

# **L800+L850 VPC450**

## **Quick Start Guide**

## Release Notes

---

Version	Release Date	Notes
1.0	Jan 2024	Initial release
2.0	July 2024	Add Android
3.0	Sup 2024	Change to L850-SB

## Disclaimer

---

This documentation is provided for use by customers. No license of product property rights is granted. We assume no liability and provide no warranty either expressed or implied relating to the usage or intellectual property right infringement that may result from its use.

We provide this document “as is,” without warranty of any kind, expressed or implied, including, but not limited to, its particular purpose. We may make changes to this document without notice.

.

## **Table of Contents**

<b>1. Precautions</b>	<b>5</b>
1.1 Safety Precautions	5
1.2 Write Prohibited Regions	5
1.3 Warrnty	5
1.4 FCC Warning	6
<b>2. Overview</b>	<b>7</b>
2.1 Overview	7
2.2 Interface Specifications	8
<b>3. Setup</b>	<b>9</b>
3.1 Console / Debug Port	9
3.2 Start Running	12
<b>4. Running Software</b>	<b>12</b>
4.1 Yocto	12
4.1.1 HDMI out (CN4)	13
4.1.2 WiFi/BT test (optional)	13
4.1.3 CAN-FD / COM / Audio Connector (CN30)	14
4.1.4 The Line in to recording test	21
4.1.5 Speaker test	21
4.1.6 GPIO test (CN29)	22
4.1.7 i2c (CN18)Test	25
4.1.8 The LAN1 & LAN2(optional) test	26
4.1.9 3D Accelerometer and Gyroscope sensor ( LSM6DSO ) test (optional)	27
4.1.10 SPI test(CN25)	28
4.1.11 USB Camera test	29
4.1.12 USB & SD Card test	30
4.1.13 GPS (M16U8BF) module test (optional)	31
4.1.14 4G LTE test	33
4.1.15 MCU-controlled Power ON/OFF Demo Test	35
4.2 Android	36
4.2.1 USB port & SD Card test	36
4.2.2 The LAN1 & LAN2(optional) test	37
4.2.3 WiFi/BT test (optional)	38
4.2.4 CAN-FD / COM / Audio Connector (CN30)	43
4.2.5 GPS (M16U8BF) module test	51
4.2.6 4G LTE test	53

4.2.7 i2c (CN18) Test	55
4.2.8 GPIO test (CN29)	56
4.2.9 3D Accelerometer and Gyroscope sensor ( LSM6DSO ) test (optional)	59
4.2.10 SPI test(CN25)	60
4.2.11 USB Camera test	61
4.2.12 MCU-controlled Power ON/OFF Demo Test	61

# 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

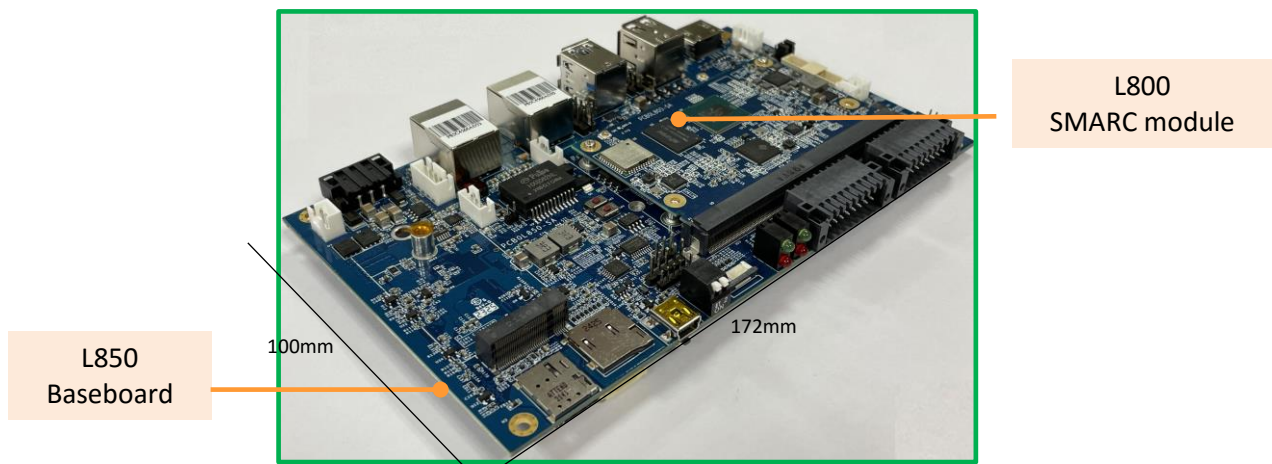
The CB-8P is a series of NXP iMX8M Plus ARM Cortex-A53 computer board. It is a flexible, high performance and low-cost computer platform designed for general embedded applications such as in-vehicle computer, KIOSK, digital signage, industrial computer, or HMI.

The CB-8P is intended for customers to quickly verify their software/hardware for a variety of applications without complicated design efforts. Each CB-8P can be installed in advance with Yocto or Android for immediate evaluation.

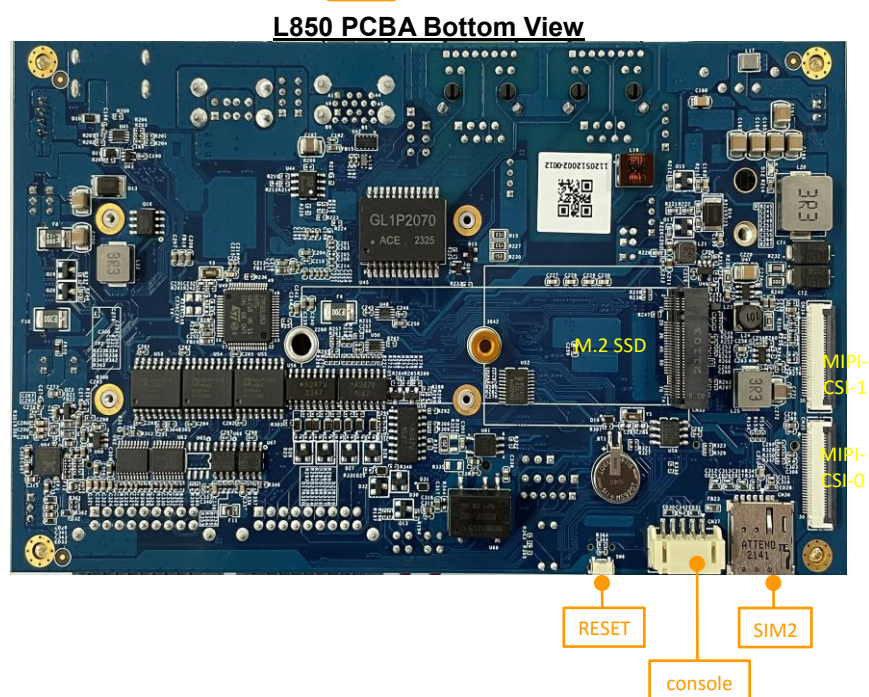
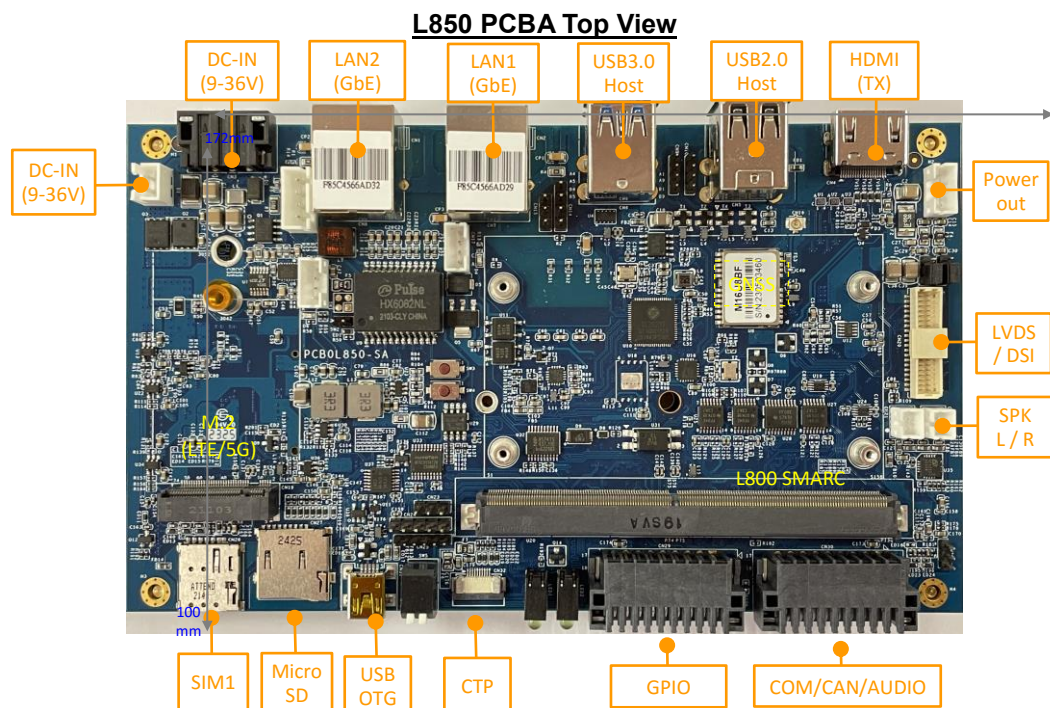
The CB-8P is comprised of:

**L800: a SMARC 2.0 compliant CPU module**

**L850: a baseboard for L800**



## 2.2 Interface Specifications





## 3. Setup

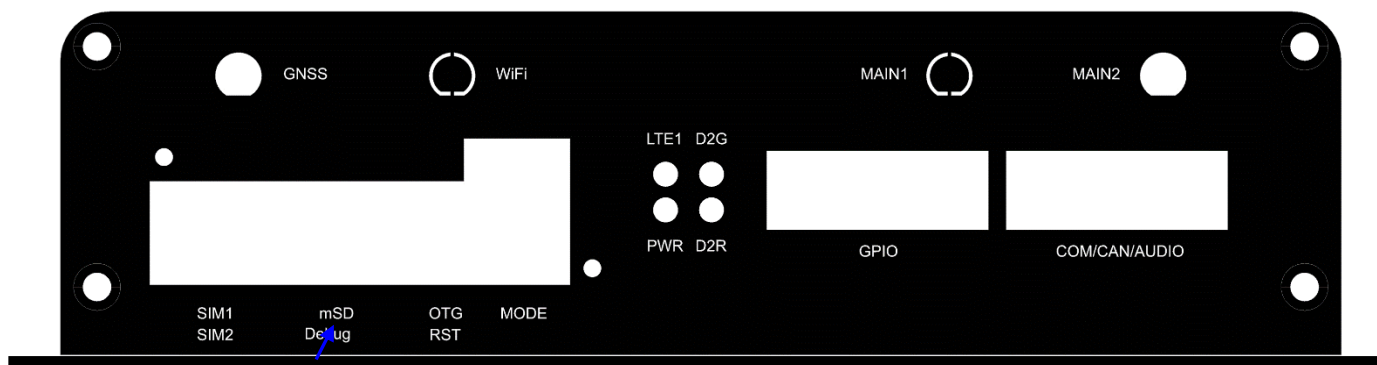
### 3.1 Console / Debug Port

The console port (or debug port) is located behind a small plate on VPC450 front panel (CN30 on PCBA).

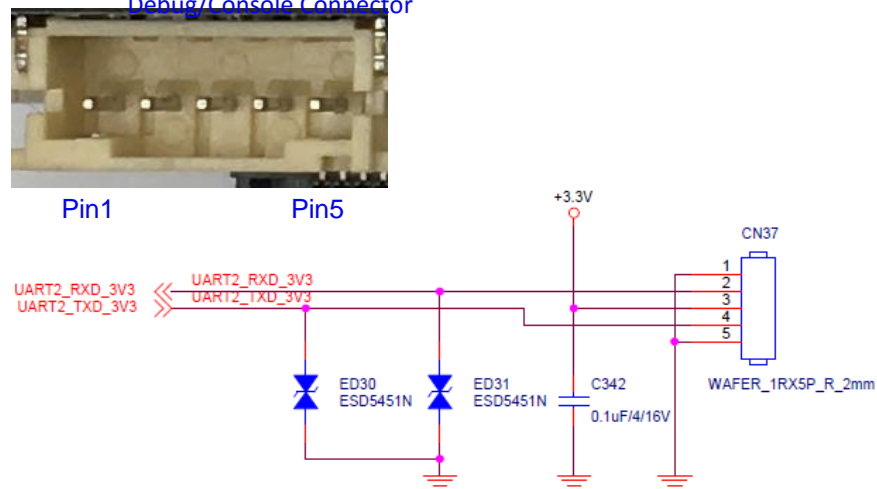
**NOTE: CN30 is dedicated for use as console/debug port. It CANNOT be used for RS232 application. The Linux device name of console/debug port is /dev/ttyxc1.**

Follow steps below to setup console port:

- Open VPC450 small plate at front panel and locate the Debug connector.



Debug/Console Connector



- Make sure you have purchased a VPC450 debug cable.



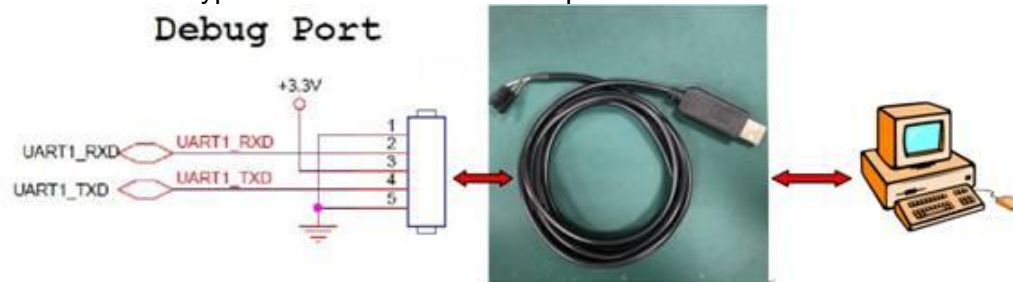
- Connect cable to debug/console connector.



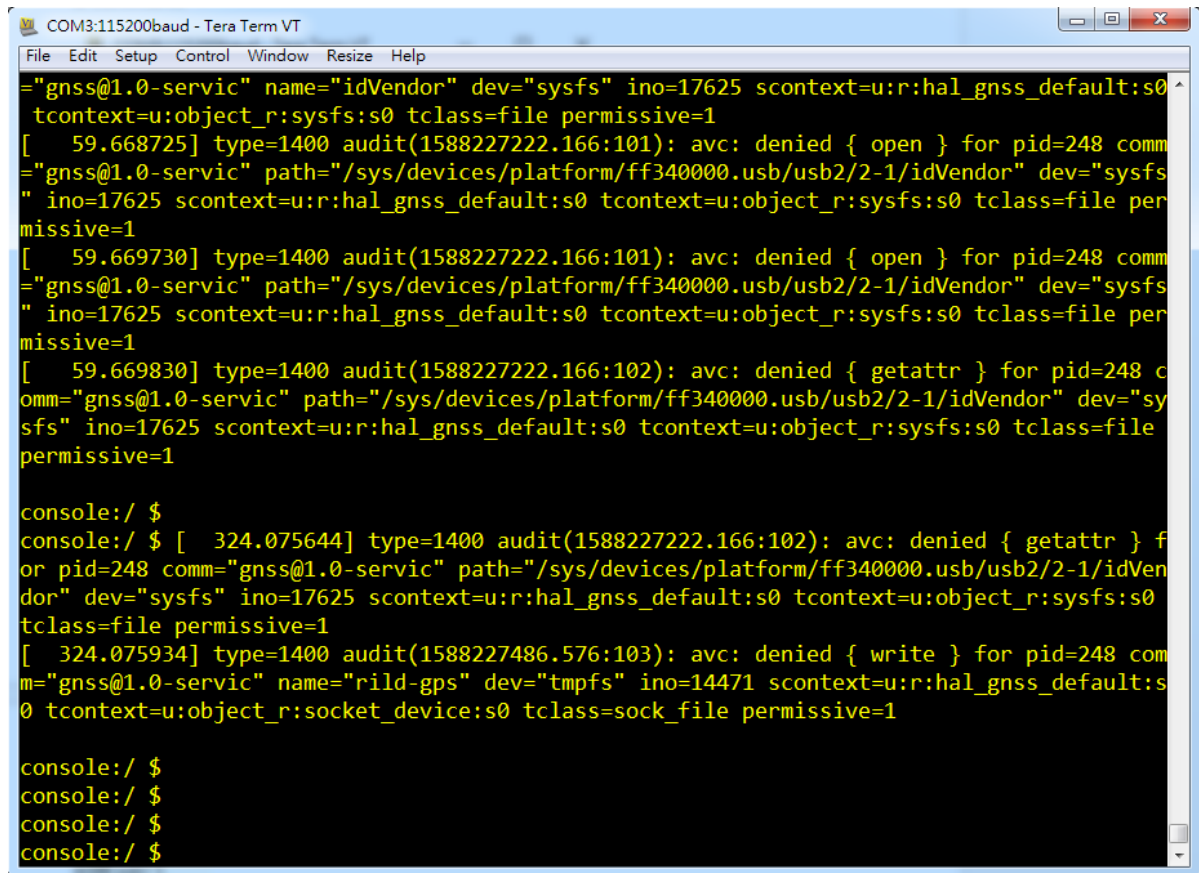
**Warning: Do NOT connect Red terminal (VCC) to Debug connector**

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.



```
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:/ $
```

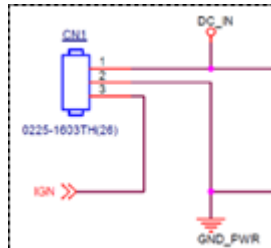
At this point, the device has entered debug mode. Type "su" into the console to enter root mode.

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

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

## 3.2 Start Running

+9V-36V 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

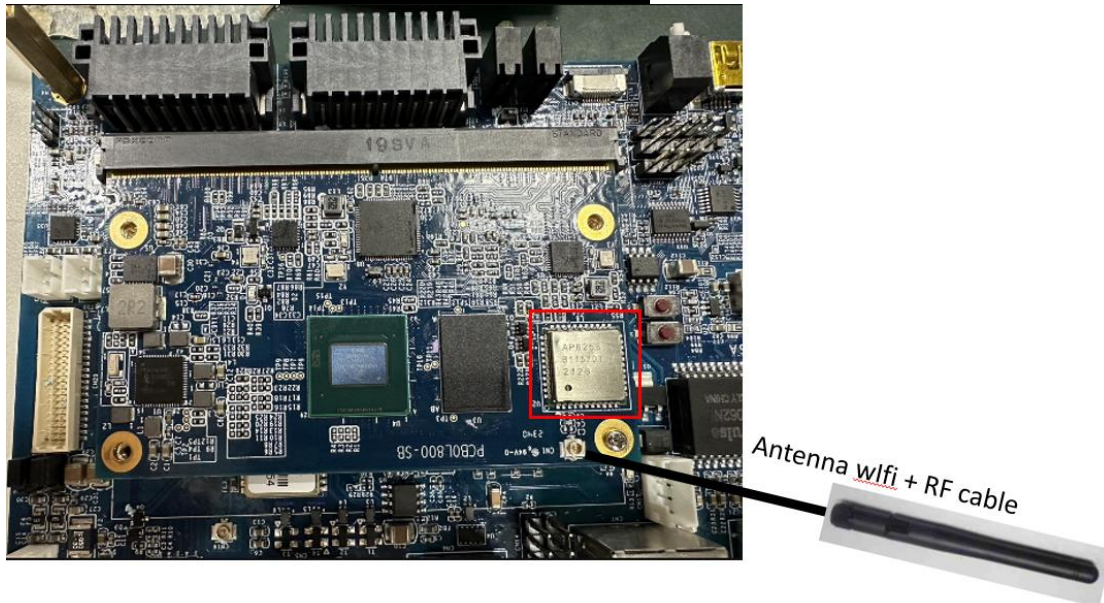
### 4.1.1 HDMI out (CN4)

