

SBC4100_NSD41xx_EC41xx

Quick Start Guide

Release Notes

Version	Release Date	Notes
1.0	Jan 2024	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.

1.4 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.

2. Overview

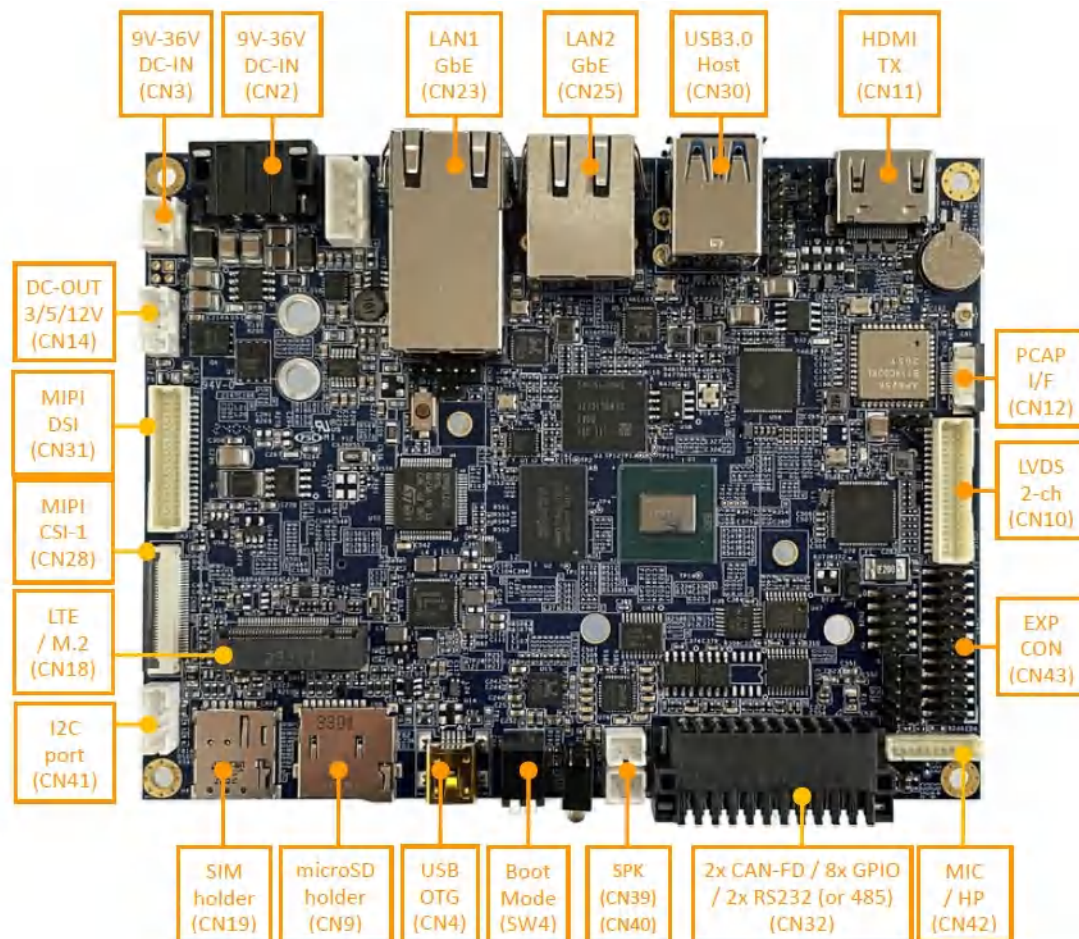
2.1 Overview

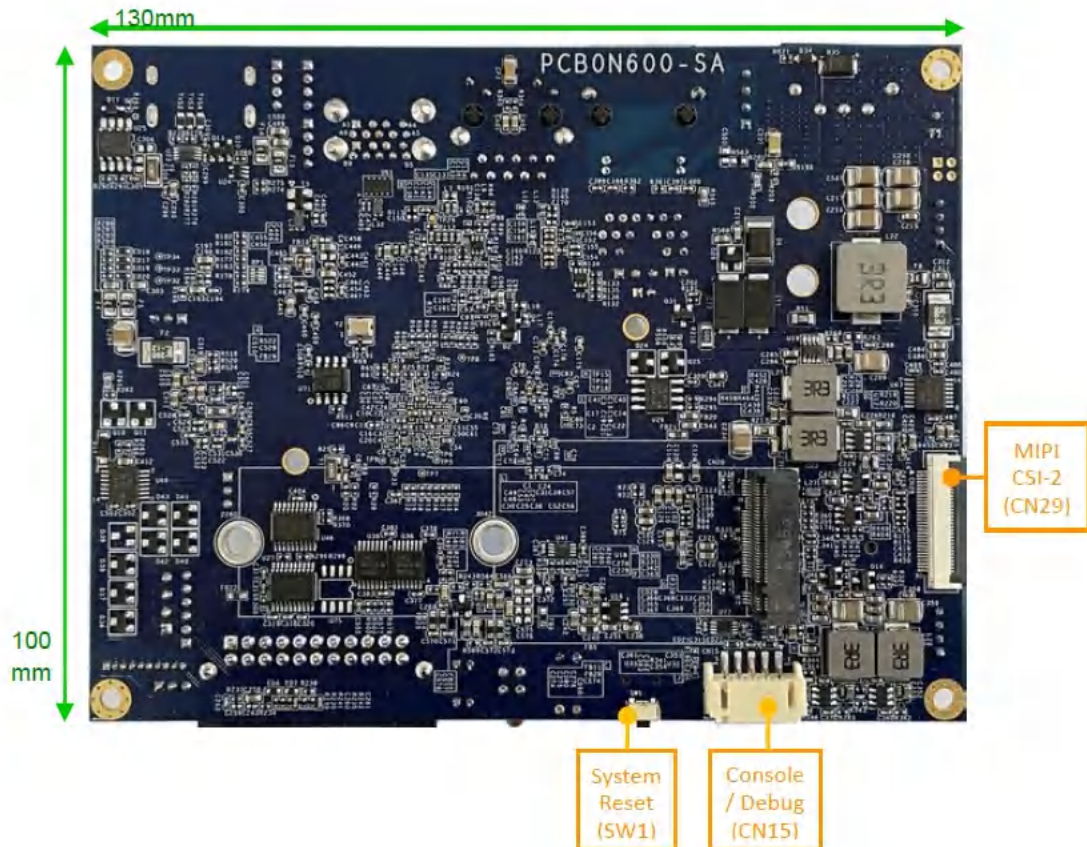
The SBC4100 is a compact size (100mmx130mm) single board computer designed for applications such as digital signage, HMI, POS, Gaming, Set top box, KIOSK and other smart devices. The SBC4100 features a quad-core ARM Cortex-A53 processor (NXP i.MX8M plus), 2x 10/100 LAN ports and PoE (Power over Ethernet) for a wide range of commercial and industrial applications.

Each SBC4100 can be installed in advance with Linux or Android for immediate evaluation.

2.2 Interface Specifications

The following photos and diagrams show brief connector positions on the SBC4100 product. See subsequent sections for more detailed connectors and functions descriptions.





3. Setup

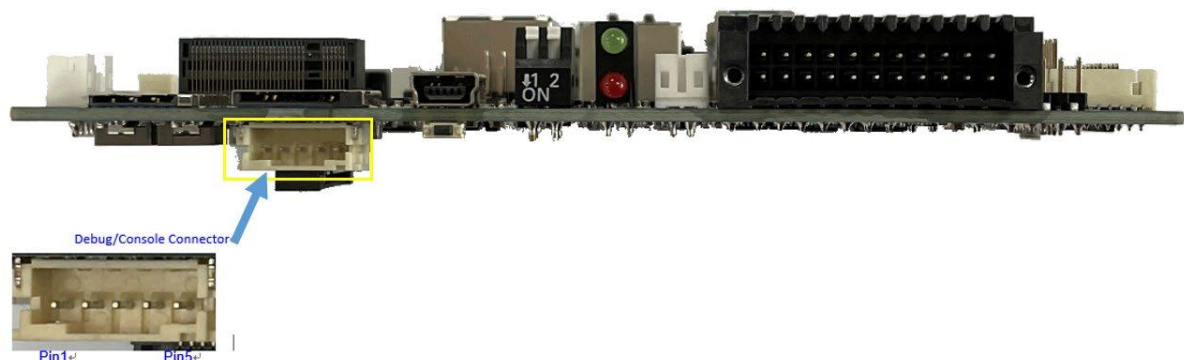
3.1 Console / Debug Port

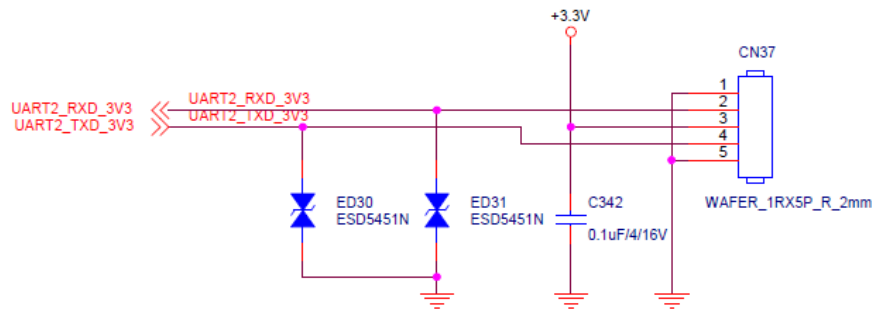
The console port (or debug port) is located behind a small plate on SBC4100_NSD4100 front panel (CN15 on PCBA).

NOTE: CN15 is dedicated for use as console/debug port. It CANNOT be used for RS232 application. The Linux device name of console/debug port is /dev/ttymx1.

Follow steps below to setup console port:

- Show as below locate the Debug connector.





- Make sure you have purchased a debug cable.



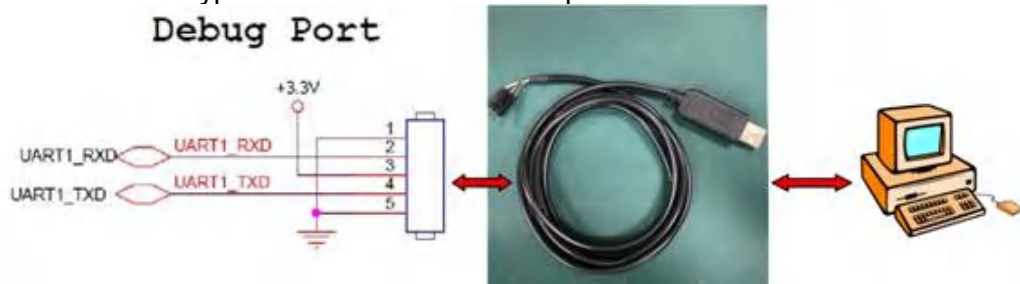
- Connect cable to debug/console connector.



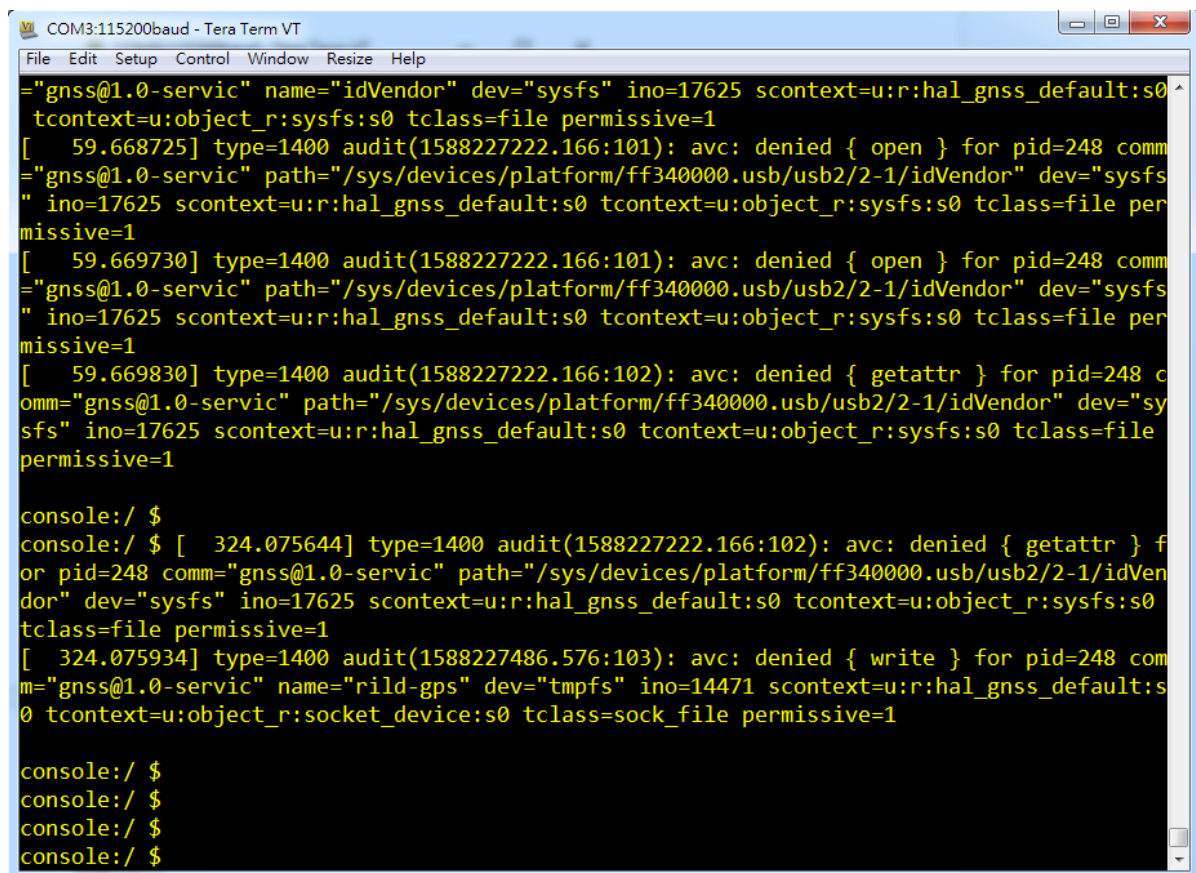
Warning: Do NOT connect Red terminal (VCC) to Debug connector

Debug Cable	VPC450 Debug/Console connector
White (TXD)	pin 2 (RXD)
Green (RXD)	pin 4 (TXD)
Black (GND)	Pin 1 (GND) or pin 5 (GND)

- Connect USB type A connector to PC host port



- The USB UART cable is based on Silicon Lab CP210X chip. You may need to download driver if your Windows PC does not support it. Driver download link is: <https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>
- Run terminal emulation program (e.g. **TeraTerm**), and open TeraTerm COM port.
- Set TeraTerm COM port at **Baud Rate 115200, 8 data bits, no parity, 1 stop bit and no flow control.**
- After the above connection/setting, you will see Linux console prompt "\$" in the PC TeraTerm.

A screenshot of a TeraTerm window titled "COM3:115200baud - Tera Term VT". The window shows a Linux console with various system messages and audit logs. The messages include "gnss@1.0-servic" and "idVendor" paths, and audit logs for denied operations like { open }, { getattr }, and { write }. The console prompt is "\$".

```
COM3:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help
="gnss@1.0-servic" name="idVendor" dev="sysfs" ino=17625 scontext=u:r:hal_gnss_default:s0
tcontext=u:object_r:sysfs:s0 tclass=file permissive=1
[ 59.668725] type=1400 audit(1588227222.166:101): avc: denied { open } for pid=248 comm
="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVendor" dev="sysfs"
ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0 tclass=file per
missive=1
[ 59.669730] type=1400 audit(1588227222.166:101): avc: denied { open } for pid=248 comm
="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVendor" dev="sysfs"
ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0 tclass=file per
missive=1
[ 59.669830] type=1400 audit(1588227222.166:102): avc: denied { getattr } for pid=248 c
omm="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVendor" dev="sy
sfs" ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0 tclass=file
permissive=1
console:/ $
console:/ $ [ 324.075644] type=1400 audit(1588227222.166:102): avc: denied { getattr } f
or pid=248 comm="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVen
dor" dev="sysfs" ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0
tclass=file permissive=1
[ 324.075934] type=1400 audit(1588227486.576:103): avc: denied { write } for pid=248 com
m="gnss@1.0-servic" name="rild-gps" dev="tmpfs" ino=14471 scontext=u:r:hal_gnss_default:s
0 tcontext=u:object_r:socket_device:s0 tclass=sock_file permissive=1
console:/ $
console:/ $
console:/ $
console:/ $
```

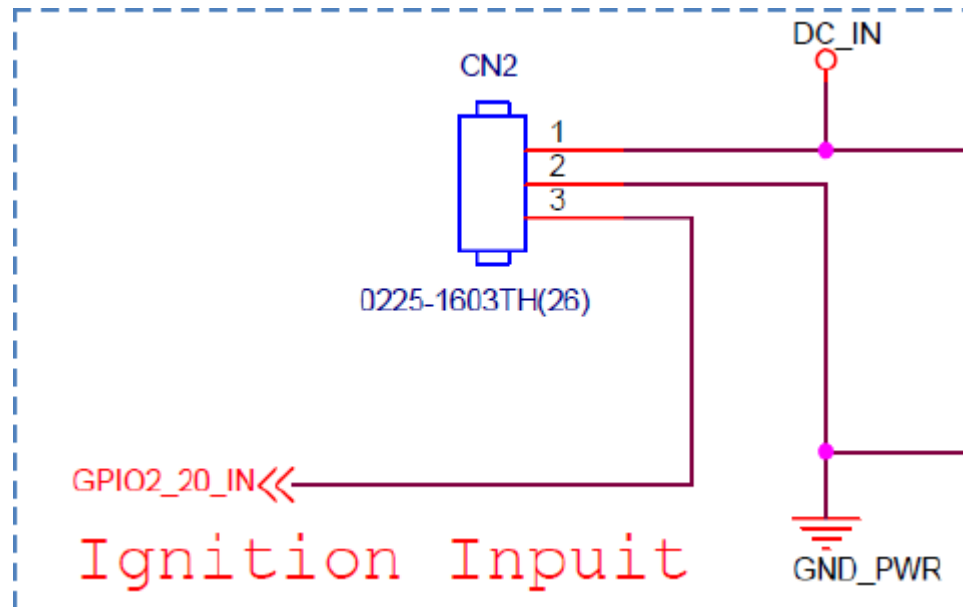
At this point, the device has entered debug mode. Type "su" into the console to enter root mode.

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

A "#" indicates the system is now in root mode.

3.2 Start Running

9V-36V 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

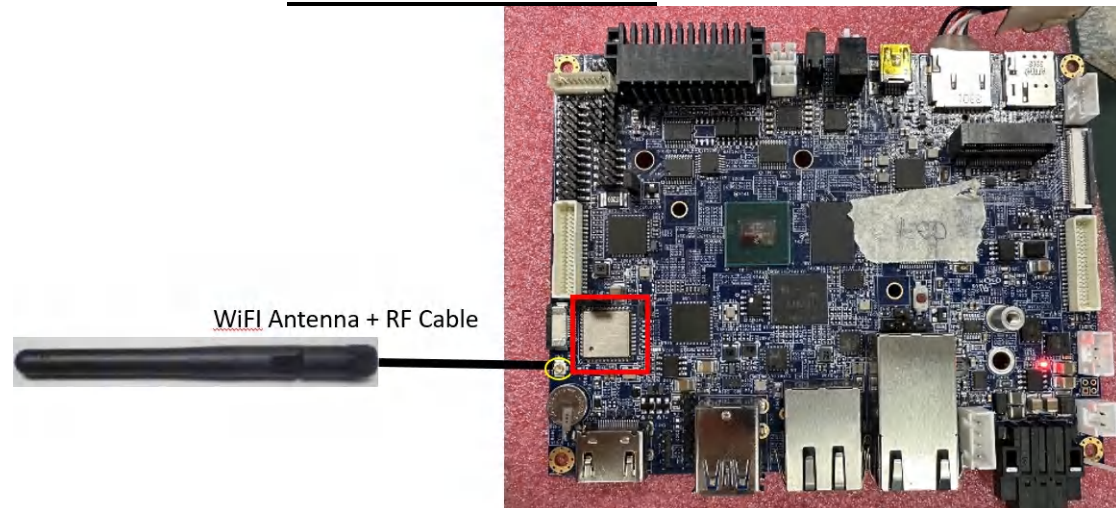
4.1.1 HDMI out (CN11)

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

4.1.2 WiFi/BT test (optional)

The actual location of the WiFi/BT module:

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



The WiFi test the type commanad:

```
# ifconfig wlan0 up
```

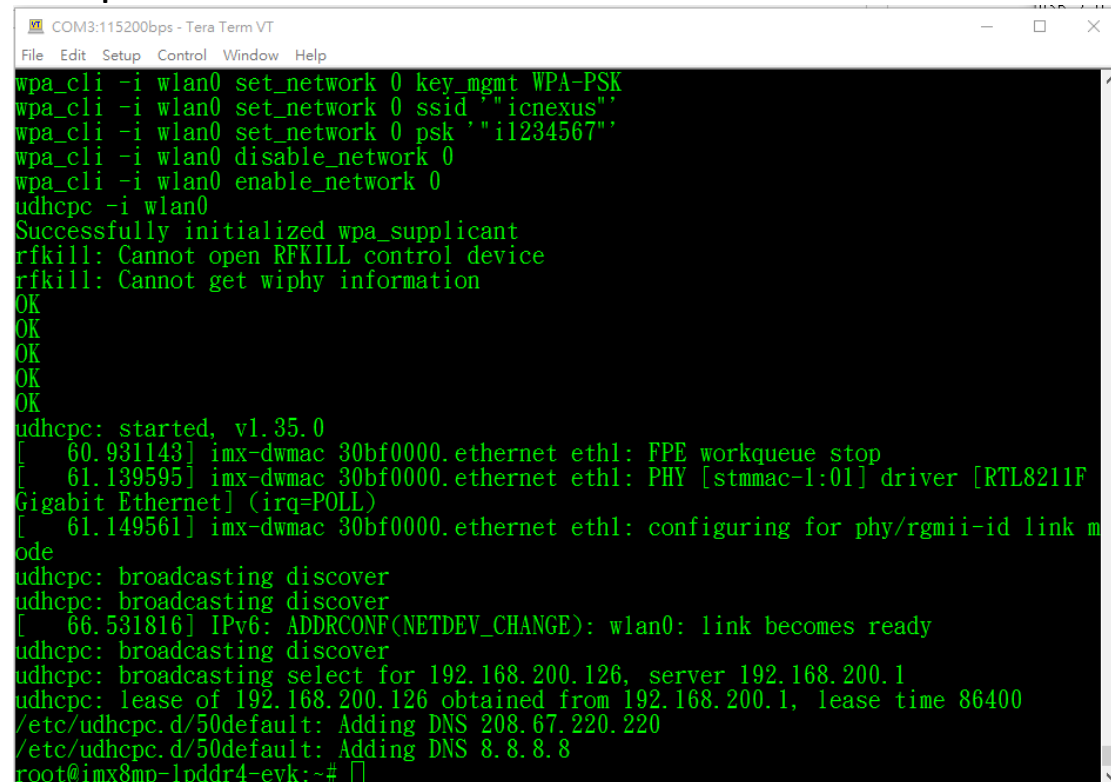
```
# iw dev wlan0 scan| grep 'SSID\|freq\|signal\|capability'
```

```
// Search for nearby WiFi ssid devices
```

```
root@imx8mp-lpddr4-evk:~# ifconfig wlan0 up
iw dev wlan0 scan| grep 'SSID\|freq\|signal\|capability' root@imx8mp-lpddr4-evk:~# iw
dev wlan0 scan| grep 'SSID\|freq\|signal\|capability'
[ 41.123955] kauditd_printk_skb: 12 callbacks suppressed
[ 41.123965] audit: type=1334 audit(1706601551.994:16): prog-id=0 op=UNLOAD
[ 41.136209] audit: type=1334 audit(1706601551.994:17): prog-id=0 op=UNLOAD
freq: 2412
capability: ESS Privacy ShortSlotTime (0x0411)
signal: -55.00 dBm
SSID: icnexus
freq: 2412
capability: ESS Privacy ShortPreamble ShortSlotTime RadioMeasure (0x1431)
signal: -80.00 dBm
SSID: readmi
* center freq segment 1: 0
* center freq segment 2: 0
freq: 2432
capability: ESS Privacy ShortSlotTime APSD (0x0c11)
signal: -44.00 dBm
SSID: Xiaomi_4125
freq: 2432
capability: ESS ShortPreamble ShortSlotTime (0x0421)
signal: -74.00 dBm
SSID: CHT Wi-Fi(HiNet)
freq: 2437
capability: ESS Privacy SpectrumMgmt ShortSlotTime RadioMeasure (0x1511)
```

