

# IOT-180 V1.1

## Digital Signage Board

# Specification

**Doc. Modification History**

Version	Description	Date
V1.1	Creation	2016-11-29

# Catalogue

<b>Chapter 1 Production General Description .....</b>	<b>错误！未定义书签。</b>
1.1 General Description .....	3
1.2 Features .....	错误！未定义书签。
1.3 Appearance And Interface Sketch .....	4
<b>Chapter 2 Basic Function List .....</b>	<b>6</b>
<b>Chapter 3 PCB Measurement And Interface Layout .....</b>	<b>8</b>
3.1 PCB Measurement Chart .....	8
3.2 Infterface Parameter Definition .....	9
<b>Chapter 4 Electric Performance .....</b>	<b>20</b>
<b>Chapter 5 Assembly Using Notice.....</b>	<b>21</b>

# Chapter 1. Production General Description

## 1.1 Scope of Application

IOT180 belongs to commercial display smart mainboard , generally applicable to:advertising machine、digital signage、smart self-service terminal、 smart retail terminal、 O2O smart device etc.

## 1.2 General Description

IOT180 uses Allwinner R18 Cortex-A53 quad core 64bit CPU , carries Android 6.0 system , main frequency 1.5GHz , outstanding Properties , affordable pricing , it is the most cost performance for quad core.Using Mali400MP2 dual core super high performance GPU , support HDMI 4K output , it is the best choice for your advertising machine、 smart terminal、 industrial projects.

## 1.3 Features

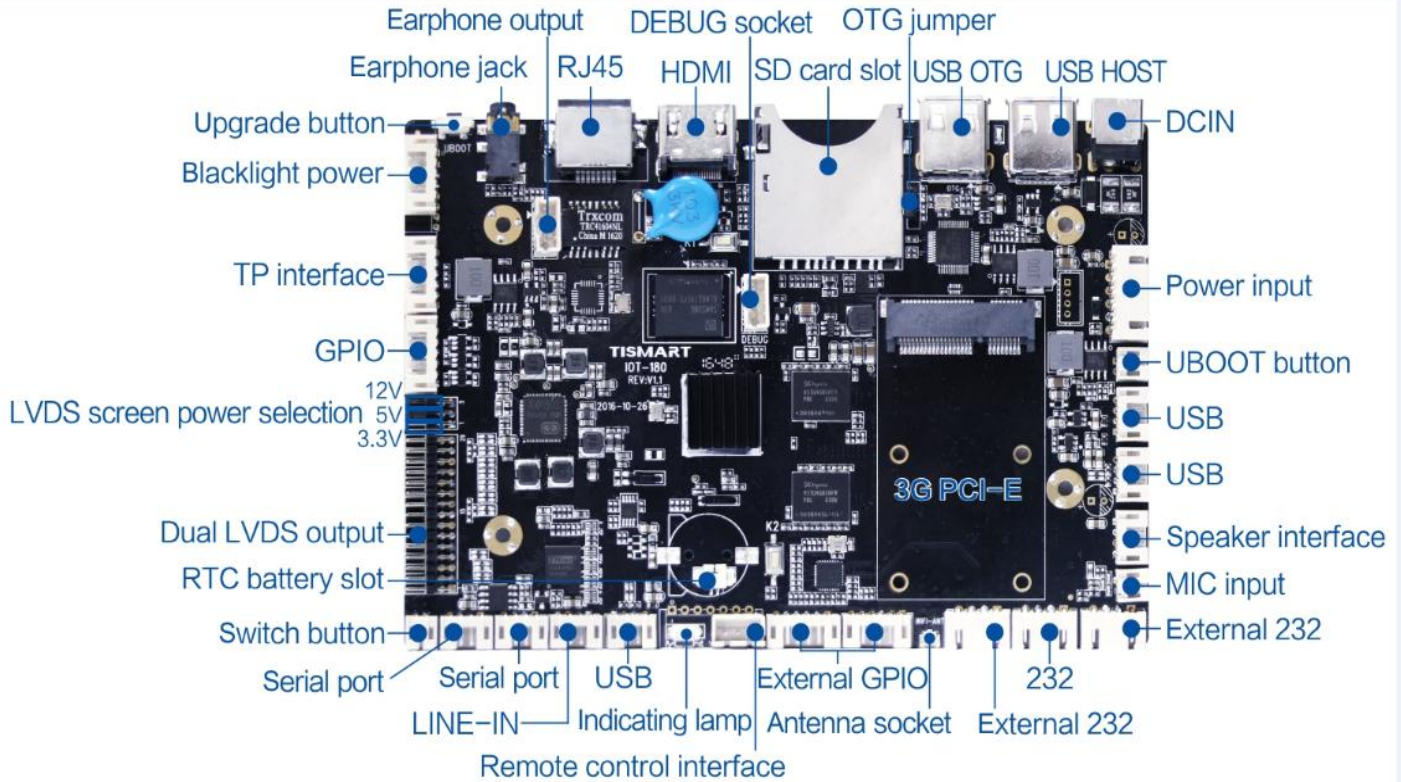
- ◆ Quad core 64 bit CPU carries Android 6.0 system , it is the most cost performance quad core board at present.
- ◆ Support HDMI 4K drive screen , support 4K video decoding , bring the real sense of ultra clear visual enjoyment.
- ◆ Support HDMI and LVDS double screen same display、 double

screen different display , horizontal and vertical screen free switch.

