



SD5300

Product manual

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Chapter One Product description

1.1 Scope of application

SD5300 belongs to the 4G Android smart dual display motherboard, which is commonly used in: interactive advertising machines, interactive digital signage, smart self-service terminals, smart retail terminals, Internet of Things equipment, industrial control hosts, etc.

1.2 Product overview

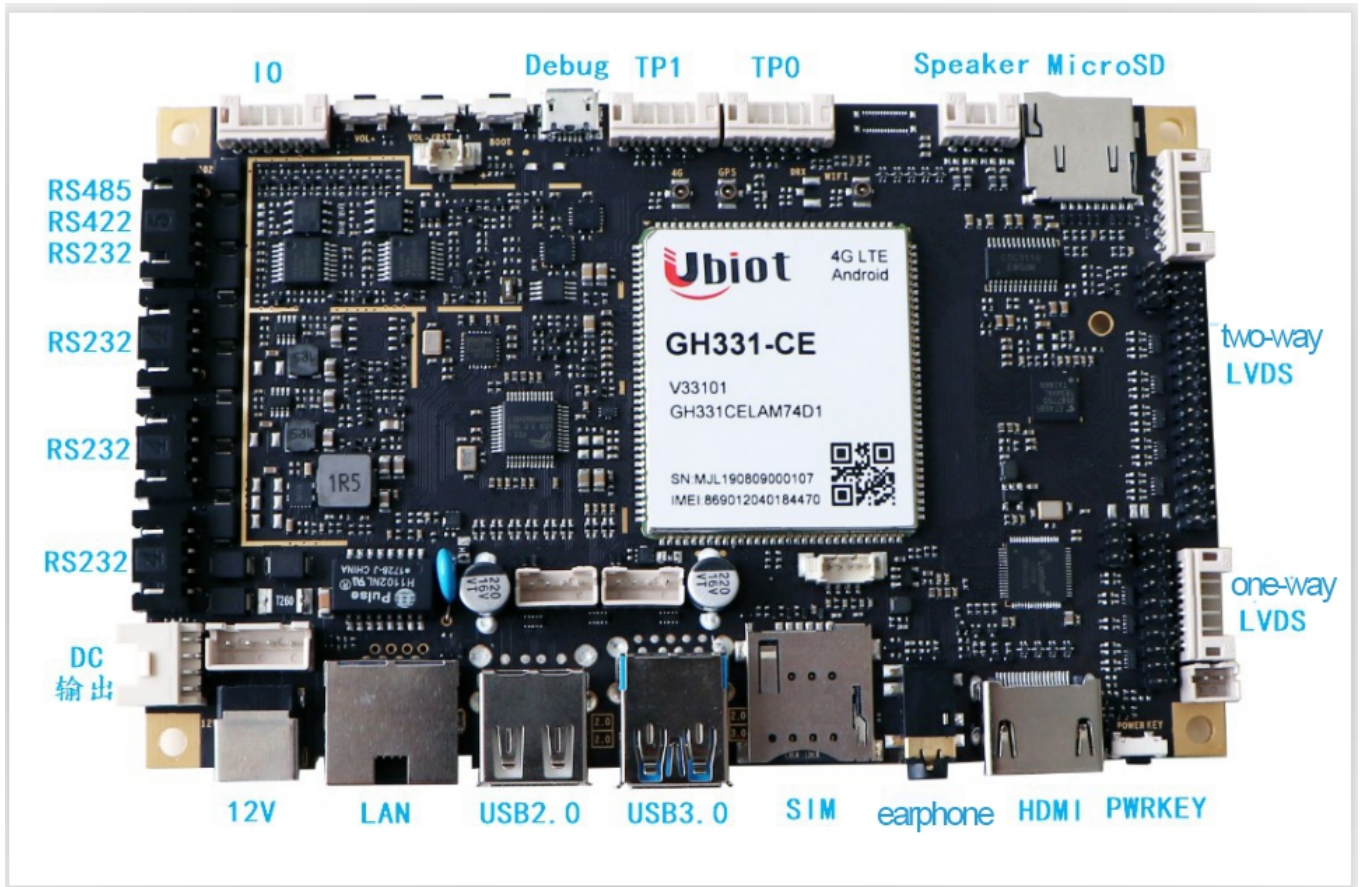
The SD5300 board adopts a self-developed hardware solution, is equipped with the android operating system, and has a wealth of android market applications. The internal integrated 3G/4G communication function supports 3G/4G full Netcom real-time communication, and also supports USB3.0 ultra-high-speed communication, 100M Ethernet wired communication, LVDS HDMI dual-screen different display and dual-screen simultaneous display functions, and can be connected to RS232, RS485, RS422 and other standard protocol peripherals. It greatly simplifies the system design of the whole machine, provides users with a simple and smooth operating experience and can meet the individual needs of customers.

