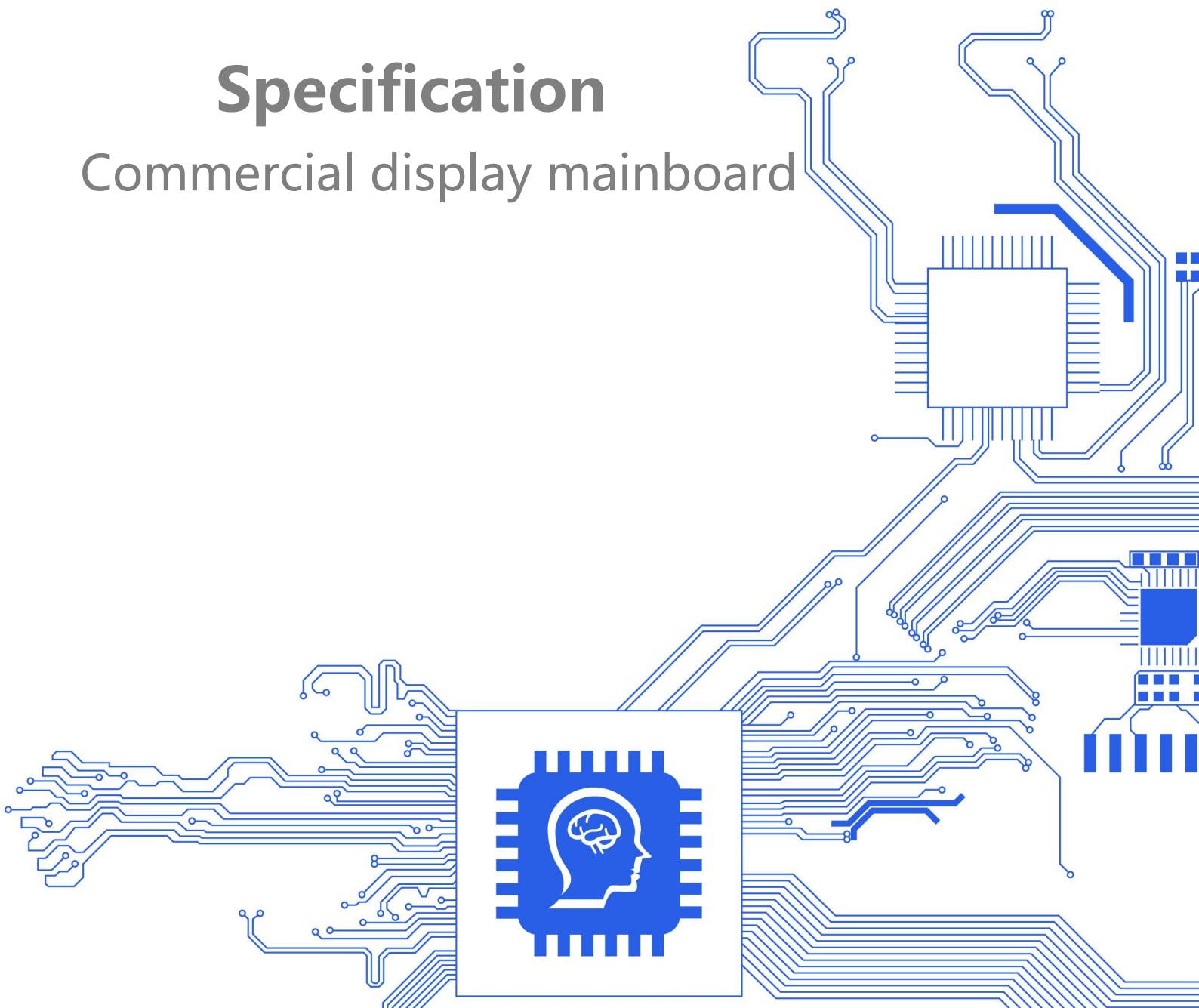
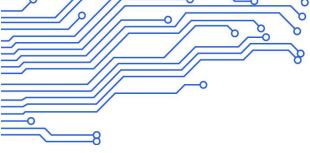


# AIoT-3588SE V1.1

## Specification

Commercial display mainboard





# APPROVAL SHEET

PRODEUCT : \_\_\_\_\_

PRODEUCT SPEC : \_\_\_\_\_

PRODEUCT CODE : \_\_\_\_\_

SAMPLE DATE : \_\_\_\_\_

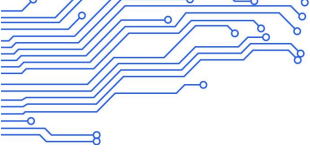
MADE	CHECK	APPROVED BY	PUBLISH SEAL

CUSTOMER : \_\_\_\_\_

PART CODE : \_\_\_\_\_

CUSTOMER APPROVER : \_\_\_\_\_

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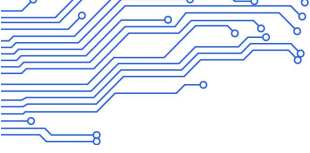
## Document modification history

Version	Revision content	Revision	Check	Date
V1.0	Initial version	Li Lei		2023-05-11

## Statement

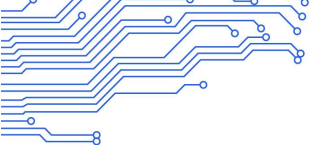
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# Chapter 1 Product Introduction

## 1.1 Scope of application

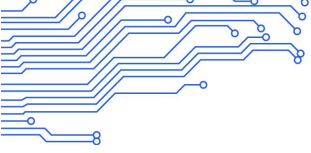
3588SE belongs to the commercial display self-service terminal motherboard, using the RK3588 chip is the 8nm process of low-power, high-performance processor. Generally applicable to smart display terminal products, video terminal products, industrial automation terminal products and computing end product, such as advertising machine, digital signage, smart self-service terminal, smart retail terminal, O2O smart device, Industrial control PC, robot device etc.

## 1.2 Product overview

AIoT-3588SE V1.1 adopts the eight core processor of the Rockchip RK3588S (Cortex-A76x4+Cortex-A55x4), equipped with the Android 12.0 system, the main frequency is up to 2.4GHz, super performance, and rich interfaces. Mali-G610 MP4 GPU, support 8K, 4K, H.265 hard decoding, whether it is running score or decoding are first-class, is your new choice in human-computer interaction, industrial control projects.

