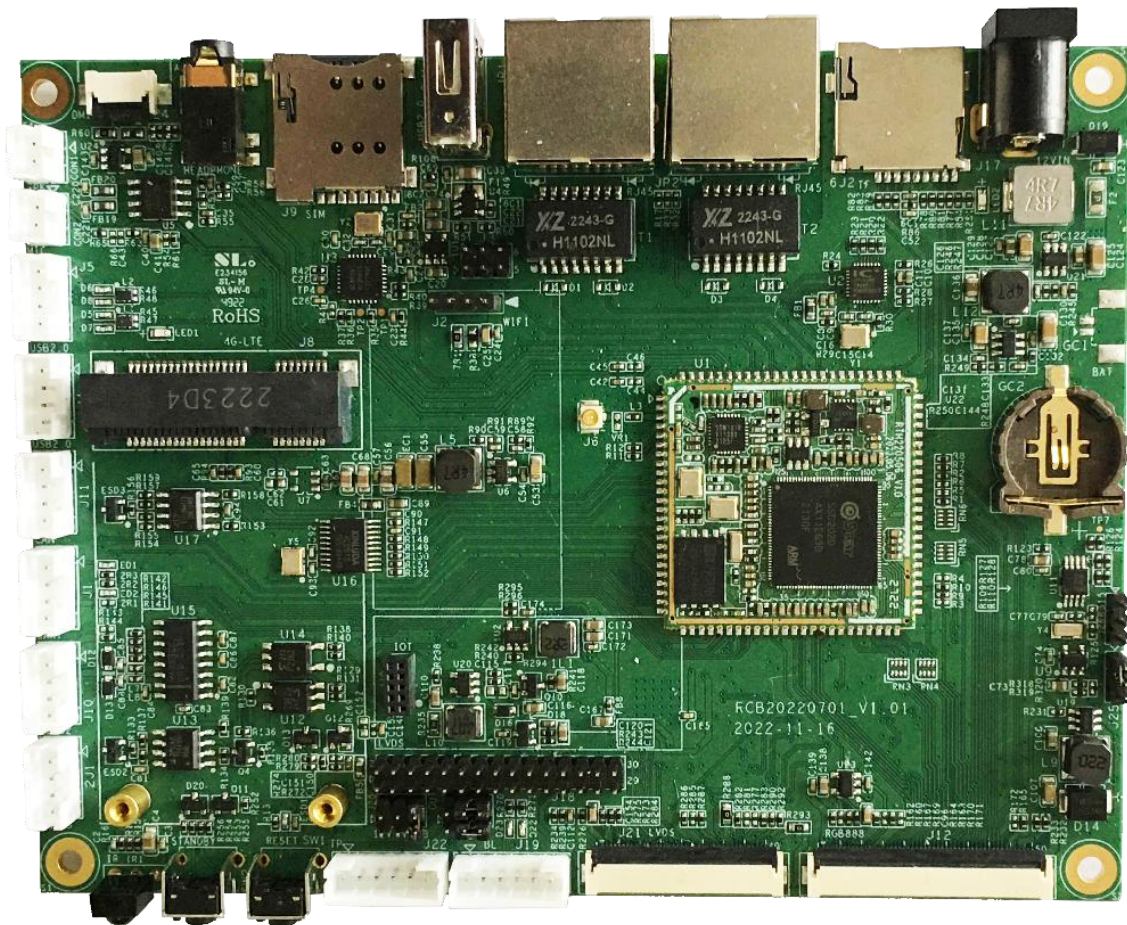


IoT Development Board User Manual

MODEL:DB202



Documentation

REVISION HISTORY					
No.	Chang cause	Chang version	Chang person	Chang DATA	Remark
1	Creating documentation	V1.0	WJ	2022-11-22	
2	Modify RS232 not available	V1.01	MK	2023-04-13	

This development test instruction mainly describes the test points, test steps, and environmental construction involved in the DB20x project test.

Website: www.geniatech.com

Address: Room 02-04, 10 / F, Block A, Building 8, Shenzhen International Innovation Valley, Dashi Road, Nanshan District, Shenzhen, Guangdong, China.

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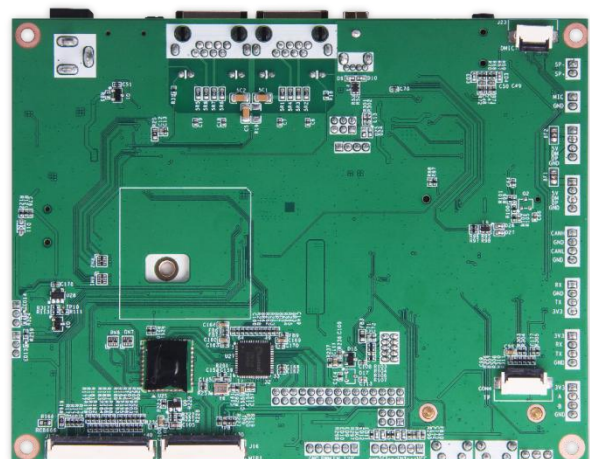
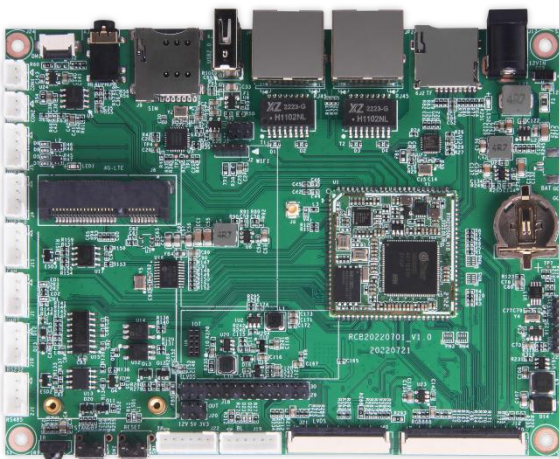
1. General Description

SSD20X is a highly integrated SoC chip from Sigmastar. It based on arm architecture (A7 dual core 1.2 GHz, integrates hardware H.264 / H.265 video decoder, built-in DDR, built-in 2 d graphics engine, support for TTL/MIPI display driver interface, built-in Ethernet MAC and PHY, etc., mainly used in intelligent building indoor machine, smart home control, small gateway, elevator floor indicator, the speech recognition application of household appliances, VOIP, coffee machine and so on many scenes with screen display.

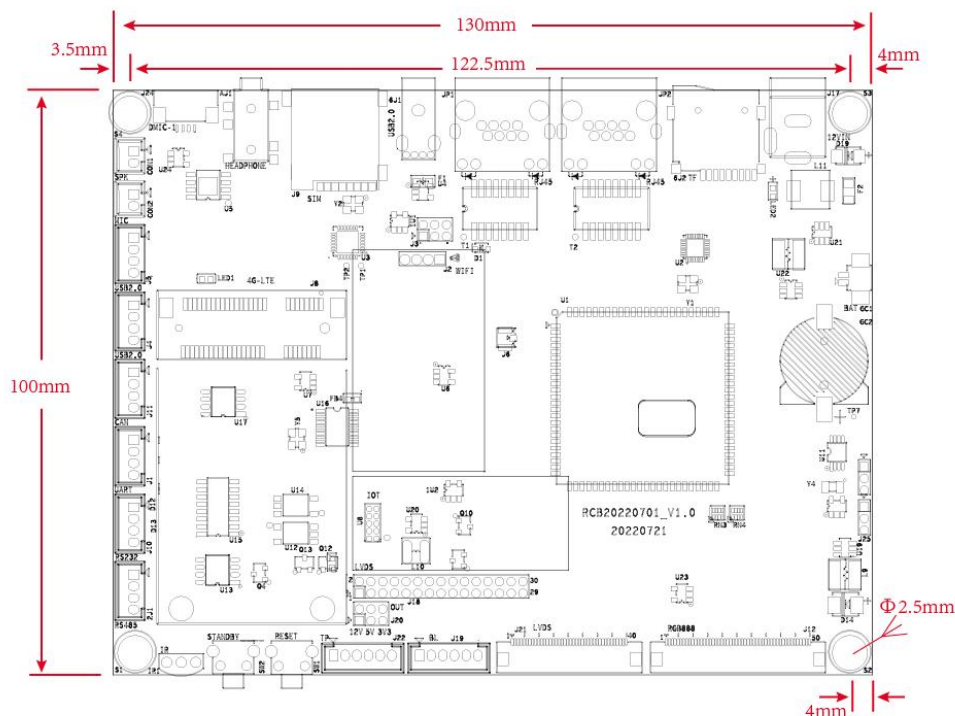
- Sigmastar SSD201/SSD202 with ARM Cortex-A7 Dual Core up to 1.2GHz
- 128MB RAM for SoM202 (64MB RAM for SoM201), 128MB/256MB Nand Flash
- Two 10/100M Ethernet
- Tiny Linux OS, 1s boot time
- Supports MIPI-DSI 4-lane interface. TTL supports the RGB666 or RGB888 format, and also supports the LVDS interface, with a maximum resolution of 1920 x 1080 FHD 60fps
- With rich interfaces such as I2C, UART, SPI, USB2.0, RMII, I2S(supports digital microphone array input), and others
- Support stereo input and output
- Support 8K/16K/48KHz sampling rate recording
- Stable operation at 0 °C-80 °C working temperature for 7X24 hours
- Designed for Commercial Application

