

# User manual

## Document modification history

| Version | Description | Date       |
|---------|-------------|------------|
| V1.0    | Creation    | 2018-03-16 |
|         |             |            |
|         |             |            |
|         |             |            |

# Catalog

|                                                 |           |
|-------------------------------------------------|-----------|
| <b>Chapter 1 Product Overview .....</b>         | <b>3</b>  |
| 1.1 8812C Application Scope .....               | 3         |
| 1.2 Description .....                           | 3         |
| 1.3 Feature .....                               | 3         |
| 1.4 Sketch map of appearance and interface..... | 4         |
| <b>Chapter 2 Basic Function List.....</b>       | <b>6</b>  |
| <b>Chapter 3 PCB Size&amp;Layout .....</b>      | <b>7</b>  |
| 3.1 PCB Drawing.....                            | 7         |
| 3.2 Interface Parameter .....                   | 8         |
| <b>Chapter4 Electrical Performance .....</b>    | <b>11</b> |
| <b>Chapter5 Assembly Notes .....</b>            | <b>11</b> |

# Chapter 1 Product Overview

## 1.1 8812C Application Scope

8812C can be used in android OPS box. It is also widely used in: OPS digital signage, OPS education AIO machine, OPS conference AIO machine, OPS self-service terminal machine, etc.

## 1.2 Description

8812C is based on RK3399 (Dual-core Cortex-A72 up to 2.0GHz, Quad-core Cortex-A53 up to 1.5GHz) with Android7.1. It adopted Mali-T860MP4 GPU , supported 4K、 H.265 Hardware Decode. It contained Rich interface and used MINIOPS interface: plug and play, simple maintenance; It is the best choice for digital signage, education, conference, self-service terminal industry.

## 1.3 Feature

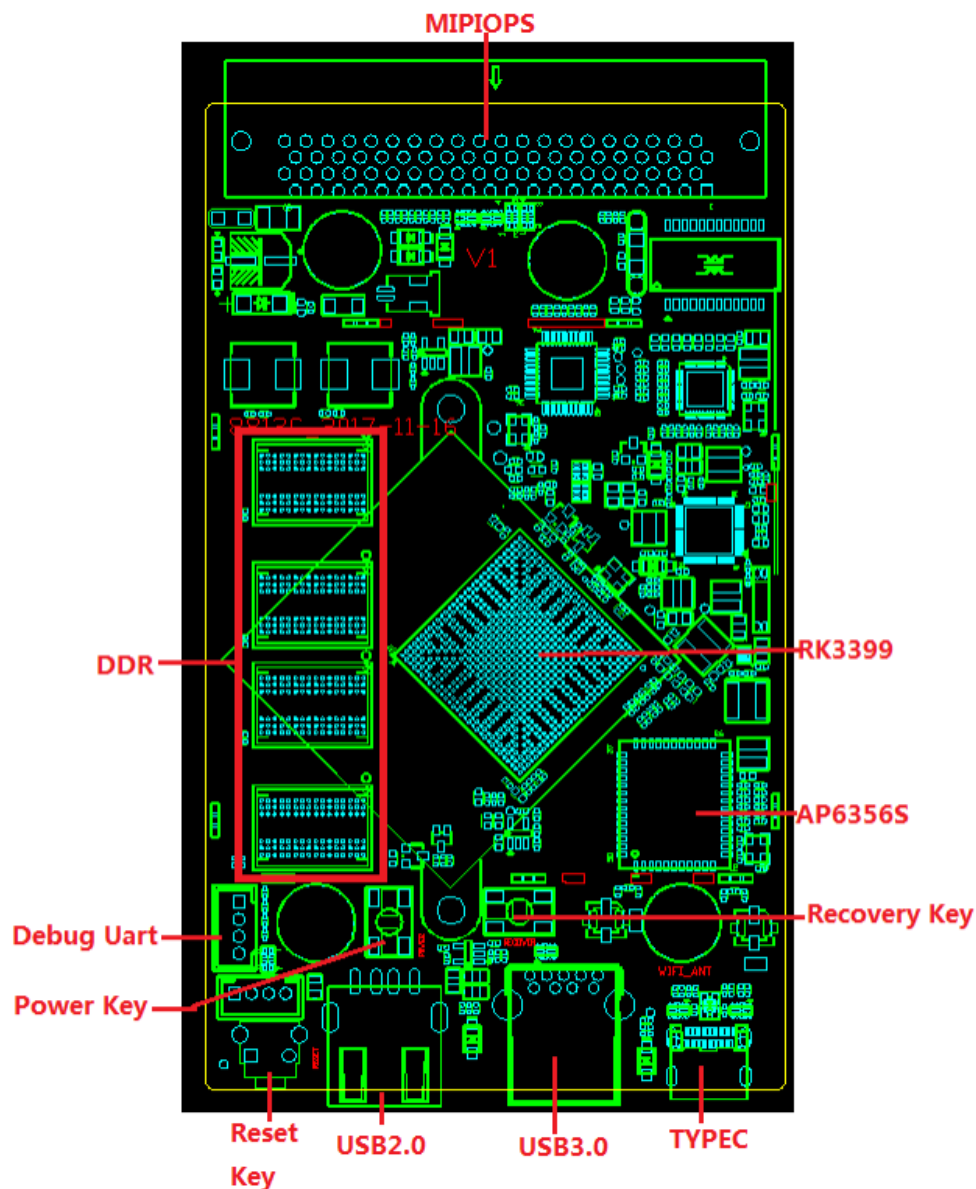
- ◆ Powered by RK3399 hexa-core Cortex A72/A53 processor with Android 7.1, Faster and better performance.
- ◆ Supported 5G&2.4G WIFI.
- ◆ Supported 1000M LAN.
- ◆ 80pin MINIOPS , Fanless , Plug&Play.
- ◆ Rich extension interface. Six USB interfaces(1XUSB3.0 , 1XUSB

