DARVEEN

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# APC-9100
# User's Manual

# Table of Contents

# Chapter 1. About this Manual

# 1. About this Manual

## 1.1 Revision History

| Date | Version | Chapter | Updates |
|---|---|---|---|
| 2024/11/15 | First Draft | | |

## 1.2 Copyright



## 1.3Disclaimer

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## 1.4Conventions

The following conventions are used in this manual:

| | |
|---|---|
| **SCREEN MESSAGES** | Denotes actual messages that appear on screen. |
| **NOTE** | Gives bits and pieces of additional information related to the current topic. |
| **WARNING** | Alerts your to any damage that might result from doing or not doing specific actions. |
| **CAUTION** | Gives precautionary measures to avoid possible hardware or software problem. |
| **IMPORTANT** | Reminds you to do specific actions relevant to the accomplishment of procedures. |

## 1.5 Preface

Before using this information and the product it supports, please read the following general information.

This service guide provides you with all technical information relating to the basic configuration decided for Darveen's "global" product offering. To better fit local market requirements and enhance product competitiveness, your regional office may have decided to extend the functionality of a machine (e.g. Add-on card, WLAN card, SSD card, com card or extra memory capability). These localized features will not be covered in this generic service guide. In such cases, please contact your regional offices or the responsible personnel/channel to provide you with further technical details.

# Chapter 2. Introducing the Motherboard

# 2.Introducing the Motherboard

## 2.1 Introduction

Thank you for choosing the APC-9100 industrial all-in-one machine, which uses the Rockchip RK3588 AI58 motherboard, AI58 is based on the onboard RK3588 quad core Cortex-A76 at 2.4GHz and quad core Cortex-A55 at 1.7GHz (8 cores in total) processor, NPU, maximum computing power up to 6TOPS processor, integrated ARMMali-G610MP4 Core GPU, supports OpenGL ES3.2/OpenCL2.2/Vulkan 1.1, 450GFLOPS, onboard LPDDR4 memory (4G/8G/16G optional), onboard eMMC storage (16GB/32GB/128GB/256GB) Optional.

The AI58 combines stable and reliable industrial grade product performance with the advantages of an intelligent digital multimedia player, and can be widely used in industries such as advertising, education, media playback, LCD screens, traffic control, information systems, financial equipment, automotive, military, and more

1Table 1.1-1 Motherboard specification of APC-9100

| | |
|---|---|
| Operating system | Android13，Ubuntu20.04 |
| processor | RK3588 quad core Cortex-A76, 2.4GHz and quad core Cortex-A55, 1.7GHz (a total of 8 cores) processors, NPU,<br>Maximum computing power up to 6TOPS |
| Chipset | SOC |
| Memory | Onboard LPDDR4 8GB memory and up to 16GB |
| Display function | ARMMali-G610MP4 GPU, supports OpenGLES3.2/OpenCL2.2/Vulkan1.1,<br>450GFLOPS<br>1 * HDMI-OUT interface, 1 * HDMI-IN interface, 1 * EDP interface, 1 * LVDS interface, V-BY-ONE interface |
| network functions | 1 * RTL8111H gigabit network card |
| Audio function | Onboard ALC6626 channel high fidelity audio controller, supporting MIC/Line out amplifiers Power amplifier 2 Ω 5W speaker |
| Expansion bus | 1*DC12V_IN，1*4pin，PH=2.5mm<br>1 * LVDS interface, 2 * 15pin, PH=2.0mm<br>Switch between 1 * EDP interface, 2 * 15pin, PH=2.0mm and V-BY-ONE interface, choose one of the two<br>1 * V-BY-ONE output interface, supports up to 4K@60fps Output, switch with EDP, choose one of the two<br>1 * Screen backlight power supply interface 1 * 6pin, PH=2.0mm<br>4 * USB 2.0 interface, 2 * 5pin, PH=2.0mm<br>1 * SATA3.0 hard drive interface, 7pin<br>1 * Hard drive power interface 1 * 4pin, PH=2.0mm<br>1 * FAN interface, 1 * 4pin, PH=2.0mm (reserved)<br>1 * Front panel function buttons and indicator light interface 2 * 5pin, PH=2.0mm |

| | |
|---|---|
| | 6 * RS232 interface, COM1/COM2 supports RS232/RS485 function, jump cap switching, COM3/4/5/6 default<br>RS232, supports TTL function<br>1 * MIC interface 1 * 2-pin, PH=2.0mm<br>1 * Power amplifier interface 1 * 4pin, PH=2.0mm<br>1 * Burn key<br>1 * LAN1, 1 * LAN2 or RJ45, 2 * 4pin, PH=2.0mm<br>1 * COM_SW (Jumping Hat Mouth)<br>1 * SIM booth |
| GPIO function | Supporting 4-way input/output GPIO function |
| Main board size | 148mm x 102mm |
| Working temperature | -10 ℃~60 ℃ |
| Working humidity | 5-95% relative humidity |
| non condensing storage temperature | -20 ℃~70 ℃ |

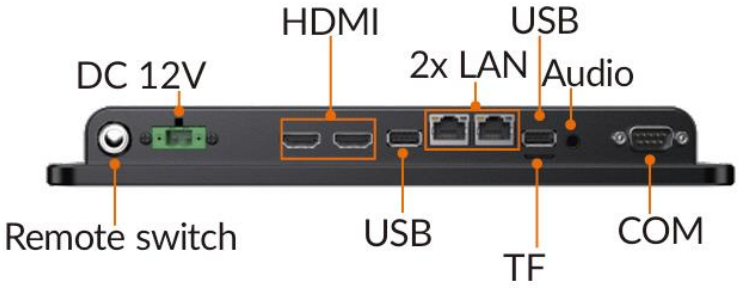
## 2.2 Main-board Physical Image

Figure 1: AI58 VER: 1.0 motherboard front view

Figure 2: AI58 VER: 1.0motherboard I/O diagram

## 2.3 Front and Rear View


## 2.4 System I/O：




## 2.5 System Information

2Table 1.1-1 Product specification of APC-9100

| **Display** | |
|---|---|
| Size | 10.1 inch |
| Touch Type | Projected capacitive multi touch |
| Transmittance | 87% |
| Control Interface | USB |

