Touch Think Intelligence Product Specification

Mainboard series

CX3588-G

V1.1

www.touchthink.net

Shenzhen Touch Think Intelligence Co., Ltd.

CATALOGUE

Chapter 1 Product Overview

1.1 Product Overview

CX-3588-G belongs to the high-performance android series products, with 8nm advanced process; with 8-core 64-bit large and small core architecture, 4 A76 large-core main frequency can reach 2.4G, 4 A55 small-core main frequency can reach 1.8G ;With NPU, with 6TOPS AI computing power, using Mali-G610 MC4 GPU; 8K video codec, 8K display output;

1.2 Function introduction

CX-3588-G uses Android12 system. The board has LVDS, eDP, MIPI, HDMI display output interface, HDMI IN display input interface, MIPI Camera, SATA hard disk interface, dual Gigabit Ethernet and other interfaces, and built-in universal backlight interface, and screen voltage jumper, compatible with more Various types of display screens; with stronger performance, faster speed, and richer interfaces, it is your best choice for human-computer interaction, intelligent terminals, and industrial control projects.

1.3 Functional features

- Multiple display interfaces: LVDS, eDP, MIPI, HDMI multiple display output interfaces.
- Rich expansion interfaces: 9 USB interfaces (3 USB3.0 HOST standard interfaces, 5 USB2.0 PH2.0 HOST interface sockets, 1 standard USB3.0 OTG interface), 1 TTL serial port, 1 RS232 , 1 channel of RS485, 2 channels of TTL/RS232 serial ports that can be switched by jumper caps, 6 channels of GPIO, one of which is multiplexed with button LED light output and GPIO 1 (can be adjusted by software, the default button LED light output), which can meet the needs of the market. Various peripheral requirements.
- Multiple network interfaces: 2 1000M Ethernet interfaces, support 5G and 2.4G WIFI, built-in PCI-E 4G, M.2 5G module interface.
- High definition: maximum support 8K/60HZ video output, support LCD display with LVDS/eDP/MIPI/HDMI and other interfaces, onboard HDMI IN input port can support 4K high-definition input.
- Support Android system customization, provide system call interface API reference code, and perfectly support the development of customer's upper application APP.
- Perfect support for various mainstream touch screens such as infrared, optical, capacitive, resistive, and touch film.

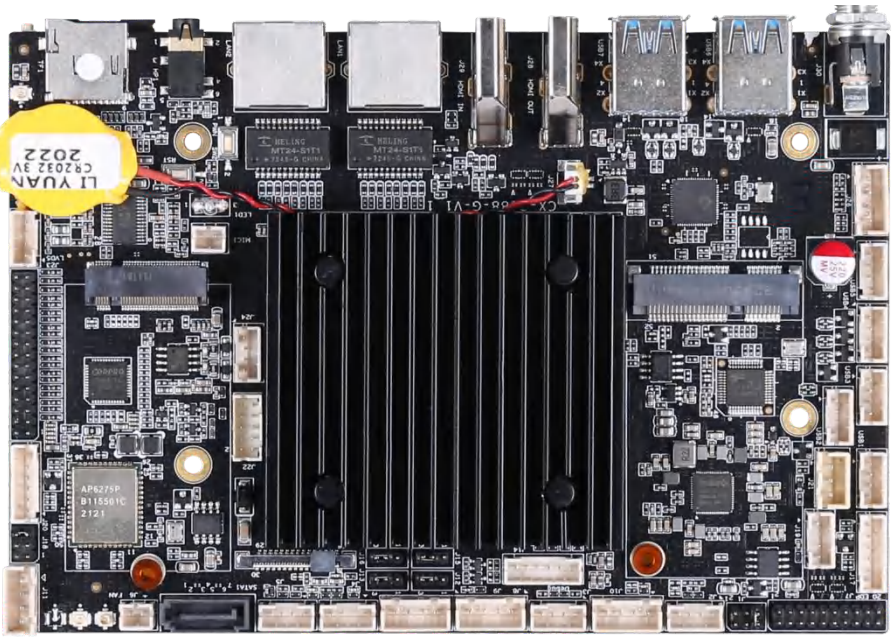
Chapter 2 Hardware specification

Type	Specification
CPU	RK3588 is a 64-bit high-performance CPU 1. Four Cortex-A76 large core 64-bit CPU 2.4GHZ 2. Quad Cortex-A55 small core 64-bit CPU 1.8GHZ
GPU	Mali-G610 MC4 High Performance GPU
Memory	8GB
Built-in memory	EMMC 64GB
Built-in ROM	4KB EEPROM
Decoding resolution	Support up to 8K/60HZ
Operating system	Android 12
Play mode	Supports multiple playback modes such as loop, timing, and interstitial
Network support	4G, 5G, Ethernet, support WiFi/ Bluetooth, wireless peripheral expansion
Video playback	Support wmv, avi, flv, rm, rmvb, mpeg, ts, mp4, etc.
Image Format	Support BMP、JPEG、PNG、GIF
USB interface	3*USB3.0 5*USB2.0 1*USB3.0 OTG
Mipi Camera	30pin FPC interface, support 1300W Camera
Serial port	5 serial sockets (1*RS232, 1*485, 1*TTL, 2*RS232/TLL switching sockets)
GPS	External GPS (optional)

