Rockchip RV1106/RV1103 EVB User Guide

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Preface

Overview

This document is going to introduce the usage of each peripheral of RV1106 EVB, aiming to verify the peripheral functions and ensure them to perform normally.

Product Version

Chipset	Kernel Version
RV1106/RV1103	Linux 5.10

Intended Audience

This document (this guide) is mainly intended for:

Technical support engineers

Software development engineers

Version	Author	Date	Change Description
V0.0.1	GZC	2022-04-18	Initial version
V1.0.0	GZC	2022-05-19	Update RTC and image details
V1.1.0	CWW	2023-02-01	Add RV1106G_EVB1_V11 and RV1103G_EVB_V11

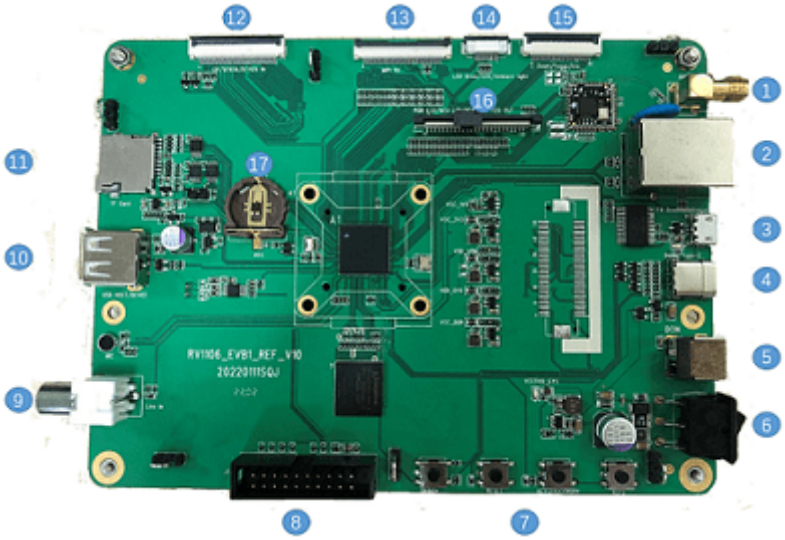
Contents

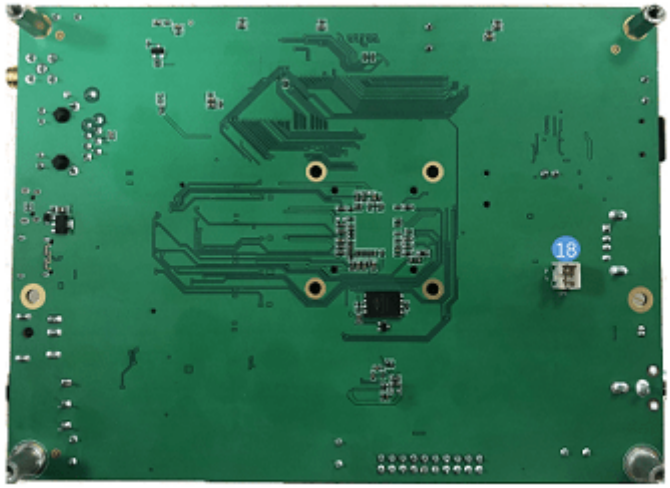
1. Hardware Introduction

1.1 Interfaces Overview

1.1.1 RV1106_EVB1_REF_V10

The hardware layout of the RV1106 EVB is showed as follows. (The hardware layout of the RV1103 EVB differs at numbers 1/8/9.)