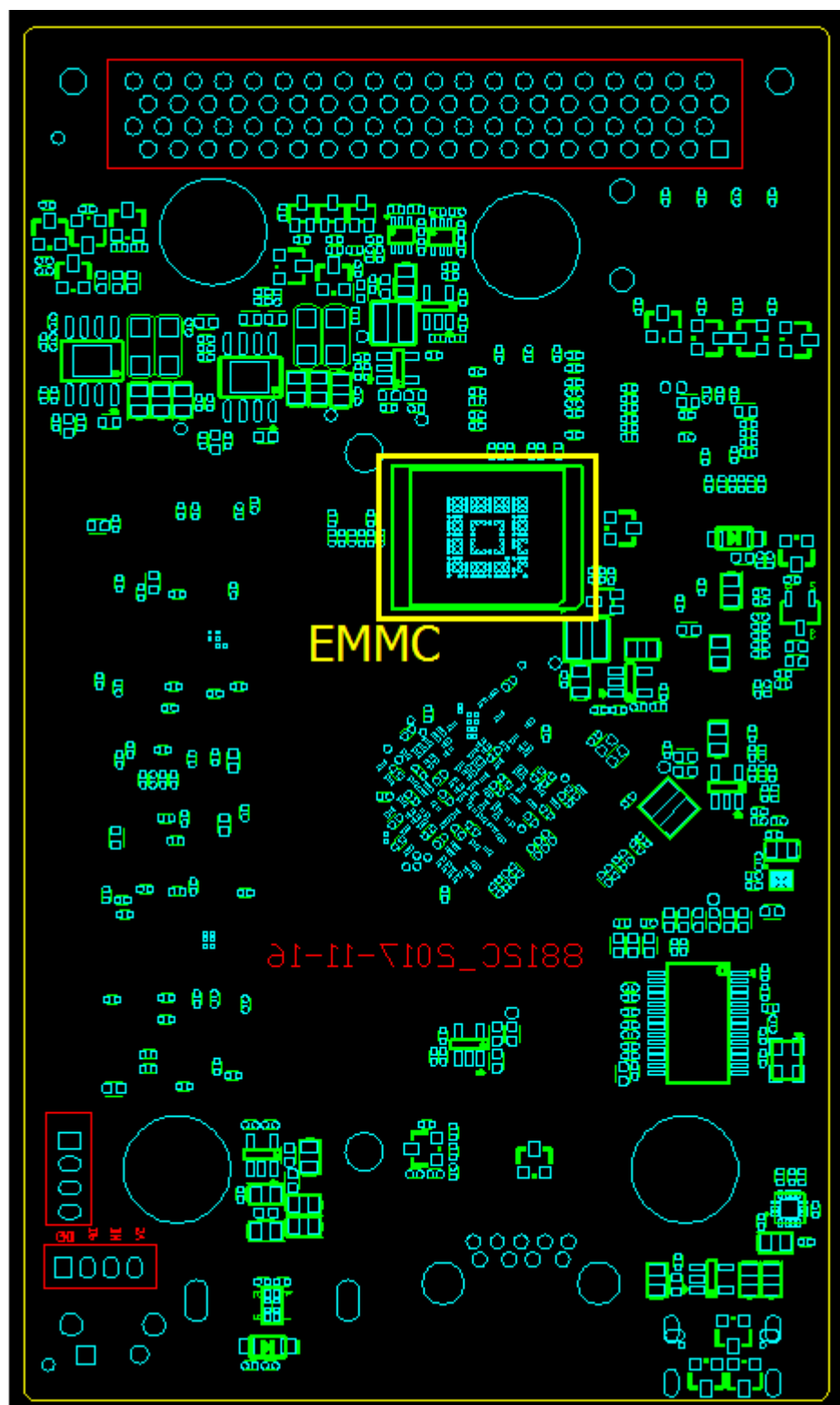
Host 2.0 +4XHUB USB2.0 , 1XTYPE C) , 1XTTL Uart, 1XTTL Debug Uart. Satisfy all kinds of peripheral needs.

