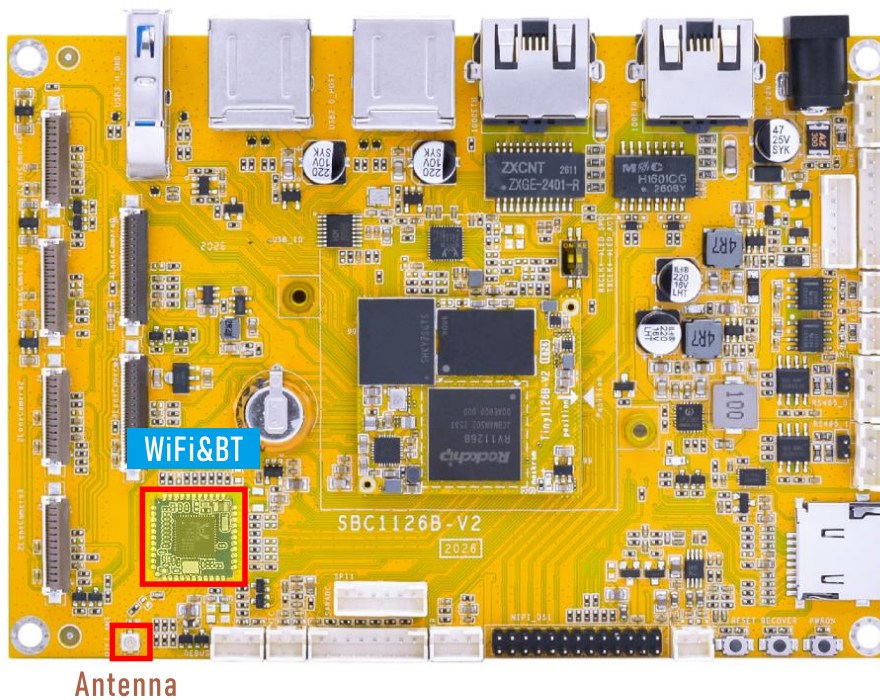
Step 2: Execute the following command to check the mount path of the SD card.

```
# df -h
```

```
root@rv1126b-buildroot:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        5.9G  445M  5.3G   8% /
devtmpfs        959M   0  959M   0% /dev
tmpfs           987M  548K  986M   1% /run
tmpfs           987M  212K  987M   1% /var/log
tmpfs           987M   0  987M   0% /dev/shm
tmpfs           987M  136K  987M   1% /tmp
/dev/mmcblk0p7  124M   5.3M  118M   5% /oem
/dev/mmcblk0p8   936M  292K  936M   1% /userdata
/dev/sda1        58G   57G   1.9G  97% /mnt/udisk
/dev/mmcblk1p1   30G   4.6G   26G  16% /mnt/sdcard
```

7.7 WiFi & Bluetooth

To use the WiFi and Bluetooth functions properly, make sure the antenna is connected.



7.7.1 WiFi

Step 1: Check the Wi-Fi device information.

Execute the following command:

```
# ifconfig wlan0
```

```
root@rv1126b-buildroot:/# ifconfig wlan0
wlan0    Link encap:Ethernet HWaddr 84:FC:14:F9:69:64
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 (0.0 B)  TX bytes:0 (0.0 B)
```

Step 2: Scan for available WiFi hotspots.

• GStreamer Version

Execute the following command:

```
# iwlist wlan0 scan
```

```
root@rv1126b-buildroot:/# iwlist wlan0 scan
wlan0    Scan completed :
  Cell 01 - Address: B4:F1:8C:FD:D1:29
            ESSID:"Boardcon_Wi-Fi5"
            Protocol:IEEE 802.11bgn
            Mode:Master
            Frequency:2.437 GHz (Channel 6)
            Encryption key:on
            Bit Rates:300 Mb/s
            Extra:wpa_ie=dd1a0050f20101000050f20202000050f2040050f20201000050f202
            IE: WPA Version 1
                  Group Cipher : TKIP
                  Pairwise Ciphers (2) : CCMP TKIP
                  Authentication Suites (1) : PSK
            Extra:
            IE: IEEE 802.11i/WPA2 Version 1
                  Group Cipher : TKIP
                  Pairwise Ciphers (2) : CCMP TKIP
                  Authentication Suites (1) : PSK
            IE: Unknown:
            DD910050F204104A0001101044000102103B00010310470010123456789ABCDEF01234B4F18C6DD124102100194875617765692054
            6563686E6F6C6F677920436F2E2C4C74641023000B576972656C657373204150102400033132331042000531323334351054000800
            060050F2040001101100095443373130322D3130100800020780103C0001011049000600372A000120
            Quality=96/100  Signal level=50/100
```

• Rockit Version

Execute the following command:

```
# wpa_cli -i wlan0 scan
# wpa_cli -i wlan0 scan_results
```

```
root@rv1126b-buildroot:/# wpa_cli -i wlan0 scan
OK
root@rv1126b-buildroot:/# wpa_cli -i wlan0 scan_results
bssid / frequency / signal level / flags / ssid
b4:f1:8c:6d:d1:24      2462    -50    [WPA-PSK-CCMP+TKIP][WPA2-PSK-CCMP+TKIP][WPS][ESS]    Boardcon
b4:f1:8c:6d:d1:29      2462    -50    [WPA2-PSK-CCMP][WPS][ESS]
b4:f1:8c:fd:d1:29      2462    -58    [WPA-PSK-CCMP+TKIP][WPA2-PSK-CCMP+TKIP][WPS][ESS]    Boardcon_Wi-
Fi5
d8:32:14:25:b7:a8      2437    -69    [WPA-PSK-CCMP][WPA2-PSK-CCMP][WPS][ESS]    LYB-2.4G
b2:22:7a:5a:b6:4a      2462    -51    [WPA2-PSK-CCMP][ESS]    DIRECT-4A-HP Laser 136w
44:6a:2e:20:83:60      2412    -67    [WPA-PSK-CCMP][WPA2-PSK-CCMP][ESS]    ydsz
9c:a6:15:10:e5:57      2437    -74    [WPA-PSK-CCMP+TKIP][WPA2-PSK-CCMP+TKIP][ESS]    TP
b4:f1:8c:6d:d1:25      2462    -58    [WPS][ESS]
38:20:28:50:1e:a1      2437    -68    [WPA2-PSK-CCMP][ESS][UTF-8]    Casvi
50:0f:f5:a7:bb:e0      2417    -78    [WPA-PSK-CCMP][WPA2-PSK-CCMP][ESS]    1960
38:20:28:50:0f:81      2412    -70    [WPA2-PSK-CCMP][ESS][UTF-8]    Casvi
d8:fe:42:ce:ee:d3      2432    -81    [WPA2-PSK-CCMP][WPS][ESS][P2P]    DIRECT-zb-HUAWEI CV81-WDMa
9c:a6:15:10:da:c5      2437    -71    [WPA-PSK-CCMP+TKIP][WPA2-PSK-CCMP+TKIP][ESS]    TP
9c:a6:15:10:dd:6f      2412    -81    [WPA-PSK-CCMP+TKIP][WPA2-PSK-CCMP+TKIP][ESS]    TP
8c:ee:fd:1a:a4:fb      2437    -77    [WPA-PSK-CCMP][WPA2-PSK-CCMP][ESS]    ChinaNet-AQ74
d8:fe:42:ce:f2:58      2437    -75    [WPA2-PSK-CCMP][WPS][ESS]    DIRECT-A1-HUAWEI CV81-WDMa
```

Step 3: Connect to the WiFi hotspot.

Execute the following command:

```
# wifi-connect.sh SSID PSK
```

```
root@rv1126b-buildroot:/# wifi-connect.sh Boardcon Boardcon43435656
connect to WiFi ssid: Boardcon, Passwd: Boardcon43435656
Successfully initialized wpa_supplicant
rfkill: Cannot open RFKILL control device
root@rv1126b-buildroot:/# [ 4095.025410] RTW: rtw_set_802_11_connect(wlan0) fw_state=0x00000008
```

Step 4: Check the network interface status.

Execute the following command:

```
# ifconfig wlan0
```

```
root@rv1126b-buildroot:/# ifconfig wlan0
wlan0      Link encap:Ethernet HWaddr 84:FC:14:F9:69:64
           inet addr:192.168.0.172 Bcast:192.168.0.255 Mask:255.255.255.0
           inet6 addr: fe80::9ac0:b4f5:cfc4:1883/64 Scope:Link
           UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
           RX packets:86 errors:0 dropped:17 overruns:0 frame:0
           TX packets:18 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:11399 (11.1 KiB) TX bytes:2584 (2.5 KiB)
```

Step 5: Test the WiFi network connection.