1.3 Product features

- Powerful processing capabilities: Qualcomm 8-core Cortex-A53 architecture processor SDM450, clocked at 1.8GHz (MSM8953 supports up to 2.2GHz), bringing powerful computing and processing capabilities.
- Flexible display configuration: The board has 2 LVDS and 1 HDMI display interfaces, supporting 1080p/LVDS+720p/LVDS, 1080p/LVDS+1080p/HDMI and other resolutions of dual-screen different display or dual-screen simultaneous display function .
- Abundant peripheral interfaces: The board has USB, RS232/485/422, RJ45, earphone, HDMI, LVDS and other interfaces, which can support the types of external devices of equipment manufacturers to the greatest extent. The board has a USB3.0 ultra-high-speed communication interface to meet various current face payment scenarios.
- High functional integration: The board integrates 2G / 3G / LTE / WIFI wireless communication and wired and wired communication; supports USB master-slave communication; supports RS232 / RS485 / RS422 protocol standards and interface equipment; SD card can be inserted to expand storage capacity; support 1080p and 720p dual-screen simultaneous display and dual-screen different display functions.
- Detailed management and use: The board runs the Android operating system, enjoys open Android development resources and rich Android application

software, which is convenient for users to control files and software, and the human-computer interaction is very simple.

1.4 Appearance and interface diagram



Appearance and interface diagram

Chapter 2 List of Basic Functions

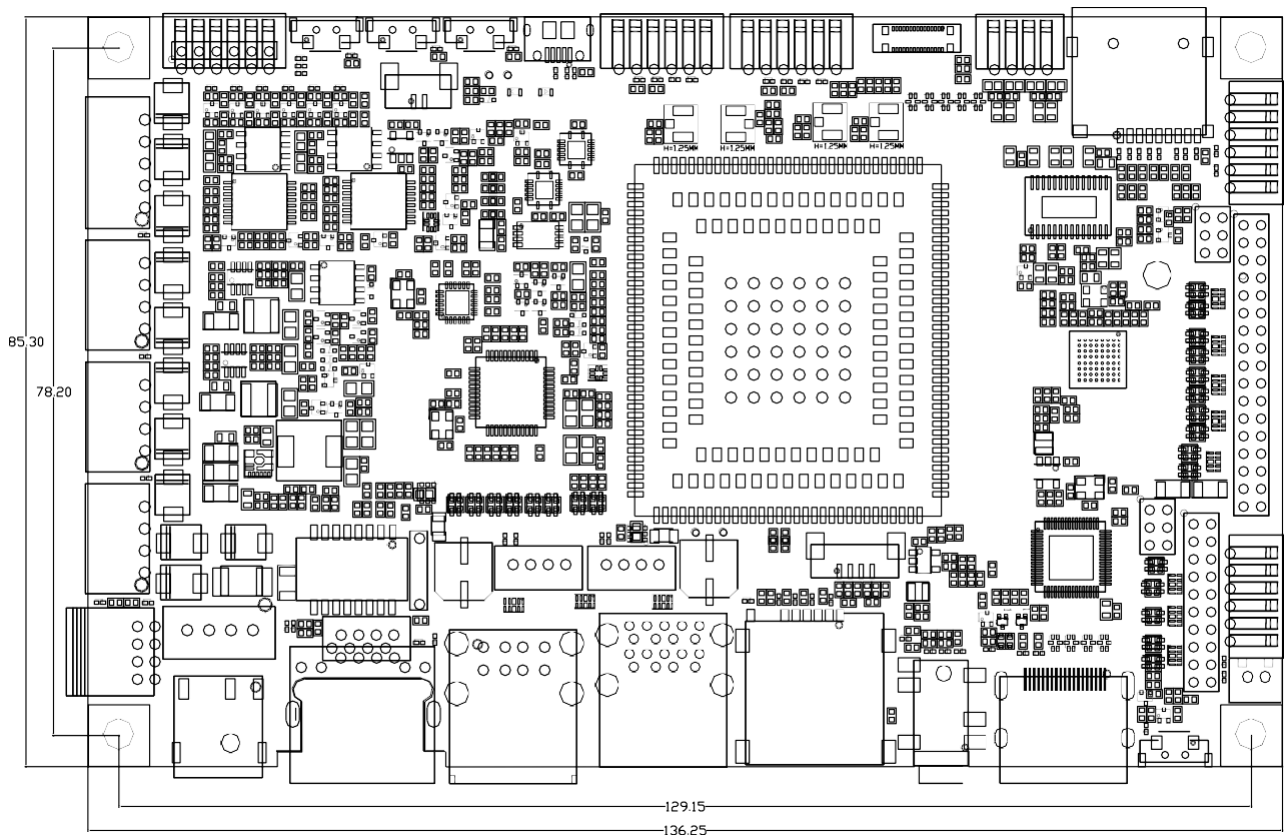
Hardware specifications	
CPU	Standard Edition SDM450 8-core A53 1.8GHz
RAM	LPDDR3: 2GB (default) Can be expanded to 3GB/4GB
Built-in memory	eMMC: 16GB (default) Can be expanded to 32GB/64GB
Operating system	Android 7.1.2
Network support	2G/3G/4G/LTE
GNSS	GPS/BeiDou/GLONASS/Galileo
WIFI,BT	Default 2.4G, Optional 5G 802.11 b/g/n/ac Bluetooth 4.2 LE and earlier
Video codec	HEVC/H.264/VP8/VP9/MP4
Image Format	BMP/JPEG/PNG/GIF
Power input	12V DC
RJ45	1 way 10M/100M Adaptive Ethernet
USB	Default allocation: 1 way USB3.0 HOST Port 1 USB2.0 HOST A Port 2 way USB20 HOST Pin interface 1 way USB2.0 Client
RS485/RS422	1 RS422/RS485 adaptive interface (default is 232 interface, RS422/RS485 interface can be selected through BOM)
RS232	4 RS232 interfaces (one of which can be configured as RS485/422 interface by BOM)
HDMI	1 HDMI, 1080p output by default
LVDS	1 single channel LVDS, default 720p output 1 dual-channel LVDS, default 1080p output Support dual-screen different display
I2C	2 I2C, configurable as touch screen interface

