



# Product Introduction

Let's get to know the P2pro in 5 minutes.

## Overview

The ArmSoM-P2pro is powered by the Rockchip RK3308B-S, which comes with a 64-bit quad-core ARM Cortex-A35 processor, USB, Ethernet, Bluetooth, wireless connectivity and a voice detection engine. With rich audio interfaces (such as MIC/PDM/SPDIF/I2S), RK3308 is ideal product for IoT and voice applications. The ArmSoM-p2pro uses 512MB DDR3 RAM and uses eMMC (optional) or SD card as the storage of operating system.

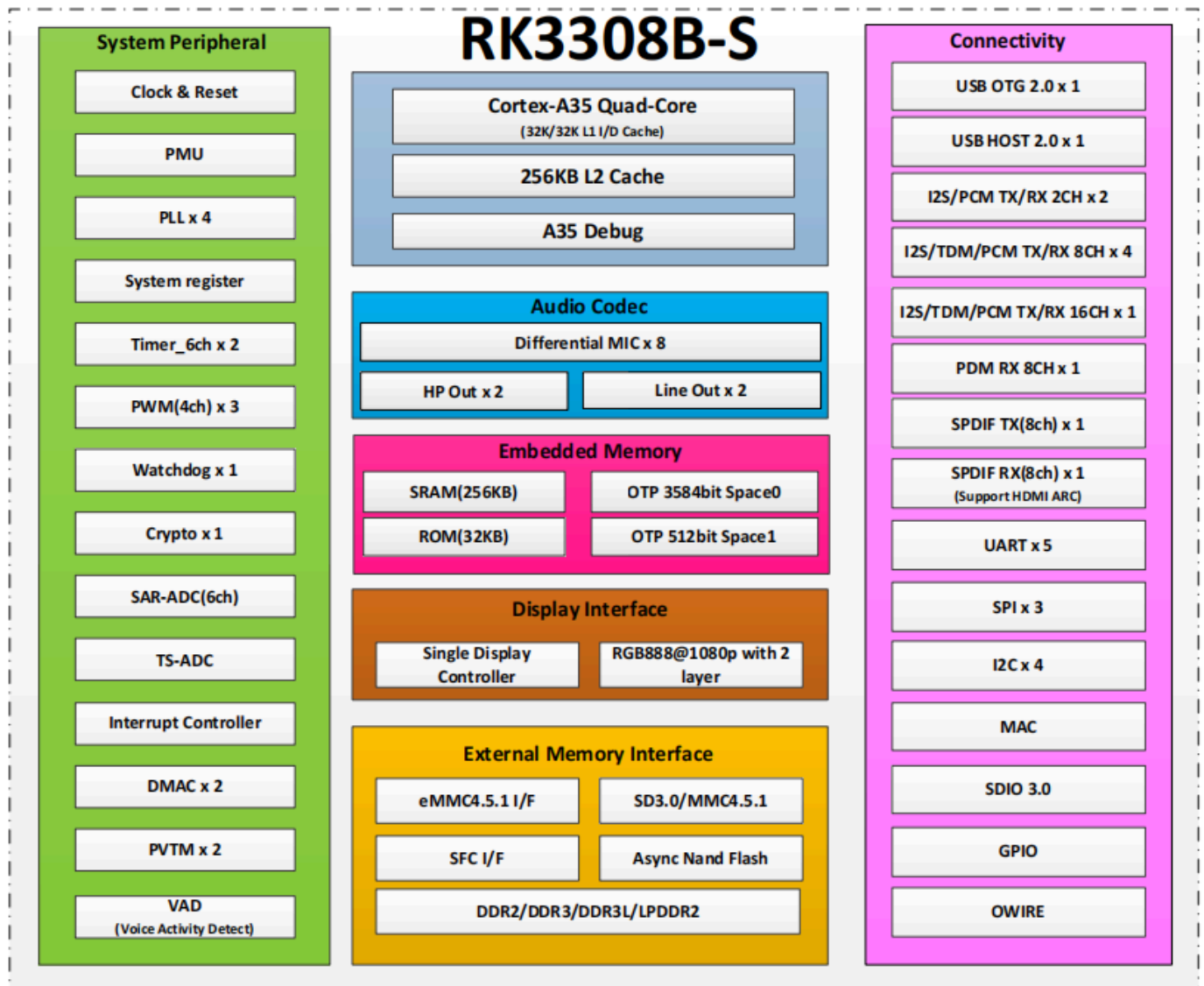