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

### 4.1.2 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 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
```

The BT test the type command:

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

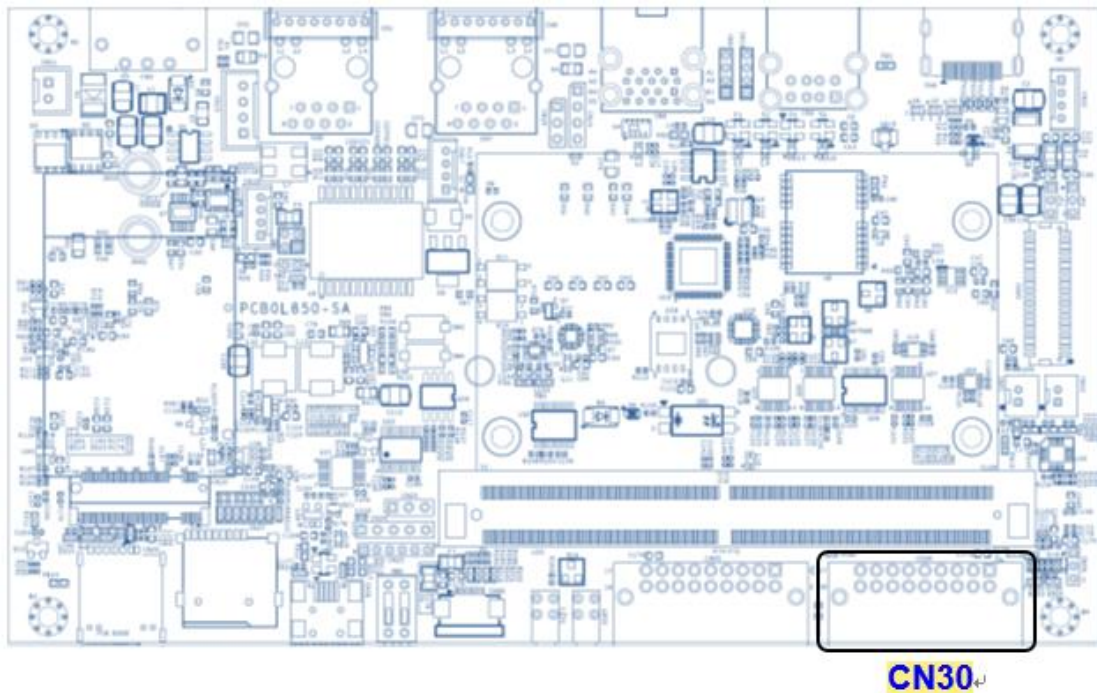
```
root@imx8mp-lpddr4-evk:~# /usr/bin/hciattach /dev/ttymx0 bcm43xx 3000000 flow -t 20
hcitool scanbcm43xx_init
Set Controller UART speed to 3000000 bit/s
Flash firmware /lib/firmware/brcm/BCM4345C5.hcd
Set Controller UART speed to 3000000 bit/s
Setting TTY to N_HCI line discipline
Device setup complete
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:~#
```

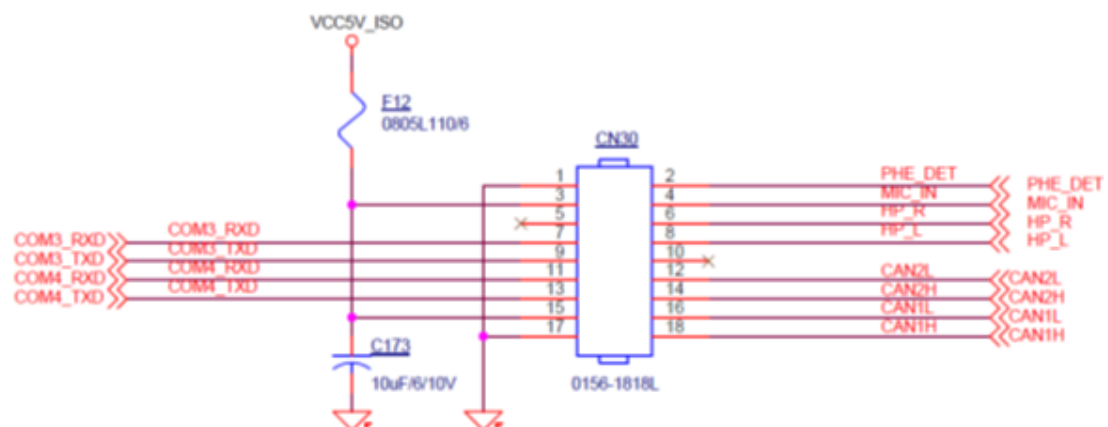
#### 4.1.3 CAN-FD / COM / Audio Connector (CN30)

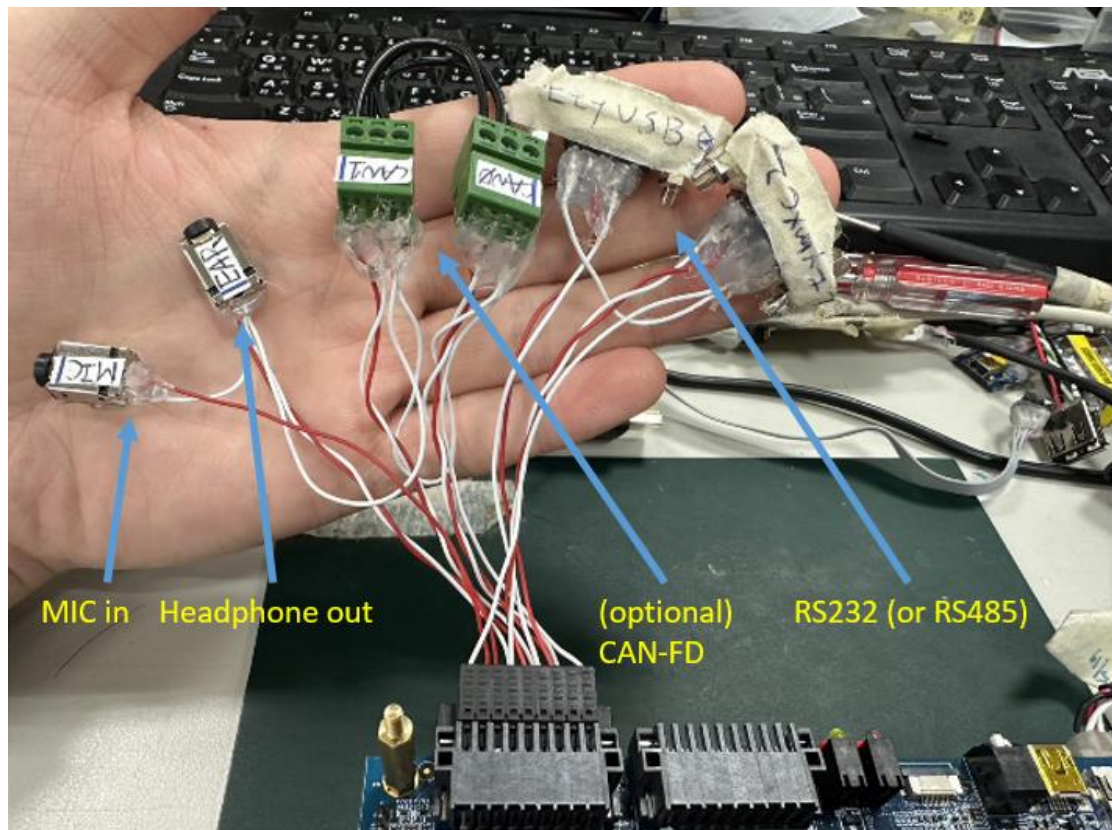
Connector↗	Descriptions↗
CN30↗	RS232 (or RS485) / (optional) CAN-FD / MIC in / Headphone out↗ <u>Linux device names:</u> ↗ COM3: /dev/ttymx2↗ COM4: /dev/ttymx3 ↗ CAN1: can0↗ CAN2: can1↗





**CN30** schematic:





- Headphone out 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
```

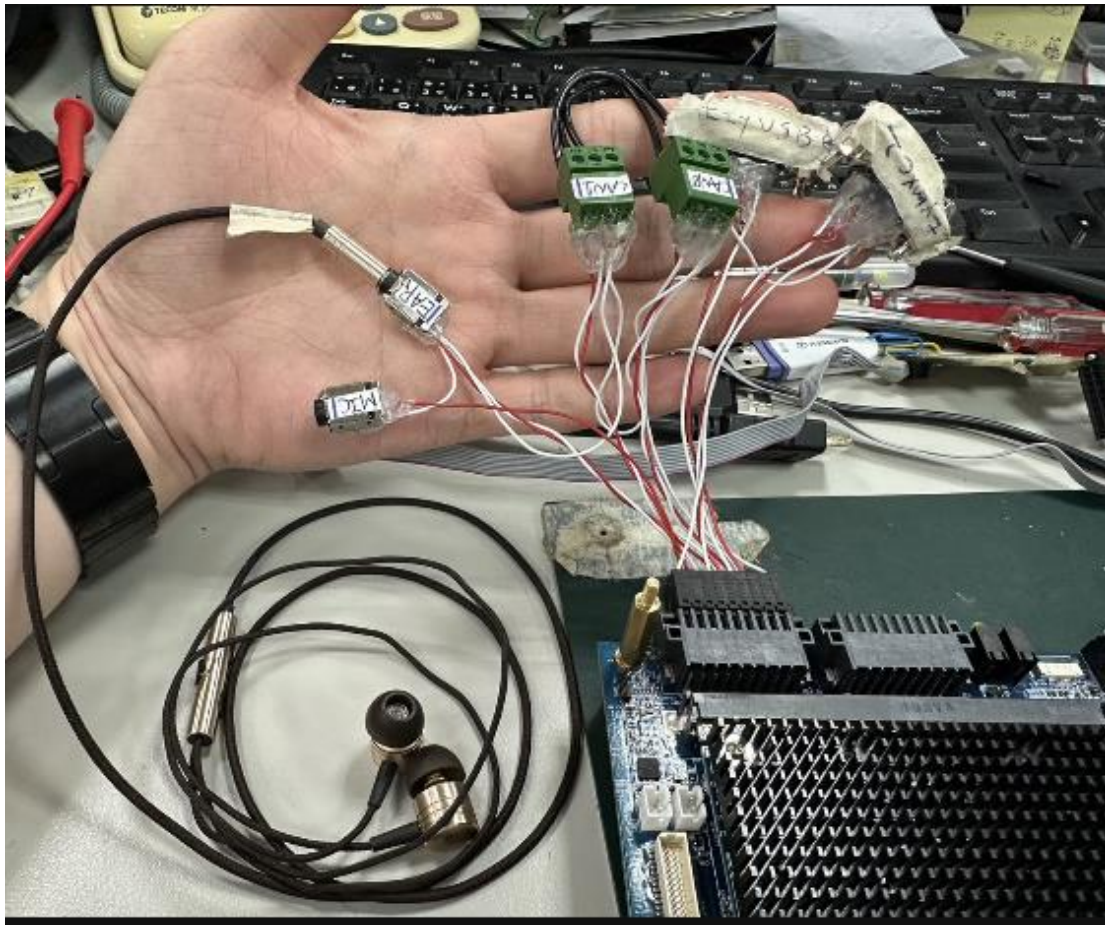


```
COM3:115200baud - Tera Term VT
File Edit Setup Control Window Help
root@imx8mp-lpddr4-evk:~#
root@imx8mp-lpddr4-evk:~# gst-launch-1.0 playbin uri=file:///run/media/SEKC-sdal/gen
.mp3
Setting pipeline to PAUSED ...
Pipeline is PREROLLING ...

===== BEEP: 4.7.3 build on Feb[ 1072.372984] remoteproc remoteproc0: powering up im
x-dsp-rproc
3 2023 05:14:46. =====
Core: DSP decoder Wrapper build on [ 1072.385761] remoteproc remoteproc0: B
ooting fw image imx/dsp/hifi4.bin, size 820796
Dec 20 2022 13:03:58
file: /usr/lib/imx-mm/audio-codec/wrap/li[ 1072.396963] rproc-virtio rproc-virtio.1
.auto: assigned reserved memory node vdev0buffer@94300000
b_dsp_wrap_arm_elinux.so
[ 1072.409166] virtio_rpmsg_bus virtio0: rpmsg host is online
[ 1072.416411] rproc-virtio rproc-virtio.1.auto: registered virtio0 (type 7)
[ 1072.425303] remoteproc remoteproc0: remote processor imx-dsp-rproc is now up
[ 1072.432564] virtio_rpmsg_bus virtio0: creating channel rpmsg-raw addr 0x1
[ 1072.439601] virtio_rpmsg_bus virtio0: creating channel rpmsg-raw addr 0x2
Audio Device Ready

==!!! Current pulsesink device is als_output.platform-rt5651-sound.stereo-fallback
!!!==

Redistribute latency...
Pipeline is PREROLLED ...
Setting pipeline to PLAYING ...
Redistribute latency...
```



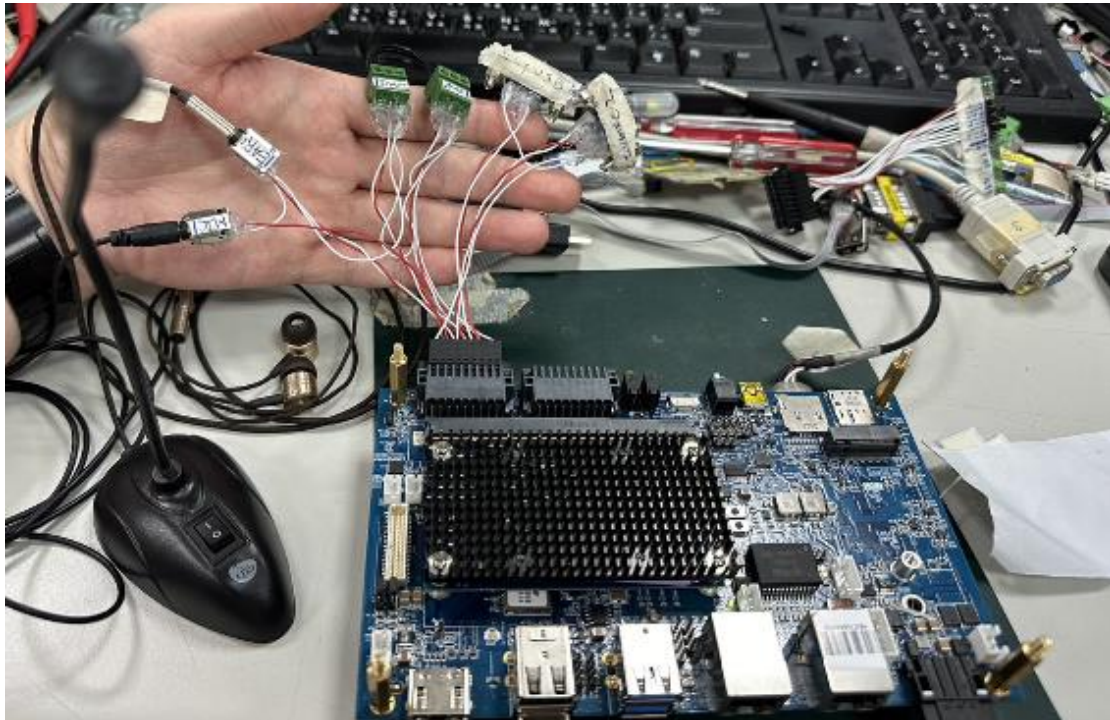
- MIC -in test

Prepare a microphone for recording, recording test type command:

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

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

```
root@imx8mp-lpddr4-evk:~# arecord -f dat /tmp/temp.wav
Recording WAVE '/tmp/temp.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Stereo
^CAborted by signal Interrupt...
arecord: pcm_read:2221: read error: Interrupted system call
root@imx8mp-lpddr4-evk:~# aplay /tmp/temp.wav
Playing WAVE '/tmp/temp.wav' : Signed 16 bit Little Endian, Rate 48000 Hz, Stereo
root@imx8mp-lpddr4-evk:~#
```



- 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/ttymx3
```

```
# cat /dev/ttymx3
```

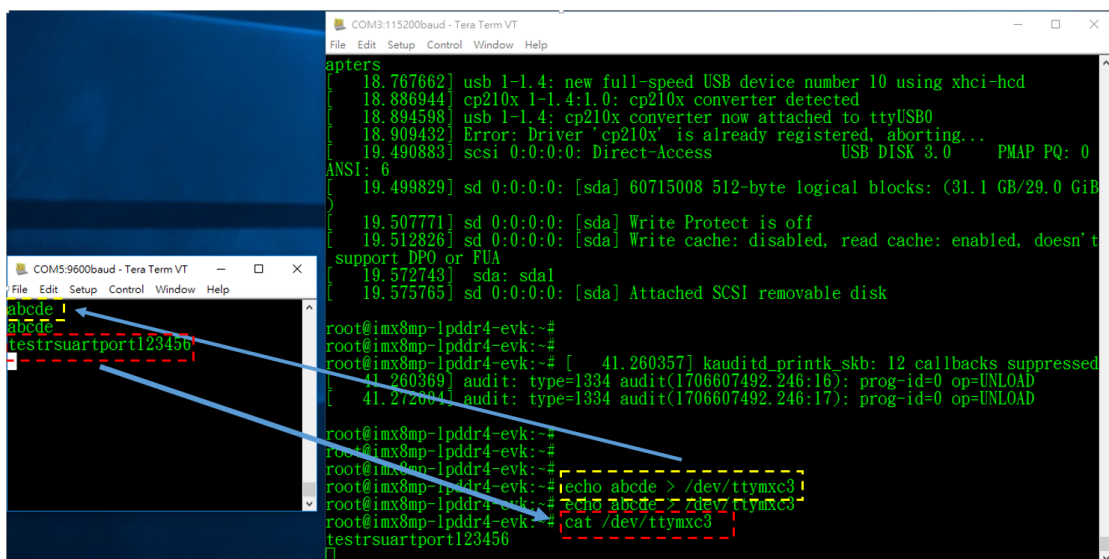
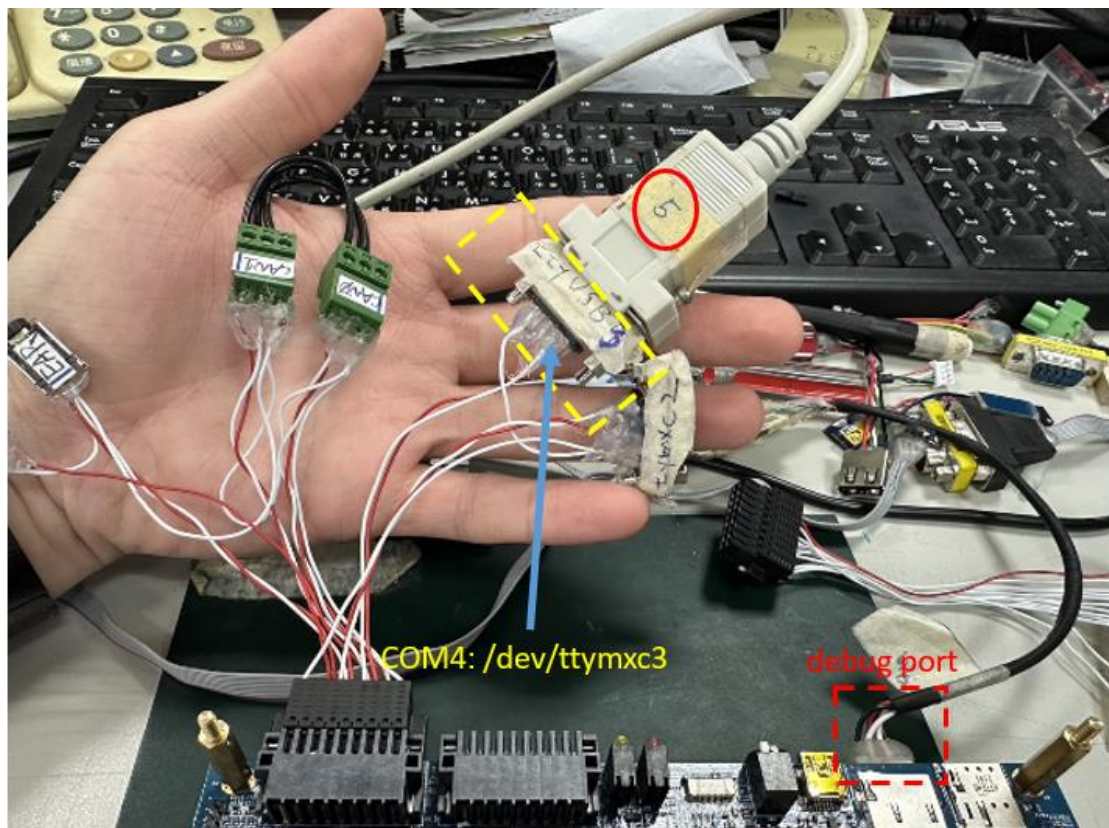
Receiving:

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).



**Sending:**

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



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 (ttymx2)

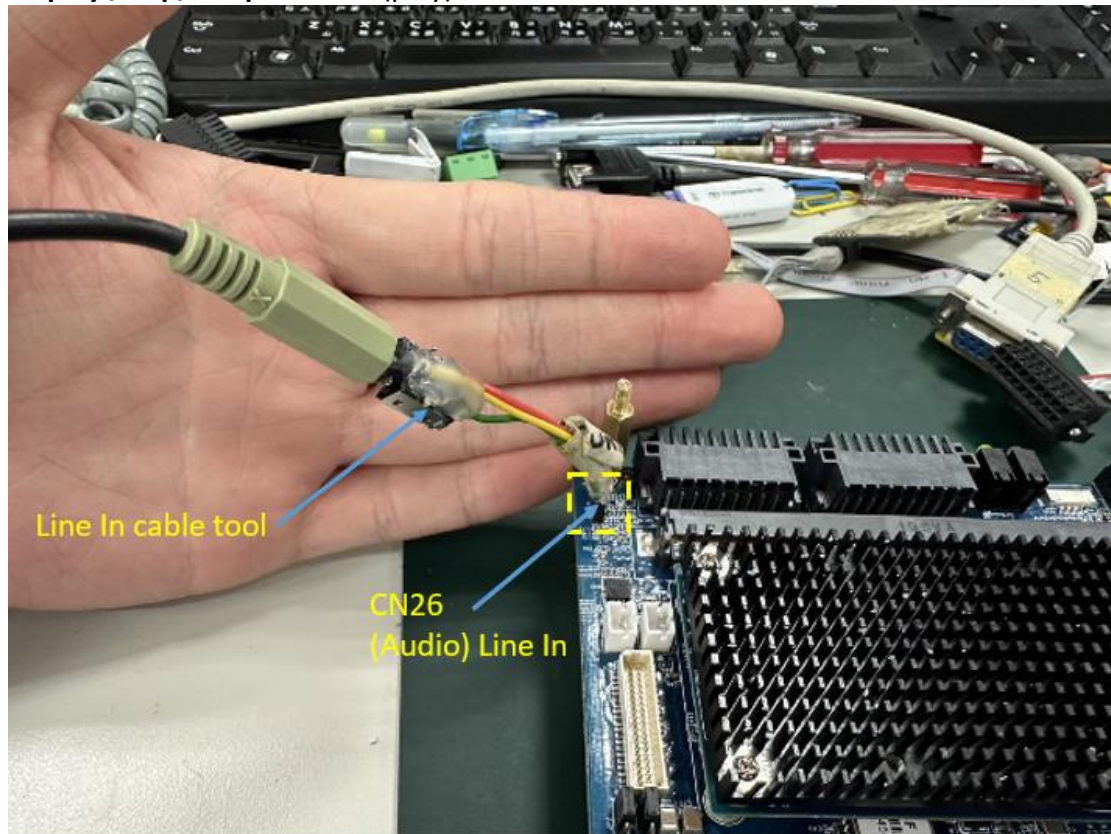
#### 4.1.4 The Line in to recording test

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)
```



