Product Specification

Mainboard series

CX3588-AN

V1.0

Catalogue

Chapter 1 Product Introduction

1.1 Scope of application

CX3588-AN is a high-performance Android series product with 8nm advanced process. With an 8-core 64-bit core architecture, the main frequency of four A76 large cores can reach 2.4G, and the main frequency of four A55 small cores can reach 1.8G；；With NPU, with 6TOPS AI computing power and Mali-G610mc4 GPU; 8K video codec, 8K display output;

1.2 Function introduction

CX3588-AN adopts Android13 system. There are LVDS, eDP, MIPI, HDMI display and output interfaces, MIPI Camera, one megabit network and one hundred megabit network on board, and a universal backlight interface and screen voltage jumper are built in, which are compatible with more kinds of display screens. With stronger performance, faster speed and richer interfaces, it is your best choice in human-computer interaction, intelligent terminals and industrial control projects.

1.3 Features

- Multi-display interface: LVDS, eDP, MIPI, HDMI and other display and output interfaces.

- Rich expansion interfaces: 6 USB interfaces (1 USB2.0 HOST standard interface, 4 USB2.0 PH2.0 HOST interface sockets and 1 USB3.0 OTG interface), 2 TTL serial ports, 2 RS232, 1 RS485 and 6 GPIO support input and output, which can meet the requirements of various peripherals in the market.

- A variety of network interfaces: 1 1000M Ethernet interface, 1 100M Ethernet interface, supporting 5G and 2.4G WIFI, and built-in M.2 5G module interface.

- High definition: it can support 8K/60HZ video output at most, and LCD screen with LVDS/eDP/MIPI/HDMI interfaces.

- Customize the Android system, provide the reference code of the system call interface API, and perfectly support the development of the customer's upper application APP.

- Perfect support for infrared, optical, capacitive, resistive, touch film and other mainstream touch screens.

Chapter2 Product specification parameter

Type	Specification parameter
CPU	RK3588S is a 64-bit high-performance CPU. 1. quad Cortex-A76 64-bit CPU 2.4GHz 2. quad Cortex-A55 corelet 64-bit CPU 1.8GHz.
GPU	Mali-G610 MC4 high performance GPU
internal storage	4GB/8GB optional, Supports up to 32GB
Internal memory	64GB/128GB/256GB optional, Supports up to 256GB
Built-in ROM	4KB EEPROM
Decoding resolution	Up to 8K/60Hz.
Operating system	Android 13.0/Linux5.10/Ubuntu20.04/Ubuntu22.04/Debian11
Play mode	Support multiple playback modes such as cycle, timing and interruption.
Network support	5G, Ethernet, WiFi/ Bluetooth support, wireless peripheral expansion
Video display	Support wmv, avi, flv, rm, rmvb, mpeg, ts, mp4, etc.
picture format	Supports BMP, JPEG, PNG and GIF.
Usb interface	1 USB2.0 standard interface 4-way USB2.0 socket 1-way USB3.0 OTG interface
Mipi Camera	30pin FPC interface, supporting 1300W Camera.
serial port	5 serial sockets (2 RS232,1 485,2 TTL)
GPS	External GPS (optional)

WIFI、BT	Built-in 2.4G/5G WIFI6, Bluetooth 5.0
4G/5G	5G module interface with built-in M.2
Ethernet	1 1000M Ethernet interface, 1 100M Ethernet interface.
CAN	CAN interface supporting 1-way standard
GPIO	Support 6 channels of 3V3 GPIO, which can be used as input and output.
Remote control interface	Support 1-way IR interface
TF card	Support TF card
LVDS output	1 dual LVDS interface
EDP output	1 4 lane eDP interface
HDMI output	1 standard HDMI output interface
MIPI output	MIPI LCD interface of a 40-pin FPC socket
audio output	Built-in dual-channel 4R/10W/ channel, 8R/5W/ channel power amplifier.
Headphone holder	Built-in 3.5mm 4-section headphone jack
RTC real-time clock	support
Time switch machine	support

