

# IDO-EVB3588S-V1 Linux使用手册

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**IDO-EVB3588S-V1**

**Linux使用手册**

深圳触觉智能科技有限公司

[www.industio.cn](http://www.industio.cn)

## 文档修订历史

版本	PCBA版本	修订内容	修订	审核	日期
V1.0	V1C	创建文档	MHK	IDO	2024/07/22

# 一、硬件资源概况

## 1.1 主板照片

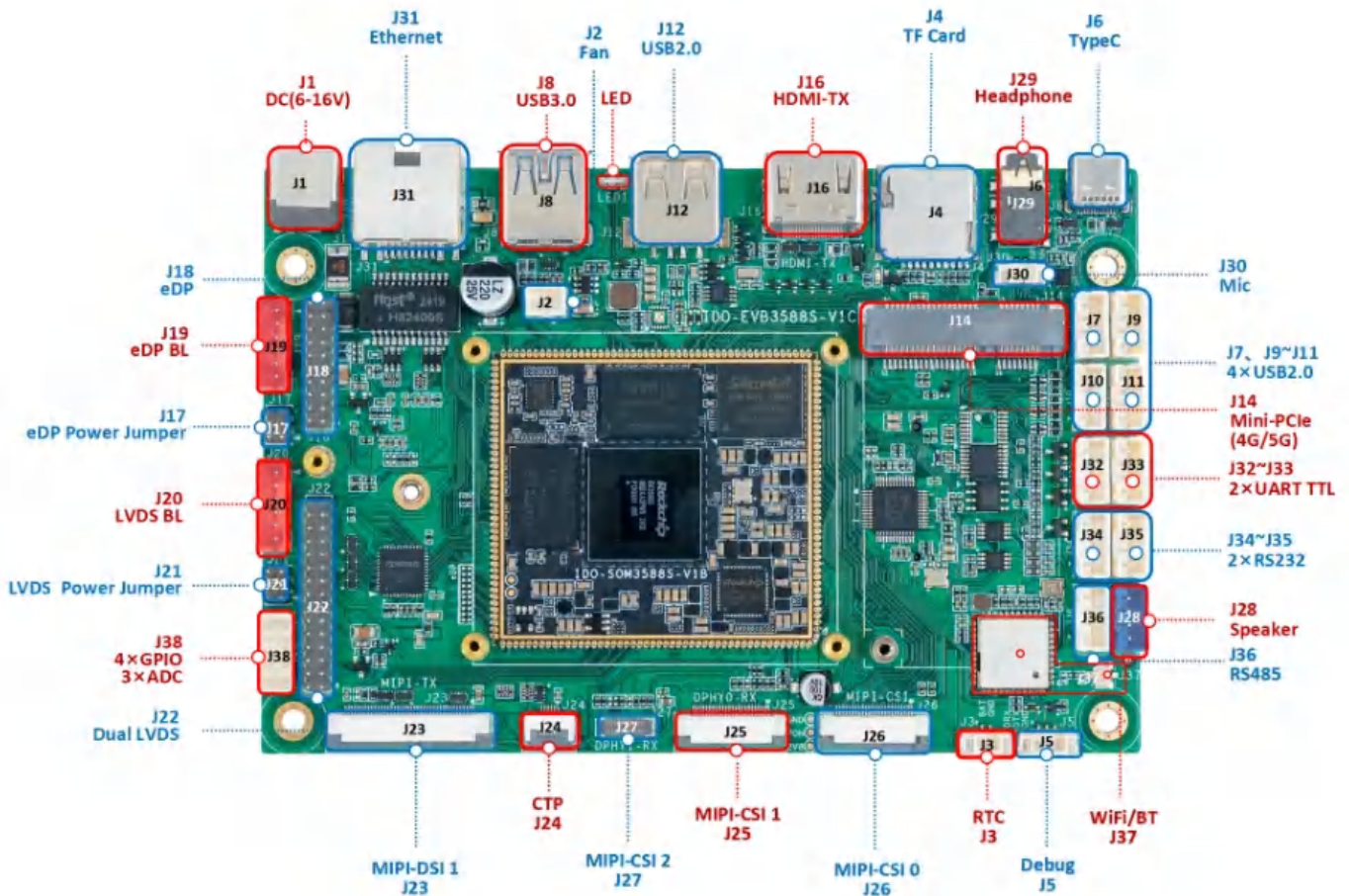


图1. IDO-EVB3588S正面接口图

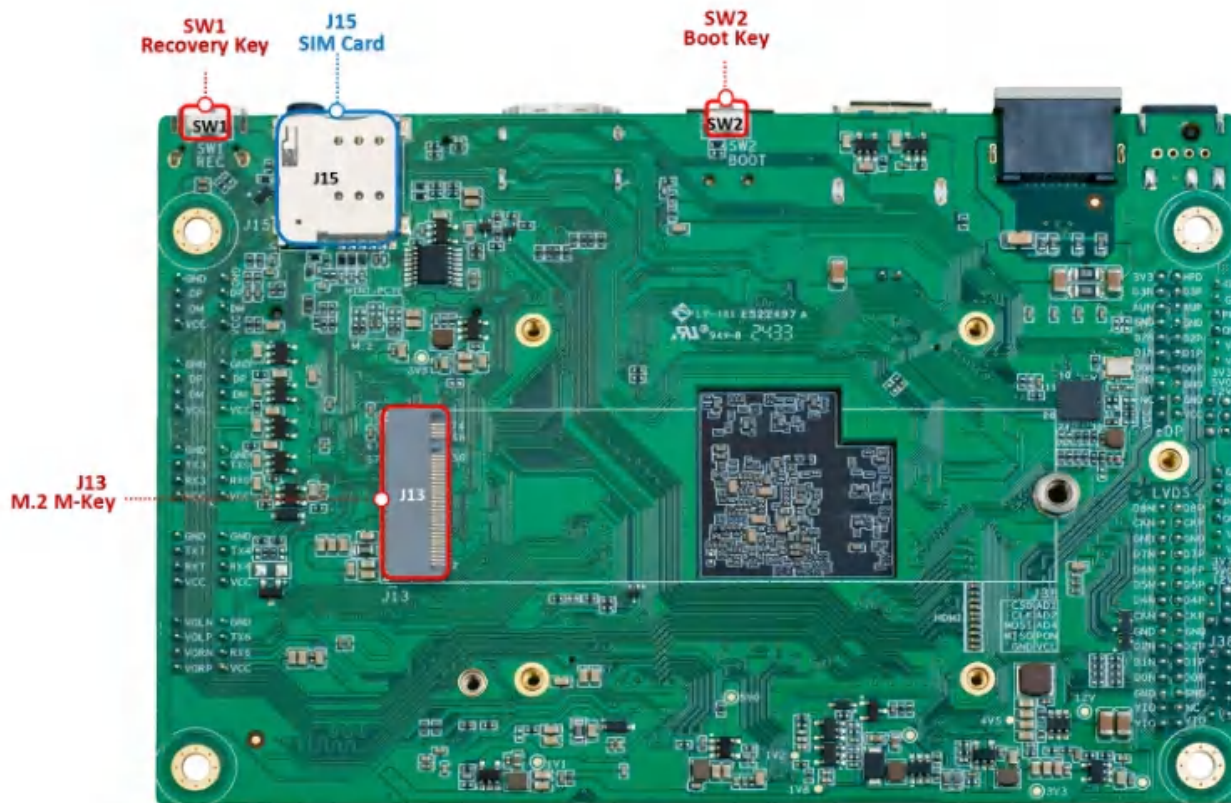


图2. IDO-EVB3588S背面接口图

## 1.2 硬件资源及设备节点

序号	名称	描述	设备节点
1	内核版本	5.10.160	/
2	系统版本	Debian11	/
3	内存	LPDDR4, 8GB	/
4	存储	eMMC, 128GB	/
5	供电	默认12V/2A供电	/

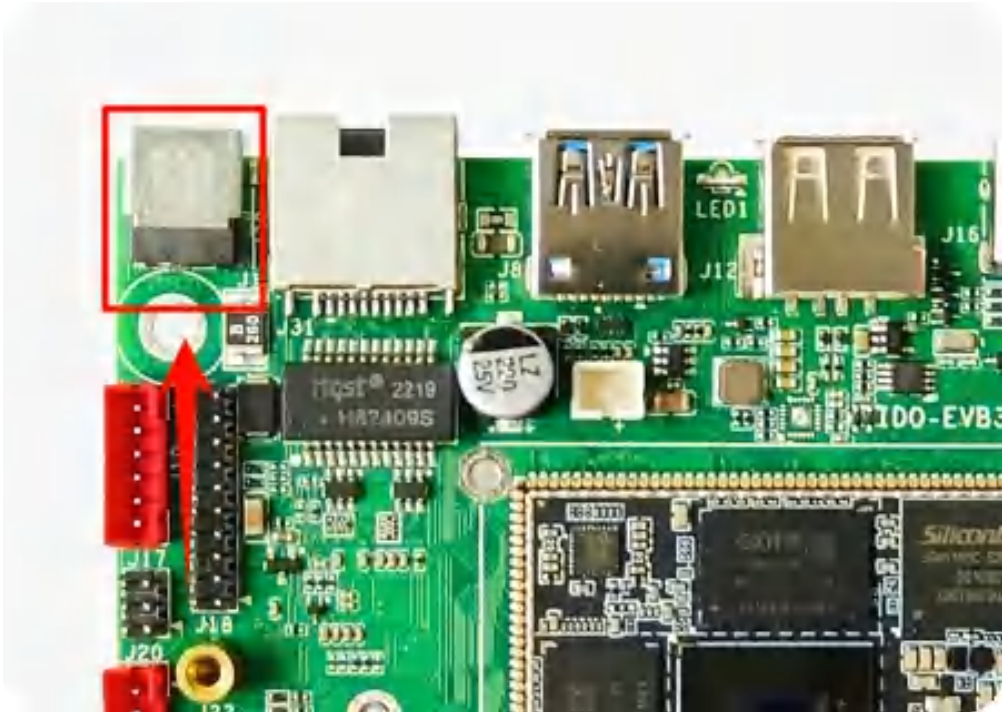
6	显示	<p>1x HDMI2.1接口, 支持 (8K/60fps或4K/120fps) 输出</p> <p>1x TypeC-DP 接口, 支持 (8K/60fps或4K/120fps) 输出</p> <p>1x MIPI DSI接口, 支持4k@60fps输出</p> <p>1x 双LVDS接口, 支持1920x1080@60fps输出</p> <p>1xEDP 接口, 支持 1920x1080@60fps 输出</p>	/
7	TP触摸	I2C-TP x1	/
8	USB OTG	/	/
9	USB HOST	<p>USB3.0 HOST(Type-A) X 1</p> <p>USB2.0 HOST(PH2.0-4A) X 4</p> <p>TYPEC3.0 X 1</p>	/
10	TF Card	TF Card x 1	/
11	以太网	千兆以太网 x 1	eth0
12	WIFI/BT	AP6256	wlan0 、 hci0
13	扬声器	/	/
14	耳机	3.5mm 国标	/
15	Camera	OV13855 X 1 IMX415 X 2	/
16	串口	<p>RS232 x 4</p> <p>RS485 x 1</p>	/
17	调试串口	TTL x 1	/
18	RTC	HYM8563S	/
19	LED	电源指示灯 x 1	/
20	4G/5G	EC20、RG200U	/
21	按键	Recovery按键、BOOT按键	/
22	MIC	/	/