## 1.3 Product feature

- ◆ High integration. Integrated LVDS/MIPI/eDP/ Ethernet /WIFI/BT in one, simple and ultra-thin, outstanding.
- ◆ Rich expansion ports. Six USB ports (three pins, two standard USB-A ports, and one type-C), three serial ports (two-channel TTL, one-channel RS232), and GPIO/ADC ports to meet various peripheral requirements in the market.
- ◆ Support three screens display, multi-screen differential display. The LVDS screen supports a maximum resolution of 1920\*1200, the eDP screen supports a maximum resolution of 3840\*2160, and the mipi screen supports a maximum resolution of 1920\*1200.
- ◆ High performance. Built-in Deep Neural network unit (NPU) with performance up to 6.0 TOPS to meet the needs of deep learning projects.
- ◆ Support Android system customization, provide system call interface API reference code, perfect support for customer upper-layer application APP development.
- ◆ Perfect support for infrared, optical, capacitive, resistor, touch film and other mainstream touch

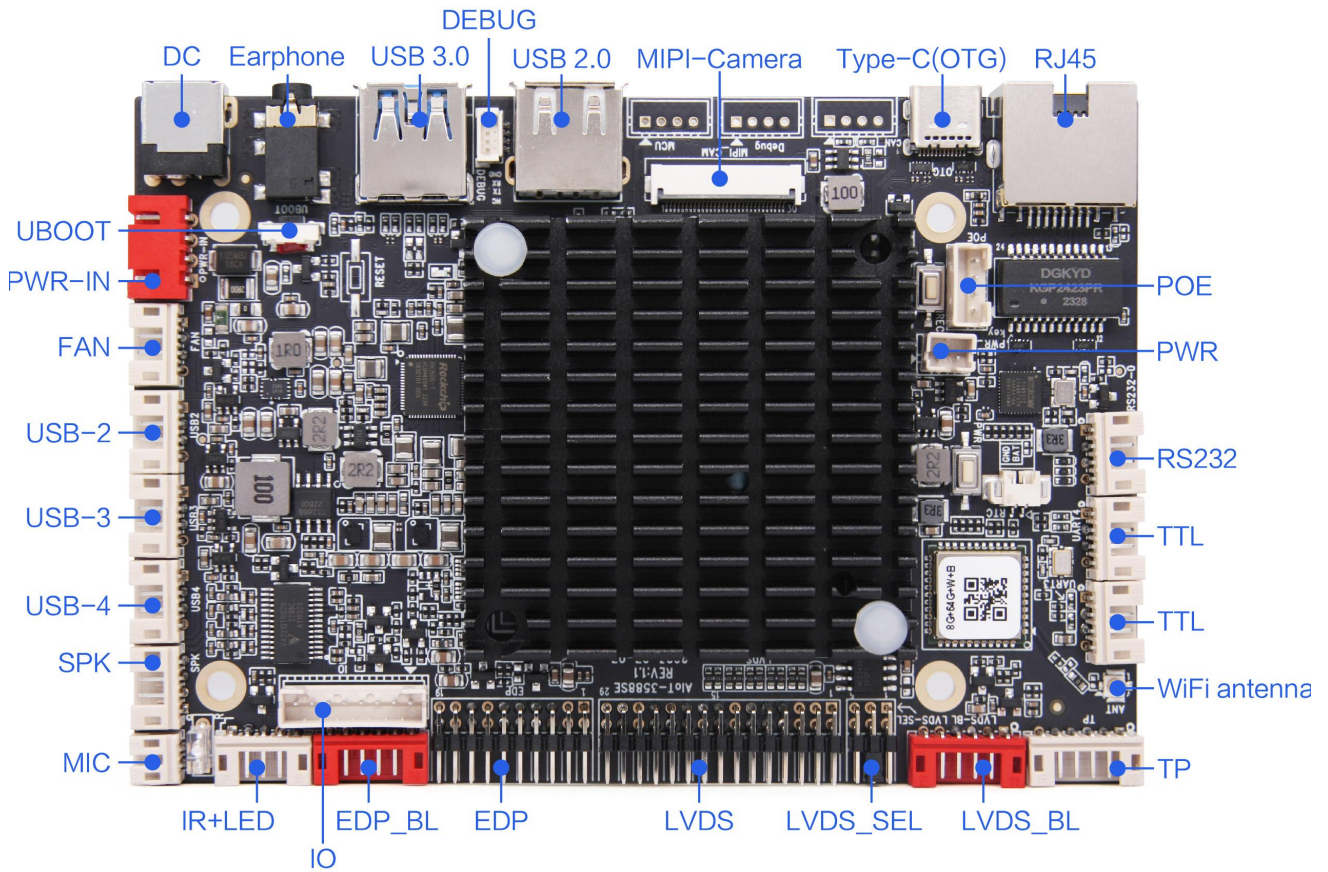


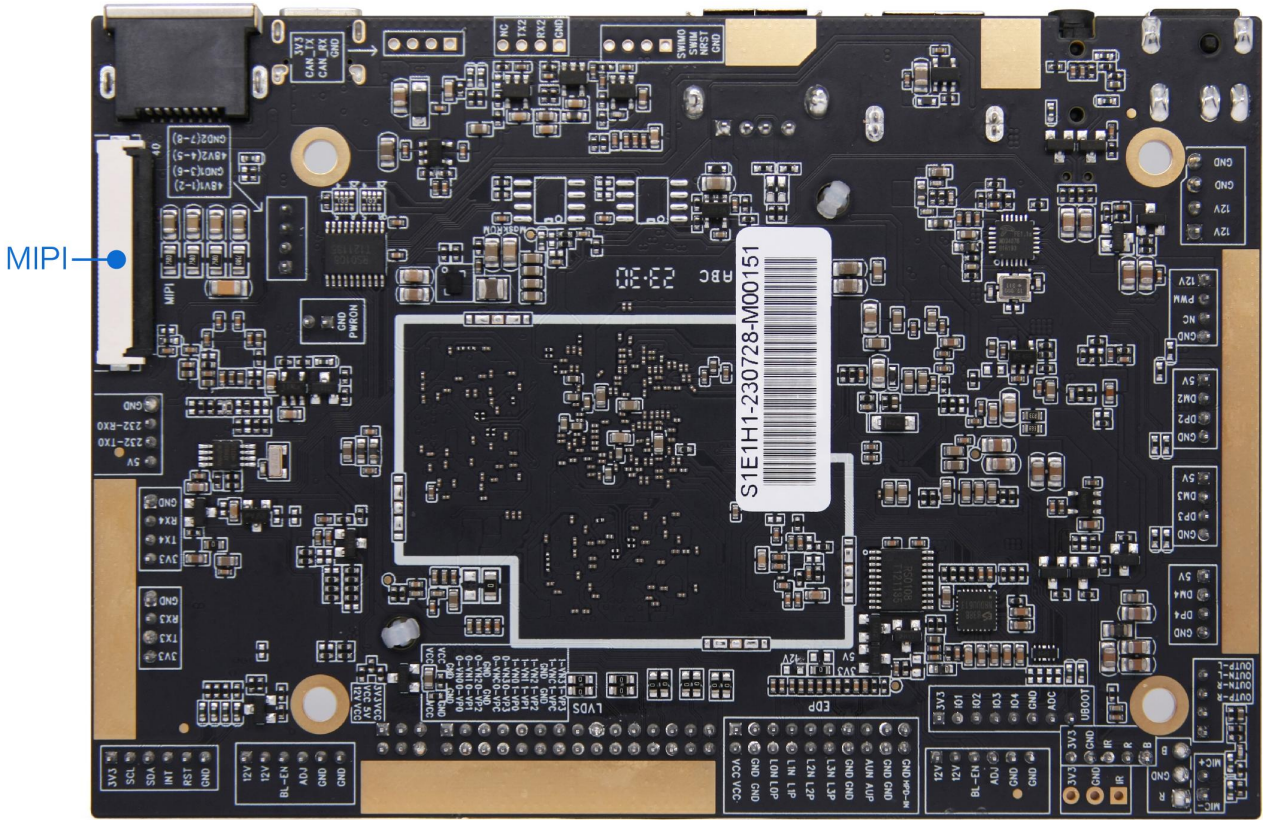
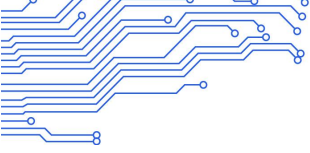
screen, support drive free touch screen HID configuration, no need to debug.

