

SBC3500

Quick Start Guide

Release Notes

Version	Release Date	Notes
1.0	July 2022	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 SBC3500 is a small size (101mmx146mm) single board computer designed for applications such as digital signage, HMI, POS, Gaming, Set top box, KIOSK and other smart devices. The SBC3500 features a quad-core 64-bit ARM Cortex-A55 processor, 2x 10/100 LAN ports and PoE (Power over Ethernet) for a wide range of commercial and industrial applications.

Each SBC3500 can be installed in advance with Linux or Android for immediate evaluation.

2.2 Features and Specifications

Features

- High performance Quad-core ARM Cortex-A55 (64-bit ARMv8)
- Hardware decoder up to 4K@60fps and encoder to 1080P@100fps or 4K@10fps
- Hardware 2D/3D graphics accelerator
- Multiple display interfaces (HDMI, eDP, LVDS or MIPI-DSI TX)
- Multiple camera interfaces (MIPI-CSI RX, USB)
- Rich set of peripherals (USB3.0, 2.0, LAN, CAN-FD, GPIO, I²C, SPI, etc.)
- Preinstalled Linux or Android OS

Specifications

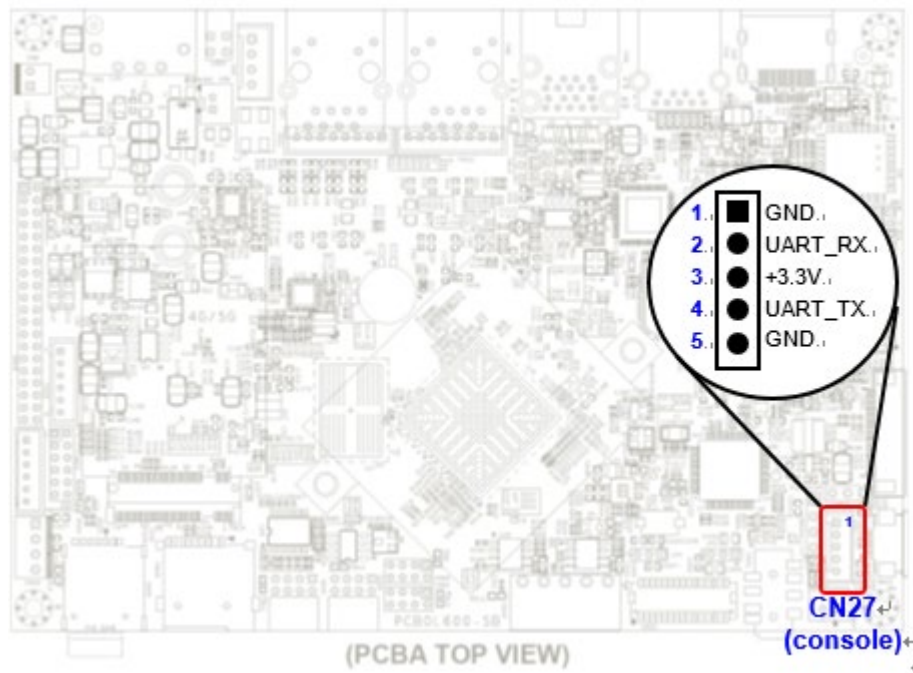
	SBC3500
CPU	Rockchip RK3568 (wide temperature version) (Quad-core 64-bit ARM Cortex-A35)
NPU	0.8 TOPs
OS	Android / Ubuntu
DDR RAM	2GB / 4GB / 8GB LPDDR4X
Flash ROM	32GB (or higher)
Display Interface	1x HDMI (4K @ 60fps)
	1x LVDS (1280x800 @60fps) or 1x MIPI-DSI (FHD @ 60fps)
	1x eDP (2K @ 60fps)
Camera Interface	1x MIPI-CSI RX (4 lanes)
Touch Interface	1x Capacitive Touch Screen Interface (I ² C)
Audio Interface	1x Mic/Earphone connector + 1x Speaker output connector
USB 3.0	2x type-A host + 1x OTG
USB 2.0	5x host (pin header)

SD 3.0	1x microSD slot
PCIe	1x PCIe 2.1 M.2 socket (for SSD)
Ethernet	LAN1: 1x GbE (RJ-45) + (optional) LAN2: 1x GbE (RJ45)
WiFi/BT	WiFi 802.11 b/g/n/ac + Bluetooth 5.2 (optional)
COM port	2x RS232 (or RS485) port + 2x RS232
GPIO	8-bit digital input/output (3.3V)
CAN	2x CAN-FD (optional)
Console port	1× UART (console / debug)
I²C port	1x I ² C master port
SPI	1x SPI port
PoE	PoE connector on LAN1 for external PoE module (optional)
Power Input	DC 12V-24V (optional 9V-36V with over-voltage/current protection)
MCU	(optional) MCU for software power on/off
Operating Temperature	0°C to 70°C -20°C to 70°C
Dimension	146mm x 101mm x H
Weight	<TBD>

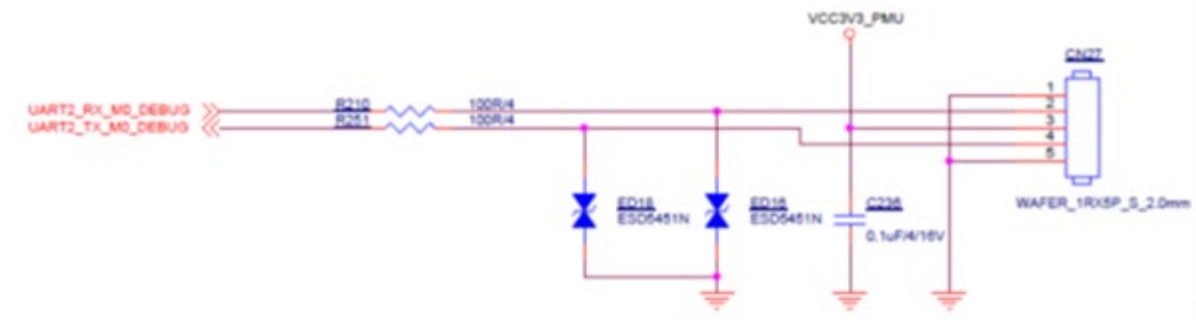
3. Setup

3.1 Console / Debug Port

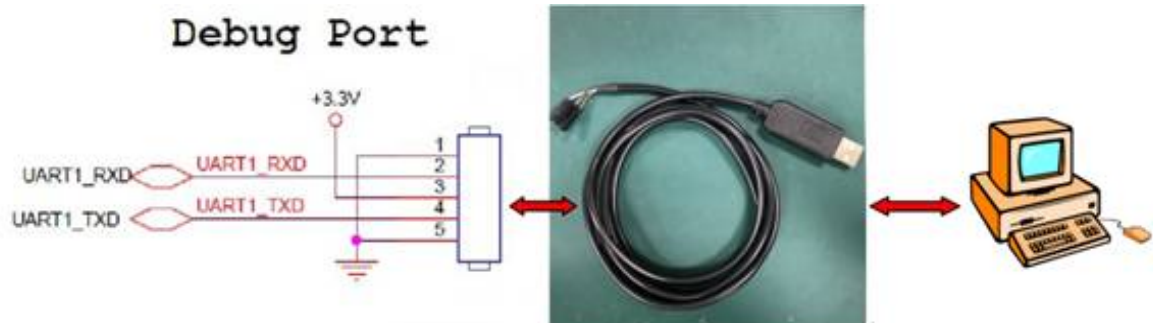
To use the Debug port, please follow the following steps. You can refer to the Quick Start Guide for more detail.



Console port schematic:



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



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

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



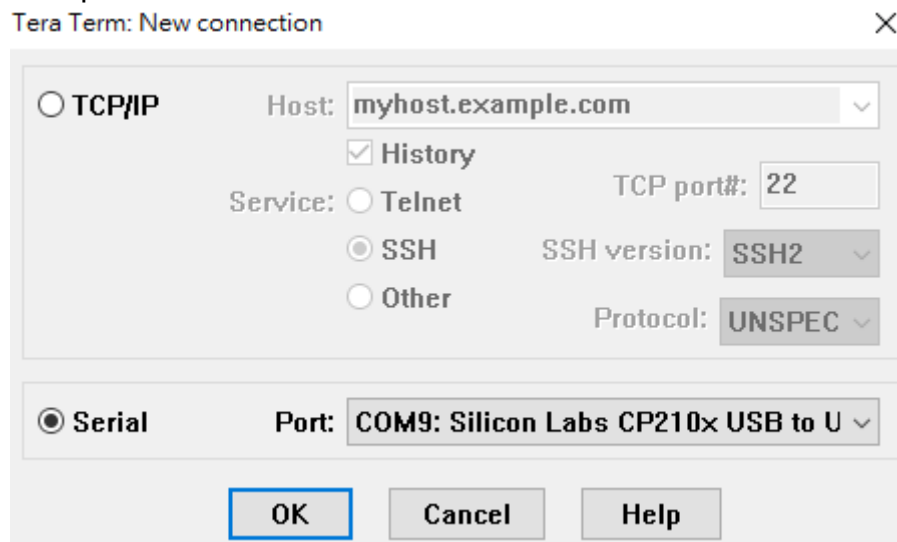
WARNING: Do NOT connect the red cable (VCC) to the board.

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

② **Connect to PC**

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

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



If nessecary, modify the settings to the following:

Baud Rate 115200, 8 data bits, no parity, 1 stop bit and no flow control.

Port:	COM9	OK
Baud rate:	115200	Cancel
Data:	8 bit	Help
Parity:	none	
Stop:	1 bit	
Flow control:	none	

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

```

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:/ #

```

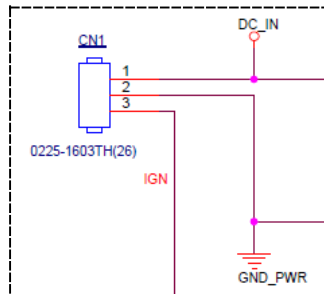
A “#” indicates the system is now in root mode.

3.2 Start Running

12V-24V DC input (3-pin terminal block) (optional 9V-36V)

Note: Tie pin1 and pin3 together if you do not connect pin3 to "ignition" input.

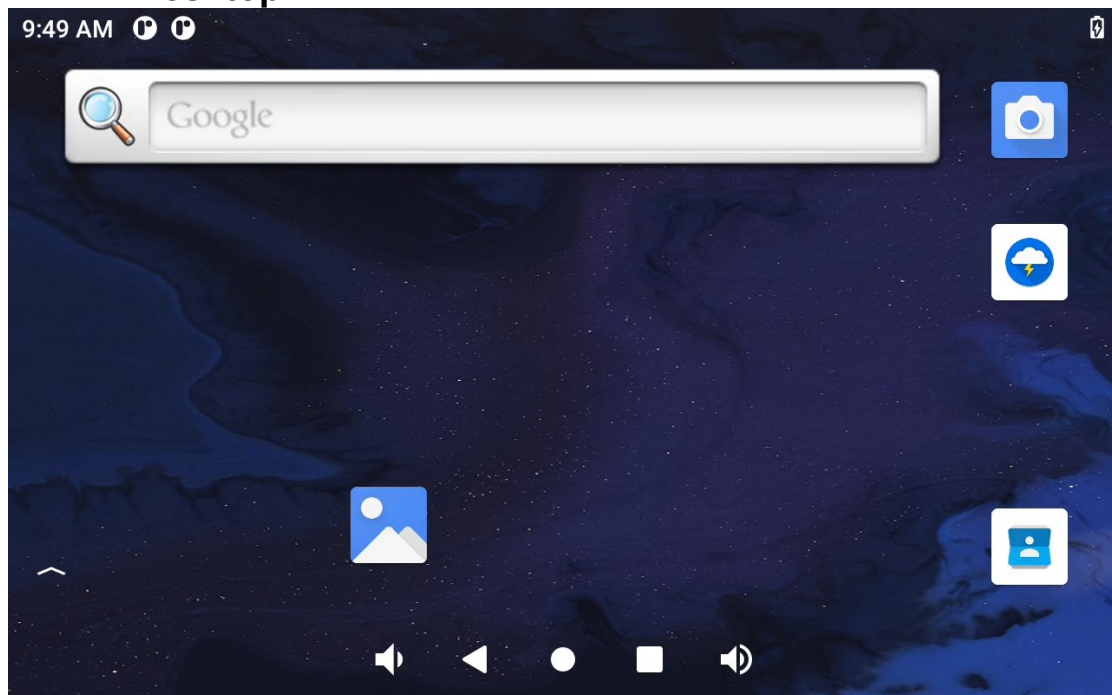
Schematic:



4. Running Software


4.1 Android

4.1.1 Desktop



9:50 AM  



 Search apps



Calculator



Calendar



Camera



Clock



Contacts



Explorer



Files



Gallery



Lightning



Music



Search



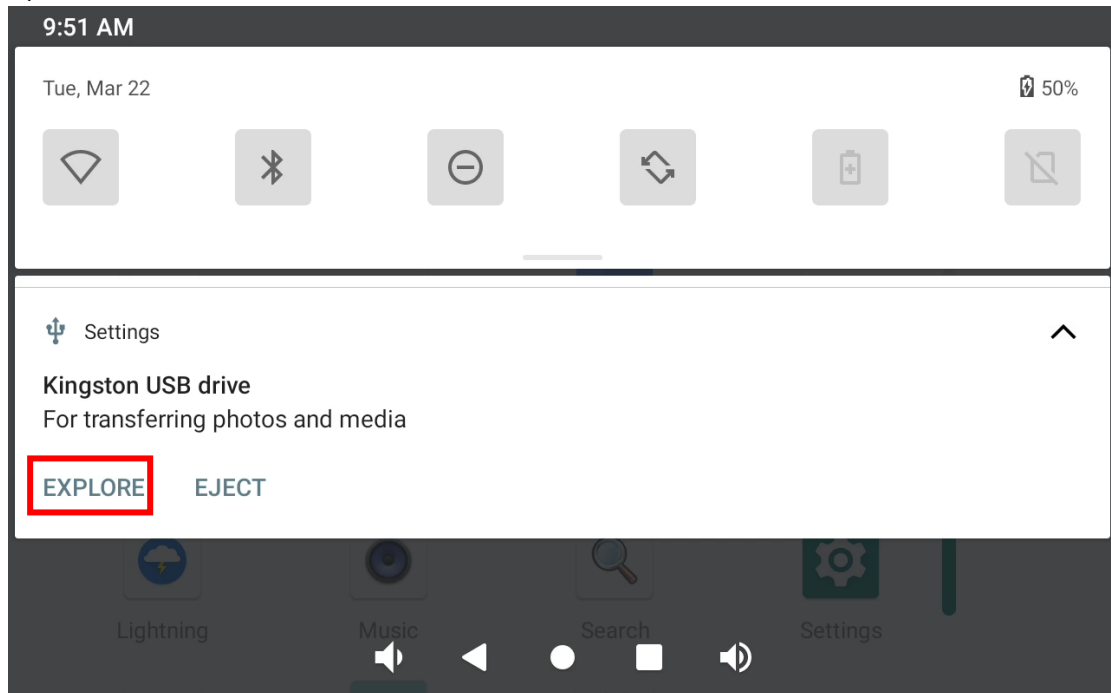
Settings



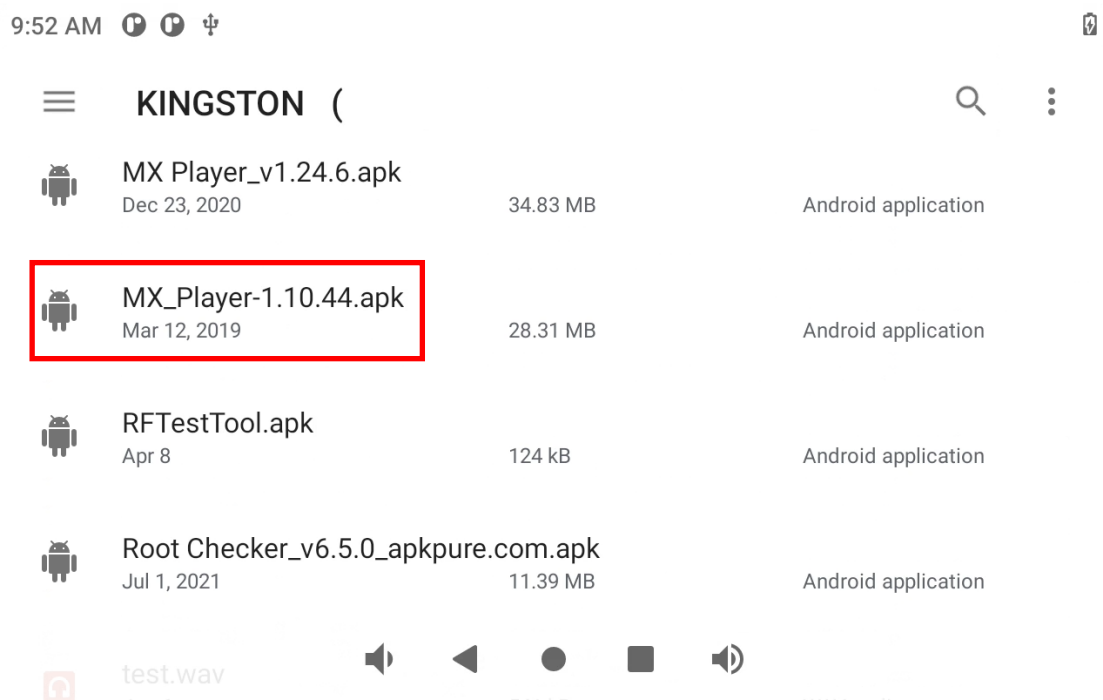
4.1.2 APK install

Following are the steps how to install apps from external devices.

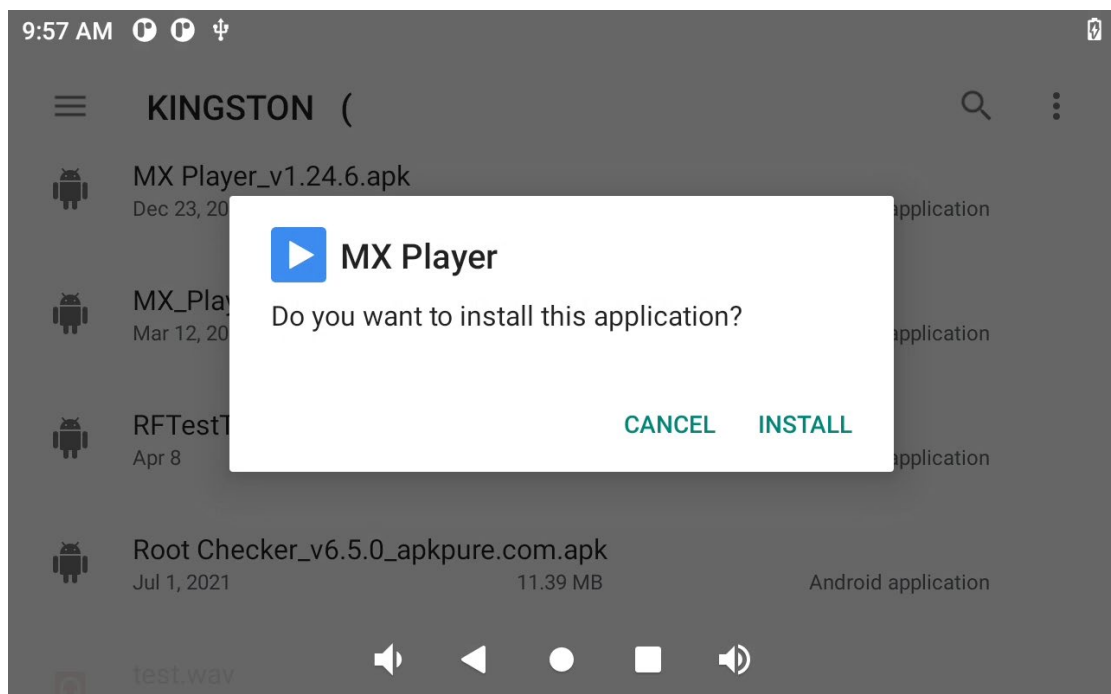
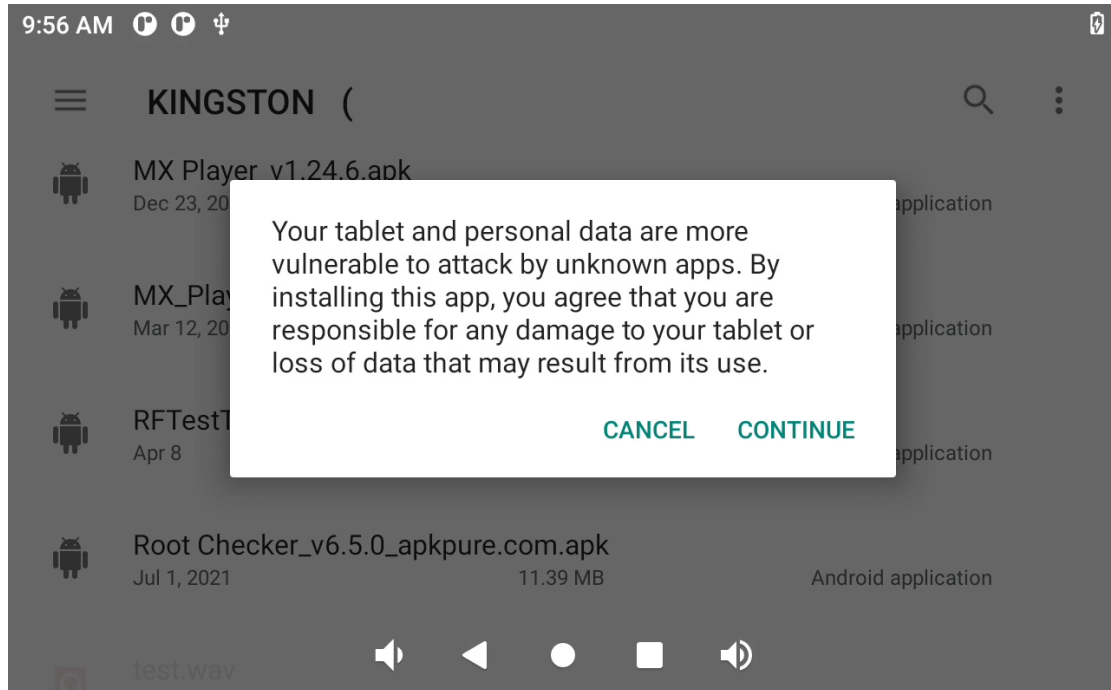
1) Go to **USB devices** → And **“EXPLORE”**

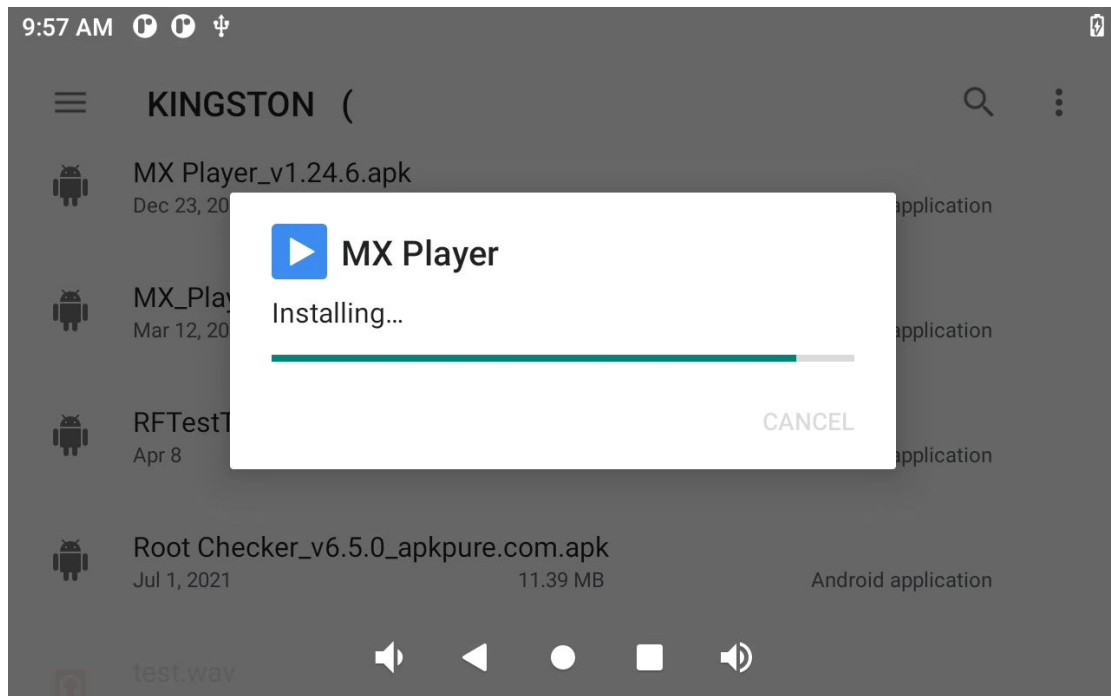


2) You can now using USB devices to install apps you want.