| | |
|---|---|
| Surface Hardness | ≥7H |
| Resolution | 1280 x 800 |
| Luminance | 350 nits |
| Contrast Ratio | 1000: 1 |
| View Angles | 89 (left), 89 (right), 89 (up), 89 (down) |
| LED Lifetime | 30,000 hrs |
| Color | 16.7M |
| **System** | |
| CPU | RK3588 quad core Cortex-A76, 2.4GHz and quad core Cortex-A55, 1.7GHz processors, NPU 6 TOPS<br>ARM Mali-G610 MP4 |
| Memory | DDR4 8GB (onboard) |
| Storage | EMMC 64G (onboard) |
| **I/O Ports** | |
| USB | 2x USB 3.0, 2x USB 2.0 |
| Serial | 1x COM (COM1 supports RS-232) |
| Ethernet | 2x GbE LAN |
| Display | 1xHDMIOUT, 1x HDMIIN |
| SIM Card Slot | 1x SIM slot for 4G or 5G |
| Antenna | 2x SMA antenna holes |
| **Expansion Slot** | |
| M.2 | 1x M.2 3042 for 4G, 1x M.2 3052 for 5G |
| **RF Communication** | |
| Wi-Fi | WIFI6 onboard |
| Cellular | M.2 expansion (optional) |
| Bluetooth | BT onboard |
| **Audio** | |
| Audio | Mic in, line out |
| Speaker | 2Ω5W speaker (optional) |
| **Power** | |

| | |
|---|---|
| Bution | YES |
| Remote Power On/Off | 1x Remote switch connector |
| DC Input | 12VDC (9-36VDC optional) |
| Power Connector | 2-pin phoenix terminal |
| Power Consumption | 23W |
| Power Adaptor | AC-DC, 12V@5A, 60W |
| **Operating System** | |
| Windows | Windows 10, Windows 11 |
| **Mechanical** | |
| Dimensions (W x D x H) | 261.4 x 174.6 x 34 mm (12.2 x 9.7 x 2.4 inches) |
| Weight (N.W.) | 1.8 kg (3.97 lbs) |
| Mounting | Panel mount, wall mount bracket VESA 100 |
| Material | Aluminum alloy panel, all-metal chassis |
| **Environment** | |
| Operating Temperature | -10 to 50°C (14 to 122°F) |
| Storage Temperature | -20 to 60°C (-4 to 140°F) |
| Relative Humidity | 10% to 95% @ 40°C (104°F), non-condensing |
| Vibration | 5-500Hz, 0.026 $G^2$/Hz, 2.16 Grms, X, Y, Z, 1 hour per axis |
| IP Rating | IP65 compliant (for front panel) |
| **Certification** | |
| EMC | CE, FCC |
| **Packing List** | |
| Packing | 1x APC-9100<br>1x AC-DC power adapter<br>6x panel mounting buckles<br>1x warranty card |

# Chapter 3. Jumper and Installation Instructions

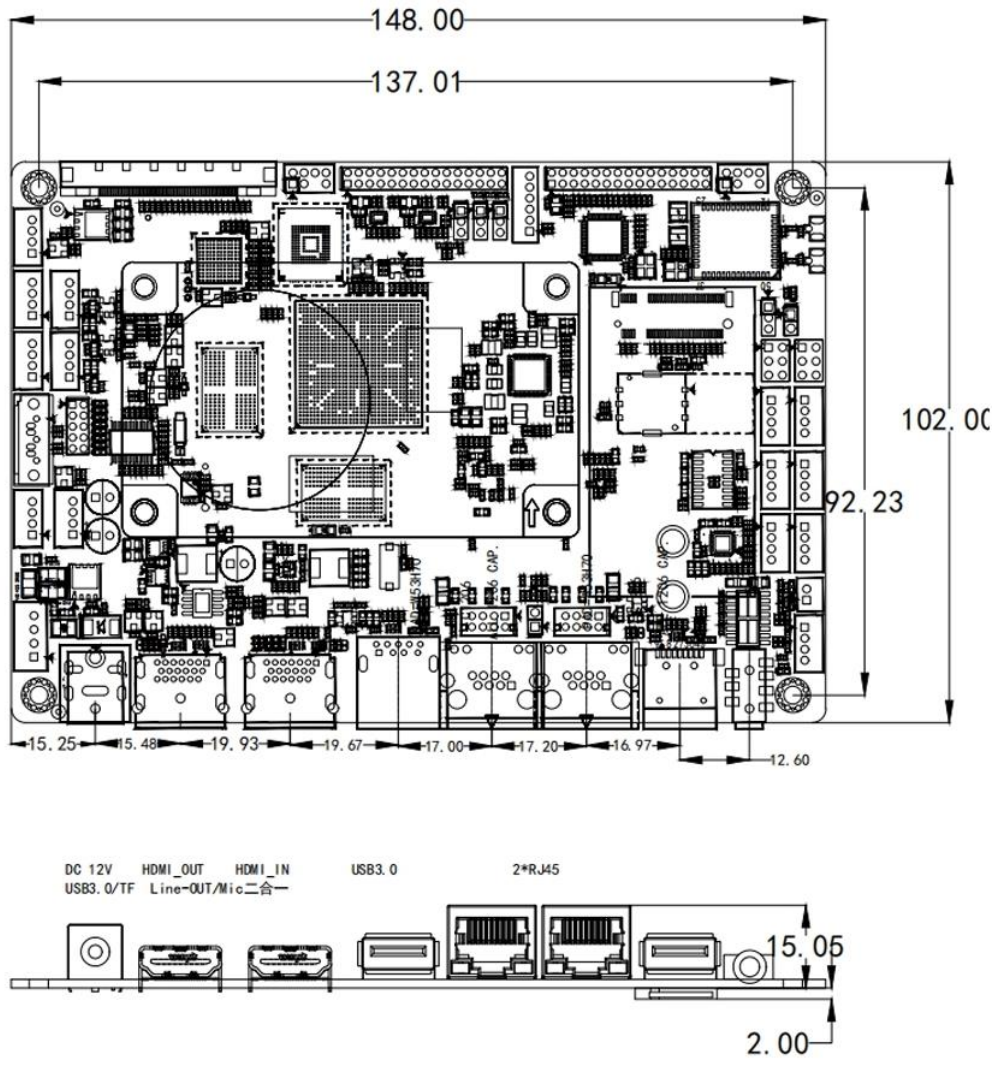
# 3.Jumper and Installation instructions

## 3.1 Safety Precautions

1. Follow these safety precautions when installing the motherboard
2. Wear a grounding strap attached to a grounded device to avoid damage from static electricity
3. Discharge static electricity by touching the metal case of a safely grounded object before working on the motherboard
4. Leave components in the static-proof bags they came in
5. Hold all circuit boards by the edges. Do not bend circuit boards

## 3.2 Main Board Size Diagram

The following diagram shows the position and size of the front interface of AI58. Care must be taken during the installation of equipment. For some components, if installed incorrectly, they will not function properly.