◆ Support USB single-binocular camera, and MIPI camera, MIPI interface can support 1x4-lane@2.5Gbps/lane, up to 48M pixels (8064X6048).

## 1.4 Appearance and interface diagram

Front/Back:





**FRONT  
VIEW**

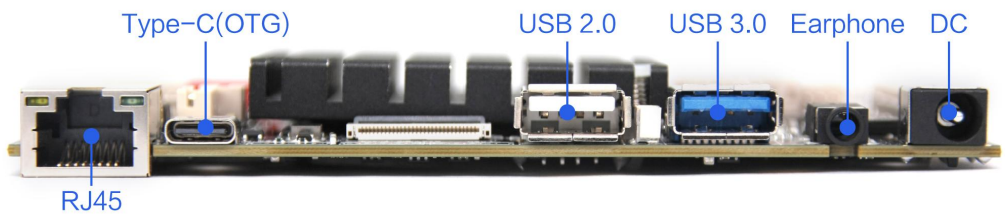
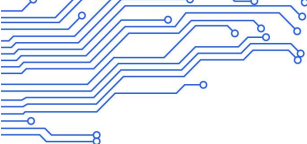


Photo statement: The above photos are taken from a certain batch of boards produced by our company. Due to the continuous maintenance of the product, the actual board cards shipped may not be consistent with the photos.

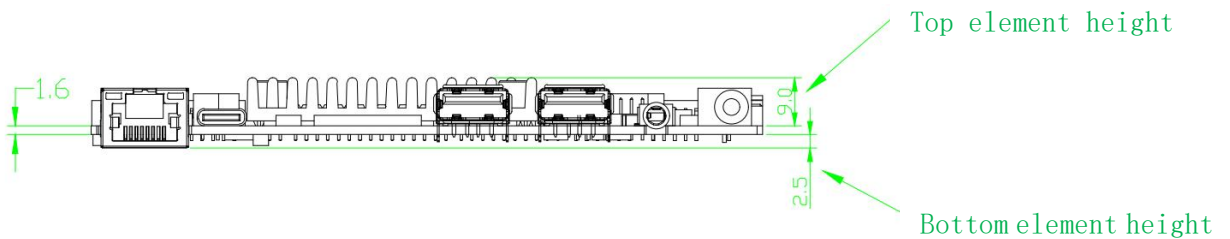
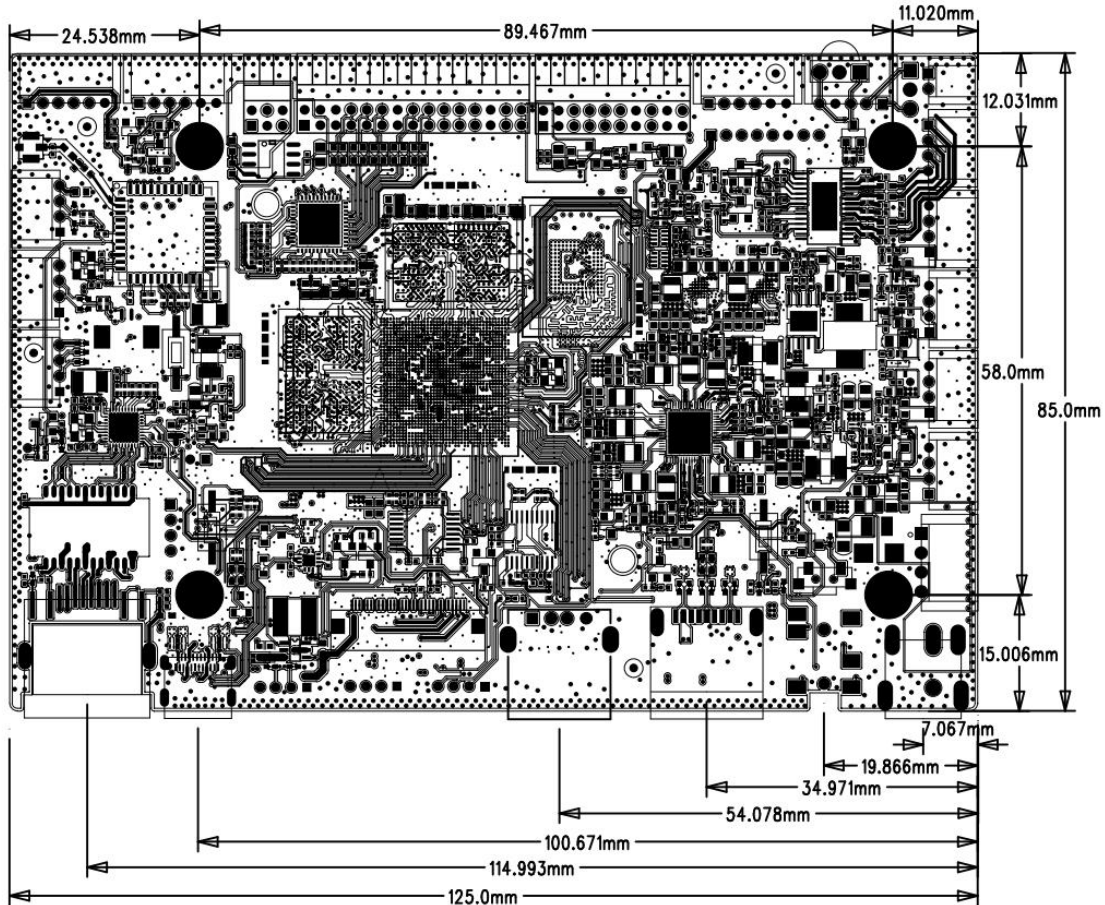


