

Industrial Android Motherboard Series

JWS3288-I USER MANUAL

- ◆ Product Overview
- ◆ Function Introduction
- ◆ Precautions



Dear User:

Thank you for purchasing the industrial android mainboard !

In order to let you know how to use this product quickly, we have written this manual for you. From which you can get features of the industrial android mainboard important notice, installation methods, how to maintain and maintain knowledge, we recommend to read this manual carefully before you use this product, which will help you to better use this product.

We will do our best efforts to ensure that the information provided in this manual is accurate and reliable. If any omission, please correct me. The company may improve the product's overall performance and reliability, there may be some improvements and upgrades to the hardware of the product, any changes in the product specification mentioned in this manual or related information are subject to change without notice. Please understand !

Thank you for your cooperation !

Warm Tips:

01. In order to use the industrial android mainboard correctly, please keep this manual for reference.
02. Please do not open the device by the agency or person who is not authorized by our company !
03. The industrial android mainboard requires professional maintenance. If there is any damage, please contact our company in time.
04. We reserve the right to modify the specifications or related information mentioned in the use of this manual.

Important Notice

01. Do not place the machine in an unstable and falling place.
02. Avoid direct exposure of the machine to sunlight and other heat sources.
03. In Thunderstorm (especially lightning), please unplug the power plug and antenna plug.
04. Please place the power cord in a place where people are not easy to trip, and do not cover the power cord with any sundries.
05. Before you supply power to the equipment, please confirm whether the power supply voltage meets the requirements of the equipment.
06. Please do not overload the power socket to avoid fire or electric shock.
07. For equipment using power cord, there must be an easily accessible power socket around the equipment.
08. Before cleaning the device, unplug the power cord from the socket and wipe the monitor with a dry, soft cloth.
09. Please avoid products or parts (such as shell, LED screen, interface, components and wires) caused by insect bite or foreign body invasion, etc.) broken, rusted, damaged, etc.
10. Avoid contact or exposure to improper temperature, solvent, acid and alkali, water immersion or humid environment.
11. Please do not allow any liquid to enter or splash into the equipment to avoid short circuit or fire.
12. Please do not open the equipment by any organization or personnel not authorized by the company.
13. If the equipment is not used for a long time, please unplug the power plug.
14. In order to avoid unnecessary damage to the product caused by frequent switch on and off, it is necessary to wait at least 30 seconds before starting the machine.
15. Before connecting or unplugging any signal wire, make sure that all power wires have been unplugged in advance.
16. Ensure good heat dissipation and ventilation of the system.
17. Please install it in a proper position under the guidance of professionals, such as on the cabinet, on the wall, etc.

Disclaimer

From the date of purchase, our company provides a one-year free warranty for the purchaser. However, the products repaired by unauthorised maintenance person will not provide quality assurance. There is a disclaimer about incorrect use, disaster, and incorrect installation.If our products fail, we will provide free repair or replacement during the warranty period.If warranty have expires, we will charge the cost of materials and artificial services fee.Please contact the relevant sales staff for details.

Transport and Packing List

In order to ensure the product intact, please accept the goods in front of the carrier and check it with carrier together. Once damage occurs, please do not accept it. Please pay attention to hold the goods, packing materials and accessories intact, and get in touch with us immediately. If there is no objection of the product within the receiving period, it will be regarded that the products are acceptable , then we will not assume the responsibility for damaged goods (unless other special terms is included in contract). Besides, please check if all the following accessories are packed in the carton.

Certificate	Warranty card	User Manual
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CATALOG >>>>

1	Product Overview	04
	1.1 Application Field	04
	1.2 Function Introduction	04
	1.3 Features	04
2	Schematic Diagram Of Main Board Interface	05
3	Basic Function	06
4	PCB Dimension	07
5	Electrical Performance	09
6	Interface Parameter Introduction	10
7	Product Assembly Precautions	18

1 Product Overview

1.1 JWS3288-I Application Field

JWS3288-I is the main board that used in intelligent automation terminals, advertising machine, digital signage, intelligent self-service terminals, intelligent retail terminals, O2O intelligent devices, industrial mini PC, Robot, etc.,