Attention:

1. Please make sure to choose appropriate screws and use the correct installation method, otherwise it may damage the motherboard.
2. How to identify the first pin of the jumper or interface, observe the text mark next to the plug and socket, which will be represented by a triangle symbol or "1" or bold lines; Look at the solder pad on the back. The square solder pad is the first pin. When inserting the device and connecting wires, pay attention to distinguishing the first pin, otherwise it may damage the motherboard

## 3.3 Schematic Diagram of Interface Location

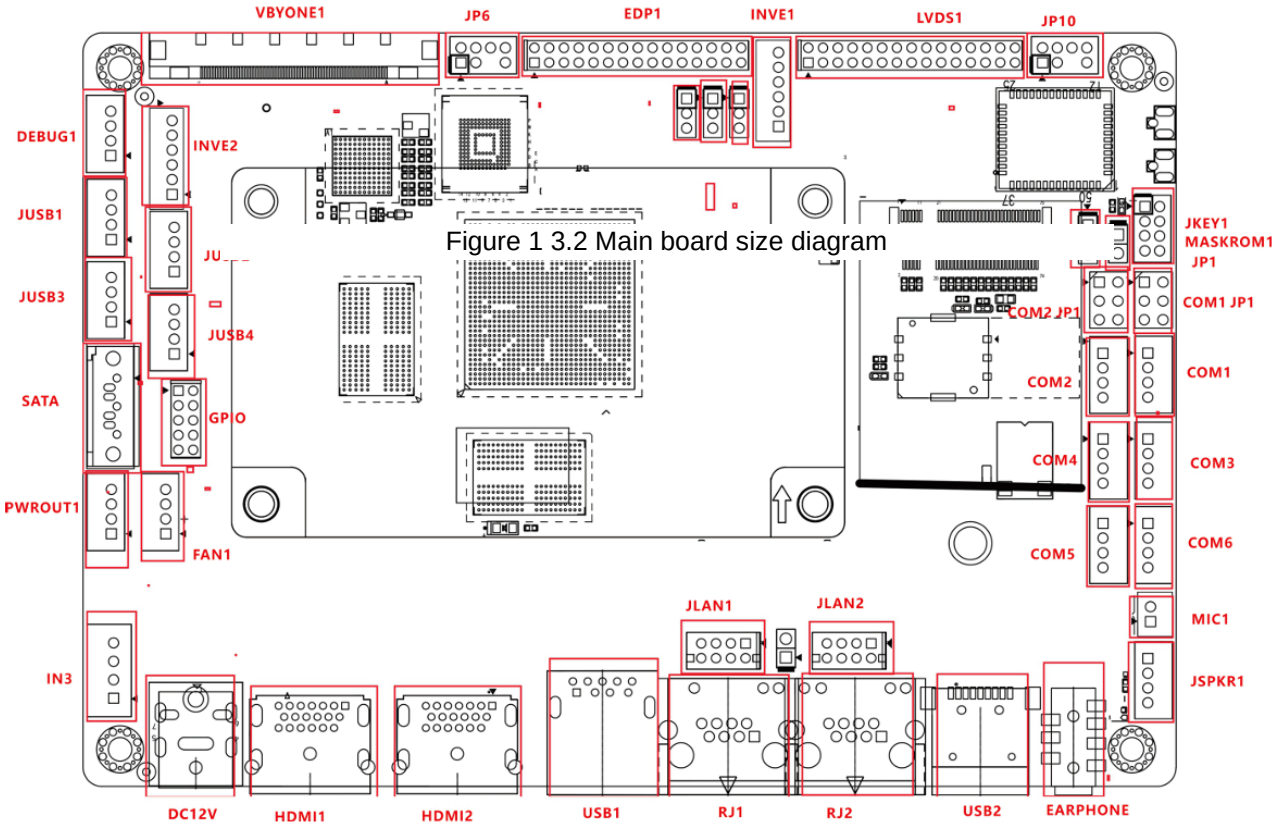


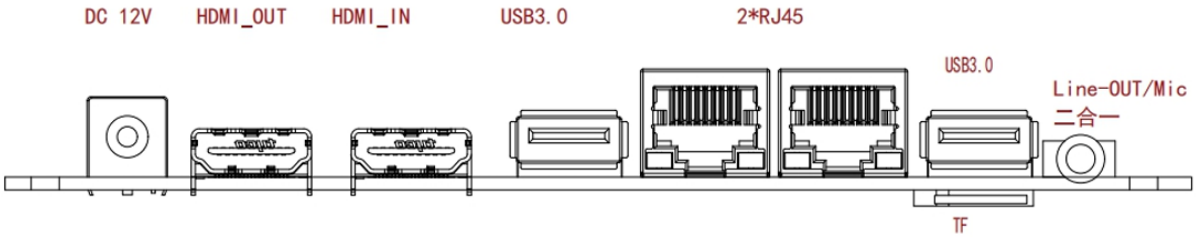

Figure 1 3.2 Main board size diagram

Reminder:
The working voltage of LVDS/EDP/VBYONE1 screen supports 3.3V, 5V, and 12V voltage outputs, with a default of 3.3V
Before EDP, please understand its required working rated voltage before setting it up.

## 3.4 Interface Description

Please read this manual carefully before connecting external connectors to avoid damaging the motherboard!

3.4.1 External interface (DC12V HDMI-OUT HDMI-IN USB3.0 * 2 RJ45 * 2 TF) Line-OUT/Min)




| SN | Interface | explain |
|---|---|---|
| 1 | DC+12V | Outer diameter 5.5mm, inner diameter 2.0mm DC socket, recommended 12V/3A DC input |
| 2 | HDMI-OUT | Standard HDMI Type-A interface, HDMI 2.0 output display, maximum support for the most<br>High 8K60FPS |
| 3 | HDMI-IN | Standard HDMI Type-A interface, HDMI 2.0 input, up to 4K60FPS |
| 4 | USB1 | Standard USB 3.0 Type-A interface, fixed Host mode, current limiting 1.5A |
| 5 | RJ45*2 | 10/100/1000M Ethernet interface, |
| 6 | USB2 | Standard USB 3.0 Type-A interface, default Host mode, can be used in the system<br>Switch Device/Host in USB settings<br>Mode, USB current limit 1.5A |
| 7 | TF | Standard TF card supports up to 512GB |
| 8 | Line out/Mic 2 | Standard 3.5mm, 4-section headphone jack with MIC, CTIA (American standard) standard |

3.4.2 Display interface (JP10 LVDS1 LNVE1 JP8 JP7 JP9 EDP1 JP6 VBYONE1 )
Built in 1 2 * 15pin EDP interface, 1 * 2 * 15pin LVDS interface,
Built in VBYONE1 interface
Note: Supports three screen display