- ◆ Supports Android system customization, provides reference code for the system API, and perfectly supports the application development of the upper layer.

## 1.4 Sketch map of appearance and interface

TOP/Bottom :





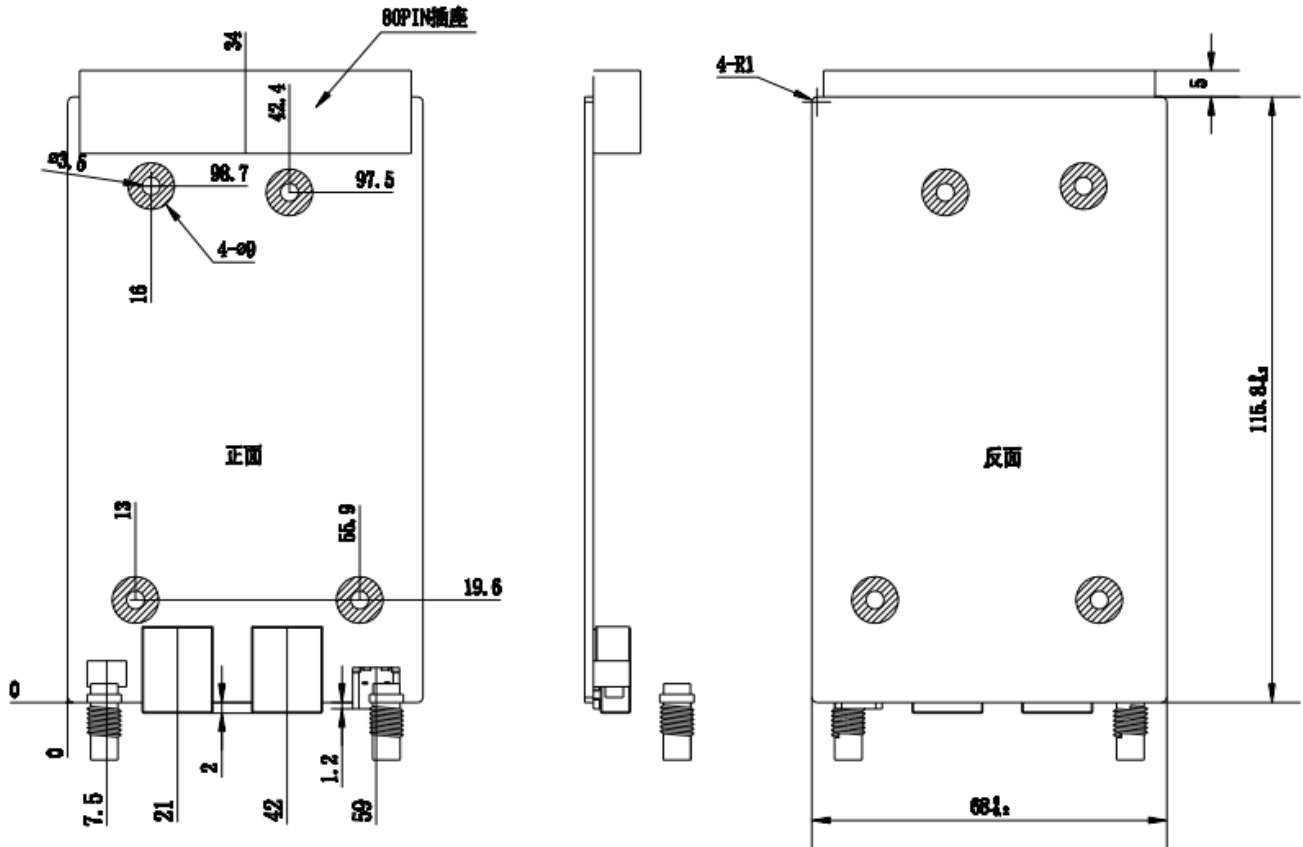
## Chapter 2 Basic Function List

| RK3399 Hardware Spec sheet |                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Platform                   | Rockchip RK3399                                                                                                                          |
| CPU                        | hexa-core bit.LITTLE processor with dual core Cortex A72 up to 2.0 GHz and quad core Cortex A53 processor                                |
| GPU                        | ARM Mali-T860MP4 GPU, support OpenGL ES1.1/2.0/3.0, OpenCL1.2, DirectX11.1 etc<br>Embedded 4 shader cores with shared hierarchical tiler |
| Video Decode               | 4K VP9 and 10-bit H.265 video codec support up to 60 fps                                                                                 |
| PMU                        | RK808 PMU                                                                                                                                |
| Memory                     | Dynamic Memory Interface DDR3 :2G                                                                                                        |
| FLASH                      | eMMC 5.1 :16G                                                                                                                            |
| WIFI&BT                    | AP6356S                                                                                                                                  |
| Enthernet                  | X1, 10M/100M/1000M Self-adaption                                                                                                         |
| USB Interface              | 4*USB 2.0 HOST+1*USB 3.0 HOST+ 1*Type-C                                                                                                  |
| UART                       | 1*UART TTL (ttyS4) ; UART2 Debug, TTL;                                                                                                   |
| HDMI OUT                   | X1, support 4K                                                                                                                           |
| Audio OUT                  | HDMI audio out                                                                                                                           |
| RTC                        | Support                                                                                                                                  |
| Key                        | RESET Key, RECOVER Key, POWER Key                                                                                                        |
| Power                      | DC12V~19V-2A                                                                                                                             |

| System/Software      |                                    |
|----------------------|------------------------------------|
| System               | Android 7.1                        |
| Programming language | C、C++、Kotlin、Java、Shell、Pyhon, etc |
| Fireware update      | OTA update                         |