23	M2.0 SSD	SSD x 1	/
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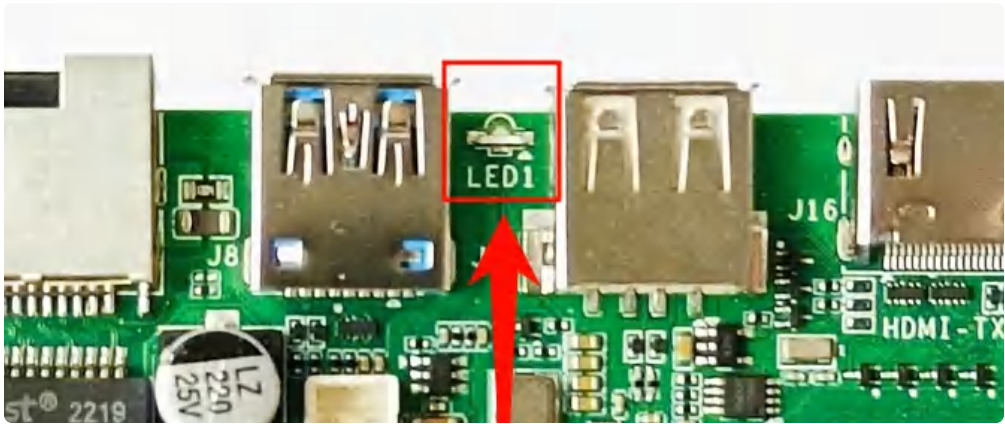
## 二、功能测试及接口使用方法

### 2.1 电源

DC:12V/2A



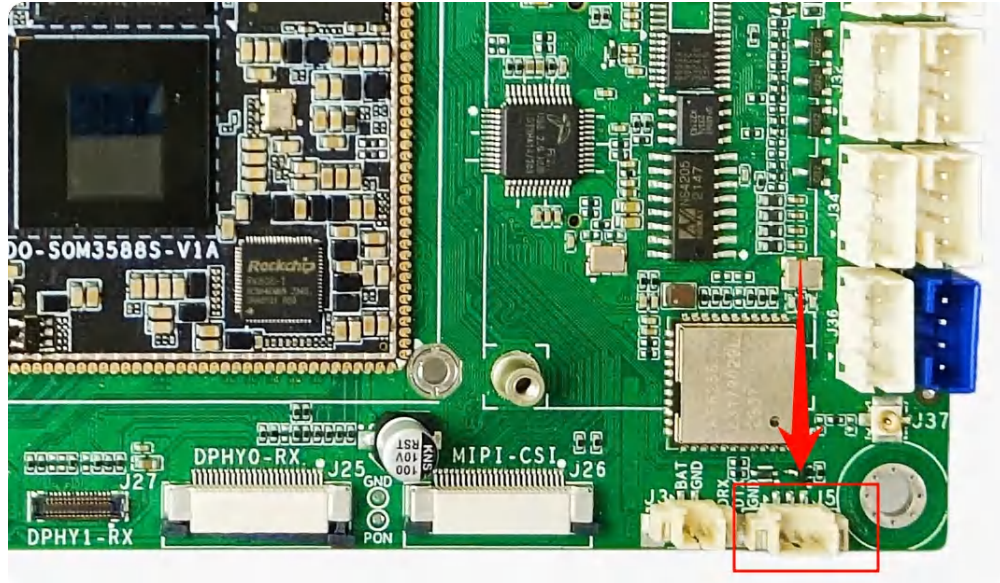
### 2.2 指示灯(LED1)