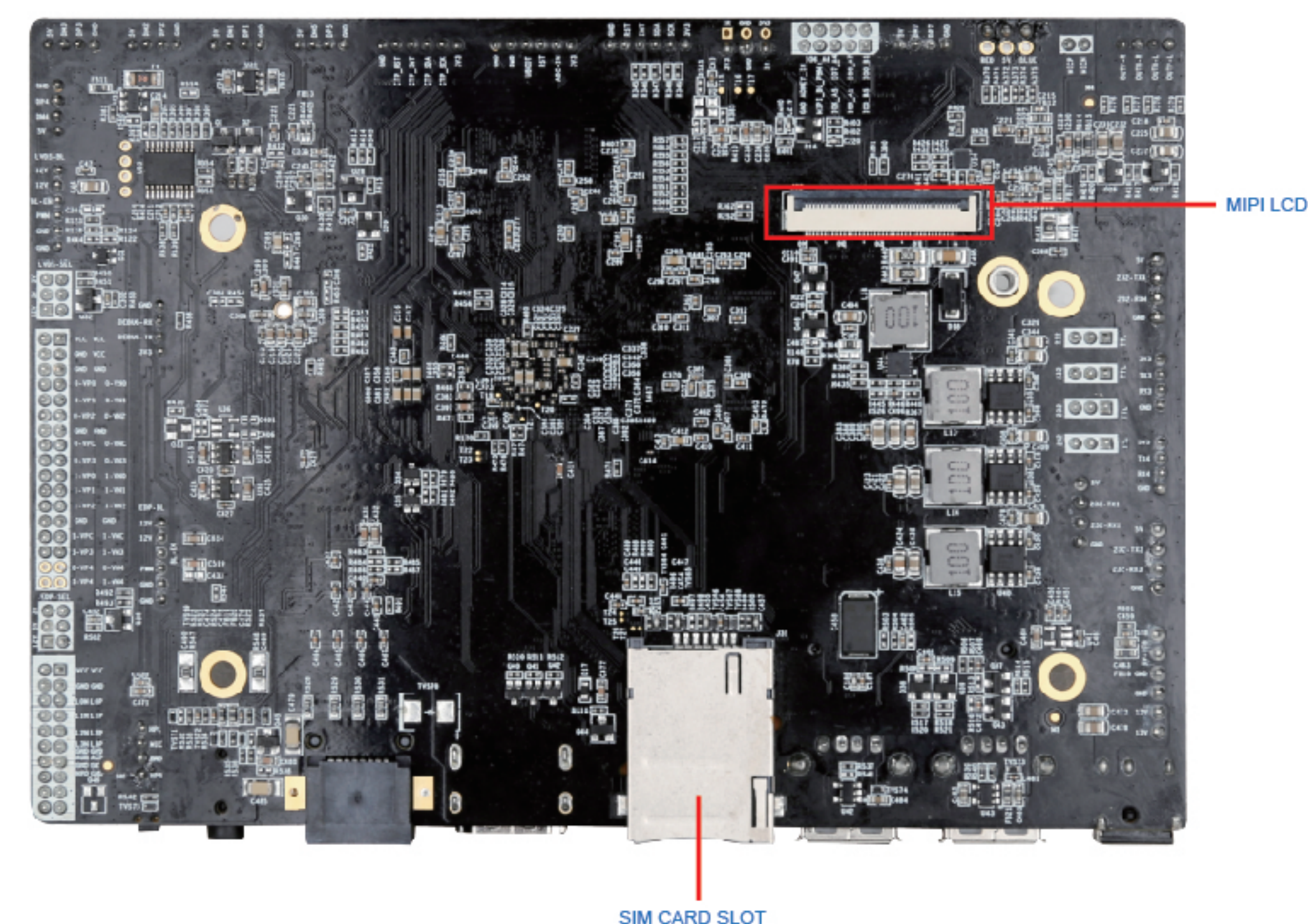
