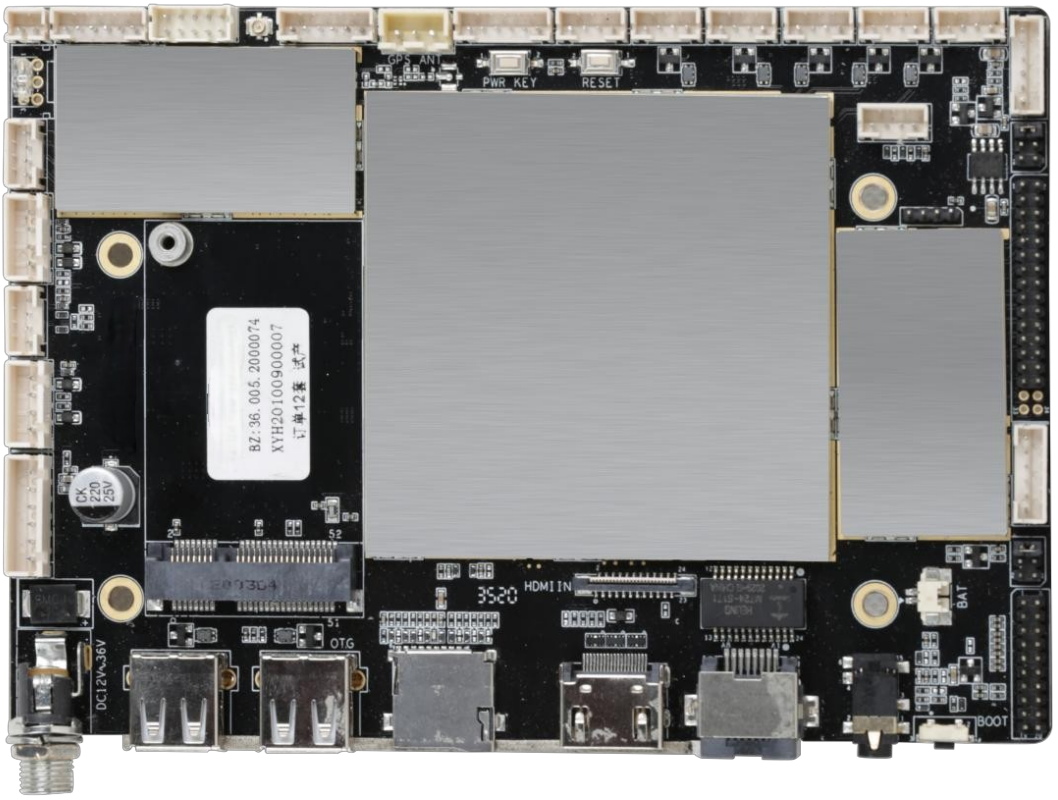
MotherBoard Series

Embedded Android CPU

OVMB-ARM-A32G




# OVİS MOTHERBOARD SERİES

# OVMB-ARM-A32G

# CONTENTS

# Chapter 1 Introduction

## 1.1 Applicability

OVMB-ARM-A32G is a intelligent terminal motherboard with large temperature endurance range. It's designed for medical industry , all parts included processor is industry grade, the temperature endurance range is -20°to +70°.

## 1.2 Functions

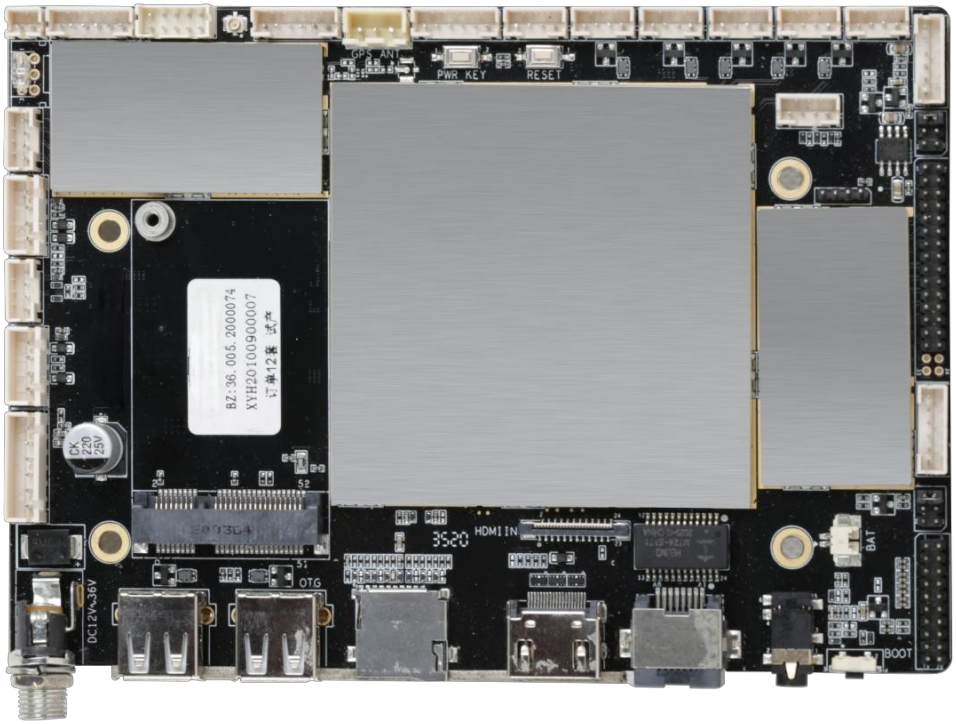
OVMB-ARM-A32G uses RK3288/RK3288K Cortex-A17 quad-core processor, basic frequency is 1.6GHz. OVMB-ARM-A32G Uses Mali-T764 GPU, it has H.265 hardware decoder to supports 4K display. Whether it is games, test performance scores or decoding, OVMB-ARM-A32G is your best choice for human-computer interaction and medical industry projects.