## Chapter 2 List of Basic Functions

Main functional parameters	
Size	125*85mm
CPU	Rockchip RK3588S, large and small core architectures: quad-core 1.8GHz Cortex-A55
Operating system	Android 12.0
RAM/Storage	Standard configuration 4G/ Standard configuration 32G (64G/128G Optional)
Built-in ROM	2KB EEPROM (Not included by default, optional)
LVDS output	1, support single/double 6-8bit, can directly drive 50/60Hz LCD screen, LVDS screen maximum support 1920*1080 resolution
eDP output	1, can directly drive a variety of resolutions of eDP interface LCD screen, measured has supported 1920*1080 resolution, RK official test up to 3840*2160 resolution
MIPI output	1, can drive a variety of resolutions of MIPI LCD screen, measured has supported 800*1280 resolution
Audio input/output	Speaker output (support left and right channel output, default 6W, can be configured 10W, need to change the resistance), MIC IN*1
Headphone output	Support one channel three/four band earphone plug in
USB port	1 USB3.0 OTG (Type-C) 1 USB3.0 HOST 4 USB HOST
Serial port	1*RS232 2*TTL
I2C port	1, can be connected to I2C interface TP or peripherals
Network Support	1. Support 10/100/1000M adaptive Ethernet 2. Built-in WiFi, support Bluetooth 5.0
Storage	Support U disk expansion storage
RTC real-time clock	Support low power consumption
System upgrade	Supports local USB upgrade

# Chapter 3 PCB Dimensions and Interface Layout

## 3.1 PCB size chart



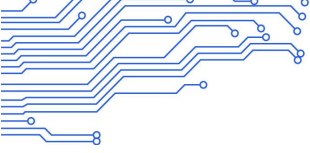
PCB : 1.6mm thickness

PCBA: L \* W=125mm\*85mm

Specification of screw hole:  $\phi$  3.2mm x 4

Note:

1. Heat dissipation design
2. Subject to the actual size of the product



### 3.2 Interface parameter description

Picture Annotation Notes: The “○” in the circle on the socket interface picture indicates the first pin. (The “○” of the red socket indicates the first pin)


#### 3.2.1 Power input interface (4pin/2.54mm)

Functional description:

The board is powered by a 12V DC power supply, and it is only allowed to supply power to the board subsystem from the DC socket and power socket. The DC IN specifications of the power adapter plug are D6.0, d2.0. In the case of no peripherals and no load, the 12V DC power supply needs to support a minimum current of 800mA.

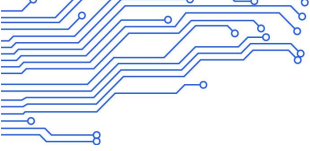
The electrical definition of the power input socket is as follows:

Number	Definition	Attributes	Description
1	12V	input	12V input
2	12V	input	12V input
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire



Note:

1. The specifications of the power socket must comply with the DC socket model. The default diameter of the DC socket is 6.0, the outer diameter of the copper pin is 2.0, the outer diameter of the DC plug is 5.5mm, and the aperture is 2.1 mm.
2. The voltage fluctuation range of DC socket and 6pin power input port should not exceed 10% of the standard input voltage of 12V, which may affect the stability of the motherboard operation.
3. It is recommended to use a power supply motherboard or adapter that meets the 3C standard, and the rated output power of the selected adapter can meet the motherboard and peripherals running at the same time and leave a margin of 30% -50%. That is, when the total current reaches 1.5A, the specification of 2.5A-3A should be selected.



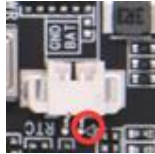
### 3.2.2 RTC Battery Port (2pin/1.25mm)

Functional description:

The Wafer socket interface with 2pin 1.25mm spacing is used to supply power to the system clock when the power is off.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	RTC	input	3V input
2	GND	Ground wire	Ground wire



Note:

1. When the RTC battery is used, pay attention to whether the positive and negative poles are correct, and the reverse connection may lead to short circuit, resulting in the risk of fire and explosion.
2. If you find that the RTC time is not accurate during use, please replace the RTC battery in time, choose the correct 3V, CR2032 cable battery, please contact FAE to provide the corresponding model specifications.

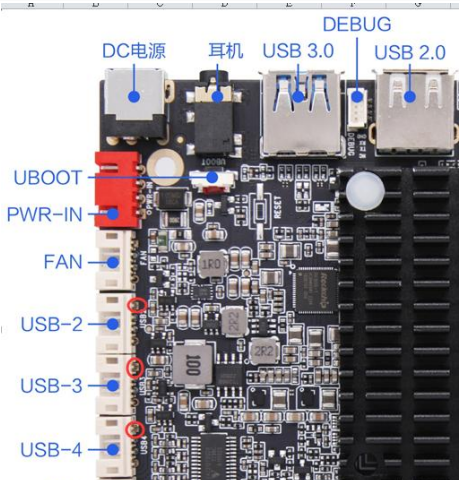
### 3.2.3 USB port (4pin/2.0mm\*3)

Functional description:

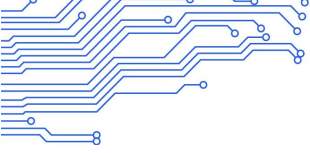
The motherboard has 2 USB standard ports, 3 built-in USB sockets for peripheral expansion, default to HOST, and supply current 1A.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	VCC	power supply	5V output
2	DM	input/output	DM
3	DP	input/output	DP
4	GND	Ground wire	Ground wire



1. Check the definition of the USB terminal cable before use to prevent the power supply from being



reversed from the ground, which may burn peripherals and motherboards.

2. The length of USB peripheral cable should be as short as possible to meet the needs of use. Do not use too long a USB cable, otherwise it may cause stability problems during the use of peripherals.

3. The signal in the USB cable is a high-speed differential signal. USB wire as far as possible to use the wire with braided shielding layer, can greatly enhance the anti-interference force of the device and increase the stability of the device.

USB port description:

Number	Screen print/serial number	Default supply current	Whether the power supply is controllable	Corresponding nodes
1	USB HOST2.0	1A	Controllable	HUB-1
2	USB HOST3.0	1A	Controllable	USB30_2
3	USB-2	1.4A	Controllable	HUB-2
4	USB-3	1.4A	Controllable	HUB-3
5	USB-4	1.4A	Controllable	HUB-4


### 3.2.4 MIC Interface (2pin/2.0mm)

Function description:

The mainboard has a MIC port for connecting to an external microphone.

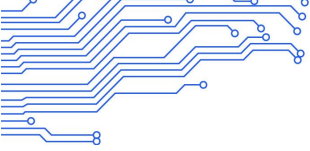
Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	MIC-	input	MIC-
2	MIC+	input	MIC+



Note:

1. Pay attention to the positive and negative MIC connections, do not reverse.
2. MIC line length should not be too long, MIC line inside the device as far as possible to avoid high-speed signal line and power line layout, to avoid interference with the sound.



