Compact3566 Linux6.1 User Manual

V2.0

Boardcon Embedded Designer

Overview

This document applies only to the Compact3566 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
Compact3566_V3	Y	Y

Revision History

Version	Date	Author	Revision History
V1.0	2025-04-22	Liu Yuan	Initial version
V2.0	2026-05-15	Liu Yuan	Update SDK to rkr7

Disclaimer

The information in this manual is provided for reference only. While Boardcon has made every effort to ensure the accuracy and reliability of the content, no guarantee is given regarding its completeness or correctness. All information in this manual is subject to change without prior notice.

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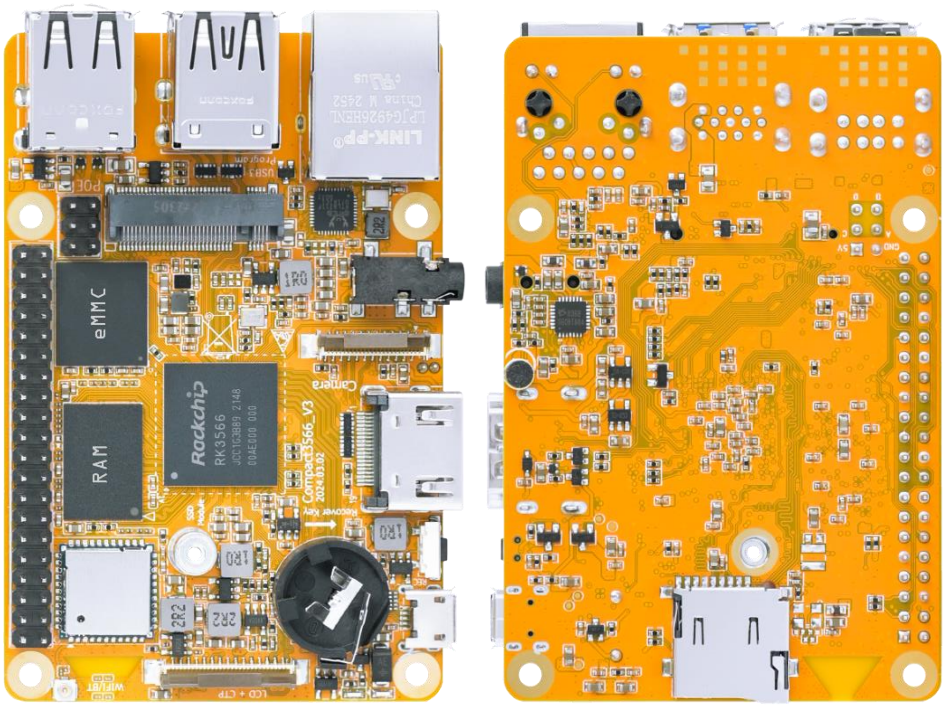
Content

1. Introduction

1.1 Overview

Compact3566 is a compact single board computer based on the Rockchip RK3566 quad-core Cortex-A55 processor. It adopts a Raspberry Pi 3 B+ style board layout, with a small size, rich onboard interfaces, and convenient expansion capability, making it suitable for IoT devices, smart terminals, industrial control, HMI, multimedia, and other embedded applications.

The board uses an integrated single-board design, which helps reduce hardware cost while maintaining good heat dissipation and reliable performance. It integrates USB ports, Gigabit Ethernet, 2.4G/5G Wi-Fi, M.2, microSD card slot, MIPI CSI camera connector, LVDS or MIPI DSI display interface, and HDMI output supporting 4K monitors.

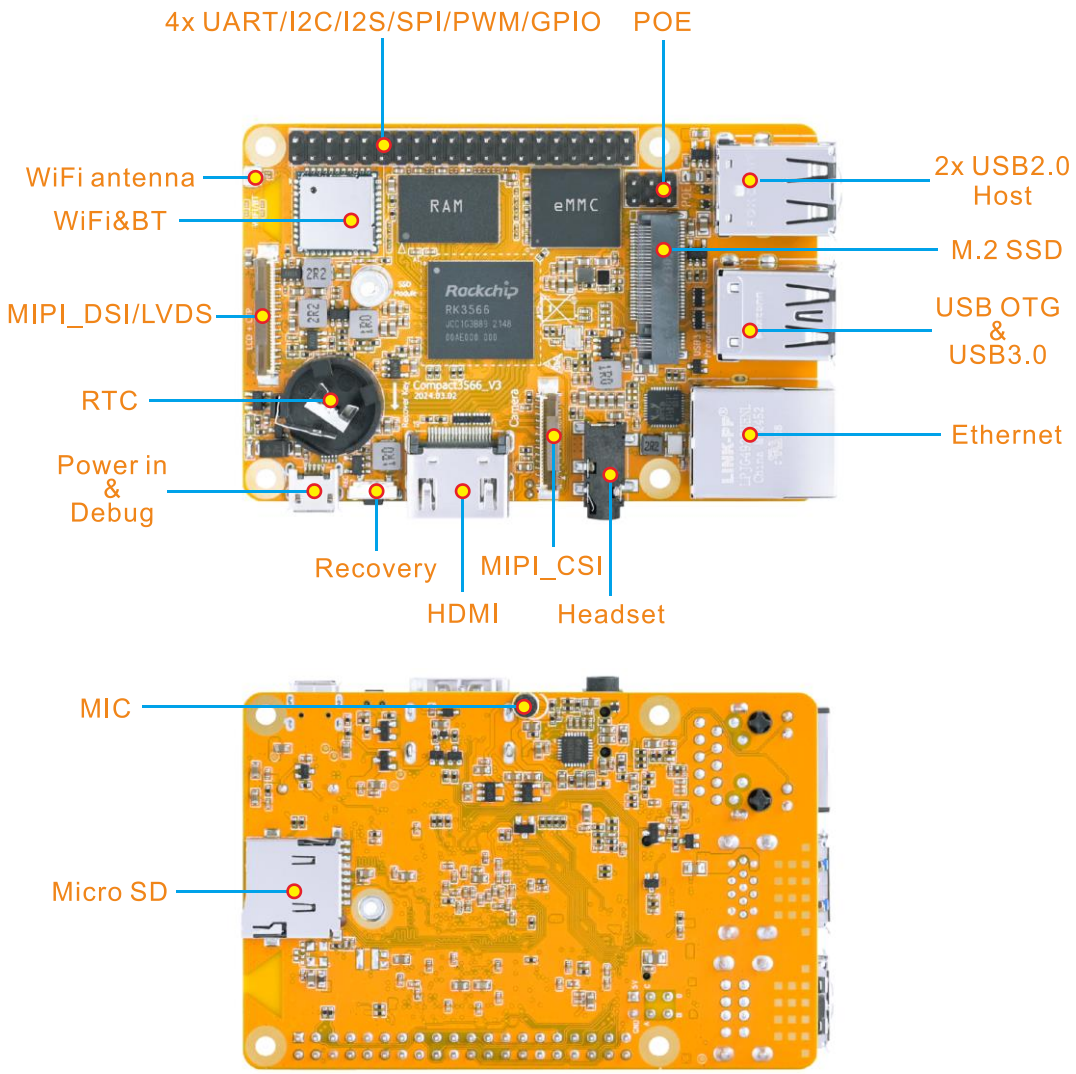


1.2 Product Parameters

Basic Parameters		
SOC		• RK3566
CPU		• Quad-core 64-bit ARM Cortex-A55@ up to 1.8GHz
GPU		• Supports OpenGL ES 1.1/2.0/3.2 • Supports OpenCL 2.0 Full Profile • Supports Vulkan 1.0 and 1.1 • 1600 MPix/s fill rate and 38.4 GFLOPs at 800 MHz
NPU		• Up to 1 TOPS • Supports INT8/INT16/FP16/BF16 MAC operations • Supports TensorFlow, TensorFlow Lite, PyTorch, Caffe, ONNX, MXNet, Keras, and Darknet
Video	Decoder	• Support 4096x2306@60fps H.265/H.264/VP9 video decoding • Support 1920x1088@60fps VP8/VC1/MPEG-4,2,1 video decoding • Support 720x576@60fps H.263 video decoding
	Encoder	• Support 1080P@60fps H.265/H.264 video encoding • Support YUV/RGB video source with rotation and mirror
RAM		• 4GB LPDDR4X (up to 8GB)
ROM		• 8GB eMMC (up to 64GB)
Support systems		Debian, Buildroot
Hardware Parameters		
Extended Storage		• Support M.2 PCIe SSD • Support MicroSD Card
Display		• Support HDMI TX 4K@60fps display • Support LVDS/MIPI display

Audio	• Support HDMI TX audio output • Support Headset output/input • Support MIC input
USB	• Support USB3.0 host • Support 3x USB2.0 host
Network	• Support Gigabit Ethernet • Support WIFI/BT module
Camera	• Support 1x Camera (ov13850)
Peripheral communication	• Support SPI • Support 4xUART
Other parameters	Support Debug, IR, RTC, OTG.
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	
dimensions	85.0mm x 56.0mm

1.3 Hardware Interface Introduction



Interface parameters	
Power in & Debug	Micro USB interface, integration of power supply and serial port debugging
Recover	Recovery key
HDMI	HDMI TX interface
MIPI_CSI	MIPI Camera interface
Headset	Headset output/input
Ethernet	Gigabit Ethernet interface

USB OTG&USB3.0	Dual-layer USB HOST interface
M.2 SSD	M.2 SSD interface
2X USB2.0 Host	Dual-layer USB2.0 HOST interface
POE	Power Over Ethernet interface
4xUART/I2C/I2S/SPI/PWM/GPIO	Expand GPIO interface
WIFI antenna	WIFI antenna interface
WIFI&BT	Realtek RTL8821CS module
RTC	RTC coin cell connector
MIC	Microphone
Micro SD	MicroSD card slot

2. Install Drivers and Tools

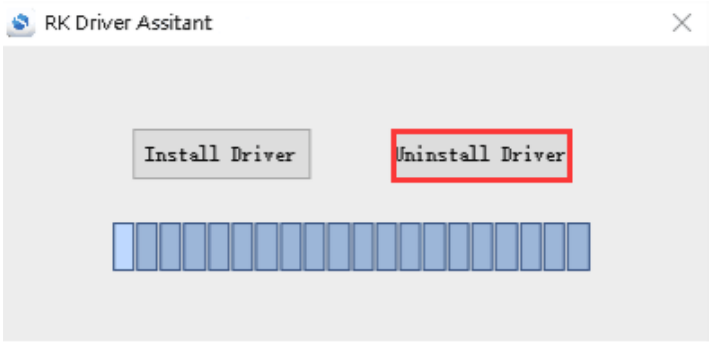
To flash firmware and debug the board through the terminal, install the following drivers and software on a Windows PC:

Number	Driver name	Driver	Use
1	RK Driver Assistant	DriverInstall.exe	OTG USB driver installation assistant
2	Serial Terminal Tool	SecureCRT.exe	Debugging tool

2.1 Install RK Driver Assitant

Step 1: Open *DriverAssistant/DriverInstall.exe*.

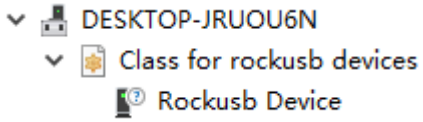
Step 2: To avoid driver conflicts, click **Uninstall Driver** uninstall the existing driver.



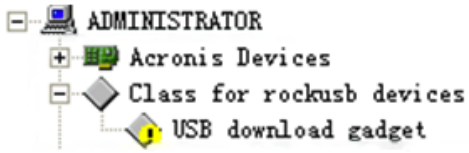
Step 3: Click **Install Driver** to install the driver.

Step 4: After the installation is complete, connect the board to the PC using a USB Type-A cable. Then press and hold the Recovery key and power on the board.

If the following device information appears in **Device Manager**, it indicates that the USB driver has been installed successfully.

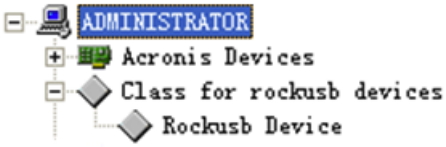


Step 5: If the device information shown below appears in Device Manager after Step 4, proceed to the next step.



Step 6: When the Found New Hardware Wizard window pops up, choose to install the driver from a specified location, and then select: *DriverAssistant/ADBDriver.*

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

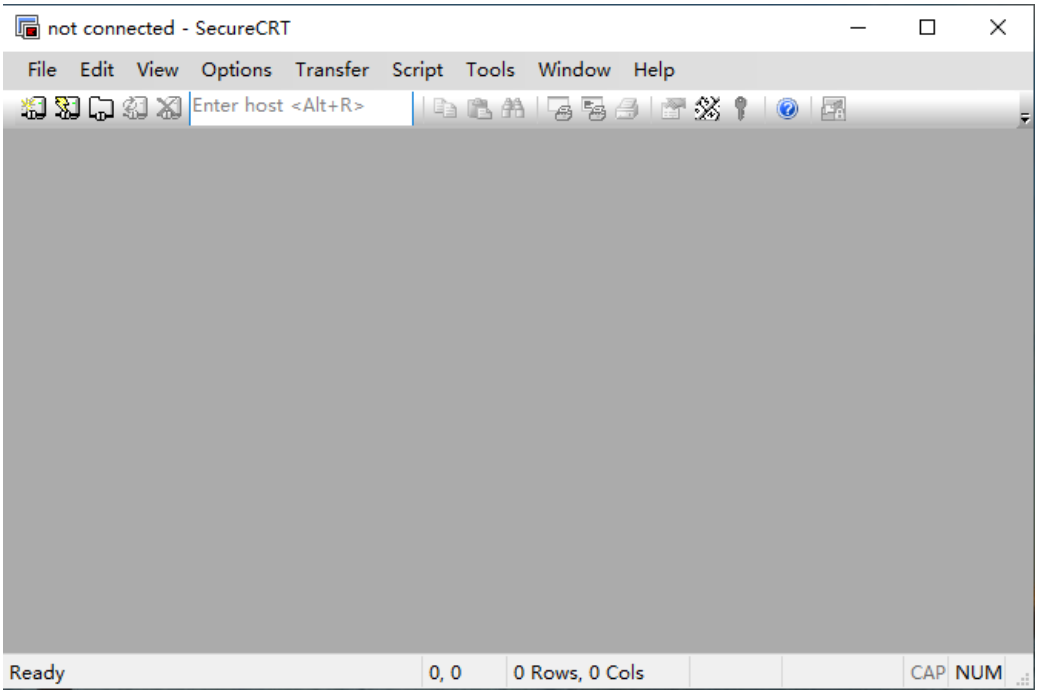


2.2 Install Serial Terminal Tool

SecureCRT is used as the serial terminal debugging tool on Windows. It can be used directly after decompression.

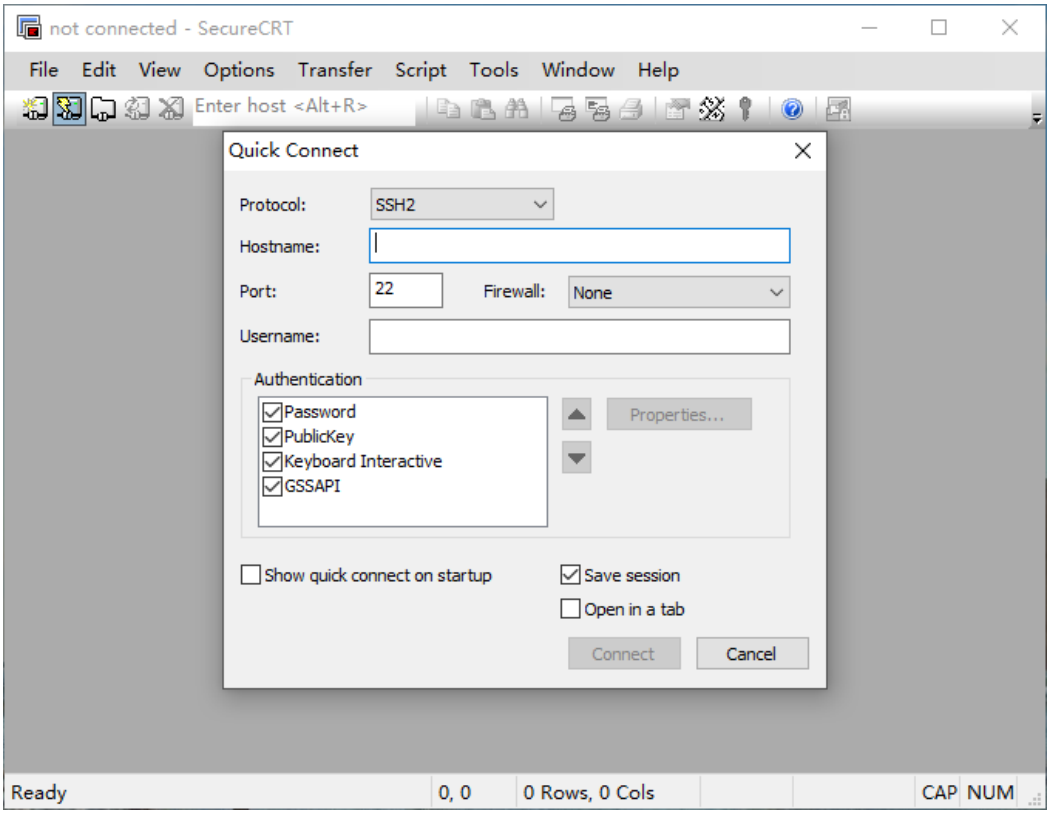
Step 1: Unzip *Platform/SecureCRT.rar* on PC.

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

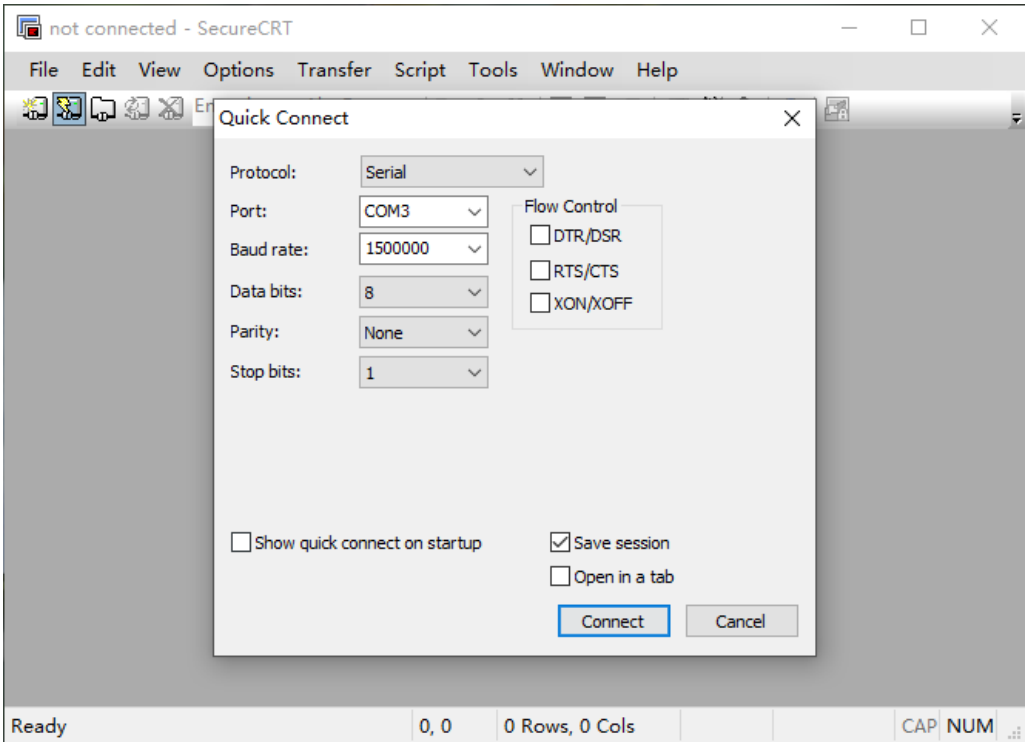


Step 3: Connect the Micro USB cable for power supply and serial debugging.

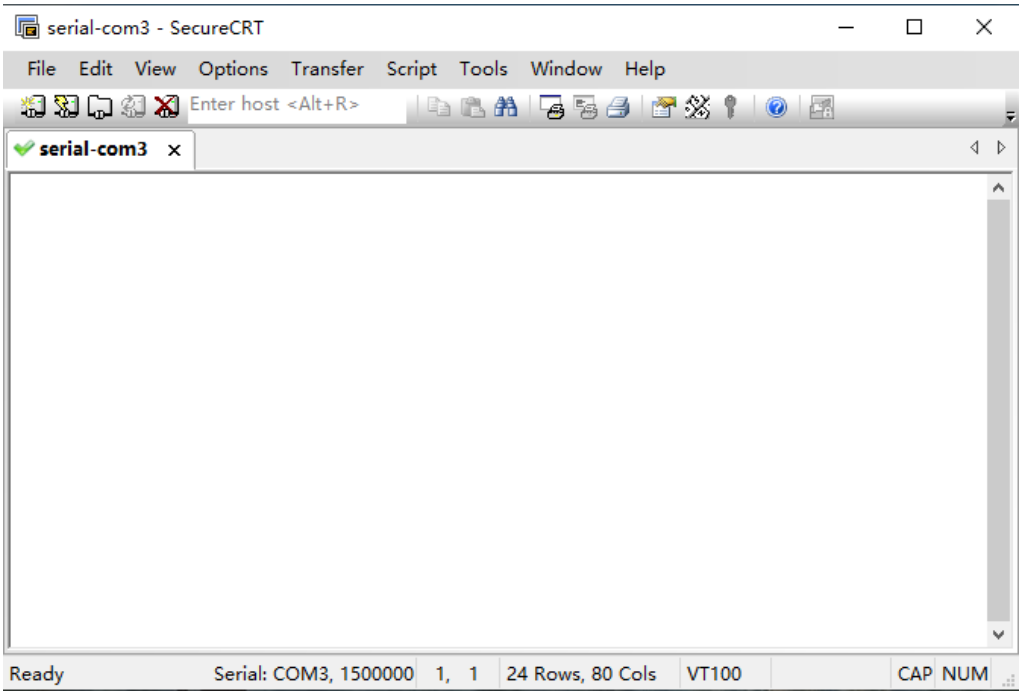
Step 4: Click **Quick Connect** to enter the Quick Connect configuration screen.



Step 5: Configure the settings as shown in the following figure.



Step 6: After clicking **Connect**, the serial terminal will be connected successfully.



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 Install RK Driver Assistant.

3.1.1 How to Enter Loader Mode

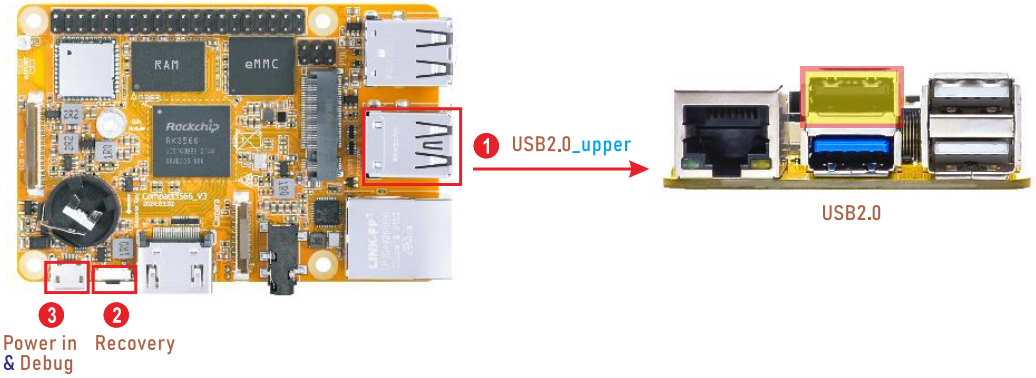
3.1.1.1 Hardware Method

Step 1: Disconnect the power adapter.