## 1.3 Features

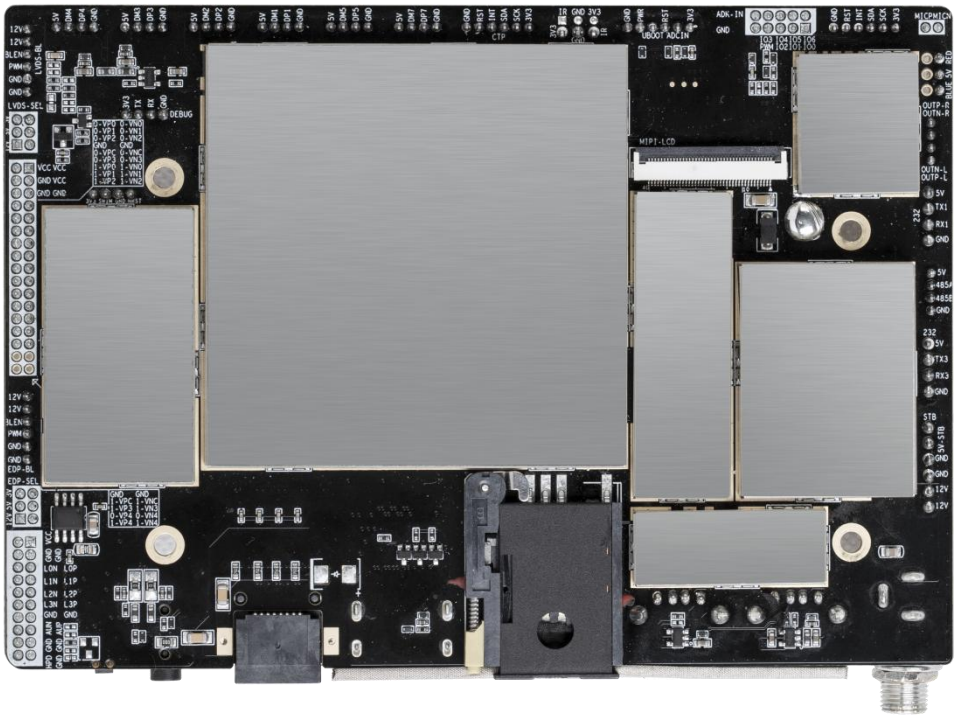
- High integration, OVMB-ARM-A32G integrated LVDS/EDP/Ethernet/HDMI/WIFI/Blue tooth functions.
- Built-in PCI-E 3G module. OVMB-ARM-A32G Supports PCIE 3G/4G module from HUAWEI,ZTE or other brand, it also supports VoLTE.
- Various expansion interfaces. OVMB-ARM-A32G has 8 USB ports(6 internal expansion ports and 2 USB standard ports.), two 232 ports and a 485 port, it can satisfy your customization requirement.
- High def inition.OVMB-ARM-A32G supports 4K 3840x2160 decoding and LCD display with various LVDS/EDP interfaces, it also supports Special-shaped screens of various sizes and resolutions.
- Support Android system customization. OVMB-ARM-A32G provides system calling interface and API reference code, it supports development of upper-layer applications perfectly.
- OVMB-ARM-A32G supports infrared, optical, capacitance, resistance and other mainstream touch screen, it also supports drive-free HID configuration which no need to debug before using..