系统指示灯：红色闪烁

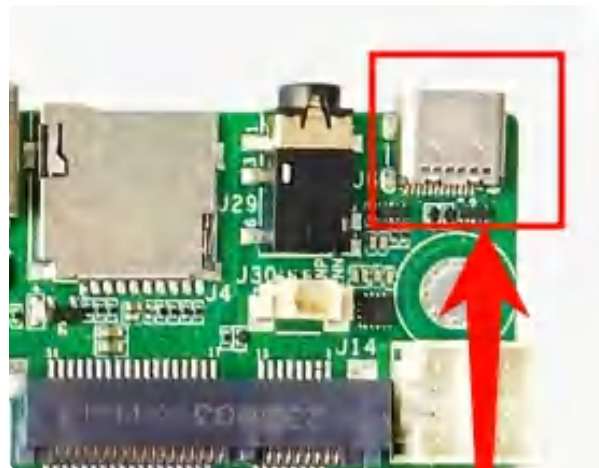
## 2.3 UART调试口

波特率：1500000



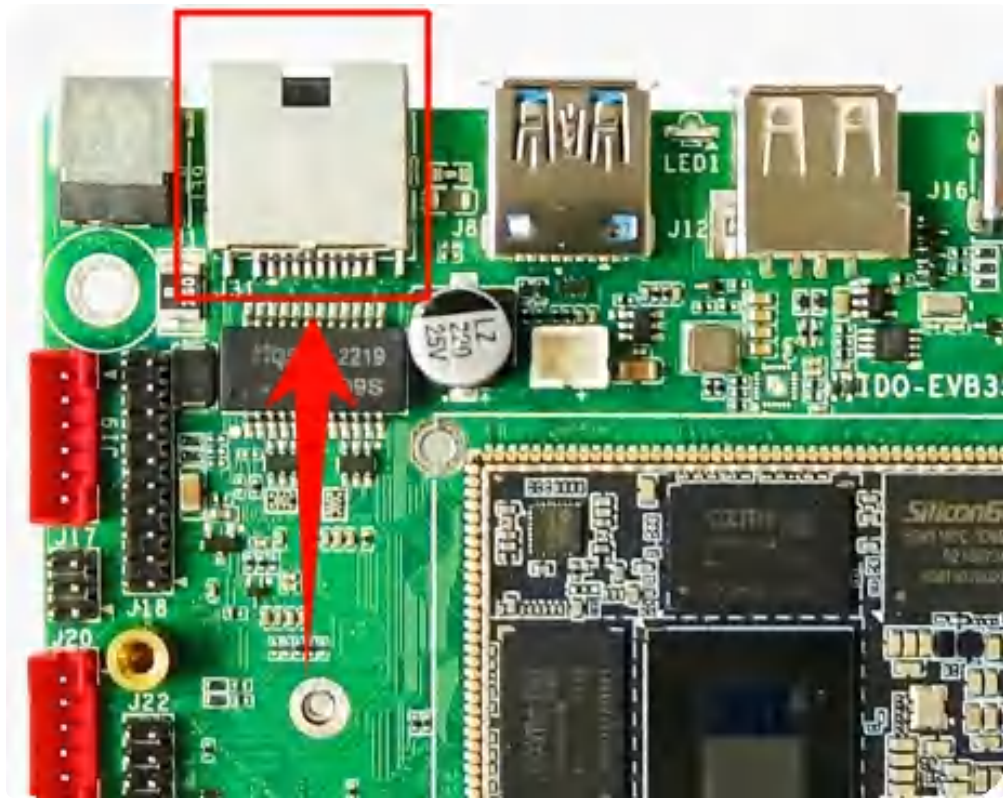
## 2.4 ADB调试口

通过 USB type-C 连接 PC，然后使用 ADB 连接开发板



## 2.5 网络

### 2.5.1 以太网(1000Mbps)



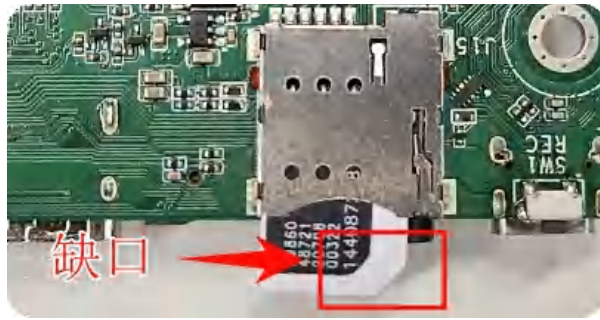
支持自动识别千兆以太网与热插拔

## 2.5.2 4G

测试需要插入SIM卡、模组以及连接好天线，如下图所示：





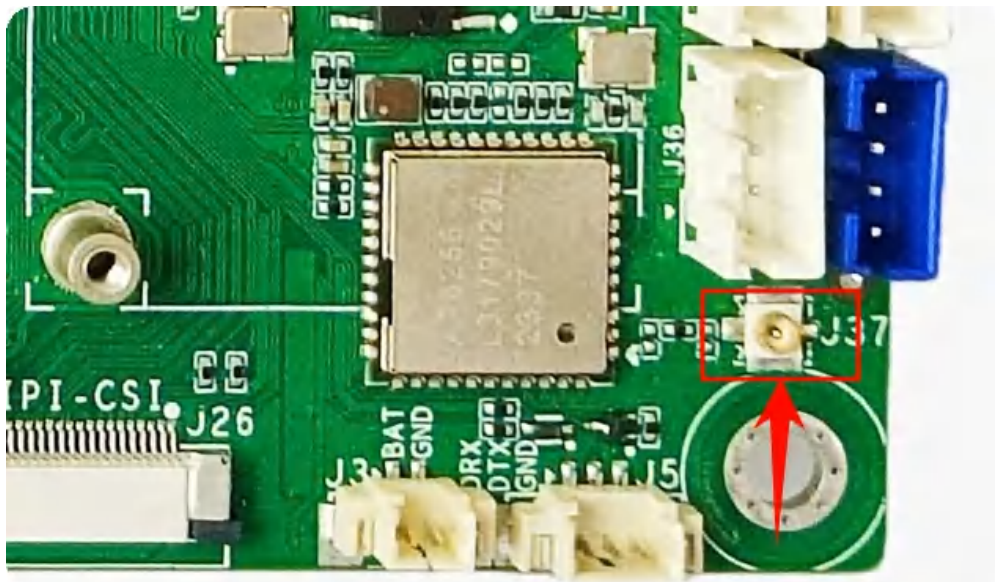


使用 nano 尺寸SIM卡，如下图所示：



使用quectel-CM &进行拨号上网。

### 2.5.3 WiFi



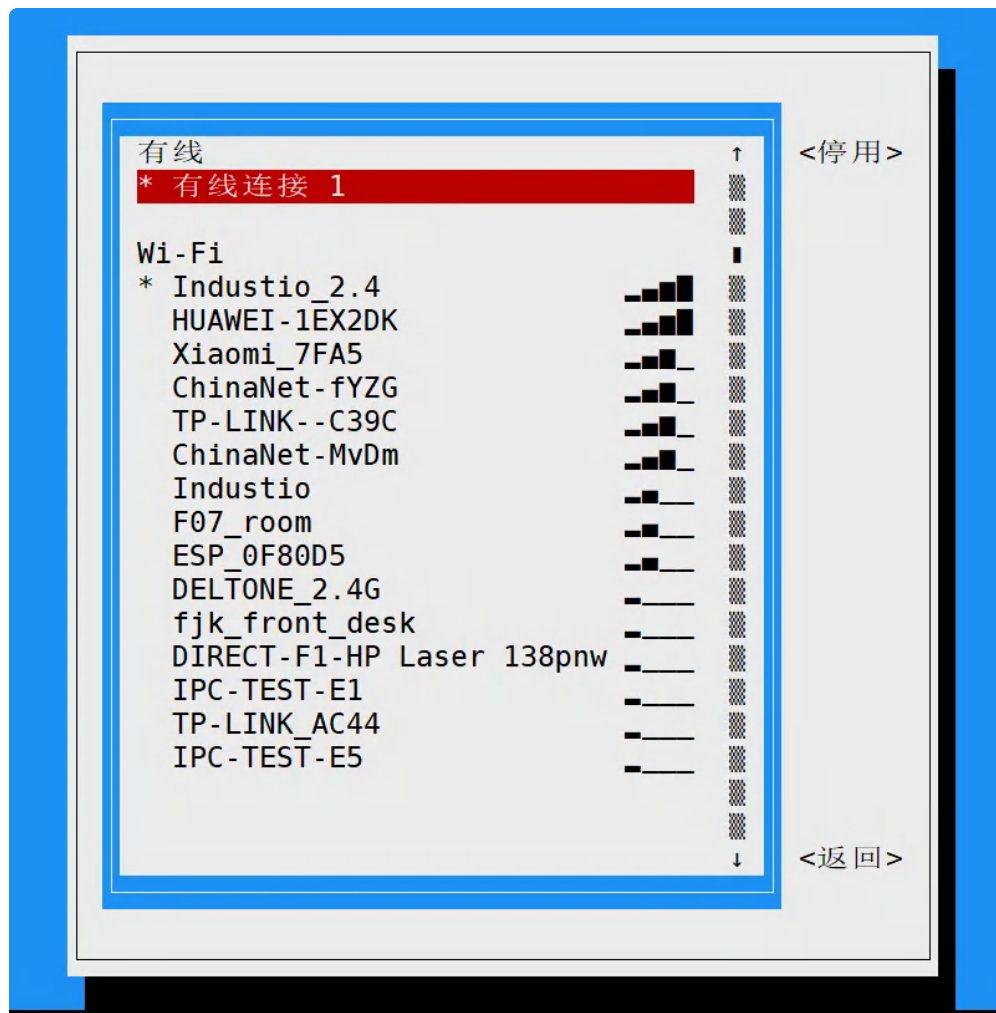
使用WiFi/蓝牙时，需要连接天线以获得良好的信号，上图为天线接口。

WiFi-STA:

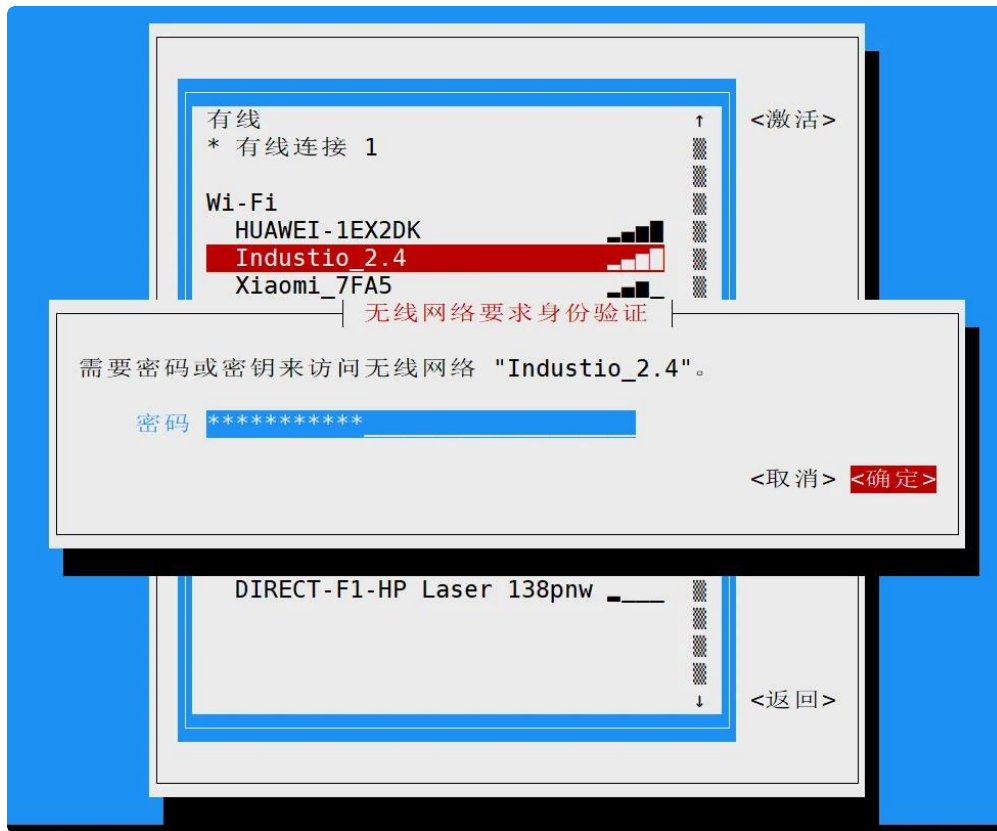
命令行输入nmtui进入WiFi连接界面，如下图所示：



进入启用连接->



选择你需要连接的账号，输入密码之后，选择确定即可，如下图所示：



连接后使用按键Esc退出，查看WiFi情况，并正常上网：

```

PowerShell |
1 root@linaro-alip:/# ifconfig wlan0
2 wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
3     inet 192.168.0.105 netmask 255.255.255.0 broadcast 192.168.0.255
4     inet6 fe80::4d89:48a:9edb:29b5 prefixlen 64 scopeid 0x20<link>
5     ether c0:f5:35:13:16:dc txqueuelen 1000 (Ethernet)
6     RX packets 320 bytes 45055 (43.9 KiB)
7     RX errors 0 dropped 13 overruns 0 frame 0
8     TX packets 16 bytes 1858 (1.8 KiB)
9     TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
10
11 root@linaro-alip:/# ping www.baidu.com -I wlan0
12 PING www.a.shifen.com (183.2.172.42) from 192.168.0.105 wlan0: 56(84) bytes
13 of data.
14 64 bytes from 183.2.172.42 (183.2.172.42): icmp_seq=1 ttl=53 time=30.7 ms
15 64 bytes from 183.2.172.42 (183.2.172.42): icmp_seq=2 ttl=53 time=19.0 ms
16 64 bytes from 183.2.172.42 (183.2.172.42): icmp_seq=3 ttl=53 time=62.6 ms
17 64 bytes from 183.2.172.42 (183.2.172.42): icmp_seq=4 ttl=53 time=21.9 ms

