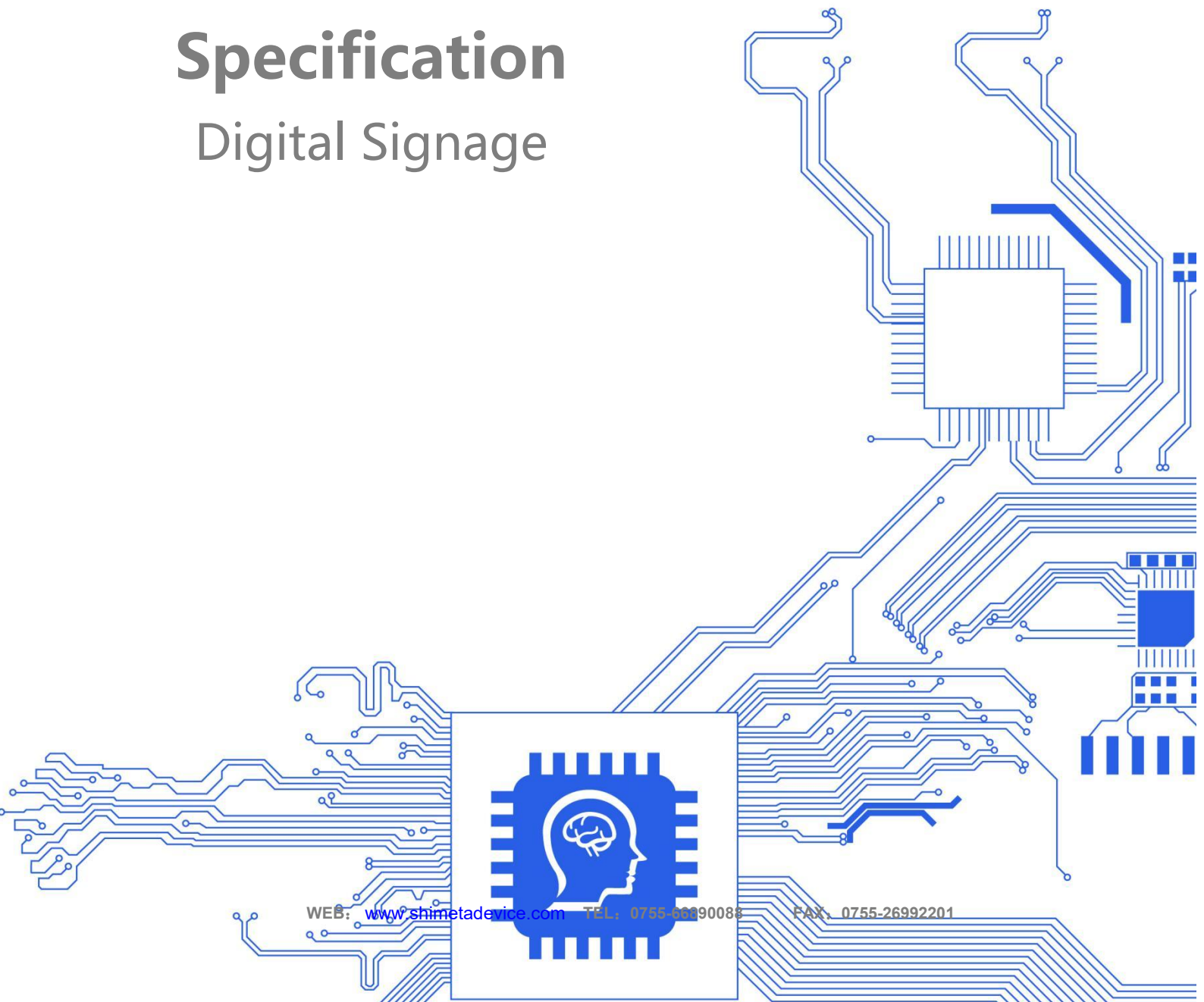
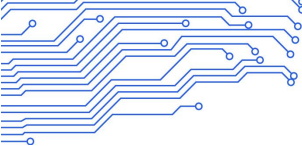