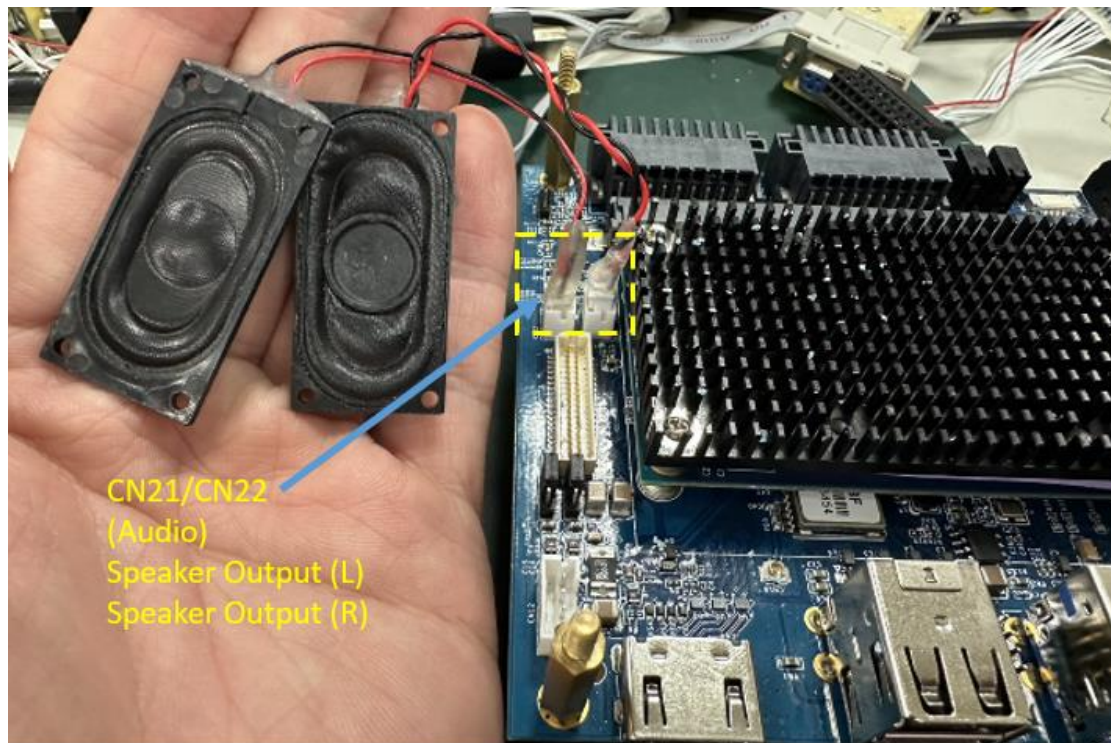
#### 4.1.5 Speaker test

Paste the following commands into the console window and press Enter

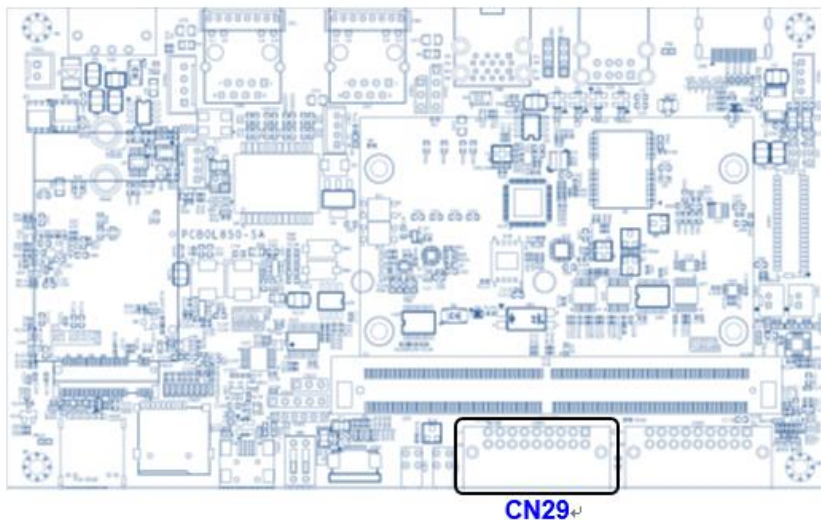
```
# gst-launch-1.0 playbin uri=file:///home/root/xxxx.mp3
```

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





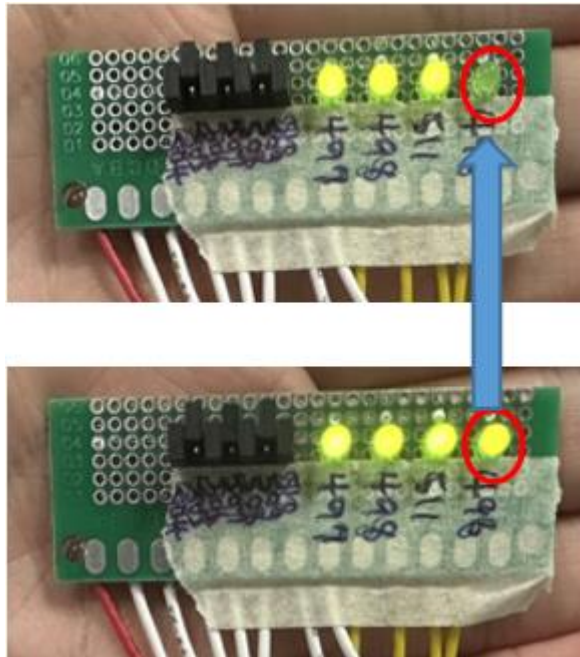
#### 4.1.6 GPIO test (CN29)



Paste the following commands into the console window and press Enter  
**GPO496 ~ GPO498 & GPO511**, you can using a LED test board to control LED light on-off .

For example, GPO496 (to test other GPO# please replace the red numbers by yourself)

```
cd /sys/class/gpio/  
echo 496 > export  
cd gpio496  
echo out > direction  
echo 1 > value  
echo 0 > value
```



```

root@imx8mp-lpddr4-evk:~# cd /sys/class/gpio/
root@imx8mp-lpddr4-evk:/sys/class/gpio# echo 496 > export
root@imx8mp-lpddr4-evk:/sys/class/gpio# cd gpio496
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio496# echo out > direction
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio496# echo 1 > value
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio496# echo 0 > value
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio496#

```

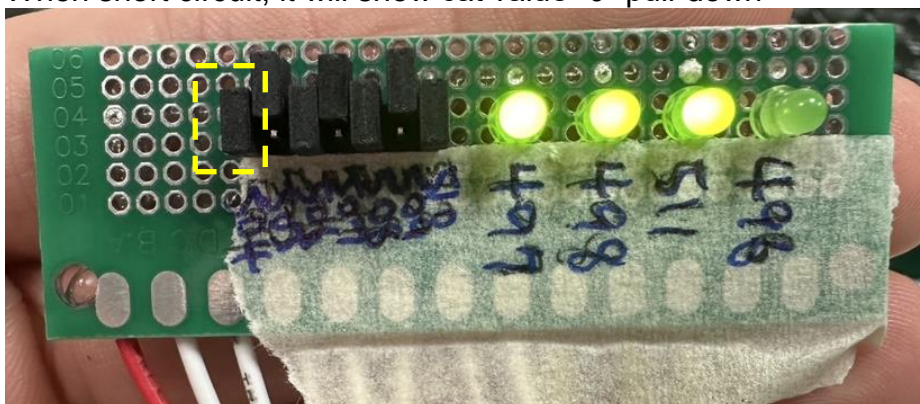
**GPI 504 ~ GPI 511 / GPI 496**, you can use a test tool similar to the following:  
For example, GPI504 (to test other GPI # please replace the red numbers by yourself)

```

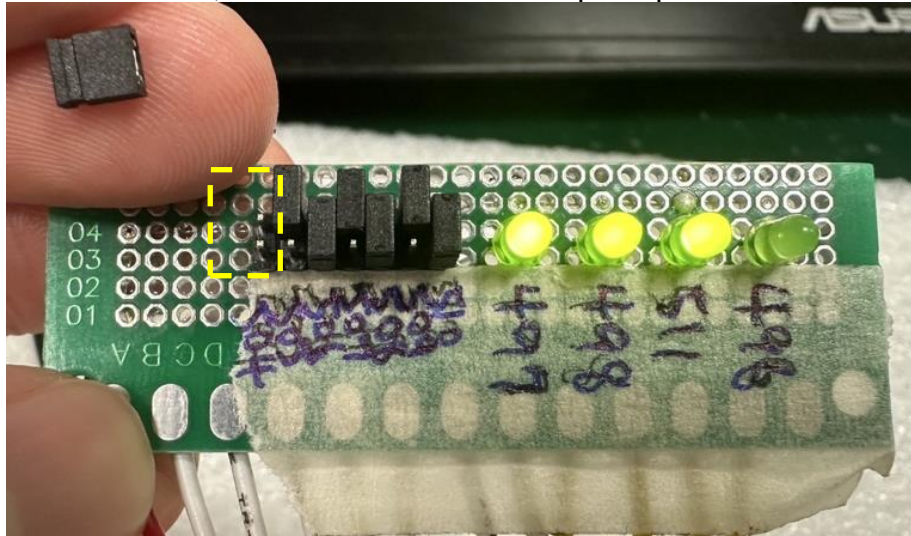
cd /sys/class/gpio/
echo 504 > export
cd gpio504
cat value

```

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

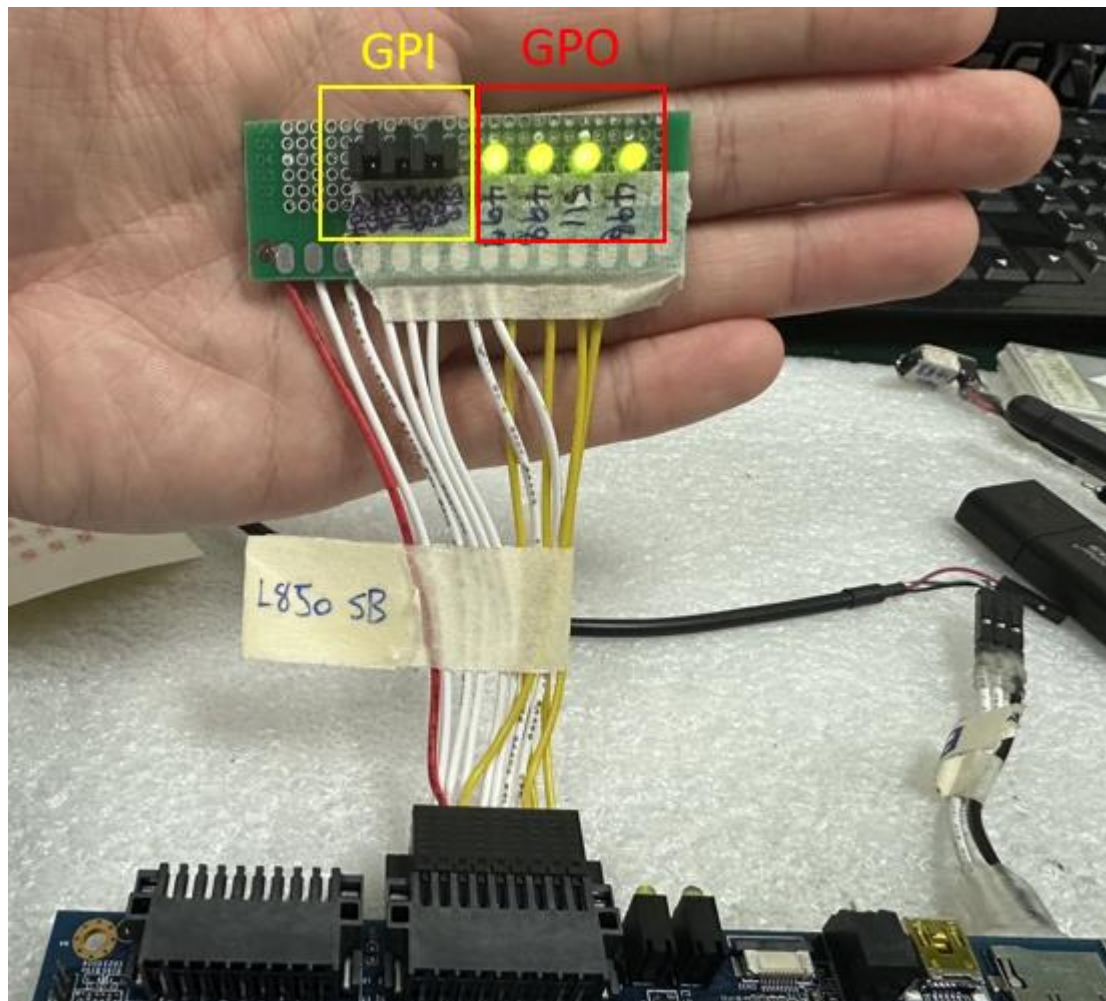


When take out, it will show cat value "1" pull-up



```
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio496# 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  
0  
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  
1  
root@imx8mp-lpddr4-evk:/sys/class/gpio/gpio504#
```





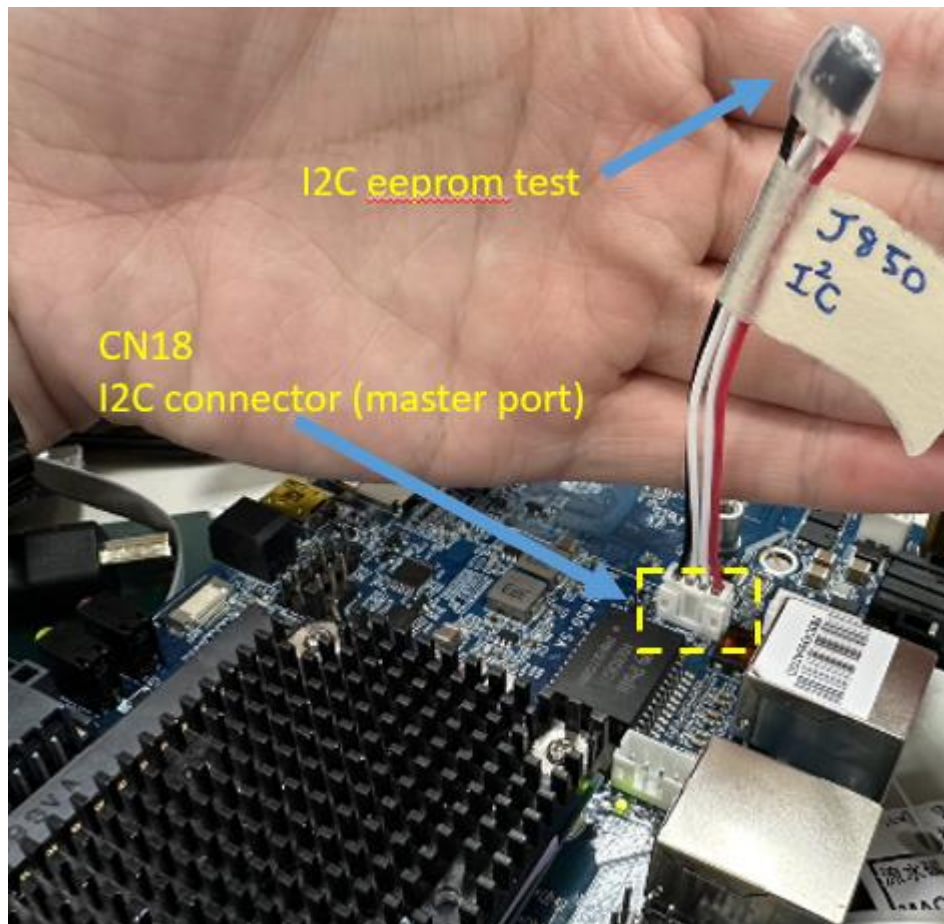
#### 4.1.7 i2c (CN18)Test

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

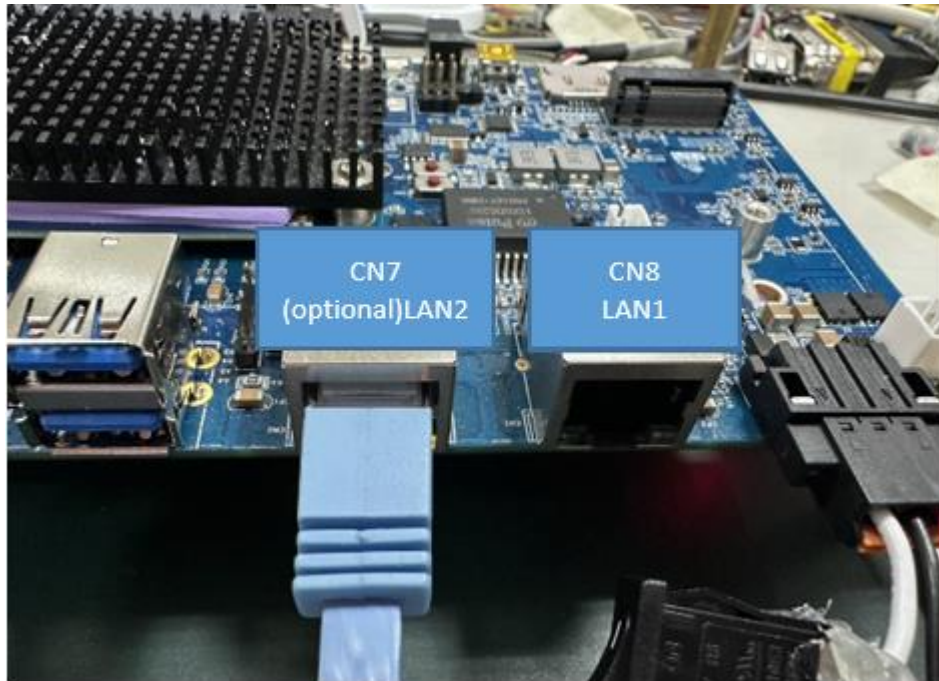
```
root@imx8mp-lpddr4-evk:~# i2cdetect -y -a 2
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: 00  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  18  --  --  --  --  --  --  --  --
20: UU UU  --  --  --  --  --  --  --  --  --  --  --  --  --  --
30: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



#### 4.1.8 The LAN1 & LAN2(optional) test

A. LAN1(CN7) eth0, ok  
**ping 8.8.8.8**

B. LAN2(CN8) eth1, ok  
**ping 8.8.8.8**



#### 4.1.9 3D Accelerometer and Gyroscope sensor ( LSM6DSO ) test (optional)

```
cat /sys/bus/iio/devices/iio:device0/name  
lsm6dso_gyro
```

```
cat /sys/bus/iio/devices/iio:device0/in_anglvel_x_raw  
cat /sys/bus/iio/devices/iio:device0/in_anglvel_y_raw  
cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw
```

```
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_x_raw  
cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw  
-11  
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_y_raw  
-131  
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw  
-52
```

```
cat /sys/bus/iio/devices/iio:device1/name  
lsm6dso_accel
```

```
cat /sys/bus/iio/devices/iio:device1/in_accel_x_raw  
cat /sys/bus/iio/devices/iio:device1/in_accel_y_raw  
cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw  
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_x_raw  
cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw  
-9  
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_y_raw  
163  
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw  
16570
```



#### 4.1.10 SPI test(CN25)

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

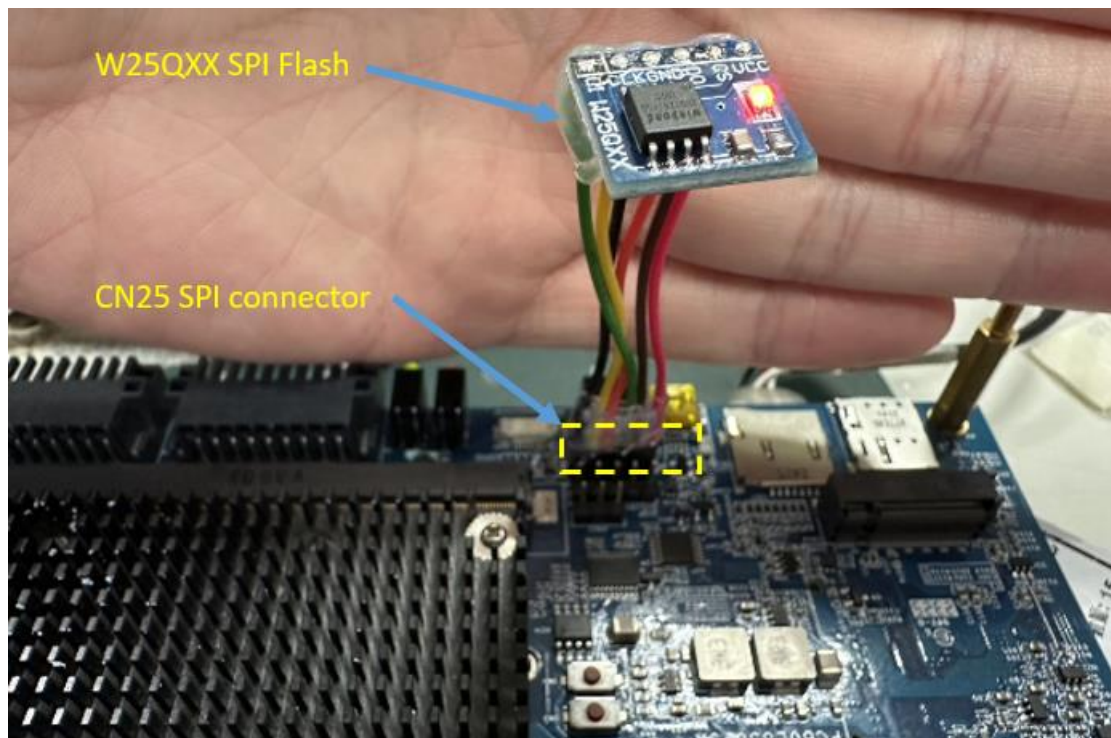
Copy demo test program (spi-test)

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

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

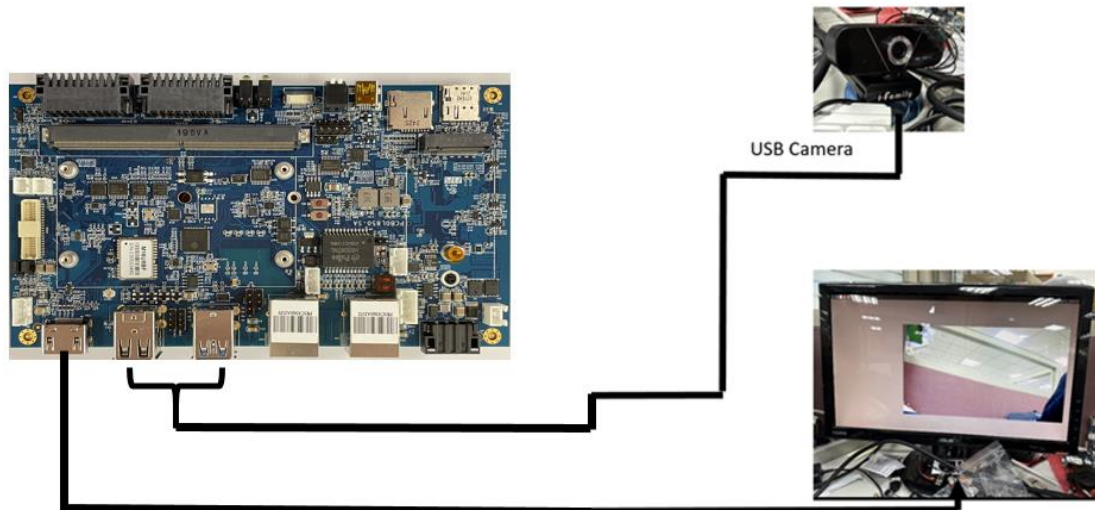
```
//will show response(7): ef 40 18 00 00 00
```

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



### 4.1.11 USB Camera test

Test schematic:

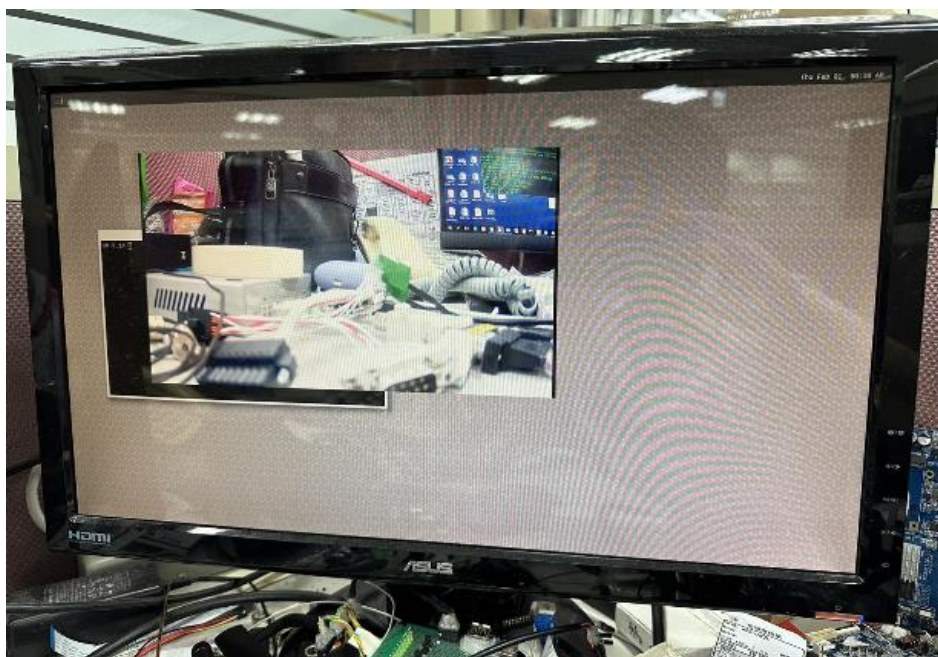


USB camera, command ( PS: , plug in the USB camera theory is /dev/video4 , you need to ls **/dev/video\*** to confirm):