Execute the following command:

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

```
root@rv1126b-buildroot:/# ping -I wlan0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (108.138.246.8) from 192.168.0.172 wlan0: 56(84) bytes of data.
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=1 ttl=246 time=201 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=2 ttl=246 time=350 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=3 ttl=246 time=189 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=4 ttl=246 time=217 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=5 ttl=246 time=172 ms
64 bytes from www.armdesigner.com (108.138.246.8): icmp_seq=6 ttl=246 time=175 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 172.029/217.381/350.466/61.433 ms
```

7.7.2 Bluetooth

In the Buildroot system, Bluetooth is configured to work as a Bluetooth speaker by default.

Step 1: Start the BlueALSA A2DP sink service.

Execute the following command:

```
# bluealsa -p a2dp-sink &
```

```
root@rv1126b-buildroot:/# bluealsa -p a2dp-sink &
[1] 1867
root@rv1126b-buildroot:/# bluealsa: [1867] D: storage.c:84: Initializing persistent storage:
/var/lib/bluealsa
bluealsa: [1867] D: main.c:604: Starting main dispatching loop
bluealsa: [1867] D: main.c:114: Acquired D-Bus service name: org.bluealsa
bluealsa: [1867] D: bluealsa-dbus.c:392: Registering D-Bus manager: /org/bluealsa
[ 5741.163059] Bluetooth: hu 000000005f39388b retransmitting 1 pkts
[ 5741.163991] rtk_btcoex: BTCOEX hci_rev 0xaaa8
[ 5741.163998] rtk_btcoex: BTCOEX lmp_subver 0x2df5
bluealsa: [1867] D: bluez.c:783: Registering battery provider: /org/bluez/hci0/battery
bluealsa: [1867] D: bluez.c:598: Creating media endpoint object: /org/bluez/hci0/A2DP/SBC/sink/1
bluealsa: [1867] D: bluez.c:509: Registering media endpoint: /org/bluez/hci0/A2DP/SBC/sink/1
bluealsa: [1867] D: bluez.c:598: Creating media endpoint object: /org/bluez/hci0/A2DP/SBC/sink/2
bluealsa: [1867] D: bluez.c:509: Registering media endpoint: /org/bluez/hci0/A2DP/SBC/sink/2
```

Step 2: Enter the Bluetooth control tool.

Execute the following command:

```
# bluetoothctl
```

```
root@rv1126b-buildroot:/# bluetoothctl
hci0 new_settings: powered bondable ssp br/edr le secure-conn
Agent registered
[CHG] Controller 84:FC:14:F9:69:65 Pairable: yes
[bluetooth]#
```

Step 3: Enable Bluetooth and set it to discoverable mode.

Execute the following commands in bluetoothctl:

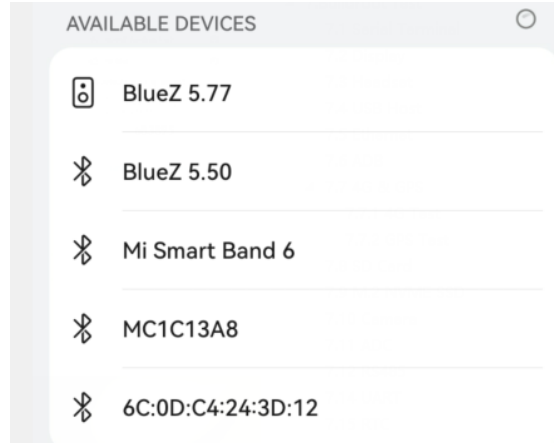
```
[bluetooth]# power on
[bluetooth]# discoverable on
```

```
[bluetooth]# power on
Changing power on succeeded
[bluetooth]# discoverable on
[bluetooth]# [ 5813.299958] Bluetooth: hu 000000005f39388b retransmitting 1 pkts
hci0 new_settings: powered connectable bondable ssp br/edr le secure-conn
hci0 new_settings: powered connectable discoverable bondable ssp br/edr le secure-conn
Changing discoverable on succeeded
[CHG] Controller 84:FC:14:F9:69:65 Discoverable: yes
[bluetooth]#
```

After this step, the Bluetooth device can be discovered by the phone.

Step 4: Pair and connect the Bluetooth device.

On the phone, find the Bluetooth device named “**BlueZ 5.77**” in the Bluetooth device list, then tap it to pair and connect.



If a pairing confirmation message appears, confirm it on both the phone and the board.

```
[bluetooth]# discoverable on
hci0 new_settings: powered connectable bondable ssp br/edr le secure-conn
[bluetooth]# [ 176.396945] Bluetooth: hu 000000007418f04b retransmitting 1 pkts
hci0 new_settings: powered connectable discoverable bondable ssp br/edr le secure-conn
Changing discoverable on succeeded
[CHG] Controller 84:FC:14:F9:69:65 Discoverable: yes
[bluetooth]# [ 190.276160] rtk_btcoex: hci accept conn req
[ 190.474589] rtk_btcoex: connected, handle 0002, status 0x00
[ 190.474615] rtk_btcoex: Page success
[ 190.522637] rtk_btcoex: io capability request
hci0 A8:35:12:9A:EB:4D type BR/EDR connected eir_len 11
[CHG] Device A8:35:12:9A:EB:4D INFO: 0x000f (15)
[CHG] Device A8:35:12:9A:EB:4D Connected: yes
Request confirmation
[agent] Confirm passkey 406213 (yes/no): yes
[liuy]# [ 195.146220] rtk_btcoex: link key notify
hci0 new_link_key A8:35:12:9A:EB:4D type 0x05 pin_len 0 store_hint 1
[liuy]# [ 195.173161] rtk_btcoex: l2cap op 2, len 16, out 0
hci0 A8:35:12:9A:EB:4D type BR/EDR disconnected with reason 0
[ 199.550019] rtk_btcoex: process disconn complete event.
[CHG] Device A8:35:12:9A:EB:4D INFO: 0x000d (13)
[CHG] Device A8:35:12:9A:EB:4D Connected: no
[CHG] Device A8:35:12:9A:EB:4D Reason: 0x0000 (0)
[bluetooth]# [ 206.851770] rtk_btcoex: hci accept conn req
[ 207.047726] rtk_btcoex: connected, handle 0003, status 0x00
[ 207.047752] rtk_btcoex: Page success
hci0 A8:35:12:9A:EB:4D type BR/EDR connected eir_len 11
[CHG] Device A8:35:12:9A:EB:4D INFO: 0x000f (15)
[CHG] Device A8:35:12:9A:EB:4D Connected: yes
[liuy]# Authorize service
[agent] Authorize service 0000110d-0000-1000-8000-00805f9b34fb (yes/no): yes
[liuy]# [ 209.640679] rtk_btcoex: l2cap op 3, len 20, out 1
```

Check the log output to confirm the MAC address. In this example, the MAC address of the mobile phone is **A8:35:12:9A:EB:4D**.

Step 5: Exit bluetoothctl.

Execute the following command:

```
[bluetooth]# exit
```

Step 6: Start Bluetooth audio playback.

Execute the following command:

```
bluealsa-aplay A8:35:12:9A:EB:4D &
```

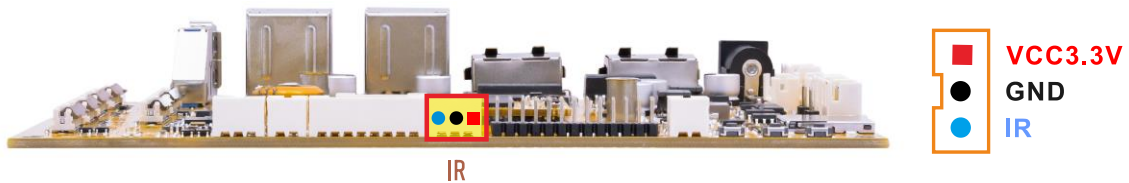
```
[liuy]# exit
root@rv1126b-buildroot:/# [ 252.758958] rtk_btcoex: update_hid_active_state: handle 0x0003, interval 400
[ 252.759004] rtk_btcoex: HID not connected, nothing to be down

root@rv1126b-buildroot:/# bluealsa-aplay A8:35:12:9A:EB:4D &
[2] 1485
root@rv1126b-buildroot:/#
```

After the Bluetooth connection is established, play audio on the phone. The audio should be output from the board.

