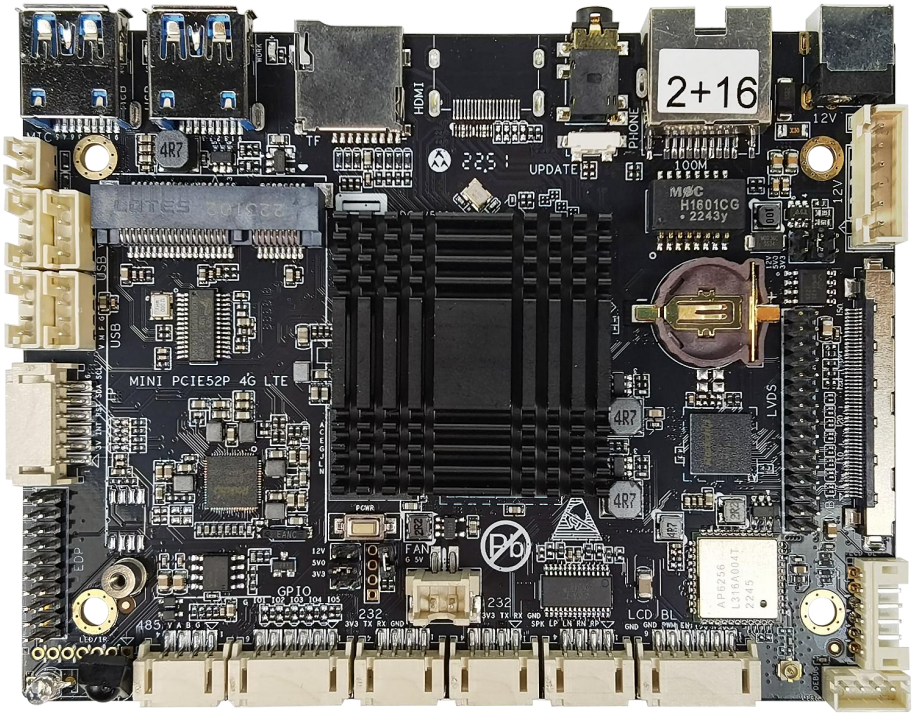
BTP-PCM-A-V568

Technical Specifications



Edition	Date	Changes
V1.0	2023-4-26	Initial release

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1. Electrical performance

1.1. Electrical performance

1.1.1. Standard power supply

Category		Min.	Typical	Max.
Standard power parameters	Voltage	11.4V	12V	12.6V
	Ripple	-	100mV	150mV
	Electric current	3A	5A	-
12V power supply only for HDMI board power consumption)	Static power consumption	-	3.73W	-
	Sleep power consumption	-	3.26W	-
LVDS power supply output current(2 * 3Pin)		3.3V working current		0.8A
		5V working current		0.8A
		12V working current		0.8A
USB（5V）Output current		-	1A（1*USB type-A）	2A
12V Output current				2A

① The total output current of 3.3V shall not exceed 3A;
② The total output current of 5V shall not exceed 3A;
③ The output current of LVDS backlight cannot exceed 1.5A;
④ 12V power input, on the basis of ensuring a minimum current of 3A, increases correspondingly with the total power of peripheral electrical devices;
⑤ The PCIE interface of the 4G module is powered by 3.8V;

2. Product overview

2.1. Introduction

568-V02,adopting the Rockchip RK3568 main control, integrating a quad core Cortex-A55 processor, and equipped with a new Arm v8.2-A architecture, the efficiency is effectively improved; The GPU is a Mail G52 2EE dual core architecture that supports 4K decoding and 1080P decoding, CBR, VBR, FixQp, AVBR, and QpMap, and ROI encoding; Image API supports OpenGL ES3.2,2.0,1.1, Vulkan1.1; Main frequency up to 2.0GHz; 22nm advanced technology, low power consumption and high performance; Built-in Ruixin Micro self-developed third-generation NPU RKNN with a computing power of 0.8Tops, supporting one click conversion of mainstream architecture models in Cafe/TensorFlow/TFLite/ONNX/PyTorch/Keras/Darknet.

2.2. Characteristics

① High performance: adopt quad-core A55 scheme, main frequency up to 2.0GHz, support 4 KH.264/H.265 and other formats HD decoding.

② Multi-channel display interface: LVDS, MIPI, HDMI, EDP multiple display output interface, support multi-screen display.