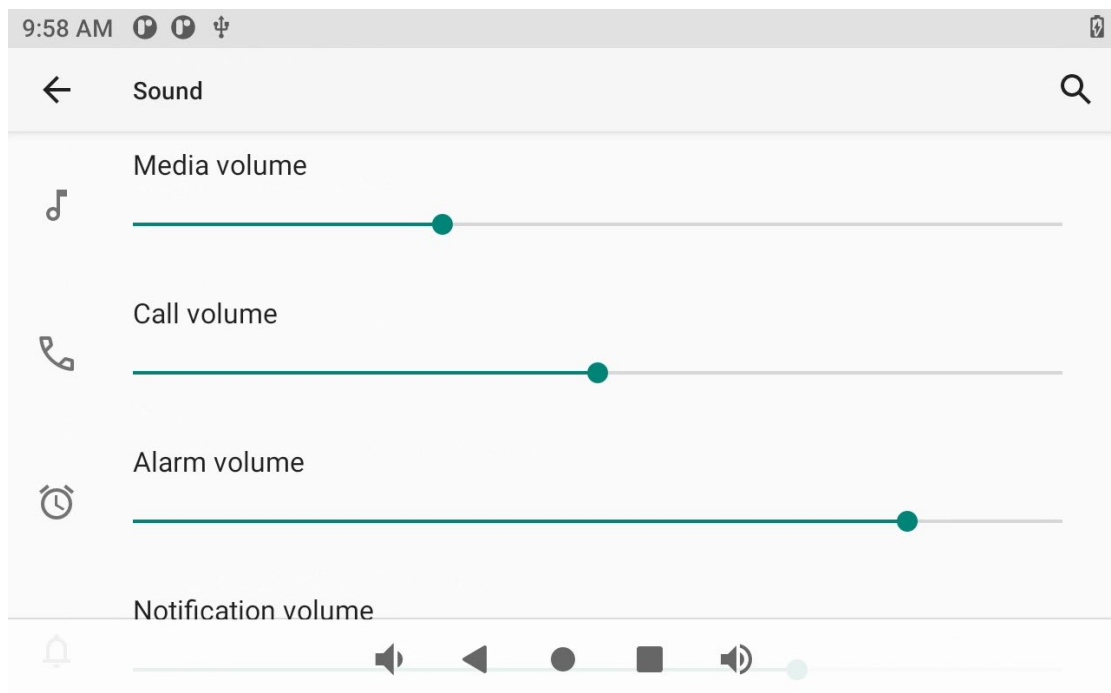
3) Click **APK File** and **CONTINUE** to install





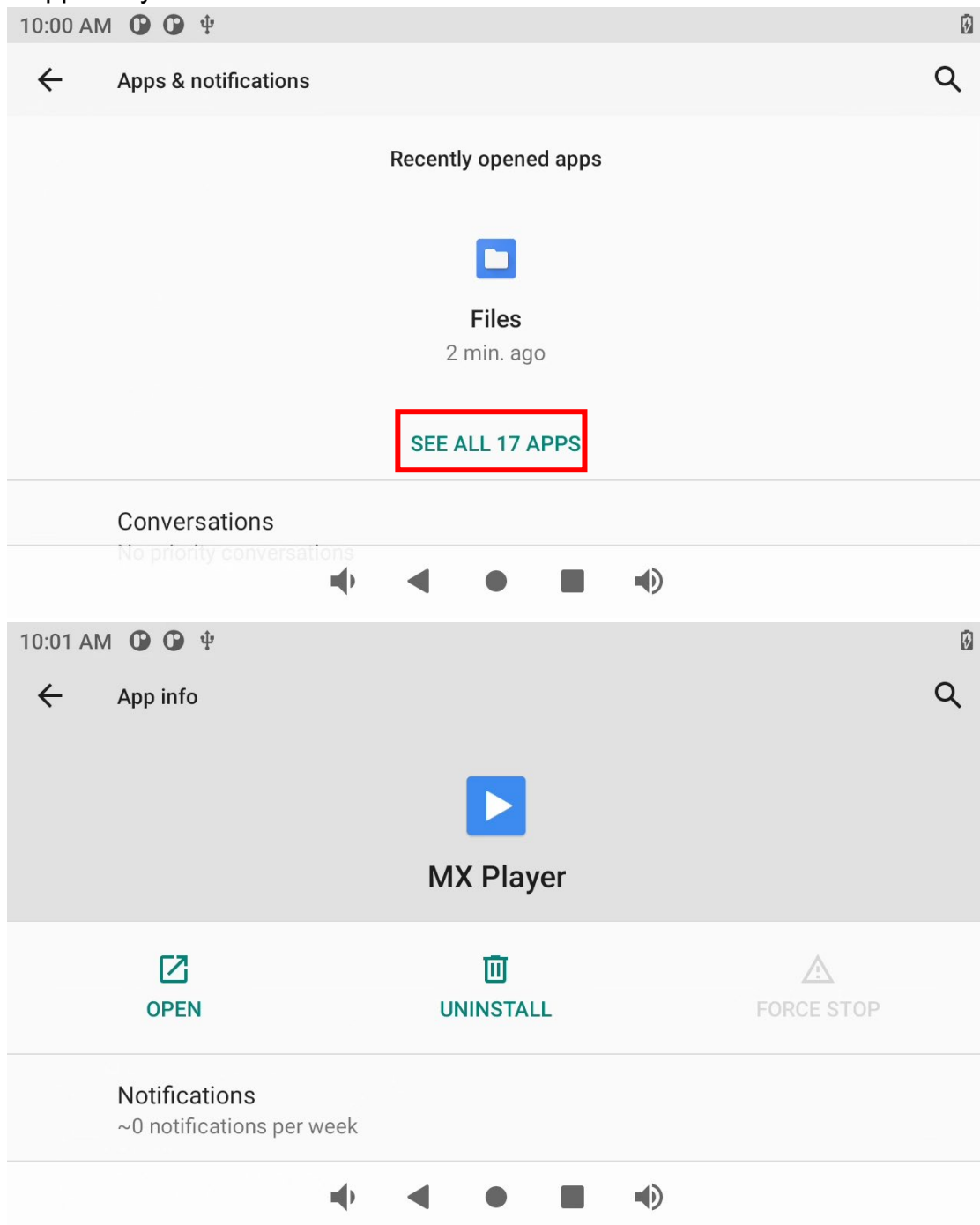
4.1.3 Sound Settings

Go to **Apps** → **Settings** → **Sound** to set up sound volume.



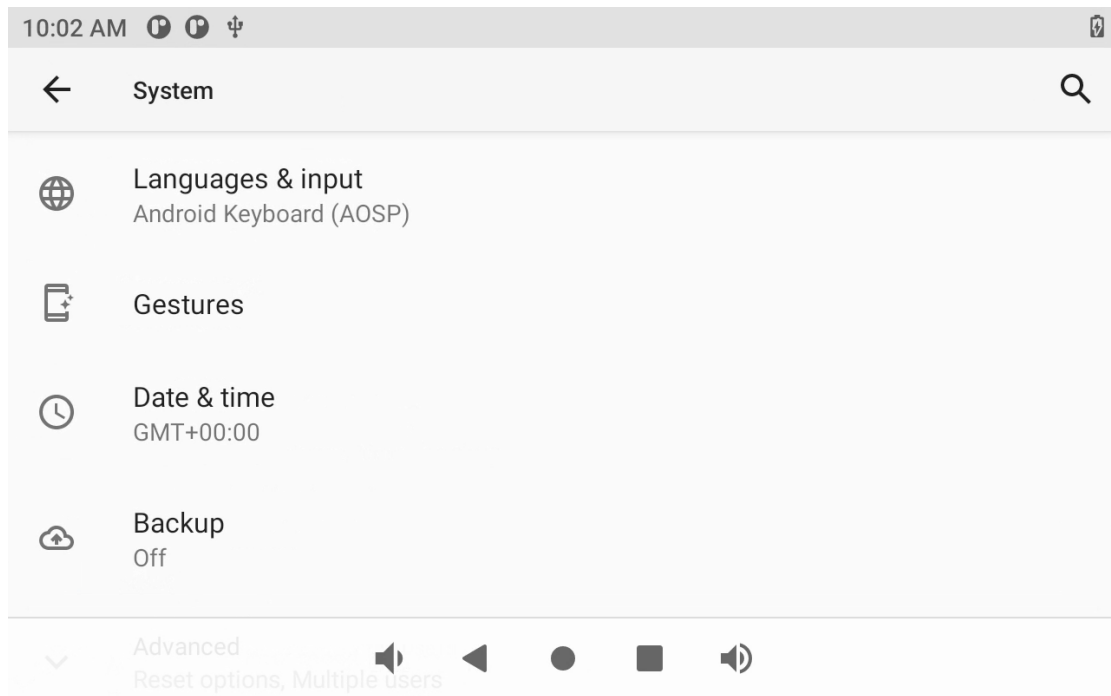
4.1.4 Apps

Go to Settings → Apps to manage all apps. You can force-stop or uninstall an app that you have installed.



4.1.5 Language & Input

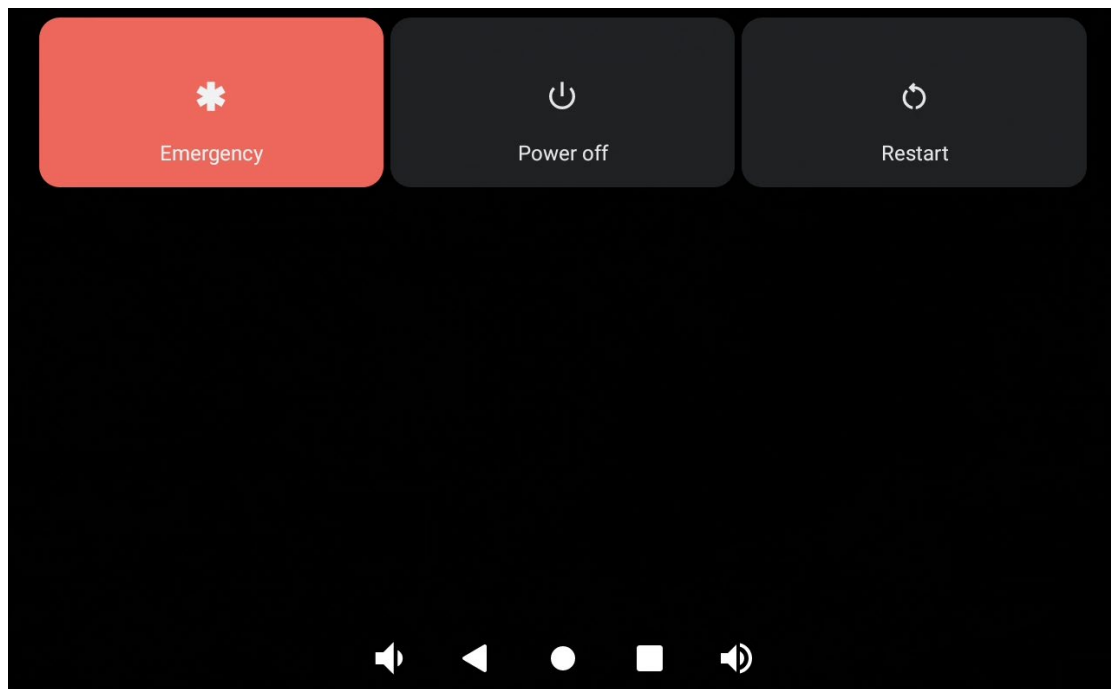
You can change the UI display language and the default input methods.