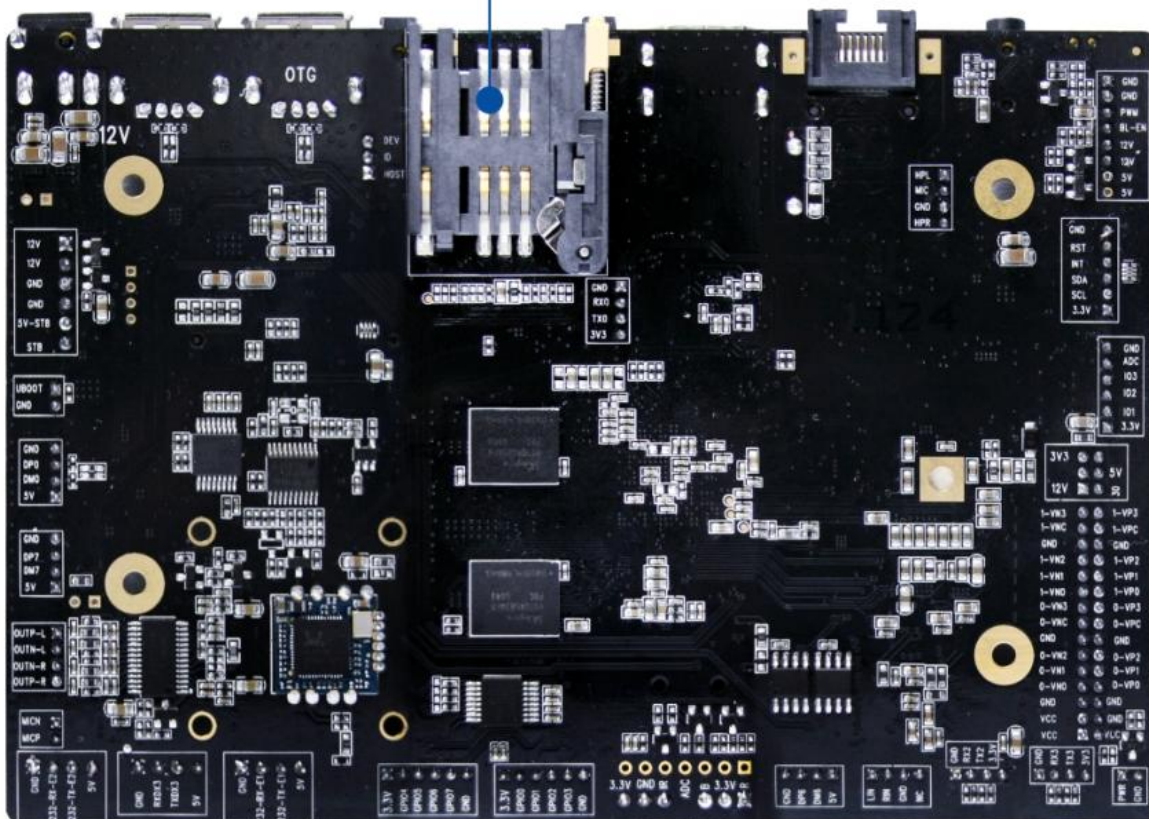
- ◆ Support EMMC 5.0 , experience the most rapid storage speed.
- ◆ Support Android system customization , provide system debug interface API reference code , perfect support customers upper application APP development.
- ◆ Support remote、 SD card/TF card、 PC etc variety of upgrade mode , SD card/TF card configure screen parameter , plug and bright , perfect support each size and each resolution LVDS display screen.
- ◆ Ample extended interfaces.5 USB ports(3 sockets,2 standard USB ports),2 extensible TTL serial port , 3 channels 232 serial port,GPIO/ADC interface , satisfying requirement of variable peripherals in the market.