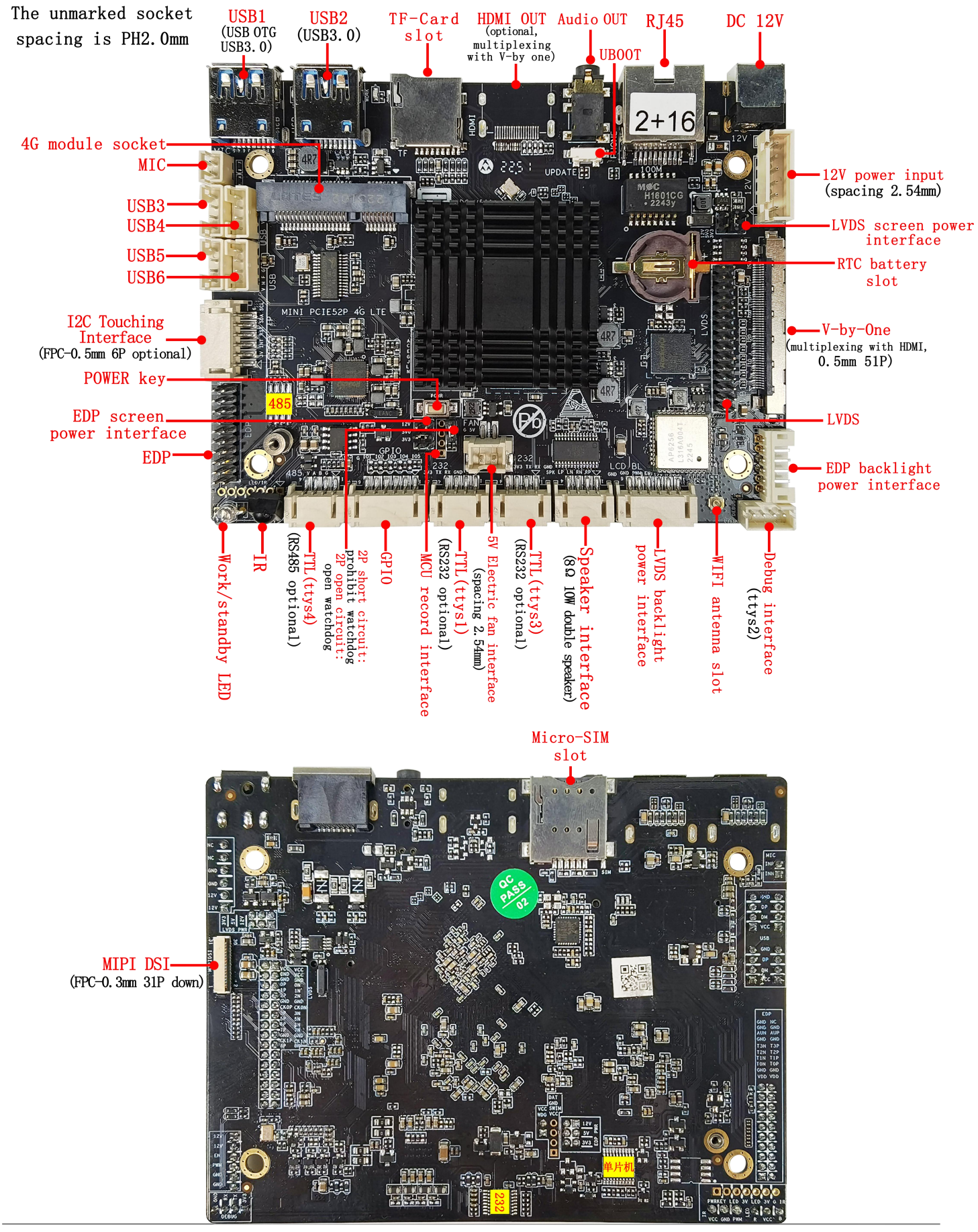
③ Multiple network interfaces: support 2.4GHz / 5GHz dual-frequency WiFi, wired Gigabit Ethernet, 4G wireless network.

④ Rich expansion interface: support USB, TTL, RS232, RS485, SPK, CAN, GPIO, SATA, PCIe3.0x2 and CIF expansion interface.

⑤ Support Android system, support system optimization, development and customization, provide secondary development source code examples, suitable for APK development;

⑥ Mainly for the Internet of Things gateway, NVR storage, industrial control tablet, industrial testing, industrial control box, Cara OK, cloud terminal, vehicle central control and other industries customized market.