## Chapter 3 PCB Size&Layout

### 3.1 PCB Drawing



PCB : 8 layers

Size : 68mm\*115.8mm\*1.6mm

Screw Hole :  $\phi 3.5\text{mm} \times 4$

## 3.2 Interface Parameter

### ◆ 80PIN MIPIOPS Pin Definition :

|    |              |
|----|--------------|
| 1  | LAN_P3-      |
| 2  | LAN_P3+      |
| 3  |              |
| 4  | LAN_P4-      |
| 5  | LAN_P4+      |
| 6  |              |
| 7  |              |
| 8  |              |
| 9  |              |
| 10 |              |
| 11 |              |
| 12 |              |
| 13 |              |
| 14 |              |
| 15 |              |
| 16 | GND          |
| 17 | TMDS_CLK-    |
| 18 | TMDS_CLK+    |
| 19 | GND          |
| 20 | TMDS0-       |
| 21 | TMDS0+       |
| 22 | GND          |
| 23 | TMDS1-       |
| 24 | TMDS1+       |
| 25 | GND          |
| 26 | TMDS2-       |
| 27 | TMDS2+       |
| 28 | GND          |
| 29 | DVI_DDC_DATA |
| 30 | DVI_DDC_CLK  |
| 31 | DVI_HPD      |
| 32 | GND          |
| 33 | 12V~19V      |
| 34 | 12V~19V      |
| 35 | 12V~19V      |

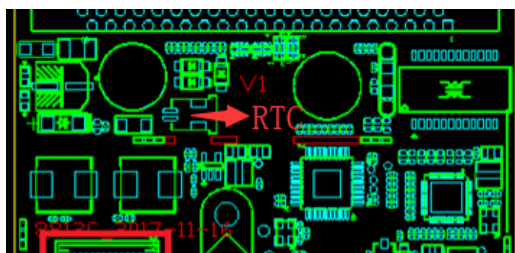
|    |            |
|----|------------|
| 36 | 12V~19V    |
| 37 | 12V~19V    |
| 38 | 12V~19V    |
| 39 | 12V~19V    |
| 40 | 12V~19V    |
| 41 | LAN_P2-    |
| 42 | LAN_P2+    |
| 43 | RESET#     |
| 44 | LAN_P1-    |
| 45 | LAN_P1+    |
| 46 | IR         |
| 47 | I2C_SCL    |
| 48 | I2C-SDA    |
| 49 | I2C_3.3V   |
| 50 |            |
| 51 | UART_RXD   |
| 52 | UART_TXD   |
| 53 | GND        |
| 54 | StdA_SSRX- |
| 55 | StdA_SSRX+ |
| 56 | GND        |
| 57 | StdA_SSTX- |
| 58 | StdA_SSTX+ |
| 59 | GND        |
| 60 | USB_PN2    |
| 61 | USB_PP2    |
| 62 | GND        |
| 63 | USB_PN1    |
| 64 | USB_PP1    |
| 65 | GND        |
| 66 | USB_PN0    |
| 67 | USB_PP0    |
| 68 | GND        |
| 69 |            |
| 70 |            |

|    |            |
|----|------------|
| 71 | CEC        |
| 72 | PB_DET     |
| 73 | PS_ON#     |
| 74 | PWR_STATUS |
| 75 | GND        |