EDP

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | PVDD | 2 | PVDD |
| 3 | NC | 4 | NC |
| 5 | EDP_TX0+ | 6 | EDP_TX0- |
| 7 | GND | 8 | GND |

| | | | |
|---|---|---|---|
| 9 | EDP_TX1+ | 10 | EDP_TX1- |
| 11 | GND | 12 | GND |
| 13 | EDP_TX2+ | 14 | EDP_TX2- |
| 15 | GND | 16 | GND |
| 17 | EDP_TX3+ | 18 | EDP_TX3- |
| 19 | GND | 20 | GND |
| 21 | EDP_AUX+ | 22 | EDP_AUX- |
| 23 | GND | 24 | HPD_DET |
| 25 | BKLT_PWM | 26 | BKLT_EN |
| 27 | GND | 28 | GND |
| 29 | INVERT_PWR | 30 | INVERT_PWR |

LVDS

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | LCDVDD | 2 | LCDVDD |
| 3 | LCDVDD | 4 | NC |
| 5 | GND | 6 | GND |
| 7 | LVDS_A0- | 8 | LVDS_A0+ |
| 9 | LVDS_A1- | 10 | LVDS_A1+ |
| 11 | LVDS_A2- | 12 | LVDS_A2+ |
| 13 | GND | 14 | GND |
| 15 | LVDSA_CLK- | 16 | LVDSA_CLK+ |
| 17 | LVDS_A3- | 18 | LVDS_A3+ |
| 19 | LVDS_B0- | 20 | LVDS_B0+ |
| 21 | LVDS_B1- | 22 | LVDS_B1+ |
| 23 | LVDS_B2- | 24 | LVDS_B2+ |
| 25 | GND | 26 | GND |
| 27 | LVDSB_CLK- | 28 | LVDSB_CLK+ |
| 29 | LVDS_B3- | 30 | LVDS_B3+ |

VBYCNE

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | VDD_VLCD12V | 2 | VDD_VLCD12V |
| 3 | VDD_VLCD12V | 4 | VDD_VLCD12V |
| 5 | VDD_VLCD12V | 6 | VDD_VLCD12V |
| 7 | VDD_VLCD12V | 8 | VDD_VLCD12V |
| 9 | NC | 10 | GND |
| 11 | GND | 12 | GND |
| 13 | GND | 14 | NC |
| 15 | NC | 16 | NC |

| | | | |
|---|---|---|---|
| 17 | NC | 18 | SDL |
| 19 | SDL | 20 | NC |
| 21 | NC | 22 | NC |
| 23 | NC | 24 | NC |
| 25 | GVI_HPD | 26 | GVL_LOCK |
| 27 | GND | 28 | GVI_D0- |
| 29 | GVI_D0+ | 30 | GND |
| 31 | GVI_D1- | 32 | GVI_D1+ |
| 33 | GND | 34 | GVI_D2- |
| 35 | GVI_D2+ | 36 | GND |
| 37 | GVI_D3- | 38 | GVI_D3+ |
| 39 | GND | 40 | GVI_D4- |
| 41 | GVI_D4+ | 42 | GND |
| 43 | GVI_D5- | 44 | GVI_D5+ |
| 45 | GND | 46 | GVI_D6- |
| 47 | GVI_D6+ | 48 | GND |
| 49 | GVI_D7- | 50 | GVI_D7+ |
| 51 | GND | | |

Different LCD screens may have different voltages, and this board provides three screen operating voltage options: 3.3V, 5V, and 12V
Before using EDP/LVDS/VBYONE, please understand the requirements for selecting 5V and 12V screen backlight supply voltages
When the selected LCD voltage is consistent with the voltage of the LCD screen used, the LCD screen can function normally
Display. The setting method is as follows:

P10 (LVDS screen backlight power supply) settings:

| Pin | JP10 |
|---|---|
| 1-2 short | 3V |
| 2-3 short | 5V |
| 7-8 short | 12V |

JP6 (EDP/VBYONE screen backlight power supply) settings:

| Pin | JP6 |
|---|---|
| 1-2 short | 3V |
| 2-3 short | 5V |
| 7-8 short | 12V |

JP9 (EDP/VBYONE) setting:

| Pin | JP9 |
|---|---|
| 1-2 short | VBYONE |
| 2-3 short | EDP |

JP7 (EDP/VBYONE Inverter power supply) setting:

| Pin | JP7 |
|---|---|
| 1-2 short | 12V |
| 2-3 short | 5V |

JP8 (LVDS Inverter power supply) settings:

| Pin | JP8 |
|---|---|
| 1-2 short | 12V |
| 3-4 short | 5V |

INVERTER1 (LVDS backlight power interface) definition

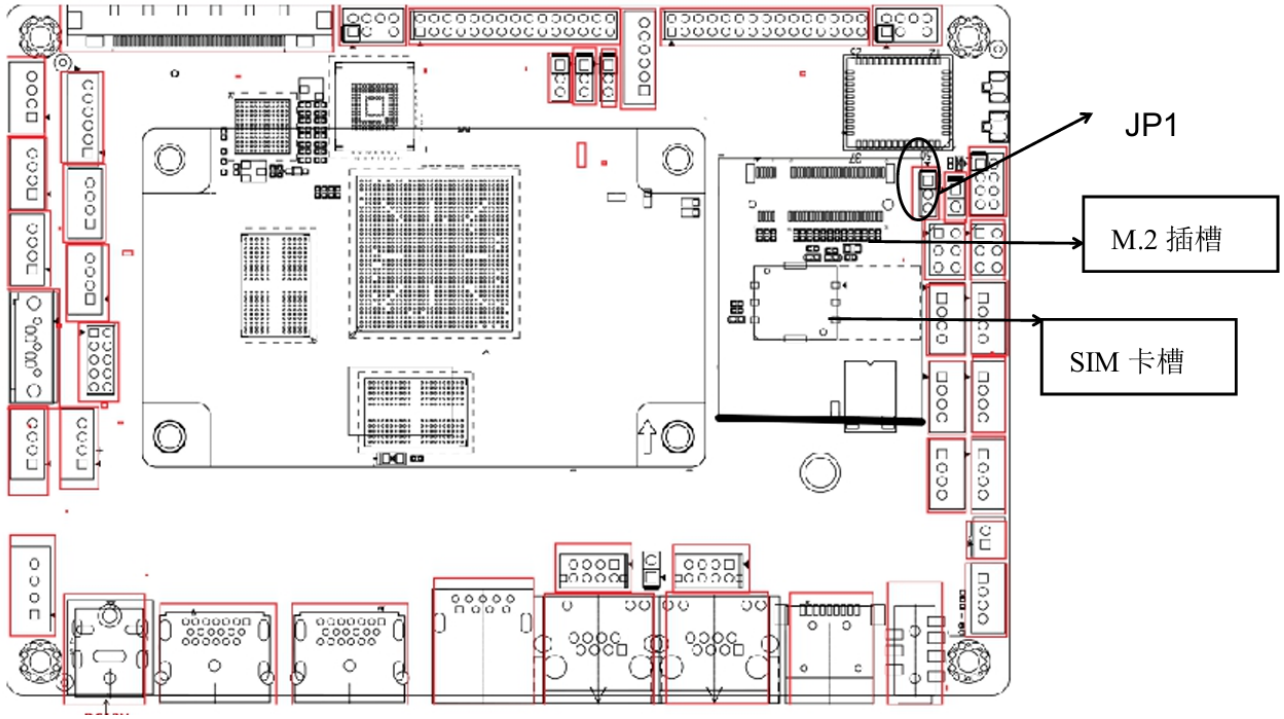
| Pin | signal |
|---|---|
| 1 | 12V/5V(INV_PWR1 Setting) |
| 2 | 12V/5V(INV_PWR1 Setting) |
| 3 | Backlight enable |
| 4 | Backlight brightness control |
| 5 | GND |
| 6 | GND |