3. Appearance and Port Description



4. List of Basic Functions

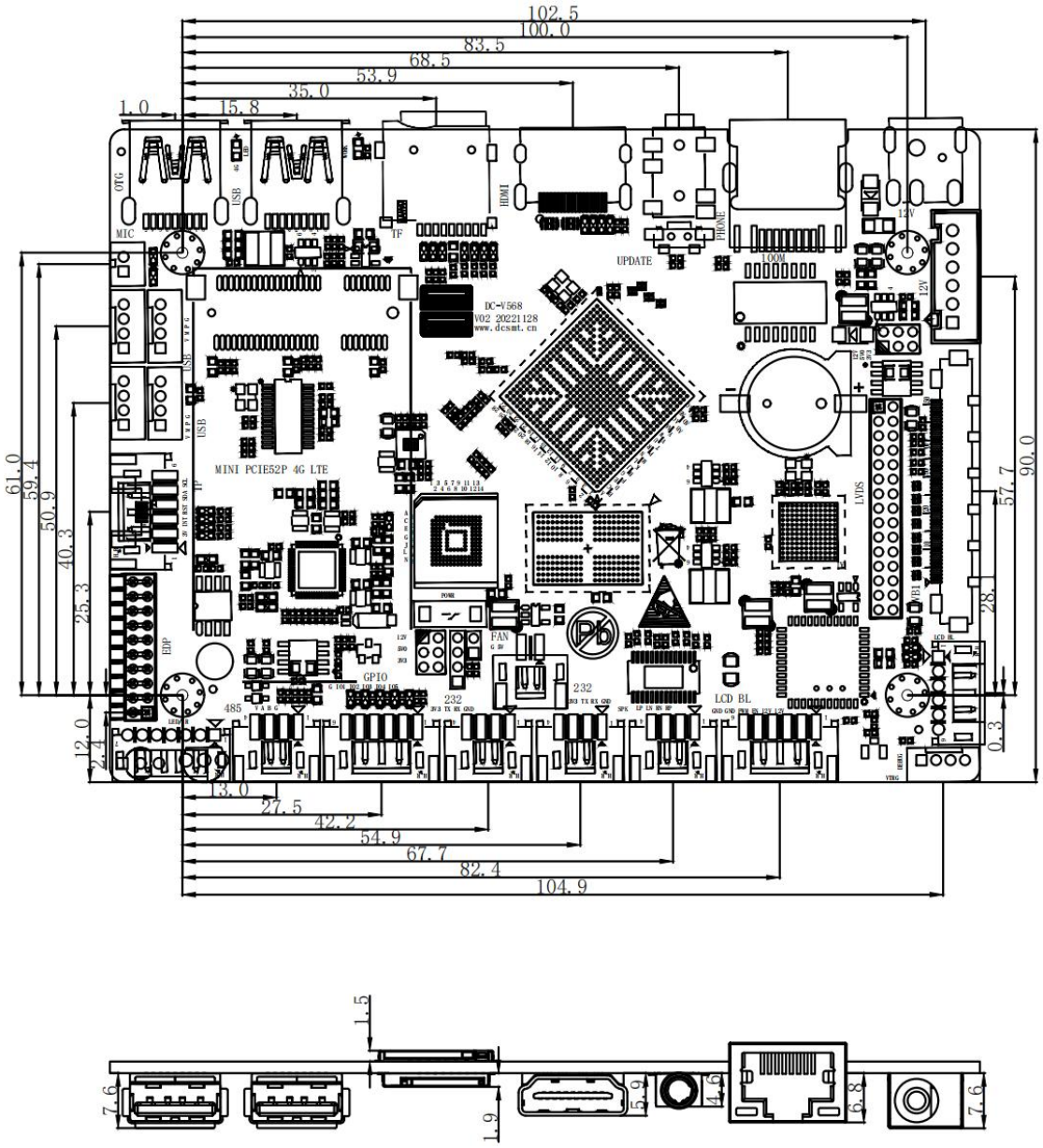
Core devices	
CPU	RK3568, Quad-core 64-bit Cortex-A 55, with the highest primary frequency of 2.0GHz
GPU	ARM G52 2EE,Support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1, embedded high-performance 2D acceleration hardware
RAMA	LPPDR4X 1GB/2GB(default)/4GB
Flash memory	eMMC 8G(default)/16/32G/64G/128G
Memory expansion	Up to 128GB of TF card expansion support
Display Interface	
HDMI OUT	Reserve the interface and cannot be used by default
LVDS OUT	1* LVDS interface (single, 6-bit dual, 8-bit dual), maximum support resolution 1920×1080
EDP OUT	1* EDP interface,with a maximum support resolution of 2560×1600@60Hz
V-by-One OUT	1* V-by-One interface,with a maximum support resolution of 4096×2160@60Hz
MIPI DSI Interface	1* MIPI DSI interface,with a maximum support resolution of 1920×1200@60Hz
Audio Interface	
Headset	1*microphone single channel input(analogue signal) 1*audio dual channel output (analogue signal)
MIC interface	1*channel microphone input interface
Amplifier	Left and right dual-channel output, support 8 Ω 10W dual speakers
Network Support	
Ethernet	1*standard RJ 45 interfaces, 10 / 100M adaptive Ethernet
Wifi/Bluetooth	On-board WIFI / BT module, support WiFi 2.4GHz / 5GHz dual-frequency (optional), support 802.11a/b/g/n/ac protocol, support Bluetooth 4.0 (support BLE)
Mobile network	1*built-in MINI PCI_E slot to connect 3G / 4G module
Basic Interface	
USB 2.0	5*USB Host interfaces (1*external standard USB 3.0 socket, 4*2.0mm-4P sockets) for external high-definition USB cameras, USB drives, keyboards, mice, and other devices