|    |     |
|----|-----|
| 76 | GND |
| 77 | GND |
| 78 | GND |
| 79 | GND |
| 80 | GND |

#### ♦ BAT RTC Interface

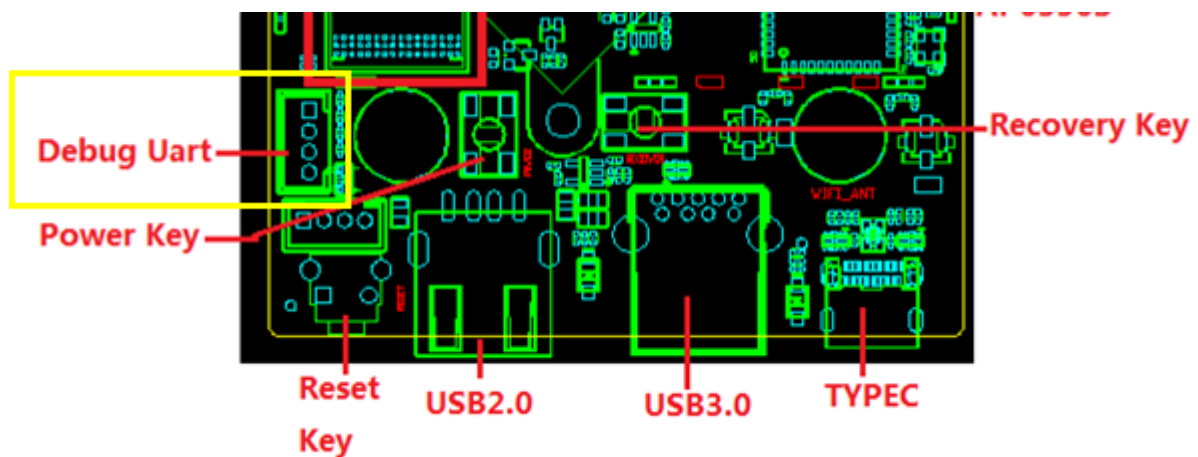
Used to power the system clock when power is off



| NO | Definition | Property | Discription |
|----|------------|----------|-------------|
| 1  | RTC        | Power IN | 3V IN       |
| 2  | GND        | GND      | GND         |

#### ♦ Debug UART

If the connection level of the serial port is higher than 3.3v, there should be damaged board.

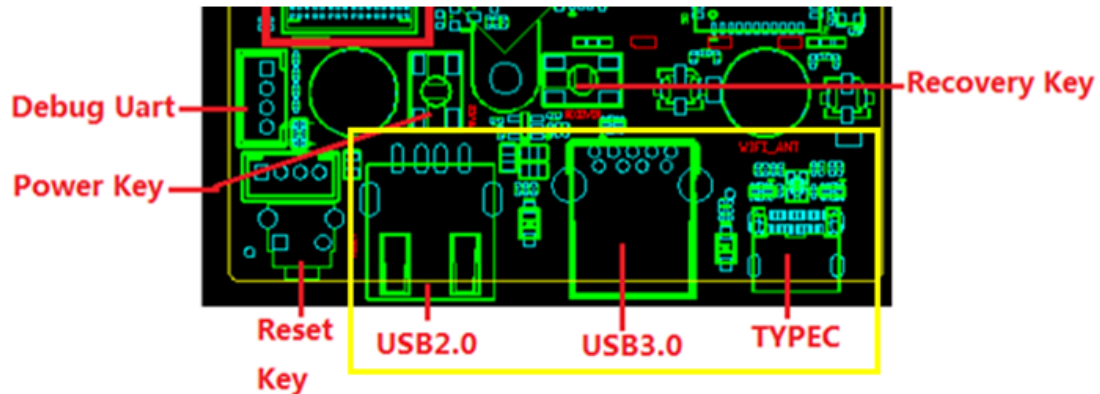


| NO | Definition | Poperty | Discription |
|----|------------|---------|-------------|
| 1  | GND        | GND     | GND         |
| 2  | RX         | Input   | RX          |
| 3  | TX         | Output  | TX          |