## Key Parameters

- SoC: Rockchip RK3308
- CPU: Quad-core ARM Cortex-A35@ 1.2GHz, 28nm
- RAM: 512MB DDR3
- Flash: 8GB eMMC, optional
- WiFi&Bluetooth: 802.11 a/b/g/n/ac & BT5.0 (AP6256)
- Operating voltage: Wide range input voltage, 5V (voltage tolerance  $\pm 5\%$ )
- Operating temperature: 0°C ~ 70°C

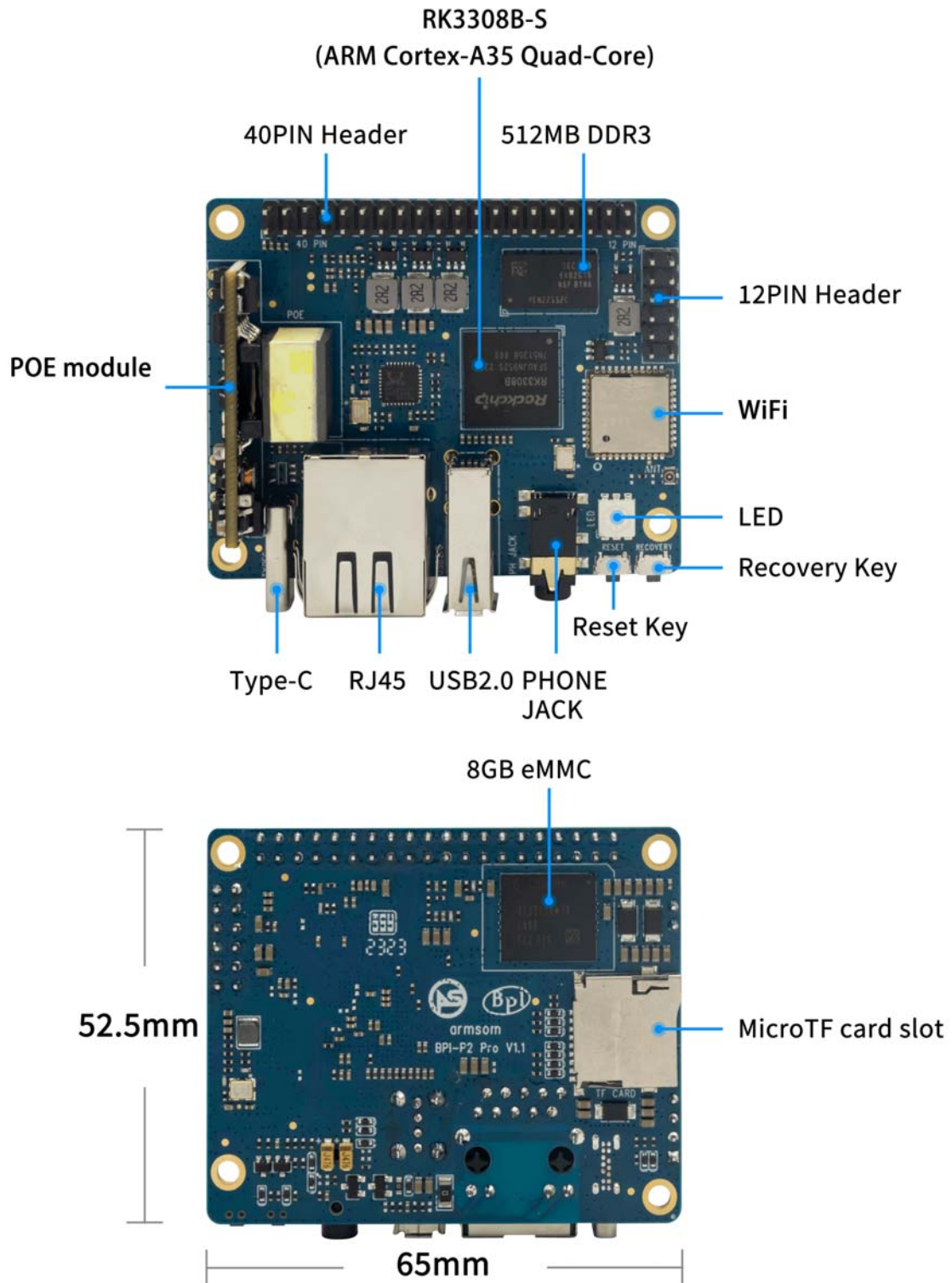
- Operating system:
  - Officially supported by Rockchip: Debian11, Buildroot
  - Third party support: istoreos (openwrt)
- Weight:
- Size: 52.5mm × 65mm