Chapter 3 Product interface definition
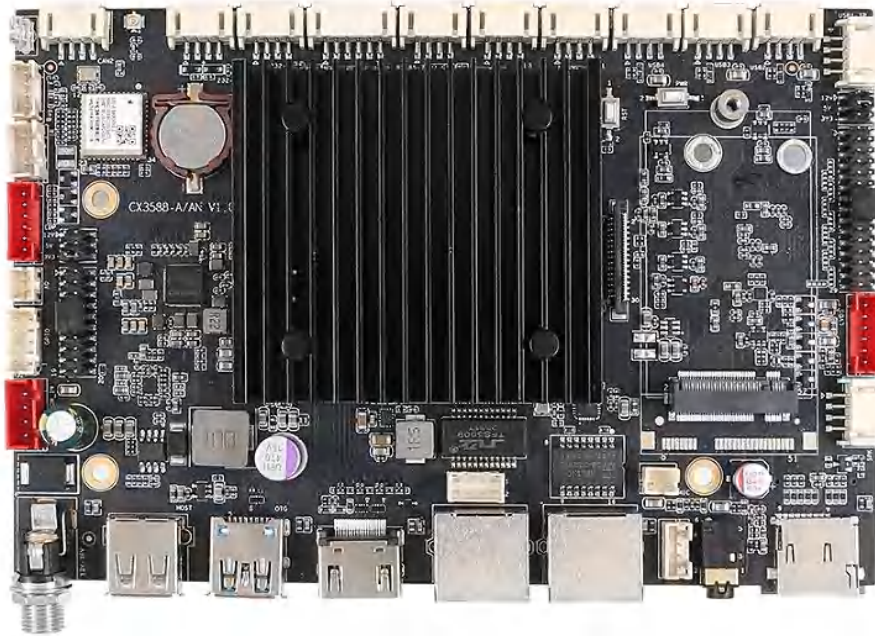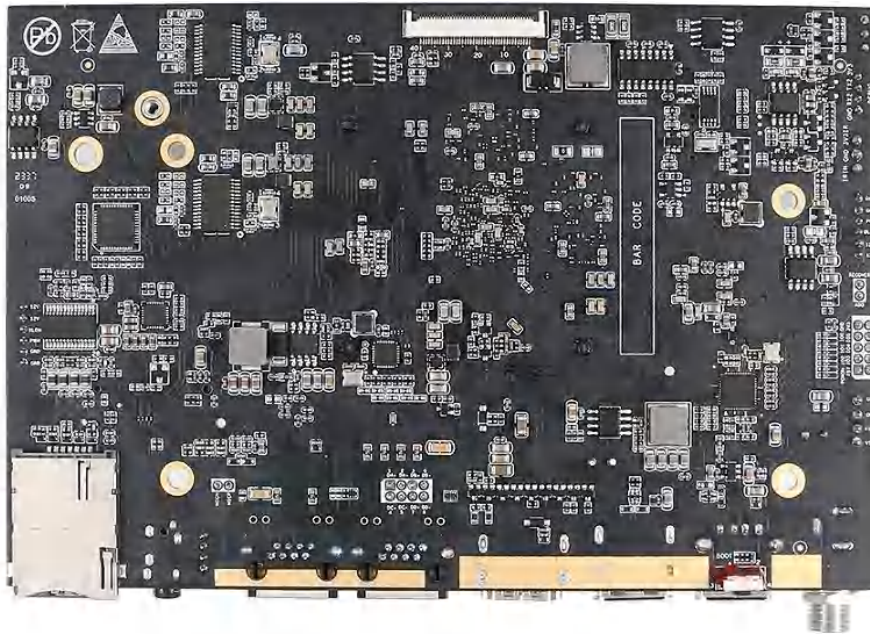
3.1 PCB Dimensions
