

SBC3800

Quick Start Guide

Release Notes

Version	Release Date	Notes
1.0	Jan 2023	Initial release

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1. Precautions

1.1 Safety Precautions

- In order to use this product safely, please take special note of the following precautions.
- Read all product manuals and related documentation before using this product. Use this product correctly and safely. Follow all warnings.
- If operating or extending this product in a manner not described in this manual, please do so at your own risk. Be sure to fully read this manual and other technical information on our website and proceed safely and responsibly.
- Do not install this product in a place with a lot of water, moisture, dust or soot. This could cause product failure, fire, or an electric shock.
- Some parts of this product generate heat and can reach high temperatures. This may cause burns if it is improperly handled. Do not touch the electronic components or surrounding area while powered on or immediately after being turned off.
- Carry out any design and development only after you have thoroughly read and understood this manual and any other related technical materials on the website or in the data sheets. Test your product thoroughly for reliability and safety.
- This product is not intended for applications that require extremely high reliability, safety, functionality and accuracy: including but not limited to medical equipment, traffic control systems, combustion control systems, and safety equipment. This company is not liable for death or injury if used in such systems.
- This product uses semiconductor components designed for generic electronics equipment such as office automation, communications, measurement equipment and machine tools. Foreign noise or a power surge may cause this product to malfunction or fail.
- To ensure there is no risk of bodily harm or property damage, be sure to take all electrical safety precautions such as protection circuits, limit switches, fuse breakers, or redundant systems. Only use the device after sufficient reliability and safety measures are in place.

1.2 Write Prohibited Regions

Data stored by the EEPROM/NOR is used by the software contained in this product. Do not write to these regions as this may cause the product stop working correctly. Purposely writing to these regions voids the product warranty.

1.3 Warrnty

As described in the Product Warranty Policy provided with this product, the product is covered by a one-year warranty starting from the time of purchase. Please note that the other included goods and software are not covered under this warranty. Some knowledge used in this product is provided by third parties, and we make no representation or warranty as to the accuracy of such information.

2. Overview

2.1 Overview

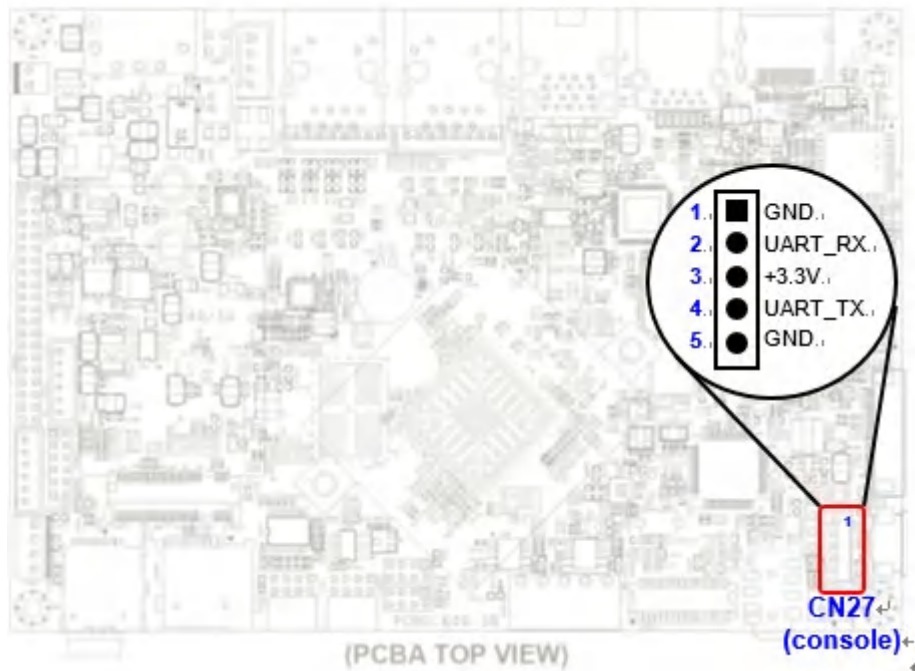
The SBC3800 is a small size (102mmx150mm) single board computer designed for applications such as digital signage, HMI, POS, Gaming, Set top box, Kiosk, and other smart devices. The SBC3800 features a quad-core ARM Cortex-A76 processor plus a quad-core Cortex-A55 processor, 2x 10/100 LAN ports, PoE (Power over Ethernet) and a rich set of interfaces for a wide range of commercial and industrial applications.

Each SBC3800 can be installed in advance with Linux or Android for immediate evaluation.

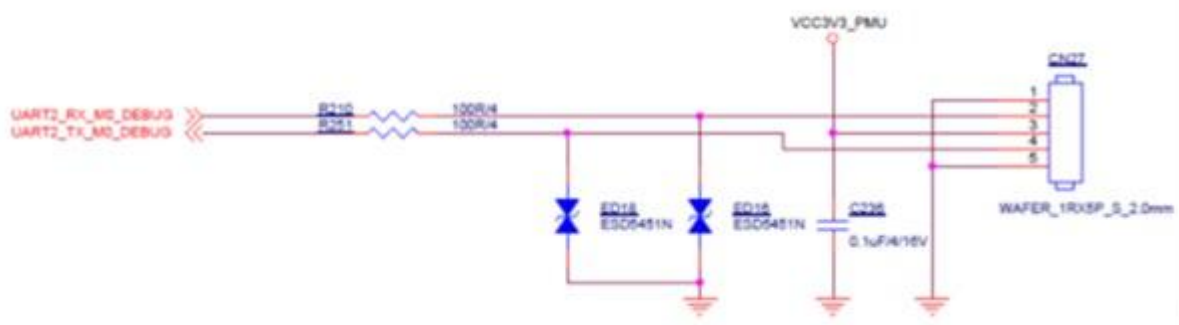
3. Setup

3.1 Console / Debug Port

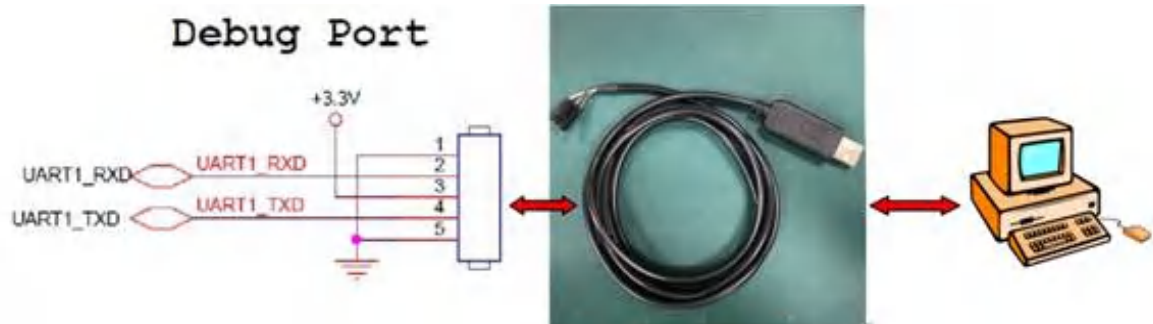
To use the Debug port, please follow the following steps.
You can refer to the Quick Start Guide for more detail.



Console port schematic:



- ① First, connect to debug port and run your hyper terminal program of choice.



- *Make sure you have a USB UART cable. Please note the cable is not included with this product.*

The USB cable comes with four colored terminals. Connect them as shown below.



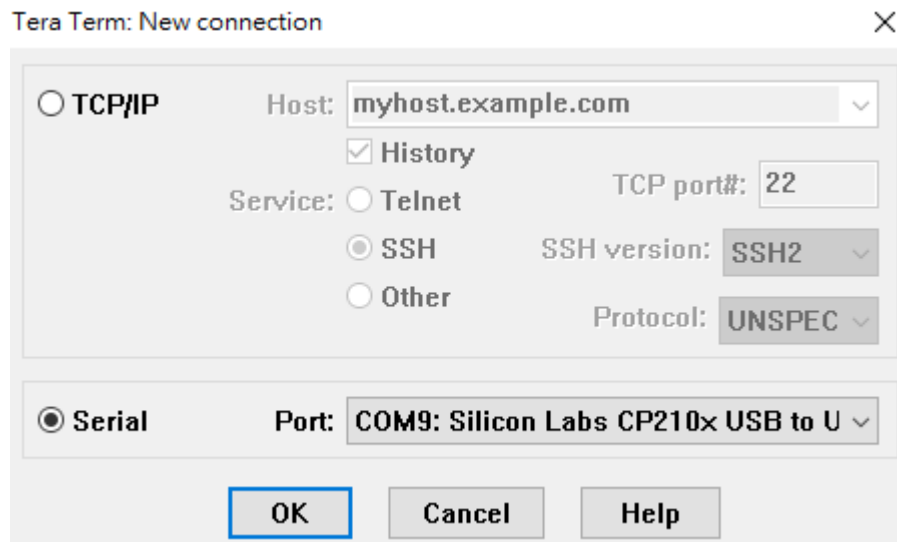
WARNING: Do NOT connect the red cable (VCC) to the board.

USB UART terminal		CN12 pin number
White (TXD)	→	pin 2 (RXD)
Green (RXD)	→	pin 4 (TXD)
Black (GND)	→	Pin 1 (GND) or pin 5 (GND)

② **Connect to PC**

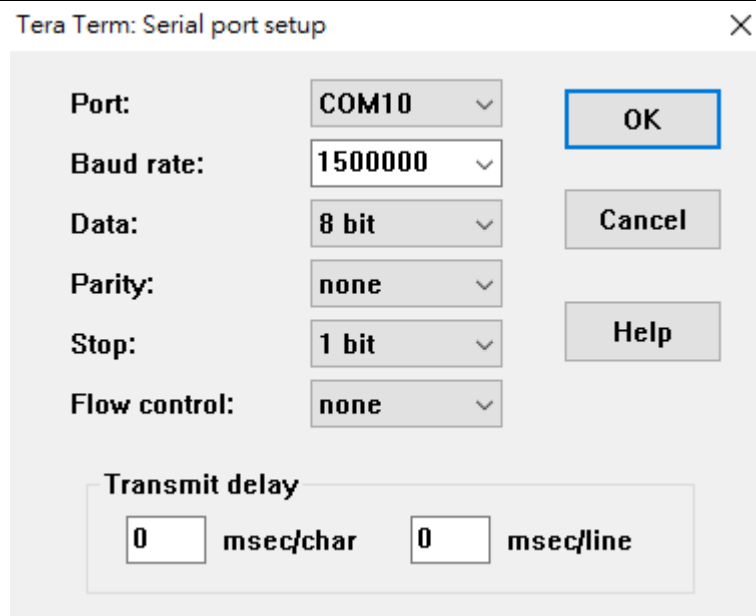
The SBC3300 is based on a Silicon Lab CP210X chip. You may need to download and install the driver if your PC does not support it. Please download the file from here: <https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>.

Run your terminal emulation program of choice (e.g. TeraTerm) and open the Serial/COM port.



If necessary, modify the settings to the following:

Baud Rate 1500000, 8 data bits, no parity, 1 stop bit and no flow control.



If the connection is successful, the console will display “\$” to indicate it is waiting for a command.

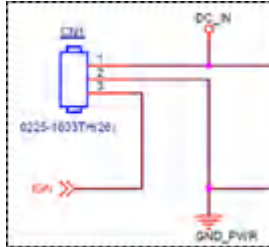
At this point, the device has entered debug mode. Type “su” into the console to enter root mode.

```
console:/ $
console:/ $
console:/ $
console:/ $ su
console:/ #
```

A “#” indicates the system is now in root mode.

3.2 Start Running

12V-24V DC input (3-pin terminal block). Note: Tie pin1 and pin3 together if you do not connect pin3 to "ignition" input. Schematic:



4. Running Software

4.1 Yocto

4.1.1 login

Power on and wait to enter the system, login first type command **root** to be into # (picture below)

```
rockchip-rk3588-evb login: root
root@rockchip-rk3588-evb: ~#
root@rockchip-rk3588-evb: ~#
```

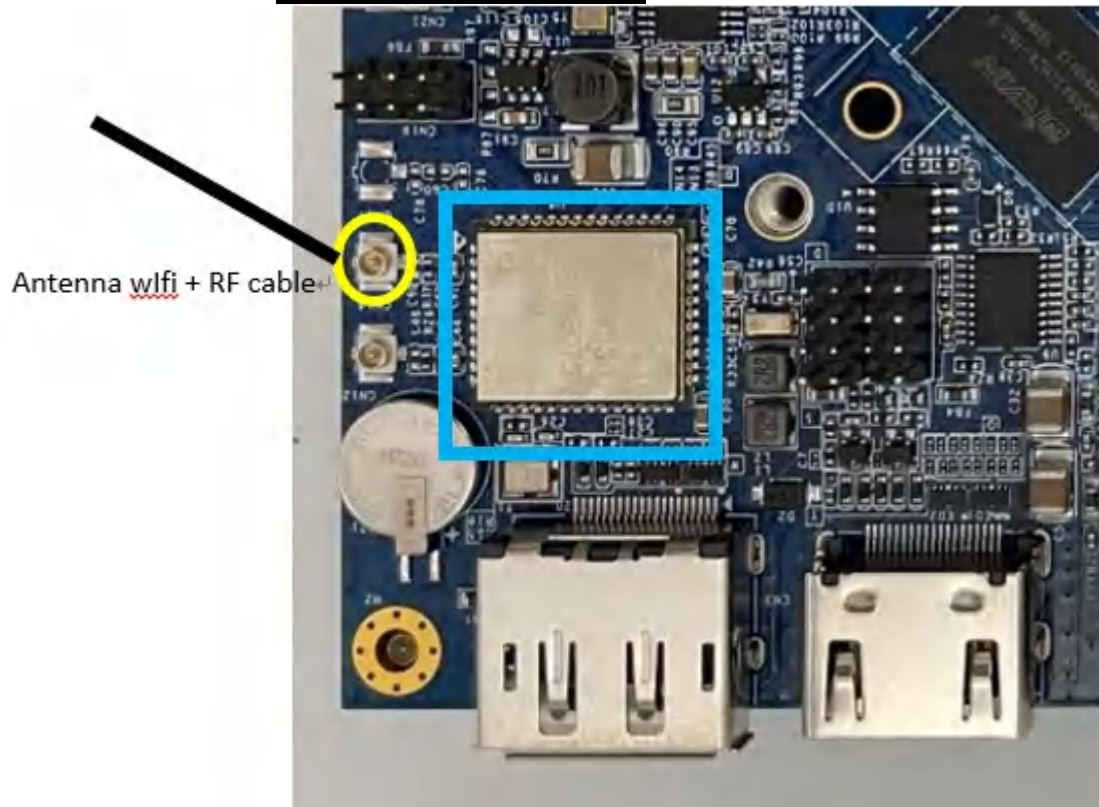
4.1.2 HDMI out (CN2)

At present, you can plug in the HDMI first, and the HDMI monitor will be display after power on.

4.1.3 WiFi/BT test (optional)

The actual location of the WiFi/BT module:

Remember add the Antenna wlfj + RF cable first.



The WiFi test the type command:

```
# iw dev wlan0 scan | grep 'SSID|freq|signal|capability'  
// Search for nearby WiFi ssid devices
```

```

root@rockchip-rk3588-evb:~# iw dev wlan0 scan | grep 'SSID\|freq\|signal\|capability'
[ 162.911672] [dhd] [wlan0] wl_run_escan : LEGACY_SCAN sync ID: 6, bssidx: 0
freq: 2412
capability: ESS Privacy ShortSlotTime (0x0411)
signal: -55.00 dBm
SSID: icnexus
freq: 2457
capability: ESS Privacy ShortPreamble ShortSlotTime (0x0431)
signal: -76.00 dBm
SSID: Macrotec-6F
freq: 2462
capability: ESS Privacy ShortSlotTime APSD (0x0c11)
signal: -58.00 dBm
SSID: Xiaomi_4125
freq: 5745
capability: ESS Privacy (0x0011)
signal: -78.00 dBm
SSID: Galaxy A53 5G631A_Finland
    * center freq segment 1: 155
    * center freq segment 2: 0
freq: 5745
capability: ESS Privacy (0x0011)

```

Actually connect to internet by WiFi test command:

```

# wpa_supplicant -Dnl80211 -iwlan0 -c/etc/wpa_supplicant.conf -B
# ifconfig wlan0 up
# wpa_cli -i wlan0 set_network 0 key_mgmt WPA-PSK
# wpa_cli -i wlan0 set_network 0 ssid "icnexus"
# wpa_cli -i wlan0 set_network 0 psk "i1234567"
# wpa_cli -i wlan0 disable_network 0
# wpa_cli -i wlan0 enable_network 0
# udhcpc -i wlan0

```

The BT test the type command:

```

# hciconfig hci0 up
# hcitool scan

```

```

root@rockchip-rk3588-evb:~# hciconfig hci0 up
root@rockchip-rk3588-evb:~# hcitool scan
Scanning ...
    30:21:5C:33:51:1B          TCS4200A
root@rockchip-rk3588-evb:~# █

```

4.1.4 Speaker/HP

Paste the following commands into the console window and press Enter

```

# mkdir /mnt/USB
# mount /dev/sda1 /mnt/USB
// Fill in the name of the currently plugged USB flash drive in red, which is located
in the blue box below

```

```

228.449897 usb 1-1.1: New USB device found, idVendor=8564, idProduct=1000, bcdDevice=11.00
228.449971 usb 1-1.1: New USB device strings: Mfr=1, Product=1, SerialNumber=3
228.449995 usbt: Mass Storage Device
228.450016 usb 1-1.1: Manufacturer: JetFlash
228.450037 usb 1-1.1: SerialNumber: 41B60BQUJYVLSFB7
228.451389 usb-storage 1-1.1:L.0: USB Mass Storage device detected
228.452351 scsi host0: usb-storage 1-1.1:L.0
229.764215 scsi 0:0:0:0: Direct-Access JetFlash Transcend 8GB 1100 PQ: 0 ANSI: 4
229.765631 sd 0:0:0:0: [sda] 15820800 512-byte logical blocks: (8.10 GB/7.54 GiB)
229.766386 sd 0:0:0:0: [sda] Write Protect is off
229.767188 sd 0:0:0:0: [sda] No Caching mode page found
229.767211 sd 0:0:0:0: [sda] Assuming drive cache: write through
229.806473 sda: sda1
229.810039 sd 0:0:0:0: [sda] Attached SCSI removable disk

root@rockchip-rk3588-evb:~#
root@rockchip-rk3588-evb:~# mkdir /mnt/USB
mkdir: can't create directory '/mnt/USB': File exists
root@rockchip-rk3588-evb:~# mount /dev/sda1 /mnt/USB
[ 257.072905] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will
be case sensitive!
[ 257.084562] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run
fsck.
root@rockchip-rk3588-evb:~#

```

Then use the aplay command to play the left and right audio .wav files

```
# aplay /mnt/USB/audiocheck_L.wav
```

```

root@rockchip-rk3588-evb:~# aplay /mnt/USB/audiocheck_L.wav
Playing WAVE '/mnt/USB/audiocheck_L.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
root@rockchip-rk3588-evb:~#

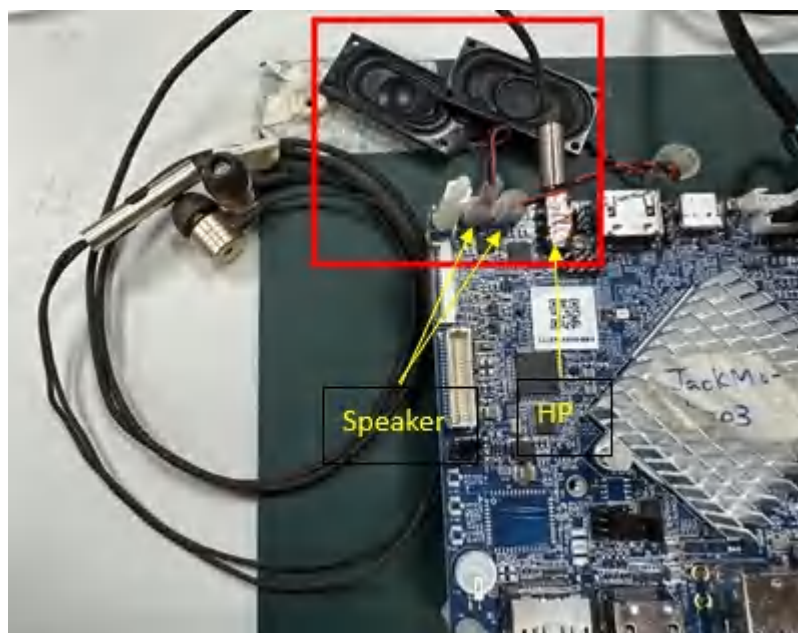
```

```
# aplay /mnt/USB/audiocheck_R.wav
```

```

root@rockchip-rk3588-evb:~# aplay /mnt/USB/audiocheck_R.wav
Playing WAVE '/mnt/USB/audiocheck_R.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
root@rockchip-rk3588-evb:~#

```



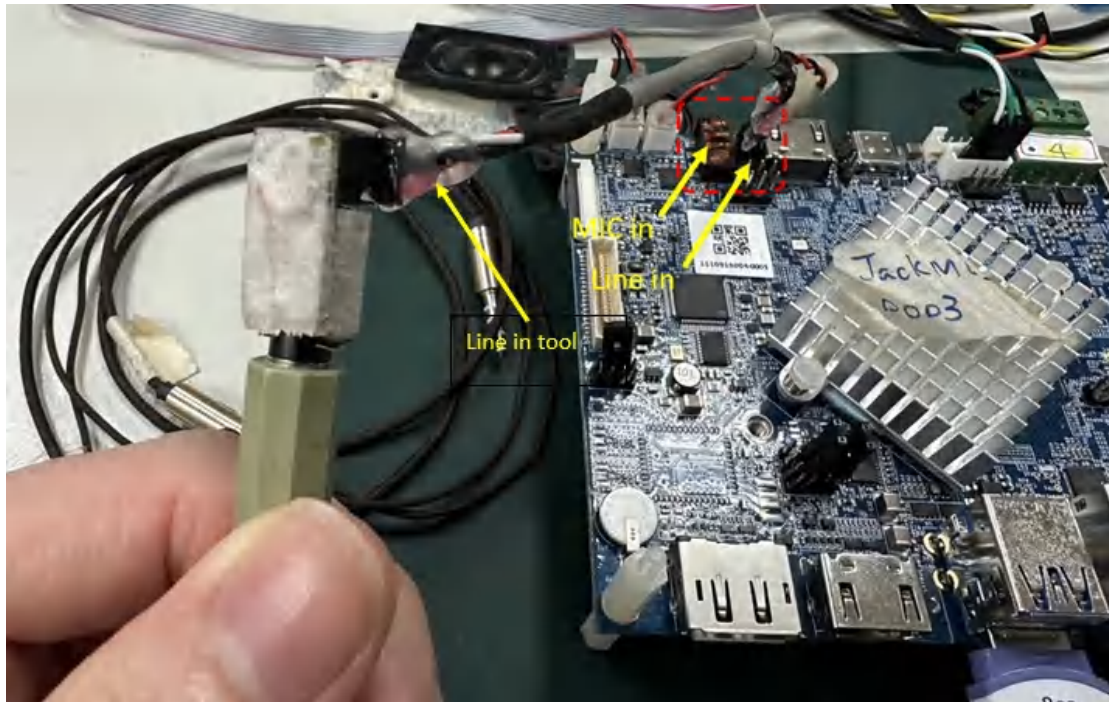
4.1.5 The Mic / the Line in to recording test

The default is Mic /Line in on

PC can play a MP3 music for recording, the Line in need to be equipped with fixtures, recording test type command:

```
# arecord -f dat /tmp/temp.wav (recording)
```

```
# aplay /tmp/temp.wav (play)
```



4.1.6 GPIO

. Paste the following commands into the console window and press Enter
GPIO501 ~ GPIO508, you can using a LED test board to control LED light on-off .