## rk3308b-s Block Diagram



## Hardware

### Hardware Interface



### TIP

The PoE module and eMMC module of P2pro are not equipped by default. They are optional choices.

## Hardware Specifications

| Model                 | ArmSoM-p2 pro  |
|-----------------------|--|
| SoC                   | RockChip RK3308B-S   |
| CPU                   | Quad-core ARM <a href="#">Cortex-A35@1.3GHz</a>  |
| RAM                   | 256MB/512MB, DDR3  |
| Flash                 | 8GB, eMMC optional. Support MicroSD card expansion   |
| Networking            | 1x 100Mbit/s Ethernet(PoE optional),802.11 a/b/g/n/ac & BT5.0 (AP6256)   |
| USB                   | 1x USB 2.0,1x USB Type-C   |
| Audio Input           | 8x MIC(40PIN Header),1x PDM/I2S(40PIN Header)  |
| Audio Output          | 2x Line out(40PIN Header),1x SPDIF out(40PIN Header),1x Audio Jack   |
| Other Interfaces      | 1x SPI/UART(12PIN Header),1x I2S(40PIN Header;8channel,SDI=4CH,SDO=4CH),1x I2C(12PIN Header),1x UART(12PIN Header),2x PWM(12PIN Header),1x ADC(40PIN Header) |
| Buttons               | 1x Reset Button,1x Recovery Button   |
| LED                   | 1x LED(RGB)  |
| Power Supply          | USB Type-C(5V/2A)  |
| OS                    | Debian11, Buildroot,istoreos   |
| Dimensions            | 65mm x 52.5mm  |
| Weight                | 30g  |
| Operating Temperature | 0°C ~ 70°C   |

## Hardware Pin Definition

**40-pin Header**

| <b>GPIO number</b> | <b>Function</b>                      | <b>Pin</b> | <b>Pin</b> | <b>Function</b>                 | <b>GPIO number</b> |
|--------------------|--------------------------------------|------------|------------|---------------------------------|--------------------|
|                    | +3.3V                                | 1          | 2          | +5.0V                           |                    |
|                    | ADC_KEY_IN1                          | 3          | 4          | +5.0V                           |                    |
| 69                 | GPIO2_A5 / I2S0_SCLK_TX              | 5          | 6          | SPDIF_TX / GPIO0_C1             | 17                 |
| 70                 | I2S0_SCLK_RX / GPIO2_A6 / PDM_CLK    | 7          | 8          | I2S0_LRCK_TX / GPIO2_A7         | 71                 |
| 68                 | I2S0_8CH_MCLK / GPIO2_A4 / I2S0_MCLK | 9          | 10         | I2S0_LRCK_RX / GPIO2_B0         | 72                 |
| 73                 | GPIO2_B1 / I2S0_SDO0                 | 11         | 12         | PDM_SDI0 / GPIO2_B5 / I2S0_SDI0 | 77                 |
| 74                 | GPIO2_B2 / I2S0_SDO1                 | 13         | 14         | PDM_SDI1 / GPIO2_B6 / I2S0_SDI1 | 78                 |
| 75                 | GPIO2_B3 / I2S0_SDO2                 | 15         | 16         | PDM_SDI2 / GPIO2_B7 / I2S0_SDI2 | 79                 |
| 76                 | GPIO2_B4 / I2S0_SDO3                 | 17         | 18         | GPIO2_C0 / PDM_SDI3 / I2S0_SDI3 | 80                 |
|                    | GND                                  | 19         | 20         | GND                             |                    |
|                    | LINEOUT_L                            | 21         | 22         | LINEOUT_R                       |                    |
|                    | MICBIAS1                             | 23         | 24         | MICBIAS2                        |                    |
|                    | MICP1                                | 25         | 26         | MICN1                           |                    |
|                    | MICP2                                | 27         | 28         | MICN2                           |                    |
|                    | MICP3                                | 29         | 30         | MICN3                           |                    |
|                    | MICP4                                | 31         | 32         | MICN4                           |                    |
|                    | MICP5                                | 33         | 34         | MICN5                           |                    |
|                    | MICP6                                | 35         | 36         | MICN6                           |                    |
|                    | MICP7                                | 37         | 38         | MICN7                           |                    |
|                    | MICP8                                | 39         | 40         | MICN8                           |                    |