2. Product pictures

Below pictures are for reference only:



3. Board view



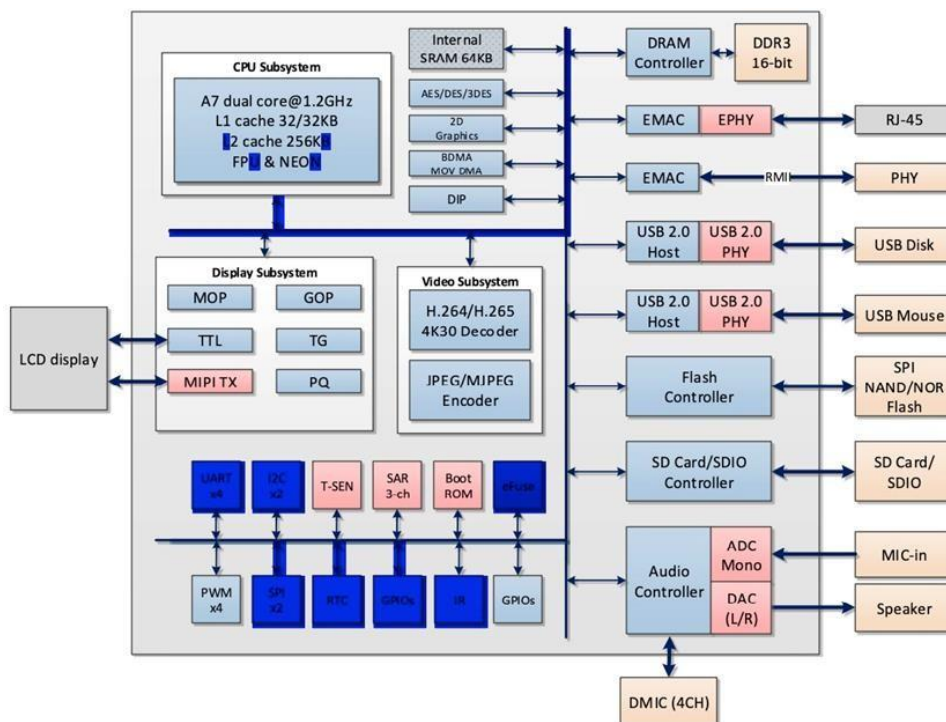
4. Features

CPU	Chip	SigmaStar SSD201/SSD202
	CPU Frequency	ARM® Cortex-A7 dual core up to 1.2GHz
Storage	Internal Memory	SoM202:DDR3 128MB SoM201: DDR2 64MB
	Internal Storage	1/2/4 bit SPI-NOR/SPI-NAND Flash 128MB/256MB/512MB
Network	2G/3G/4G/LTE	LTE for EU、LTE for AU、LTE for US(Optional)
	Built-in WiFi	802.11 a/b/g/n
	WiFi 2.4G Frequency Range	2.400~2.497GHz
	USB WiFi	Can delete built-in WiFi module,use external USB WiFi module.
	Ethernet port(LAN)	1*RJ45 10/100Mbps LAN(JP1) Default Ethernet port 1*RJ45 10/100Mbps (JP2),This network port is reused with the RGB display interface, and resistance hopping is required
Display	MIPI DSI	4-lane with max. 1.5Gbps and output up to FHD 60fps 30Pin FPC 0.5
	RGB	HD 60fps with RGB666 40Pin FPC 0.5
		HD 60fps with RGB888 format

		50Pin FPC 0.5
	LVDS	Compatible with VESA and JEIDA standard Resolution Up to 1920x1080 60Hz or any other Resolution whose Pixel Clk less than 200MHz 40Pin FPC 0.5
		Compatible with VESA and JEIDA standard Resolution Up to 1920x1080 60Hz or any other Resolution whose Pixel Clk less than 200MHz 2*15Pin 2.0
	LVDS voltage	12V/5V/3.3V selection 6Pin 2.0 ranking
Touch interface	Capacitive touch	6Pin2.0 ranking
		6Pin FPC 0.5
I/O interface	USB2.0	USB-A 2.0 x 1 Two 4Pin 2.0 ranking
	CAN	4Pin 2.0 ranking
	RS232	4Pin 2.0 ranking
	RS485	4Pin 2.0 ranking
	UART	4Pin 2.0 ranking
Protocol	RS485	TIA485/EIA-485-A -7~+12V
	CAN	ISO11898-2:2016 and SAE J2284-1 to SAE J2284-5 ESD Protection(8kV IEC and HBM) 5Mbit/s
	UART	IO level 3.3V
	RS232	±5~±15V
Audio interface	AMIC	8K/16K/32K/48KHz sampling rate
	DMIC	8K/16K/32K/48KHz sampling rate
	1 x LINEOUT	8K/16K/32K/48KHz sampling rate
IR Interface	1 x IR input	NEC code value
Extended interface	LEDs	Power
	SIM Slot	Micro SIM Card
	SD Card	Micro SD Card
	GTIoT	2*5P 1.27 socket
	Debug	4P 2.0 ranking
	Button	Reset,User-defined custom keys(Power Standby)
Power pack	Supply voltage	DC12V 2A (4.5V~18V)
	DC Interface	Φ5.5/2.1mm
	Energy	Within 3W(No display screen for reference only)
	RTC&Watchdog	3V
Environment	Operating temperature	0℃- 80℃
	Operating humidity	10%~90%

Mechanical properties	Size (mm)	130*100
	Net Weight (g)	90
Operating system(OS)	Linux kernel version: 4.9.84 UI flythings, littleVGL, miniGUI, QT	
Other	WiFi antenna	

5. Sigmastar SSD20x Diagram



6. Support Formats

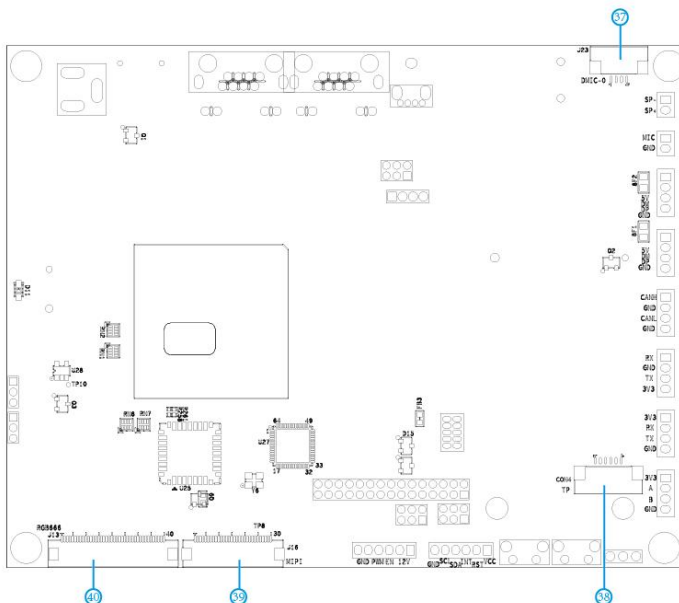
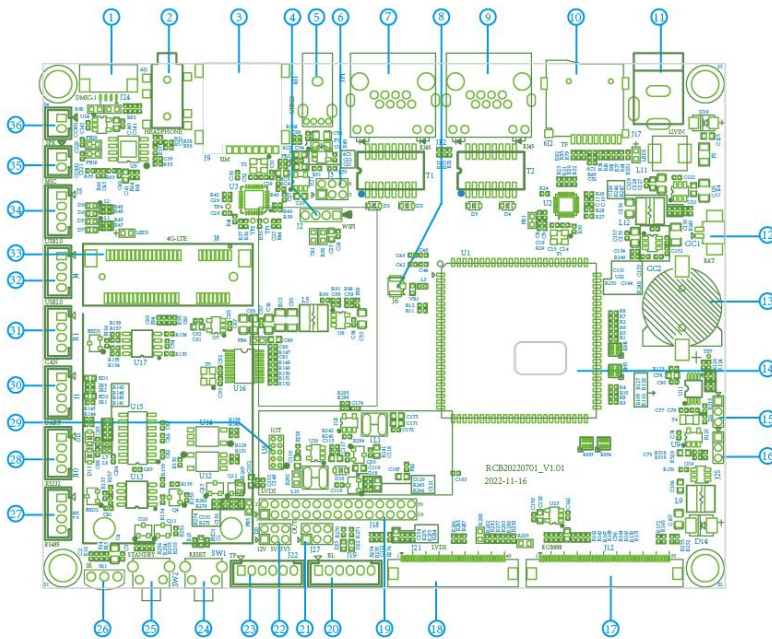
Video Decoder