For example, GPIO501 (to test other GPIO# please replace the red numbers by yourself)

```
cd /sys/class/gpio/
```

```
echo 501 > export
```

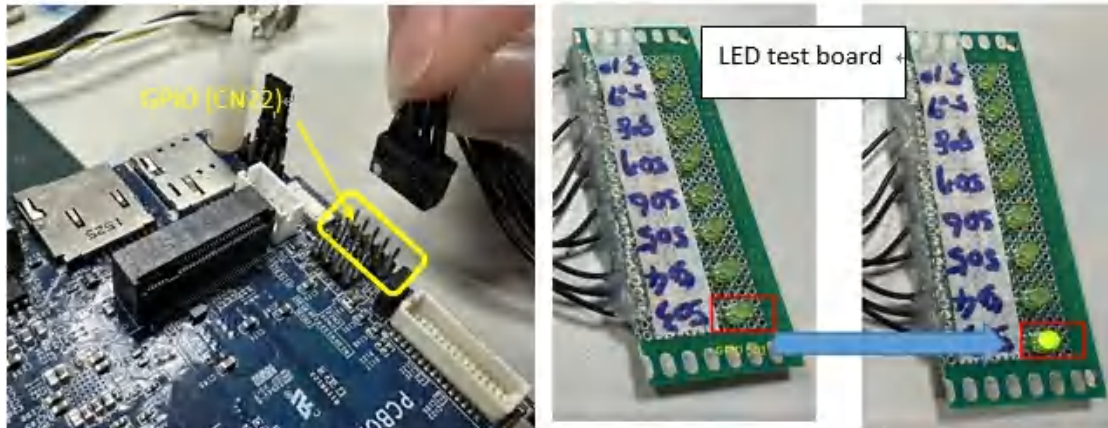
```
cd gpio501
```

```
echo out > direction
```

```
echo 1 > value
```

```
echo 0 > value
```

```
root@rockchip-rk3588-evb:~# cd /sys/class/gpio/
root@rockchip-rk3588-evb:/sys/class/gpio# echo 501 > export
root@rockchip-rk3588-evb:/sys/class/gpio# cd gpio501
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo out > direction
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo 1 > value
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo 0 > value
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501#
```



4.1.7 CASH Drawer Connector test (CN22)

Paste the following commands into the console window and press Enter

```
echo 136 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio136/direction
```

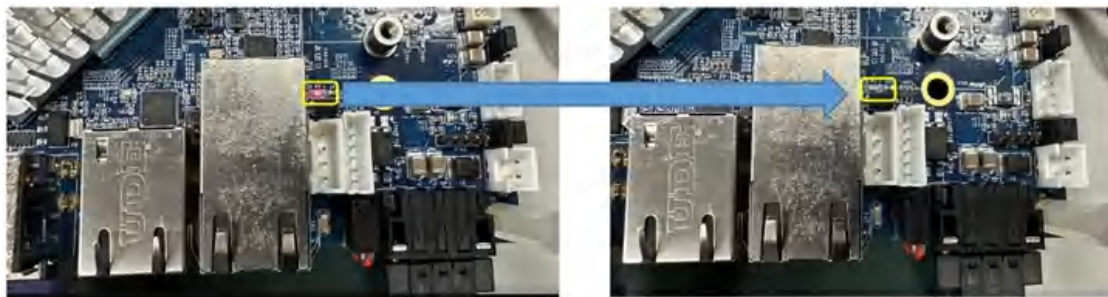
open cash drawer

```
echo 1 > /sys/class/gpio/gpio136/value
```

close cash drawer

```
echo 0 > /sys/class/gpio/gpio136/value
```

The above can be tested by using the LED light on the board end to turn off/on



4.1.8 CAN bus

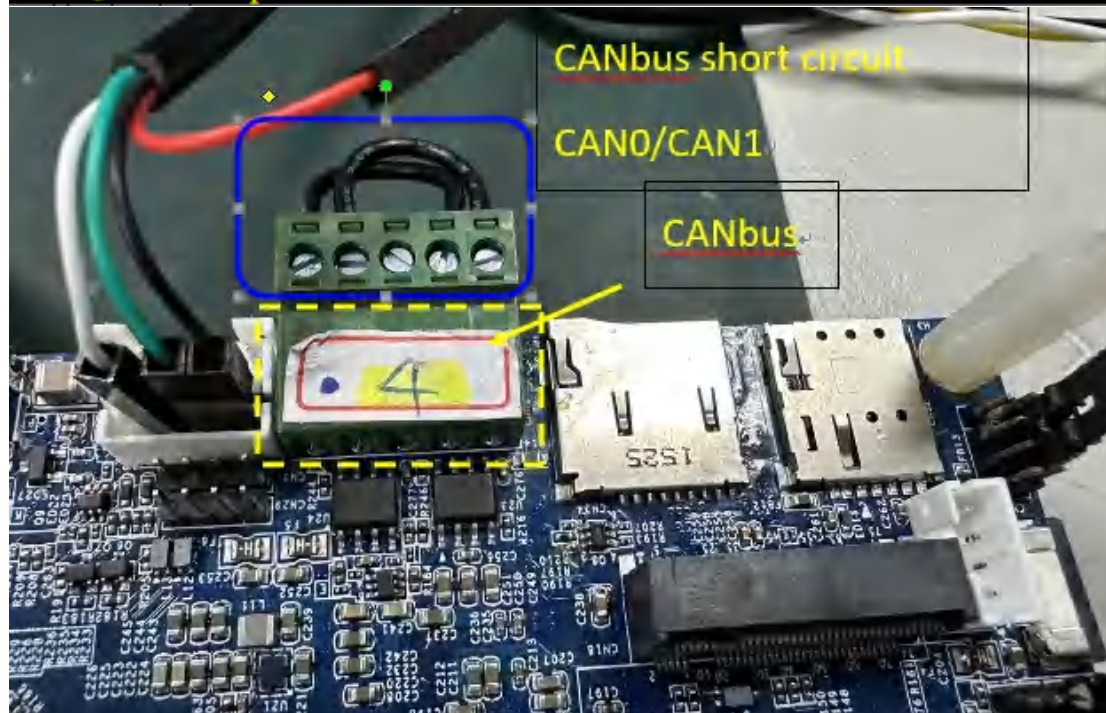
Paste the following commands into the console window and press Enter
you can using a short circuit CAN0/CAN1 to test:

```
ip link set can0 up type can bitrate 125000
ip link set can1 up type can bitrate 125000
```

```
candump can0 &
cansend can1 001#112233
```

```

root@rockchip-rk3588-evb:~#
root@rockchip-rk3588-evb:~# ip link set can0 up type can bitrate 125000
[ 535.324757] IPv6: ADDRCONF(NETDEV_CHANGE): can0: link becomes ready
root@rockchip-rk3588-evb:~# ip link set can1 up type can bitrate 125000
root@rockchip-rk3588-evb:~# [ 536.348434] IPv6: ADDRCONF(NETDEV_CHANGE): can1: link becomes
root@rockchip-rk3588-evb:~# candump can0 &
[1] 732
root@rockchip-rk3588-evb:~# cansend can1 001#112233
root@rockchip-rk3588-evb:~# can0 001 [3] 11 22 33
root@rockchip-rk3588-evb:~#
    
```



4.1.9 i2c (CN25)Test

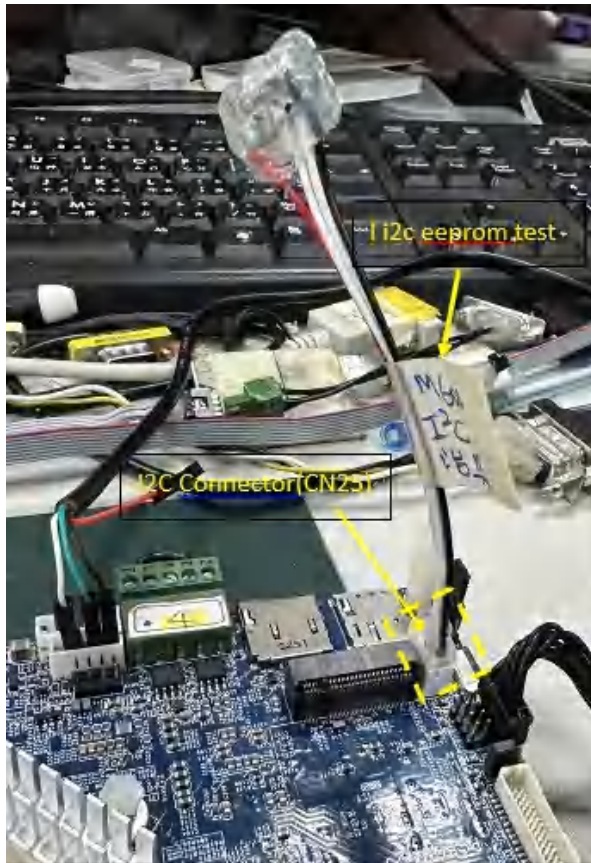
Paste the following commands into the console window and press Enter, you can using a i2c eeprom test board to detect .

```
i2cdetect -y -a 4
```

it will show 50 nodes

```

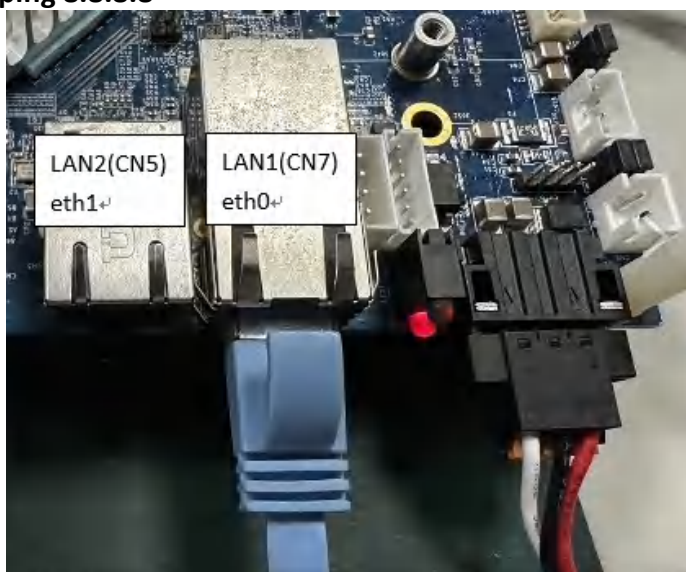
root@rockchip-rk3588-evb:~# i2cdetect -y -a 4
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: UU -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
root@rockchip-rk3588-evb:~#
    
```

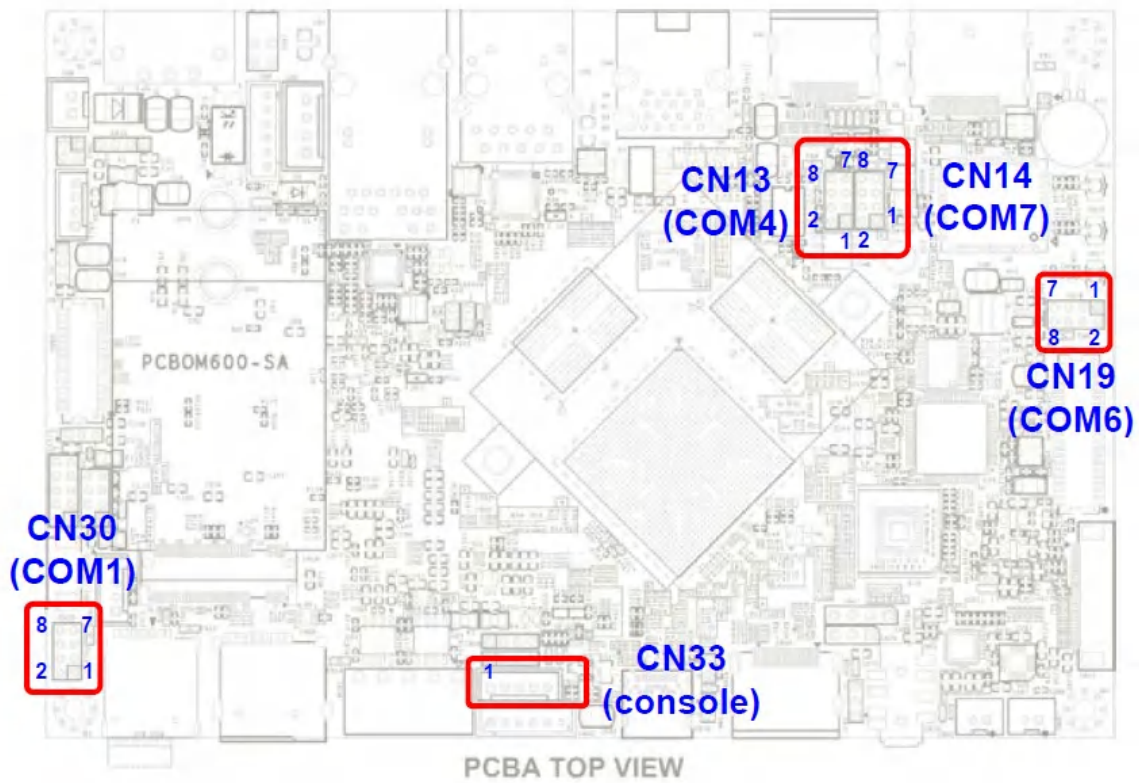
4.1.10 The LAN1 & LAN2(optional) test

A. LAN1(CN7) eth0, ok
ping 8.8.8.8

B. LAN2(CN5) eth1, ok
udhcpc -i eth1
ping 8.8.8.8



4.1.11 RS232/RS485(CN13 CN14 CN19 CN38) x4 test



```

busybox microcom -s 115200 /dev/ttyS1
busybox microcom -s 115200 /dev/ttyS6
busybox microcom -s 115200 /dev/ttyS4
busybox microcom -s 115200 /dev/ttyS7

```

- Test RS232 function, the following is CN19 COM6 (ttyS6),
 1. Connect to RS232 port and run the two hyper terminal on PC (such as TeraTerm).
 - One open COM4 for RS232
 - One open COM11 for debug port

When you open the Terminal window, you have to do some serial port setup (see below pic).

- (1) Port : Select the COM which your device connected.
- (2) Baud rate : 115200
- (3) Date : 8 bit

2. execute following commands in console window:

```
# busybox microcom -s 115200 /dev/ttyS6
```

Receiving:

Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

- Test RS485 function,
 1. After setting UART port and configuration, you can start to read and write data.
The test method is as same as RS232.
 2. execute following commands in console window:
busybox microcom -s 115200 /dev/ttyS4

Receiving:

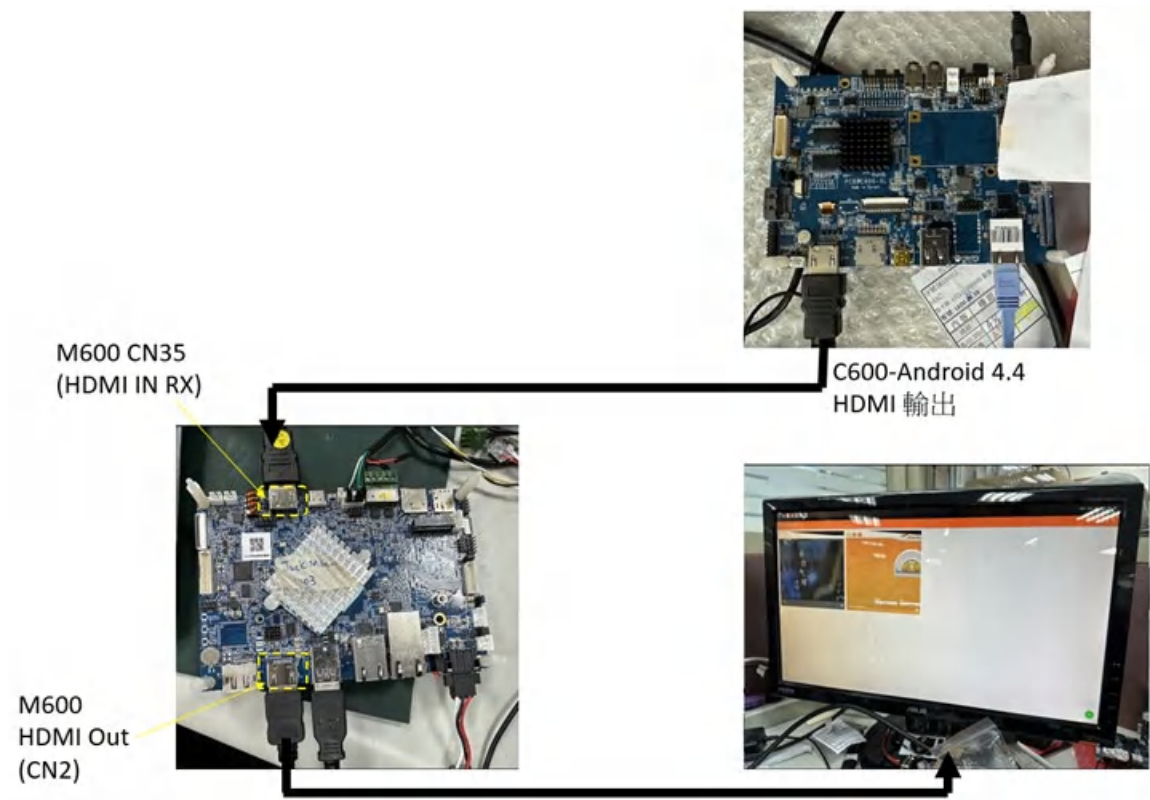
Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

Sending:

Type any number or sentence in the console window (CON11) and you should see the same output appears in terminal window (CON4)

4.1.12 HDMI in test (CN35)

Test schematic:



1. Prepare one as **source in** devices (HDMI output), such as SBC2100-Android 4.4
2. Use type the **v4l2-ctl -d /dev/video40 -V -D** command on the SBC3800 console port to determine whether the source signal is:
width=1920, height=1080, pixelformat='NV24'
or
width=1920,height=1080,pixelformat='BGR3' → for this test example

```

root@rockchip-rk3588-evb:~# v4l2-ctl -d /dev/video20 -V -D
Driver Info:
    Driver name      : rk_hdmirx
    Card type       : rk_hdmirx
    Bus info        : fdee0000.hdmirx-controller
    Driver version  : 5.10.110
    Capabilities    : 0x84201000
                    Video Capture Multiplanar
                    Streaming
                    Extended Pix Format
                    Device Capabilities
    Device Caps     : 0x04201000
                    Video Capture Multiplanar
                    Streaming
                    Extended Pix Format
Format Video Capture Multiplanar:
    Width/Height    : 1920/1080
    Pixel Format     : 'BGR3' (24-bit BGR 8-8-8)
    Field           : None
    Number of planes : 1
    Flags           : premultiplied-alpha, 0x000000fe
    Colorspace      : SMPTE 170M
    Transfer Function : Unknown (0x000000b8)
    YCbCr/HSV Encoding: Unknown (0x000000ff)
    Quantization    : Default
    Plane 0        :
                    Bytes per Line : 5760
                    Size Image     : 6220800
root@rockchip-rk3588-evb:~#

```

3. The following commands are all required. Execute in the terminal on the Yocto desktop (the first icon in the upper left corner of the screen), switch to the root identity, and the command is su

- HDMI-IN , command , while recording:

If “width=1920,height=1080,pixelformat='NV24'**”, please use the following:

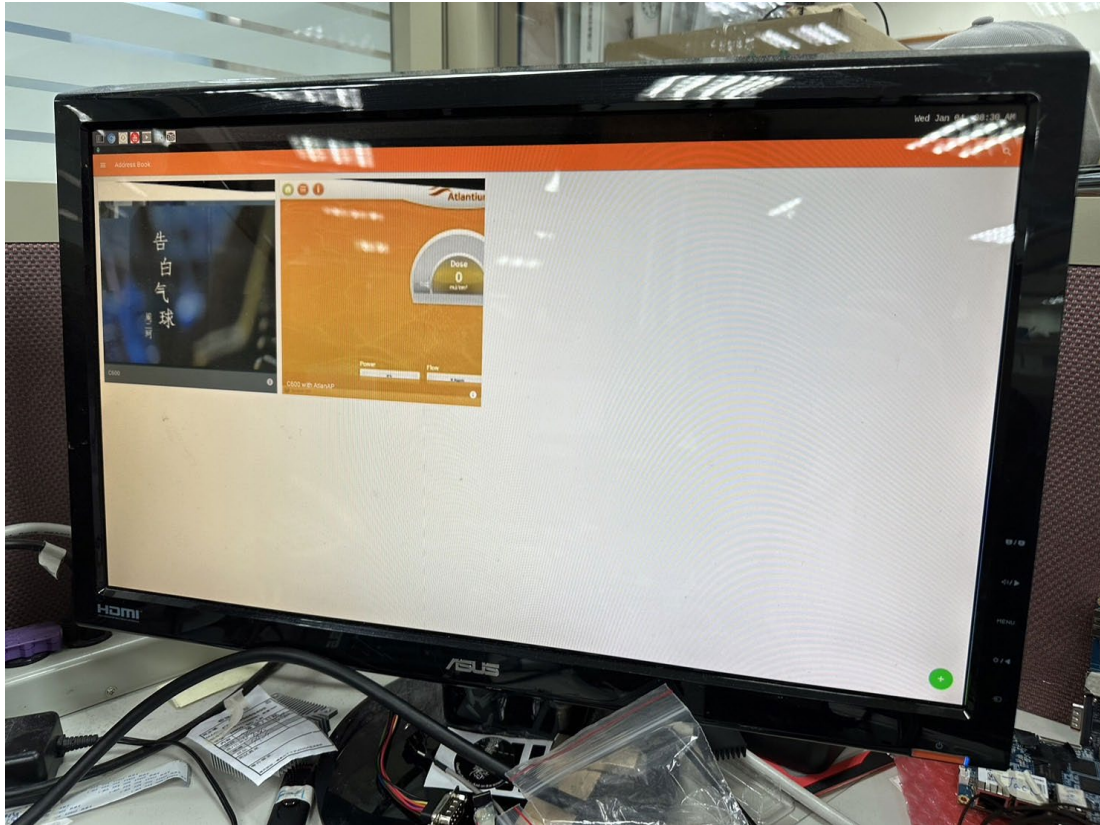
```
# v4l2-ctl -d /dev/video40 --set-fmt-
video=width=1920,height=1080,pixelformat='NV24' --stream-mmap=4 --
stream-skip=20 --stream-to= 1080p_nv24.yuv --stream-count=200 --
stream-poll
```

If “width=1920,height=1080,pixelformat='BGR3'**”, please use the following:

```
# v4l2-ctl -d /dev/video40 --set-fmt-
video=width=1920,height=1080,pixelformat='BGR3' --stream-mmap=4 --
stream-skip=20 --stream-to= 1080p_nv24.yuv --stream-count=200 --
stream-poll
```

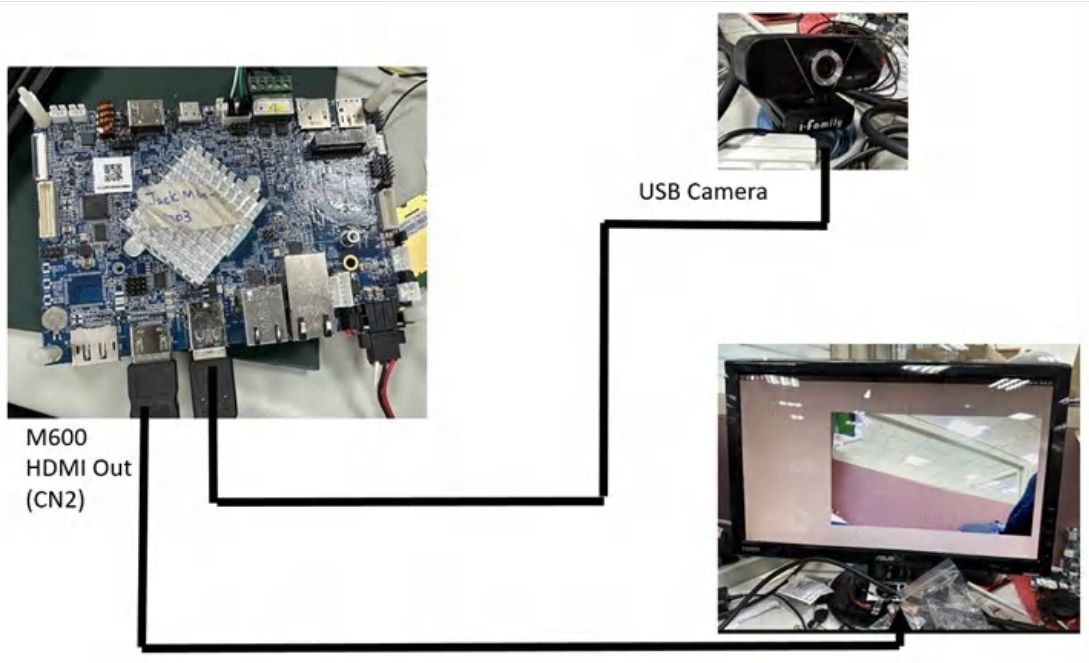
- When playing a video file:

```
# ffplay -f rawvideo -video_size 1920x1080 -pixel_format nv24
1080p_nv24.yuv
# ffplay -f rawvideo -video_size 1920x1080 -pixel_format rgb24
1080p_nv24.yuv
```

4.1.13 USB Camera test

Test schematic:



The following commands are required, execute in the terminal on the desktop (the first icon in the upper left corner of the screen), switch to root status, the command is su

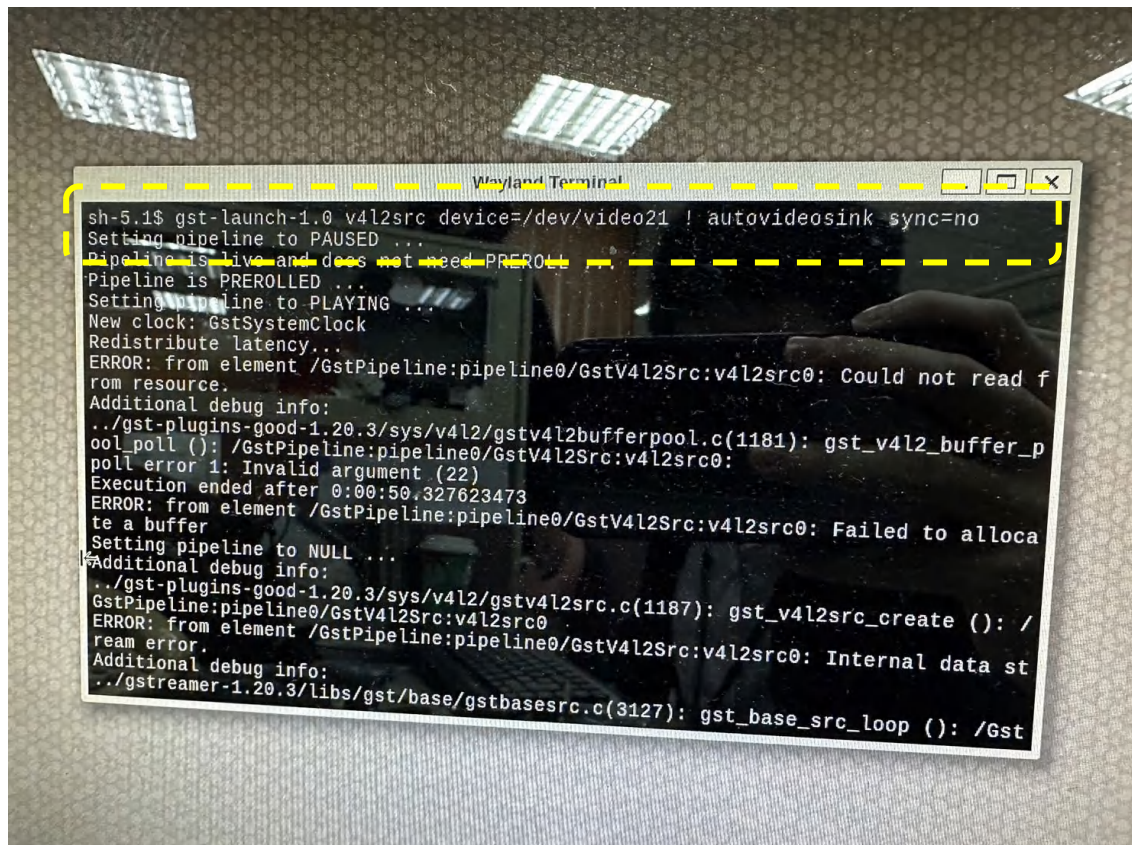
USB camera, command (PS: HDMI-IN is /dev/video20 , plug in the USB camera theory is /dev/video21 , you need to ls /dev/video* to confirm):

