IoT-3288A
User Manual

Doc. Modification History

Version	Description	Date
V1.0	Creation	2017-03-06
V1.1	Modify	2017-05-03
V1.2	Modifiy	2017-07-31
V1.3	Modify	2017-11-27

Catalogue

Chapter 1. Production General Description

1.1 Scope of Application

IoT-3288A v1.3 board integrated multimedia decoder, LCD driver, Ethernet, HDMI, WiFi, Bluetooth in one. Support most of current popular video and image format decoding, Support HDMI video output, input. Dual 8/10 bit LVDS interface and EDP interface, SIM card SD card and lock, More stable, very suitable for HD network player, video advertisement machine and picture frame advertisement machine. Belongs to commercial display smart mainboard, generally applicable to:advertising machine, digital signage, smart self-service terminal, smart retail terminal, O2O smart device, industrial control host, robot devices etc.

1.2 General Description

IoT-3288A uses Rockchip RK3288 Cortex-A17 quad core 64bit CPU, carries Android 5.1.1 system, main frequency 1.8GHz, outstanding properties. Using Mali-T764 GPU, support 4K, H.265 hard decoding,it is super top-ranking not only on game, benchmarking but aslo decoding. it is the best choice for your man-machine interactive, industrial projects.

1.3 Features

*High integration, Integrated USB/LVDS/eDP/Ethernet/HDMI/WIFI/ Bluetooth in one, Simplified machine design , Pluggable SD card .
*Rich extension interface: 7 USB interfaces(5 insert pin, 2 standard USB interface), 4 extensible serial port, GPIO/ADC interface, it can meet the requirements of various peripherals in the market.
*High definition. Maximum support 3840x2160 decoding and all kinds of LCD screen with LVDS/eDP interface.
*Complete function. Support screen playback, video screen, rolling caption, time switch, USB data import and other functions.
*Convenient management. Humanized playlist making software, easy advertising management and control. Play daily record, easy to understand playback.