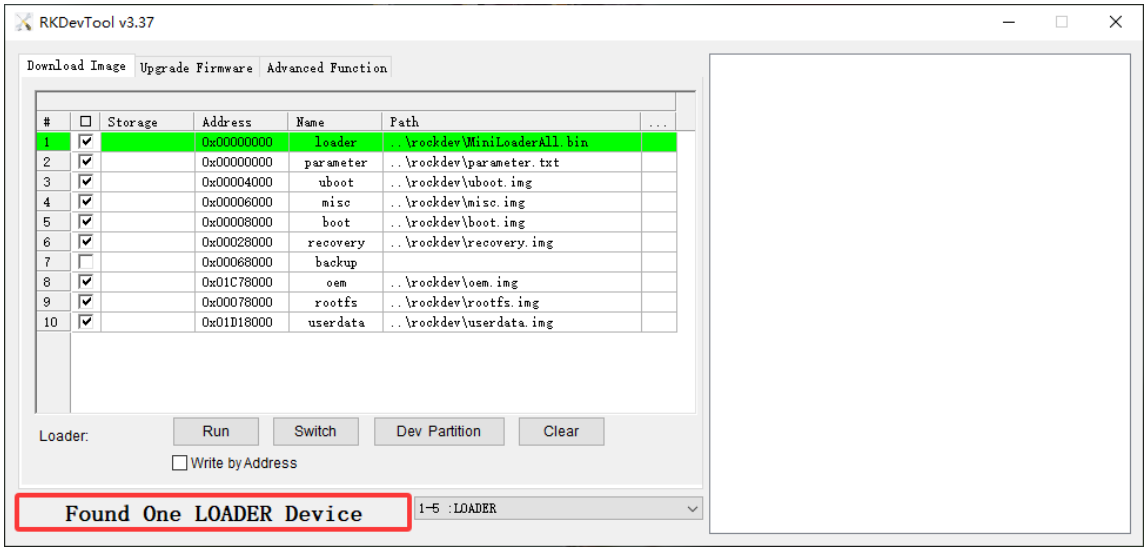
Step 2: Use a USB Type-A data cable to connect the development board to the host PC.

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

Step 4: Connect the Micro USB cable to power on the board.



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



3.1.1.2 Software

After the USB Type-A data cable is connected and the board is powered on, execute the following command from the serial debug terminal or ADB shell:

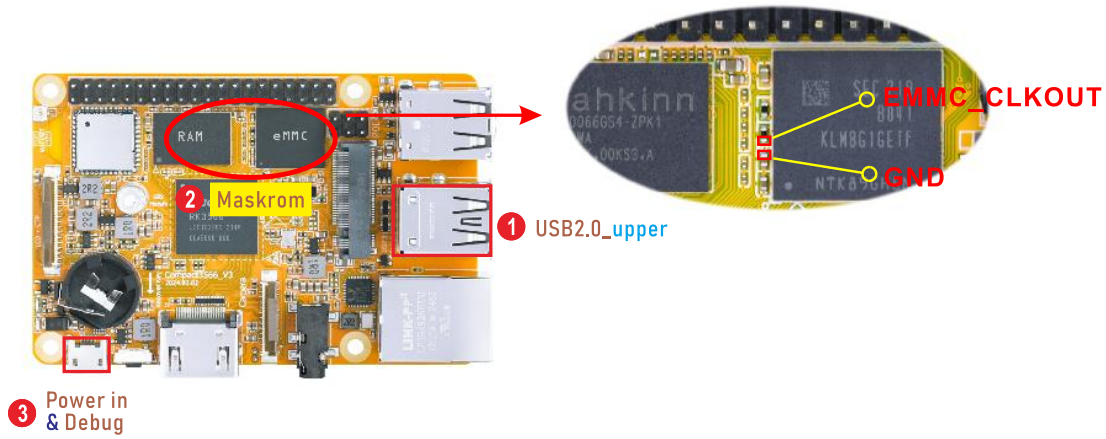
```
# reboot loader
```

3.1.2 How to Enter MaskRom Mode

Step 1: Disconnect the power adapter.

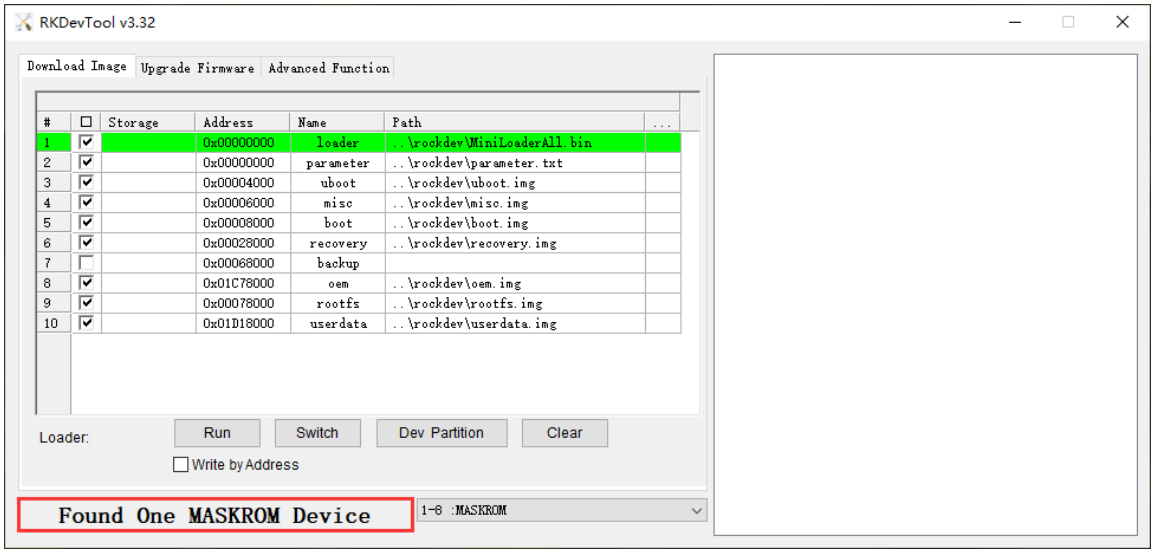
Step 2: Use a USB Type-A data cable to connect the development board to the host PC.

Step 3: Use tweezers to short **EMMC_CLKOUT** to **GND**.



Step 4: While keeping EMMC_CLKOUT shorted to GND, connect the power supply.

Step 5: After the flashing tool shows **"Found one MASKROM Device"**, release the tweezers.

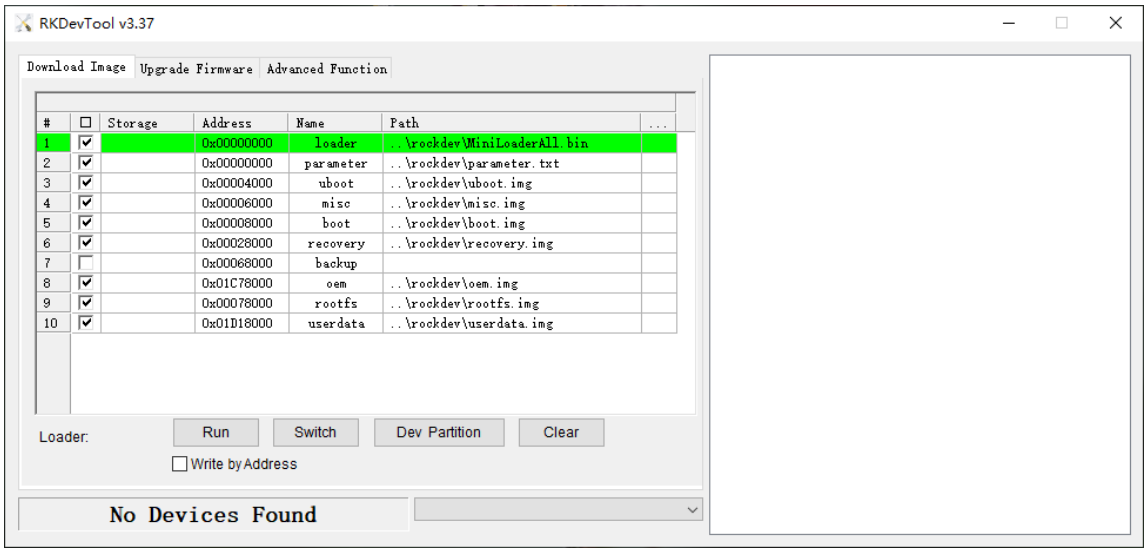


3.2 Firmware Flashing

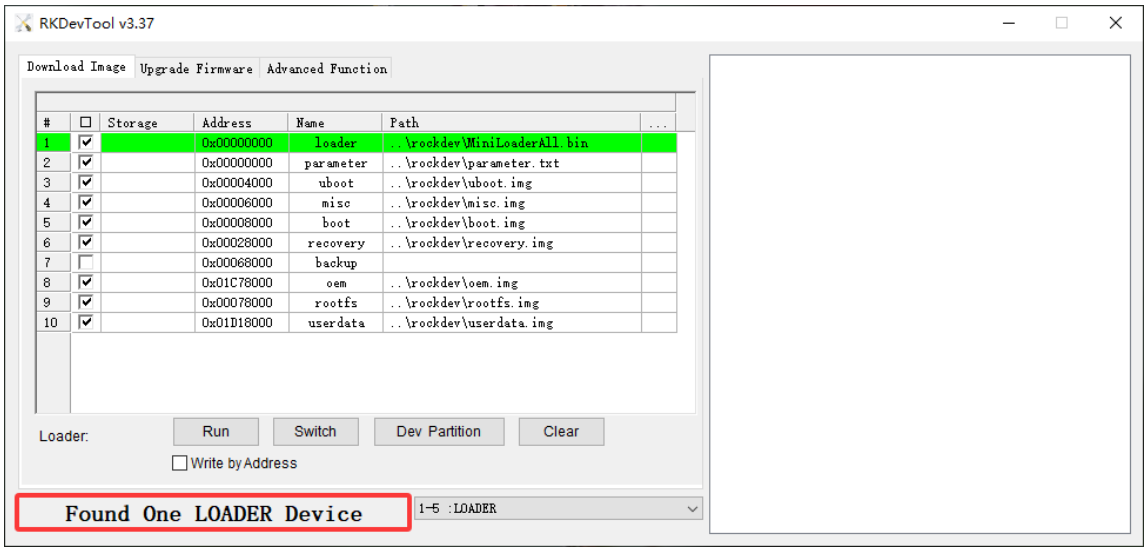
Environment: Windows OS

3.2.1 Flash update.img Firmware

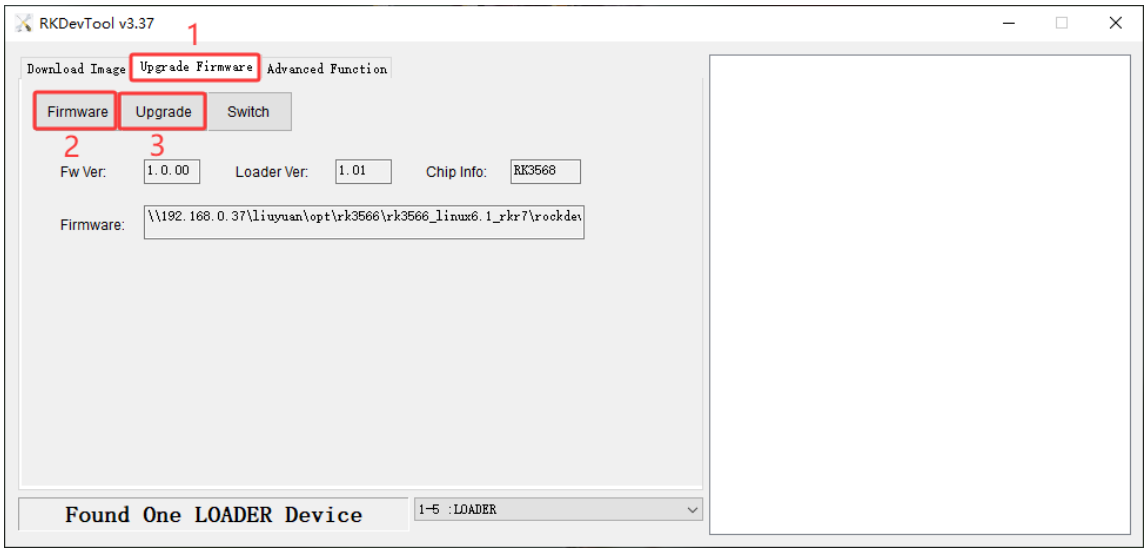
Step 1: Open *RKDevTool\RKDevTool_Release\RKDevTool.exe*.



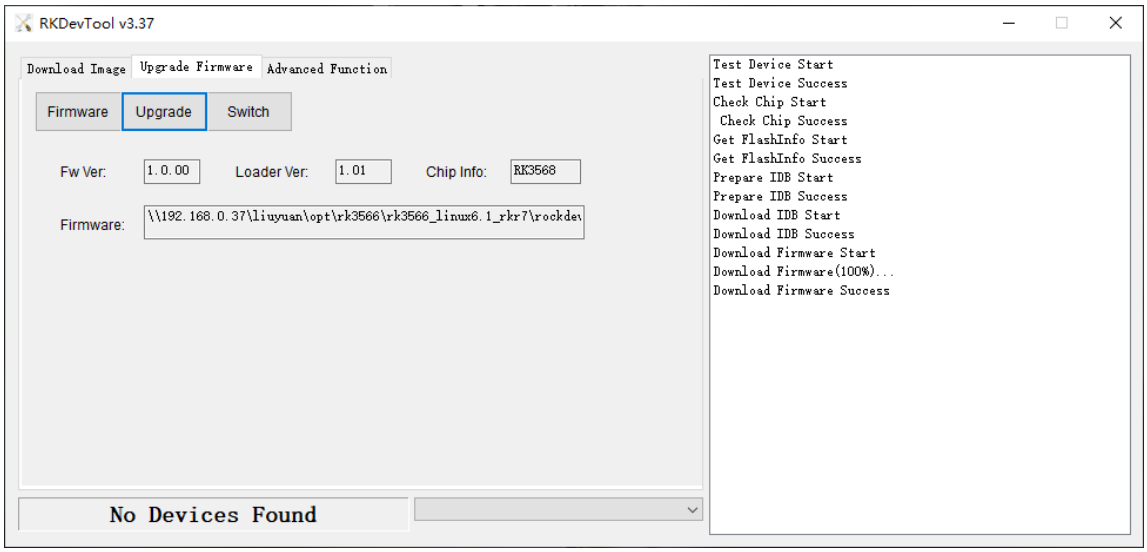
Step 2: Put the board into Loader mode. For details, refer to Section 3.1.1 How to Enter Loader Mode.



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.



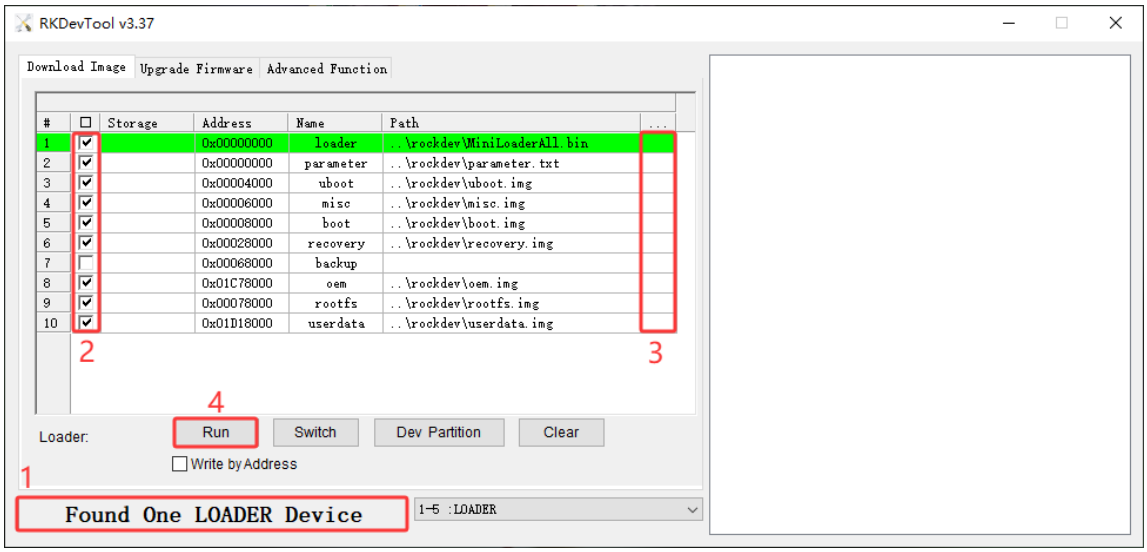
3.2.2 Flash Split Firmware

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

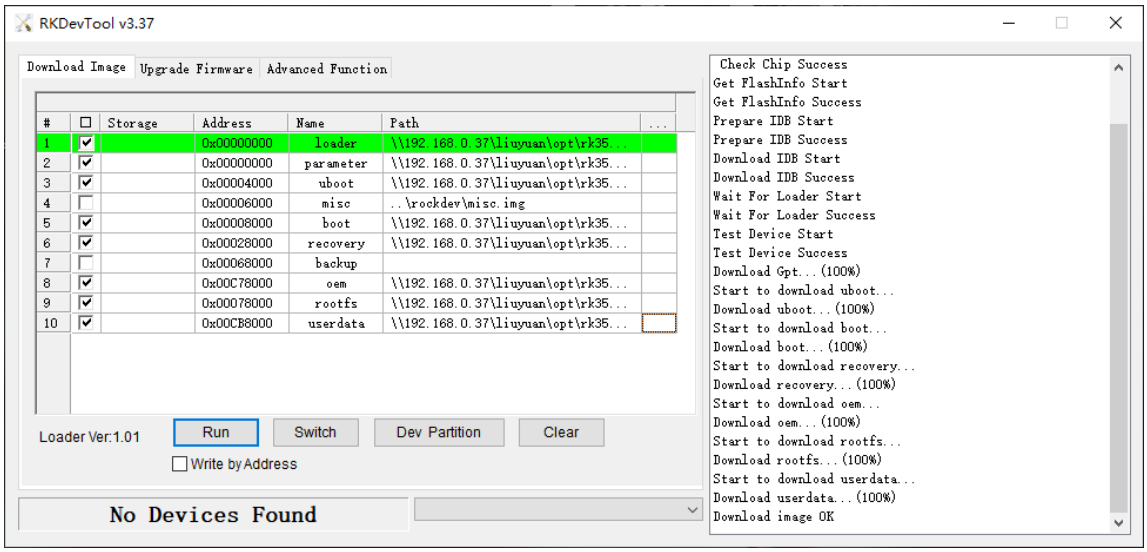
Step 2: Select the partitions to be flashed. Multiple partitions can be selected.

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 files, execute the following commands:

```
$ tar xvf rk3566_linux6.1_rk*.tar.bz2
$ cd rk3566_linux6.1_rkr7
```

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 HDMI display, select:

2. boardcon_compact3566_hdmi_defconfig

• For LVDS display (1280x800), select:

3. boardcon_compact3566_lvds_defconfig

• For MIPI display (800x1280), select:

4. boardcon_compact3566_mipi_defconfig

Example: HDMI display configuration

```
liuyuan@boardcon:~/opt/rk3566/rk3566_linux6.1_rkr7$ ./build.sh lunch
############### Rockchip Linux SDK ###############
Manifest: rk3566_rk3568_linux6.1_release_v1.3.0_20251220.xml
GIT commit: "a6ba994 Release rk3566_rk3568 - 2025-12-30"
Log colors: message notice warning error fatal
Log saved at /home/liuyuan/opt/rk3566/rk3566_linux6.1_rkr7/output/sessions/2026-05-13_20-33-29
Pick a defconfig:
1. rockchip_defconfig
2. boardcon_compact3566_hdmi_defconfig
3. boardcon_compact3566_lvds_defconfig
4. boardcon_compact3566_mipi_defconfig
5. boardcon_em3566_hdmi_defconfig
6. boardcon_em3566_lvds_defconfig
7. boardcon_em3566_mipi_defconfig
8. boardcon_idea3566_hdmi_defconfig
9. boardcon_idea3566_lvds_defconfig
10. boardcon_idea3566_mipi_defconfig
11. rockchip_rk3566_evb2_lp4x_v10_32bit_defconfig
12. rockchip_rk3566_evb2_lp4x_v10_defconfig
13. rockchip_rk3568_evb1_ddr4_v10_32bit_defconfig
14. rockchip_rk3568_evb1_ddr4_v10_defconfig
15. rockchip_rk3568_pcie_ep_lp4x_v10_defconfig
Which would you like? [1]: 2
Switching to defconfig:
/home/liuyuan/opt/rk3566/rk3566_linux6.1_rkr7/device/rockchip/.chip/boardcon_compact3566_hdmi_defconfig
```

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
```

This command builds the kernel using the currently selected board configuration.

If the U-Boot display selection menu is required, use the following command instead:

```
$ ./build.sh kernel_dtb
```

This command builds the kernel and packages HDMI, LVDS, and MIPI DTBs for the currently selected board into the boot image. It is used for the display switching function in U-Boot.

Note:

```
• ./build.sh kernel: For a normal single-display firmware build.
• ./build.sh kernel_dtb: For firmware that supports HDMI/LVDS/MIPI display switching from the U-Boot menu.
```

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
```

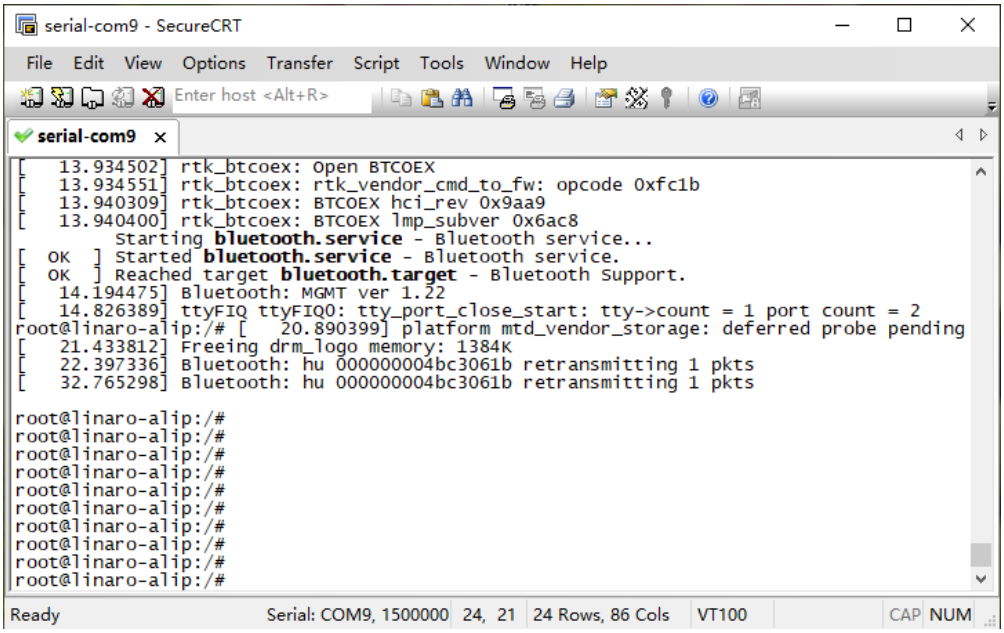
After the command is completed, the image files and **update.img** will be generated in the *rockdev/* directory.