7.8 IR

Step 1: Connect the IR receiver.



Step 2: Enable IR debug logs.

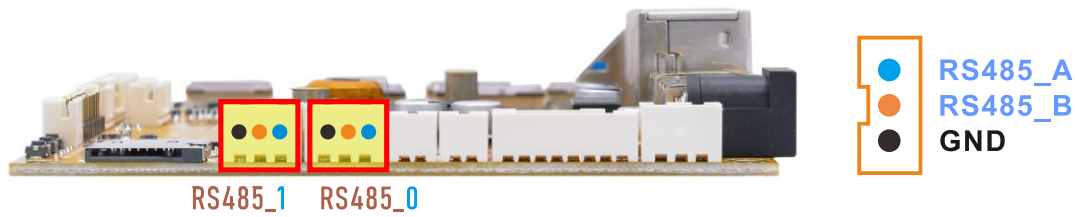
Execute the following command:

```
# echo 1 > /sys/module/rockchip_pwm_remotectl/parameters/code_print
```

Step 3: Point the remote control at the IR receiver and press a button. The corresponding key value will be printed in the log.

```
/code_printb-buildroot:/# echo 1 > /sys/module/rockchip_pwm_remotectl/parameters/
root@rv1126b-buildroot:/# [ 1345.994471] USERCODE=0x1818
[ 1346.021609] RMC_GETDATA=98
[ 1347.228038] USERCODE=0x1818
[ 1347.255198] RMC_GETDATA=99
[ 1347.849855] USERCODE=0x3030
[ 1347.875982] RMC_GETDATA=34
[ 1348.437214] USERCODE=0x1818
[ 1348.464347] RMC_GETDATA=9b
[ 1350.801900] USERCODE=0x1818
[ 1350.829034] RMC_GETDATA=e4
[ 1355.237407] USERCODE=0x1818
[ 1355.264600] RMC_GETDATA=e5
[ 1356.729980] USERCODE=0x601
[ 1356.754855] RMC_GETDATA=c3
```

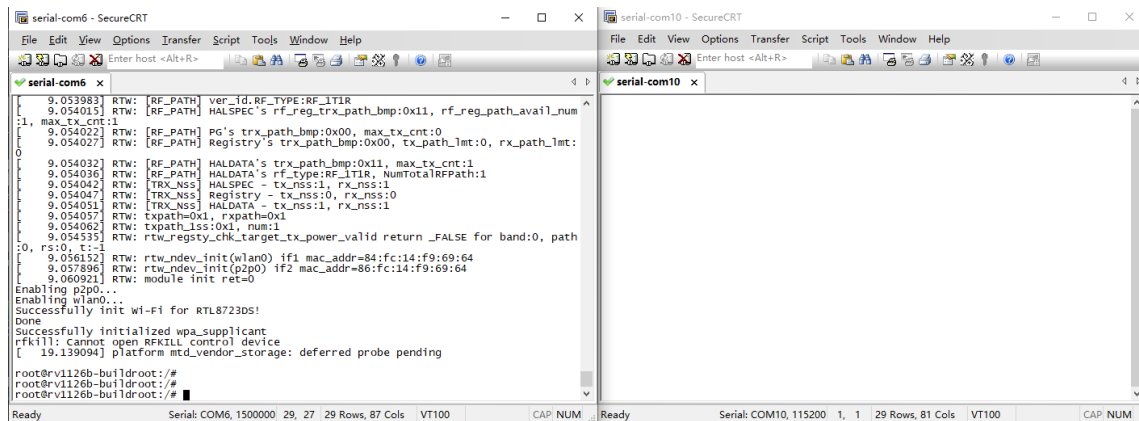
7.9 RS485



Step 1: Connect the RS485 test tool to the development board as shown in the diagram.



Step 2: Open two serial terminal windows. Set the debug serial port baud rate to 1500000, and set the RS485 serial port baud rate to 115200.



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

RS485_0:

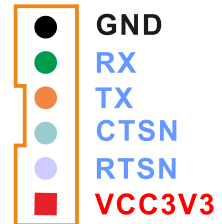
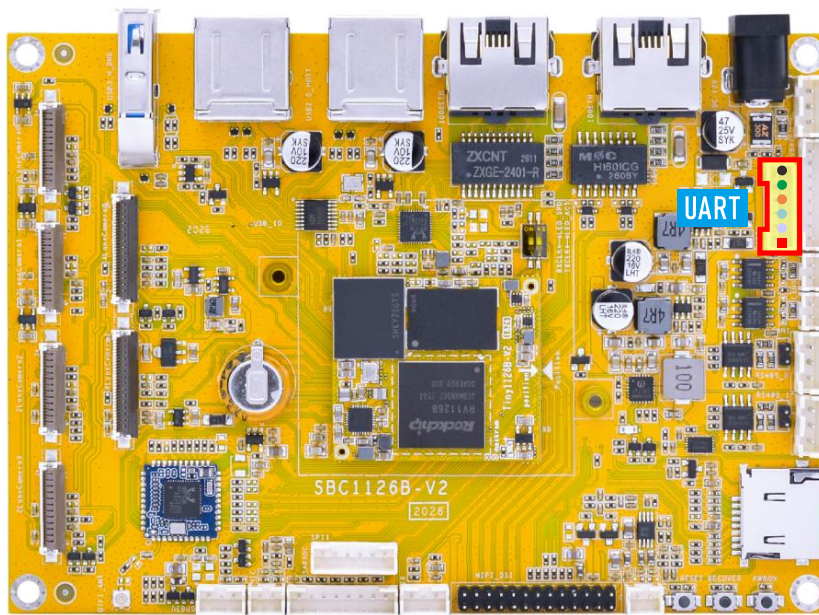
```
# com /dev/ttyS5 115200 8 0 1
```

RS485_1:

```
# com /dev/ttyS6 115200 8 0 1
```

7.10 UART

Step 1: Connect the RX and TX pins of the UART interface together to create a loopback connection.



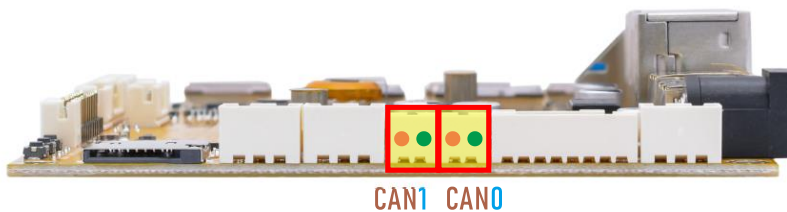
Step 2: Test UART loopback communication.

Execute the following command:

```
# com /dev/ttyS4 115200 8 0 1
```

```
root@rv1126b-buildroot:/# com /dev/ttyS4 115200 8 0 1
port = /dev/ttyS4
baudrate = 115200
cs = 8
parity = 0
stopb = 1
ioioioioioioioio
RECV: ioioioioioioioio
yuyuyurtrt
RECV: yuyuyurtrt
565621211
RECV: 565621211
tytyty
RECV: tytyty
nnnn
RECV: nnnn
```

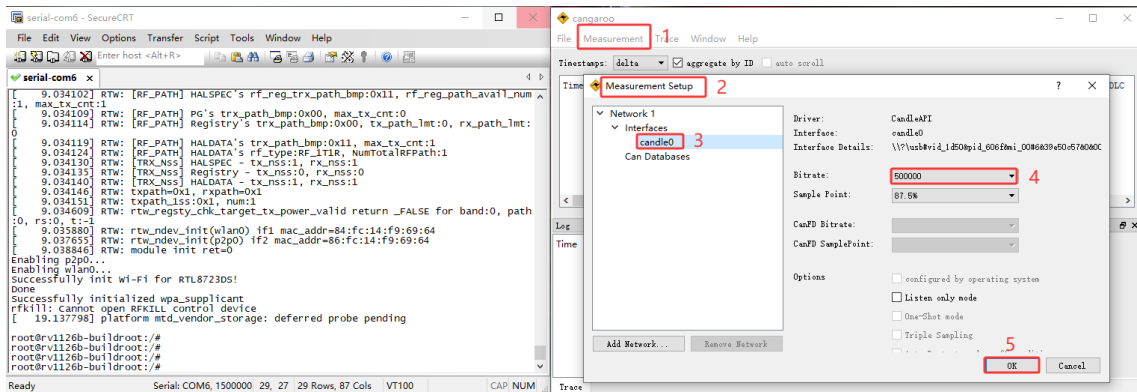
7.11 CAN



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.