```
# gst-launch-1.0 v4l2src device=/dev/video4 ! autovideosink
```

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

```
inkt@imx8mp-lpddr4-evk:~$ gst-launch-1.0 v4l2src device=/dev/video4 ! autovideosi
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.
```



### 4.1.12 USB & SD Card test

###USB

USB 2.0 pin header Connector(CN9/CN10)

USB 2.0 Dual Connector(CN5)

USB 3.0 Dual Connector(CN6)

# mout

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

ex:

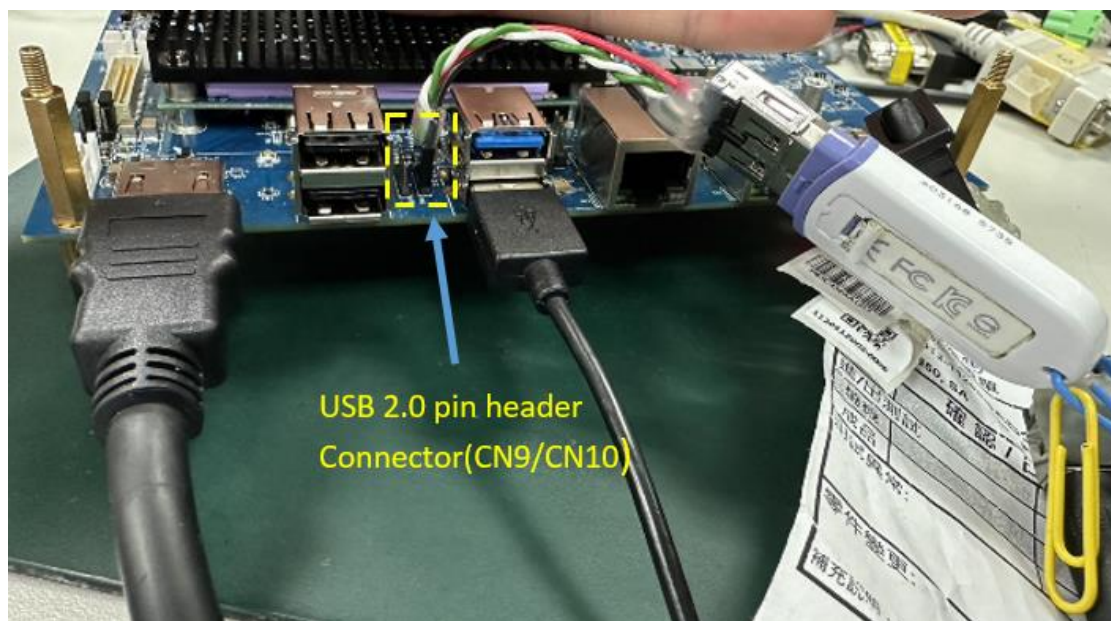
# cd /run/media/TRANSCEND-sda

# 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(CN34)

# mkdir /mnt/SD

# mount /dev/**mmcblk1p1** /mnt/SD

# cd /mnt/SD

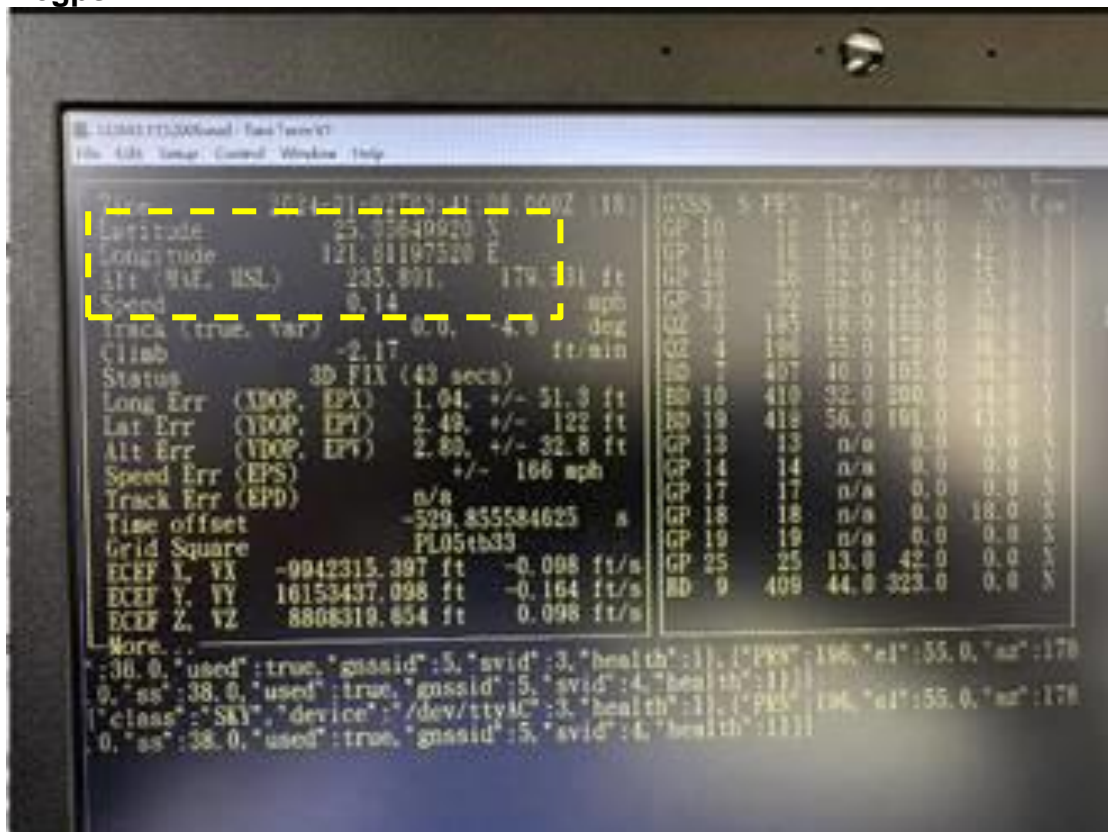
# ls

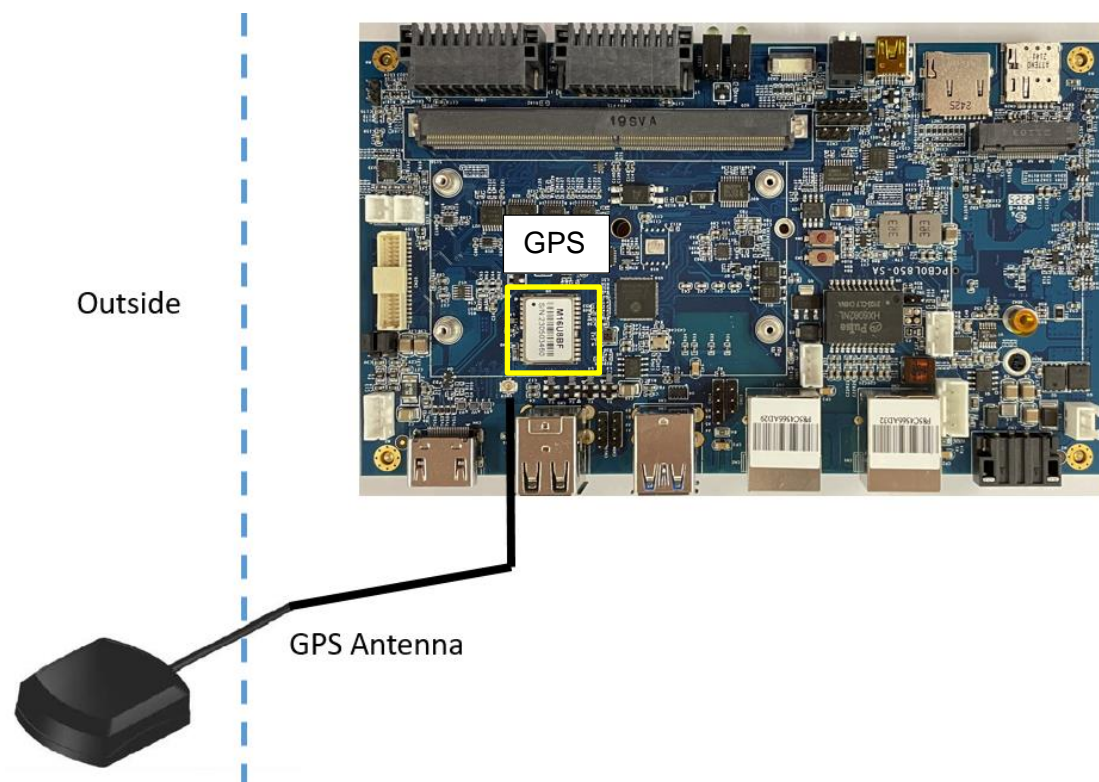
//Fill in the name of the currently inserted SD card in red letters, located in the yellow box below:

```
root@imx8mp-lpddr4-evk:~# [ 3053.184331] mmc1: host does not support reading read-only
ly switch, assuming write-enable
[ 3053.223678] mmc1: new ultra high speed SDR104 SDHC card at address 1234
[ 3053.230756] mmcblk1: mmc1:1234 SA16G 14.5 GiB
[ 3053.237169] mmcblk1: p1
root@imx8mp-lpddr4-evk:~# [
```

**4.1.13 GPS (M16U8BF) module test (optional)**

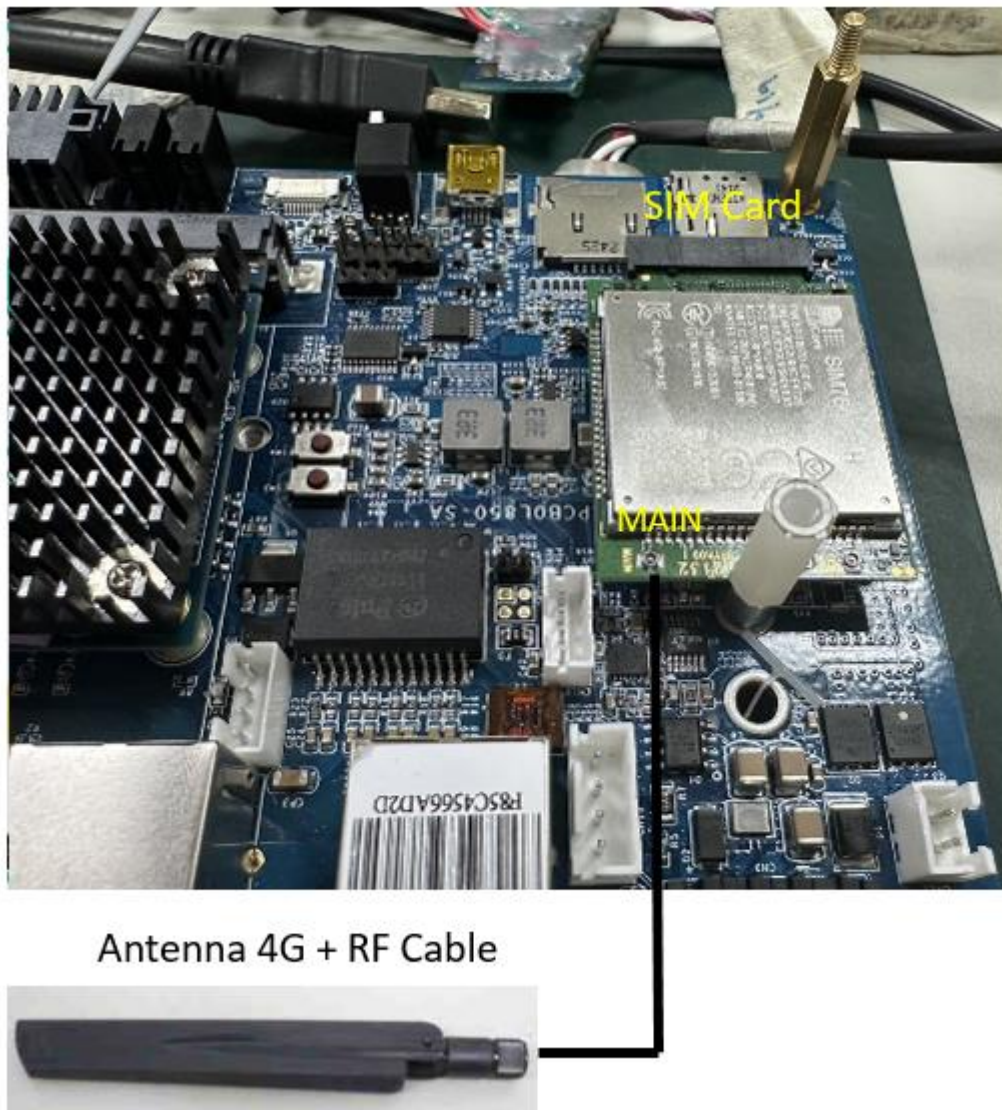
Type command:

# **cgps**





#### 4.1.14 4G LTE test



After booting, 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

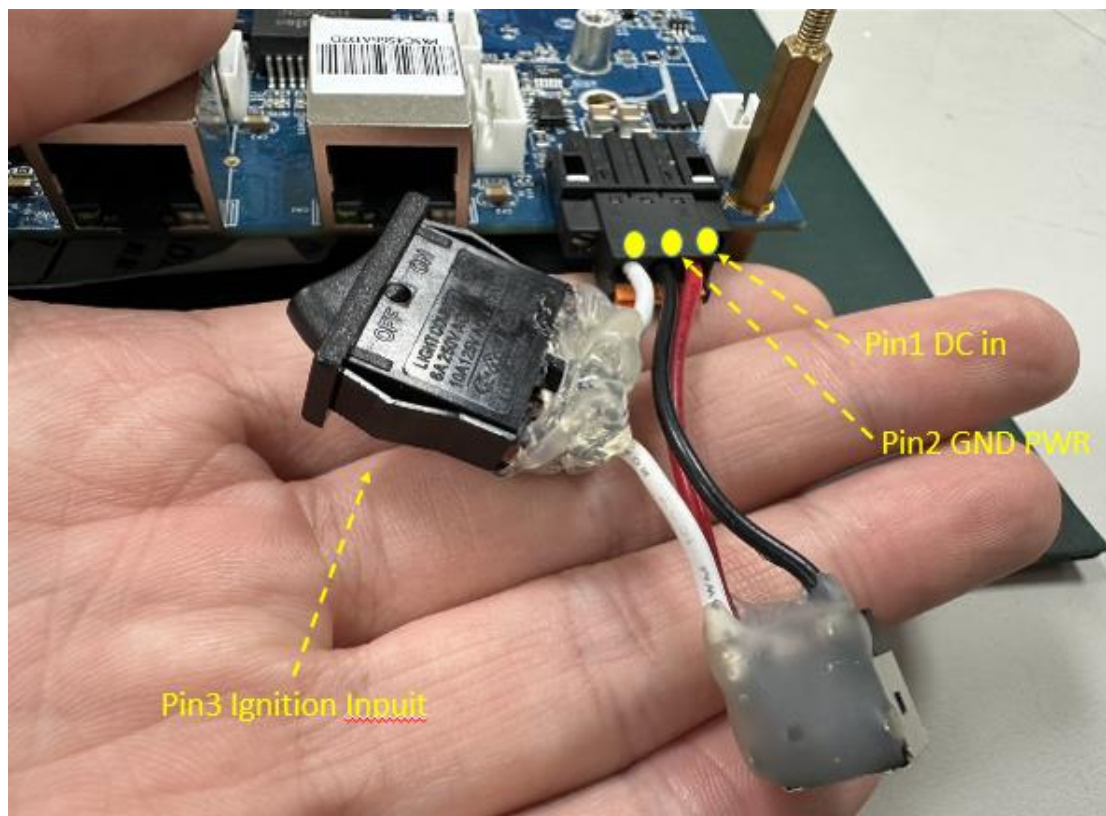
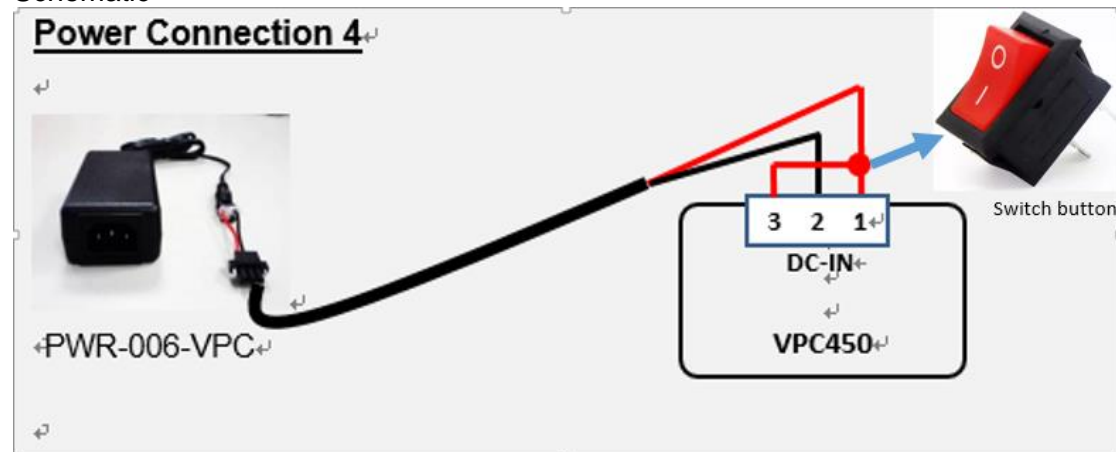
send (`MAT+CGDCONT=1,"IP","INTERNET",,0,0`M)
expect (OK)
`M
AT+CGDCONT=1,"IP","INTERNET",,0,0`M`M
OK
-- got it
```

```
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
```

### 4.1.15 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 VPC450.

And if disconnect ignition signal can be turned off VPC450.