6. Debian12 Test

Account: linaro
Password: linaro

6.1 Serial Terminal

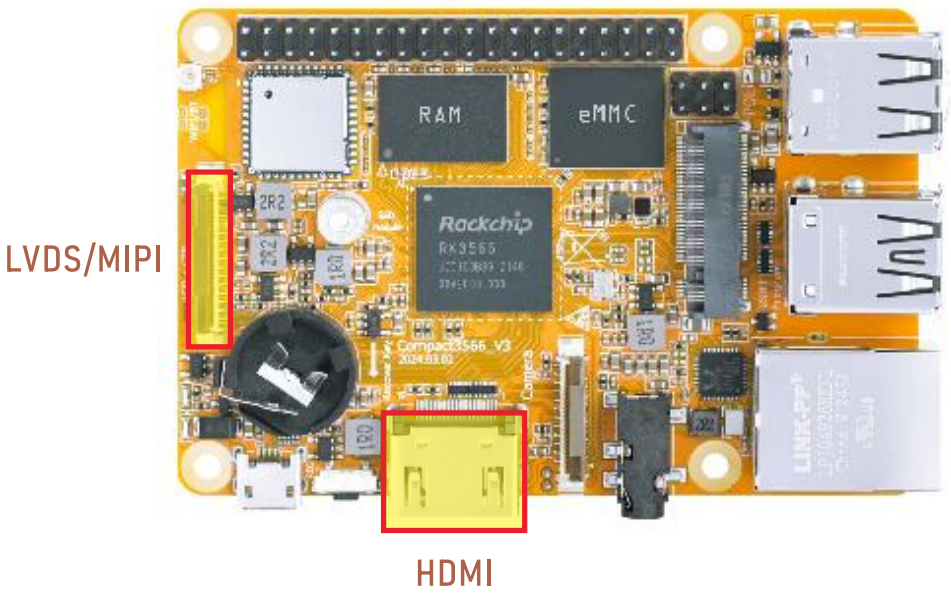
Connect the Micro USB cable (for power and debugging), and then open the serial terminal. The terminal will output the boot information. The default baud rate is 1500000.



For details about installing and using the serial terminal tool, please refer to Section 2. Install Drivers and Tools.

6.2 Display

Only one display output is supported at a time. HDMI, LVDS, or MIPI can be selected as the display output. Multiple display outputs cannot be used simultaneously.



6.2.1 Display Output Switching Method

During the U-Boot startup stage, press and hold **Ctrl + C** to enter the U-Boot command line, then execute the following command to enter the display output selection menu:

```
=> boot_fit menu
```

The following example shows how to switch to **MIPI display**:

```
=> boot_fit menu

========================================
 Select display output:
   1. HDMI
   2. LVDS
   3. MIPI
========================================
Please select display mode: 3

Selected display mode: MIPI
========================================
 Action:
   S. Save and reboot
   Q. Save and quit to U-Boot
   C. Cancel, do not save
========================================
Please select action: s
vendor_storage_write display mode ret=12
Display mode saved: MIPI
Reset board to apply display mode...
```

Select 3 to switch to MIPI display, then select S to save the configuration and reboot.

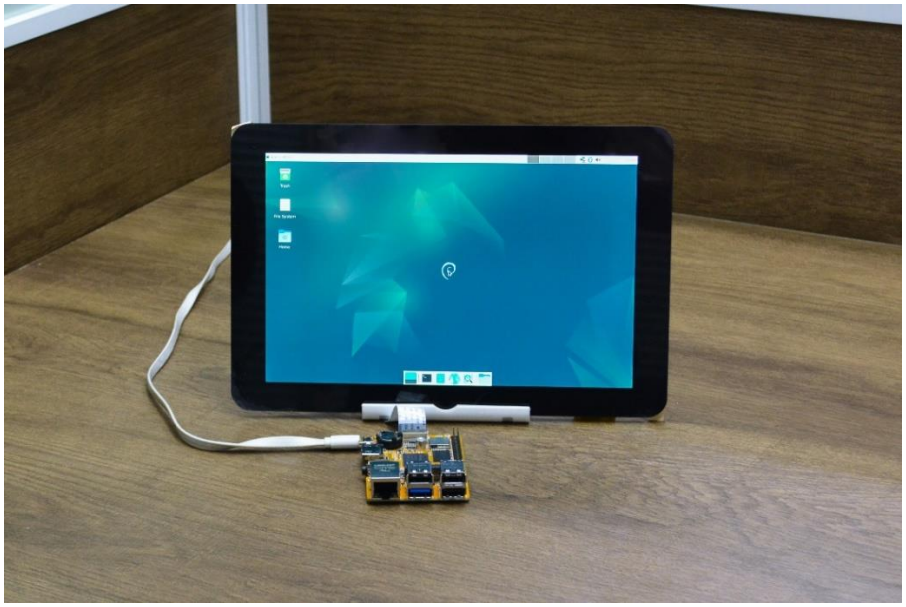
The new display mode will take effect after reboot.

6.2.2 Display Effect Examples

If no display mode switching operation is performed, the system uses **HDMI display** by default.

HDMI Display Effect

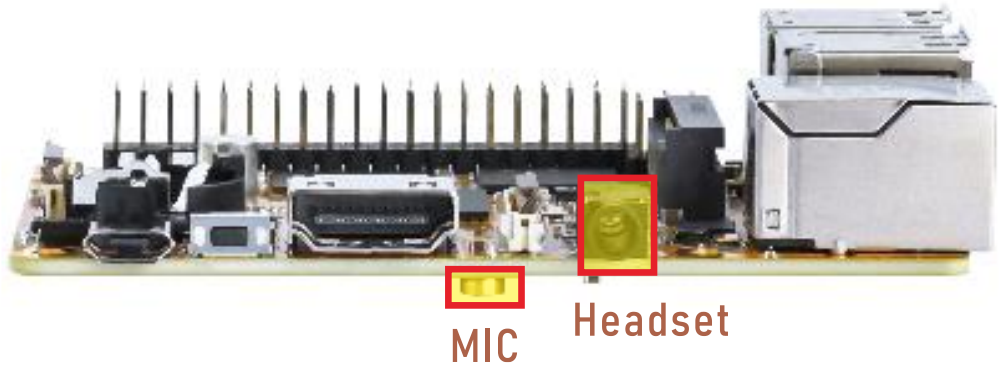
LVDS Display Effect



MIPI Display Effect

6.3 Audio I/O

Step 1: Plug the headset into the headset jack.



Step 2: Check the sound card information.

Execute the following command:

```
# cat /proc/asound/cards
```

```
root@linaro-alip:/# cat /proc/asound/cards
 0 [rockchiphdmi   ]: rockchip-hdmi - rockchip-hdmi
                      rockchip-hdmi
 1 [rockchipes8388c]: simple-card - rockchip,es8388-codec
                      rockchip,es8388-codec
```

Step 3: Record audio from the headset microphone or the built-in microphone.

Note:

The headset microphone has higher priority. If no headset is connected, the system will use the built-in microphone by default.

• When using HDMI as the display:

```
# arecord -Dhw:1,0 -f cd record.wav
```

```
root@linaro-alip:/# arecord -Dhw:1,0 -f cd record.wav
Recording WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

• When using LVDS/MIPI as the display:

```
# arecord -Dhw:0,0 -f cd record.wav
```

```
root@linaro-alip:/# arecord -Dhw:0,0 -f cd record.wav
Recording WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

Step 4: Play audio through the headset.

• When using HDMI as the display:

```
# aplay -Dhw:1,0 record.wav
```

```
root@linaro-alip:/# aplay -Dhw:1,0 record.wav
Playing WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

Note: Supplementary instructions on audio output.

```
• aplay -Dhw:0,0 record.wav : HDMI TX audio output
• aplay -Dhw:1,0 record.wav : Headset audio output
```

• When using LVDS/MIPI as the display:

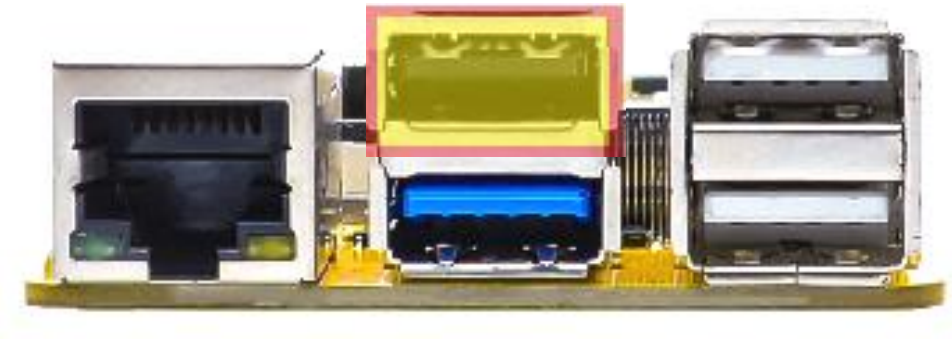
```
# aplay -Dhw:0,0 record.wav
```

```
root@linaro-alip:/# aplay -Dhw:0,0 record.wav
Playing WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

6.4 USB

6.4.1 USB OTG

The USB OTG port of Compact3566 is configured as Host mode by default at startup.



USB OTG

• To switch the USB OTG port to USB device mode, Execute the following command:

```
# echo peripheral > /sys/devices/platform/fe8a0000.usb2-phy/otg_mode
```

```
root@linaro-alip:/#                                                    echo
peripheral > /sys/devices/platform/fe8a0000.usb2-phy/otg_mode
root@linaro-alip:/# [   52.824586] xhci-hcd xhci-hcd.0.auto: remove, state 4y/otg_mode
[   52.824662] usb usb1: USB disconnect, device number 1
[   52.826224] xhci-hcd xhci-hcd.0.auto: USB bus 1 deregistered
[   54.342615] phy phy-fe8a0000.usb2-phy.2: charger = USB_SDP_CHARGER
[   54.569311] dwc3 fcc00000.usb: device reset
[   54.657795] android_work: sent uevent USB_STATE=CONNECTED
[   54.688533] android_work: sent uevent USB_STATE=CONFIGURED
```

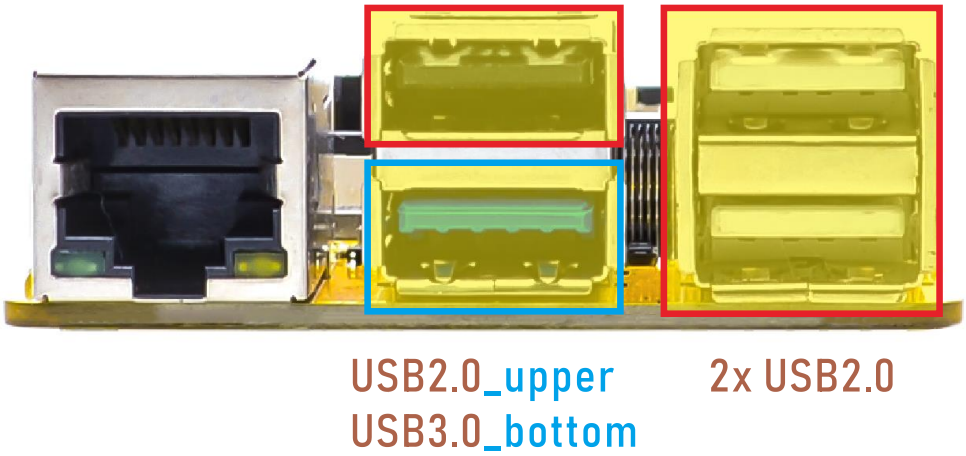
• To switch the USB OTG port back to USB Host mode, Execute the following command:

```
# echo host > /sys/devices/platform/fe8a0000.usb2-phy/otg_mode
```

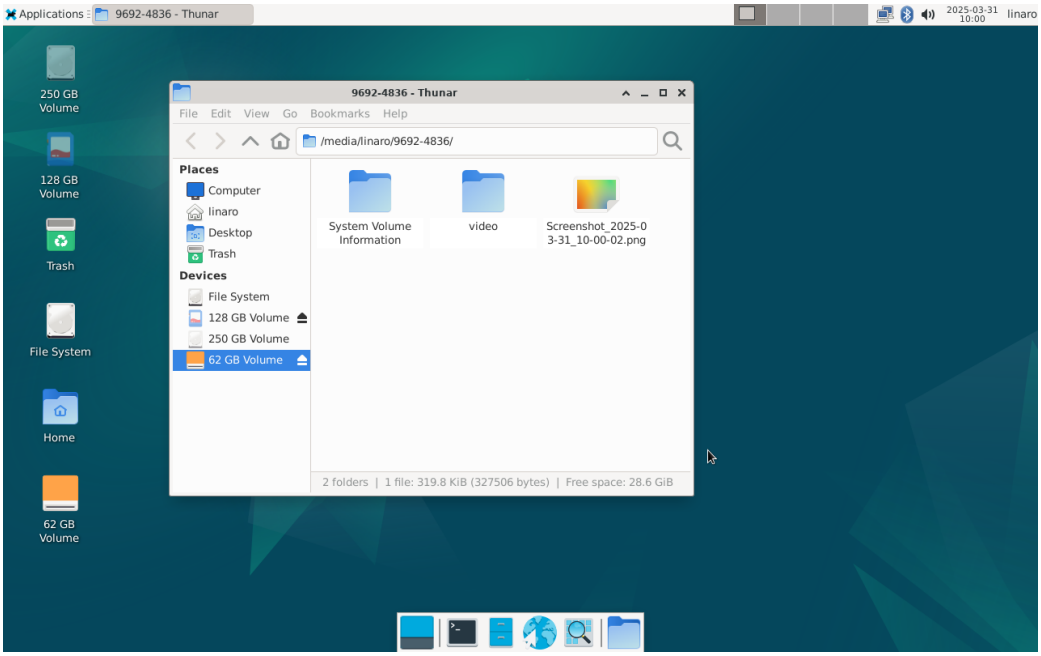
```
root@linaro-alip:/#                                                    e
[  113.856437] dwc3 fcc00000.usb: device disconnectrm/fe8a0000.usb2-phy/otg_mode
root@linaro-alip:/# [  113.859083] android_work: sent uevent USB_STATE=DISCONNECTED
[  113.868836] dwc3 fcc00000.usb: request 0000000034715a76 was not queued to ep0out
[  113.869029] android_work: did not send uevent (0 0 0000000000000000)
[  113.983257] xhci-hcd xhci-hcd.0.auto: xHCI Host Controller
[  113.983835] xhci-hcd xhci-hcd.0.auto: new USB bus registered, assigned bus number 1
[  113.984060] xhci-hcd xhci-hcd.0.auto: USB3 root hub has no ports
[    113.984086]  xhci-hcd  xhci-hcd.0.auto:  hcc  params  0x0220fe64  hci  version  0x110  quirks
0x0000008022010010
[  113.984141] xhci-hcd xhci-hcd.0.auto: irq 59, io mem 0xfcc00000
[  113.984489] usb usb1: New USB device found, idVendor=1d6b, idProduct=0002, bcdDevice= 6.01
[  113.984515] usb usb1: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[  113.984526] usb usb1: Product: xHCI Host Controller
[  113.984535] usb usb1: Manufacturer: Linux 6.1.141 xhci-hcd
[  113.984544] usb usb1: SerialNumber: xhci-hcd.0.auto
[  113.985283] hub 1-0:1.0: USB hub found
[  113.985362] hub 1-0:1.0: 1 port detected
[  114.238627] usb 1-1: new high-speed USB device number 2 using xhci-hcd
[  114.387642] usb 1-1: New USB device found, idVendor=21c4, idProduct=0cc7, bcdDevice= 1.00
[  114.387701] usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  114.387717] usb 1-1: Product: USB Flash Drive
[  114.387728] usb 1-1: Manufacturer: Lexar
[  114.387739] usb 1-1: SerialNumber: 04102800000031D7
[  114.389262] usb-storage 1-1:1.0: USB Mass Storage device detected
[  114.389940] scsi host0: usb-storage 1-1:1.0
[  115.399899] scsi 0:0:0:0: Direct-Access     Lexar    USB Flash Drive  1.00 PQ: 0 ANSI: 4
[  115.402396] sd 0:0:0:0: [sda] 120861886 512-byte logical blocks: (61.9 GB/57.6 GiB)
[  115.402879] sd 0:0:0:0: [sda] Write Protect is off
[  115.403217] sd 0:0:0:0: [sda] No Caching mode page found
[  115.403245] sd 0:0:0:0: [sda] Assuming drive cache: write through
[  115.408675]  sda: sda1
```

6.4.2 USB HOST

The Compact3566 provides both USB 2.0 Host and USB 3.0 Host interfaces. 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.



After a USB flash drive is connected and recognized successfully, a removable storage icon will appear on the desktop. Users can click the icon to 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**":

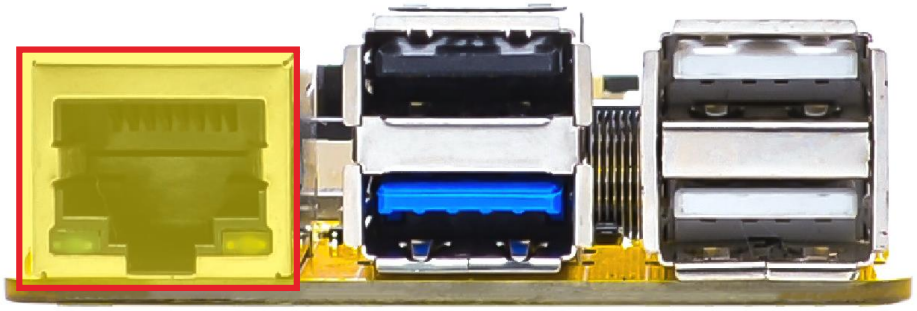
```
root@linaro-alip:/# [  100.401796] usb 5-1.1: new high-speed USB device number 5 using ehci-platform
[  100.540580] usb 5-1.1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[  100.540631] usb 5-1.1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  100.540654] usb 5-1.1: Product: OnlyDisk
[  100.540674] usb 5-1.1: Manufacturer: Netac
[  100.540715] usb 5-1.1: SerialNumber: 0A6544CD10427AB2
[  100.542566] usb-storage 5-1.1:1.0: USB Mass Storage device detected
[  100.543718] scsi host1: usb-storage 5-1.1:1.0
[  101.684785] scsi 1:0:0:0: Direct-Access     Netac    OnlyDisk        8.01 PQ: 0 ANSI: 6
[  101.690705] sd 1:0:0:0: [sdb] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[  101.691923] sd 1:0:0:0: [sdb] Write Protect is off
[  101.692854] sd 1:0:0:0: [sdb] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[  101.701334]  sdb: sdb1
[  101.701915] sd 1:0:0:0: [sdb] Attached SCSI removable disk
```

• When the device operates in USB 3.0 mode, the log usually shows "**SuperSpeed**":

```
root@linaro-alip:/# [  532.647833] usb 2-1: new SuperSpeed USB device number 2 using xhci-hcd
[  532.678717] usb 2-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[  532.678806] usb 2-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  532.678844] usb 2-1: Product: OnlyDisk
[  532.678875] usb 2-1: Manufacturer: Netac
[  532.678903] usb 2-1: SerialNumber: C0E8BFA3EC38F796
[  532.681471] usb-storage 2-1:1.0: USB Mass Storage device detected
[  532.682322] scsi host0: usb-storage 2-1:1.0
[  534.054924] scsi 0:0:0:0: Direct-Access     Netac    OnlyDisk        8.01 PQ: 0 ANSI: 6
[  534.061337] sd 0:0:0:0: [sda] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[  534.062193] sd 0:0:0:0: [sda] Write Protect is off
[  534.062675] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[  534.071082]  sda: sda1
[  534.071668] sd 0:0:0:0: [sda] Attached SCSI removable disk
```

6.5 Ethernet

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



After the network cable is connected, check the kernel log. The log shows that the Gigabit Ethernet link is detected successfully.

```
root@linaro-alip:/# [  842.043556] rk_gmac-dwmac fe010000.ethernet end1: Link is Up - 1Gbps/Full - flow
control rx/tx
[  842.043727] IPv6: ADDRCONF(NETDEV_CHANGE): end1: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig
```

```
root@linaro-alip:/# ifconfig
end1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.123  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::4518:4199:8681:eecd  prefixlen 64  scopeid 0x20<link>
        ether 46:93:f4:d6:c9:79  txqueuelen 1000  (Ethernet)
        RX packets 173  bytes 23607 (23.0 KiB)
        RX errors 0  dropped 33  overruns 0  frame 0
        TX packets 105  bytes 9546 (9.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 55
```

Step 3: Test the network connection.

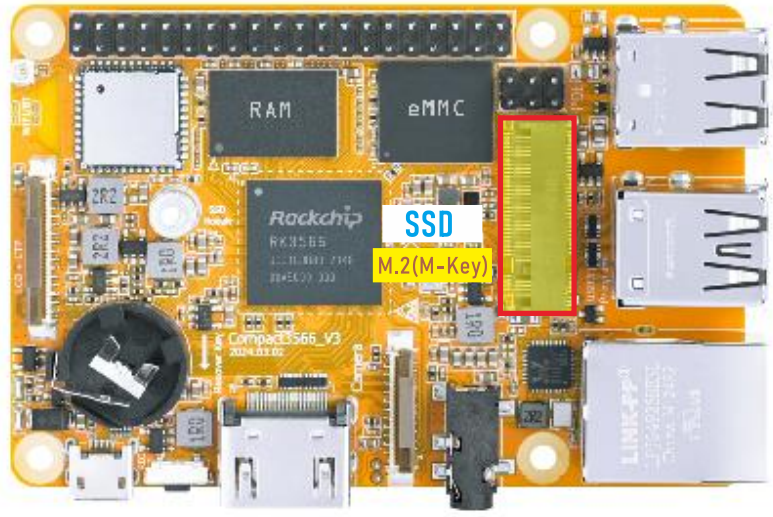
Execute the following command:

```
# ping -I end1 www.armdesigner.com
```

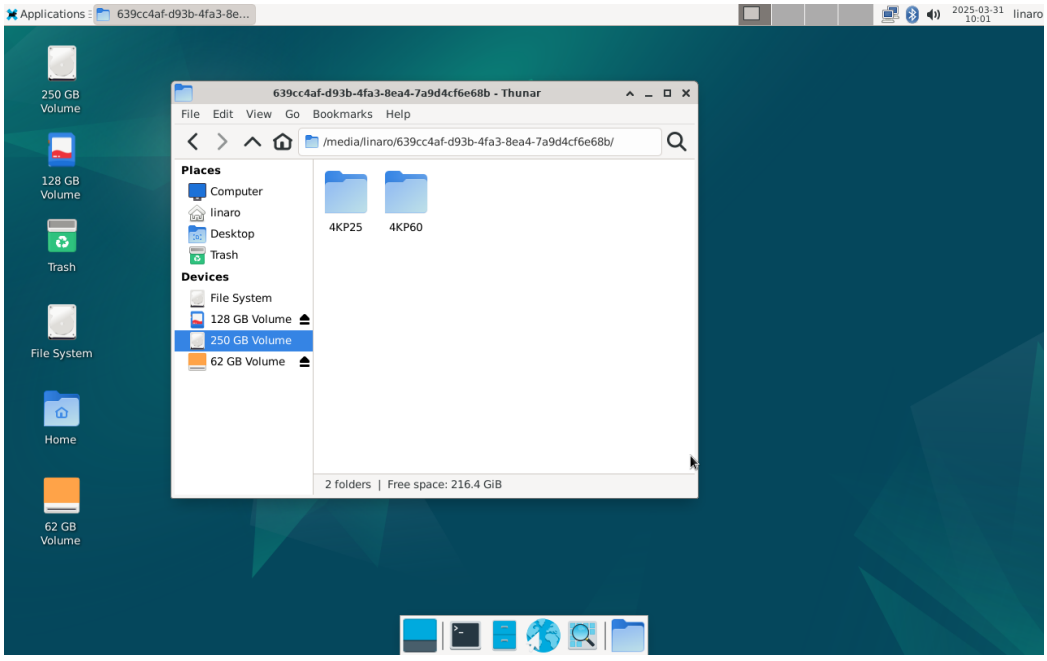
```
root@linaro-alip:/# ping -I end1 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 192.168.0.123 end1: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=48 time=174 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=6 ttl=48 time=171 ms
^C
--- www.armdesigner.com ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 16307ms
rtt min/avg/max/mdev = 170.934/171.583/173.918/1.050 ms
```

6.6 M.2 SSD

Step 1: Install the SSD into the SSD slot, then power on the board.