Actually connect to internet by WiFi test command:

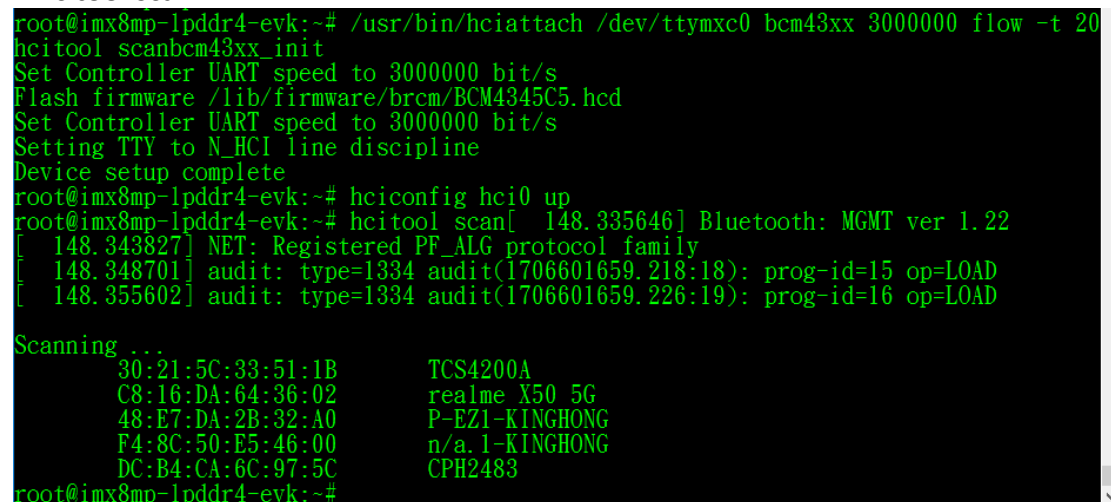
```
# wpa_supplicant -Dnl80211 -iwlan0 -c/etc/wpa_supplicant.conf -B
# ifconfig wlan0 up
# wpa_cli -i wlan0 set_network 0 key_mgmt WPA-PSK
# wpa_cli -i wlan0 set_network 0 ssid '"icnexus"'
# wpa_cli -i wlan0 set_network 0 psk '"i1234567"'
# wpa_cli -i wlan0 disable_network 0
# wpa_cli -i wlan0 enable_network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



```
COM3:115200bps - Tera Term VT
File Edit Setup Control Window Help
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
Successfully initialized wpa_supplicant
rfkill: Cannot open RFKILL control device
rfkill: Cannot get wiphy information
OK
OK
OK
OK
OK
udhcpc: started, vl.35.0
[ 60.931143] imx-dwmac 30bf0000.ethernet eth1: FPE workqueue stop
[ 61.139595] imx-dwmac 30bf0000.ethernet eth1: PHY [stmmac-l:01] driver [RTL8211F
Gigabit Ethernet] (irq=POLL)
[ 61.149561] imx-dwmac 30bf0000.ethernet eth1: configuring for phy/rgmii-id link m
ode
udhcpc: broadcasting discover
udhcpc: broadcasting discover
[ 66.531816] IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
udhcpc: broadcasting discover
udhcpc: broadcasting select for 192.168.200.126, server 192.168.200.1
udhcpc: lease of 192.168.200.126 obtained from 192.168.200.1, lease time 86400
/etc/udhcpc.d/50default: Adding DNS 208.67.220.220
/etc/udhcpc.d/50default: Adding DNS 8.8.8.8
root@imx8mp-lpddr4-evk:~# []
```

The BT test the type command:

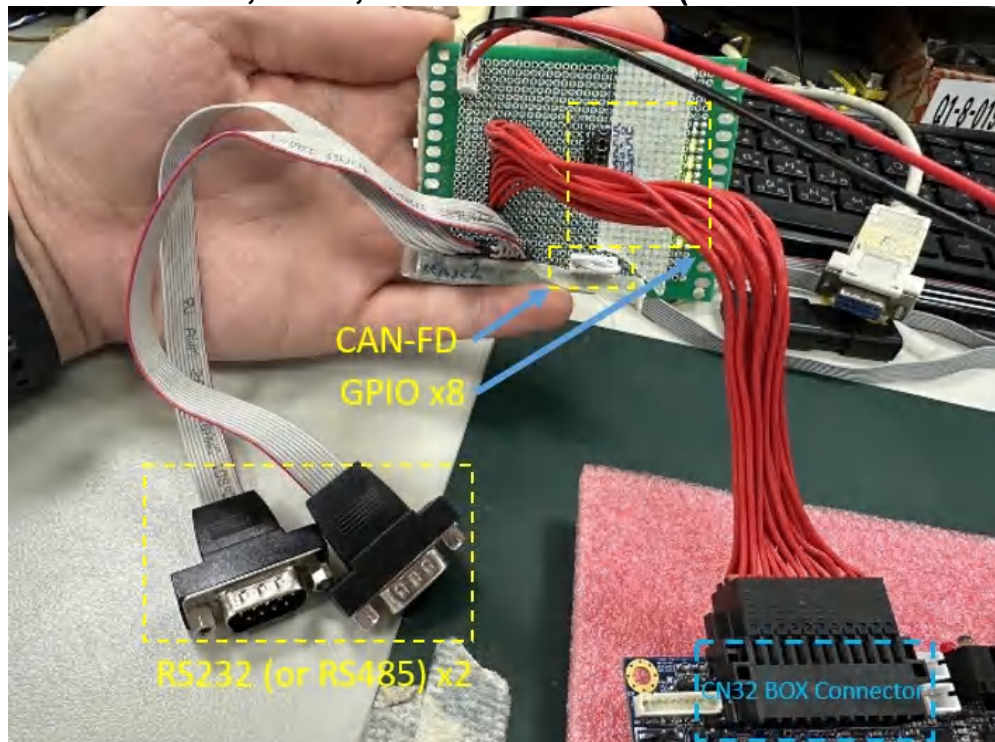
```
# /usr/bin/hciattach /dev/ttymx0 bcm43xx 3000000 flow -t 20
# hciconfig hci0 up
# hcitool scan
```



```
root@imx8mp-lpddr4-evk:~# /usr/bin/hciattach /dev/ttymx0 bcm43xx 3000000 flow -t 20
hcitool scanbcm43xx_init
Set Controller UART speed to 3000000 bit/s
Flash firmware /lib/firmware/brcm/BCM4345C5.hcd
Set Controller UART speed to 3000000 bit/s
Setting TTY to N_HCI line discipline
Device setup complete
root@imx8mp-lpddr4-evk:~# hciconfig hci0 up
root@imx8mp-lpddr4-evk:~# hcitool scan[ 148.335646] Bluetooth: MGMT ver 1.22
[ 148.343827] NET: Registered PF_ALG protocol family
[ 148.348701] audit: type=1334 audit(1706601659.218:18): prog-id=15 op=LOAD
[ 148.355602] audit: type=1334 audit(1706601659.226:19): prog-id=16 op=LOAD

Scanning ...
30:21:5C:33:51:1B TCS4200A
C8:16:DA:64:36:02 realme X50 5G
48:E7:DA:2B:32:A0 P-EZ1-KINGHONG
F4:8C:50:E5:46:00 n/a. 1-KINGHONG
DC:B4:CA:6C:97:5C CPH2483
root@imx8mp-lpddr4-evk:~#
```

4.1.3 CAN, COM, GPIO Connector (CN32 BOX Connector)



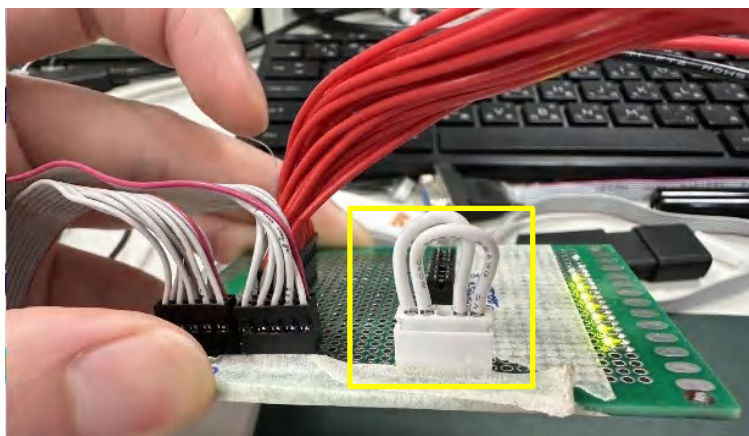
- CAN bus test

The can bus short circuit together, type command:

```
# ip link set can0 up type can bitrate 125000 dbitrate 2000000 restart-  
ms 1000 berr-reporting on fd on  
# ip link set can1 up type can bitrate 125000 dbitrate 2000000 restart-  
ms 1000 berr-reporting on fd on
```

```
###CAN 0  
candump can0 &  
cansend can1 321#11223344556677DF
```

```
###CAN 1  
candump can1 &  
cansend can0 321#99887766554433DF
```



```

root@imx8mp-lpddr4-evk:~# ip link set can0 up type can bitrate 125000 dbitrte 20000
00 restart-ms 1000 berr-reporting on fd on
[ 99.903300] flexcan 308c0000.can can0: Data brp=1 and brp=4 don't match, this may
result in a phase error. Consider using different bitrate and/or data bitrate.
[ 99.918079] IPv6: ADDRCONF(NETDEV_CHANGE): can0: link becomes ready
root@imx8mp-lpddr4-evk:~# ip link set can1 up type can bitrate 125000 dbitrte 20000
00 restart-ms 1000 berr-reporting on fd on
[ 99.952295] flexcan 308d0000.can can1: Data brp=1 and brp=4 don't match, this may
result in a phase error. Consider using different bitrate and/or data bitrate.
root@imx8mp-lpddr4-evk:~# [ 100.928268] IPv6: ADDRCONF(NETDEV_CHANGE): can1: link b
ecomes ready

root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# candump can0 &
[1] 1154
root@imx8mp-lpddr4-evk:~# cansend can1 321#11223344556677DF
root@imx8mp-lpddr4-evk:~# can0 321 [8] 11 22 33 44 55 66 77 DF

root@imx8mp-lpddr4-evk:~# candump can1 &
[2] 1177
root@imx8mp-lpddr4-evk:~# cansend can0 321#99887766554433DF
root@imx8mp-lpddr4-evk:~# can0 321 [8] 99 88 77 66 55 44 33 DF
can1 321 [8] 99 88 77 66 55 44 33 DF

```

- RS232 (or RS485) test

COM3: /dev/ttymx2

COM4: /dev/ttymx3

1. Connect to RS232 port and run the two hyper terminal on PC (such as TeraTerm).

One open COM5 for RS232

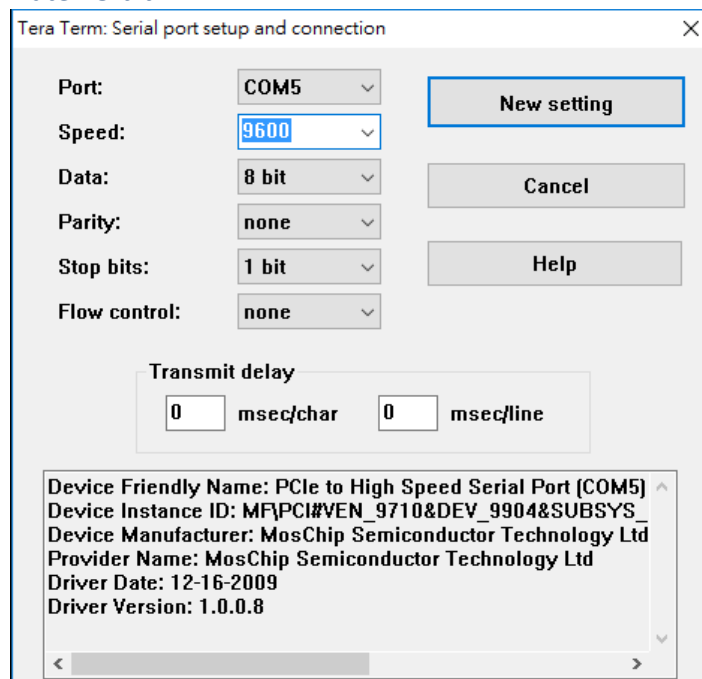
One open COM3 for debug port

When you open the RS232 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 : 9600

(3) Date : 8 bit



2. execute following commands in console window:

```
# echo abcde > /dev/ttymx2  
# cat /dev/ttymx2
```

Receiving:

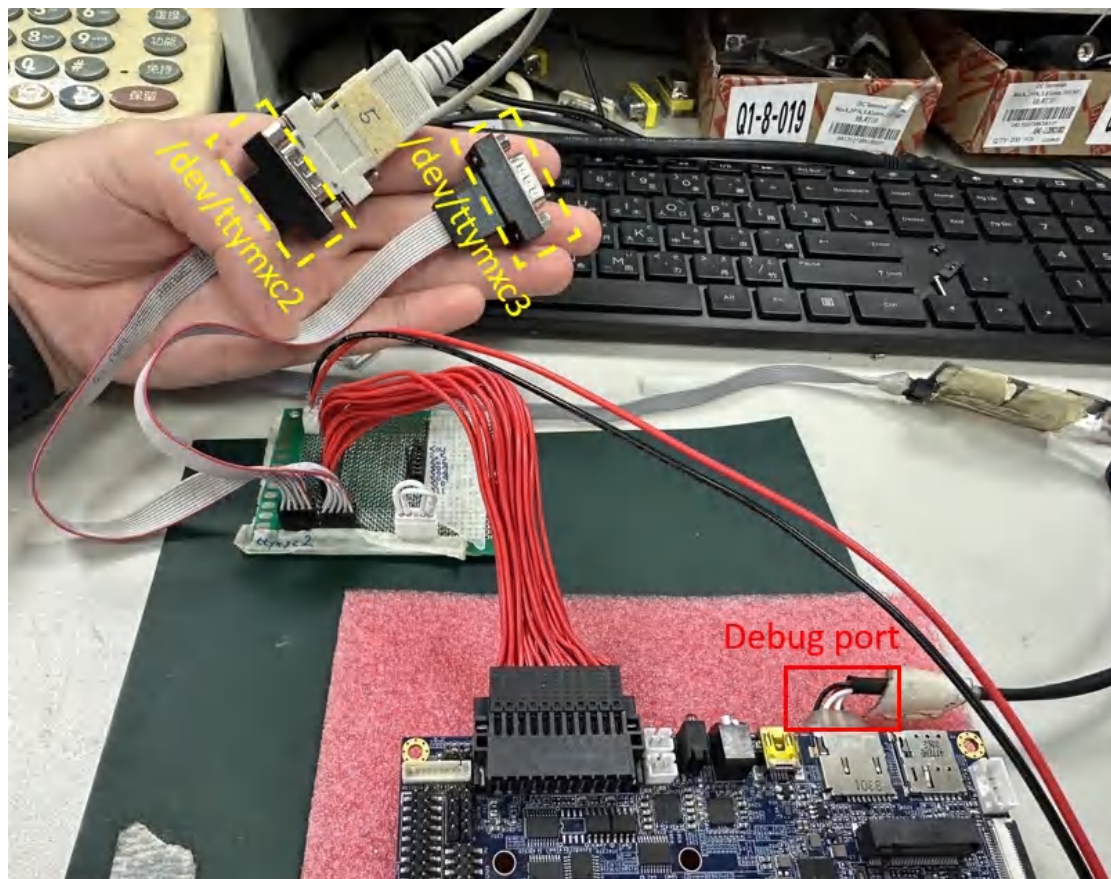
Type any number or sentence in terminal window (COM5) on your PC desktop and you should see the same output appears in the console window (CON3).

```
# cat /dev/ttymx2
```

Sending:

Type any number or sentence in the console window(CON3) and you should see the same output appears in terminal window (CON5).

```
# echo abcde > /dev/ttymx2
```



```

COM5:115200baud - Tera Term VT
File Edit Setup Control Window Help

[18.767662] usb 1-1.4: new full-speed USB device number 10 using xhci-hcd
[18.886944] cp210x 1-1.4:1.0: cp210x converter detected
[18.894598] usb 1-1.4: cp210x converter now attached to ttyUSB0
[18.909432] Error: Driver 'cp210x' is already registered, aborting...
[19.490883] scsi 0:0:0:0: Direct-Access              USB DISK 3.0    PMAP PQ: 0
ANSI: 6
[19.499829] sd 0:0:0:0: [sda] 60715008 512-byte logical blocks: (31.1 GB/29.0 GiB)
[19.507771] sd 0:0:0:0: [sda] Write Protect is off
[19.512826] sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't
support DPO or FUA
[19.572743] sda: sda1
[19.575765] sd 0:0:0:0: [sda] Attached SCSI removable disk

root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# [ 41.260357] kauditd_printk_skb: 12 callbacks suppressed
[ 41.260369] audit: type=1334 audit(1706607492.246:16): prog-id=0 op=UNLOAD
[ 41.272664] audit: type=1334 audit(1706607492.246:17): prog-id=0 op=UNLOAD

root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# echo abcde > /dev/ttymx3
root@imx8mp-lpddr4-evk:~# echo abcde > /dev/ttymx3
root@imx8mp-lpddr4-evk:~# cat /dev/ttymx3
testrsuartport123456

```

After the test is complete, Ctrl + C jumps out of the background,
Other RS232 ports are also tested in the same way, change COM5 to other
RS232 ports (ttymx3)

- GPIO test

Paste the following commands into the console window and press Enter

GPIO504 ~ GPIO511

For example, **GPO504** (to test other GPO# please replace the red numbers
by yourself) , you can using a LED test board to control LED light on-off .

cd /sys/class/gpio/

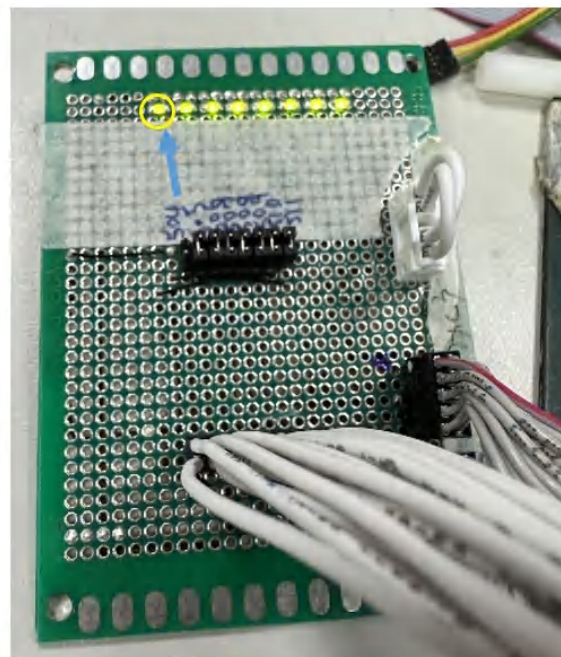
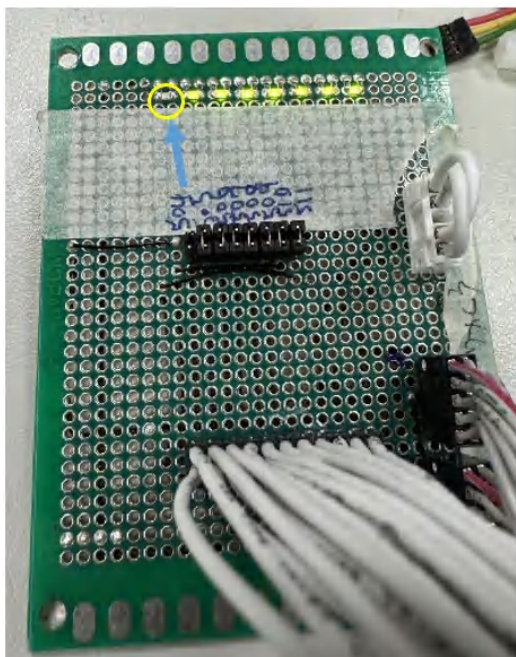
echo 504 > export

cd gpio504

echo out > direction

echo 1 > value ← LED OFF

echo 0 > value ← LED ON



For example, **GPI504** (to test other GPI # please replace the red numbers by yourself)

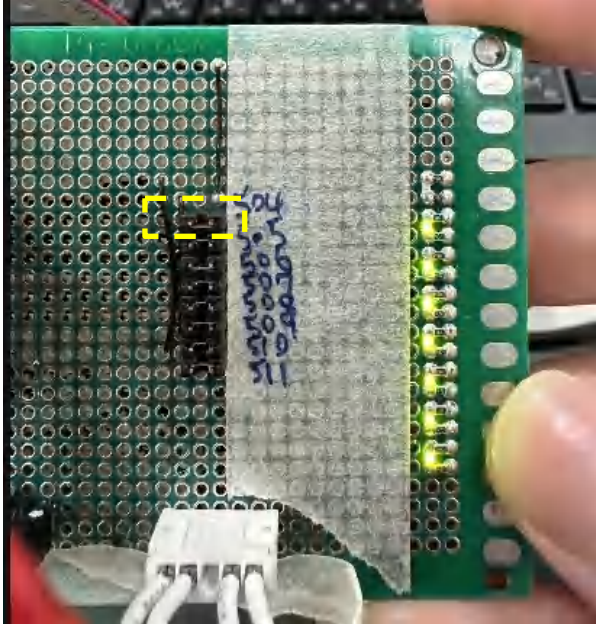
```
cd /sys/class/gpio/
```