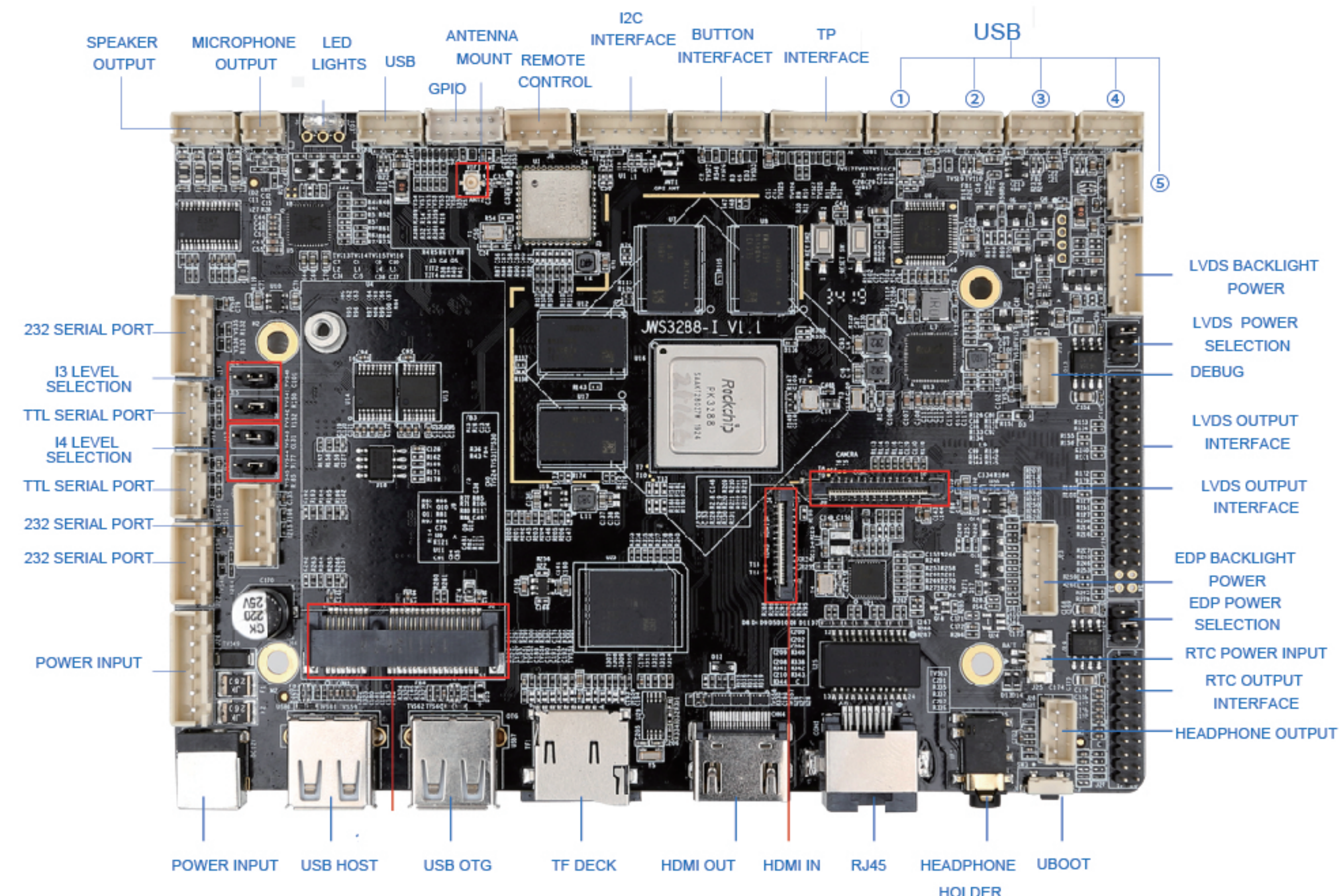
1.2 Function Introduction