## 1.4 Front/Back Side Picture

【Front】




【Back】

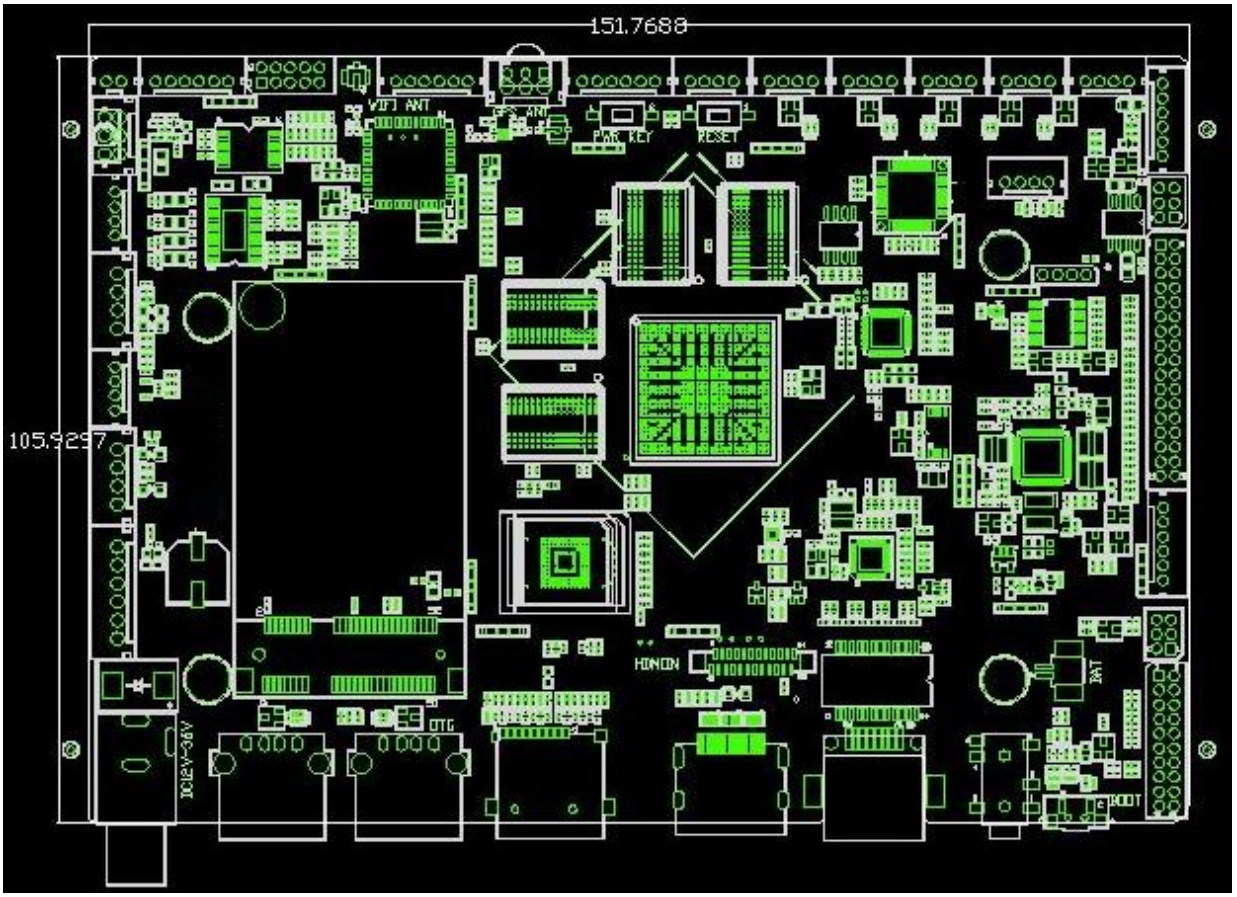


# Chapter 2 Basic Informatio

| Specifications | |
|---|---|
| CPU | RK3288, Quad-core, 1.6GHz |
| Memory | 2G(4G optional) |
| Storage | EMMC 16G(8/32/64G optional,maximum 64G) |
| ROM | 4KB EEPROM |
| Resolution | Maximum 3840*2160 |
| OS | Android 7.1/10.0 |
| Play Mode | Supports multiple play modes such as loop,timing and interstitial. |
| Network | 4G,Ethernet,WiFi/BT4.0,Wireless peripheral extension |
| Video Format | Support WMV,AVI,FLV,RM,RMVB,MPEG,TS,MP4 etc |
| Photograph Format | Support BMP,JPEG,PNG,GIF |
| USB | USB HOST*2,USB interface*6 |
| Serial Port | 232*2，485*1 |
| GPS | External GPS(Optional) |
| WIFI、BT | Built-in WIFI，BT4.0 |
| 4G | Unlocked,Support voice call(base on 4G module,Optional) |
| Ethernet | 10M/100M/1000M adapt Ethernet |
| TF Card | Trans flash Card supported |
| LVDS | LVDS*1,support 50/60Hz LCD panel |
| EDP | Support Multi-resolution EDP interface LCD panel |
| HDMI | HDMI*1, support 1080P@120Hz，4kx2k@60Hz output |
| AV Output | Built-in dual 4Ω/20W，8Ω/10W amplifier |
| Real Time Clock | Supported |
| Timing turn on/off | Supported |
| OS upgrade | Support upgrade through TF,USB |

# Chapter 3 PCB And Interface

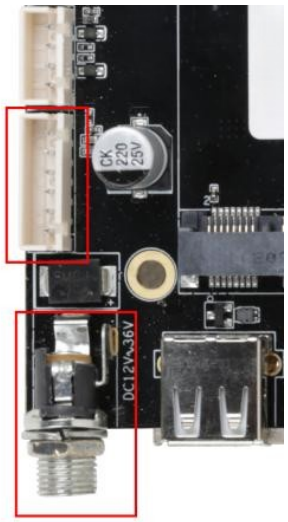
## 3.1 PCB Drawing



## 3.2 Interface Parameter Definition

### ◆ Power Input

12V DC power supply, motherboard can only uses power input from DC port or power input port.

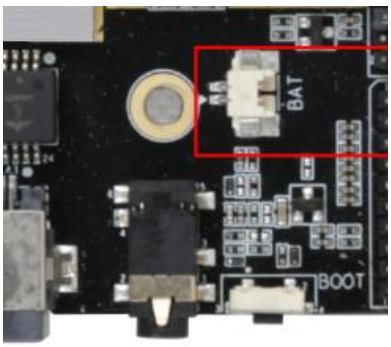



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | INPUT | 12V Input |
| 2 | VCC | INPUT | 12V Input |
| 3 | GND | GROUND | Ground |
| 4 | GND | GROUND | Ground |
| 5 | 5V-STB | INPUT | 5V Input(default is disable) |
| 6 | STB | I/O | Connect to MCU pin |

5V-STB and STB(I/O) are designed for power board standby function, if customer need low-power consumption standby, connect 5V-STB(OVMB-ARM-A32G) to 5V-STB(Power board) and connect STB(Output) to PS_ON(Power board),please notice that different brand of power board might have difference on define of those two pin,please refer to actual conditions. If this function is not needed, user can disconnect those two pins(in this situation motherboard will disable standby function).