7.11.1 CAN0 Test

Step 1: Configure and enable the CAN0 interface on the board with a bitrate of 500000.

Execute the following command:

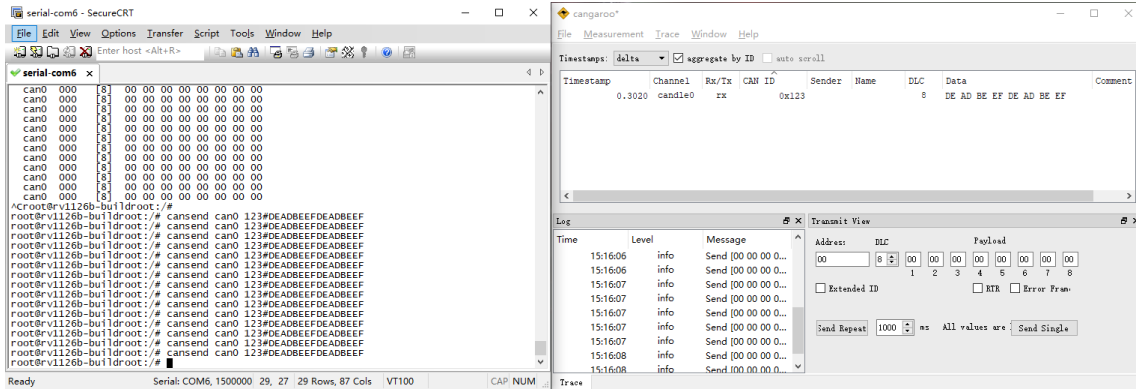
```
# ip link set can0 down
# ip link set can0 type can bitrate 500000
# ip link set can0 up
```

Step 2: Test CAN0 receiving.

Configure the CAN test tool as the sender, and configure CAN0 on the board as the receiver.

Execute the following command:

```
# candump can0
```

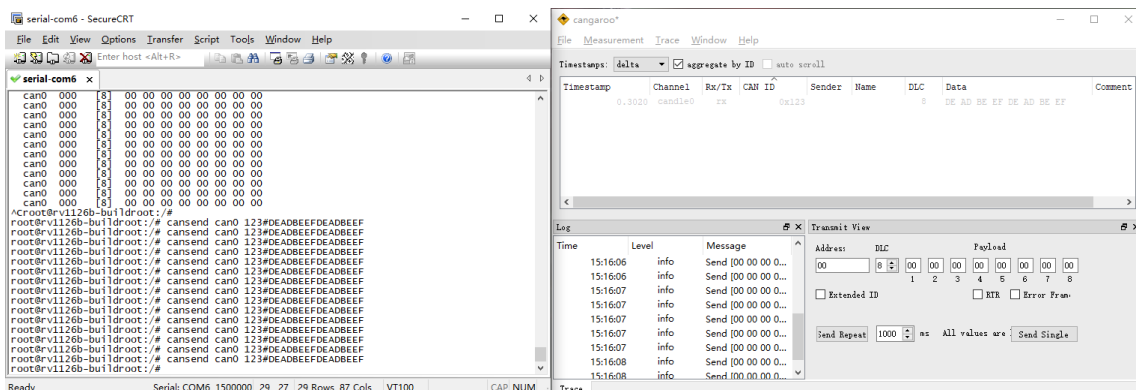


Step 3: Test CAN0 sending.

Configure the CAN test tool as the receiver, and configure CAN0 on the board as the sender.

Execute the following command:

```
# cansend can0 123#DEADBEEFDEADBEEF
```



7.11.2 CAN1 Test

Step 1: Configure and enable CAN1 with a bitrate of 500000.

Execute the following command:

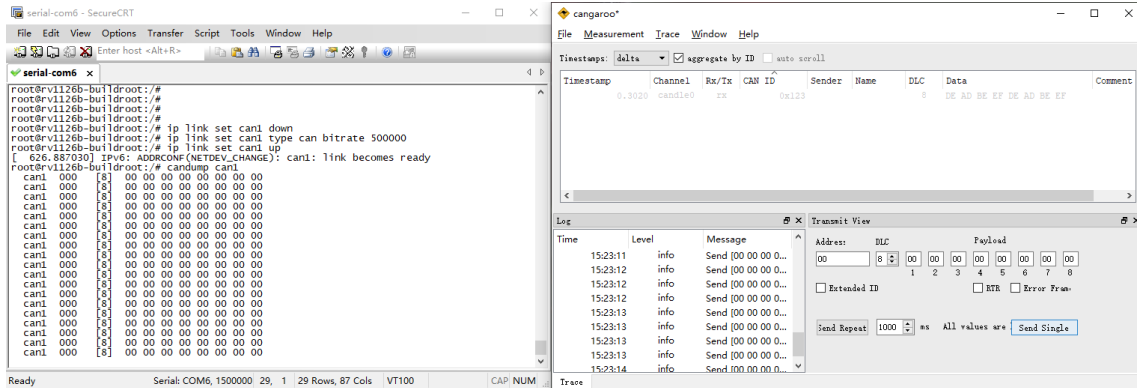
```
# ip link set can1 down
# ip link set can1 type can bitrate 500000
# ip link set can1 up
```

Step 2: Test CAN1 receiving.

Configure the CAN test tool as the sender, and configure CAN1 on the board as the receiver.

Execute the following command:

```
# candump can1
```

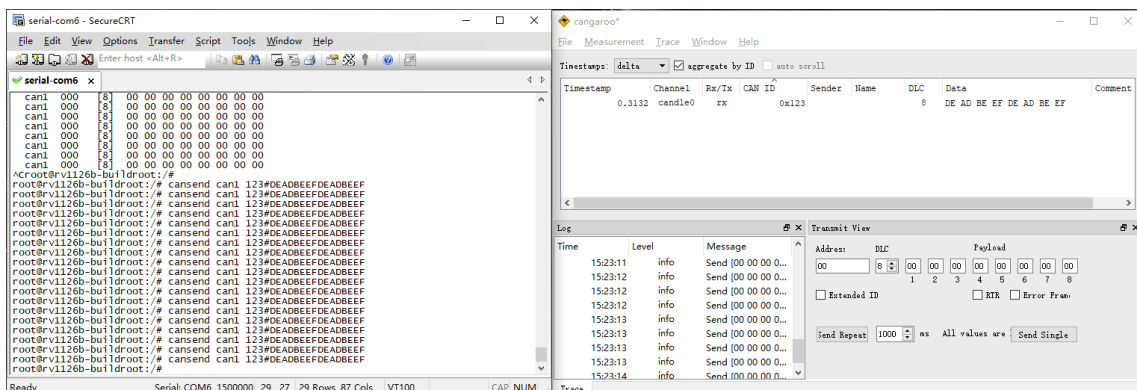


Step 3: Test CAN1 sending.

Configure the CAN test tool as the receiver, and configure CAN1 on the board as the sender.

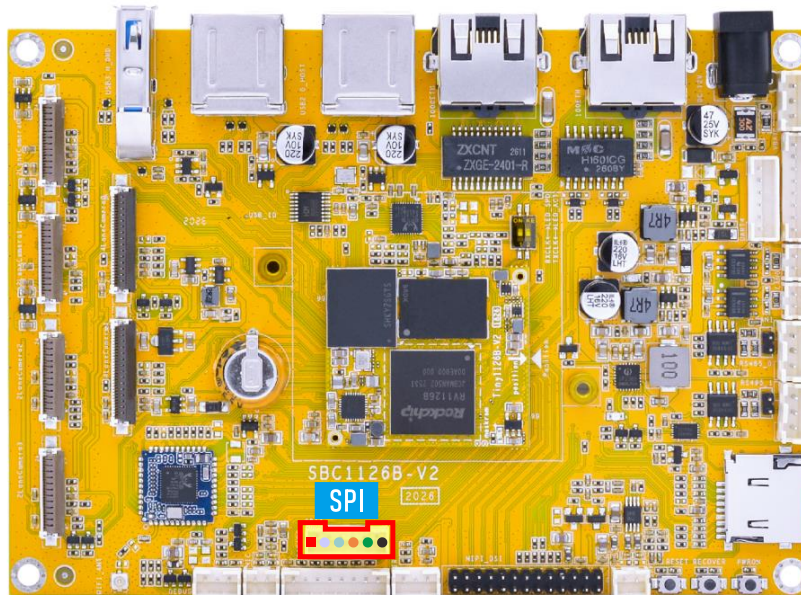
Execute the following command:

```
# cansend can1 123#DEADBEEFDEADBEEF
```



7.12 SPI

Step 1: Short the MOSI and MISO pins of the SPI interface to create a loopback connection.