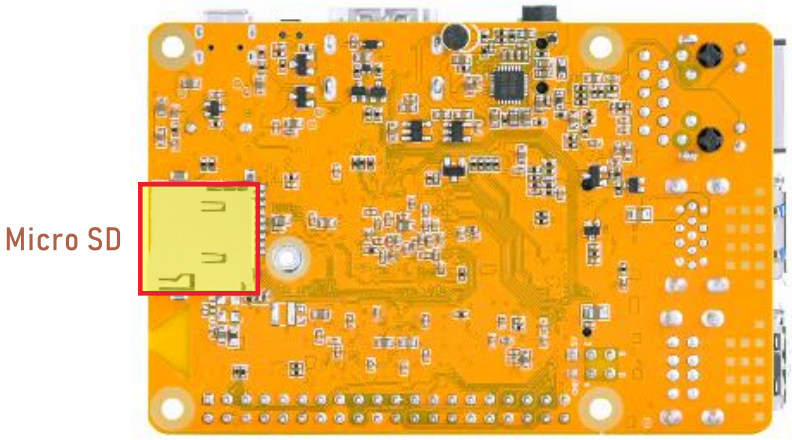


Step 2: If the SSD is recognized successfully, a storage device icon will appear on the desktop. Users can click the icon to access the files on the SSD.

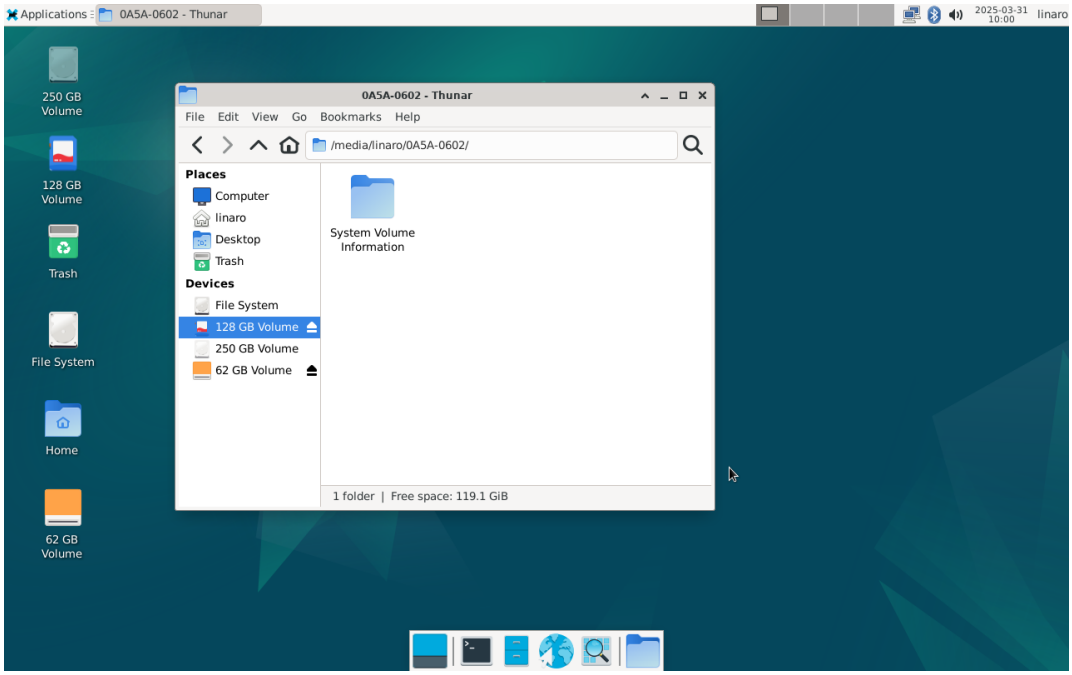


6.7 SD Card

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

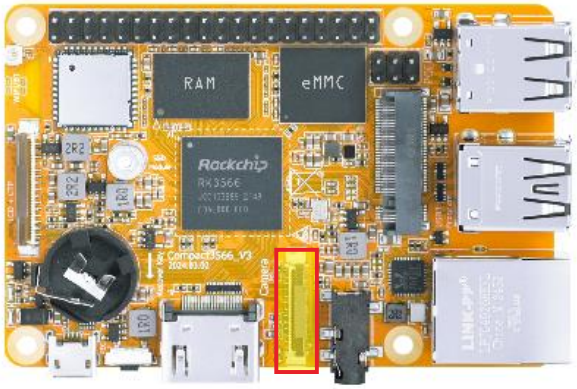


Step 2: After the micro SD card is inserted and recognized successfully, a removable storage icon will appear on the desktop. Users can click the icon to access the files on the micro SD card.



6.8 Camera

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



MIPI Camera

OV13850

Step 2: Preview the camera.

Execute the following command:

```
# /rockchip-test/camera/camera_rkisp_test.sh
```

```
root@linaro-alip:/# /rockchip-test/camera/camera_rkisp_test.sh
Start RKISP Camera Preview!
mpp[5674]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[5674]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[5674]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[5674]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[5674]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
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
[  891.087747] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
[  891.088402] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
[  891.088527] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
Redistribute latency...
0:00:04.7 / 99:99:99.
```

Step 3: Record a video.

Execute the following command:

```
# gst-launch-1.0 v4l2src device=/dev/video0 num-buffers=100 ! \
video/x-raw,format=NV12,width=1920,height=1088,framerate=30/1 ! \
videoconvert ! mpph264enc ! h264parse ! mp4mux ! \
filesink location=/tmp/h264.mp4
```

```
root@linaro-alip:/# gst-launch-1.0 v4l2src device=/dev/video0 num-buffers=100 ! \
video/x-raw,format=NV12,width=1920,height=1088,framerate=30/1 ! \-buffers=100 ! \
videoconvert ! mpph264enc ! h264parse ! mp4mux ! \merate=30/1 ! \
filesink location=/tmp/h264.mp44parse ! mp4mux ! \
Setting pipeline to PAUSED ...4
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
[ 1332.482863] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
[ 1332.486664] rkisp rkisp-vir0: first params buf queue
[ 1332.487047] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
[ 1332.487117] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
Redistribute latency...
Redistribute latency...
```

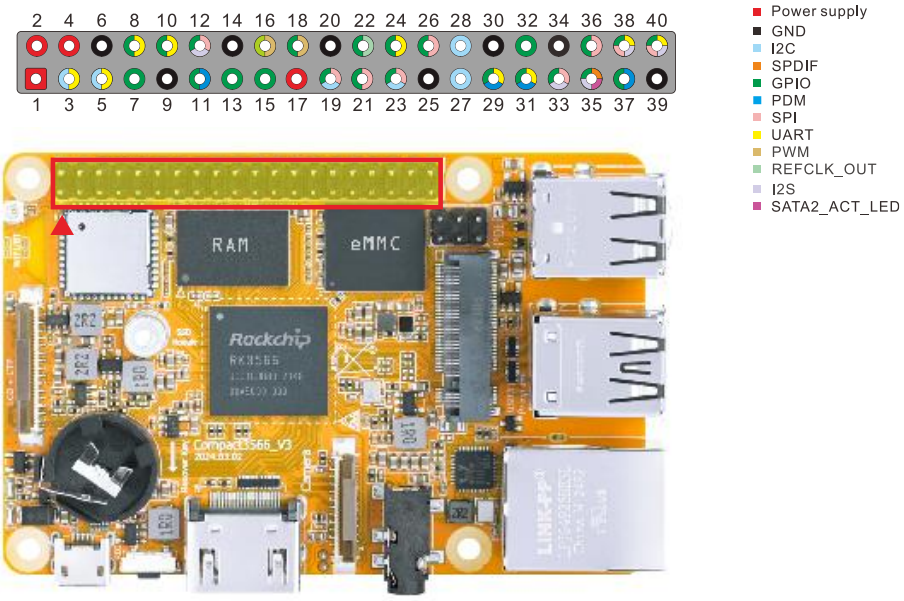
Step 4: Take photos.

```
# gst-launch-1.0 -v v4l2src device=/dev/video0 num-buffers=10 ! \
video/x-raw,format=NV12,width=1280,height=800 ! mppjpegenc ! \
multifilesink location=/tmp/test%05d.jpg
```

```
root@linaro-alip:/# gst-launch-1.0 -v v4l2src device=/dev/video0 num-buffers=10 ! \
video/x-raw,format=NV12,width=1280,height=800 ! mppjpegenc ! \o0 num-buffers=10 ! \
multifilesink location=/tmp/test%05d.jpgt=800 ! mppjpegenc ! \
Setting pipeline to PAUSED ...st%05d.jpg
Using mplane plugin for capture
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0: crop-bounds = < (int)0, (int)0, (int)2112, (int)1568 >
New clock: GstSystemClock
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, framerate=(fraction)120/1, interlace-mode=(string)progressive,
colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, framerate=(fraction)120/1, interlace-mode=(string)progressive,
colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstMppJpegEnc:mppjpegenc0.GstPad:src: caps = image/jpeg, width=(int)1280,
height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstMultiFileSink:multifilesink0.GstPad:sink: caps = image/jpeg, width=(int)1280,
height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstMppJpegEnc:mppjpegenc0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, framerate=(fraction)120/1, interlace-mode=(string)progressive,
colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, framerate=(fraction)120/1, interlace-mode=(string)progressive,
colorimetry=(string)1:3:5:1
[ 1353.072875] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
[ 1353.077612] rkisp rkisp-vir0: first params buf queue
[ 1353.077990] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
[ 1353.078061] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
Redistribute latency...
Got EOS from element "pipeline0".
Execution ended after 0:00:00.573107228
Setting pipeline to NULL ...
[ 1353.650280] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream_stop stream stop, dphy1
[ 1353.650352] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:0, dphy1, ret 0
Freeing pipeline ...
```

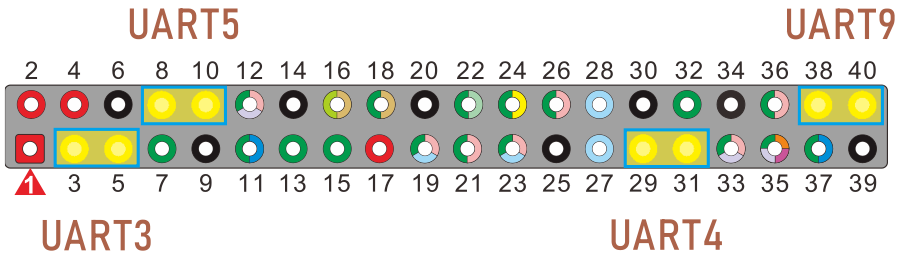
6.9 Expansion Interface

The expansion interface supports **UART3/4/5/9**, **IR**, **SPI**, and **I2C** by default. The remaining pins are configured as General Purpose I/O (GPIO).



6.9.1 UART

Connect the TX pin to the RX pin of the corresponding UART port for the loopback test.



• UART3 test:

```
# com /dev/ttyS3 115200 8 0 1
```

```
root@linaro-alip:/# com /dev/ttyS3 115200 8 0 1
port = /dev/ttyS3
baudrate = 115200
cs = 8
parity = 0
stopb = 1
gggjjj
RECV: gggjjj
ooo
RECV: ooo
11
RECV: 11
ggg000
RECV: ggg000
```

• UART4 test:

```
# 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
jjjuuuoo
RECV: jjjuuuoo
gggy77
RECV: gggy77
fffffd
RECV: fffffd
```

• UART5 test:

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

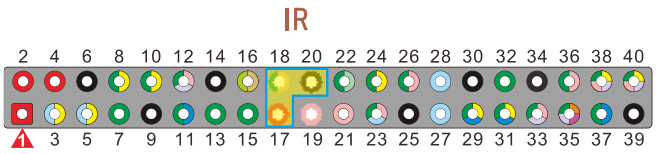
```
root@linaro-alip:/# com /dev/ttyS5 115200 8 0 1
port = /dev/ttyS5
baudrate = 115200
cs = 8
parity = 0
stopb = 1
jjjkk
RECV: jjjkk
uurr
RECV: uurr
w4445
RECV: w4445
```

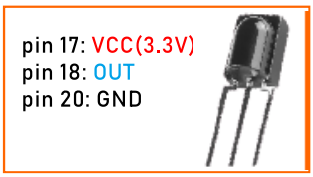
• UART9 test:

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

```
root@linaro-alip:/# com /dev/ttyS9 115200 8 0 1
port = /dev/ttyS9
baudrate = 115200
cs = 8
parity = 0
stopb = 1
5555555
RECV: 5555555
iii0077
RECV: iii0077
gggg
RECV: gggg
rrrr00
RECV: rrrr00
```

6.9.2 IR





Step 1: Enable IR debug logs.

Execute the following command:

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

Step 2: 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:/# [ 2395.705625] USERCODE=0x1818
[ 2395.732759] RMC_GETDATA=98
[ 2396.049720] USERCODE=0x1818
[ 2396.076862] RMC_GETDATA=98
[ 2396.401411] USERCODE=0x1818
[ 2396.428547] RMC_GETDATA=98
[ 2396.789799] USERCODE=0x1818
[ 2396.816937] RMC_GETDATA=99
[ 2397.181501] USERCODE=0x1818
[ 2397.208680] RMC_GETDATA=9a
[ 2397.545912] USERCODE=0x1818
[ 2397.573052] RMC_GETDATA=9b
[ 2399.581539] USERCODE=0x1818
[ 2399.608585] RMC_GETDATA=97
```

6.9.3 SPI

Step 1: Connect the MISO_M1 and MOSI_M1 pins of the SPI interface for the loopback test.

Step 2: Execute the following command to test SPI:

```
# spidev0.0_test
```

```
root@linaro-alip:/# spidev0.0_test
spi mode: 0
bits per word: 8
max speed: 500000 Hz (500 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
```

6.10 RTC

Step 1: Install the coin cell battery.

Step 2: Set the system time manually, for example:

```
# date -s "2026-05-15 10:57:00"
```

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

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

```
# hwclock -w
```

Step 4: Read the current hardware clock time:

```
# hwclock
```

```
root@linaro-alip:/# date -s "2026-05-15 10:57:00"
Fri May 15 10:57:00 UTC 2026
root@linaro-alip:/# hwclock -w
root@linaro-alip:/# hwclock
2026-05-15 10:57:07.085300+00:00
root@linaro-alip:/# hwclock
2026-05-15 10:57:31.362100+00:00
```

Step 5: Power off the board and disconnect the main power supply. Wait for a period of time, then power on the board again.

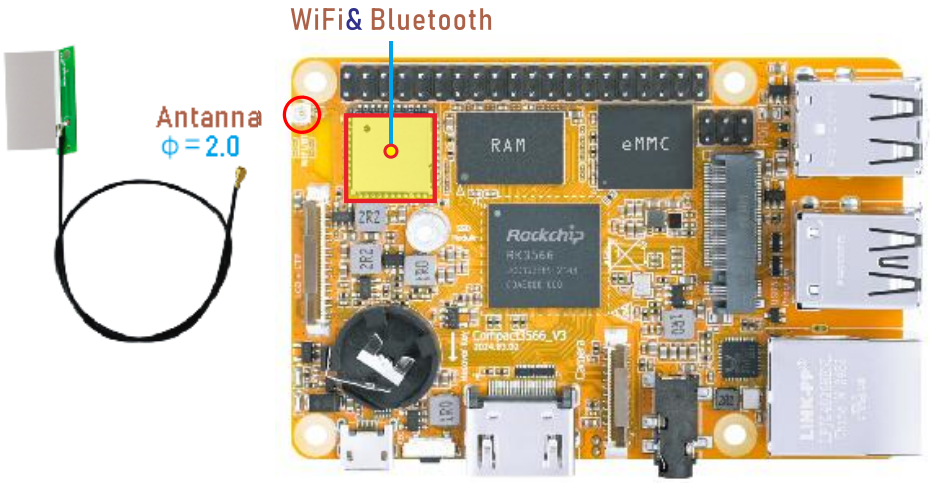
Step 6: Read the hardware clock time again.

```
root@linaro-alip:/# hwclock
2026-05-15 11:02:12.373159+00:00
root@linaro-alip:/# hwclock
2026-05-15 11:02:48.357651+00:00
root@linaro-alip:/# hwclock
2026-05-15 11:03:18.445242+00:00
```

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

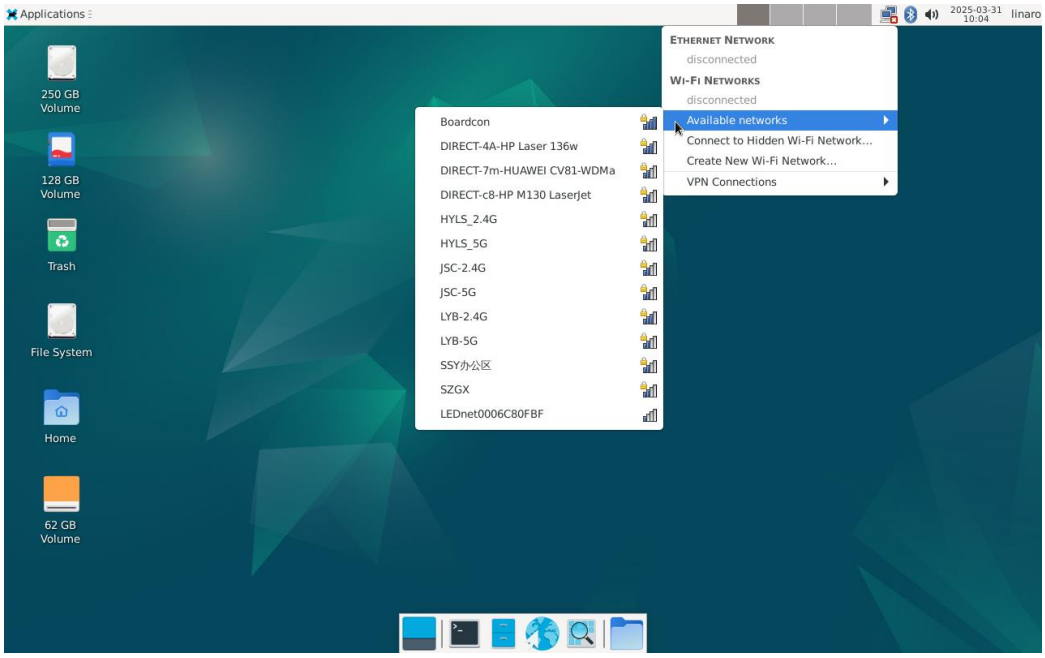
6.11 WiFi & Bluetooth

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

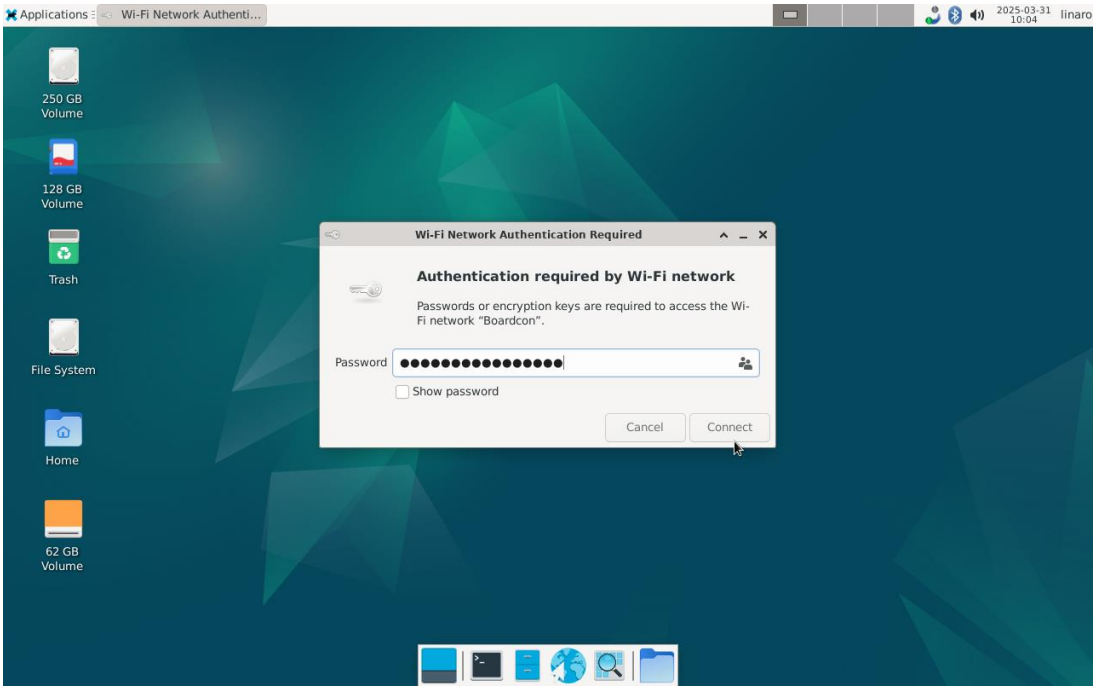


6.11.1 WiFi

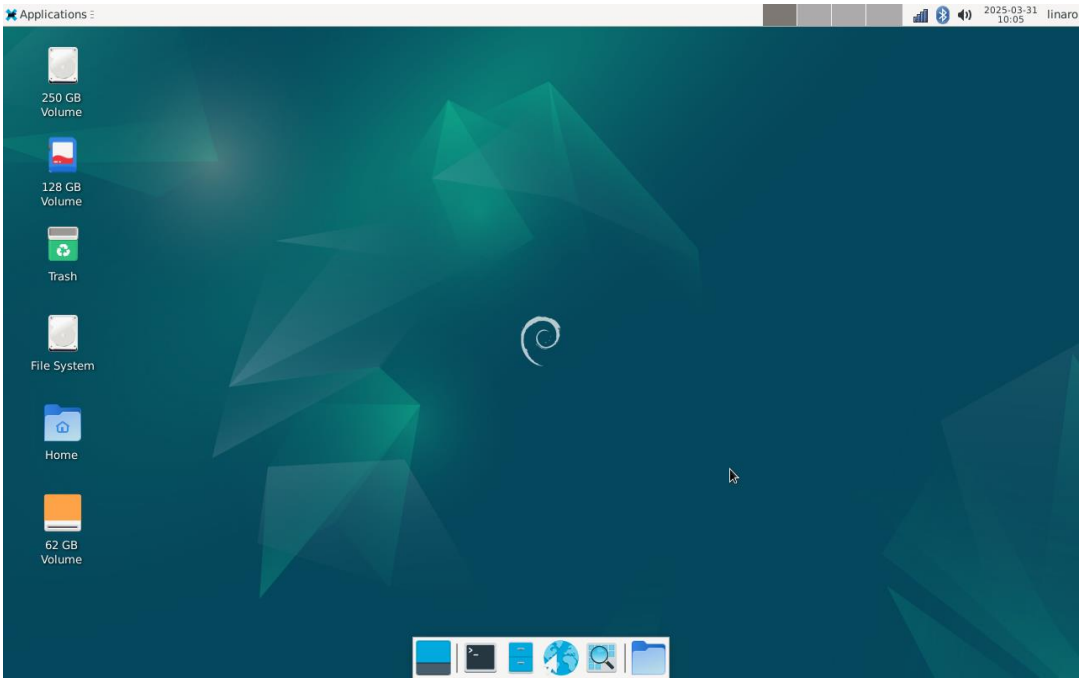
Step 1: Click the network icon in the upper-right corner of the desktop, then select **"Available Networks"** to view the list of available WiFi hotspots.



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 upper-right corner of the desktop.



Step 4: Users can test the network connection using the built-in browser, or verify it with the following commands.

(1) View network interface information.

Execute the following command:

```
# ifconfig
```

```
root@linaro-alip:/# ifconfig
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
       inet 192.168.0.124  netmask 255.255.255.0  broadcast 192.168.0.255
       inet6 fe80::62b6:26:17a9:362e  prefixlen 64  scopeid 0x20<link>
       ether 78:22:88:d9:62:91  txqueuelen 1000  (Ethernet)
       RX packets 55  bytes 12753 (12.4 KiB)
       RX errors 0  dropped 2  overruns 0  frame 0
       TX packets 30  bytes 3738 (3.6 KiB)
       TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

(2) Test network connectivity.