## ◆ RTC Battery

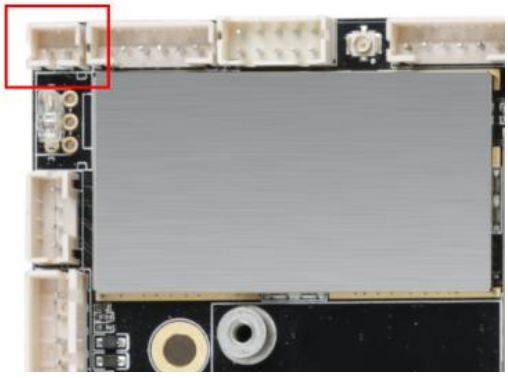
Supply power to OS clock when peripheral power is disconnect.




| SN | DEEN | Property | Description |
|---|---|---|---|
| 1 | RTC | INPUT | 3V Input |
| 2 | GND | GROUND | Ground |

## ◆ MIC

Please mind MIC P/N poles.



| SN | DEEN | Property | Description |
|---|---|---|---|
| 1 | MIC1N | INPUT | MIC- |
| 2 | MIC1P | INPUT | MIC+ |

## ◆ Telecontrol

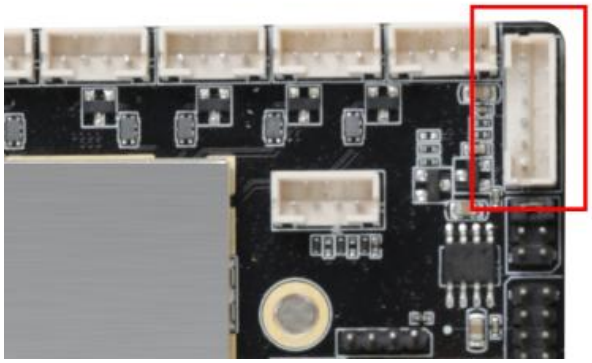

| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | IR | INPUT | Telecontrol signal Input |
| 2 | GND | GROUND | Ground |
| 3 | 3V3 | Power | 3.3V Output |

## ◆ Indicator


| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | LED_B | Blue | Work state indicator |
| 2 | VCC | Power | 3.3V Output |
| 3 | LED_R | Red | Standby state indicator |

## ◆ Backlight Control Port

This port is designed for LVDS panel’ s backlight control function, the current of 12V power supply is 2A, if screen backlight power beyond 24W, in order to prevent system unstable defect, please connect backlight cable to other power panel.This interface can only be used to supply backlight power, never connect it to other device as power input.



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | GND | GROUND | Ground |
| 2 | GND | GROUND | Ground |
| 3 | BL_ADJ | OUTPUT | Backlight brightness control |
| 4 | BL_EN | OUTPUT | Backlight dis/enable control |
| 5 | VCC | Power | 12V Output |
| 6 | VCC | Power | 12V Output |

## ◆ LVDS Screen Panel Port

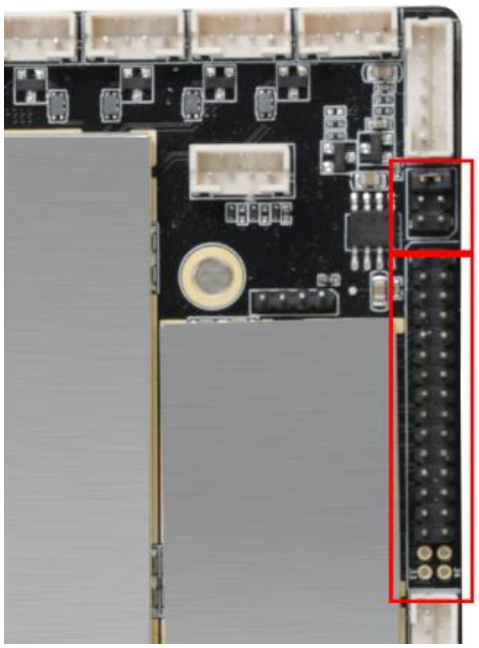
Common LVDS pin definition, support single/dual, 6/8bit LVDS panel, user can change port voltage level by move jumper cap position, 3.3V/5V/12V is optional.

To prevent board and screen panel burning-out, please notice below:

1.Confirm LVDS screen panel’s voltage in SPEC is correct and it’s correspond to motherboard power supply, please also confirm that motherboard can provide maximum current which LVDS screen panel required.

2.Please use multimeter to test motherboard output voltage, make sure jumper cap mounted on the right position.

3.When you connect 6/8bit LVDS screen, make sure pin on cable and board is aligned(pin1 to pin1 for example).