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I/O	Default 6 3.3V I/O ports (internal 3.3V pull-up)
Screen backlight	2-channel brightness adjustable backlight interface
headset	1 way 3.5mm headphone jack
speaker	1 dual channel 8R/5W speaker driver interface
SIM card	1.8V/3/3V, Push-Push Micro-SIM card socket
MicroSD card	Push-Push Micro-SD card holder
webcam	1 channel 1600M MIPI rear camera interface
button	Switch machine button Force upgrade button volume plus button Volume down/reset button
antenna	Main antenna IPEX interface WIFI/BT IPEX interface GNSS IPEX interface
Indicator light	Red power indicator Blue network status indicator
RTC real time clock	stand by
System Upgrade	Local USB upgrade

Chapter 3 PCB Dimensions and Interface Layout

3.1 PCB dimensions



Unit mm

PCB process: 4 layers of through holes, the whole board is gold

Board size: 136mm*85mm

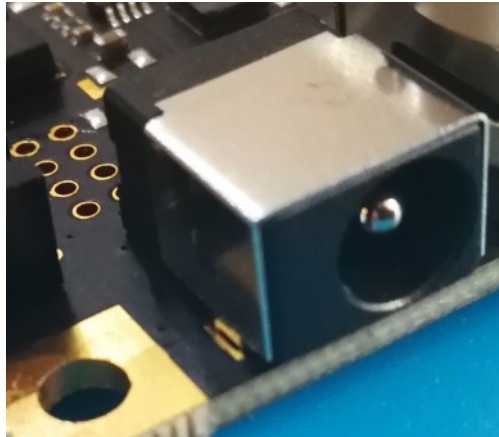
Fixing hole: ϕ 3.5mm x 4

3.2 Interface parameter description

■ Power connector

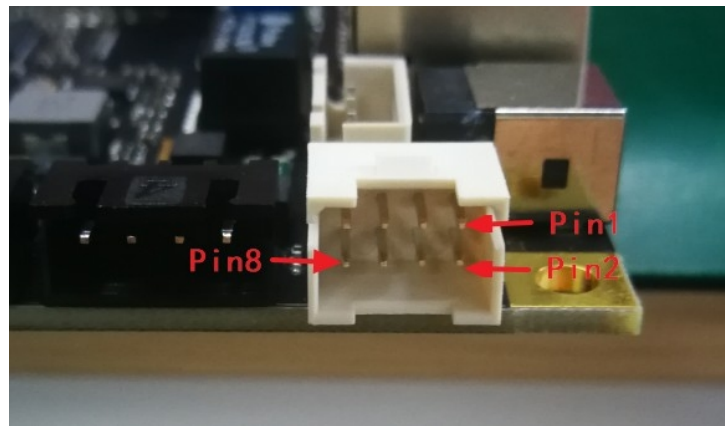
SD5300 adopts DC-044B DC power socket interface, DC IN inner needle ϕ 2.1mm, suitable for commonly used 5.5X2.1mm 12V DC adapter connector, the motherboard

uses a 16V/3.5A recoverable fuse for over-current protection, and the current through the motherboard's DC interface cannot be greater than 3.5A. The figure below is the 12V DC power input interface of the board.