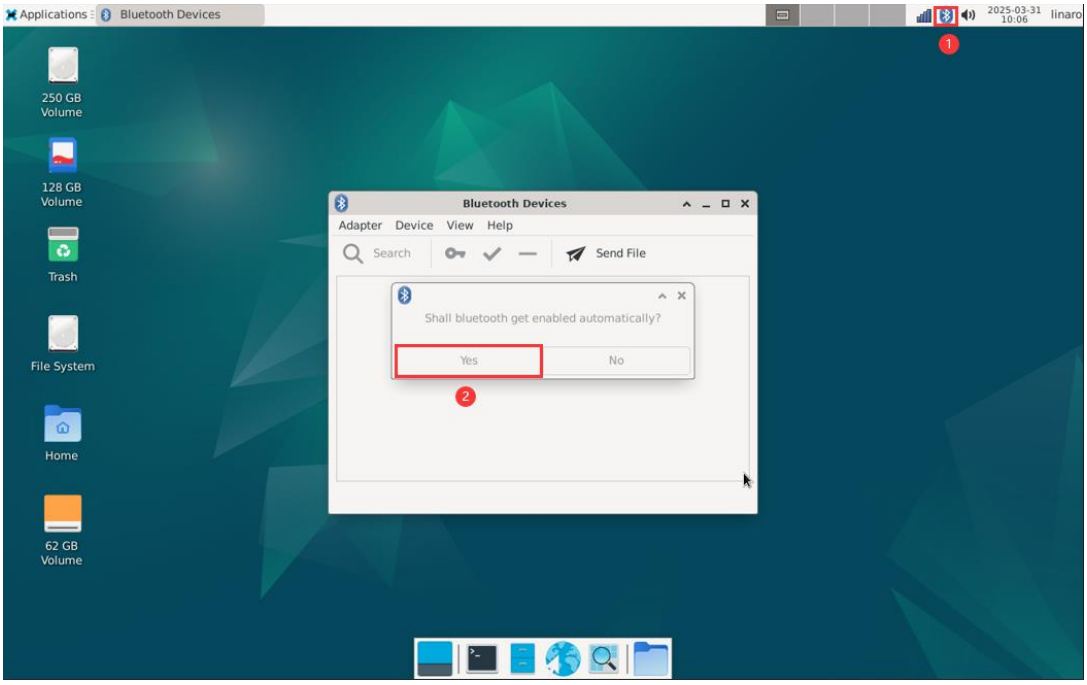
Execute the following command:

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

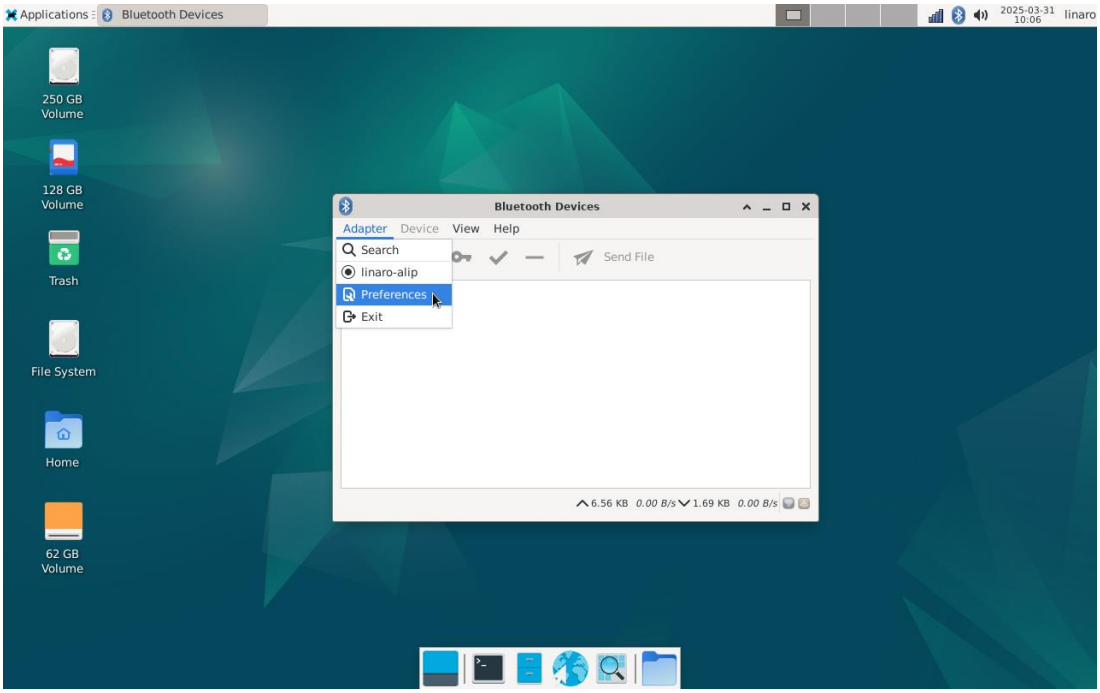
```
root@linaro-alip:/# ping -I wlan0 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 192.168.0.124 wlan0: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=48 time=178 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=48 time=178 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=48 time=179 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=48 time=174 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=48 time=179 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=6 ttl=48 time=174 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=7 ttl=48 time=177 ms
^C
--- www.armdesigner.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6009ms
rtt min/avg/max/mdev = 174.087/177.135/179.413/1.909 ms
```

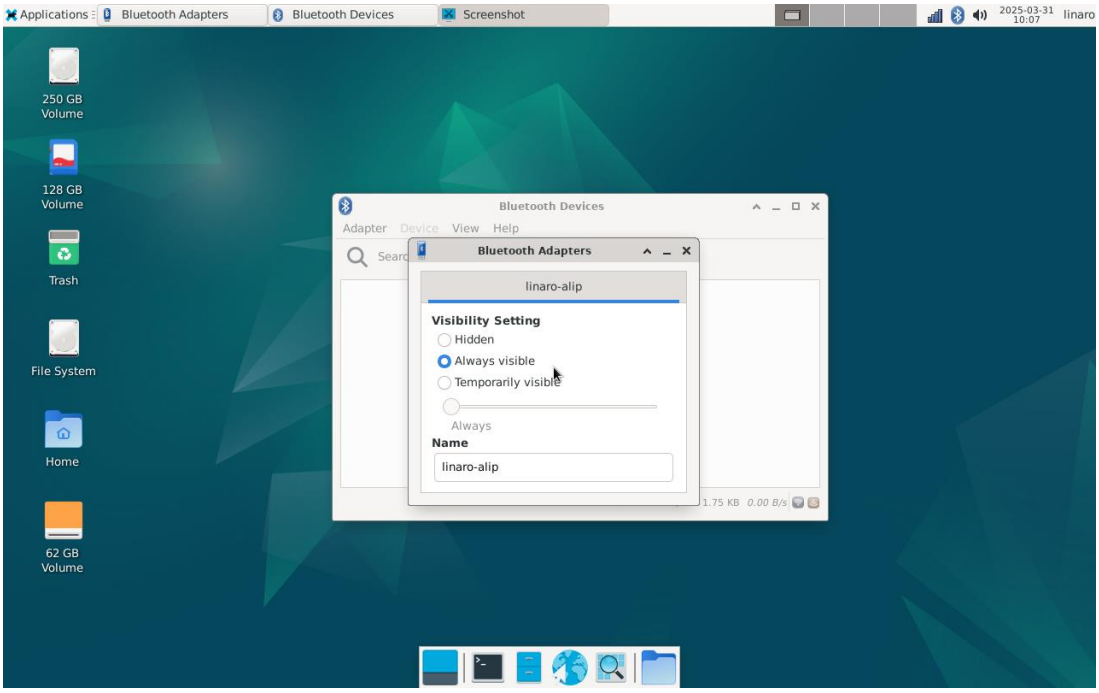
6.11.2 Bluetooth

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

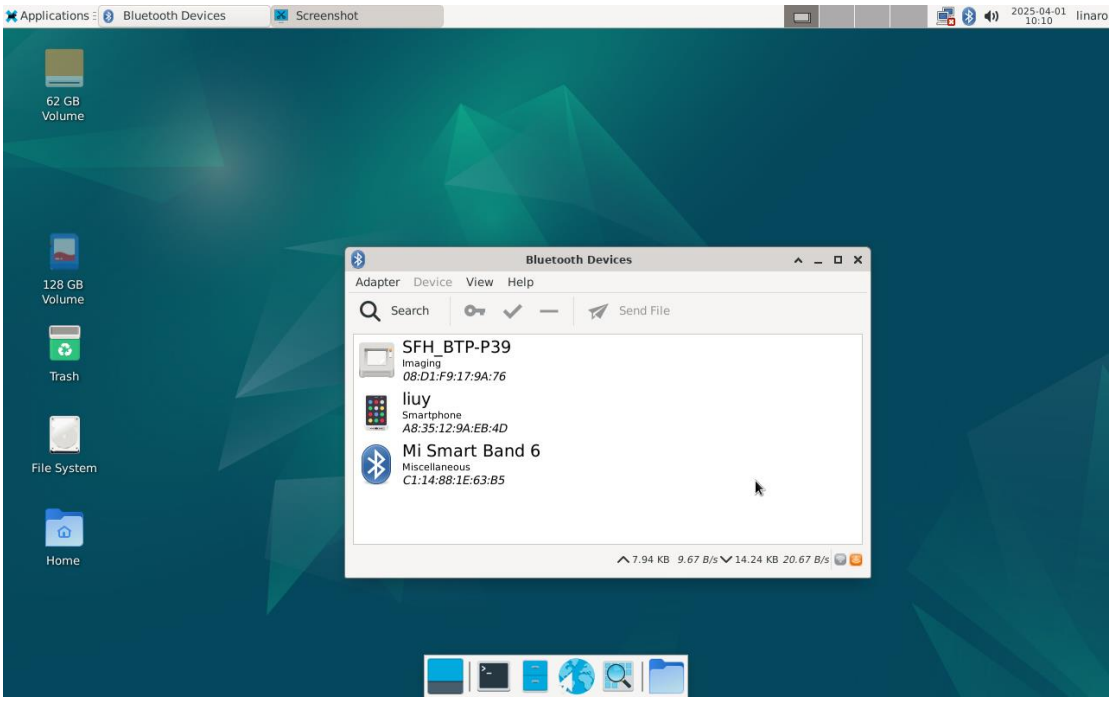


Step 2: The Bluetooth device name is hidden by default. To make it visible to other Bluetooth devices, select Adapter -> Preferences -> Always visible.





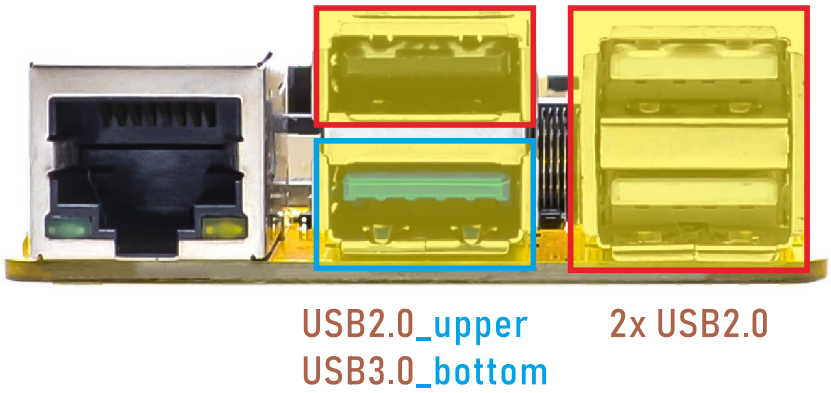
Step 3: Click "**Search**" to scan for nearby Bluetooth devices, then select the target device from the list and start pairing.



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

6.12 USB 4G

Step 1: Connect the USB 4G module to the USB Host interface.



After the USB 4G module is successfully recognized, the corresponding “ttyUSB” device nodes will be generated.

Execute the following command to check the device nodes:

```
# ls /dev/ttyUSB*
```

```
root@linaro-alip:/# [ 4750.027991] usb 6-1: new high-speed USB device number 6 using xhci-hcd
[ 4750.181231] usb 6-1: New USB device found, idVendor=2ecc, idProduct=3001, bcdDevice= 0.00
[ 4750.181324] usb 6-1: New USB device strings: Mfr=3, Product=2, SerialNumber=0
[ 4750.181361] usb 6-1: Product: WUKONG
[ 4750.181390] usb 6-1: Manufacturer: MARVELL
[ 4750.672002] usb 6-1: USB disconnect, device number 6
[ 4758.691976] usb 6-1: new high-speed USB device number 7 using xhci-hcd
[ 4758.841241] usb 6-1: New USB device found, idVendor=2c7c, idProduct=6005, bcdDevice= 3.18
[ 4758.841338] usb 6-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 4758.841378] usb 6-1: Product: Android
[ 4758.841409] usb 6-1: Manufacturer: Android
[ 4758.841438] usb 6-1: SerialNumber: 0000
[ 4758.953379] option 6-1:1.2: GSM modem (1-port) converter detected
[ 4758.954182] usb 6-1: GSM modem (1-port) converter now attached to ttyUSB0
[ 4758.955119] option 6-1:1.3: GSM modem (1-port) converter detected
[ 4758.955711] usb 6-1: GSM modem (1-port) converter now attached to ttyUSB1
[ 4758.956636] option 6-1:1.4: GSM modem (1-port) converter detected
[ 4758.957252] usb 6-1: GSM modem (1-port) converter now attached to ttyUSB2

root@linaro-alip:/# ls /dev/ttyUSB*
/dev/ttyUSB0  /dev/ttyUSB1  /dev/ttyUSB2
root@linaro-alip:/#
```

Step 2: Execute the following commands to start the PPP connection:

```
# sed -i 's#/dev/ttyUSB3#/dev/ttyUSB2#g' /etc/ppp/peers/quectel-ppp
# pppd call quectel-ppp &
```

```
root@linaro-alip:/# sed -i 's#/dev/ttyUSB3#/dev/ttyUSB2#g' /etc/ppp/peers/quectel-ppp
root@linaro-alip:/#
root@linaro-alip:/# pppd call quectel-ppp &
[1] 11447
root@linaro-alip:/# pppd options in effect:
debug           # (from /etc/ppp/peers/quectel-ppp)
nodetach                # (from /etc/ppp/peers/quectel-ppp)
dump            # (from /etc/ppp/peers/quectel-ppp)
noauth          # (from /etc/ppp/peers/quectel-ppp)
user test               # (from /etc/ppp/peers/quectel-ppp)
password ??????         # (from /etc/ppp/peers/quectel-ppp)
remotename 3gppp                # (from /etc/ppp/peers/quectel-ppp)
/dev/ttyUSB2            # (from /etc/ppp/peers/quectel-ppp)
115200          # (from /etc/ppp/peers/quectel-ppp)
lock            # (from /etc/ppp/peers/quectel-ppp)
connect chat -s -v -f /etc/ppp/peers/quectel-chat-connect               # (from /etc/ppp/peers/quectel-ppp)
disconnect chat -s -v -f /etc/ppp/peers/quectel-chat-disconnect         # (from /etc/ppp/peers/quectel-ppp)
nocrtscts               # (from /etc/ppp/peers/quectel-ppp)
modem           # (from /etc/ppp/peers/quectel-ppp)
asyncmap 0              # (from /etc/ppp/options)
lcp-echo-failure 4              # (from /etc/ppp/options)
lcp-echo-interval 30            # (from /etc/ppp/options)
hide-password           # (from /etc/ppp/peers/quectel-ppp)
novj            # (from /etc/ppp/peers/quectel-ppp)
novjccomp               # (from /etc/ppp/peers/quectel-ppp)
ipcp-accept-local               # (from /etc/ppp/peers/quectel-ppp)
ipcp-accept-remote              # (from /etc/ppp/peers/quectel-ppp)
ipparam 3gppp           # (from /etc/ppp/peers/quectel-ppp)
noipdefault             # (from /etc/ppp/peers/quectel-ppp)
ipcp-max-failure 30             # (from /etc/ppp/peers/quectel-ppp)
defaultroute            # (from /etc/ppp/peers/quectel-ppp)
usepeerdns              # (from /etc/ppp/peers/quectel-ppp)
noccp           # (from /etc/ppp/peers/quectel-ppp)
noipx           # (from /etc/ppp/options)
abort on (BUSY)
abort on (NO CARRIER)
abort on (NO DIALTONE)
abort on (ERROR)
abort on (NO ANSWER)
timeout set to 30 seconds
send (AT^M)
expect (OK)
AT^M^M
OK
 -- got it

send (ATE0^M)
expect (OK)
^M
ATE0^M^M
OK
 -- got it

send (ATI;+CSUB;+CSQ;+CPIN?;+COPS?;+CGREG?;&D2^M)
expect (OK)
^M
^M
Quectel^M
EC200A^M
Revision: EC200AEUHAR01A13M16^M
^M
SubEdition: V02^M
^M
+CSQ: 31,99^M
^M
+CGREG: 0,1^M
^M
+CPIN: READY^M
^M
+COPS: 0,0,"CHN-UNICOM",7^M
^M
OK
 -- got it

send (AT+CGDCONT=1,"IP","3gnet",,0,0^M)
expect (OK)
^M
^M
OK
 -- got it

send (ATD*99#^M)
expect (CONNECT)
```

Step 3: Check the network interface status.

```
# ifconfig
```

```
root@linaro-alip:/# ifconfig
ppp0: flags=4305<UP,POINTOPOINT,RUNNING,NOARP,MULTICAST>  mtu 1500
        inet 10.227.116.122  netmask 255.255.255.255  destination 10.64.64.64
        ppp  txqueuelen 3  (Point-to-Point Protocol)
        RX packets 5  bytes 66 (66.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 15  bytes 112 (112.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Step 4: Test the PPP network connection.

```
# ping -I ppp0 www.armdesigner.com
```

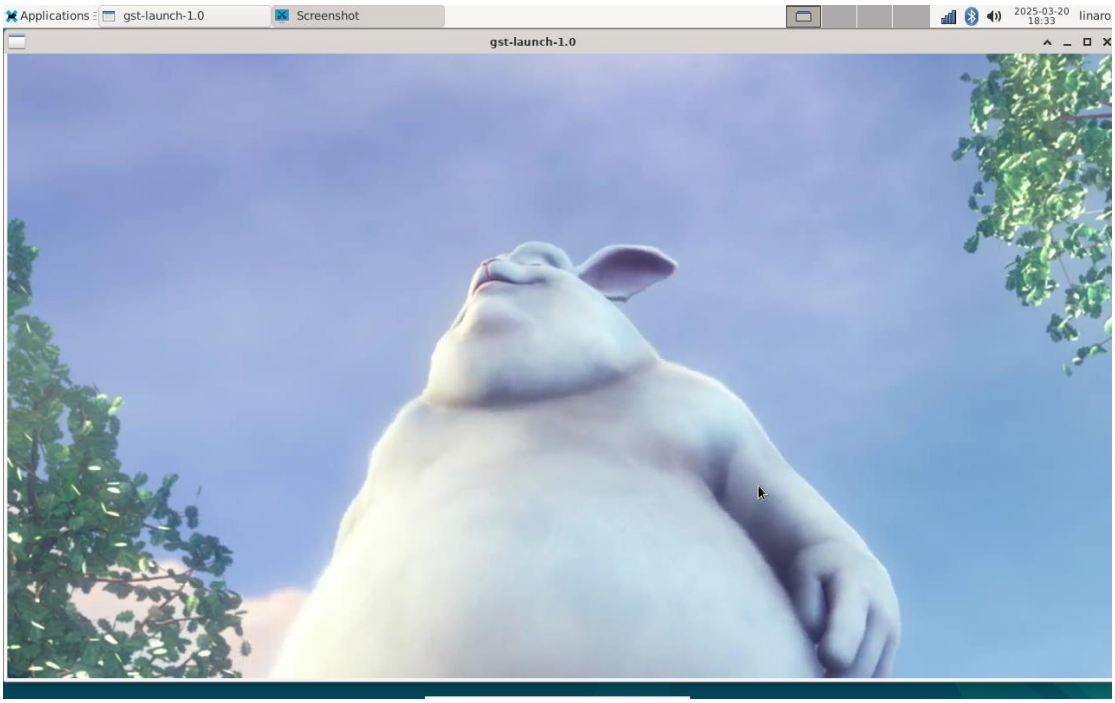
```
root@linaro-alip:/# ping -I ppp0 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 10.227.116.122 ppp0: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=46 time=366 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=46 time=324 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=46 time=259 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=46 time=546 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=46 time=498 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=6 ttl=46 time=472 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=7 ttl=46 time=416 ms
^C
--- www.armdesigner.com ping statistics ---
8 packets transmitted, 7 received, 12.5% packet loss, time 7007ms
rtt min/avg/max/mdev = 259.103/411.681/546.039/94.255 ms
```

6.13 Video Playback

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

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