Demo video:

[https://drive.google.com/file/d/1r7dAbE5htDYxdtjSM8UlrT0MqGk4IAv/view?usp=drive\\_link](https://drive.google.com/file/d/1r7dAbE5htDYxdtjSM8UlrT0MqGk4IAv/view?usp=drive_link)

## 4.2 Android

### 4.2.1 USB port & SD Card test

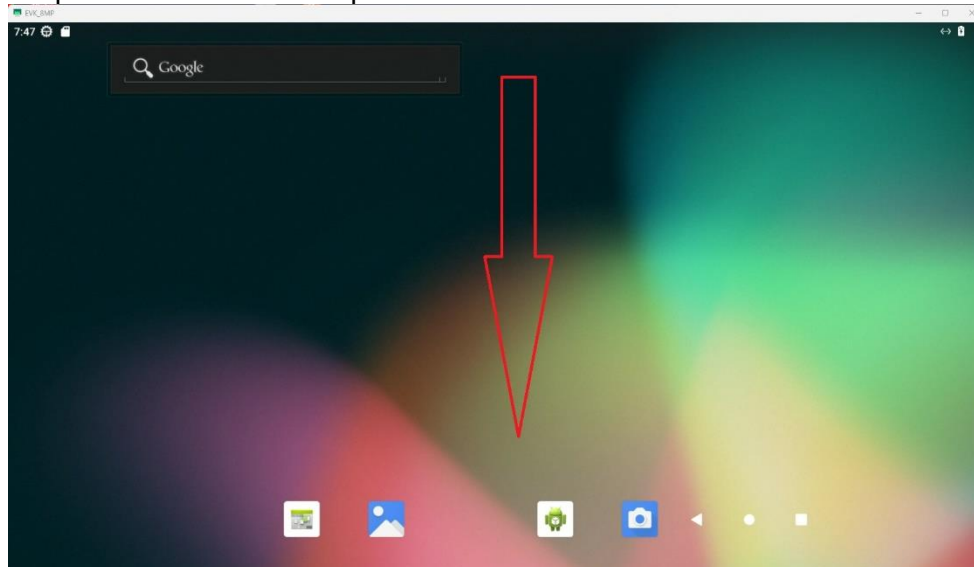
###USB

USB 2.0 pin header Connector(CN9/CN10)

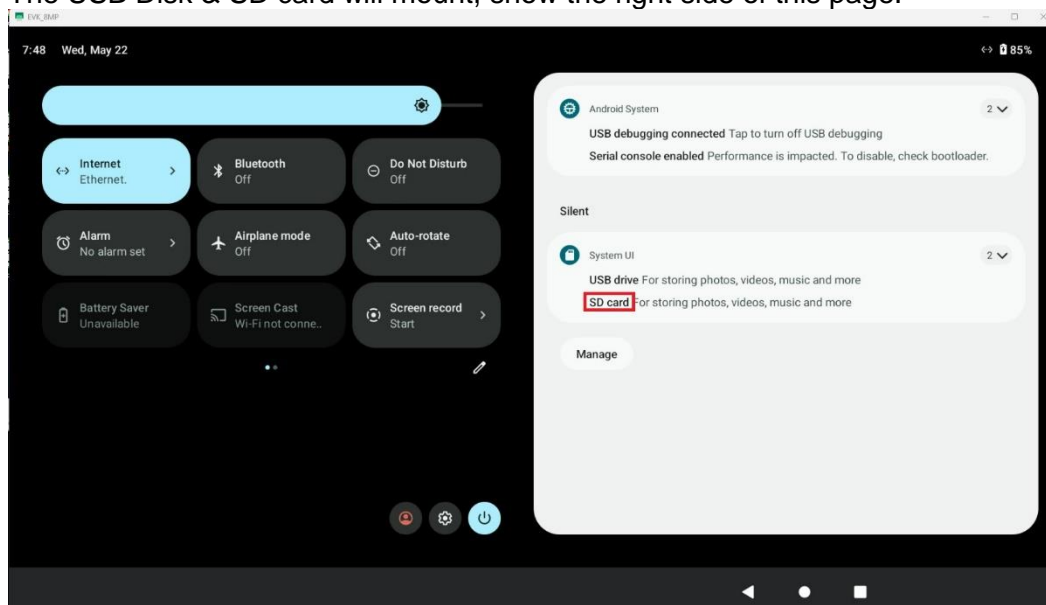
USB 2.0 Dual Connector(CN5)

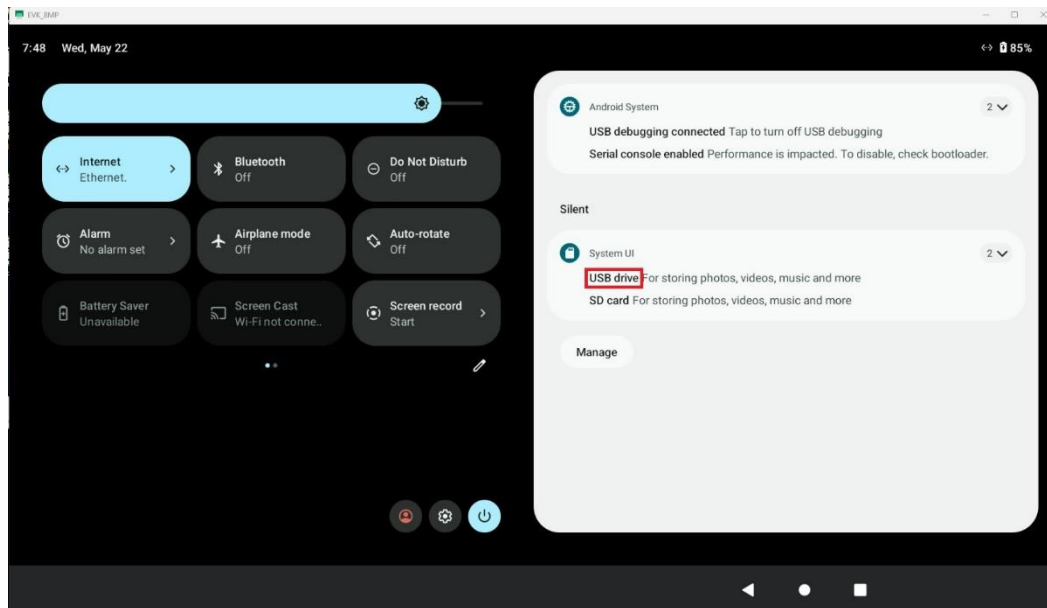
USB 3.0 Dual Connector(CN6)

Swipe down on the desktop



The USB Disk & SD card will mount, show the right side of this page.





## 4.2.2 The LAN1 & LAN2(optional) test

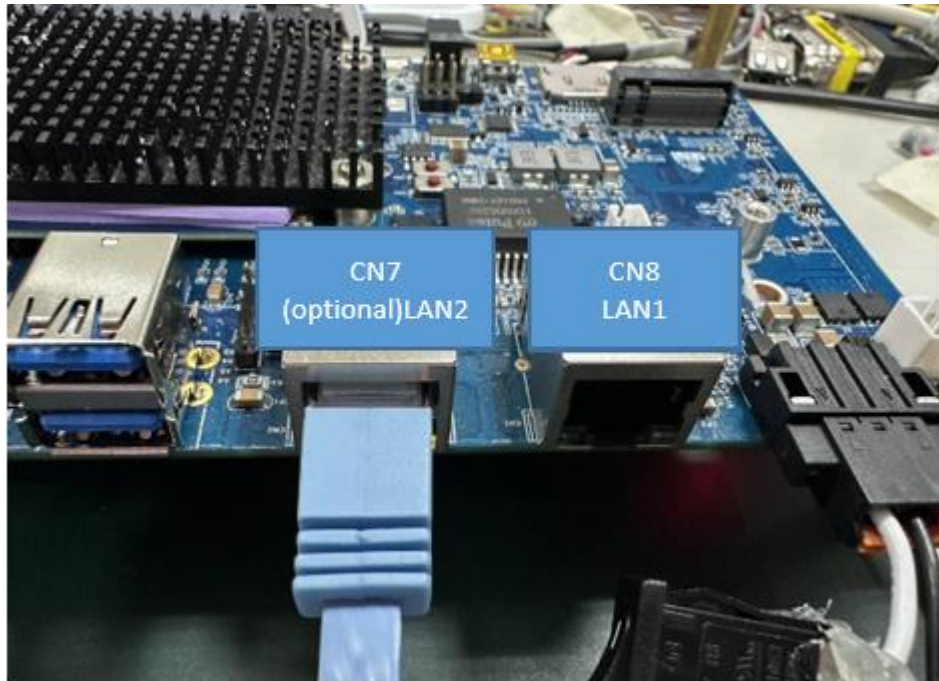
You can **ping 8.8.8.8** in console port or using the browser to internet.

```
COM7:115200baud - Tera Term VT
File Edit Setup Control Window Help
[ 42.375642][ T1] init: Untracked pid 1557 did not have an associated servi
ce entry and will not be reaped
[ 42.378248][ T207] FAT-fs (mmcblk1p1): Volume was not properly unmounted. So
me data may be corrupt. Please run fsck.
[ 43.460780][ T1] init: Untracked pid 1582 received signal 15
[ 43.465819][ T207] FAT-fs (sdb1): Volume was not properly unmounted. Some da
ta may be corrupt. Please run fsck.
[ 43.468116][ T1] init: Untracked pid 1582 did not have an associated servi
ce entry and will not be reaped

evk_8mp:/ $
evk_8mp:/ $ [ 49.170185][ T1] init: Untracked pid 1838 received signal 15
[ 49.176402][ T1] init: Untracked pid 1838 did not have an associated servi
ce entry and will not be reaped
[ 49.178850][ T207] FAT-fs (sdal): Volume was not properly unmounted. Some da
ta may be corrupt. Please run fsck.

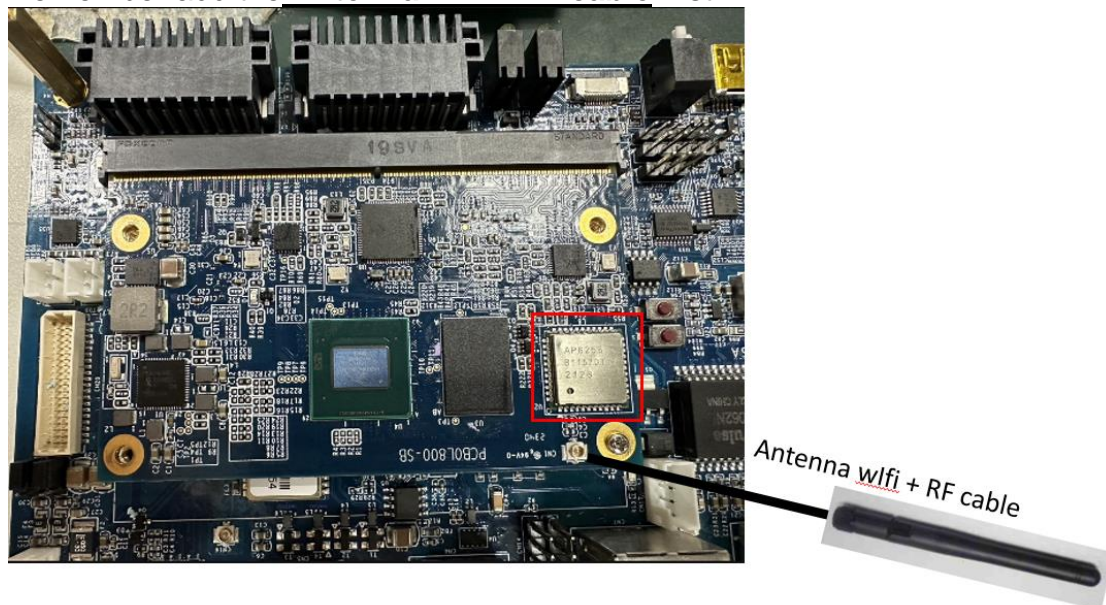
evk_8mp:/ $ su
evk_8mp:/ #
evk_8mp:/ # ping 8.8.8.8
PING 8.8.8.8: 64 bytes of data:
64 bytes from 8.8.8.8: icmp_seq=1 ttl=57 time=4.04 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=57 time=4.14 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=57 time=4.58 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=57 time=4.26 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=57 time=3.81 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=57 time=3.96 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=57 time=4.92 ms
```





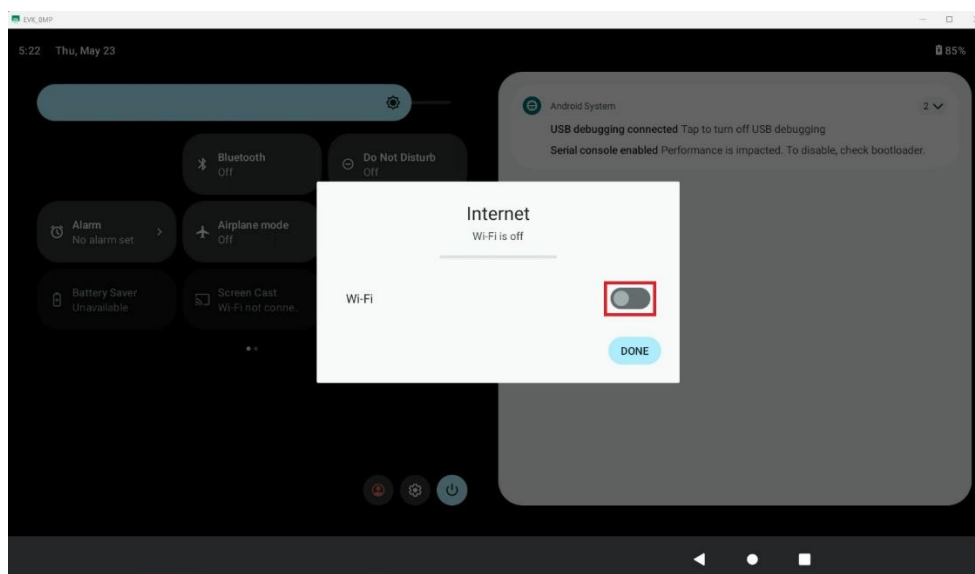
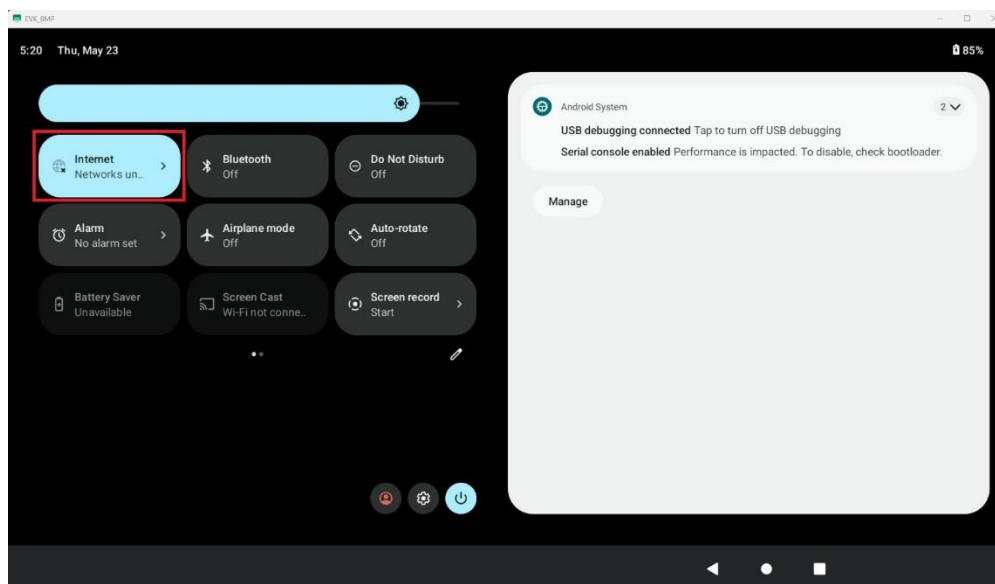
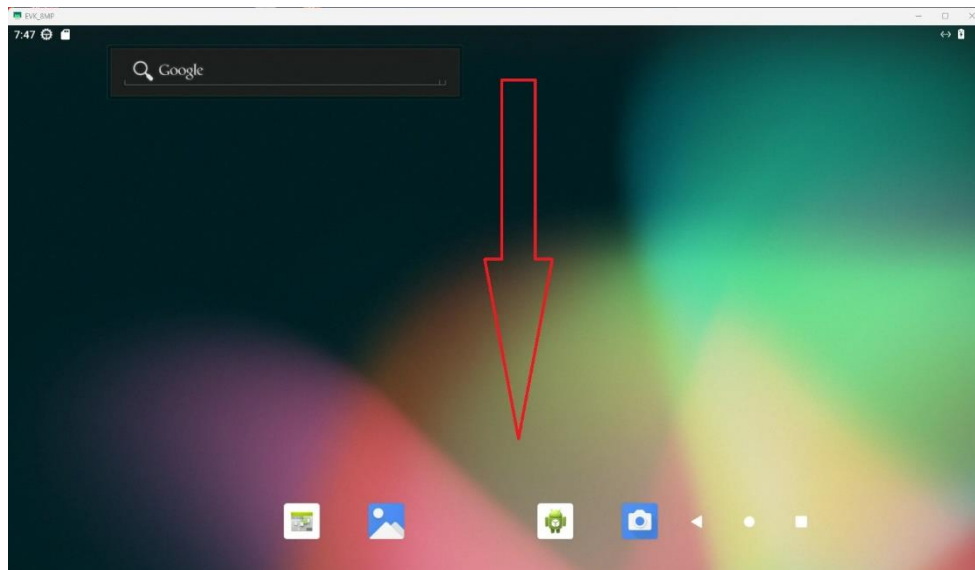
### 4.2.3 WiFi/BT test (optional)

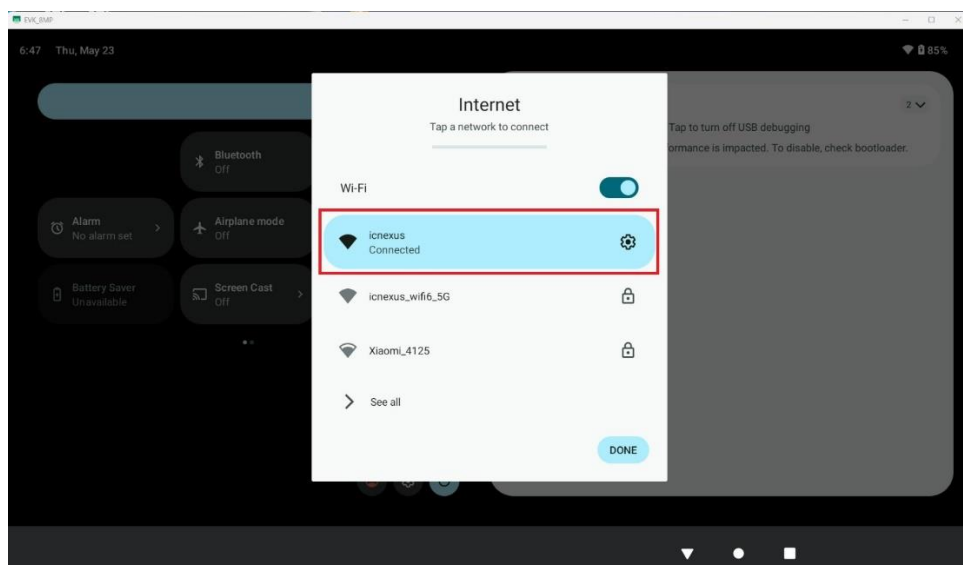
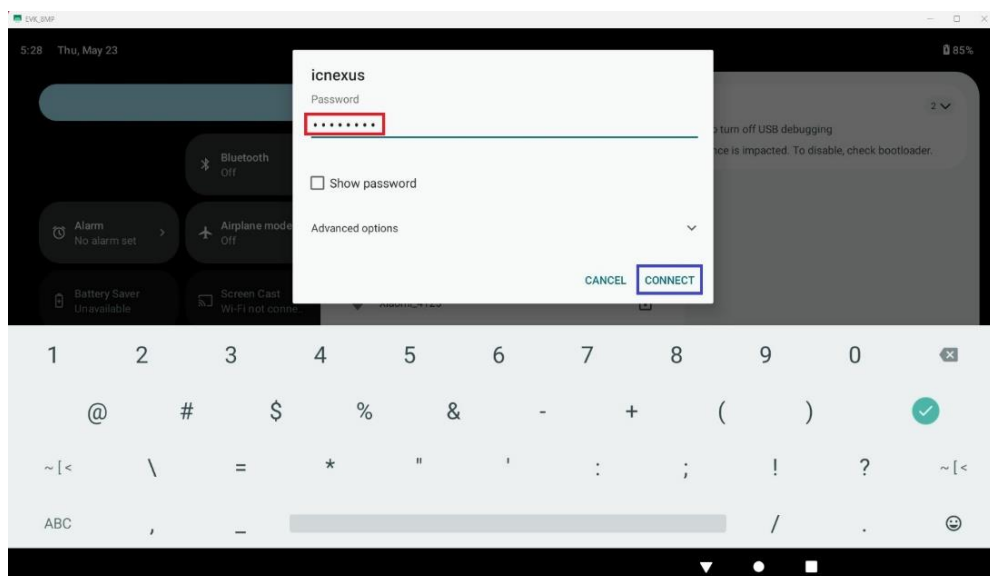
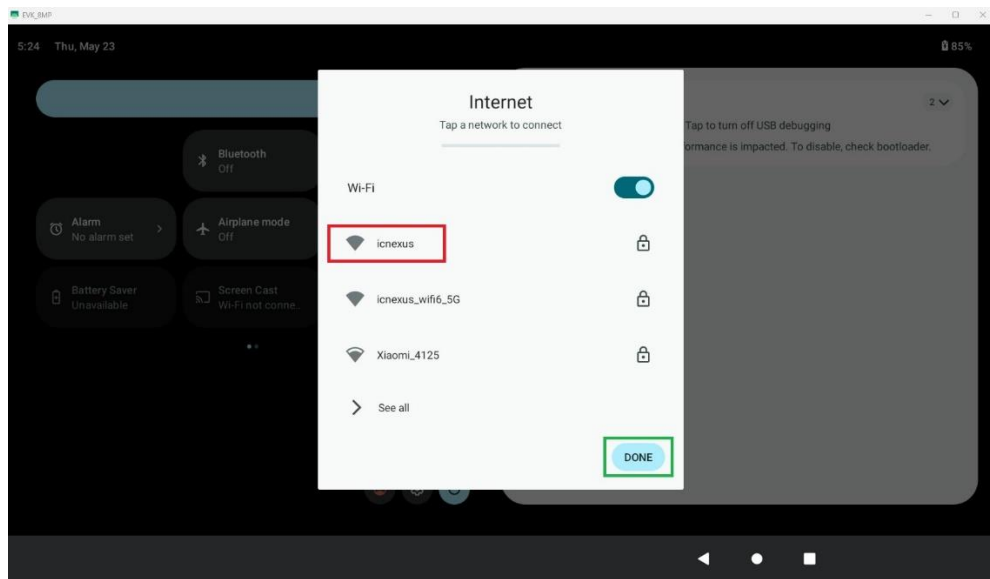
The actual location of the WiFi/BT module:  
Remember add the **Antenna wlfy + RF cable** first.



- 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.