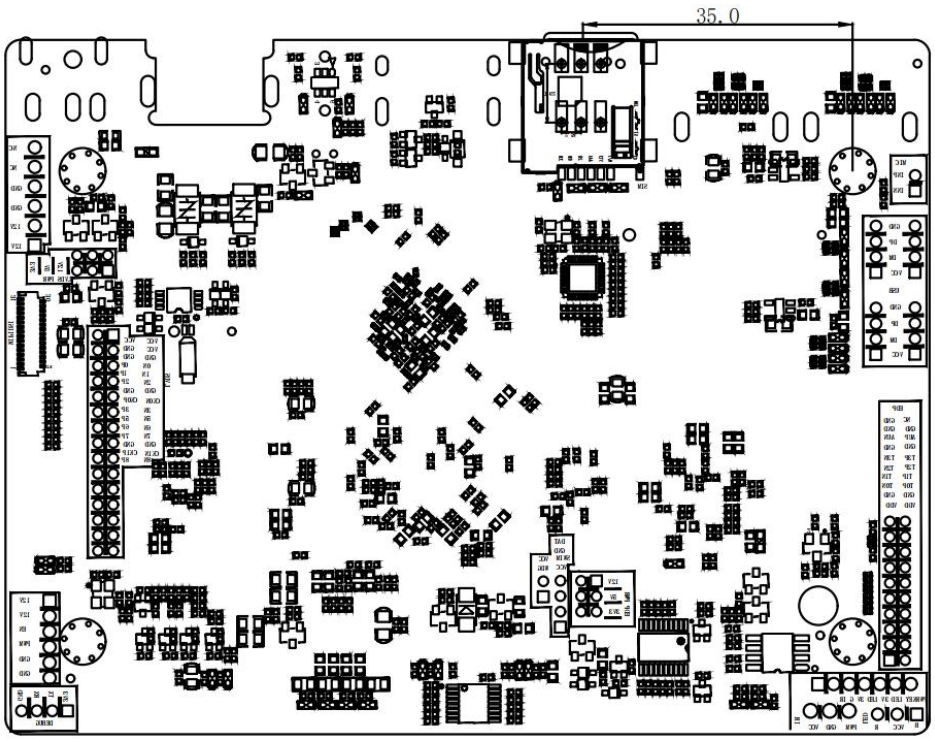
USB OTG	1*USB OTG interface (standard USB 3.0 socket) for system debugging, firmware updates, and can also be set to Host mode
Serial port	4*channels of serial ports, including 3*channels of TTL (2*channels can be optionally configured as RS232 serial port, 1*channel can be optionally configured as RS485 serial port), and 1*channel of TTL debugging serial port
GPIO Interface	Provides 5 IO ports for free definition of input and output status
RTC	Support for real-time clock, 1220 button battery power supply
Timing on/off machine	Support
I2C Interface	1*standard I2C interface for touch and communication
Infrared receiving	1-channel infrared receiver head, support infrared remote control function
Other	
Operating system	Android 11
Power socket	1* DC 12V Input(DC-5.5*2.5MM),1*6P Input(2.54mm-6P)
Adaptive	12V 2-5A
system upgrade	Support for PC/U disk/TF card upgrade
Working Environment	
working temperature	0℃～70℃, recommended 5℃～35℃
working humidity	10%～90%, with no condensation
Storage Temperature	-30℃～75℃, recommended storage at room temperature