```

WiFi-AP:

```
▼ Bash |  
  
1 start 10.10.100.2  
2 end 10.10.100.254  
3 interface wlan1  
4 opt dns 8.8.8.8 10.10.100.1  
5 option subnet 255.255.255.0  
6 opt router 10.10.100.1  
7 opt wins 8.8.8.8  
8 option dns 8.8.8.8 # appended to above DNS servers for a total of 3  
9 option domain local  
10 option lease 864000 # default: 10 days  
11 option msstaticroutes 10.0.0.0/8 10.127.0.1 # single static route  
12 option staticroutes 10.0.0.0/8 10.127.0.1, 10.11.12.0/24 10.11.12.1  
13 # Arbitrary option in hex form:  
14 option 0x08 01020304 # option 8: "cookie server IP addr: 1.2.3.4"
```

开启AP热点:

```
▼ Bash |  
  
1 iw dev wlan0 interface add wlan1 type managed  
2 ifconfig wlan1 10.10.100.1  
3 hostapd -d /opt/hostapd.conf &  
4 sleep 8  
5 udhcpd /opt/udhcpd.conf
```

将eth0网口的数据转发到wlan1, 使AP设备能通过以太网上网:

```
▼ Bash |  
  
1 echo "1" > /proc/sys/net/ipv4/ip_forward  
2 iptables -F  
3 iptables -t nat -F  
4 iptables -t mangle -F  
5 iptables -X  
6 iptables -t nat -X  
7 iptables -t mangle -X  
8 iptables -P INPUT ACCEPT  
9 iptables -P OUTPUT ACCEPT  
10 iptables -P FORWARD ACCEPT  
11 iptables -t nat -A POSTROUTING -j MASQUERADE  
12 iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE  
13 iptables -t nat -A POSTROUTING -o wlan1 -j MASQUERADE
```

手机连接WiFi热点正常, 上网正常:

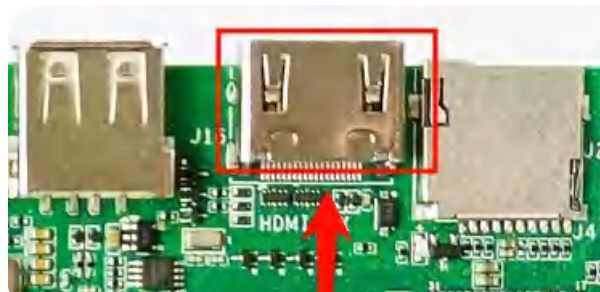


## 2.5.4 Bluetooth

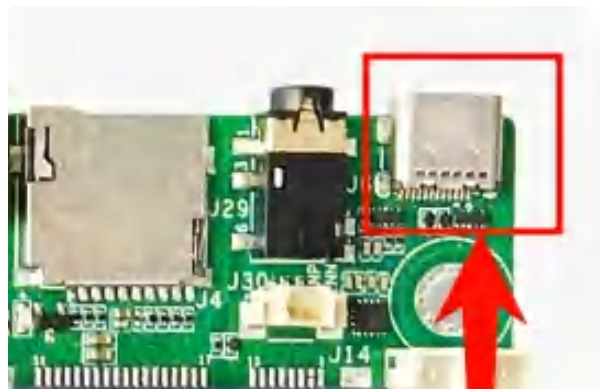
```
1 hciconfig -a //查看蓝牙信息
2 hciconfig hci0 up //打开蓝牙
3
4 bluetoothctl power on //打开蓝牙
5 bluetoothctl scan on //扫描蓝牙
6 bluetoothctl devices //查看蓝牙设备
7 bluetoothctl trust xx:xx:xx:xx:xx:xx //信任某些设备, 以便日后轻松连接
8 bluetoothctl untrust xx:xx:xx:xx:xx:xx //取消信任
9 bluetoothctl pair xx:xx:xx:xx:xx:xx //配对蓝牙(xx为设备MAC地址)
10 bluetoothctl connect xx:xx:xx:xx:xx:xx //连接蓝牙(xx为设备MAC地址)
11
```

## 2.6 HDMI显示

标准HDMI-19S接口, 支持 HDMI2.0 8K@60fps 输出 和 HDCP 1.4/2.2



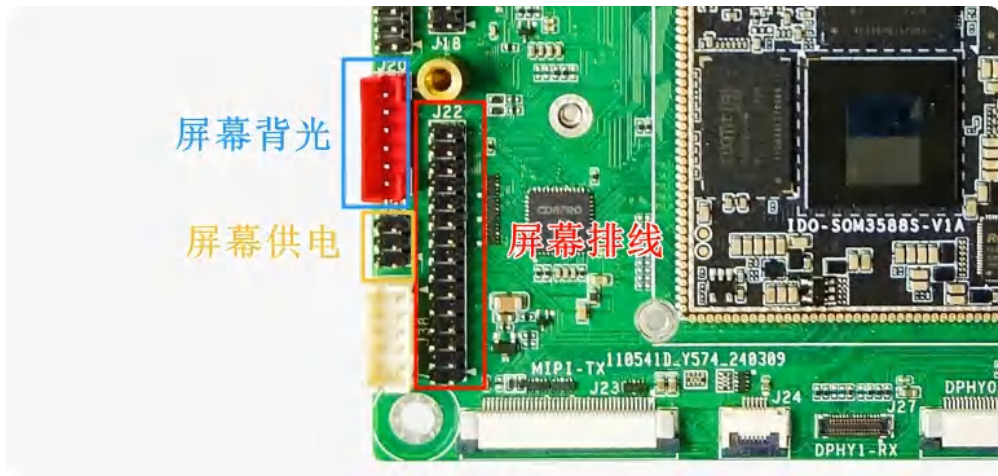
### 2.6.1 DP



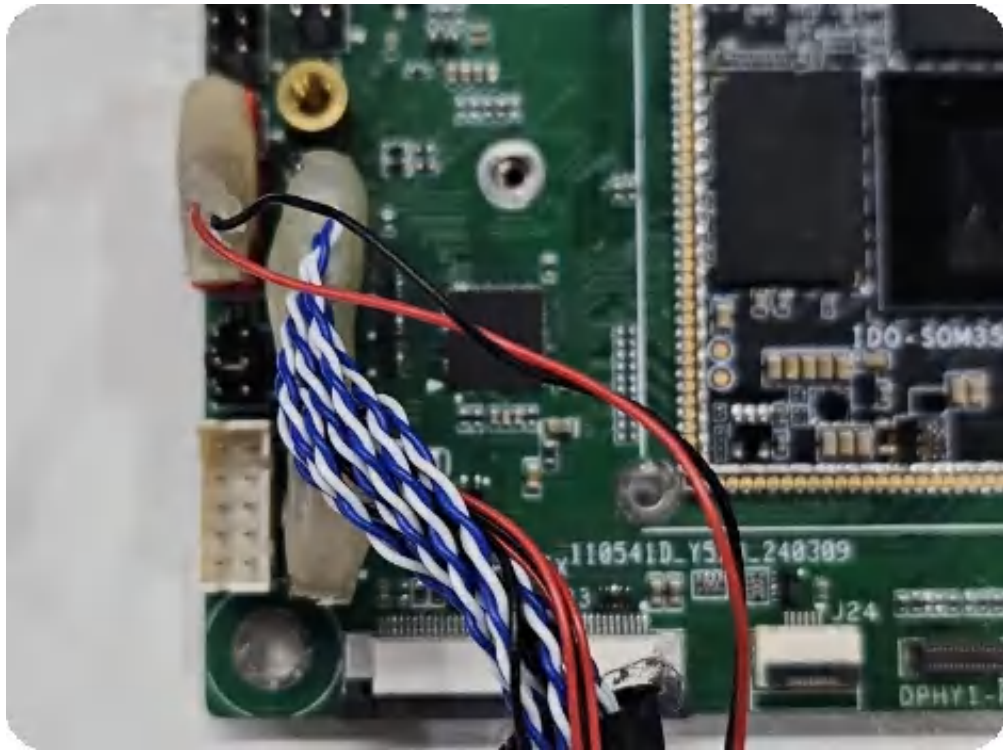
可以使用 TypeC 转高清线



## 2.6.2 Dual LVDS

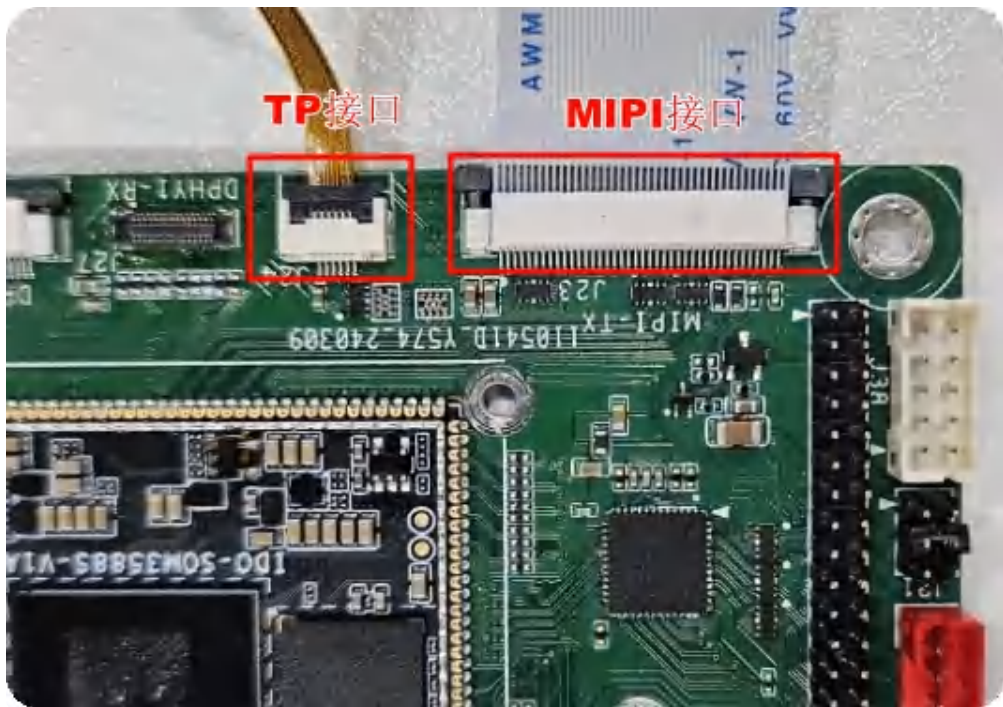






1. LVDS 屏幕 3.3V 供电
2. Dual LVDS 屏排线
3. LVDS 屏幕背光接口

### 2.6.3 MIPI



MIPI屏LCD排线接线

1. 触摸 TP 接口，下接
2. 主板 LCD 排线接线（上接），40Pin FPC 屏座子

## 2.6.4 eDP



1. eDP 屏幕 3.3V 供电
2. eDP 屏排线
3. eDP 屏幕背光接口

## 2.6.5 屏幕背光

查看背光:

PowerShell

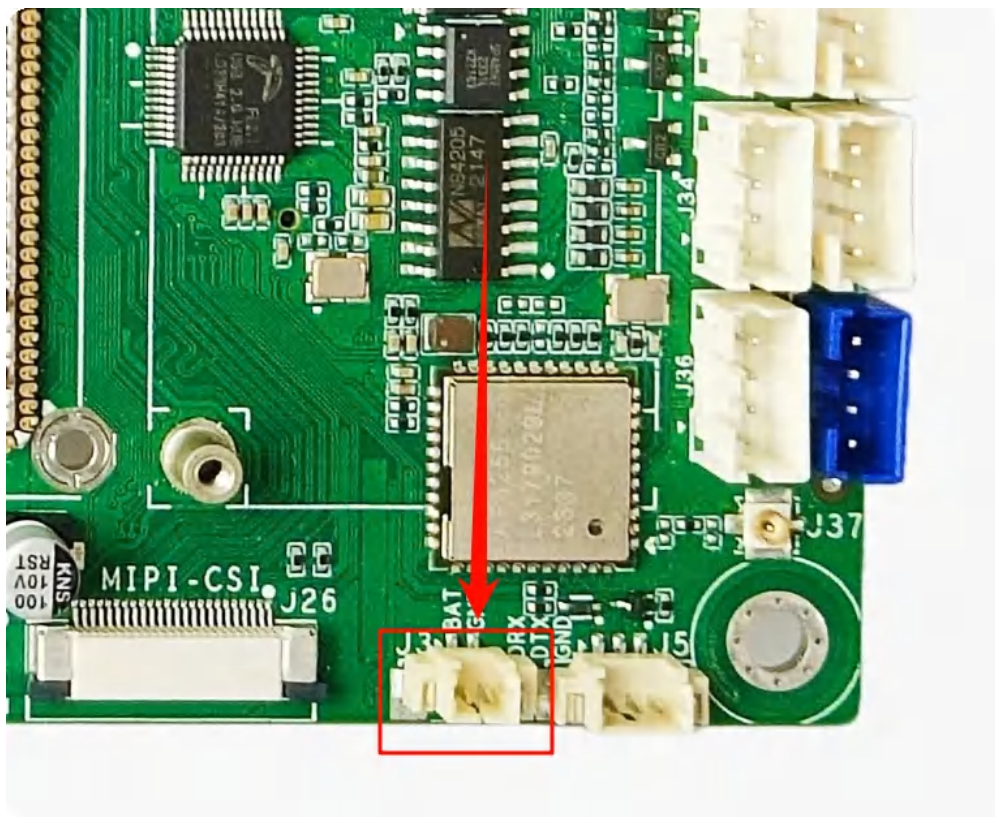
```
1 root@linaro-alip:/# cat /sys/class/backlight/backlight/brightness
```

修改背光:

PowerShell

```
1 root@linaro-alip:/# echo 200 > /sys/class/backlight/backlight/brightness
```

## 2.7 RTC



断开网卡等外围设备，防止网络时间的干扰。

设置时间并同步:

```
1 root@linaro-alip:~# date -s "2024-07-22 14:25:30"
2 2024年 07月 22日 星期一 14:25:30 UTC
3 root@linaro-alip:~# hwclock -w
4 root@linaro-alip:~# hwclock -r
5 2024-07-22 14:25:35.380799+00:00
```

断电一段时间后，上电读取rtc时间，和系统时间相差无几：

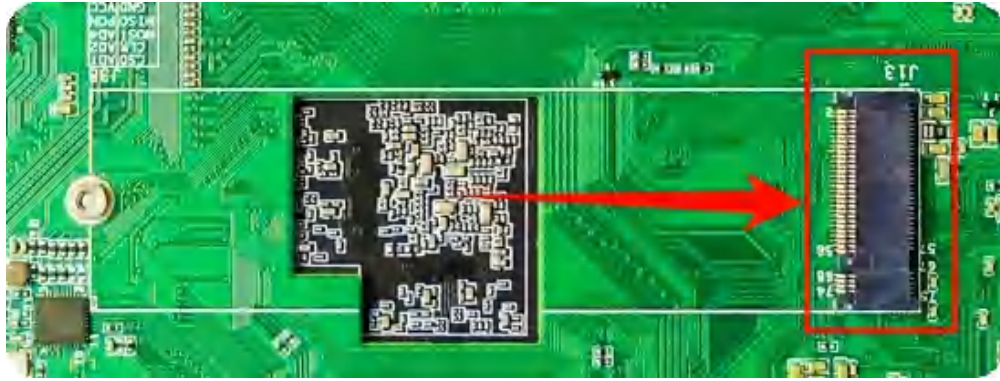
```
1 root@linaro-alip:~# date
2 2024年 07月 22日 星期一 14:27:42 UTC
3 root@linaro-alip:~# hwclock -r
4 2024-07-22 14:27:43.851327+00:00
```

## 2.8 FAN 风扇



在 55° 自动开启，50° 自动关闭

## 2.10 M2.0 固态



- 接上M2.0 固态，可以识别到一个存储的设备，将设备挂载出来后可以进行正常操作。

```

root@linaro-alip:~# fdisk -l
Disk /dev/ram0: 4 MiB, 4194304 bytes, 8192 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes

Disk /dev/nvme0n1: 119.24 GiB, 128035676160 bytes, 250069680 sectors
Disk model: Colorful CN600 128GB
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x00000000

Device          Boot Start      End  Sectors  Size Id Type
/dev/nvme0n1p1          2048 250069646 250067599 119.2G  c W95 FAT32 (LBA)

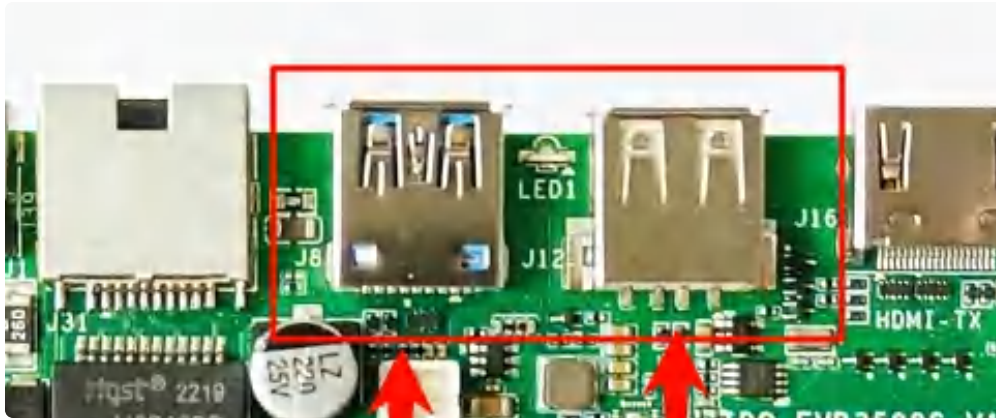
Disk /dev/mmcbk0: 116.48 GiB, 125074145280 bytes, 244285440 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: BE070000-0000-4A15-8000-205E00006C9F

Device          Start      End  Sectors  Size Type
/dev/mmcbk0p1    16384     24575     8192    4M unknown
/dev/mmcbk0p2    24576     32767     8192    4M unknown
• /dev/mmcbk0p3    32768    163839   131072   64M unknown