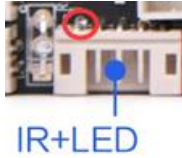
### 3.2.5 LED/IR port (5pin/2.0mm)

Functional description:

The mainboard has a socket shared by the IR remote control interface and the indicator light, in which pin3-5 can choose to weld the IR receiving tube or connect the external remote control receiving header.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	LED_B	Output	Work indicator light
2	LED_R	Output	Standby indicator light
3	IR	input	Remote signal input
4	GND	Ground wire	Ground wire
5	3V3	power supply	3.3V Output



Note:

1. The indicator port is a common anode indicator port. By default, a common anode indicator is required.
2. The board default limited current, LED light drive current 6mA, voltage 3.3V, the external indicator does not need to increase resistance, otherwise the brightness may be too low.
3. Pay attention to the pin definition and positive and negative terminals of the remote control receiving header, do not reverse connection, reverse connection may cause damage to the remote control receiving header, and the remote control cannot be used.


### 3.2.6 Work indicator light

Functional description:

Default support for common cathode red and blue dual LED lights.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	LED_R	red light	Standby indicator light
2	VCC	power supply	3.3V Output
3	LED_B	blue light	Work indicator light

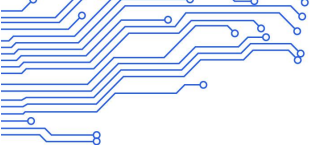


### 3.2.7 Backlight control interface (6pin/2.0mm\*2)


Functional description:

By default, the board has two backlight adjustment/control ports. One is the LVDS backlight adjustment/control port by default, and the other is the eDP backlight adjustment/control port by default.

Electrical definitions are as follows:



Number	Definition	Attributes	Description
1	VCC	power supply	12V Output
2	VCC	power supply	12V Output
3	BL-EN	Output	Backlight enable control
4	BL-ADJ	Output	Backlight brightness control
5	GND	Ground wire	Ground wire
6	GND	Ground wire	Ground wire



Note:

1. The 12V power supply in this socket can only be used as backlight power output, prohibited as power input to the system.
2. LVDS dimming mode is ADJ by default, and eDP backlight socket is PWM dimming by default, please choose the dimming mode according to the specification of the selected screen.
3. ADJ and PWM can be switched by changing the hardware, please consult FAE if you need to change.
4. Due to the limited width of the motherboard power supply alignment, only the load of the motherboard itself is taken into consideration during the design, so when using a large screen over 19 inches or the power consumption of the screen is more than 15W, the backlight power supply should be taken from other power supply boards, so as not to cause system instability.


### 3.2.8 PW Rkey Interface (2pin/2.0mm)

Function description:

The mainboard has one on-off button interface for connecting to the external PWR button.

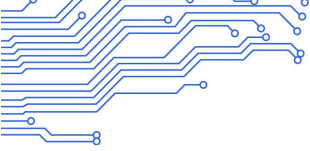
Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	PWR_KEY	input	PWR key input
2	GND	Ground wire	Ground wire



Note:

1. Note that the key should not be short-connected with other power sources.



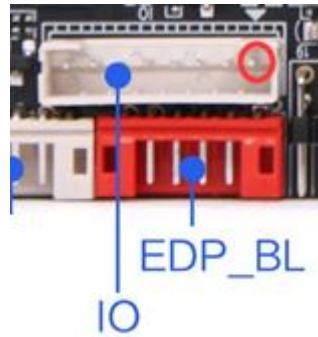
### 3.2.9 IO/KEY port (8pin/2.0mm)

Functional description:

IO is used to provide input/output of control signals to peripherals, and the level is 3.3V. The socket also leads to the interface of the ADC and the upgrade button.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	VCC	power supply	3.3V Output
2	I/O	Input	GPIO-1
3	I/O	Input	GPIO-2
4	I/O	Output	GPIO-3
5	I/O	Input	GPIO-4
6	GND	Ground wire	Ground wire
7	ADC	Input	ADC signal
8	Uboot	Input	External upgrade button



Note:

1. The peripheral IO level cannot be higher than 3.3V. If the IO level of the docking device is higher than 3.3V, there should be an isolation circuit or level switching circuit, otherwise the main control and device will be burned out.
2. When using an I/O port, note whether the I/O port is an input or output port.
3. ADC level is up to 1.8V.
4. The peripheral is powered on through this IO port (When the device is powered off, the IO measured by a multimeter should be 0V).

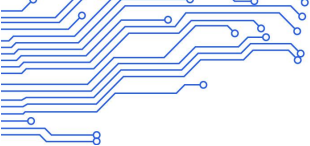
### 3.2.10 LVDS screen port (15\*2pin/2.0mm)

Functional description:

Generic LVDS interface definition, support single/dual, 6/8-bit 1080P LVDS screen.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	PVCC	power output	LCD power output, +3.3v/+5V/ +12V optional
2			
3			
4	GND	Ground wire	Ground wire
5			
6			



7	0-VN0	Output	Pixel0 Negative Data (Odd)
8	0-VP0	Output	Pixel0 Positive Data (Odd)
9	0-VN1	Output	Pixel1 Negative Data (Odd)
10	0-VP1	Output	Pixel1 Positive Data (Odd)
11	0-VN2	Output	Pixel2 Negative Data (Odd)
12	0-VP2	Output	Pixel2 Positive Data (Odd)
13	GND	Ground wire	Ground wire
14	GND	Ground wire	Ground wire
15	0-VNC	Output	Negative Sampling Clock (Odd)
16	0-VPC	Output	Positive Sampling Clock (Odd)
17	0-VN3	Output	Pixel3 Negative Data (Odd)
18	0-VP3	Output	Pixel3 Positive Data (Odd)
19	1-VN0	Output	Pixel0 Negative Data (Even)
20	1-VP0	Output	Pixel0 Positive Data (Even)
21	1-VN1	Output	Pixel1 Negative Data (Even)
22	1-VP1	Output	Pixel1 Positive Data (Even)
23	1-VN2	Output	Pixel2 Negative Data (Even)
24	1-VP2	Output	Pixel2 Positive Data (Even)
25	GND	Ground wire	Ground wire
26	GND	Ground wire	Ground wire
27	1-VNC	Output	Negative Sampling Clock (Even)
28	1-VPC	Output	Positive Sampling Clock (Even)
29	1-VN3	Output	Pixel3 Negative Data (Even)
30	1-VP3	Output	Pixel3 Positive Data (Even)