- H.264/AVC Variable block size; CABAC/CAVLC; Support max.resolution FHD 1080P@60fps
- H.265/HEVC I/P/B slices; variable CTU size; High performance CABAC decoding; Support max.resolution FHD 1080P@60fps

JPEG Encoder

- Support JPEG baseline encoding
- Support YUV422 or YUV420 formats
- Support max. Resolution FHD(1920*1080) with 15fps

7. Extension GPIO definition

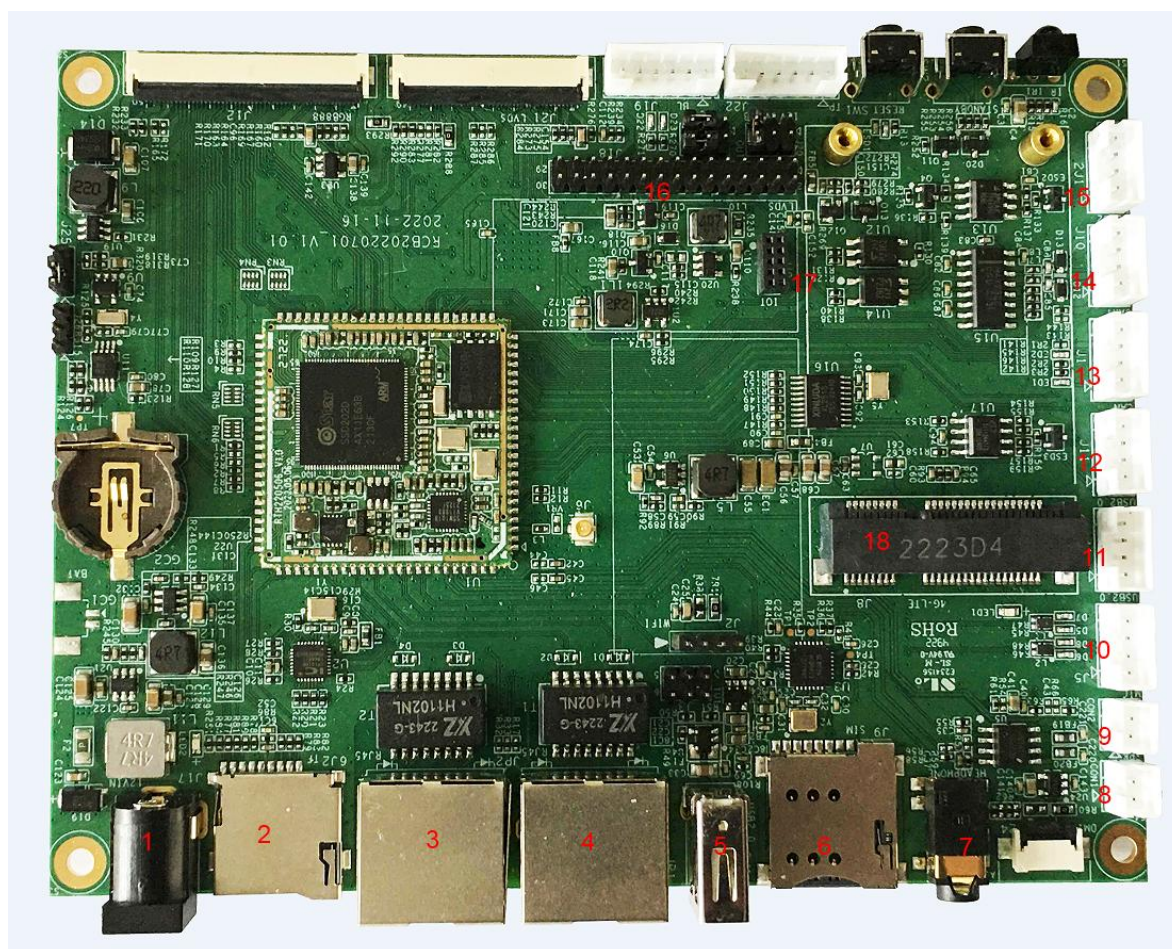


No.	Name	Description
1	DMIC interface	1*6Pin 0.5 FPC
2	Audio+Mic	1*3.5mm Jack
3	SIM Card Slot	1*Micro SIM Card
4	USB2.0-1	1*USB2.0 4Pin 2.0mm(For the USB WiFi modules)
5	USB2.0	1*USB2.0 Type A
6	USB2.0-1 Skipping selection	1* (2*3Pin 2.0mm)
7	LAN1	1*RJ45 10/100(LED)
8	WIFI ANT	1*IPXE Port
9	LAN2	1*RJ45 10/100(LED)
10	TF Card Slot	1*Micro SD Card
11	DC IN	1* DC IN (Φ5.5/2.1mm)
12	RTC Battery interface	1*2Pin
13	RTC Battery	CR1220 battery seat
14	SoM202	1*96Pin 1.0mm stamp package
15	WDT Function Selection	1*3Pin2.0mm
16	MIPI/LVDS Function Selection	1*3Pin2.0mm
17	RGB888	1*50Pin0.5mm FPC
18	LVDS	1*30Pin0.5mm FPC
19	LVDS	1*(2*15Pin2.0mm)
20	LCD Voltage	1*6Pin2.0mm
21	RS232/RS485 choose	1*(3*2Pin 2.0mm)
22	LCD Voltage choose	1*(3*2Pin 2.0mm)
23	I2C(TP)	1*6Pin2.0mm
24	Reset key	1*key
25	User-defined custom keys	1*key
26	IR Reception	1*IR
27	RS485	1*4Pin2.0mm
28	RS232	1*4Pin2.0mm
29	GTIoT	1*(2x5Pin1.27mm)
30	Debug UART	1*4Pin2.0mm
31	CAN	1*4Pin2.0mm
32	USB2.0-2	1*4Pin2.0mm
33	Mini PCIe	1*52Pin 8.5mm
34	USB2.0-3	1*4Pin2.0mm
35	AMIC	1*2Pin2.0mm
36	SPK	1*2Pin2.0mm
37	DMIC	1*6Pin0.5mm FPC
38	I2C(TP)	1*6Pin0.5mm FPC
39	MIPI	1*30Pin0.5mm FPC
40	RGB666	1*40Pin0.5mm FPC

8. Functional Testing

Description: This test guide focuses on the test points, test steps, and environment setup involved in DB20x project testing.