Main power input interface

SD5300 supports 3.3V, 5V, 12V DC output, and the output current is limited. If the external load is greater than the rated output current value, it will cause the board to work abnormally. The following table shows the board's DC output interface pin definition. If you need to use this interface, you must first discuss with our company to determine the peripheral type of this interface before you can use it.



DC output interface

DC output interface definition

Serial number	Definition	Attributes	Description
1,2	12V	Output	The maximum rated current is to be determined according to the peripherals of the whole board

4	5V	Output	The maximum rated current is to be determined according to the peripherals of the whole board
6	3.3V	Output	The maximum rated current is to be determined according to the peripherals of the whole board
7,8	GND	Ground	
3	ADC_IN	Enter	ADC input, up to 1.8V
5	NC	Enter	Hang in the air

■ USB interface

The board USB function is divided into two modes, Host mode and Client mode. In Host mode, the board can use the USB Host interface to connect and read and write USB devices. In Client mode, the board can debug or debug the board through the Micro-USB port. version upgrade. Host mode and Client mode will switch automatically, without manual control, the board enters Host mode by default.

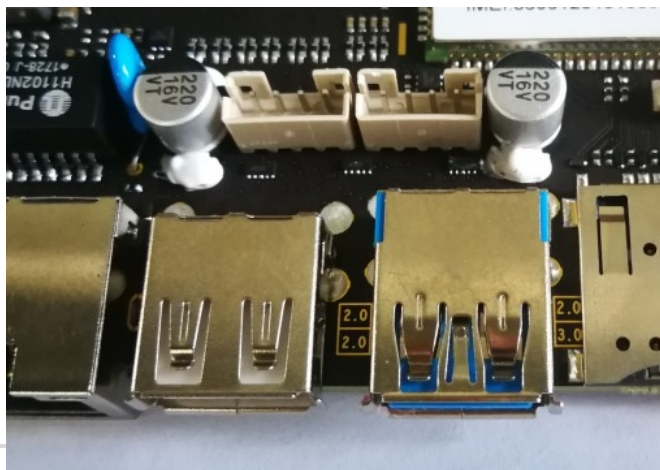
The USB Host interface configuration is as follows:

- **1 USB3.0 A port, supports super-high-speed USB transmission, fully meets the current needs of facial imaging, rated output current 1.5A**
- **1 USB2.0 A port (up to 3 channels), supports low-speed, high-speed and full-speed USB transmission, rated output current 500mA**
- **2 USB2.0 pin (PH2.0-4AW) interface, support low-speed, high-speed and full-speed USB transmission, rated output current 500 mA**

The USB Client interface configuration is as follows:

- **1 Micro-USB interface, when this interface is connected to a PC, the board will directly switch from Host mode to Client mode**

When the USB is connected to a peripheral, there will be a voltage drop on the cable, so the voltage output value of the USB interface of the board is set to 5.2V. In order to ensure the effective voltage drop of the control cable when high-power USB peripherals are connected, it is recommended that the length of the USB cable should not be greater than 1m