●	GND
●	SLK
●	CSN0
●	MISO
●	MOSI
■	VCC3.3V

Step 2: Execute the following command to perform the SPI loopback test:

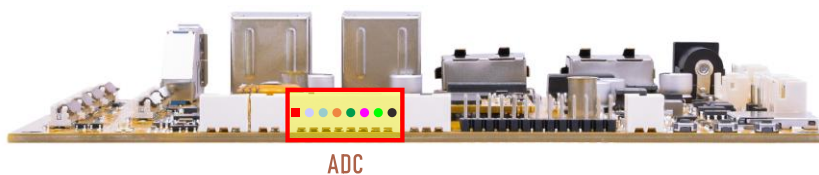
```
# test_spi 1 0
```

```
root@rv1126b-buildroot:/# test_spi 1 0
device= /dev/spidev1.0
spi mode: 0
bits per word: 8
max speed: 5000000 Hz (5000 KHz)

FF FF FF FF FF FF
40 00 00 00 00 95
FF FF FF FF FF FF
FF FF FF FF FF FF
FF FF FF FF FF FF
DE AD BE EF BA AD
F0 0D
```

7.13 ADC

The board provides six ADC input interfaces: ADC1, ADC2, ADC3, ADC4, ADC5, and ADC6.



●	GND
●	SARADC0_IN6
●	SARADC0_IN5
●	SARADC0_IN4
●	SARADC0_IN2
●	SARADC0_IN3
●	SARADC0_IN1
■	VCC1.8V

This test is used to check whether the ADC raw value changes according to the input

voltage.

Step 1: Apply a voltage level to the ADC input pin.

Connect the ADC pin to GND for a low level, or connect it to 1.8 V for a high level.

Step 2: Read the ADC raw value.

Example for **ADC1**:

```
# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
```

```
root@rv1126b-buildroot:/# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
8191
root@rv1126b-buildroot:/# cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
14
```

For other ADC read commands, refer to the ADC read command description below:

```
Single-channel read commands:
ADC1 : cat /sys/bus/iio/devices/iio:\device0/in_voltage1_raw
ADC2 : cat /sys/bus/iio/devices/iio:\device0/in_voltage2_raw
ADC3 : cat /sys/bus/iio/devices/iio:\device0/in_voltage3_raw
ADC4 : cat /sys/bus/iio/devices/iio:\device0/in_voltage4_raw
ADC5 : cat /sys/bus/iio/devices/iio:\device0/in_voltage5_raw
ADC6 : cat /sys/bus/iio/devices/iio:\device0/in_voltage6_raw

To read all ADC1-ADC6 raw values, execute the following command:
for i in 1 2 3 4 5 6; do
    echo -n "ADC$i: "
    cat /sys/bus/iio/devices/iio:\device0/in_voltage${i}_raw
done
```

7.14 RTC

The RTC on the SBC1126B is powered by a supercapacitor.

Step 1: Set the system time manually, for example:

```
# date -s "2026-05-21 16:00:00"
```

Note: If the network is connected, the system time may be synchronized automatically to the current UTC time.

Step 2: Write the system time to the hardware clock:

```
# hwclock -w
```

Step 3: Read the current hardware clock time:

```
# hwclock
```

```
root@rv1126b-buildroot:/# date -s "2026-05-21 16:00:00"
Thu May 21 16:00:00 UTC 2026
root@rv1126b-buildroot:/# hwclock -w
root@rv1126b-buildroot:/# hwclock
Thu May 21 16:00:07 2026 0.000000 seconds
root@rv1126b-buildroot:/# hwclock
Thu May 21 16:00:24 2026 0.000000 seconds
```

Step 4: Power off the board and disconnect the main power supply. Wait for a period of time, then power on the board again.

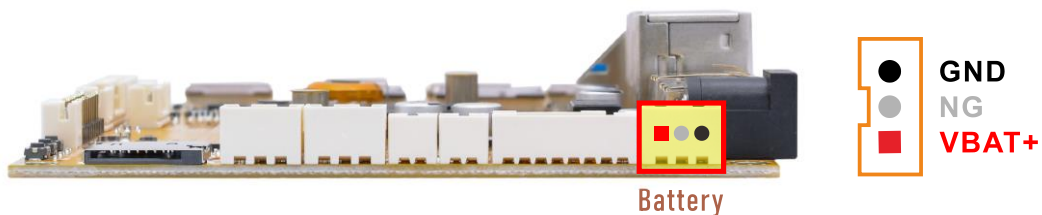
Step 5: Read the hardware clock time again:

```
root@rv1126b-buildroot:/# hwclock
Thu May 21 16:11:16 2026 0.000000 seconds
root@rv1126b-buildroot:/# hwclock
Thu May 21 16:11:33 2026 0.000000 seconds
root@rv1126b-buildroot:/# hwclock
Thu May 21 16:12:06 2026 0.000000 seconds
```

If the RTC is working properly, the hardware clock time should be retained and continue running after power-off.

7.15 Battery supply

Step 1: Connect the 7.4V Li-ion battery, then press and hold the power button to turn on the board.



Step 2: Read the current battery capacity percentage.

```
# cat /sys/class/power_supply/cw221X-bat/capacity
```

```
root@rv1126b-buildroot:/# cat /sys/class/power_supply/cw221X-bat/capacity
53
```

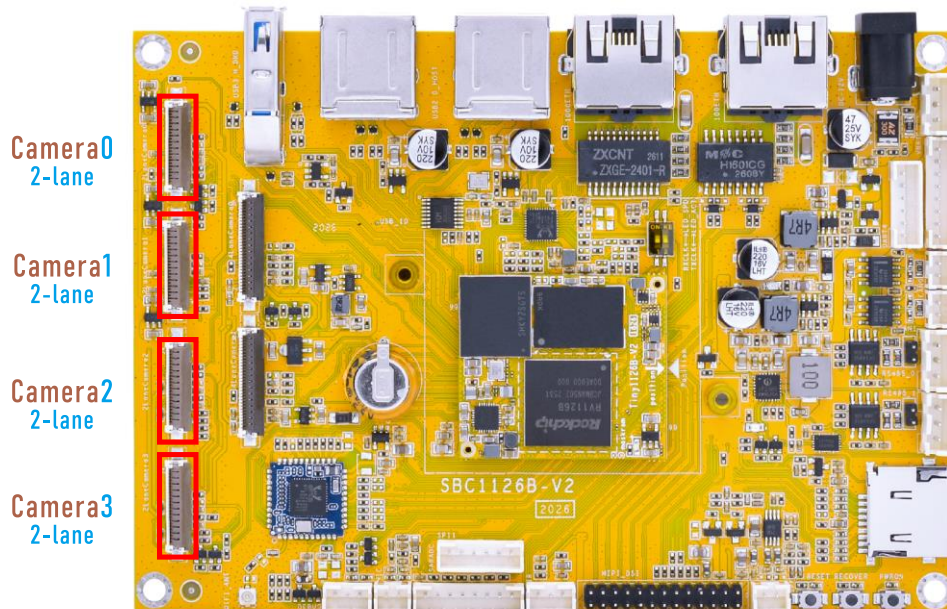
Step 3: Read the current battery voltage.

```
# cat /sys/class/power_supply/cw221X-bat/voltage_now
```

```
root@rv1126b-buildroot:/# cat /sys/class/power_supply/cw221X-bat/voltage_now
3360000
```

7.16 Camera

Connect the camera module, then power on the board.



7.16.1 GStreamer Version

Step 1: Check the video device nodes.

Execute the following command:

```
# grep "" /sys/class/video4linux/v*/name | grep mainpath
```

```
root@rv1126b-buildroot:/# grep "" /sys/class/video4linux/v*/name | grep mainpath
/sys/class/video4linux/video44/name:rkisp_mainpath4linux/v*/name | grep mainpath
/sys/class/video4linux/video52/name:rkisp_mainpath
/sys/class/video4linux/video60/name:rkisp_mainpath
/sys/class/video4linux/video68/name:rkisp_mainpath
```

Step 2: Preview the camera.