```
root@linaro-alip:/# /rockchip-test/video/test_gst_video.sh
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...
Redistribute latency...
mpp[3272]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[3272]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[3272]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[3272]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[3272]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
mpp[3272]: mpp_info: mpp version: 520ab553 author: Herman Chen    2025-12-16 fix[sys_cfg]: Fix decoder
sys_cfg crash
Redistribute latency...
mpp[3272]: h264d_api: is_avcC=1
Pipeline is PREROLLED ...0 %)
Prerolled, waiting for async message to finish...
Setting pipeline to PLAYING ...
Redistribute latency...
New clock: GstSystemClock
0:00:02.3 / 0:00:29.5 (7.8 %)
```

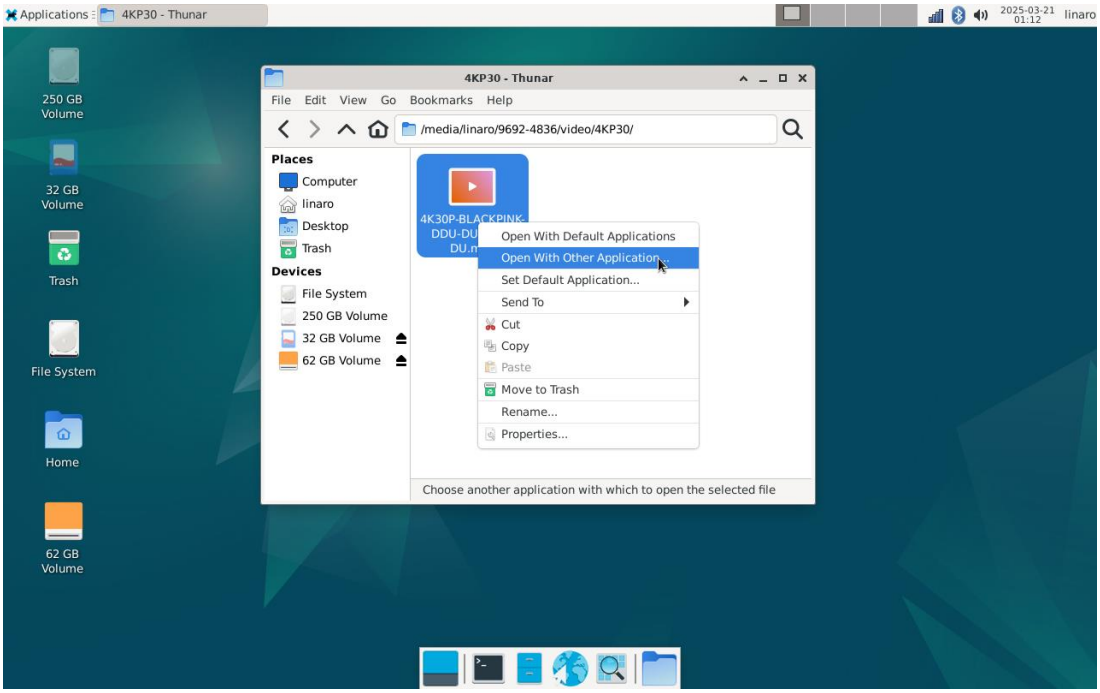


(2) Play videos using Chromium Browser.

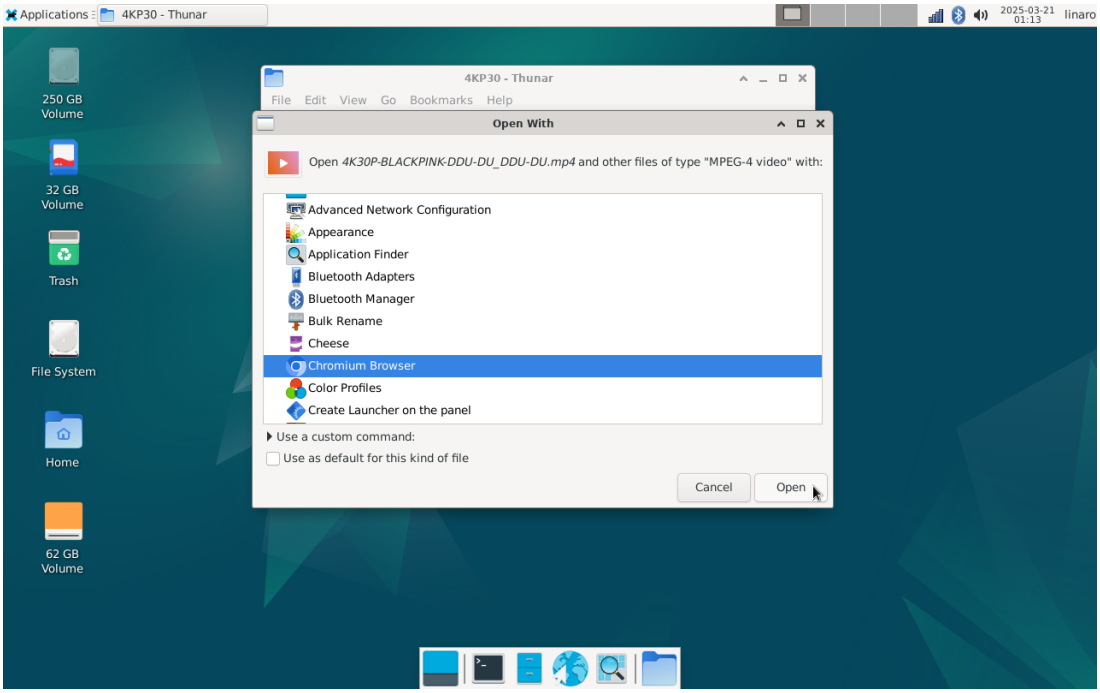
Chromium Browser supports video playback up to 4K resolution. The supported video decoding formats include VP8, H.264, H.265, VP9, and AV1.

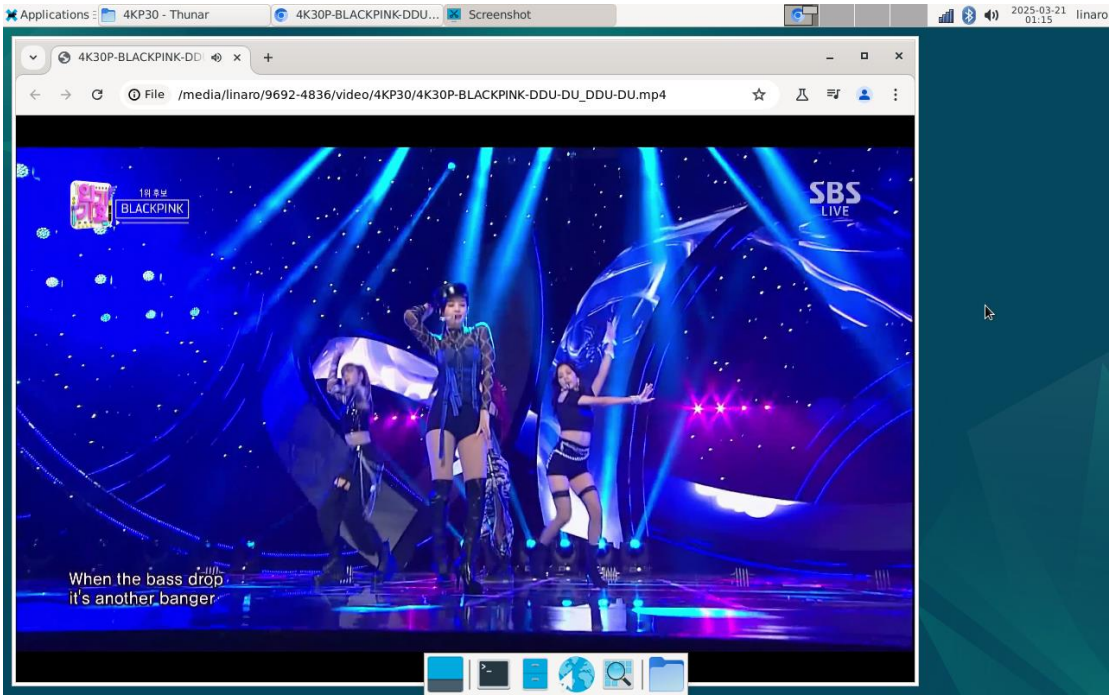
Note: Chromium Browser may not be compatible with all H.265 video files.

Step 1: Select the video file, right-click it, and choose **"Open With Other Application…"**.



Step 2: Find **Chromium Browser** in the application list, select it, and click **"Open"** to play the video file.





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

Example command:

```
# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
# gst-play-1.0 --flags=3 --videosink="kmssink plane-id=98" /media/linaro/F3AB-0FF3/video/4KP60/4KP60-exist.mp4  --audiosink="alsasink device=hw:0,0"
```

Command explanation:

• export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1: Open AFBC.

• --videosink="kmssink plane-id=98": Specifies the plane. Which can be viewed using the command: cat /sys/kernel/debug/dri/0/state | grep "plane\[".

• /media/linaro/F3AB-0FF3/video/4KP60/4KP60-exist.mp4: The media file path to be played.

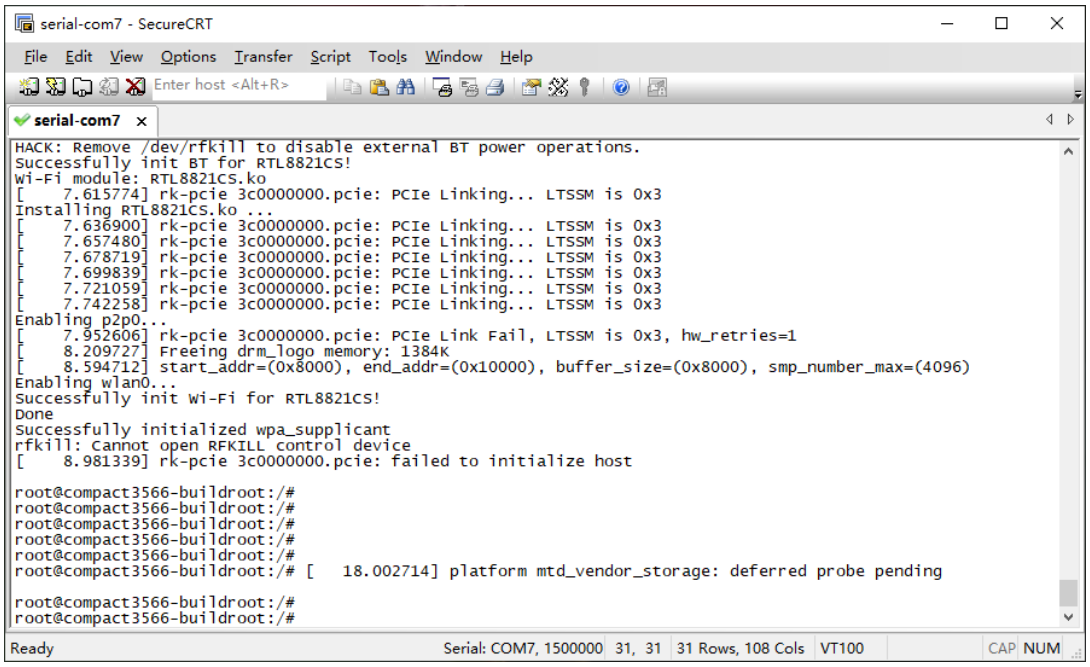
• --audiosink="alsasink device=hw:0,0": Specifies the audio output device as hw:0,0.

```
root@linaro-alip:/# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
gst-play-1.0 --flags=3 --videosink="kmssink plane-id=98" /media/linaro/F3AB-0FF3/video/4KP60/4KP60-exist.mp4  --audiosink="alsasink device=hw:0,0"
Press 'k' to see a list of keyboard shortcuts.ideosink="kmssink plane-id=98" /media/linaro/F3AB-0FF3/video/4KP60/4KP60-exist.mp4  --audiosink="alsasink device=hw:0,0"
Now playing /media/linaro/F3AB-0FF3/video/4KP60/4KP60-exist.mp4
Redistribute latency...
mpp[12677]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[12677]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[12677]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[12677]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[12677]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
mpp[12677]: mpp_info: mpp version: 520ab553 author: Herman Chen   2025-12-16 fix[sys_cfg]: Fix decoder sys_cfg crash
Redistribute latency...
mpp[12677]: h264d_api: is_avcC=1
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...
Redistribute latency...
0:00:02.4 / 0:04:01.9
```

7. Buildroot Test

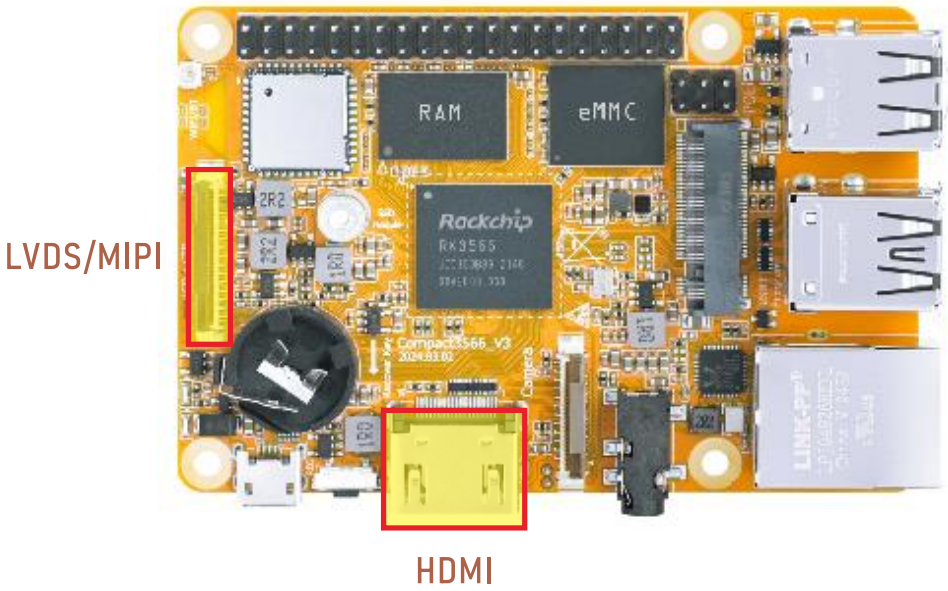
7.1 Serial Terminal

Connect the Micro USB cable (for power and debugging), and then open the serial terminal. The terminal will output the boot information. The default baud rate is 1500000.



7.2 Display

Only one display output is supported at a time. HDMI, LVDS, or MIPI can be selected as the display output. Multiple display outputs cannot be used simultaneously.



7.2.1 Display Output Switching Method

During the U-Boot startup stage, press and hold **Ctrl + C** to enter the U-Boot command line, then execute the following command to enter the display output selection menu:

```
=> boot_fit menu
```

The following example shows how to switch to **MIPI display**:

```
=> boot_fit menu

========================================
 Select display output:
   1. HDMI
   2. LVDS
   3. MIPI
========================================
Please select display mode: 3

Selected display mode: MIPI
========================================
 Action:
   S. Save and reboot
   Q. Save and quit to U-Boot
   C. Cancel, do not save
========================================
Please select action: s
vendor_storage_write display mode ret=12
Display mode saved: MIPI
Reset board to apply display mode...
```

Select 3 to switch to MIPI display, then select S to save the configuration and reboot. The new display mode will take effect after reboot.

7.2.2 Display Effect Examples

If no display mode switching operation is performed, the system uses **HDMI display** by default.

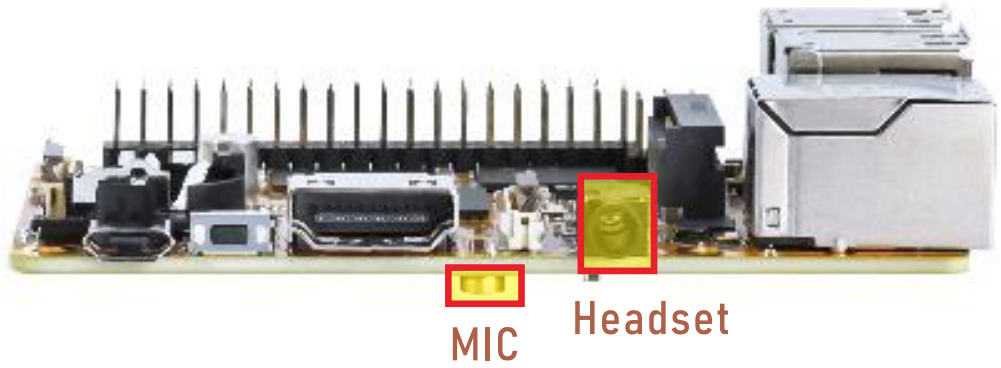
HDMI Display Effect

LVDS Display Effect

MIPI Display Effect

7.3 Audio I/O

Step 1: Plug the headset into the headset jack.



Step 2: Check the sound card information.

Execute the following command:

```
# cat /proc/asound/cards
```

```
root@compact3566-buildroot:/# cat /proc/asound/cards
 0 [rockchiphdmi   ]: rockchip-hdmi - rockchip-hdmi
                      rockchip-hdmi
 1 [rockchipes8388c]: simple-card - rockchip,es8388-codec
                      rockchip,es8388-codec
```

Step 3: Record audio from the headset microphone or the built-in microphone.

Note:

The headset microphone has higher priority. If no headset is connected, the system will

use the built-in microphone by default.

• When using HDMI as the display:

```
# arecord -Dhw:1,0 -f cd record.wav
```

```
root@compact3566-buildroot:/# arecord -Dhw:1,0 -f cd record.wav
Recording WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

• When using LVDS/MIPI as the display:

```
# arecord -Dhw:0,0 -f cd record.wav
```

```
root@compact3566-buildroot:/# arecord -Dhw:0,0 -f cd record.wav
Recording WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

Step 4: Play audio through the headset.

• When using HDMI as the display:

```
# aplay -Dhw:1,0 record.wav
```

```
root@compact3566-buildroot:/# aplay -Dhw:1,0 record.wav
Playing WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

Note: Supplementary instructions on audio output.

```
• aplay -Dhw:0,0 record.wav : HDMI TX audio output
• aplay -Dhw:1,0 record.wav : Headset audio output
```

• When using LVDS/MIPI as the display:

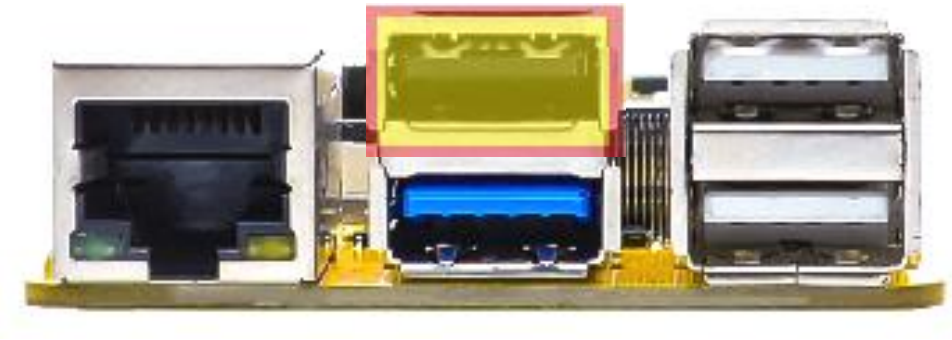
```
# aplay -Dhw:0,0 record.wav
```

```
root@compact3566-buildroot:/# aplay -Dhw:0,0 record.wav
Playing WAVE 'record.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
```

7.4 USB

7.4.1 USB OTG

The USB OTG port of Compact3566 is configured as Host mode by default at startup.



USB OTG

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

```
# echo peripheral > /sys/devices/platform/fe8a0000.usb2-phy/otg_mode
```

```
root@compact3566-buildroot:/#
sb2-phy/otg_mode-buildroot:/# echo peripheral > /sys/devices/platform/fe8a0000.us
root@compact3566-buildroot:/# [  461.044593] xhci-hcd xhci-hcd.0.auto: remove, state 4
[  461.044643] usb usb1: USB disconnect, device number 1
[  461.045699] xhci-hcd xhci-hcd.0.auto: USB bus 1 deregistered
[  462.272230] dwc3 fcc00000.usb: device reset
[  462.330814] dwc3 fcc00000.usb: device reset
[  462.540087] phy phy-fe8a0000.usb2-phy.2: charger = USB_SDP_CHARGER
[  462.640931] dwc3 fcc00000.usb: device reset
[  462.729148] android_work: sent uevent USB_STATE=CONNECTED
[  462.758656] android_work: sent uevent USB_STATE=CONFIGURED
```

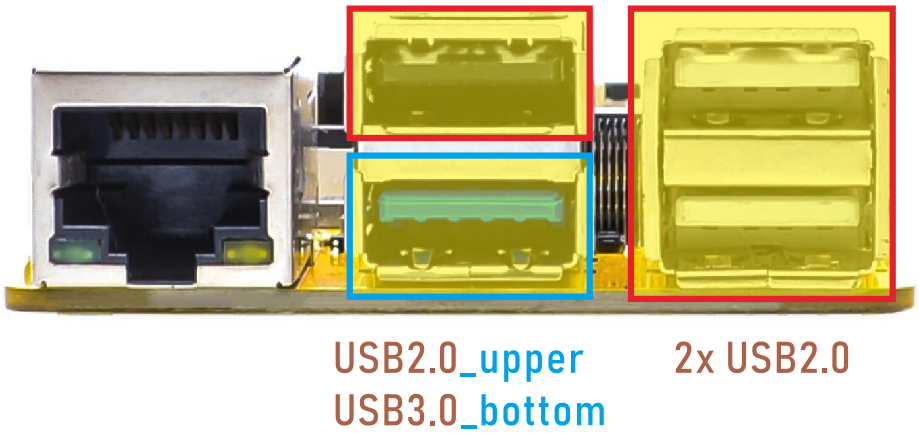
• To switch the USB OTG port back to Host mode, execute the following command:

```
# echo host > /sys/devices/platform/fe8a0000.usb2-phy/otg_mode
```

```
root@compact3566-buildroot:/#
y/otg_modect3566-buildroot:/# echo host > /sys/devices/platform/fe8a0000.usb2-phy
[  546.508041] dwc3 fcc00000.usb: device disconnect
root@compact3566-buildroot:/# [  546.510238] android_work: sent uevent USB_STATE=DISCONNECTED
[  546.519975] dwc3 fcc00000.usb: request 00000000895e31a8 was not queued to ep0out
[  546.522520] android_work: did not send uevent (0 0 0000000000000000)
[  546.628674] xhci-hcd xhci-hcd.0.auto: xHCI Host Controller
[  546.629030] xhci-hcd xhci-hcd.0.auto: new USB bus registered, assigned bus number 1
[  546.629188] xhci-hcd xhci-hcd.0.auto: USB3 root hub has no ports
[    546.629204]  xhci-hcd  xhci-hcd.0.auto:  hcc  params  0x0220fe64  hci  version  0x110  quirks
0x0000008022010010
[  546.629253] xhci-hcd xhci-hcd.0.auto: irq 59, io mem 0xfcc00000
[  546.629737] usb usb1: New USB device found, idVendor=1d6b, idProduct=0002, bcdDevice= 6.01
[  546.629763] usb usb1: New USB device strings: Mfr=3, Product=2, SerialNumber=1
[  546.629775] usb usb1: Product: xHCI Host Controller
[  546.629785] usb usb1: Manufacturer: Linux 6.1.141 xhci-hcd
[  546.629795] usb usb1: SerialNumber: xhci-hcd.0.auto
[  546.630531] hub 1-0:1.0: USB hub found
[  546.630644] hub 1-0:1.0: 1 port detected
[  546.883939] usb 1-1: new high-speed USB device number 2 using xhci-hcd
[  547.032880] usb 1-1: New USB device found, idVendor=21c4, idProduct=0cc7, bcdDevice= 1.00
[  547.032929] usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  547.032942] usb 1-1: Product: USB Flash Drive
[  547.032951] usb 1-1: Manufacturer: Lexar
[  547.032960] usb 1-1: SerialNumber: 04102800000031D7
[  547.035036] usb-storage 1-1:1.0: USB Mass Storage device detected
[  547.035799] scsi host1: usb-storage 1-1:1.0
[  548.049208] scsi 1:0:0:0: Direct-Access     Lexar    USB Flash Drive  1.00 PQ: 0 ANSI: 4
[  548.051779] sd 1:0:0:0: [sdb] 120861886 512-byte logical blocks: (61.9 GB/57.6 GiB)
[  548.052121] sd 1:0:0:0: [sdb] Write Protect is off
[  548.052396] sd 1:0:0:0: [sdb] No Caching mode page found
[  548.052412] sd 1:0:0:0: [sdb] Assuming drive cache: write through
[  548.056966]  sdb: sdb1
[  548.057356] sd 1:0:0:0: [sdb] Attached SCSI removable disk
[  548.663170] FAT-fs (sdb1): utf8 is not a recommended IO charset for FAT filesystems, filesystem
will be case sensitive!
```

7.4.2 USB HOST

The Compact3566 provides both USB 2.0 Host and USB 3.0 Host interfaces. 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.