USB HOST interface

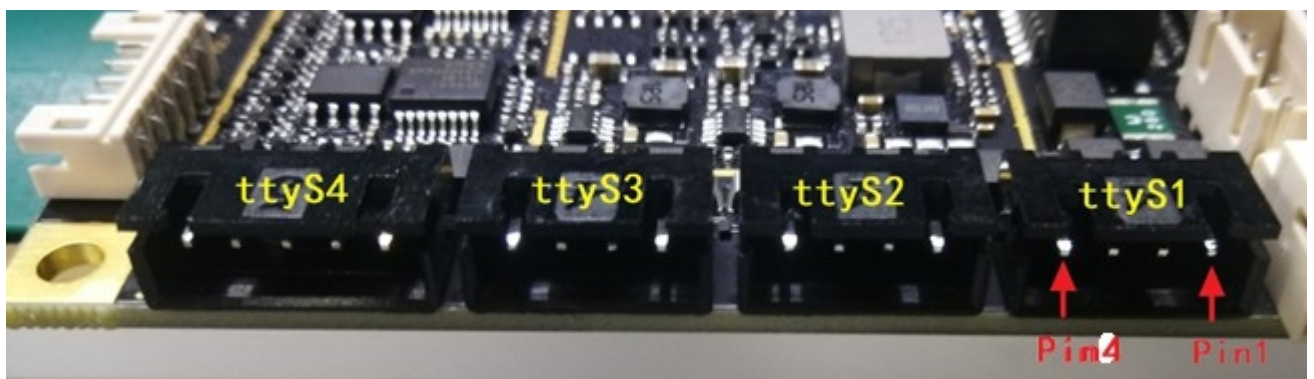


USB Client interface

I RS232 & RS485 interface

The board default configuration 3 RS232 interface, 1 RS485/RS422 interface, RS485/RS422 interface can be selected as RS232 interface through BOM control.

The RS232 interface adopts the XH2.54-4AW base, and the RS485/RS422 interface adopts the XH2.54-5AW base. The interface is shown in the figure below. ttyS1, ttyS2, ttyS3 are RS232 interfaces; ttyS4 is RS485/RS422 interface (the BOM can be selected as RS232 interface), the board adopts RS485/422 compatible circuit, and it will adapt to RS485 or RS422 communication through peripheral signals.



RS232 & RS485 interface

RS232 interface pin definition

Serial number	Definition	Attributes	Description
1	GND	Ground	Ground wire
2	RS232-RX	enter	232 Receive
3	RS232-TX	Output	232 Send
4	5V	power supply	5V output

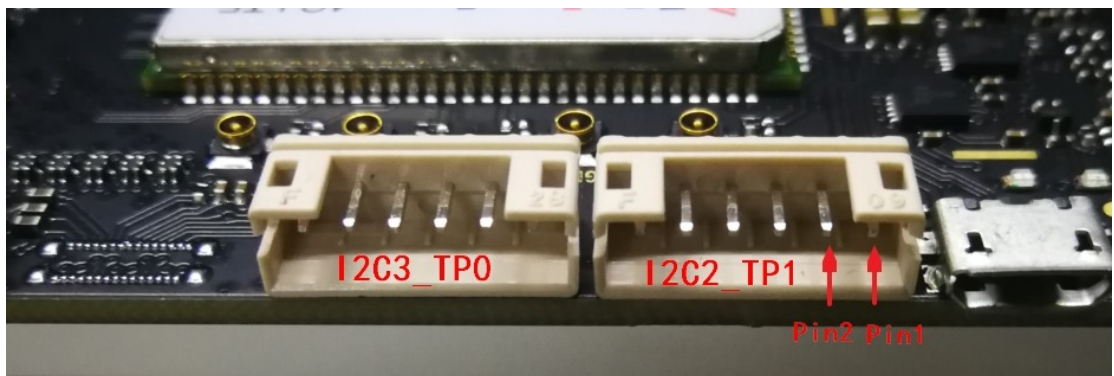
RS485/422 interface pin definition

Serial number	Definition	Attributes	Description
1	TRX+/A/RS232-RX	Output/input	RS422 send differential positive / RS485 data A / RS232 receive
2	TRX-/B/RS232-TX	Output/input	RS422 send differential negative / RS485 data B / RS232 send
3	RXD+	Enter	RS422 receive differential positive
4	RXD-	Enter	RS422 receive differential negative
5	GND	Ground	Ground

I I2C interface

The board supports two I2C interfaces, the internal use is 3.3V pull-up, the maximum communication rate is 400KHz, and the I2C interface uses PH2.0-6AW base, which can be connected to a touch screen or other I2C devices. Since these two I2C channels have been used inside the board, please note that the device address cannot be the same as the address of the I2C device inside the board when connecting to an I2C device, otherwise I2C cannot communicate normally.

The occupied I2C addresses of TP0(I2C3) are: 0X90, 0X91, 0X92, 0X93, 0X94, 0X95
The occupied I2C address of TP1(I2C2) is: 0XA2, 0XA3



I2C interface

TP0 (I2C3) interface pin definition

Serial number	Definition	Attributes	Description
1	TP0_3V3	Output	3.3V power output
2	TP0_SCL	Output	I2C clock signal / GPIO11
3	TP0_SDA	Output/input	I2C data signal / GPIO10
4	TP0_INT_N	Enter	Interrupt input / GPIO65
5	TP0_RST_N	Output	Reset output / GPIO64
6	GND	Ground	Ground