Camera0:

```
# gst-launch-1.0 v4l2src device=/dev/video44 ! video/x-raw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink
```

```

root@rv1126b-buildroot:/#
aw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink4 ! video/x-ra
mpp[1503]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1503]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1503]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1503]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[1503]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 29.735171] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 29.737027] rkCIF-mipi-lvds: stream[0] start streaming
[ 29.737257] rockchip-mipi-csi2 mipi0-csi2: stream on, src_sd: 0000000080763734, sd_name:rockchip-csi2-
dphy1
[ 29.737274] rockchip-mipi-csi2 mipi0-csi2: stream ON
[ 29.737316] rockchip-csi2-dphy1: dphy1, data_rate_mbps 742
[ 29.737342] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
[ 29.737354] sc200ai 5-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
[06:43:35.126] seeing the first app
0:01:17.9 / 99:99:99.

```

Camera1:

```

# gst-launch-1.0 v4l2src device=/dev/video52 ! video/x-
raw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink

```

```

root@rv1126b-buildroot:/#
aw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink2 ! video/x-ra
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 137.261037] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 137.263008] rkCIF-mipi-lvds1: stream[0] start streaming
[ 137.263299] rockchip-mipi-csi2 mipi1-csi2: stream on, src_sd: 0000000070466ffc, sd_name:rockchip-csi2-
dphy2
[ 137.263319] rockchip-mipi-csi2 mipi1-csi2: stream ON
[ 137.263362] rockchip-csi2-dphy2: dphy2, data_rate_mbps 742
[ 137.263390] rockchip-csi2-dphy csi2-dphy2: csi2_dphy_s_stream stream on:1, dphy2, ret 0
[ 137.263402] sc200ai 3-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:10.3 / 99:99:99.

```

Camera2:

```

# gst-launch-1.0 v4l2src device=/dev/video60 ! video/x-
raw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink

```



```
root@rv1126b-buildroot:/#
aw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink0 ! video/x-ra
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 511.250129] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 511.254087] rkisp rkisp-vir2: first params buf queue
[ 511.254249] rkCIF-mipi-lvds3: stream[0] start streaming
[ 511.254485] rockchip-mipi-csi2 mipi3-csi2: stream on, src_sd: 00000000d64f4909, sd_name:rockchip-csi2-
dphy5
[ 511.254498] rockchip-mipi-csi2 mipi3-csi2: stream ON
[ 511.254538] rockchip-csi2-dphy5: dphy5, data_rate_mbps 742
[ 511.254566] rockchip-csi2-dphy csi2-dphy5: csi2_dphy_s_stream stream on:1, dphy5, ret 0
[ 511.254577] sc200ai 4-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:27.3 / 99:99:99.
```

Camera3:

```
# gst-launch-1.0 v4l2src device=/dev/video68 ! video/x-
raw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink
```

```
root@rv1126b-buildroot:/#
aw,format=NV16,width=1920,height=1080, framerate=25/1 ! waylandsink8 ! video/x-ra
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 575.764993] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 575.767040] rkCIF-mipi-lvds2: stream[0] start streaming
[ 575.767337] rockchip-mipi-csi2 mipi2-csi2: stream on, src_sd: 00000000c1cf2049, sd_name:rockchip-csi2-
dphy4
[ 575.767357] rockchip-mipi-csi2 mipi2-csi2: stream ON
[ 575.767399] rockchip-csi2-dphy4: dphy4, data_rate_mbps 742
[ 575.767425] rockchip-csi2-dphy csi2-dphy4: csi2_dphy_s_stream stream on:1, dphy4, ret 0
[ 575.767437] sc200ai 1-0030: 1920x1080@10, mode 0, vts 0x1a5e
Redistribute latency...
0:00:15.2 / 99:99:99.
```

Simultaneous preview of Camera0, Camera1, Camera2, and Camera3:

```
# gst-launch-1.0 v4l2src device=/dev/video44 ! video/x-
raw,format=NV16,width=480,height=320,framerate=25/1 ! videoconvert ! videoflip
video-direction=90r ! videoconvert ! fpsdisplaysink name=video44 video-
sink="waylandsink render-rectangle=\"<20,10,320,480>\" &
gst-launch-1.0 v4l2src device=/dev/video52 ! video/x-
raw,format=NV16,width=480,height=320,framerate=25/1 ! videoconvert ! videoflip
video-direction=90r ! videoconvert ! fpsdisplaysink name=video52 video-
sink="waylandsink render-rectangle=\"<370,10,320,480>\" &
gst-launch-1.0 v4l2src device=/dev/video60 ! video/x-
raw,format=NV16,width=480,height=320,framerate=25/1 ! videoconvert ! videoflip
video-direction=90r ! videoconvert ! fpsdisplaysink name=video60 video-
sink="waylandsink render-rectangle=\"<20,510,320,480>\" &
gst-launch-1.0 v4l2src device=/dev/video68 ! video/x-
raw,format=NV16,width=480,height=320,framerate=25/1 ! videoconvert ! videoflip
video-direction=90r ! videoconvert ! fpsdisplaysink name=video68 video-
sink="waylandsink render-rectangle=\"<370,510,320,480>\" &
```

```
root@rv1126b-buildroot:/#
ndsink render-rectangle=\"<20,10,320,480>\" &ink name=video44 video-sink="waylan
[1] 1503
ndsink render-rectangle=\"<370,10,320,480>\" &nk name=video52 video-sink="waylan
[2] 1505
root@rv1126b-buildroot:/# Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 30.197350] rkisp_hw 21d00000.isp: set isp clk = 297000000Hz
[ 30.199285] rkCIF-mipi-lvds: stream[0] start streaming
[ 30.199547] rockchip-mipi-csi2 mipi0-csi2: stream on, src_sd: 000000019d11252, sd_name:rockchip-csi2-
dphy1
[ 30.199567] rockchip-mipi-csi2 mipi0-csi2: stream ON
[ 30.199610] rockchip-csi2-dphy1: dphy1, data_rate_mbps 742
[ 30.199636] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
[ 30.199647] sc200ai 5-0030: 1920x1080@10, mode 0, vts 0x1a5e
Setting pipeline to PAUSED ...
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
ndsink render-rectangle=\"<20,510,320,480>\" &nk name=video60 video-sink="waylan
[3] 1522
root@rv1126b-buildroot:/# [ 30.264061] rkCIF-mipi-lvds1: stream[0] start streaming
[ 30.264368] rockchip-mipi-csi2 mipi1-csi2: stream on, src_sd: 0000000b9b88701, sd_name:rockchip-csi2-
dphy2
[ 30.264392] rockchip-mipi-csi2 mipi1-csi2: stream ON
[ 30.264438] rockchip-csi2-dphy2: dphy2, data_rate_mbps 742
[ 30.264466] rockchip-csi2-dphy csi2-dphy2: csi2_dphy_s_stream stream on:1, dphy2, ret 0
[ 30.264479] sc200ai 3-0030: 1920x1080@10, mode 0, vts 0x1a5e
[ 30.289591] rkisp_hw 21d00000.isp: set isp clk = 396000000Hz
current rga_api version 1.10.5_[9]. The called RockchipRga API is deprecated and will be removed in a
future release, currently using the legacy API for compatibility. Please refer to the latest IM2D API
documentation to update your implementation.
Redistribute latency...
[07:02:57.583] seeing the first app
Setting pipeline to PAUSED ...
Using mplane plugin for capture
```

7.16.2 Rockit Version

After the system boots, the stitched preview image from all four camera channels is

displayed by default.

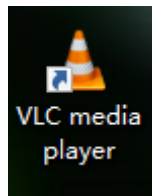
Step 1: Check the network status and obtain the Ethernet IP address of the board.