**12 PIN GPIO**

| <b>GPIO number</b> | <b>Function</b>                          | <b>Pin</b> | <b>Pin</b> | <b>Function</b>     | <b>GPIO number</b> |
|--------------------|--|------------|------------|---------------------|--------------------|
| 65                 | UART0_TX / GPIO2_A1 / SPI0_TX            | 1          | 2          | I2C1_SDA / GPIO0_B3 | 11                 |
| 64                 | UART0_RX / GPIO2_A0 / SPI0_RX            | 3          | 4          | I2C1_SCL / GPIO0_B4 | 12                 |
| 56                 | SPI2_CS / I2C0_SCL / GPIO1_D1 / UART1_TX | 5          | 6          | VCC_IO +3.3V        | 17                 |

| GPIO number | Function  | Pin | Pin | Function                   | GPIO number |
|-------------|---|-----|-----|----------------------------|-------------|
| 57          | SPI2_CLK / I2C0_SDA / GPIO1_D0 / UART1_TX         | 7   | 8   | GND                        |             |
| 55          | JTAG_TMS /<br>UART2_TX_M0<br>/ GPIO1_C7 / SPI2_TX | 9   | 10  | PWM2 / GPIO0_B7 / I2C3_SDA | 15          |
| 54          | JTAG_TCK /<br>UART2_RX_M0<br>/ GPIO1_C6 / SPI2_RX | 11  | 12  | PWM3 / GPIO0_C0 / IR_RX    | 16          |

## Resources

### Source Code

[ArmSoM-P2pro BSP](#)

### Official Image

The following systems have been tested and verified by ArmSoM official:

Network disk address: [Google Drive link](#)

#### debain bullseye

Firmware location: 3. Linux image/debian/ArmSoM-P2pro

#### istoreos

Firmware location: 3. Linux image/openwrt/ArmSoM-P2pro

### Third Party System

#### armbian



We are working on adapting armbian systems! Coming soon...

## Hardware Resources

[ArmSoM-p2pro v1.1 Schematic pdf](#)

[ArmSoM-p2pro v1.1 Bottom&Top](#)

[ArmSoM-p2pro v1.1 Component diagram](#)

[ArmSoM-p2pro v1.1 datasheet](#)

### **VERSION CHANGE HISTORY**

v1.0 is an internal version (fail to disclose now)

## User Manual

The P2pro user manual helps users understand the basic usage and preparation work needed for P2pro.

Its model and hardware version can be found printed on the board when you got P2pro.

This article gives an overview of the product information to you in as much detail as possible.

## Getting Started

Before starting to use ArmSoM-P2pro, please prepare the following items

## Tool Preparation

- P2pro main board
- Power supply: USB Type-C
  - Support 5V/2A
- System Installation (choose one)
  - MicroSD card/TF card boot
    - MicroSD card/TF card, Class 10 or above, at least 8GB SDHC and card reader
    - The following are high-speed TF cards tested and verified by the ArmSoM team
      - SanDisk 32GB TF (MicroSD) (Developer Recommended)
      - SanDisk 32GB TF (MicroSD) Driving Recorder & Security Surveillance Dedicated Storage Card (Long Term Running Recommended)
      - Sandisk TF 8G Class10 microSD
      - Sandisk TF 128G Class10 microSD XC TF 128G 48MB/S:
  - Onboard eMMC boot
    - USB Type-C data cable, P2pro typec port connected to computer, write image.

## Optional Options

- Ethernet cable
  - P2pro supports Ethernet access, up to 100M.
  - The network cable is used to connect P2pro to the local network and the Internet.
- Wireless WIFI
  - P2pro supports wireless Internet access, and supports 802.11 a/b/g/n/ac & BT5.0 (AP6256)
- Audio cable
  - You can play audio through speakers or headphones using a standard 3.5 mm jack.
- USB-A to USB-C data cable

## Image Flashing

[Flash System Image](#)

## Interface Setup

If this is your first time using the ArmSoM-P2pro, please familiarize yourself with the [Peripheral Interfaces](#Hardware Interface) first to better understand the following.