IoT-3288A V1.5

Specification Digital Signage





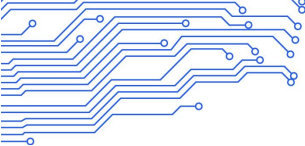
Document modification history

Version	Revision content	Revision	Audit	Date
V1.5	modification			2021-04-13
V1.5	modification			2022-12-01
V1.5	modification			2023-04-11
V1.5	modification			2023-11-24
V1.5	modification			2023-12-14

Statement

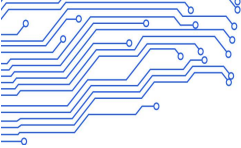
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Chapter 1 Product Introduction

1.1 Scope of application

IoT-3288A belongs to android smart mainboard, generally applicable to smart display terminal products, video terminal products, industrial automation terminal products, 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

IoT-3288A uses RockChip RK3288 Cortex-A17 quad core CPU, carries Android 5.1/7.1 system, main frequency up to 1.8GHz with super performance. It adopts Mali-T764 GPU and supports 4K 、 H.265 hard decoding. It is the best choice for human-computer interaction and industrial control projects, whether it is game, benchmark or decoding.

1.3 Features

- ◆ High integration density. Integrated LVDS/eDP/Ethernet/HDMI/WIFI/Bluetooth, simple and ultra-thin, extraordinary.
- ◆ Built in PCI-E 4G module, support Quectel, LongShang and other PCI-E 4G modules, support internet data and call.
- ◆ Rich extension interface: 7 USB interfaces(2 USB standard ports, 5 USB sockets), 3 available serial ports(1*TTL,2*RS232), GPIO/ADC interface, it can meet the requirements of various peripherals in the market.
- ◆ High definition. Maximum support 4K 3840x2160 decoding and all kinds of LCD screen with LVDS/eDP interface, support various size and different resolution cropping screen.
- ◆ Support Android system customization, provide system call interface API reference code, perfect support customer upper application APP development.
- ◆ Perfect support for infrared, optical, capacitive, resistive, touch film and other mainstream touch screen, support non driver touch screen HID configuration without debugging

1.4 Appearance and Interface Diagram

Front/Back:

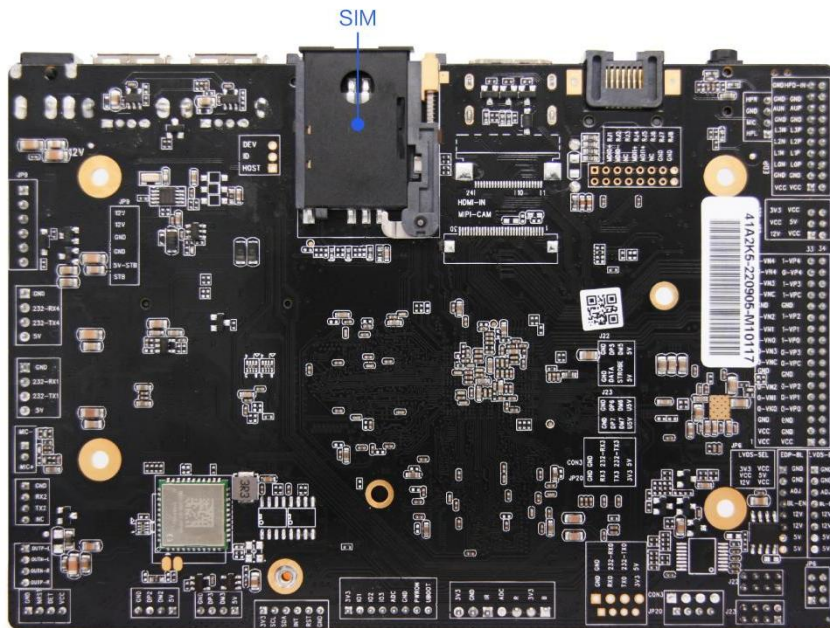
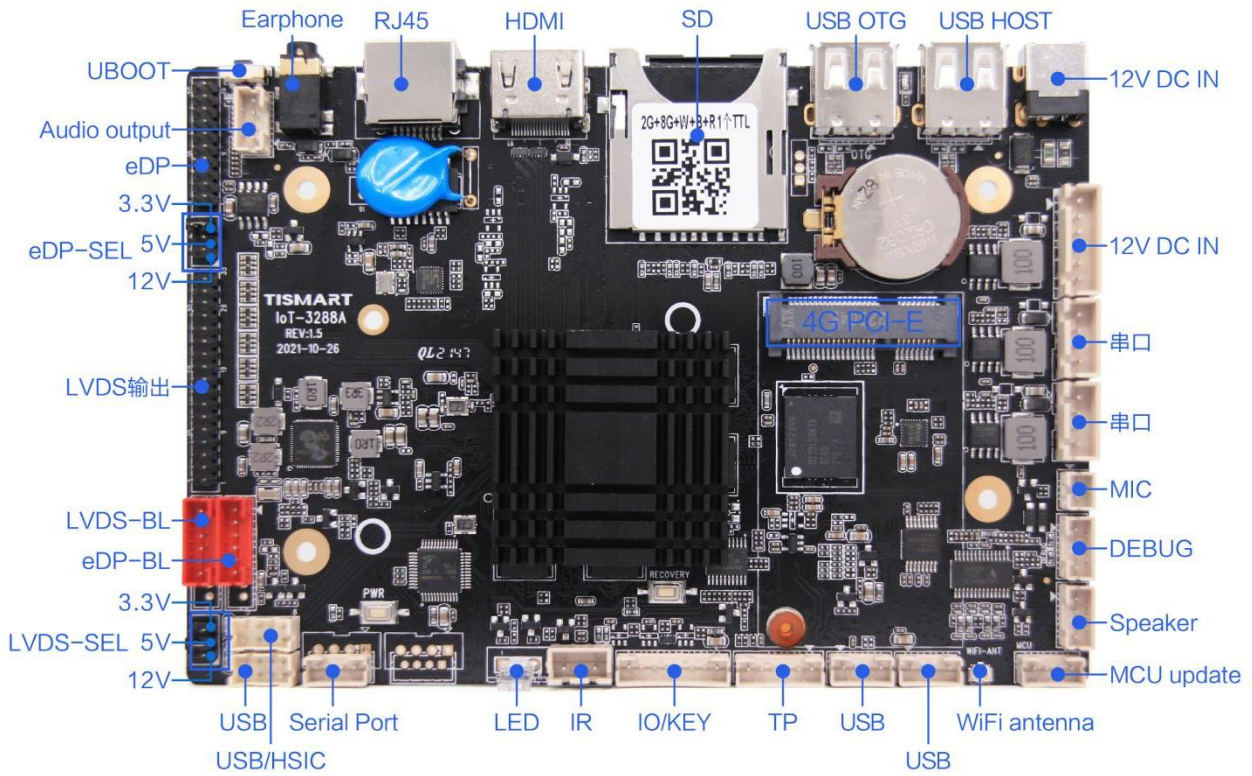
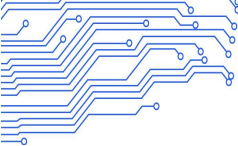
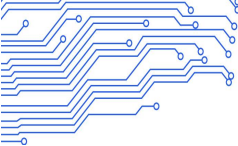


Photo statement: The above photos are taken from a certain batch of boards produced by our company. Due to the continuous maintenance of the product, the actual board cards shipped may not be consistent with the photos.



