Product Specification

Mainboard series

CX3588-A

V1.0

Catalogue

Chapter 1 Product Introduction

1.1 Scope of application

CX3588-A belongs to high performance Android series products, with 8nm advanced manufacturing process; With 8-core 64-bit size core architecture, 4 A76 large core frequency can reach 2.4G, 4 A55 small core frequency can reach 1.8G; With NPU, with 6TOPS AI computing power, Mali-G610 MC4 GPU; 8K video codec,

8K display output;

1.2 Function introduction

The CX3588-A runs Android13. The board is equipped with LVDS, eDP, MIPI, HDMI display output interface, MIPI Camera, 1 Gigabit network 1 100 Gigabit network and other interfaces, and built-in universal backlight board interface, and screen voltage jumper, compatible with more kinds of display; Stronger performance, faster, more rich interface, is your best choice in human-computer interaction, intelligent terminal, industrial control projects.

1.3 Features

- Multi-channel display interface: LVDS, eDP, MIPI, HDMI display output interface.
- Rich expansion interface: 6 USB interfaces (1 USB2.0 HOST standard interface, 4 USB2.0 PH2.0 HOST interface socket, 1 standard USB3.0 OTG interface), 2 TTL serial port, 2 RS232, 1 RS485, 6 GPIO support input and output, can meet the requirements of various peripherals on the market.
- Multiple network interfaces: 1*1000M Ethernet interface, 1 * 100M Ethernet interface, support 5G and 2.4G WIFI, built-in PCI-E 4G module interface.
- High definition: Maximum support 8K/60HZ video output, support LVDS/EDP/MIPI/HDMI interface LCD display.
- Customized with Android system, 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.

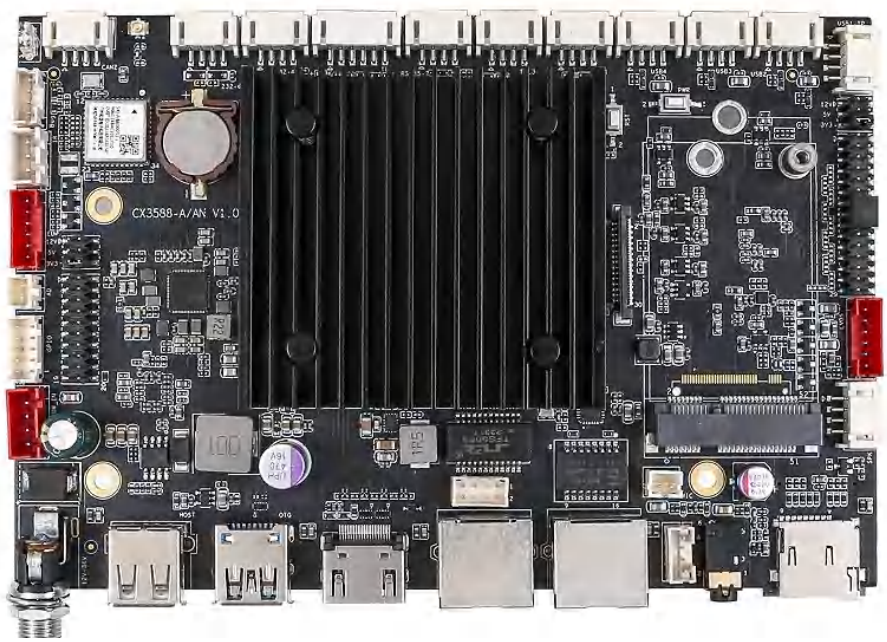
Chapter2 Product specification parameter

Type	Specification parameters
CPU	The RK3588S is a 64-bit high performance CPU 1 Quad 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	4GB/8GB optional, Supports up to 32GB
Built-in memory	64GB/128GB/256GB optional, Supports up to 256GB
Built-in ROM	4KB EEPROM
Decoding resolution	Supports up to 8K/60Hz
Operating system	Android 13.0/Linux5.10/Ubuntu20.04/Ubuntu22.04/Debian11
Play Mode	Support a variety of playback modes, such as loop, timing, and interjection
Network support	4G, Ethernet, WiFi/ Bluetooth support, wireless peripheral expansion
Video playback	Support wmv, avi, flv, rm, rmvb, mpeg, ts, mp4, etc
Image Format	BMP, JPEG, PNG, GIF are supported
USB port	1 USB2.0 standard port 4 * USB2.0 socket 1 USB3.0 OTG socket
Mipi Camera	30pin FPC interface, support 1300W Camera
Serial port	5 serial port sockets (2* RS232,1 *485,2 TTL)