At the heart of this board is a RK3288-I quad-core ARM Cortex-A17 CPU and a Mali-T764 GPU. Main frequency up to 1.8GHz, equipped with Android 7.1 operating system, support 4K and H.265. It is the best choice for your HMI and industrial panel PC solutions due to its excellent performance in data processing in the complex environment.

1.3 Features

- High integration: It is all-in-one design for multi-functions, integrates LVDS, eDP, Ethernet, HDMI, WiFi, Bluetooth, etc.
- The 3G / 4G module of MINI-PCIE interface are available to support Internet connection and calling.
- Multiple interfaces support I/O expansion, to meet the requirements of various peripherals in market.
- High definition: It supports 4K 3840x2160 decoding and LCD display with various LVDS / eDP interfaces, also supports LCD screen with various sizes and resolution.
- Support customization service for Android system, provide API interface reference code for system call, and support the development of customer's upper application APP.
- It supports multiple touch screen technologies: Infrared, SAW, multi-touch capacitive, single-touch resistive, etc. And supports HID configuration of drive-free touch screen while without debugging.

2 Schematic Diagram Of Main Board Interface

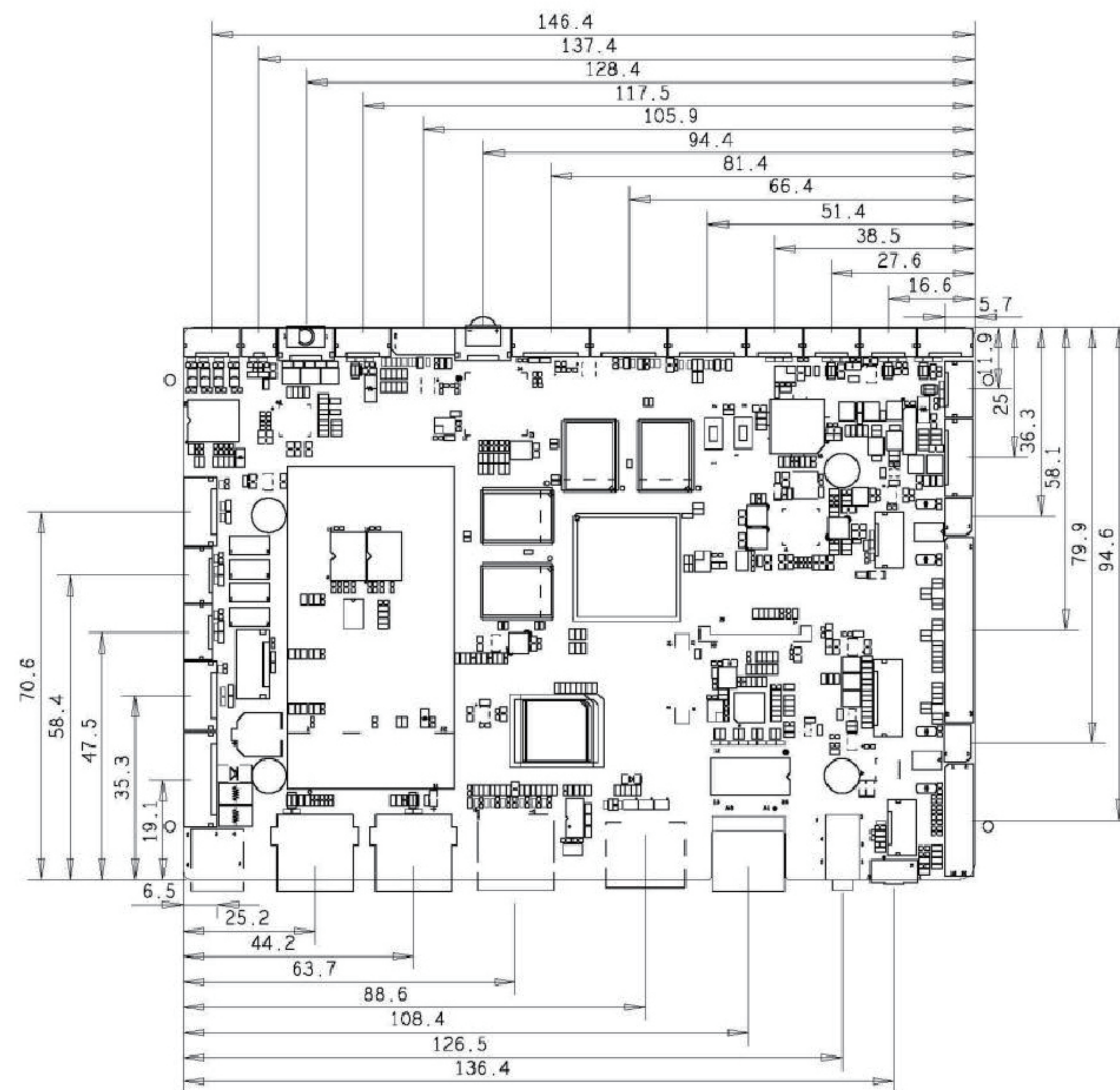


3 Basic Function

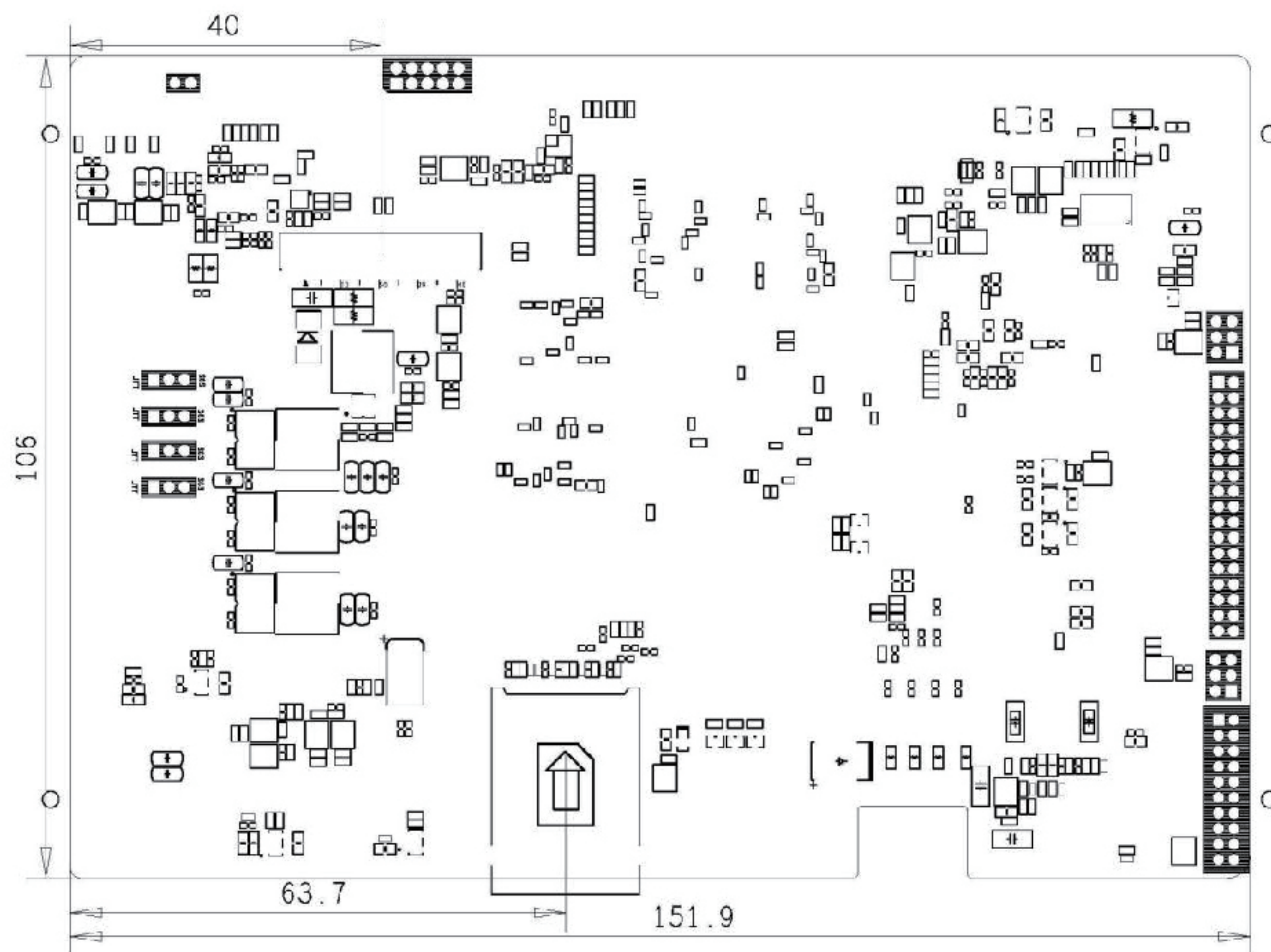
Main Configuration	
CPU	RK3288, quad-core, main frequency: 1.8GHz
Storage	2G(4G for optional)
Internal Memory	EMMC 16G(8G/32G/64G for optional)
Internal ROM	4KB EEPROM
Decoding Resolution	3840*2160 is available
Operating System	Android 7.1
Play Mode	It supports multiple play modes such as looping, timing and inter-cut.
Network	It supports 3G, Ethernet, WiFi / Bluetooth 4.0 and wireless peripheral expansion.
Video Playing	It supports WMV, AVI, FLV, RM, RMVB, MPEG, TS, MP4,.etc.
Picture Format	BMP, JPEG, PNG, GIF.
USB Interface	1*USB HOST, 1*USB Socket, 6*USB socket
Serial Port	1 232 serial port, 2 TTL / 232 serial ports are optional
GPS	External GPS (optional)
WIFI,BT	Built in WiFi, BT4.2(optional)
3G/4G	It support 4G all network communication and voice calls.