5. Main board specification

5.1. PCB Dimension drawing

Unit:mm



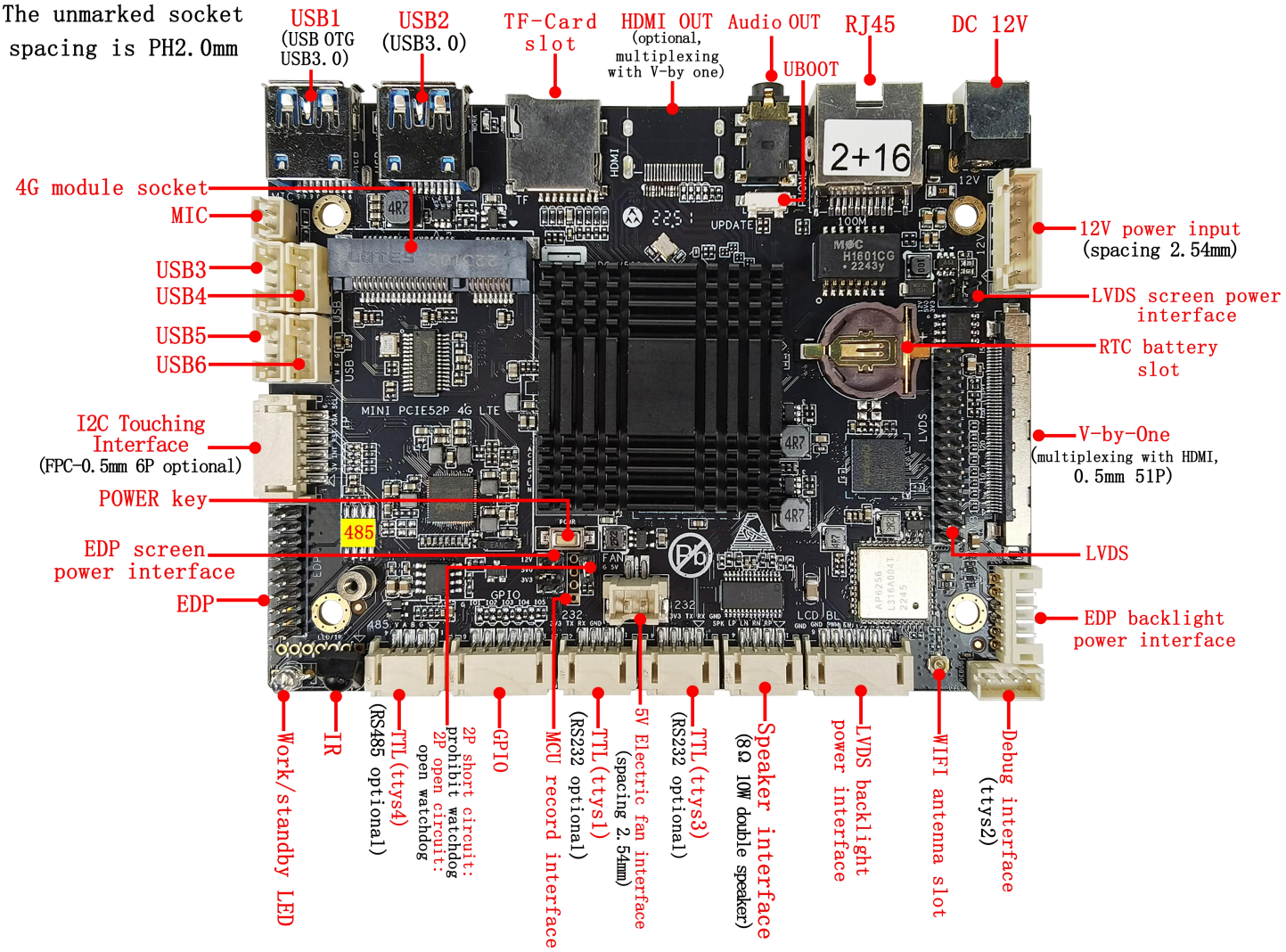


5.2. Specifications parameters

Main board size: 120*92*12mm
Main board height:front side≤8mm,back side≤3mm
Main board height:6 layers
PCB Size:120*90*1.6mm
PCB Color: Black
PCB Technique: Sink gold
Screw hole specification:Φ3.8mm*4

6. Interface Specification

6.1. Interface description



* Note: Except for the switching power interface and DC interface, the other interfaces cannot be connected to power input;

"▼"The first foot defined for the socket interface;

6.1.1. MIC interface

No.	Definition	Attribute	Description
1	INN	Input	Microphone-
2	INP	Input	Microphone+

6.1.2. USB interface

No.	Definition	Attribute	Description
1	V	Power	+5V Output
2	M	Output	USB data line negative pole
3	P	Output	USB data line positive pole
4	G	Ground	Ground

6.1.3. I2C Touching Interface

No.	Definition	Attribute	Description	Voltage domain
1	3.3V	Power	+3.3V Output	
2	INT	Input/Output	Touch Panel Interrupt Signal (GPIO0_B5)	3.3V
3	RST	Input/Output	Touch Panel Reset Signal(GPIO0_B6)	3.3V
4	SDA	Input/Output	I2C1 Data Line(GPIO0_B2_U)	3.3V
5	SCL	Input/Output	I2C1 Timing Line (GPIO0_B3_U)	3.3V
6	GND	Ground	Ground	

6.1.4. EDP interface

Note: This interface is only used to connect the EDP screen. Please check the screen specification to confirm whether the interface definition is consistent with the voltage. If not, please adjust the line order;

No.	Definition	Attribute	Description
1	VDD	Power	Output +3.3V/+5V/+12V
2	VDD	Power	Output +3.3V/+5V/+12V
3	GND	Ground	Ground
4	GND	Ground	Ground
5	TON	Output	data channel
6	TOP	Output	data channel
7	T1N	Output	data channel
8	T1P	Output	data channel
9	T2N	Output	data channel
10	T2P	Output	data channel
11	T3N	Output	data channel
12	T3P	Output	data channel
13	GND	Ground	Ground
14	GND	Ground	Ground
15	AUN	Output	data channel
16	AUP	Output	data channel
17	GND	Ground	Ground
18	GND	Ground	Ground
19	GND	Ground	Ground
20	NC	/	/

6.1.5. LED/IR interface

No.	Definition	Attribute	Description
1	PWRKEY	Input	Switch Control Line, Single pull down effective

2	LED	Indicator Light	Standby Light
3	3.3V	Power	+3.3V Output
4	LED	Indicator Light	Working Light
5	3.3V	Power	+3.3V Output
6	GND	Ground	Ground
7	IR_IN	Input	Infrared receiver signal input(GPIO0_C6)

*The indicator light is connected by common anode, the positive pole is connected to 3.3V, and the negative pole is connected to the corresponding indicator light pin.