INVERTER2 (EDP/VBYONE backlight power interface) definition

| Pin | signal |
|---|---|
| 1 | 12V/5V(INV_PWR1 Setting) |
| 2 | 12V/5V(INV_PWR1 Setting) |
| 3 | Backlight enable |
| 4 | Backlight brightness control |
| 5 | GND |
| 6 | GND |

### 3.4.3 M. 2 slots (CN1)

Provide one M.2 slot on the board, supporting M.2B-KEY2242/2252/22604G/5G modules
JP1 jump cap is used to set 4G/5G voltage

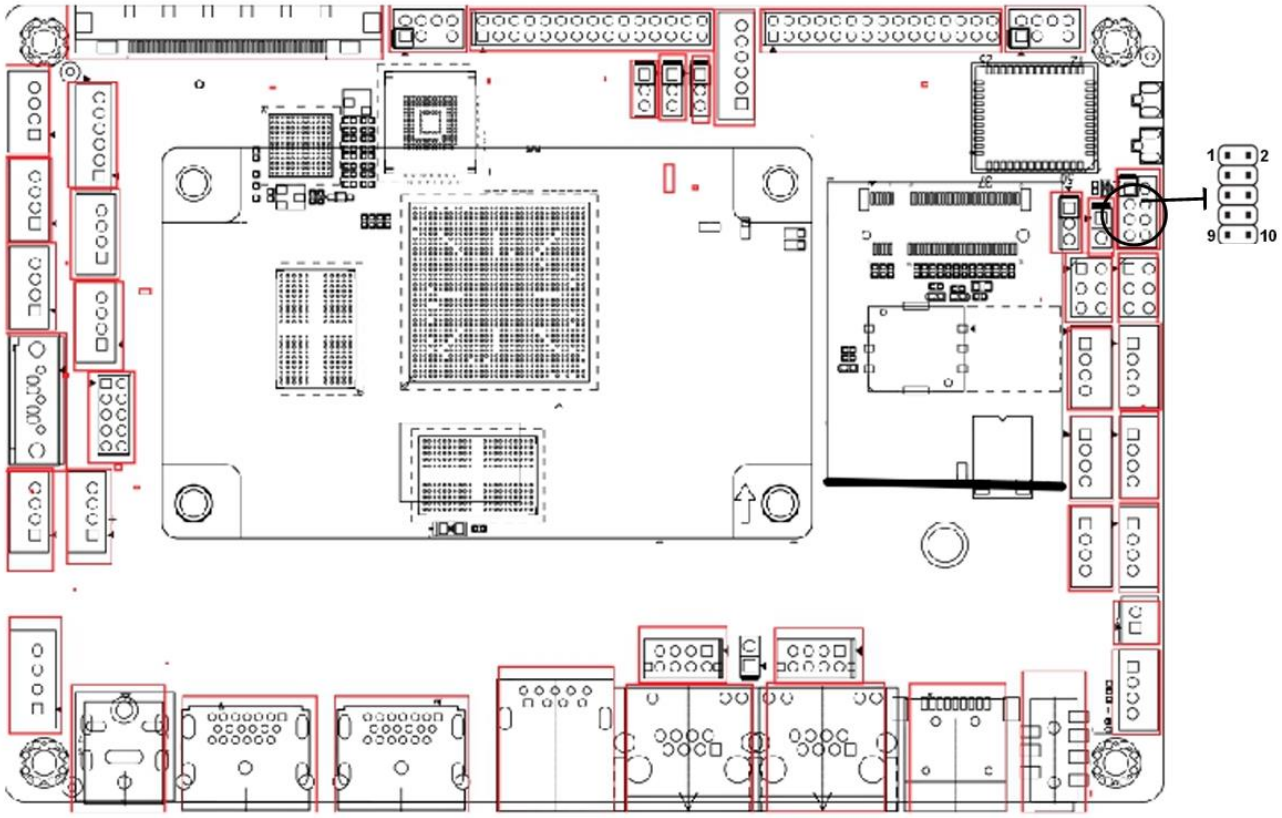



JP1 (4G/5G module voltage setting):

| Pin | JP1 |
|---|---|
| 1-2 short | 3.8V |
| 2-3 short | 3.3V |

### 3.4.4 Front panel interface (JKEY1)

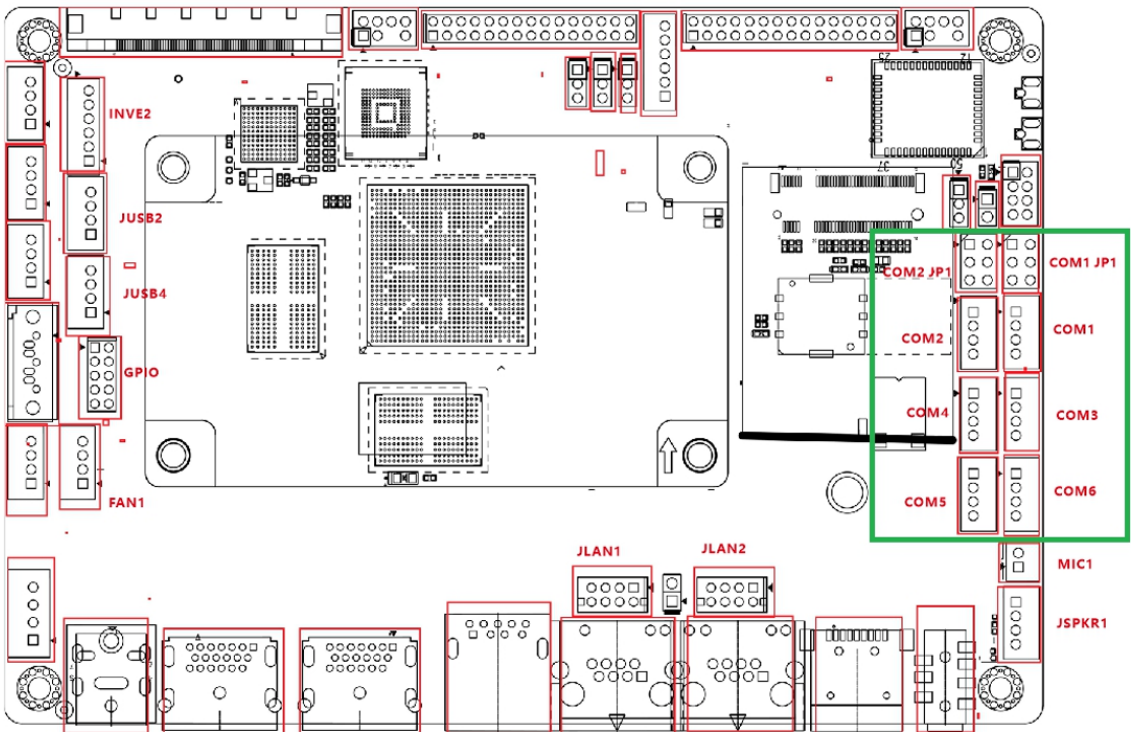
Provide 1 front panel interface JKEY1, 2 * 5pin on the board