100M Ethernet

If you are using wired Ethernet access, please insert the network cable into the RJ45 port on ArmSoM-P2pro, and the network port light flashes,indicating hardware connected properly.

Manually configure Ethernet

- Switch to root user

```
sudo su
```

- Check if Ethernet is working properly with the ifconfig command, and it will display the network card eth0 and Ethernet IP address. In addition, use the ping tool to determine if the network is connected.

```
ifconfig
ping www.baidu.com
```

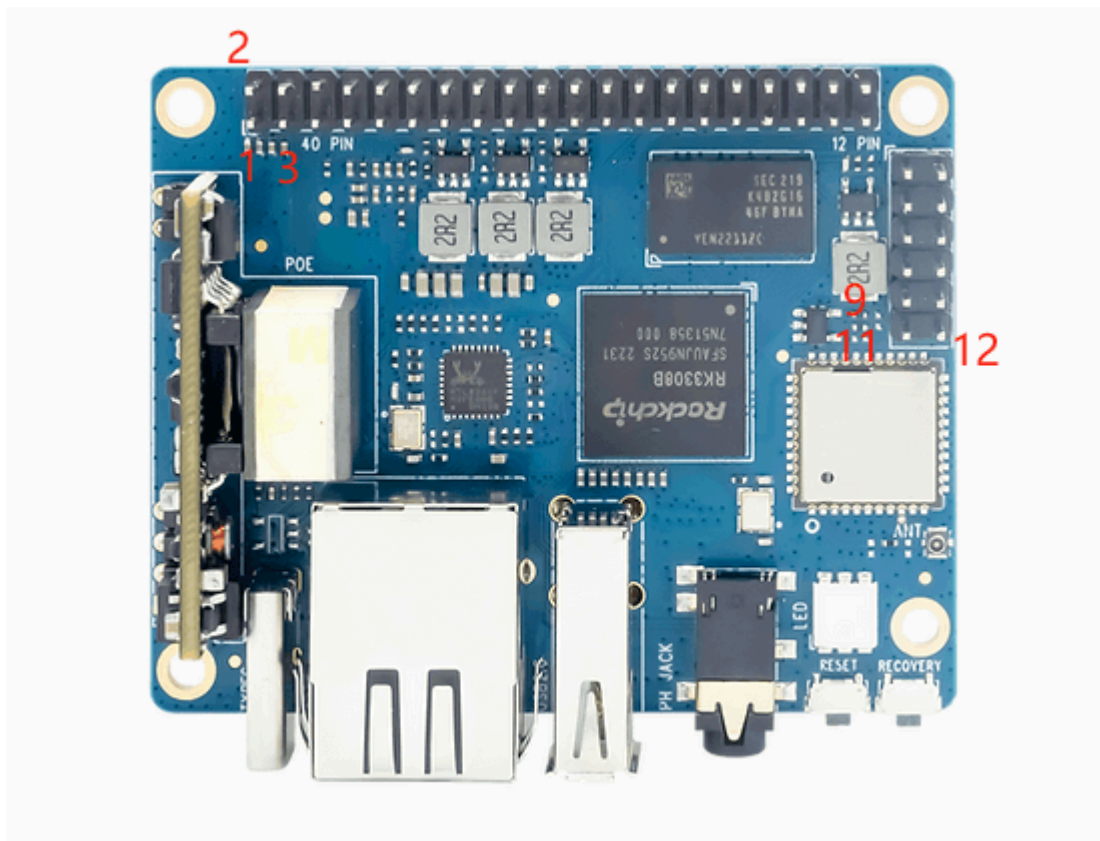
- If unable to ping, please try

```
$ sudo dhclient eth0
```

Debug Serial Port

The debug serial port location is pin 9 and 11 of the 12-pin header

| P2pro       | Connection | Serial Module |
|-------------|------------|---------------|
| GND (pin 8) | --->       | GND           |
| TX (pin 9)  | --->       | RX            |
| RX (pin 11) | --->       | TX            |