```

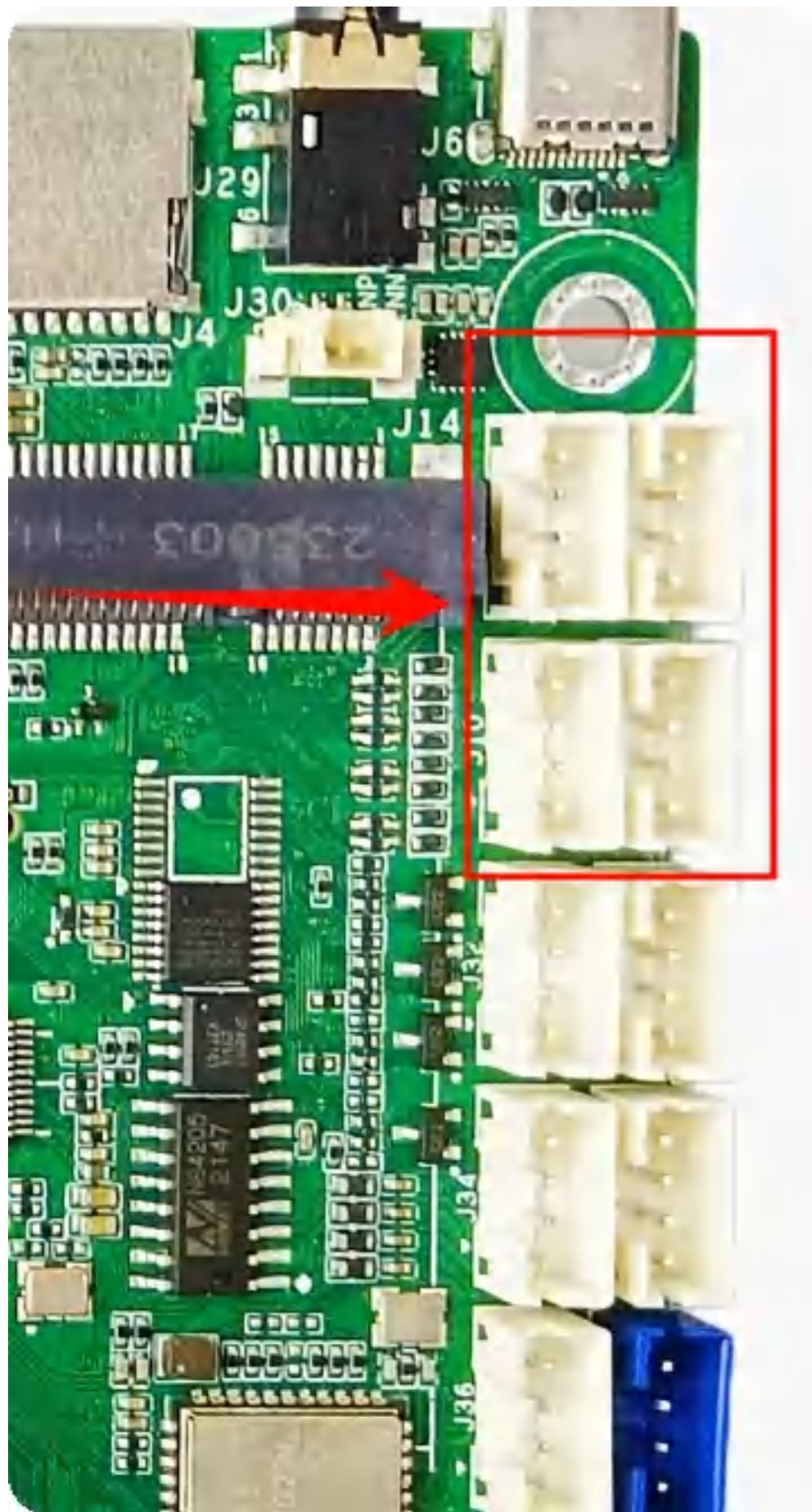
## 2.11 USB

### 2.11.1 Type-A



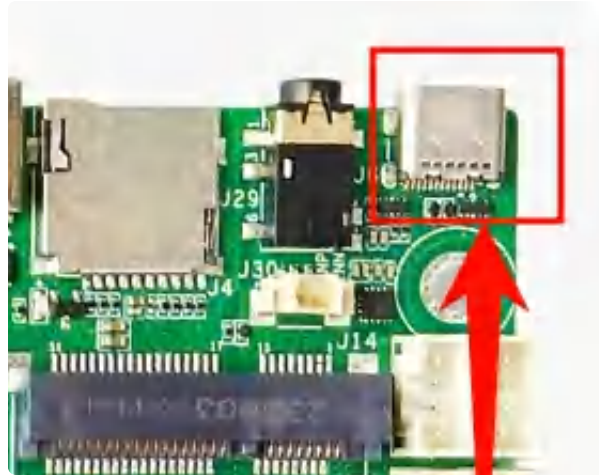
- USB 电源控制（以丝印 J8 座子为例，其他节点类推）
  - 关闭电源：`echo 0 > /sys/class/leds/usb_j8/brightness`
  - 开启电源：`echo 1 > /sys/class/leds/usb_j8/brightness`

## 2.11.2 PH2.0-4A



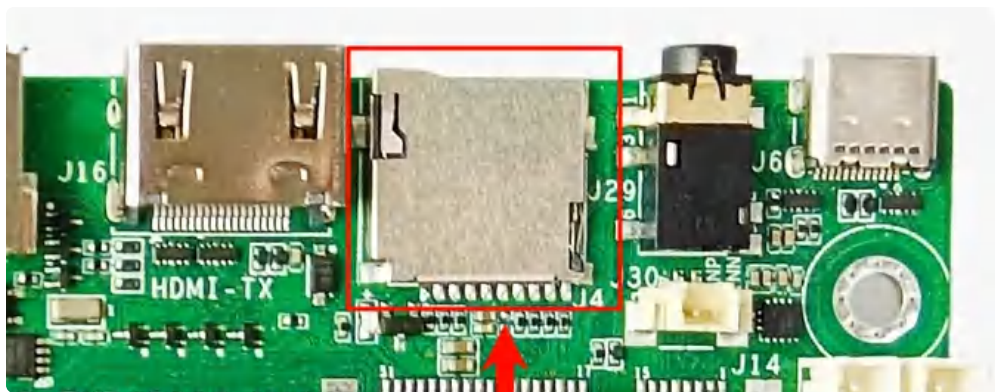
- USB 电源控制 (以丝印 J7 座子为例, 其他节点类推)
  - 关闭电源: `echo 0 > /sys/class/leds/usb_j7/brightness`
  - 开启电源: `echo 1 > /sys/class/leds/usb_j7/brightness`

## 2.11.2 Type-C



TypeC0 支持固件烧写、host 和device 模式的自动切换、DP显示

## 2.12 TF 卡测试

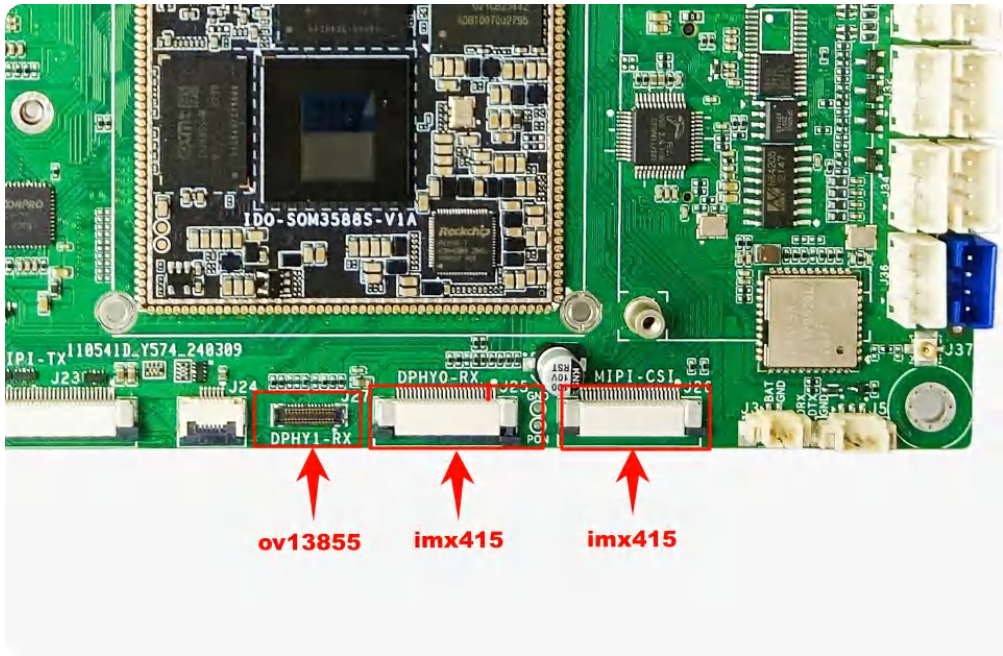


支持热插拔

插入TF卡后, 输入fdisk -l查看sd卡设备:

## 2.13 MIPI 摄像头







查看摄像头节点：

```
1 root@linaro-alip:/# grep "" /sys/class/video4linux/video*/name
2 /sys/class/video4linux/video0/name:stream_cif_mipi_id0
3 /sys/class/video4linux/video10/name:rkCIF_tools_id2
4 /sys/class/video4linux/video11/name:stream_cif_mipi_id0
5 /sys/class/video4linux/video12/name:stream_cif_mipi_id1
6 /sys/class/video4linux/video13/name:stream_cif_mipi_id2
7 /sys/class/video4linux/video14/name:stream_cif_mipi_id3
8 /sys/class/video4linux/video15/name:rkCIF_scale_ch0
9 /sys/class/video4linux/video16/name:rkCIF_scale_ch1
10 /sys/class/video4linux/video17/name:rkCIF_scale_ch2
11 /sys/class/video4linux/video18/name:rkCIF_scale_ch3
12 /sys/class/video4linux/video19/name:rkCIF_tools_id0
13 /sys/class/video4linux/video1/name:stream_cif_mipi_id1
14 /sys/class/video4linux/video20/name:rkCIF_tools_id1
15 /sys/class/video4linux/video21/name:rkCIF_tools_id2
16 /sys/class/video4linux/video22/name:stream_cif_mipi_id0
17 /sys/class/video4linux/video23/name:stream_cif_mipi_id1
18 /sys/class/video4linux/video24/name:stream_cif_mipi_id2
19 /sys/class/video4linux/video25/name:stream_cif_mipi_id3
20 /sys/class/video4linux/video26/name:rkCIF_scale_ch0
21 /sys/class/video4linux/video27/name:rkCIF_scale_ch1
22 /sys/class/video4linux/video28/name:rkCIF_scale_ch2
23 /sys/class/video4linux/video29/name:rkCIF_scale_ch3
24 /sys/class/video4linux/video2/name:stream_cif_mipi_id2
25 /sys/class/video4linux/video30/name:rkCIF_tools_id0
26 /sys/class/video4linux/video31/name:rkCIF_tools_id1
27 /sys/class/video4linux/video32/name:rkCIF_tools_id2
28 /sys/class/video4linux/video33/name:rkisp_mainpath
29 /sys/class/video4linux/video34/name:rkisp_selfpath
30 /sys/class/video4linux/video35/name:rkisp_fbcpath
31 /sys/class/video4linux/video36/name:rkisp_iqtool
32 /sys/class/video4linux/video37/name:rkisp_rawrd0_m
33 /sys/class/video4linux/video38/name:rkisp_rawrd2_s
34 /sys/class/video4linux/video39/name:rkisp_rawrd1_l
35 /sys/class/video4linux/video3/name:stream_cif_mipi_id3
36 /sys/class/video4linux/video40/name:rkisp-statistics
37 /sys/class/video4linux/video41/name:rkisp-input-params
38 /sys/class/video4linux/video42/name:rkisp_mainpath
39 /sys/class/video4linux/video43/name:rkisp_selfpath
40 /sys/class/video4linux/video44/name:rkisp_fbcpath
41 /sys/class/video4linux/video45/name:rkisp_iqtool
42 /sys/class/video4linux/video46/name:rkisp_rawrd0_m
43 /sys/class/video4linux/video47/name:rkisp_rawrd2_s
44 /sys/class/video4linux/video48/name:rkisp_rawrd1_l
45 /sys/class/video4linux/video49/name:rkisp-statistics
```

```
46 /sys/class/video4linux/video4/name:rkCIF_scale_ch0
47 /sys/class/video4linux/video50/name:rkisp-input-params
48 /sys/class/video4linux/video51/name:rkisp_mainpath
49 /sys/class/video4linux/video52/name:rkisp_selfpath
50 /sys/class/video4linux/video53/name:rkisp_fbcpath
51 /sys/class/video4linux/video54/name:rkisp_iqtool
52 /sys/class/video4linux/video55/name:rkisp_rawrd0_m
53 /sys/class/video4linux/video56/name:rkisp_rawrd2_s
54 /sys/class/video4linux/video57/name:rkisp_rawrd1_l
55 /sys/class/video4linux/video58/name:rkisp-statistics
56 /sys/class/video4linux/video59/name:rkisp-input-params
57 /sys/class/video4linux/video5/name:rkCIF_scale_ch1
58 /sys/class/video4linux/video6/name:rkCIF_scale_ch2
59 /sys/class/video4linux/video7/name:rkCIF_scale_ch3
60 /sys/class/video4linux/video8/name:rkCIF_tools_id0
61 /sys/class/video4linux/video9/name:rkCIF_tools_id1
```