8.1 Hardware Interface Diagram

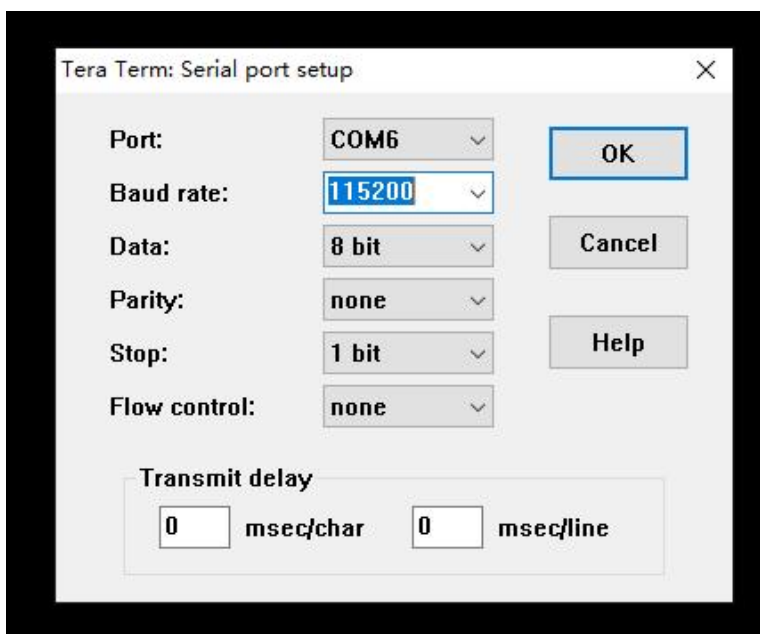
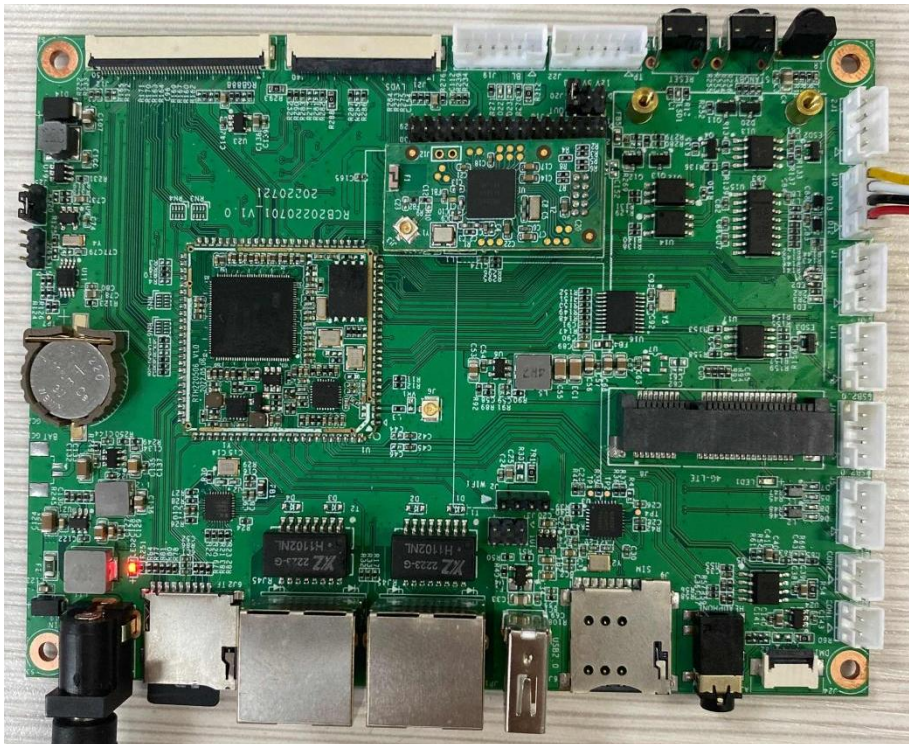


No.	Interface name	No.	Interface name
1	DC12V input	2	TF card
3	Ethernet 2(LAN2)	4	Ethernet 1(LAN1)
5	USB2.0	6	SIM card
7	Headphone jack	8	microphones
9	Speaker	10	USB2.0
11	USB2.0	12	CAN
13	Debug	14	RS485

15	RS232	16	LVDS
17	GTIoT	18	Mini PCIe--LTE module

8.2 Test Preparation:

Prepare a serial cable to connect the Debug port of the board to the PC, enter Device Manager->Ports of the PC to check the port number recognized by the system. Open the terminal debugging tool, select the corresponding port number and baud rate 115200.



8.3 WIFI Test

8.3.1 Connect to encrypted WiFi

Execute the `vi /appconfigs/wpa_supplicant.conf` directive for configuration

Press `i` to edit, add the following, and then type `:wq` to save the configuration

```
network={
    ssid="geniatech360"    // Name of the encrypted WiFi in the environment
    key_mgmt=WPA-PSK
    psk="geniatech1234" //WiFi password
}
```

```
ctrl_interface=/tmp/wifi/run/wpa_supplicant
update_config=1
network={
    ssid="geniatech360"
    key_mgmt=WPA-PSK
    psk="geniatech1234"
}
```

Execute the following command again:

```
cd /config/wifi/
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib:/lib:/config/wifi
./wpa_supplicant -Dnl80211 -i wlan0 -c /appconfigs/wpa_supplicant.conf -d &
udhcpc -q -i wlan0 -s /etc/init.d/udhcpc.script &
```

```
/config/wifi # Sending select for 192.168.0.76...
Lease of 192.168.0.76 obtained, lease time 172800
Setting IP address 192.168.0.[Sstar_log]:ieee80211_ifa_changed(wlan0):IPv4 enable,end_time(-148120)
76 on wlan0
Deleting routers
route: SIOCDELRT: No such process
Adding router 192.168.0.1
Recreating /appconfigs/resolv.conf
Adding DNS server 192.168.0.1
```

Once you have this printed, type `ifconfig` to see if wlan0 has an IP

```
/config/wifi # ifconfig
eth0      Link encap:Ethernet  HWaddr 00:70:27:00:00:01
          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 (0.0 B)  TX bytes:0 (0.0 B)
          Interrupt:35

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:8 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:656 (656.0 B)  TX bytes:656 (656.0 B)

wlan0     Link encap:Ethernet  HWaddr 24:14:07:BB:34:CC
          inet addr:192.168.0.76  Bcast:192.168.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:404 errors:0 dropped:21 overruns:0 frame:0
          TX packets:18 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:34220 (33.4 KiB)  TX bytes:5657 (5.5 KiB)
```

8.3.2 Connect to unencrypted WiFi

Go to configuration `vi /appconfigs/wpa_supplicant.conf`, add the following configuration, and then type `:wq` to save the configuration

```
network={
ssid="HUAWEI-H10V21" // Name of the unencrypted WiFi in the environment
key_mgmt=NONE
}
```

```
Sending discover.../wifi/run/wpa_supplicant
update_config=1
network={
    ssid="HUAWEI-H10V21"
    key_mgmt=NONE
```

Execute the following command again::

```
cd /config/wifi/
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib:/lib:/config/wifi
./wpa_supplicant -Dnl80211 -i wlan0 -c /appconfigs/wpa_supplicant.conf -d &
udhcpc -q -i wlan0 -s /etc/init.d/udhcpc.script &
```

```
2 on wlan0
Deleting routers
route: SIOCDELRT: No such process
Adding router 192.168.3.1
Recreating /appconfigs/resolv.conf
3 Adding DNS server 192.168.3.1
[1]+ Done udhcpc -q -i wlan0 -s /etc/init.d/udhcpc.script
/config/wifi #
```

With this printed, type `ifconfig` to see if `wlan0` has an IP

```
/config/wifi # ifconfig
eth0      Link encap:Ethernet  HWaddr 00:70:27:00:00:01
          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 (0.0 B)  TX bytes:0 (0.0 B)
          Interrupt:35

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:8 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:656 (656.0 B)  TX bytes:656 (656.0 B)

wlan0     Link encap:Ethernet  HWaddr 24:14:07:BB:34:CC
          inet addr:192.168.3.22  Bcast:192.168.3.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:88 errors:0 dropped:81 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:5229 (5.1 KiB)  TX bytes:758 (758.0 B)
```


8.4 Ethernet Test

Test preparation: a network cable



8.4.1 Ethernet-JP1 Port Network Test

After powering up, connect the network cable to the JP1 port and enter ifconfig to check whether the eth0 node has acquired the IP address.

```
/ # ifconfig
eth0      Link encap:Ethernet  HWaddr 00:70:27:00:00:01
          inet addr:192.168.1.124  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:2 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:684 (684.0 B)  TX bytes:656 (656.0 B)
          Interrupt:35

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:24 errors:0 dropped:0 overruns:0 frame:0
          TX packets:24 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:1968 (1.9 KiB)  TX bytes:1968 (1.9 KiB)

wlan0     Link encap:Ethernet  HWaddr 24:14:07:BB:34:CC
          inet addr:192.168.3.22  Bcast:192.168.3.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:446 errors:0 dropped:378 overruns:0 frame:0
          TX packets:7 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:33361 (32.5 KiB)  TX bytes:1006 (1006.0 B)
```