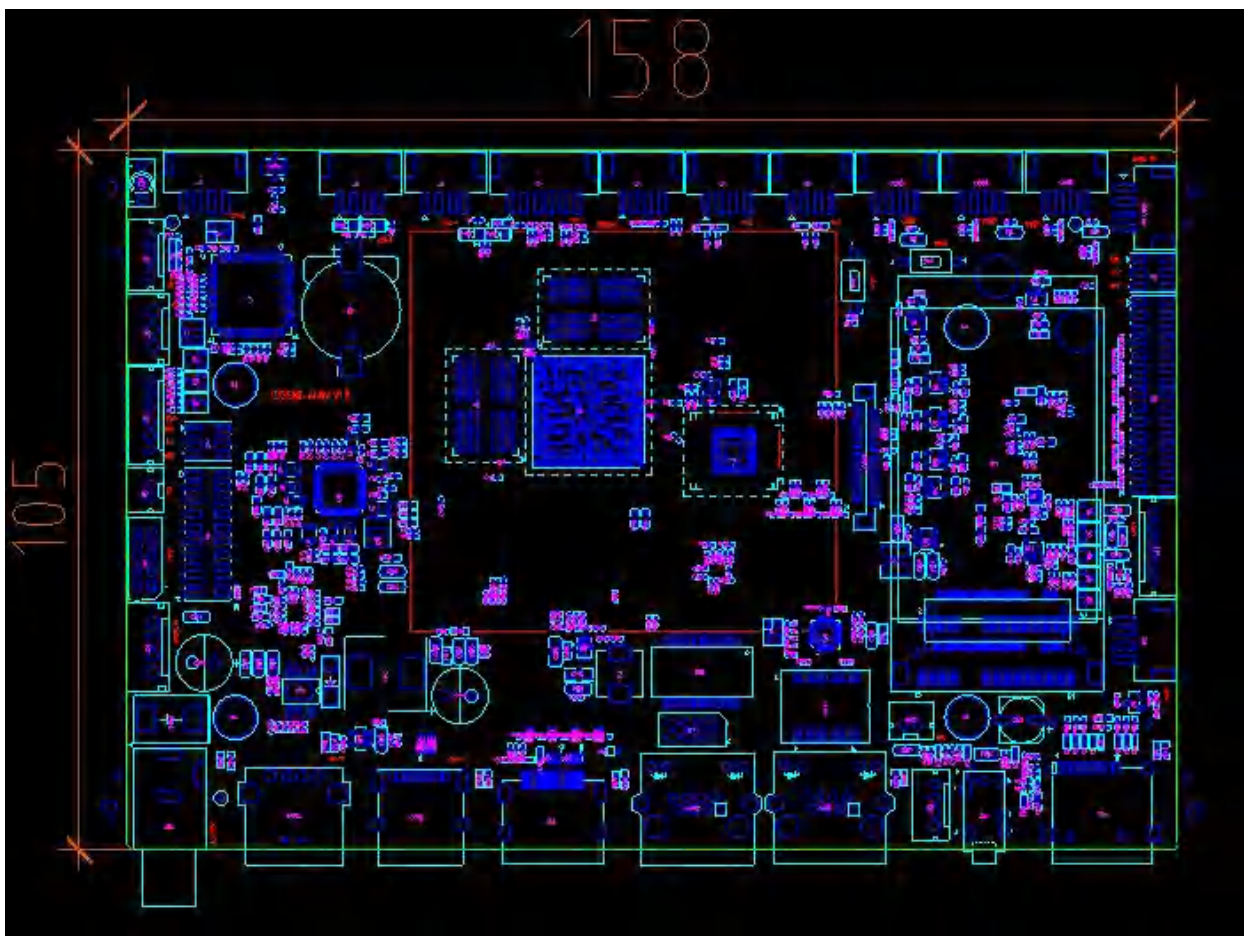
3.2 Interface parameters
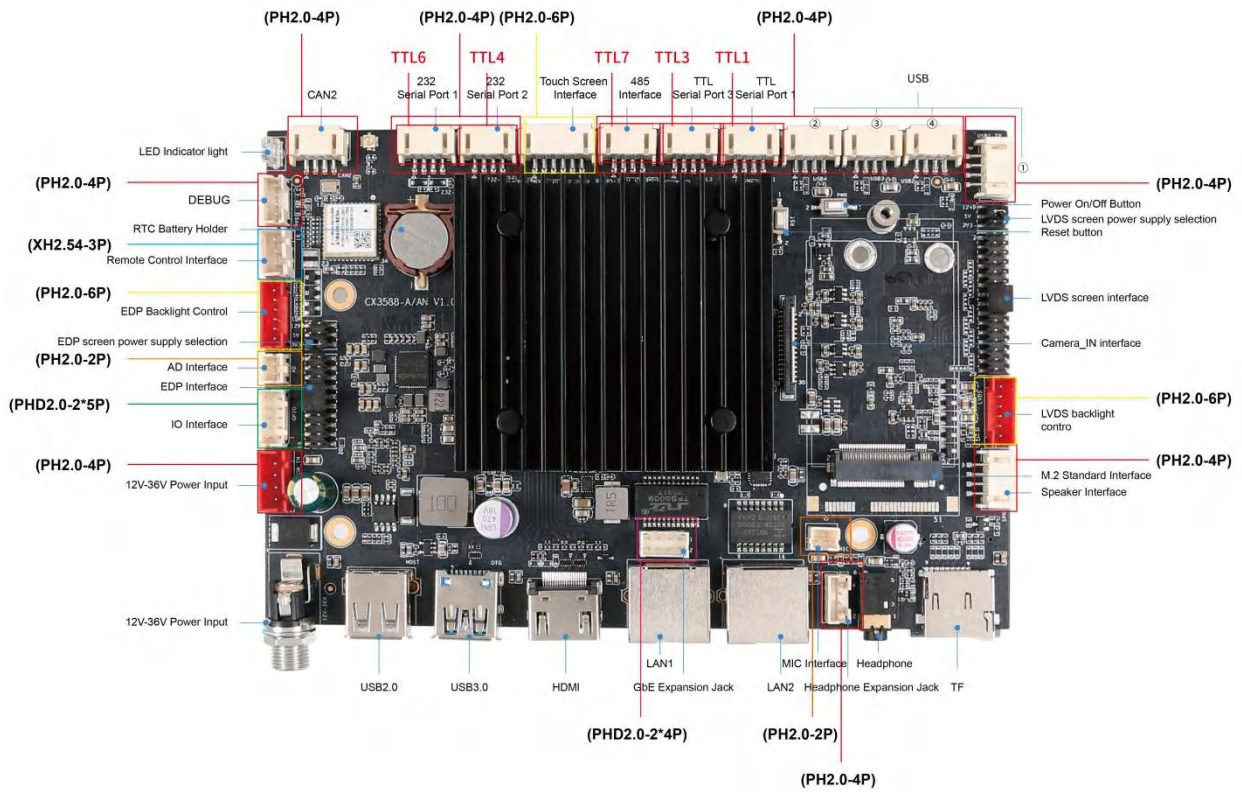
◆ 3.2.1 Power input interface