imx415节点为/dev/video33和/dev/video42， ov13855节点为/dev/video51。

预览命令：

video33:

```
PowerShell |
1 gst-launch-1.0 v4l2src device=/dev/video33 ! video/x-raw, format=NV12, width=1920, height=1080, framerate=30/1 ! kmssink plane-id=54
```

video42:

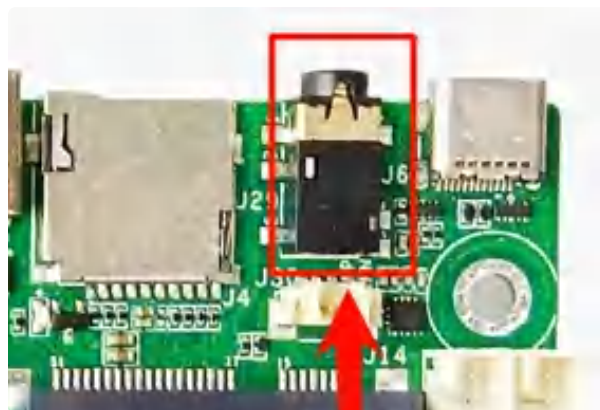
```
PowerShell |
1 gst-launch-1.0 v4l2src device=/dev/video42 ! video/x-raw, format=NV12, width=1920, height=1080, framerate=30/1 ! kmssink plane-id=54
```

video51:

```
PowerShell |
1 gst-launch-1.0 v4l2src device=/dev/video51 ! video/x-raw, format=NV12, width=1920, height=1080, framerate=30/1 ! kmssink plane-id=54
```

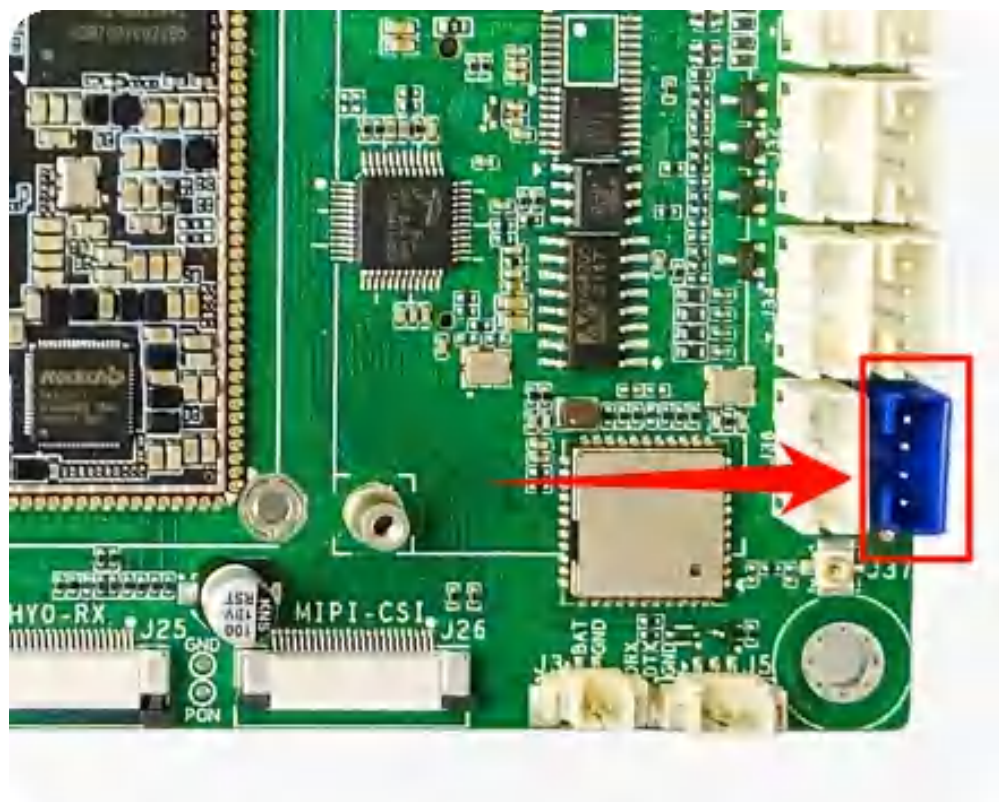
## 2.14 Audio 测试

## 2.14.1 耳机



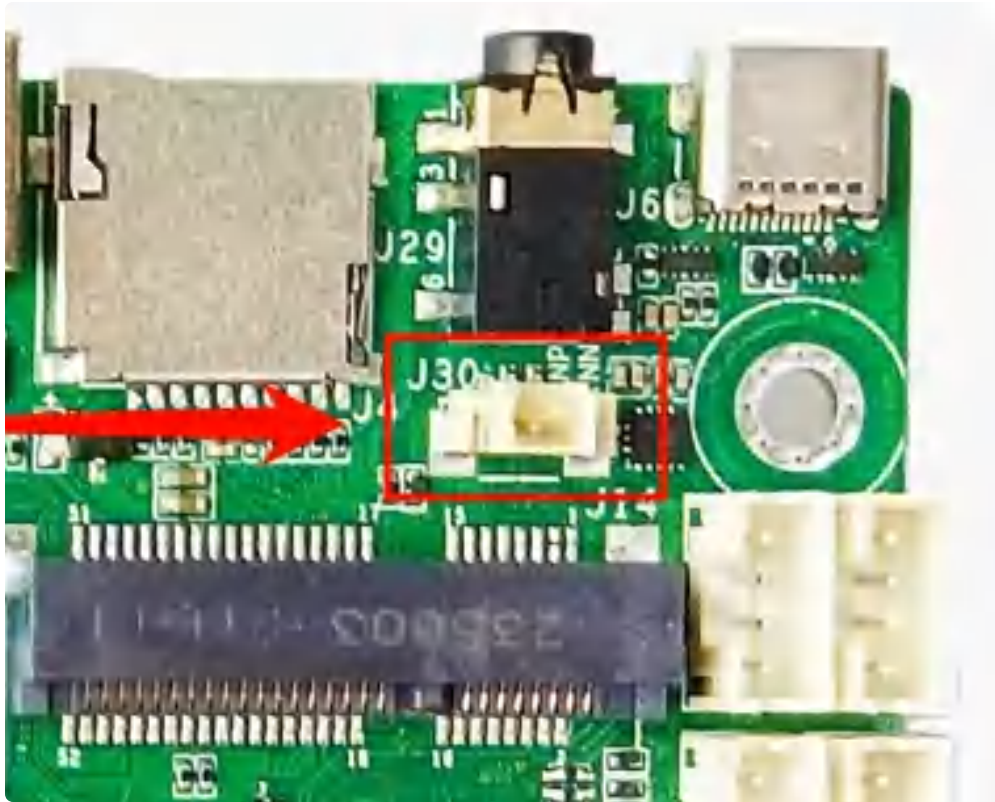
支持耳机检测

## 2.14.2 喇叭SPK



支持左右声道

## 2.14.3 Mic



测试：

查看录音设备：

```
PowerShell |
1 root@linaro-alip:/# arecord -l
2 **** List of CAPTURE Hardware Devices ****
3 card 2: rockchipes8388c [rockchip,es8388-codec], device 0: dailink-multicod
ecs ES8323.7-0011-0 [dailink-multicodecs ES8323.7-0011-0]
4 Subdevices: 1/1
5 Subdevice #0: subdevice #0
```

查看音频设备：

```
1 root@linaro-alip:/# aplay -l
2 **** List of PLAYBACK Hardware Devices ****
3 ▾ card 0: rockchipdp0 [rockchip-dp0], device 0: rockchip-dp0 spdif-hifi-0 [r
   ockchip-dp0 spdif-hifi-0]
4   Subdevices: 1/1
5   Subdevice #0: subdevice #0
6 ▾ card 1: rockchiphdmi0 [rockchip-hdmi0], device 0: rockchip-hdmi0 i2s-hifi-
   0 [rockchip-hdmi0 i2s-hifi-0]
7   Subdevices: 1/1
8   Subdevice #0: subdevice #0
9 ▾ card 2: rockchipes8388c [rockchip,es8388-codec], device 0: dailink-multico
   decs ES8323.7-0011-0 [dailink-multicodecs ES8323.7-0011-0]
10  Subdevices: 1/1
11  Subdevice #0: subdevice #0
```