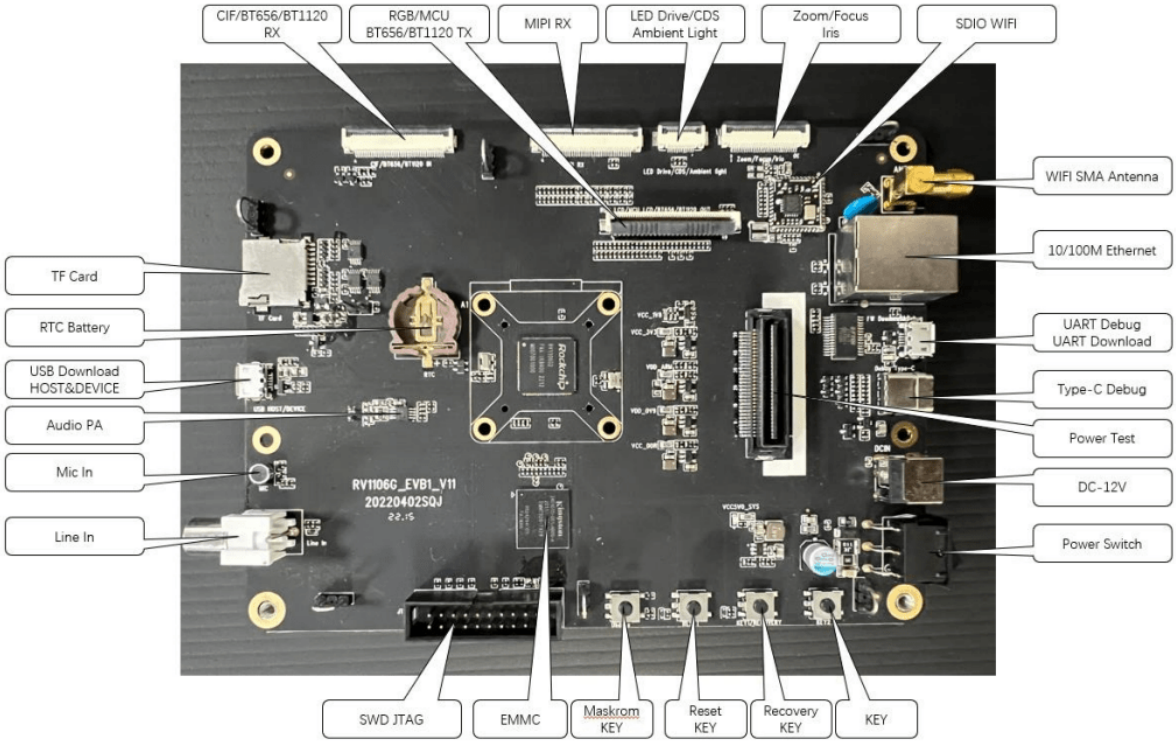
1.1.1.1 Interface Functions

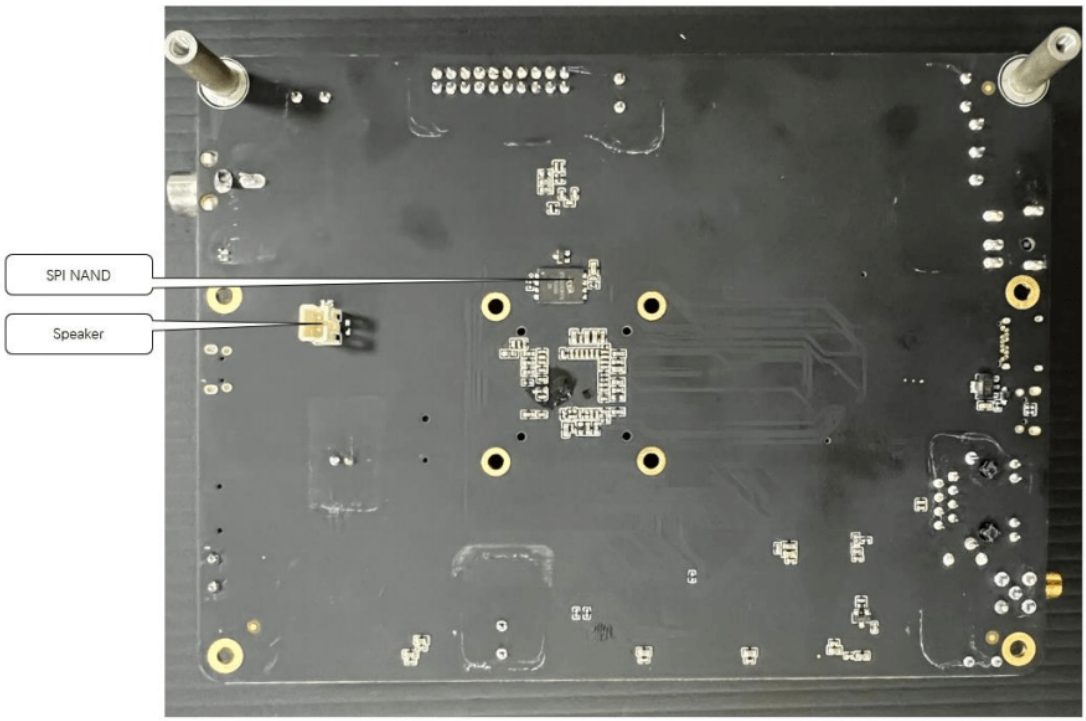
NO.	Name	Function
1	ANT	Antenna input connector
2	Ethernet	Ethernet interface
3	FW Download & Debug	Serial port for firmware burning and debugging
4	Debug Type-C	Chip Verification
5	DCIN	DC adapter input 12V power supply
6	The boat switch	The boat switch
7	Key board	Keyboard (Update/Reset/Recovery)
8	JTAG	Chip verification and debugging
9	Line In	Audio In (Wired)
10	USB HOST/DEVICE	Identify USB devices; powered by USB
11	TF Card	TF Card Interface
12	CIF /BT656 /BT1120 IN	CIF camera input
13	MIPI RX	MIPI camera Input
14	LED Drive/CDS/Ambient light	Connect to LED-sub board to provide drive, CDS and ambient light
15	Zoom/Focus/Iris	Zoom/Focus/Iris connectors are reserved on EVB board, which is convenient for customers to debug and develop camera devices
16	RGB LCD/MCU LCD/BT656/BT1120 OUT	Support RGB serial/parallel output, MCU serial output, BT656/1120 output
17	RTC	RTC clock is powered by battery
18	SPK	Audio Output

1.1.2 RV1106G_EVB1_V11 and RV1103G_EVB_V11

The hardware layout of the RV1106G_EVB1_V11 is showed as follows. (The hardware layout of the RV1103 EVB differs at numbers 1/8/9.)

Note: There is no "Line in" in the the hardware layout of the RV1103G_EVB_V11.The USB interface is used for Wi-Fi by default (Please use the serial port to download firmware).





1.2 Power-on

It can be powered via USB or a power supply.

It is recommended to use a power supply first. Only using USB power supply is unstable, and plugging and unplugging USB may affect the usage of the serial port.