1.4   Appearance and Interface Sketch

HDMI IN

MIPI Camera
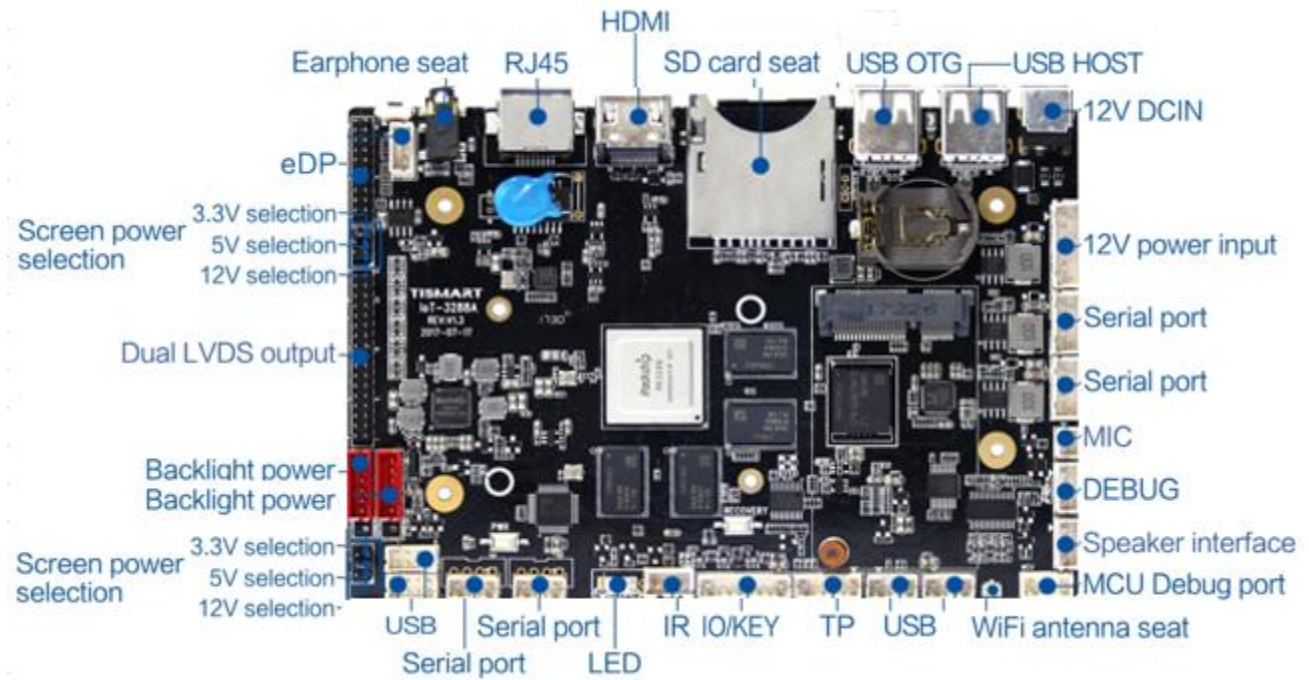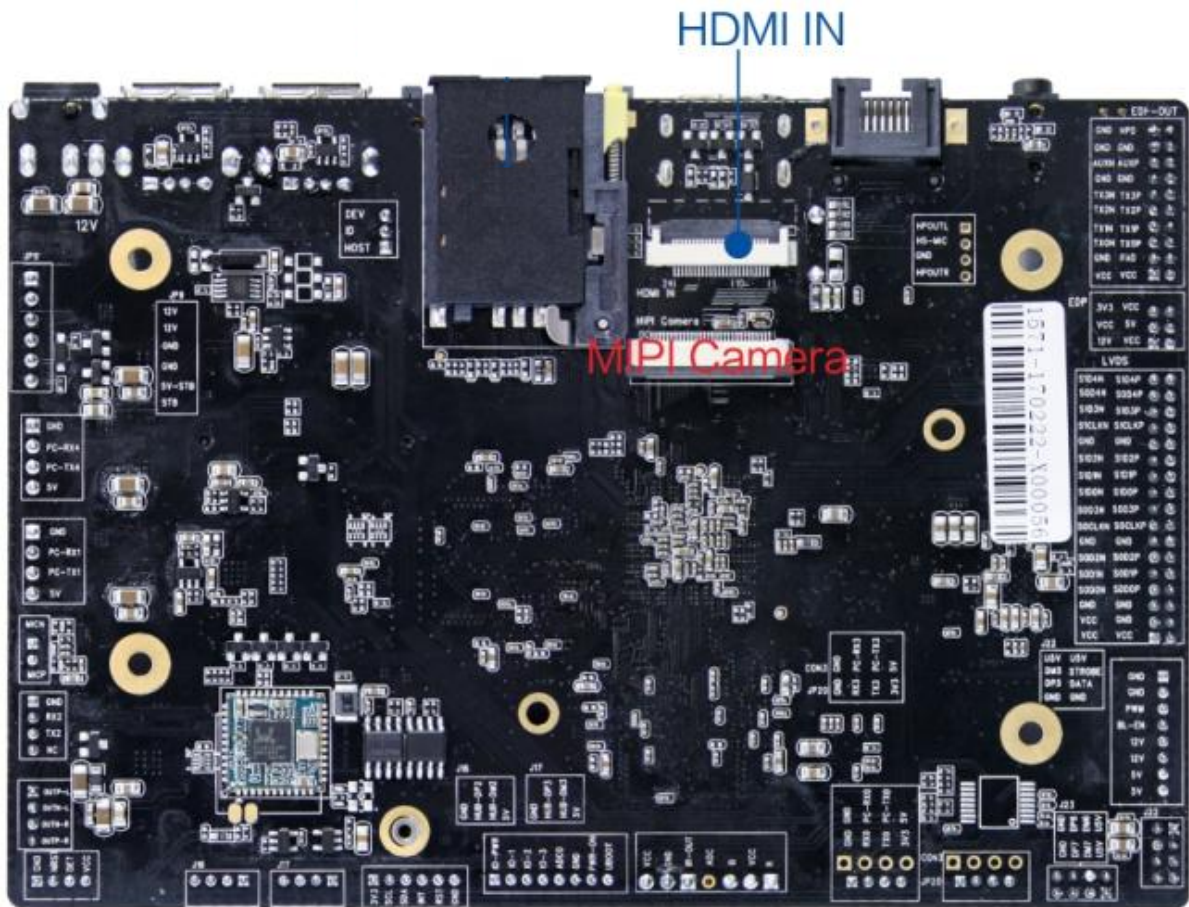
Chapter 2. Basic Function List

Main Hardware Index	
CPU	RK3288, quad core，main frequency 1.8GHz
Internal Memory	2/4G(optional)
Built-in Memory	EMMC 8/16/32G(optional)
Built-in ROM	2KB EEPROM
Decoding Definition	maximum support 3840*2160
Operating System	Android 5.X above
Play Mode	Support cycle, timing, and other modes of play
Network Support	3GEthernet、support WiFi/bluetooth 4.0
Video Playing	Support wmv、avi、flv、rm、rmvb、mpeg 、ts、mp4, etc
Image Format	Support BMP、JPEG、PNG、GIF
USB2.0 Interface	2 USB HOST、5 个 USB Socket
Serial Port	4 serial port sockets
WIFI、BT	Built-in WIFI，BT4.0（optional）
Ethernet	1，10M/100M self-adapting Ethernet
SD Card	Support SD Card
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
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, thickness1.6mm

Screw hole specification：φ3.2mm x 4
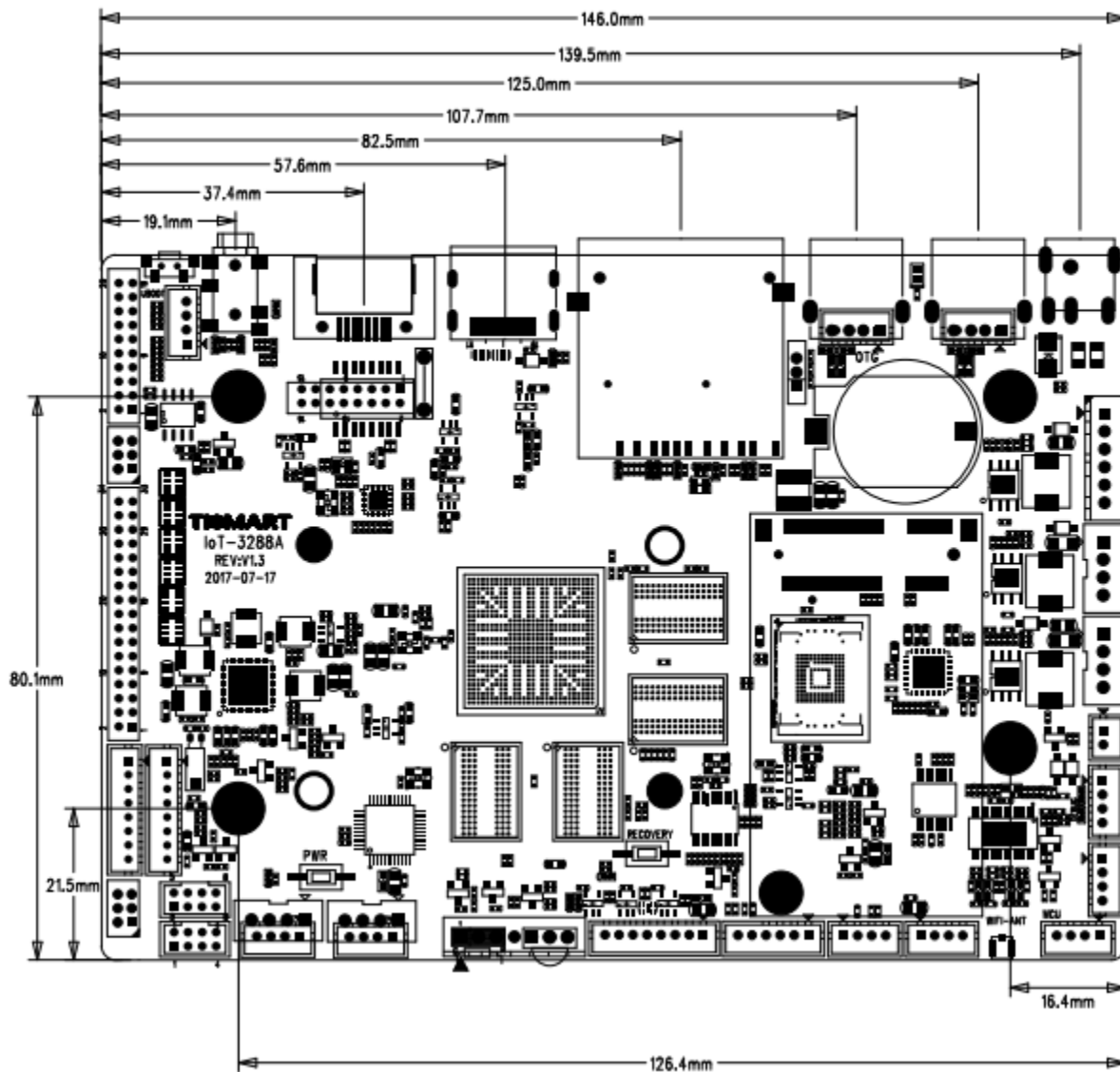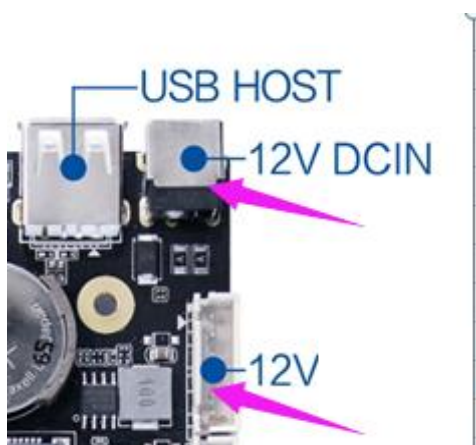
3.2 Interface Parameter Definition

◆**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**

Standard 2032 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.
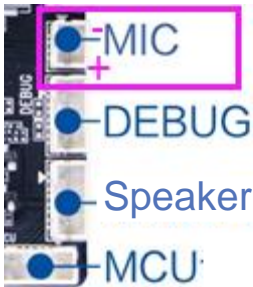
NO.	Definition	Property	Description
1	MIC-	input	MIC-
2	MIC+	input	MIC+

◆ **Port Of Receiving Remote Control**
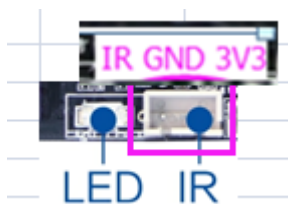
NO.	Definition	Property	Description
1	IR	input	remote control signal input
2	GND	ground electrode	ground electrode
3	3V3	Power	3.3V output

◆ **Work Indicating Lamps**

The default support gongyang red blue double LED lights.
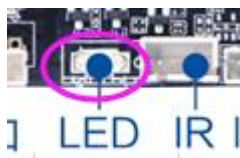
NO.	Definition	Property	Description
1	LED_B	Blue light	Work light
2	VCC	Power supply	3.3V output
3	LED_R	Red light	Standby lamp

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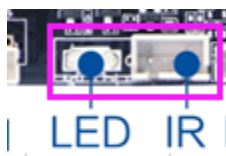
NO.	Definition	Property	Description
1	LED_B	output	work indicating lamp
2	VCC	power	3.3V output
3	LED_R	output	standby indicating lamp
4	ADC	ADC input	ADC button input
5	IR	input	remote control signal input
6	GND	ground electrode	ground electrode
7	3.3V	power	3.3V output

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

◆ **IO/KEY Interface**

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

LED/IR   IO/KEY

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
7	PWR-ON	input	External power button
8	Uboot	input	External upgrade keys

◆ **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	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)
31	0-VN4	Output	Pixel4 Negative Data (Odd)
32	0-VP4	Output	Pixel4 Positive Data (Odd)
33	1-VN4	Output	Pixel4 Negative Data (Even)
34	1-VP4	Output	Pixel4 Positive Data (Even)

Remark：31-34 Default pin is not welded

◆ 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.
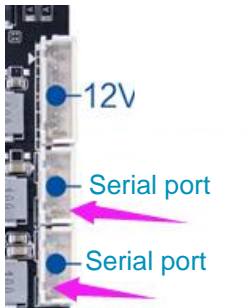
NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	PC232-RX	input	232-RX
3	PC232-TX	output	232-TX
4	VCC	Power supply	5V output

◆ TTL Wires Serial Socket Port*2

The board raises a common two 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.
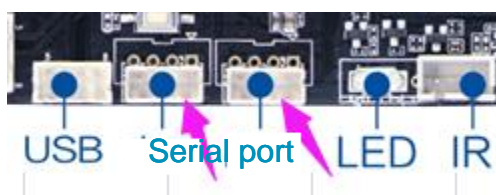
NO.	Definition	Property	Description
1	GND	ground electrode	ground electrode
2	UART-RX	input/output	RX
3	UART-TX	input/output	TX
4	VCC	Power supply	3.3V output

◆ USB

The board has 2 standard USB interface，including 5 inbuilt 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 screen printing position and the jumper as below picture on the PCB board.

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

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

J22 Electrical definitions are as follows ：【Remark,J22Outlet only one way USB host available 】

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	/	/	/
7	/	/	/
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**

The interface collocation of our hdmi_in small hdmi_in function, socket CON14Electrical definitions as follows：

NO.	Definition	Property	Description
1	VCC	Power supply	5V output
2	PWREN	output	Power enable
3	GND	ground electrode	ground electrode
4	GND	ground electrode	ground electrode
5	D0N	input/output	Mipi data channel 0 minus
6	D0P	input/output	Mipi data channel 0 plus
7	D1N	input/output	Mipi data channel 1 minus
8	D1P	input/output	Mipi data channel 1 plus
9	D2N	input/output	Mipi data channel 2 minus
10	D2P	input/output	Mipi data channel 2 plus
11	D3N	input/output	Mipi data channel 3 minus
12	D3P	input/output	Mipi data channel 3 plus
13	CLKN	input/output	Mipi Clock channel minus
14	CLKP	input/output	Mipi Clock channel plus
15	INT	input	interrupt signal
16	STBY	outpu	Standby control
17	IR	input	indeterminate
18	RST	outpu	reset signal
19	I2S_LRCK_RX	input/output	I2S In group signal
20	I2S_SCLK	input/output	I2S In group signal
21	I2S_MCLK	outpu	I2S In group signal
22	I2S_SDI	input	I2S In group signal
23	I2C4_SDA	input/output	SDA signal

| 24	I2C4_SCL	output	SCL signal

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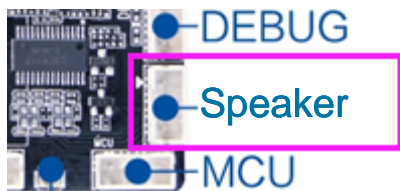
NO.	Definition	Property	Description
1	OUTP-R	output	Audio output right+
2	OUTN-R	output	Audio output right-
3	OUTN-L	output	Audio output left-
4	OUTP-L	output	Audio output left+

◆ **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 100M wire network
HDMI Port	Standard port	support HDMI data output, maximum support 1080P
Earphone Port	Standard port	3.5mm standard port
3G Port	PCI-E Standard port	Support HUAWEI, ZTE and other mini PCI-E 3G/4G module
SIMcard Port	Standard port	Support a variety of formats （Depending on the 3G module ）

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

$C\epsilon$

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