Ethernet	One 10M/100M/1000M for adaptive Ethernet.
TFCard	Support TF card
LVDS Output	One single/dual channel, which drives 50/60Hz LCD screen directly.
eDP Output	It supports directly drive LCD screen with various resolutions of eDP interface.
HDMI Output	1*HDMI, it supports 1080P@120Hz, 4Kx2K@60Hz output.
Audio/Video Output	It supports left and right channel output, built-in dual-4R/20W, 8R/10W power amplifier.
RTC	Support
Timing Switch	Support
System Upgrade	Support local TF, USB upgrade

4 PCB Dimension And Interface

4.1 PCB Dimension



4.2 PCB Dimension



PCB: 6 layers
Dimension: 151.9*106mm, thickness: 1.6mm
Screw hole specification: $\varnothing$ 3.2mm x 4

5 Electrical Performance >>>>

Item		Min	Typ	Max
Power parameter	Voltage	--	12V	--
	Ripple	--	--	50mV
	Current	3A		
Power supply current(HDMI output, No other peripherals connected)	Working current	--	200mA	350mA
	Stand-by current	--	17mA	20mA
	USB power supply current	--	--	500mA
Power supply current (LVDS)	3.3V working current		400mA	500mA
	5V working current		550mA	1A
	12V working current		580mA	1A
	USB supply current	--	--	500mA
Power supply current (EDP)	3.3V working current	--	400mA	500mA
	5V working current	--	--	--
	12V working current	--	--	--
	USB supply current	--	--	500mA
Total output	Current	3.3V		800mA
Environment	Relative humidity	--	--	80%
	Working temperature	0°C	--	60°C
	Storage temperature	-20°C		70°C

- Attention:
01. When connecting with the LVDS screen, it is necessary to choose the correct working voltage of backlight (3.3V, 5V and 12V). Please do not apply it to peripherals that exceed the corresponding maximum current.
02. When connecting eDP / LVDS screen, the overall working current and stand-by current of the board depend on the connected screen, which are not listed in the table above.

6 Interface Parameter Description >>>

※ Power Input Interface

It adopts 12V DC power supply, it is only allowed to supply power to board subsystem from DC base and power socket. The plug's DC IN specification of power adapter is D6.0, d2.0. The 12V DC power supply needs to support the minimum 600mA current when no external device is connected.