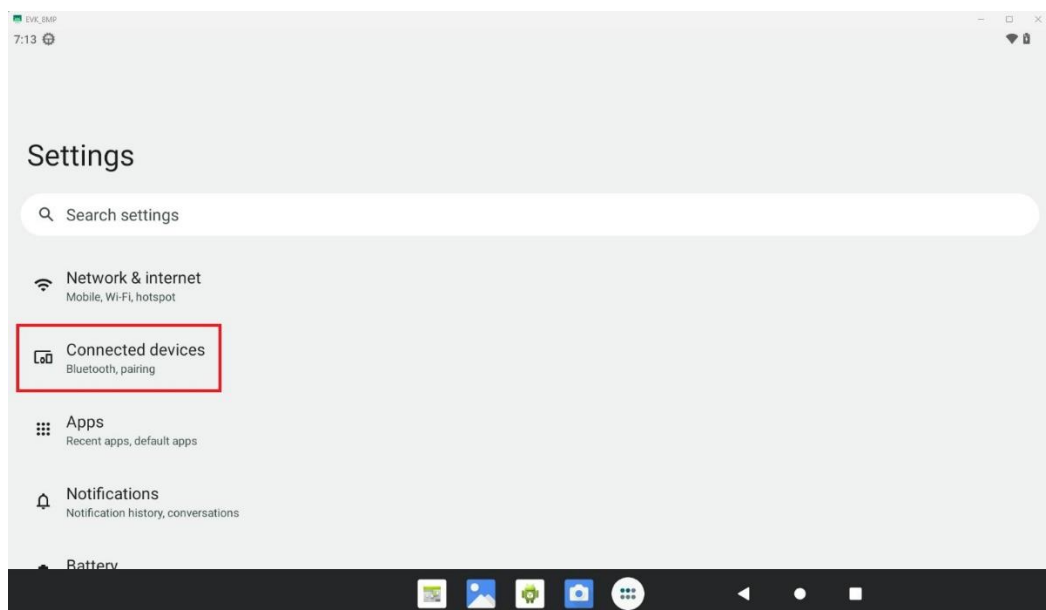
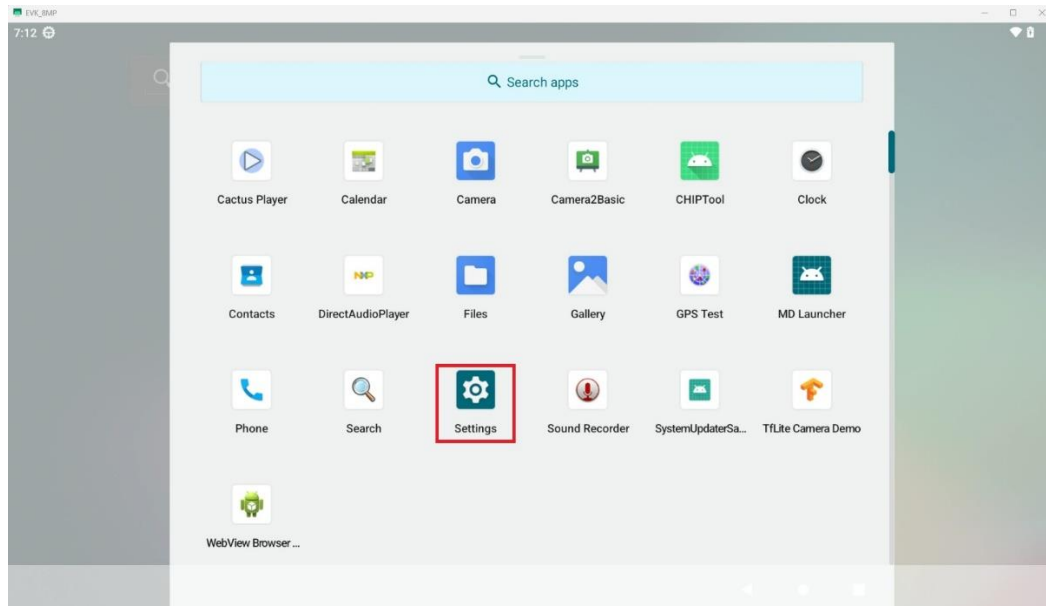


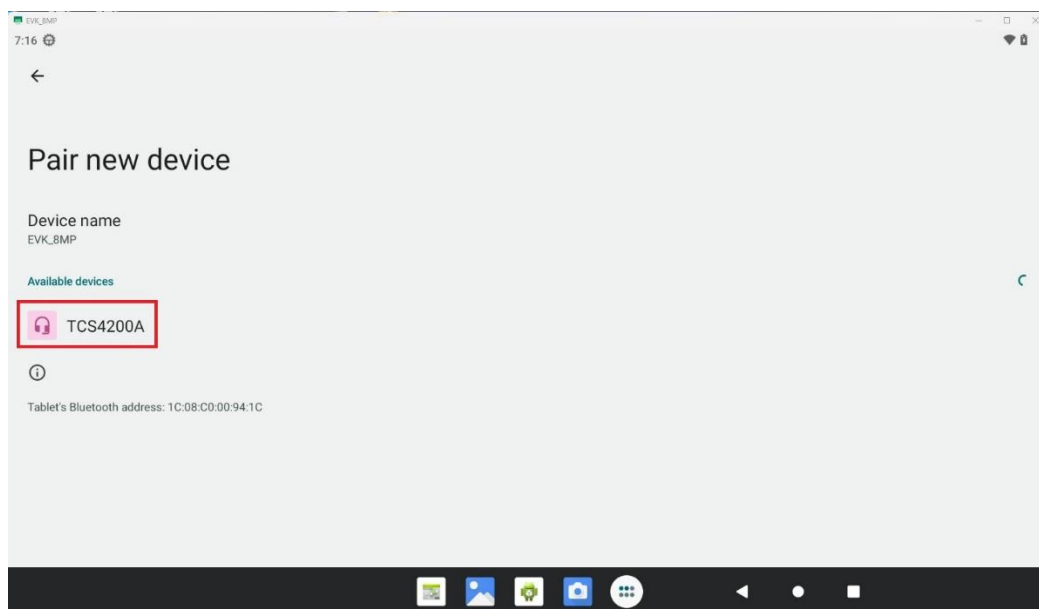
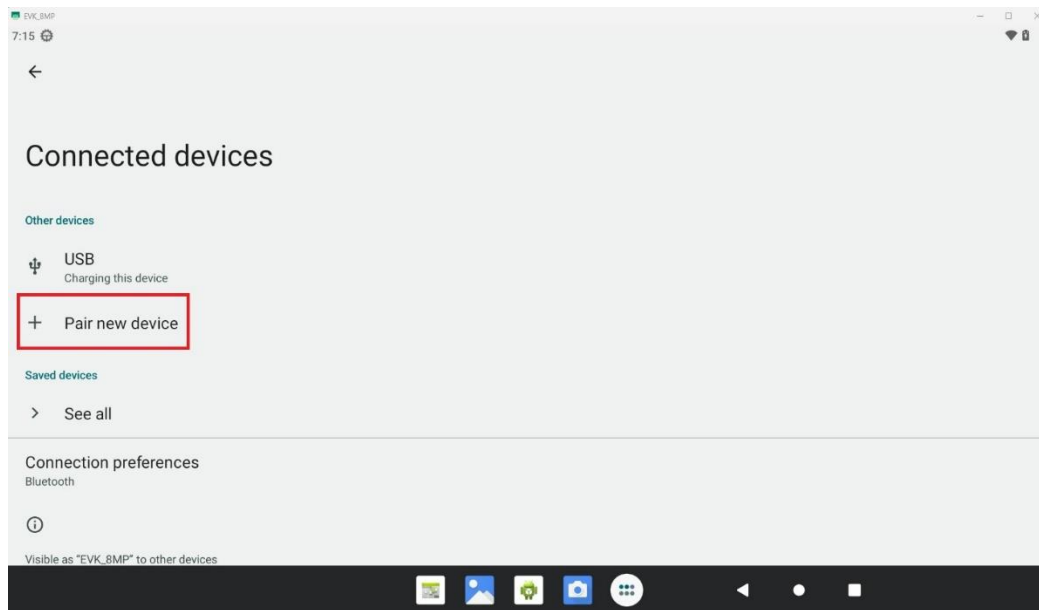


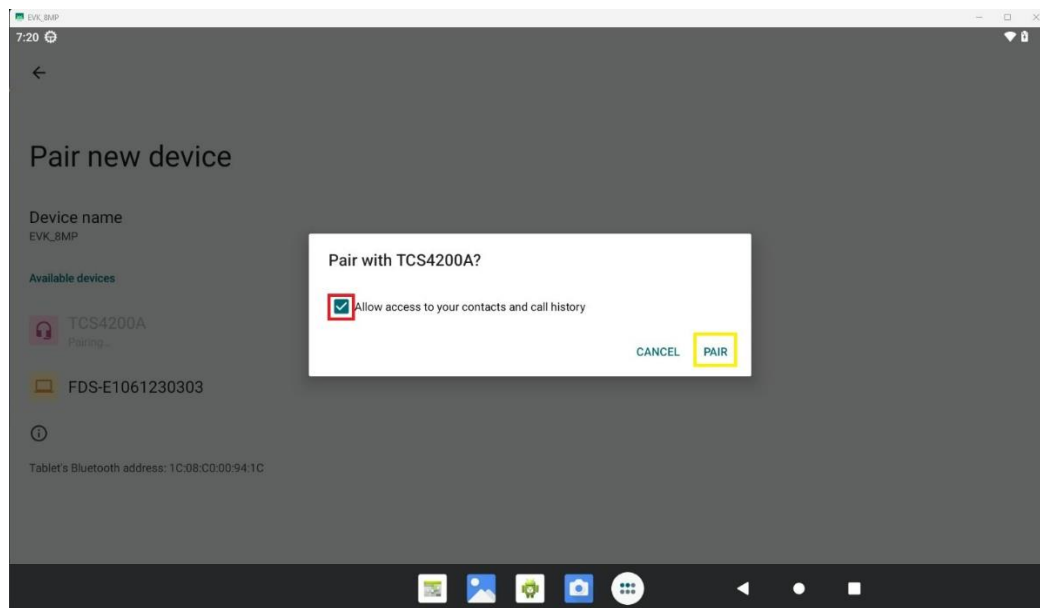


- BT

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”

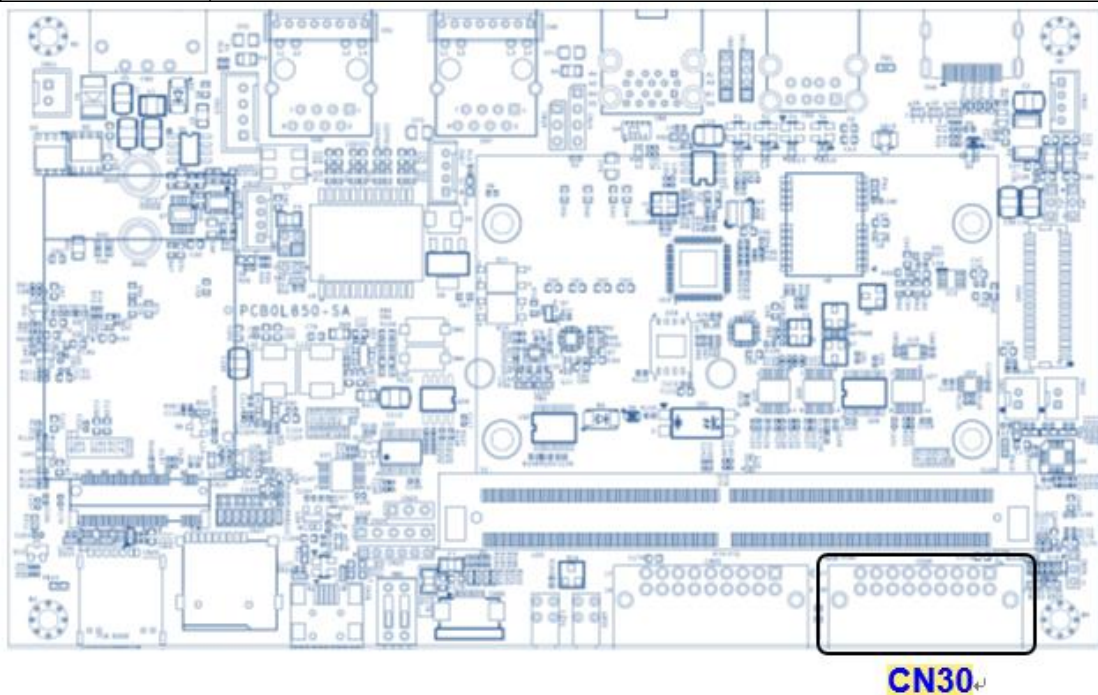


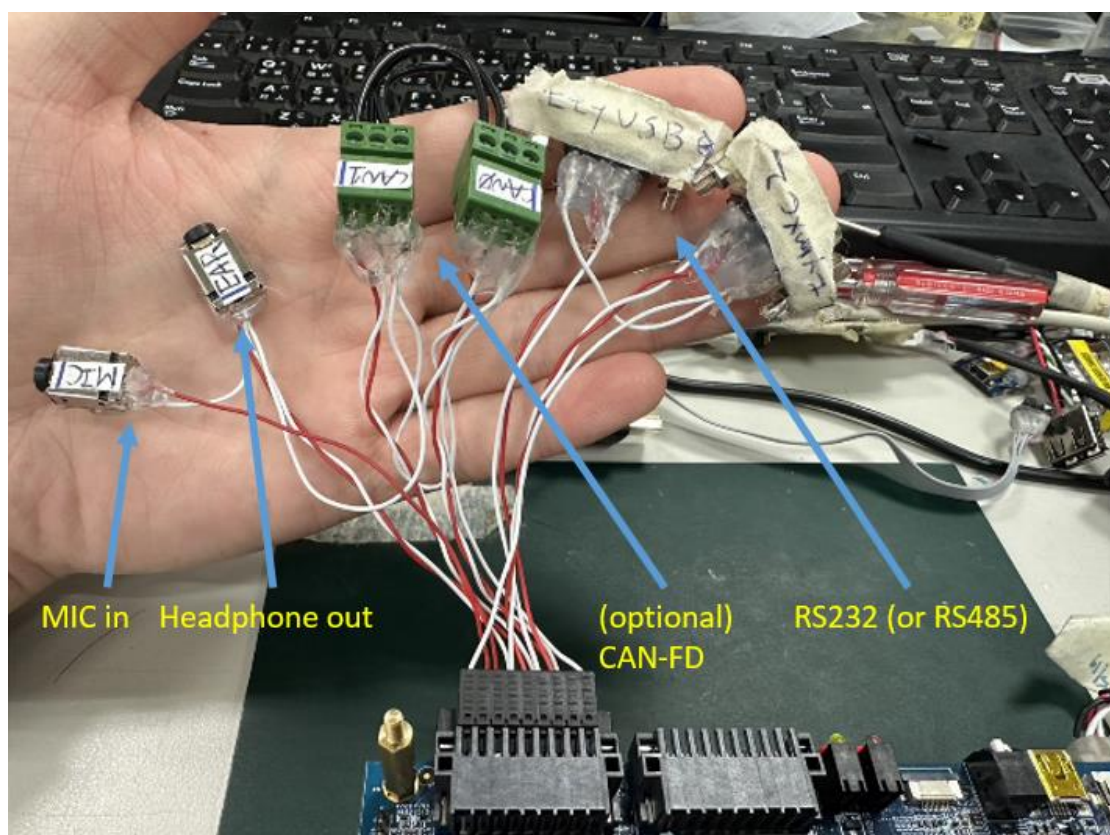
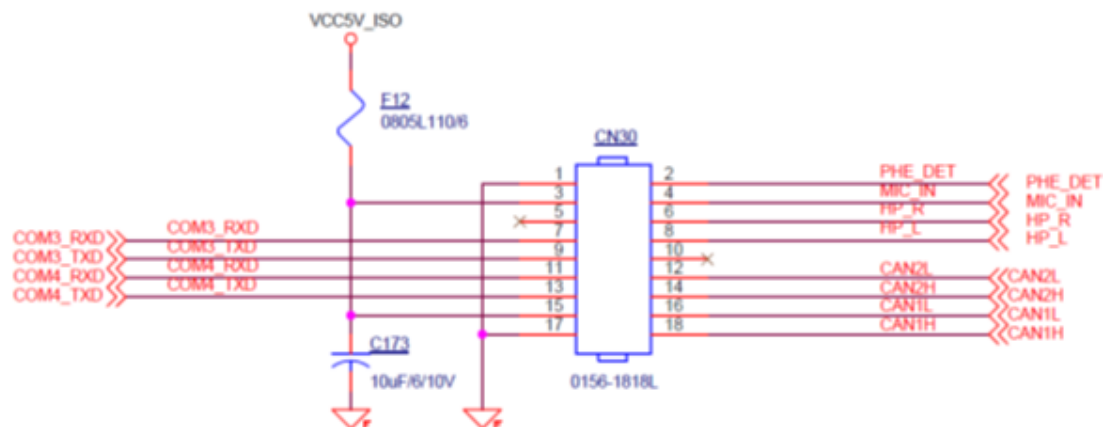




#### 4.2.4 CAN-FD / COM / Audio Connector (CN30)

Connector↵	Descriptions↵
<b>CN30</b> ↵	RS232 (or RS485) / (optional) CAN-FD / MIC in / Headphone out↵ <u>Linux device names:</u> ↵ COM3: /dev/ttymx2↵ COM4: /dev/ttymx3 ↵ CAN1: can0↵ CAN2: can1↵



**CN30** schematic:

- Headphone out / 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**, which is located in the red box below



```

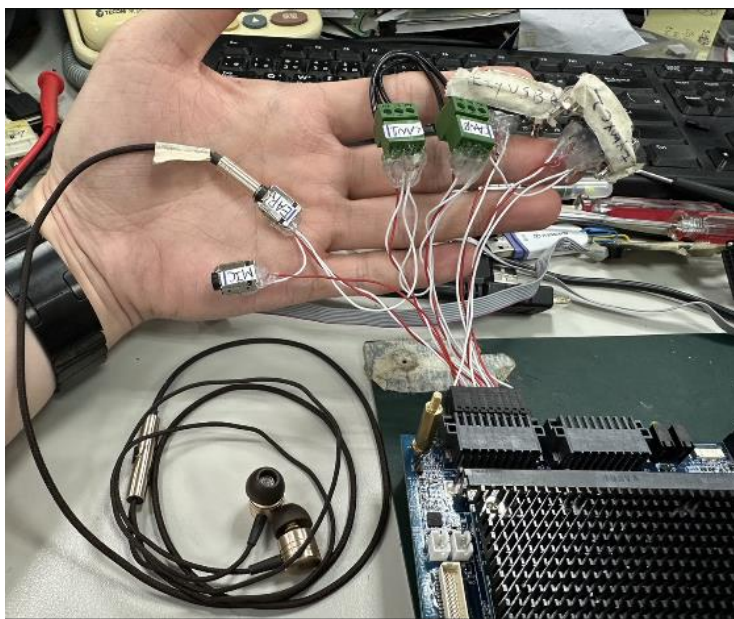
COM7:115200baud - Tera Term VT
File Edit Setup Control Window Help
de=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /mnt/user/0/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /mnt/androidwritable/0/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /mnt/installer/0/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /storage/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/vold/public:8,1 on /mnt/media_rw/0584-0D0F type vfat (rw,directsync,nosuid,nODEV,NOEXEC,NOATIME,gid=1077,fmask=0007,dmask=0007,allow_utime=0020,codepage=437,ioccharset=iso8859-1,shortname=mixed,utf8,errors=remount-ro)
evk 8mp:/ #

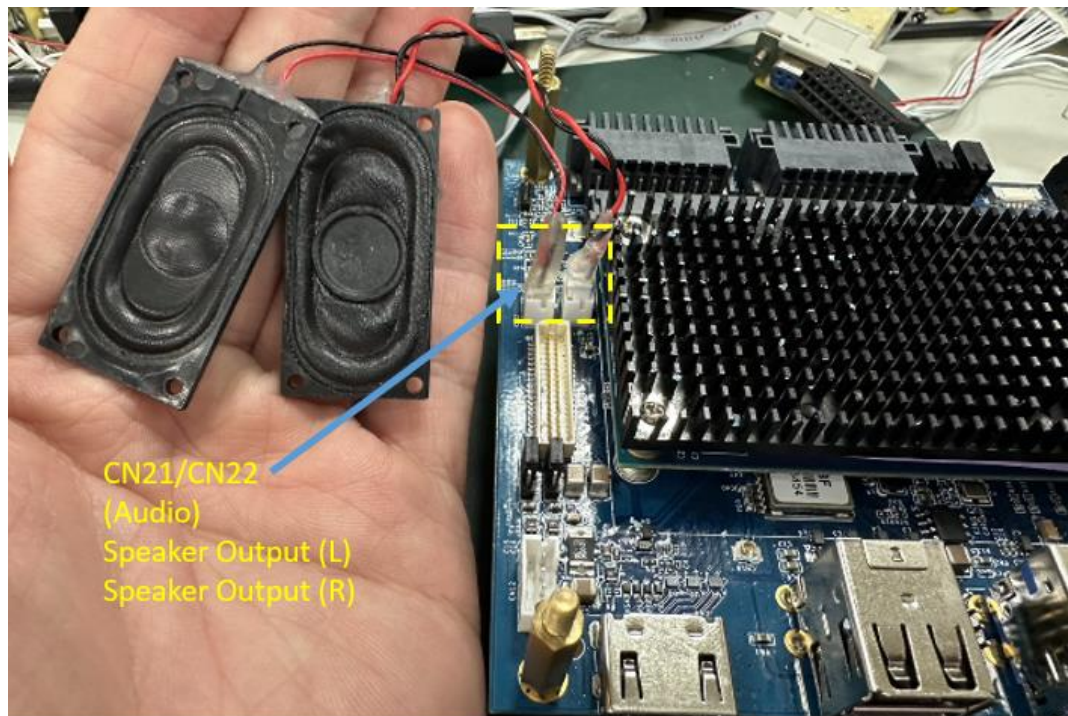
```

```

COM7:115200baud - Tera Term VT
File Edit Setup Control Window Help
active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /storage/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/dm-37 on /storage/emulated/0/Android/obb type f2fs (rw,lazytime,seclabel,nosuid,nODEV,NOATIME,background_gc=on,discard,no_heap,user_xattr,inline_xattr,acl,inline_data,inline_dentry,flush_merge,extent_cache,mode=adaptive,active_logs=6,reserve_root=32768,resuid=0,resgid=0,inlinecrypt,alloc_mode=reuse,checkpoint_merge,fsync_mode=posix,compress_algorithm=lz4,compress_log_size=2,compress_mode=fs,discard_unit=block,memory=normal)
/dev/block/vold/public:8,1 on /mnt/media_rw/0584-0D0F type vfat (rw,directsync,nosuid,nODEV,NOEXEC,NOATIME,gid=1077,fmask=0007,dmask=0007,allow_utime=0020,codepage=437,ioccharset=iso8859-1,shortname=mixed,utf8,errors=remount-ro)
evk 8mp:/ # [ 194.869698][ T351] healthd: battery l=85 v=3 t=35.0 h=2 st=2 c=400000 fc=4000000 cc=32 chg=a
[ 254.869590][ T351] healthd: battery l=85 v=3 t=35.0 h=2 st=2 c=400000 fc=4000000 cc=32 chg=a
[ 314.869607][ T351] healthd: battery l=85 v=3 t=35.0 h=2 st=2 c=400000 fc=4000000 cc=32 chg=a
evk 8mp:/ #
evk 8mp:/ # [ 374.869659][ T351] healthd: battery l=85 v=3 t=35.0 h=2 st=2 c=400000 fc=4000000 cc=32 chg=a
evk 8mp:/ #
evk 8mp:/ # tinyplay /mnt/media_rw/0584-0D0F/audiocheck.L.wav -D 1 -d 0
Playing sample: 2 ch, 44100 hz, 16 bit 208152 bytes
evk 8mp:/ # tinyplay /mnt/media_rw/0584-0D0F/audiocheck.R.wav -D 1 -d 0
Playing sample: 2 ch, 44100 hz, 16 bit 194040 bytes
evk 8mp:/ #