1) Execute the command **ping 110.242.68.66** to test the network connection.

```
/ # ping 110.242.68.66
PING 110.242.68.66 (110.242.68.66): 56 data bytes
64 bytes from 110.242.68.66: seq=0 ttl=46 time=34.484 ms
64 bytes from 110.242.68.66: seq=1 ttl=47 time=89.859 ms
64 bytes from 110.242.68.66: seq=2 ttl=46 time=33.960 ms
64 bytes from 110.242.68.66: seq=3 ttl=47 time=96.248 ms
64 bytes from 110.242.68.66: seq=4 ttl=46 time=34.114 ms
64 bytes from 110.242.68.66: seq=5 ttl=47 time=89.552 ms
64 bytes from 110.242.68.66: seq=6 ttl=46 time=33.349 ms
64 bytes from 110.242.68.66: seq=7 ttl=46 time=35.180 ms
64 bytes from 110.242.68.66: seq=8 ttl=46 time=35.534 ms
64 bytes from 110.242.68.66: seq=9 ttl=46 time=33.215 ms
64 bytes from 110.242.68.66: seq=10 ttl=46 time=33.656 ms
64 bytes from 110.242.68.66: seq=11 ttl=46 time=35.507 ms
64 bytes from 110.242.68.66: seq=12 ttl=46 time=33.298 ms
```

8.4.2 Ethernet-JP2 Port Network Test Connect

The network cable to the JP2 port after powering on the network.

Execute the **ifconfig eth1 up** command to turn on the node, then enter **ifconfig** to see if the eth1 node is turned on

Execute **udhcpc -q -i eth1** to get the IP address.

```
/ # ifconfig eth1 up
/ # udhcpc -q -i eth1Sending discover...

udhcpc (v1.20.2) started
Sending discover...
Sending discover...
Sending discover...
Sending select for 192.168.1.114...
Lease of 192.168.1.114 obtained, lease time 86400
/usr/share/udhcpc/default.script: Resetting default routes
route: SIOCDELRT: No such process
/usr/share/udhcpc/default.script: Adding DNS 192.168.1.1
```

Execute the command **ping 110.242.68.66** to test the network connection.

8.5 TF Card Test

- 1) Test Preparation: One TF card
- 2) Insert the TF card into the card slot (see hardware schematic)
- 3) Run **fdisk -l** to view partitions

```
/ # fdisk -lSending discover...

Disk /dev/mmcblk0: 1999 MB, 1999110144 bytes
25 heads, 24 sectors/track, 6507 cylinders
Units = cylinders of 600 * 512 = 307200 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1      1           6508     1952191+    6  FAT16
```

Execute **df -h** to view the mount

```
/ # df -h
Filesystem      Size      Used Available Use% Mounted on
ubi:rootfs      103.3M    10.1M      93.2M    10% /
devtmpfs        30.9M      0         30.9M     0% /dev
tmpfs           30.9M      4.0K      30.9M     0% /tmp
var             30.9M      0         30.9M     0% /var
vendor          30.9M      0         30.9M     0% /vendor
mdev            30.9M      0         30.9M     0% /dev
ubi0:miservice   7.5M       5.3M       2.2M     71% /config
ubi0:customer    58.9M     52.2M       6.7M     89% /customer
ubi0:appconfigs   2.0M      28.0K       2.0M     1% /appconfigs
/dev/mmcblk0p1   1.9G     32.0M       1.8G     2% /mnt/sdcard
```

8.6 Headset, Speaker, Microphone(headset mic and 2 Pin mic)

8.6.1 Microphone (Headset Mic/2pin Mic)

Test preparation: headset with microphone * 1, 2pin microphone * 1 (separate test, do not connect the headset and microphone at the same time)

8.6.2 Recording:

Execute the `/customer/prog_audio_all_test_case -t 30 -l -o /tmp -d 0 -c 1 -v 20 -s 8000` command to record (try to place the microphone as close to the source as possible when testing)

```
/ #
/ # /customer/prog_audio_all_test_case -t 30 -l -o /tmp -d 0 -c 1 -v 20 -s 8000
AI param:client [942] connected, module:sys

AI OutPut Pathclient [942] connected, module:ai
:/tmp
Device:Am[AUDIO ERROR]DrvAudApiDtsInit, Failed to gpio_request amp-gpio !
ic
ChnNum:1
Mo[AUDIO ERROR]DrvAudApiDtsInit, IS_MHAL_SUPPORT_ES_CODEC=0.
de:Mono
Aed:Disable
Vqe working sample rate:not specified
Aec:Disable
Hpf:Disable
Nr:Disable
Agc:Disable
Eq:Disable
Ssl:Disable
Bf:Disable
Resample:Disable
Aenc:Disable
3049 Start test: MI_SYS_Init()
AUDIO_TEST [3049] MI_SYS_Init() exec function pass
3049 End test: MI_SYS_Init()
3057 Start test: initAi()
OutputName:/tmp/Chn0_Amic_0K_[_MI_AI_Init:3145] Init Ai Gain.
16bit_MONO.wav
[ _MI_AI_IMPL_AllocTmpBuffer:3596] tmp buffer addr[caa7d000].
2029 Start test: MI_AI_SetPubAttr(AiDevId, sstAiSetAttr)
AUDIO_TEST [2029] MI_AI_SetPubAttr(AiDevId, sstAiSetAttr) exec function pass
2029 End test: MI_AI_SetPubAttr(AiDevId, sstAiSetAttr)
2035 Start test: MI_AI_GetPubAttr(AiDevId, sstAiGetAttr)
AUDIO_TEST [2035] MI_AI_GetPubAttr(AiDevId, sstAiGetAttr) exec function pass
2035 End test: MI_AI_GetPubAttr(AiDevId, sstAiGetAttr)
2041 Start test: MI_AI_Enable(AiDevId)
  _MI_AI_OpenAecLib: success
  _MI_AI_OpenVqeLib: success
  _MI_AI_OpenSrcLib: success
  _MI_AI_OpenG711Lib: success
  _MI_AI_OpenG726Lib: success
  _MI_AI_OpenAedLib: success
  _MI_AI_OpenSslLib: success
  _MI_AI_OpenBfLib: success
AUDIO_TEST [2041] MI_AI_Enable(AiDevId) exec function pass
2041 End test: MI_AI_Enable(AiDevId)
2070 Start test: MI_AI_SetVqeVolume(AiDevId, u32ChnIdx, s32AiVolume)
AUDIO_TEST [2070] MI_AI_SetVqeVolume(AiDevId, u32ChnIdx, s32AiVolume) exec function pass
2070 End test: MI_AI_SetVqeVolume(AiDevId, u32ChnIdx, s32AiVolume)
2123 Start test: MI_SYS_SetChnOutputPortDepth(sstAiChnOutputPort0[u32ChnIdx], 1, TOTAL_BUF_DEPTH)
AUDIO_TEST [2123] MI_SYS_SetChnOutputPortDepth(sstAiChnOutputPort0[u32ChnIdx], 1, TOTAL_BUF_DEPTH)
exec function pass
2123 End test: MI_SYS_SetChnOutputPortDepth(sstAiChnOutputPort0[u32ChnIdx], 1, TOTAL_BUF_DEPTH)
2128 Start test: MI_AI_EnableChn(AiDevId, u32ChnIdx)
AUDIO_TEST [2128] MI_AI_EnableChn(AiDevId, u32ChnIdx) exec function pass
2128 End test: MI_AI_EnableChn(AiDevId, u32ChnIdx)
create ai thread.
AUDIO_TEST [3057] initAi() exec function pass
3057 End test: initAi()
```


8.6.3 Headphones/Speakers

Test preparation: headset * 1, speaker * 1, according to the hardware schematic diagrams show connected (separate test, do not access the speaker and headset at the same time)

Play local music:

Use the cd command to enter the file location of the music being played (as shown below, my music is stored in cd /mnt/udisk/sda1/music/wav), and execute the command, as follows