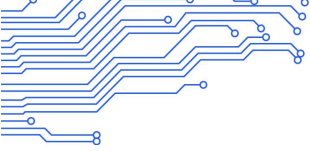


The screen power supply voltage can be adjusted through the LVDS-SEL socket and selected through the jumper cap, optionally supporting 3.3V/5V/ 12V panel power supply.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	12V	power supply	12V screen power jumps this pin to PANELVCC_IN
2	PANELVCC_IN	power supply	Screen power input pin
3	PANELVCC_IN	power supply	Screen power input pin
4	5V	power supply	5V screen power jumps this pin to PANELVCC_IN





5	3.3V	power supply	3.3V screen power jumps this pin to PANELVCC_IN
6	PANELVCC_IN	power supply	Screen power input pin

In order to avoid burning the board and screen, please pay attention to the following:

1. Please confirm whether the power supply voltage of the screen is correct in the screen specification and whether the corresponding power supply of the board can meet the maximum current of the screen.
2. Please use a multimeter to confirm whether the power supply selected by the jumper cap is correct.
3. When receiving a single screen line of a 6/8-bit LVDS screen, plug it in and install it close to the pin1 end. Do not reverse and dislocation, so as to avoid damage to the screen and motherboard.
4. Before connecting, check whether the electrical definition of the cable sequence matches. Connect the screen before powering on the device. Do not plug or plug the device when it is live.

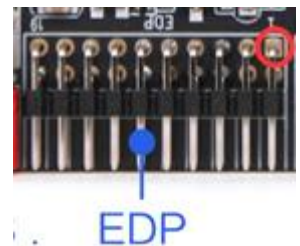
### 3.2.11 EDP screen interface (10\*2pin/2.0mm)

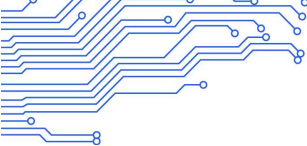
Functional description:

This interface is a common eDP screen interface in the form of 10\*2 double-row pins.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	PVCC	power supply	eDP screen power output, +3.3v/+5V/ +12V optional
2			
3	GND	Ground wire	Ground wire
4			
5	D0-	Output	Display Port Lane 0 negative output
6	D0+	Output	Display Port Lane 0 positive output
7	D1-	Output	Display Port Lane 1 negative output
8	D1+	Output	Display Port Lane 1 positive output
9	D2-	Output	Display Port Lane 2 negative output
10	D2+	Output	Display Port Lane 2 positive output
11	D3-	Output	Display Port Lane 3 negative output
12	D3+	Output	Display Port Lane 3 positive output
13	GND	Ground wire	Ground wire
14	GND	Ground wire	Ground wire
15	AUX-	Output	Display Port AUX- chanenl negative singal
16	AUX+	Output	Display Port AUX+ chanenl positive singal
17	GND	Ground	Ground wire





		wire		
18	GND	Ground wire	Ground wire	
19	GND	Ground wire	Ground wire	
20	eDP_HPDP	Input	Screen hot plug detection signal, screen output	

The screen power supply voltage can be adjusted through the eDP-SEL socket and selected through the jumper cap, optionally supporting 3.3V/5V/ 12V panel power supply.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	12V	power supply	For 12V screen power supply, select resistance R95914
2	5V	power supply	For a 5V screen power supply, select resistor R9042
3	3.3V	power supply	For a 3.3V screen power supply, select resistor R9043



Note:

1. Please confirm whether the power supply voltage of the screen is correct in the specifications of the screen, and whether the corresponding power supply of the board can meet the maximum current of the screen.
2. Please use a multimeter to confirm whether the power supply selected by the jumper cap is correct.
3. Before connecting, check whether the electrical definition of the cable sequence matches. Connect the screen before powering on the device. Do not plug or unplug the device when it is live.

### 3.2.12 RS232 serial socket interface (4pin/2.0mm)

Functional description:

The board has 1 sets of common 232 serial ports by default, which can support common 232 serial devices on the market.

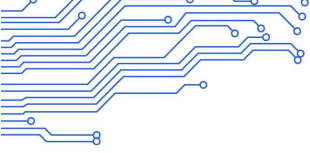
Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	GND	Ground wire	Ground wire
2	PC232-RX	Input	232-RX
3	PC232-TX	Output	232-TX
4	VCC	Power supply	5V Output



Precautions:

1. Whether the serial port voltage matches. Can not directly connect to TTL, RS485 serial devices.



2. Whether the connection of TX and RX is correct.


### 3.2.13 TTL serial socket interface\*2 (4pin/2.0mm\*2)

Functional description:

The board supports 2 sets of common dual-wire serial ports, which can support common serial port devices in the market, and the level of serial ports is 0V to 3.3V.

Electrical definitions are as follows:

Number	Definition	Attributes	Description
1	GND	Ground wire	Ground wire
2	UART-RX	Input	RX
3	UART-TX	Output	TX
4	VCC	Power supply	3.3V Output



Precautions:

1. Whether the TTL serial port voltage matches. Can not directly connect to RS232, RS485 equipment.
2. Whether the connection of TX and RX is correct.
3. If the level of the connected serial port is higher than 3.3V, there must be an isolation circuit or a level conversion circuit, otherwise the main control and equipment will be burned out.
4. Note the mapping between system nodes and hardware serial ports during software development. For details, see Definition of Serial Ports and System Nodes in the following section.

Serial port configurations and nodes are as follows:

Number	Serial Number	Corresponding nodes	Default setting	Configurable or not
1	TTLport-3	TTYS3	TTL	NOT
2	TTLport-4	TTYS4	TTL	NOT
5	RS232-0	TTYS0	RS232	NOT

Notes :

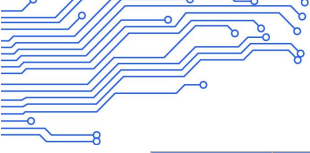
Modifying the configuration requires a professional operation

### 3.2.14 I2C interface (6pin/2.0mm)

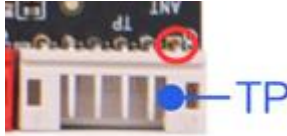
Functional description:

The board supports the TP screen connected to the I2C interface.

Electrical definitions are as follows:



Number	Definition	Attributes	Description
1	VCC	Power supply	3.3V Output
2	SCL	Input/Output	I2C Clock
3	SDA	Input/Output	I2C Data
4	INT	Input/Output	Interrupt
5	RST	Input/Output	Reset
6	GND	Ground wire	Ground wire



Notes:

1. The board supports the TP screen connected to the I2C interface. Before connecting the board, check whether the interface of the touch screen is I2C or USB.
2. The level of I2C, RST, and INT in the interface is 3.3V. If a 1.8V touch screen is connected, the level must be converted.

Please note that the electrical definition of the wire sequence matches before connecting. Connect the touch screen before powering it on. Do not plug it in when it is live.