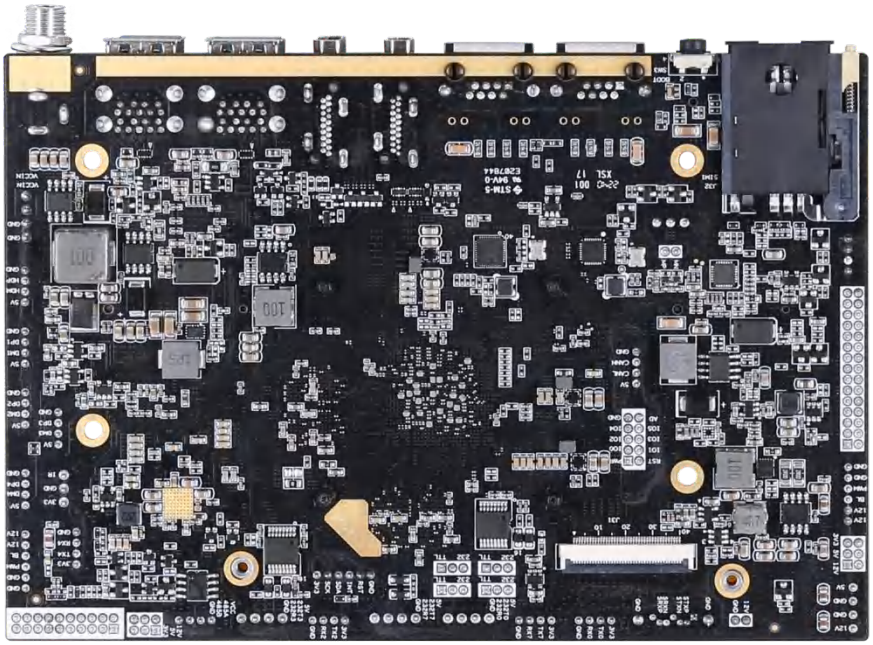
SATA	1*SATA HDD interface
WIFI、BT	Built-in 2.4G/5G WIFI6, Bluetooth 5.0
4G/5G	4G module interface with built-in MINI PCIE, M.2 5G module interface
Ethernet	2*1000M Ethernet interface
TF card	Support TF card
LVDS output	1*Dual LVDS interface
eDP output	1*4 lane eDP interface
HDMI output	1*HDMI output interface
HDMI input	1*HDMI input interface
MIPI output	1*MIPI LCD interface of 40-pin FPC socket
Audio output	Built-in dual-channel 4R/10W/per channel, 8R/5W/per channel power amplifier
Headphone socket	Built-in 3.5mm 4-section headphone jack
Real Time Clock	Support
Timer switch	Support