/customer/prog_audio_all_test_case -t 30 -O -i 101-re~1.wav -D 0 -V 0

(Note: 101-re~1.wav is the name of the music played, please change it to the name of the actual music played during the test, and it only supports playing music in wav format)

```

/mnt/udisk/sda1/music/wav #
/mnt/udisk/sda1/music/wav # /customer/prog_audio_all_test_case -t 30 -O -i 101-r
~1.wav -D 0 -V 0Sending discover...

Ao Param:client [996] connected, module:sys

AO InPut Path:101-re~1.wav
Declient [996] connected, module:ao
vice:LineOut
Hp[AUDIO ERROR]DrvAudApiDtsInit, Failed to gpio_request amp-gpio !
[AUDIO ERROR]DrvAudApiDtsInit, IS_MHAL_SUPPORT_ES_CODEC=0.
f:Disable
Nr:Disable
Agc:Disable
Eq:Disable
Resample:Disable
3049 Start test: MI_SYS_Init()
AUDIO_TEST [3049] MI_SYS_Init() exec function pass
3049 End test: MI_SYS_Init()
3063 Start test: initAo()
2378 Start test: MI_AO_SetPubAttr(AoDevId, &stAoSetAttr)
[MI_AO_Init:1237] Init Ao Gain.
AUDIO_TEST [2378] MI_AO_SetPubAttr(AoDevId, &stA[MI_AO_IMPL_SendFrame:2666] Strat pcm out su
!!
oSetAttr) exec function pass
2378 End test: MI_AO_SetPubAttr(AoDevId, &stAoSetAttr)
2384 Start test: MI_AO_GetPubAttr(AoDevId, &stAoGetAttr)
AUDIO_TEST [2384] MI_AO_GetPubAttr(AoDevId, &stAoGetAttr) exec function pass
2384 End test: MI_AO_GetPubAttr(AoDevId, &stAoGetAttr)
2390 Start test: MI_AO_Enable(AoDevId)
MI_AO_OpenVqeLib: success
MI_AO_OpenSrcLib: success
MI_AO_OpenG711Lib: success
MI_AO_OpenG726Lib: success
AUDIO_TEST [2390] MI_AO_Enable(AoDevId) exec function pass
2390 End test: MI_AO_Enable(AoDevId)
2396 Start test: MI_AO_EnableChn(AoDevId, AoChn)
AUDIO_TEST [2396] MI_AO_EnableChn(AoDevId, AoChn) exec function pass
2396 End test: MI_AO_EnableChn(AoDevId, AoChn)
2461 Start test: MI_AO_SetVolume(AoDevId, s32AoVolume)
AUDIO_TEST [2461] MI_AO_SetVolume(AoDevId, s32AoVolume) exec function pass
2461 End test: MI_AO_SetVolume(AoDevId, s32AoVolume)
2462 Start test: MI_AO_GetVolume(AoDevId, &s32AoGetVolume)
AUDIO_TEST [2462] MI_AO_GetVolume(AoDevId, &s32AoGetVolume) exec function pass
2462 End test: MI_AO_GetVolume(AoDevId, &s32AoGetVolume)
create ao thread.
AUDIO_TEST [3063] initAo() exec function pass
3063 End test: initAo()

```

8.6.4 Playback of recording files (headphones/speakers):

Execute the **cd /tmp** command to enter the tmp path, and then execute this command (Note: the default name of the recording file is Chn0_Amic_8K_16bit_MONO.wav, which can be viewed by the ls command)

/customer/prog_audio_all_test_case -t 30 -O -i Chn0_Amic_8K_16bit_MONO.wav -D 0 -V 0


```
COM6:115200baud - Tera Term VT
File Edit Setup Control Window Help
/tmp #
/tmp #
/tmp #
/tmp #
tmp # /customer/prog_audio_all_test_case -t 30 -O -i Chn0_Amic_8K_16bit_MONO.wa
V D C V O
Ao Param:client [934] connected, module:sys

AO InPut Path:client [934] connected, module:ao
Chn0_Amic_8K_16b[AUDIO ERROR]DrvAudApiDtsInit, Failed to gpio_request amp-gpio !
[AUDIO ERROR]DrvAudApiDtsInit, IS_MHAL_SUPPORT_ES_CODEC=0.
it MONO.wav
Device:LineOut
Hpf:Disable
Nr:Disable
Agc:Disable
Eq:Disable
Resample:Disable
3049 Start test: MI_SYS_Init()
AUDIO_TEST [3049] MI_SYS_Init() exec function pass
3049 End test: MI_SYS_Init()
3063 Start test: initAo()
2378 Start test: MI_AO_SetPubAttr(AoDevId, &stAoSetAttr)
[MI_AO_Init:1237] Init Ao Gain.
AUDIO_TEST [2378] MI_AO_SetPubAttr(AoDevId, &stA[MI_AO_IMPL_SendFrame:2666] Strat pcm out success!!
!!
oSetAttr) exec function pass
2378 End test: MI_AO_SetPubAttr(AoDevId, &stAoSetAttr)
2384 Start test: MI_AO_GetPubAttr(AoDevId, &stAoGetAttr)
AUDIO_TEST [2384] MI_AO_GetPubAttr(AoDevId, &stAoGetAttr) exec function pass
2384 End test: MI_AO_GetPubAttr(AoDevId, &stAoGetAttr)
2390 Start test: MI_AO_Enable(AoDevId)
MI_AO_OpenVqeLib: success
MI_AO_OpenSrcLib: success
MI_AO_OpenG711Lib: success
MI_AO_OpenG726Lib: success
AUDIO_TEST [2390] MI_AO_Enable(AoDevId) exec function pass
2390 End test: MI_AO_Enable(AoDevId)
2396 Start test: MI_AO_EnableChn(AoDevId, AoChn)
AUDIO_TEST [2396] MI_AO_EnableChn(AoDevId, AoChn) exec function pass
2396 End test: MI_AO_EnableChn(AoDevId, AoChn)
2461 Start test: MI_AO_SetVolume(AoDevId, s32AoVolume)
AUDIO_TEST [2461] MI_AO_SetVolume(AoDevId, s32AoVolume) exec function pass
2461 End test: MI_AO_SetVolume(AoDevId, s32AoVolume)
2462 Start test: MI_AO_GetVolume(AoDevId, &s32AoGetVolume)
AUDIO_TEST [2462] MI_AO_GetVolume(AoDevId, &s32AoGetVolume) exec function pass
2462 End test: MI_AO_GetVolume(AoDevId, &s32AoGetVolume)
create ao thread.
AUDIO_TEST [3063] initAo() exec function pass
3063 End test: initAo()

激活 Windows
转到“设置”以激活 Windows
```

8.7 LVDS 7" Screen & Touch

8.7.1 Display:

Connect the LVDS screen according to the schematic diagram (pay attention to the pin position), power on and start up,

the boot interface is black, and the display will be as follows after the startup is completed



8.7.2 Backlight

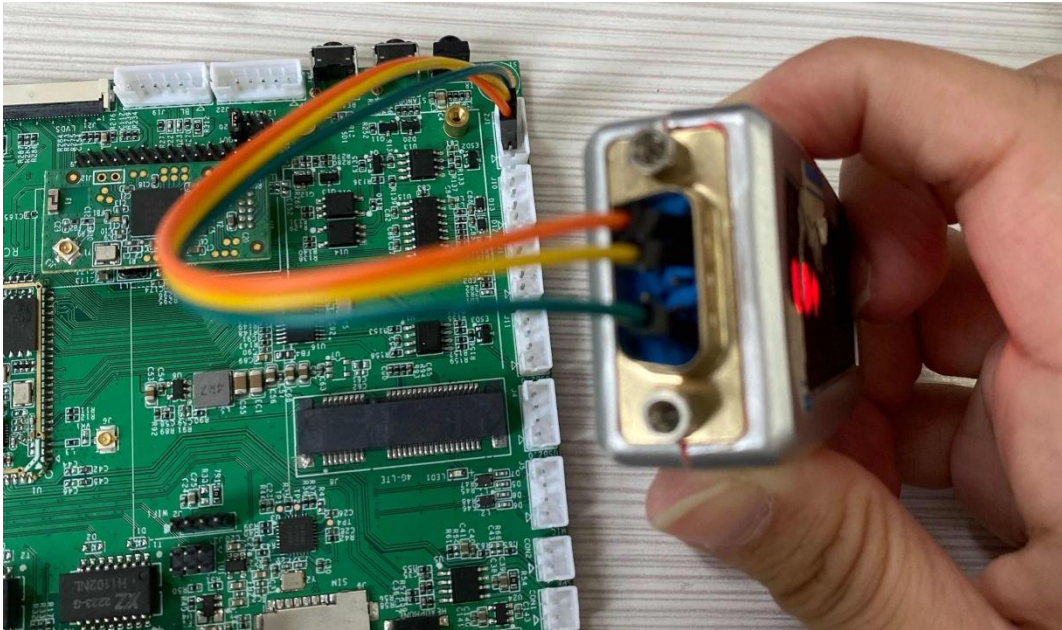


Touch: After the system startup is completed, slide the screen left and right with your finger, and you can turn the page left and right, that is, the test is passed

8.8 RS485 Communication

8.8.1 Test Preparation: One 485 communication cable, use DuPont cable to connect the board to the tx, rx and GND of

the 485 line, and the other end of the USB port to connect to the PC.