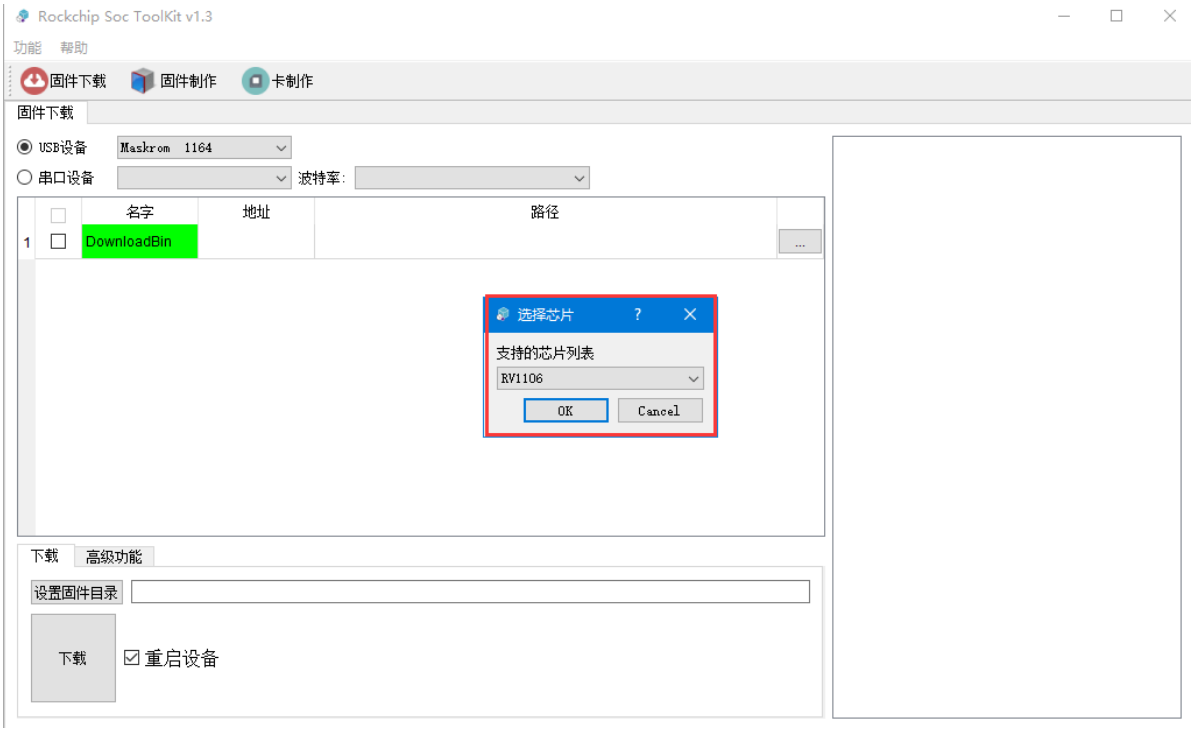
1.3 Firmware Flashing

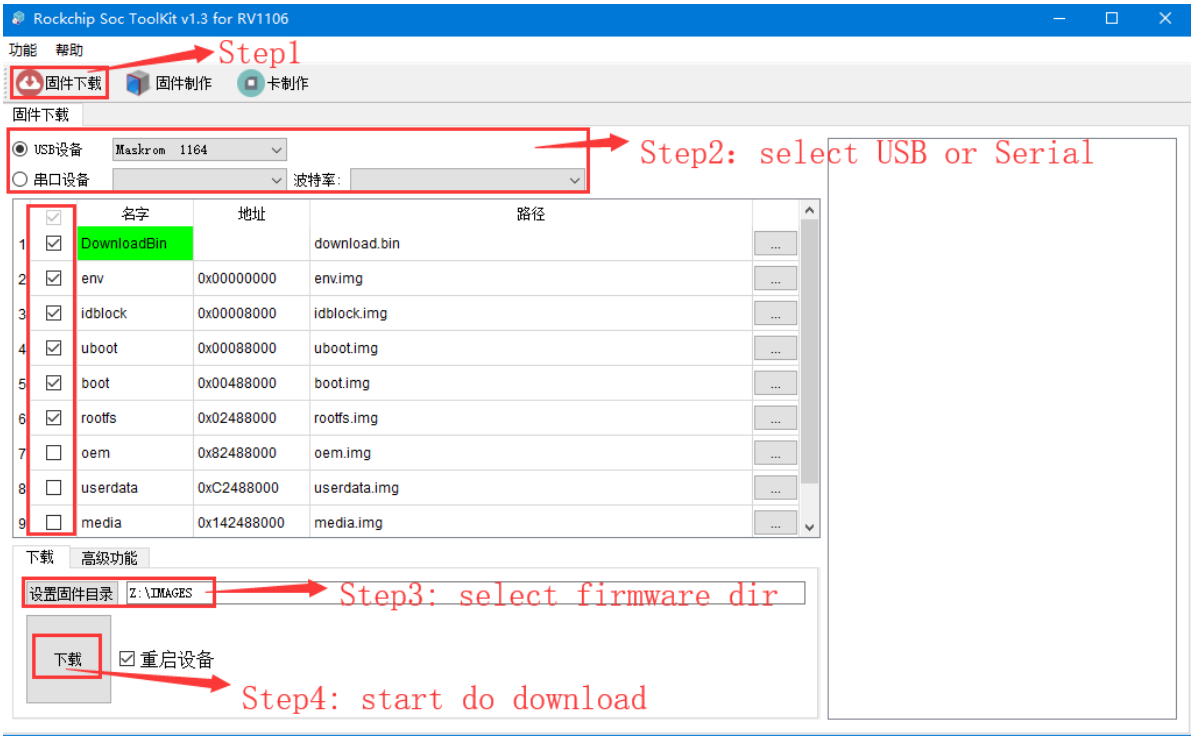
1.3.1 By USB or Serial Port

This method uses the Windows flashing tool SocToolKit provided in the SDK. It should be connected to the serial port and USB, the baud rate of the serial port should be set to 115200 (the baud rate of serial port of the fast-boot firmware should be set to 1500000), and input the reboot loader command to enter the maskrom mode.