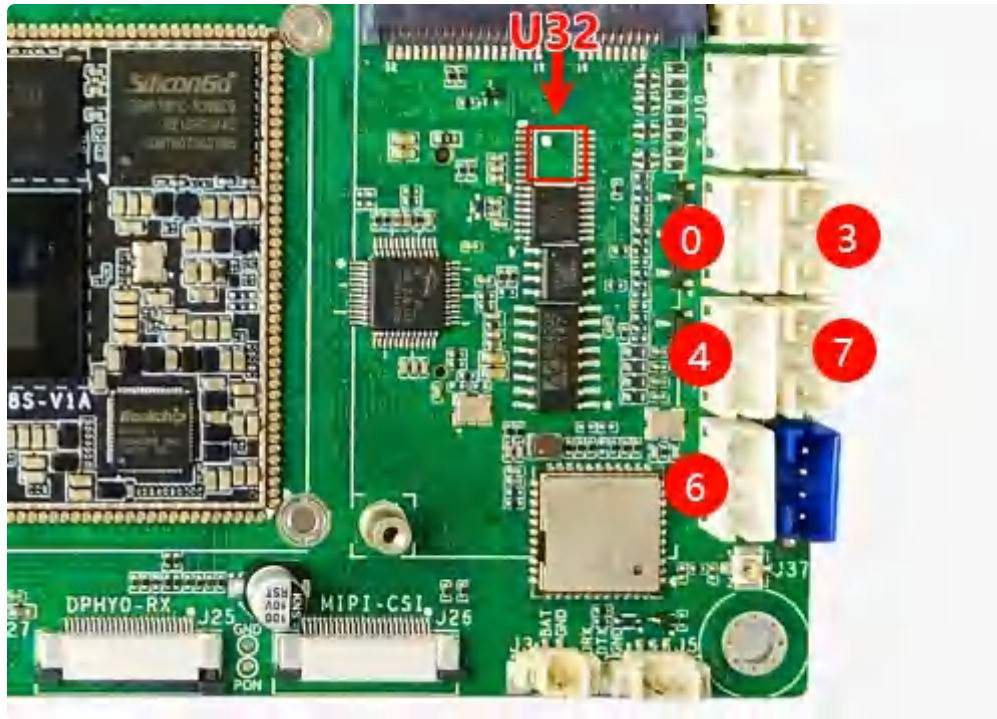
录音测试:

```
1 root@linaro-alip: arecord -D hw:2,0 -f S16_LE -r 16000 -c 2 test.wav
```

播放音频:

```
1 root@linaro-alip: aplay -D plughw:2,0 test.wav
```

## 2.15 串口测试



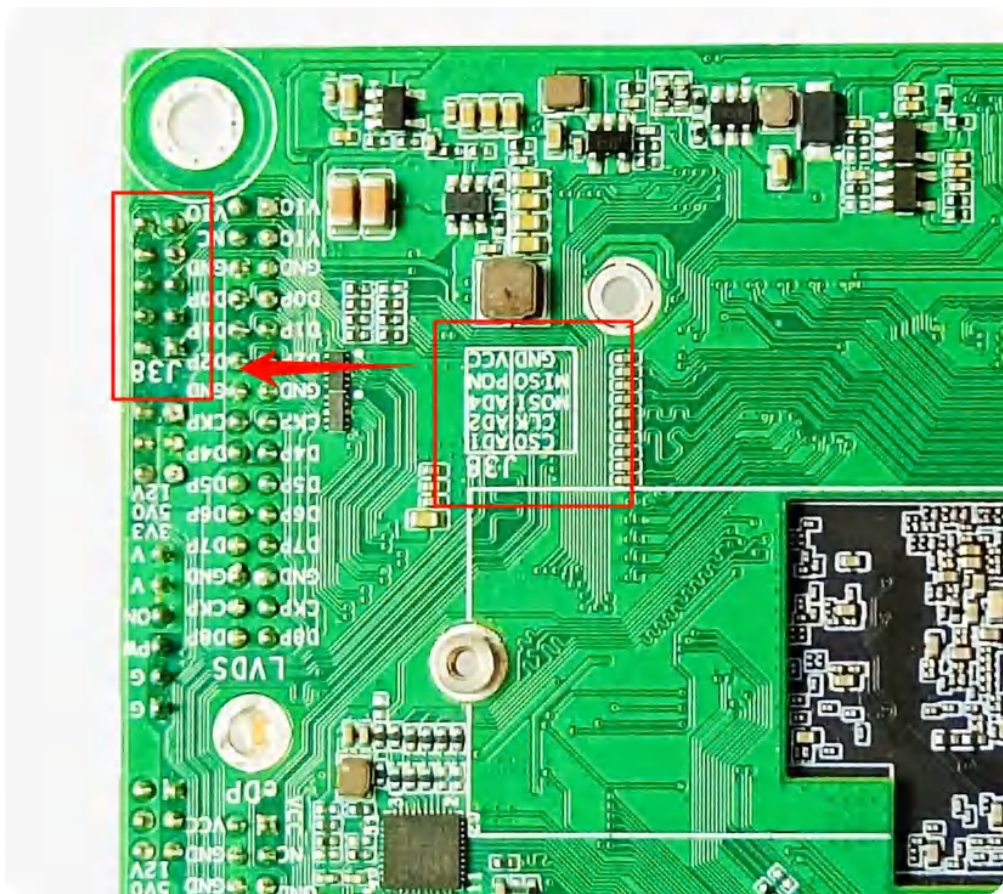
U32 默认不贴，串口0、串口3 为 TTL 电平

设备控制节点如下表所示：

序号	功能	设备节点
0	TTL J32 (丝印 J32)	/dev/ttyS0
3	TTL J33 (丝印 J33)	/dev/ttyS3
4	RS232 J34 (丝印 J34)	/dev/ttyS4
7	RS232 J35 (丝印 J35)	/dev/ttyS7
6	485 (丝印 J36)	/dev/ttyS6

## 2.16 GPIO





序号	管脚标号	GPIO 标号	GPIO 序号
1	CS0	GPIO1_A3	35
2	CLK	GPIO1_A2	34
3	MOSI	GPIO1_A1 (复用为 485, 当前作为485使用)	33

4	MISO	GPIO1_A0 (复用为 485, 当前作为485使用)	32
5	GND	地	/
6	AD1	recovery 键	/
7	AD2	ADC2	/
8	AD4	ADC4	/
9	PON	Power 键	/
10	VCC	3.3V 供电	/

## GPIO 控制方式（默认使用）

默认内部上拉输出高电平。往设备节点写“0”输出低电平，写“255”输出高电平

shell控制输出的方法如下：

```

▼ PowerShell |
1 # 输出低电平（默认状态）
2 echo 0 > /sys/class/leds/spi_cs/brightness
3
4 # 输出高电平
5 echo 255 > /sys/class/leds/spi_cs/brightness

```

## 2.17 SPI

序号	管脚	功能
1	MISO	SPI4_MISO
2	MOSI	SPI4_MOSI
3	CLK	SPI4_CLK
4	CS0	SPI4_CS0_M2

默认配置为 GPIO 功能，使用 SPI 接口，需要修改软件配置

## 2.18 mSATA

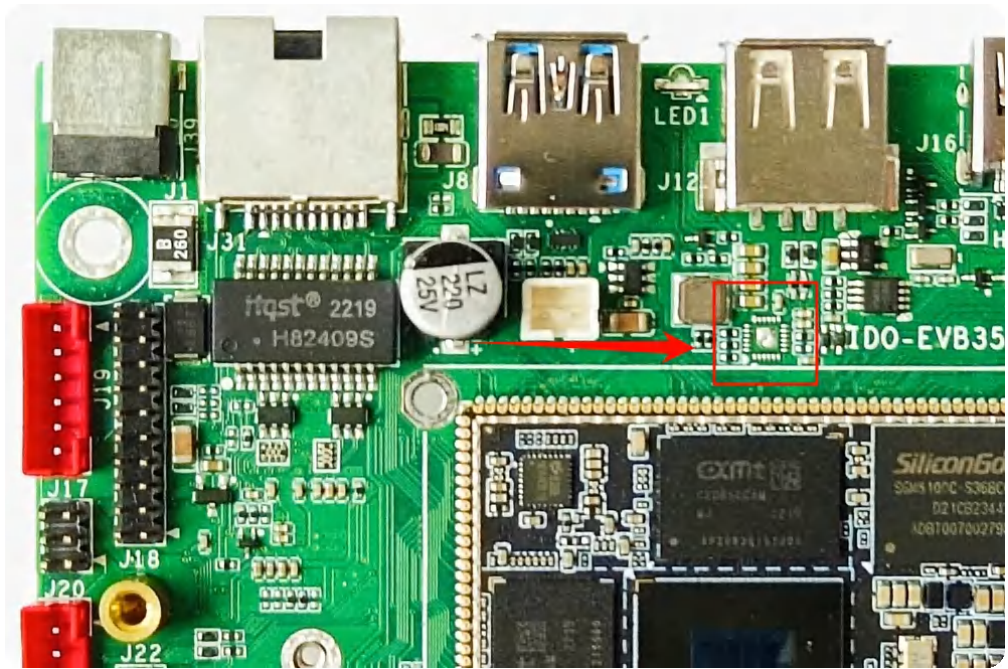


默认配置为 4G，支持 mSATA 需要修改硬件为 3.3V 供电

需要修改软件配置

可以识别到一个存储的设备，并且可以读写

## 2.19 重力传感器



预留功能，默认不贴 MPU6500