IoT-3399E
USER MANUAL

Modification History

Version	Description	Date
V1.0	Creation	2017-07-12
V1.1	Modify	2017-09-20
V2.0	Modify	2018-06-27

Catalogue

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Chapter 1. Production General Description

1.1 Scope of Application

IoT3399E belongs to android smart mainboard, generally applicable to smart display terminal products, video terminal products, industrial automation terminal products, such as: advertising machine, digital signage, smart self-service termina, smart retail terminal, O2O smart device , Industrial control PC, robot device etc

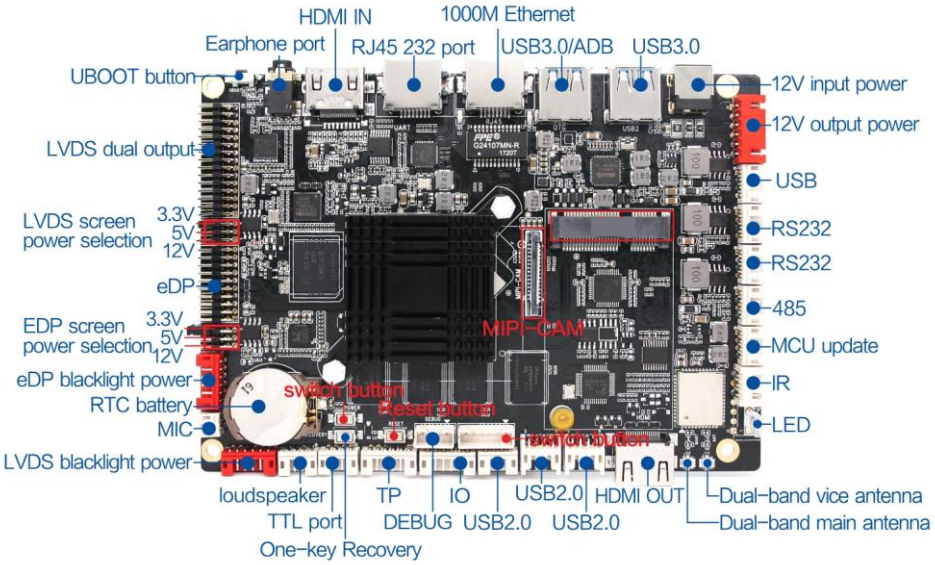
1.2 General Description

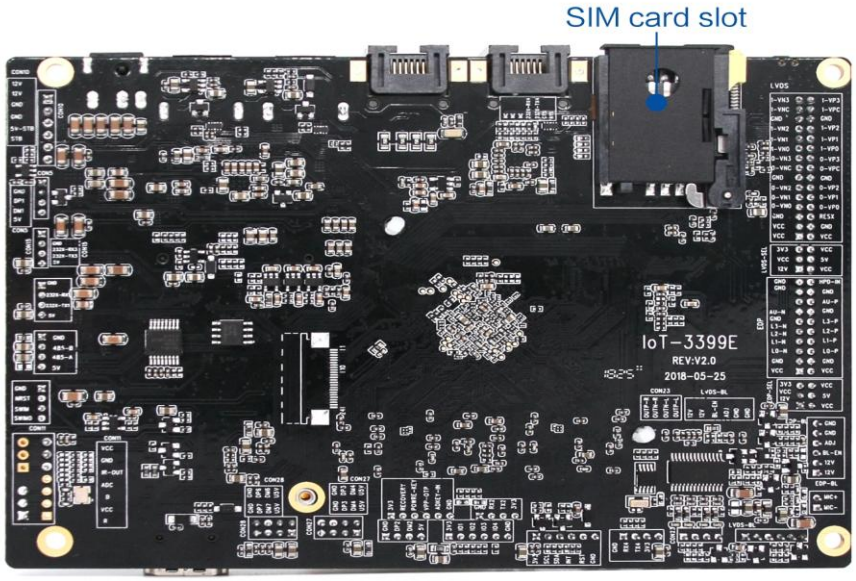
IoT-3399E uses Rockchip RK3399 Big.Little architecture: Dual Cortex-A72 + Quad Cortex-A53, 64-bit CPU,carries Android 7.1 system, main frequency 2.0GHz, outstanding properties.Using Mali-T864GPU, support 4K, H.265 hard decoding. Multi-channel video output and input for better performance, faster speed and richer interfaces ,it is the best choice for your man-machine interactive,industrial projects.