## WIFI

```
# 1. Open the WIFI
root@linaro-alip:/# nmcli r wifi on
# 2. Scan WIFI
root@linaro-alip:/# nmcli dev wifi
# 3. Connect to WIFI network
root@linaro-alip:/# nmcli dev wifi connect "wifi_name" password
"wifi_password"
```

| p2pro wifi | 2.4G                    | 5G                      |
|------------|-------------------------|-------------------------|
| debian     | Tx 25 Mbps Rx 46 Mbps   | Tx 130 Mbps Rx 132 Mbps |
| istoreos   | Tx 131 Mbps Rx 130 Mbps | Tx 194 Mbps Rx 193 Mbps |

## BT

```
# 1. Activate Bluetooth
root@linaro-alip:/# service bluetooth start
# 2. Enter bluetoothctl
root@linaro-alip:/# bluetoothctl
# 3. Enter the following command to connect
```

```
root@linaro-alip:/# power on
root@linaro-alip:/# agent on
root@linaro-alip:/# default-agent
root@linaro-alip:/# scan on
root@linaro-alip:/# pair yourDeviceMAC
```

## 音频

### View sound cards in the system:

```
root@linaro-alip:~# aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: rockchiprk3308a [rockchip,rk3308-acodec], device 0: dailink-
multicodecs ff560000.acodec-0 [dailink-multicodecs ff560000.acodec-0]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 7: Loopback [Loopback], device 0: Loopback PCM [Loopback PCM]
  Subdevices: 8/8
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
    Subdevice #7: subdevice #7
card 7: Loopback [Loopback], device 1: Loopback PCM [Loopback PCM]
  Subdevices: 8/8
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
    Subdevice #7: subdevice #7
```

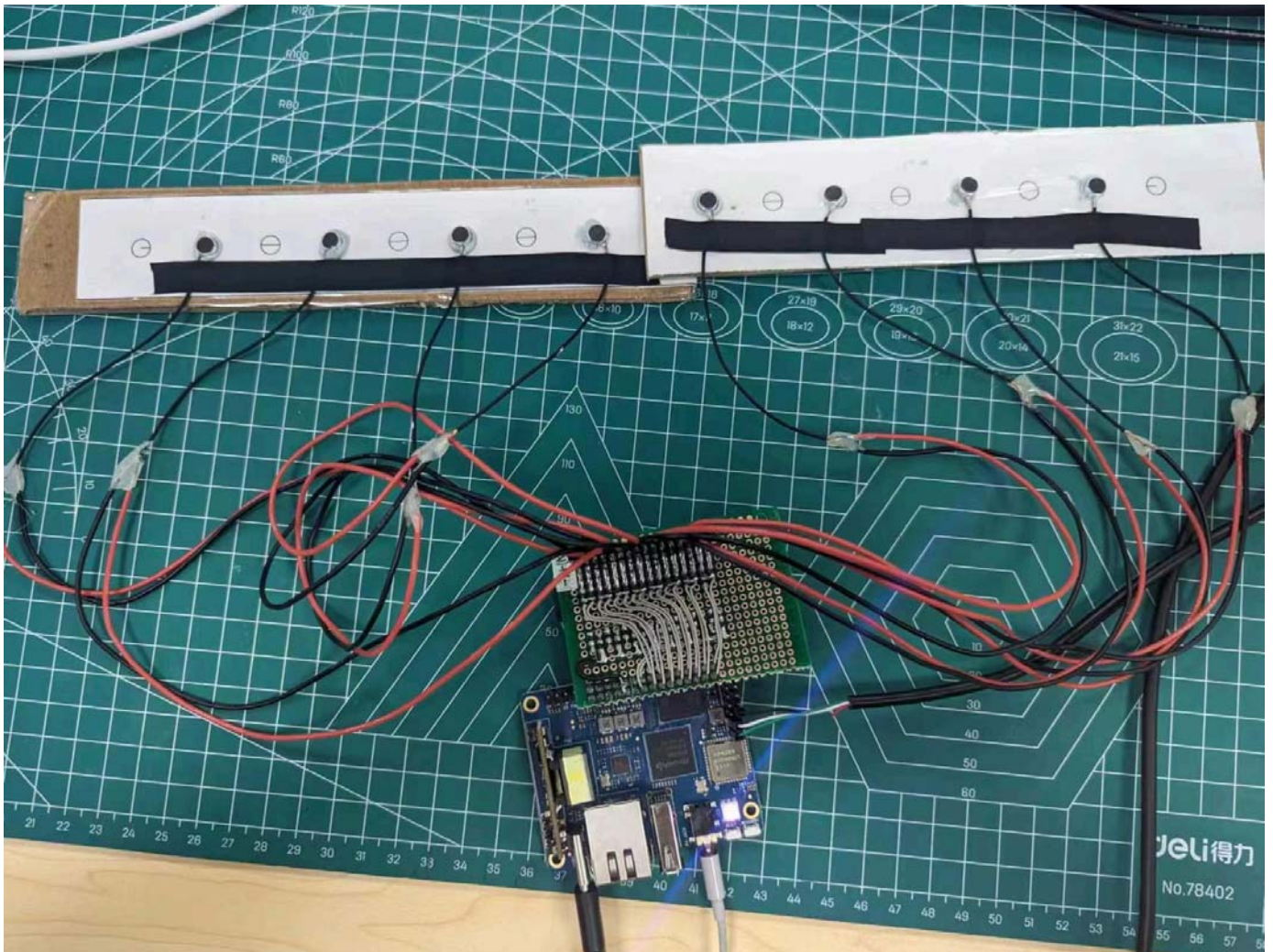
### play music

```
root@linaro-alip:/# aplay -D plughw:0,0
./usr/share/sounds/alsa/Rear_Right.wav
```