If the device cannot enter maskrom mode through the reboot loader command, you can press and hold the Update button on the board, then power on or press the RESET button to enter maskrom mode.

SocToolKit is located in the project root directory `<SDK>/Tools/windows/SocToolKit/SocToolKit.exe`. The usage method is shown in the following figure:





1.3.2 Flashing Firmware in a U-Boot Terminal by tftp

The tftp upgrade file will be built with the firmware in the `<SDK>/output/image/` directory, the file name is `tftp_update.txt`, the usage is showed as follows:

- Configure tftp server
- Put the upgrade file `tftp_update.txt` and all firmware with the extension `.img` into the directory specified by the server

(Note: currently, SLC NAND does not support upgrading the `idblock` partition by downloading firmware.)

- Set IP address in U-Boot terminal

```
=> setenv ipaddr 192.168.1.111
=> setenv serverip 192.168.1.100
=> saveenv
Saving Environment to envf...
=>
```

The above IP addresses are for reference only, please set them according to the actual situation to ensure that the client and the server are in the same network segment.

- Run the upgrade command `tftp_update` in the U-Boot terminal

```
=>  tftp_update
ethernet@ffc40000 Waiting for PHY auto negotiation to complete. done
Using ethernet@ffc40000 device
TFTP from server 192.168.1.100; our IP address is 192.168.1.111
Filename 'tftp_update.txt'.
Load address: 0x3be24c00
Loading: *•#
     203.1 KiB/s
done
Bytes transferred = 1250 (4e2 hex)
...
```

1.3.3 Burn Firmware in U-Boot Terminal by an SD Card

The SD card update file will be built with the firmware in the `<SDK>/output/image/` directory, the file name is `sd_update.txt`, the usage is as follows:

- Put the upgrade file `sd_update.txt` and all firmware with the extension `.img` into the root directory of the SD card

(Note: 1. currently, SLC NAND does not support upgrading `idblock` partition by downloading firmware; 2. SD card only supports FAT format file system.)

- Insert an SD card to the device
- Run the upgrade command `sd_update` in the U-Boot terminal

```
=> sd_update
PartType: ENV
reading sd_update.txt
1511 bytes read in 2 ms (737.3 KiB/s)
...
```

1.4 Keys

Keys	Function
Update	Flashing and upgrade
RESET	Restart the device
RECOVERY	Enter the recovery mode (Currently, this function is not supported)

2. LAN Preview (RTSP)

2.1 Video Preview

The device supports previewing in the same local area network. After the device is connected to the Internet, use RTSP software on the PC (such as VLC) to open the network stream, and enter the following address:

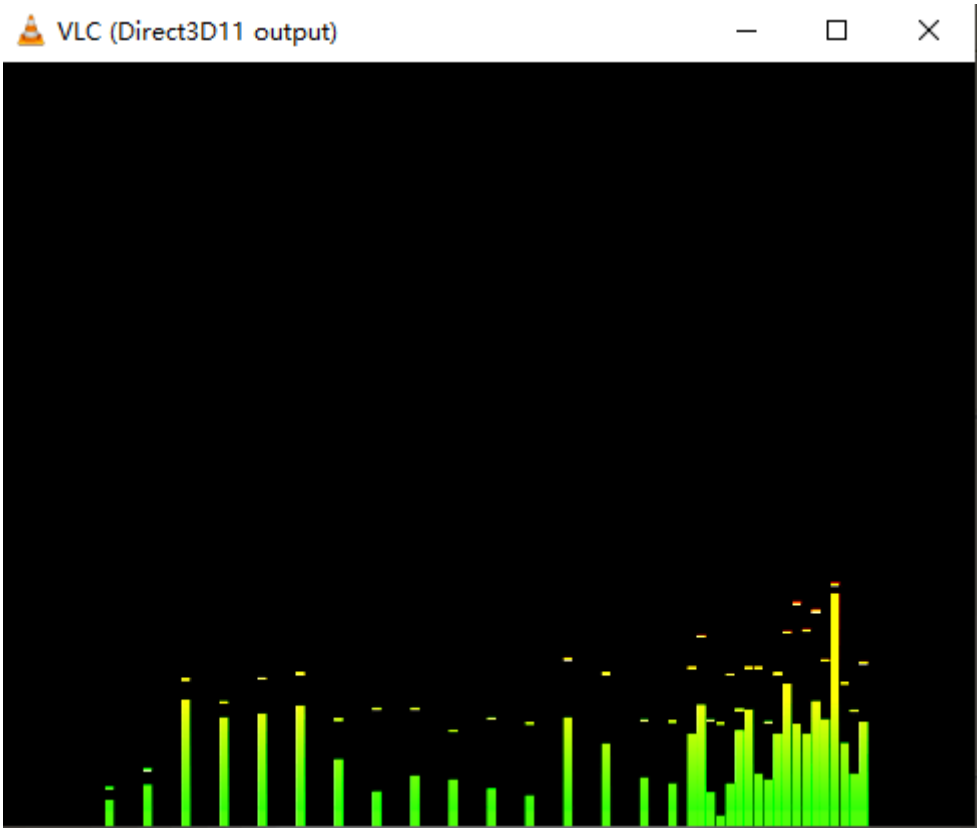
```
rtsp://(your device's IP address)/live/0
```

You will see the preview of the camera:

2.2 Audio (MIC) Testing

Accessing RTSP Stream Preview through the PC, you can get the audio at the same time. The audio can be played to the speaker directly, or can be detected by using the visual audio that comes with the software. The way to see audio spectrum is as follows:

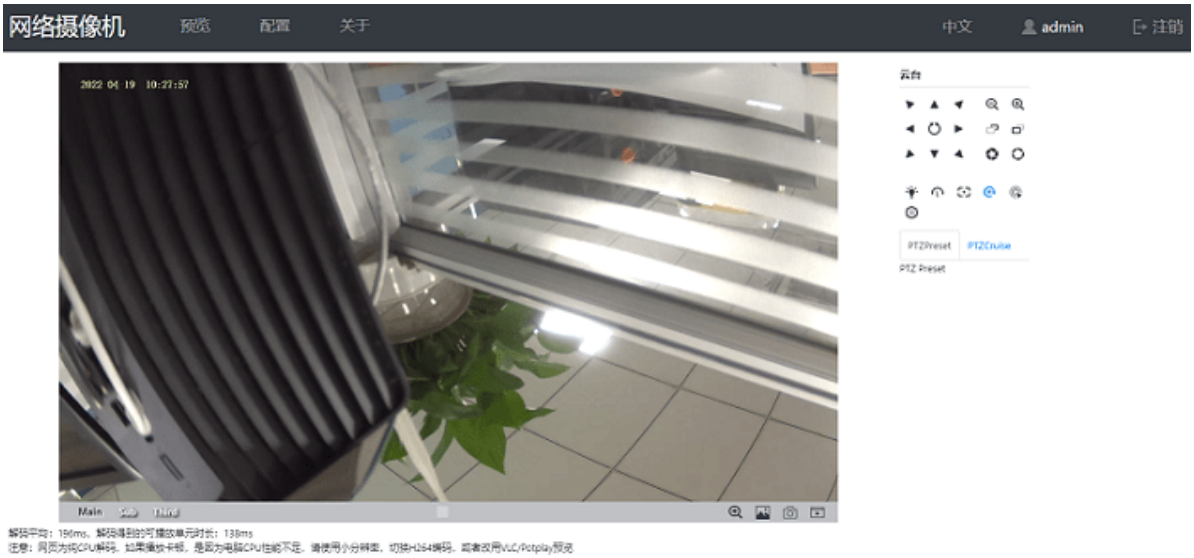
The spectrum effect is as follows:



3. Web Live (RTMP)

The main stream, sub-stream, and H264/H265 supports live broadcasting on the Web side. Access the IP address of the device through a browser, enter the user name and password (both are admin by default), and enter the live preview system.