6.1.6. TTL interface(Serial port 4)

No.	Definition	Attribute	Description
1	Ground	Ground	Ground
2	B/RX4	Input	RS485-B/Serial port 4 data receiving(TTL)
3	A/TX4	Output	RS485-A/Serial port 4 data sending(TTL)
4	3.3V	Power	+3.3V Output

*The node of serial port 4 is ttys 4;

*Default TTL serial port, optional as RS485 serial port;

6.1.7. GPIO interface

No.	Definition	Attribute	Description	Voltage domain
1	IO5	Input/Output	GPIO1_A1_u(default)	3.3V
			GPIO3_A6_d(optional)	
2	IO4	Input/Output	GPIO1_A0_u	3.3V
3	IO3	Input/Output	GPIO3_A3_d	3.3V
4	IO2	Input/Output	GPIO3_A5_d	3.3V
5	IO1	Input/Output	GPIO3_A4_d	3.3V
6	GND	Ground	Ground	

6.1.8. EDP screen power interface

It is used for power supply EDP panel. The screen power can be selected by inserting 2.0mm jumper cap. There are 3.3V/5V/12V for supply, you can select 5V by inserting jumper cap to indicated pins.

To avoid board or screen burning, please note:

1. Please confirm the correct specification or power supply for screen. And power supply meets the maximum current of the screen.
2. Please confirm the correct power of jumper cap by multimeter
3. Every power is forbidden to connect to each other, or the board maybe burnt.

No.	Definition	Attribute	Description	No.	Definition	Attribute	Description
1	12V	Power	+12V	2	VCC	Power	EDP Power
3	VCC	Power	EDP Power	4	5V	Power	+5V
5	3.3V	Power	+3.3V	6	VCC	Power	EDP Power

6.1.9. MCU record interface

No.	Definition	Attribute	Description
1	VCC	Power	+3.3V Output
2	SWIM/ISPCLK	Input	Debug IO
3	GND	Ground	Ground
4	MCURST/ISPDAT	Input	Debug IO

*Default ISP burning mode, optional with SWIM burning mode, please contact business for details;

6.1.10. TTL interface(Serial port 1/Serial port 3)

No.	Definition	Attribute	Description
1	GND	Ground	Ground
2	RX1/RX3	Input	Serial port 1/Serial port 3 data receiving (TTL)
3	TX1/TX3	Input	Serial port 1/Serial port 3 data sending (TTL)
4	3.3V	Power	+3.3V Output

*The node of serial port 1 is ttys1;
*The node of serial port 3 is ttys3;
*Default TTL serial port, optional as RS232 serial port;

6.1.11. 5V Electric fan interface

No.	Definition	Attribute	Description
1	5V	Power	+5V Output
2	GND	Ground	Ground

6.1.12. Speaker interface

This audio signal is amplified by a built-in amplifier, and it is recommended to connect an external 8 Ω 10W double speaker;

No.	Definition	Attribute	Description
1	RP	Output	Output R+ Audio Signal
2	RN	Output	Output R- Audio Signal
3	LN	Output	Output L- Audio Signal
4	LP	Output	Output L+ Audio Signal

6.1.13. LVDS backlight power interface

It is used for power supply of LVDS panel, and the current of 12V power suppl is not more than 1.5A; and When using a 19 inch or larger screen, or the power of the screen backlight is more than 20W, please take power from other power boards to avoid system instability.

The power for backlight enable is 3.3V, if other voltage is required, please use IO level converter circuit.

This 12V power is only used for backlight, it is forbidden to use for power supply for main-board.

No.	Definition	Attribute	Description
1	12V	Power	+12V Output
2	12V	Power	+12V Output

3	EN	Output	Backlight enable control signal GPIO0_C5(3.3V)
4	PWM	Output	Backlight Brightness adjustment signal(0-5V)
5	GND	Ground	Ground
6	GND	Ground	Ground

6.1.14. Debug interface

No.	Definition	Attribute	Description
1	3.3V	Power	+3.3V Output
2	TX	Output	Serial port 2 data sending (TTL)
3	RX	Input	Serial port 2 data receiving (TTL)
4	GND	Ground	Ground

*This interface is the default system debugging port (not software debugging port), can be changed to ordinary serial port for use, please contact the business if;

*Serial port 2 device number is ttys2;

6.1.15. EDP backlight power interface

It is used for power supply of EDP panel, and the current of 12V power suppl is not more than 1.5A; and When using a 19 inch or larger screen, or the power of the screen backlight is more than 20W, please take power from other power boards to avoid system instability.

The power for backlight enable is 3.3V, if other voltage is required, please use IO level converter circuit.

This 12V power is only used for backlight, it is forbidden to use for power supply for main-board.

No.	Definition	Attribute	Description
1	12V	Power	+12V Output
2	12V	Power	+12V Output
3	EN	Output	Backlight enable control signal GPIO0_C5(3.3V)
4	PWM	Output	Backlight Brightness adjustment signal(0-5V)
5	GND	Ground	Ground
6	GND	Ground	Ground

6.1.16. LVDS interface

Standard LVDS interface, support single/double, 6/8 1080P LVDS screen.