NO.	Name	Attribute	Description
1	VCC	Input	12V input
2	VCC	Input	12V input
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire
5	5V-STB	Input	5V input
6	STB	input Output	Pull down to MCU pins

Standby 5V input and standby signal output are used for power board standby. For low-power standby, connect the standby 5V input and The standby signal output signal is connected to the 5V STB and PS_ON of the power board (the description of these two signals by the power boards of different houses) It may be different, please refer to the actual situation), if you do not need to do low-power standby, these two pins can be left empty (the default is not supported) Support standby function).

※ RTC battery holder

Used to power the system clock during power failure

NO	Name	Attribute	Description
1	RTC	Input	3V input
2	GND	Ground wire	Ground wire

※ MIC interface

Please pay attention to the connection of the MIC positive and negative poles.

NO	Name	Attribute	Description
1	MIC1N	Input	MIC-
2	MIC1P	Input	MIC+

※ Remote receiving interface

NO	Name	Attribute	Description
1	IR	Input	Remote control signal input
2	GND	Ground wire	Ground wire
3	3V3	power supply	3.3V output

※ Operation indicator

NO	Name	Attribute	Description
1	LED_B	Blue light	Work indicator
2	VCC	power supply	3.3 output
3	LED_R	red light	Standby indicator

※ Backlight control interface

Used for backlight control of LVDS / eDP screen, 12V power supply current is not more than 1.5A, when using 19-inch large screen or screen backlight If the power is above 20W, please take power from other power supply boards to avoid power supply instability. This 12V electricity The source can only be used as a backlight power output, and must not be used as a power input to the system.

NO	Name	Attribute	Description
1	GND	Ground wire	Ground wire
2	GND	Ground wire	Ground wire
3	BL_ADJ	output	Backlight brightness control
4	BL_EN	output	Backlight brightness control
5	VCC	power supply	12V output
6	VCC	power supply	12V output

※ LVDS interface

Universal LVDS interface definition, support single / dual, 6/8 / 10-bit 1080P LVDS screen.

Screen voltage can be jumper cap

Choose to support 3.3V / 5V / 12V screen power supply.

In order to avoid burning boards and screens, please note the following:

1. Please confirm whether the screen specification book screen is supplied with the correct voltage and whether the corresponding power supply of the board can meet the maximum working current of the screen.
2. Please use a multimeter to confirm whether the power supply selected by the jumper cap is correct.
3. When connecting the 6 / 8-bit LVDS screen cable, install it near pin1.

NO	Name	Attribute	Description
1	VCC	power supply	Screen power output, 3.3V/5V/12V optional
2	VCC	power supply	Screen power output, 3.3V/5V/12V optional
3	VCC	power supply	Screen power output, 3.3V/5V/12V optional
4	GND	Ground wire	Ground wire
5	GND	Ground wire	Ground wire
6	GND	Ground wire	Ground wire
7	D0N	output	Pixel0 Negative Data (Odd)
8	D0P	output	Pixel0 Positive Data (Odd)
9	D1N	output	Pixel0 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	CL0N	output	Negative Sampling Clock (Odd)
16	CL0P	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 Negative Data (Even)
21	D6N	output	Pixel1 Negative Data (Even)
22	D6P	output	Pixel1 Negative Data (Even)
23	D7N	output	Pixel2 Negative Data (Even)
24	D7P	output	Pixel2 Negative Data (Even)
25	GND	Ground wire	Ground wire
26	GND	Ground wire	Ground wire
27	CL1N	output	Negative Sampling Clock (Even)
28	CL1P	output	Positive Sampling Clock (Even)
29	D8N	output	Pixel3 Negative Data (Even)
30	D8P	output	Pixel3 Positive Data (Even)

※ EDP screen backlight interface

Used for backlight control of EDP screen, 12V power supply current is not more than 1.5A, when using a large screen or screen backlight power over 19 inches If it is above 20W, please draw power from other power supply boards to avoid causing system instability. Backlight enable voltage is 5V, For other voltages, please add IO level shifter. This 12V power supply can only be used as a backlight power output, and must not be used as a power supply.

Enter the supply system.

NO	Name	Attribute	Description
1	VCC	power supply	12V output
2	VCC	power supply	12V output
3	EN	output	Backlight enable control
4	PWM	output	Backlight enable control
5	GND	Ground wire	Ground wire
6	GND	Ground wire	Ground wire

※ EDP screen interface

NO	Name	Attribute	Description
1	VCC	power supply	Screen power output, 3.3V/5V/12V optional
2	VCC	power supply	Screen power output, 3.3V/5V/12V optional
3	GND	Ground wire	Ground wire
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	GND	Ground wire	Ground wire
18	GND	Ground wire	Ground wire
19	GND	Ground wire	Ground wire
20	HPD	Ground wire	EDP DETECT

※ MIPI screen interface

The MIPI interface supports a single-channel MIPI LCD screen, and the 4-channel MIPI interface supports up to 1920 * 1200 @ 60fps.