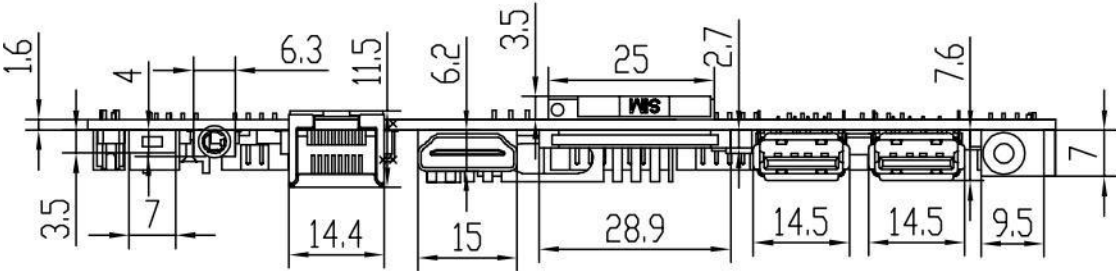
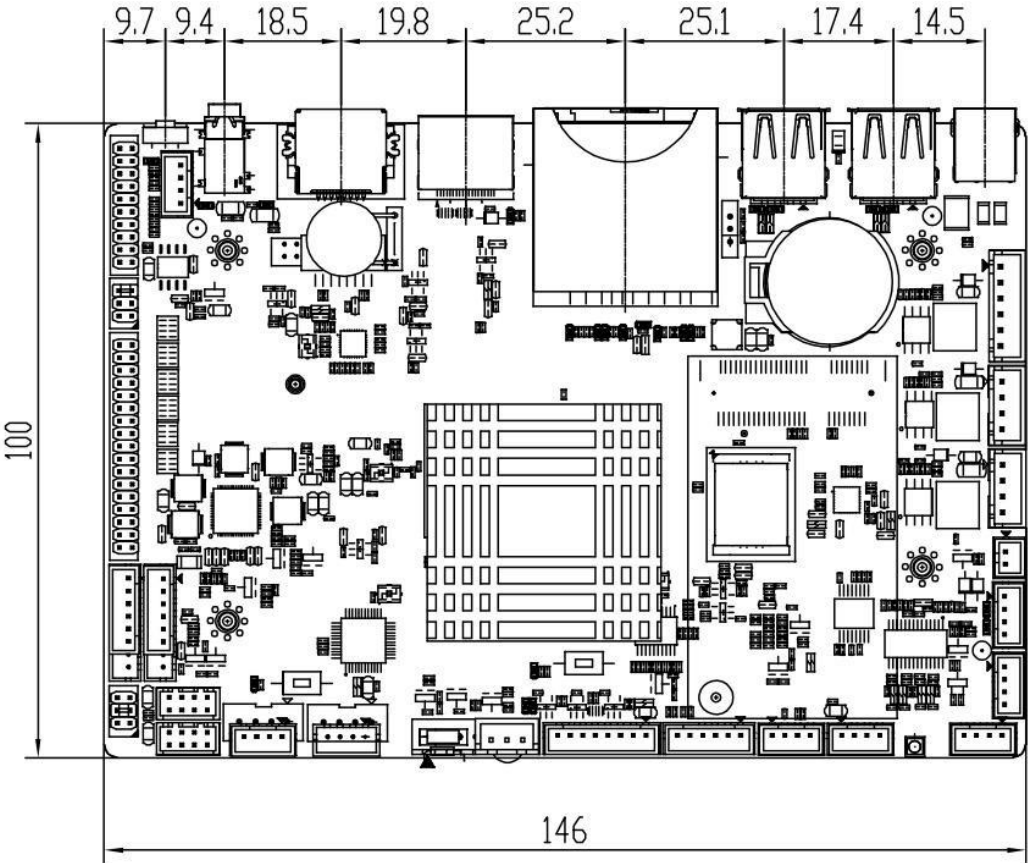
Chapter 2 List of Basic Functions