```



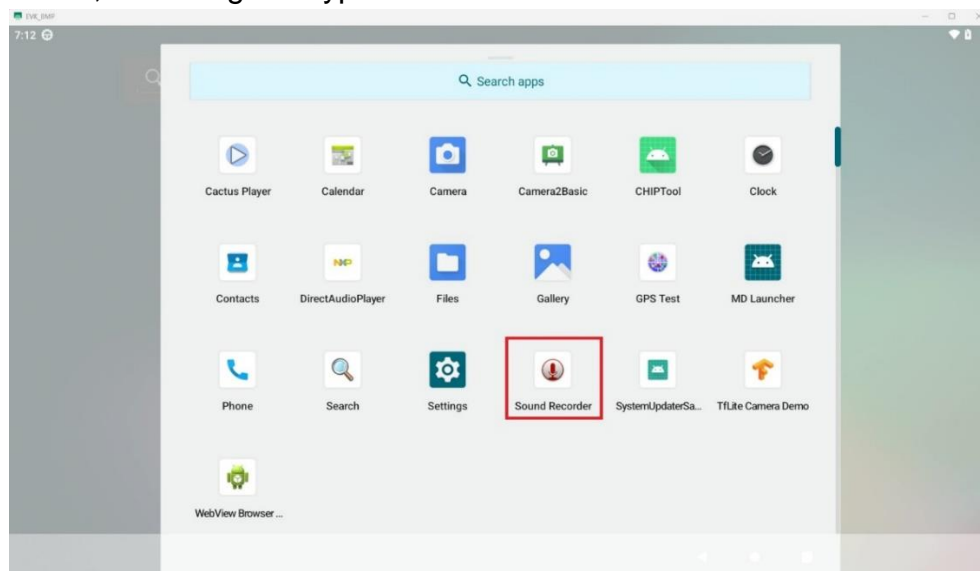


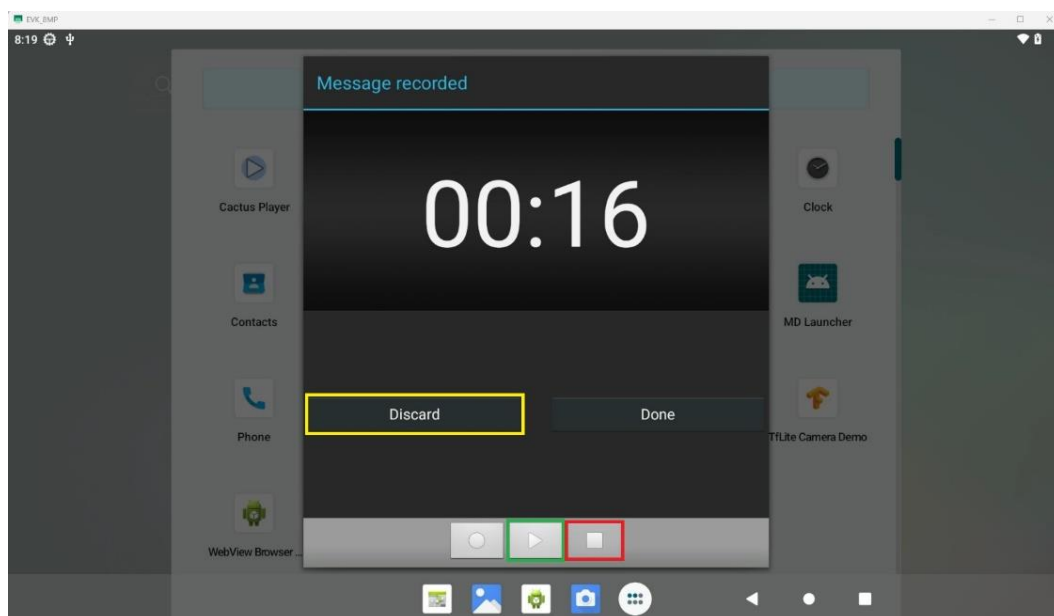
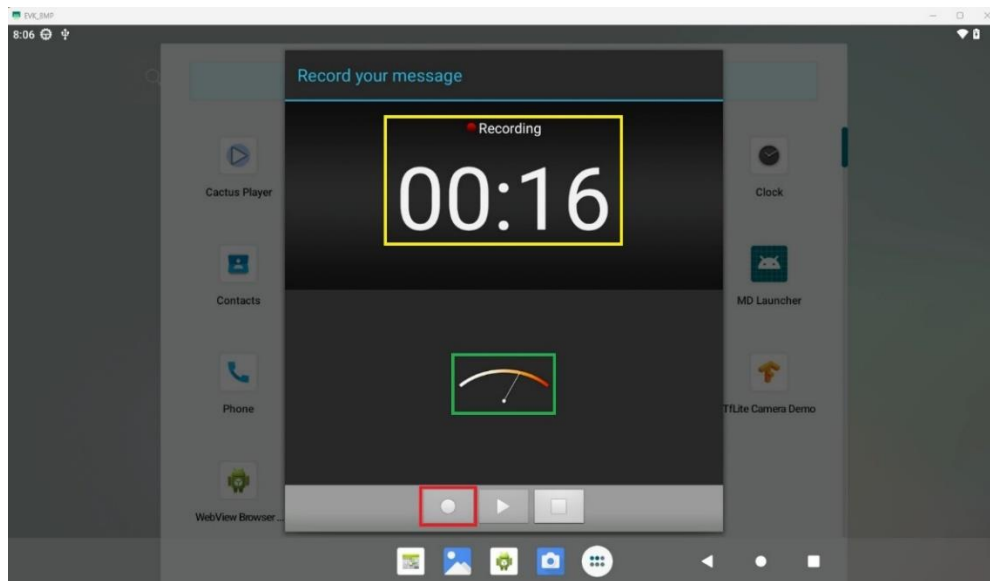
- MIC/Line-in Test:

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

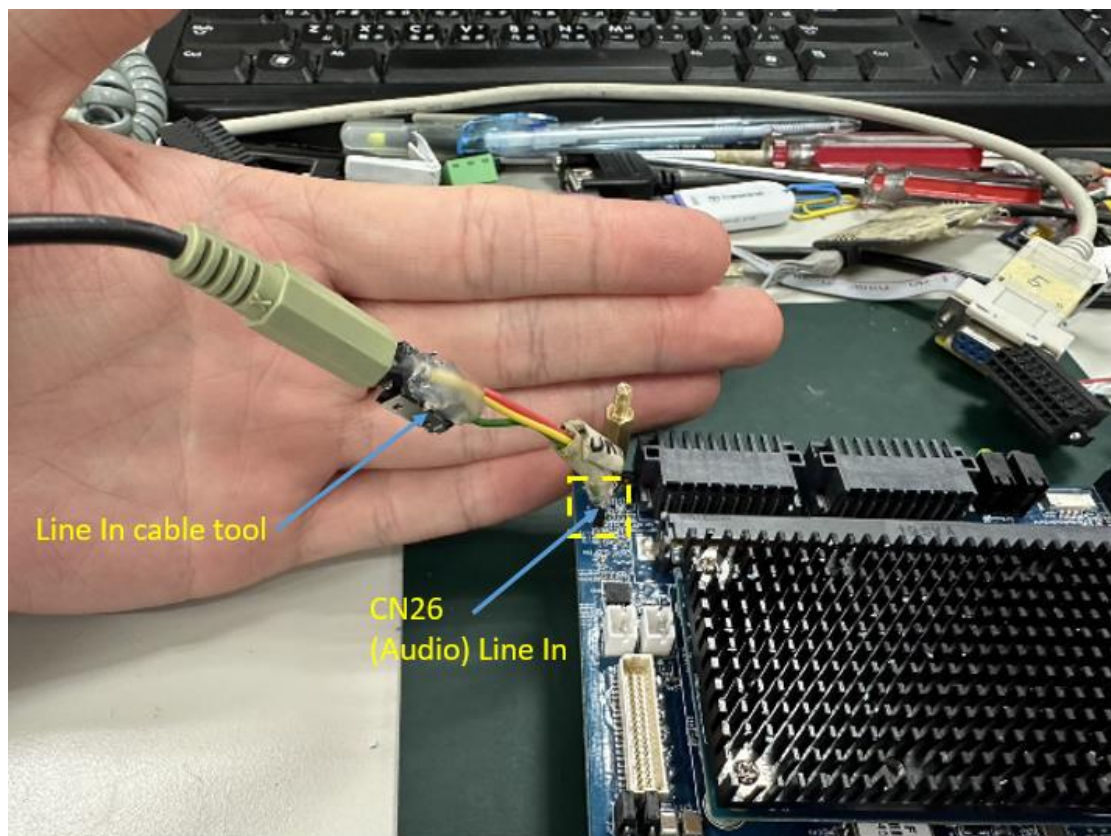
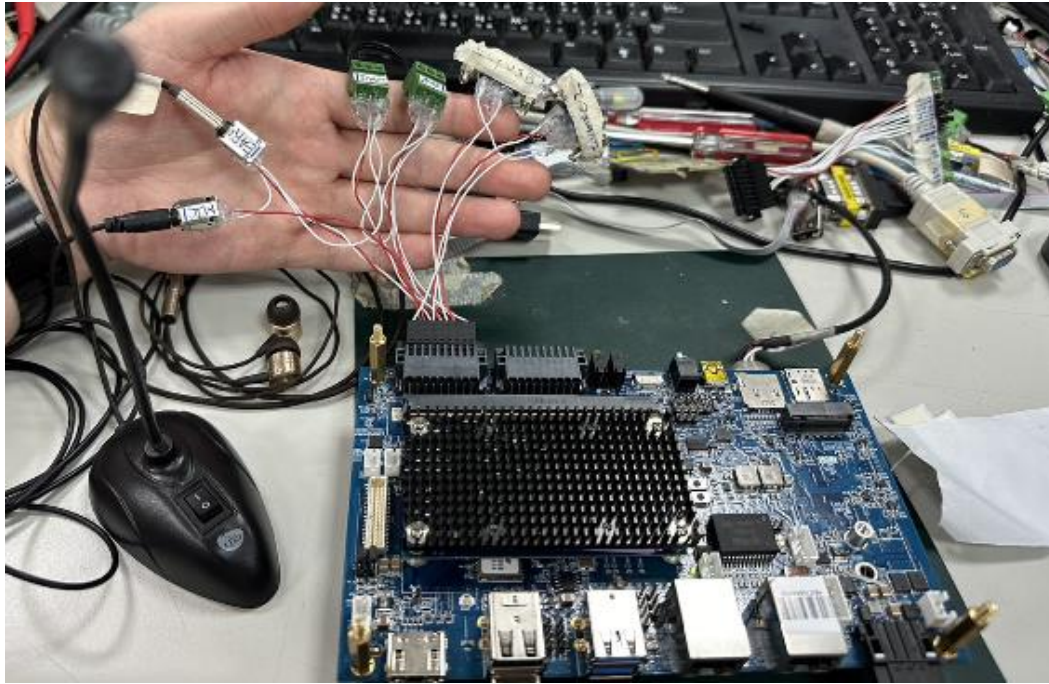
\*\*The default is Line in on

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









- 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).

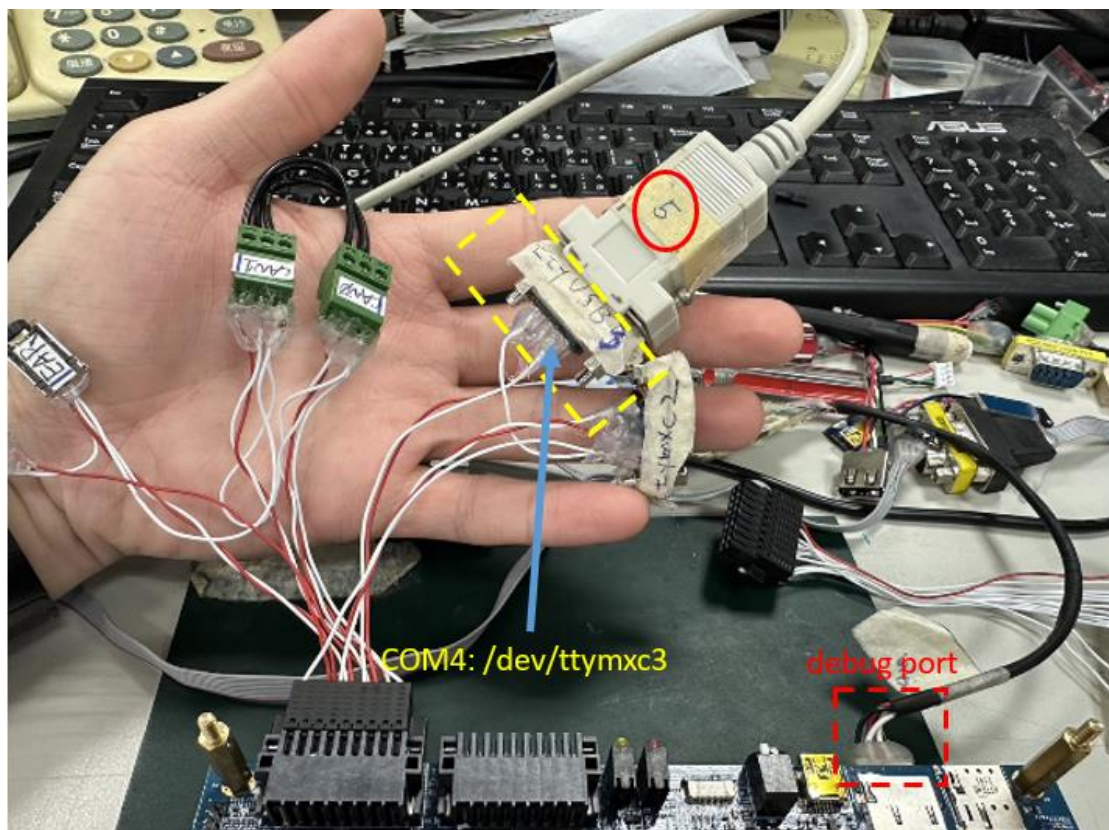
- (4) Port : Select the COM which your device connected.
- (5) Baud rate : 9600
- (6) Date : 8 bit
- 4. execute following commands in console window:  
# **echo abcde > /dev/ttymxc3**  
# **cat /dev/ttymxc3**

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).

Sending:

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



```

COM3:115200baud - 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/ttymxc3
root@imx8mp-lpddr4-evk:~# echo abcde > /dev/ttymxc3
root@imx8mp-lpddr4-evk:~# cat /dev/ttymxc3
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 (ttymxc2)

- 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

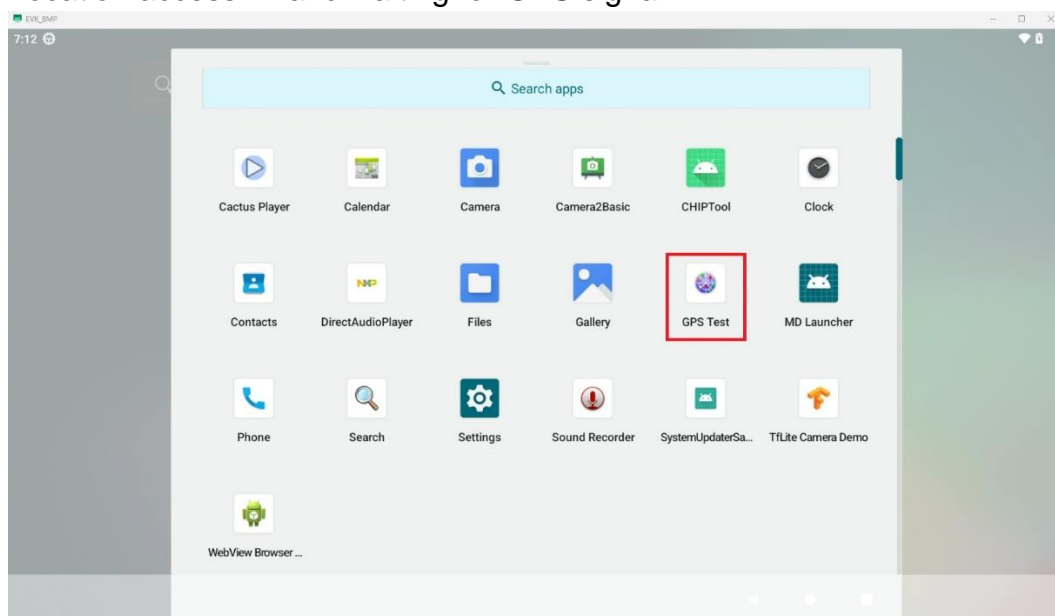
root@imx8mp-lpddr4-evk:~# candump can1 &
[2] 1177
root@imx8mp-lpddr4-evk:~# cansend can0 321#99887766554433DF
root@imx8mp-lpddr4-evk:~#   can0 321  [8] 99 88 77 66 55 44 33 DF
   can1 321  [8] 99 88 77 66 55 44 33 DF

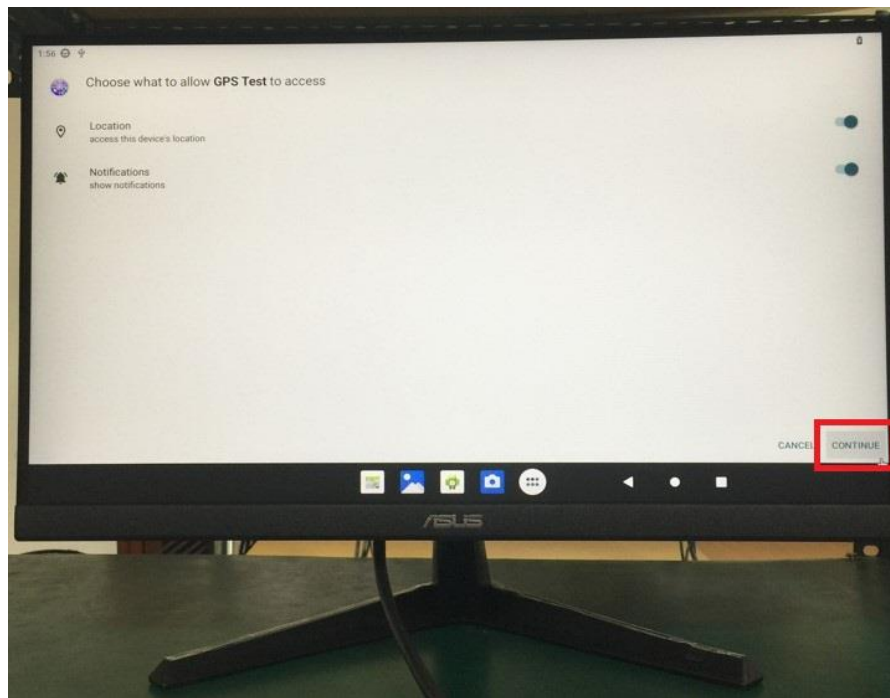
```



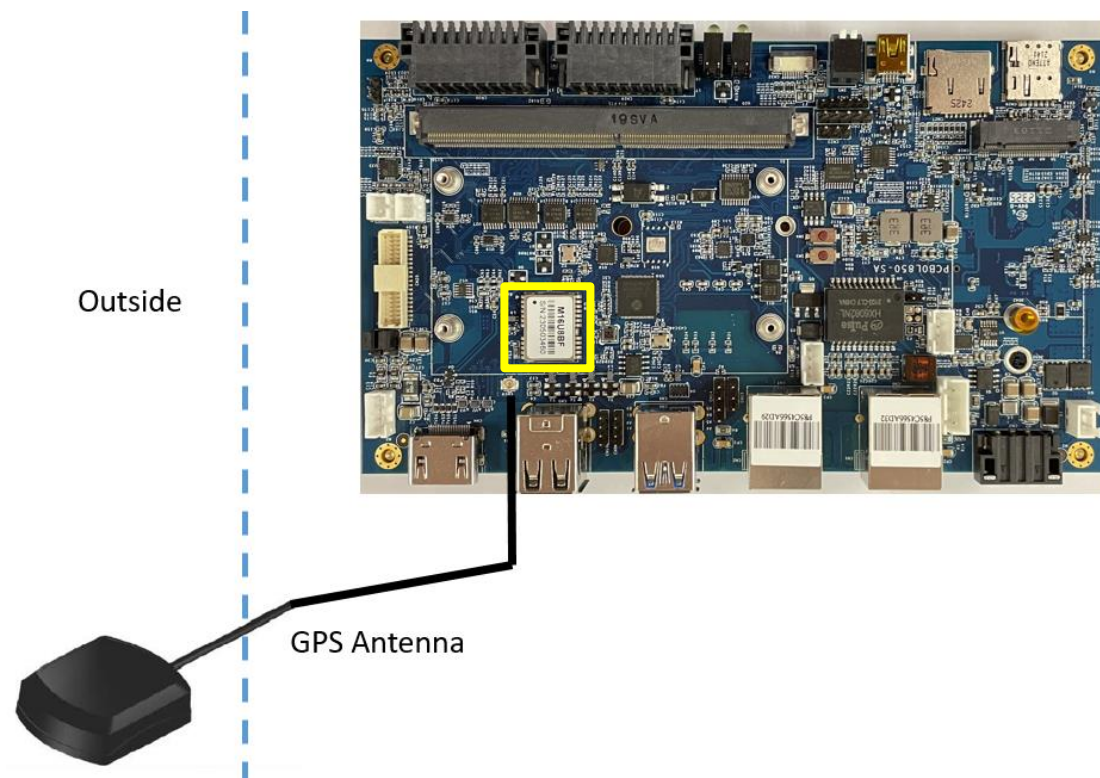
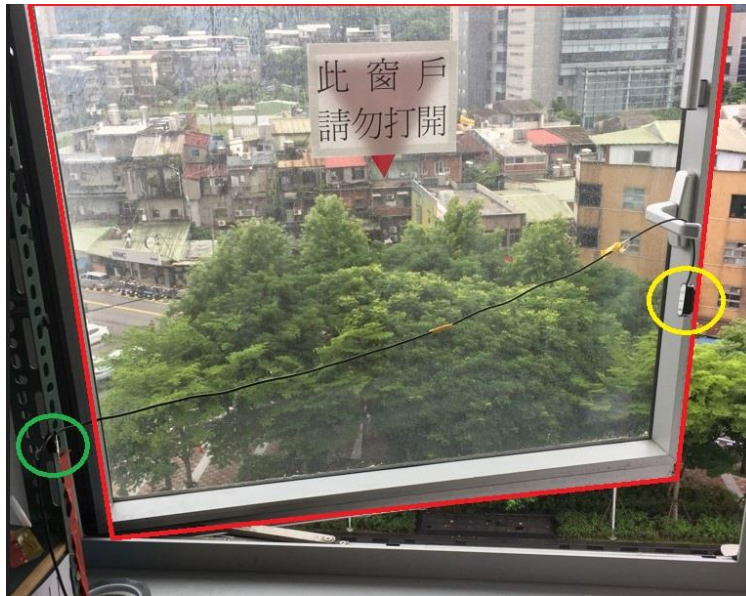
#### 4.2.5 GPS (M16U8BF) module test

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









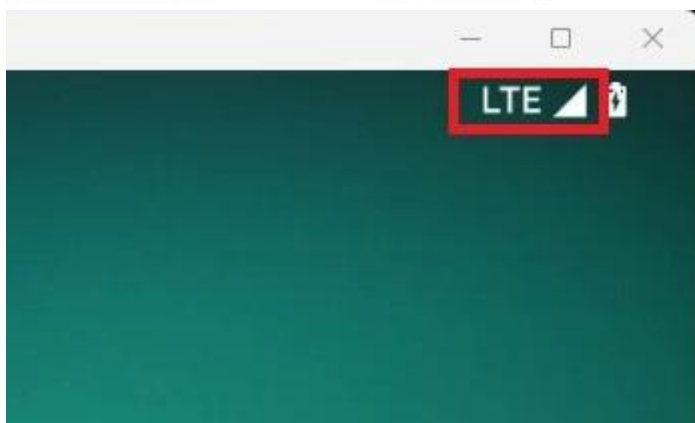
#### 4.2.6 4G LTE test

Power on the system and see LTE/4G signal in the upper right corner of the screen.