Chapter 3 Dimensions and Interface Layout

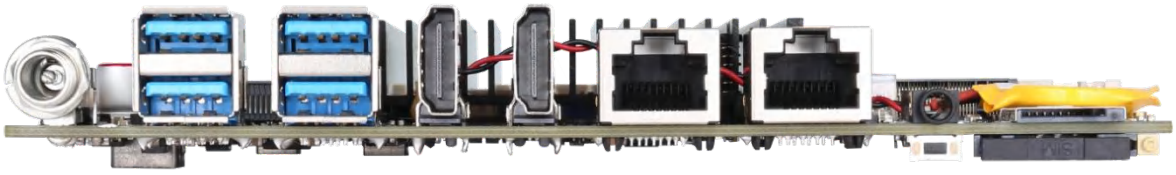
【Front 】



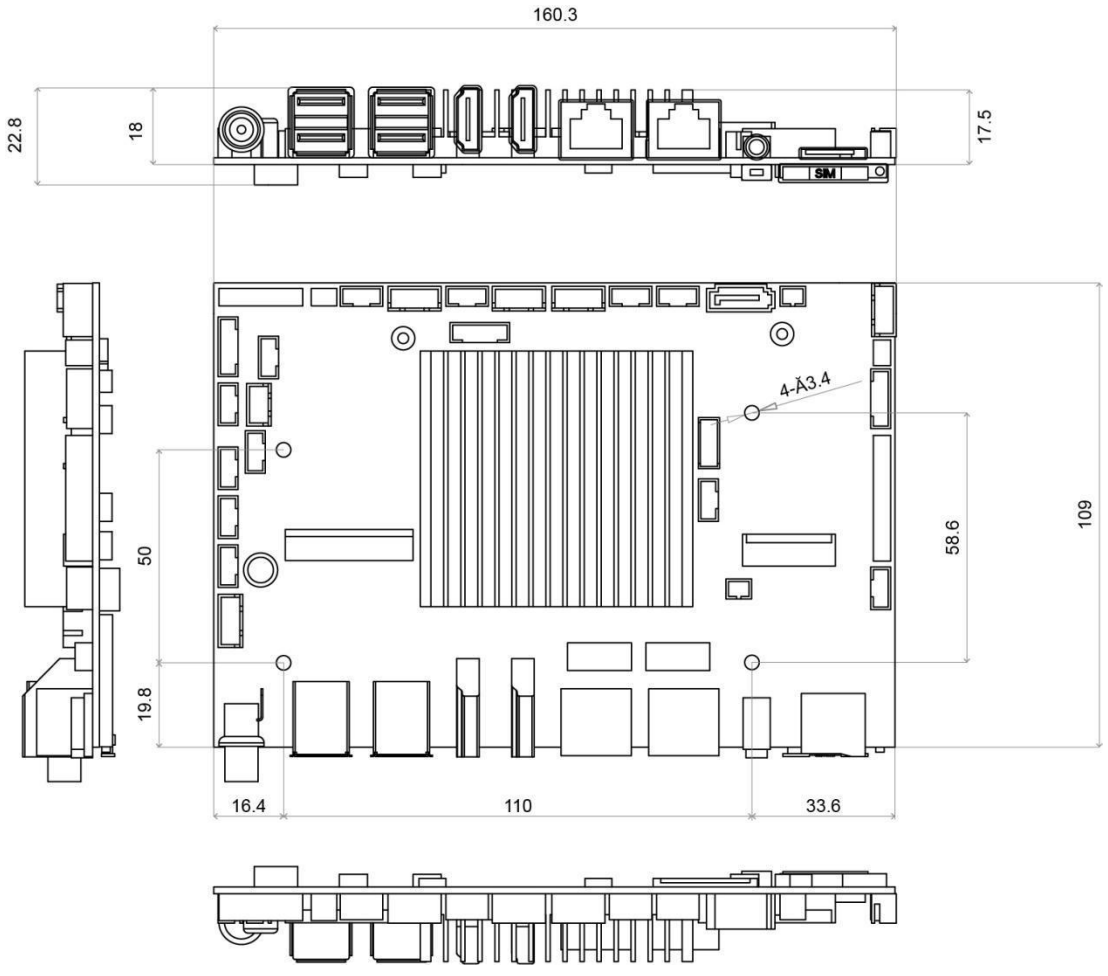
【Back】



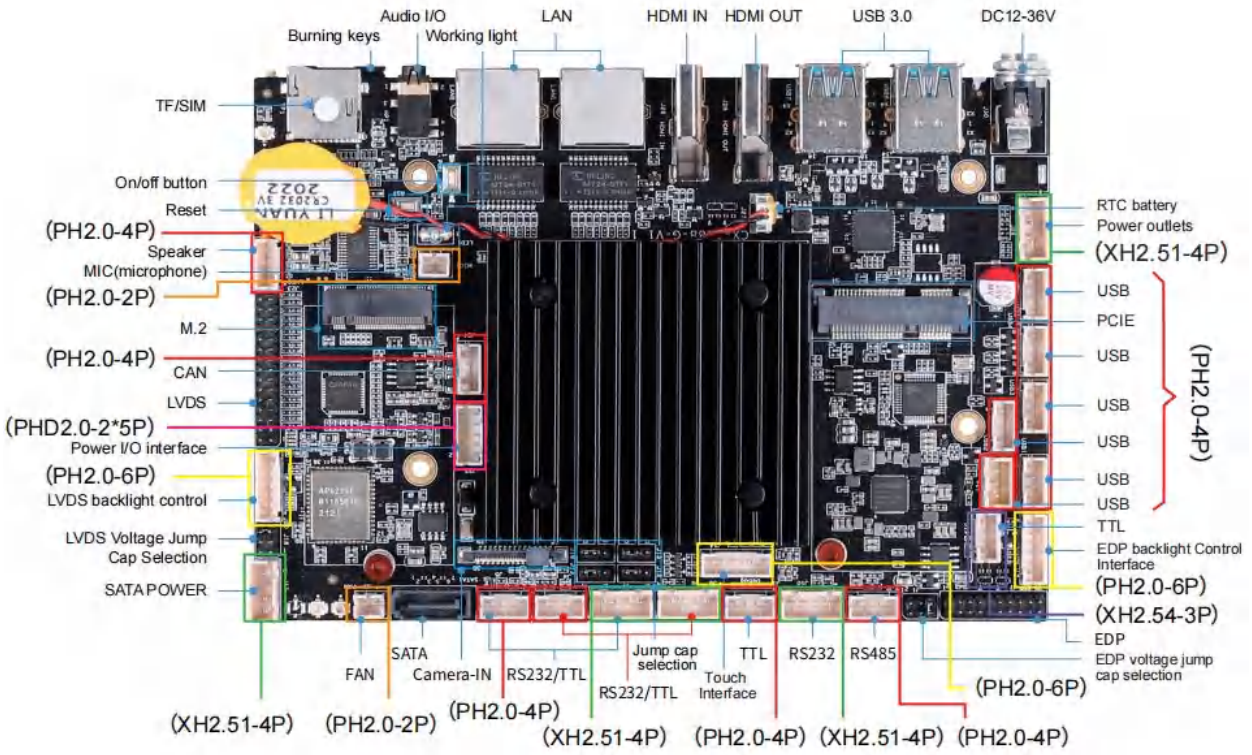
【Seaboard】



3.1 PCB Dimensions

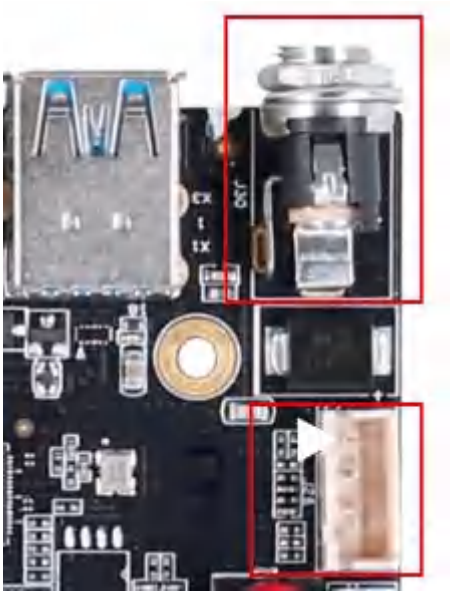


3.2 Interface parameters



◆ 3.2.1 Power input interface

It is powered by 12V-36V DC power supply, and only the DC socket and power socket are allowed to supply power to the board subsystem. The plug DC IN specification of the power adapter is a d2.0 threaded head. The 12V DC power supply needs to support a minimum current of 2A when no peripherals are connected to the load.

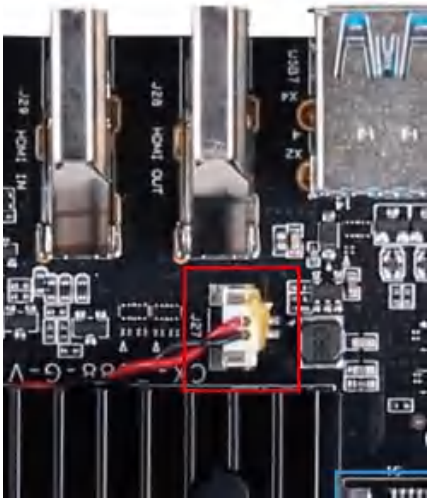


The interface of the power socket is defined as follows, the power board can be used for power supply, and the socket specification is 4PIN 2.54mm pitch.

SN	Definition	Property	Description
1	VCC	input	12V-36V input
2	VCC	input	12V-36V input
3	GND	ground wire	ground wire
4	GND	ground wire	ground wire

◆ 3.2.2 RTC battery interface

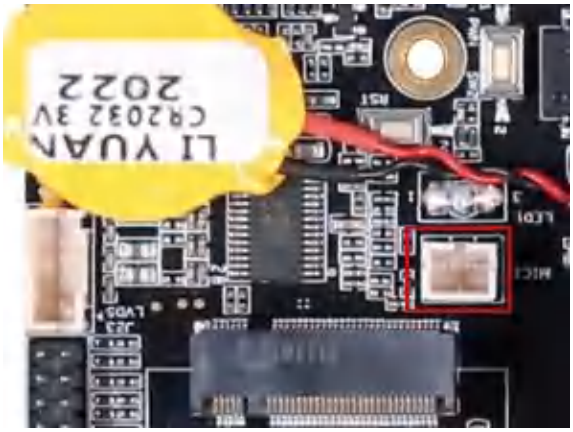
Used to power the system clock during a power outage.