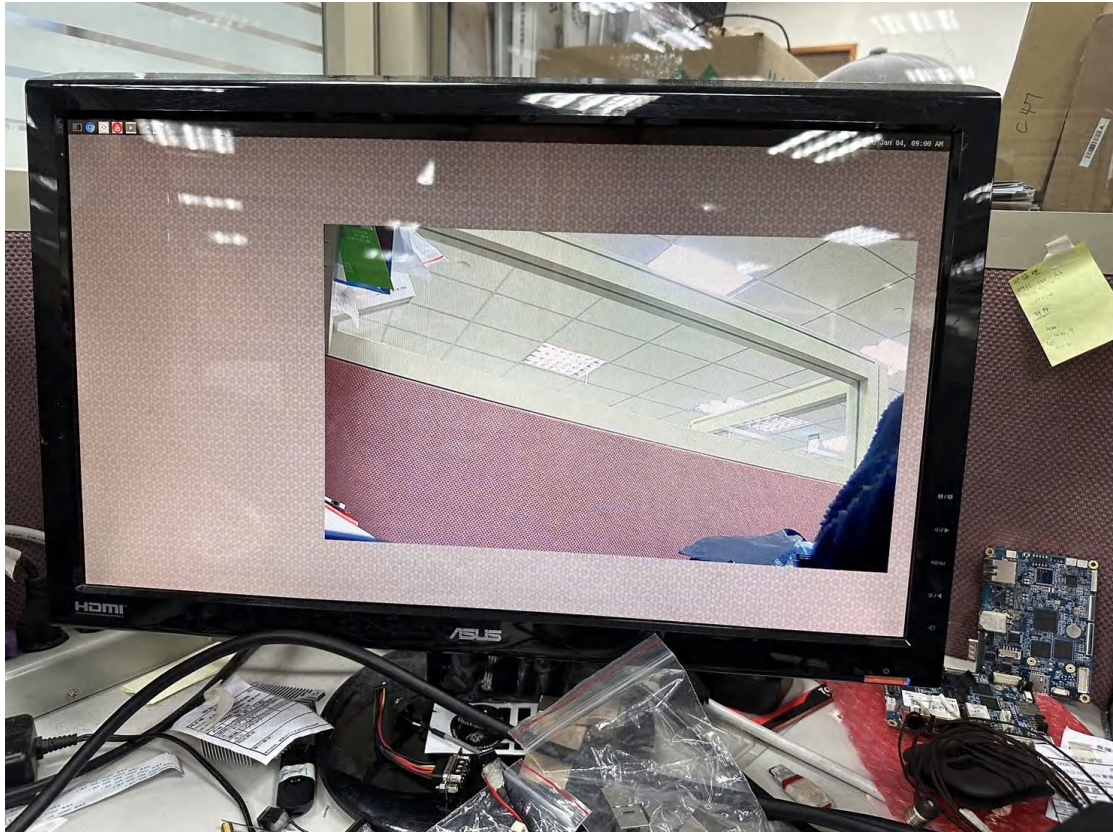
```
# gst-launch-1.0 v4l2src device=/dev/video21 ! autovideosink
```

or

```
# gst-launch-1.0 v4l2src device=/dev/video21 ! autovideosink sync=no
```

Actual result: SBC3800 will show present the display of USB camera:





4.1.14 USB & SD Card test

****USB****

USB3.0 Host (CN4)

2x USB 2.0 pin header (CN29 & CN31),

```
# mkdir /mnt/USB
```

```
# mount /dev/sda1 /mnt/USB
```

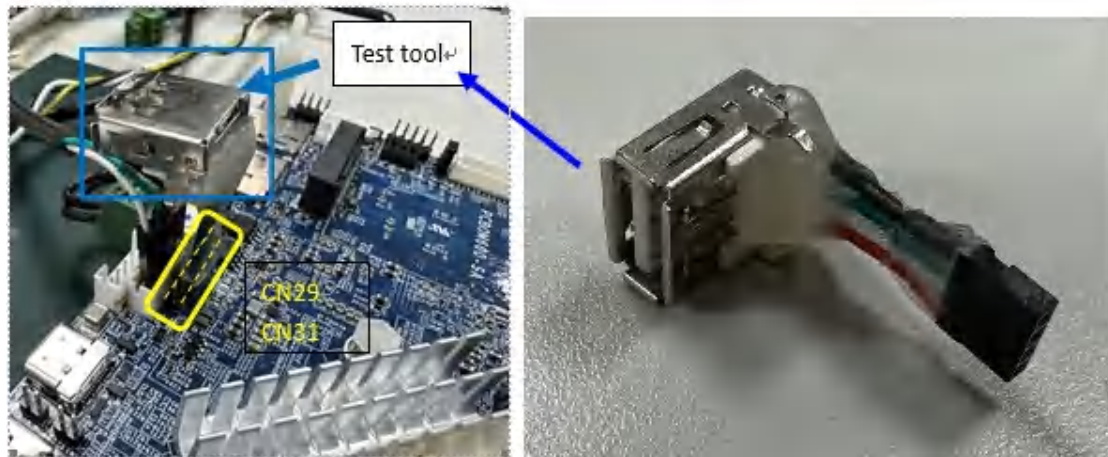
```
# cd /mnt/USB
```

```
# ls
```

//Fill in the name of the USB flash drive currently plugged in in red, which is located in the blue box below:

```
228.449897| usb 1-1.1: New USB device found, idVendor=8564, idProduct=1000, bcdDevice=11.00
228.449971| usb 1-1.1: New USB device strings: Mfr=1, Product=1, SerialNumber=3
228.449995| usb 1-1.1: Manufacturer: JetFlash
228.450016| usb 1-1.1: SerialNumber: A1B60BQUJYYLSFB7
228.450037| usb 1-1.1: SerialNumber: A1B60BQUJYYLSFB7
228.451389| usb-storage 1-1.1:1.0: USB Mass Storage device detected
228.452351| scsi host0: usb-storage 1-1.1:1.0
229.764215| scsi 0:0:0:0: Direct-Access JetFlash Transcend 8GB 1100 PQ: 0 ANSI: 4
229.765631| sd 0:0:0:0: sda 15820800 512-byte logical blocks: (8.10 GB/7.54 GiB)
229.766386| sd 0:0:0:0: sda Write Protect is off
229.767188| sd 0:0:0:0: sda No Caching mode page found
229.767211| sd 0:0:0:0: sda Assuming drive cache: write through
229.806473| sda: sda1
229.810039| sd 0:0:0:0: sda Attached SCSI removable disk

root@rockchip-rk3588-evb: #
root@rockchip-rk3588-evb: # mkdir /mnt/USB
mkdir: can't create directory '/mnt/USB': File exists
root@rockchip-rk3588-evb: # mount /dev/sda1 /mnt/USB
[ 257.072905] FAT-fs (sda1): utf8 is not a recommended [0 charset for FAT filesystems, filesystem will be case sensitive!
[ 257.084562] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run fsck.
root@rockchip-rk3588-evb: #
```



SD Card

Micro SD Connector(CN34)

```
# mkdir /mnt/SD
```

```
# mount /dev/mmcblk1p1 /mnt/SD
```

```
# cd /mnt/SD
```

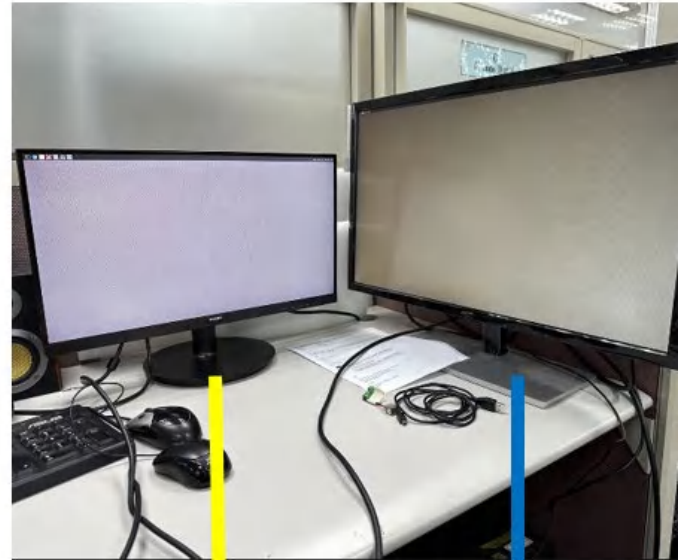
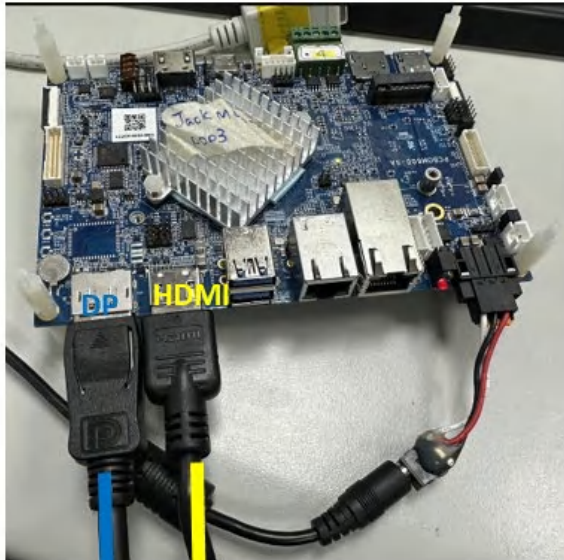
```
# ls
```

//Fill in the name of the currently inserted SD card in red letters, located in the yellow box below:

```
root@rockchip-rk3588-eyb:~# [ 7022.043713] dwmmc_rockchip fe2c0000.mmc: could not set regulator OCR (-22)
[ 7022.043784] dwmmc_rockchip fe2c0000.mmc: failenable vmmc regulator
[ 7022.258643] mmc_host mmc1: Bus speed (slot 0) = 148500000Hz (slot req 150000000Hz, actual 148500000
Hz div = 0)
[ 7022.403399] dwmmc_rockchip fe2c0000.mmc: Successfully tuned phase to 263
[ 7022.403902] mmc1: new ultra high speed SDR104 SDHC card at address aaaa
[ 7022.405757] mmcblk1: mmc1:aaaa SC16G 14.8 GiB
[ 7022.408218] mmcblk1: p1
root@rockchip-rk3588-eyb:~#
```

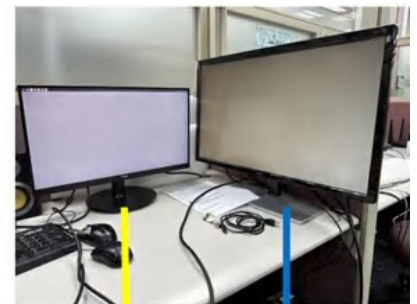
4.1.15 DP out test

Using the DP screen to test



4.1.16 Type C (CN39) test

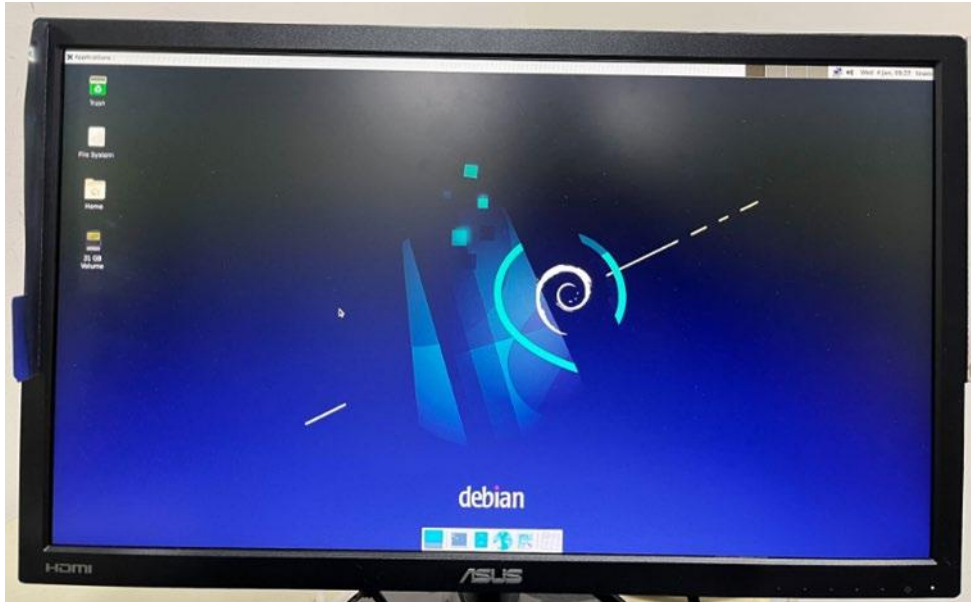
With the Type C to DP or Type C to HDMI tool to display



4.2 Debian

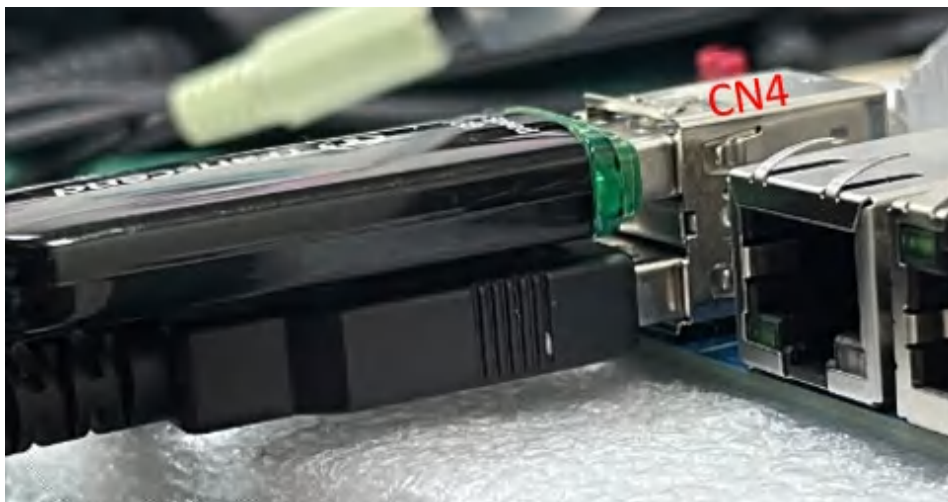
4.2.1 Desktop

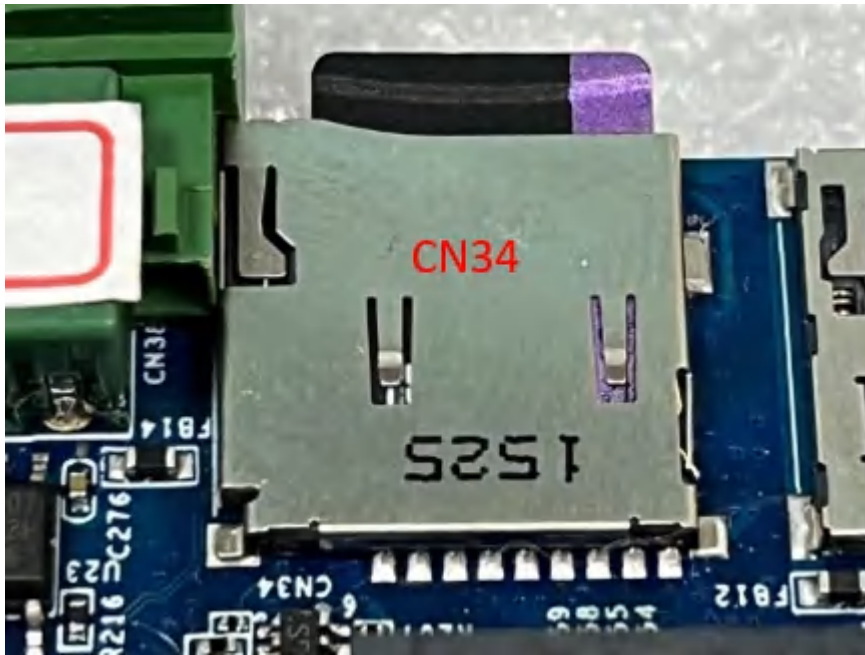
Find your Home folder, File System and external storage here.

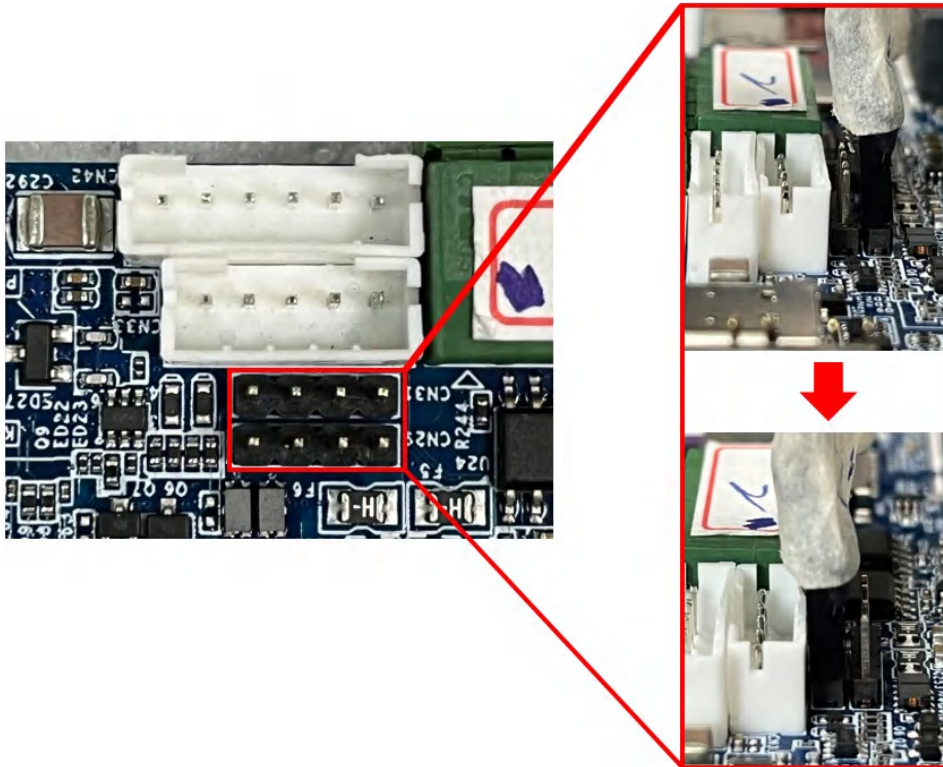


4.2.2 USB / SD card Test

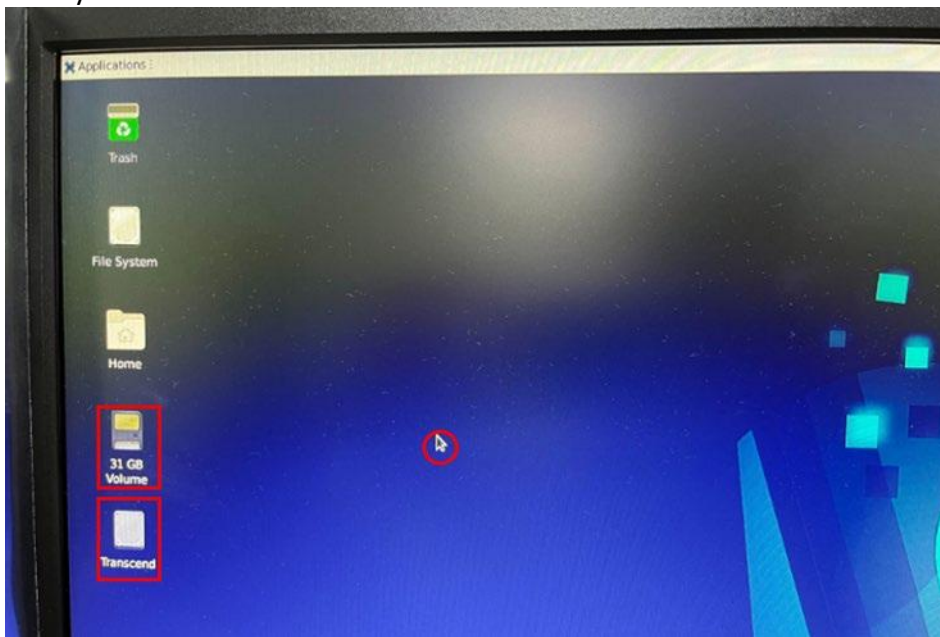
PCBA USB3.0 Host (CN4) / USB 2.0 Host port x2 (header) and microSD (CN34)





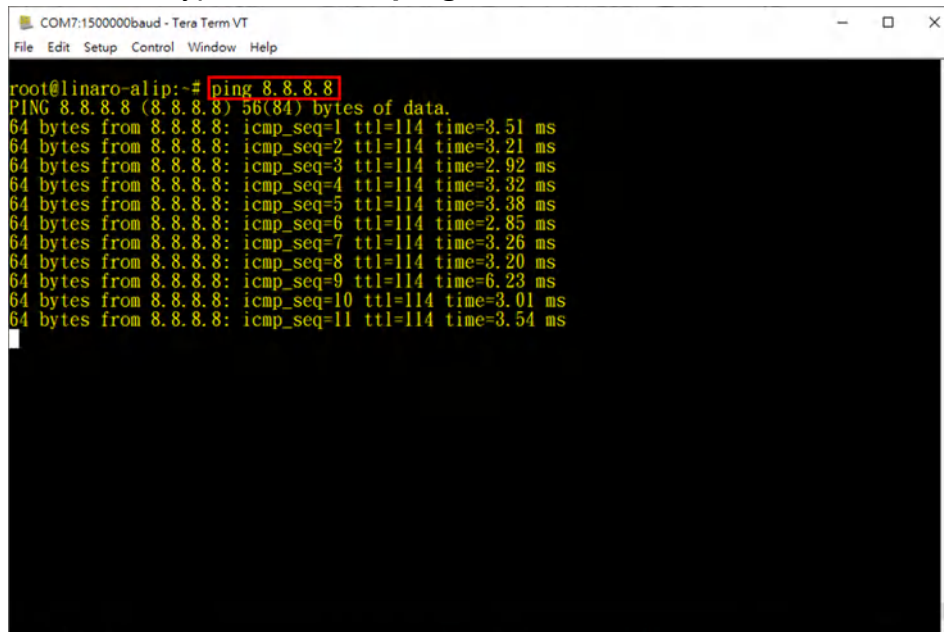


The system will show USB Disk & SD Card device contents



4.2.3 The LAN1 & LAN2(optional) test

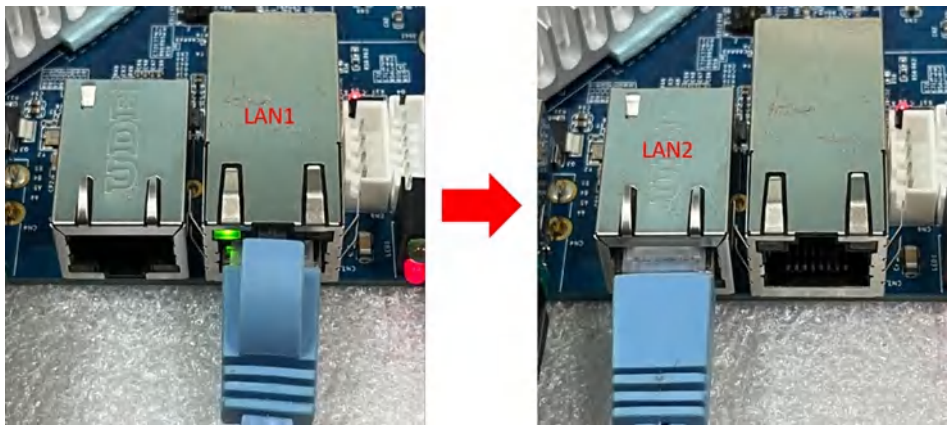
In console, type command **ping 8.8.8.8**



```

COM7:1500000baud - Tera Term VT
File Edit Setup Control Window Help
root@linaro-alip:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56(84) bytes of data:
64 bytes from 8.8.8.8: icmp_seq=1 ttl=114 time=3.51 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=114 time=3.21 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=114 time=2.92 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=114 time=3.32 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=114 time=3.38 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=114 time=2.85 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=114 time=3.26 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=114 time=3.20 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=114 time=6.23 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=114 time=3.01 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=114 time=3.54 ms

```



4.2.4 The Can Bus(CN38)

Paste the following commands into the console window and press Enter you can using a short circuit CAN0/CAN1 to test:

```

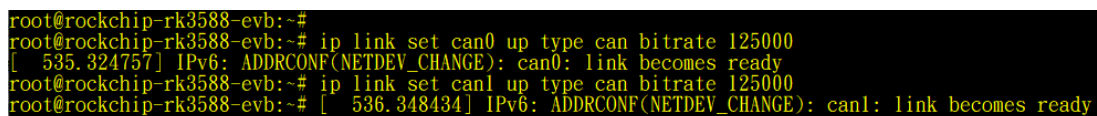
ip link set can0 up type can bitrate 125000
ip link set can1 up type can bitrate 125000