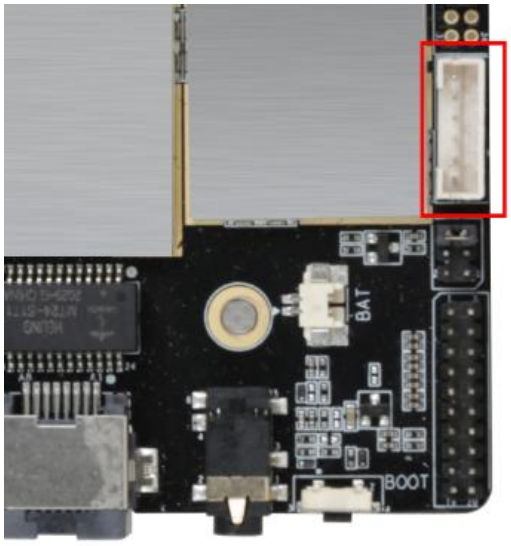


| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power OUTPUT | LCD power Output, +3.3v/+5V/+12V(optional) |
| 2 | | | |
| 3 | | | |
| 4 | GND | GROUND | Ground |
| 5 | | | |
| 6 | | | |
| 7 | D0N | OUTPUT | Pixel0 Negative Data (Odd) |
| 8 | D0P | OUTPUT | Pixel0 Positive Data (Odd) |
| 9 | D1N | OUTPUT | Pixel1 Negative Data (Odd) |
| 10 | D1P | OUTPUT | Pixel1 Positive Data (Odd) |
| 11 | D2N | OUTPUT | Pixel2 Negative Data (Odd) |
| 12 | D2P | OUTPUT | Pixel2 Positive Data (Odd) |
| 13 | GND | GROUND | Ground |
| 14 | GND | GROUND | Ground |
| 15 | CL0N | OUTPUT | Negative Sampling Clock (Odd) |
| 16 | CL0P | OUTPUT | Positive Sampling Clock (Odd) |
| 17 | D3N | OUTPUT | Pixel3 Negative Data (Odd) |

| | | | |
|---|---|---|---|
| 18 | D3P | OUTPUT | Pixel3 Positive Data (Odd) |
| 19 | D5N | OUTPUT | Pixel0 Negative Data (Even) |
| 20 | D5P | OUTPUT | Pixel0 Positive Data (Even) |
| 21 | D6N | OUTPUT | Pixel1 Negative Data (Even) |
| 22 | D6P | OUTPUT | Pixel1 Positive Data (Even) |
| 23 | D7N | OUTPUT | Pixel2 Negative Data (Even) |
| 24 | D7P | OUTPUT | Pixel2 Positive Data (Even) |
| 25 | GND | GROUND | Ground |
| 26 | GND | GROUND | Ground |
| 27 | CL1N | OUTPUT | Negative Sampling Clock (Even) |
| 28 | CL1P | OUTPUT | Positive Sampling Clock (Even) |
| 29 | D8N | OUTPUT | Pixel3 Negative Data (Even) |
| 30 | D8P | OUTPUT | Pixel3 Positive Data (Even) |

## ◆ EDP Screen Backlight Port

This port is designed for EDP panel’ s backlight control function, the current of 12V power supply is 2A, if screen backlight power beyond 24W, in order to prevent system unstable defect, please connect backlight cable to another power panel.Backlight dis/enable controller voltage is 5V, if EDP screen request other voltage, please add a IO level-shift circuit.This port can only be used to supply backlight power, never connect it to other device as power input.

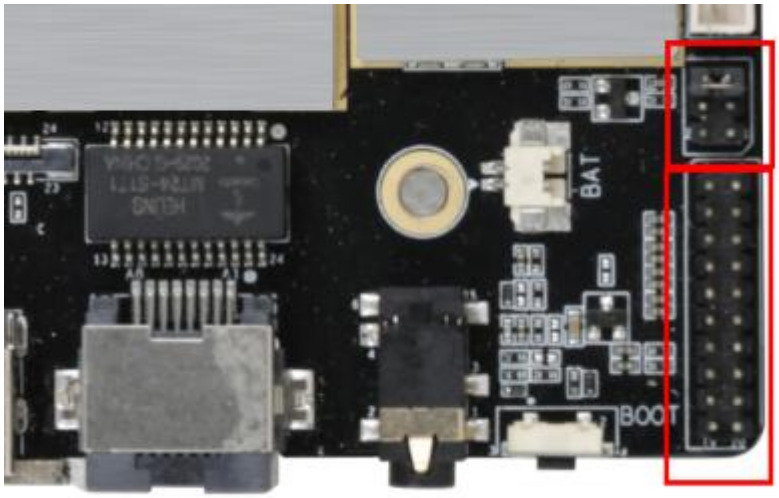


| SN | DEFN | Property | Description |
|---|---|---|---|
| 6 | VCC | Power | 12V Output |
| 5 | VCC | Power | 12V Output |
| 4 | EN | OUTPUT | Backlight dis/enable control |
| 3 | PWM | OUTPUT | Backlight brightness control |
| 2 | GND | GROUND | Ground |
| 1 | GND | GROUND | Ground |

## ◆ EDP

Jumper cap can be mounted on different position to change power output(3.3V/5V/12V), pleas check silkscreen on PCB backside.

Please check the pin definition on board and cable, make sure pin on cable and board is aligned(pin1 to pin1 for example).