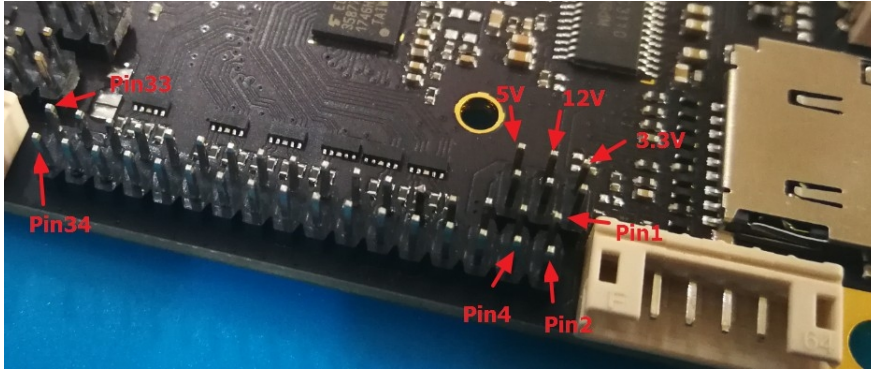
TP1(I2C2) interface pin definition

Serial number	Definition	Attributes	Description
1	TP1_3V3	Output	3.3V power output
2	TP1_SCL	Output	I2C clock signal / GPIO7
3	TP1_SDA	Output/input	I2C data signal / GPIO6
4	TP1_INT_N	Enter	Interrupt input / GPIO9
5	TP1_RST_N	Output	Reset output / GPIO8
6	GND	Ground	Ground

I LVDS interface

The board supports LVDS dual-screen simultaneous display or different display, the main screen LVDS (dual-channel LVDS) defaults to 1080p output, and the secondary screen LVDS (single-channel LVDS) defaults to 720p output. The LVDS resolution can be set by setting à user customization à main screen resolution/sub Screen resolution Modify the resolution of the primary and secondary screens. The current board supports adjustable resolutions as follows: 1024*600, 1280*800, 800*1280, 1280*720, 1366*768, 1920*1080.

When connecting different sizes of LVDS screens, please pay attention to select the correct LVDS drive voltage through the jumper. According to experience, when the screen is 18.5 inches or less, please select 3.3V screen drive voltage; when the screen is 21.5 inches or higher, please select 5V or higher screen drive voltage. The drive voltage of the screen is ultimately subject to the screen specifications.



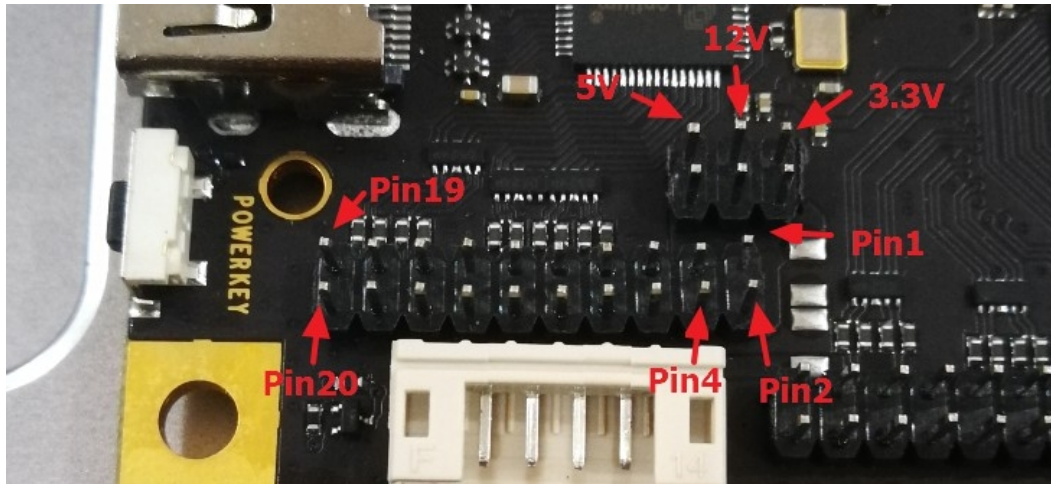
LVDS main screen interface

LVDS main screen interface pin definition

Serial number	Definition	Attributes	Description
1,2,3	VCC	Power supply	3.3V/5V/12V power supply
4,5,6	GND	Ground	Grounded
7	S0D0N	Output	Channel 0 (odd channel) differential data 0 negative
8	S0D0P	Output	Channel 0 (odd channel) differential data 0 positive
9	S0D1N	Output	Channel 0 (odd channel) differential data 1 negative
10	S0D1P	Output	Channel 0 (odd channel) differential data 1 positive
11	S0D2N	Output	Channel 0 (odd channel) differential data 2 negative
12	S0D2P	Output	Channel 0 (odd channel) differential data 2 positive
13,14	GND	Ground	Grounded
15	S0CLKN	Output	Channel 0 (odd channel) differential clock negative
16	S0CLKP	Output	Channel 0 (odd channel) differential clock positive
17	S0D3N	Output	Channel 0 (odd channel) differential data 3 negative
18	S0D3P	Output	Channel 0 (odd channel) differential data 3 positive
19	S1D0N	Output	Channel 1 (even channel) differential data 0 negative
20	S1D0P	Output	Channel 1 (even channel) differential data 0 positive
21	S1D1N	Output	Channel 1 (even channel) differential data 1 negative

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22	S1D1P	Output	Channel 1 (even channel) differential data 1 positive
23	S1D2N	Output	Channel 1 (even channel) differential data 2 negative
24	S1D2P	Output	Channel 1 (even channel) differential data 2 positive
25,26	GND	Ground	Grounded
27	S1CLKN	Output	Channel 1 (even channel) differential clock negative
27	S1CLKP	Output	Channel 1 (even channel) differential clock positive
29	S1D3N	Output	Channel 1 (even channel) differential data 3 negative
30	S1D3P	Output	Channel 1 (even channel) differential data 3 positive
31,32,33,34	NC	NC	Hang in the air



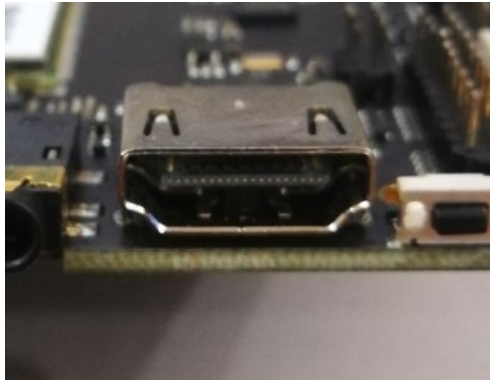
LVDS secondary screen interface

LVDS pin definition of secondary screen interface

Serial number	Definition	Attributes	Description
1,2,3	VCC	Power supply	3.3V/5V/12V power supply
4,5,6	GND	Ground	Grounded
7	S0D0N	Output	Differential data 0 negative
8	S0D0P	Output	Differential data 0 positive
9	S0D1N	Output	Differential data 1 negative
10	S0D1P	Output	Differential data 1 positive
11	S0D2N	Output	Differential data 2 negative
12	S0D2P	Output	Differential data 2 positive
13,14	GND	Ground	Grounded
15	S0CLKN	Output	Differential clock negative
16	S0CLKP	Output	Differential clock positive
17	S0D3N	Output	Differential data 3 negative
18	S0D3P	Output	Differential data 3 positive
19	NC		
20	NC		

I HDMI interface

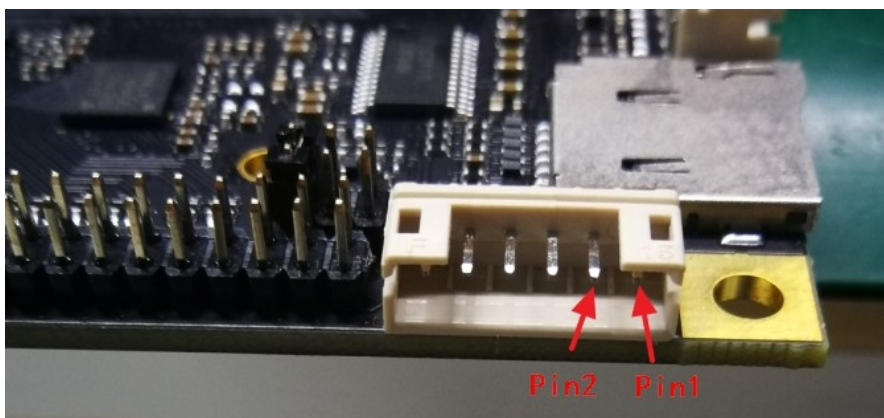
The board has a standard Type-A HDMI female socket, which supports 720p video signal output by default. The HDMI display content is exactly the same as that of the LVDS secondary screen.



HDMI Interface

I LVDS Backlight interface

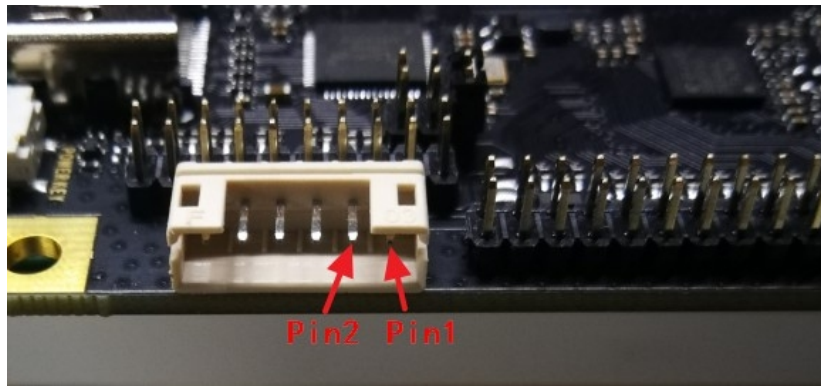
The main and sub-screen LVDS interfaces of the board are equipped with a screen backlight interface. The backlight interface adopts a PH2.0-6AW base. The backlight power supply is 12V. The total backlight current of the main and secondary screens cannot exceed 12V/1.5A, otherwise it will cause the board The card works abnormally or even overcurrent protection. The backlight enable control output signal is internally pulled up to 5V through a 2.7K resistor to ensure the high-level drive capability of the enable signal.



LVDS Main screen backlight interface

LVDS Definition of backlight interface pin of main screen

Serial number	Definition	Attributes	Description
1,2	12V	Power supply	12V backlight power supply
3	EN	Output	Backlight enable control output, internal 1K resistor pull up to 5V
4	PWM	Output	Backlight brightness control output, pulse signal, internal series 200R resistor
5,6	GND	Ground	Ground



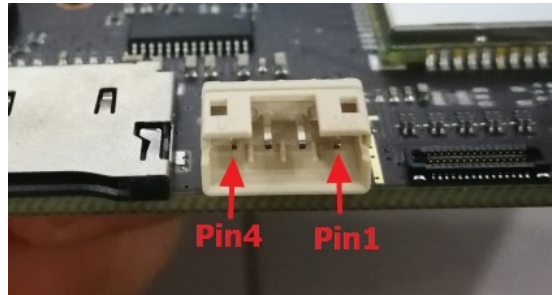
LVDS Secondary screen backlight interface

LVDS Pin definition of the secondary screen backlight interface

Serial number	Definition	Attributes	Description
1,2	12V	Power supply	12V backlight power supply
3	EN	Output	Backlight enable control output, internal 1K resistor pull up to 5V
4	PWM	Output	Backlight brightness control output, pulse signal, internal series 200R resistor
5,6	GND	Ground	Ground

■ Speaker interface

The board supports dual 8R/5W speaker output, and the interface model is PH2.0-4AW.



Speaker interface

Speaker interface pin definition

Serial number	Definition	Attributes	Description
1	SPKR-	Output	Right channel output negative
2	SPKR+	Output	Right channel output is positive
3	SPKL-	Output	Left channel output negative
4	SPKL+	Output	Left channel output positive

Other standard interfaces

Other standard interfaces

Interface	Attributes	Description
MicroSD	SD card	Data storage
MicroSIM	SIM card	1.8V/3V SIM
RJ45	Ethernet interface	Fast Ethernet interface (sinking type interface)
Headset	3.5mm American standard interface	3.5mm JACK American standard headphone jack

Chapter 4 Electrical Performance

Board electrical performance

project		The smallest	Rated	Maximum	Remarks
Main power	Voltage	9V	12 V	15V	
	Ripple	--	--	--	
	Current	--	2.5A	3.5A	
DC output	3.3V output current	--	--	--	
	5.0V output current	--	--	--	
	12V output current	--	--	--	
USB 3.0	Output current	--	1.5A	--	
USB 2.0	Output current		0.5A		
Surroundings	Relative humidity	--	--	--	
	Operating temperature	-20		70	
	Storage temperature	--	--	--	

Chapter 5 Precautions for Assembly and Use

In the process of assembling and using, please pay attention to the following points.

- The bottom silk screen of the bare board adopts a copper leakage design, and the connector pins are 2–3mm higher than the pad. During installation, ensure that the copper leakage silk screen and the connector pins contact metal objects to prevent the board from short-circuiting.
- When installing, ensure that the surrounding fixing holes are evenly stressed to

prevent the board from deforming due to uneven force.

- When installing the LVDS screen, first determine the power supply voltage of the screen, and use the jumper to select the correct voltage configuration.
- When installing the LVDS screen, pay attention to whether the screen backlight voltage and backlight current are consistent. When the power of the screen backlight is above 15W, be sure to use other power boards to supply power.
- When installing the serial port, pay attention to the interface sequence of 232, 485, and 422.