```

```

candump can0 &
cansend can1 001#112233

```



```

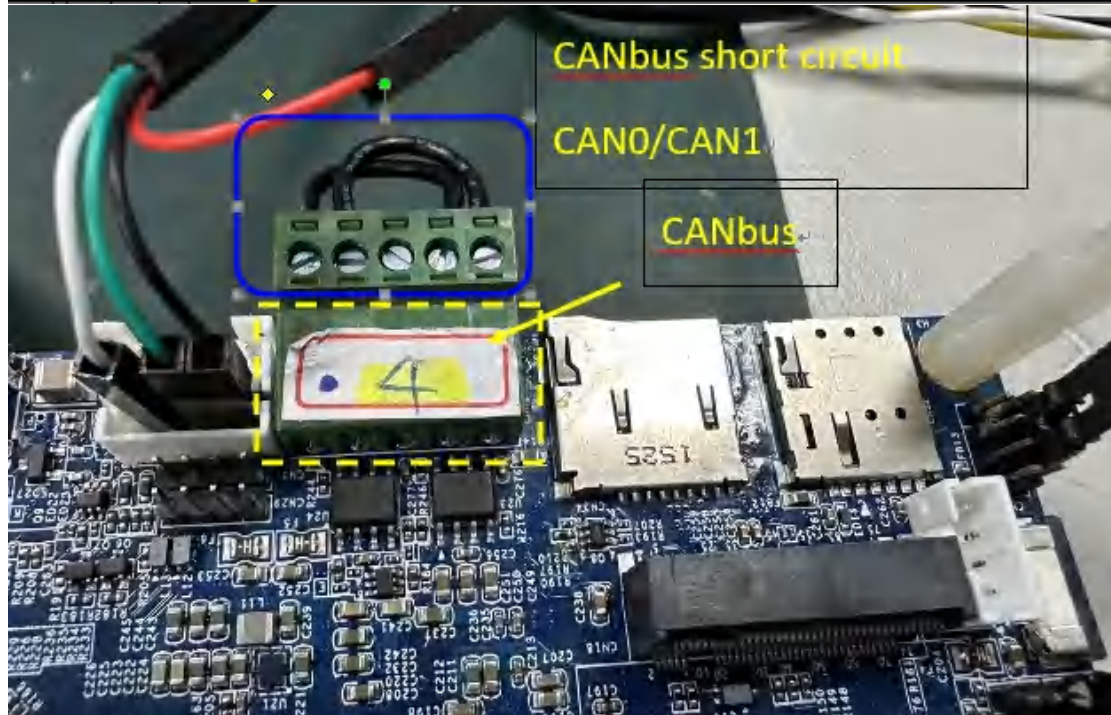
root@rockchip-rk3588-evb:~#
root@rockchip-rk3588-evb:~# ip link set can0 up type can bitrate 125000
[ 535.324757] IPv6: ADDRCONF(NETDEV_CHANGE): can0: link becomes ready
root@rockchip-rk3588-evb:~# ip link set can1 up type can bitrate 125000
root@rockchip-rk3588-evb:~# [ 536.348434] IPv6: ADDRCONF(NETDEV_CHANGE): can1: link becomes ready

```

```

root@rockchip-rk3588-evb:~# candump can0 &
[1] 732
root@rockchip-rk3588-evb:~# cansend can1 001#112233
root@rockchip-rk3588-evb:~# can0 001 [3] 11 22 33
root@rockchip-rk3588-evb:~#

```



4.2.5 The Speaker/HP

Paste the following commands into the console window and press Enter

```

# mkdir /mnt/USB
# mount /dev/sda1 /mnt/USB

```

// Fill in the name of the currently plugged USB flash drive in red, which is located in the blue box below

```

228.449897 usb 1-1.1: New USB device found, idVendor=8564, idProduct=1000, bcdDevice=11.00
228.449971 usb 1-1.1: New USB device strings: Mfr=1, Product=3
228.449995 usbt: Mass Storage Device
228.450016 usb 1-1.1: Manufacturer: JetFlash
228.450037 usb 1-1.1: SerialNumber: 41B60BQJYVLSFB7
228.451389 usb-storage 1-1.1:L.0: USB Mass Storage device detected
228.452351 scsi host0: usb-storage 1-1.1:L.0
229.764215 scsi 0:0:0:0: Direct-Access JetFlash Transcend 8GB 1100 PQ: 0 ANSI: 4
229.765631 sd 0:0:0:0: [sda] 15820800 512-byte logical blocks: (8.10 GB/7.54 GiB)
229.766386 sd 0:0:0:0: [sda] Write Protect is off
229.767188 sd 0:0:0:0: [sda] No Caching mode page found
229.767211 sd 0:0:0:0: [sda] Assuming drive cache: write through
229.806473 sda: sda1
229.810039 sd 0:0:0:0: [sda] Attached SCSI removable disk

root@rockchip-rk3588-evb:~#
root@rockchip-rk3588-evb:~# mkdir /mnt/USB
mkdir: can't create directory '/mnt/USB': File exists
root@rockchip-rk3588-evb:~# mount /dev/sda1 /mnt/USB
[ 257.072905] FAT-fs (sda1): utf8 is not a recommended IO charset for FAT filesystems, filesystem will
be case sensitive!
[ 257.084562] FAT-fs (sda1): Volume was not properly unmounted. Some data may be corrupt. Please run
fsck.
root@rockchip-rk3588-evb:~#

```

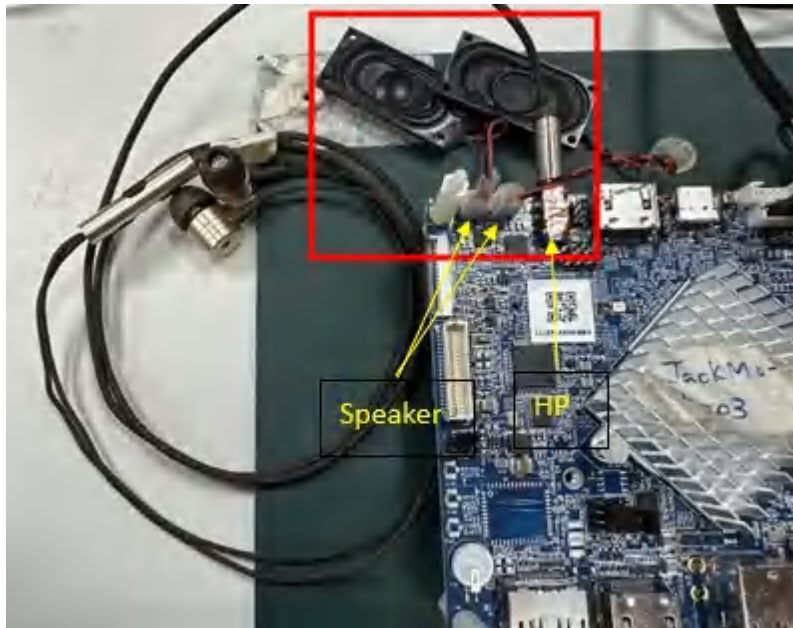

Then use the aplay command to play the left and right audio .wav files

```
# aplay /mnt/USB/audiocheck_L.wav
```

```
root@rockchip-rk3588-evb:~# aplay /mnt/USB/audiocheck_L.wav
Playing WAVE '/mnt/USB/audiocheck_L.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
root@rockchip-rk3588-evb:~#
```

```
# aplay /mnt/USB/audiocheck_R.wav
```

```
root@rockchip-rk3588-evb:~# aplay /mnt/USB/audiocheck_R.wav
Playing WAVE '/mnt/USB/audiocheck_R.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
root@rockchip-rk3588-evb:~#
```



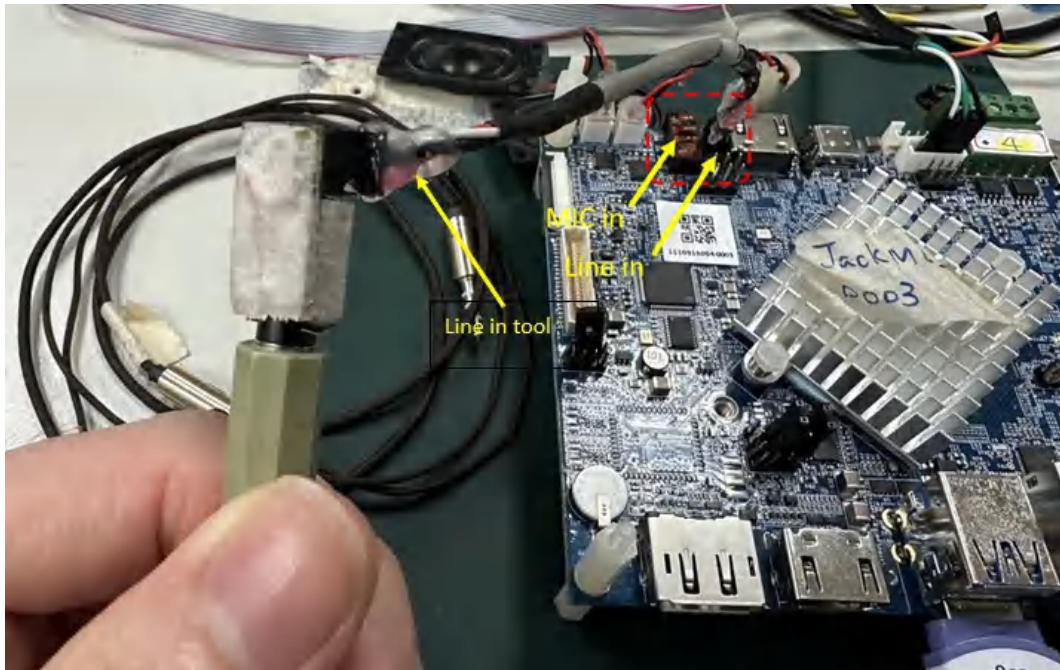
4.2.6 The Mic / the Line in to recording test

The default is Mic /Line in on

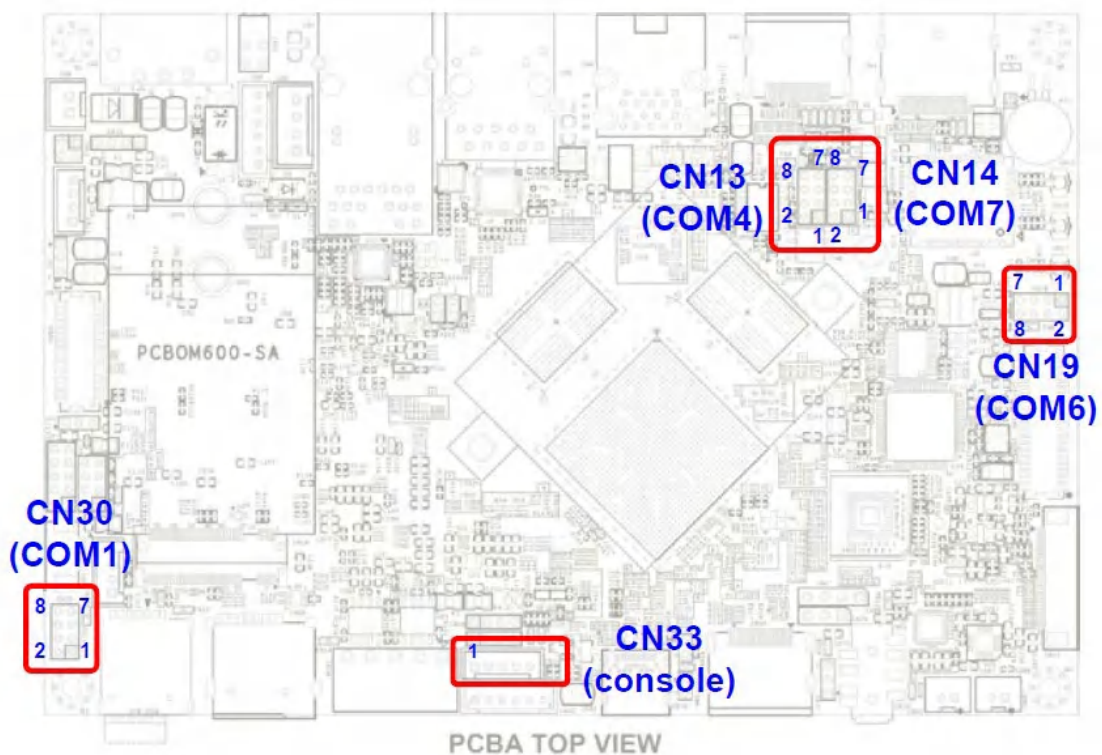
PC can play a MP3 music for recording, the Line in need to be equipped with fixtures, recording test type command:

```
# arecord -d 5 -t wav /tmp/temp.wav (recording)
```

```
# aplay /tmp/temp.wav (play)
```



4.2.7 RS232/RS485(CN13 CN14 CN19 CN38) x4 test



```

busybox microcom -s 115200 /dev/ttyS1
busybox microcom -s 115200 /dev/ttyS6
busybox microcom -s 115200 /dev/ttyS4
busybox microcom -s 115200 /dev/ttyS7

```

- Test RS232 function, the following is CN19 COM6 (ttyS6),
3. Connect to RS232 port and run the two hyper terminal on PC (such as

TeraTerm).

One open COM4 for RS232

One open COM11 for debug port

When you open the Terminal window, you have to do some serial port setup (see below pic).

(4) Port : Select the COM which your device connected.

(5) Baud rate : 115200

(6) Date : 8 bit

4. execute following commands in console window:

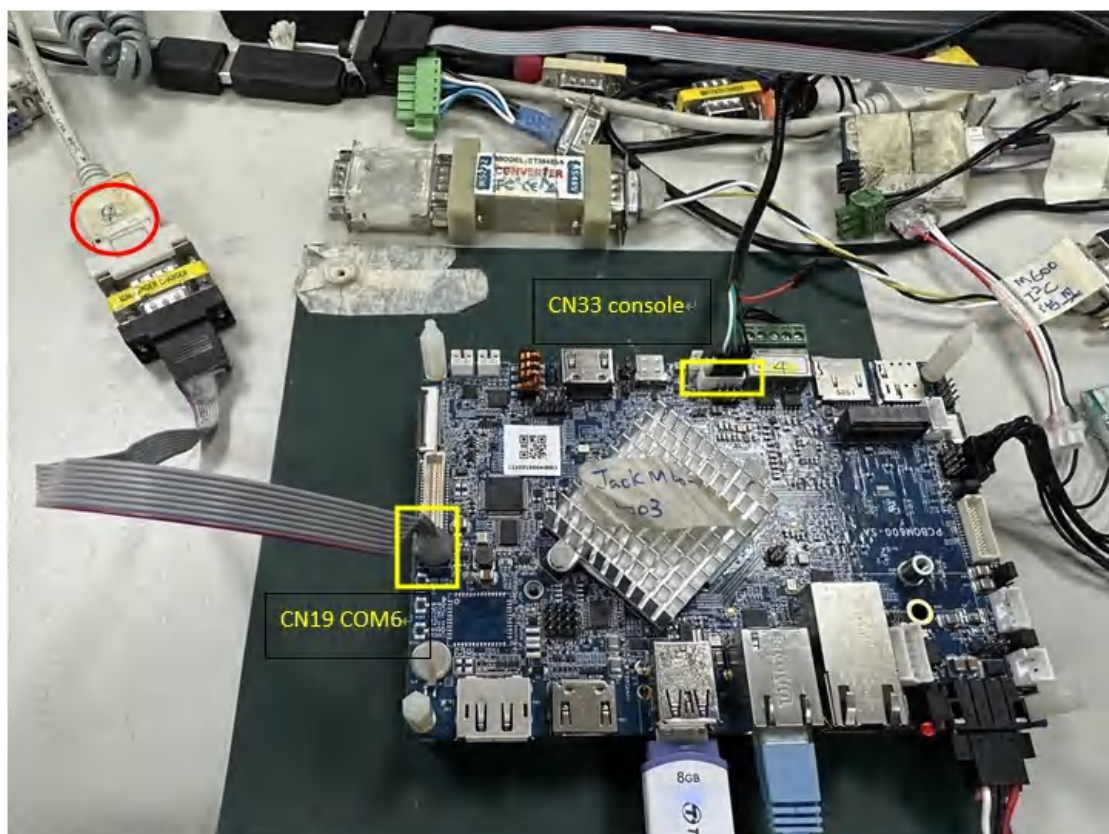
```
# busybox microcom -s 115200 /dev/ttyS6
```

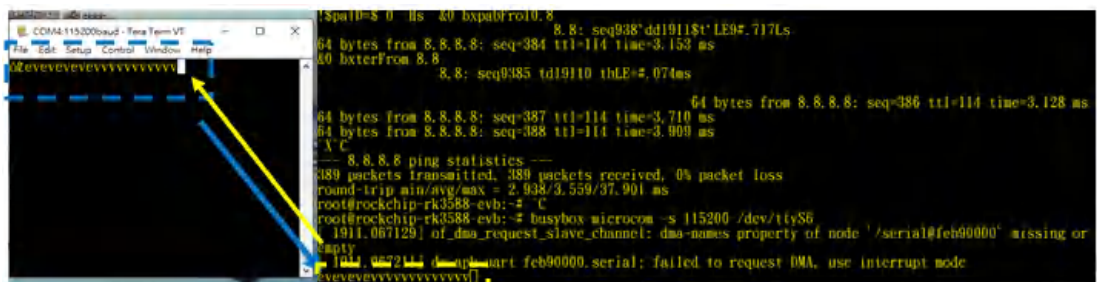
Receiving:

Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

Sending:

Type any number or sentence in the console window (CON11) and you should see the same output appears in terminal window (CON4).





After the test is complete, Ctrl + C jumps out of the background,
Other RS232 ports are also tested in the same way, change COM4 to other
RS232 ports (ttyS1/ ttyS7)

- Test RS485 function,
3. After setting UART port and configuration, you can start to read and write data.

The test method is as same as RS232.

4. execute following commands in console window:
busybox microcom -s 115200 /dev/ttyS4

Receiving:

Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

Sending:

Type any number or sentence in the console window (CON11) and you should see the same output appears in terminal window (CON4)

4.2.8 I2C port(CN25)

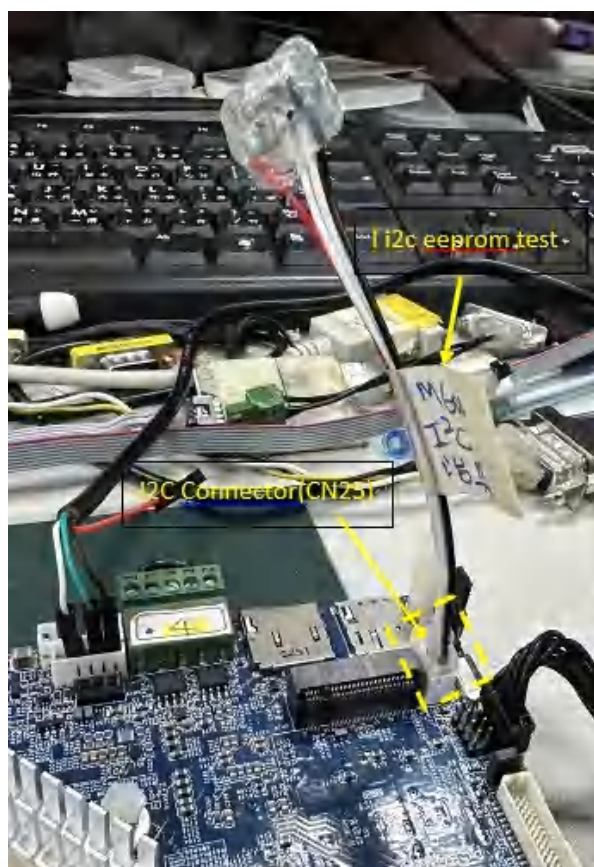
Paste the following commands into the console window and press Enter, you can use a i2c eeprom test board to detect .

i2cdetect -y -a 4

it will show 50 nodes

```
COM7:1500000baud - Tera Term VT
File Edit Setup Control Window Help

root@linaro-alip:~# i2cdetect -y -a 4
 0 1 2 3 4 5 6 7 8 9 a b c d e f
00: ---
10: ---
20: UU ---
30: ---
40: ---
50: 50 ---
60: ---
70: ---
root@1
```



4.2.9 GPIO(CN22) Test: GPIO501 ~ GPIO508

Paste the following commands into the console window and press Enter **GPIO501 ~ GPIO508**, you can using a LED test board to control LED light on-off .

For example, GPIO501 (to test other GPIO# please replace the red numbers by yourself)

```
cd /sys/class/gpio/
```

```
echo 501 > export
```

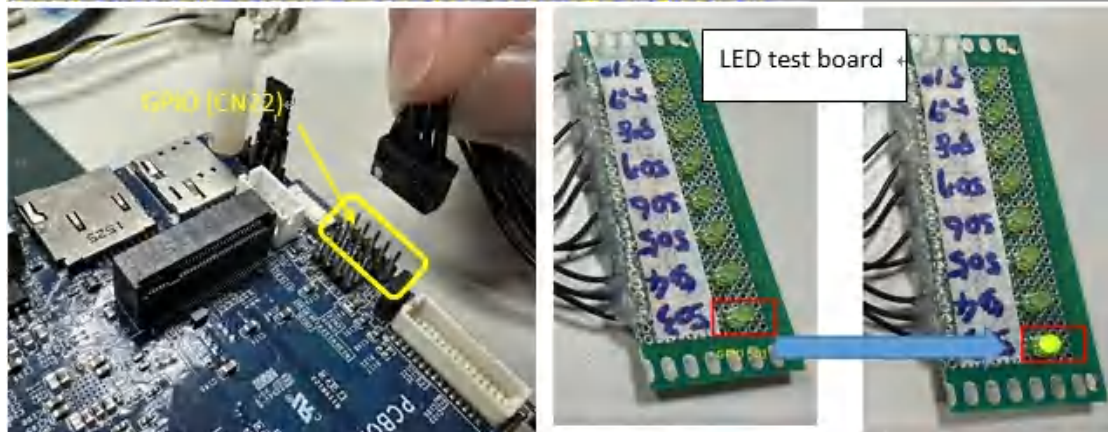
```
cd gpio501
```

```
echo out > direction
```

```
echo 1 > value
```

```
echo 0 > value
```

```
root@rockchip-rk3588-evb:~# cd /sys/class/gpio/
root@rockchip-rk3588-evb:/sys/class/gpio# echo 501 > export
root@rockchip-rk3588-evb:/sys/class/gpio# cd gpio501
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo out > direction
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo 1 > value
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501# echo 0 > value
root@rockchip-rk3588-evb:/sys/class/gpio/gpio501#
```



4.2.10 CASH Drawer Connector test (CN22)

Paste the following commands into the console window and press Enter

```
echo 136 > /sys/class/gpio/export
```

```
echo out > /sys/class/gpio/gpio136/direction
```

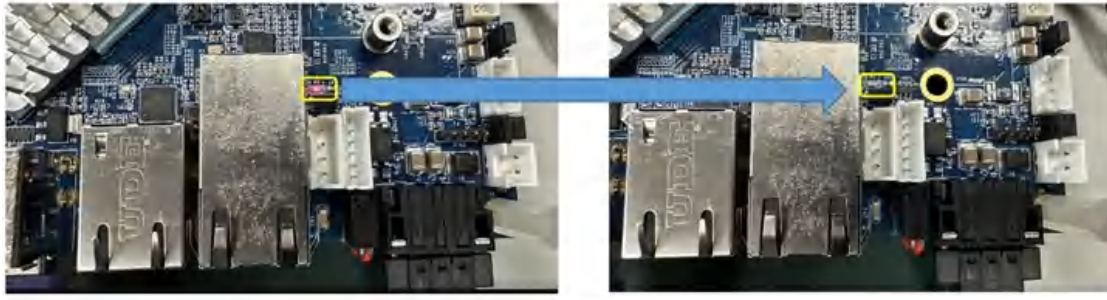
open cash drawer

```
echo 1 > /sys/class/gpio/gpio136/value
```

close cash drawer

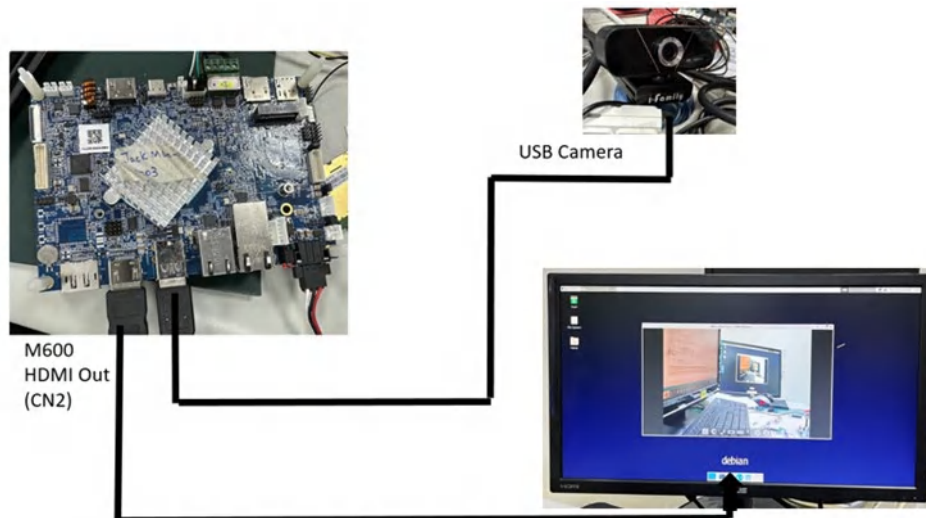
```
echo 0 > /sys/class/gpio/gpio136/value
```

The above can be tested by using the LED light on the board end to turn off/on



4.2.11 USB Camera

Test schematic:



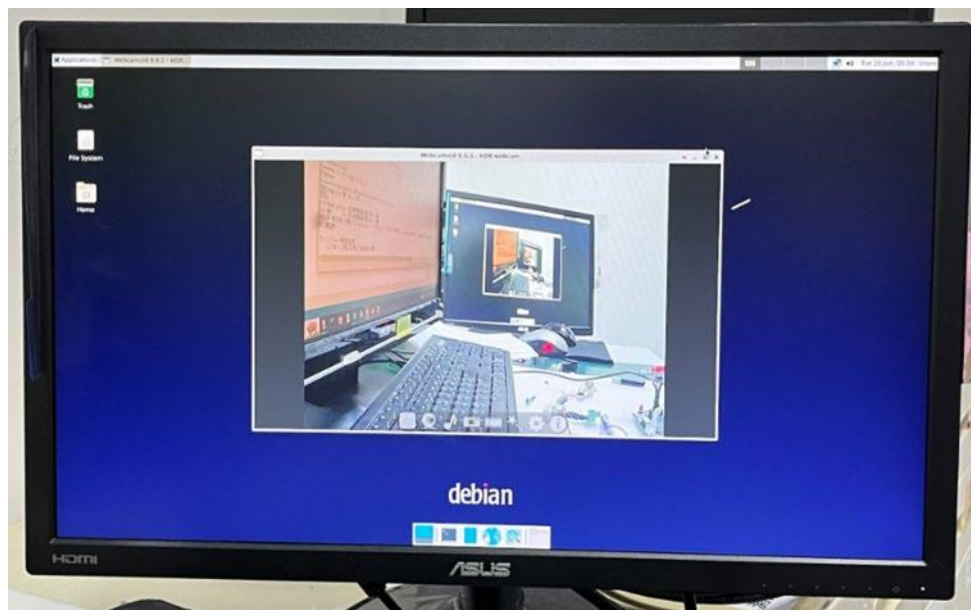
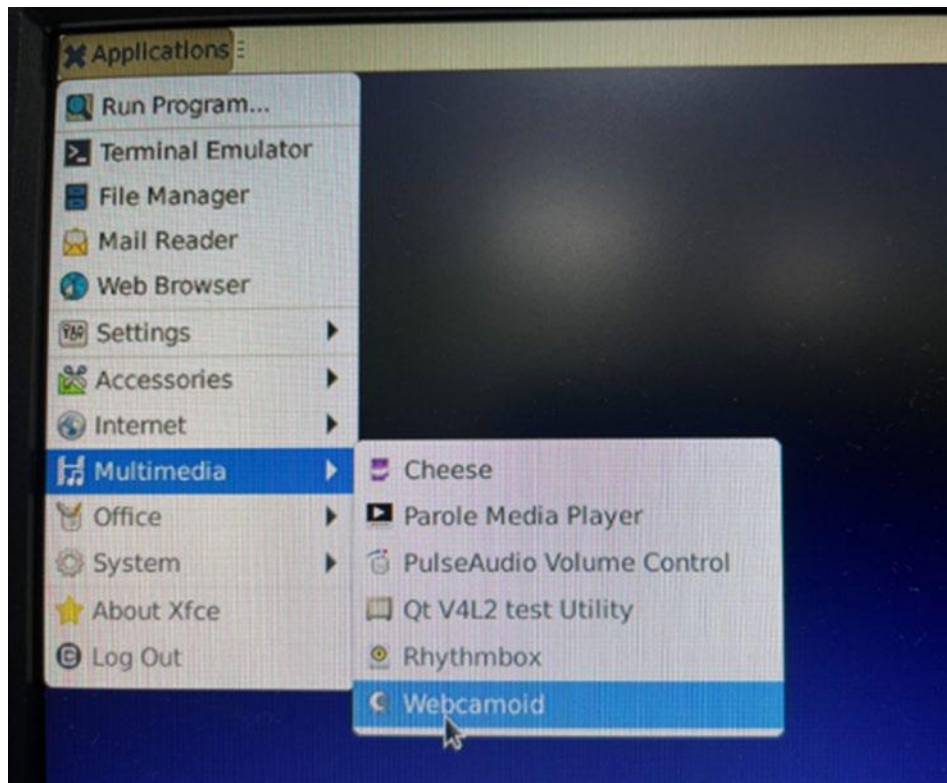
Paste the following commands into the console window and press Enter:
Install software to test camera, like webcamoid APP

apt-get update

apt install webcamoid

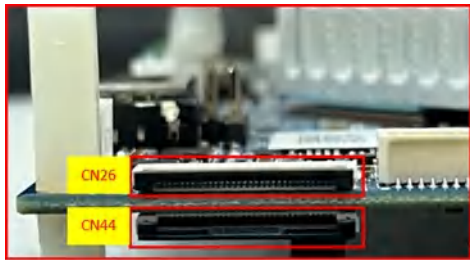
```
COM7:1500000baud - Tera Term VT
File Edit Setup Control Window Help
97% [13 Translation-en store 0 B]
97% [13 Translation-en store 0 B]
97% [13 Translation-en store 0 B]
97% [13 Translation-en store 0 B]
98% [Working]
98% [Working]
98% [Working]
99% [Working]
99% [Working]
99% [18 Sources] 3,825 kB/s
Reading package lists... Done
root@linaro-alip:~# apt install webcamoid
Reading package lists... Done
Building dependency tree... Done
Reading state informationThe following additional packages will
be installed:
  akqml fonts-open-sans libavkys8 libqt5qu libqt5quicktemplates
2-5 qml-moquick-dialogs qml-module-qtquickThe following NEW pack
ages will be installed:
  akqml fonts-open-sans libavkys8 libqt5quickcontrols2-5
  libqt5quicktemplates2-5 qml-module-qs2
  qml-module-qtquick-dialogs0 upgraded, 20 newly installed, 0 to
remove and 26 not upgraded
Need to get 12.1 MB of archive to continue? [Y/n]
```

After install, go to Applications>>Multimedia>>webcamoid to open webcamoid APP, and then will show present the display of USB camera:

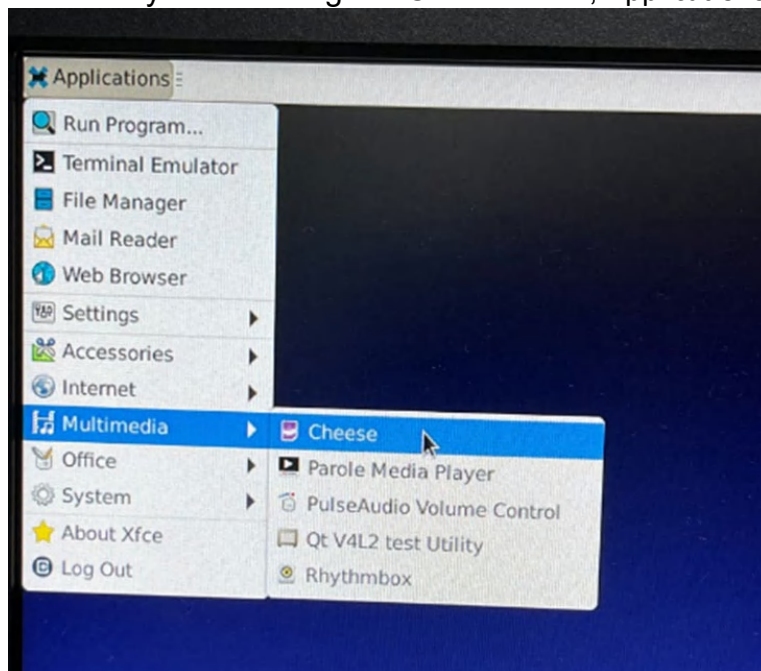


4.2.12 MIPI camera input test (CN26,CN44)

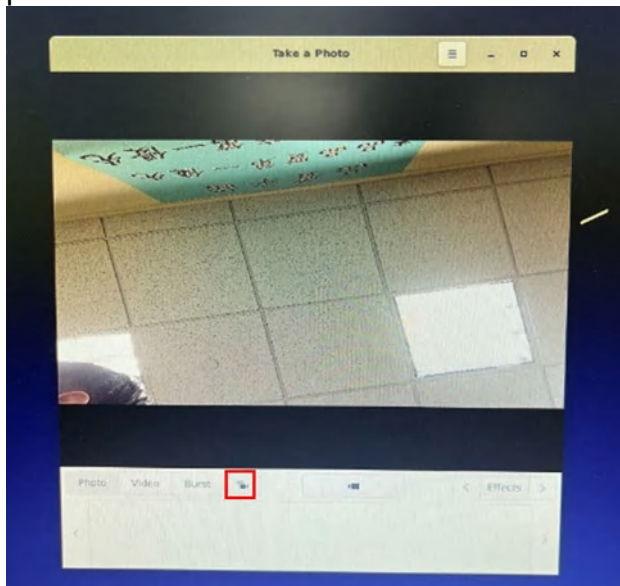
- Using the Camera modules (OV13855) board,



And then you can using the Cheese APP, Applications>>Multimedia>>Cheese

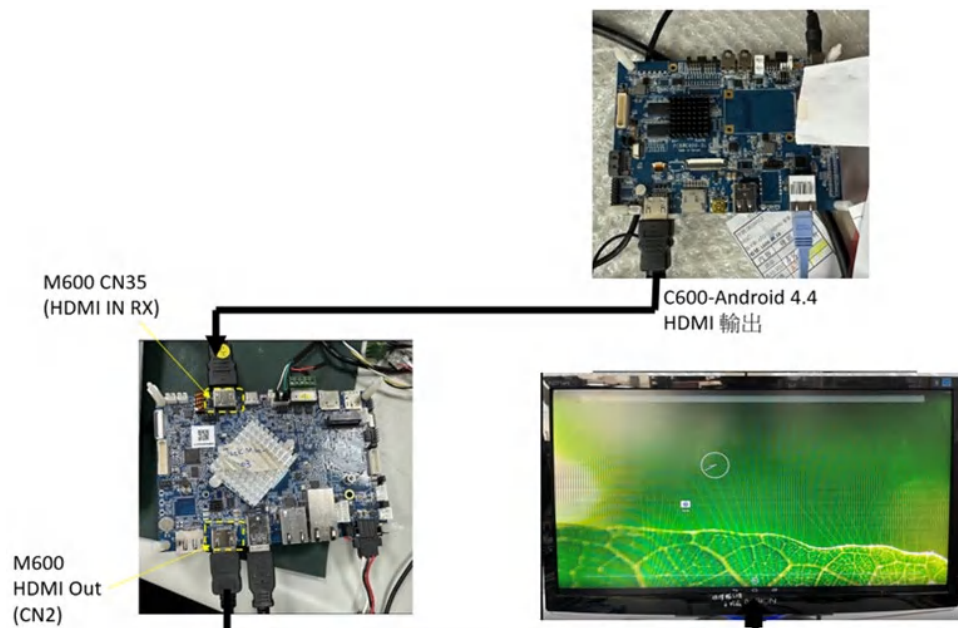



It will show present the display of camera, if want switch to another lens, please click the switch button in the red frame.

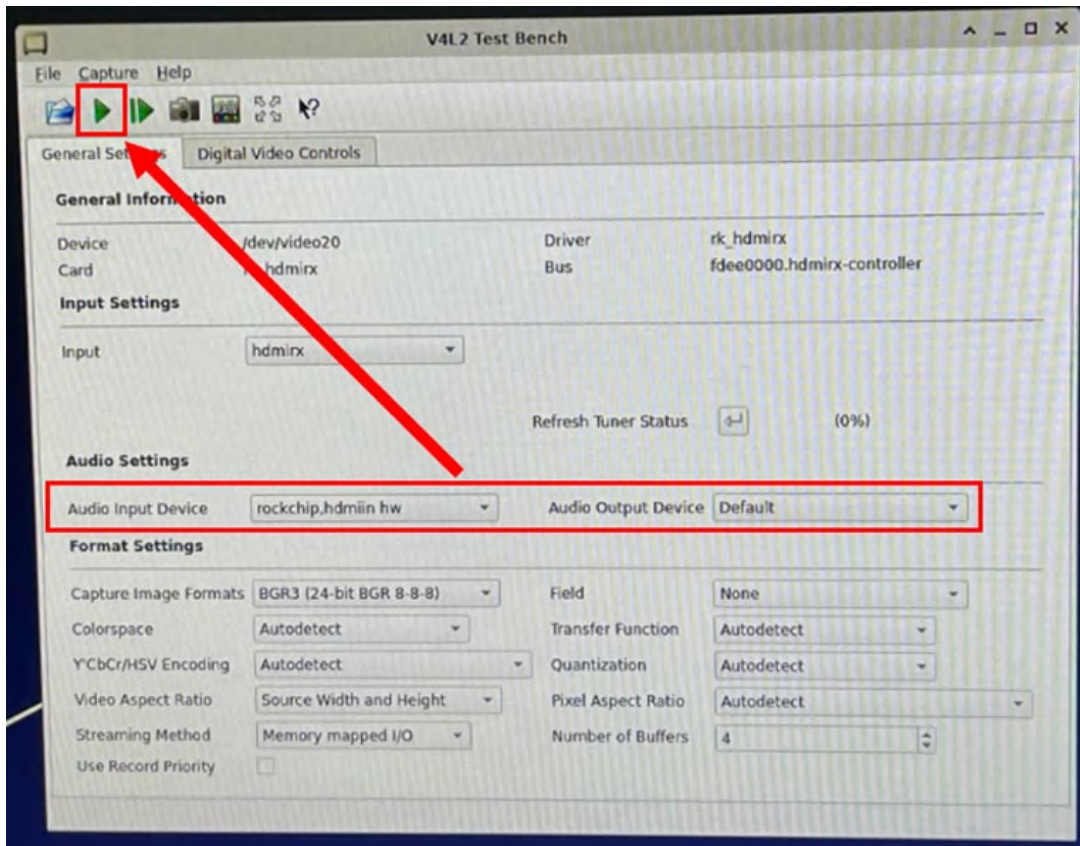
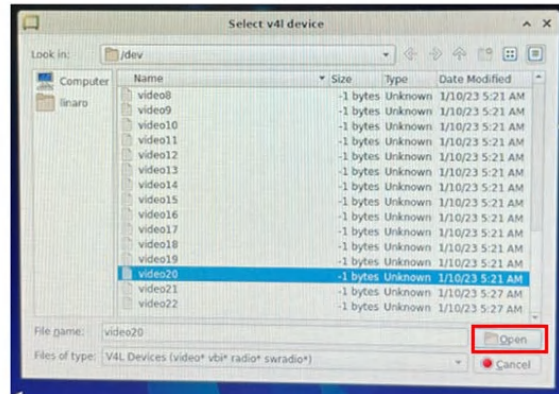
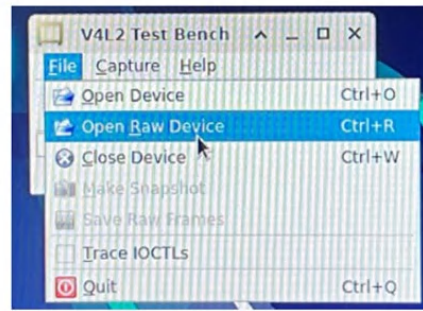
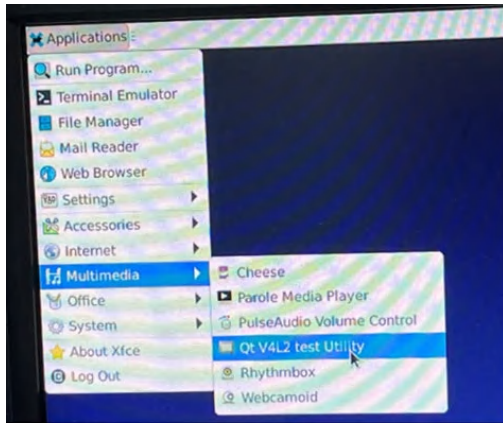


4.2.13 HDMI in test (CN35)

Test schematic:



1. Prepare one as source in devices (HDMI output), such as SBC2100-Android 4.4
2. Use built-in APP (Qt V4L2 test Utility)
Open the **Qt V4L2 test Utility** APP → **"Open Raw Device"** select **" video40"**
After **the Audio Setting part** (shown in the red box) to setting:
Audio input Device → (rockchip.hdmiiin.hw)
Audio Output Device → (Default)
3. Play  green button , SBC3800 will show the screen captured by SBC2100:





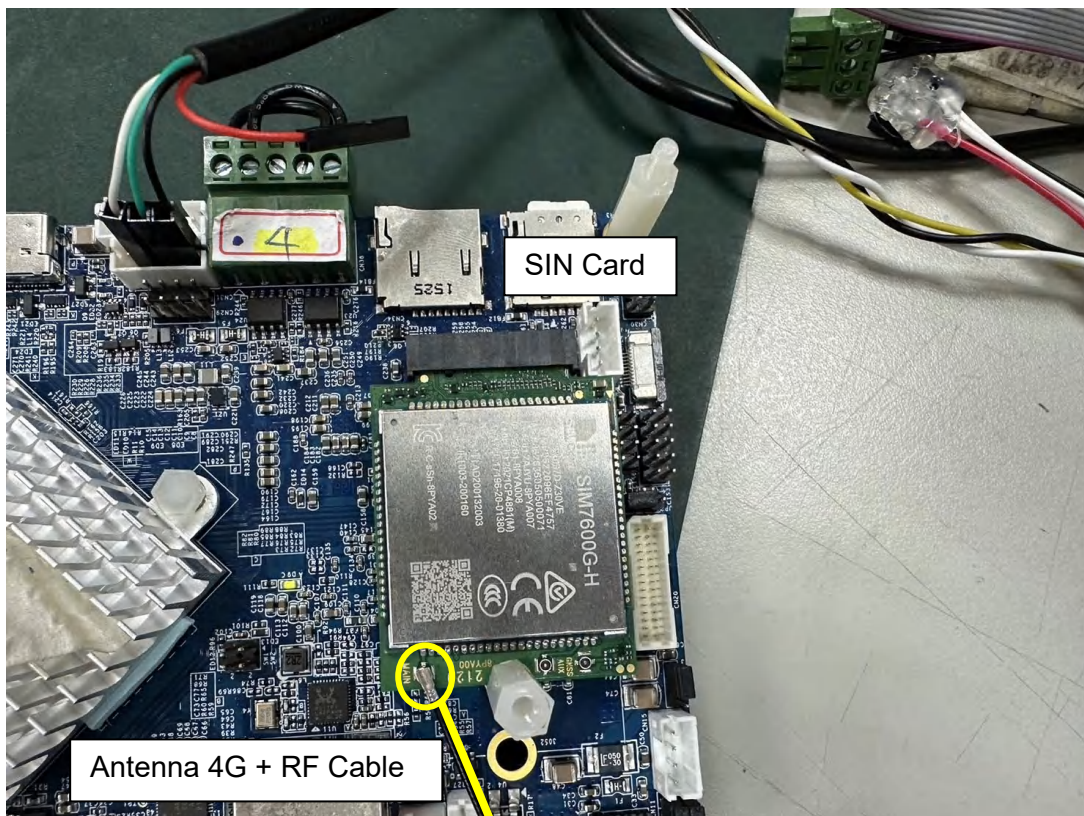
4.2.14 4G LTE test

Prepare Antenna 4G + RF Cable and 4G Module

Antenna 4G(Dipole),2dB_i,16.7cm,SMA 公頭公針(黑),美碩[®]

Antenna RF Cable(GPS/4G),1.13,15cm,母頭母針(黑),IPEX4,美碩[®]

模組 Module,4G,SIM7600G-H_PCIe,MiniPCIe,SIMCom[®]



After booting, dial the command at the Console port:

在 Console port 撥接指令:

```
# pppd call provider
```

```
//ifconfig will show ppp0
```

```
ping 8.8.8.8
```

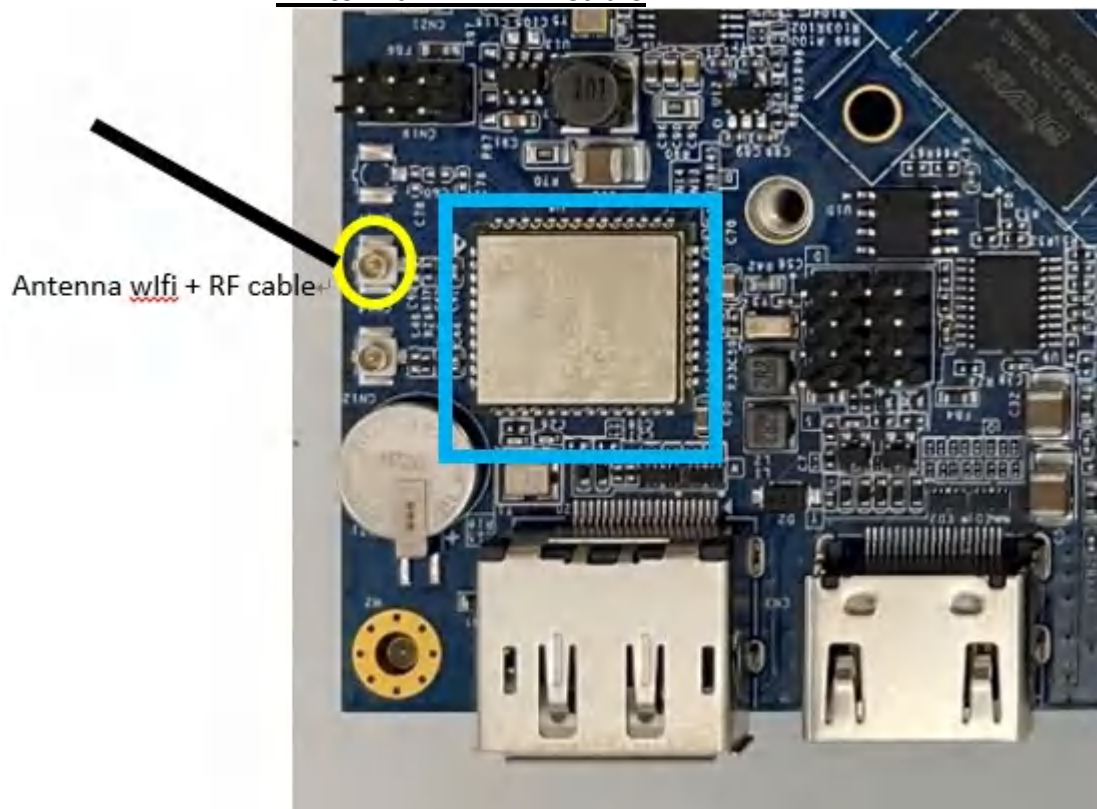
```
ppp0: flags=4305<UP, POINTOPOINT, RUNNING, NOARP, MULTICAST> mtu 1500
  inet 10.16.162.89 netmask 255.255.255.255 destination 10.64.64.64
  ppp txqueuelen 3 (Point-to-Point Protocol)
  RX packets 5 bytes 62 (62.0 B)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 7 bytes 115 (115.0 B)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@rockchip-rk3588-evb:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=55 time=197.060 ms
64 bytes from 8.8.8.8: seq=1 ttl=55 time=68.420 ms
64 bytes from 8.8.8.8: seq=2 ttl=55 time=67.785 ms
64 bytes from 8.8.8.8: seq=3 ttl=55 time=47.650 ms
```

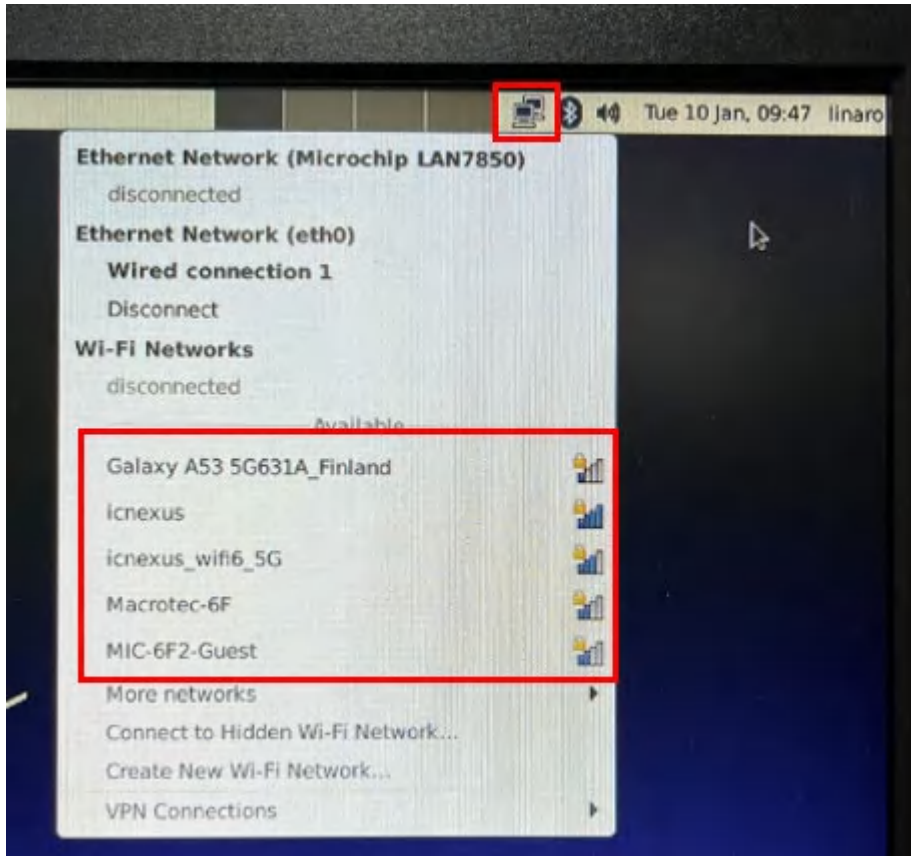
4.2.15 WiFi/BT test (optional)

The actual location of the WiFi/BT module:

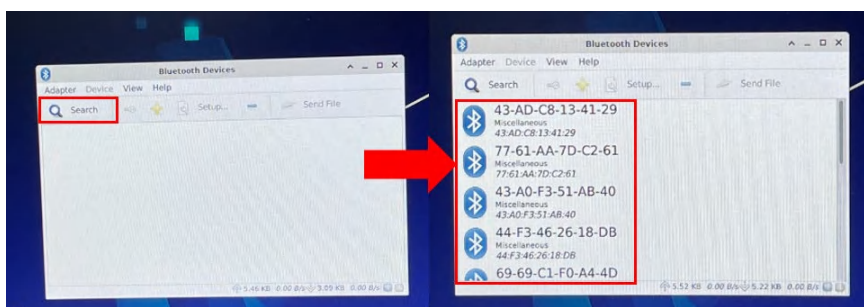
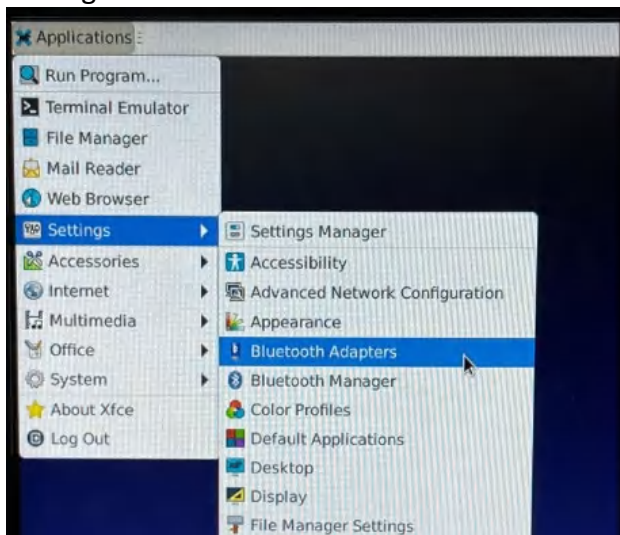
Remember add the Antenna wlfli + RF cable first.