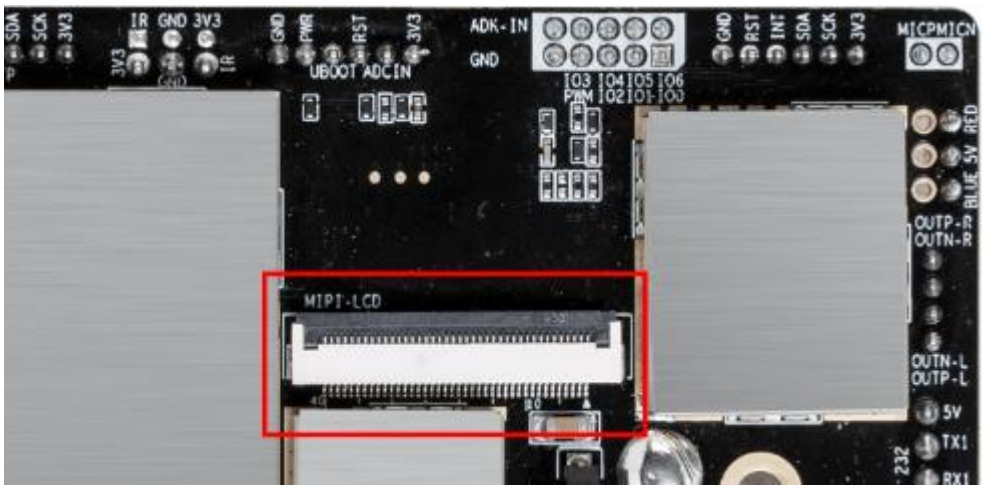



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power OUTPUT | LCD Power Output，+3.3V/+5V/+12V optional |
| 2 | | | |
| 3 | GND | GROUND | Ground |
| 4 | | | |
| 5 | TX0P | OUTPUT | EDP Pixel0 Positive Data (Odd) |
| 6 | TX0N | OUTPUT | EDP Pixel0 Negative Data (Odd) |
| 7 | TX1P | OUTPUT | EDP Pixel1 Positive Data (Odd) |
| 8 | TX1N | OUTPUT | EDP Pixel1 Negative Data (Odd) |

| | | | |
|---|---|---|---|
| 9 | TX2P | OUTPUT | EDP Pixel2 Positive Data (Odd) |
| 10 | TX2N | OUTPUT | EDP Pixel2 Negative Data (Odd) |
| 11 | TX3P | OUTPUT | EDP Pixel3 Positive Data (Odd) |
| 12 | TX3N | OUTPUT | EDP Pixel3 Negative Data (Odd) |
| 13 | GND | GROUND | Ground |
| 14 | GND | GROUND | Ground |
| 15 | AUXP | OUTPUT | EDP AUX Positive Data (Odd) |
| 16 | AUXN | OUTPUT | EDP AUX Negative Data (Odd) |
| 17 | GND | GROUND | Ground |
| 18 | | | |
| 19 | | | |
| 20 | HPD | INPUT | EDP Detect |

## ◆ MIPI

MIPI port support single channel MIPI LCD screen, the maximum resolution and frequency for 4 channels is 1920*1200@60fps.



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | NC | - | Not connect |
| 2 | VDD | Power | Digital power |
| 3 | VDD | Power | Digital power |
| 4 | GND | GROUND | Ground |
| 5 | REST | OUTPUT | Global reset pin |
| 6 | NC | - | Not connect |
| 7 | GND | GROUND | Ground |
| 8 | D0N | OUTPUT | Negative MIPI differential data output |
| 9 | D0P | OUTPUT | Positive MIPI differential data output |
| 10 | GND | GROUND | Ground |
| 11 | D1N | OUTPUT | Negative MIPI differential data output |
| 12 | D1P | OUTPUT | Positive MIPI differential data output |
| 13 | GND | GROUND | Ground |
| 14 | CLKN | OUTPUT | Negative MIPI differential data output |
| 15 | CLKP | OUTPUT | Positive MIPI differential data output |
| 16 | GND | GROUND | Ground |
| 17 | D2N | OUTPUT | Negative MIPI differential data output |
| 18 | D2P | OUTPUT | Positive MIPI differential data output |
| 19 | GND | GROUND | Ground |
| 20 | D3N | OUTPUT | Negative MIPI differential data output |
| 21 | D3P | OUTPUT | Positive MIPI differential data output |
| 22 | GND | GROUND | Ground |
| 23 | NC | - | Not connect |
| 24 | NC | - | Not connect |
| 25 | GND | GROUND | Ground |
| 26 | NC | - | Not connect |
| 27 | NC | - | Not connect |
| 28 | NC | - | Not connect |
| 29 | NC | - | Not connect |
| 30 | GND | GROUND | Ground |
| 31 | LED- | Power | LED Cathode |
| 32 | LED- | Power | LED Cathode |
| 33 | NC | - | Not connect |
| 34 | NC | - | Not connect |

| | | | |
|---|---|---|---|
| 35 | NC | - | Not connect |
| 36 | NC | - | Not connect |
| 37 | NC | - | Not connect |
| 38 | NC | - | Not connect |
| 39 | LED+ | Power | LED Anode |
| 40 | LED+ | Power | LED Anode |

## ◆ 232 *2

Motherboard provides two 232 serial ports which can support mainstream 232 serial ports devices.

Note:

1.232 serial port level on board must matched with device's level, those serial ports don't support TTL/485 device connect directly.