## 1.4 Appearance and Interface Sketch

Front/back :



### SIM卡座



## Chapter 2. Basic Function List

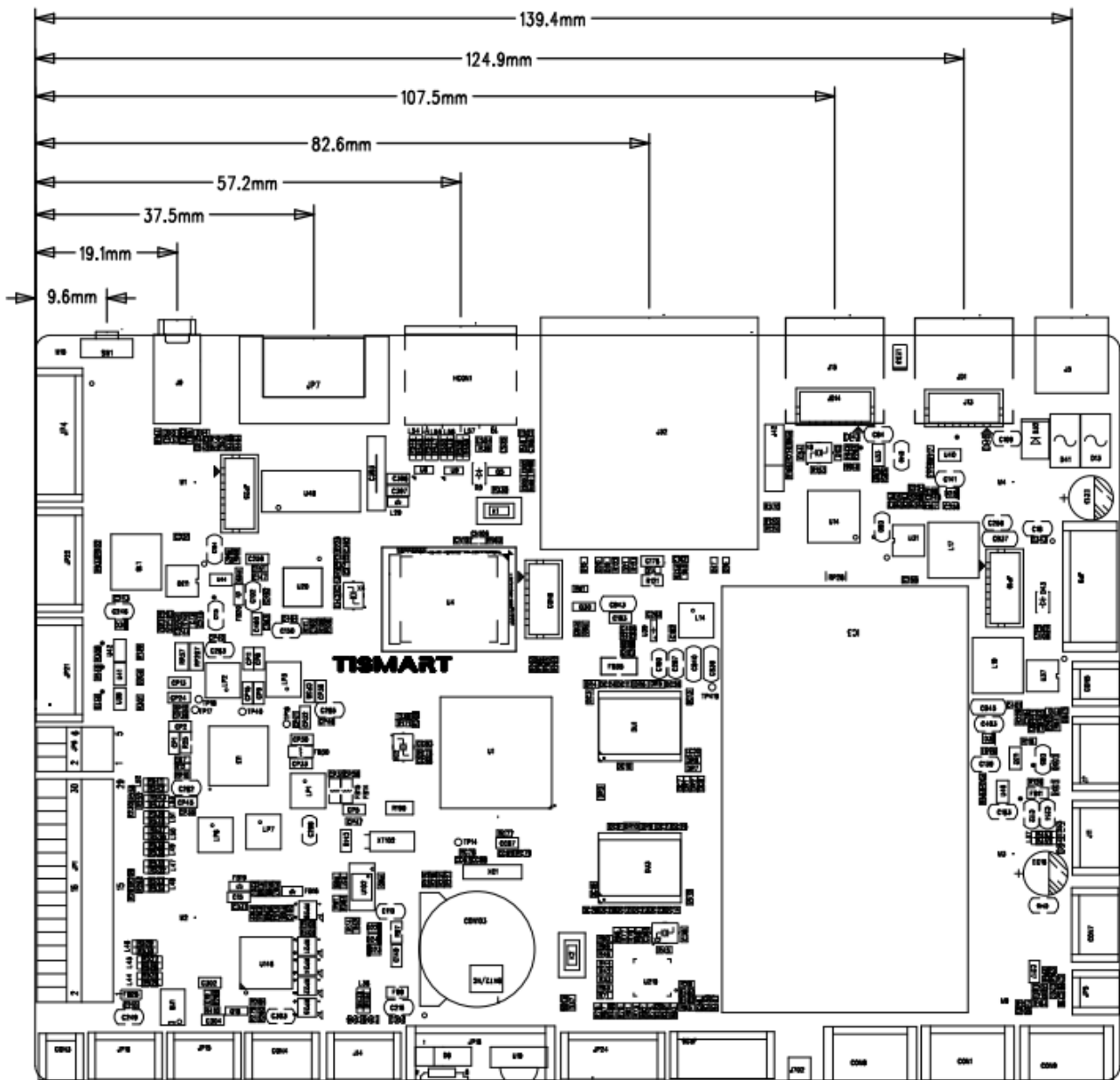
Main Hardware Index	
CPU	R18,quad core,main frequency 1.5GHz
Internal Memory	LPDDR3 1G/2G (4 pcs 8 bit DDR3)
Built-in Memory	EMMC 5.0 4/8/16/32G(optional)
Built-in ROM	4KB EEPROM
Decoding Definition	Maximum support 4k 3840*2160
Operating System	Android 6.0
Play Mode	Support loop, timing, inter-cut and variable play modes
Network Support	Ethernet、 support WiFi wireless peripheral extension
Video Playing	Support wmv、 avi、 flv、 rm、 rmvb、 mpeg 、 ts、 mp4 etc.
Image Format	Support BMP、 JPEG、 PNG、 GIF
USB2.0 Ports	3 USB HOST sockets、 2 USB A type socket ( including 1 OTG )
Serial Port	2 TTL serial port sockets , 3 232 serial port sockets