```
echo 504 > export
```

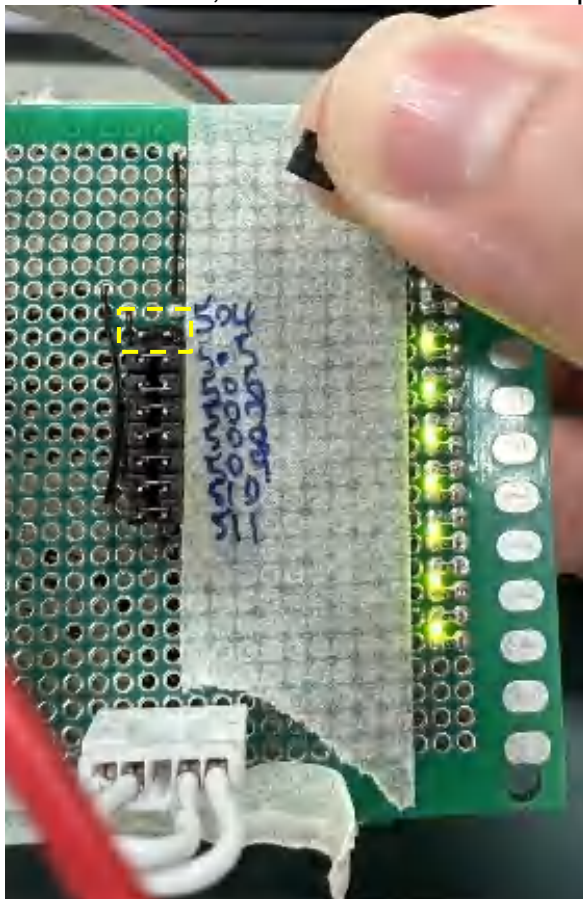
```
cd gpio504
```

```
cat value
```

When short circuit, it will show cat value “0” pull-down



When take out, it will show cat value “1” pull-up



```
root@imx8mp-lpddr4-evk:~# cd /sys/class/gpio/  
root@imx8mp-lpddr4-evk:/sys/class/gpio# echo 504 > export  
root@imx8mp-lpddr4-evk:/sys/class/gpio# cd gpio504  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
0  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
1  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
0  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
1  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504#
```

4.1.4 CN26 GPIO Pin Header

Paste the following commands into the console window and press Enter

GPIO496 ~ GPIO503

For example, **GPO496** (to test other GPO# please replace the red numbers by yourself) , you can using a LED test board to control LED light on-off .

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

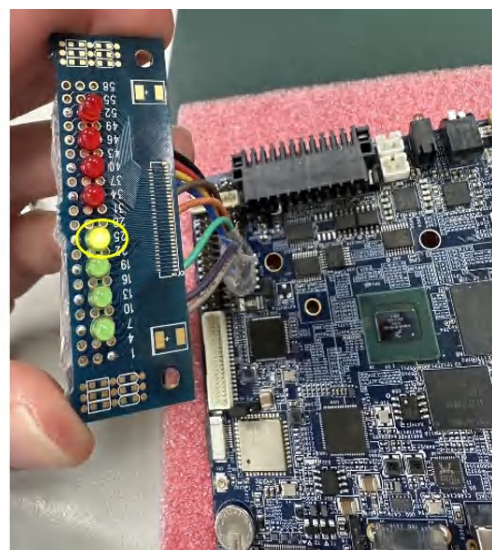
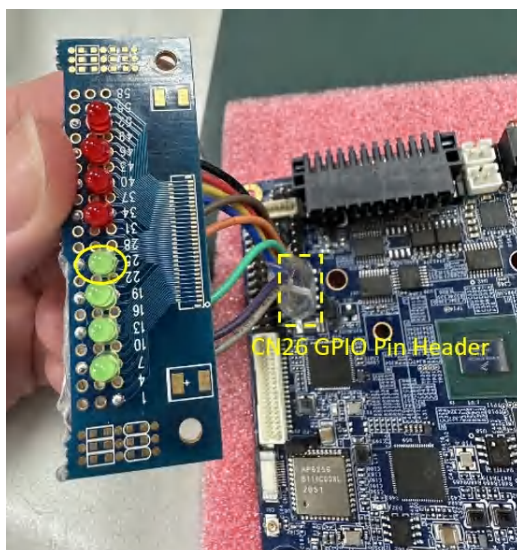
```
echo 496 > export
```

```
cd gpio496
```

```
echo out > direction
```

```
echo 1 > value ← LED OFF
```

```
echo 0 > value ← LED ON
```



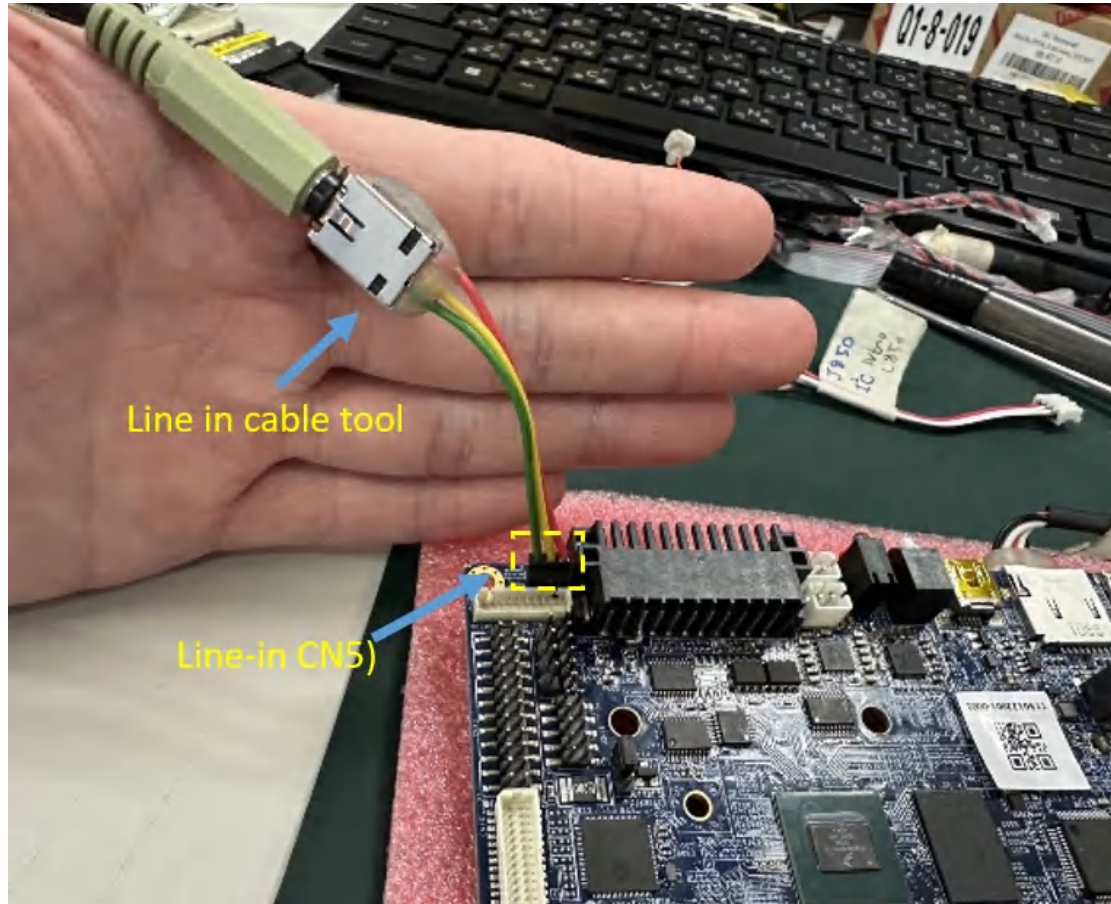
4.1.5 The Line in to recording test

The default is Line in on

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

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

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



4.1.6 Speaker test

Paste the following commands into the console window and press Enter

```
# gst-launch-1.0 playbin uri=file:///home/root/xxxx.mp3
```

```
// xxxx fill in the MP3 file you want to play
```



4.1.7 Headphone/MIC Pin Header test (CN42)

The audio cable need to be equipped with audio jig wire.

- Headphone

Paste the following commands into the console window and press Enter

```
# gst-launch-1.0 playbin uri=file:///home/root/xxxx.mp3
```

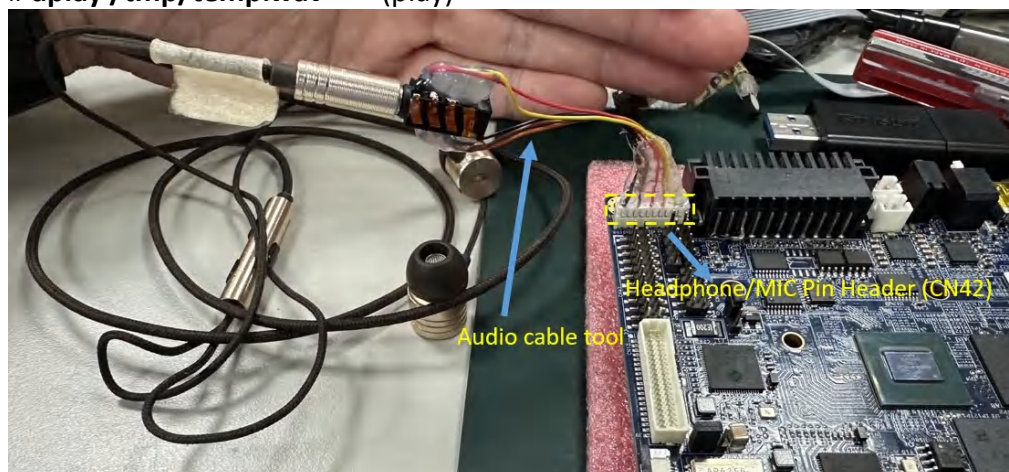
// **xxxx** fill in the MP3 file you want to play

- MIC in

PC can play a MP3 music for recording, recording test type command:

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

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



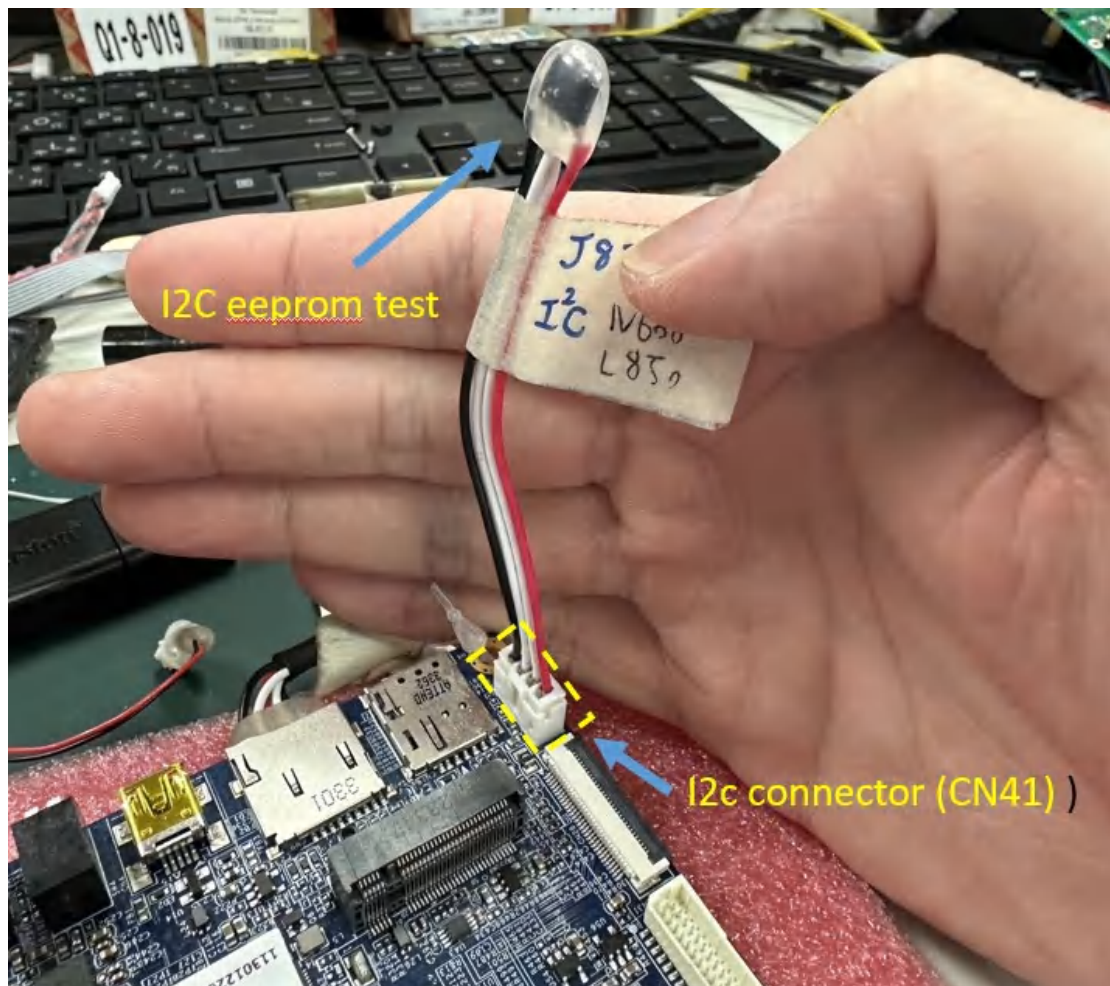
4.1.8 i2c(CN41) Test

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

i2cdetect -y -a 4

it will show 50 nodes

```
root@imx8mp-lpddr4-evk:~# i2cdetect -y -a 2
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: 00  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10: --  --  --  --  --  --  --  18  --  --  --  --  --  --  --
20: UU  UU  --  --  --  --  --  --  --  --  --  --  --  --  --
30: --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40: --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
50: 50  51  --  --  --  --  --  --  --  --  --  --  --  --  --
60: --  --  --  --  --  --  --  UU  --  --  --  --  --  --  --
70: --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
```



4.1.10 The LAN1 & LAN2(optional) test

A. LAN1(CN23) eth0, ok
ping 8.8.8.8

B. LAN2(CN25) eth1, ok
ping 8.8.8.8



4.1.11 SPI test(CN25)

Paste the following commands into the console window and press Enter ,
You can using a W25QXX SPI Flash to detect

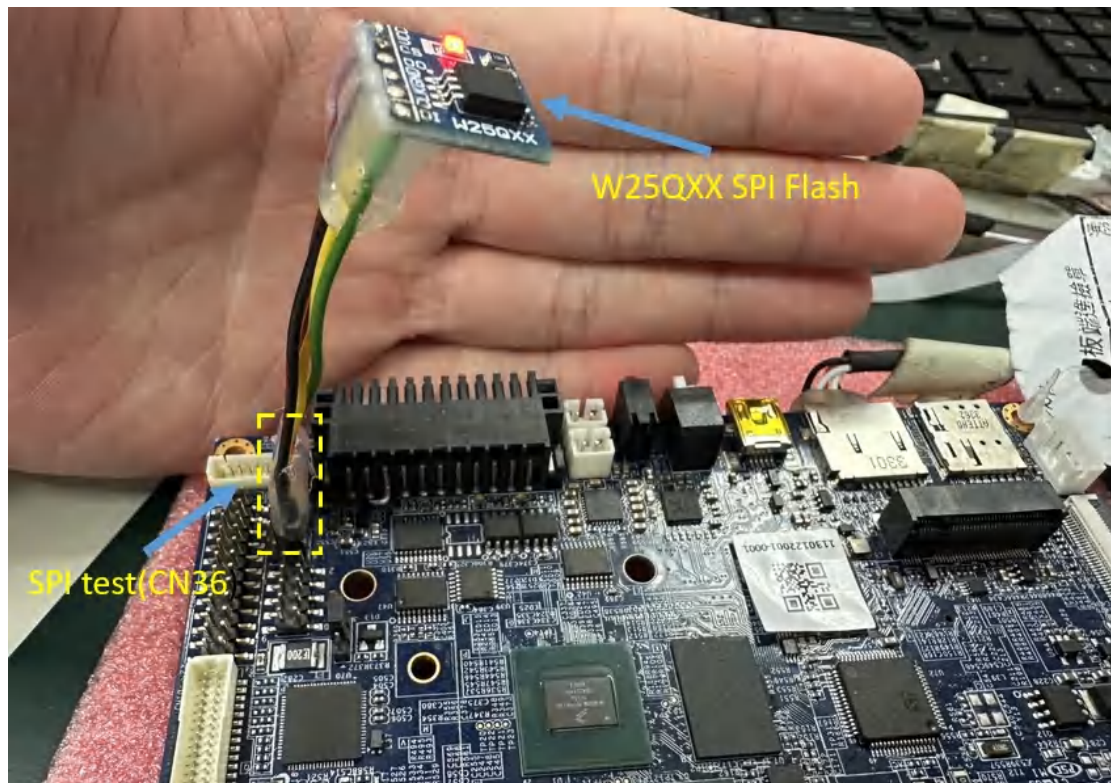
Copy demo test program (spi-test)

```
# chmod +x spi-test
```

```
# ./spi-test /dev/spidev1.0
```

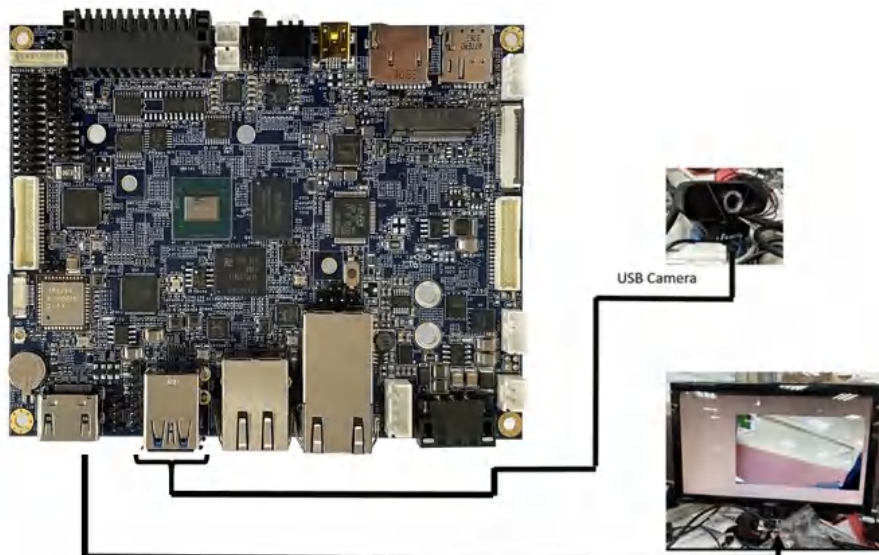
```
//will show response(7): ef 40 18 00 00 00
```

```
root@imx8mp-lpddr4-evk:~# ./spi-test /dev/spidev1.0  
response(7): ef 40 18 00 00 00
```



4.1.12 USB Camera test

Test schematic:



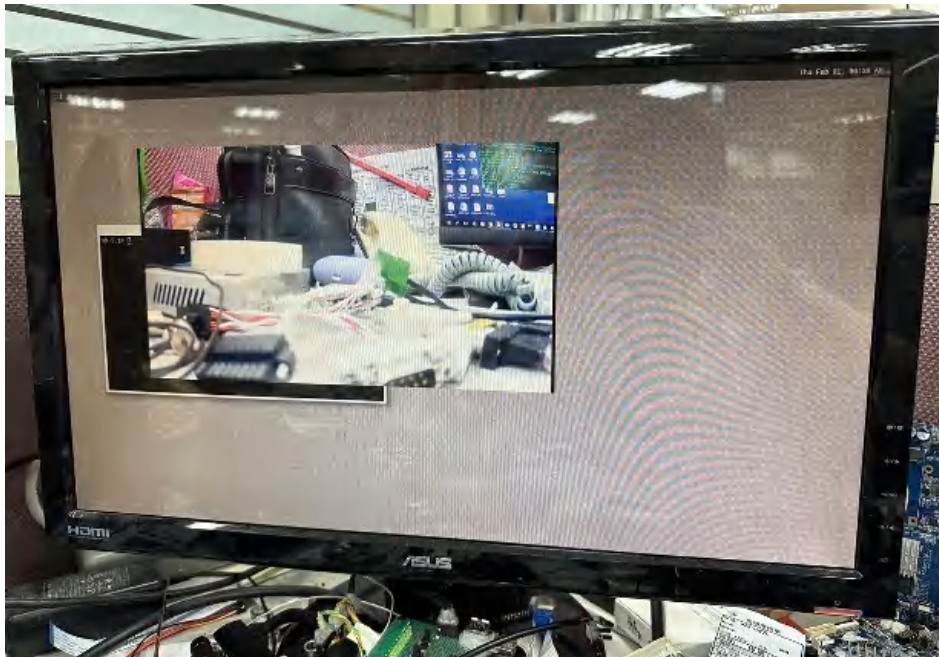
USB camera, command

(PS: , plug in the USB camera theory is /dev/video3 , you need to ls /dev/video* to confirm):

```
# gst-launch-1.0 v4l2src device=/dev/video3 ! autovideosink
```

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

```
inikt@imx8mp-lpddr4-evk:~# gst-launch-1.0 v4l2src device=/dev/video4 ! autovideosink
Setting pipeline to PAUSED ...
Pipeline is live and does not need PREROLL ...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
New clock: GstSystemClock
Redistribute latency...
0:00:32.7 / 99:99:99.
```



4.1.13 MIPI CSI FPC Connector (CN28/CN29) test

First, you need an the ov5640 camera module, then type command:
(PS: plug in the MIPI camera theory is /dev/video3 & /dev/video4 , you need to ls /dev/video* to confirm):

The CN29 should be the first camera for /dev/video3

The CN28 it should be the second camera as /dev/video4

```
# gst-launch-1.0 -v v4l2src device=/dev/video4 ! capsfilter caps="video/x-raw, width=640, height=480, framerate=30/1" ! queue ! autovideosink
```