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@compact3566-buildroot:/# [  805.779967] usb 4-1: new high-speed USB device number 2 using ehci-
platform
[  805.938320] usb 4-1: New USB device found, idVendor=21c4, idProduct=0cc7, bcdDevice= 1.00
[  805.938411] usb 4-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  805.938450] usb 4-1: Product: USB Flash Drive
[  805.938479] usb 4-1: Manufacturer: Lexar
[  805.938508] usb 4-1: SerialNumber: 04102800000031D7
[  805.942338] usb-storage 4-1:1.0: USB Mass Storage device detected
[  805.944130] scsi host0: usb-storage 4-1:1.0
[  806.962529] scsi 0:0:0:0: Direct-Access     Lexar    USB Flash Drive  1.00 PQ: 0 ANSI: 4
[  806.966903] sd 0:0:0:0: [sda] 120861886 512-byte logical blocks: (61.9 GB/57.6 GiB)
[  806.967646] sd 0:0:0:0: [sda] Write Protect is off
[  806.968273] sd 0:0:0:0: [sda] No Caching mode page found
[  806.968290] sd 0:0:0:0: [sda] Assuming drive cache: write through
[  806.975009]  sda: sda1
[  806.976163] sd 0:0:0:0: [sda] Attached SCSI removable disk
[  807.568210] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will be
case sensitive!
[  807.573989] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run
```

• When the device operates in USB 3.0 mode, the log usually shows "**SuperSpeed**":

```
root@compact3566-buildroot:/# [  852.228613] usb 7-1: new SuperSpeed USB device number 3 using xhci-hcd
[  852.258620] usb 7-1: New USB device found, idVendor=0dd8, idProduct=3b00, bcdDevice= 0.02
[  852.258713] usb 7-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  852.258751] usb 7-1: Product: OnlyDisk
[  852.258780] usb 7-1: Manufacturer: Netac
[  852.258808] usb 7-1: SerialNumber: C0E8BFA3EC38F796
[  852.261643] usb-storage 7-1:1.0: USB Mass Storage device detected
[  852.263277] scsi host1: usb-storage 7-1:1.0
[  853.354987] scsi 1:0:0:0: Direct-Access     Netac    OnlyDisk        8.01 PQ: 0 ANSI: 6
[  853.359926] sd 1:0:0:0: [sdb] 121610240 512-byte logical blocks: (62.3 GB/58.0 GiB)
[  853.360385] sd 1:0:0:0: [sdb] Write Protect is off
[  853.360667] sd 1:0:0:0: [sdb] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
[  853.365861]  sdb: sdb1
[  853.366679] sd 1:0:0:0: [sdb] Attached SCSI removable disk
[  853.598106] FAT-fs (sdb1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will be
case sensitive!
[  853.602171] FAT-fs (sdb1): Volume was not properly unmounted. Some data may be corrupt. Please run
fsck.
```

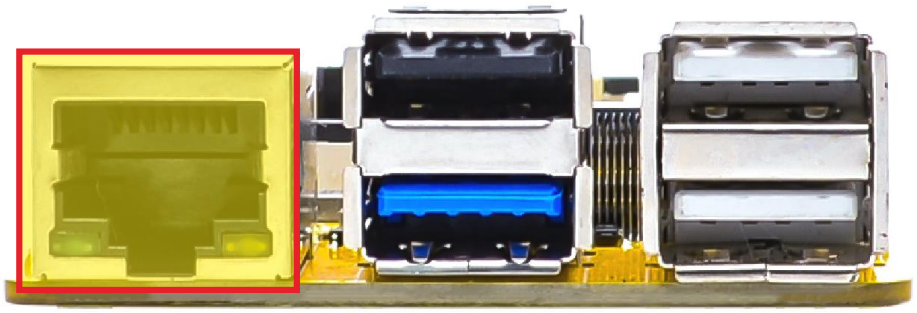
After a USB flash drive is connected, it will be mounted automatically. Execute the following command to check the mount path of the USB flash drive:

```
# df -h
```

```
root@compact3566-buildroot:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root       5.9G  728M  5.0G  13% /
devtmpfs        1.9G  8.0K  1.9G   1% /dev
tmpfs           2.0G  392K  2.0G   1% /run
tmpfs           2.0G  760K  2.0G   1% /var/log
tmpfs           2.0G     0  2.0G   0% /dev/shm
tmpfs           2.0G  140K  2.0G   1% /tmp
/dev/mmcblk0p7  124M  5.3M  115M   5% /oem
/dev/mmcblk0p8   23G  352K   23G   1% /userdata
/dev/sda1        32G  5.5G   27G  17% /mnt/udisk
/dev/sdb1        58G   56G  2.8G  96% /media/udisk1
```

7.5 Ethernet

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



After the network cable is connected, check the kernel log. The log shows that the Gigabit Ethernet link is detected successfully.

```
root@linaro-alip:/# [  842.043556] rk_gmac-dwmac fe010000.ethernet end1: Link is Up - 1Gbps/Full - flow
control rx/tx
[  842.043727] IPv6: ADDRCONF(NETDEV_CHANGE): end1: link becomes ready
```

Step 2: Check the network interface information.

Execute the following command:

```
# ifconfig
```

```
root@linaro-alip:/# ifconfig
end1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.123  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::4518:4199:8681:eecd  prefixlen 64  scopeid 0x20<link>
        ether 46:93:f4:d6:c9:79  txqueuelen 1000  (Ethernet)
        RX packets 173  bytes 23607 (23.0 KiB)
        RX errors 0  dropped 33  overruns 0  frame 0
        TX packets 105  bytes 9546 (9.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 55
```

Step 3: Test the network connection.

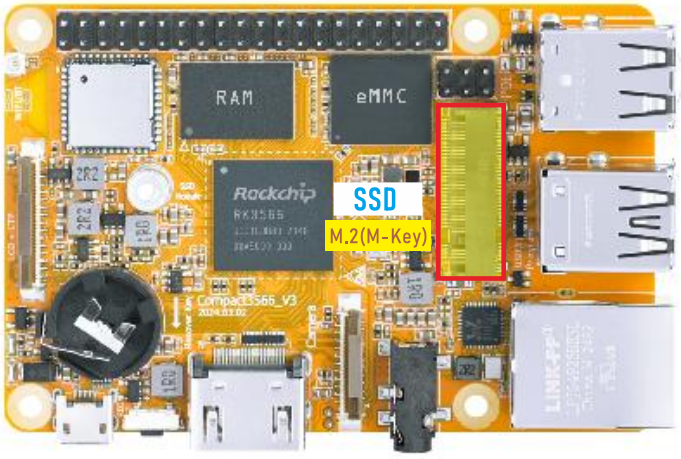
Execute the following command:

```
# ping -I end1 www.armdesigner.com
```

```
root@linaro-alip:/# ping -I end1 www.armdesigner.com
PING www.armdesigner.com (67.222.54.196) from 192.168.0.123 end1: 56(84) bytes of data.
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=1 ttl=48 time=174 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=2 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=3 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=4 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=5 ttl=48 time=171 ms
64 bytes from 67-222-54-196.unifiedlayer.com (67.222.54.196): icmp_seq=6 ttl=48 time=171 ms
^C
--- www.armdesigner.com ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 16307ms
rtt min/avg/max/mdev = 170.934/171.583/173.918/1.050 ms
```

7.6 M.2 SSD

Step 1: Install the SSD into the SSD slot, then power on the board.



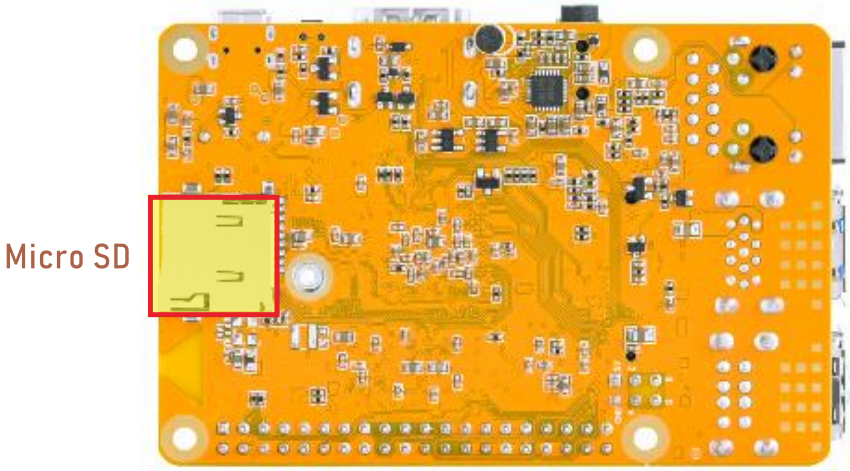
Step 2: After the SSD is recognized, it will be mounted automatically. Execute the following command to check the mount path of the SSD:

```
# df -h
```

```
root@compact3566-buildroot:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root       5.9G  728M  5.0G  13% /
devtmpfs        1.9G  8.0K  1.9G   1% /dev
tmpfs           2.0G  408K  2.0G   1% /run
tmpfs           2.0G  196K  2.0G   1% /var/log
tmpfs           2.0G     0  2.0G   0% /dev/shm
tmpfs           2.0G  140K  2.0G   1% /tmp
/dev/mmcblk0p7  124M  5.3M  115M   5% /oem
/dev/mmcblk0p8   23G  360K   23G   1% /userdata
/dev/nvme0n1p1  233G   15M  233G   1% /mnt/storage
/dev/sdb1        58G   56G  2.8G  96% /mnt/udisk
/dev/sda1        32G  5.5G   27G  17% /media/udisk1
root@compact3566-buildroot:/#
```

7.7 SD Card

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



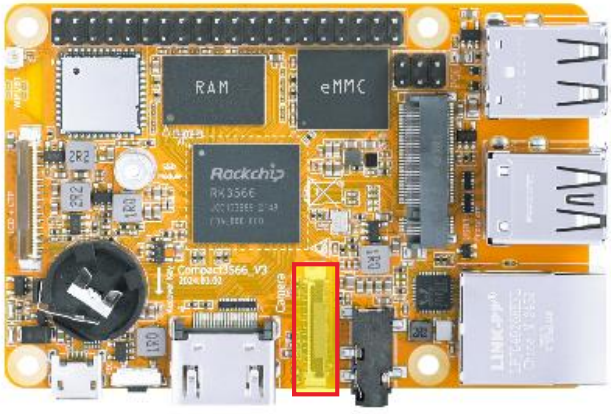
Step 2: After the SD card is recognized, it will be mounted automatically. Execute the following command to check the mount path of the SD card:

```
# df -h
```

```
root@compact3566-buildroot:/# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root       5.9G  728M  5.0G  13% /
devtmpfs        1.9G  8.0K  1.9G   1% /dev
tmpfs           2.0G  416K  2.0G   1% /run
tmpfs           2.0G  264K  2.0G   1% /var/log
tmpfs           2.0G     0  2.0G   0% /dev/shm
tmpfs           2.0G  140K  2.0G   1% /tmp
/dev/mmcblk0p7  124M  5.3M  115M   5% /oem
/dev/mmcblk0p8   23G  368K   23G   1% /userdata
/dev/nvme0n1p1  233G   15M  233G   1% /mnt/storage
/dev/sdb1        58G   56G  2.8G  96% /mnt/udisk
/dev/sda1        32G  5.5G   27G  17% /media/udisk1
/dev/mmcblk1p1   60G   20M   60G   1% /mnt/sdcard
```

7.8 Camera

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



MIPI Camera

OV13850

Step 2: Preview the camera.

Execute the following command:

```
# /rockchip-test/camera/camera_rkisp_test.sh
```

```
root@compact3566-buildroot:/# /rockchip-test/camera/camera_rkisp_test.sh
mpp[1635]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1635]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1635]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1635]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[1635]: 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 ...
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0: crop-bounds = < (int)0, (int)0, (int)2112, (int)1568 >
New clock: GstSystemClock
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)640, height=(int)480, framerate=(fraction)30/1, pixel-aspect-ratio=(fraction)1/1, interlace-
mode=(string)progressive, colorimetry=(string)1:4:16:4
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)640, height=(int)480, framerate=(fraction)30/1, pixel-aspect-ratio=(fraction)1/1, interlace-
mode=(string)progressive, colorimetry=(string)1:4:16:4
/GstPipeline:pipeline0/GstWaylandSink:waylandsink0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)640, height=(int)480, framerate=(fraction)30/1, pixel-aspect-ratio=(fraction)1/1, interlace-
mode=(string)progressive, colorimetry=(string)1:4:16:4
[  308.803586] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)640, height=(int)480, framerate=(fraction)30/1, pixel-aspect-ratio=(fraction)1/1, interlace-
mode=(string)progressive, colorimetry=(string)1:4:16:4
[  308.804010] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
[  308.804083] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
Redistribute latency...
[17:25:32.542] seeing the first app
0:00:02.0 / 99:99:99.
```

Step 3: Record a video.

Execute the following command:

```
# gst-launch-1.0 v4l2src device=/dev/video0 num-buffers=100 ! \
video/x-raw,format=NV12,width=1920,height=1088,framerate=30/1 ! \
videoconvert ! mpph264enc ! h264parse ! mp4mux ! \
filesink location=/tmp/h264.mp4
```

```
ers=100 ! \t3566-buildroot:/# gst-launch-1.0 v4l2src device=/dev/video0 num-buffe
> video/x-raw,format=NV12,width=1920,height=1088,framerate=30/1 ! \
> videoconvert ! mpph264enc ! h264parse ! mp4mux ! \
> filesink location=/tmp/h264.mp4
mpp[1696]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1696]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1696]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1696]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[1696]: 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
mpp[1696]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1696]: mpp: Only rk3588's h264/265/jpeg and rk3576's h264/265 encoder can use frame parallel
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
mpp[1696]: mpp_enc: set prep cfg w:h [1920:1088] stride [1920:1088] fmt 0 rotate 0 mirror 0
mpp[1696]: mpp_enc: set rc cbr bps [7833600:8323200:7344000] fps [30:1:fix] - [30:1:fix] gop 30
mpp[1696]: mpp_enc: mode cbr bps [7344000:7833600:8323200] fps fix [30/1] -> fix [30/1] gop i [30] v [0]
[  358.398014] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
[  358.400616] rkisp rkisp-vir0: first params buf queue
[  358.400890] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
[  358.400944] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
Redistribute latency...
Redistribute latency...
0:00:02.3 / 99:99:99.
```

Step 4: Take photos.

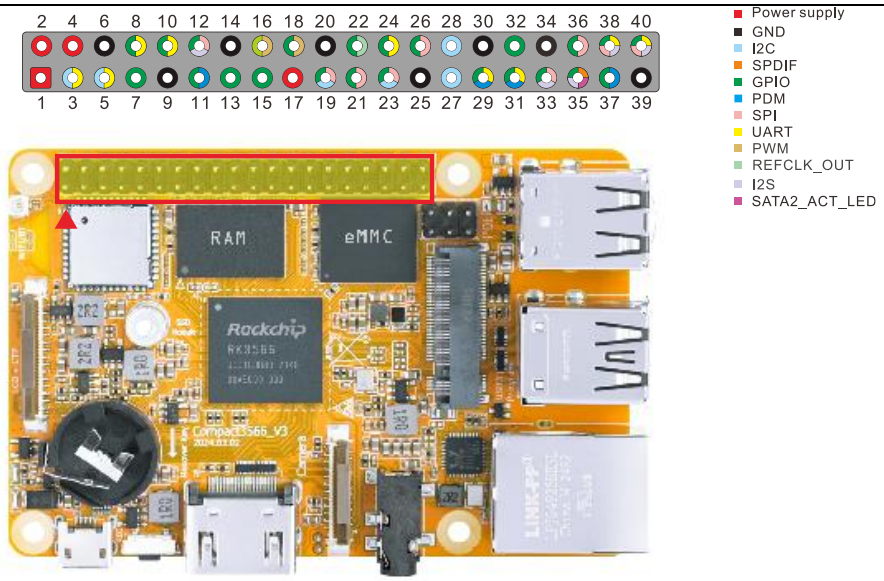
Execute the following command:

```
# gst-launch-1.0 -v v4l2src device=/dev/video0 num-buffers=10 ! \
video/x-raw,format=NV12,width=1280,height=800 ! mppjpegenc ! \
multifilesink location=/tmp/test%05d.jpg
```

```
uffers=10 ! \566-buildroot:/# gst-launch-1.0 -v v4l2src device=/dev/video0 num-bu
> video/x-raw,format=NV12,width=1280,height=800 ! mppjpegenc ! \
> multifilesink location=/tmp/test%05d.jpg
mpp[1742]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1742]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1742]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1742]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[1742]: 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
mpp[1742]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref
and poc setup overflow
mpp[1742]: mpp: Only rk3588's h264/265/jpeg and rk3576's h264/265 encoder can use frame parallel
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0: crop-bounds = < (int)0, (int)0, (int)2112, (int)1568 >
New clock: GstSystemClock
/GstPipeline:pipeline0/GstV4l2Src:v4l2src0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:src: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
[  389.325801] rkisp_hw fdff0000.rkisp: set isp clk = 297000000Hz
mpp[1742]: mpp_enc: set prep cfg w:h [1280:800] stride [1280:800] fmt 0 rotate 0 mirror 0
mpp[1742]: mpp_enc: set rc cbr bps [15360000:16320000:14400000] fps [120:1:fix] - [120:1:fix] gop 120
mpp[1742]: mpp_enc: set jpeg qfactor [80:1:99]
[  389.328332] rkisp rkisp-vir0: first params buf queue
/GstPipeline:pipeline0/GstMppJpegEnc:mppjpegenc0.GstPad:src: caps = image/jpeg, width=(int)1280,
height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
[  389.328596] rockchip-csi2-dphy1: dphy1, data_rate_mbps 600
/GstPipeline:pipeline0/GstMultiFileSink:multifilesink0.GstPad:sink: caps = image/jpeg, width=(int)1280,
height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
[  389.328653] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:1, dphy1, ret 0
/GstPipeline:pipeline0/GstMppJpegEnc:mppjpegenc0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
/GstPipeline:pipeline0/GstCapsFilter:capsfilter0.GstPad:sink: caps = video/x-raw, format=(string)NV12,
width=(int)1280, height=(int)800, pixel-aspect-ratio=(fraction)1/1, framerate=(fraction)120/1, interlace-
mode=(string)progressive, colorimetry=(string)1:3:5:1
Redistribute latency...
Got EOS from element "pipeline0".
Execution ended after 0:00:00.564566417
Setting pipeline to NULL ...
[  389.900481] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream_stop stream stop, dphy1
[  389.900588] rockchip-csi2-dphy csi2-dphy1: csi2_dphy_s_stream stream on:0, dphy1, ret 0
Freeing pipeline ...
```

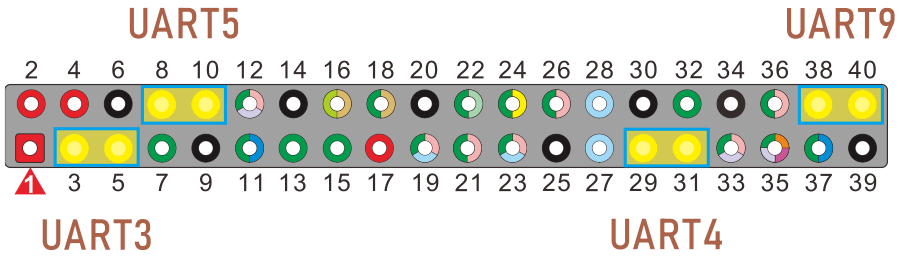
7.9 Expansion Interface

The expansion interface supports **UART3/4/5/9**, **IR**, **SPI**, and **I2C** by default. The remaining pins are configured as General Purpose I/O (GPIO).



7.9.1 UART

Connect the TX pin to the RX pin of the corresponding UART port for the loopback test.



• UART3 test:

```
# com /dev/ttyS3 115200 8 0 1
```

```
root@compact3566-buildroot:/# com /dev/ttyS3 115200 8 0 1
port = /dev/ttyS3
baudrate = 115200
cs = 8
parity = 0
stopb = 1
klklkl
RECV: klklkl
ioioioouoo
RECV: ioioioouoo
5656565op
RECV: 5656565op
ytyt
RECV: ytyt
```

• UART4 test:

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

```
root@compact3566-buildroot:/# com /dev/ttyS4 115200 8 0 1
port = /dev/ttyS4
baudrate = 115200
cs = 8
parity = 0
stopb = 1
jkjkjkj
RECV: jkjkjkj
232323232323223
RECV: 232323232323223
yuyuyu8989
RECV: yuyuyu8989
ppp
RECV: ppp
```

• UART5 test:

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

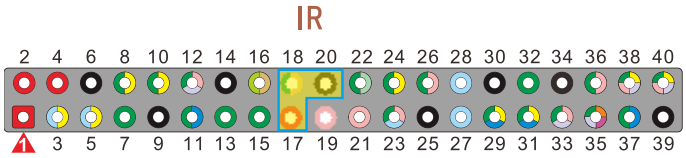
```
root@compact3566-buildroot:/# com /dev/ttyS5 115200 8 0 1
port = /dev/ttyS5
baudrate = 115200
cs = 8
parity = 0
stopb = 1
klklklklklkl
RECV: klklklklklkl
0000000000
RECV: 0000000000
tytytytyt
RECV: tytytytyt
65656ioio
RECV: 65656ioio
```

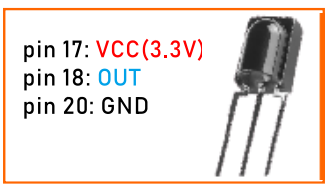
• UART9 test:

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

```
root@compact3566-buildroot:/# com /dev/ttyS9 115200 8 0 1
port = /dev/ttyS9
baudrate = 115200
cs = 8
parity = 0
stopb = 1
klklk
RECV: klklk
ioioioiyuyrt
RECV: ioioioiyuyrt
5656565656565
RECV: 5656565656565
ggggg
RECV: ggggg
```

7.9.2 IR





Step 1: Enable IR debug logs.

Execute the following command:

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

Step 2: Point the remote control at the IR receiver and press a button. The corresponding key value will be printed in the log.