1. The interface in the upper right corner of the system screen shows that WiFi automatically searches for SSID devices

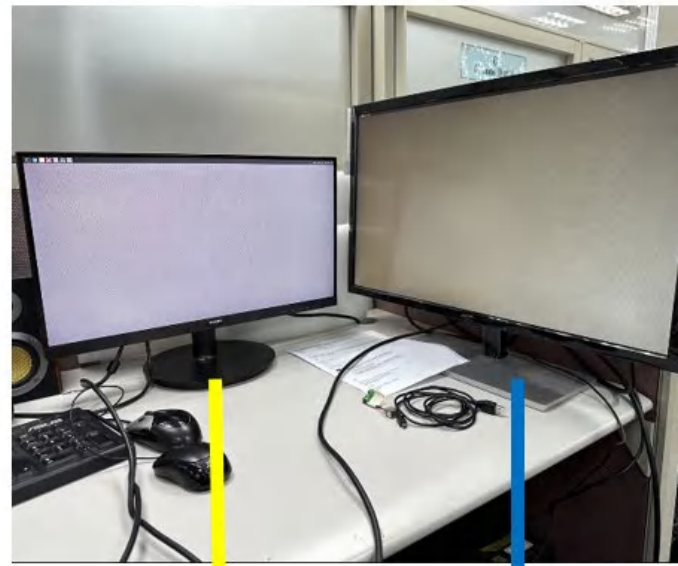
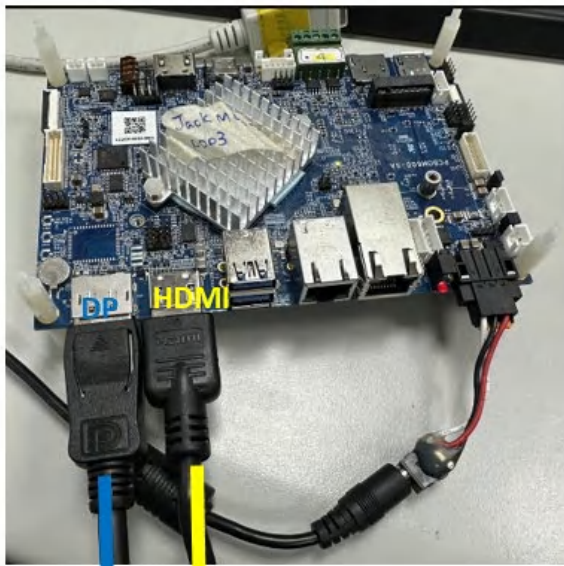


2. Using the Bluetooth Manager, go to Applications>>Settings>>Bluetooth Manager to Search BT Devices



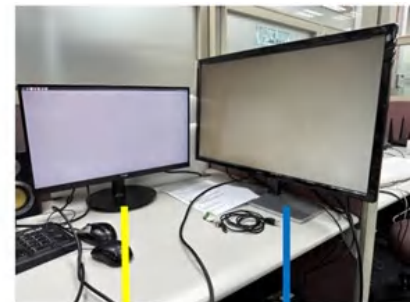
4.2.16 DP out test

Using the DP screen to test



4.2.17 Type C (CN39) test

With the Type C to DP or Type C to HDMI tool to display



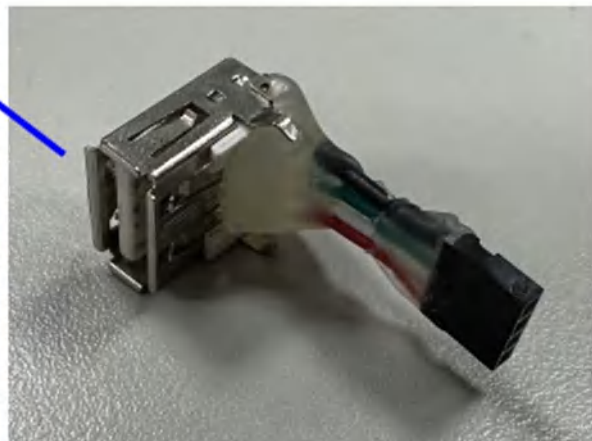
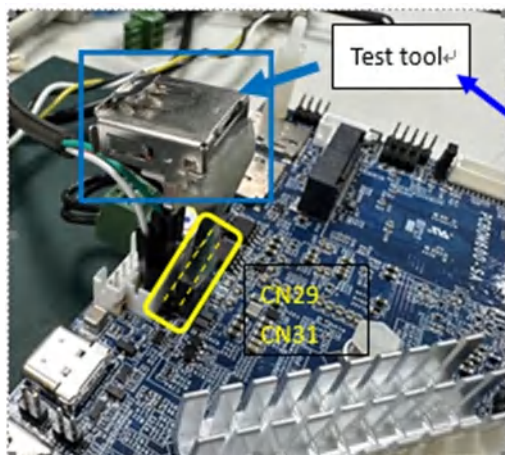
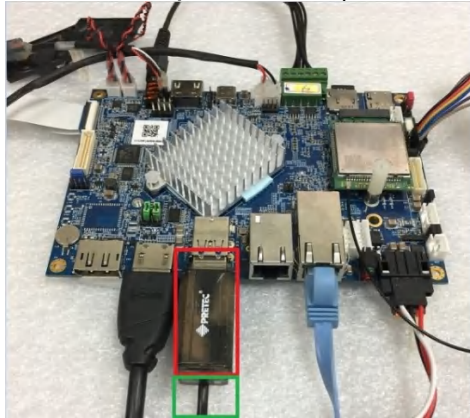
4.3 Android

4.3.1 USB & SD Card test

USB

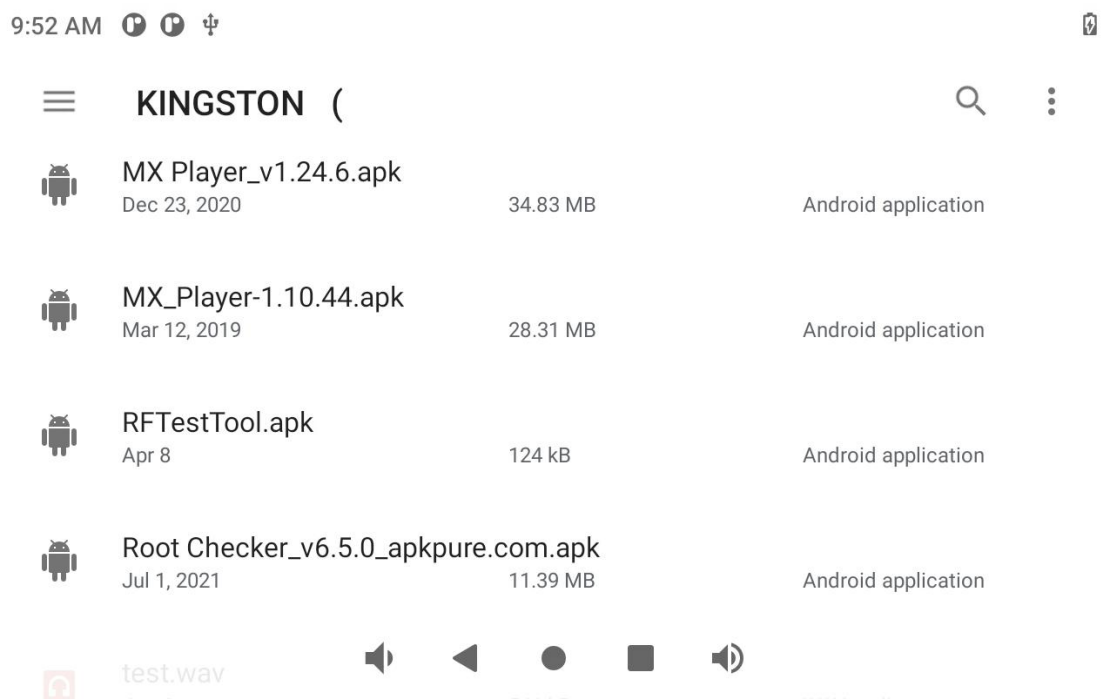
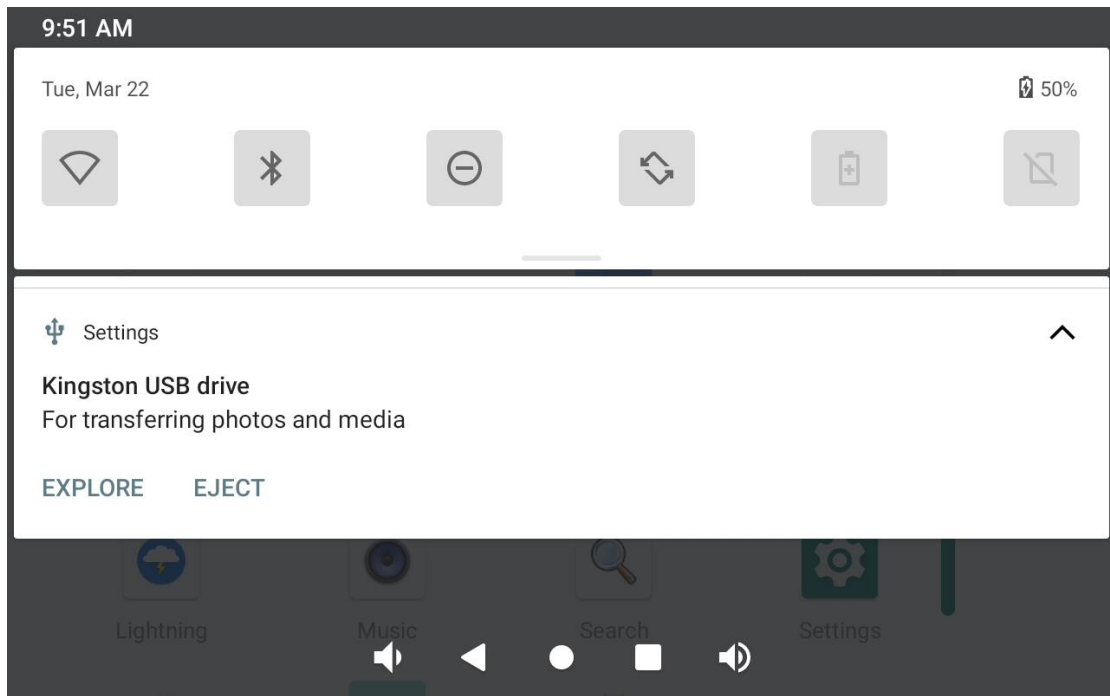
USB3.0 Host (CN4)

2x USB 2.0 pin header (CN29 & CN31),



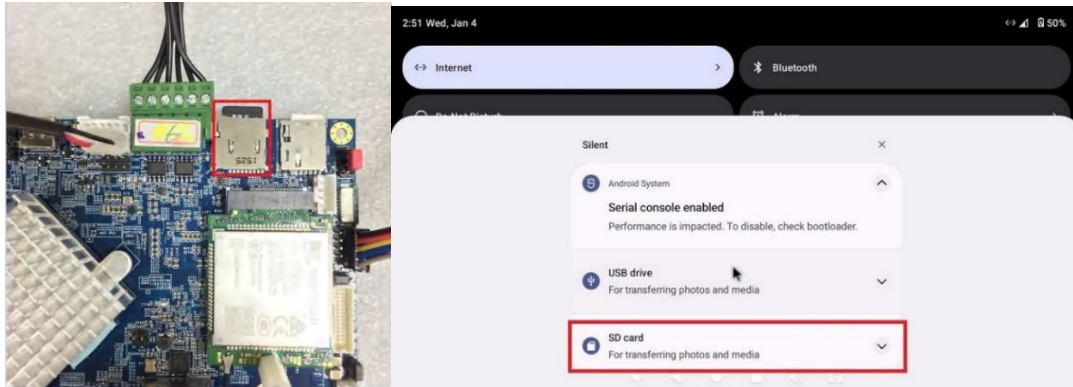
Following are the steps

Go to **USB devices** → And **“EXPLORE”**, you can now using USB devices to install apps you want.



****SD Card****

Insert to Micro SD Connector(CN34) of SBC3500



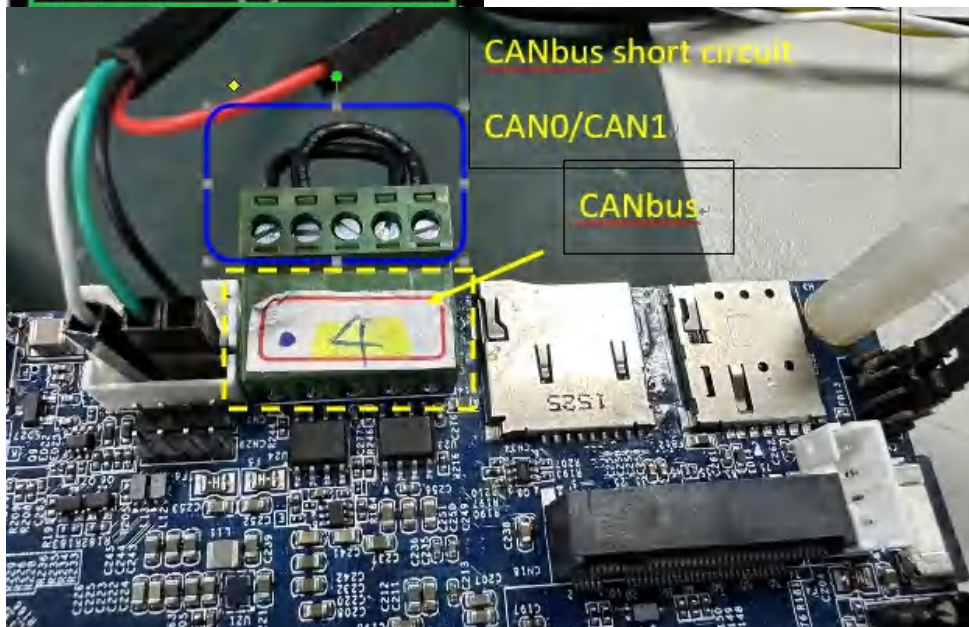
4.3.2 CAN bus

Paste the following commands into the console window and press Enter you can using a short circuit CAN0/CAN1 to test:

```
ip link set can0 up type can bitrate 125000
ip link set can1 up type can bitrate 125000
```

```
candump can0 &
cansend can1 001#112233
```

```
:/ # ip link set can0 up type can bitrate 125000
ip link set can1 up type can bitrate 125000
:/ # candump can0 &
[1] 2137
:/ # cansend can1 001#112233
can0 001 [3] 11 22 33
```



4.3.3 The LAN1 & LAN2(optional) test

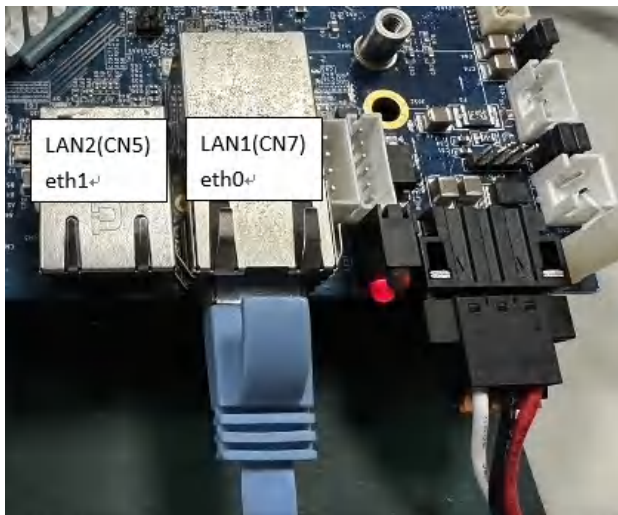
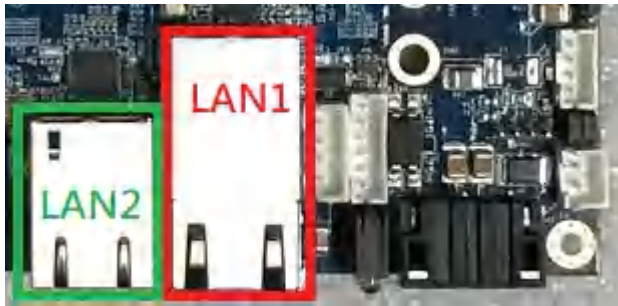
Insert RJ45 Cable, see the pattern in the upper right corner of the system(red circle), you can using the browser to internet.

A. LAN1(CN7) eth0, ok

ping 8.8.8.8

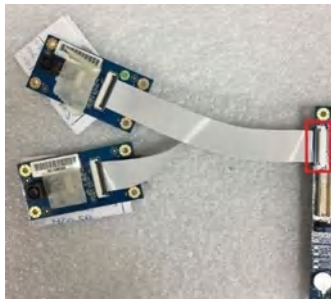
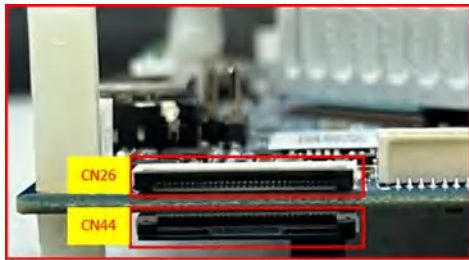
B. LAN2(CN5) eth1, ok

ping 8.8.8.8

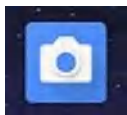


4.3.4 MIPI camera input test (CN26,CN44)

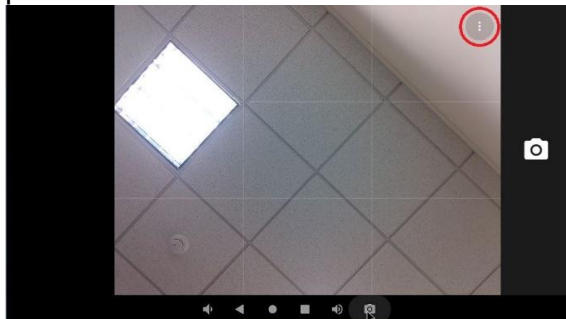
- Using the Camera modules (OV13855) board,

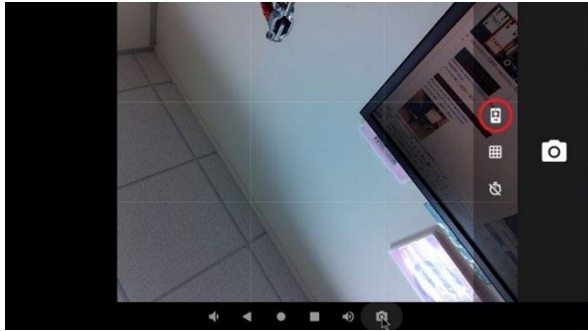


1. Click built-in the Camera AP,

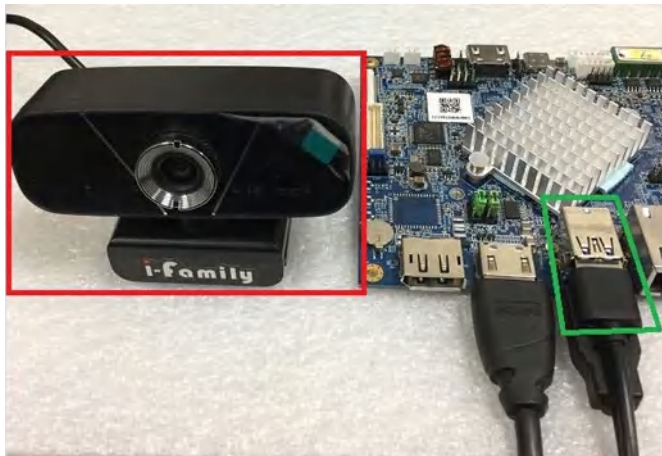


It will show present the display of camera, if want switch to another lens, please click the switch button in the red frame.

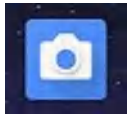




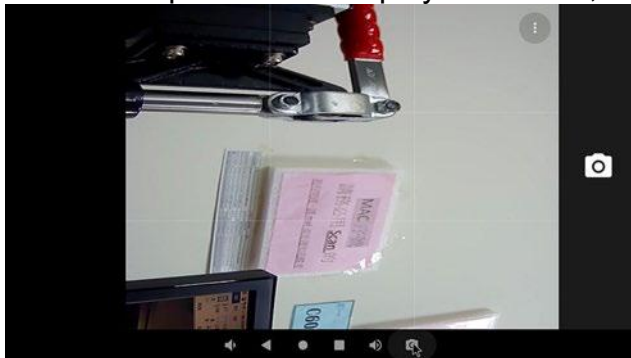
4.3.5 USB Camera



1. Click built-in the Camera AP,



It will show present the display of camera,



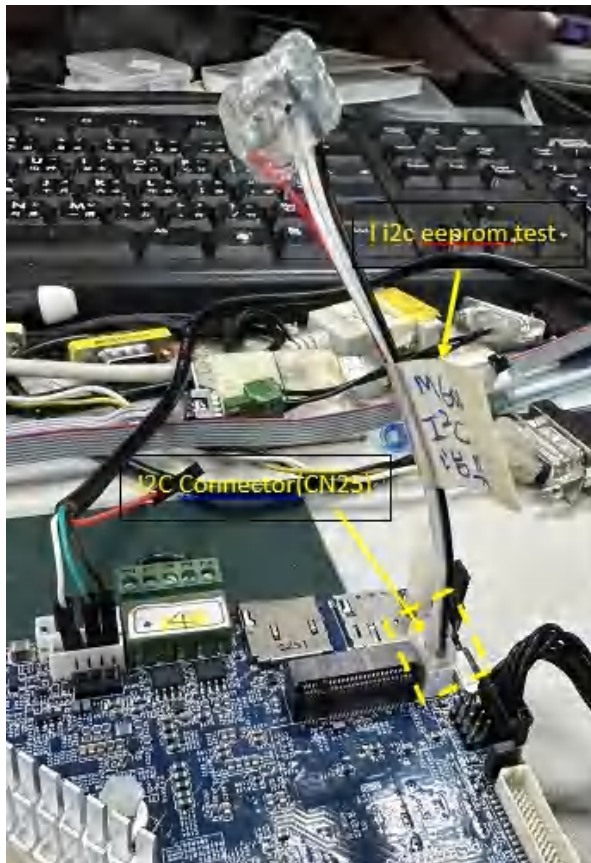
4.3.6 i2c (CN25)Test

Paste the following commands into the console window and press Enter, you can using a i2c eeprom test board to detect .

```
i2cdetect -y -a 4
```

it will show 50 nodes

```
:/ # i2cdetect -v -a 4
0 1 2 3 4 5 6 7 8 9 a b c d e f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: UU -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```

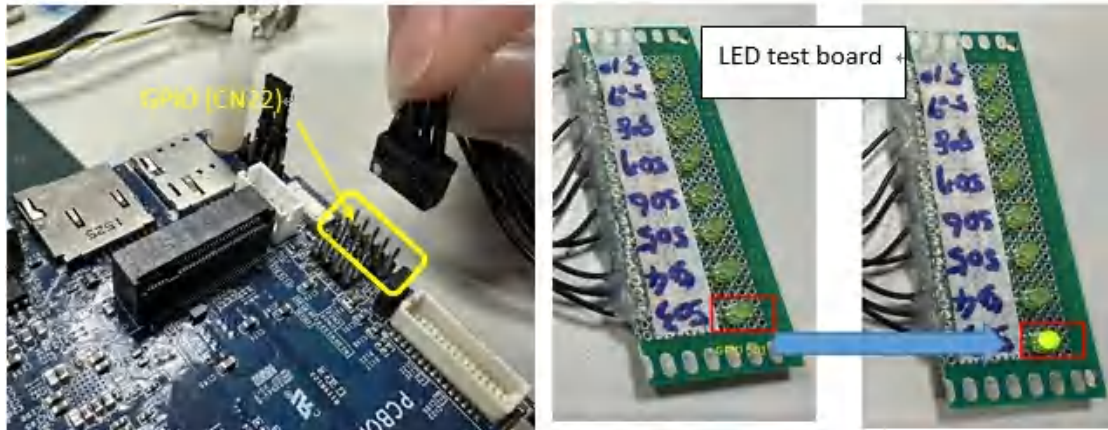


4.3.7 GPIO

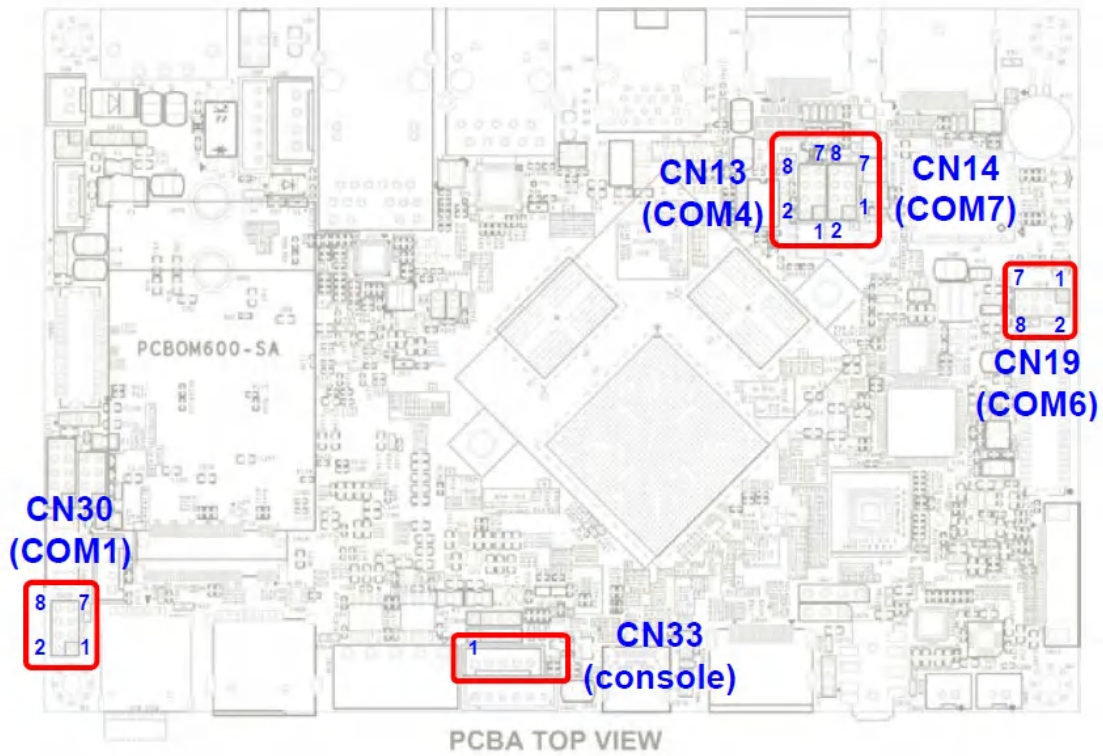
Paste the following commands into the console window and press Enter
GPIO501 ~ GPIO508, you can use a LED test board to control LED light on-off .

For example, GPIO501 (to test other GPIO# please replace the red numbers by yourself)