```
# gst-launch-1.0 -v v4l2src device=/dev/video3 ! capsfilter caps="video/x-raw, width=1920, height=1080, framerate=30/1" ! queue ! autovideosink
```

Actual result: will show present the display of MIPI camera:



4.1.14 USB & SD Card test

###USB

USB 2.0 pin header Connector(CN33/CN34/CN35) (optional)

USB 3.0 Dual Connector (CN30)

mout

//you will found the name of USB disk: /run/media/xxxxxxx-sda

ex:

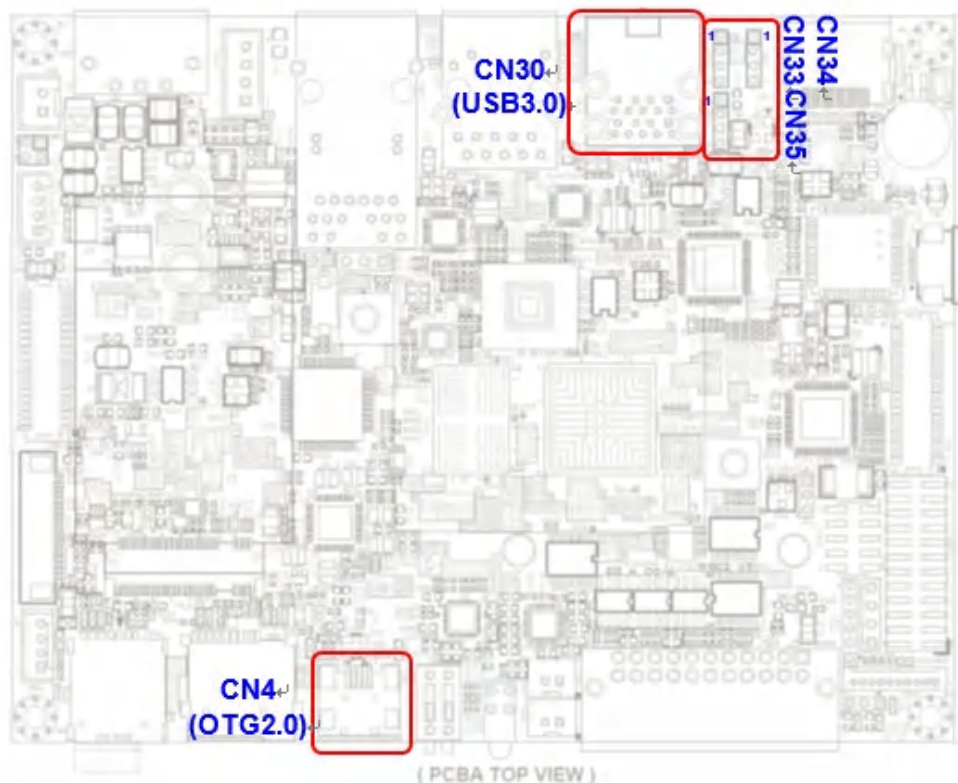
cd /run/media/TRANSCEND-sda

ls

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

```
root@imx8mp-lpddr4-evk:~# [ 2045.811683] usb 1-1.1.2: new high-speed USB device number 10 using xhci-hcd
[ 2046.020957] usb-storage 1-1.1.2:1.0: USB Mass Storage device detected
[ 2046.028090] scsi host0: usb-storage 1-1.1.2:1.0
[ 2047.407564] scsi 0:0:0:0: Direct-Access    JetFlash Transcend 8GB    1100 PQ: 0
ANSI: 4
[ 2047.417214] sd 0:0:0:0: [sda] 15820800 512-byte logical blocks: (8.10 GB/7.54 GiB)
[ 2047.425297] sd 0:0:0:0: [sda] Write Protect is off
[ 2047.430925] sd 0:0:0:0: [sda] No Caching mode page found
[ 2047.436265] sd 0:0:0:0: [sda] Assuming drive cache: write through
[ 2047.446216] sda:
[ 2047.448405] sd 0:0:0:0: [sda] Attached SCSI removable disk
root@imx8mp-lpddr4-evk:~# [ 2049.218904] sda:
```

```
/dev/sda on /run/media/TRANSCEND-sda type vfat (rw,relatime,gid=6,fmask=0007,dmask=0007,allow_utime=0020,codepage=437,iocharset=iso8859-1,shortname=mixed,errors=remount-ro)
root@imx8mp-lpddr4-evk:~#
```



****SD Card****

###Micro SD Connector(CN9)

mout

cd /run/media/LOCALFS-mmcb1k1p1

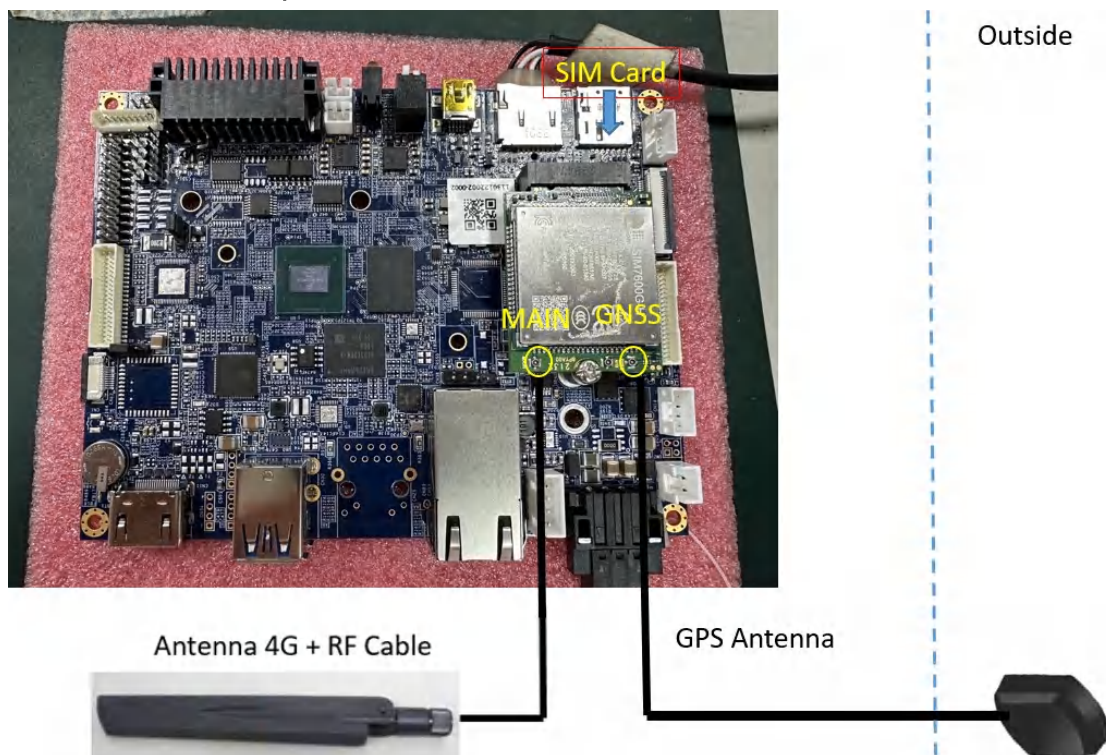
ls

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

```
root@imx8mp-lpddr4-evk:~# [ 85.163178] mmc1: host does not support reading read-only
ly switch, assuming write-enable
[ 85.174336] mmc1: new high speed SDHC card at address e624
[ 85.180325] mmcblk1: mmc1:e624 SU08G 7.40 GiB
[ 85.195369] mmcblk1: p1
```

```
/dev/mmcblk1p1 on /run/media/LOCALFS-mmcb1k1p1 type vfat (rw,relatime,gid=6,fmask=00
07,dmask=0007,allow_utime=0020,codepage=437,ioccharset=iso8859-1,shortname=mixed,erro
rs=remount-ro)
root@imx8mp-lpddr4-evk:~# ^C
root@imx8mp-lpddr4-evk:~# cd /run/media/LOCALFS-mmcb1k1p1
root@imx8mp-lpddr4-evk:/run/media/LOCALFS-mmcb1k1p1# ls
Alarms          DCIM             LOST.DIR         Notifications    Recordings
Android          Documents        Movies           Pictures         Ringtones
Audiobooks       Download         Music            Podcasts        'System Volume Information'
```

4.1.15 4G LTE/GPS module test



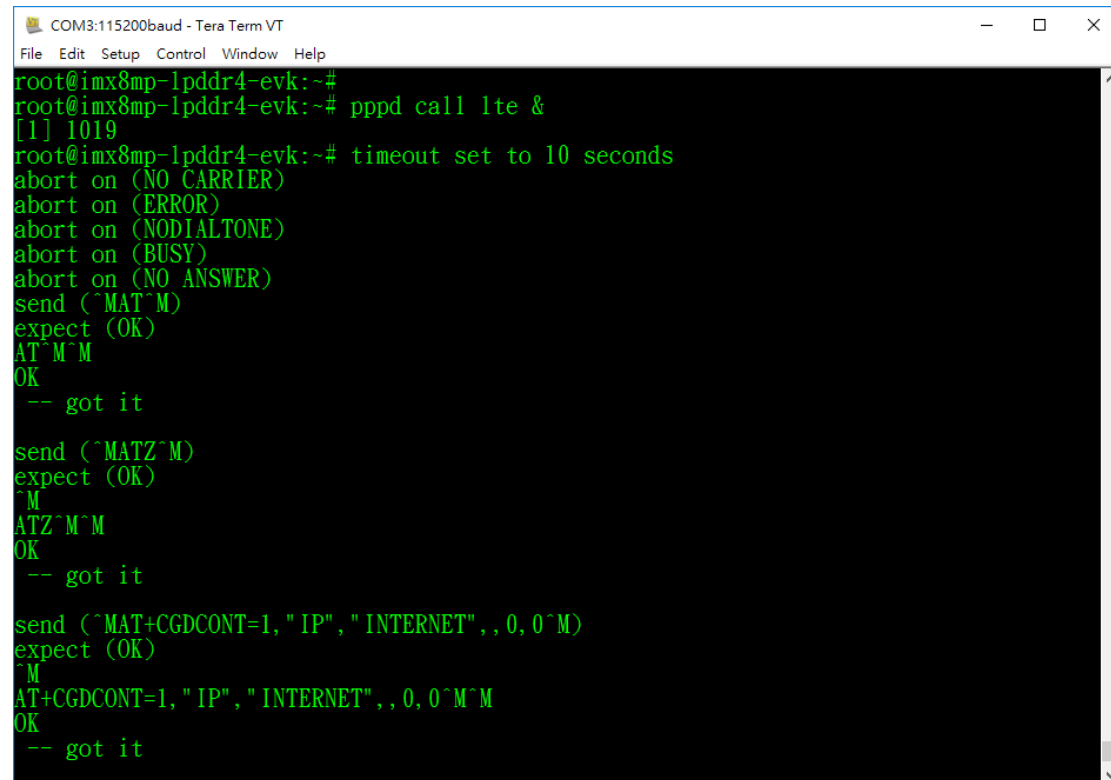
4G LTE test

Insert SIM Card, and after waiting for boot, dial the command at the Console port:

pppd call lte &

//ifconfig will show ppp0

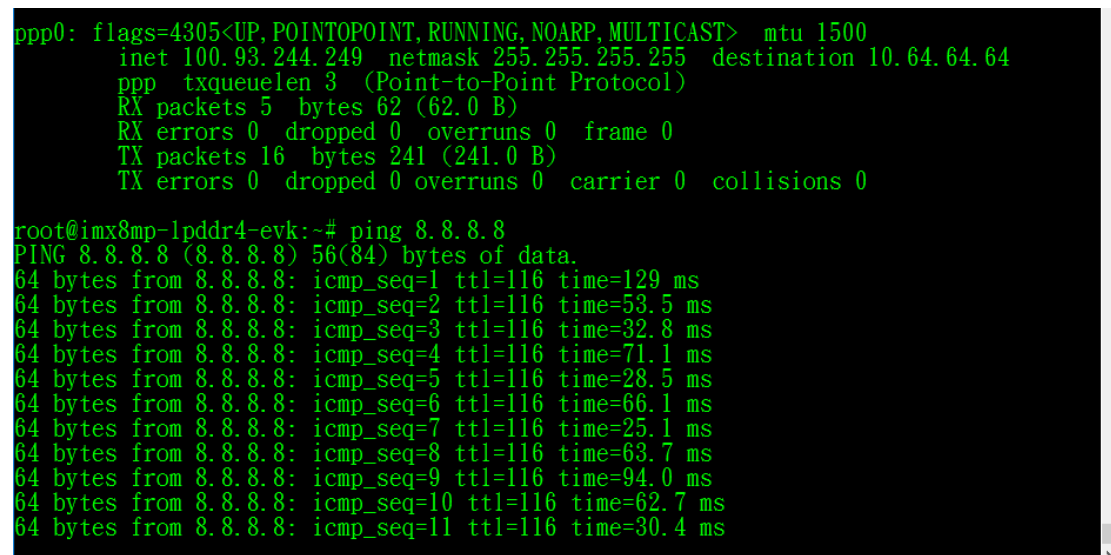
ping 8.8.8.8



```
COM3:115200baud - Tera Term VT
File Edit Setup Control Window Help
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# pppd call lte &
[1] 1019
root@imx8mp-lpddr4-evk:~# timeout set to 10 seconds
abort on (NO CARRIER)
abort on (ERROR)
abort on (NODIALTONE)
abort on (BUSY)
abort on (NO ANSWER)
send (`MAT`M)
expect (OK)
AT`M`M
OK
-- got it