JKEY1 Definition:

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | PMIC_PWRON | 2 | VOL+/RECOVERY |
| 3 | SOC_RESET# | 4 | VOL- |
| 5 | LED+ | 6 | HOME |
| 7 | LED- | 8 | ESC |
| 9 | GND | 10 | MENU |

3.4.5 serial interface (COM1、COM2、COM3、COM4、COM5、COM6、COMJP1 、COMJP2)




6 * RS232 interface, COM1/COM2 supports RS232/RS485 function, jump cap switching, COM3/4/5/6
Default RS232, supports TTL function of 1 * 4pin, PH=2.00mm

COM1JP1（RS232/RS485

| Pin | COM1 JP1 |
|---|---|
| 1-2 short | RS-232 |
| 3-4 short | |
| 3-4 short | RS-485 |
| 5-6 short | |

COM2JP1(RS232/RS485)

| Pin | COM2 JP1 |
|---|---|
| 1-2 short | RS-232 |
| 3-4 short | |
| 3-4 short | RS-485 |
| 5-6 short | |

The motherboard has 6 serial ports, 1 TTL interface, 6 RS232 interfaces, and RS485/RS485 interfaces for external use
One. The corresponding node files are:/dev/ttysWK0,/dev/ttysWK1,/dev/ttysWK2,/dev/ttysWK3, /Dev/tttyS3,/dev/tttyS4. The corresponding relationship is shown in the following table:

| COM1 | COM2 | COM3 | COM4 | COM5 | COM6 |
|---|---|---|---|---|---|
| ttysWK0 | ttysWK1 | ttysWK2 | ttysWK3 | ttyS3 | ttyS4 |

The device file corresponding to the exposed CN3 serial port is ttysWK0.

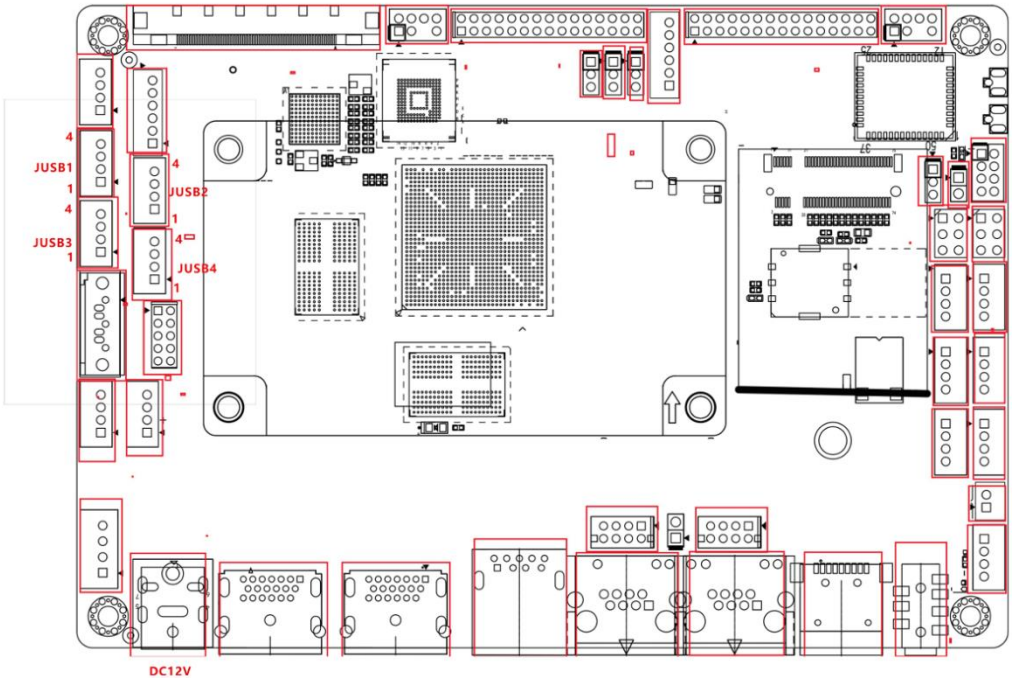
COM1~COM2（RS232/RS485）

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | 5V | 2 | TX |
| 3 | RX | 4 | GND |

COM1~COM2（RS232/RS485）

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | 5V | 2 | MSIN- |
| 3 | MSO- | 4 | GND |

3.4.6 USB interface (USB1, USB2, JUSB1, JUSB2, JUSB3, JUSB4)
Two standard USB 3.0 interfaces are provided on the board,
Built in 4 USB 2.0 interfaces (1 * 4pin pin spacing: 2.00mm)