Note:it is only used for LVDS, please confirm the specification, make sure the interface definition is consistent with voltage. If not, please adjust the line.

No.	Definition	Attribute	Description
1	VCC	Power	Output +3.3V/+5V/+12V
2	VCC	Power	Output +3.3V/+5V/+12V
3	VCC	Power	Output +3.3V/+5V/+12V
4	GND	Ground	Ground

5	GND	Ground	Ground
6	GND	Ground	Ground
7	0N	Output	data channel
8	0P	Output	data channel
9	1N	Output	data channel
10	1P	Output	data channel
11	2N	Output	data channel
12	2P	Output	data channel
13	GND	Ground	Ground
14	GND	Ground	Ground
15	CK0P	Output	data channel
16	CK0N	Output	data channel
17	3N	Output	data channel
18	3P	Output	data channel
19	5N	Output	data channel
20	5P	Output	data channel
21	6N	Output	data channel
22	6P	Output	data channel
23	7N	Output	data channel
24	7P	Output	data channel
25	GND	Ground	Ground
26	GND	Ground	Ground
27	CK1P	Output	data channel
28	CK1N	Output	data channel
29	8N	Output	data channel
30	8P	Output	data channel

6.1.17. LVDS screen power interface

It is used for power supply or LVDS panel. The screen power can be selected by inserting 2.0mm jumper cap.There are 3.3V/5V/12V for supply, you can select 5V by inserting jumper cap to indicated pins.

To avoid board or screen burning, please note:

2. Please confirm the correct specification or power supply for screen. And power supply meets the maximum current of the screen.

2. Please confirm the correct power of jumper cap by multimeter

3. Every power is forbidden to connect to each other, or the board maybe burnt.

4.The maximum current is 800mA, and the instantaneous current cannot exceed 5A.

No.	Definition	Attribute	Description	No.	Definition	Attribute	Description
1	12V	Power	+12V	2	VCC	Power	LVDS Power

3	VCC	Power	LVDS Power	4	5V	Power	+5V
5	3.3V	Power	+3.3V	6	VCC	Power	LVDS Power

6.1.18. 12V Power input interface

No.	Definition	Attribute	Description
1	12V	Power	+12V Input
2	12V	Power	+12V Input
3	GND	Ground	Ground
4	GND	Ground	Ground
5	NC	-	-
6	NC	-	-

6.1.19. MIPI_DSI interface

Note: This interface can be used to connect the MIP screen, please check the screen specification to confirm whether the interface definition is consistent, if the inconsistent screen can be converted through the transfer board, please contact the business for details;

Before inserting the line, please confirm the direction of the line (up / down), and then insert the line to avoid damage to the display screen and main board;

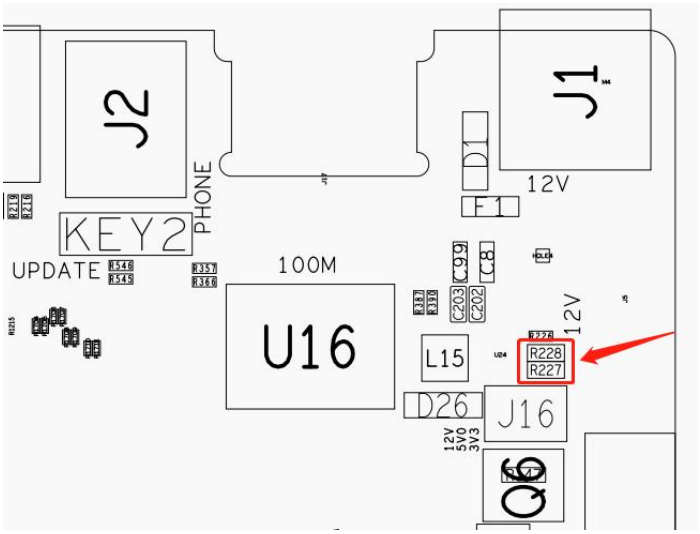
No.	Definition	Attribute	Description
1	VCC_LEDA	Power	Positive voltage of backlight power supply
2	VCC_LEDA	Power	Positive voltage of backlight power supply
3	VCC_LEDA	Power	Positive voltage of backlight power supply
4	NC	-	-
5	VCC_LEDK	Power	Negative voltage of backlight power supply
6	VCC_LEDK	Power	Negative voltage of backlight power supply
7	VCC_LEDK	Power	Negative voltage of backlight power supply
8	VCC_LEDK	Power	Negative voltage of backlight power supply
9	GND	Ground	Ground
10	GND	Ground	Ground
11	MIPIDSI_TX1_D2_P	Output	data channel
12	MIPIDSI_TX1_D2_N	Output	data channel
13	GND	Ground	Ground
14	MIPIDSI_TX1_D1_P	Output	data channel
15	MIPIDSI_TX1_D1_N	Output	data channel
16	GND	Ground	Ground
17	MIPIDSI_TX1_CLK_P	Output	data channel