## USB Interface

ArmSoM-P2pro provides a USB 2.0 port.

## Mic Interface



## View All Built-in Codec Gains

```
amixer contents
```

The headphone output sound is too low

Check the current left and right channel output gain of the codec:

```
amixer cget name='DAC HPOUT Left Volume'  
amixer cget name='DAC HPOUT Right Volume'
```

Adjust the base gain as needed:

```
amixer cset name='DAC HPOUT Left Volume' 18
amixer cset name='DAC HPOUT Right Volume' 18
```

Adjust volume (percentage):

```
amixer cset name='Master Playback Volume' 40
```

## recording

Mic gain adjustment for built-in codec

- Group 0: mic1/mic2; Group 1: mic3/mic4; Group 2: mic5/mic6; Group 3: mic7/mic8
- The prefix "ADC MIC" indicates adjustment of the linear gain of the front-stage MIC PGA
- The prefix "ADC ALC" indicates adjustment of the linear gain of the back-stage ALC

```
amixer cset name='ADC MIC Group 0 Right Gain' 3
amixer cset name='ADC MIC Group 0 Left Gain' 3
amixer cset name='ADC ALC Group 0 Left Volume' 31
amixer cset name='ADC ALC Group 0 Right Volume' 31
```

```
amixer cset name='ADC MIC Group 1 Right Gain' 3
amixer cset name='ADC MIC Group 1 Left Gain' 3
amixer cset name='ADC ALC Group 1 Left Volume' 31
amixer cset name='ADC ALC Group 1 Right Volume' 31
```

```
amixer cset name='ADC MIC Group 2 Right Gain' 3
amixer cset name='ADC MIC Group 2 Left Gain' 3
amixer cset name='ADC ALC Group 2 Left Volume' 31
amixer cset name='ADC ALC Group 2 Right Volume' 31
```

```
amixer cset name='ADC MIC Group 3 Right Gain' 3
amixer cset name='ADC MIC Group 3 Left Gain' 3
amixer cset name='ADC ALC Group 3 Left Volume' 31
amixer cset name='ADC ALC Group 3 Right Volume' 31
```

```
export ALSA_LIB_ADD_GAIN=3
```

```
// When the sampling rate is greater than 16000hz, the recording command
should add the parameters --period-size=1024 --buffer-size=4096
arecord -D hw:0,0 -c 8 -r 44100 -f S16_LE --period-size=1024 --buffer-
```

```
size=4096 test.wav
```


## Easy to buy sample

ArmSoM online shop: <https://www.armsom.org/product-page/p2pro>

ArmSoM Aliexpress online shop: <https://www.aliexpress.com/item/3256805779421715.html>

ArmSoM Taobao shop: <https://item.taobao.com/item.htm?id=735000017740>

OEM&ODM, please contact: [sales@armsom.org](mailto:sales@armsom.org)

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