SN	Definition	Property	Description
1	VCC	input	3V input
2	GND	ground wire	ground wire

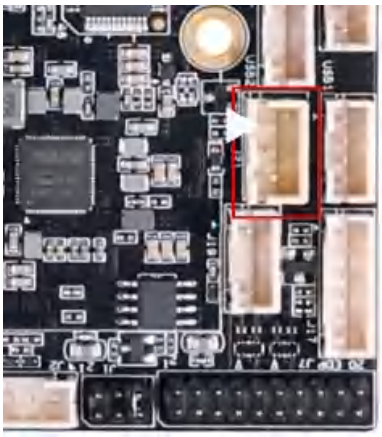
◆ 3.2.3 MIC interface

Please pay attention to the connection method of the positive and negative poles of the MIC, do not reverse the connection.



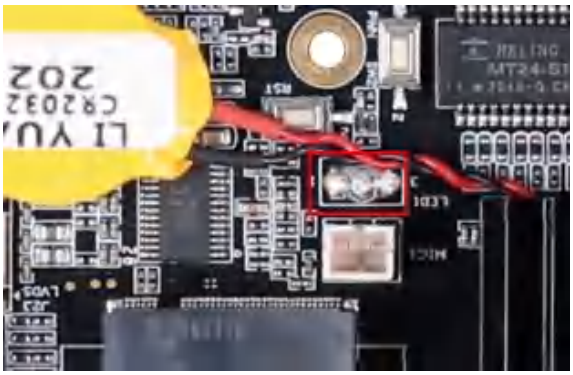
SN	Definition	Property	Description
1	MICP	input	MIC+
2	MICN	input	MIC-

◆ 3.2.4 Remote control receiver



SN	Definition	Property	Description
1	IR	input	Remote signal input
2	GND	ground wire	ground wire
3	3V3	Power	3.3V output

◆ 3.2.5 Working light

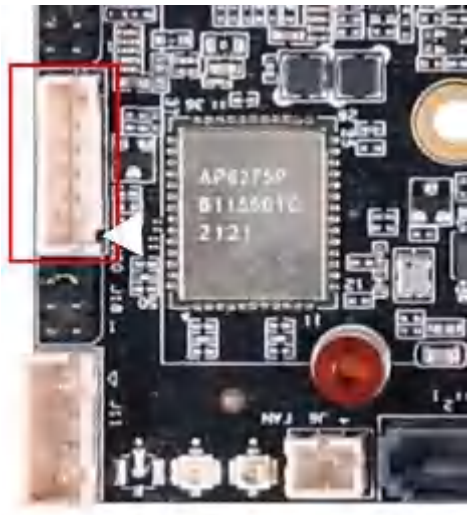


By default, it supports common anode red and blue dual LED lights.

SN	Definition	Property	Description
1	LED_B	blue light	Working light
2	VCC	power supply	3.3V output
3	LED_R	red light	standby indicator light

◆ 3.2.6 LVDS backlight control interface

For backlight control of LVDS screen, the 12V power supply current is not more than 2A. If the power of the backlight of the screen is above 24W, please take power from other power boards to avoid system instability. The backlight enable voltage is 5V, if it is other voltage, please add IO level conversion circuit. This 12V power supply can only be used as backlight power output, and must not be used as power input to supply the system.



SN	Definition	Property	Description
1	VCC	power supply	12V output
2	VCC	power supply	12V output
3	EN	output	Backlight Enable Control
4	PWM	output	Backlight Brightness Control
5	GND	ground wire	ground wire
6	GND	ground wire	ground wire

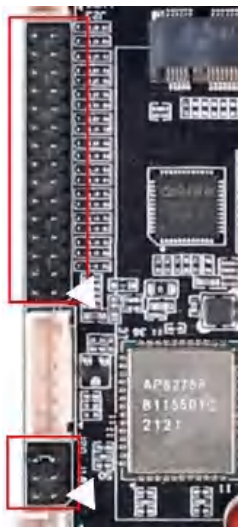
◆ 3.2.7 LVDS interfaces

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

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

1. Please confirm whether the power supply voltage of the screen specification book is correct, and whether the corresponding power supply of the board can meet the maximum working current.

2. Please use a multimeter to confirm whether the power supply selected by the jumper cap is correct.

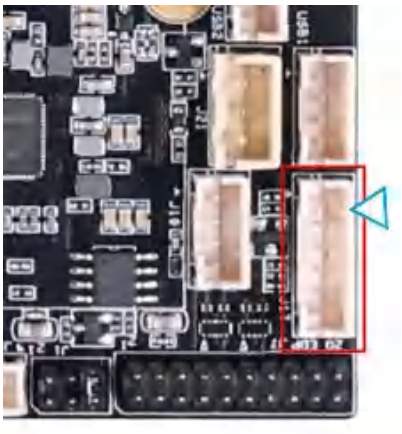


SN	Definition	Property	Description
1	VCC	Power output	LCD power output, +3.3V/+5V/+12V optional
2			
3			
4	GND	ground wire	ground wire
5			
6	GND	ground wire	ground wire
7	D0N	output	Pixel0 Negative Data (Odd)
8	D0P	output	Pixel0 Positive Data (Odd)
9	D1N	output	Pixel1 Negative Data (Odd)
10	D1P	output	Pixel1 Positive Data (Odd)
11	D2N	output	Pixel2 Negative Data (Odd)
12	D2P	output	Pixel2 Positive Data (Odd)
13	GND	ground wire	ground wire
14	GND	ground wire	ground wire
15	CLK0N	output	Negative Sampling Clock (Odd)
16	CLK0P	output	Positive Sampling Clock (Odd)
17	D3N	output	Pixel3 Negative Data (Odd)
18	D3P	output	Pixel3 Positive Data (Odd)
19	D5N	output	Pixel0 Negative Data (Even)
20	D5P	output	Pixel0 Positive Data (Even)
21	D6N	output	Pixel1 Negative Data (Even)