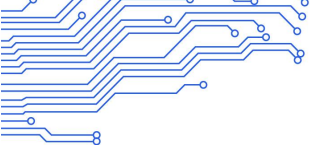
### 3.2.15 MIPI Camera port (30pin/0.5mm)

Function Description: The board supports one mipi camera input.

The electrical definition of MIPI Camera socket is as follows:

Number	Definition	Attributes	Description
1	NC	/	/
2	VDD	power supply	2.8V output
3	DVDD	power supply	1.2V output
4	DOVDD	power supply	1.8V output
5	NC	/	/
6	GND	Ground wire	Ground wire
7	VDD	power supply	2.8V output
8	GND	Ground wire	Ground wire
9	SDA	Input/Output	SDA signal
10	SCL	output	SCL signal
11	RST	output	reset signal
12	PWDN	output	Power down control
13	GND	Ground wire	Ground wire
14	MCLK	output	master clock
15	GND	Ground wire	Ground wire
16	D3P	Input/Output	mipi data channel 3 positive
17	D3N	Input/Output	mipi data channel 3 negative





18	GND	Ground wire	Ground wire
19	D2P	Input/Output	mipi data channel 2 positive
20	D2N	Input/Output	mipi data channel 2 negative
21	GND	Ground wire	Ground wire
22	D1P	Input/Output	mipi data channel 1 positive
23	D1N	Input/Output	mipi data channel 1 negative
24	GND	Ground wire	Ground wire
25	CLKP	Input/Output	mipi clock channel positive
26	CLKN	Input/Output	mipi clock channel negative
27	GND	Ground wire	Ground wire
28	D0P	Input/Output	mipi data channel 0 positive
29	D0N	Input/Output	mipi data channel 0 negative
30	GND	Ground wire	Ground wire

Notes:

1. The maximum supported resolution is: 4800W.
- 2.. The signal level of I2C and RST in the interface is 1.8V. If the module with 3.3V level is connected, the level conversion should be done.
3. Before connection, please pay attention to whether the electrical definition of the wire sequence matches. It is necessary to connect the module before power on.

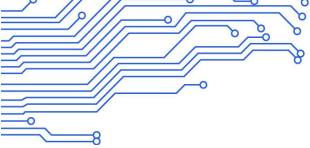
### 3.2.16 MIPI screen interface (back, 40pin/0.5mm)

Function description:

The mainboard supports one mipi screen display interface in the form of a 40pin 0.5mm spacing FPC socket.

The electrical definition of the MIPI screen interface is as follows:

Number	Definition	Attributes	Description
1	VDD_1.8V	power supply	power output, 1.8V
2	VDD	power supply	Screen power output, 3.3V
3	VDD	power supply	
4	NC	--	---
5	Reset	output	Screen reset signal, high level 3.3V
6	NC	--	---
7	GND	Ground wire	Ground wire
8	MIPI_D0N	output	MIPI Port Lane 0 negative output

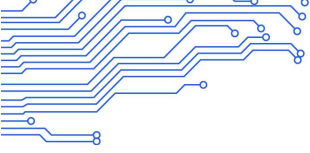


9	MIPI_D0P	output	MIPI Port Lane 0 positive output	
10	GND	Ground wire	Ground wire	
11	MIPI_D1N	output	MIPI Port Lane 1 negative output	
12	MIPI_D1P	output	MIPI Port Lane 1 positive output	
13	GND	Ground wire	Ground wire	
14	MIPI_CKN	output	MIPI Port clock negative output	
15	MIPI_CKP	output	MIPI Port clock positive output	
16	GND	Ground wire	Ground wire	
17	MIPI_D2N	output	MIPI Port Lane 2 negative output	
18	MIPI_D2P	output	MIPI Port Lane 2 positive output	
19	GND	Ground wire	Ground wire	
20	MIPI_D3N	output	MIPI Port Lane 3 negative output	
21	MIPI_D3P	output	MIPI Port Lane 3 positive output	
22	GND	Ground wire	Ground wire	
23	NC	--	---	
24	NC	--	---	
25	GND	Ground wire	Ground wire	
26	NC	--	---	
27	NC	--		
28	NC	--		
29	NC	--		
30	GND	Ground wire		
31	LED-	power supply	LCD backlight power -	
32	LED-	power supply		
33	NC	--	---	
34	NC	--		
35	NC	--		
36	NC	--		
37	NC	--		
38	NC	--		
39	LED+	power supply	LCD backlight power +	
40	LED+	power supply		

Note:

1. Please confirm whether the screen power supply voltage and current parameters in the screen specification match with the board, **the default backlight drive current of the board is 90mA. If the current parameters of the selected screen do not match, you can seek support from our FAE, or adjust the output current by adjusting the resistance value of R9431, formula is :  $I(\text{led})=200\text{mV}/R9431$ .**

2. Ensure that the circuit electrical definitions of the screen interface and the board interface are




consistent, and that the FPC screen cable is correctly selected.

### 3.2.17 Speaker port (4pin/2.0mm)

Function Description: This port can be connected to an external speaker.

Electrical definition:

Number	Definition	Attributes	Description
1	OUTP-L	output	Audio output left +
2	OUTN-L	output	Audio output left -
3	OUTN-R	output	Audio output right -
4	OUTP-R	output	Audio output right +

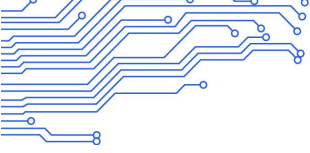


Note:

1. This is a dual horn connection. When using a single horn is pin1 and pin2 group, pin3 and pin4 group, make no mistake.
2. The use of the horn, you need to connect the horn before starting. Do not allow live plug.
3. The default output power of the horn interface is 6R/8W. If a 4R horn is used, the power should be reduced by half accordingly.
4. The maximum power amplifier chip can support power up to 8R/ 10W, requiring custom hardware implementation.
5. When using, be sure to measure the actual maximum output power should be less than the actual horn rated power.

### 3.3 Other standard interfaces and features

Interface	Standard	Parameter Description
memory interface	USB TYPE-C	USB 2.0, up to 480Mbps/s transfer rate (60MB/s) USB 3.0, up to 5.0Gbps/s transfer rate (500MB/s)
Ethernet interface	RJ45 port	Support 10/100/1000M wired network
headphone jack	3.5mm	Support left and right dual channels, support MIC recording

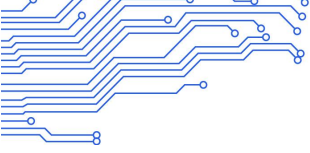


# Chapter 4 Electrical performance

Items		Min	Typical	Max
Power parameter	Voltage	--	12V	--
	Ripple	--	--	50mV
	Current	3A		
Supply current(裸板)	working current		250mA	380mA
	standby current		22mA	30mA
Supply current(LVDS)	3.3V working current		400 mA	1.5A
	5V working current		550 mA	2A
	12V working current		580 mA	2A
Supply current (eDP)	3.3V working current		350 mA	2A
	5V working current		550mA	2A
	12V working current		600mA	2A
Total output	current	--	--	3A
Environment	Relative humidity	--	--	80%
	Operating temperature	0℃	--	60℃
	Storage temperature	-40℃		80℃

Remark 1: When connecting the LVDS/eDP/MIPI screen, please pay attention to selecting the correct screen working voltage 3.3V, 5V, 12V to avoid burning the screen.