```
cd /sys/class/gpio/  
echo 501 > export  
cd gpio501  
echo out > direction  
echo 1 > value  
echo 0 > value
```



4.3.8 RS232/RS485(CN13 CN14 CN19 CN38) x4 test



```

busybox microcom -s 115200 /dev/ttyS1
busybox microcom -s 115200 /dev/ttyS6
busybox microcom -s 115200 /dev/ttyS4
busybox microcom -s 115200 /dev/ttyS7
    
```

- Test RS232 function, the following is CN19 COM6 (ttyS6),
5. Connect to RS232 port and run the two hyper terminal on PC (such as TeraTerm).
One open COM4 for RS232
One open COM11 for debug port

When you open the Terminal window, you have to do some serial port setup (see below pic).

- (7) Port : Select the COM which your device connected.
- (8) Baud rate : 115200
- (9) Date : 8 bit

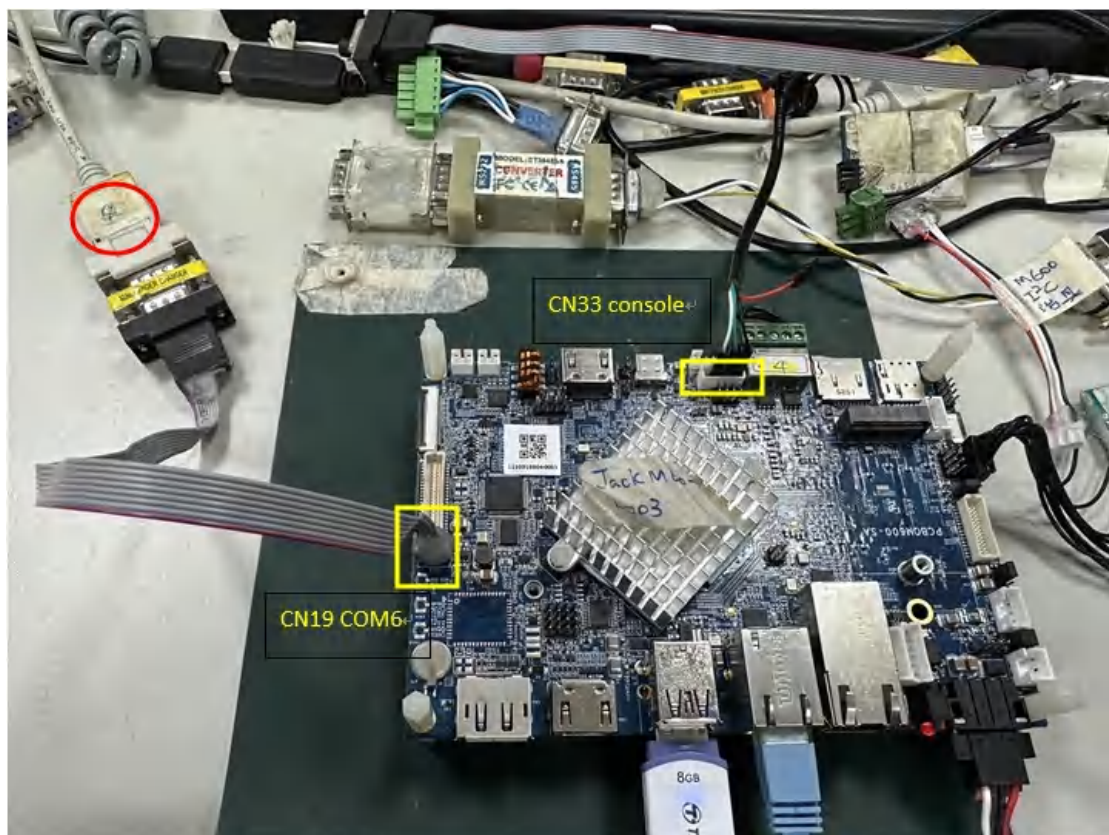
6. execute following commands in console window:
busybox microcom -s 115200 /dev/ttyS6

Receiving:

Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

Sending:

Type any number or sentence in the console window (CON11) and you should see the same output appears in terminal window (CON4).





After the test is complete, Ctrl + C jumps out of the background, Other RS232 ports are also tested in the same way, change COM4 to other RS232 ports (ttyS1/ ttyS7)

- Test RS485 function,
5. After setting UART port and configuration, you can start to read and write data.

The test method is as same as RS232.

6. execute following commands in console window:
busybox microcom -s 115200 /dev/ttyS4

Receiving:

Type any number or sentence in terminal window (COM4) on your PC desktop and you should see the same output appears in the console window (CON11).

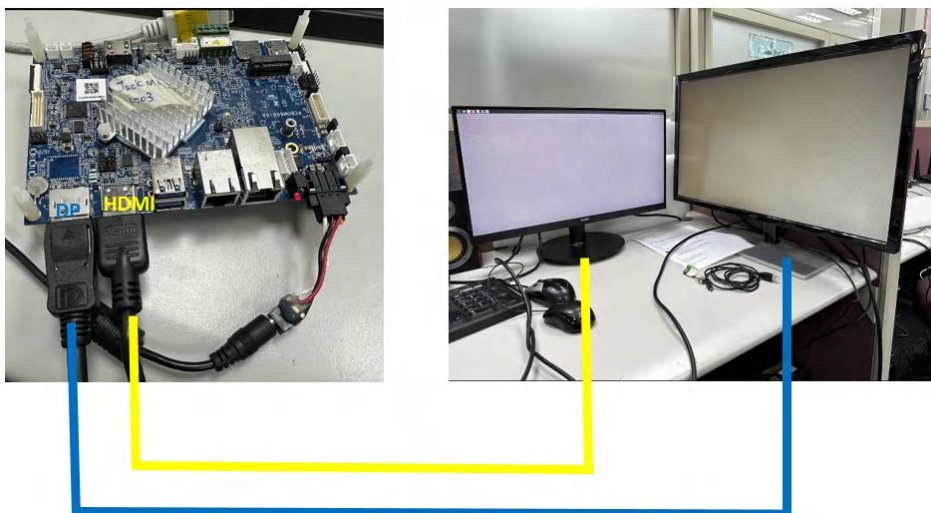
Sending:

Type any number or sentence in the console window (CON11) and you should see the same output appears in terminal window (CON4)

4.3.9 HDMI (CN2) / DP (CN3) Out

At present, you can plug in the HDMI first, and the HDMI monitor will be display after power on.

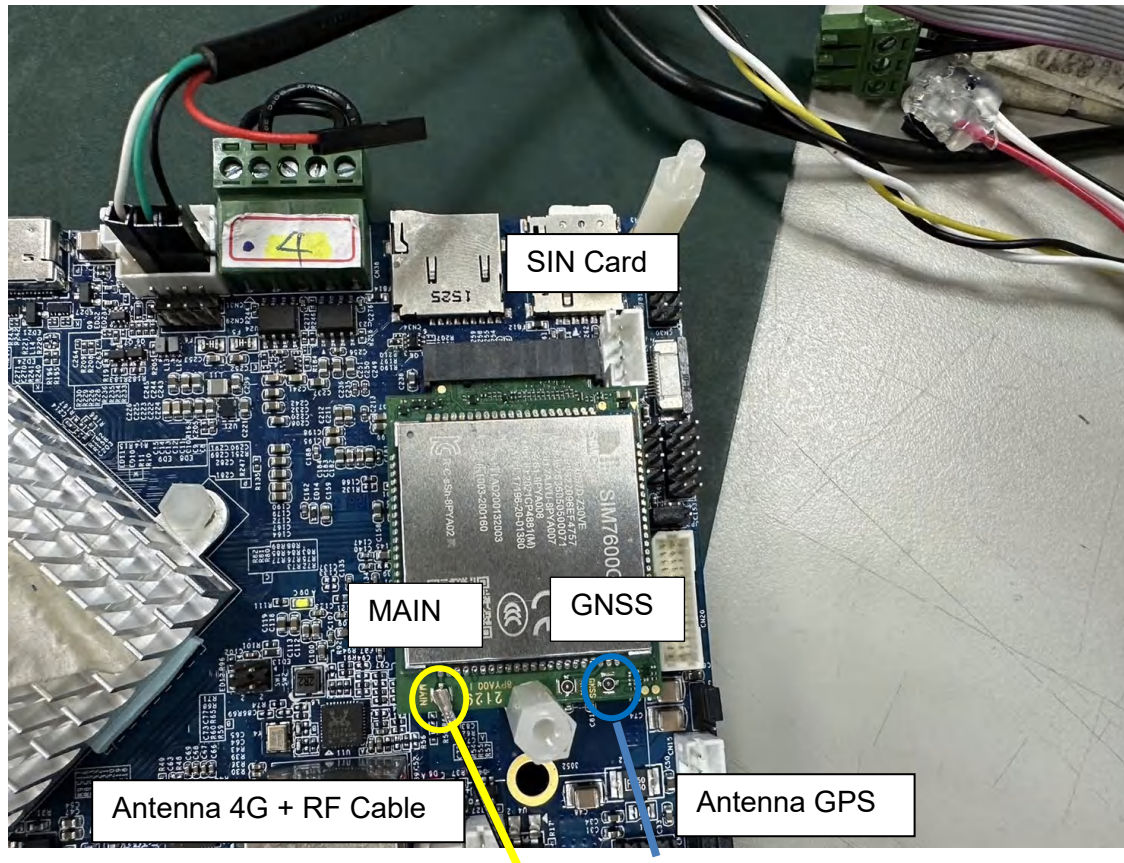
Using the DP screen to test



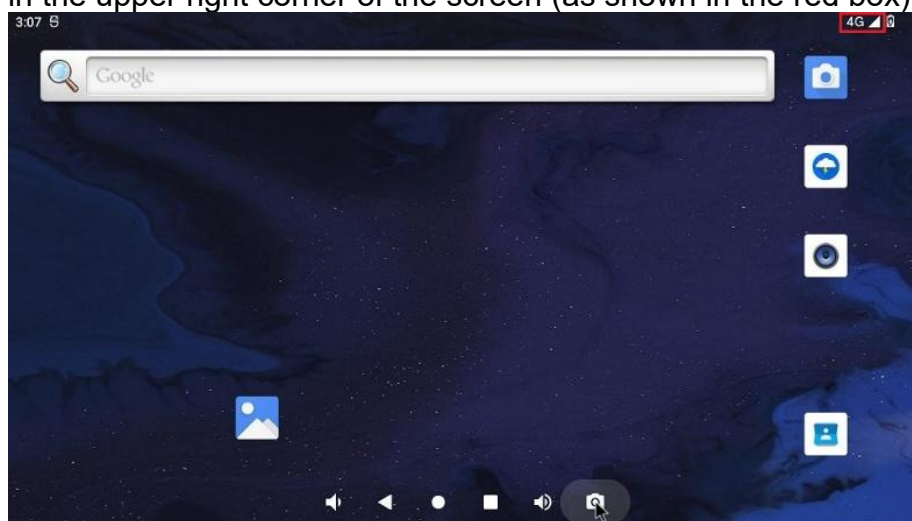
4.3.10 4G LTE +GPS test

Prepare Antenna 4G + RF Cable and 4G Module and GPS Antenna

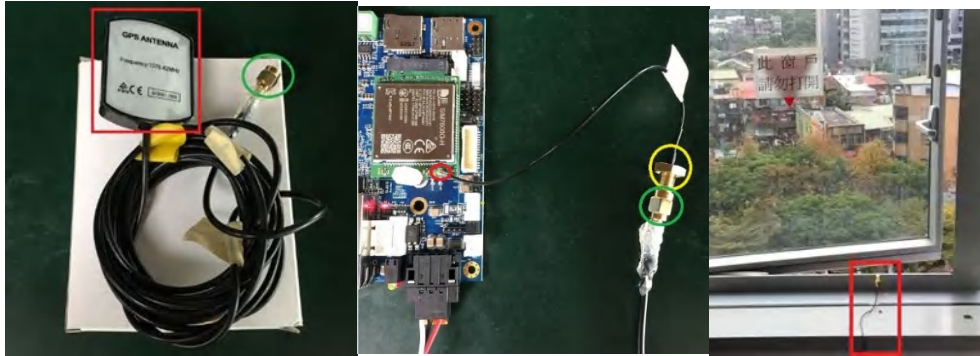
Antenna 4G(Dipole),2dB,16.7cm,SMA 公頭公針(黑),美碩®
Antenna RF Cable(GPS/4G),1.13,15cm,母頭母針(黑),IPEX4,美碩®
模組 Module,4G,SIM7600G-H_PCIe,MiniPCIe,SIMCom®



After powering on the system, you can see the 4G and signal strength pattern in the upper right corner of the screen (as shown in the red box)



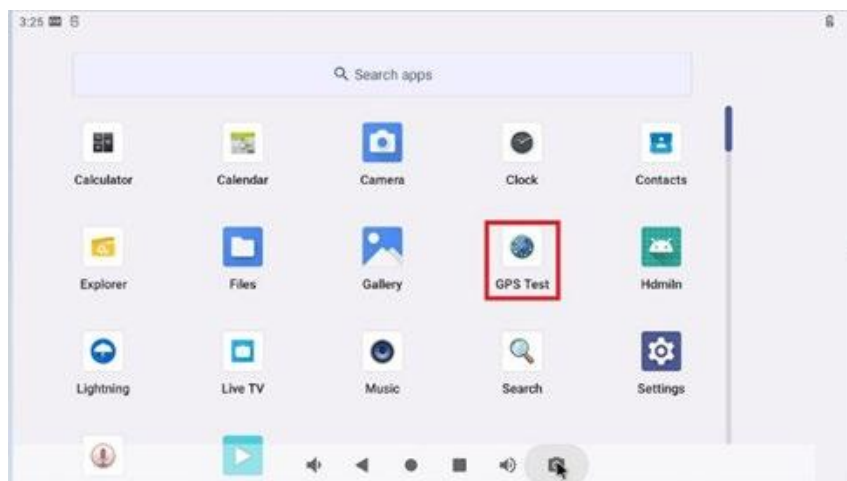
The SIM7600G-H is a 4G+GPS module, so can external GPS **three-foot** (3m) antenna cable,



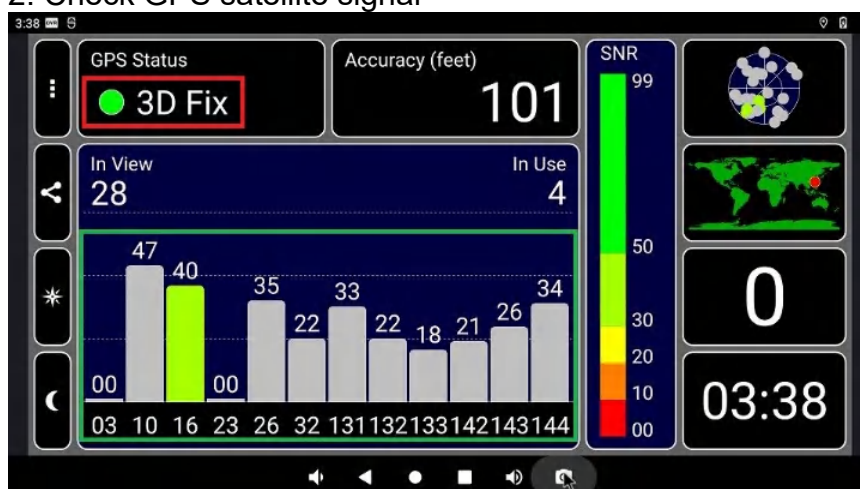
If you use a GPS five-foot external antenna, the GPS signal cannot be received because the cable is too long. The recommended length is about 3 feet.

1.First, you can install a GPS test AP, like as below:

https://drive.google.com/file/d/1biT3vOHTDPOA-VpNsAAHSIWS0qdAzHxX/view?usp=share_link



2. Check GPS satellite signal



4.3.11 CASH Drawer Connector test (CN22)

Paste the following commands into the console window and press Enter

```
echo 136 > /sys/class/gpio/export
```

```
echo out > /sys/class/gpio/gpio136/direction
```

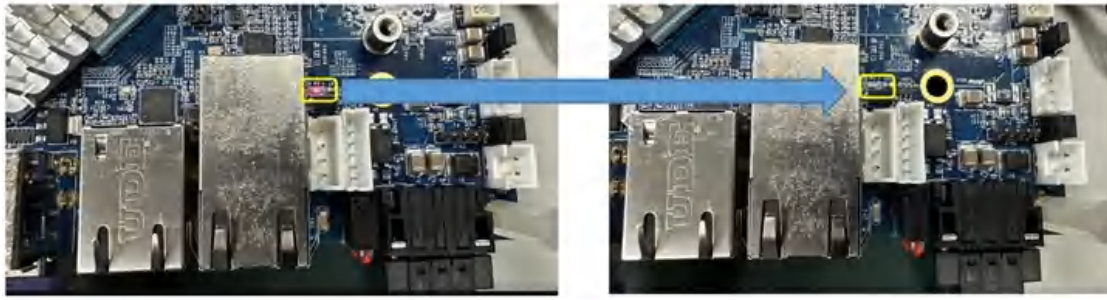
open cash drawer