In console type command **ifconfig** also will show wwan0 interface



Antenna 4G + RF Cable



```

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:/ #

```

#### 4.2.7 i2c (CN18) 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**

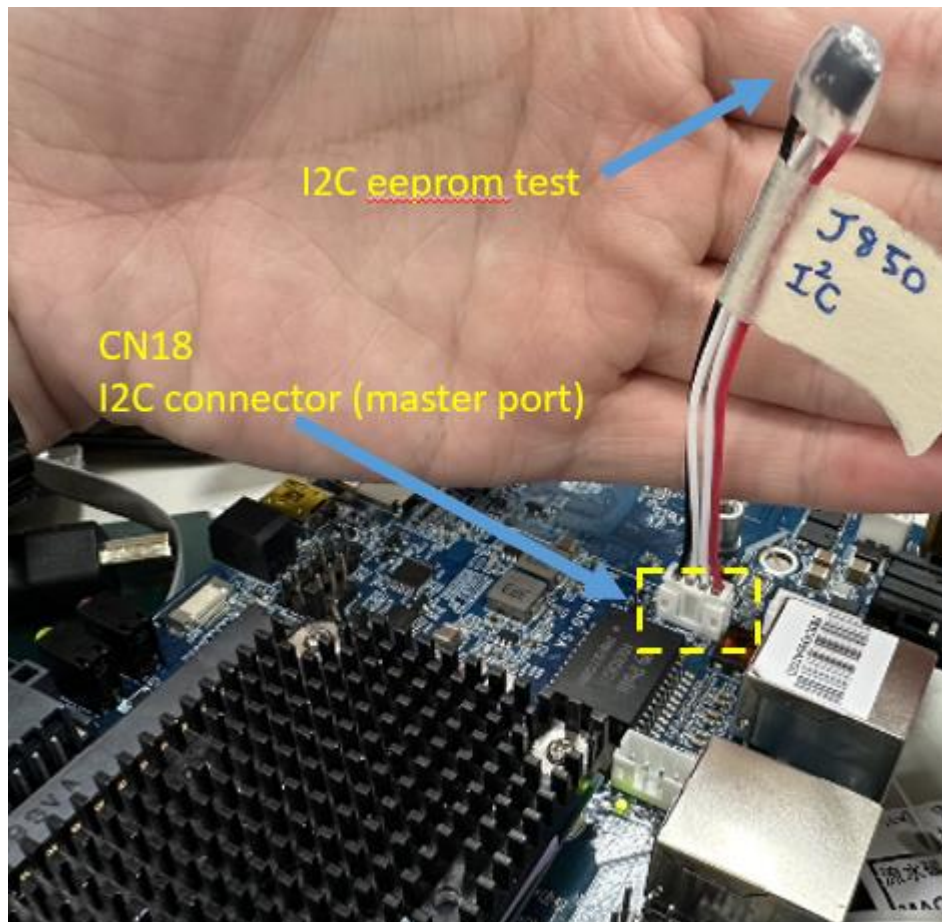
it will show 50 nodes

```

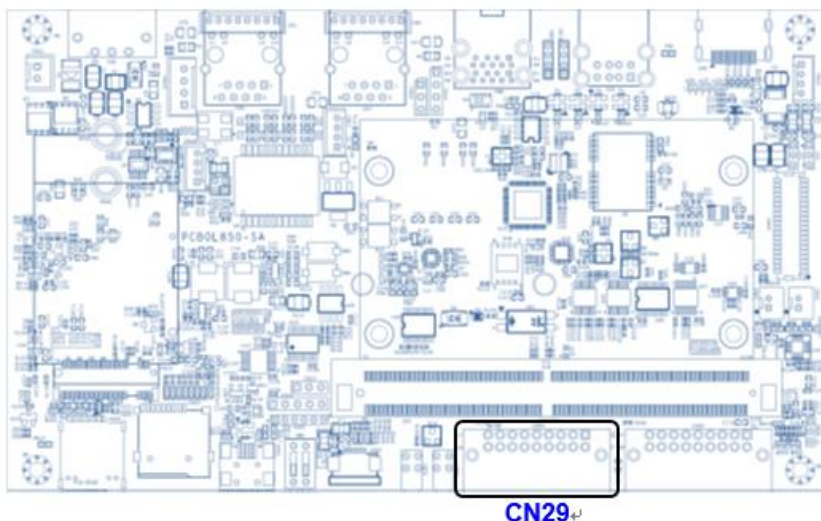
root@imx8mp-lpddr4-evk:~# i2cdetect -y -a 2
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: 00 -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- 18 -- -- -- -- -- -- -- --
20: UU UU -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- --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

```





#### 4.2.8 GPIO test (CN29)

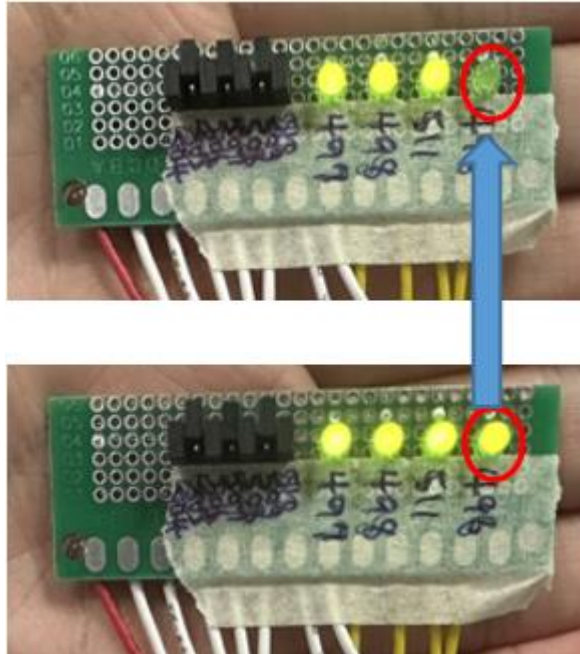


Paste the following commands into the console window and press Enter  
**GPO496 ~ GPO498 & GPO511**, you can using a LED test board to control LED light on-off .

For example, GPO496 (to test other GPO# please replace the red numbers by yourself)



```
cd /sys/class/gpio/
echo 496 > export
cd gpio496
echo out > direction
echo 1 > value
echo 0 > value
```

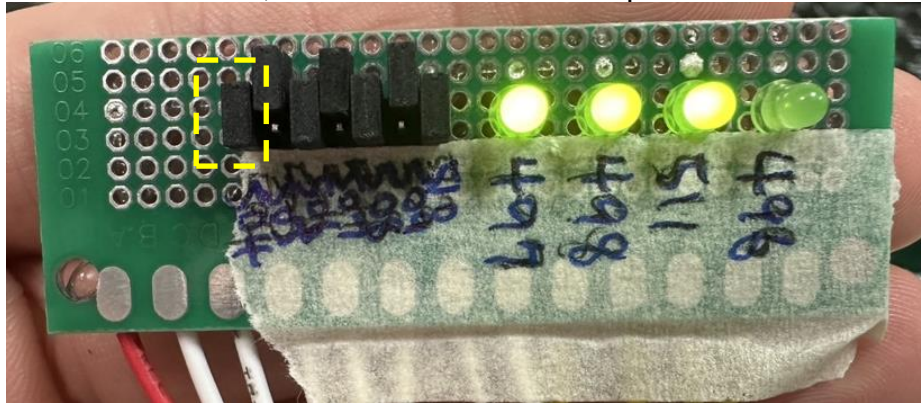


```
evk_8mp:/sys/class/gpio/gpio496 # cd /sys/class/gpio/
evk_8mp:/sys/class/gpio # echo 496 > export
l|evk_8mp:/sys/class/gpio # cd gpio496
evk_8mp:/sys/class/gpio/gpio496 # echo out > direction
evk_8mp:/sys/class/gpio/gpio496 # echo 1 > value
evk_8mp:/sys/class/gpio/gpio496 # echo 0 > value
evk_8mp:/sys/class/gpio/gpio496 #
```

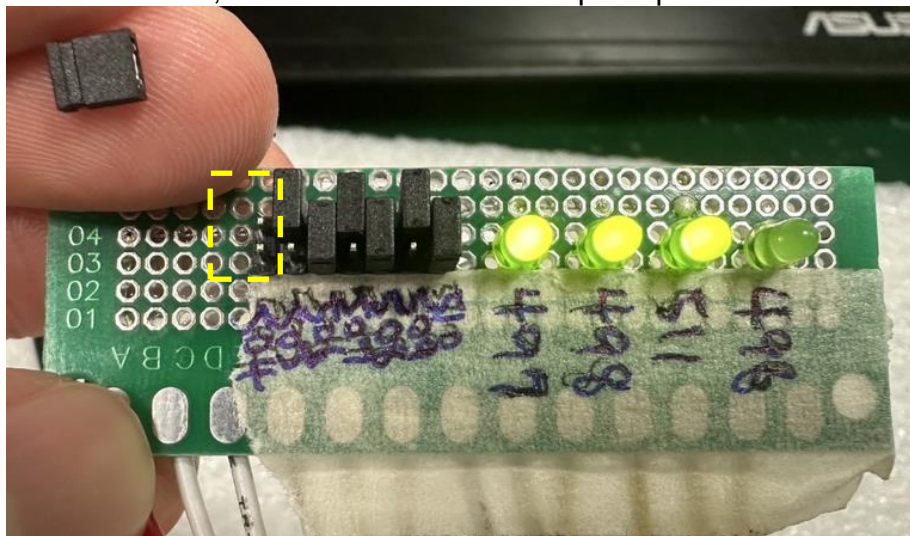
**GPI 504 ~ GPI 511 / GPI 496**, you can use a test tool similar to the following:  
For example, GPI504 (to test other GPI # please replace the red numbers by yourself)

```
cd /sys/class/gpio/
echo 504 > export
cd gpio504
cat value
```

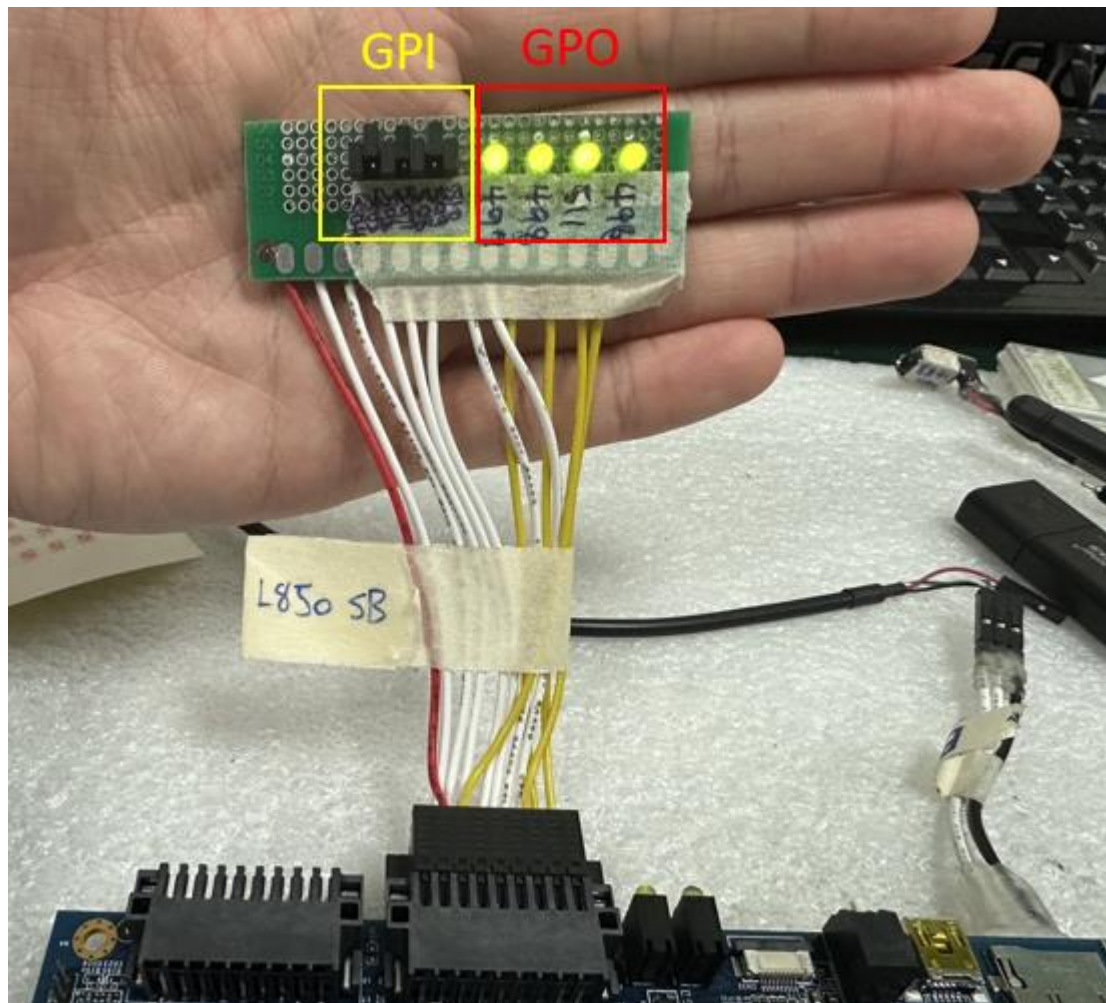
When short circuit, it will show cat value "0" pull-down



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#
```



#### 4.2.9 3D Accelerometer and Gyroscope sensor ( LSM6DSO ) test (optional)

```
cat /sys/bus/iio/devices/iio:device0/name
lsm6dso_gyro
```

```
cat /sys/bus/iio/devices/iio:device0/in_anglvel_x_raw
cat /sys/bus/iio/devices/iio:device0/in_anglvel_y_raw
cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw
```

```
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_x_raw
cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw
-11
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_y_raw
-131
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device0/in_anglvel_z_raw
-52
```

```
cat /sys/bus/iio/devices/iio:device1/name
lsm6dso_accel
```

```
cat /sys/bus/iio/devices/iio:device1/in_accel_x_raw
cat /sys/bus/iio/devices/iio:device1/in_accel_y_raw
```



```
cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_x_raw
cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw
-9
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_y_raw
163
root@imx8mp-lpddr4-evk:~# cat /sys/bus/iio/devices/iio:device1/in_accel_z_raw
16570
```

#### 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

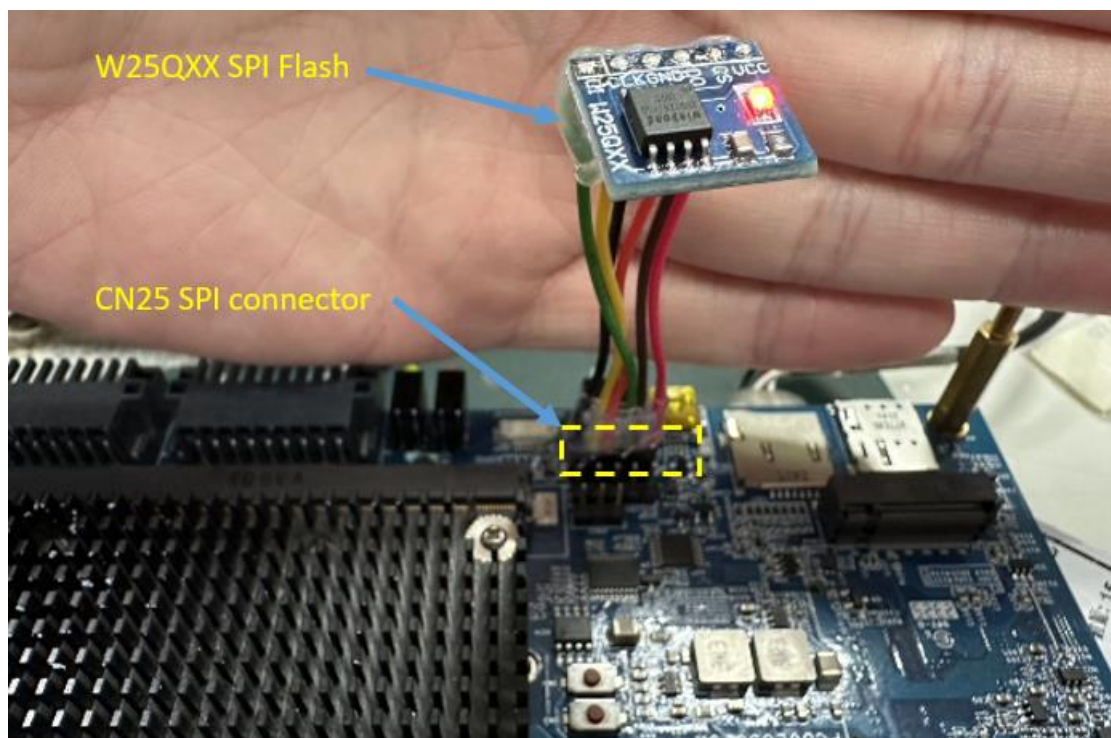
Copy demo test program (spi-test)

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

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

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

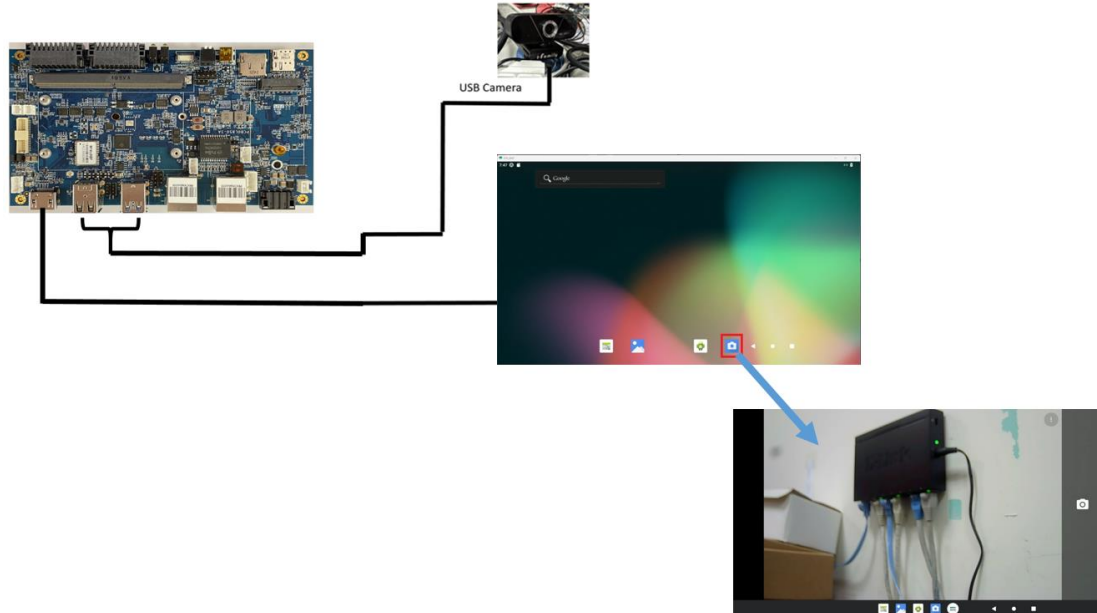
```
root@imx8mp-lpddr4-evk:~# ./spi-test /dev/spidev1.0
response(7): ef 40 18 00 00 00
```





#### 4.2.11 USB Camera test

Connected an USB Camera, and run build in Camera APP.



#### 4.2.12 MCU-controlled Power ON/OFF Demo Test

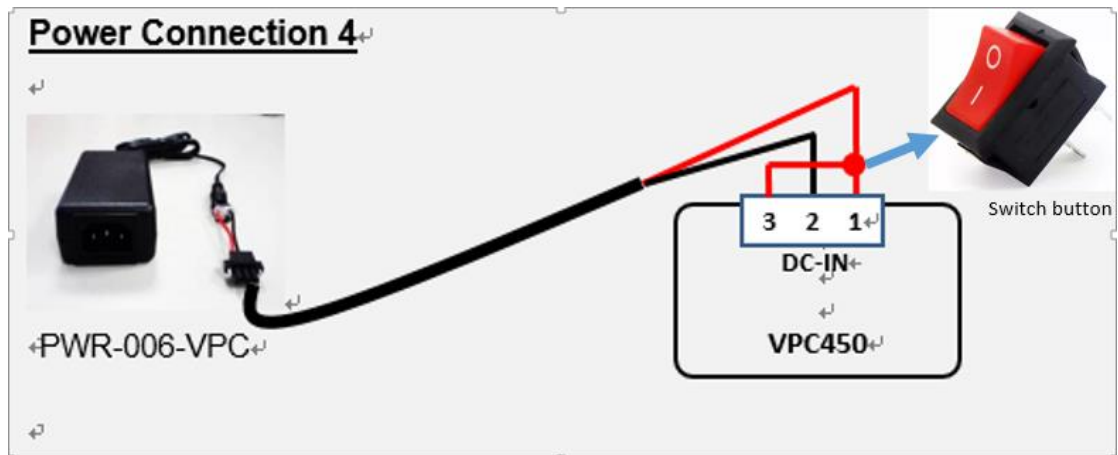
The MCU will always detect an ignition signal as long as DC adapter is on can be turned on VPC450.

And if disconnect ignition signal can be turned off VPC450.

Demo video:

[https://drive.google.com/file/d/1r7dAbE5htDYxdtjSM8UlrT0MqGk4IAv/view?usp=drive\\_link](https://drive.google.com/file/d/1r7dAbE5htDYxdtjSM8UlrT0MqGk4IAv/view?usp=drive_link)

Schematic



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