send (`MATZ`M)
expect (OK)
`M
ATZ`M`M
OK
-- got it

send (`MAT+CGDCONT=1,"IP","INTERNET",,0,0`M)
expect (OK)
`M
AT+CGDCONT=1,"IP","INTERNET",,0,0`M`M
OK
-- got it
```



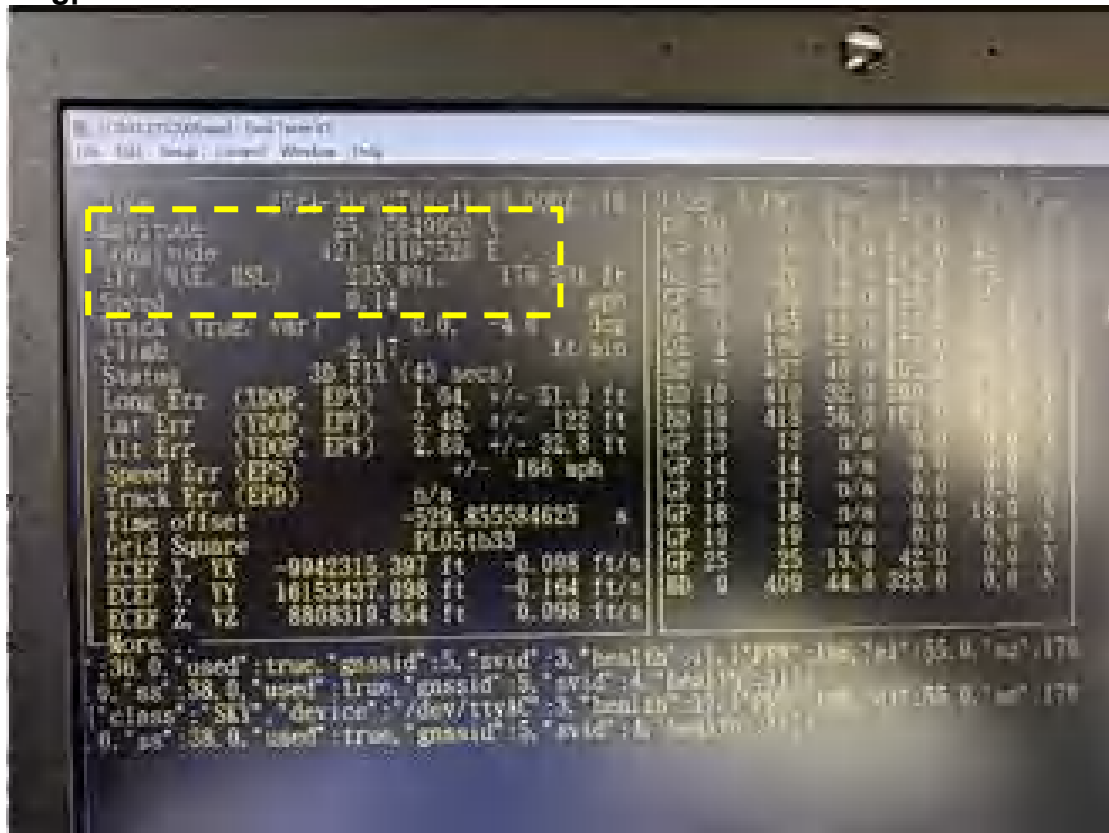
```
ppp0: flags=4305<UP,POINTOPOINT,RUNNING,NOARP,MULTICAST> mtu 1500
    inet 100.93.244.249 netmask 255.255.255.255 destination 10.64.64.64
    ppp txqueuelen 3 (Point-to-Point Protocol)
    RX packets 5 bytes 62 (62.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 16 bytes 241 (241.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@imx8mp-lpddr4-evk:~# 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=116 time=129 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=53.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=32.8 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=71.1 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=28.5 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=116 time=66.1 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=116 time=25.1 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=116 time=63.7 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=116 time=94.0 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=116 time=62.7 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=116 time=30.4 ms
```

GPS test

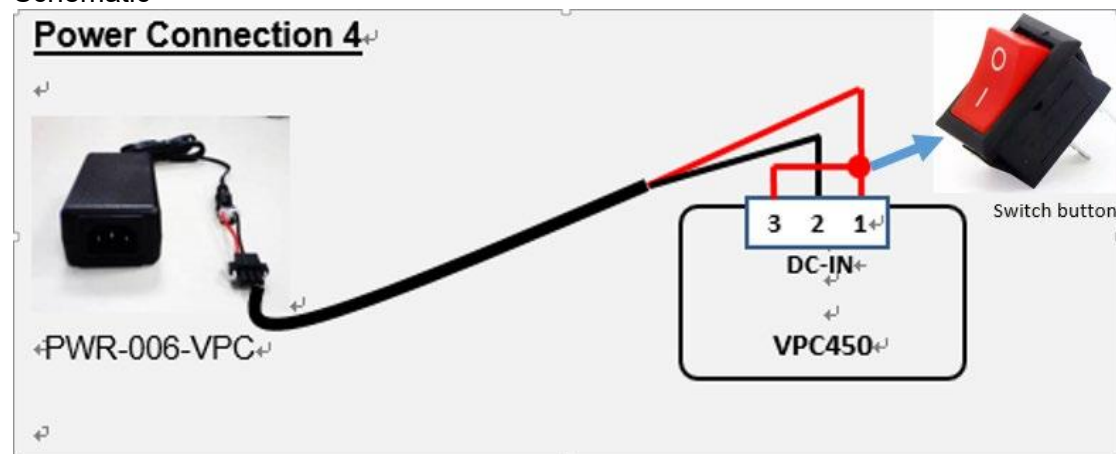
Type command:

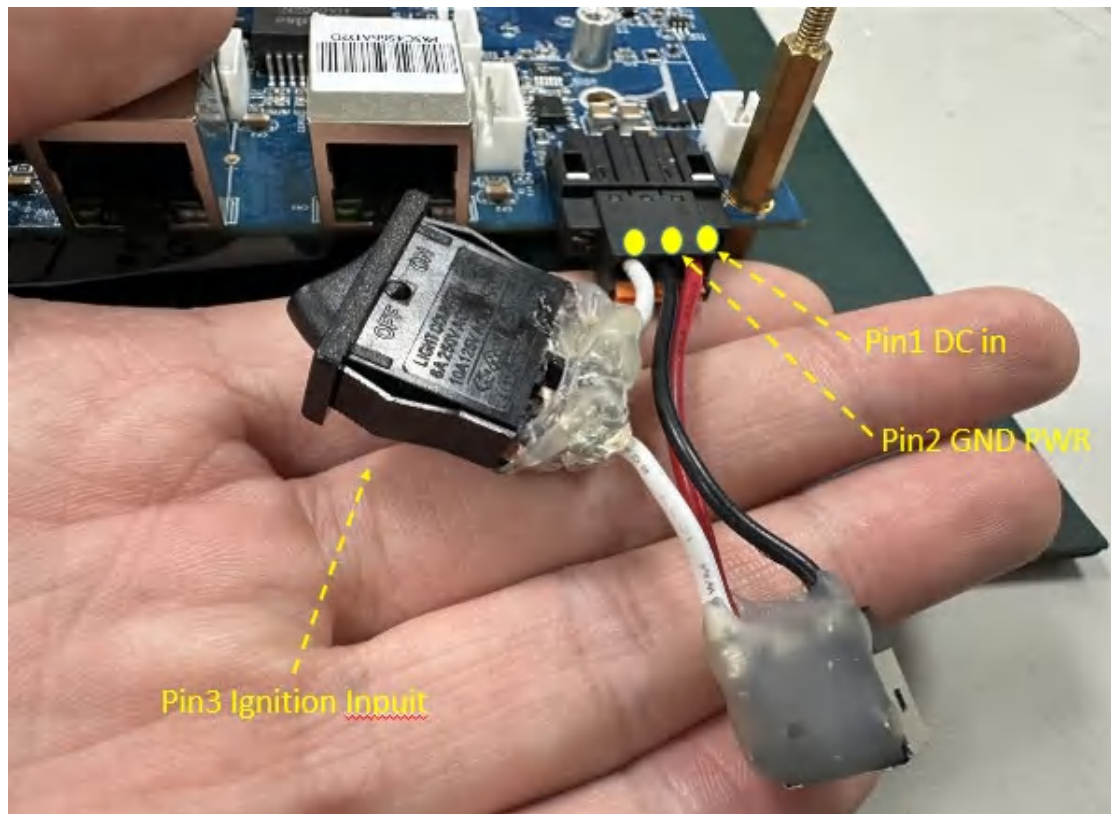
cgps



4.1.16 MCU-controlled Power ON/OFF Demo Test

Schematic





The MCU will always detect an ignition signal as long as DC adapter is on can be turned on SBC4100_NSD4100.
And if disconnect ignition signal can be turned off SBC4100_NSD4100.

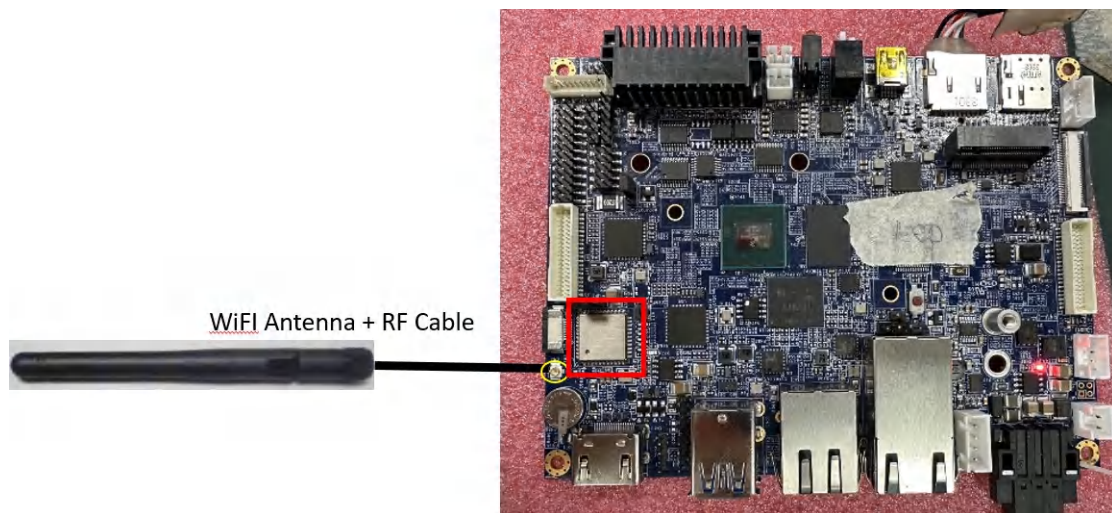
4.2 Android

4.2.1 HDMI out (CN11)

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

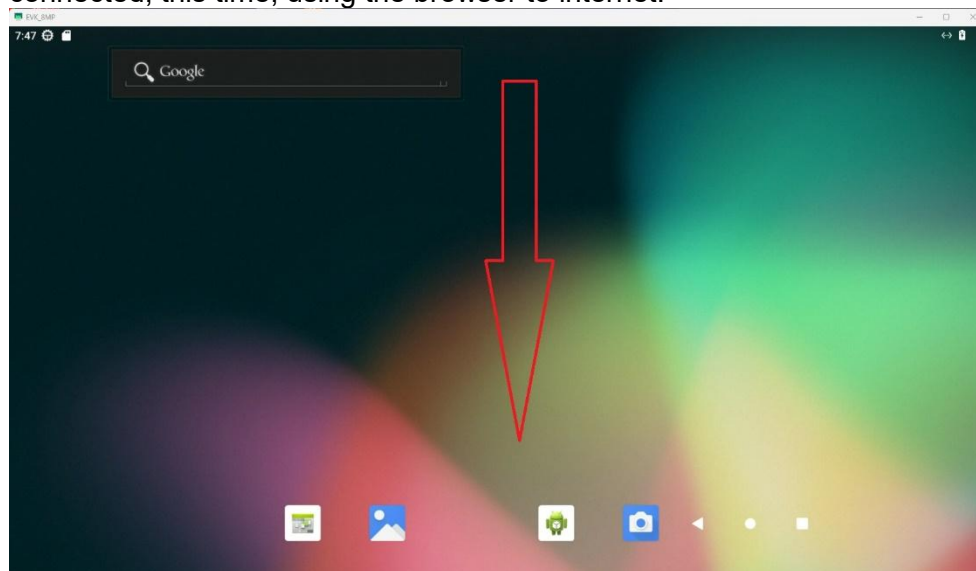
4.2.2 WiFi/BT test (optional)

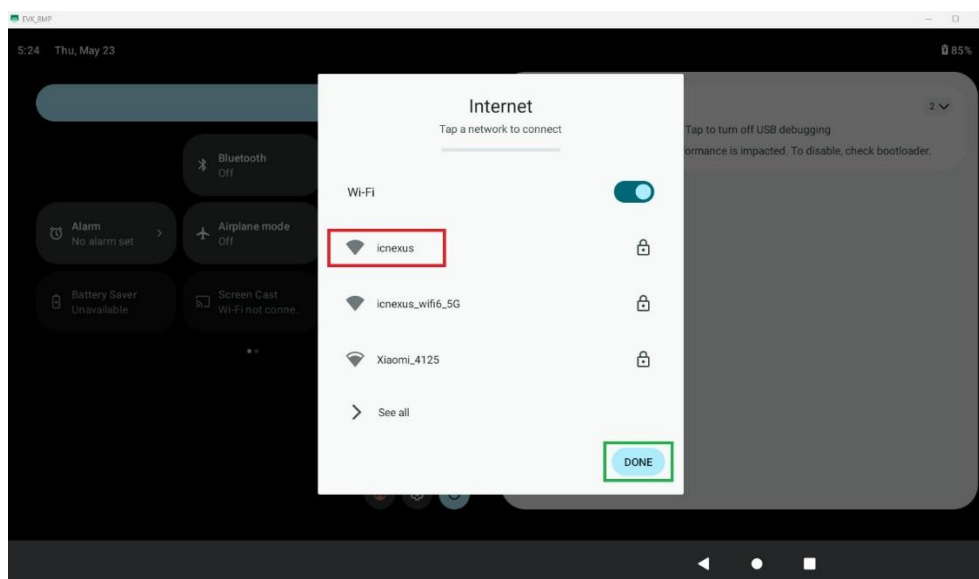
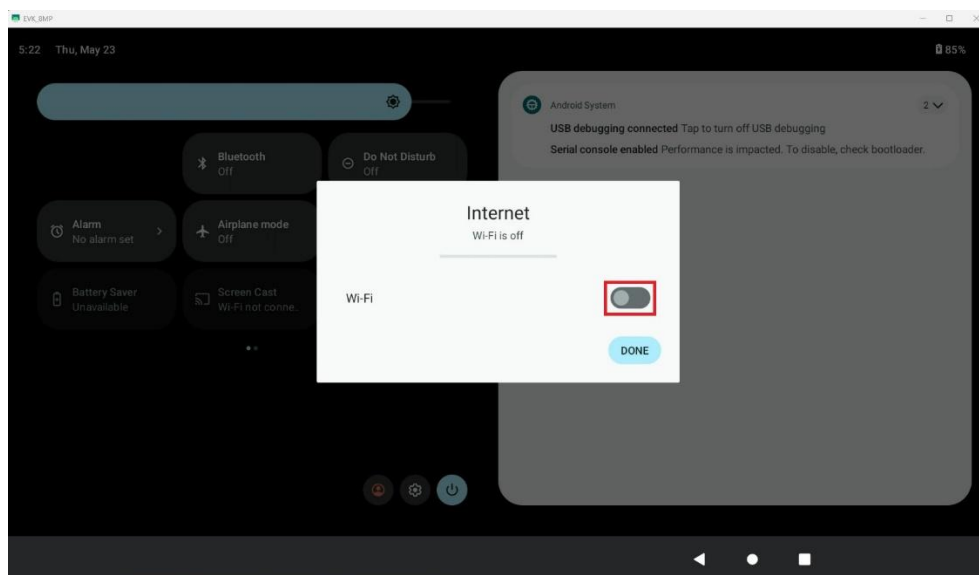
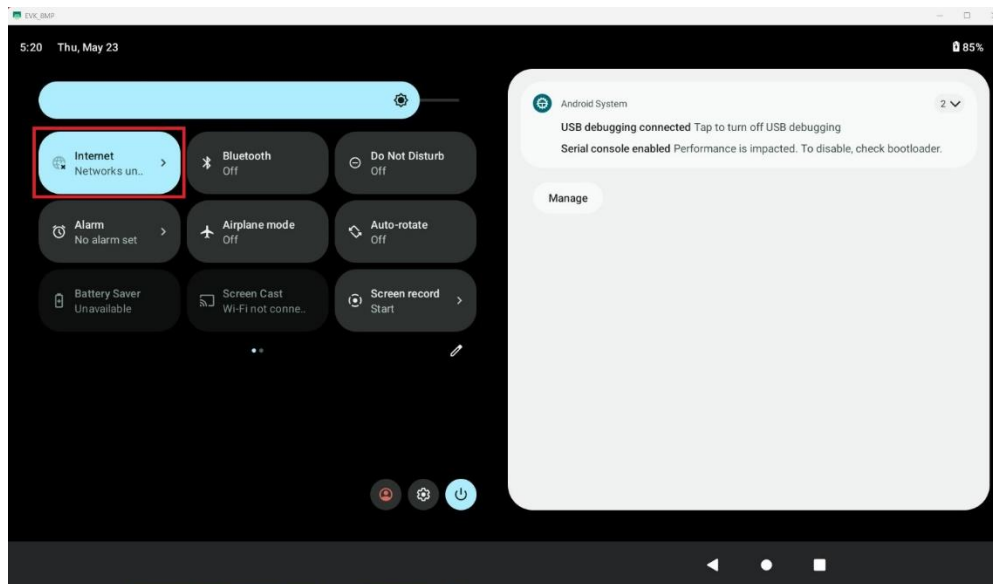
The actual location of the WiFi/BT module:
Remember add the wlfi Antenna + RF cable first.

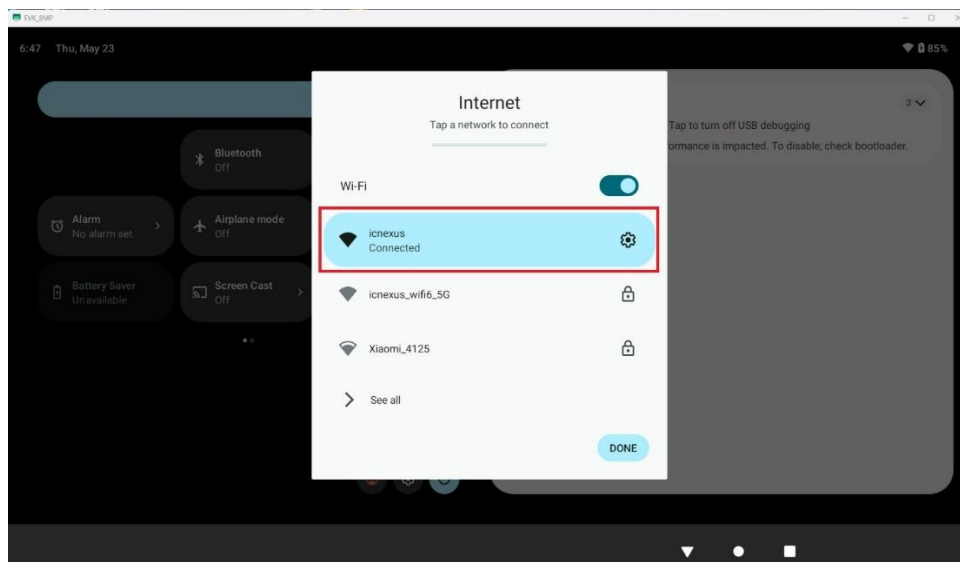
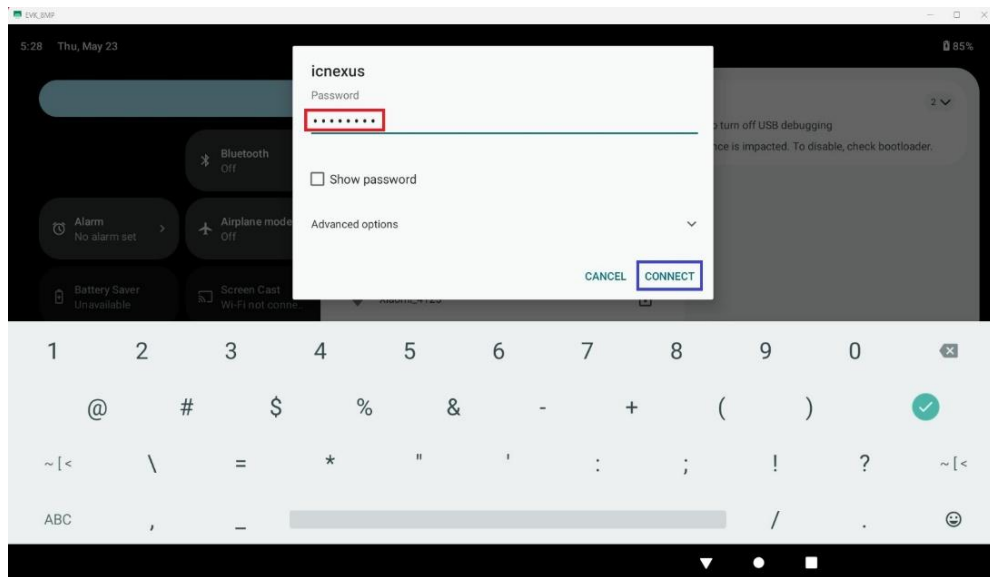


- **WiFi**

Swipe down on the desktop, and click **"Internet"** → **"Turn on Wifi"** → Choose an SSID device near you & input the password → will show your SSID device connected, this time, using the browser to internet.

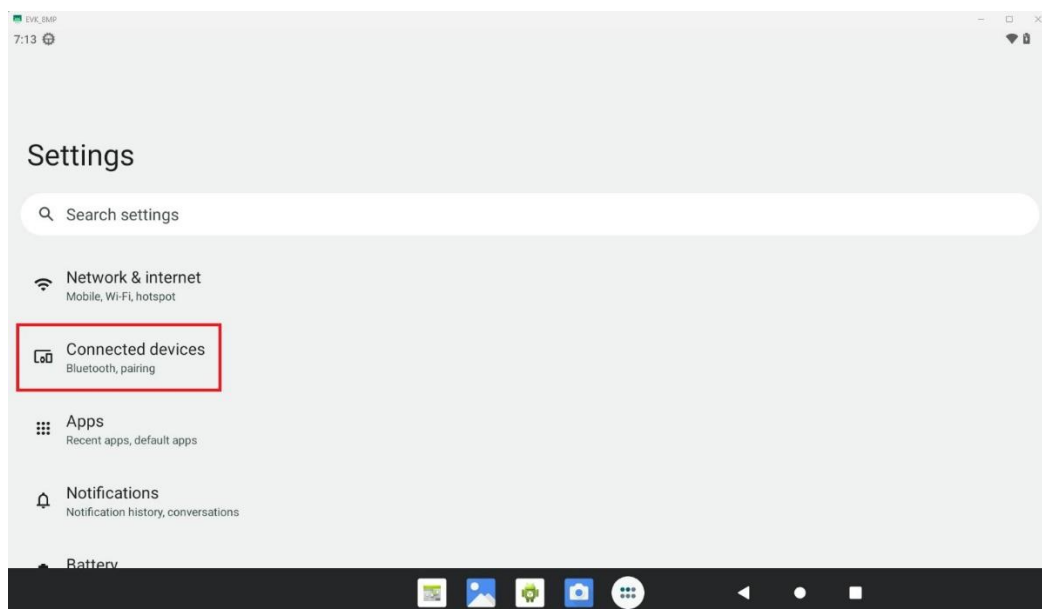
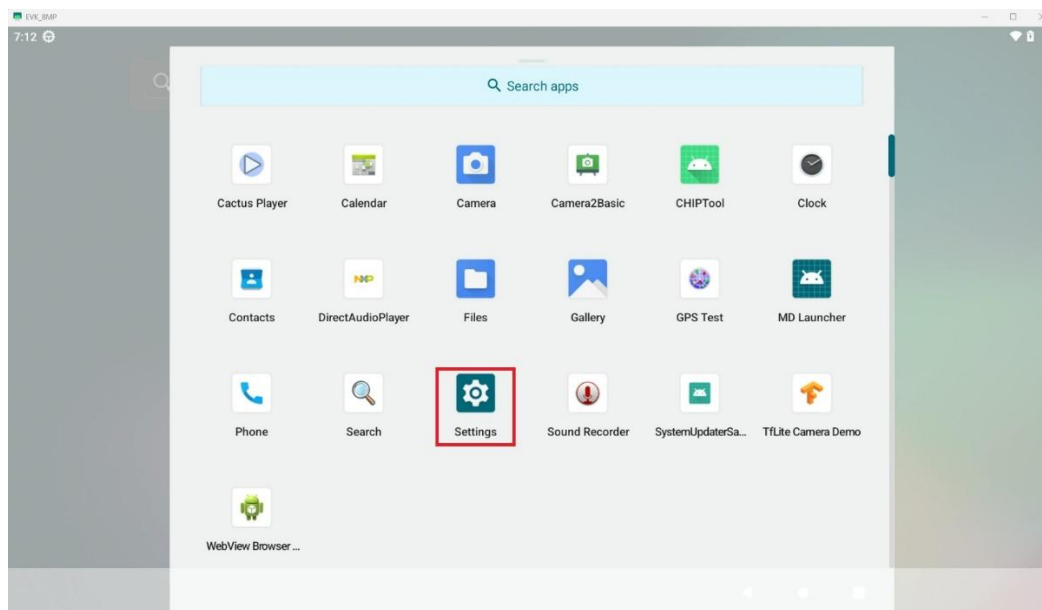


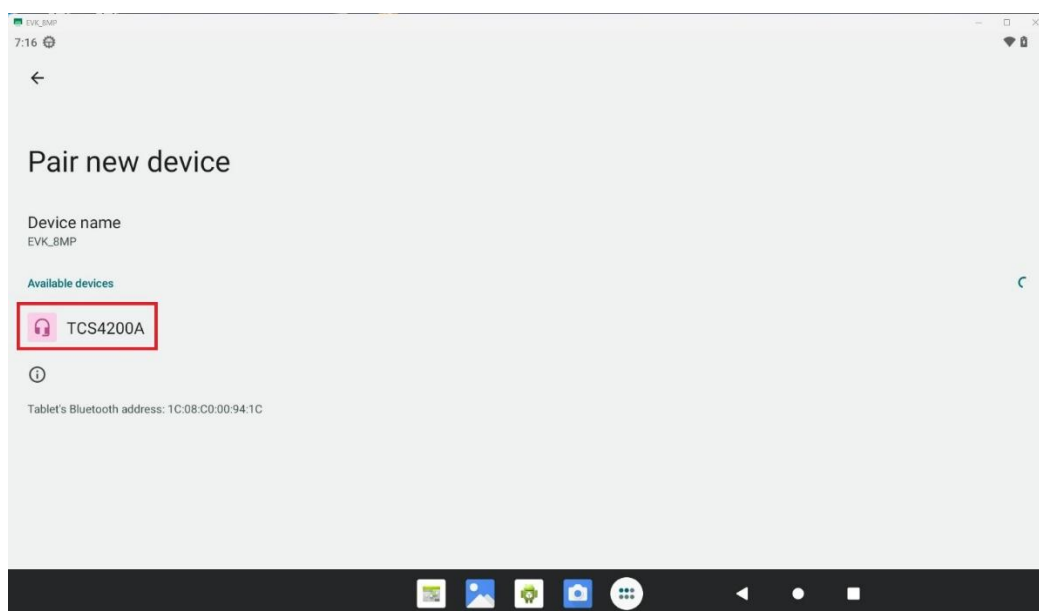
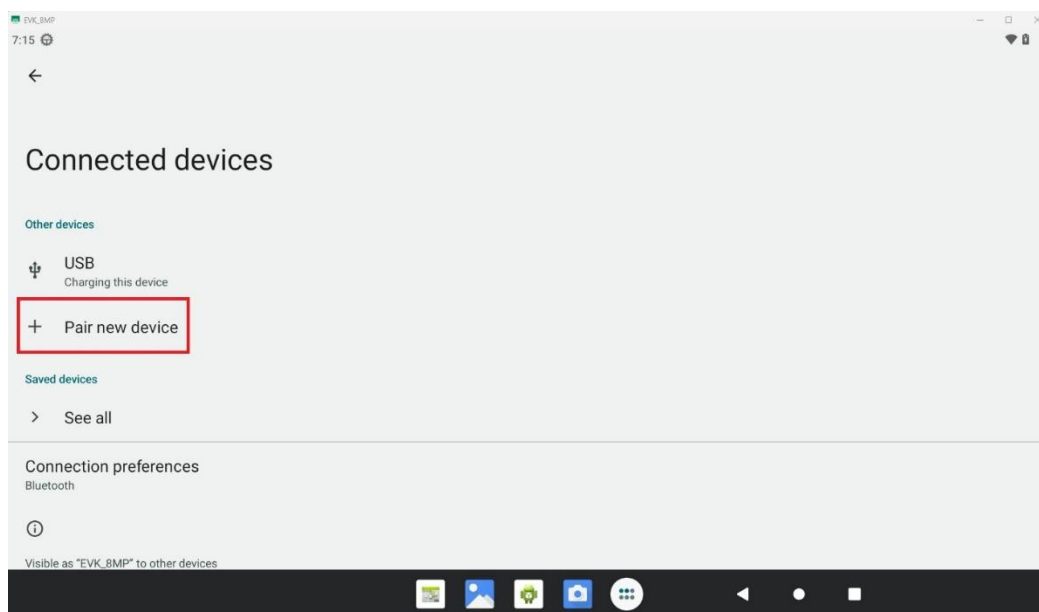


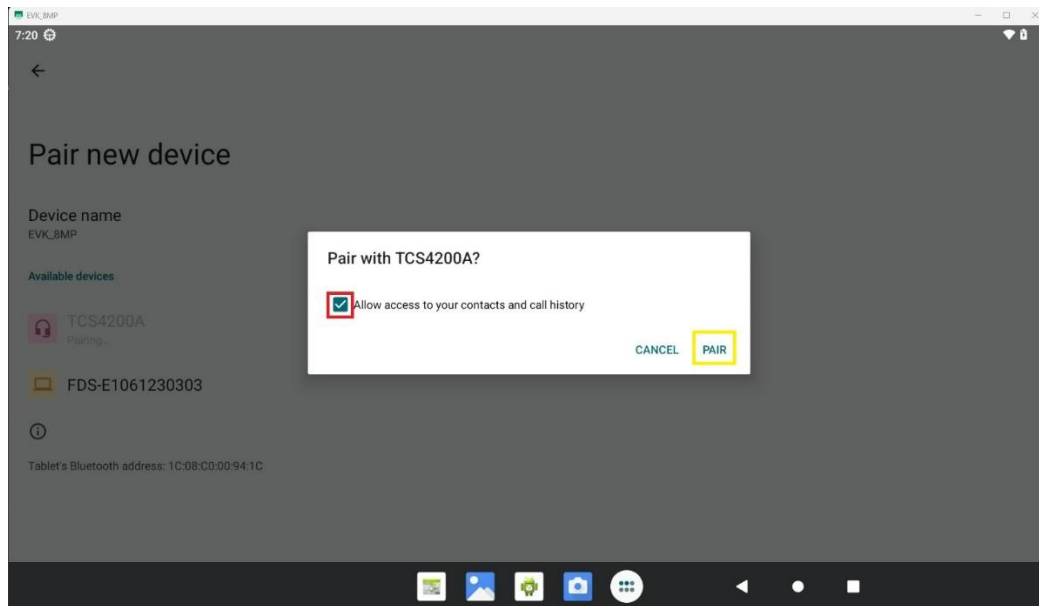


- BT

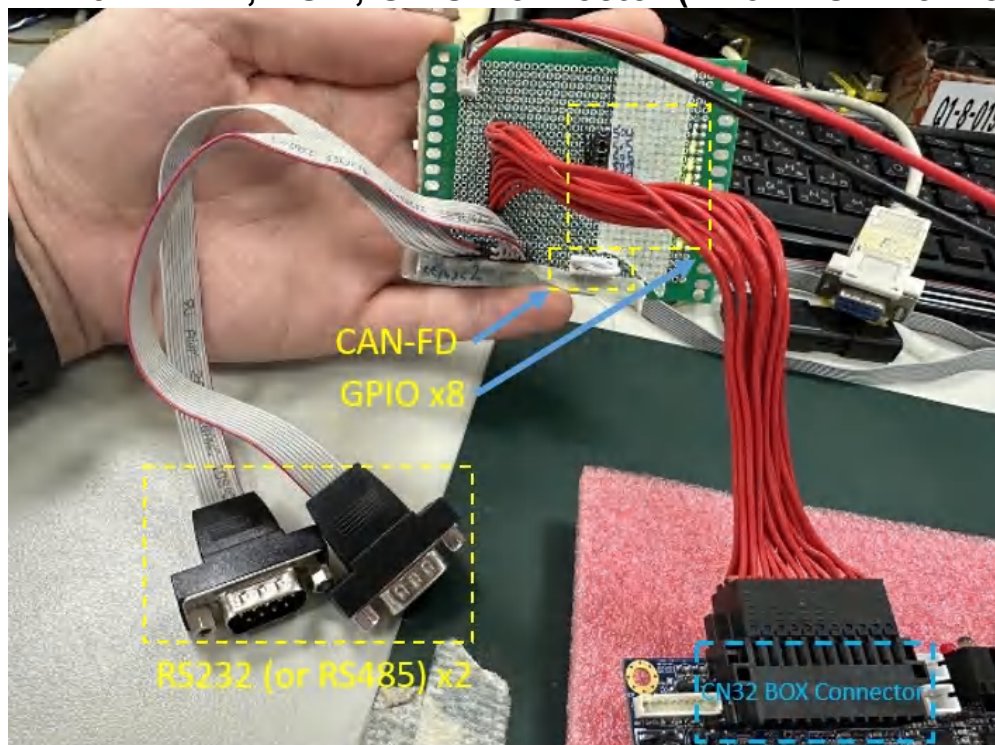
Go to **“Settings”** → **“Connected devices”** → click “Pair new device”, so will see a nearby Bluetooth device, like “TCS4200A” ***This device is a Bluetooth speaker, Choose it and “Allow access to your contacts and call history” to “PAIR”







4.2.3 CAN, COM, GPIO Connector (CN32 BOX Connector)



- CAN bus test

The can bus short circuit together, type command:

```
# ip link set can0 up type can bitrate 125000 dbitrate 2000000 restart-  
ms 1000 berr-reporting on fd on  
# ip link set can1 up type can bitrate 125000 dbitrate 2000000 restart-  
ms 1000 berr-reporting on fd on
```

```
###CAN 0
```

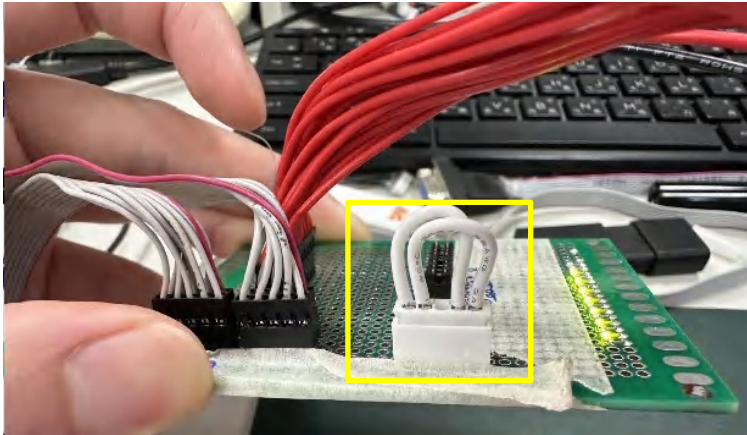
```
candump can0 &
```

cansend can1 321#11223344556677DF

###CAN 1

candump can1 &

cansend can0 321#99887766554433DF



```

root@imx8mp-lpddr4-evk:~# ip link set can0 up type can bitrate 125000 dbitrte 20000
00 restart-ms 1000 berr-reporting on fd on
[ 99.903300] flexcan 308c0000.can can0: Data brp=1 and brp=4 don't match, this may
result in a phase error. Consider using different bitrate and/or data bitrate.
[ 99.918079] IPv6: ADDRCONF(NETDEV_CHANGE): can0: link becomes ready
root@imx8mp-lpddr4-evk:~# ip link set can1 up type can bitrate 125000 dbitrte 20000
00 restart-ms 1000 berr-reporting on fd on
[ 99.952295] flexcan 308d0000.can can1: Data brp=1 and brp=4 don't match, this may
result in a phase error. Consider using different bitrate and/or data bitrate.
root@imx8mp-lpddr4-evk:~# [ 100.928268] IPv6: ADDRCONF(NETDEV_CHANGE): can1: link b
ecomes ready

root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# candump can0 &
[1] 1154
root@imx8mp-lpddr4-evk:~# cansend can1 321#11223344556677DF
root@imx8mp-lpddr4-evk:~# can0 321 [8] 11 22 33 44 55 66 77 DF

root@imx8mp-lpddr4-evk:~# candump can1 &
[2] 1177
root@imx8mp-lpddr4-evk:~# cansend can0 321#99887766554433DF
root@imx8mp-lpddr4-evk:~# can0 321 [8] 99 88 77 66 55 44 33 DF
can1 321 [8] 99 88 77 66 55 44 33 DF

```

- RS232 (or RS485) test

COM3: /dev/ttymx2

COM4: /dev/ttymx3

3. Connect to RS232 port and run the two hyper terminal on PC (such as TeraTerm).

One open COM5 for RS232

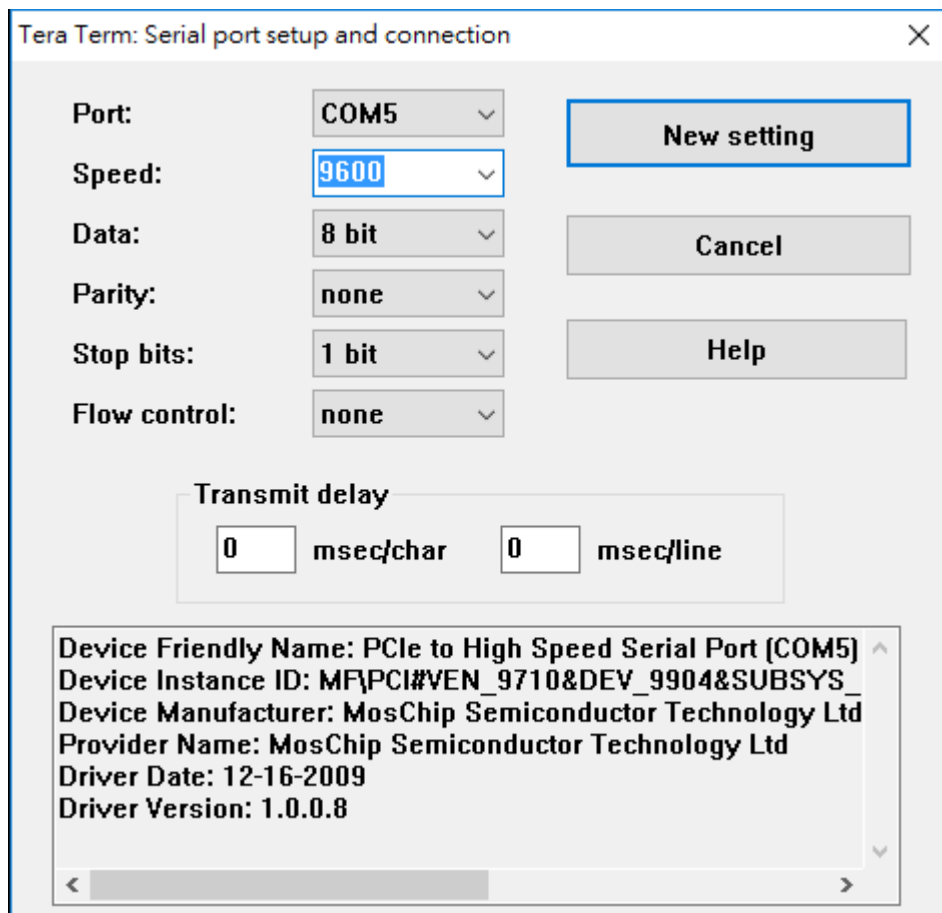
One open COM3 for debug port

When you open the RS232 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 : 9600

(6) Date : 8 bit



4. execute following commands in console window:

```
# echo abcde > /dev/ttymx2  
# cat /dev/ttymx2
```

Receiving:

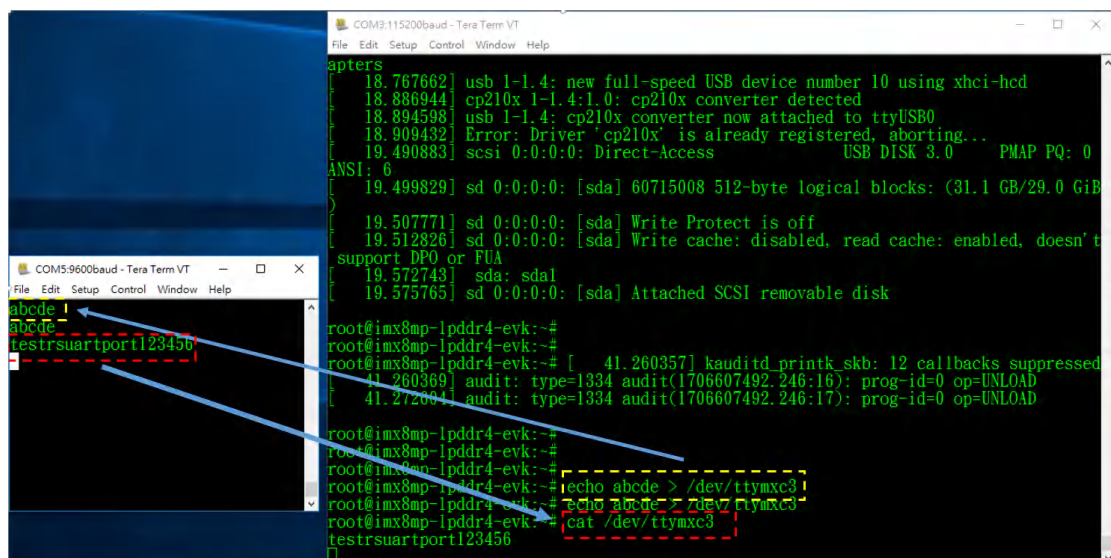
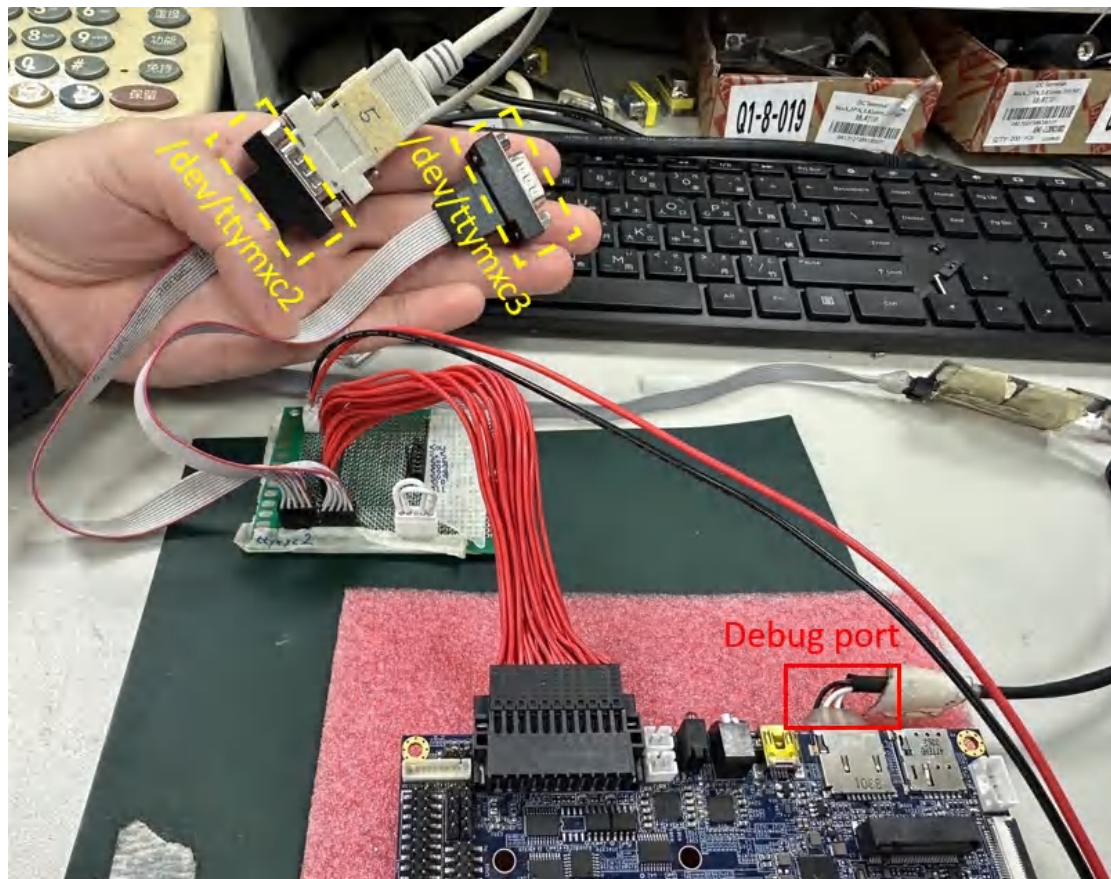
Type any number or sentence in terminal window (COM5) on your PC desktop and you should see the same output appears in the console window (CON3).

```
# cat /dev/ttymx2
```

Sending:

Type any number or sentence in the console window(CON3) and you should see the same output appears in terminal window (CON5).

```
# echo abcde > /dev/ttymx2
```



After the test is complete, Ctrl + C jumps out of the background,
Other RS232 ports are also tested in the same way, change COM5 to other
RS232 ports (ttyMXC3)

- GPIO test

Paste the following commands into the console window and press Enter

GPIO504 ~ GPIO511

For example, **GPO504** (to test other GPO# please replace the red numbers by yourself) , you can using a LED test board to control LED light on-off .

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

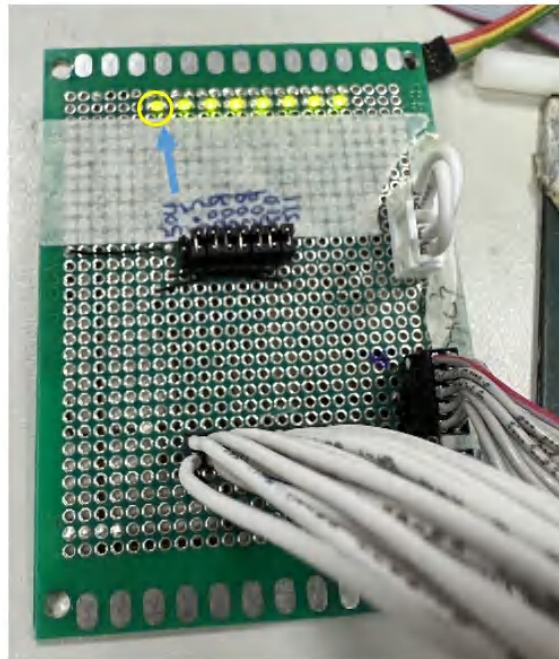
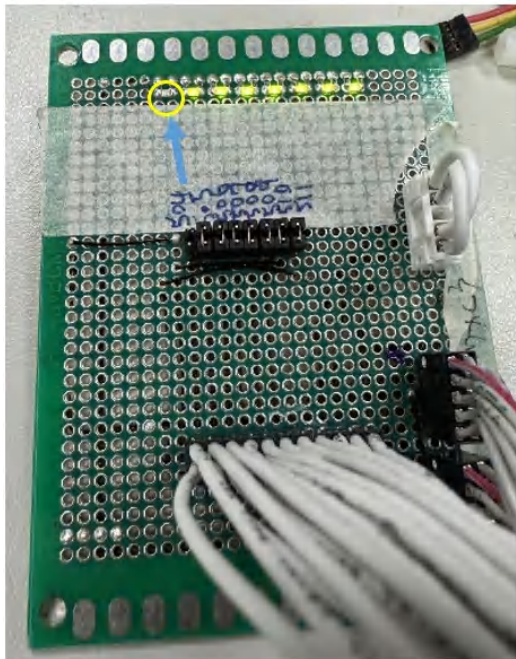
```
echo 504 > export
```

```
cd gpio504
```

```
echo out > direction
```

```
echo 1 > value ← LED OFF
```

```
echo 0 > value ← LED ON
```



For example, **GPI504** (to test other GPI # please replace the red numbers by yourself)

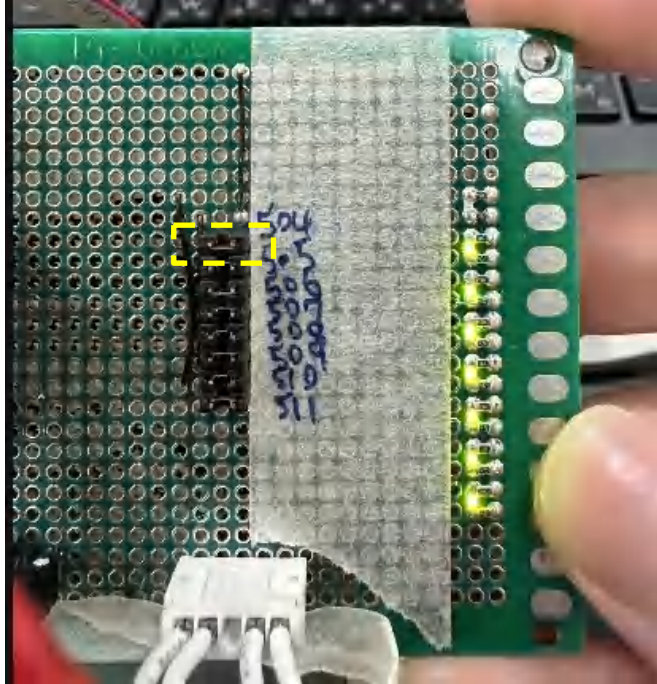
```
cd /sys/class/gpio/
```

```
echo 504 > export
```

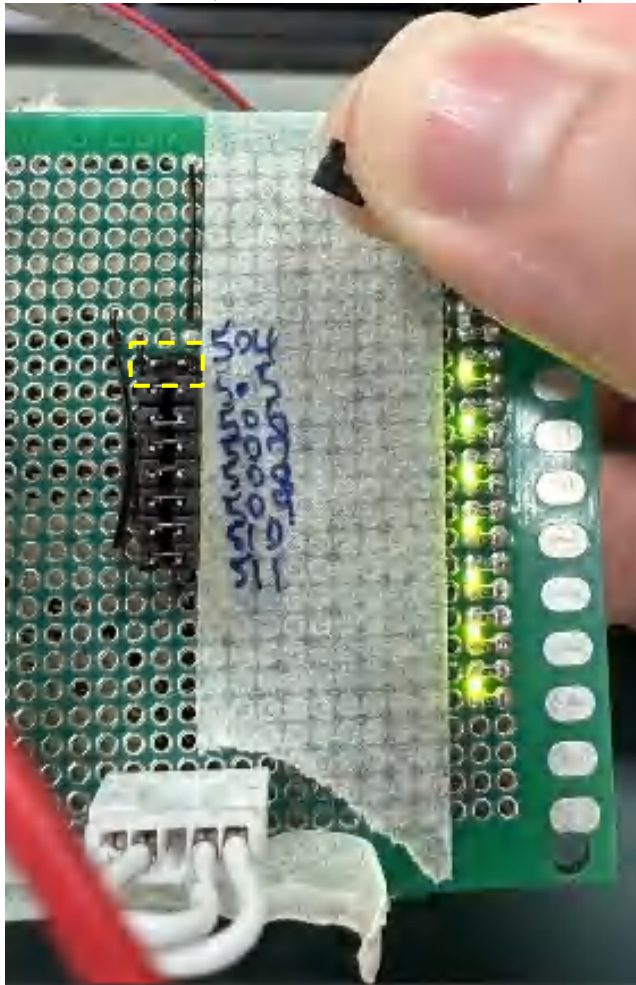
```
cd gpio504
```

```
cat value
```

When short circuit, it will show cat value “0” pull-down



When take out, it will show cat value “1” pull-up



```
root@imx8mp-lpddr4-evk:~# cd /sys/class/gpio/  
root@imx8mp-lpddr4-evk:/sys/class/gpio# echo 504 > export  
root@imx8mp-lpddr4-evk:/sys/class/gpio# cd gpio504  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
0  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
1  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
0  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504# cat value  
1  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504#
```

4.2.4 CN26 GPIO Pin Header

Paste the following commands into the console window and press Enter

GPIO496 ~ GPIO503

For example, GPO496 (to test other GPO# please replace the red numbers by yourself) , you can using a LED test board to control LED light on-off .

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

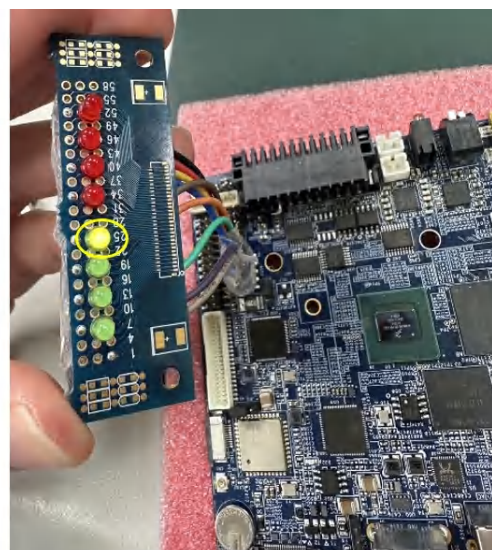
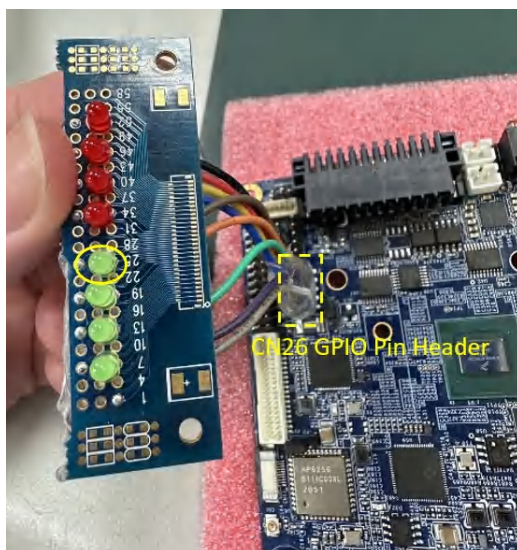
```
echo 496 > export
```