Execute the following command:

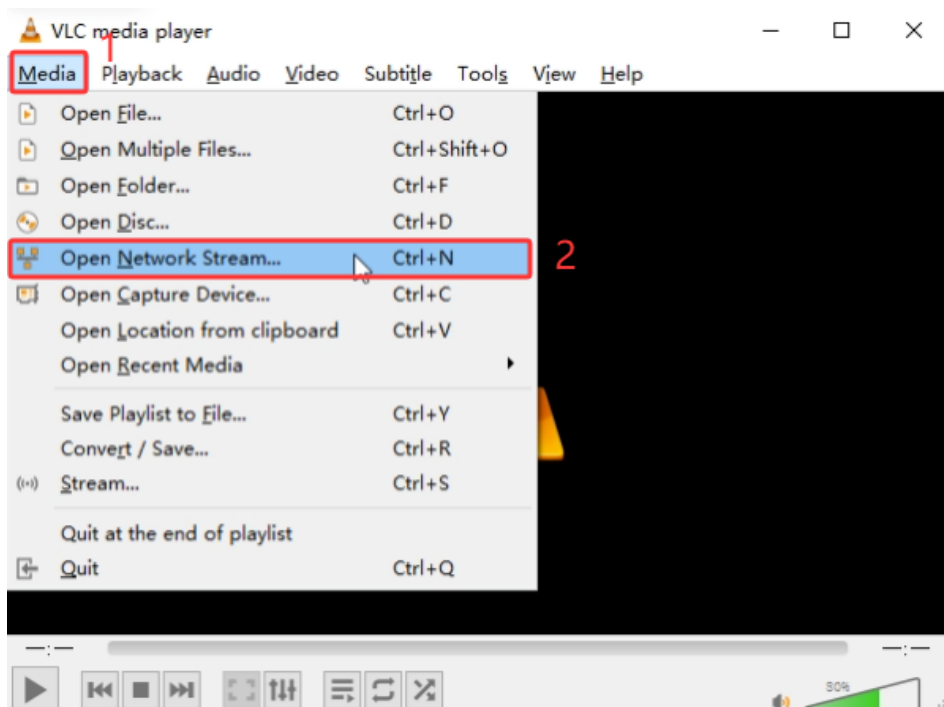
```
# ifconfig eth0
```

```
root@rv1126b-buildroot:/# ifconfig
eth0      Link encap:Ethernet  HWaddr 4A:47:A5:18:57:64
          inet addr:192.168.0.179  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::b466:2cb4:6ffb:2434/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:17  errors:0  dropped:0  overruns:0  frame:0
          TX packets:7  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0  txqueuelen:1000
          RX bytes:1752 (1.7 KiB)  TX bytes:858 (858.0 B)
          Interrupt:80
```

Step 2: Open VLC media player on the PC.

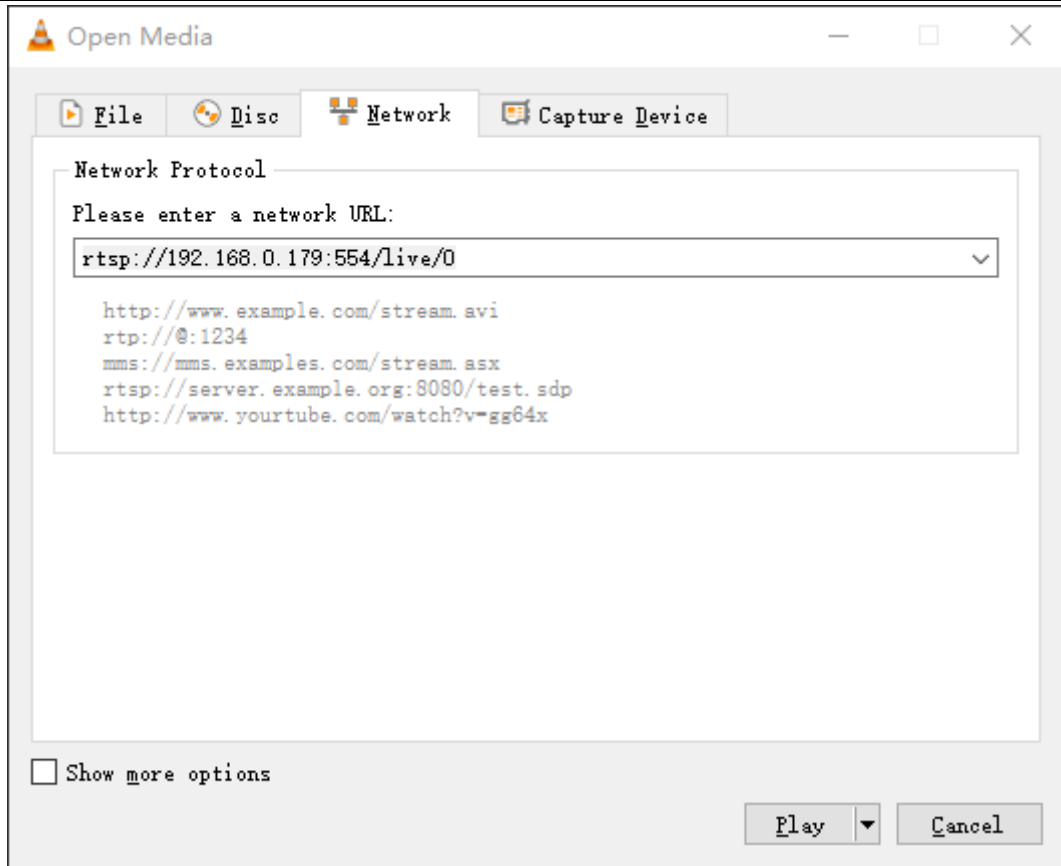


Step 3: Select **Media** -> **Open Network Stream....**



Step 4: Enter the following RTSP URL to preview the camera stream:

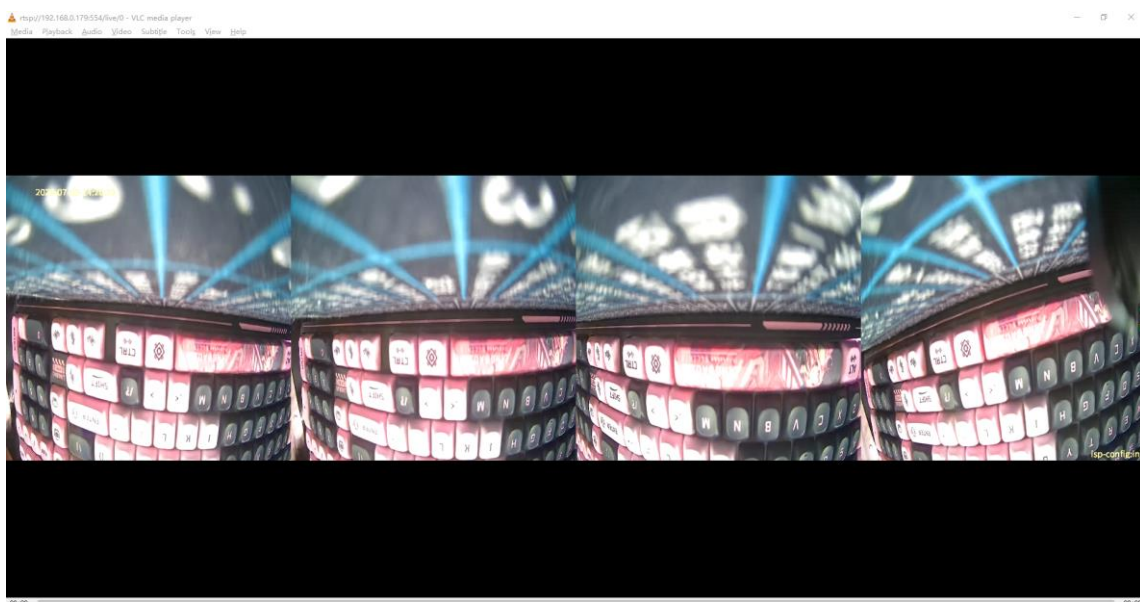
```
rtsp://192.168.0.179:554/live/0
```



Note:

Replace 192.168.0.179 with the actual Ethernet IP address of the board.

Step 5: Check the four-camera preview result.



7.17 Video Playback

7.17.1 GStreamer Version

(1) Use the built-in video test scripts.

Execute the following command:

```
# /rockchip-test/video/test_gst_video.sh
```

```
root@rv1126b-buildroot:/# /rockchip-test/video/test_gst_video.sh
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...
Redistribute latency...
mpp[1489]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and poc setup overflow
mpp[1489]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and poc setup overflow
mpp[1489]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and poc setup overflow
mpp[1489]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[1489]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and poc setup overflow
mpp[1489]: mpp_info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and poc setup overflow
Redistribute latency...
mpp[1489]: h264d_api: is_avcC=1
mpp[1489]: mpp_buf_slot: mismatch h_stride_by_pixel 1472 - 1280
mpp[1489]: mpp_buf_slot: mismatch h_stride_by_byte 1472 - 1280
mpp[1489]: mpp_buf_slot: mismatch size_total 1589760 - 1843200
mpp[1489]: mpp_buf_slot: mismatch h_stride_by_pixel 1472 - 1280
mpp[1489]: mpp_buf_slot: mismatch h_stride_by_byte 1472 - 1280
mpp[1489]: mpp_buf_slot: mismatch size_total 1589760 - 1843200
Pipeline is PREROLLED ...0 %)
Prerolled, waiting for async message to finish...
Setting pipeline to PLAYING ...
Redistribute latency...
New clock: GstSystemClock
0:00:03.2 / 0:00:29.5 (10.9 %)
```

(2) Play videos using the gst-play-1.0 command.