GPS	External GPS ( optional )
WIFI	Built-in WIFI
Ethernet	1 , 10M/100M self-adapting Ethernet
SD Card	SD Card
LVDS Output	1 single/double channel , can drive 50/60Hz LCD panel directly
HDMI Output	1,support 4K output
Audio And Video Output	Support left and right channels output, built-in dual 4R/20W,8R/10W amplifier
RTC Real Time Clock	Support
Timing Switch	Support
System Upgrade	Support local SD,USB upgrade

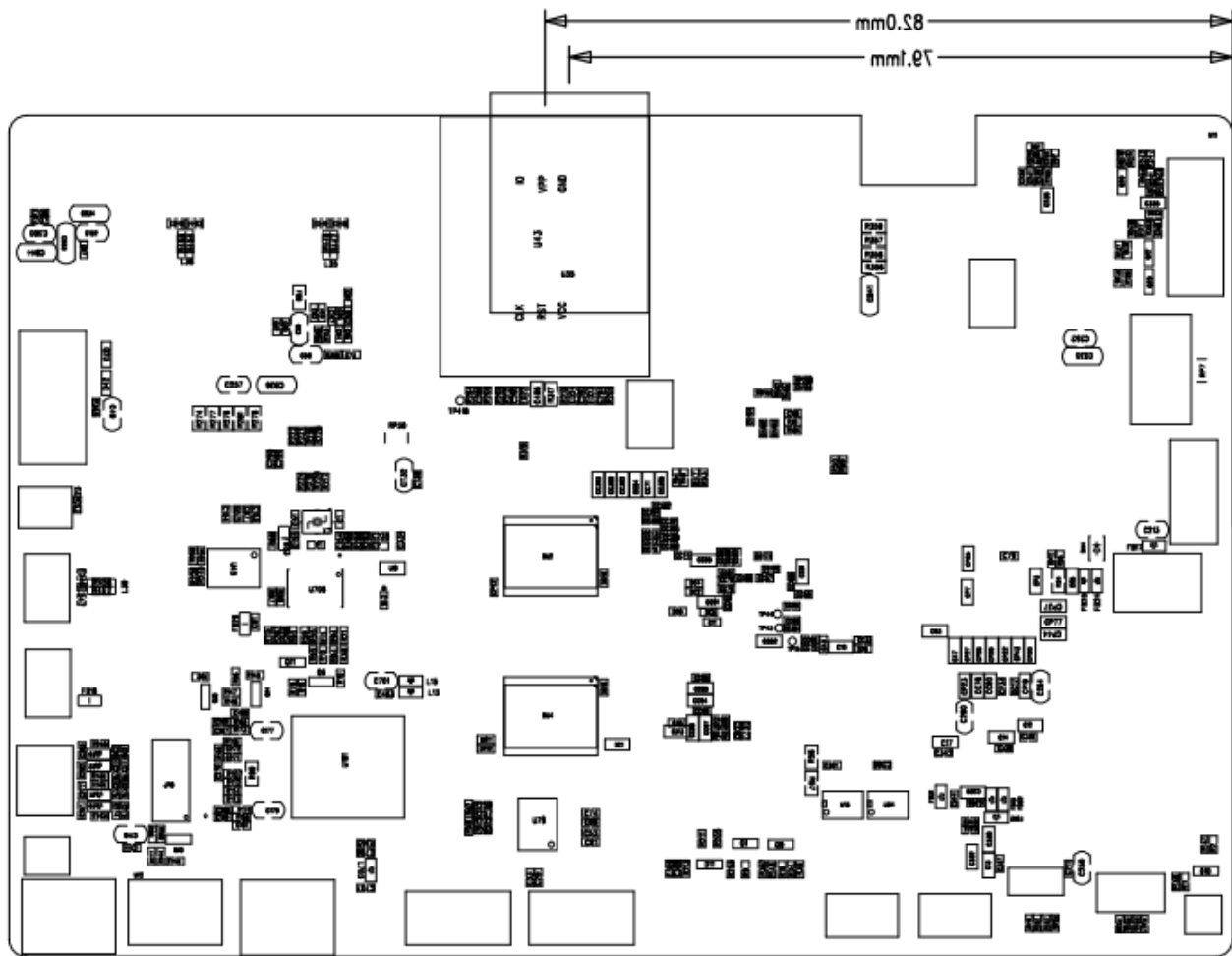


# Chapter 3 PCB Measurement And Interface Layout

## 3.1 PCB Measurement Chart







PCB : 6 layers

Measurement : 146mm\*100mm, thickness 1.6mm

Screw hole specification :  $\phi 3.2\text{mm} \times 4$

## 3.2 Interface Parameter Definition

### ◆Power Input Port

Use 12V DC power supply, only allowed from the DC power supply and power socket to power the board system, the plug of the power adapter DC IN specifications is D6.0,d2.0. without in a peripheral empty load cases,12V dc power supply to support the minimum current 600 mA.