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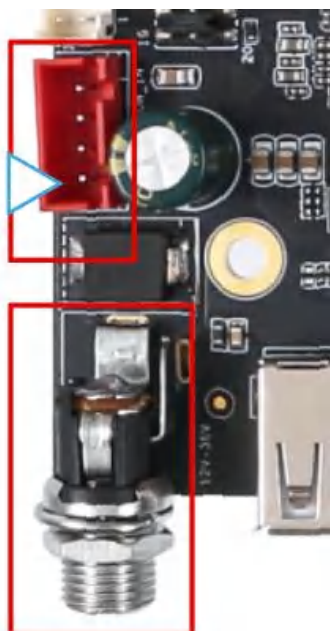
The interface of the power outlet is defined as follows, it can be powered by a power board, and the seat son specification is 4PIN 2.54mm pitch.

SN	Definition	Attribute	Describe
1	VCC	input	12V-36V input
2	VCC	input	12V-36V input
3	GND	earth wire	earth wire
4	GND	earth wire	earth wire

◆ 3.2.2 RTC Battery
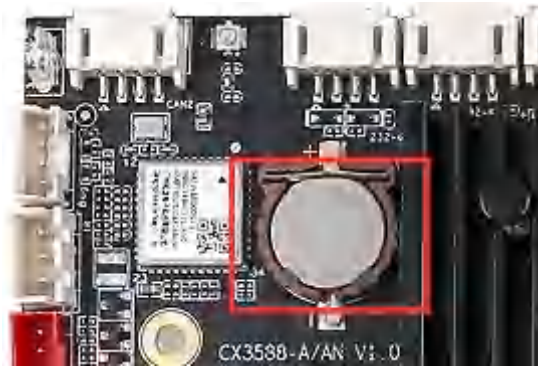
Used to power the system clock during power outages. Use a CR1220 button battery.

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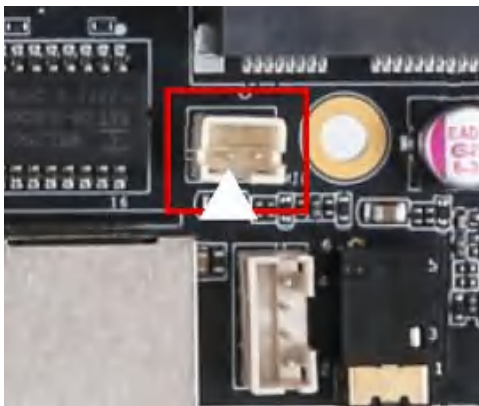
Please pay attention to the connection of positive and negative MIC terminals, do not reverse connection.

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	Definition	Attribute	Describe
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	earth wire	earth wire
6	GND	earth wire	earth 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	Definition	Attribute	Describe
1	VCC	power output	LCD power output, +3.3V/+5V/ +12V optional.
2			
3			
4			
5	GND	earth wire	earth wire
6	GND	earth wire	earth 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	earth wire	earth wire
14	GND	earth wire	earth 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	earth wire	earth wire
26	GND	earth wire	earth 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 backlight control of EDP screen, the power supply current of 12V is not more than 2A, and if the power of screen backlight is more than 24W, please take power from other power boards to avoid system instability. 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 supply output, and must not be used as power supply input for the system.
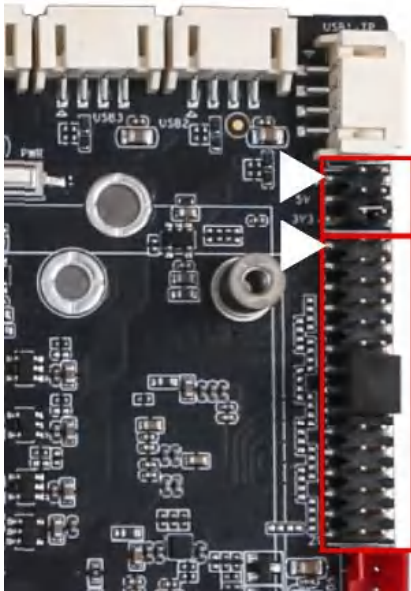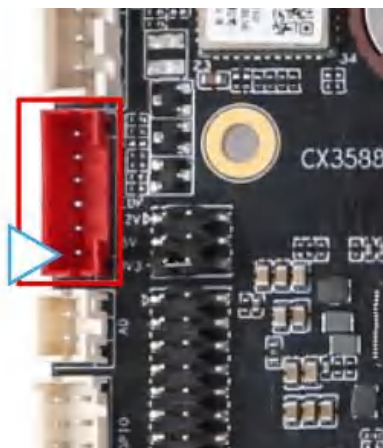