```
root@compact3566-buildroot:/#
ters/code_print6-buildroot:/# echo 1 > /sys/module/rockchip_pwm_remotectl/paramet
root@compact3566-buildroot:/# [  191.829613] USERCODE=0x1818
[  191.856784] RMC_GETDATA=9a
[  192.915381] USERCODE=0x1818
[  192.942446] RMC_GETDATA=98
[  193.965400] USERCODE=0x1818
[  193.992534] RMC_GETDATA=99
[  194.272156] USERCODE=0x1818
[  194.299196] RMC_GETDATA=9b
[  194.713120] USERCODE=0x1818
[  194.740303] RMC_GETDATA=e6
[  195.020855] USERCODE=0x1818
[  195.048013] RMC_GETDATA=e4
[  195.704898] USERCODE=0x1818
[  195.732032] RMC_GETDATA=e5
```

7.9.3 SPI

Step 1: Connect the MISO_M1 and MOSI_M1 pins of the SPI interface for the loopback test.

Step 2: Execute the following command:

```
# spidev0.0_test
```

```
root@compact3566-buildroot:/# spidev0.0_test
spi mode: 0
bits per word: 8
max speed: 500000 Hz (500 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
```

7.10 RTC

Step 1: Install the coin cell battery.

Step 2: Set the system time manually, for example:

```
# date -s "2026-05-15 14:35:00"
```

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

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

```
# hwclock -w
```

Step 4: Read the current hardware clock time:

```
# hwclock
```

```
root@compact3566-buildroot:/# date -s "2026-05-15 14:35:00"
Fri May 15 14:35:00 UTC 2026
root@compact3566-buildroot:/# hwclock -w
root@compact3566-buildroot:/# hwclock
Fri May 15 14:35:12 2026  0.000000 seconds
root@compact3566-buildroot:/# hwclock
Fri May 15 14:35:29 2026  0.000000 seconds
```

Step 5: Power off the board and disconnect the main power supply. Wait for a period of time, then power on the board again.

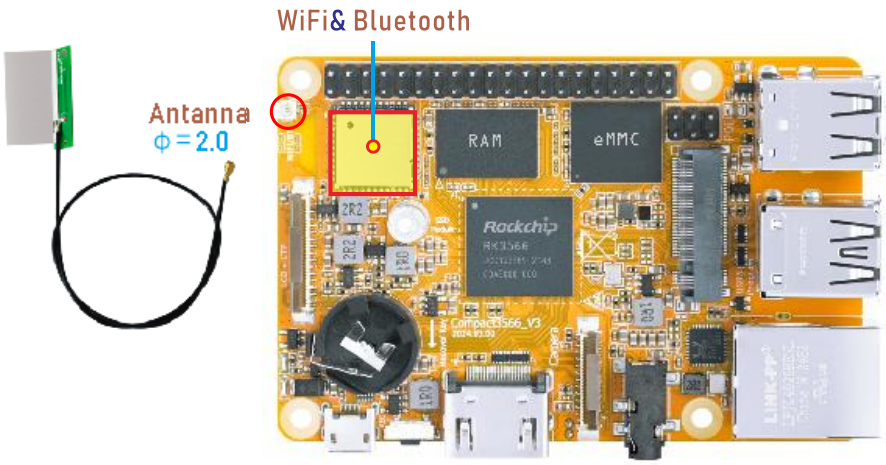
Step 6: Read the hardware clock time again:

```
root@compact3566-buildroot:/# hwclock
Fri May 15 14:53:29 2026  0.000000 seconds
root@compact3566-buildroot:/# hwclock
Fri May 15 14:54:29 2026  0.000000 seconds
root@compact3566-buildroot:/# hwclock
Fri May 15 14:55:44 2026  0.000000 seconds
```

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

7.11 WiFi & Bluetooth

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



7.11.1 WiFi

Step 1: Check the Wi-Fi device information.

Execute the following command:

```
# ifconfig
```

```
root@compact3566-buildroot:/# ifconfig
wlan0     Link encap:Ethernet  HWaddr 78:22:88:D9:62:C7
          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.

Execute the following command:

```
# iwlist wlan0 scan
```

```
root@compact3566-buildroot:/# iwlist wlan0 scan
wlan0     Scan completed :
          Cell 01 - Address: B2:22:7A:5A:B6:4A
                    ESSID:"DIRECT-4A-HP Laser 136w"
                    Protocol:IEEE 802.11gn
                    Mode:Master
                    Frequency:2.462 GHz (Channel 11)
                    Encryption key:on
                    Bit Rates:72 Mb/s
                    Extra:rsn_ie=30140100000fac040100000fac040100000fac020c00
                    IE: IEEE 802.11i/WPA2 Version 1
                        Group Cipher : CCMP
                        Pairwise Ciphers (1) : CCMP
                        Authentication Suites (1) : PSK
                    Quality=84/100  Signal level=49/100
                    Extra:fm=0003
          Cell 02 - Address: B4:F1:8C:6D:D1:24
                    ESSID:"Boardcon"
                    Protocol:IEEE 802.11bgn
                    Mode:Master
                    Frequency:2.462 GHz (Channel 11)
                    Encryption key:on
                    Bit Rates:780 Mb/s
                    Extra:wpa_ie=dd1a0050f20101000050f20202000050f2040050f20201000050f202
```

Step 3: Connect to the WiFi hotspot.

Execute the following command:

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

```
root@compact3566-buildroot:/# wifi-connect.sh Boardcon Boardcon43435656
connect to WiFi ssid: Boardcon, Passwd: Boardcon43435656
Successfully initialized wpa_supplicant
rfkill: Cannot open RFKILL control device
root@compact3566-buildroot:/# [ 2687.333572] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
```

Step 4: Check the network interface status.

Execute the following command:

```
# ifconfig
```

```
root@compact3566-buildroot:/# ifconfig
wlan0     Link encap:Ethernet  HWaddr 78:22:88:D9:62:C7
          inet addr:192.168.0.93  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::f4a6:aca3:f8c2:1278/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:66 errors:0 dropped:11 overruns:0 frame:0
          TX packets:19 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:8721 (8.5 KiB)  TX bytes:2954 (2.8 KiB)
```

Step 5: Test the WiFi network connection.

Execute the following command:

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

```
root@compact3566-buildroot:/# ping -I wlan0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (13.32.99.68) from 192.168.0.93 wlan0: 56(84) bytes of data.
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=1 ttl=246 time=216 ms
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=2 ttl=246 time=210 ms
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=3 ttl=246 time=224 ms
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=4 ttl=246 time=268 ms
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=5 ttl=246 time=218 ms
64 bytes from server-13-32-99-68.fra60.r.cloudfront.net (13.32.99.68): icmp_seq=6 ttl=246 time=210 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 9316ms
rtt min/avg/max/mdev = 209.557/224.339/267.601/19.935 ms
```

7.11.2 Bluetooth

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

Step 1: Set the Bluetooth adapter to discoverable mode.

Execute the following command:

```
# hciconfig hci0 piscan
```

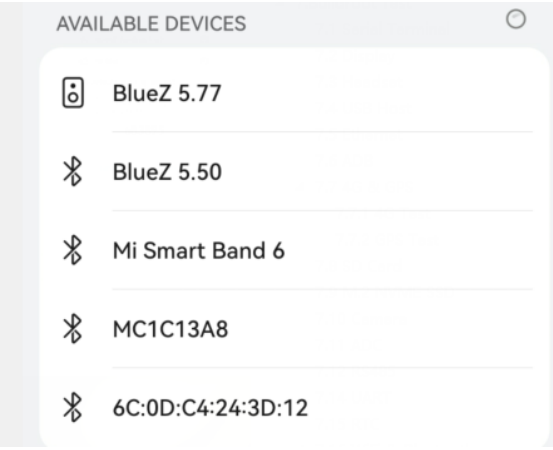
Step 2: Configure and control the Bluetooth device.

Execute the following command:

```
# bluetoothctl
```

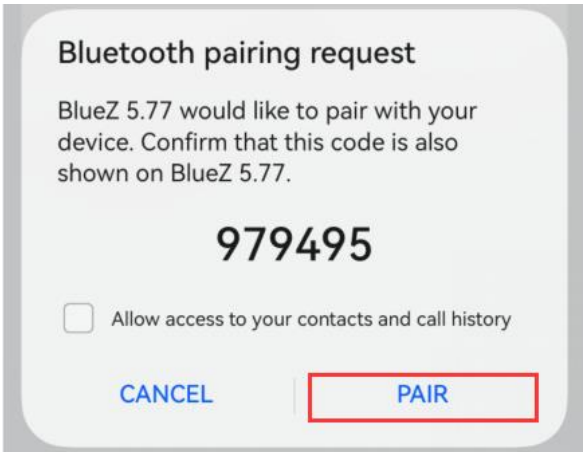
```
root@compact3566-buildroot:/# hciconfig hci0 piscan
[ 3156.141885] Bluetooth: hu 0000000070a8bb21 retransmitting 1 pkts
root@compact3566-buildroot:/# bluetoothctl
hci0 new_settings: powered connectable discoverable bondable ssp br/edr le secure-conn
Agent registered
[CHG] Controller 78:22:88:D9:62:C8 Pairable: yes
[bluetooth]#
```

Step 3: On the phone, find the Bluetooth speaker device named "**BlueZ 5.77**", then tap it to connect.



Step 4: Confirm the pairing request on both the phone and the Bluetooth speaker.

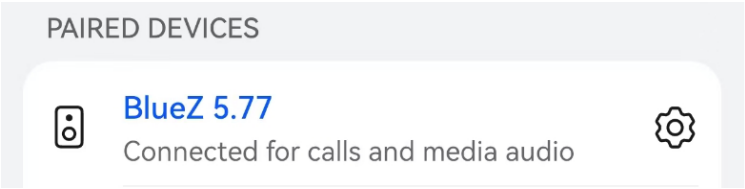
Phone:



Bluetooth speaker:

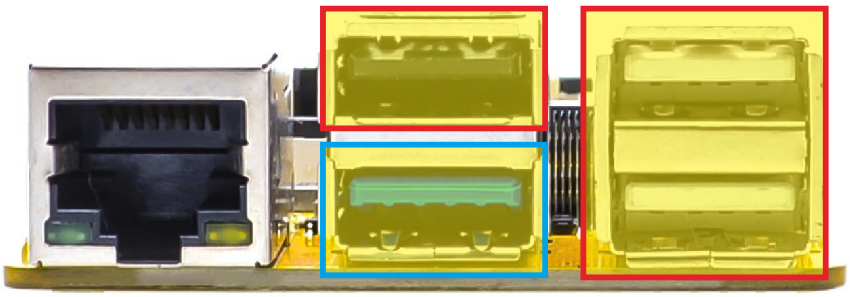
```
 [bluetooth]# [ 3214.109159] rtk_btcoex: hci accept conn req
[ 3214.304575] rtk_btcoex: connected, handle 0002, status 0x00
[ 3214.304666] rtk_btcoex: Page success
[ 3214.335967] rtk_btcoex: io capability request
hci0 A8:35:12:9A:EB:4D type BR/EDR connected eir_len 11
[NEW] Device A8:35:12:9A:EB:4D liuy
Request confirmation
[agent] Confirm passkey 545009 (yes/no): yes
[liuy]# [ 3217.991474] rtk_btcoex: link key notify
hci0 new_link_key A8:35:12:9A:EB:4D type 0x05 pin_len 0 store_hint 1
hci0 device_flags_changed: A8:35:12:9A:EB:4D (BR/EDR)
     supp: 0x00000000  curr: 0x00000000
[CHG] Device A8:35:12:9A:EB:4D INFO: 0x0007 (7)
[CHG] Device A8:35:12:9A:EB:4D Bonded: yes
[liuy]# [ 3218.019499] rtk_btcoex: l2cap op 2, len 16, out 0
[CHG] Device A8:35:12:9A:EB:4D UUIDs: 9664aa26-d76c-43ad-9775-d310f253a408
[CHG] Device A8:35:12:9A:EB:4D UUIDs: c574edb3-6551-473b-bad8-65035f07e4a8
[CHG] Device A8:35:12:9A:EB:4D ServicesResolved: yes
[CHG] Device A8:35:12:9A:EB:4D INFO: 0x000f (15)
[CHG] Device A8:35:12:9A:EB:4D Paired: yes
Authorize service
[agent] Authorize service 0000110d-0000-1000-8000-00805f9b34fb (yes/no): yes
[liuy]# [ 3220.549798] rtk_btcoex: l2cap op 3, len 20, out 1
[liuy]# [ 3220.743265] rtk_btcoex: l2cap op 2, len 16, out 0
[liuy]# [ 3220.934484] rtk_btcoex: l2cap op 6, len 16, out 1
[liuy]# W: [pulseaudio] module-loopback.c: Configured latency of 200.00 ms is smaller than minimum
Authorize service
[agent] Authorize service 00001108-0000-1000-8000-00805f9b34fb (yes/no): yes
[liuy]#
```

Step 5: After pairing is confirmed, the Bluetooth connection is established successfully.



7.12 USB 4G

Step 1: Connect the USB 4G module to the USB Host interface.



After the USB 4G module is successfully recognized, the corresponding "ttyUSB" device nodes will be generated.

Execute the following command to check the device nodes:

```
# ls /dev/ttyUSB*
```

```
root@compact3566-buildroot:/# [  802.924230] usb 3-1: new high-speed USB device number 3 using ehci-platform
[  803.085186] usb 3-1: New USB device found, idVendor=2ecc, idProduct=3001, bcdDevice= 0.00
[  803.085233] usb 3-1: New USB device strings: Mfr=3, Product=2, SerialNumber=0
[  803.085249] usb 3-1: Product: WUKONG
[  803.085260] usb 3-1: Manufacturer: MARVELL
[  803.565561] usb 3-1: USB disconnect, device number 3
[  811.584221] usb 3-1: new high-speed USB device number 4 using ehci-platform
[  811.742405] usb 3-1: New USB device found, idVendor=2c7c, idProduct=6005, bcdDevice= 3.18
[  811.742500] usb 3-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[  811.742537] usb 3-1: Product: Android
[  811.742567] usb 3-1: Manufacturer: Android
[  811.742595] usb 3-1: SerialNumber: 0000
[  811.746915] option 3-1:1.2: GSM modem (1-port) converter detected
[  811.748229] usb 3-1: GSM modem (1-port) converter now attached to ttyUSB0
[  811.749924] option 3-1:1.3: GSM modem (1-port) converter detected
[  811.750235] usb 3-1: GSM modem (1-port) converter now attached to ttyUSB1
[  811.751415] option 3-1:1.4: GSM modem (1-port) converter detected
[  811.751731] usb 3-1: GSM modem (1-port) converter now attached to ttyUSB2

root@compact3566-buildroot:/#
root@compact3566-buildroot:/# ls /dev/ttyUSB*
/dev/ttyUSB0  /dev/ttyUSB1  /dev/ttyUSB2
```

Step 2: Execute the following commands to start the PPP connection:

```
# mkdir -p var/run/pppd/lock
# sed -i 's#/dev/ttyUSB3#/dev/ttyUSB2#g' /etc/ppp/peers/quectel-ppp
# pppd call quectel-ppp &
```

```
root@compact3566-buildroot:/#  mkdir -p var/run/pppd/lock
root@compact3566-buildroot:/#
ers/quectel-ppp6-buildroot:/# sed -i 's#/dev/ttyUSB3#/dev/ttyUSB2#g' /etc/ppp/pee
root@compact3566-buildroot:/#
root@compact3566-buildroot:/# pppd call quectel-ppp &
[1] 2616
root@compact3566-buildroot:/# pppd options in effect:
debug           # (from /etc/ppp/peers/quectel-ppp)
nodetach              # (from /etc/ppp/peers/quectel-ppp)
dump            # (from /etc/ppp/peers/quectel-ppp)
noauth          # (from /etc/ppp/peers/quectel-ppp)
user test             # (from /etc/ppp/peers/quectel-ppp)
password ??????         # (from /etc/ppp/peers/quectel-ppp)
remotename 3gppp              # (from /etc/ppp/peers/quectel-ppp)
/dev/ttyUSB2           # (from /etc/ppp/peers/quectel-ppp)
115200          # (from /etc/ppp/peers/quectel-ppp)
lock            # (from /etc/ppp/peers/quectel-ppp)
connect chat -s -v -f /etc/ppp/peers/quectel-chat-connect             # (from /etc/ppp/peers/quectel-ppp)
disconnect chat -s -v -f /etc/ppp/peers/quectel-chat-disconnect        # (from /etc/ppp/peers/quectel-ppp)
nocrtscts             # (from /etc/ppp/peers/quectel-ppp)
modem           # (from /etc/ppp/peers/quectel-ppp)
hide-password          # (from /etc/ppp/peers/quectel-ppp)
novj            # (from /etc/ppp/peers/quectel-ppp)
novjccomp             # (from /etc/ppp/peers/quectel-ppp)
ipcp-accept-local             # (from /etc/ppp/peers/quectel-ppp)
ipcp-accept-remote            # (from /etc/ppp/peers/quectel-ppp)
ipparam 3gppp          # (from /etc/ppp/peers/quectel-ppp)
noipdefault            # (from /etc/ppp/peers/quectel-ppp)
ipcp-max-failure 30           # (from /etc/ppp/peers/quectel-ppp)
defaultroute           # (from /etc/ppp/peers/quectel-ppp)
usepeerdns             # (from /etc/ppp/peers/quectel-ppp)
noccp           # (from /etc/ppp/peers/quectel-ppp)
abort on (BUSY)
abort on (NO CARRIER)
abort on (NO DIALTONE)
abort on (ERROR)
abort on (NO ANSWER)
timeout set to 30 seconds
send (AT^M)
expect (OK)
AT^M^M
OK
 -- got it

send (ATE0^M)
expect (OK)
^M
ATE0^M^M
OK
 -- got it

send (ATI;+CSUB;+CSQ;+CPIN?;+COPS?;+CGREG?;&D2^M)
expect (OK)
^M
^M
Quectel^M
EC200A^M
Revision: EC200AEUHAR01A13M16^M
^M
SubEdition: V02^M
^M
+CSQ: 31,99^M
^M
+CGREG: 0,1^M
^M
+CPIN: READY^M
^M
+COPS: 0,0,"CHN-UNICOM",7^M
^M
OK
 -- got it

send (AT+CGDCONT=1,"IP","3gnet",,0,0^M)
expect (OK)
^M
^M
OK
 -- got it

send (ATD*99#^M)
expect (CONNECT)
^M
^M
```

Step 3: Check the network interface status.

Execute the following command:

```
# ifconfig
```

```
root@compact3566-buildroot:/# ifconfig
ppp0      Link encap:Point-to-Point Protocol
          inet addr:10.224.144.1  P-t-P:10.64.64.64  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:5 errors:0 dropped:0 overruns:0 frame:0
          TX packets:15 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:66 (66.0 B)  TX bytes:112 (112.0 B)
```

Step 4: Test the PPP connection.

Execute the following command:

```
# ping -I ppp0 www.armdesigner.com
```

```
root@compact3566-buildroot:/# ping -I ppp0 www.armdesigner.com
PING d3dsoj86mhwkk6.cloudfront.net (13.35.202.93) from 10.224.144.1 ppp0: 56(84) bytes of data.
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=1 ttl=244 time=76.3 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=2 ttl=244 time=76.2 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=3 ttl=244 time=66.5 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=4 ttl=244 time=72.4 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=5 ttl=244 time=67.7 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=6 ttl=244 time=79.4 ms
64 bytes from server-13-35-202-93.sin2.r.cloudfront.net (13.35.202.93): icmp_seq=7 ttl=244 time=72.4 ms
^C
--- d3dsoj86mhwkk6.cloudfront.net ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6010ms
rtt min/avg/max/mdev = 66.453/72.962/79.399/4.374 ms
```

7.13 Video Playback

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

Execute the following command:

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

```
root@compact3566-buildroot:/# /rockchip-test/video/test_gst_video.sh
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...
Redistribute latency...
mpp[3004]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3004]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3004]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3004]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[3004]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3004]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
Redistribute latency...
mpp[3004]: h264d_api: is_avcC=1
Pipeline is PREROLLED ...
Prerolled, waiting for async message to finish...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
Redistribute latency...
[19:53:31.550] seeing the first app
0:00:03.1 / 0:00:29.5 (10.5 %)
```

(2) Video Playback Using Chromium Browser.

Chromium Browser supports video playback up to 4K resolution. The supported video decoding formats include VP8, H.264, H.265, VP9, and AV1.

Note: Chromium Browser may not be compatible with all H.265 video files.

Execute the following command to play the video using Google Chrome:

```
# chromium /mnt/udisk/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4
```

```
U-DU_DDU-DU.mp46-buildroot:/# chromium /mnt/udisk/video/4KP30/4K30P-BLACKPINK-DDU
[3238:3257:0514/195451.653676:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.654635:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.654832:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.654981:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.655129:ERROR:object_proxy.cc(576)]       Failed       to       call       method:
org.freedesktop.DBus.NameHasOwner: object_path= /org/freedesktop/DBus: unknown error type:
[3238:3257:0514/195451.690948:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.761086:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3257:0514/195451.761273:ERROR:object_proxy.cc(576)]       Failed       to       call       method:
org.freedesktop.DBus.NameHasOwner: object_path= /org/freedesktop/DBus: unknown error type:

(process:3238): GLib-GIO-CRITICAL **: 19:54:51.830: g_settings_schema_source_lookup: assertion 'source !=
NULL' failed
[3238:3253:0514/195451.831360:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3253:0514/195451.831518:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
[3238:3238:0514/195452.047553:ERROR:object_proxy.cc(576)]       Failed       to       call       method:
org.freedesktop.DBus.NameHasOwner: object_path= /org/freedesktop/DBus: unknown error type:
[3238:3238:0514/195452.073392:ERROR:object_proxy.cc(576)]       Failed       to       call       method:
org.freedesktop.DBus.NameHasOwner: object_path= /org/freedesktop/DBus: unknown error type:
[3238:3238:0514/195452.073642:ERROR:object_proxy.cc(576)]       Failed       to       call       method:
org.freedesktop.DBus.NameHasOwner: object_path= /org/freedesktop/DBus: unknown error type:
[3238:3253:0514/195452.073970:ERROR:bus.cc(407)] Failed to connect to the bus: Could not parse server
address: Unknown address type (examples of valid types are "tcp" and on UNIX "unix")
```

Command explanation:

- chromium: Launches the Chromium browser.
- /mnt/udisk/video/4KP30/4K30P-BLACKPINK-DDU-DU_DDU-DU.mp4: The media file path to be played.

(3) Use the gst-play-1.0 command to play the video.

Execute the following commands:

```
# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
# gst-play-1.0 --videosink="waylandsink fullscreen=true"
/mnt/udisk/video/4KP60/4KP60-exist.mp4 --audiosink="alsasink device=hw:0,0"
```

```
root@compact3566-buildroot:/#
root@compact3566-buildroot:/# export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1
rue" /mnt/udisk/video/4KP60/4KP60-exist.mp4 --audiosink="alsasink device=hw:0,0"
Press 'k' to see a list of keyboard shortcuts.audiosink="alsasink device=hw:0,0"
Now playing /mnt/udisk/video/4KP60/4KP60-exist.mp4
Redistribute latency...
Redistribute latency...
mpp[3597]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3597]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3597]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3597]: mpp: unable to create enc vp8 for soc rk3566 unsupported
mpp[3597]: mpp_info: mpp version: 958803d7 author: Herman Chen   2026-02-26 fix[h265d_rkv]: Fix rkv ref and
poc setup overflow
mpp[3597]: 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[3597]: h264d_api: is_avcC=1
Redistribute latency...
0:00:03.3 / 0:04:01.9
```

Command explanation:

- export GST_MPP_VIDEODEC_DEFAULT_ARM_AFBC=1: Open AFBC.
- /mnt/udisk/video/4KP60/4KP60-exist.mp4: The media file path to be played.
- --audiosink="alsasink device=hw:0,0": Specifies the audio output device as hw:0,0.