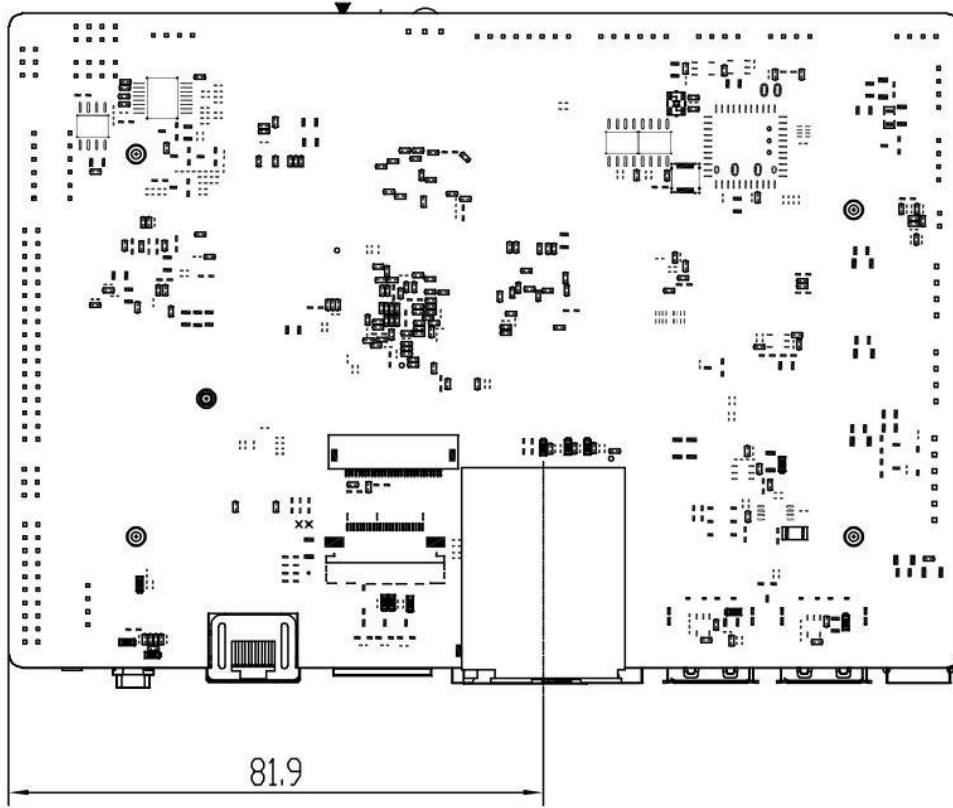
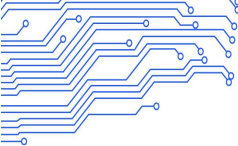
Main functional parameters	
Size	146*100mm
CPU	RK3288, quad core, highest frequency: 1.8 GHz
Operating system	Android 5.1.1/7.1
RAM/Storage	Standard 2G/ Standard 16G(8/32/64GB optional)
Built-in ROM	2KB EEPROM (without by default, optional)
HDMI output	1, Support 1080P@60Hz, 4kx2k@60Hz output
LVDS output	1, support single/dual 8 bit, can directly drive 50/60Hz LCD screen
eDP output	1, can directly drive multiple resolution eDP screens
Amplifier output	Support left and right channel output, maximum support 8R/10W or 4R/20W
Headphone output	Support one-way three/four-segment headphone insertion
USB port	7 channels (2 USB standard ports, 5 USB sockets)
Serial port/expansion port	3 available serial ports (1*TTL+2*232), 1 Bluetooth multiplexed serial port, 3 IO interfaces, 1 ADC
Network support	1. Support 10/100M adaptive Ethernet 2. Built-in WiFi, support hotspot sharing, support Bluetooth 4.0 (standard) 3. Built-in PCI-E port, can support 3G/4G Internet access and phone calls
Storage Card	Support SD card
MIPI CAM	Reserved MIPI CAM interface, support up to 13 megapixels
RTC real-time clock	Support, support timing switch
System upgrade	Support local SD, USB upgrade



Chapter 3 PCB Dimensions and Interface Layout

3.1 PCB size chart





PCB: 6 layers

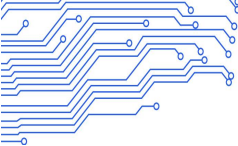
尺寸: 146mm*100mm, 1.6mm thickness

Screw hole specification: ϕ 3.2mm x 4

Matters need attention:

1. Heat Dissipation

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.

3.2.1 Power input interface

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. When no external load is connected, the 12V DC power supply needs to support a minimum current of 600mA.

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

Number	Definition	Attributes	Description
1	VCC	Input	12V Input
2	VCC	Input	12V Input
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire
5	VCC-5V	Input	Standby 5V input
6	STB	Output	Standby signal output




The standby 5V input and standby signal output are used for the power board standby. If low power consumption standby is required, the standby 5V input and standby signal output signals are connected to the 5V STB and PS_ON of the power board respectively (the description of these two signals may be different from the power board of different home, please refer to the actual one). If low-power standby is not needed, the two pins can be not connected.

3.2.2 MIC interface (2pin*2.0mm)

Pay attention to the positive and negative MIC connections, do not reverse.

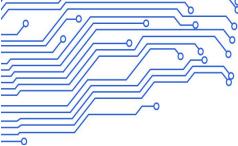
Number	Definition	Attributes	Description
1	MIC-	input	MIC-
2	MIC+	input	MIC+



3.2.3 Status LED




LED color description: Red when powered on, blue when powered on.