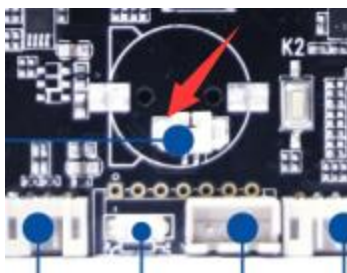
Power socket interfaces are defined as follows, can use power panel power supply, the socket specifications is 6 pin 2.54 mm spacing.

NO.	Definition	Property	Description
1	VCC	input	12V input
2	VCC	input	12V input
3	GND	ground electrode	ground electrode
4	GND	ground electrode	ground electrode
5	VCC-5V	input	standby 5V input
6	STB	output	standby signal output

Standby 5V input & standby signal output is used as standby power supply board, if want to do low standby power consumption, the standby 5V input & standby signal output signal respectively connected with the 5 v power supply board STB and PS\_ON (the description of the two signals might be different from different suppliers of power supply board, Please refer to the actual), If you don't need to do low standby power consumption, then no need to connect the 2 pins.

#### ◆ BAT1 RTC Battery Port

Used to install the clock battery, supply power to the system clock when power outages.



NO.	Definition	Property	Description
1	RTC	input	3V input
2	GND	ground electrode	ground electrode

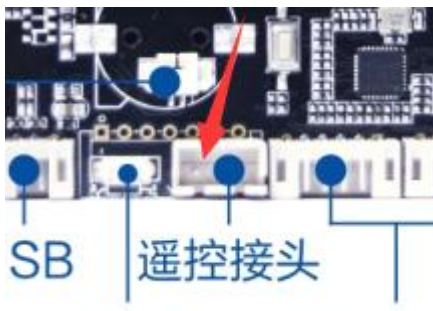
### ◆ MIC Port

Please note that the MIC is positive negative connection, not reverse.



NO.	Definition	Property	Description
1	MIC-	input	MIC-
2	MIC+	input	MIC+

### ◆ Port Of Receiving Remote Control



NO.	Definition	Property	Description
1	IR	input	remote control signal input
2	GND	ground electrode	ground electrode
3	3V3	Power	3.3V output

### ◆ Work Indicating Lamps

The default support gongyang red blue double LED lights.



NO.	Definition	Property	Description
1	LED_B	blue lamp	work indicating lamp
2	VCC	power	3.3V output
3	LED_R	red lamp	standby indicating lamp

#### ◆ LED/IR Port

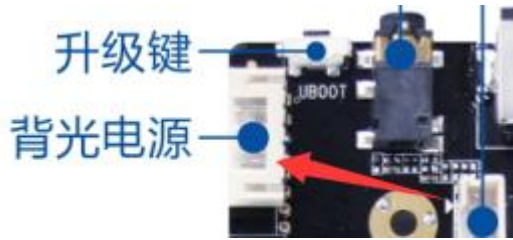
The position of remote control receiving and indicating light is shared (can choose welding 2.54 mm spacing of 7 pins socket)



NO.	Definition	Property	Description
1	LED_B	output	work indicating lamp
2	VCC	power	3.3V output
3	LED_R	output	standby indicating lamp
4	ADC	ADC input	ADC button input
5	IR	input	remote control signal input
6	GND	ground electrode	ground electrode
7	3.3V	power	3.3V output

#### ◆ Backlight Control Port

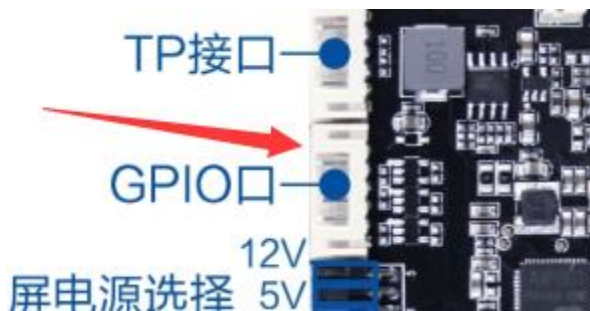
Use for LVDS screen backlight control, the 12V power supply current is not more than 1.5A, When using more than 19 inch screen or screen backlight power in more than 20W, backlight power supply electricity is taken from the other power plate, so as not to cause system instability. Backlight can make voltage is 5V, if other voltage, please add IO level conversion circuit. **The 12V power supply only as a backlight power output, don't as a power input supply system.**



NO.	Definition	Property	Description
6	VCC	power	12V output
5	VCC	power	12V output
4	BL-EN	output	backlight enable control
3	BL-ADJ	output	backlight brightness adjust control
2	GND	ground electrode	ground electrode
1	GND	ground electrode	ground electrode

#### ◆ I/O Control Port

For provide peripherals with input/output for controlling signal. Electrical level is 3.3V, ADC signal can be used for press key control.