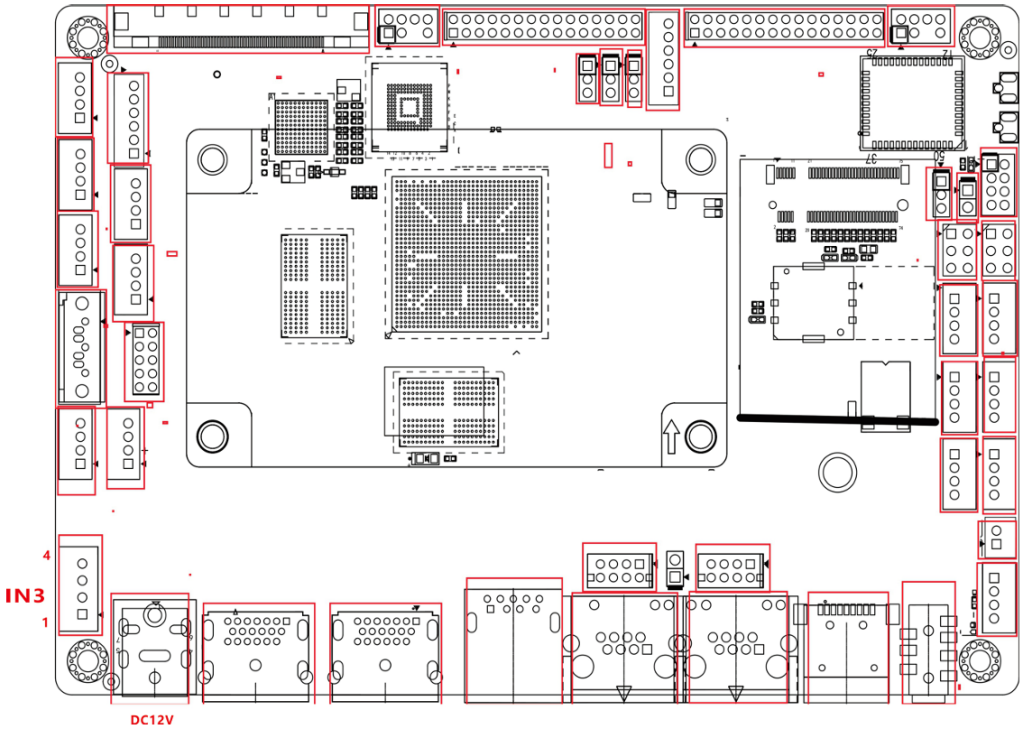



JUSB1, JUSB2, JUSB3, JUSB4

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | 5V | 2 | D+ |
| 3 | D- | 4 | GND |

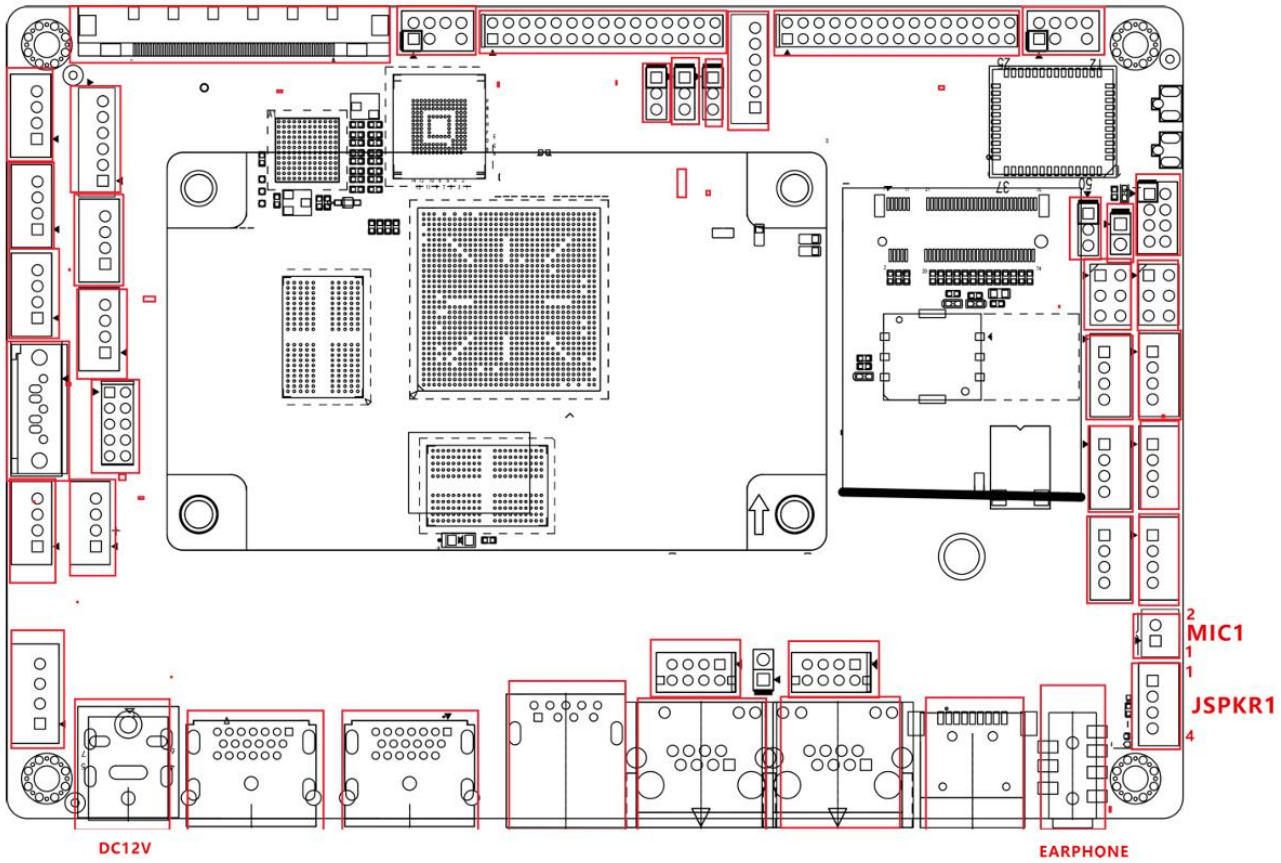
### 3.4.7 Power interface (DC12V-IN1)

Provide a DC adapter interface on the board, supporting DC12V power supply




| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | VIN | 2 | VIN |
| 3 | GND | 4 | GND |

3.4.8 Audio interface (EARPHONE, JSPKR1, MIC1)
A PHONE1/MIC is provided on the board as a standard audio jack, supporting Line out and MIC
Built in 1 * 4pin (pin distance: 2.0mm) SPK amplifier interface, supporting 2x2 Euro 5W,
1 * 2 pin (pin spacing: 2.0mm) 1 MIC interface



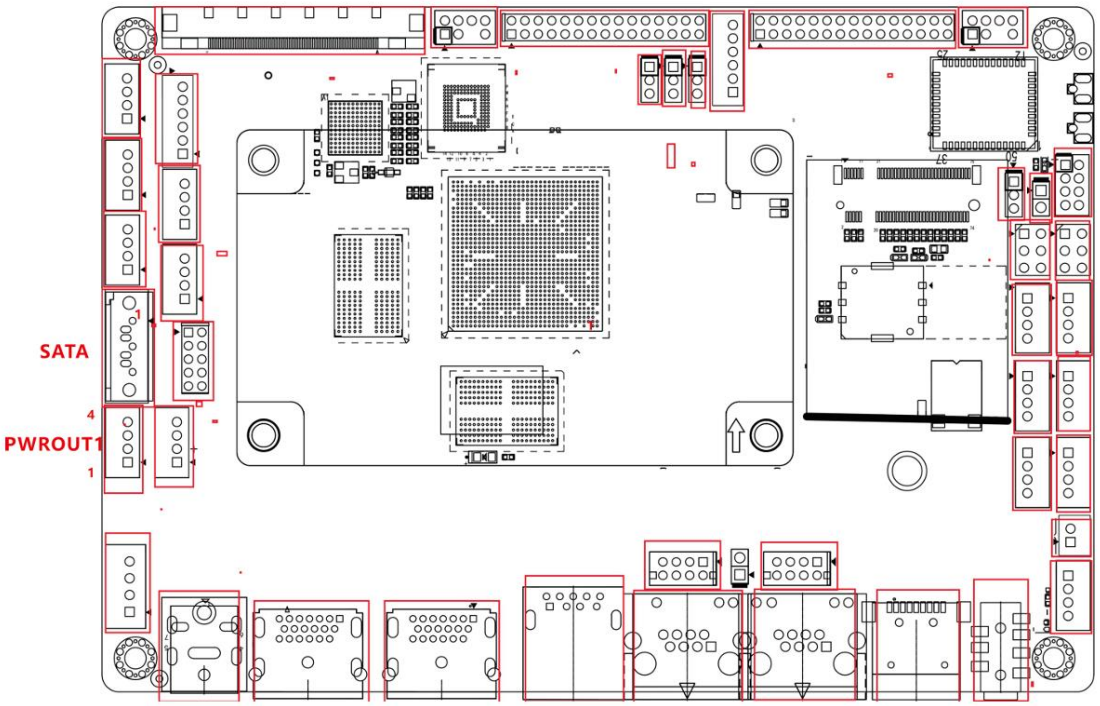

JSPKR1

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | IN_SPKL+ | 2 | IN_SPKL- |
| 3 | IN_SPKL+ | 4 | IN_SPKL- |

MIC

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | P | 2 | N |

3.4.9 Hard disk interface (SATA1,)
Provide one 7pin SATA 3.0 interface on the board, with a transmission rate of 6Gbps




SATA1

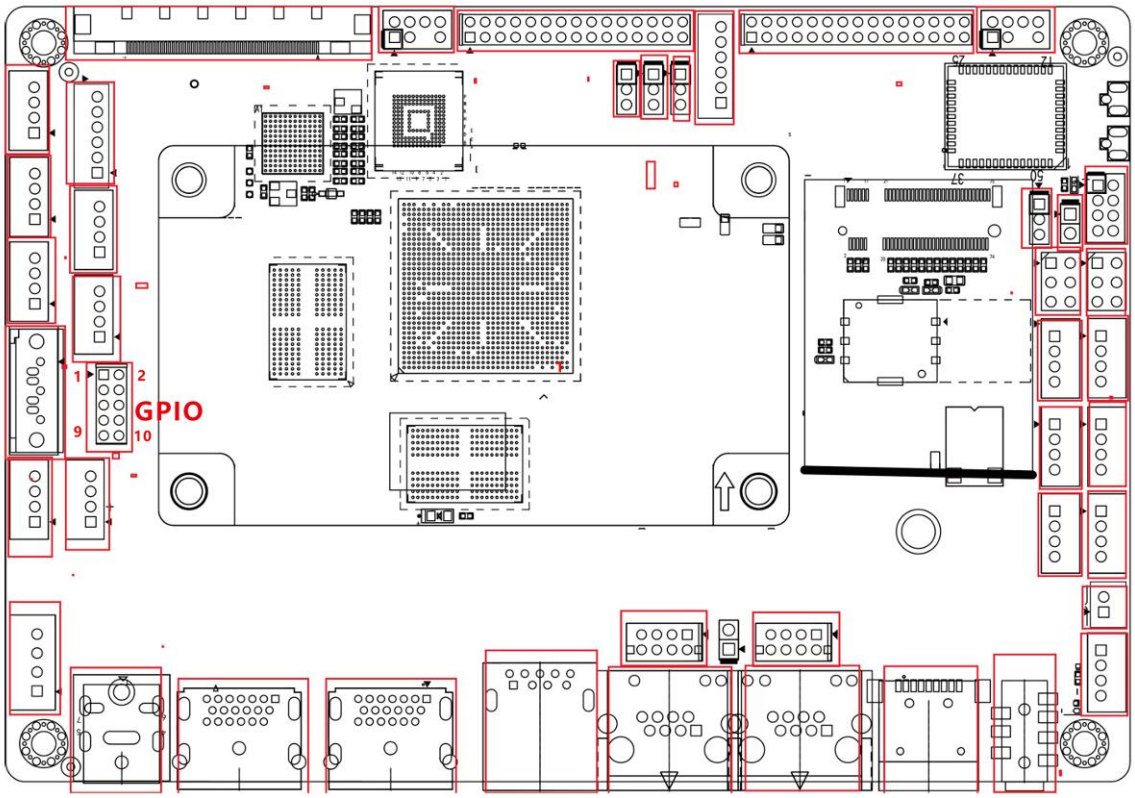
| PIN | signal |
|---|---|
| 1 | GND |
| 2 | SATA_TXP |
| 3 | SATA_TXN |
| 4 | GND |
| 5 | SATA_RXN |
| 6 | SATA_RXP |
| 7 | GND |

PWROUT1

| PIN | signal |
|---|---|
| 1 | +12V |
| 2 | GND |
| 3 | GND |
| 4 | +5V |

Tip: 1. The first pin of the PWROUT1 hard drive power interface has a+12V output, and the fourth pin has a+5V output,
When using, please use the power cord that comes standard with our company to avoid burning out the hard drive.

### 3.4.10 Programmable Input/Output Interface (GPIO)




GPIO

| Pin | signal | Pin | signal |
|---|---|---|---|
| 1 | +3.3V | 2 | GND |
| 3 | GPIO11 | 4 | GPIO01 |
| 5 | GPIO12 | 6 | GPIO02 |
| 7 | GPIO13 | 8 | GPIO03 |
| 9 | GPIO14 | 10 | GPIO04 |

# Chapter 4. Standard Assembly Process

# 4. Standard Assembly Process

## 6.1 LCD Assemble

### 6.1.1 Assemble the LCD bracket

### 6.2.1 Assembly extension interface

# Chapter 5. Appendix

## 7.1 Material List

| CATEGORY | PARTNAME | PART NO. |
|---|---|---|
| Structure | | |
| | Heatsink, Aluminum | A.03.002.000540 |
| | | A.03.002.000541 |
| | APC-9100-HK | A.03.001.001246 |

| CATEGORY | PARTNAME | ACER PART NO. |
|---|---|---|
| Structure | | |
| | APC-9100-LCD | A.03.007.000102 |
| | APC-9100C_R-QK | A.03.002.000423 |
| MAINBOARD | | |

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