18	MIPIDSI_TX1_CLK_N	Output	data channel
19	GND	Ground	Ground
20	MIPIDSI_TX1_D0_P	Output	data channel
21	MIPIDSI_TX1_D0_N	Output	data channel
22	GND	Ground	Ground
23	MIPIDSI_TX1_D3_P	Output	data channel
24	MIPIDSI_TX1_D3_N	Output	data channel
25	GND	Ground	Ground
26	VDDIO_1.8	Power	+1.8V Output
27	LCD1_RST_L_GPIO4_C6	Input	reset signal 3.3V
28	GND	Ground	Ground
29	VDDIO_1.8	Power	+1.8V Output
30	VCC_LCD_0	Power	+3.3V Output
31	VCC_LCD_0	Power	+3.3V Output

*To avoid burning the board and screen, please note the following:

1. Please confirm whether the screen power supply voltage and current parameters in the screen specification book match the board card. The default driving current for the LED backlight on the board card is 60mA. If it does not meet the current parameter requirements of the selected screen, the output current can be adjusted by adjusting the resistance value of R. The formula is: I (led)=200mV/R The R of this motherboard is determined by the parallel connection of R227 and R228. It is recommended to use R227=R228=3R6, and R defaults to=1R8. The following is a common matching list of current and resistance. The specific values should also be determined based on the actual screen specifications:

屏背光电流	R阻值
40mA	5R1
60mA	3R3
80mA	2R7
180mA	1R1
350mA	1R1/1R2



2. Confirm that the electrical definitions of the screen interface and the board interface are consistent, and that the FPC screen wires are selected correctly.

6.1.20. 4G module socket

52P MINI PCI-E socket, is used for 4G module assembly(optional, can't connect to any other external device).

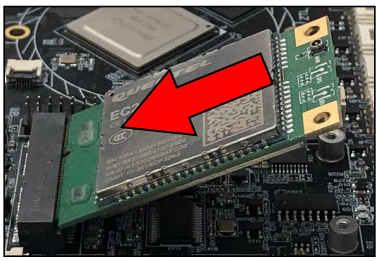
① According to the module model, record the corresponding software.

② Insert the gold finger of the module into the 4G module socket at an angle of 30°.

③ Insert the Micro-SIM card into the slot on back of the board.

④ Some IOT cards need to be configured with APN, please consult SIM card operator to obtain APN,

and then add / configure.



6.2. USB Explanation of External Power Supply

*Note: All USB power supplies should not exceed 3A in total;

USB interface	GPIO	Straight out/HUB	electric current
USB1	GPIO0-A5-D	Straight out OTG	1.5A
USB2	GPIO0-A6-D	Straight out	1.5A
USB3	GPIO0-A6-D	HUB	Share 1.5A
USB4	GPIO0-A6-D	HUB	
USB5	GPIO0-A6-D	HUB	
USB6	GPIO0-A6-D	Straight out	

6.3. Other standard interfaces and functions

name	Seat specifications	description
DC 12V Power supply interface	DC-5.5*2.5mm Terminal Female head	The 12V power supply input
100M Ethernet interface	RJ45 interface	Support for a road 100M cable network
Headphone seat interface	National standard earphones interface	1*microphone mono input (analog signal input), 1*audio dual channel output (analog signal output)
UBOOT key	Non self-locking button	UBOOT key
HDMI interface	Standard HDMI Female head	Reserve the interface and cannot be used by default
V-by-One interface	Standard V-by-One interface	Maximum support resolution of 4096×2160@60Hz
TF card interface	Standard TF card interface	Up to 128GB of TF card expansion support
SIM card interface	Standard SIM card interface	Support mobile / Unicom / Telecom full netcom
USB interface	Standard USB 3.0 interface	HOST mode supports data storage, data import, USB mouse and keyboard, camera, touch screen, etc.
USB OTG interface	Standard USB 3.0 interface	Support OTG / HOST mode switch, OTG mode can be software debugging,

		firmware upgrade;
POWER key	Non self-locking button	POWER ON Push the key button
Standard RTC battery interface	Support for real-time clock, 1220 button battery power supply	Standard RTC battery interface
WIFI antenna pedestal	IPEX terminal male	Support for WiFi 2.4GHz/5GHz dual-frequency
Work indicator light	LED Light	The green light is on in the operating state, and the red light is on in the shutdown state

7. Matters need attention

- Please wear electrostatic wristbands and other electrostatic protective tools when contacting the main board (you should have good grounding);
- Do not do live assembly, wiring and other operations;
- Please check the motherboard interface definition and peripheral interface definition, no error or reverse connection;
- Please fix the motherboard with M3 flat round head screws, do not use large gauge screws; pay attention to avoid motherboard deformation and bending when twisting screws;
- Pay attention to the matching of IO port, serial port, enabling foot and other levels;
- Pay attention to the power of the external screen, with large power, please consider the external power supply;
- Pay attention to the overall power of the product, and select the power supply with sufficient power;