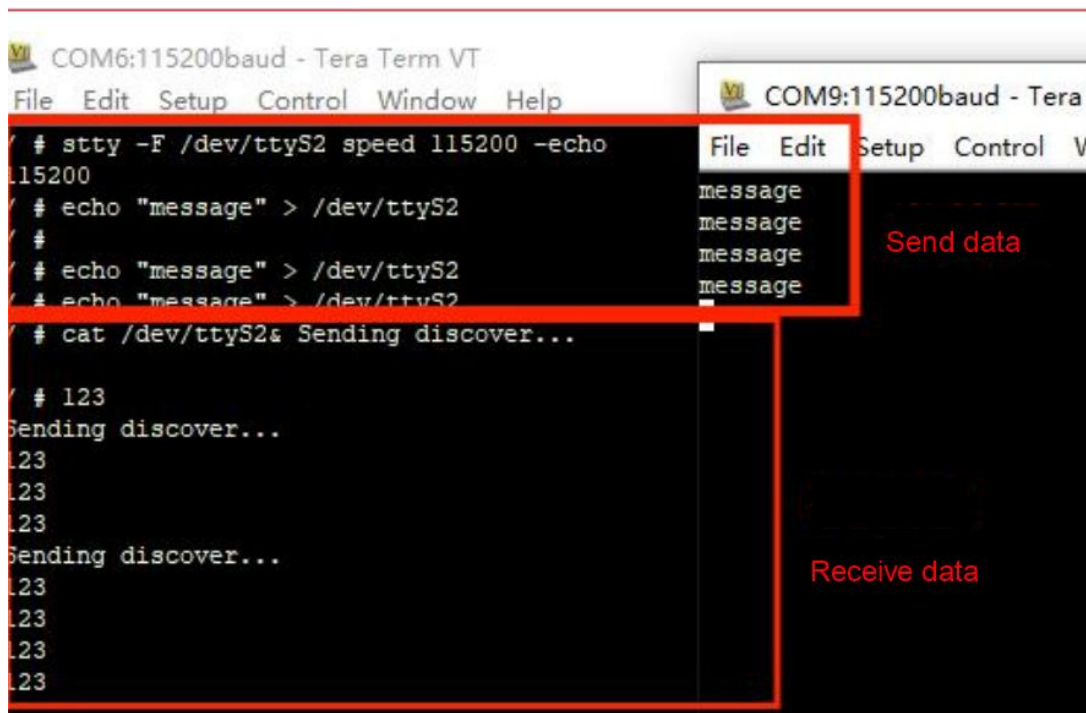
8.8.2 receive and send data

Set 485 serial port baud rate to 115200: `stty -F /dev/ttyS2 speed 115200 -echo`

Open another serial port, select the corresponding COM port (Device Manager->Port View), set the baud rate to 115200 and enter the following command in the original serial port window

`cat /dev/ttyS2&` //Receive data command, type in the characters in the 485 serial terminal and enter to see if the other end will receive it

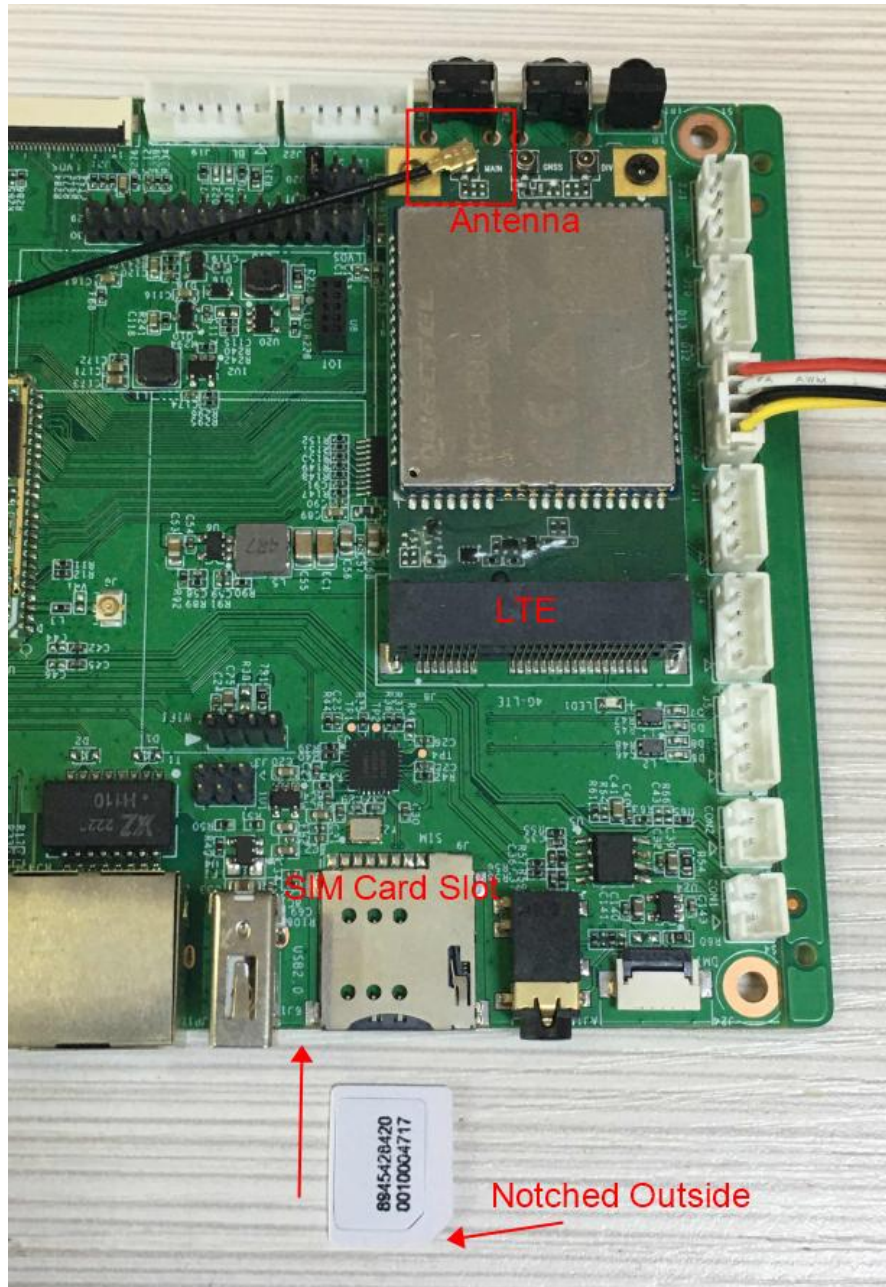
`echo "message" > /dev/ttyS2` //Input this command in the serial line terminal and enter to see if the other end receives the "message" data.



8.9 LTE Test

Preparation tools: SIM card*1, LTE module*1, antenna*1

1) Connect the SIM card, LTE, and antenna as shown in the picture.



2) After powering on and booting up, enter the `lsusb` command, and an ID of ID 2c7c:0125 means it was mounted successfully.


```

lsusb
Bus 002 Device 002: ID 1b20:8888
Bus 001 Device 001: ID 1d6b:0002
Bus 001 Device 002: ID 05e3:0610
Bus 002 Device 001: ID 1d6b:0002
Bus 001 Device 003: ID 2c7c:0125
/ # Sending discover

```

- 3) Execute the `ifconfig wwan0 up` command to open the node
- 4) Execute `quectel-CM&` again --- to run the dialup script;
- 5) Execute the `ifconfig` command to see if the wwan0 node acquires an IP address

```

/ # ifconfig
eth0      Link encap:Ethernet  HWaddr 00:70:27:00:00:01
          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 (0.0 B)  TX bytes:0 (0.0 B)
          Interrupt:35

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:8 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:656 (656.0 B)  TX bytes:656 (656.0 B)

wlan0     Link encap:Ethernet  HWaddr 24:14:07:BB:34:CC
          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 (0.0 B)  TX bytes:0 (0.0 B)

wwan0     Link encap:UNSPEC  HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
          inet addr:100.116.28.111  P-t-P:100.116.28.111  Mask:255.255.255.224
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:7 errors:0 dropped:0 overruns:0 frame:0
          TX packets:14 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1807 (1.7 KiB)  TX bytes:2816 (2.7 KiB)

```

- 6) Test the network connection by executing the `ping -I wwan0 baidu.com` command.