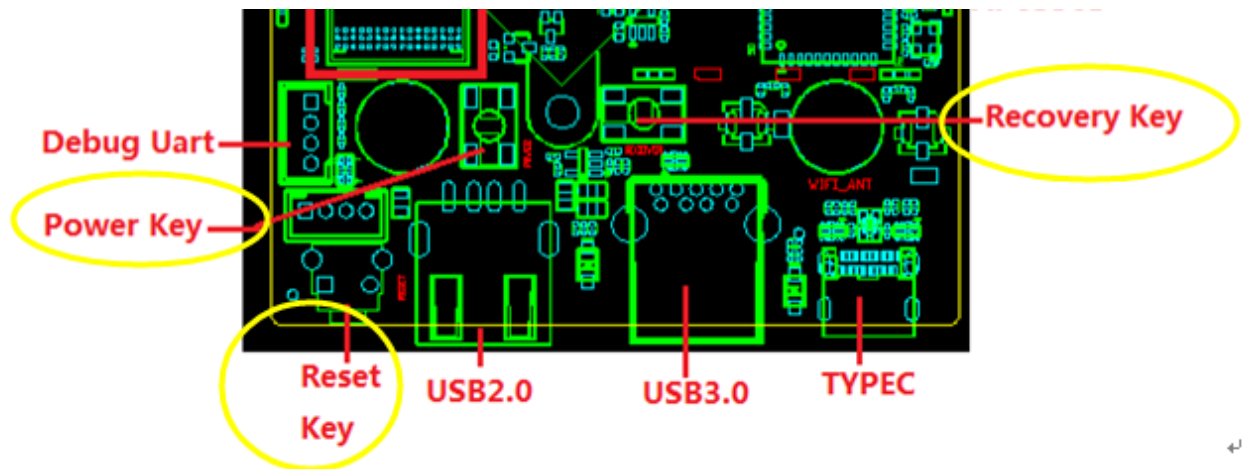
|   |     |       |      |
|---|-----|-------|------|
| 4 | VCC | Power | 3.3V |
|---|-----|-------|------|

#### ◆ USB Ports

8812C has 4xUSB2.0, 1xUSB3.0 and 1xTYPE-C interface. The external interface of board is: 1xUSB2.0; Three interfaces were extended through the 80PIN MINIOPS.



#### ◆ Keys



|              |                                                                                                                                                                                                                                                                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Key    | When the low level time is detected over 500ms, the machine will start up automatically. After starting up, if the PWRON is pulled down more than 6s, it will be forced shutdown (usually used to force shutdown when the system crash and start up again). During sleep and wake up operations, the low level of the PWRON needs to be maintained over 30ms. |
| Reset Key    | Reset is valid with low level. In order to ensure stable and normal operation, the minimum Reset time is 100 main clock cycles of 24MHz, at least 4us.                                                                                                                                                                                                        |
| Recovery Key | Press this button for a long time before starting the machine, it will enter the Recovery mode. The firmware can be brushed by wire.                                                                                                                                                                                                                          |

## Chapter4 Electrical Performance

| Item                |                       | Min   | Typ | Max  |
|---------------------|-----------------------|-------|-----|------|
| Supply Voltage      | Voltage               | 12    | 16V | 19V  |
|                     | Ripple                | --    | --  | 50mV |
|                     | Current               | 2A    |     |      |
| Working Environment | Relative humidity     | --    | --  | 80%  |
|                     | Operating temperature | 0°C   | --  | 40°C |
|                     | Storage temperature   | -20°C |     | 70°C |

## Chapter5 Assembly Notes

During assembly, please note the following (not limited to) problem points.

- 1.Short circuit problem of board and peripheral equipment.
- 2.During installation and fixation, board should be avoided deformation for fixed reasons.
- 3.When installing peripheral devices (USB, IO, uart.etc.), pay attention to external IO voltage level and current output problems.
- 4.When installing serial port, whether TX and RX are connected correctly
- 5.Whether the input voltage, current, etc. meet the requirements, according to the full peripherals.

## FCC STATEMENT

1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

## FCC Statement:

This equipment complies with FCC radiation limits set forth for an uncontrolled environment. This equipment must not be colocated or operating with any other antenna or transmitter.

This module is designed to comply with FCC statement FCC ID is: 2AKP8-RK3399

The host system using this module should have label in a visible area indicating the following texts "Contains FCC ID: 2AKP8-RK3399".

2.4G and 5G can transmit simultaneously when sharing antennas.

Operations in the 5.15–5.25GHz band are restricted to indoor usage only.

## FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, Human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

When OEG purchase the module, they can only buy this antenna to match the Modules. The max antenna gain of antenna is 2dBi. The following is a example of the module and antenna:

