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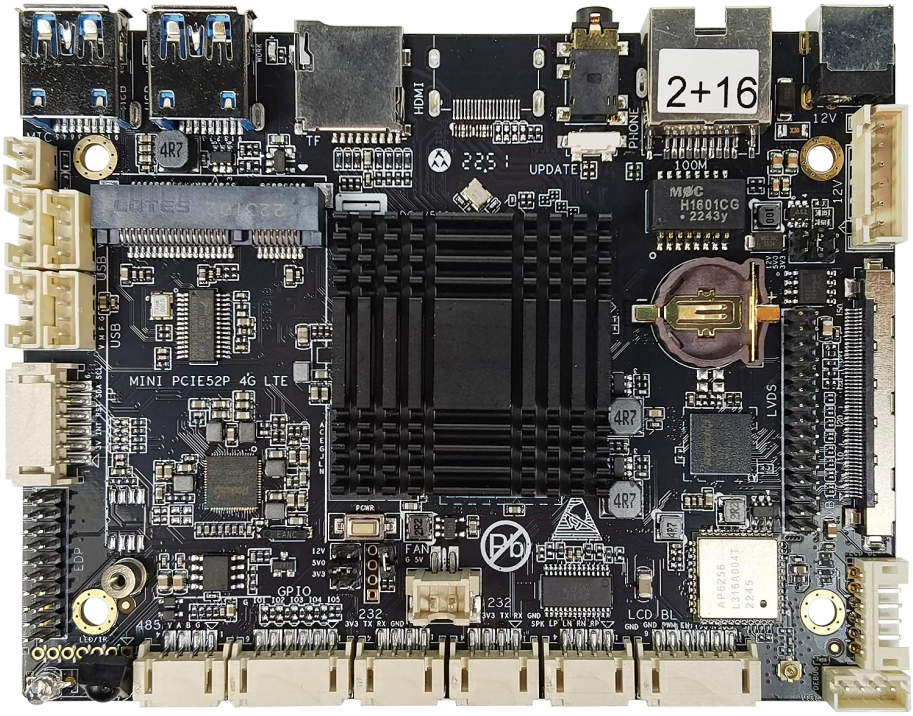
# BTP-PCM-A-RK3568V02.1

# 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 | - |
| Mainboard power consumption (For v-by-one Only 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 |

Note: Static power consumption refers to the power consumption when the system is turned on and unloaded.

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.

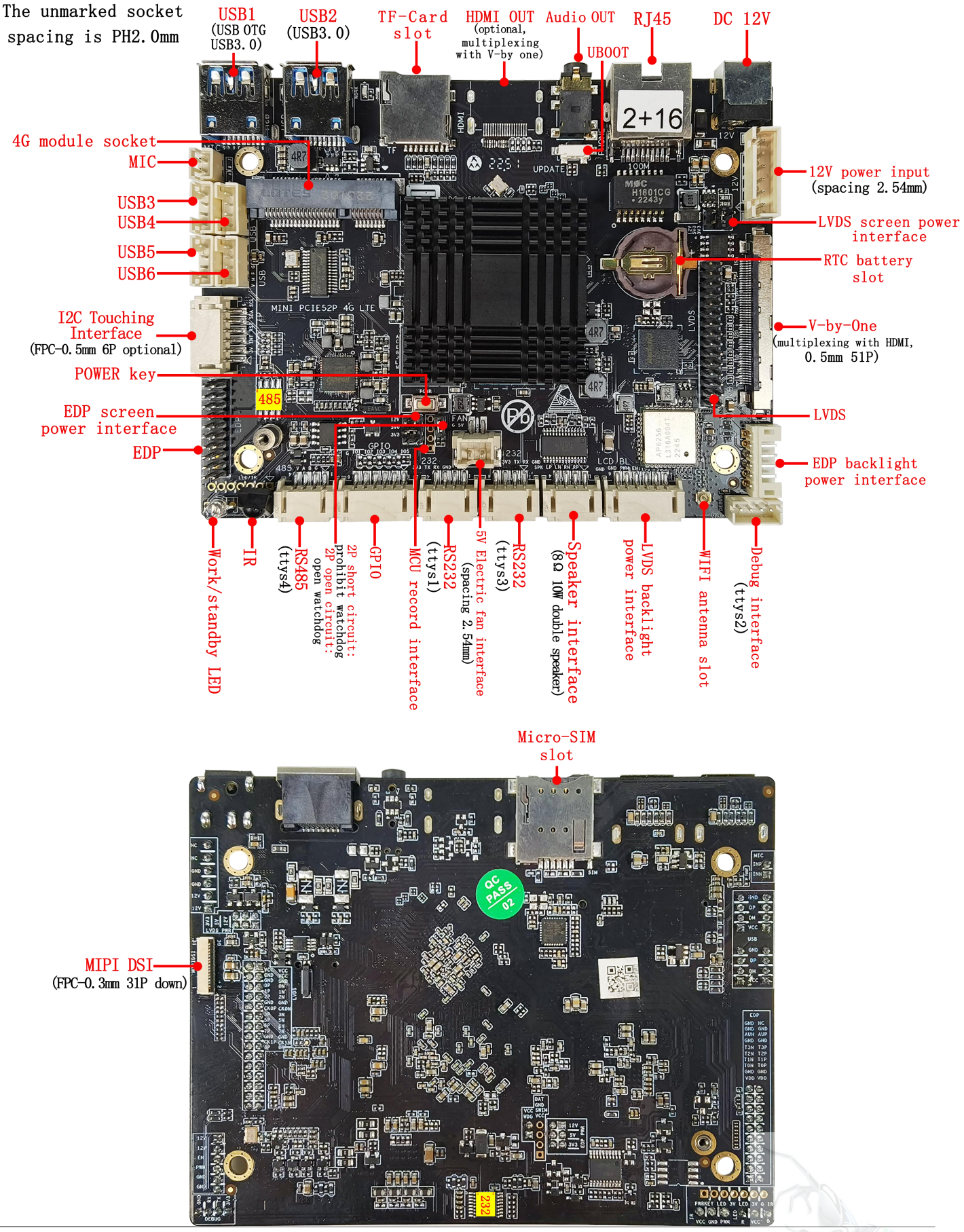
④ Rich expansion interface: support USB, TTL, RS232, RS485, SPK, CAN, GPIO, SATA, PCIe3.0x2 and CIF expansion interface.

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

The unmarked socket spacing is PH2.0mm



# 4. List of Basic Functions

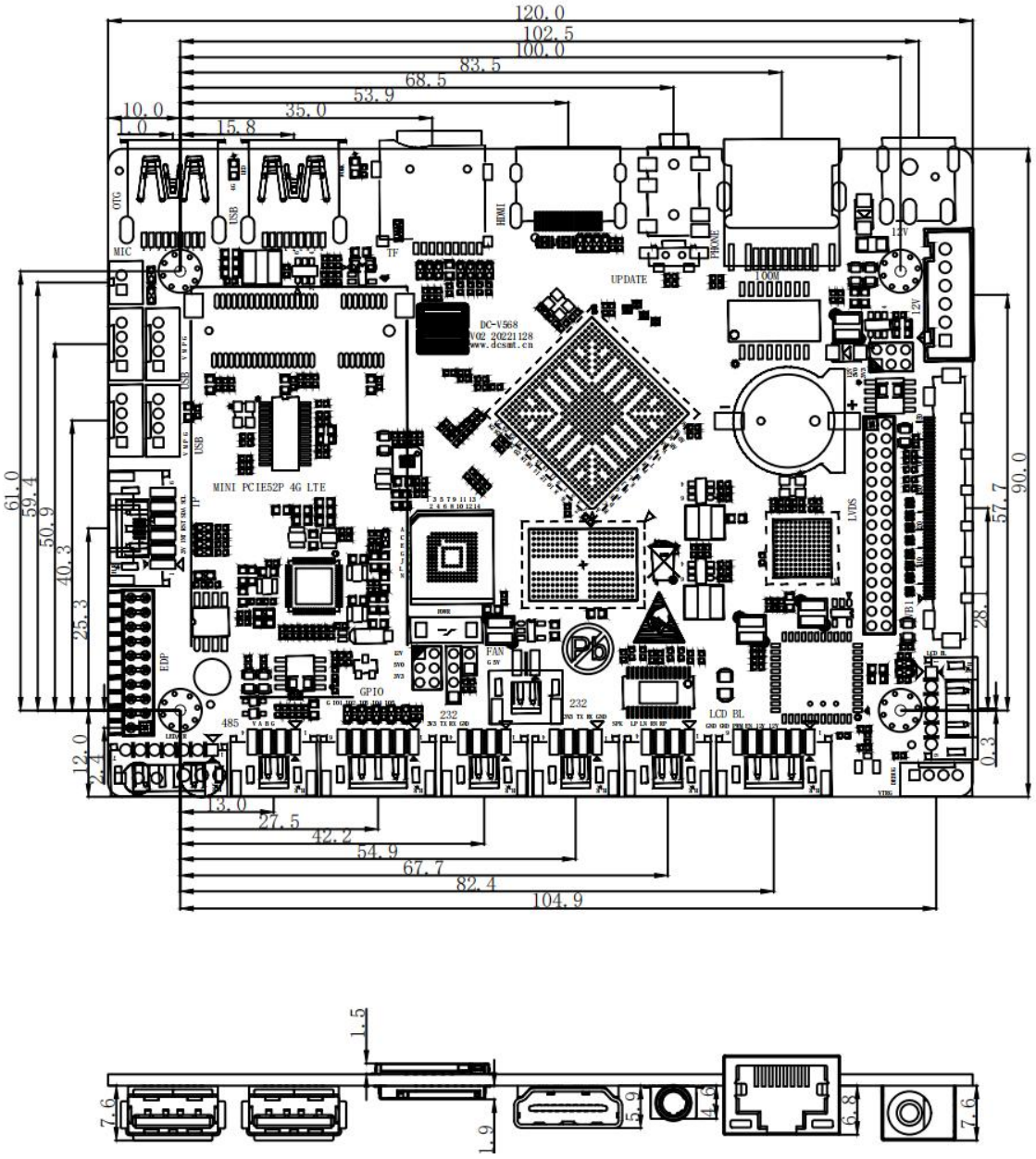
| | |
|---|---|
| **Core devices** | |
| CPU | RK3568, Quad-core 64-bit Cortex-A 55, with the highest primary frequency of 2.0GHz |
| GPU | ARM G52 2EE,Support OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1, embedded high-performance 2D acceleration hardware |
| RAMA | LPPDR4X 1GB/2GB(default)/4GB |
| Flash memory | eMMC 8G(default)/16/32G/64G/128G |
| Memory expansion | Up to 128GB of TF card expansion support |
| **Display Interface** | |
| 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)<br>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 | Equipped with an onboard WIFI/BT module, it supports WiFi 2.4G/5GHz dual-band WiFi5, adheres to 802.11a/b/g/n/ac protocols, and supports Bluetooth 5.0 (including 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 |

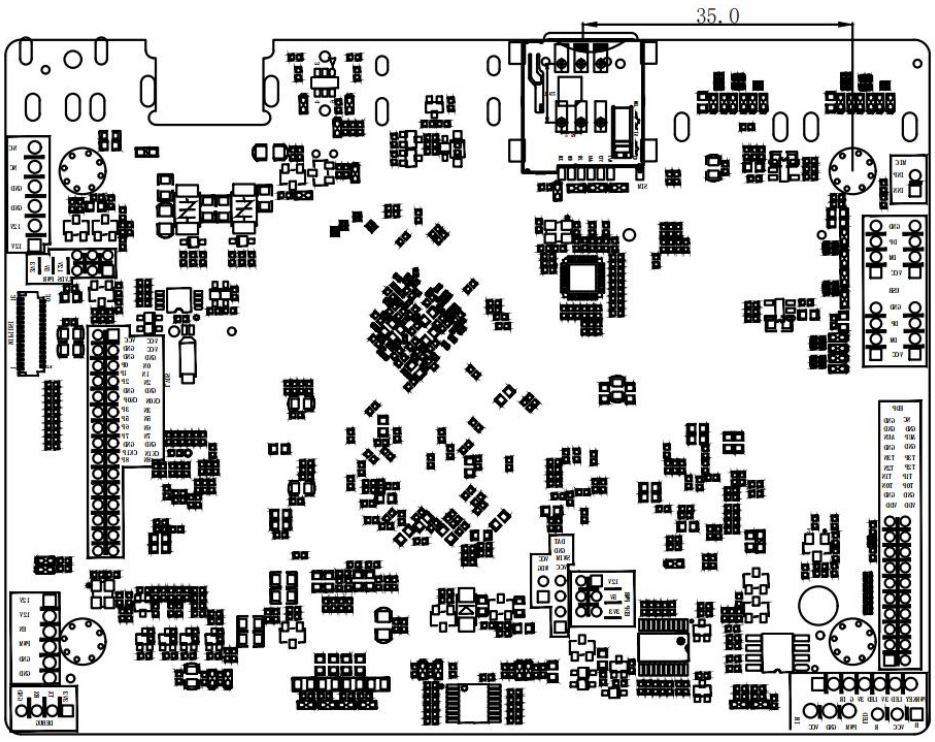
| | |
|---|---|
| USB OTG | 1*USB OTG interface (standard USB 3.0 socket) for system debugging, firmware updates, and can also be set to Host mode |
| Serial port | 4 serial ports, including 2 RS232 serial ports, 1 RS485 serial port, and 1 TTL debugging serial port |
| GPIO Interface | Provides 5 IO 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



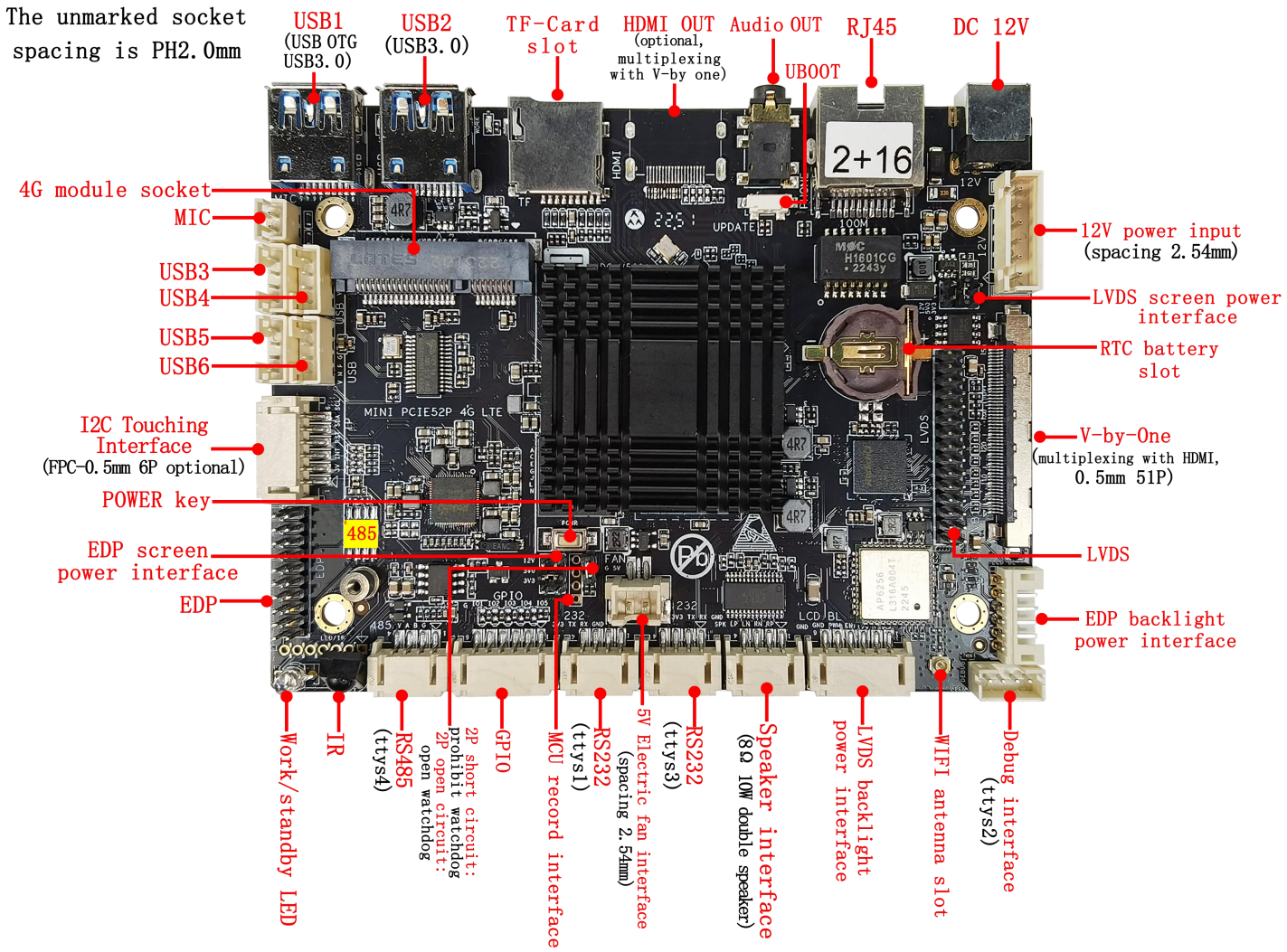



## 5.2. Specifications parameters

**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: The spacing between unmarked sockets is PH2.0mm;

* 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 | IR_IN | Input | Infrared receiver signal input(GPIO0_C6) |

| | | | |
|---|---|---|---|
| 2 | GND | Ground | Ground |
| 3 | 3.3V | Power | +3.3V Output |
| 4 | LED | Indicator Light | Working Light |
| 5 | 3.3V | Power | +3.3V Output |
| 6 | LED | Indicator Light | Standby Light |
| 7 | PWRKEY | Input | Switch Control Line, Single pull down effective |

*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. RS485 interface(TTL optional)

| No. | Definition | Attribute | Description | Voltage domain |
|---|---|---|---|---|
| 1 | GND | Ground | Ground | |
| 2 | B/RX4 | Input/Output | RS485-B | If this serial port is changed to TTL serial port, the voltage domain will be 3.3V |
| 3 | A/TX4 | Input/Output | RS485-A | |
| 4 | VCC | Power | +3.3V Output | |

*The node of serial port 4 is ttys 4;

*Default RS485 serial port, optional as TTL 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. RS232 interface(TTL optional)

| No. | Definition | Attribute | Description | Voltage domain |
|---|---|---|---|---|
| 1 | GND | Ground | Ground | |
| 2 | RX1/RX3 | Input | Serial port 1/Serial port 3 data receiving | If this serial port is changed to TTL serial port, the voltage domain will be 3.3V |
| 3 | TX1/TX3 | Output | Serial port 1/Serial port 3 data sending | |
| 4 | VCC | Power | +3.3V output | |

*The node of serial port 1 is ttys1;
*The node of serial port 3 is ttys3;
*Default RS232 serial port, optional as TTL 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 | Voltage domain |
|---|---|---|---|---|
| 1 | 3.3V | Power | +3.3V Output | |
| 2 | TX | Output | Serial port 2 data sending (TTL) | 3.3V |
| 3 | RX | Input | Serial port 2 data receiving (TTL) | 3.3V |
| 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. V-by-One interface

Note: This interface is only used to connect the V-by-One 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 | GND | Ground | Ground |
| 2 | RK628D_G7/L2/M2_D3P | Output | data channel |
| 3 | RK628D_G7/L2/M2_D3N | Output | data channel |
| 4 | GND | Ground | Ground |
| 5 | RK628D_G6/L2/M2_D2P | Output | data channel |
| 6 | RK628D_G6/L2/M2_D2N | Output | data channel |
| 7 | GND | Ground | Ground |
| 8 | RK628D_G5/L2/M2_D1P | Output | data channel |
| 9 | RK628D_G5/L2/M2_D1N | Output | data channel |
| 10 | GND | Ground | Ground |
| 11 | RK628D_G4/L2/M2_D0P | Output | data channel |
| 12 | RK628D_G4/L2/M2_D0N | Output | data channel |
| 13 | GND | Ground | Ground |
| 14 | RK628D_G3/L1/M1_D3P | Output | data channel |
| 15 | RK628D_G3/L1/M1_D3N | Output | data channel |
| 16 | GND | Ground | Ground |
| 17 | RK628D_G2/L1/M1_D2P | Output | data channel |
| 18 | RK628D_G2/L1/M1_D2N | Output | data channel |
| 19 | GND | Ground | Ground |
| 20 | RK628D_G1/L1/M1_D1P | Output | data channel |
| 21 | RK628D_G1/L1/M1_D1N | Output | data channel |

| | | | |
|---|---|---|---|
| 22 | GND | Ground | Ground |
| 23 | RK628D_GO/L1/M1_DOP | Output | data channel |
| 24 | RK628D_GO/L1/M1_DON | Output | data channel |
| 25 | GND | Ground | Ground |
| 26 | GVI_LOCK | Output | data channel |
| 27 | GVI_HPD | Output | data channel |
| 28 | SEL_LVDS | Input/Output | GPIO0_A7 |
| 29 | AGP | Input/Output | Default low level |
| 30 | TCON_CK1 | Input/Output | GPIO0_A6 |
| 31 | Bit_SEL1 | Input/Output | Default low level |
| 32 | TCON_LC | Input/Output | GPIO0_A5 |
| 33 | I2C5_SCL_M1 | Input/Output | I2C4 Timing Line GPIO0_B4 |
| 34 | I2C5_SDA_M1 | Input/Output | I2C4Data Line GPIO0_B5 |
| 35 | 2D/3D | Input/Output | GPIO0_A4 |
| 36 | TCON_STV | Input/Output | GPIO0_A3 |
| 37 | L/R_OUT | Input/Output | Default low level |
| 38 | NC | - | - |
| 39 | GND | Ground | Ground |
| 40 | GND | Ground | Ground |
| 41 | GND | Ground | Ground |
| 42 | GND | Ground | Ground |
| 43 | NC | - | - |
| 44 | VCC | Power | +12V Output |
| 45 | VCC | Power | +12V Output |
| 46 | VCC | Power | +12V Output |
| 47 | VCC | Power | +12V Output |
| 48 | VCC | Power | +12V Output |
| 49 | VCC | Power | +12V Output |
| 50 | VCC | Power | +12V Output |
| 51 | VCC | Power | +12V Output |

### 6.1.19. 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 | - | - |

### 6.1.20. 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;

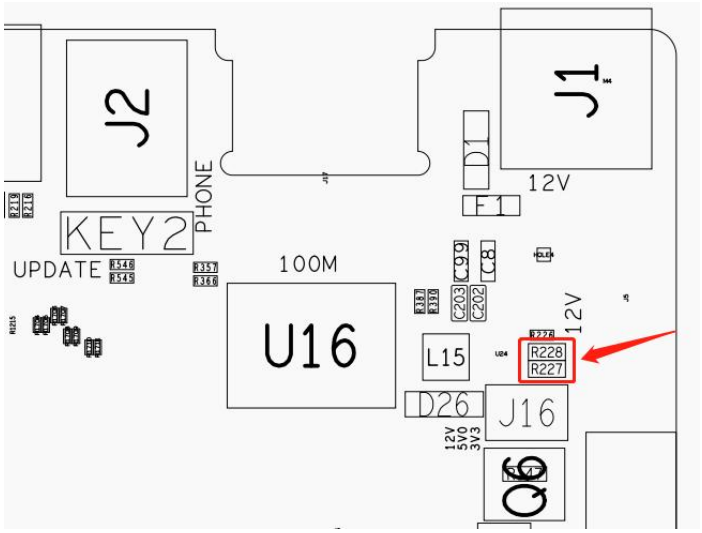
| No. | Definition | Attribute | Description |
|---|---|---|---|
| 1 | VCC_LEDA | Power | Positive voltage of backlight power supply |
| 2 | VCC_LEDA | Power | Positive voltage of backlight power supply |
| 3 | VCC_LEDA | Power | Positive voltage of backlight power supply |
| 4 | NC | - | - |
| 5 | VCC_LEDK | 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.

### 6.1.21. 4G module socket

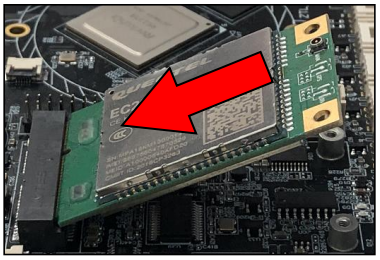
52P MINI PCI-E socket, is used for 4G module assembly(optional, can't connect to any other external device).

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 |
| USB4 | GPIO0-A6-D | HUB | 1.5A |

| | | | |
|---|---|---|---|
| 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;