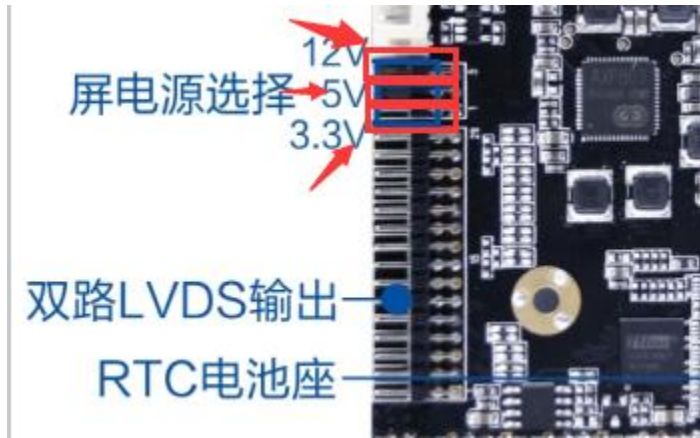
NO.	Definition	Property	Description
1	VCC	power	3.3V output
2	I/O	input	GPIO-1
3	I/O	input	GPIO-2
4	I/O	output	GPIO-3
5	ADC	input/output	ADC signal
6	GND	ground electrode	ground electrode

#### ◆ LVDS Port

Commonly used LVDS interface definitions, support single/double channels, 6/8 bits 1080P LVDS screen. Screen voltage can be choose by jumper cap, can choose to support 3.3V/5V/12V screen power supply.

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

1. Please make sure the specifications and power supply voltage of the screen is correct, the power supply of the board can meet the maximum current screen work accordingly
2. Please confirm the power of the jumper cap is correct by multimeter.



Using jumper cap to select the power of the screen above, from top to bottom, in order: 12V/5V/3.3V.

NO.	Definition	Property	Description
1	PVCC	power output	LCD power output , +3.3v/+5V/ +12V optional
2			
3			
4	GND	ground electrode	ground electrode
5			
6			
7	0-VN0	output	Pixel0 Negative Data (Odd)
8	0-VP0	output	Pixel0 Positive Data (Odd)
9	0-VN1	output	Pixel1 Negative Data (Odd)
10	0-VP1	output	Pixel1 Positive Data (Odd)
11	0-VN2	output	Pixel2 Negative Data (Odd)
12	0-VP2	output	Pixel2 Positive Data (Odd)
13	GND	ground electrode	ground electrode
14	GND	ground electrode	ground electrode
15	0-VNC	output	Negative Sampling Clock (Odd)
16	0-VPC	output	Positive Sampling Clock (Odd)
17	0-VN3	output	Pixel3 Negative Data (Odd)
18	0-VP3	output	Pixel3 Positive Data (Odd)
19	1-VN0	output	Pixel0 Negative Data (Even)
20	1-VP0	output	Pixel0 Positive Data (Even)
21	1-VN1	output	Pixel1 Negative Data (Even)
22	1-VP1	output	Pixel1 Positive Data (Even)
23	1-VN2	output	Pixel2 Negative Data (Even)

24	1-VP2	output	Pixel2 Positive Data (Even)
25	GND	ground electrode	ground electrode
26	GND	ground electrode	ground electrode
27	1-VNC	output	Negative Sampling Clock (Even)
28	1-VPC	output	Positive Sampling Clock (Even)
29	1-VN3	output	Pixel3 Negative Data (Even)
30	1-VP3	output	Pixel3 Positive Data (Even)

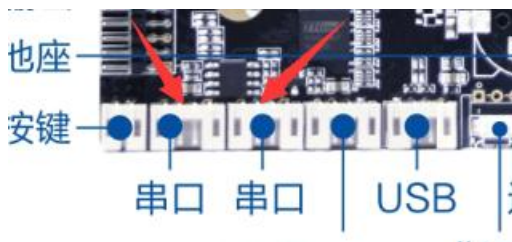
## ◆ TTL Double Wires Serial Socket Port\*2

The board raises two common double wires of serial ports,can support general serial port devices on the market, level of the serial port is 0V to 3.3V.If the abutting serial level higher than 3.3 V, must have the isolating circuit or level conversion circuit, otherwise it will burn out master and equipment.

Notice:

1.If TTL serial port voltage can match or not, can't directly access MAX232,485 devices.

2.TX, RX connection if is correct.



NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	UART- RX	input/output	RX
3	UART- TX	input/output	TX
4	VCC	power	3.3V output

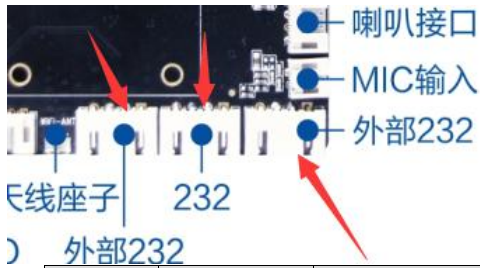
## ◆ 232 Double Wires Serial Socket Port \*3

Notice:

1.If 232 serial port voltage can match or not, can't directly access TTL,485 devices.

2.TX,RX of 232 connection if is correct.

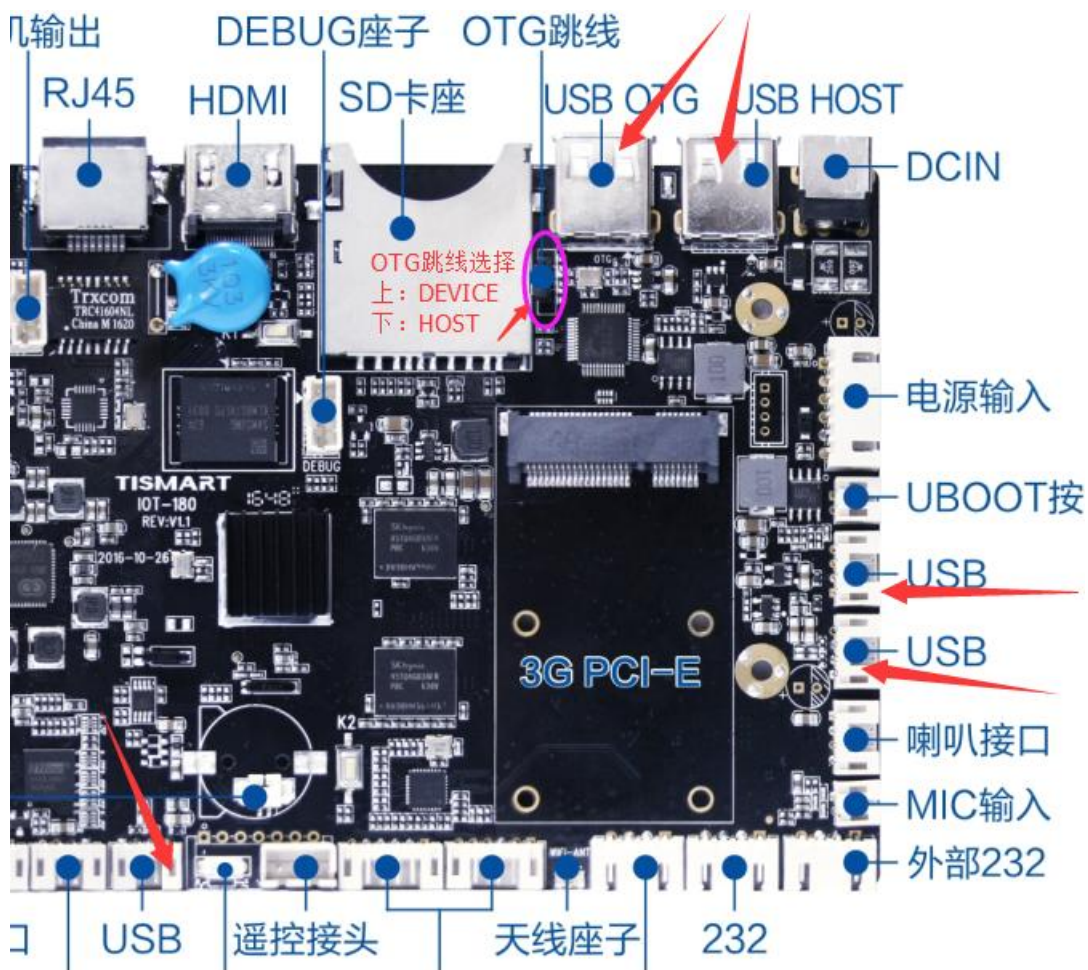




NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	232-RX	input/output	232-RX
3	232-TX	input/output	232-TX
4	VCC	power	5V output

#### ◆ USB

The board has 2 standard USB interface, including 3 inbuilt USB socket, can be used for peripheral expansion, default to HOST, each interface power supply current is 900mA, for USB OTG interface, can select the Host/Device by screen printing position and the jumper as below picture on the PCB board.



NO.	Definition	Property	Description
1	VCC	power	5V output
2	DM	input/output	DM
3	DP	input/output	DP
4	GND	ground electrode	ground electrode

#### ◆ Touch Screen Port



NO.	Definition	Property	Description
1	VCC	power	3.3V output
2	SCK	input/output	I2C clock
3	SDA	input/output	I2C data
4	INT	input/output	interrupt
5	RST	input/output	reset
6	GND	ground electrode	ground electrode

#### ◆ LINE\_IN Port



NO.	Definition	Property	Description
1	LIN	input	left channel audio input
2	RIN	input	right channel audio input
3	GND	ground electrode	ground electrode
4	NC	disconnect	unused

◆ **Audio Port 1(External amplifier needed)**



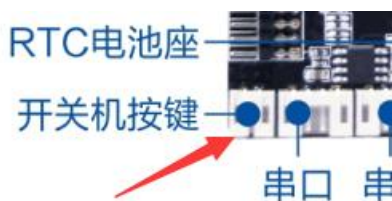
NO.	Definition	Property	Description
1	AL	output	audio output left
2	HS-MIC	input	detect earphone input
3	GND	ground electrode	ground electrode
4	AR	output	audio output right

◆ **Audio Port 2(can drive loudspeaker directly)**



NO.	Definition	Property	Description
1	OUTP-R	output	audio output right+
2	OUTN-R	output	audio output right-
3	OUTN-L	output	audio output left-
4	OUTP-L	output	audio output left+

◆ **Switch Button Interface**



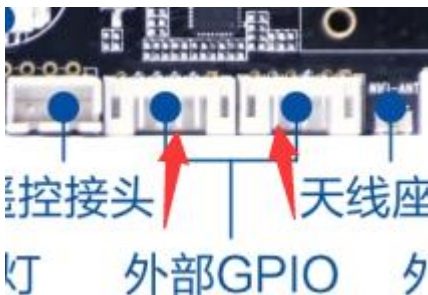
NO.	Definition	Property	Description
1	PWR-ON	input	external connect one pin of power button
2	GND	ground electrode	external connect another pin of power button

#### ◆ Uboot Upgrade Button Port



NO.	Definition	Property	Description
1	Uboot	input	external connect one pin of upgrade button
2	GND	ground electrode	external connect another pin of upgrade button

#### ◆ External GPIO



NO.	Definition	Property	Description
1	3.3V	power	3.3V output
2	GPIO0	input/output	GPIO0
3	GPIO1	input/output	GPIO1
4	GPIO2	input/output	GPIO2
5	GPIO3	input/output	GPIO3
6	GND	ground electrode	GND
NO.	Definition	Property	Description
1	3.3V	power	3.3V output
2	GPIO4	input/output	GPIO4
3	GPIO5	input/output	GPIO5
4	GPIO6	input/output	GPIO6
5	GPIO7	input/output	GPIO7

6	GND	ground electrode	GND
---	-----	------------------	-----

◆ **Other Standard Interfaces And Function:**

Memory Port	SD/TF Card	data storage, maximum support 32G
	USB	HOST port, support data storage, data input, USB, mouse keyboard, camera, touch screen etc.
Ethernet Port	RJ45 Port	Support 100M wire network
HDMI Port	Standard Port	support HDMI data output, maximum support 1080P
Earphone Port	Standard port	3.5mm standard port

## FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

## Chapter 4. Electric Performance

Project		Min	Typical	Max
Power voltage	voltage	--	12V	--
	ripple wave	--	--	50mV
Power voltage	current	3A		
Power current (HDMI output, no other peripheral)	working current	--	300mA	500mA
	standby current	--	17mA	20mA
	USB power supply current	--	--	900mA
Power current (LVDS)	3.3V working current		400 mA	500 mA
	5V working current		550 mA	1A
	12V working current		580 mA	1A
	USB power supply current	--	--	900mA
Total output	current	3.3V		800mA
Environment	Relative	--	--	80%



	humidity			
	working temperature	-20°C	--	70°C

Remark 1 : When connect the LVD screens , need to pay attention to select the right backlight working voltage 3.3V, 5V, 12V , the users cannot be applied to beyond the corresponding maximum current peripherals.

Remark 2: When connect the LVD screens , the board of the whole working current and standby current depending on the connection screens , above form not listed.

## Chapter 5 Assembly Using Notice

In the process of assembly use , please note the following points (and not limited to) problem.

- 一 , Bare board and a peripheral short circuit problem.
- 二 , In the process of installing fixed , avoiding the bare board deformation caused by fixed problems.
- 三 , When connect the LVD screens , pay attention to the screen voltage, electric current if is coincident. Attention to the problem of screen socket 1 pin direction.
- 四 , When connect the LVD screens , pay attention to the screen backlight voltage, electric current if is coincident. The backlight power is more than



20W, whether or not to use other power panel power supply.

- 五, Peripheral devices (USB, IO, etc) when installation, attention to the problem of peripheral IO level and current output.
- 六, A serial port when installation, pay attention to whether connect 232,485 devices directly. TX, RX connection if is correct.
- 七, Whether the input power supply access on the power input interface, according to the total peripheral evaluation, whether can meet the requirements of the input power supply voltage, electric current and so on. To eradicate facilitate the operation from a backlight socket for access to the power supply input power.