```
cd gpio496
```

```
echo out > direction
```

```
echo 1 > value ← LED OFF
```

```
echo 0 > value ← LED ON
```

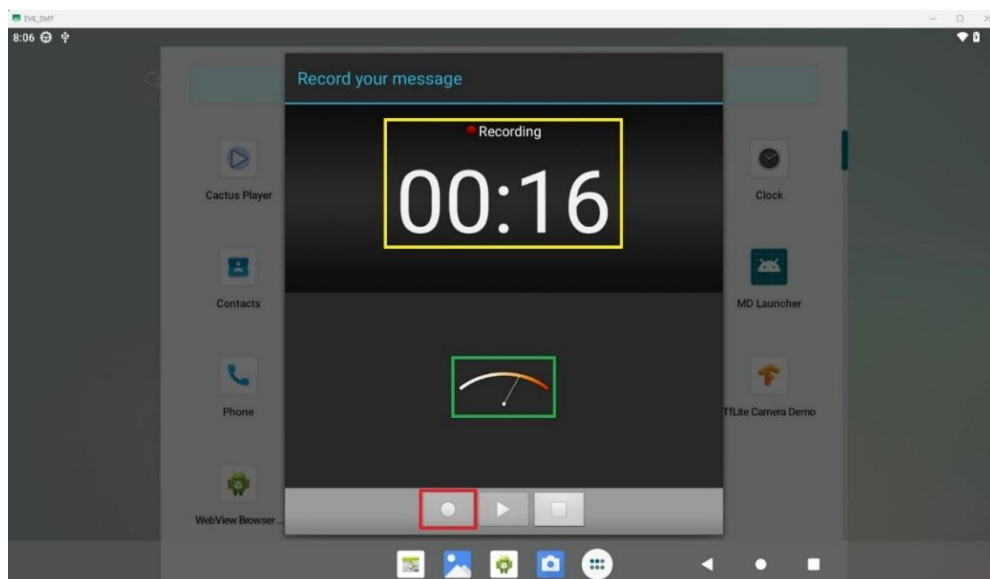
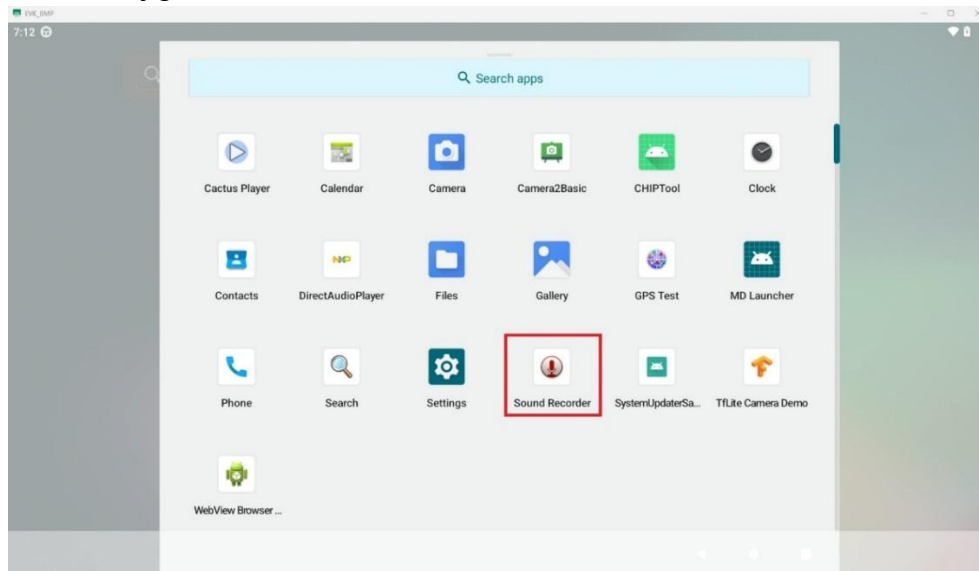


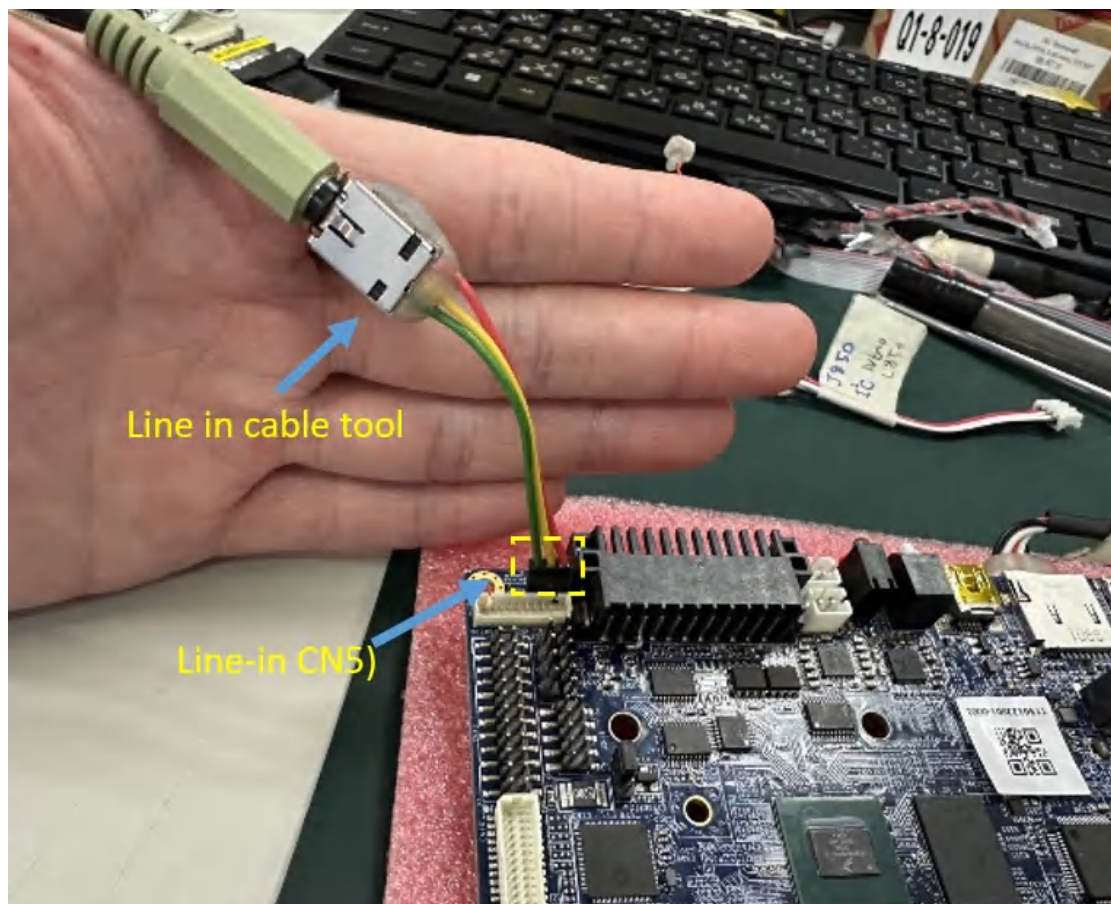
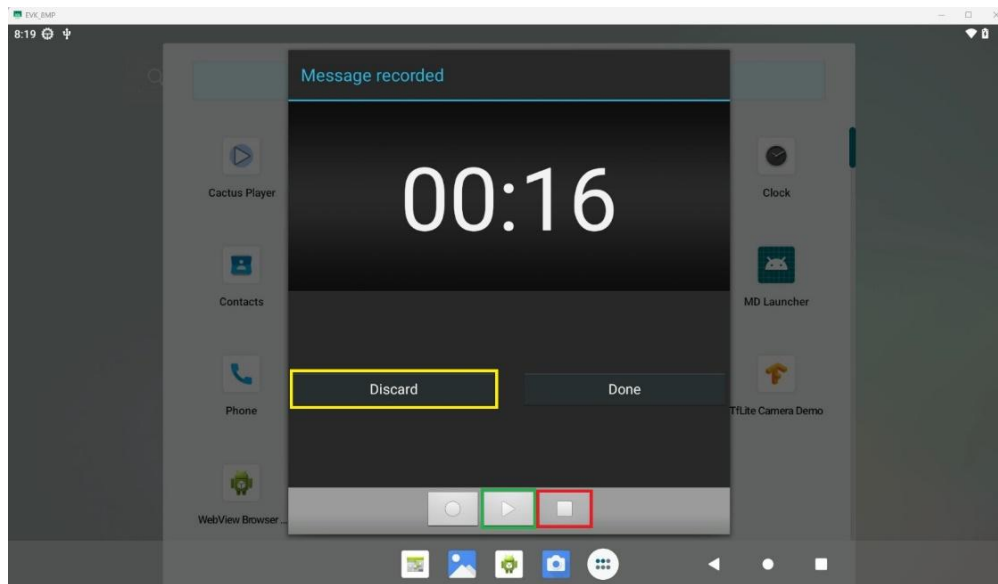
4.2.5 The Line in to recording test

Using the build in Sound Recorder AP → Click “● Record button” → “■ Stop recording” → “▶ Play”

**The default is Line in on

PC can play a MP3 music for recording, the Line in cable need to be equipped with audio jig wire.





4.2.6 Speaker test

Paste the following commands into the console window and press Enter

```
# tinyplay /mnt/media_rw/0584-0D0F/audiocheck_L.wav -D 1 -d 0
```

```
# tinyplay /mnt/media_rw/0584-0D0F/audiocheck_R.wav -D 1 -d 0
```

// Fill in the name of the currently plugged USB flash drive in red



4.2.7 Headphone/MIC Pin Header test (CN42)

Prepare a headset and with audio cable tool, like see as below pic.

- Headphone

Paste the following commands into the console window and press Enter

```
# tinyplay /mnt/media_rw/0584-0D0F/audiocheck_L.wav -D 1 -d 0
```

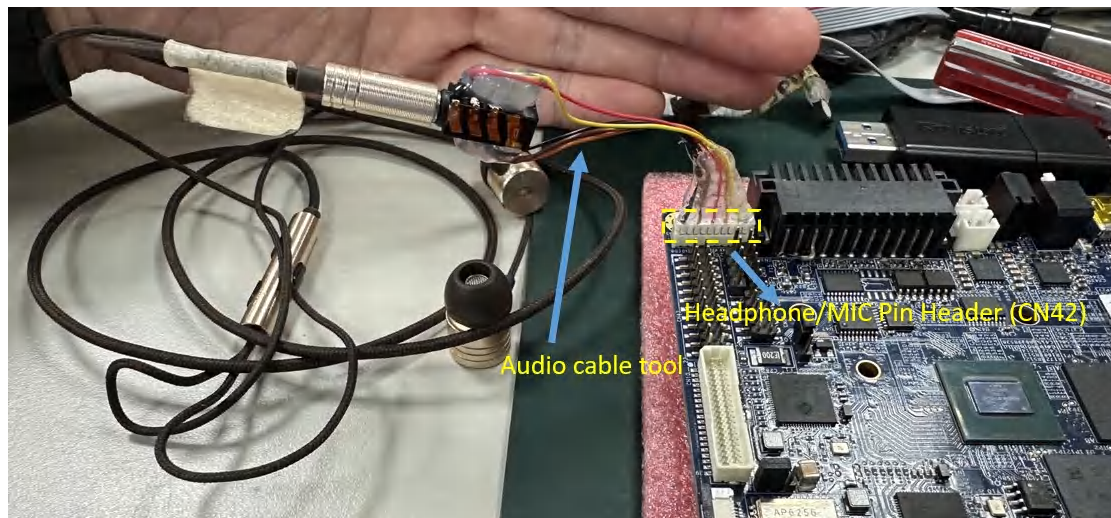
```
# tinyplay /mnt/media_rw/0584-0D0F/audiocheck_R.wav -D 1 -d 0
```

// Fill in the name of the currently plugged USB flash drive in red

- MIC in

Using the build in Sound Recorder AP → Click “● Record button” → “■

Stop recording” → “▶ Play”



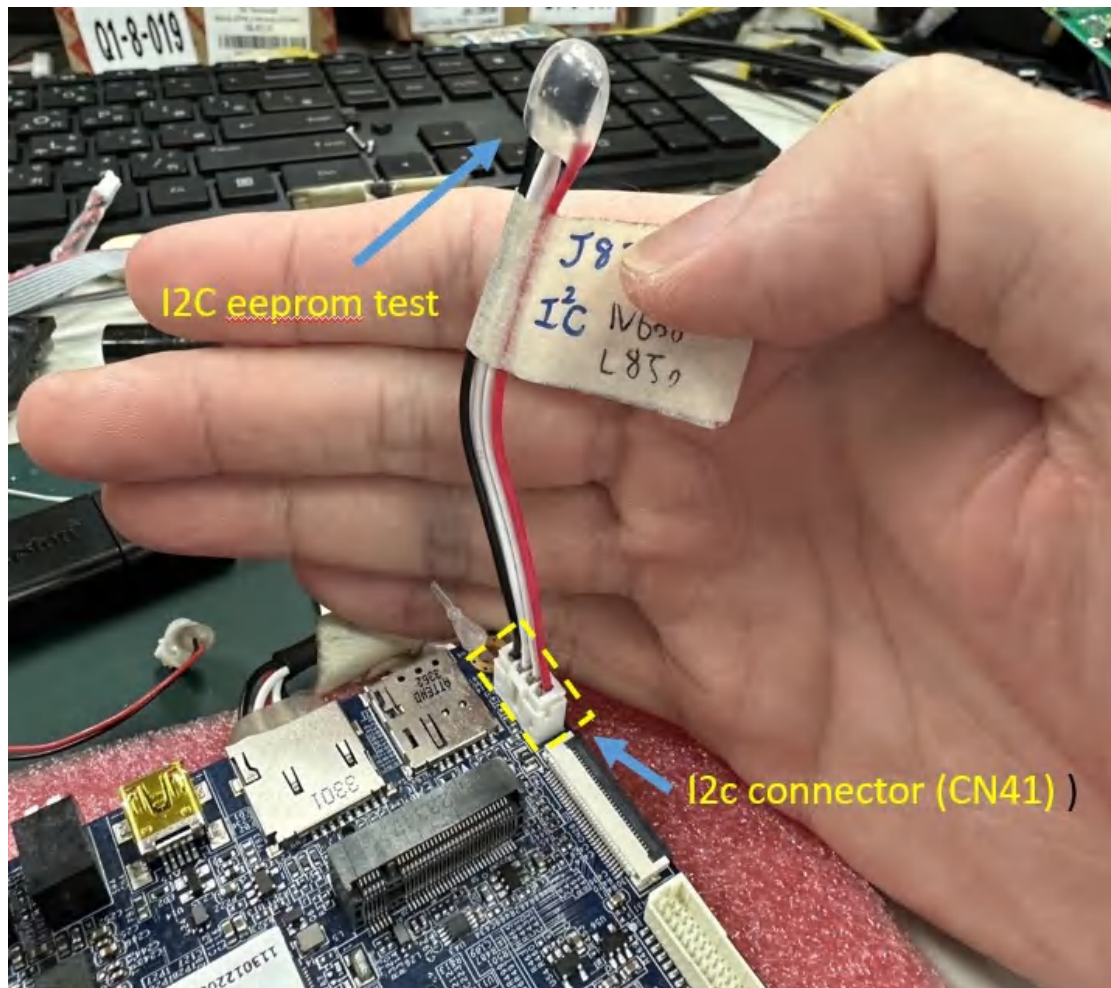
4.2.8 i2c(CN41) Test

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

i2cdetect -y -a 4

it will show 50 nodes

```
root@imx8mp-lpddr4-evk:~# i2cdetect -y -a 2
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: 00 -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- 18 -- -- -- -- -- -- --
20: UU UU -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 51 -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- UU -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
```



4.2.9 The LAN1 & LAN2(optional) test

C. LAN1(CN23) eth0, ok
ping 8.8.8.8

D. LAN2(CN25) eth1, ok
ping 8.8.8.8



4.2.10 SPI test(CN25)

Paste the following commands into the console window and press Enter ,
You can using a W25QXX SPI Flash to detect

Copy demo test program (spi-test)

```
# cp /mnt/media_rw/FC45-2BBB/spi-test /data/
```

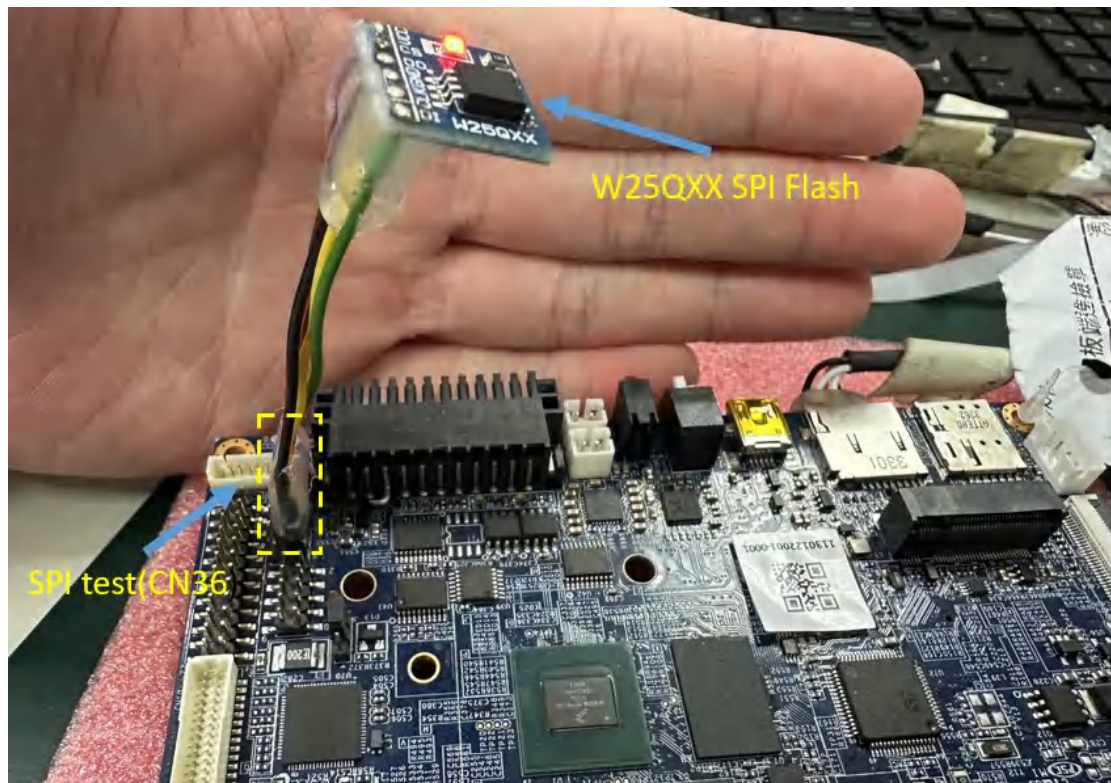
```
# cd /data/
```

```
# chmod +x spi-test
```

```
# ./spi-test /dev/spidev1.0
```

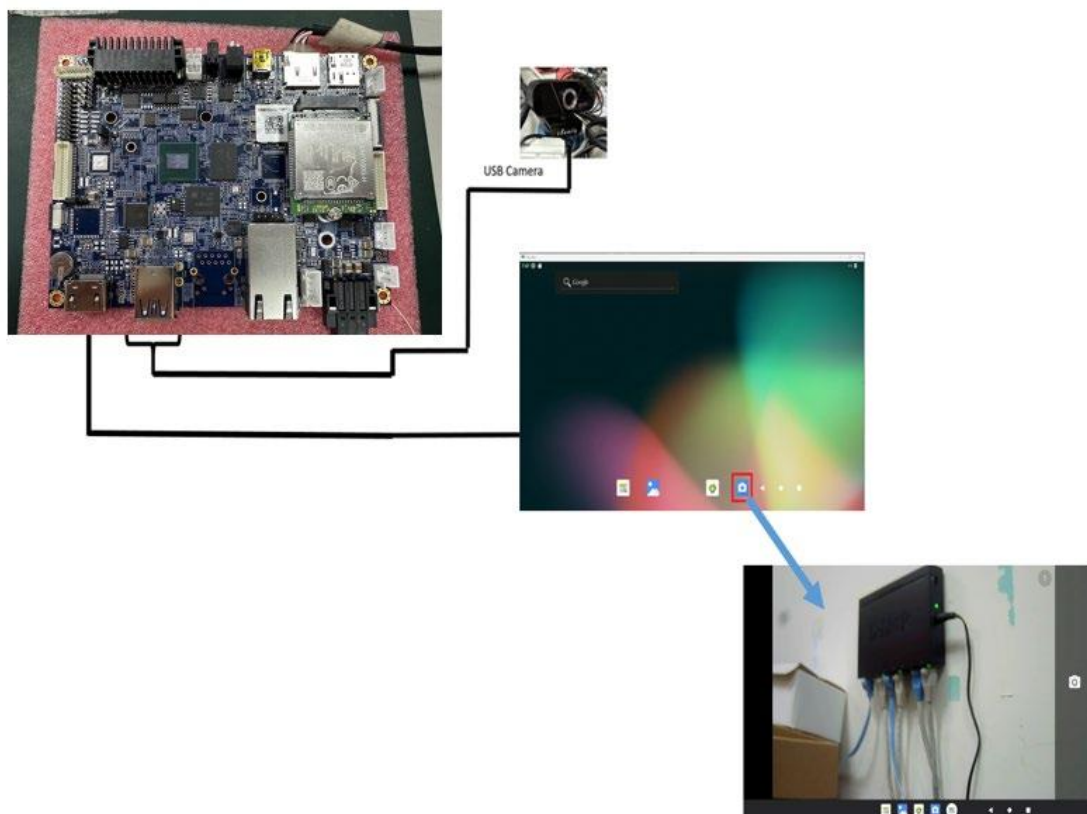
```
//will show response(7): ef 40 18 00 00 00
```