22	D6P	output	Pixel1 Positive Data (Even)
23	D7N	output	Pixel2 Negative Data (Even)
24	D7P	output	Pixel2 Positive Data (Even)
25	GND	ground wire	ground wire
26	GND	ground wire	ground wire
27	CLK1N	output	Negative Sampling Clock (Even)
28	CLK1P	output	Positive Sampling Clock (Even)
29	D8N	output	Pixel3 Negative Data (Even)
30	D8P	output	Pixel3 Positive Data (Even)

◆ 3.2.8 EDP Backlight control interface

It is used for the backlight control of the EDP screen. The 12V power supply current is not more than 2A. If the power of the screen backlight is above 24W, please take power from other power boards for the backlight power supply, so as not to cause system instability. The backlight enable voltage is 5V, if it is other voltage, please add IO level conversion circuit. This 12V power supply can only be used as backlight power output, and must not be used as power input to supply the system.

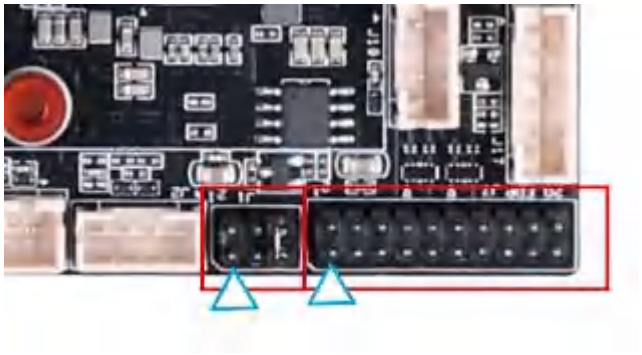


SN	Definition	Property	Description
1	VCC	power supply	12V output
2	VCC	power supply	12V output
3	EN	output	Backlight Enable Control
4	PWM	output	Backlight Brightness Control
5	GND	ground wire	ground wire
6	GND	ground wire	ground wire

◆ 3.2.9 EDP Interface

In the picture above, use the jumper cap to select the power supply of the screen, you can choose: 12V/5V/3.3V, please refer to the silk screen on the back of the PCB carefully.

For the electrical definition of the output interface, pay attention to the position of the first pin of the 20PIN plug-in, if it is reversed, it is easy to burn the EDP screen.

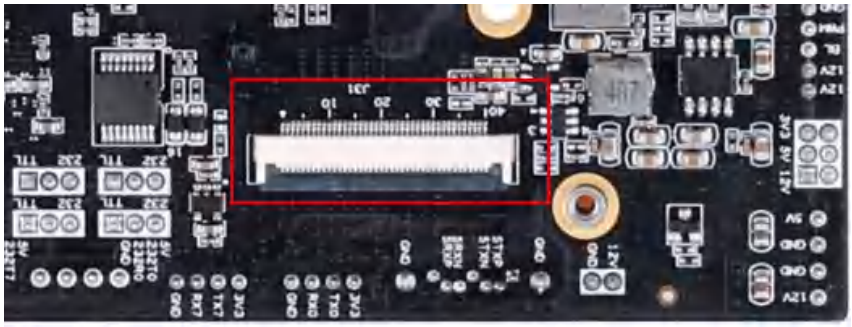


SN	Definition	Property	Description
1	VCC	Power Output	LCD power output, +3.3V/+5V/+12V optional
2			

3 4	GND	ground wire	ground wire
5	TX0P	output	EDP Pixel0 Positive Data (Odd)
6	TX0N	output	EDP Pixel0 Negative Data (Odd)
7	TX1P	output	EDP Pixel1 Positive Data (Odd)
8	TX1N	output	EDP Pixel1 Negative Data (Odd)
9	TX2P	output	EDP Pixel2 Positive Data (Odd)
10	TX2N	output	EDP Pixel2 Negative Data (Odd)
11	TX3P	output	EDP Pixel3 Positive Data (Odd)
12	TX3N	output	EDP Pixel3 Negative Data (Odd)
13	GND	ground wire	ground wire
14	GND	ground wire	ground wire
15	AUXP	output	EDP AUX Positive Data (Odd)
16	AUXN	output	EDP AUX Negative Data (Odd)
17 18 19	GND	ground wire	ground wire
20	HPD	input	EDP DETECT

◆ 3.2.10 MIPI Screen interface

MIPI interface supports single-channel MIPI LCD screen, 4-channel MIPI interface.

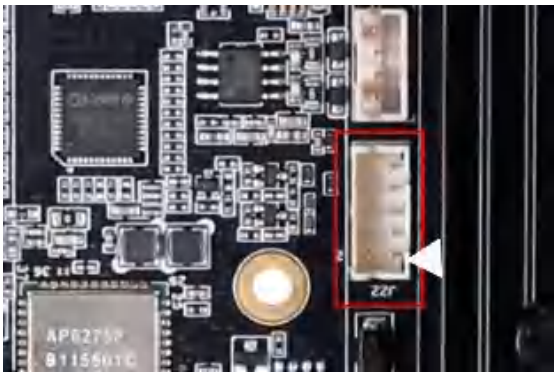


SN	Definition	Property	Description
40	NC	-	Not connect
39	VDD	power supply	Digital power
38	VDD	power supply	Digital power
37	GND	ground wire	Ground
36	REST	output	Global reset pin
35	NC	-	Not connect
34	GND	ground wire	Ground
33	D0N	output	Negative MIPI differential data output
32	D0P	output	Positive MIPI differential data output
31	GND	ground wire	Ground
30	D1N	output	Negative MIPI differential data output
29	D1P	output	Positive MIPI differential data output
28	GND	ground wire	Ground
27	CLKN	output	Negative MIPI differential data output
26	CLKP	output	Positive MIPI differential data output
25	GND	ground wire	Ground
24	D2N	output	Negative MIPI differential data output
23	D2P	output	Positive MIPI differential data output
22	GND	ground wire	Ground
21	D3N	output	Negative MIPI differential data output
20	D3P	output	Positive MIPI differential data output
19	GND	ground wire	Ground
18	NC	-	Not connect
14	NC	-	Not connect
16	GND	ground wire	Ground
15	NC	-	Not connect
14	NC	-	Not connect
13	NC	-	Not connect
12	NC	-	Not connect