1.3 Features

- RK3399 super CPU with Android 7.1 system, faster speed, better performance.
- Support 5G and 2.4GWIFI, independent dual antenna
- Support 1000M ethernet port
- Rich extension interface: 8 USB interfaces(6 insert pin, 2 standard USB interface), 4 extensible serial port(3* RS232,1*TTL), 1*485 interfaces ,4*GPIO and ADC interface, it can meet the requirements of various peripherals in the market.
- High definition. Maximum support 3840x2160 4K decoding and all kinds of LCD screen with LVDS/eDP/HDMI etc interface,support each size and different resolution cropping screen, Support dual screen display.
- Support Android system customized, provide system invocation interface API reference source code, support clients upper application development perfectly.
- Perfect support IR, optics,capacitive, resistance, touch foil etc multiple mainstream touch screen,support non driver touch screen HID configuration without debugging.

1.4 Appearance and Interface Sketch



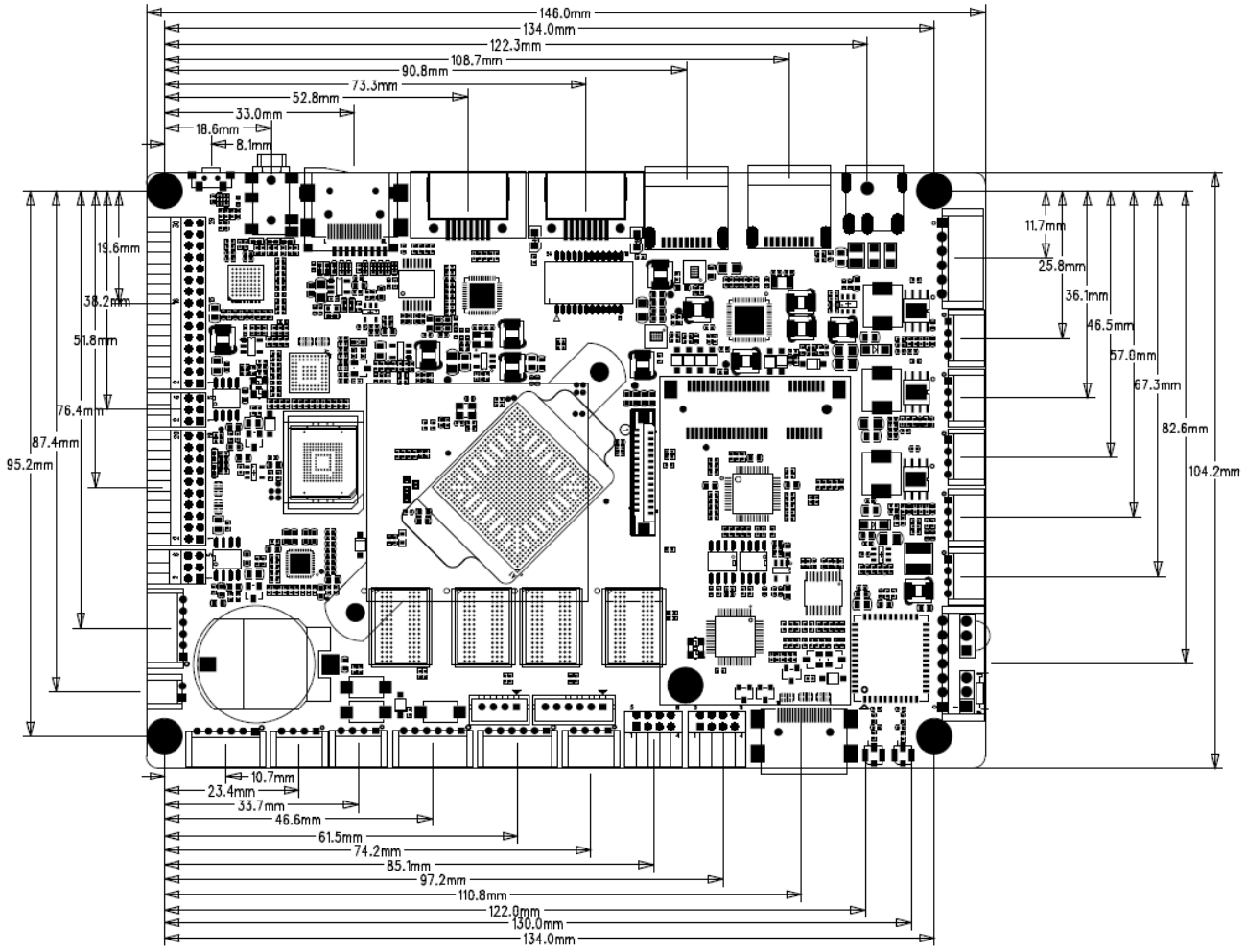


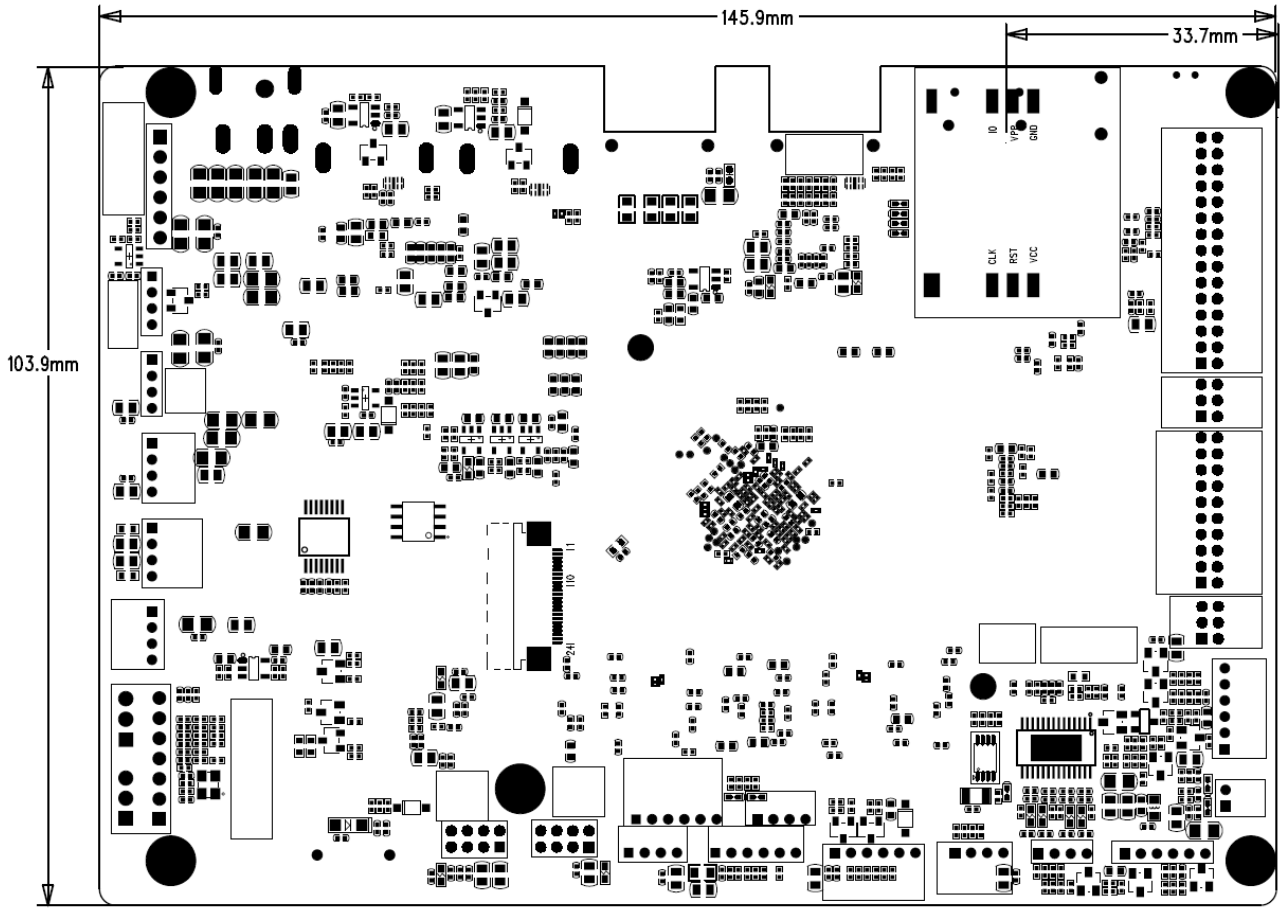
Chapter 2. Basic Function List

Main Hardware Index	
CPU	Rockchip RK3399 64-bit CPU, main frequency 2.0GHz 1.Big.Little architecture: Dual Cortex-A72 + Quad Cortex-A53 2.Built-in low power consumption MCU Cortex-M0
GPU	Quad Cortex- Mali-T860MP4
Internal Memory	Standard configuration 2G(4G optional)
Built-in Storage	Standard configuration 8G(16/32/64G optional)
Built-in ROM	2KB EEPROM
LVDS output	1 single/double channel，can drive 50/60Hz LCD panel directly
eDP output	Can drive many kinds of resolution LCD panel with eDP interface
HDMI output	1,support 1080P@120Hz，4kx2k@60Hz output