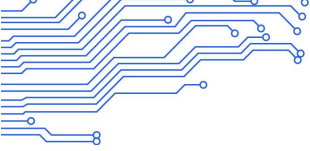
Remark 2: When connecting to LVDS/eDP/MIPI screen, the overall working current and standby current of the board depend on the connected screen, which are not listed in the above table.



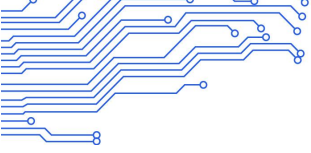
# Chapter 5 Minimum test item of the whole machine

## Description:

Minimum test item of stability and reliability of the whole machine		
Number	Test item	Test detail and description
1	Basic functional performance test	Test the main function performance of the whole machine, test wifi, Bluetooth, Ethernet, USB, serial port, video playback and other functions
2	Software upgrade function test	The whole product upgrade function verification, respectively test product line brush, U disk upgrade, and network remote upgrade function is normal
3	High temperature aging test	Test the high temperature resistance of the whole machine. After playing the aging work video in 60°C environment for 3 days, it can run normally and there are no bad electrical phenomena such as crash, abnormal painting and black screen
4	Low temperature power failure test	Test the anti-low temperature ability of the whole machine. After playing the aging work video in 0°C environment for 3 days, it can run normally and there are no bad electrical phenomena such as crash, abnormal painting and black screen
5	Normal temperature short time timing switch	Test product in the ability to withstand the power on and off, programming 3 minutes to shut down, 7 minutes to start, after 7 days of normal operation, no crash, painting, black screen and other electrical adverse phenomena, abnormal record probability is not more than 4/10000
6	Electrostatic (ESD) test	The simulation test evaluates the anti-static discharge capability of the product. According to the IEC 61000-4-2 test standard, the product is discharged by contact $\pm 4\text{KV}$ and air $\pm 8\text{KV}$ . Product validation must meet A Grade A or B to be accepted, and C and D grades are nonconformity
7	Sweep vibration test	Test the vibration resistance of the product through simulated transport tests and the bearing capacity of the board solder and parts to avoid potential problem points. The vibration tester was used to test the product. After the test, the structure of the test product was not loose and fell off, and it could operate normally. There was no crash, abnormal painting, black screen and other electrical defects and structural appearance damage, and it was judged to be OK
8	Free drop test	Test the vibration resistance of the product through simulated transport tests and the bearing capacity of the board solder and parts to avoid potential problem points. Use a

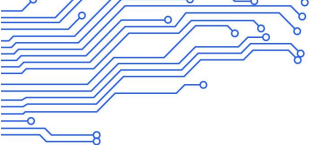


		vibration tester to test the product. After the test, the structure of the test product is not loose and falling off, and it can operate normally, and there is no crash, abnormal painting, black screen and other electrical defects and structural appearance damage, then it is judged to be OK.
9	Short power failure shock at normal temperature	Through this test, the ability of the product to withstand the power supply is tested
10	Long time timing switch machine at normal temperature	To verify the stability of MCU and the stability of system operation, the timing switch tool is set to start the machine at 9:30 am and shut down at 18:30 minutes, and the log records the same time interval for each startup. Turn on and off on time. If the error is less than 1min, it is judged to be qualified
11	Voltage overvoltage and undervoltage test	According to the power supply specification of the Android board, the voltage bearing capacity of the board is tested through the voltage change, and the whole machine is tested for 2 hours under the rated power supply of -20% +30%. After the test is carried out and completed, the test product can run normally, and no bad electrical phenomena such as crash, abnormal painting and black screen are judged to be OK



# Chapter 6 Configurable parameter table (difference point)

Type	Standard		Full function		High configuration	
DDR	2G	<input type="checkbox"/>	2G	<input type="checkbox"/>	2G	<input type="checkbox"/>
	4G	<input checked="" type="checkbox"/>	4G	<input checked="" type="checkbox"/>	4G	<input type="checkbox"/>
	8G	<input type="checkbox"/>	8G	<input type="checkbox"/>	8G	<input checked="" type="checkbox"/>
EMMC	16	<input type="checkbox"/>	16	<input type="checkbox"/>	128	<input checked="" type="checkbox"/>
	32	<input checked="" type="checkbox"/>	32	<input type="checkbox"/>	32	<input type="checkbox"/>
	64	<input type="checkbox"/>	64	<input checked="" type="checkbox"/>	64	<input type="checkbox"/>
WiFi+BT	2.4G+BT	<input checked="" type="checkbox"/>	2.4G+BT	<input checked="" type="checkbox"/>	2.4G+BT	<input checked="" type="checkbox"/>
	5G+BT	<input checked="" type="checkbox"/>	5G+BT	<input checked="" type="checkbox"/>	5G+BT	<input checked="" type="checkbox"/>
4G/PCIE	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
5G/M.2	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
ETH/RJ45	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SATA3.0	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
LVDS	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
eDP	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HDMI	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
USB*3	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
TTL*2	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RS232*1	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RS485*1	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
CAN*1	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Hdmi in	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
TF	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	



# Chapter 7 Assembly and Use Precautions

In the process of assembly and use, please pay attention to the following (and not limited to) problems.

1. Please ensure that the board card is not electrified for installation and installation of peripherals, and be sure to wear electrostatic bracelet and other anti-static tools during installation.
2. When connecting peripherals through wires, please ensure that the pin definition of each peripheral is corresponding to the socket of the main board to avoid short circuit caused by wire sequence error.
3. When fixing the main board with screws, pay attention to make the board card bear the force evenly, so as to avoid the PCB opening due to the deformation of the board car.
4. When installing interfaces with optional screen voltages (such as LVDS, eDP, etc.), please note that the voltage selected is consistent with the screen specifications.
5. When installing peripherals (USB, UART, IO .etc), pay attention to the level matching and current output capability of peripherals.
6. The 12V power supply in the backlight socket can only be used as backlight power output, and is strictly prohibited to be used as power input to the motherboard.The input power should be selected according to the general peripherals to evaluate whether the input power voltage and total current can meet the requirements.
7. The input power should be selected according to the general peripherals to evaluate whether the input power voltage and total current can meet the requirements.
8. When designing the whole product, the height limit and heat dissipation of the board should be considered.