11	GND	ground wire	Ground
10	LED-	power supply	LED Cathode
9	LED-	power supply	LED Cathode
8	NC	-	Not connect
7	NC	-	Not connect
6	NC	-	Not connect
5	NC	-	Not connect
4	NC	-	Not connect
3	NC	-	Not connect
2	LED+	power supply	LED Anode
1	LED+	power supply	LED Anode

◆ 3.2.11 IO Interfaces

IO is used to provide input/output of control signals to peripherals, and the level is 3.3V. The switch key is also drawn out of the socket.



SN	Definition	Property	Description
1	PWR	wer supply	System switch
2	RST	input	reset
3	I/O 0	input/output	IO 口
4	button LED/I/O 1	output/input	Button LED light output (default)/IO port (optional)
5	I/O 2	input/output	IO 口
6	I/O 3	input	IO 口
7	I/O 4	input/output	IO 口
8	I/O 5	input	IO 口
9	GND	ground wire	ground wire
10	AD	ground wire	analog input

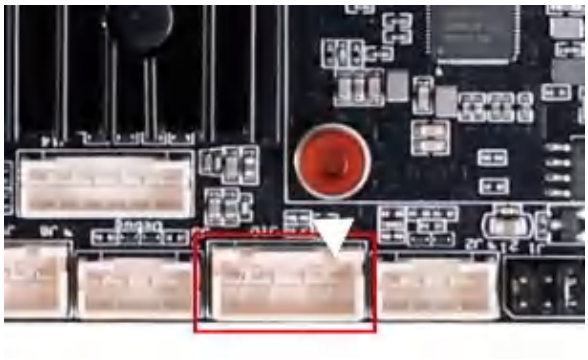
◆ 3.2.12 232 serial socket*1

The board leads out a group of ordinary 232 serial ports, which can support common 232 serial port devices on the market.

Precautions:

1. Whether the serial port voltage matches. It cannot be directly connected to common 232 serial devices on the market.

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



SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	PC-RX	input	232-RX
3	PC-TX	output	232-TX
4	VCC	power supply	5V output

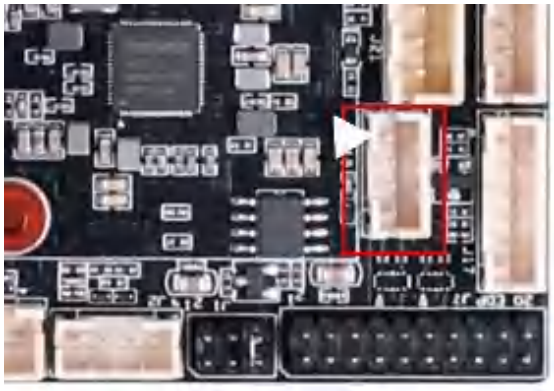
◆ 3.2.13 TTL Serial socket interface*1

The board has a set of TTL serial ports, which can support common serial devices on the market, and the voltage level of the 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.

Precautions:

1. Whether the TTL serial port voltage matches. It cannot be directly connected to MAX232, 485 devices.

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



SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	UART-RX	input	RX
3	UART-TX	output	TX
4	VCC	power supply	3.3V output

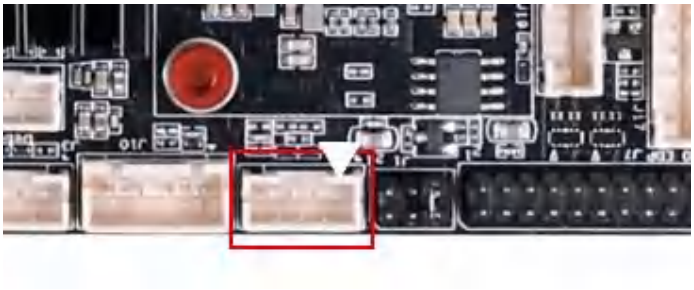
◆ 3.2.14 485 socket interface*1

The board also supports a group of 485 communication interfaces, which can support common 485 interface devices on the market, and the level of the interface is 3.3V. If the level of the connected interface is higher than 3.3V, there must be an isolation circuit or a level conversion circuit, otherwise the device will be easily damaged.

Precautions:

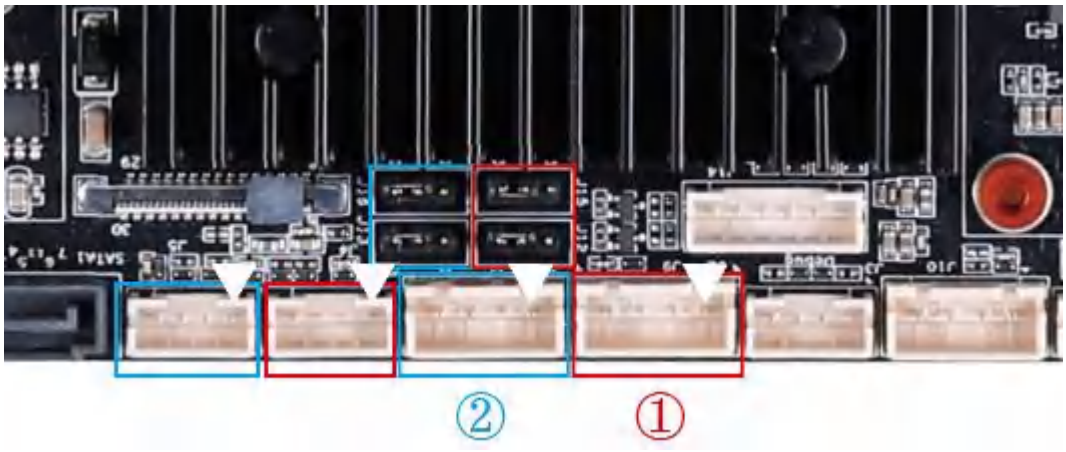
1. Whether the 485 interface voltage matches.