```
evk_8mp:/ # cd /data/  
evk_8mp:/data # ./spi-test /dev/spidev1.0  
response(7): ef 40 18 00 00 00  
evk_8mp:/data #
```



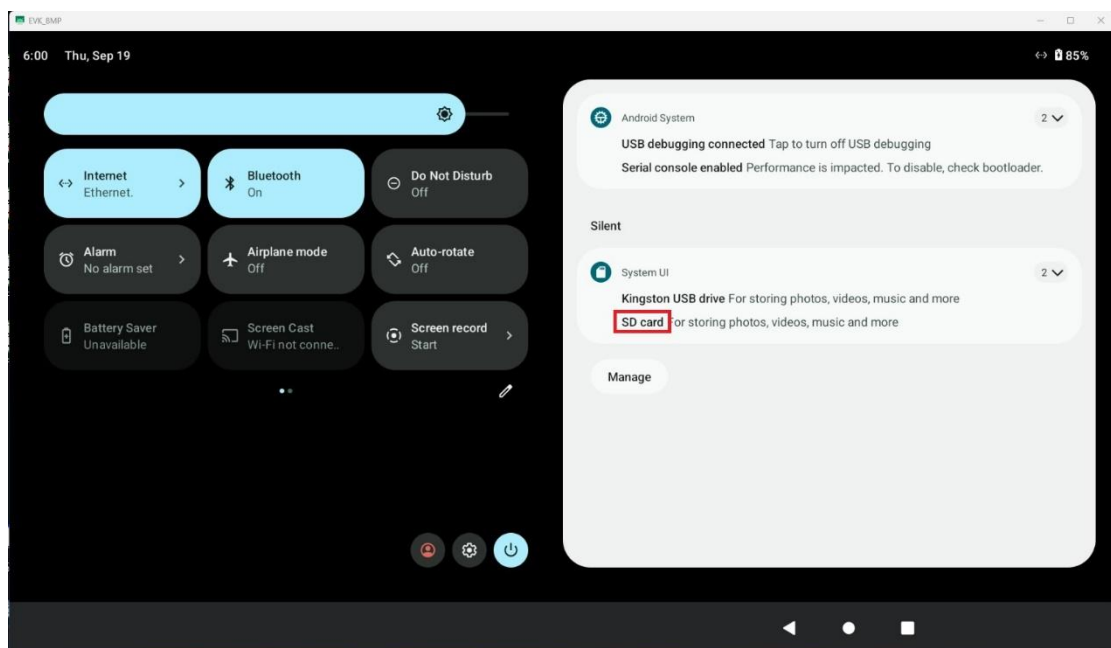
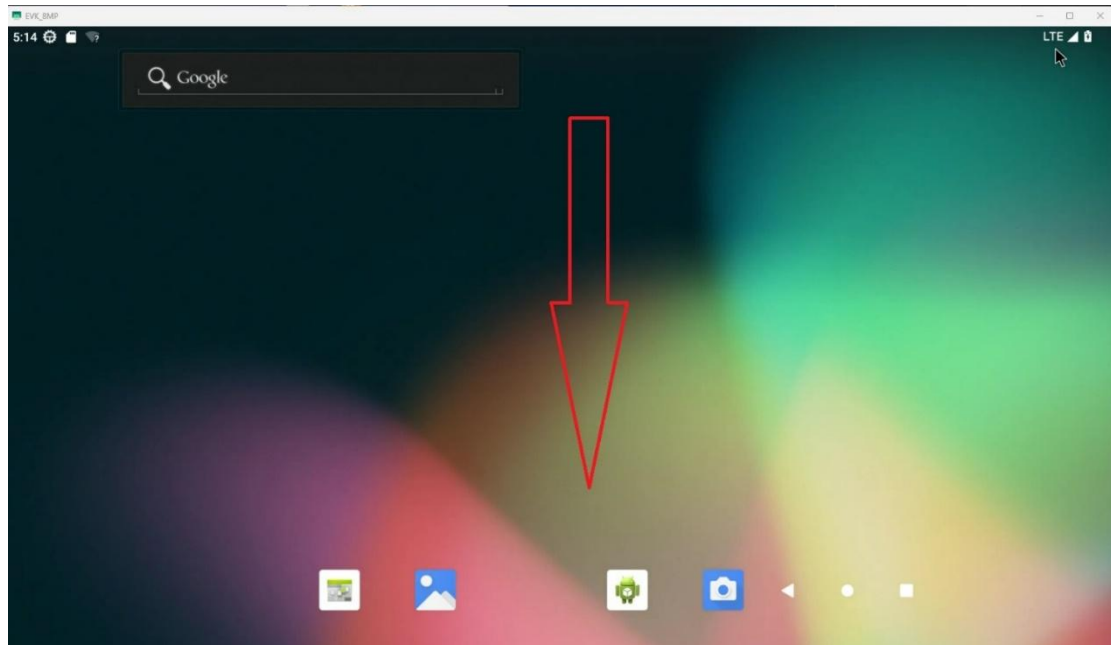
4.2.11 USB Camera test

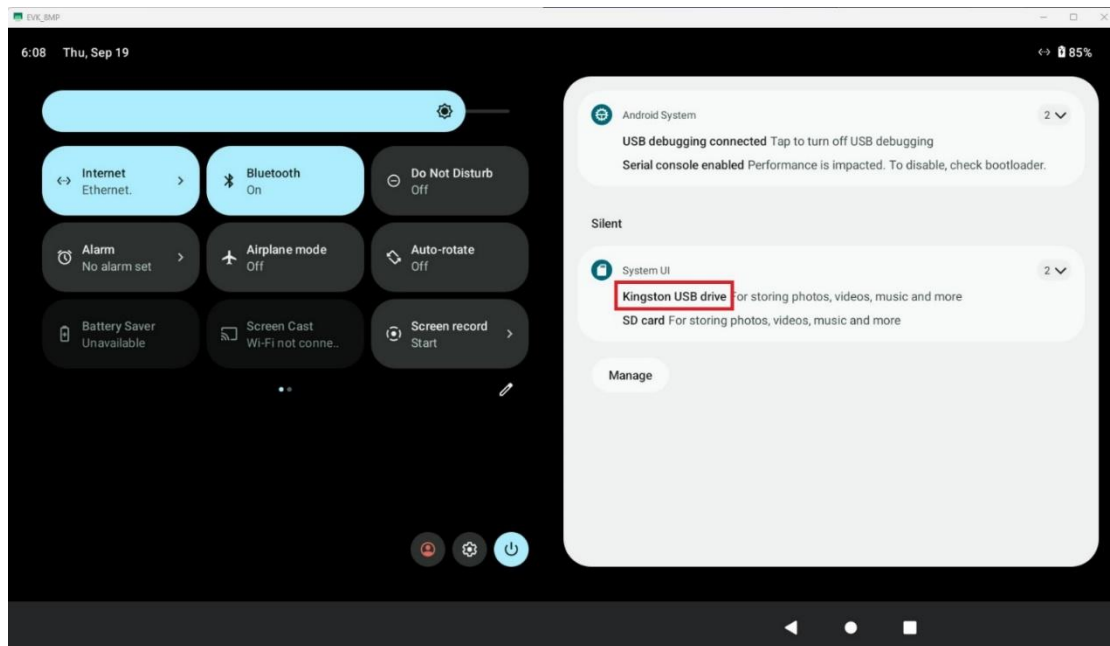
Connected an USB Camera, and run build in Camera APP.
Test schematic:



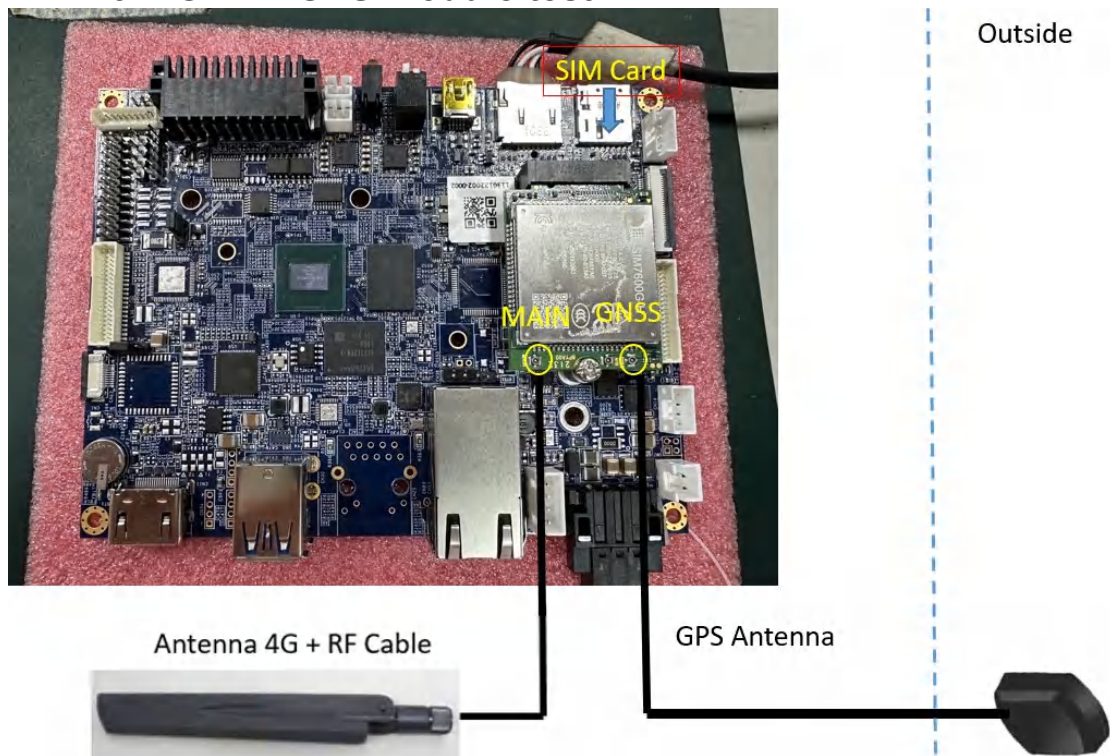
4.2.12 USB & SD Card test

Insert an USB disk & SD card, then swipe down on the desktop, will see a SD card device & Kingston USB drive

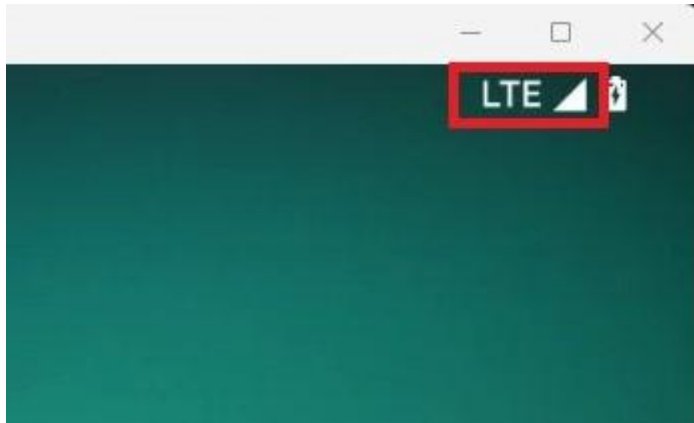




4.2.13 4G LTE/GPS module test

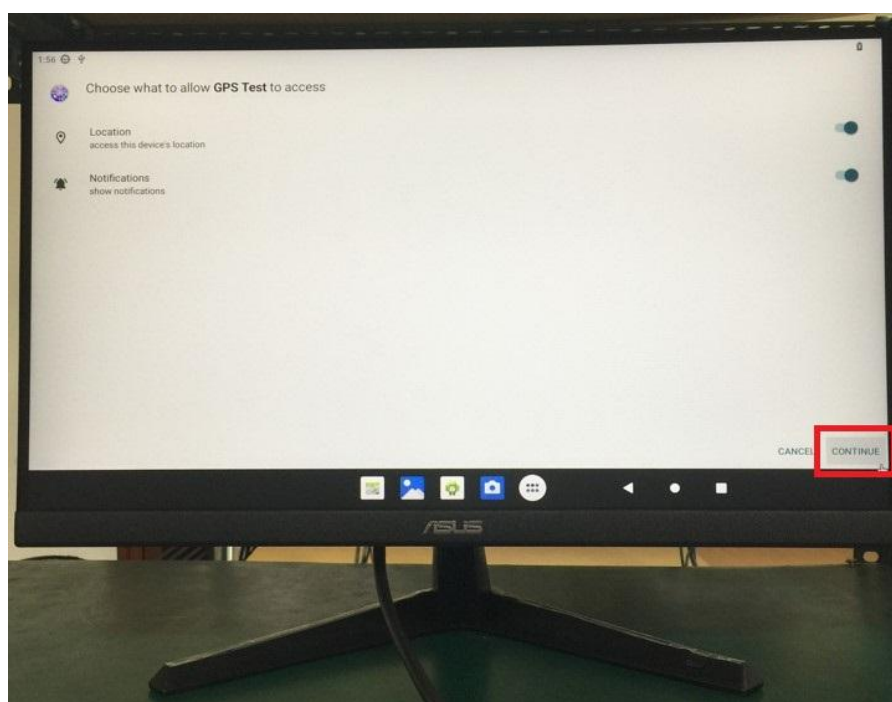
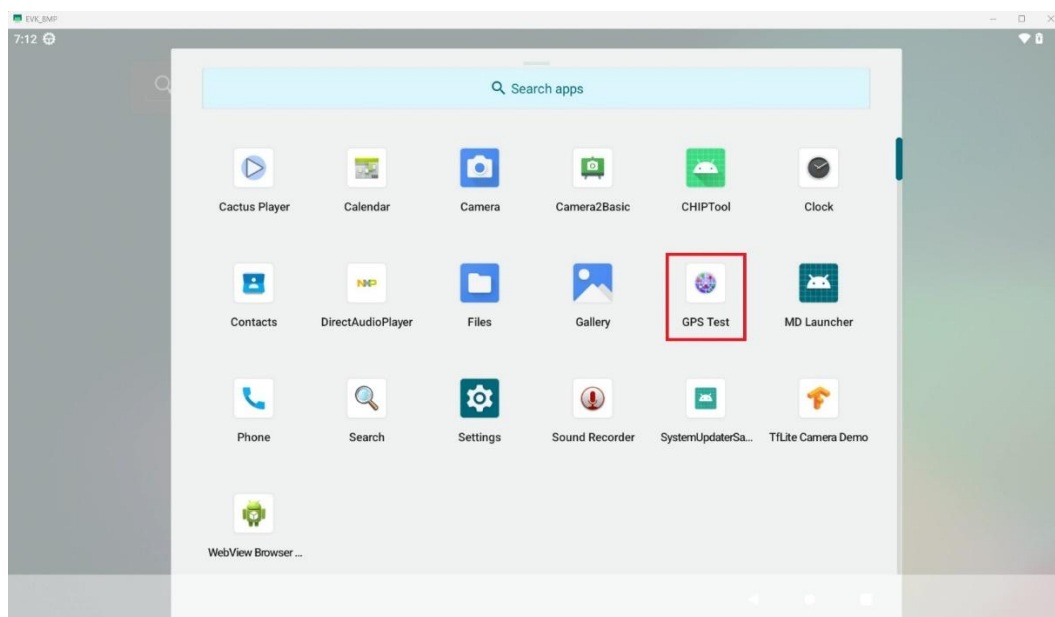


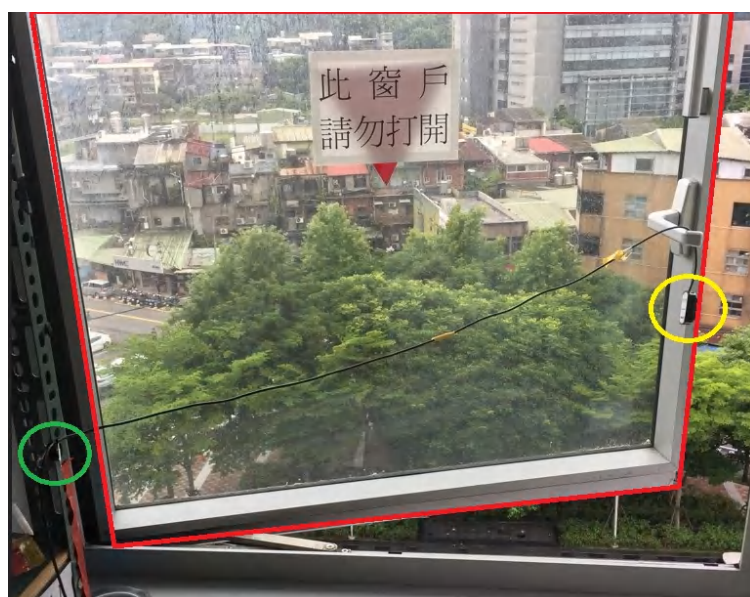
For 4G LTE test, Insert SIM Card, and after waiting for boot, and see LTE/4G signal in the upper right corner of the screen.
In console type command **ifconfig** also will show wwan0 interface



```
COM7:115200baud - Tera Term VT
File Edit Setup Control Window Help
TX packets:7 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 TX bytes:490
eth0: Link encap:Ethernet HWaddr ae:83:7b:e9:4b:83 Driver fec
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 TX bytes:0
eth1: Link encap:Ethernet HWaddr fa:a4:67:36:93:e5 Driver imx-dwmac
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 TX bytes:0
Interrupt:54
wwan0: Link encap:Ethernet HWaddr 36:aa:df:f4:1f:cc Driver simcom_wwan
inet addr:10.202.47.9 Bcast:10.202.47.11 Mask:255.255.255.252
inet6 addr: fe80::34aa:dfff:fef4:1fcc/64 Scope: Link
UP BROADCAST RUNNING NOARP MULTICAST MTU:1500 Metric:1
RX packets:59 errors:0 dropped:0 overruns:0 frame:0
TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:10649 TX bytes:7839
evk 8mp:/ #
```

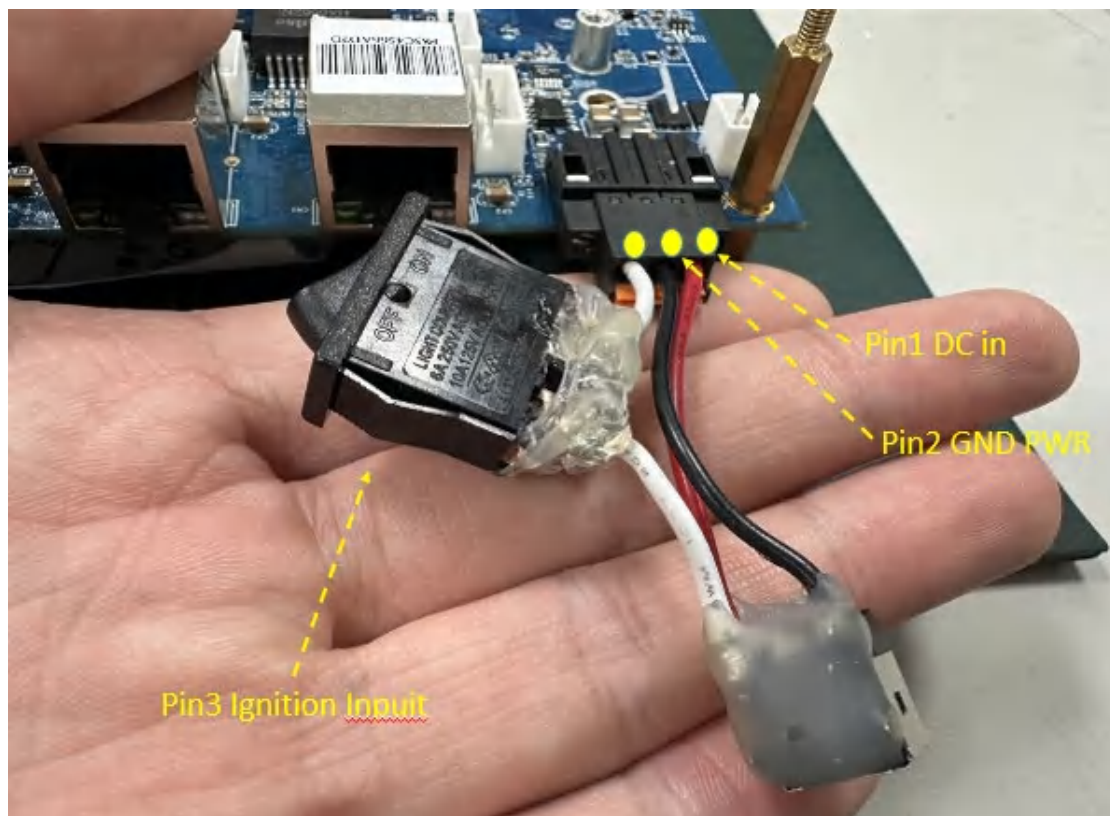
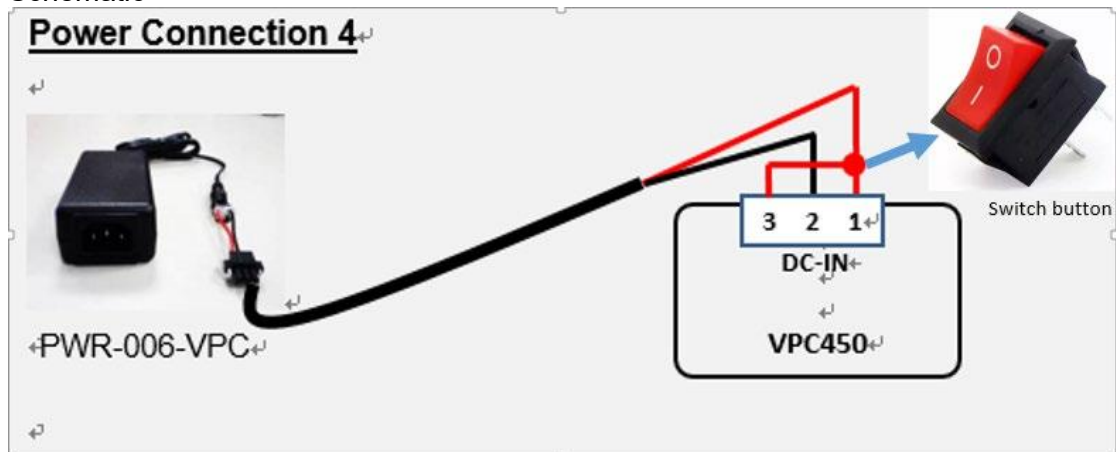
For GPS test, you can try install GPS APP, click **“GPS AP”** → **“CONTINUE”** to allow Location access → and waiting for GPS signal





4.2.14 MCU-controlled Power ON/OFF Demo Test

Schematic



The MCU will always detect an ignition signal as long as DC adapter is on can be turned on SBC4100_NSD4100.

And if disconnect ignition signal can be turned off SBC4100_NSD4100.

For any further informatin that we do not mention in the manual, please contact us directly.