HDMI input	Support HDMI IN（can select TF card slot）
Audio and Video ouput	Support left and right channels output, built-in dual 4R/20W,8R/10W amplifier
Earphone	Support one channel earphone interface
USB interface	2*USB 3.0, 6*USB Socket
Serial port	5 channels serial port (3*232,1*TTL,1*485)
Mipi Camera	30pin FPC interface，Support 1300w Camera
WIFI、BT	Built-in WIFI, BT4.0（optional）
Ethernet	1000M self-adapting Ethernet
Video Playing	Support wmv、avi、flv、rm、rmvb、mpeg 、ts、mp4, etc
Image Format	Support BMP, JPEG, PNG, GIF
Operating System	Android 7.1
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：8 layers

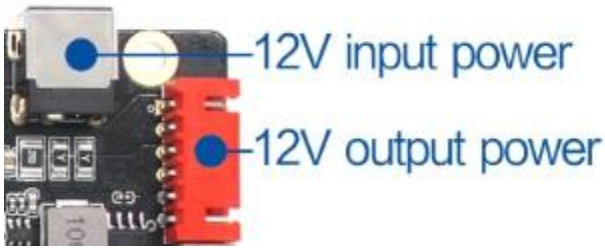
Measurement：146mm*100mm, thickness1.6mm

Screw hole specification：ϕ3.2mm x 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.（outerΦ4.4mm,PINΦ1.65mm),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.