2. Check whether the wiring sequence of 485A and 485B is correct.



SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	485B	input/output	B
3	485A	input/output	A
4	VCC	power supply	3.3V output

◆ 3.2.15 2-way RS232/TTL socket You can select the current use of RS232 or TTL through the jumper cap



○1 The red mark represents the first group RS232/TTL

○2 The blue logo represents the second group RS232/TTL

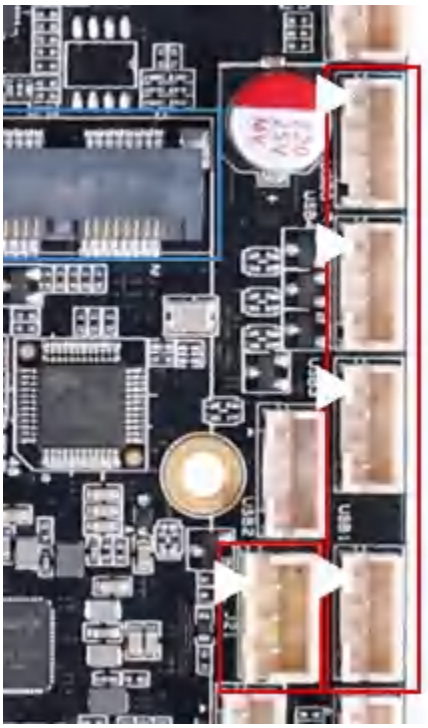
RS232 Seat definition

SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	PC-RX	input	232-RX
3	PC-TX	output	232-TX
4	VCC	power supply	5V output

TTL Seat definition

SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	UART-RX	input	RX
3	UART-TX	output	TX
4	VCC	power supply	3.3V output

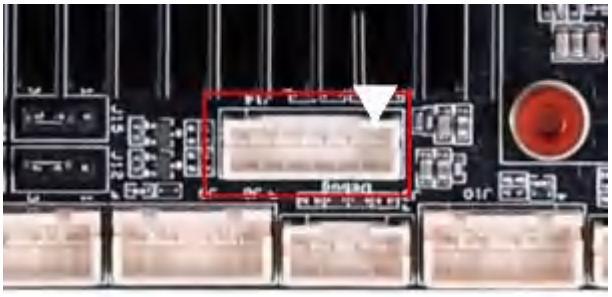
◆ 3.2.16 USB Socket



The board has 5 USB2.0 sockets for peripheral expansion, the default is HOST, and the power supply current of each channel is not more than 500mA. Among them, USB5 is directly output from CPU, and others are converted from USB HUB.

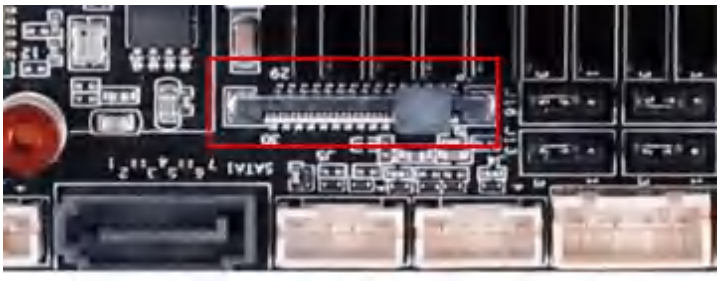
SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	DP	input/output	DP
3	DM	input/output	DM
4	VCC	power supply	5V output

◆ 3.2.17 Touch screen interface



SN	Definition	Property	Description
1	VCC	power supply	3.3V output
2	SCK	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

◆ 3.2.18 Camera_IN interfaces



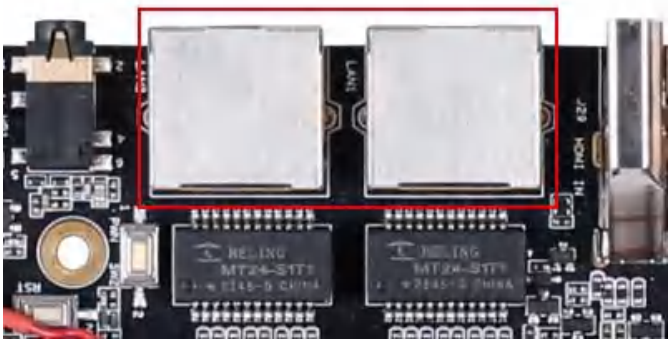
The board supports a 1300W pixel MIPI camera, and the electrical definition of the socket is as follows:

SN	Definition	Property	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 lane 3 positive
17	D3N	input/output	MIPI data lane 3 negative
18	GND	ground wire	ground wire
19	D2P	input/output	MIPI data lane 2 positive
20	D2N	input/output	MIPI data lane 2 negative
21	GND	ground wire	ground wire
22	D1P	input/output	MIPI data lane 1 positive
23	D1N	input/output	MIPI data lane 1 negative
24	GND	ground wire	ground wire
25	CLKP	input/output	MIPI clock lane positive
26	CLKN	input/output	MIPI clock lane negative
27	GND	ground wire	ground wire
28	D0P	input/output	MIPI data lane 0 positive
29	D0N	input/output	MIPI data lane 0 negative
30	GND	ground wire	ground wire

◆ 3.2.19 Speaker interface

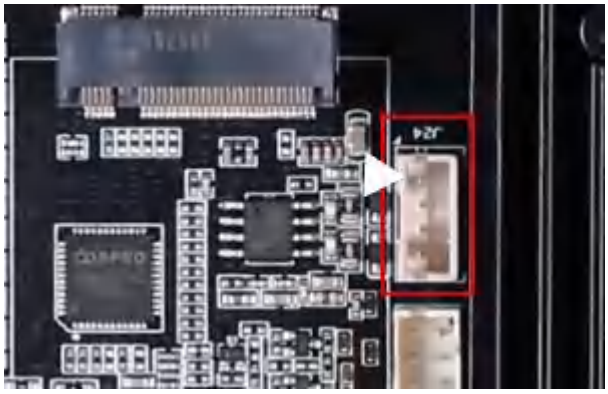
SN	Definition	Property	Description
1	OUP-R	output	Audio output right+
2	OUN-R	output	Audio output right-
3	OUN-L	output	Audio output left-
4	OUP-L	output	Audio output left+

◆ 3.2.20 Ethernet



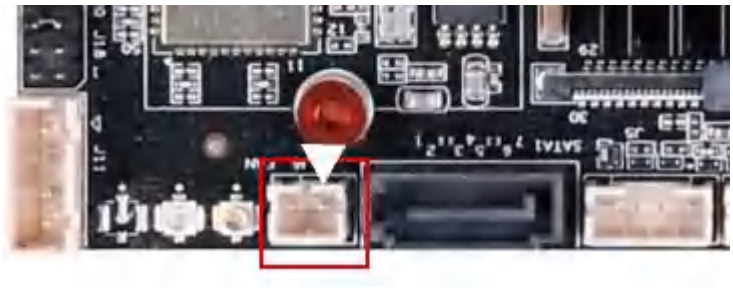
The board supports 2 Gigabit Ethernet ports.

◆ 3.2.21 CAN BUS



SN	Definition	Property	Description
1	GND	ground wire	ground wire
2	CANH	High-end signal	CAN high
3	CANL	Low end signal	CAN low
4	VCC5V	power supply	5V Power output

◆ 3.2.22 Fan interface



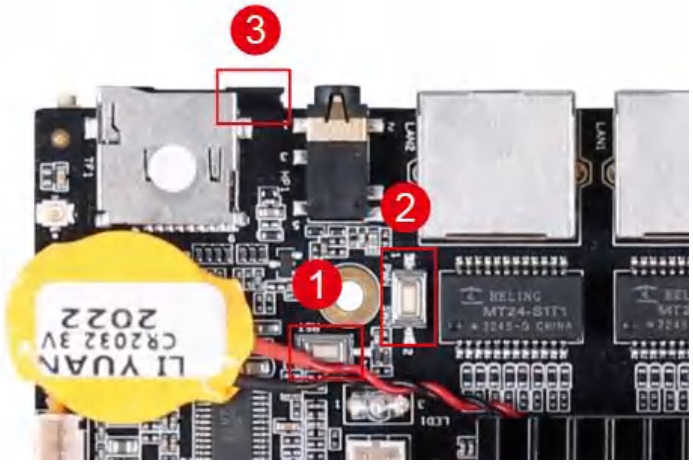
SN	Definition	Property	Description
1	GND	ground wire	ground wire
4	VCC	power supply	12V Power output

◆ 3.2.23 Standard SATA interface

◆ 3.2.24 SATA power supply interface

SN	Definition	Property	Description
1	VCC-12	Power output	12V Power output
2	GND	digitally	ground wire
3	GND	digitally	ground wire
4	VCC-5V	Power output	5V Power output

◆ 3.2.25 Key description



○1 Reset button

○2 Switch button

○3 Enter the burning mode button

◆ 3.2.26 Other standard interfaces and functions

storage interface	TF card	Data storage, currently only tested to 1T
	USB	USB3.0 interface supports backward compatibility with USB2.0, supports data storage, data import, USB mouse, keyboard, camera, touch screen, etc.
HDMI interface	standard interface	Support HDMI data output, maximum support 8K/60HZ
HDMI IN interface	standard interface	Support HDMI data input, maximum support 4K/60HZ
headphone jack	standard interface	3.5mm standard interface
4G interface	PCI-E standard interface	Support Huawei, ZTE and other Mini PCI-E 3G/4G modules
5G interface	M.2 standard interface	Quectel and TD Tech 5G modules are currently supported
SIM card interface	standard interface	Support various standards (depending on 4G/5G module)

Chapter 4 Electrical properties

Item		Minimum	Typical	Maximum
Power parameters	Voltage	--	12V	36V
	ripple	--	--	100mV
	electric current		4A	
Supply current (HDMI output without other peripherals)	Board working current	--	600mA	1500mA
	stand-by current	--	--	--
	USB supply current	--	--	500mA
static electricity	contact discharge			8KV
	air discharge			15KV
environment	Relative humidity	--	--	80%
	Operating temperature	-20℃	--	60℃
	storage temperature	-20℃		70℃

Remark 1:

When connecting to an LVDS screen, care should be taken to select the correct backlight operating voltage of 3.3V, 5V, and 12V, and users should not apply it to peripherals that exceed the corresponding maximum current.

Remark 2:

When connecting to eDP/LVDS screen, the overall operating current and standby current of the board depends on the connected screen, and the above table does not list them one by one.

Chapter 5 Precautions for assembly and use

During assembly and use, please pay attention to the following (and not limited to) problems:

1. Short circuit between bare board and peripherals;

2. During the installation and fixing process, avoid the deformation of the bare board due to fixing reasons;

3. When installing the eDP/LVDS screen, pay attention to whether the voltage and current of the screen meet the requirements, and pay attention to the direction of the pin 1 of the screen holder;

4. When installing the eDP/LVDS screen, pay attention to whether the screen backlight voltage and current are in compliance. If the backlight power of the screen is above 20W, whether to use other power boards for power supply;

5. When installing peripherals (USB, IO, ETC), pay attention to the IO level and current output of peripherals;

6. When installing the serial port, pay attention to whether the 232,485 device is directly connected. TX, RX connection is correct.

Whether the input power is connected to the power input interface, according to the overall peripheral evaluation, whether the input power voltage and current meet the requirements. Put an end to the power supply input power from the backlight socket for the convenience of operation