NO	Name	Attribute	Description
1	NC	-	Not connect
2	VDD	power supply	Digital power
3	VDD	power supply	Digital power

4	GND	Ground wire	Ground
5	REST	Output	Global reset pin
6	NC	-	Not connect
7	GND	Ground wire	Ground
8	D0N	Output	Negative MIPI differential data output
9	D0P	Output	Negative MIPI differential data output
10	GND	Ground wire	Ground
11	D1N	Output	Negative MIPI differential data output
12	D1P	Output	Negative MIPI differential data output
13	GND	Ground wire	Ground
14	CLKN	Output	Negative MIPI differential data output
15	CLKP	Output	Positive MIPI differential data output
16	GND	Ground wire	Ground
17	D2N	Output	Negative MIPI differential data output
18	D2P	Output	Negative MIPI differential data output
19	GND	Ground wire	Ground
20	D3N	Output	Negative MIPI differential data output
21	D3P	Output	Positive MIPI differential data output
22	GND	Ground wire	Ground
23	NC	-	Not connect
24	NC	-	Not connect
25	GND	Ground wire	Ground
26	NC	-	Not connect
27	NC	-	Not connect
28	NC	-	Not connect
29	NC	-	Not connect
30	GND	Ground wire	Ground

31	LED-	power supply	LED Cathode
32	LED-	power supply	LED Cathode
33	NC	-	Not connect
34	NC	-	Not connect
35	NC	-	Not connect
36	NC	-	Not connect
37	NC	-	Not connect
38	NC	-	Not connect
39	LED+	power supply	LED Anode
40	LED+	power supply	LED Anode

※ 232 serial socket interface * 3

The board introduces two sets of ordinary 232 serial ports, which can support universal 232 serial port devices on the market.Precautions:

1. Whether the serial port voltage matches. Can not directly access TTL, 485 equipment.
 2. Whether the TX and RX connections are correct.
 3. You can choose TTL level (corresponding to socket J16) or 232 level (corresponding to socket J22) by jumping J14 and J15;
- Similarly, you can select TTL level (corresponding to socket J20) or 232 level (corresponding to socket J11) by jumping J17 and J18.

NO	Name	Attribute	Description
1	GND	Ground wire	Ground wire
2	232-RX	Input	232-RX
3	232-TX	Output	232-TX
4	VCC	power supply	5V Output

※ TTL serial socket interface * 2

The board introduces two sets of ordinary two-wire serial ports, which can support common serial devices on the market. The level of the serial port 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. Does the TTL serial port voltage match? Can't directly connect to MAX232,485 equipment.
 2. Whether the TX and RX connections are correct.
 3. You can choose TTL level (corresponding to socket J16) or 232 level (corresponding to socket J22) by jumping J14 and J15; for the same reason,
- You can select TTL level (corresponding to socket J20) or 232 level (corresponding to socket J11) by jumping J17 and J18.

※ MIPI interface

The board supports a MIPI camera with a maximum of 1300W pixels. The electrical definition of the socket is as follows:

NO	Name	Attribute	Description
1	GND	Ground wire	Ground wire
2	D0P	Input/Output	MIPI data channel 0 positive
3	D0N	Input/Output	MIPI data channel 0 negative
4	GND	Ground wire	Ground wire
5	D2P	Input/Output	MIPI data channel 2 positive
6	D2N	Input/Output	MIPI data channel 2 negative
7	GND	Ground wire	Ground wire
8	D3P	Input/Output	MIPI data channel 3 positive
9	D3N	Input/Output	MIPI data channel 3 negative
10	GND	Ground wire	Ground wire
11	MCLK	Output	Master clock
12	RST	Output	Reset signal
13	GND	Ground wire	Ground wire
14	PWDN	Output	Power-down control
15	GND	Ground wire	Ground wire
16	GND	Ground wire	Ground wire
17	DVDD	power supply	2.8V output
18	AFVDD	power supply	2.8V output
19	GND	Ground wire	Ground wire
20	SDA	Input/Output	SDA signal
21	SCL	Output	SCL signal
22	DVDD	power supply	1.2V output
23	GND	Ground wire	Ground wire
24	DOVDD	power supply	1.8output
25	GND	Ground wire	Ground wire
26	D1N	Input/Output	MIPI data channel 1 positive
27	D1P	Input/Output	MIPI data channel 1 negative

28	GND	Ground wire	Ground wire
29	CLKP	Input/Output	MIPI clock channel is positive
30	CLKN	Input/Output	MIPI clock channel negative