3.2.4 Remote control receiving interface (3pin*2.54mm)

Remote control receiving interface, defined as follows:

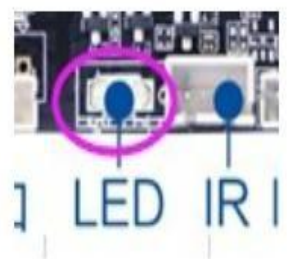
Number	Definition	Attributes	Description
1	IR	input	Remote control signal input
2	GND	Ground wire	Ground wire
3	3V3	power supply	3.3V Output



3.2.5 LED/IR port

By default, dual LED lights are supported, both red and blue, and the location is shared with the remote control receiving socket and indicator light (optional welding 7pin socket with 2.54mm spacing).


Number	Definition	Attributes	Description
1	LED_B	Output	Work indicator light
2	VCC	power supply	3.3V Output
3	LED_R	Output	Standby indicator light
4	ADC	ADC input	ADC signal input
5	IR	input	Remote control signal input
6	GND	Ground wire	Ground wire
7	3.3V	power supply	3.3V Output

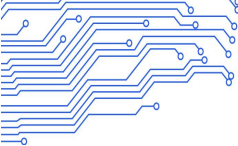


3.2.6 RTC battery interface

The standard 2032 interface is used to power the system clock in the event of a power outage.

Number	Definition	Attributes	Description
1	RTC	input	3.3V input
2	GND	Ground wire	Ground wire

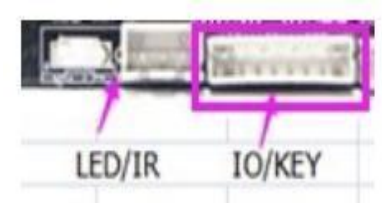




3.2.7 IO/KEY Interface (8pin*2.0mm)


IO is used to provide the input/output of the control signal to the peripheral, the level is 3.3V, and the ADC signal can be used for key control. The socket also leads to the switch button and the upgrade button interface.

Number	Definition	Attributes	Description
1	VCC	power	3.3V output
2	I/O	input	GPIO-1
3	I/O	input	GPIO-2
4	I/O	output	GPIO-3
5	ADC	input	ADC signal
6	GND	Ground wire	Ground wire
7	PWR-ON	input	External power button
8	Uboot	input	External upgrade keys



3.2.8 Touch screen interface (6pin*2.0mm)

Number	Definition	Attributes	Description
1	3V3	power	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

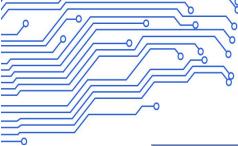


3.2.9 TTL serial socket interface (4pin*2.0mm)

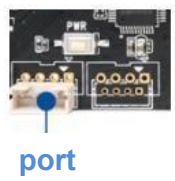
The board supports 1 sets of common dual-wire serial ports(Serial port 3), which can support common serial port devices in the market, and the level of serial ports is 0V to 3.3V. If the level of the connected serial port is higher than 3.3V, there must be an isolation circuit or a level conversion circuit, otherwise the main control and equipment will be burned out.

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.



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




3.2.10 RS232 serial socket interface (4pin*2.54mm*2)

The board has 2 sets of common 232 serial ports by default, which can support common 232 serial devices on the market.

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.

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



Description of serial port nodes:

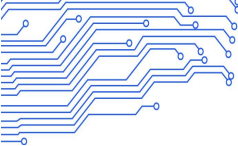
Number	Serial number	Corresponding nodes	Whether extendable
1	port 0	ttyS0	The default is TTL and RS232 can be configured
2	port 1	ttyS1	Default RS232
3	port 3	ttyS3	The default is TTL and RS232 can be configured
3	port 4	ttyS4	Default RS232

Note: Serial port 0 is a Bluetooth multiplex serial port and is reserved.


3.2.11 USB port (standard interface *2+ socket *5)

The board has a 2-way USB standard interface and a 5-way built-in USB socket for peripheral expansion. The default mode for all USB ports is HOST, and the power supply current is not greater than 2A. The USB OTG port can be set to Device mode.