The preview effect is as follows:



4. Wi-Fi

The Wi-Fi function is not enabled by default, and the following configurations are required when you want to use it:

```
cd /oem/usr/ko/
./insmod_wifi.sh
```

When `RTW: module init ret=0` appears in the log, the configuration is successful, and then enter the Wi-Fi SSID and password:

```
wifi_start.sh <SSID> <password>
```

After running successfully, you will get wlan0 in `ifconfig`:

```
# ifconfig
eth0      Link encap:Ethernet  HWaddr DA:54:55:F7:10:18
          inet addr:192.168.1.169  Bcast:255.255.255.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:58 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:6852 (6.6 KiB)  TX bytes:2052 (2.0 KiB)
          Interrupt:45

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:356100 errors:0 dropped:0 overruns:0 frame:0
          TX packets:356100 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:106376267 (101.4 MiB)  TX bytes:106376267 (101.4 MiB)

wlan0     Link encap:Ethernet  HWaddr F0:B0:40:69:53:17
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:375 errors:0 dropped:325 overruns:0 frame:0
          TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:107823 (105.2 KiB)  TX bytes:288 (288.0 B)
```

Get network IP:

```
udhcpc -i wlan0
```

Finally, get the network information:

```
wlan0     Link encap:Ethernet  HWaddr F0:B0:40:69:53:17
          inet addr:192.168.1.155  Bcast:255.255.255.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:506 errors:0 dropped:419 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:141895 (138.5 KiB)  TX bytes:1028 (1.0 KiB)
```

Testing:

```
# ping www.baidu.com
PING www.baidu.com (163.177.151.109): 56 data bytes
64 bytes from 163.177.151.109: seq=0 ttl=54 time=25.981 ms
64 bytes from 163.177.151.109: seq=1 ttl=54 time=26.812 ms
64 bytes from 163.177.151.109: seq=2 ttl=54 time=50.451 ms
64 bytes from 163.177.151.109: seq=3 ttl=54 time=56.411 ms
^C
--- www.baidu.com ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 25.981/39.913/56.411 ms
```

5. RTC

Currently, only RV1106 supports RTC. The RTC needs to be installed with a battery to keep the clock unchanged after the power is powered on. (The battery models such as CR1220.)

Here are some ways to use RTC:

To check the RTC information:

```
hwclock
```

```
# hwclock
Fri Jan  1 12:52:21 2021  0.000000 seconds
```

Synchronize the system clock by RTC:

```
hwclock -s
```

```
# date
Fri Jan  1 00:00:45 UTC 2021
# hwclock -r
Tue Apr 19 15:16:14 2022  0.000000 seconds
# hwclock -s
# date
Tue Apr 19 15:16:30 UTC 2022
# hwclock -r
Tue Apr 19 15:16:35 2022  0.000000 seconds
```

Synchronize RTC by the system clock:

```
hwclock -w
```

```
# date
Tue Apr 19 15:20:04 UTC 2022
# hwclock -r
Fri Jan  1 00:00:40 2021  0.000000 seconds
# hwclock -w
# date
Tue Apr 19 15:20:14 UTC 2022
# hwclock -r
Tue Apr 19 15:20:17 2022  0.000000 seconds
#
```

6. TF Card

After inserting a TF card and power on, the TF card will be automatically mounted to `/mnt/sdcard`.

```
/dev/mmcblk1 on /mnt/sdcard type vfat (rw,noatime,uid=1000,
```

To save the video to TF card, the application configuration file `rkipc.ini` should be modified, enable the storage module and mount path.

```
vi /data/rkipc.ini
```

Take the `/mnt/sdcard` mount path as an example, modifications are shown below:

```
[storage]
mount_path                      = /mnt/sdcard
free_size_del_min               = 500
free_size_del_max               = 1000


[storage.0]
enable                          = 1
folder_name                     = video0
file_format                     = mp4
file_duration                   = 60
video_quota                     = 30
```

Reboot the device, videos will be written to `/mnt/sdcard/video0`.