8.10 USB Port Test

8.10.1 Test Preparation: USB Mouse/Keyboard*1, USB Flash Drive*1, USB Hard Drive*1

8.10.2 After powering up the board and plugging in the mouse/keyboard, type `lsusb` to see if it is mounted.

```
/ # lsusb
Bus 002 Device 002: ID 1b20:8888
Bus 001 Device 001: ID 1d6b:0002
Bus 001 Device 014: ID 1c4f:0034
Bus 001 Device 002: ID 05e3:0610
Bus 002 Device 001: ID 1d6b:0002
```

8.10.3 Connect a USB flash drive or USB hard disk, **fdisk -l** to see if it is recognized, **df -h** to see where it is mounted.

```
Disk /dev/mmcblk0: 7906 MB, 7906263040 bytes
255 heads, 63 sectors/track, 961 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1  *            1           962       7719936    b  Win95 FAT32
Partition 1 has different physical/logical endings:
   phys=(960, 254, 63) logical=(961, 54, 53)

Disk /dev/sda: 15.3 GB, 15376318464 bytes
255 heads, 63 sectors/track, 1869 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1  *            1        1870      15014912    c  Win95 FAT32 (LBA)

/ # df -h
Filesystem      Size      Used Available Use% Mounted on
ubi:rootfs      103.3M    10.1M     93.2M   10% /
devtmpfs        30.9M      0        30.9M    0% /dev
tmpfs           30.9M      0        30.9M    0% /tmp
var             30.9M      0        30.9M    0% /var
vendor          30.9M      0        30.9M    0% /vendor
mdev            30.9M      0        30.9M    0% /dev
ubi0:miservice   7.5M       5.3M     2.2M    71% /config
ubi0:customer    58.9M     52.2M     6.7M    89% /customer
ubi0:appconfigs  2.0M      32.0K     2.0M     2% /appconfigs
/dev/mmcblk0p1   7.3G      1.4G     5.9G    19% /mnt/sdcard
/dev/sda1       14.3G     1.1G    13.2G     8% /mnt/udisk/sda1
```

```
/ # fdisk -l

Disk /dev/mmcblk0: 7906 MB, 7906263040 bytes
255 heads, 63 sectors/track, 961 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/mmcblk0p1  *            1           962       7719936    b  Win95 FAT32
Partition 1 has different physical/logical endings:
   phys=(960, 254, 63) logical=(961, 54, 53)

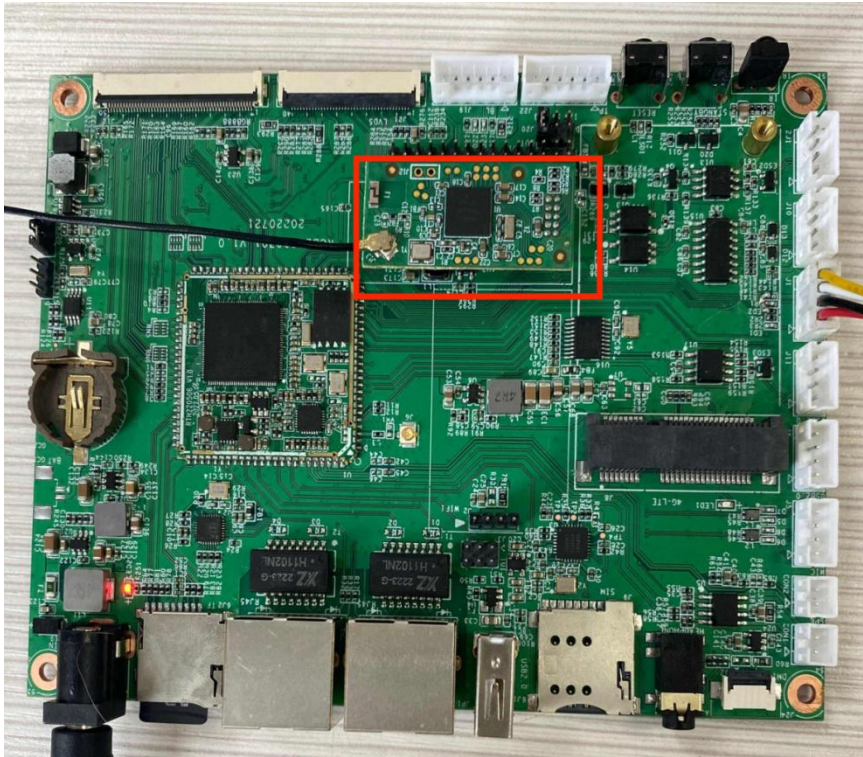
Disk /dev/sda: 1000.2 GB, 1000204886016 bytes
255 heads, 63 sectors/track, 121601 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1  *          1        121601     976760001    7  HPFS/NTFS

/ # df -h
Filesystem      Size      Used Available Use% Mounted on
ubi:rootfs      103.3M    10.1M     93.2M   10% /
devtmpfs        30.9M      0        30.9M    0% /dev
tmpfs           30.9M      0        30.9M    0% /tmp
var             30.9M      0        30.9M    0% /var
vendor          30.9M      0        30.9M    0% /vendor
mdev            30.9M      0        30.9M    0% /dev
ubi0:miservice   7.5M       5.3M     2.2M    71% /config
ubi0:customer    58.9M     52.2M     6.7M    89% /customer
ubi0:appconfigs  2.0M      32.0K     2.0M     2% /appconfigs
/dev/mmcblk0p1   7.3G      1.4G     5.9G    19% /mnt/sdcard
/dev/sda1       931.5G    74.1G    857.4G     8% /mnt/udisk/sda1
```

8.11 GTIOT Interface Test

8.11.1 Test Preparation: Prepare BLE module*1 antenna*1, access as follows



8.11.2 Input command: `stty -F /dev/ttyS1 speed 115200 -echo` //Change baud rate
`cat /dev/ttyS1&` //Data printing
`echo -en "AT\r\n" >> /dev/ttyS1` //Read version information
`echo -en "scan on\r\n" >> /dev/ttyS1` //Turn on search
`echo -en "scan\r\n" >> /dev/ttyS1` //Search for devices
`echo -en "scan off\r\n" >> /dev/ttyS1` //Close search


```
/ # stty -F /dev/ttyS1 speed 115200 -echo
115200
/ # Sending discover...
cat /dev/ttyS1&
/ # Sending discover...
Sending discover...
echo -en "AT\r\n" >> /dev/ttyS1
/ # AT

1,00,v3.3.0,OTA-2


echo -en "scan on\r\n" >> /dev/ttyS1
/ # scan on

1,02


echo -en "scan\r\n" >> /dev/ttyS1
/ # scan

1,01,D1:12:6B:CF:BE:D0,

1,01,6E:6F:C0:D2:C0:C1,

1,01,28:7A:FB:5E:05:F6,

1,01,41:38:B2:45:07:19,

1,01,7B:EF:E0:F7:78:00,

1,01,7B:35:69:0D:8F:3B,

1,01,71:BC:0C:98:15:BB,

1,01,57:A7:82:9A:23:0B,

1,01,DD:0D:30:00:14:2F,


Sending discover...
Sending discover...
Sending discover...
echo -en "scan off\r\n" >> /dev/ttyS1
/ # scan off

1,03
```


9. Precautions for use

1. Relative humidity: 10% ~ 90% .
2. Storage temperature: -10 ~ 125℃
3. Operation temperature: 0 ~ 80℃
4. Do not squeeze、 distort or disassemble the board.
5. Keep the board away from static electricity .
6. Keep the board away from water and other liquid.
7. Clean the board with soft and clean dry cloth when it's dirty.
8. Don't use long connect wires which may affect performance and image quality.