Execute the following command:

```
# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
# gst-play-1.0 --videosink="waylandsink fullscreen=true"
/mnt/udisk1/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4 --audiosink="alsasink
device=hw:0,0"
```



```
root@rv1126b-buildroot:/# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
root@rv1126b-buildroot:/#
  device=hw:0,0"de0/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4 --audiosink="alsasink
Press 'k' to see a list of keyboard shortcuts.
Now playing /mnt/udisk1/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4
Redistribute latency...
Redistribute latency...
mpp[1553]: mpp_info: mpp version: 958803d7 author: Herman Chen  2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[1553]: mpp_info: mpp version: 958803d7 author: Herman Chen  2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[1553]: mpp_info: mpp version: 958803d7 author: Herman Chen  2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[1553]: mpp: unable to create enc vp8 for soc rv1126b unsupported
mpp[1553]: mpp_info: mpp version: 958803d7 author: Herman Chen  2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[1553]: mpp_info: mpp version: 958803d7 author: Herman Chen  2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
Redistribute latency...
Redistribute latency...
mpp[1553]: h264d_api: is_avcC=1
mpp[1553]: mpp_buf_slot: mismatch h_stride_by_pixel 4032 - 3840
mpp[1553]: mpp_buf_slot: mismatch h_stride_by_byte 4032 - 3840
mpp[1553]: mpp_buf_slot: mismatch size_total 13063680 - 16588800
mpp[1553]: mpp_buf_slot: mismatch h_stride_by_pixel 4032 - 3840
mpp[1553]: mpp_buf_slot: mismatch h_stride_by_byte 4032 - 3840
mpp[1553]: mpp_buf_slot: mismatch size_total 13063680 - 16588800
Redistribute latency...
[08:23:02.993] seeing the first app
0:00:10.6 / 0:03:28.8
```

Command explanation:

- export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1: [Open AFBC](#).
- --videosink="kmssink plane-id=74": [Specifies the plane](#). Which can be viewed using the command: `cat /sys/kernel/debug/dri/0/state | grep "plane\[\"`.
- /mnt/udisk1/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4: [The media file path to be played](#).
- --audiosink="alsasink device=hw:0,0": [Specifies the audio output device as hw:0,0](#).

7.17.2 Rokit Version

Step 1: Stop the default rkipc service.

Execute the following command:

```
# RkLunch-stop.sh
```

```

root@rv1126b-buildroot:/# RkLunch-stop.sh
Stop Application ...
[rkipc.c][sig_proc]:received signo 15
killall: udhpc: no process killed
[network.c][rk_network_get_cable_state]:read Cable state
[network.c][rk_network_get_cable_state]:
[wlan0] link down
[server.c][rkipc_server_deinit]:rkipc_server_deinit failed
[osd.c][osd_time_server]:exit
[video.c][rkipc_osd_bmp_destroy]:RK_MPI_RGN_Destroy [2] failed with 0xa0038005
[video.c][rkipc_osd_bmp_destroy]:RK_MPI_RGN_Destroy [3] failed with 0xa0038005
[video.c][rkipc_osd_cover_destroy]:RK_MPI_RGN_Destroy [4] failed with 0xa0038005
[video.c][rkipc_osd_cover_destroy]:RK_MPI_RGN_Destroy [11] failed with 0xa0038005
[video.c][rkipc_osd_cover_destroy]:RK_MPI_RGN_Destroy [5] failed with 0xa0038005
[video.c][rkipc_osd_cover_destroy]:RK_MPI_RGN_Destroy [12] failed with 0xa0038005
[video.c][rkipc_osd_bmp_destroy]:RK_MPI_RGN_Destroy [6] failed with 0xa0038005
[video.c][rkipc_bind_deinit]:start
rkipc exit
ls: cannot access '/oem/usr/etc/init.d/S??*': No such file or directory
root@rv1126b-buildroot:/# [ 665.361317] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 4 hnd
000000003345d2a0 online 0 combo -1 mst -1
[ 665.362129] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 4 done
[video.c][rkipc_pipe_jpeg_deinit]:RK_MPI_VENC_DestroyChn success
[ 665.364703] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 0 hnd 00000000959476e3 online 0
combo -1 mst -1
[ 665.365175] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 0 done
[ 665.368838] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 1 hnd 00000000c4c76055 online 0
combo -1 mst -1
[ 665.369329] mpp_vcodec_chan: mpp_vcodec_chan_destory: destroy chan 1 done
[video.c][rkipc_avs_deinit]:RK_MPI_AVIS_StopGrp success
[video.c][rkipc_avs_deinit]:RK_MPI_AVIS_DisableChn success
[ 665.395927] rockit isp stream off

```

Step 2: The Rockit version supports video playback using the `simple_vdec_bind_vo` command.

Execute the following command:

```
# simple_vdec_bind_vo -i /mnt/udisk/testh264.h264
```



```
root@rv1126b-buildroot:/# simple_vdec_bind_vo -i /mnt/udisk/testh264.h264
param list: w = 1920, h = 1080, i = /mnt/udisk/testh264.h264, b = 1
rockit load start
v4l2 tx probe successv4l2_rx_probe success
rockit load end
rockit log path (null), log_size = 0
log_file = (nil)
(null) 14:26:27-956 {log_level_init :209}

please use echo name=level > /tmp/rt_log_level set log level
name: all cmpi mb sys vdec venr rgn vpss vgs tde avs wbc vo vi ai ao aenc adec
log_level: 0 1 2 3 4 5 6

rockit default level 4, can use export rt_log_level=x, x=0,1,2,3,4,5,6 change
(null) 14:26:27-956 {read_log_level :083} text is all=4
(null) 14:26:27-956 {read_log_level :085} module is all, log_level is 4
(null) 14:26:27-956 {dump_version :060} -----
(null) 14:26:27-956 {dump_version :061} rockit version: git-5057bd373 Thu Dec 11 09:34:24
2025 +0800
(null) 14:26:27-956 {dump_version :062} rockit building: built-Chu 2025-12-15 10:15:00
(null) 14:26:27-956 {dump_version :063} -----
(null) 14:26:27-956 {monitor_log_level :141} #Start monitor_log_level thread, arg:(nil)
vsys dev open 4
[ 734.550516] vsys dev open 6
[ 734.570908] rkvpss-offline: CLK_CORE_VPSS set to 396000000 Hz (requested 400000000 Hz)
load library(librga.so) in relative path
mpp[1935]: mpp info: mpp version: 958803d7 author: Herman Chen 2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[1935]: hal_264d_com: control info: fmt 0, w 1920, h 1080
mpp[1935]: mpp_dec: mpp_dec_proc_cfg found MPP_DEC_SET_FRAME_INFO fmt 0
mpp[1935]: mpp_buf_slot: mismatch h_stride_by_pixel 1984 - 1920
mpp[1935]: mpp_buf_slot: mismatch h_stride_by_byte 1984 - 1920
mpp[1935]: mpp_buf_slot: mismatch size total 3237888 - 4177920
mpp[1935]: mpp_buf_slot: set frame info: w 1920 h 1080 hor 1920 ver 1088
mpp[1935]: mpp_dec: setting default w 1920 h 1080 h_str 1920 v_str 1088
Layer 0 is successfully bound to device 0.
get a hdl = 0x557a079960
[ 734.590291] phys = 542ff000
get a hdl = 0x557a089b60
[ 734.598533] phys = 4fe51000
get a hdl = 0x557a08a3b0
mpp[1935]: mpp_buf_slot: mismatch h_stride_by_pixel 960 - 800
mpp[1935]: mpp_buf_slot: mismatch h_stride_by_byte 960 - 800
mpp[1935]: mpp_buf_slot: mismatch size total 1843200 - 2048000
load library(librga.so) in relative path
rga_api version 1.10.5_[9]
```

Command explanation:

- `simple_vdec_bind_vo`: Video decoding and display test tool.
- `-i`: Specifies the input video file.
- `/mnt/udisk/testh264.h264`: Input H.264 file path.

Note:

This command supports H.264 elementary stream files, such as .h264 files. Standard MP4 files are not supported.