2.TX/RX pin must connect to cable TX/RX pin correctly.


| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | GND | GROUND | Ground |
| 2 | 232-RX | INPUT | 232-RX |
| 3 | 232-TX | OUTPUT | 232-TX |
| 4 | VCC | Power | 5V Output |

## ◆ RS485*1

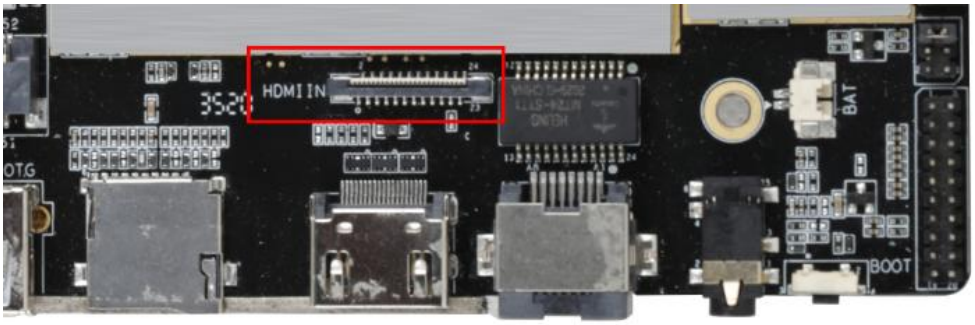
To prevent motherboard and screen panel burning-out, please notice below:

1.Confirm MIPI LCD electrical parameter in SPEC is correct and its request is in consonance with board power supply.

2.Please confirm pin definition on board and screen interface is the same, make sure FPC cable is correct.


| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | GND | GROUND | Ground |
| 2 | 485B | DIF | Differential B |
| 3 | 485A | DIF | Differential A |
| 4 | VCC | Power | 5V Output |

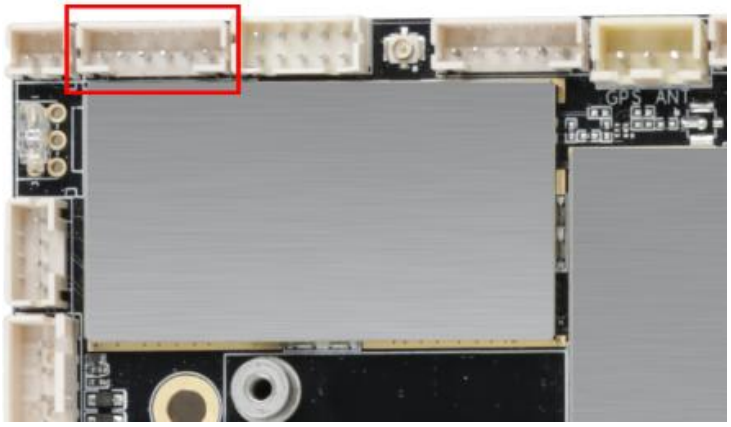
## ◆ HDMI IN




| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power | 5V Output |
| 2 | PWREN | OUTPUT | Power dis/enable |
| 3 | GND | GROUND | Ground |
| 4 | GND | GROUND | Ground |
| 5 | D0N | INPUT/OUT | MIPI Data Channel 0 Negative |
| 6 | D0P | INPUT/OUT | MIPI Data Channel 0 Positive |
| 7 | D1N | INPUT/OUT | MIPI Data Channel 1 Negative |
| 8 | D1P | INPUT/OUT | MIPI Data Channel 1 Positive |
| 9 | D2N | INPUT/OUT | MIPI Data Channel 2 Negative |
| 10 | D2P | INPUT/OUT | MIPI Data Channel 2 Positive |
| 11 | D3N | INPUT/OUT | MIPI Data Channel 3 Negative |
| 12 | D3P | INPUT/OUT | MIPI Data Channel 3 Positive |
| 13 | CLKN | INPUT/OUT | MIPI Clock Channel Negative |
| 14 | CLKP | INPUT/OUT | MIPI Clock Channel Positive |
| 15 | INT | INPUT | Interrupt |
| 16 | STBY | OUTPUT | Standby control |
| 17 | IR | INPUT | Undetermined |
| 18 | RST | OUTPUT | Reset Signal |
| 19 | NC | NC | NC |
| 20 | NC | NC | NC |
| 21 | NC | NC | NC |
| 22 | NC | NC | NC |
| 23 | I2C4_SDA | INPUT/OUT | SDA signal |
| 24 | I2C4_SCL | OUTPUT | SCL signal |

## ◆ IIC Switch Port

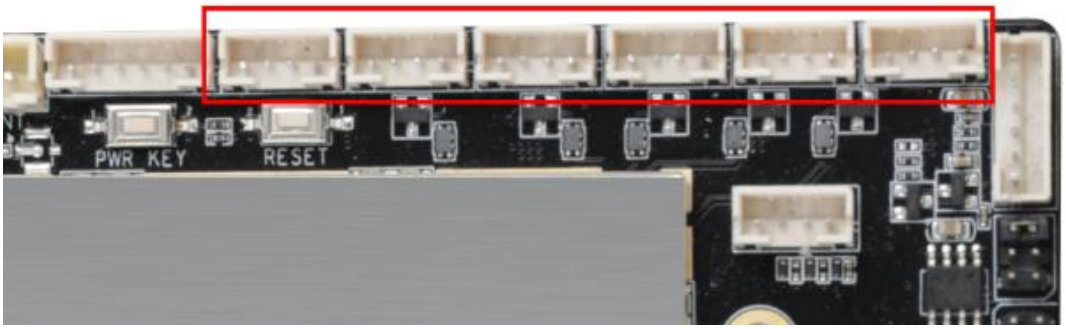
With a transform board from our company, I2C switch port can transform to TTL serial port or 8 channel GPIO port. It is designed for situations that lack of TTL/GPIO output.