4.1.6 Power Button Switch(SW1)

When DC power is applied to DC input connector, SBC will be turned on automatically.

SBC can be **Power off/Restart/Emergency** if SW1 pin1 and pin2 are short for more than 2 seconds.



4.1.7 Reset Switch(SW2)

Short SW2 pin1 and pin2 to do SBC hardware reset.

4.1.8 COM (RS232/RS485) Port

To test serial communication on Android OS, you can use our demo APP “uart_demo.apk” application. Please contact with us if you want this APP.

1. Click upper right menu



2. Click “**Config**” to set Device name & Baud rate

===== RS232/RS485(CN35 CN36 CN28 CN32) x4 test =====

UART **Device name**

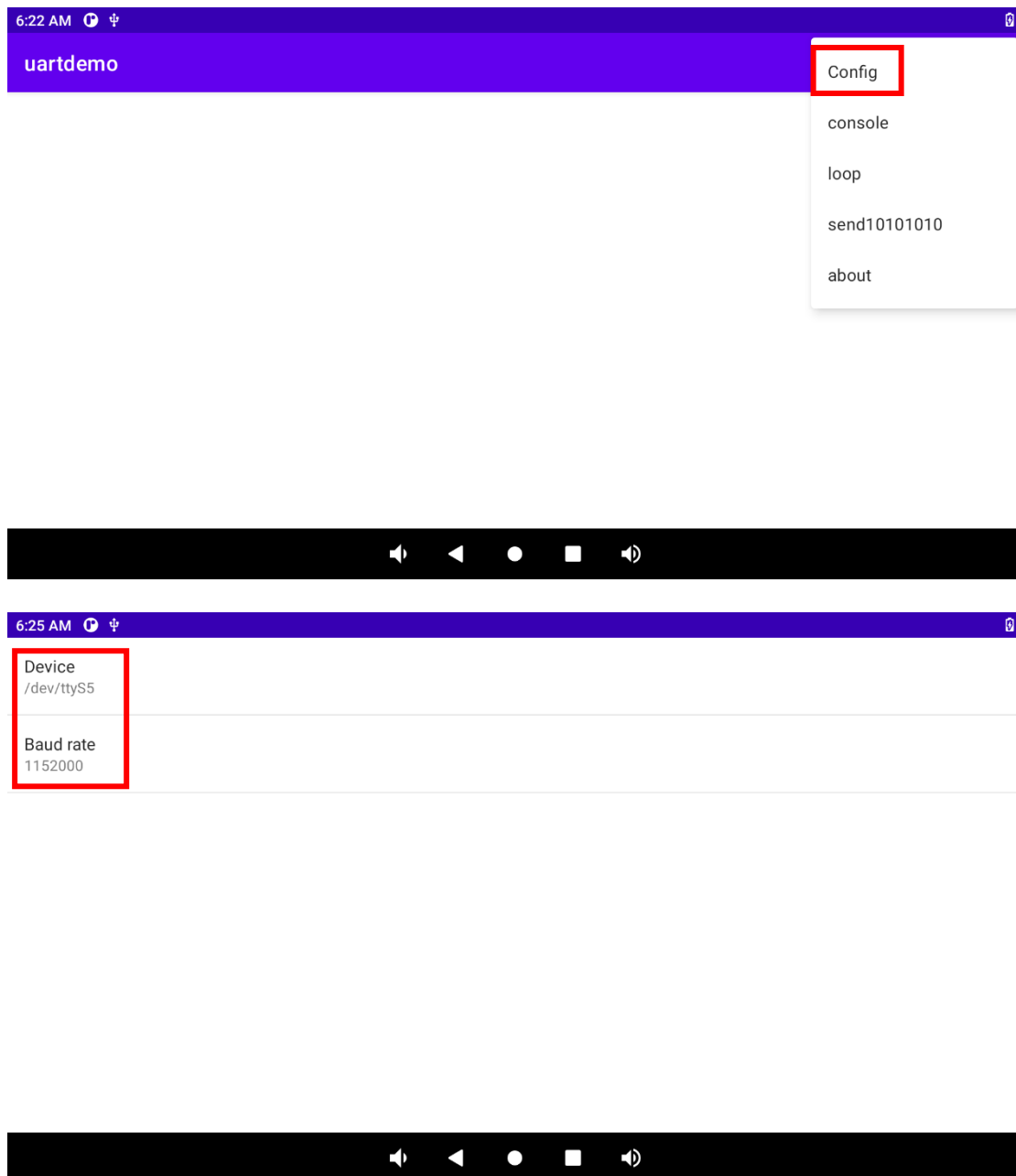
CN35 RS232 ttyS3

CN32 RS232 ttyS5

CN28 RS232 ttyS7

CN36 RS485 ttyS4

Baud rate: 115200, 8 bit ,top bit, 1 ,non parity, non flow control

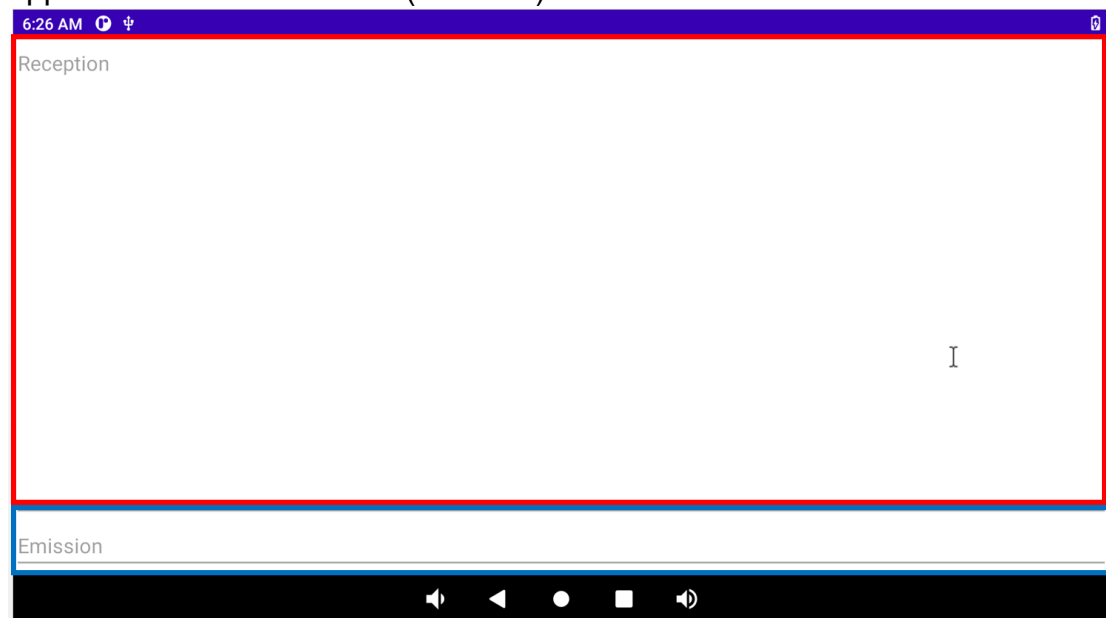


3. And click “**Console**” to test receiving & transmission function



The **red box** is the test receiving function(RX)
Type any number or sentence in terminal window (COMXX)on your PC desktop and you should see the same output appears in the demo uart (Pic red box).

The **blue box** is the test transmission function(TX)
Type any number or sentence in the demo uart (Pic blue box), remember using the USB keyboard connected to SBC3500 USB port to enter into the blue box and “Enter “ in USB keyboard, so you should see the same output appears in terminal window (CONxxx)

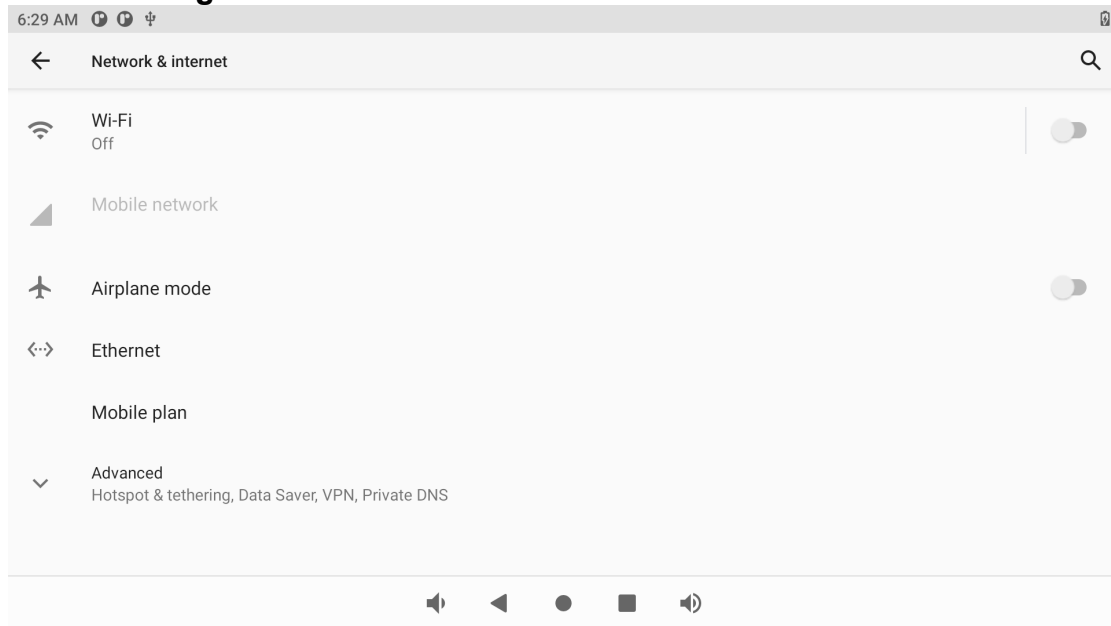


We take a test video for reference:

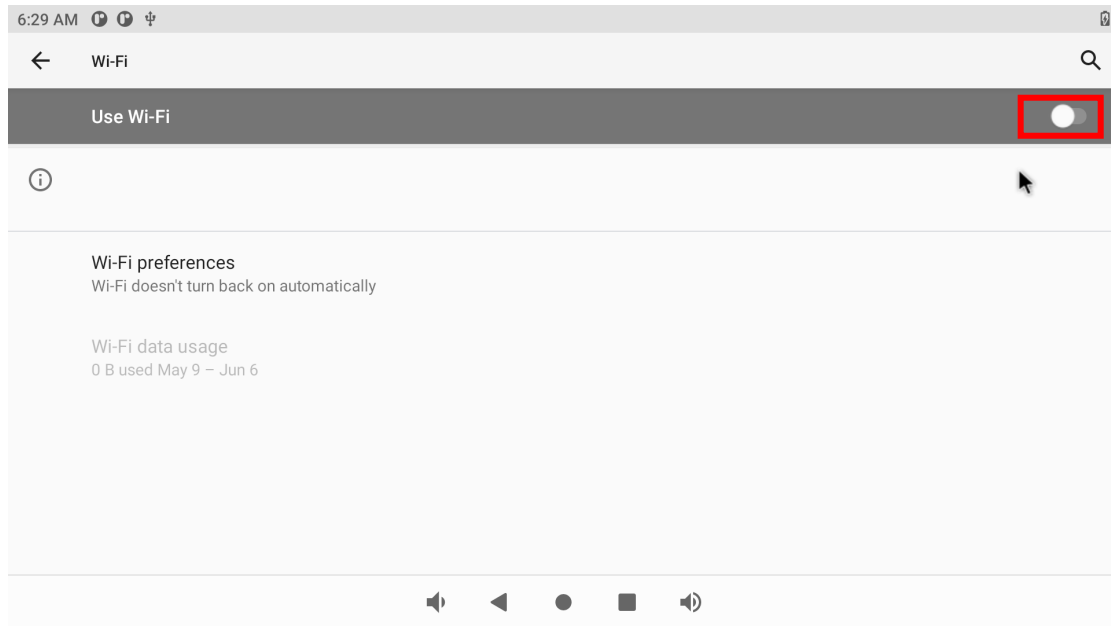
<https://drive.google.com/file/d/1xcQJclhnWp0p16vf72mxY2jougr-5U5U/view?usp=sharing>

4.1.9 The WiFi/BT

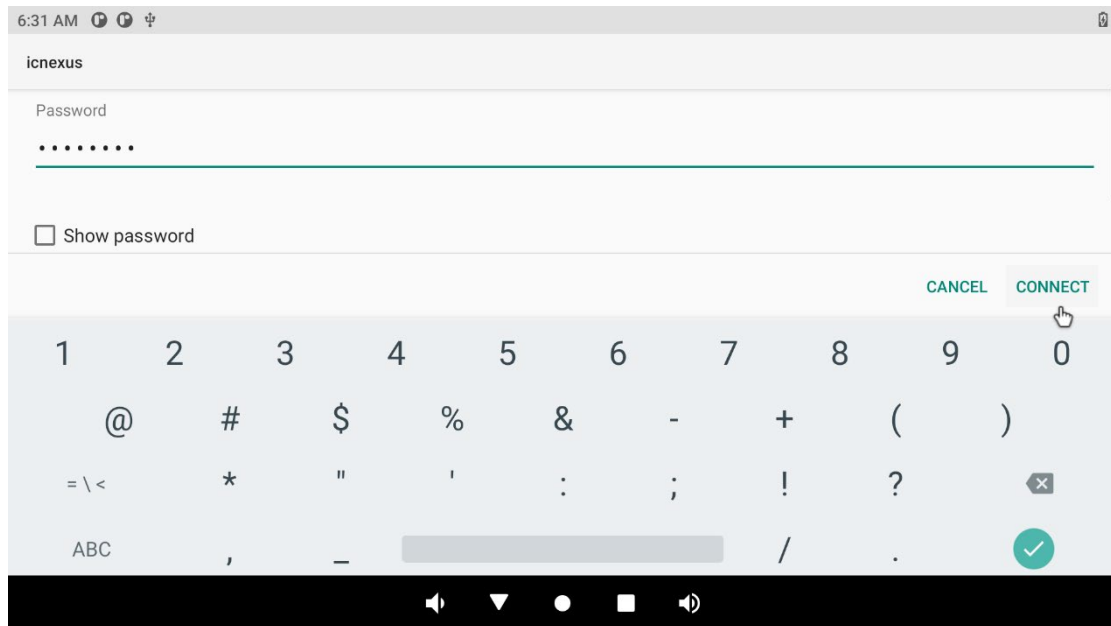
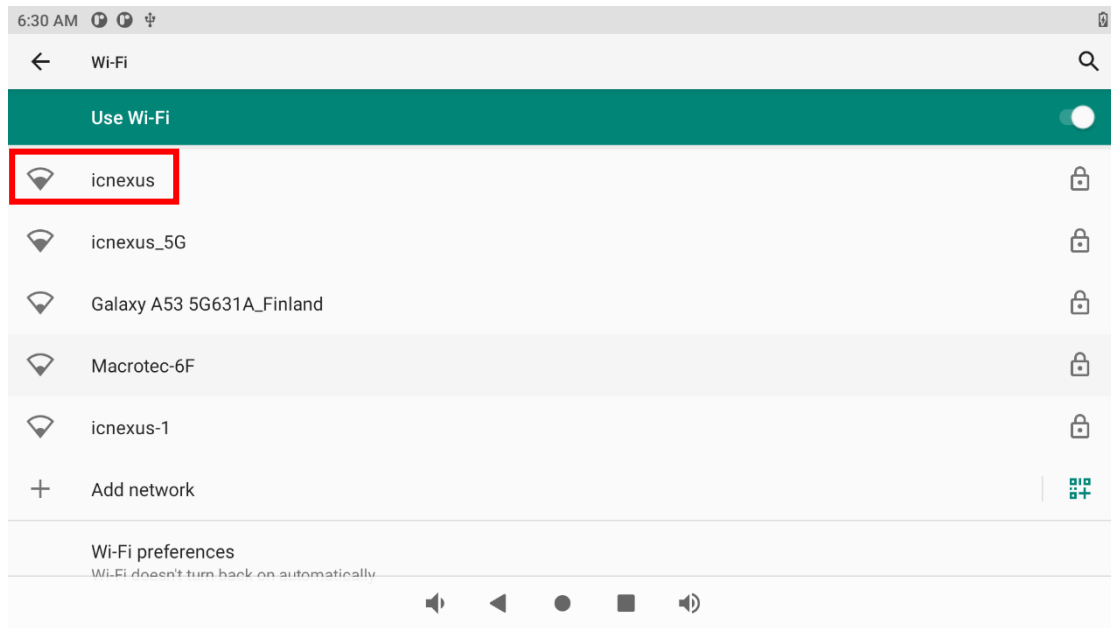
Go to “Settings” → “Network & internet” → “Wi-Fi”



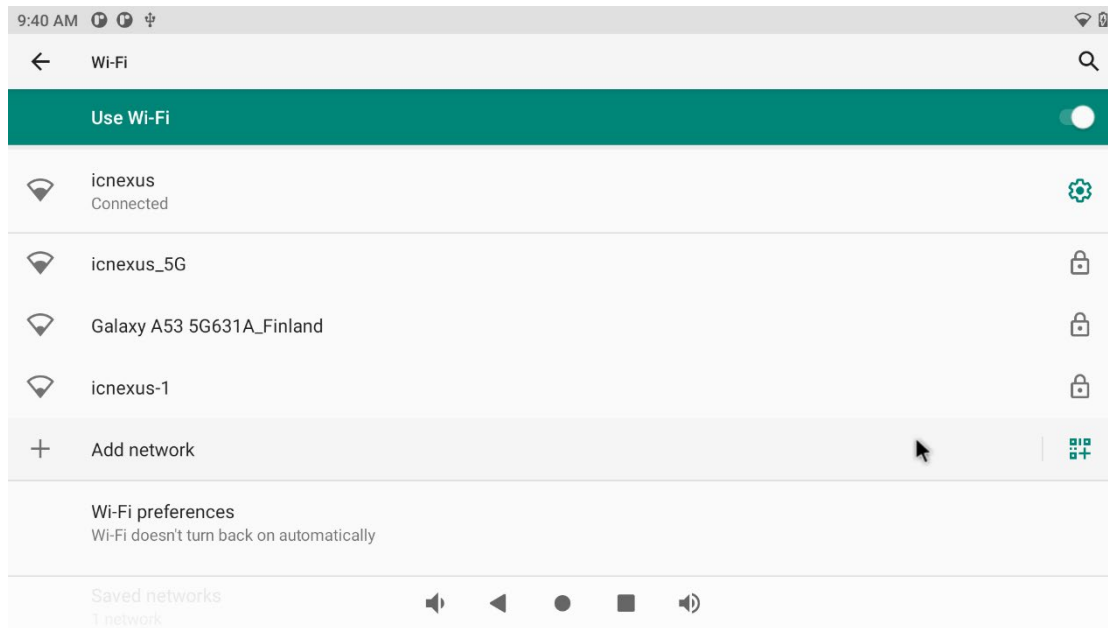
Enable WiFi button



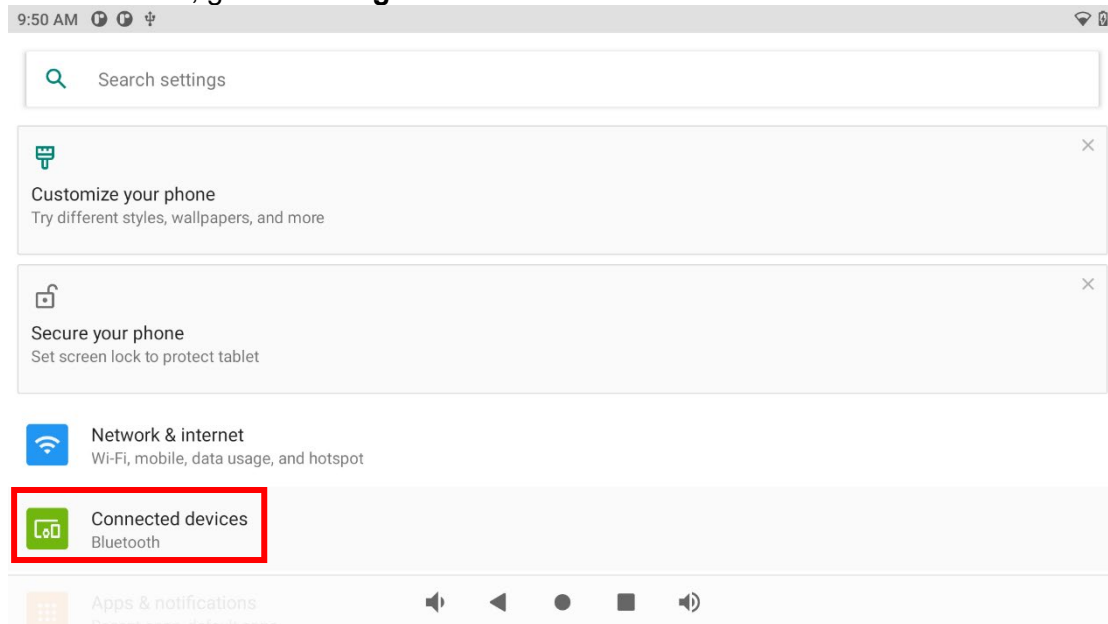
Choose your WiFi AP SSID name and input password



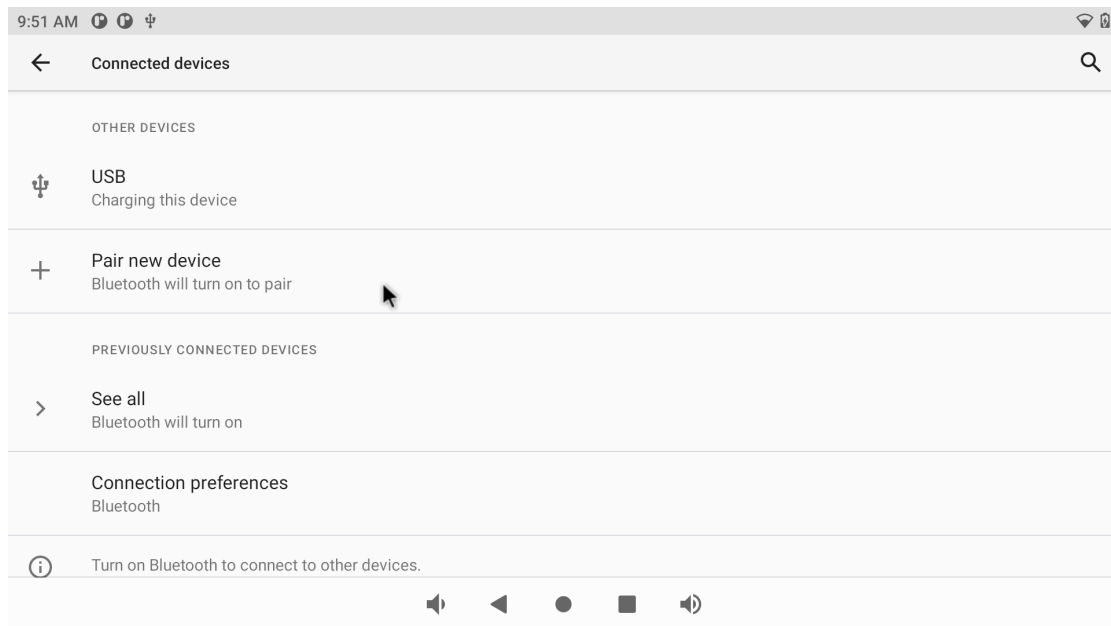
Connected success



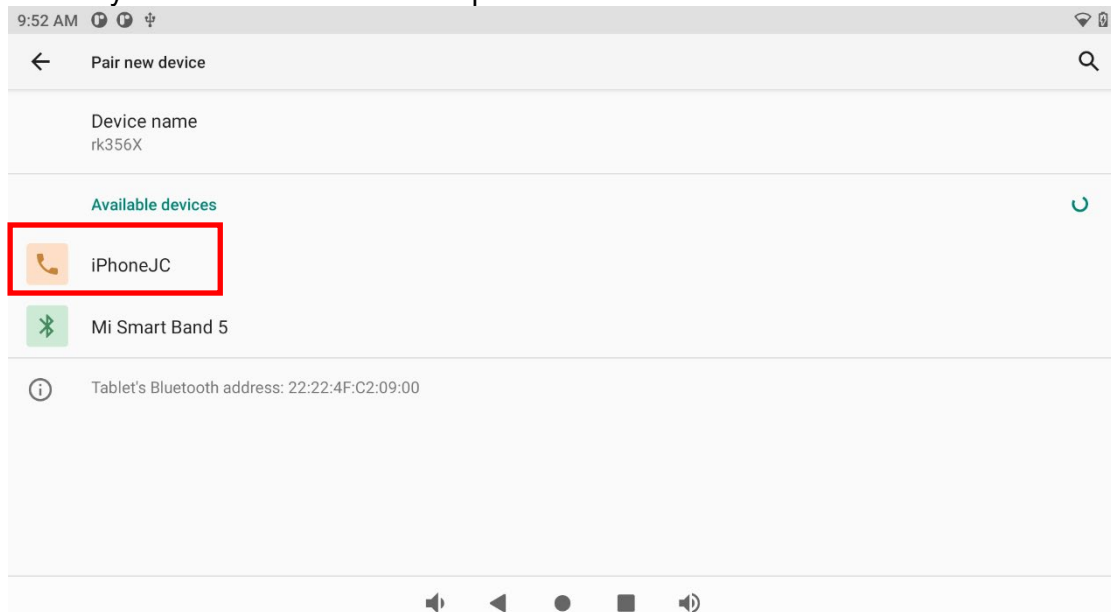
The Bluetooth, go to **“Settings”** → **“Connected devices”**



Choose **“ + Pair new devices ”**



Search your Bluetooth devices and pair it.



4.1.1 CAN bus test

=====CAN bus test=====

```
ip link set can0 type can bitrate 125000 dbitrate 2000000 fd on
ip link set can0 up
```

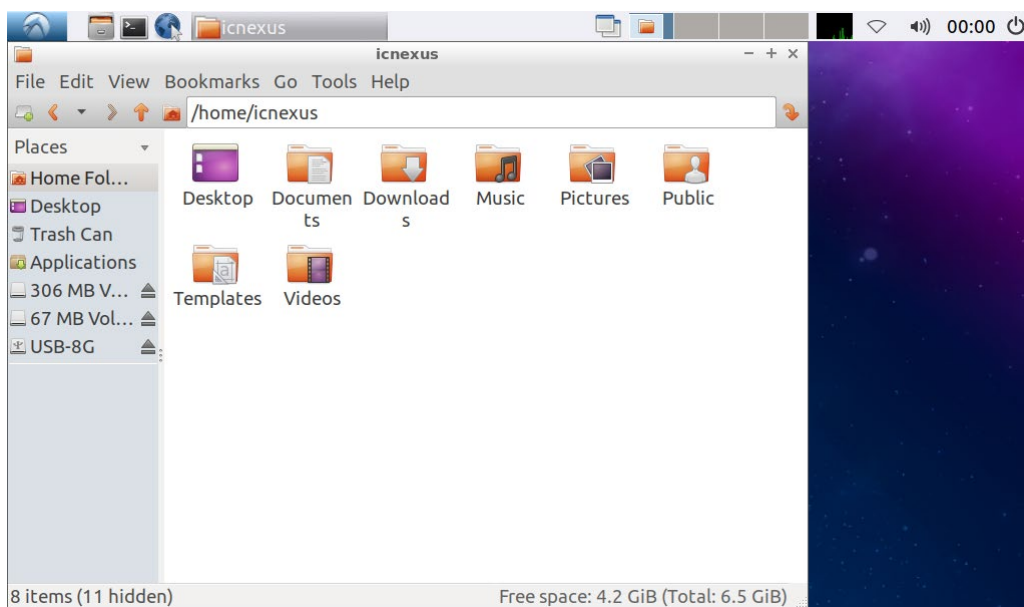
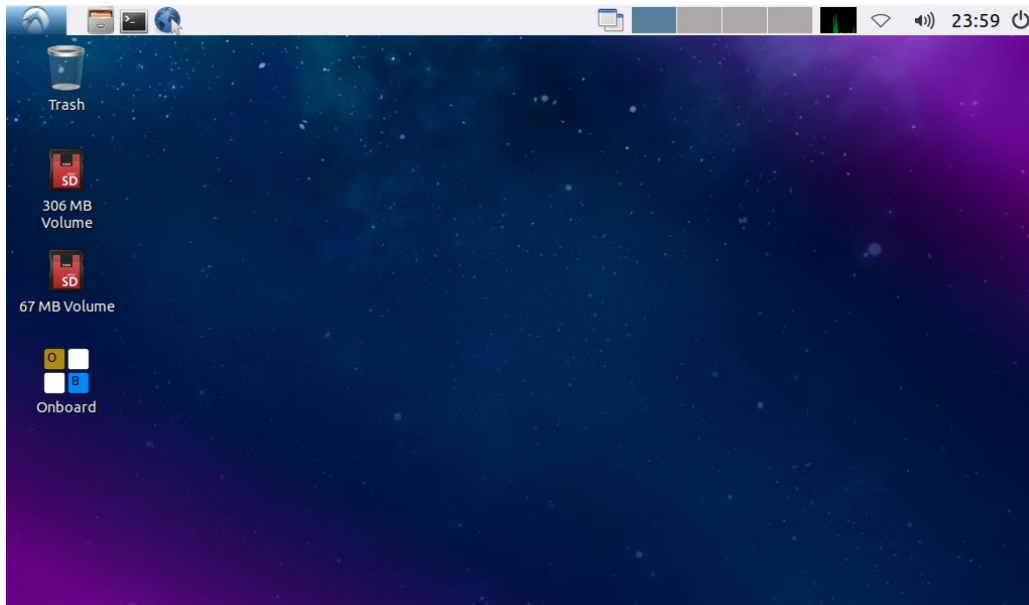
```
ip link set can1 type can bitrate 125000 dbitrate 2000000 fd on
ip link set can1 up
```

```
# CAN-FD
candump can0 &
cansend can1 012###1.00112233445566778899AABBCCDDEEFF
```


4.2 Ubuntu Linux

4.2.1 Linux Desktop

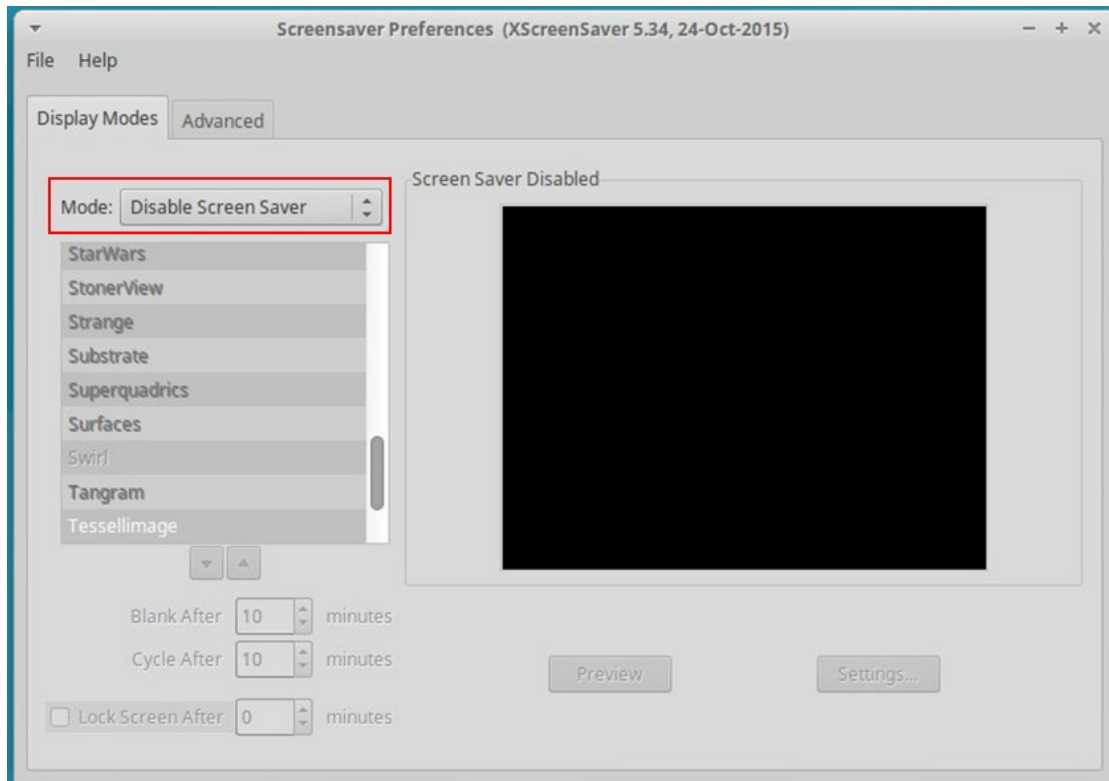
Find your Home folder, File System and external storage here.



4.2.2 Screensaver

Like Android, Ubuntu also has the sleep mode. To disable the sleep mode, you can go to **Settings** → **Screensaver Preference** → **Display Modes**.

Select the mode **Disable Screen Saver**.

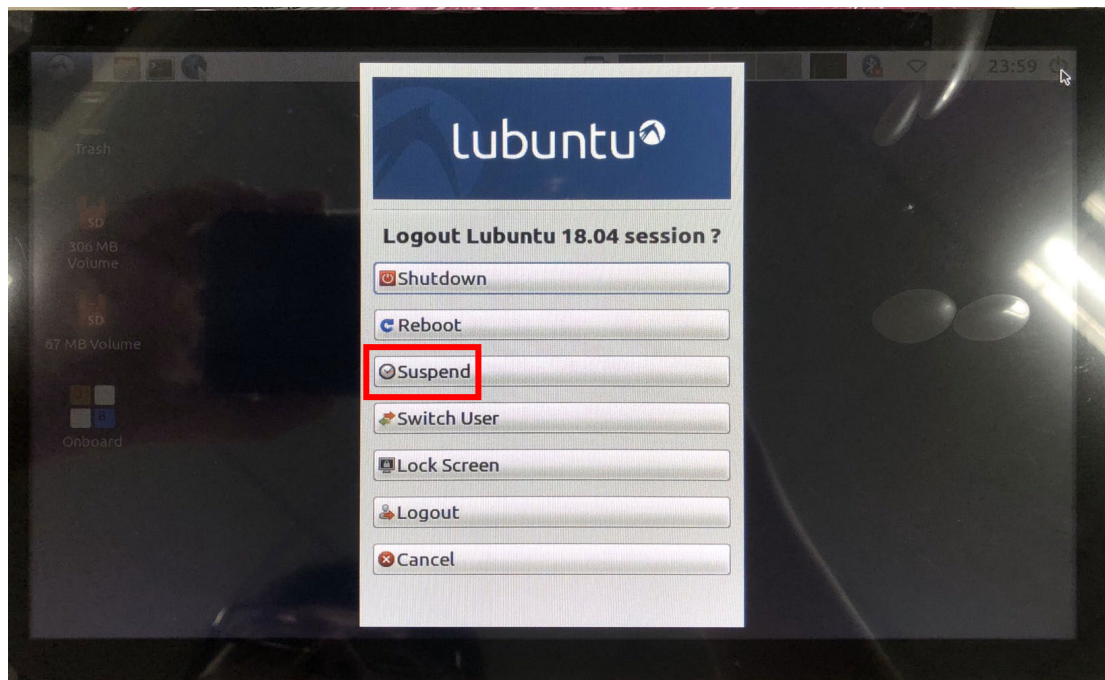


4.2.3 Power Button Switch(SW1)

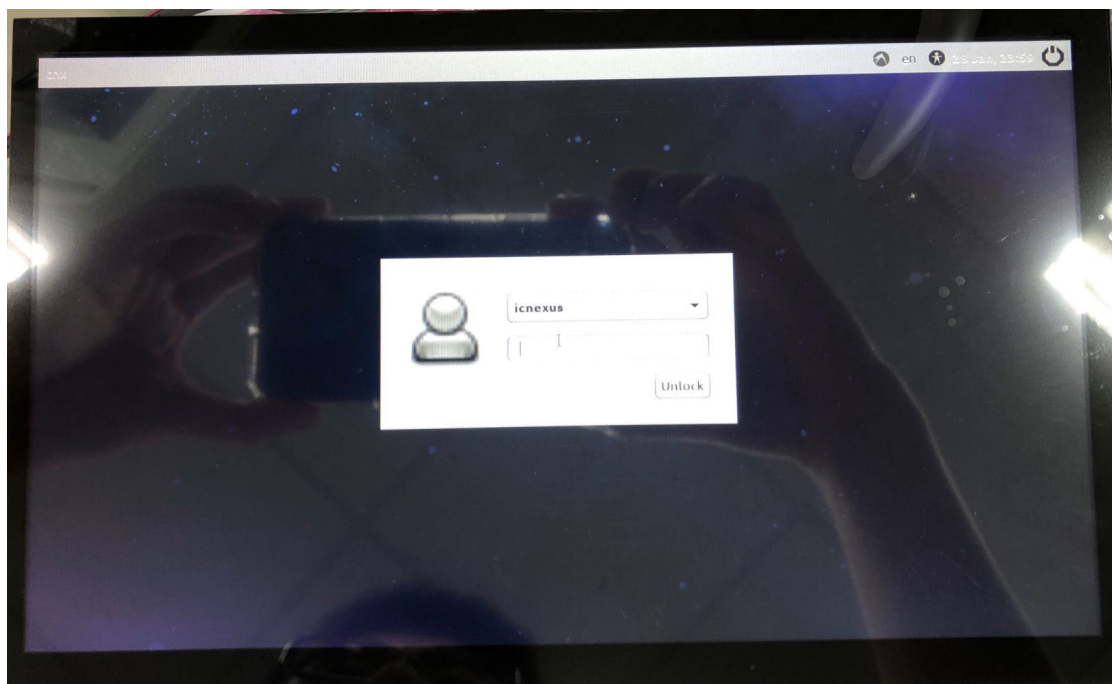
When DC power is applied to DC input connector, SBC will be turned on automatically.

SBC can be **Shutdown** if SW2 pin1 and pin2 are short for more than 2 seconds.

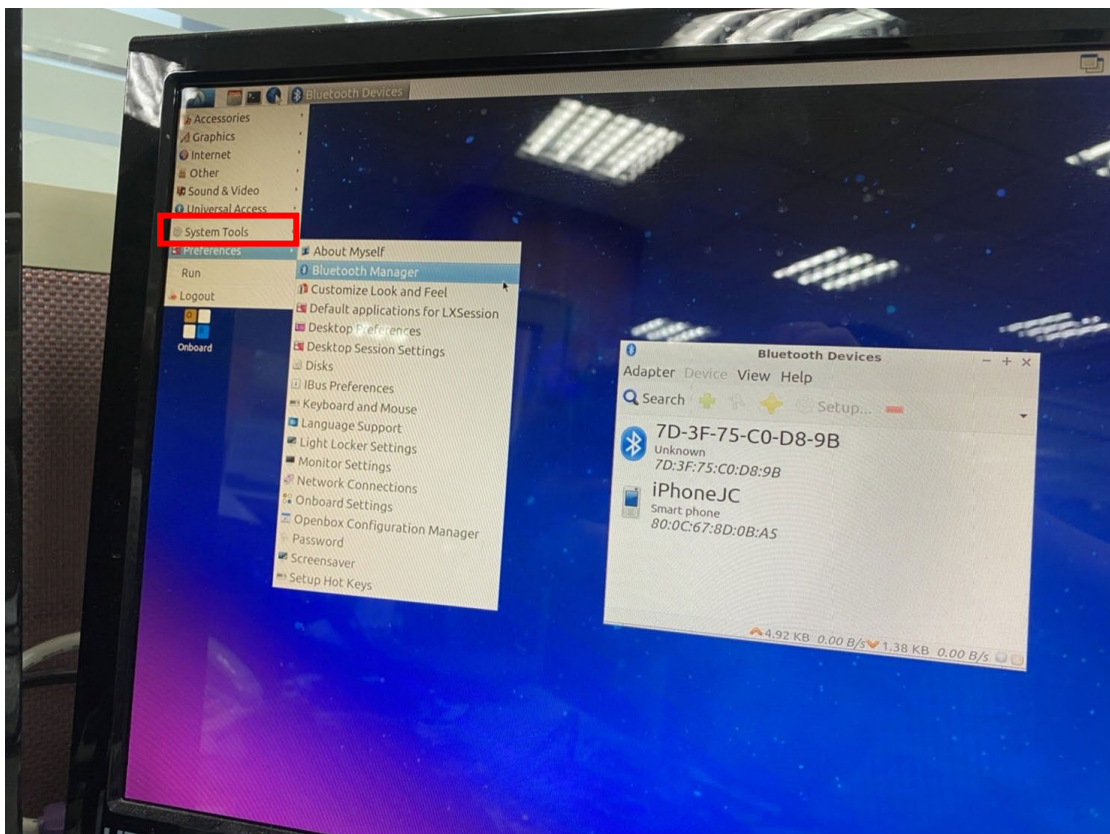
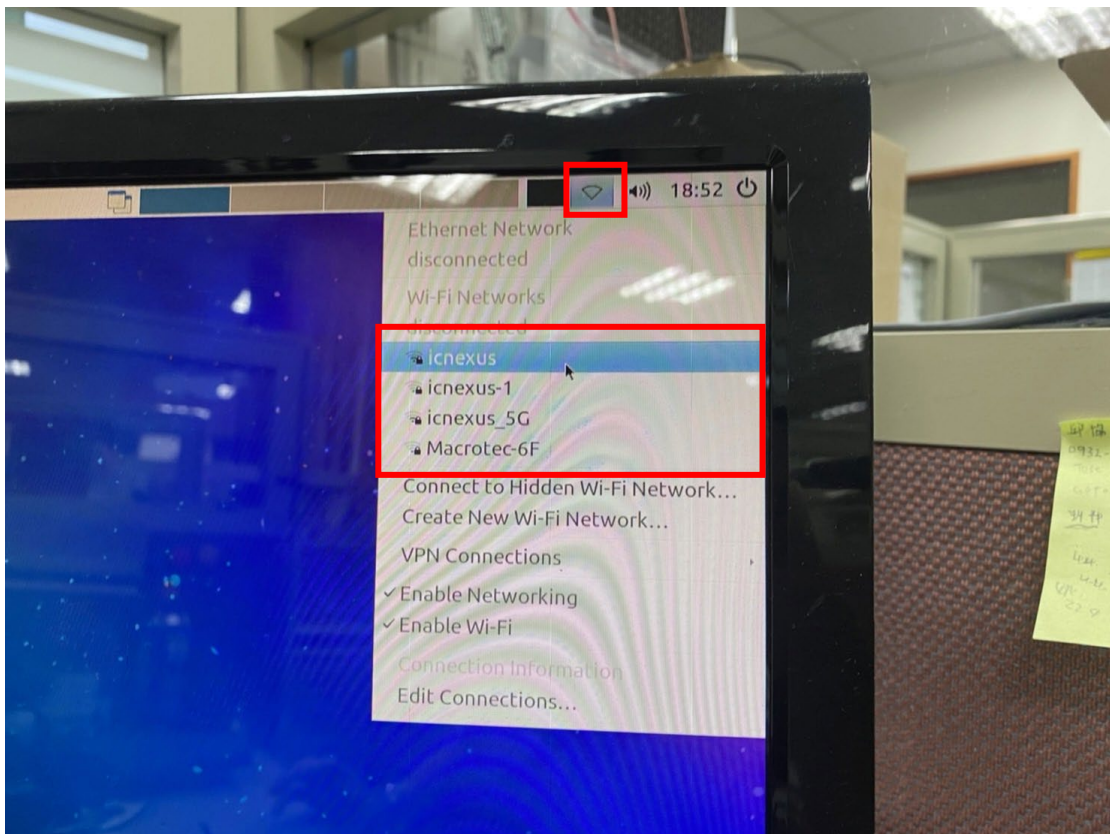
- Suspend Mode, if wake up processor from Suspend Mode,



Default user (**icnexus**), password: **i1234**



4.2.4 The WiFi/BT



4.2.5 Test COM port by command

=====RS232/RS485(CN35 CN36 CN28 CN32) test=====

CN32 RS232 ttyS5

CN35 RS232 ttyS3

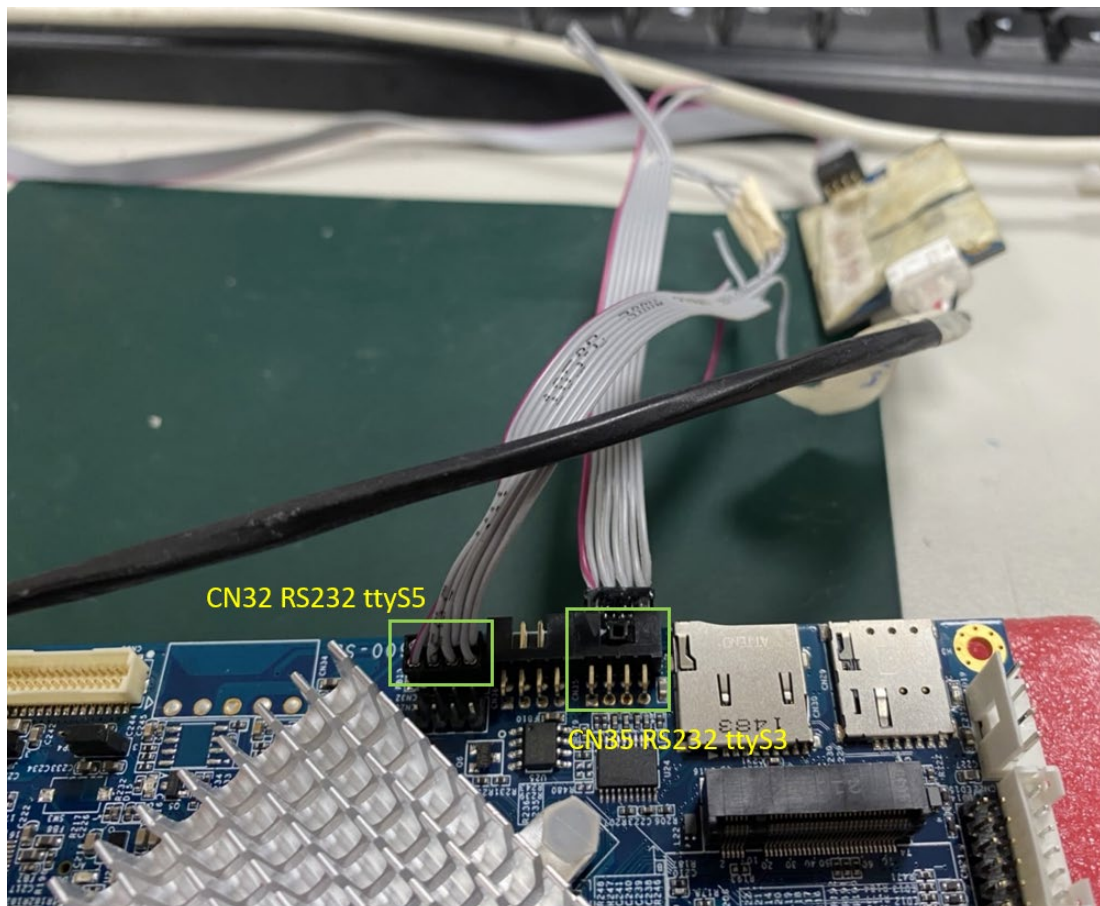
CN28 RS232 ttyS7

CN36 RS485 ttyS4

- RS232

cat /dev/ttyS3 &

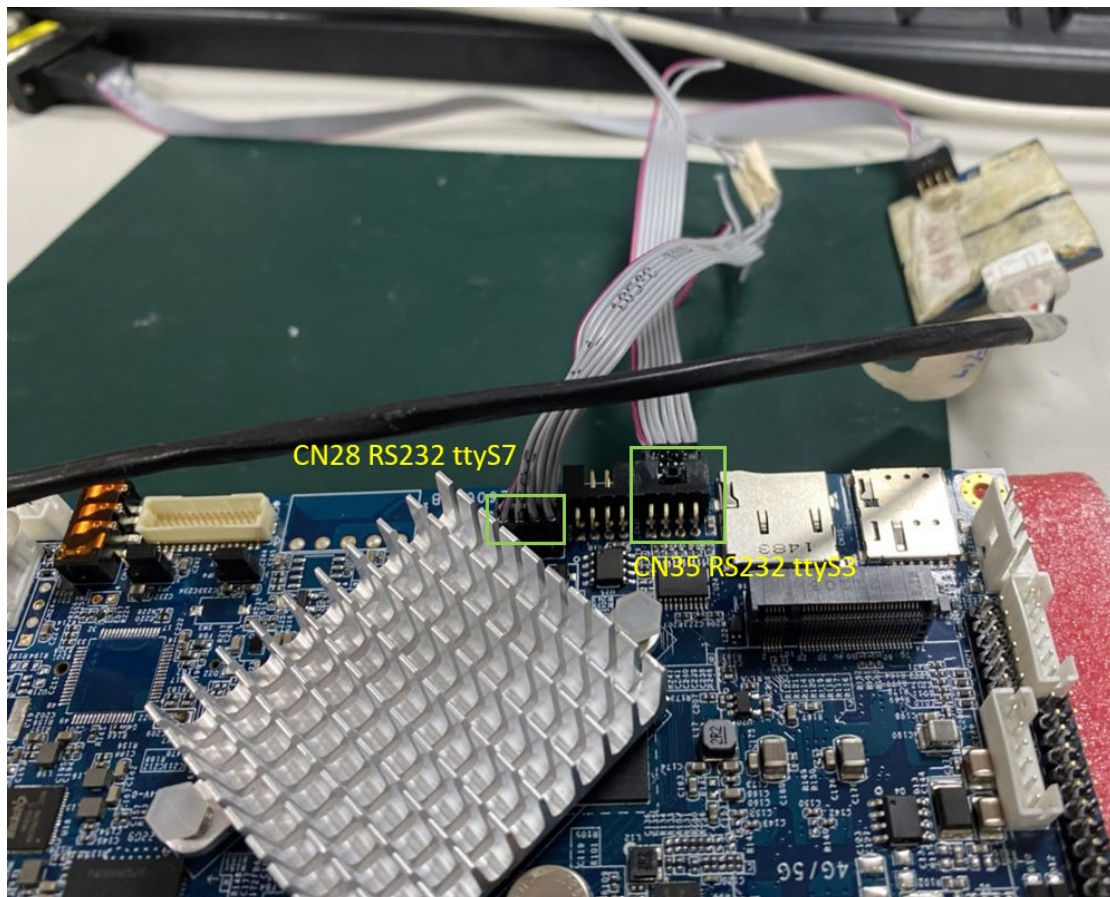
echo abcde > /dev/ttyS5



```
root@cnx:~# cat /dev/ttyS3 &
[1] 822
root@cnx:~# echo abcde > /dev/ttyS5
abcde
```

cat /dev/ttyS3 &

echo qwert > /dev/ttyS7



```
root@cnx:~# echo qwert > /dev/ttyS7
qwert
root@cnx:~# echo qwert > /dev/ttyS7
qwert
```

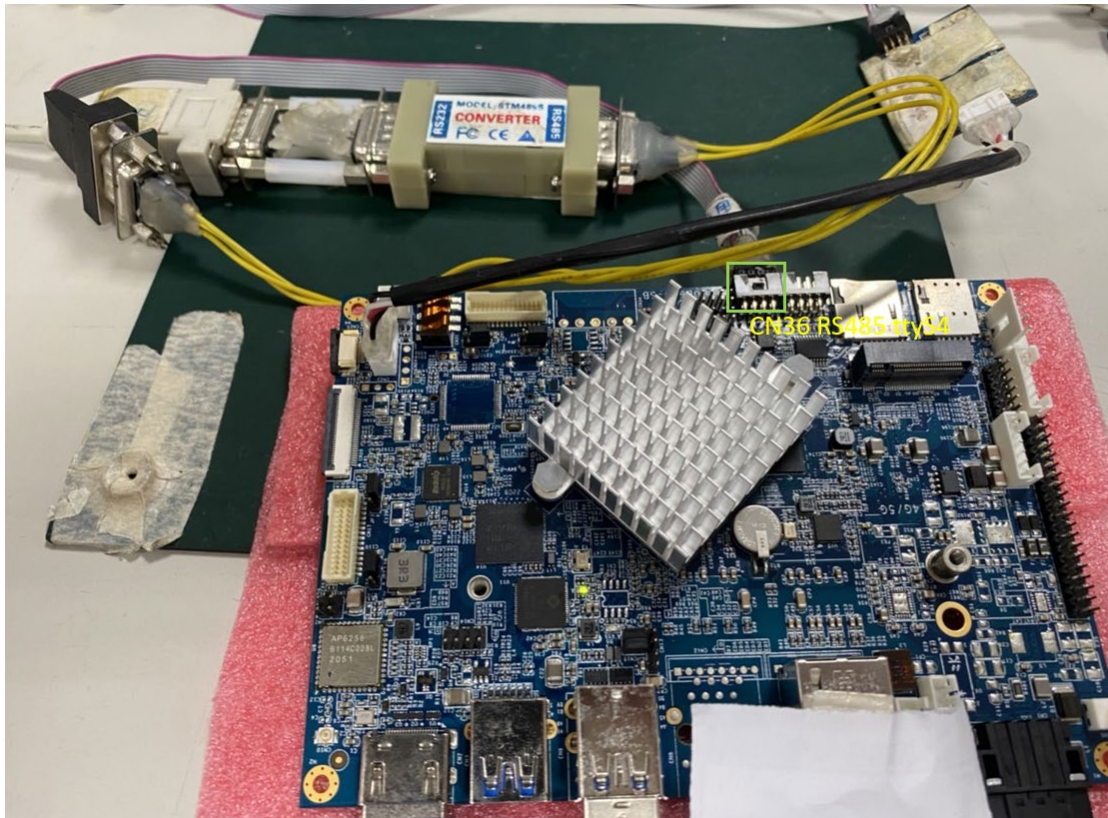
- RS485

```
# stty -F /dev/ttyS4
```

```
speed 9600 baud; line = 0;
```

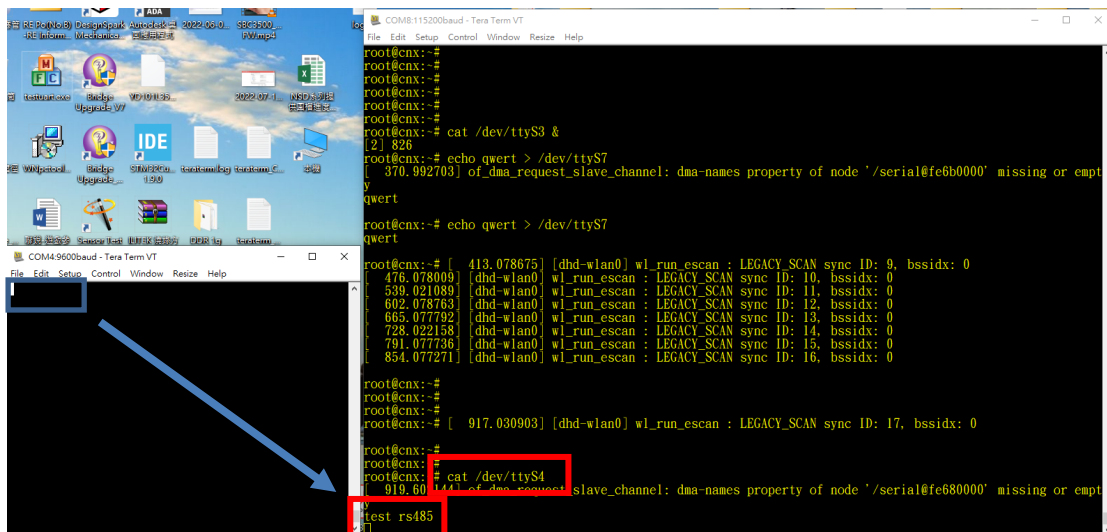
```
-brkint -imaxbel
```

```
// Baud rate is 9600
```



Default is to receive:

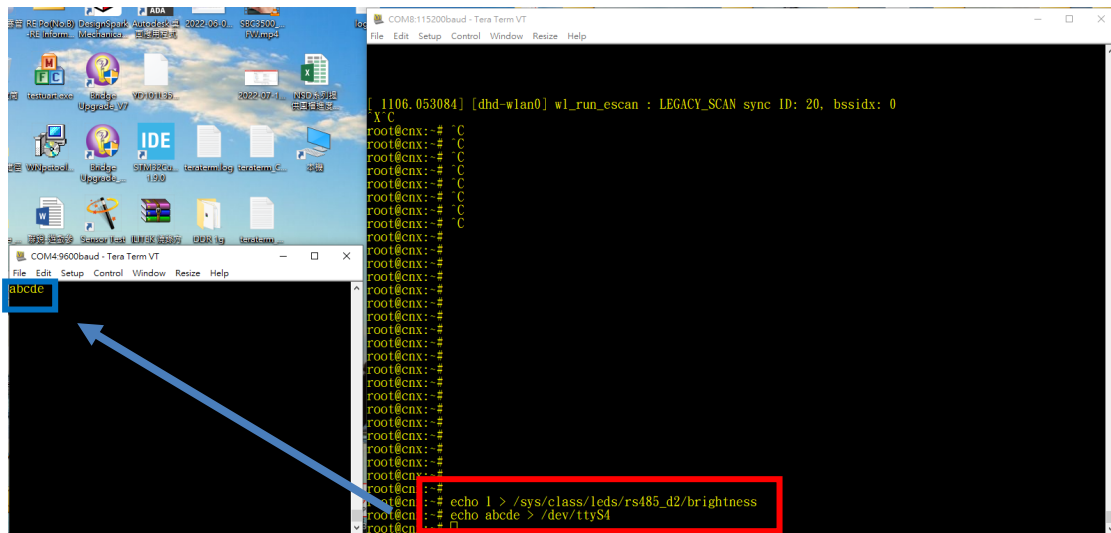
cat /dev/ttyS4



test transmission function(TX)

echo 1 > /sys/class/leds/rs485_d2/brightness

echo abcde > /dev/ttyS4



4.2.6 CAN bus test

=====CAN bus test=====

apt-get update

apt-get -y install can-utils

ip link set can0 type can bitrate 125000 dbitrate 2000000 fd on

ip link set can0 up

ip link set can1 type can bitrate 125000 dbitrate 2000000 fd on

ip link set can1 up

CAN-FD

candump can0 &

cansend can1

012##1.00112233445566778899AABBCCDDEEFF

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