USB2、USB3 (4pin*2.0mm) single row USB socket electrical definition is as follows:

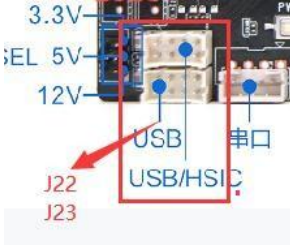


Number	Definition	Attributes	Description
1	VCC	Power supply	5V Output
2	DM2/3	Input/Output	DM2/3
3	DP2/3	Input/Output	DP2/3
4	GND	Ground wire	Ground wire



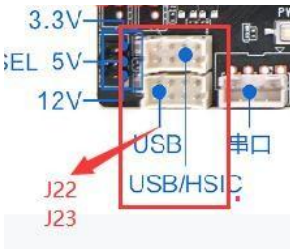
The electrical definition of USB6, USB7 double-row socket J23 is as follows:

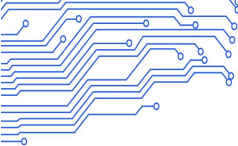
Number	Definition	Attributes	Description
1	VCC	Power supply	5V Output
2	DM7	Input/Output	DM7
3	DP7	Input/Output	DP7
4	GND	Ground wire	Ground wire
5	VCC	Power supply	5V Output
6	DM	Input/Output	DM
7	DP	Input/Output	DP
8	GND	Ground wire	Ground wire



The electrical definition of USB5 two-row socket J22 is as follows:

Number	Definition	Attributes	Description
1	VCC	Power supply	5V Output
2	DM5	Input/Output	DM5
3	DP5	Input/Output	DP5
4	GND	Ground wire	Ground wire
5	VCC	Power supply	5V Output
6	STROBE	/	/
7	DATA	/	/
8	GND	Ground wire	Ground wire

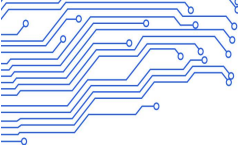




USB port description:

Number	Board screen printing	Default supply current	Whether the power supply is controllable	Corresponding nodes
1	DP2/DM2	2A	controllable	HUB2
2	DP3/DM3	2A	controllable	HUB3
3	DP5/DM5	unlimited	uncontrollable	HUB5
4	DP6/DM6	unlimited	uncontrollable	HUB6
5	DP7/DM7	unlimited	uncontrollable	HUB7
6	OTG	2A	controllable	USB OTG
7	USB HOST	2A	controllable	USB HOST

Note: The total current of all USB ports must not exceed




3.2.12 Backlight control interface (6pin*2.0mm, red)

For the backlight control of the LVDS screen, the 12V power supply current is not greater than 1.5A. When the large screen of more than 19 inches or the power of the backlight of the screen is more than 20W, the backlight power supply should be obtained from other power supply boards to avoid system instability. **The 12V power supply in the backlight socket can only be used as the backlight power output. Do not use it as the power input to the mainboard.**

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

LVDS
backlight
socket

eDP
backlight
socket



3.2.13 LVDS screen interface (Double rows of pins, 2*17pin*2.0mm, male connector)

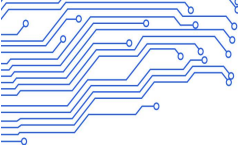
Generic LVDS interface definition, support single/dual, 6/8-bit 1080P LVDS screen. The screen voltage can be selected through the jumper cap, and can be selected to support 3.3V/5V/12V screen power supply.

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.

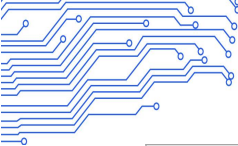
In the following figure, jumper cap is used to select the screen power supply, from left to right, in order: 3.3V/5V/12V.

The electrical definition of 15*2 pins for LVDS output is as follows:

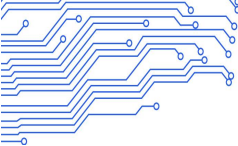


Number	Definition	Attributes	Description
1	PVCC	power output	LCD power output, +3.3v/+5V/+12V optional
2			
3			
4	GND	Ground wire	Ground wire
5			
6			
7	0-VN0	Output	Pixel0 Negative Data (Odd)
8	0-VP0	Output	Pixel0 Positive Data (Odd)
9	0-VN1	Output	Pixel1 Negative Data (Odd)
10	0-VP1	Output	Pixel1 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)
31	0-VN4	Output	Pixel4 Negative Data (Odd)





32	0-VP4	Output	Pixel4 Positive Data (Odd)	
33	1-VN4	Output	Pixel4 Negative Data (Even)	
34	1-VP4	Output	Pixel4 Positive Data (Even)	

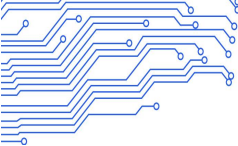


3.2.14 MIPI Camera port (Reserved, back, 30pin/0.5mm)

The board supports a mipi camera of up to 13 megapixels and is installed in the JP26 socket, the electrical definition of the 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	I2C3_SDA	Input/Output	SDA signal
10	I2C3_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





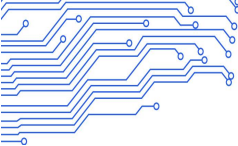
3.2.15 eDP interface (Double row pins, 2*10pin*2.0mm, male connector)

This interface is common eDP screen interface, form as 10*2 double row pins loader. Screen voltage can be choosed by jumper cap, can choose to support 3.3V/5V/12V screen power supply.

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

- 1.Please make sure the specifications and power supply voltage of the screen is correct, the power supply of the board can meet the maximum current screen work accordingly
- 2.Please confirm the power of the jumper cap is correct by multimeter.

The electrical definition of the 20pin screen interface is as follows:



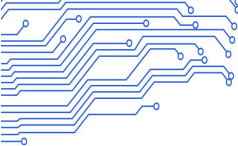
Number	Definition	Attributes	Description
1	PVCC	power supply	eDP LCD power output
2	PVCC	power supply	
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire
5	D0-	Output	Display Port Lane 0 negative output
6	D0+	Output	Display Port Lane 0 positive output
7	D1-	Output	Display Port Lane 1 negative 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-	Ground wire	Display Port AUX- chanenl negative singal
16	AUX+	Input/Output	Display Port AUX+ chanenl positive singal
17	GND	Ground wire	Ground wire
18	GND	Ground wire	Ground wire
19	GND	Ground wire	Ground wire
20	eDP-HPD	Input	Screen hot plug detection signal, screen output



3.2.11 Speaker interface (4pin*2.0mm)

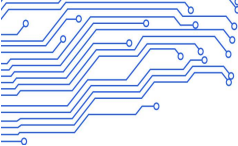
Number	Definition	Attributes	Description
1	OUTP-R	output	Audio output right+
2	OUTN-R	output	Audio output right-
3	OUTN-L	output	Audio output left-
4	OUTP-L	output	Audio output left+





3.2.12 Other standard interfaces and features

HDMI port	Standard port	Support HDMI data output, maximum support 1080P
3/4G port	PCI-E standard port	Support a variety of Mini PCI-E 3G/4G modules such as Quectel and Longshang, power supply 3.8V
SIM card Port	Standard port	Support for various standards (depending on 3/4G module)
Ethernet Port	RJ45	Support 100M cable network
Earphone Port	Standard port	3.5mm standard port
Memory Port	SD card	Data storage, up to 64GB
	USB	HOST interface, support data storage, data import, USB mouse and keyboard, camera, touch screen, etc



Chapter 4 Electrical performance

Items		Min	Typical	Max
Power parameter	Voltage	--	12V	--
	Ripple	--	--	50mV
	Current	3A		
Supply current(LVDS)	3.3V working current		400 mA	1A
	5V working current		550 mA	2A
	12V working current		580 mA	2A
Supply current (eDP)	3.3V working current		400 mA	500 mA
	5V working current	--	--	--
	12V working current	--	--	--
Supply current (HDMI output, no other peripherals are connected)	working current	--	200mA	500mA
	standby current	--	17mA	20mA
	USB supply current	--	--	2A
Total output	current	--		3A
Environment	Relative humidity	--	--	80%
	Operating temperature	0℃	--	60℃
	Storage temperature	-20℃		70℃

Remark 1: When connecting the LVDS/eDP 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 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 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.