```
echo 1 > /sys/class/gpio/gpio136/value
```

close cash drawer

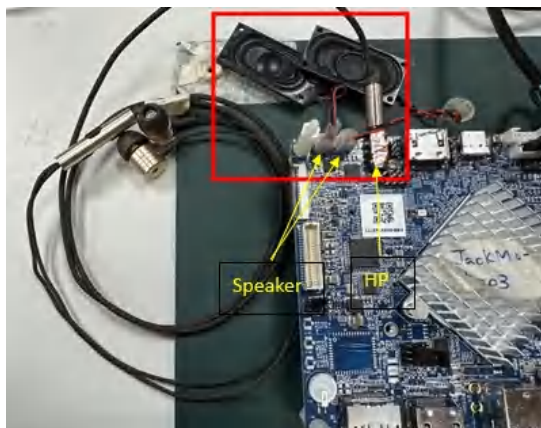
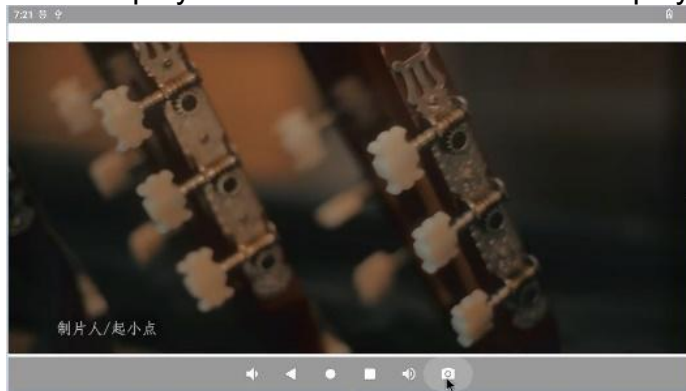
```
echo 0 > /sys/class/gpio/gpio136/value
```

The above can be tested by using the LED light on the board end to turn off/on



4.3.12 Speaker/HP

You can play a MP4 file or internet Youtube play video .

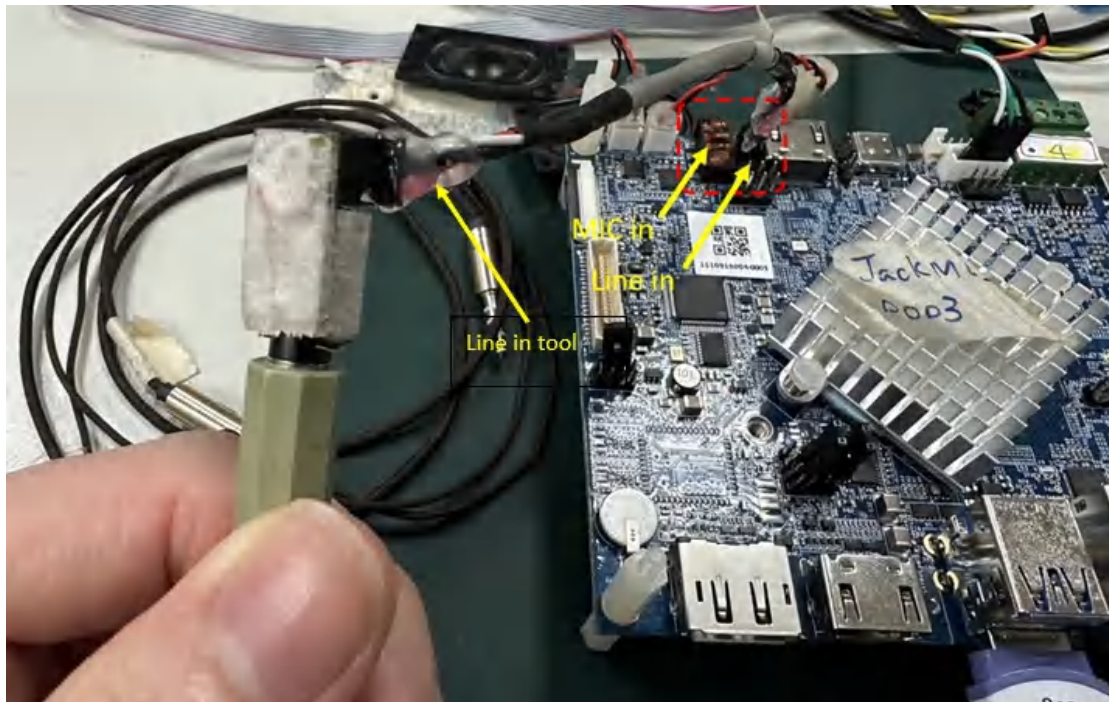


If the HDMI display is connected, the system will sound from the HDMI screen itself, unplugging the HDMI cable, it will switch sound from the built-in Speaker/HP

4.3.13 The Mic / the Line in to recording test

The default is Mic /Line in on

PC can play a MP3 music for recording, the Line in need to be equipped with fixtures.



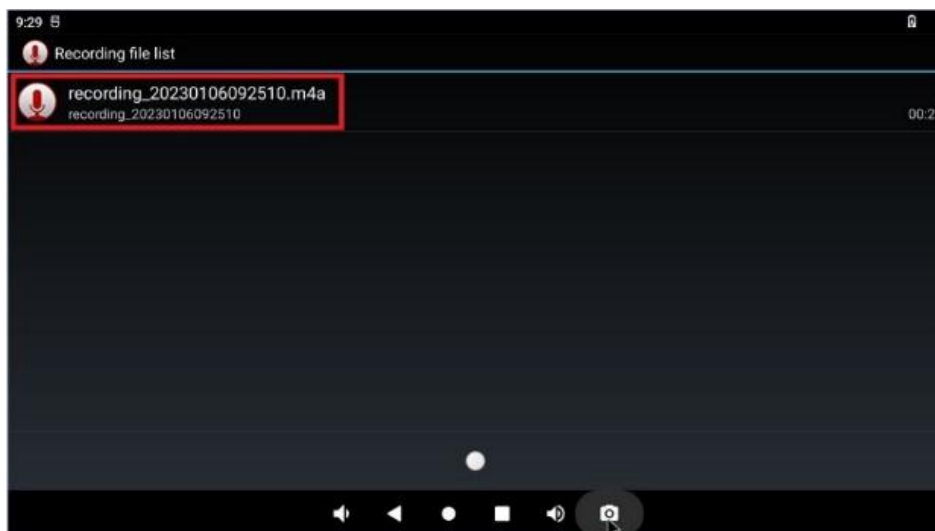
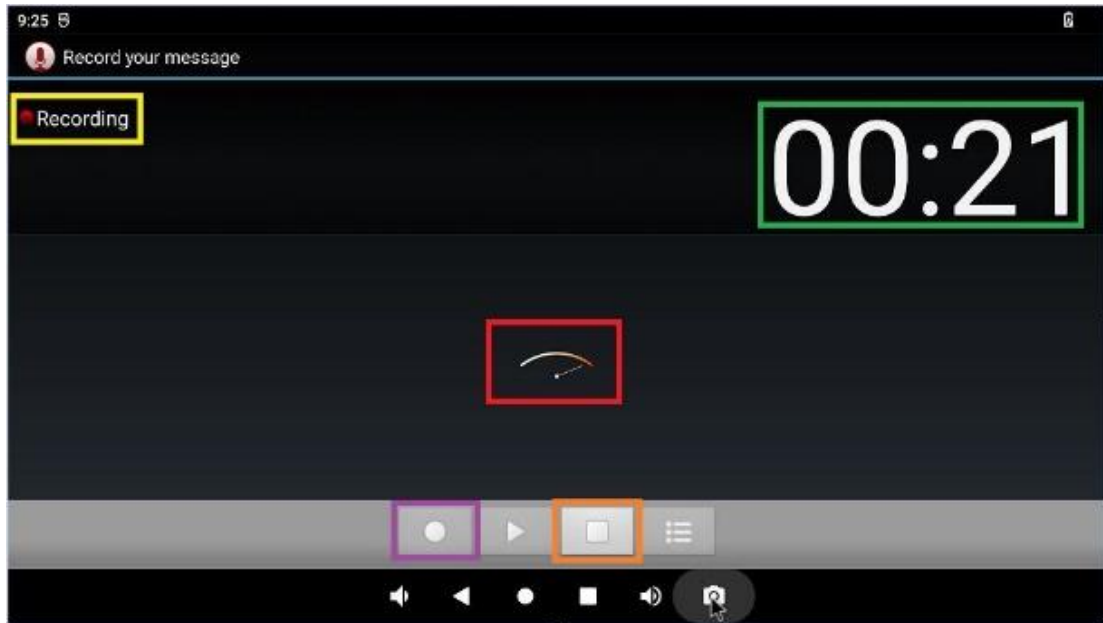
1. click built-in Sound Recorder AP,



2. Enter the recording, click the recording button● (purple box) to start recording.

3. And then click Stop button (orange box) to Save (red box) .

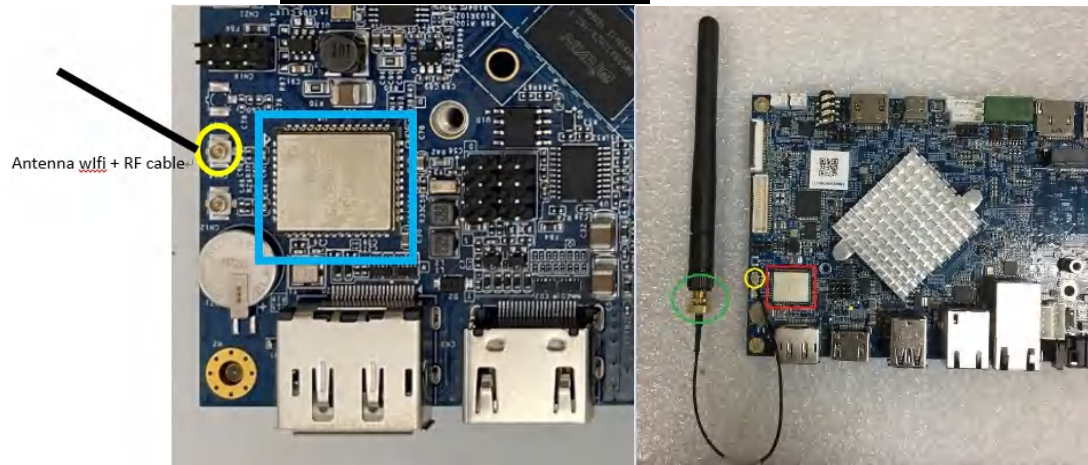
4. Click ☰ start the recording file to play



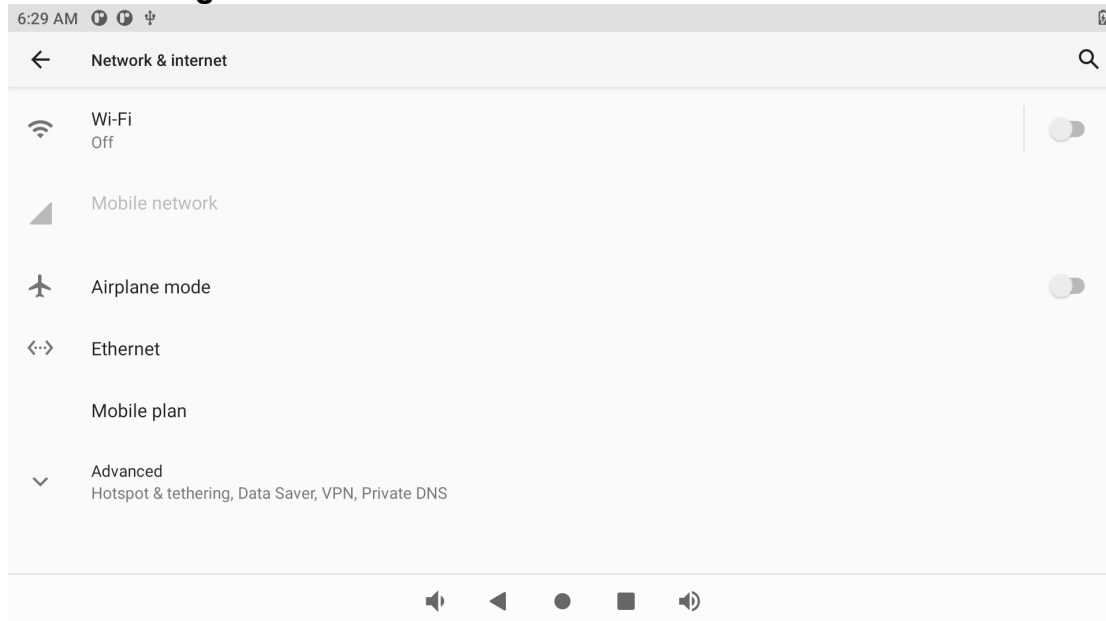
4.3.14 WiFi/BT test (optional)

The actual location of the WiFi/BT module:

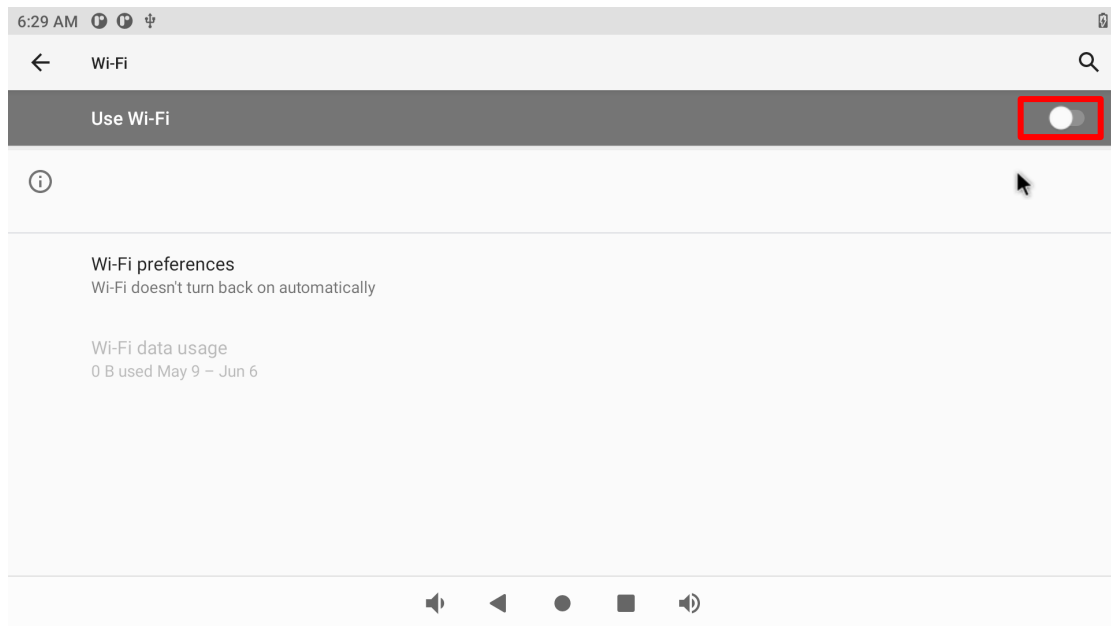
Remember add the **Antenna wlfj + RF cable** first.



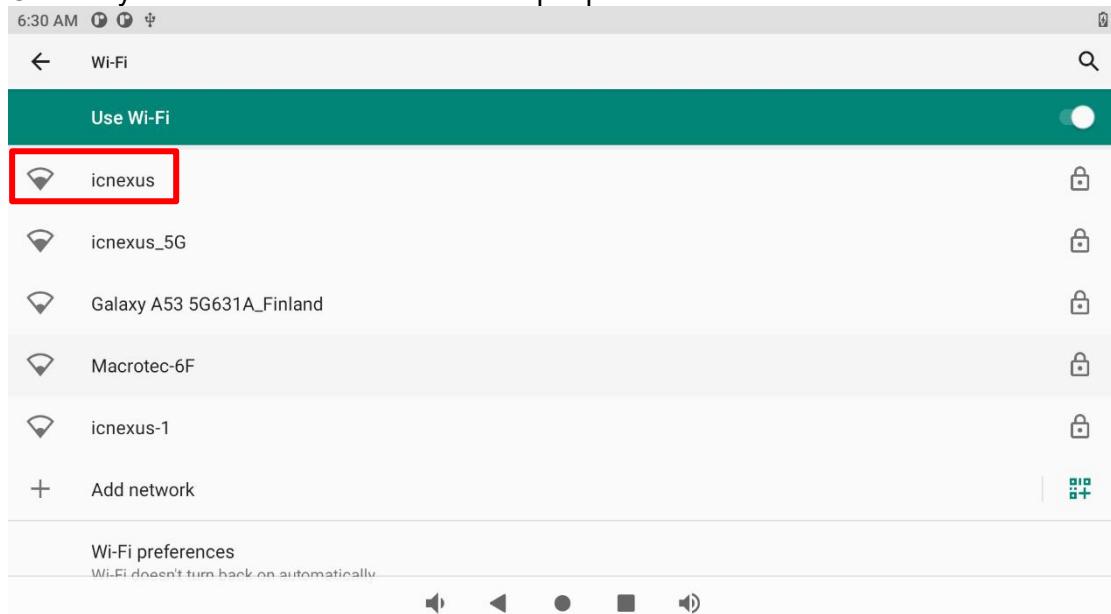
Go to “**Settings**” → “**Network & internet**” → “**Wi-Fi**”

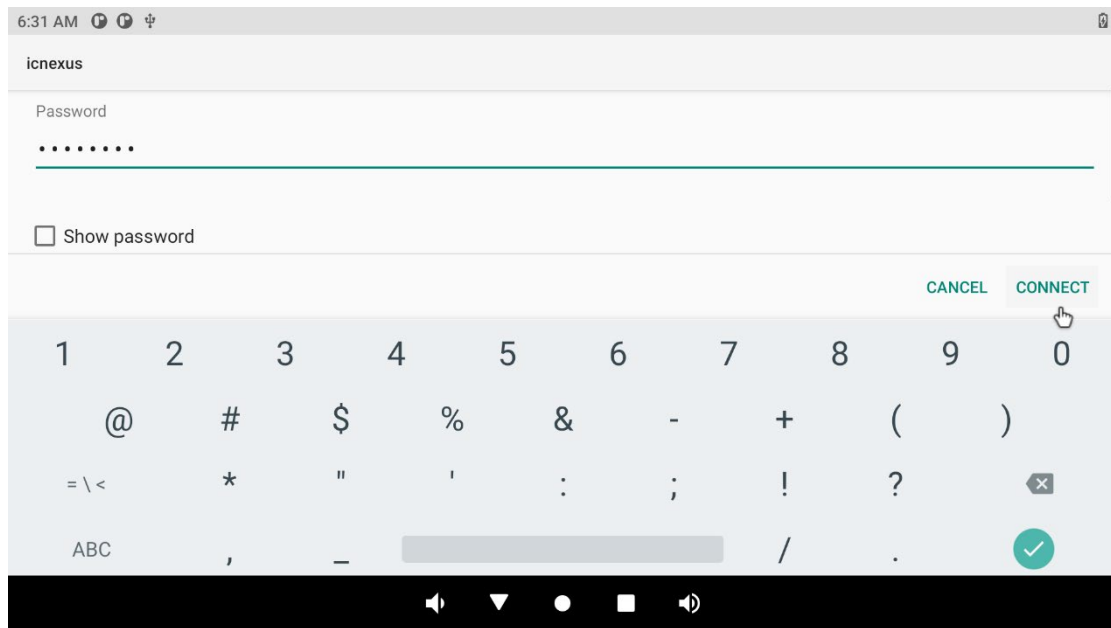


Enable WiFi button

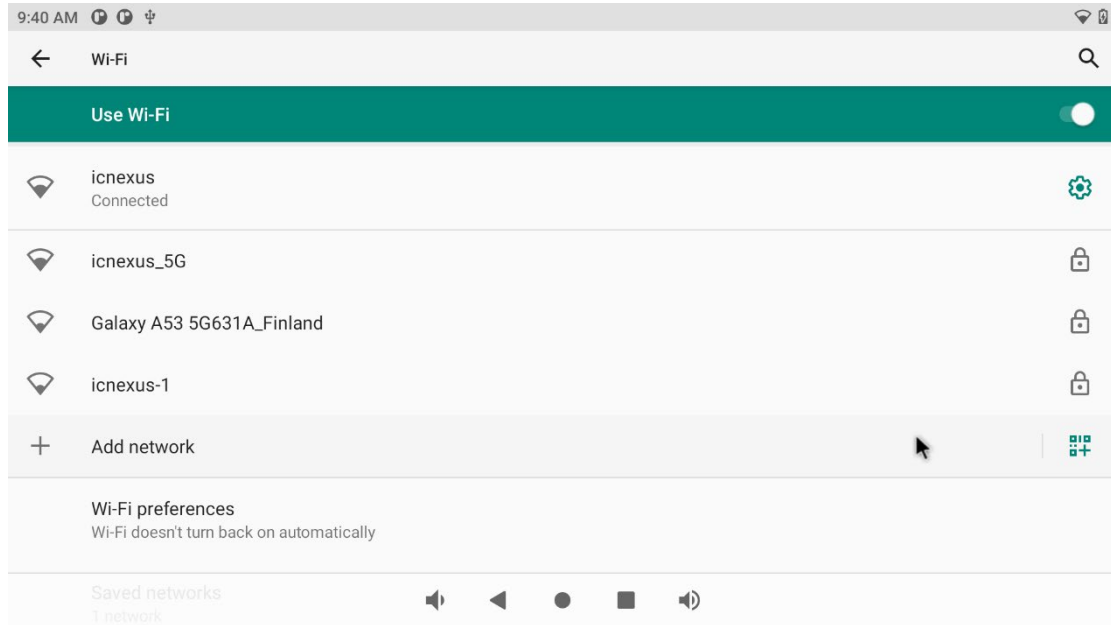


Choose your WiFi AP SSID name and input password

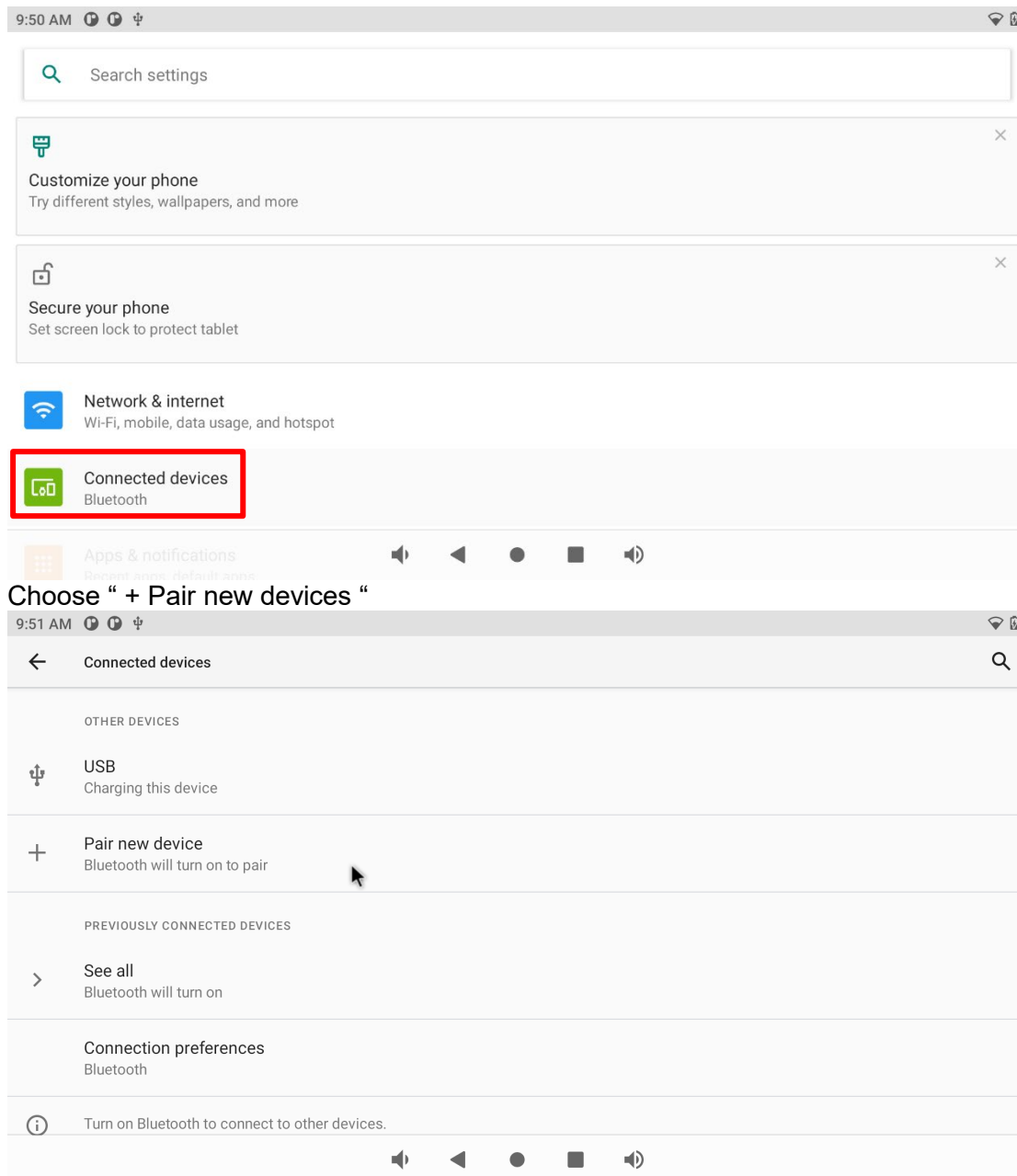




Connected success



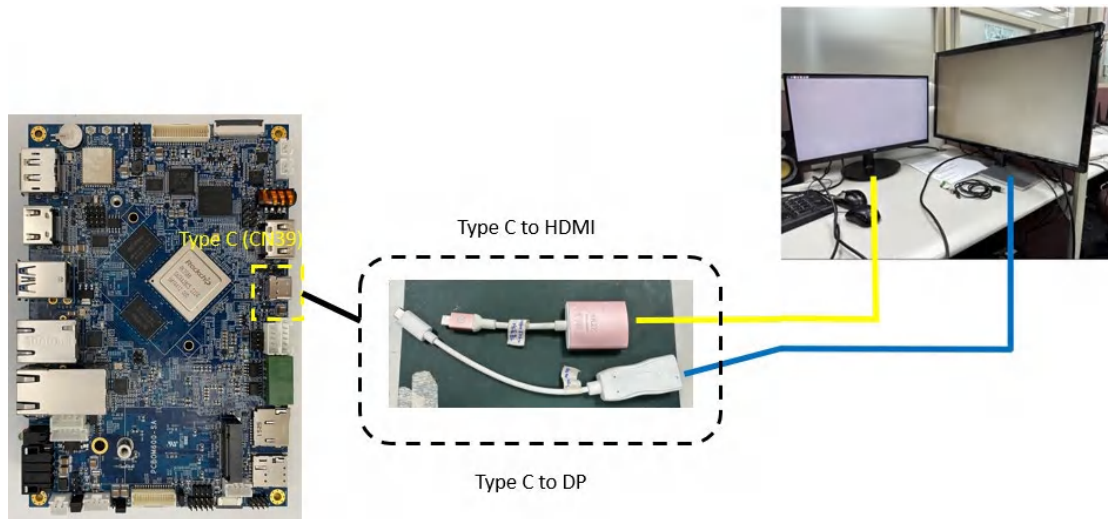
The Bluetooth, go to **“Settings”** → **“Connected devices”**



Search your Bluetooth devices and pair it.

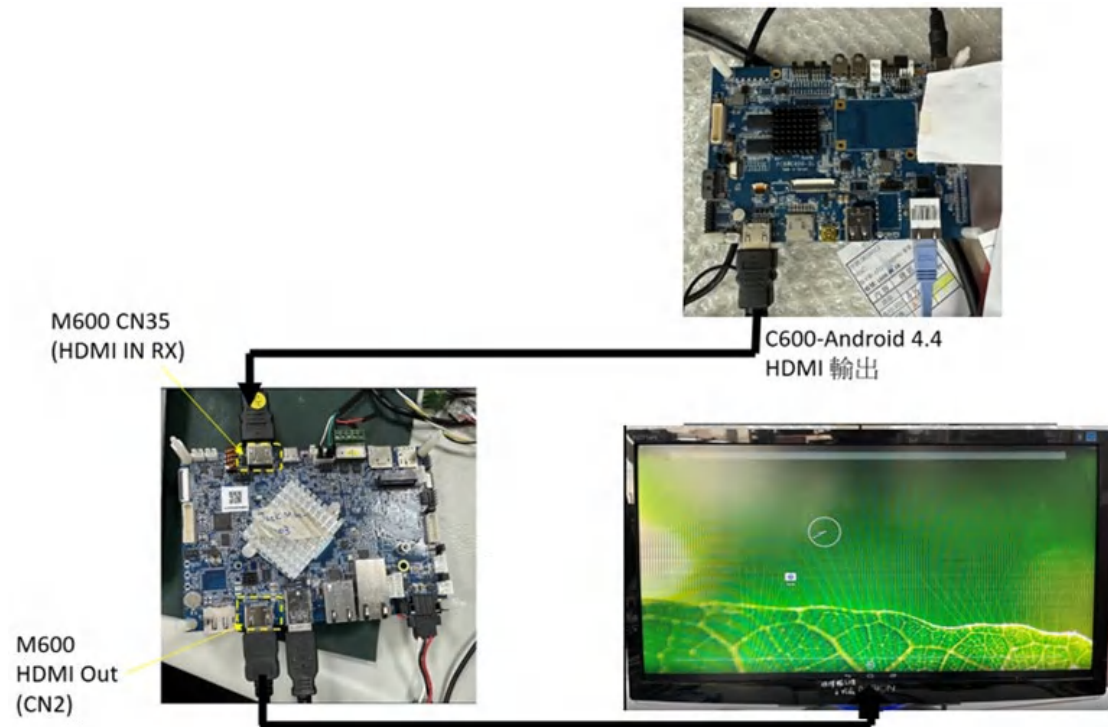
4.3.15 Type C (CN39) test

With the Type C to DP or Type C to HDMI tool to display

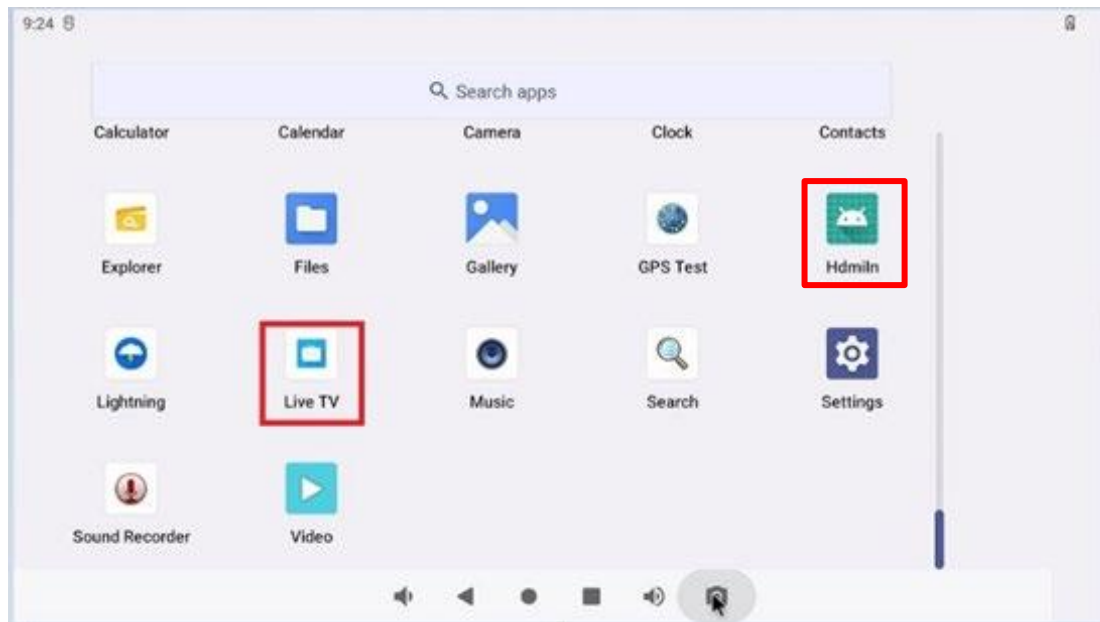


4.3.16 HDMI in test (CN35)

Test schematic:



1. Prepare one as source in devices (HDMI output), such as SBC2100-Android 4.4
2. Use built-in “HDMIIN” or ” LIVE TV” APP



The SBC3800 will show the screen captured by SBC2100:

[For any further informatin that we do not mention in the manual, please contact us directly.](#)

SBC3800 Operational description

The SBC3800 is a small size (102mmx150mm) single board computer designed for applications such as digital signage, HMI, POS, Gaming, Set top box, Kiosk, and other smart devices. The SBC3800 features a quad-core ARM Cortex-A76 processor plus a quad-core Cortex-A55 processor, 2x 10/100 LAN ports, PoE (Power over Ethernet) and a rich set of interfaces for a wide range of commercial and industrial applications.

Each SBC3800 can be installed in advance with Linux or Android for immediate evaluation.

	SBC3800
CPU	Rockchip RK3588 (64-bit ARM quad-core Cortex-A76 + quad-core Cortex-A55)
GPU	GPU: ARM Mali G610 MP4 (OpenGL ES 3.2 / Vulkan 1.2 / 8K video decoder and encoder)
NPU	6 TOPs
OS	Android / Linux
DDR RAM	4GB LPDDR4X (optional 8GB / 16GB)
Flash ROM	32GB (or bigger)
Display Interfaces	1x HDMI TX (8K @ 60fps)
	1x MIPI DSI (4K @ 60fps)
	1x eDP TX (4K @ 60fps)
	1x DP TX (8K @ 30fps)
Camera Interface	1x MIPI-CSI RX (4 lanes)
Touch Interface	1x Capacitive Touch Screen Interface (I ² C)
Audio Interface	1x Mic/Earphone connector + 1x Speaker output connector
USB 3.1	2x Type-A host + 1x Type-C OTG
USB 2.0	2x host (pin header)
SD 3.0	1x microSD slot

PCIe	1x PCIe 2.1 M.2 socket (for SSD)
Ethernet	LAN1: 1x GbE (RJ-45) + (optional) LAN2: 1x GbE (RJ45)
WiFi/BT	WiFi 6 (802.11 ac) + Bluetooth 5.0 (optional)
COM port	4x COM (RS232 or RS485)
GPIO	8-bit digital input/output (3.3V)
CAN bus	2x CAN2.0 (optional)
Console port	1× UART (console / debug)
I²C port	1x I ² C master port
PoE	PoE connector on LAN1 for external PoE module (optional)
Power Input	DC 12V-24V
MCU	(optional) MCU for software power on/off
Operating Temperature	0°C to 70°C -20°C to 70°C
Dimension	150mm x 102mm x H
Weight	<TBD>

FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF exposure statement:

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance between 20cm the radiator your body.