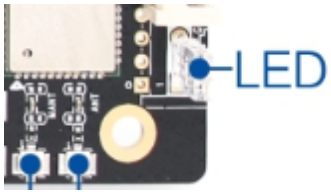
NO.	Definition	Property	Description
1	MIC-	input	MIC-
2	MIC+	input	MIC+

- **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

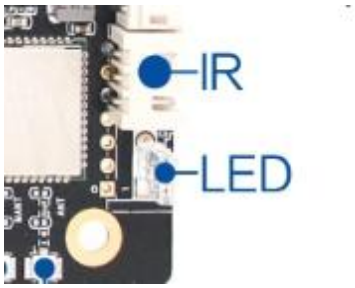
The default support gongyang red blue double LED lights.



NO.	Definition	Property	Description
1	LED_B	Blue light	Work light
2	VCC	Power supply	3.3V output
3	LED_R	Red light	Standby 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

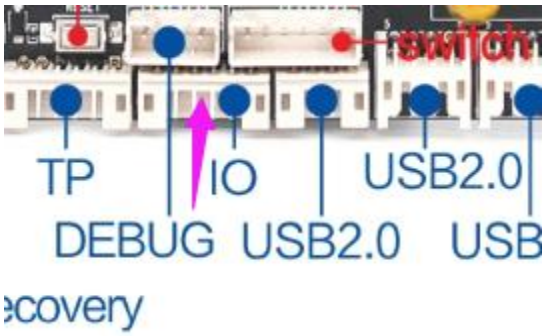
Backlight Control Port

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
1	GND	ground electrode	ground electrode
2	GND	ground electrode	ground electrode
3	BL-ADJ	output	backlight brightness adjust control
4	BL-EN	output	backlight enable control
5	VCC	power	12V output
6	VCC	power	12V output

IO Interface

I/O used for provide peripherals with input/output for controlling signal. Electrical level is 3.3V.



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

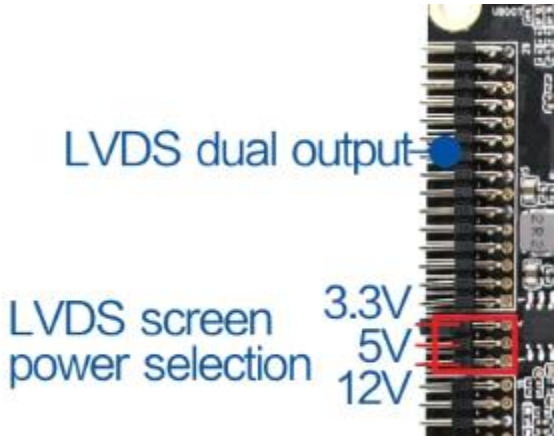
- **LVDS Port**

Commonly used LVDS interface definitions，support single/ double channels，6/8/10 bits 1080P LVDS screen. Screen voltage can be choosed 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.



The selection of screen power supply with jumper cap in above photo, from top to bottom :3.3V/5V/12V.

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	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 electrode	ground electrode
14	GND	ground electrode	ground electrode
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 electrode	ground electrode
26	GND	ground electrode	ground electrode
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)

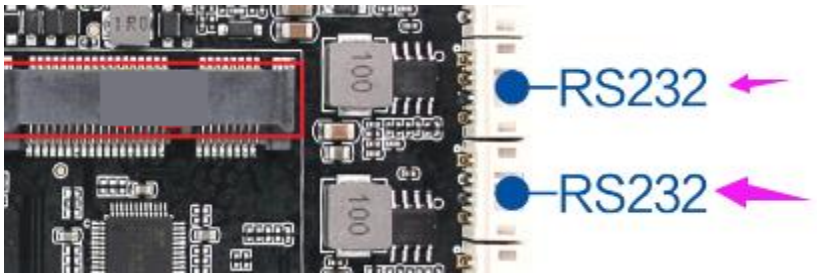
◆ 232 Serial port interface*2

Led out of the two sets of ordinary 232 serial port, can support the general market of the 232 serial devices.

Remark：

1.Serial voltage matching, Cannot access directly TTL,485 serial device.

2.TX，RX　whether the connection is correct.



NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	232-RXn	input	232-RX
3	232-TXn	output	232-TX
4	VCC	Power supply	5V output

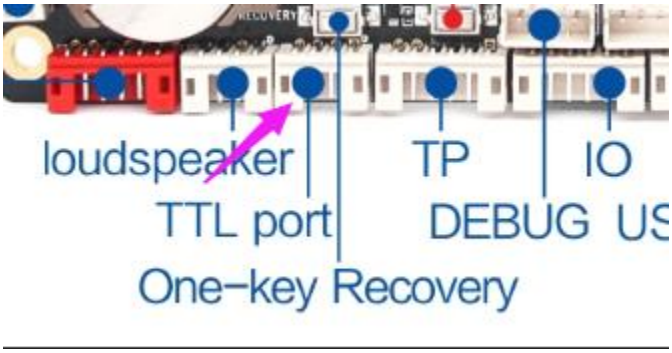
◆ TTL Wires Serial Socket Port*1

The board raises a common one 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 supply	3.3V output

- **485**

Support 1 set of 485 communication interfaces, It can support the common 485 interface devices on the market, interface level is 3.3V, When the interface level is higher than 3.3v, there should be an isolated circuit or a level conversion circuit, otherwise the main control and equipment will be burnt out.

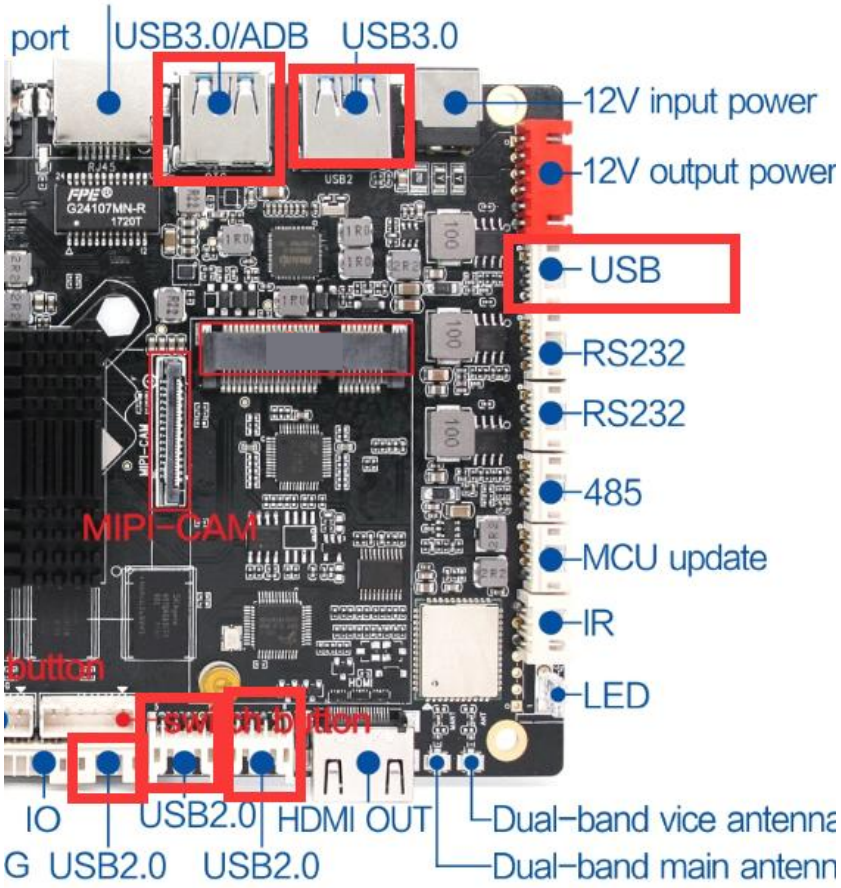
1.485 interface voltage is matched.

2.485A, 485B line sequence connection method is correct.

NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	485B	input/output	RX
3	485A	input/output	TX
4	VCC	Power supply	3.3V output

- **USB**

The board has 2 standard USB 3.0interface，including 6inbuilt USB socket，can be used for peripheral expansion，default to HOST，each interface power supply current is not more than 500mA，for USB OTG interface，can select the Host/Device by System settings.



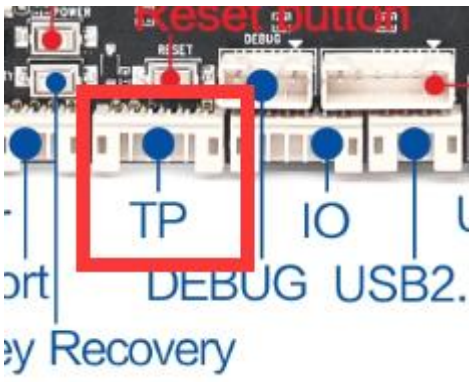
USB There are two kinds of sockets ： One kind is single row pin ， Electrical definitions are as follows：

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

The other is a double row pin, electrical definitions such as J23 are as follows：

NO.	Definition	Property	Description
1	VCC	Power supply	5V output
2	DM	input/output	DM
3	DP	input/output	DP
4	GND	ground electrode	ground electrode
5	VCC	Power supply	5V output
6	DM	input/output	DM
7	DP	input/output	DP
8	GND	ground electrode	ground electrode

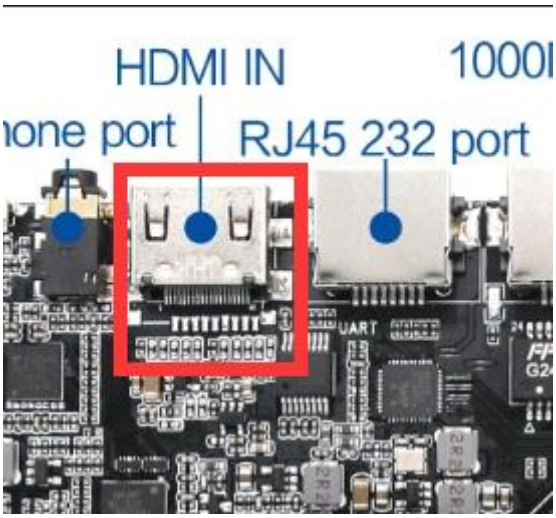
- **Touch screen interface**



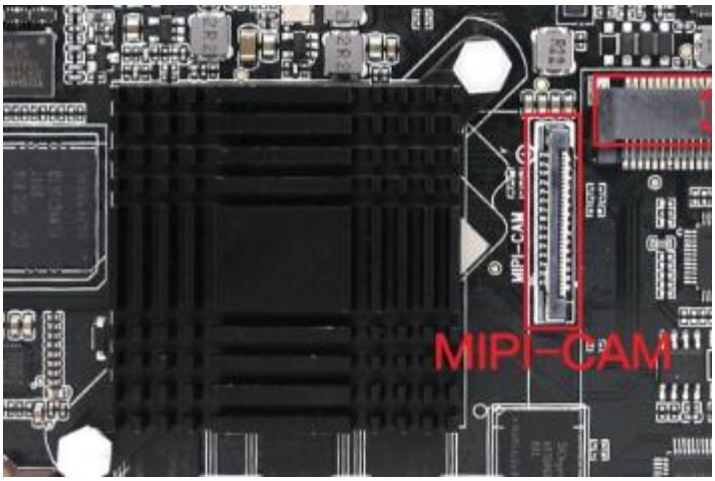
NO.	Definition	Property	Description
1	VCC	Power supply	3.3V output
2	SCK	input/output	I2C clock
3	SDA	input/output	I2C data
4	INT	input/output	interrupt
5	RST	input/output	reset
6	GND	ground electrode	ground electrode

- **HDMI_IN Interface**

HDMI_IN and TF card Alternative interface



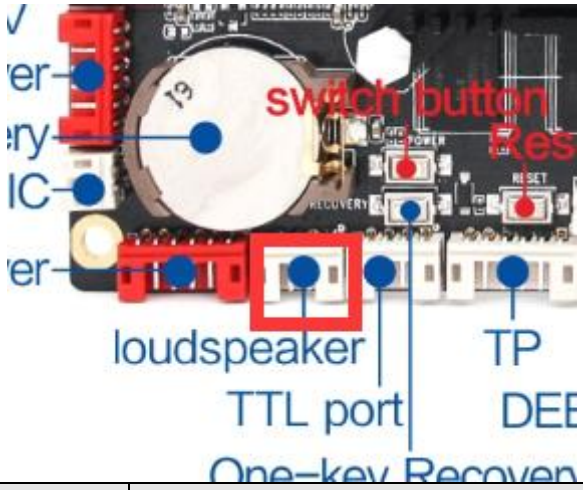
- **Camera_IN Interface**



Board support 1400W pixel Mipi camera，Installed in jp26 socket ，the electrical definition of the socket is as follows：

NO.	Definition	Property	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 electrode	ground electrode
7	VDD	Power supply	2.8V output
8	GND	ground electrode	ground electrode
9	I2C3_SDA	input/output	SDA signal
10	I2C3_SCL	output	SCL signal
11	RST	output	reset signal
12	PWDN	output	Power down control
13	GND	ground electrode	ground electrode
14	MCLK	output	Master clock
15	GND	ground electrode	ground electrode
16	D3P	input/output	mipi data channel3 plus
17	D3N	input/output	mip data channel3 minus
18	GND	ground electrode	ground electrode
19	D2P	input/output	mipi data channel2 plus
20	D2N	input/output	mipi data channel2 minus
21	GND	ground electrode	ground electrode
22	D1P	input/output	Mipi data channel 1 plus
23	D1N	input/output	Mipi data channel 1 minus
24	GND	ground electrode	ground electrode
25	CLKP	input/output	Mipi Clock channel plus
26	CLKN	input/output	Mipi Clock channel minus
27	GND	ground electrode	ground electrode
28	D0P	input/output	Mipi data channel 0 plus
29	D0N	input/output	Mipi data channel 0 minus
30	GND	ground electrode	ground electrode

- **Speaker interface**



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

- **Other standard interfaces and functions :**

Memory Port	SD 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 1000M wire network
HDMI Port	Standard port	support HDMI data output, maximum support 1080P
Earphone Port	Standard port	3.5mm standard port

Chapter 4. Electric Performance

Project		Min	Typical	Max
Power voltage	voltage	--	12V	--
	ripple wave	--	--	50mV
	current	3A		
Power current (HDMI output,no other peripheral)	working current	--	200mA	350mA
	standby current	--	17mA	20mA
	USB power supply current	--	--	500mA
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	--	--	500mA
Total output(eDP)	3.3V working current		400 mA	500 mA
	5V working current	--	--	--
	12V working current	--	--	--
	USB supply current	--	--	500mA
Total output	current	3.3V		800mA
Environment	Relative humidity	--	--	80%
	working temperature	0℃	--	60℃
	Storage temperature	-20℃		70℃

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 eDP/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 eDP/LVDS 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 eDP/LVDS 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 the serial port of the device level matching(232 or 485).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.

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.
Note: 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.

Warning: Changes or modifications to this unit not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement
This equipment complied 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.

EU Regulatory Conformance
Hereby, we (Shenzhen Smart Device Technology Co., LTD) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU

CE

Importer: Fender Musical Instruments S.L.U.
Address: C/Capitan Haya, 38 Planta 4, 28020 MADRID, Spain.
E-mail: support@fender.com
Manufacturer: Shenzhen Smart Device Technology Co., LTD
Address: 17th, 18th floor, Guoshi Mansion, Shahe West Road 1801, Nanshan, Shenzhen, China