SN	Definition	Attribute	Describe
1	VCC	Power Supply	12V output
2	VCC	Power Supply	12V output
3	EN	output	Backlight enable control
4	PWM	output	Backlight brightness control
5	GND	earth wire	earth wire
6	GND	earth wire	earth wire

◆ 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.
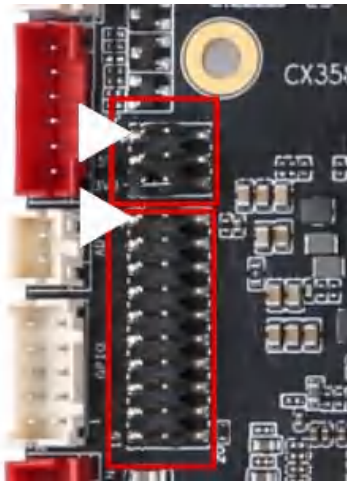
SN	Definition	Attribute	Describe
1	VCC	power output	LCD power output, +3.3V/+5V/ +12V optional.
2			
3	GND	earth wire	earth wire
4			
5	TX0P	output	EDP Pixel0 Positive Data (Odd)
6	TX0N	output	EDP Pixel0 Negative Data (Odd)
7	TX1P	output	EDP Pixel1 Positive Data (Odd)
8	TX1N	output	EDP Pixel1 Negative 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	earth wire	earth wire
14	GND	earth wire	earth wire
15	AUXP	output	EDP AUX Positive Data (Odd)
16	AUXN	output	EDP AUX Negative Data (Odd)

17			
18	GND	earth wire	earth wire
19			
20	HPD	input	EDP DETECT

◆ **3.3.0 MIPI Screen Interface**

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

SN	Definition	Attribute	Describe
40	NC	-	Not connect
39	VDD	Power Supply	3.3V Digital power
38	VDD	Power Supply	3.3V Digital power
37	GND	land	Ground
36	REST	output	3.3V Global reset pin
35	NC	-	Not connect
34	GND	land	Ground
33	D0N	output	Negative MIPI differential data output
32	D0P	output	Positive MIPI differential data output
31	GND	land	Ground
30	D1N	output	Negative MIPI differential data output
29	D1P	output	Positive MIPI differential data output
28	GND	land	Ground
27	CLKN	output	Negative MIPI differential data output
26	CLKP	output	Positive MIPI differential data output
25	GND	land	Ground
24	D2N	output	Negative MIPI differential data output
23	D2P	output	Positive MIPI differential data output
22	GND	land	Ground

21	D3N	output	Negative MIPI differential data output
20	D3P	output	Positive MIPI differential data output
19	GND	land	Ground
18	NC	-	Not connect
17	NC	-	Not connect
16	GND	land	Ground
15	NC	-	Not connect
14	NC	-	Not connect
13	NC	-	Not connect
12	NC	-	Not connect
11	GND	land	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
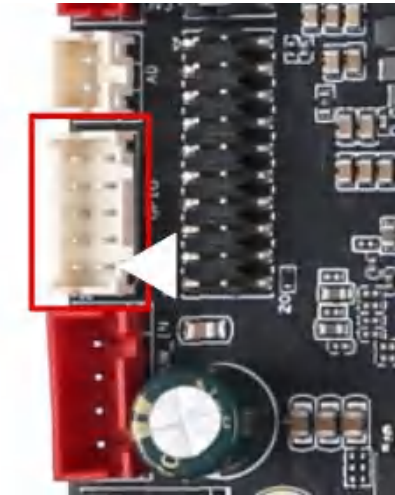
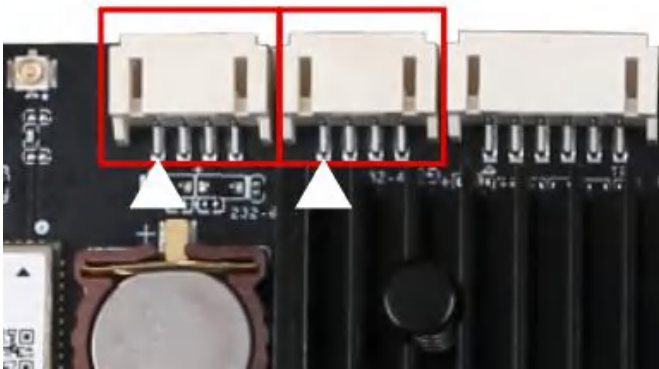| SN	Definition	Attribute	Describe
1	PWR	Key input	System on-off
2	RST	Reset input	system reset
3	I/O 2	Input / output	I/O 2
4	I/O 3	Output/input	I/O 3
5	I/O 1	Input / output	I/O 1
6	I/O 4	Input / output	I/O 4
7	I/O 0	Input / output	I/O 0
8	I/O 5	Input / output	I/O 5
9	GND	earth wire	earth wire
10	3V3	power output	3.3V power supply 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	Definition	Attribute	Describe
1	GND	earth wire	earth wire
2	PC-RX	input	232-RX
3	PC-TX	output	232-TX
4	VCC	Power Supply	5V output

◆ 3.3.3 TTL Serial Socket Interface *2

Two groups of TTL serial ports are led out of the board, which can support common serial port devices on the market, and the level of serial ports is 3.3V. If the level of the connected serial port is higher than 3.3V, there should be an isolation circuit or a level conversion circuit, otherwise the main control and equipment will be burned out.
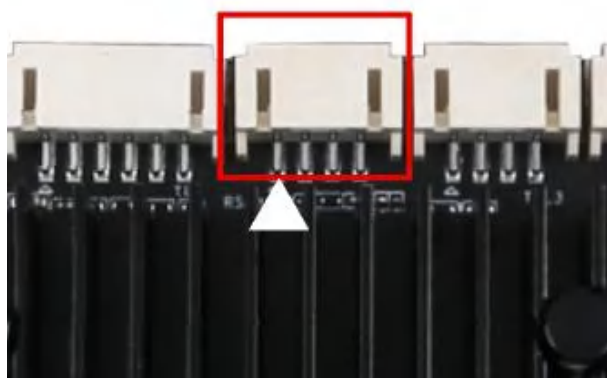
Precautions:

1. Whether the TTL serial port voltage matches. Can't directly access RS232 equipment.

2. Whether the TX and RX connections are correct.
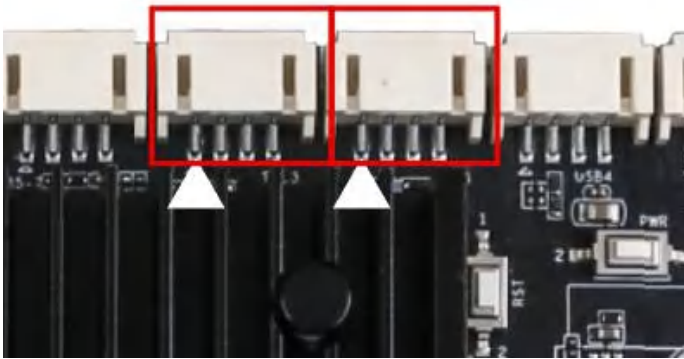
| SN	Definition	Attribute	Describe
1	GND	earth wire	earth wire
2	UART-RX	input	RX
3	UART-TX	output	TX
4	VCC	Power Supply	3.3V output

◆ 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	Definition	Attribute	Describe
1	GND	earth wire	earth wire
2	485B	Input/output	B
3	485A	Input/output	A
4	VCC	Power Supply	3.3V output

◆ 3.3.5 Headphone expansion pin holder
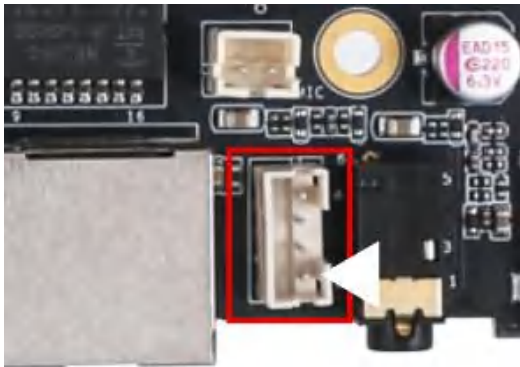
Pin seat sub dfinition

| 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
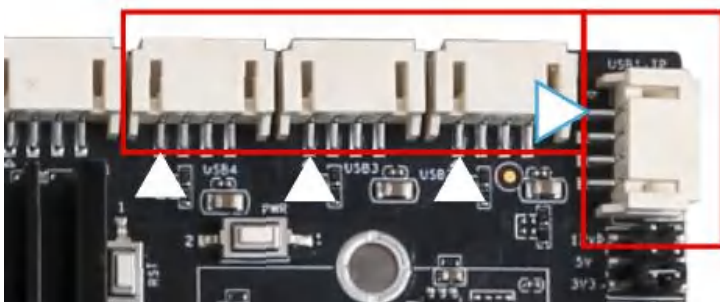
The board has 4 USB2.0 HOST sockets for peripheral expansion, each supplying no more than 500mA of current. All are transferred out of the USB HUB. If the device wants to connect to the TP touch of USB, it is recommended to connect to the No. 1 pin.
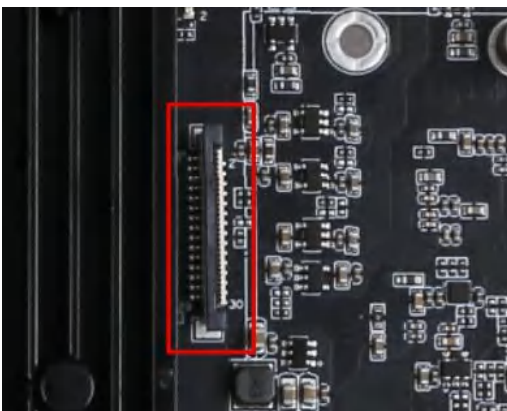
SN	Definitions	Attribute	Description
1	GND	Earth wire	Earth wire
2	DP	Input/out	DP
3	DM	Input/out	DM
4	VCC	Power source	5V output

◆ 3.3.7 Touch screen interface
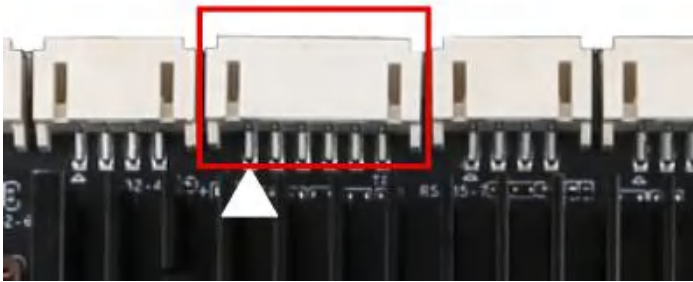
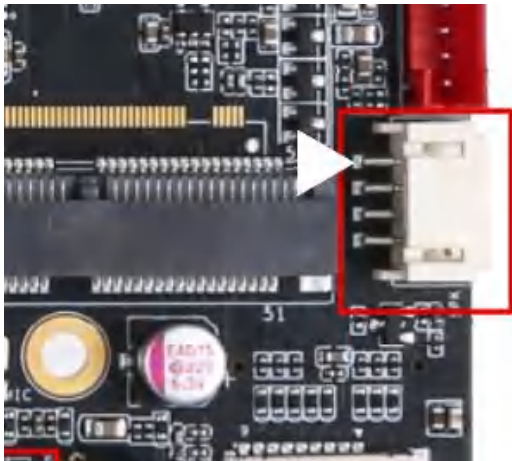| SN	Definition	Attribute	Describe
1	VCC	Power Supply	3.3V output
2	SCK	Input/output	I2C clock
3	SDA	Input/output	I2C data
4	INT	Input/output	suspend
5	RST	Input/output	reset
6	GND	earth wire	earth wire

◆ 3.3.8 Camera_IN port

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

SN	Definition	Attribute	Describe
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	earth wire	earth wire
7	VDD	Power Supply	2.8V output
8	GND	earth wire	earth wire
9	I2C3_SDA	Input/output	SDA signal
10	I2C3_SCL	output	SCL signal
11	RST	output	reset signal
12	PWDN	output	Power failure control
13	GND	earth wire	earth wire
14	MCLK	output	master clock
15	GND	earth wire	earth wire
16	D3P	Input/output	MIPI data channel 3 is positive
17	D3N	Input/output	MIPI data channel 3 negative
18	GND	earth wire	earth wire
19	D2P	Input/output	MIPI data channel 2 is positive
20	D2N	Input/output	MIPI data channel 2 negative
21	GND	earth wire	earth wire
22	D1P	Input/output	MIPI data channel 1 is positive
23	D1N	Input/output	MIPI data channel 1 negative
24	GND	earth wire	earth wire
25	CLKP	Input/output	MIPI clock channel positive
26	CLKN	Input/output	MIPI clock channel negative
27	GND	earth wire	earth wire
28	D0P	Input/output	MIPI data channel 0 is positive
29	D0N	Input/output	MIPI data channel 0 negative
30	GND	earth wire	earth wire

◆ **3.3.9 Horn port**

SN	Definition	Attribute	Describe
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+

◆ **3.4.0 Ethernet**
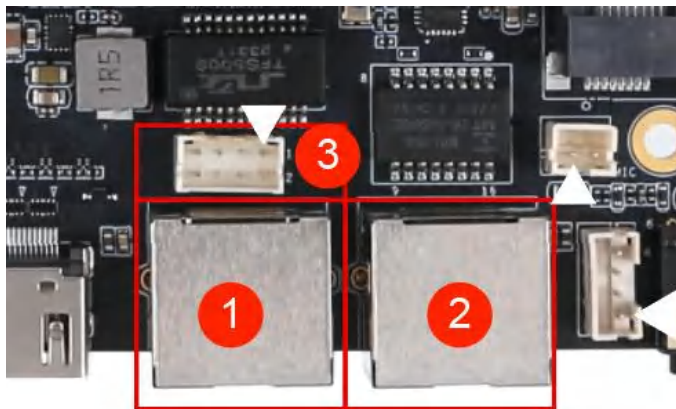
1 is astandard Gigabit and 2 is a standard 100 Gigabit

3 is a double row 2.0 pitch 8PIN seat above the standard RJ45 Gigabit network signal, 1

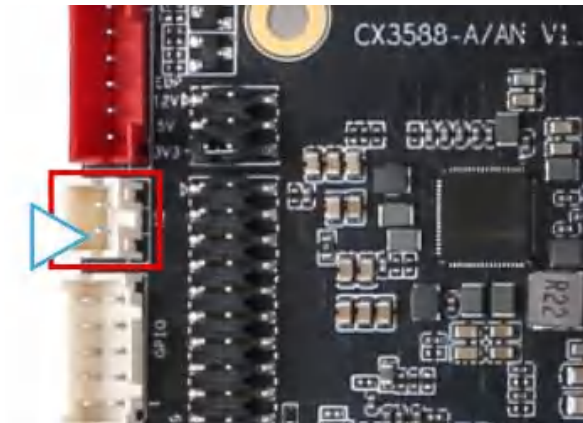and 3 of the two can only choose one to use. The 8PIN seat can cooperate with our

self-developed POE module to achieve POE function.

◆ **3.4.1 CAN bus**
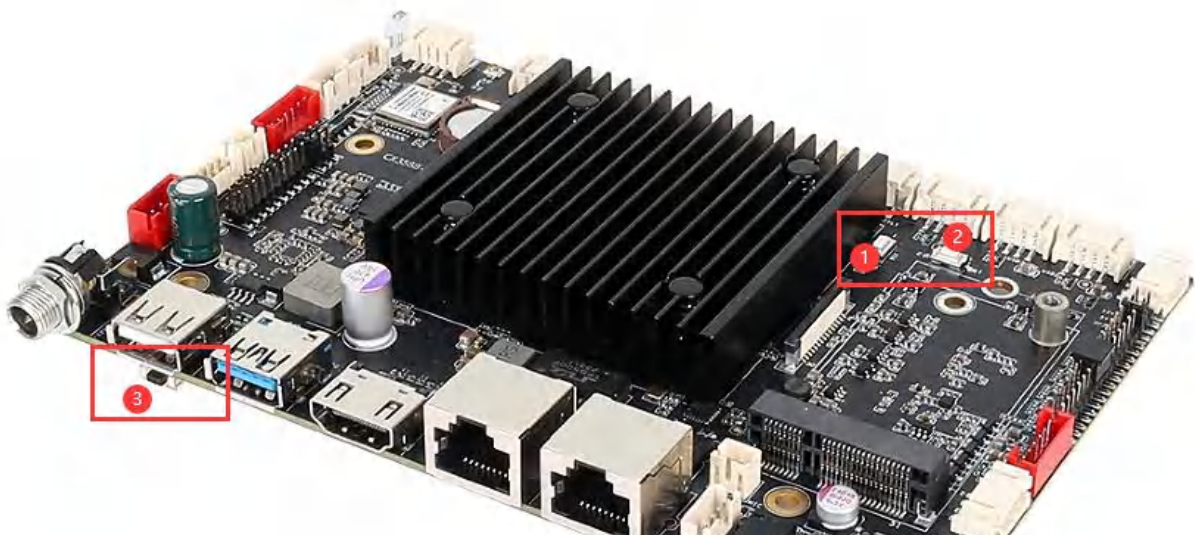

SN	Definition	Attribute	Describe
1	GND	Ground	Ground
2	CANH	High end	CAN height
3	CANL	Low end	CAN low
4	VCC5V	Power Sup	5V power supply output

◆ 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
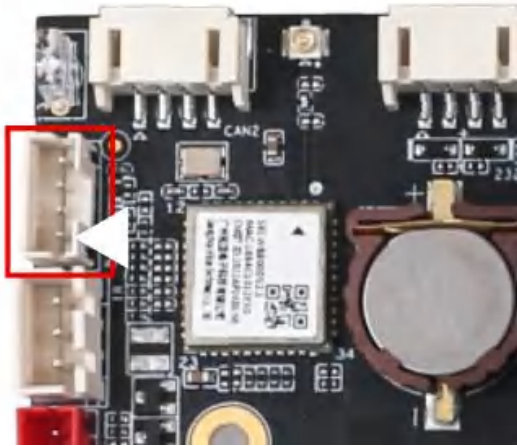
This interface is used for debugging by default

SN	Definition	Attribute	Describe
1	GND	earth wire	earth 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

memory interface	TF card	Data storage, currently only tested to 1T.
	USB	The USB3.0 interface supports backwards compatibility USB2.0, data storage, data import and USB mouse.
HDMI interface	standard interface	Support HDMI data output, and support 8K/60HZ at most.
headphone jack	standard interface	3.5mm 4-segment standard interface
5G interface	M.2 standard interface	5G module supporting remote series
USB 3.0 OTG	OTG interface	TYPE-A standard OTG 3.0 interface.
USB2.0 HOST	Usb interface	TYPE-A standard HOST 2.0 interface.
SIM card interface	standard interface	Standard 5G SIM card interface

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