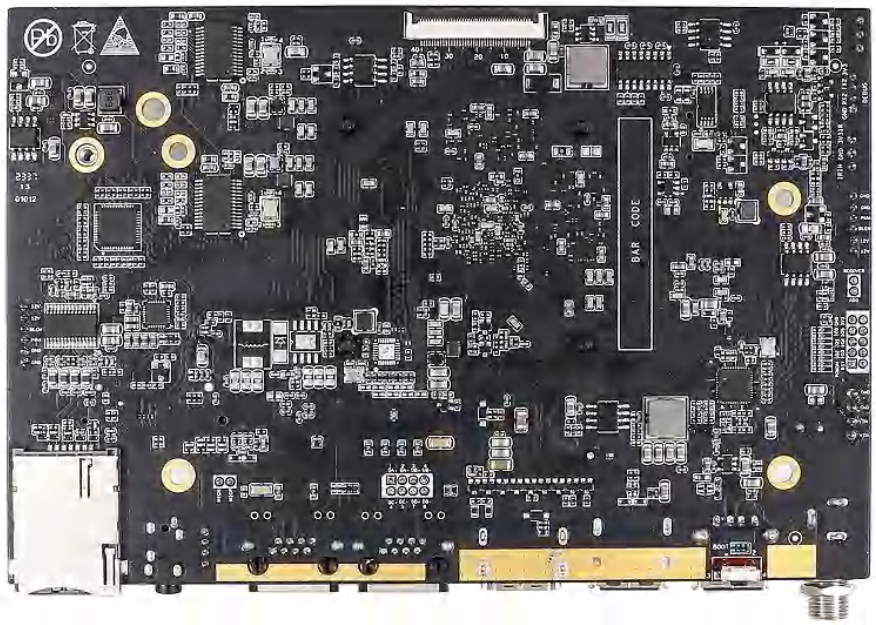
GPS	External GPS (optional)
WIFI, BT	Built-in 2.4G/5G WIFI6, Bluetooth 5.0
4G/5G	4G module interface with built-in MINIPCIE
Ethernet	1 1000M Ethernet interface, 1 100M Ethernet interface
CAN	Supports 1 standard CAN interface
GPIO	Supports 6 3V3 GPIOs, which can be used as input and output
Remote	Supports one IR port
TF card	TF card support
LVDS output	1 dual LVDS port
eDP output	1 4 lane eDP interface
HDMI output	1 standard HDMI output port
MIPI Output	MIPI LCD connector for 1 40-pin FPC seat son
Audio output	Built-in power amplifier for dual channel 4R/10W/ per channel, 8R/5W/per channel
Headphone	Built-in 3.5mm 4-section headphone jack
RTC real-time	Support
Timing switch	Support

Chapter 3 Product interface definition

【Front 】

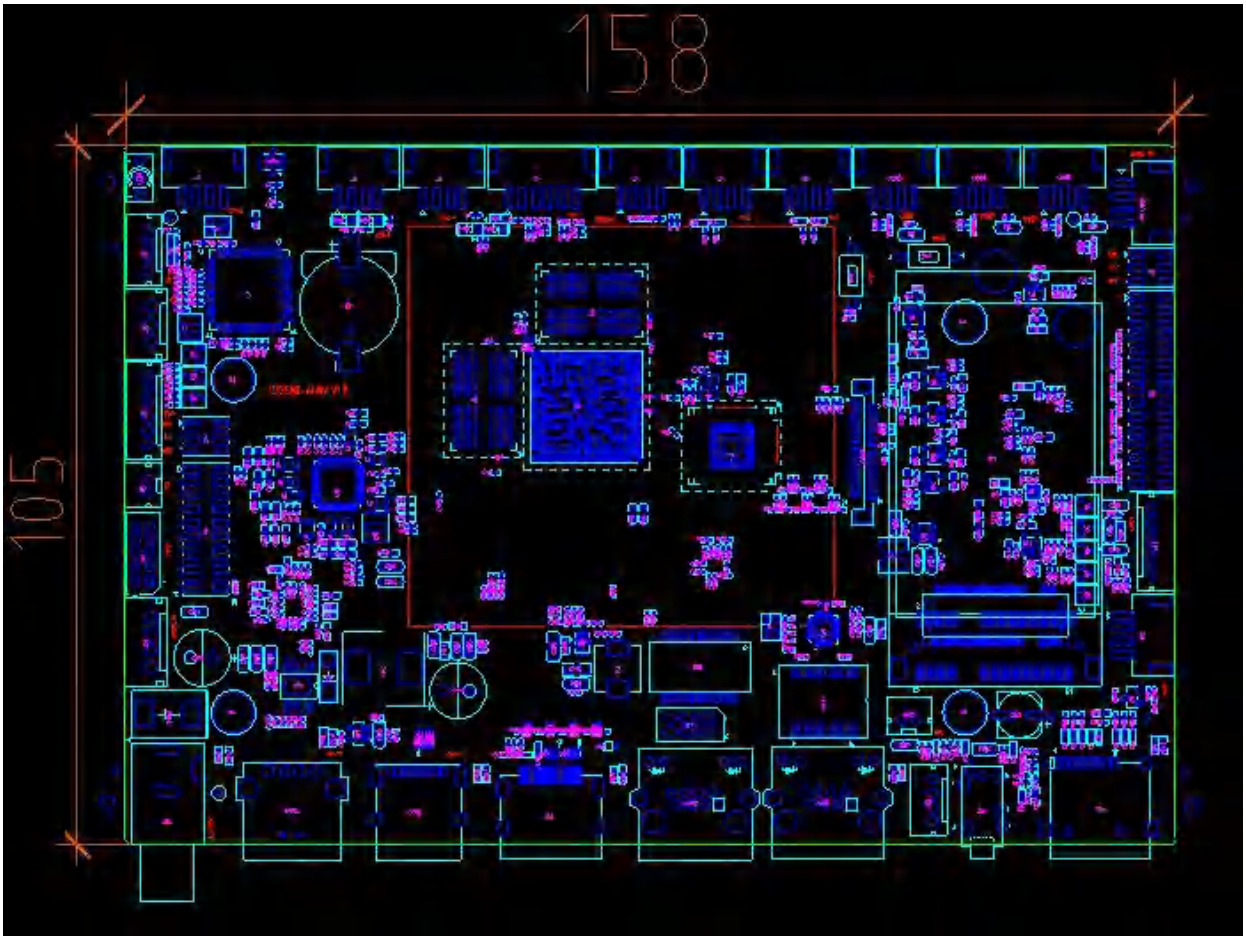


【Back】

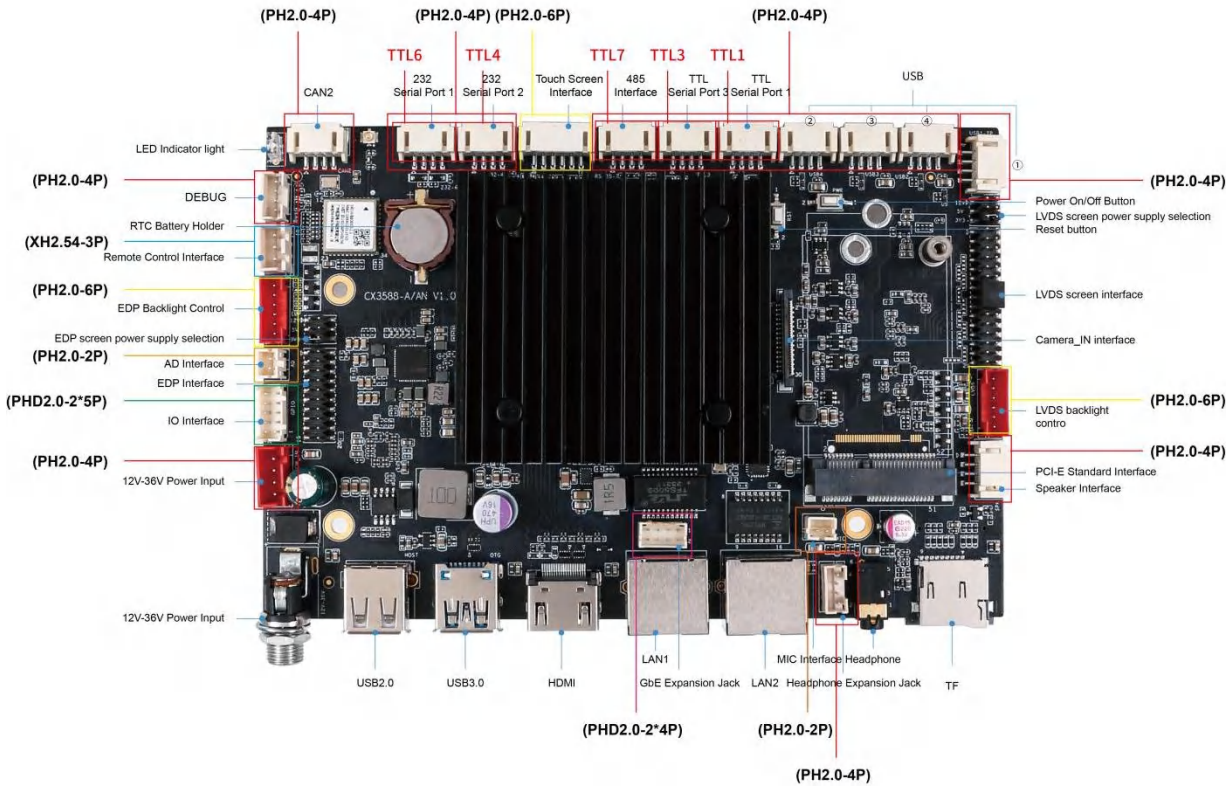


【Seaboard】

3.1 PCB Dimensions



3.2 Interface parameters



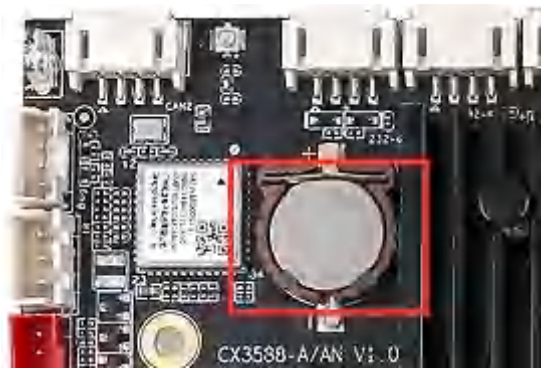
◆ 3.2.1 Power input interface

Use 12V-36V DC power supply, only allowed to power the board sub-system from the DC base and power socket, the power adapter plug DC IN specification is d2.0 thread head. In the absence of peripheral empty load, the 12V DC power supply needs to support a minimum of 2A current.

The interface of the power outlet is defined as follows, it can be powered by a power board, and the seat son specification is 4PIN 2.54mm pitch.

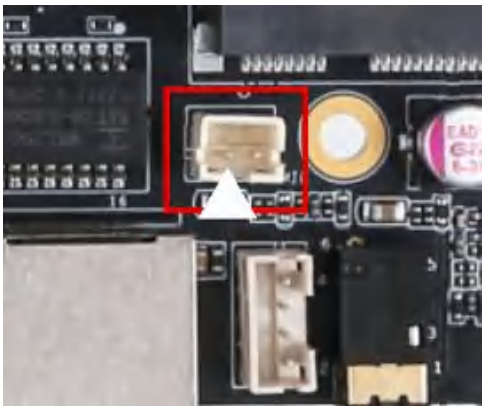
SN	Definitions	Attributes	Description
1	VCC	Input	12V-36V input
2	VCC	Input	12V-36V input
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire

◆ 3.2.2 RTC Battery



Used to power the system clock during power outages. Use a CR1220 button battery.

◆ 3.2.3 MIC interface



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

SN	Definitions	Attributes	Description
1	MICP	Input	MIC+
2	MICN	Input	MIC-

◆ 3.2.4 Remote Control Receiving port

SN	Definitions	Attributes	Description
1	IR	Input	Remote signal input
2	GND	Ground wire	Ground wire
3	3V3	Power supply	3.3V output

◆ 3.2.5 Work light indicator

◆ 3.2.6 LVDS backlight control interface

For the backlight control of LVDS screen, the supply current of 12V is not greater than 2A.

When the backlight power of the screen is more than 24W, the backlight supply should be powered from other power supply boards to avoid system instability. Backlight enable voltage is 5V, if other voltages, please add IO level conversion circuit. This 12V power supply can only be used as backlight power output, do not be used as power input to supply the system.

SN	Definitions	Attributes	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 Interface

Common LVDS interface definition, support single/dual, 6/8 -bit 1080P LVDS screen. The screen voltage can be selected through the jumper cap, optionally supporting 3.3V/5V/12V

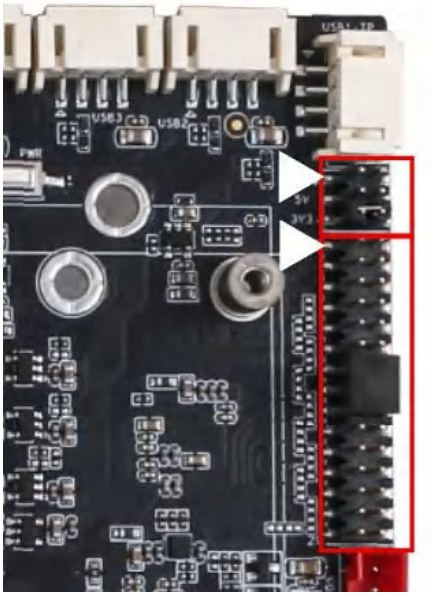
screen power supply.

In order to avoid burning boards and screens, 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.

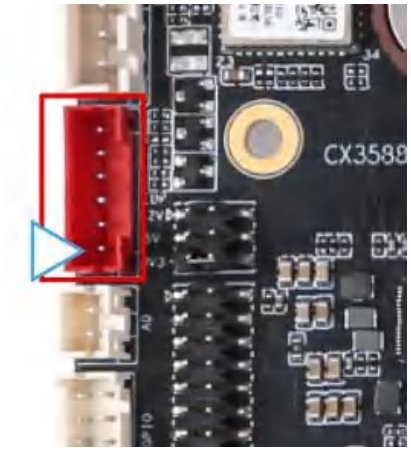


SN	Definitions	Attributes	Description
1	VCC	Power output	LCD power output, +3.3V/+5V/ +12V optional
2			
3			
4	GND	Ground wire	Ground wire
5			
6	GND	Ground wire	Ground wire
7	D0N	Output	Pixel0 Negative Data (Odd)
8	D0P	Output	Pixel0 Positive Data (Odd)
9	D1N	Output	Pixel1 Negative Data (Odd)
10	D1P	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

For the EDP screen backlight control, the 12V power supply current is not greater than 2A, if the power of the screen backlight is more than 24W, the backlight power supply should be taken from other power supply boards to avoid system instability. Backlight enabling voltage is 5V, if other voltages, pleaseadd IO level conversion circuit. This 12V power supply can only be used as backlight power output, do not be used as power input to supply the system.

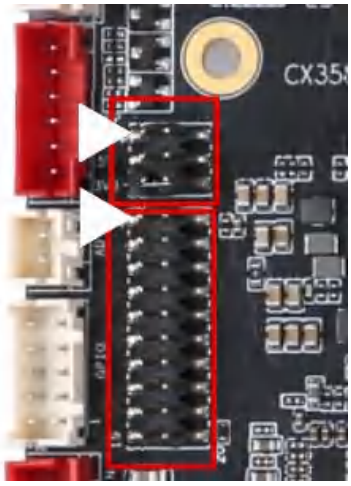


SN	Definitions	Attributes	Description
1	VCC	Power source	12V output
2	VCC	Power supply	12V output
3	EN	Output	Backlight Enable control
4	PWM	Output	Backlight brightness control
5	GND	Ground wire	Ground wire
6	GND	Ground wire	Ground wire

◆ 3.2.9 EDP interface

In the figure above, jumper cap is used to select the screen power supply, which can be selected: 12V/5V/3.3V, please carefully see the screen printing on the back of the PCB. The electrical definition of the output interface, pay attention to the first pin position of the

20PIN plug-in, if inserted backwards, it is easy to burn the EDP screen.



SN	Definitions	Attributes	Description
1	VCC	Power output	LCD power output, +3.3V/+5V/ +12V optional
2			
3	GND	Ground wire	Ground wire
4			
5	TX0P	Output	EDP Pixel0 Positive Data (Odd)
6	TX0N	Output	EDP Pixel0 Negative Data (Odd)
7	TX1P	exportation	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	exportation	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	exportation	EDP AUX Positive Data (Odd)
16	AUXN	Output	EDP AUX Negative Data (Odd)
17	GND	Ground wire	Ground wire
18			
19			
20	HPD	Input	EDP DETECT

◆ 3.3.0 MIPI Screen Interface

MIPI interface Supports a maximum of 4 -channel MIPI interface.

SN	Definitions	Attributes	Description
40	NC	-	Not connect
39	VDD	Power supply	3.3V Digital power
38	VDD	Power source	3.3V Digital power
37	GND	to	Ground
36	REST	Output	3.3V Global reset pin
35	NC	-	Not connect
34	GND	to	Ground
33	D0N	Output	Negative MIPI differential data output
32	D0P	Output	Positive MIPI differential data output
31	GND	to	Ground
30	D1N	Output	Negative MIPI differential data output
29	D1P	Output	Positive MIPI differential data output
28	GND	to	Ground
27	CLKN	Output	Negative MIPI differential data output
26	CLKP	Output	Positive MIPI differential data output
25	GND	to	Ground
24	D2N	Output	Negative MIPI differential data output
23	D2P	Output	Positive MIPI differential data output
22	GND	to	Ground
21	D3N	Output	Negative MIPI differential data output
20	D3P	Output	Positive MIPI differential data output
19	GND	to	Ground
18	NC	-	Not connect
17	NC	-	Not connect
16	GND	to	Ground
15	NC	-	Not connect
14	NC	-	Not connect
13	NC	-	Not connect
12	NC	-	Not connect
11	GND	to	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

◆ 3.3.1 IO interface

IO is used to provide the input/output of the control signal to the peripheral, and the level is 3.3V

SN	definition	Attributes	Description
1	PWR	Key input	System switch
2	RST	Reset input	System reset
3	I/O 2	Input/Output	I/O 2
4	I/O 3	Output/Input	I/O 3
5	I/O 1	Input/Output	I/O 1
6	I/O 4	Input/Output	I/O 4
7	I/O 0	Input/Output	I/O 0
8	I/O 5	Input/Output	I/O 5
9	GND	Ground wire	Ground wire
10	3V3	Power output	3.3V power output

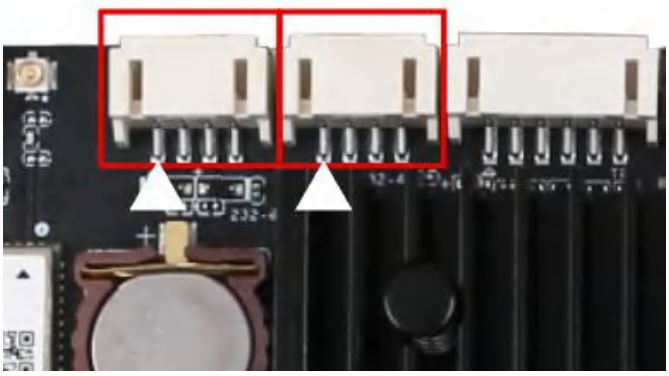
◆ 3.3.2 232 Serial Port socket *2

The board brings out two sets of common 232 serial ports, which can support common 232 serial port devices in the market.

Note:

1. Whether the serial port voltage matches. Cannot be directly connected to the 232 serial port device in the market.

2, TX,RX connection is correct.



SN	Definitions	Attributes	Description
1	GND	Ground wire	Ground wire
2	PC-RX	Enter	232-RX
3	PC-TX	Output	232-TX
4	VCC	Power supply	5V output

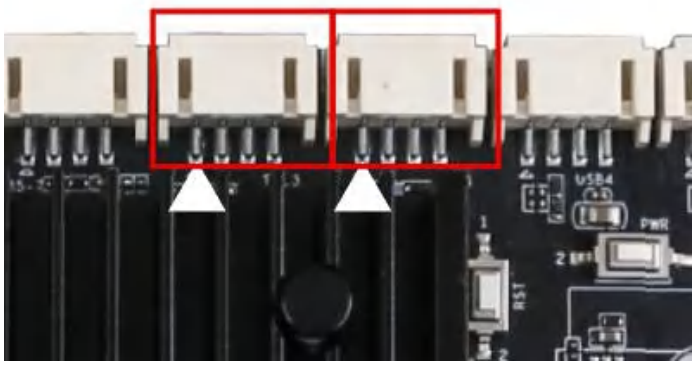
◆ 3.3.3 TTL Serial Socket Interface *2

The board leads out two sets of TTL serial ports, which can support the common serial port devices in the market. The level of the serial ports is 3.3V. If the level of the docking serial port is higher than 3.3V, there should be an isolation circuit or level conversion circuit, otherwise it will burnout the main control and equipment.

Points to note:

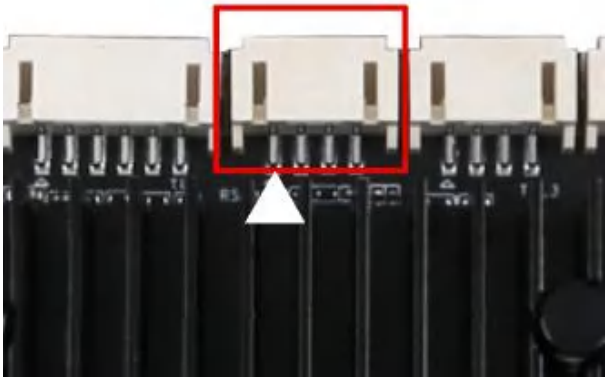
1, TTL serial port voltage match. Can not directly connect to RS232, 485 devices.

2, TX,RX connection is correct.



SN	Definitions	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

◆ 3.3.4 485 Socket interface *1



The board also supports a set of 485 communication interfaces, which can support the common 485 interface devices on the market, and the level of the interface is 3.3V. If the level of the docking interface is higher than 3.3V, there should be an isolation circuit or level switching circuit, otherwise it is easy to damage the device.

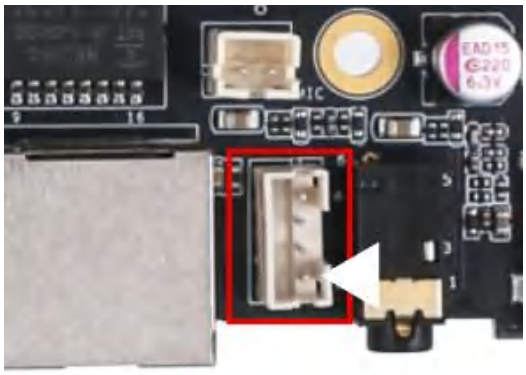
Points to note:

1. Check whether the voltage of the 485 interface matches.

2, 485A,485B line sequence method is correct

SN	Definitions	Attributes	Description
1	GND	Ground wire	Ground wire
2	485B	Input/out	B
3	485A	Input/output	A
4	VCC	Power supply	3.3V output

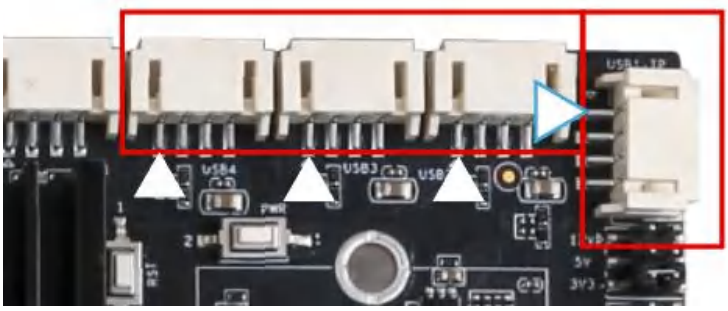
◆ 3.3.5 Headphone expansion pin holder



Pin seat sub dfinition

SN	Definition	Property	Description
1	MIC	Input	MIC voice input for headphones
2	HPL	Output	Headphone voice output
3	HPR	Output	Headphone voice output
4	GND	Ground	Ground

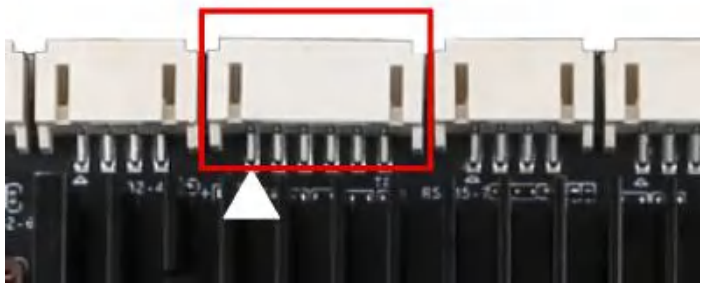
◆ 3.3.6 USB socket



The board has 4 USB2.0 HOST sockets for peripheral expansion, each supplying no more than 500mA of current. All are transferred out of the USB HUB. If the device wants to connect to the TP touch of USB, it is recommended to connect to the No. 1 pin.

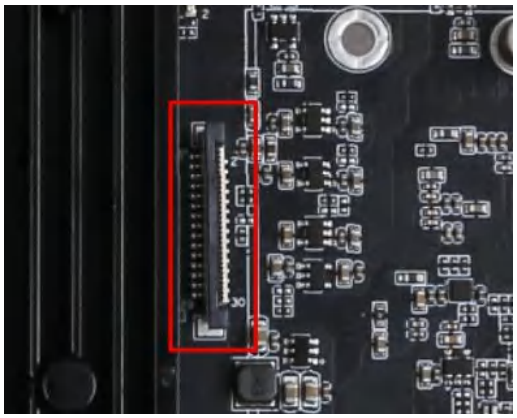
SN	Definitions	Attribute	Description
1	GND	Ground wire	Ground wire
2	DP	Input/out	DP
3	DM	Input/out	DM
4	VCC	Power source	5V output

◆ 3.3.7 Touch screen interface



SN	Definitions	Attributes	Description
1	VCC	Power supply	3.3V output
2	SCK	Input/out	I2C clock
3	SDA	Input/out	I2C data
4	INT	Input/out	Interrupt
5	RST	Input/out	Reset
6	GND	Ground wire	Ground wire

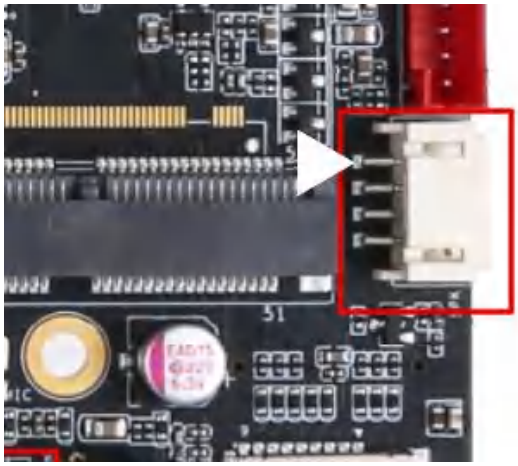
◆ 3.3.8 Camera_IN port



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

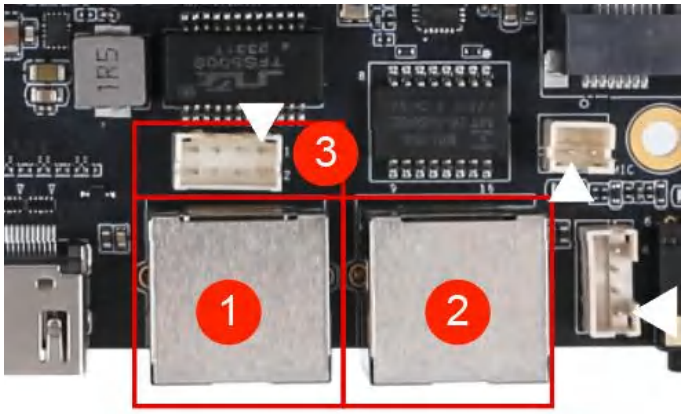
SN	Definitions	Attributes	Description
1	NC	/	/
2	VDD	Power supply	2.8V output
3	DVDD	Power supply	1.2V output
4	DOVDD	Power supply	1.8V output
5	NC	/	/
6	GND	Ground wire	Ground wire
7	VDD	Power supply	2.8V output
8	GND	Ground wire	Ground wire
9	I2C3_SDA	Input/out	SDA signal
10	I2C3_SCL	Output	SCL signal
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/out	MIPI data channel 3 positive
17	D3N	Input/out	MIPI data channel 3 negative
18	GND	Ground wire	Ground wire
19	D2P	Input/out	MIPI data channel 2 positive
20	D2N	Input/out	MIPI data channel 2 minus
21	GND	Ground wire	Ground wire
22	D1P	Input/out	MIPI data channel 1 positive
23	D1N	Input/out	MIPI data channel 1 negative
24	GND	Ground wire	Ground wire
25	CLKP	Input/out	MIPI clock channel positive
26	CLKN	Input/out	MIPI clock channel negative
27	GND	Ground wire	Ground wire
28	D0P	Input/out	MIPI data channel 0 positive
29	D0N	Input/out	MIPI data channel 0 negative
30	GND	Ground wire	Ground wire

◆ 3.3.9 Horn port



SN	Definitions	Stats	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	exportation	Audio output left +

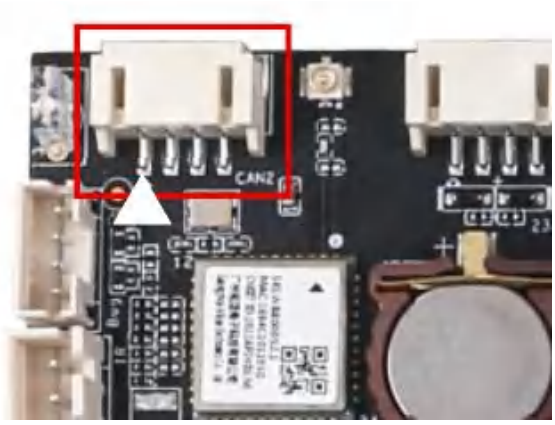
◆ 3.4.0 Ethernet



1 is astandard Gigabit and 2 is a standard 100 Gigabit

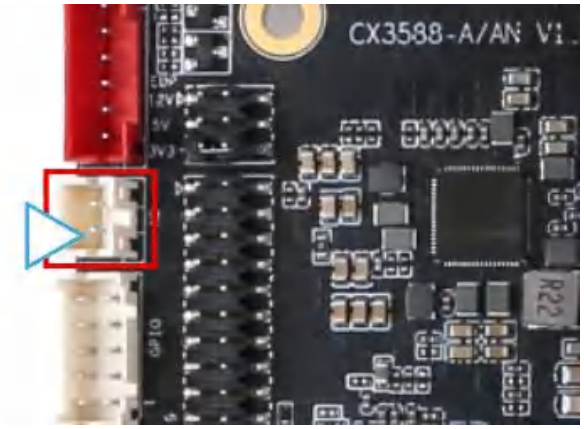
3 is a double row 2.0 pitch 8PIN seat above the standard RJ45 Gigabit network signal, 1 and 3 of the two can only choose one to use. The 8PIN seat can cooperate with our self-developed POE module to achieve POE function.

◆ 3.4.1 CAN bus



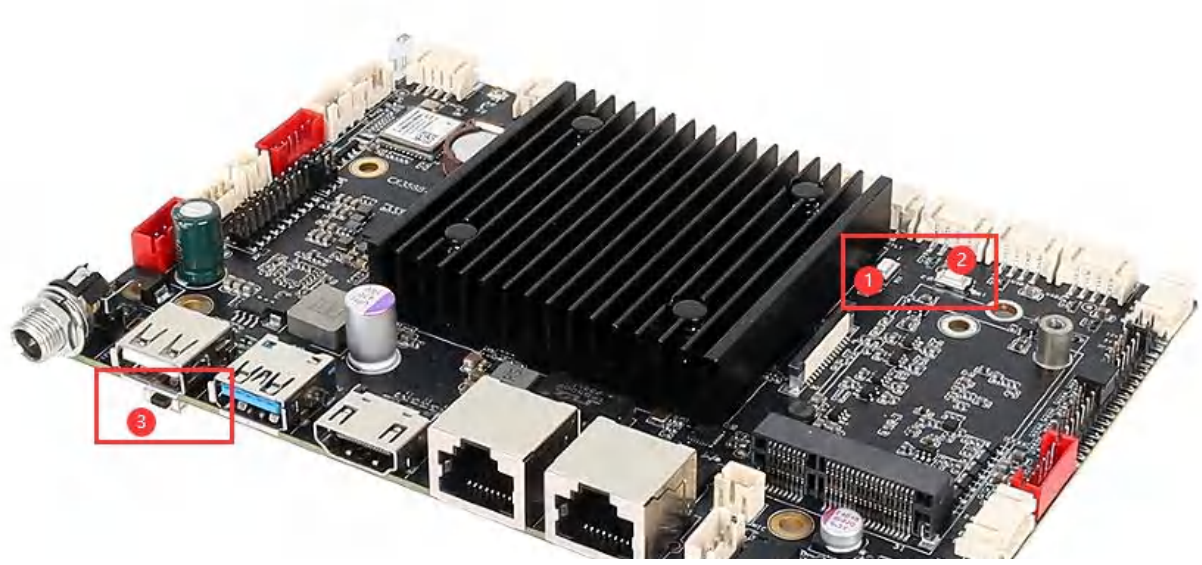
SN	Definition	Property	Description
1	GND	Ground	Ground
2	CANH	High-end	CAN high
3	CANL	Low end signal	CAN low
4	VCC5V	Power supply	5V power output

◆ 3.4.2 AD interface



Serial	Definitions	Attributes	Description
1	AD0	Analog input	1V8 Analog input
2	RECOVER	Analog input	1V8 Analog input/System upgrade input

◆ 3.4.3 Keystrokes

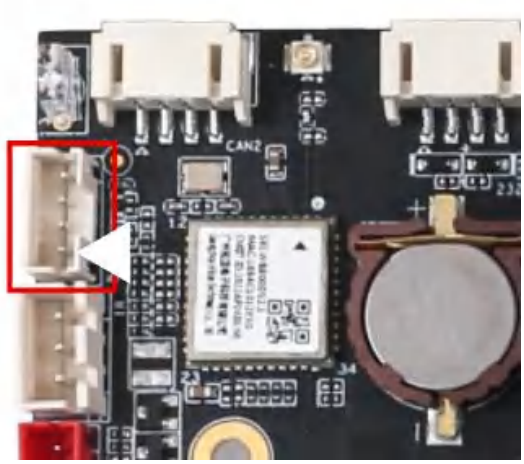


1 Reset button

2 Switch on/off button

3 Enter the burn mode button

◆ 3.4.4 Debug interface TTL



This interface is used for debugging by default

SN	Definitions	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

◆ 3.4.5 Other standard interfaces and functions

Storage interface	TF card	Data storage, currently only tested up to 1T
	USB	USB3.0 interface supports backward compatibility with USB2.0, supports data storage, data
HDMI port	Standard port	Support HDMI data output, up to 8K/60HZ
Headphone jack	Standard jack	3.5mm 4-segment standard interface
4G port	PCI-E standard port	Supports a variety of Mini PCI-E 4G modules such as remote
USB 3.0 OTG	OTG Interface	Standard OTG 3.0 interface for TYPE-A
USB2.0 HOST	USB port	TYPE-A's standard HOST 2.0 interface
SIM card interface	Standard port	Standard 4G SIM port

Chapter 4 Electrical performance

Items		Minimum	Typical	Max
Power supply parameters	voltage	--	12V	36V
	Ripple	--	--	100mV
	Current		4A	
Power supply current (HDMI output, no other peripherals connected)	Board operating	--	600mA	1500mA
	Standby current	--	--	--
	USB supply	--	--	500mA
Static	Contact discharge			8KV
	Air discharge			15KV
Environment	Relative humidity	--	--	80%
	Operating	- 20 ℃	--	60 ℃
	Storage	- 20 ℃		70 ℃

Note 1:

When LVDS screen is connected, it is necessary to select the correct backlight working voltage 3.3V,5V,12V, please do not apply it to the peripheral beyond the corresponding maximum current.

Note 2:

When connected to eDP/LVDS screen, the overall working current and standby current of the board depends on the connected screen, which is not listed in the table above.

Chapter 5 Precautions for assembly and use

During assembly use, please pay attention to the following (and not limited to) problem points.

1.Bare plate and peripherals short circuit problem;

2.In the process of installation and fixing, avoid the deformation problem caused by

3.fixing the bare plate;

4.When installing eDP/LVDS screen, pay attention to whether the screen voltage and current are in line with each other, and pay attention to the orientation of the screen,seat son pin 1;

5.When installing eDP/LVDS screen, pay attention to whether the backlight voltage and current of the screen are consistent. If the backlight power of the screen is more than 20W, whether to use other power supply board; Peripherals (USB, IO, ETC) installation, pay attention to the peripheral IO level and current output problems;

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

7.Whether the input power supply is inserted in the power input interface, according to the total peripheral evaluation, input power supply voltage, current, etc., whether it,meets the requirements. Do not access the input power supply from the backlit socket for easy operat