※ HDMI IN Interface

NO	Name	Attribute	Description
1	VCC	power supply	5V Output
2	PWREN	Output	Power enable
3	GND	Ground wire	Ground wire
4	GND	Ground wire	Ground wire
5	D0N	Input/Output	MIPI data channel 0 negative
6	D0P	Input/Output	MIPI data channel 0 positive
7	D1N	Input/Output	MIPI data channel 1 negative
8	D1P	Input/Output	MIPI data channel 1 positive
9	D2N	Input/Output	MIPI data channel 2 negative
10	D2P	Input/Output	MIPI data channel 2 positive
11	D3N	Input/Output	MIPI data channel 3 negative
12	D3P	Input/Output	MIPI data channel 3 positive
13	CLKN	Input/Output	MIPI clock channel negative
14	CLKP	Input/Output	MIPI clock channel is positive
15	INT	Input/	Interrupt signal
16	STBY	Output	Standby control
17	IR	Input/	To be determined
18	RST	Output	Reset signal
19	I2S_LRCK_RX	Input/Output	Signal in I2S group
20	I2S_SCLK	Input/Output	Signal in I2S group
21	I2S_MCLK	Output	Signal in I2S group
22	I2S_SDI	Input/	Signal in I2S group
23	I2C4_SDA	Input/Output	SDA signal
24	I2C4_SCL	Output	SCL signal

※ IIC to serial port

I2C to serial port with our small board to achieve I2C to dual standard TTL interface, 8 GPIO, can be used in TTL, GPIO interface is not enough .Use on occasion.

NO	Name	Attribute	Description
1	VCC	power supply	3.3V Output
2	SCK	Input/Output	I2C clock
3	SDA	Input/Output	I2C data
4	INT	Input/Output	Break
5	RST	Input/Output	Reset
6	GND	Ground wire	Ground wire

※ USB

The board has 2 Host USB standard interfaces (1 host port, 1 OTG port), 6 built-in Host USB sockets

NO	Name	Attribute	Description
1	VCC	power supply	5V Output
2	DM	Input/Output	DN
3	DP	Input/Output	IDP
4	GND	Ground wire	Ground wire

※ Touch screen interface

NO	Name	Attribute	Description
1	VCC	power supply	3.3V Output
2	RST	Input/Output	Break
3	INT	Input/Output	Reset
4	SCL	Input/Output	I2C clock
5	SDA	Input/Output	I2C data
6	GND	Ground wire	Ground wire

※ Speaker interface

NO	Name	Attribute	Description
1	RP	Output	Audio output right +
2	RN	Output	Audio output right-
3	LN	Output	Audio output left-
4	LP	Output	Audio output left +

※ GPIO Interface

NO	Name	Attribute	Description
1	GPIO0_B5	Input/Output	I3.3V output
2	GPIO0_B1	Input/Output	IO port
3	GPIO0_A1	Input/Output	IO port
4	GPIO0_A7	Input/Output	IO port
5	GPIO6_A5	Input/Output	IO port
6	GPIO7_A4	Input/Output	IO port
7	MIPI_BL_PWM	NC	NC
8	GPIO6_A6	Input/Output	IO port
9	GND	Ground wire	Ground
10	ADC_IN	Input	ADC signal

※ Button Interface

NO	Name	Attribute	Description
1	VCC	power supply	1.5V output
2	ADC	Input/Output	ADC signal
3	RST	Input/Output	Reset signal
4	UBOOT	Input/Output	Update signal input
5	PWR_ON	Input/Output	Power signal input
6	GND	Ground wire	Ground wire

※ Other standard interfaces and functions

Storage interface	TF card	Data storage, support 32G for maximum
	USB	Host interface, supporting data storage, data import, USB mouse and keyboard, camera, touch screen,. etc
Ethernet interface	RJ45 interface	Support 1000M wire network
HDMI interface	Standard interface	Support HDMI data output, 1080P for maximum
Headphone jack	Standard interface	3.55mm
3G interface	PCI-E Standard interface	Support Huawei, ZTE and other Mini PCI-E 3G/4G modules
SIM card interface	Standard interface	Support various network system (it depends on 3G module)

7 Product Assembly Precautions >>>

 During assembly and use, please pay attention to the following points:

01. Short circuit issues between bare board and peripheral equipment.
02. During the process of installation and fixation, please avoid any damage of bare plate due to fixation.
03. When installing the eDP/LVDS screen, pay attention to whether the voltage and current of screen are compliance with standards. And pay attention to the direction of the first pin on screen holder.
04. When installing the eDP/LVDS screen, pay attention to whether the backlight voltage and current of the screen are compliance with standards. If the power of screen backlight is more than 20W, it should consider whether use other power boards for power supply.
05. When installing peripherals (USB, IO, ETC), pay attention to the electrical level and current output of IO.
06. When installing the serial port, pay attention to whether the 232/485 device is connected, and whether the TX and RX connection methods are correct.
07. Whether the input power supply is involved in the power input interface, whether the input power supply voltage and current meet the requirements, and it is forbidden to intervene the power input power supply from the backlight socket for purpose of convenient operation.