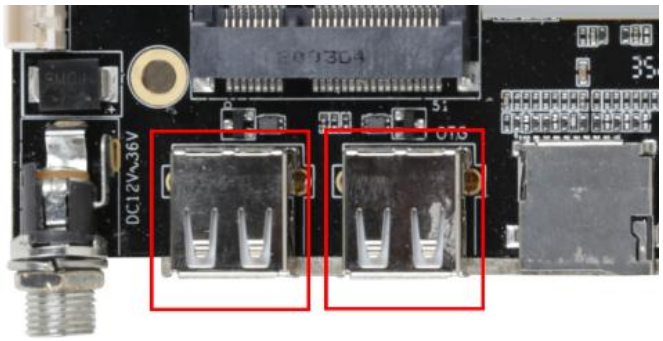



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power | 3.3V Output |
| 2 | SCK | INPUT/OUTPUT | I2C Clock |
| 3 | SDA | INPUT/OUTPUT | I2C Data |
| 4 | INT | INPUT/OUTPUT | Interrupt |
| 5 | RST | INPUT/OUTPUT | Reset |
| 6 | GND | GROUND | Ground |

## ◆ USB

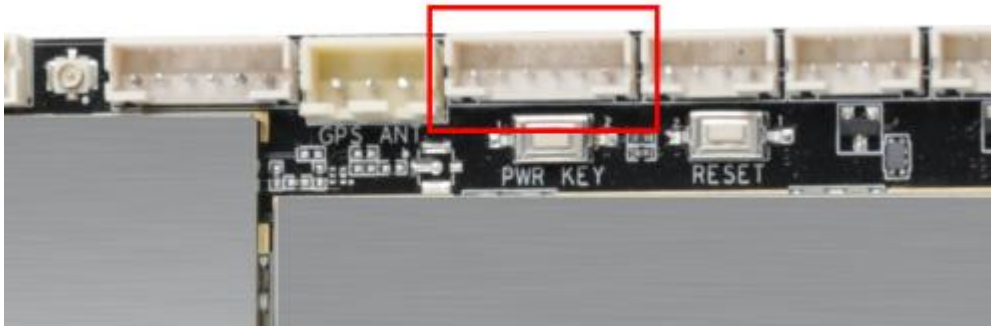
Motherboard provides 2 Host USB standard ports(host*1,OTG*1), and 6 internal USB ports.





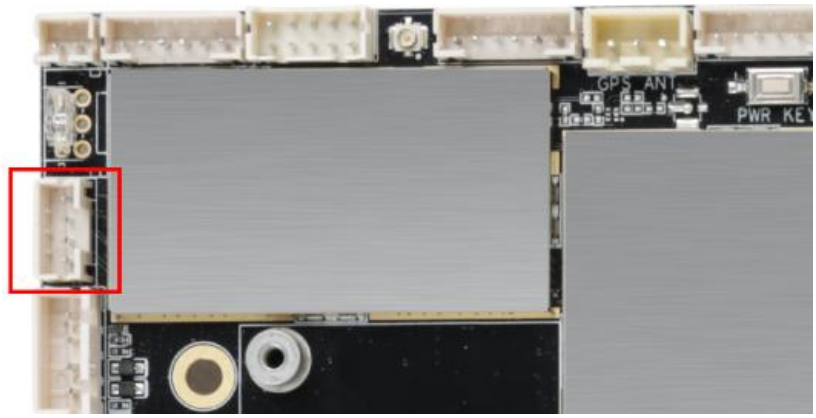

| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power | 5V Output |
| 2 | DM | INPUT/OUTPUT | DM |
| 3 | DP | INPUT/OUTPUT | DP |
| 4 | GND | GROUND | Ground |

## ◆ Touch Screen(TP)



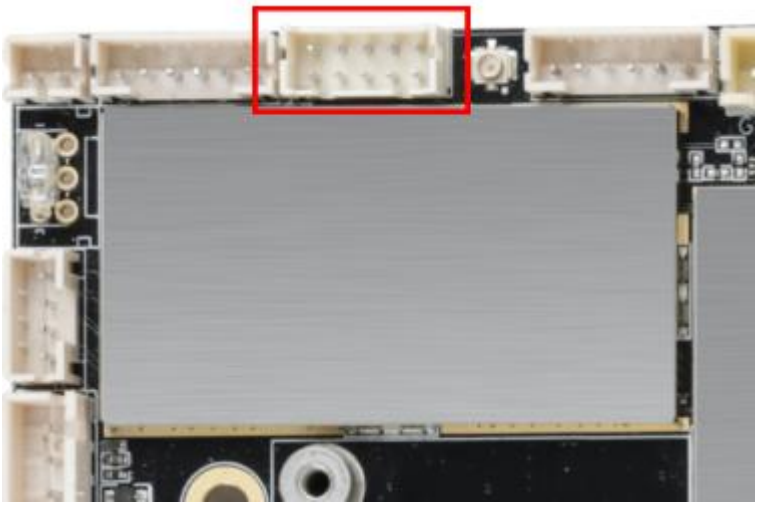

| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power | 3.3V Output |
| 2 | SCL | INPUT/OU | I2C Clock |
| 3 | SDA | INPUT/OU | I2C Data |
| 4 | INT | INPUT/OU | Interrupt |
| 5 | RST | INPUT/OU | Reset |
| 6 | GND | GROUND | Ground |

## ◆ Speaker



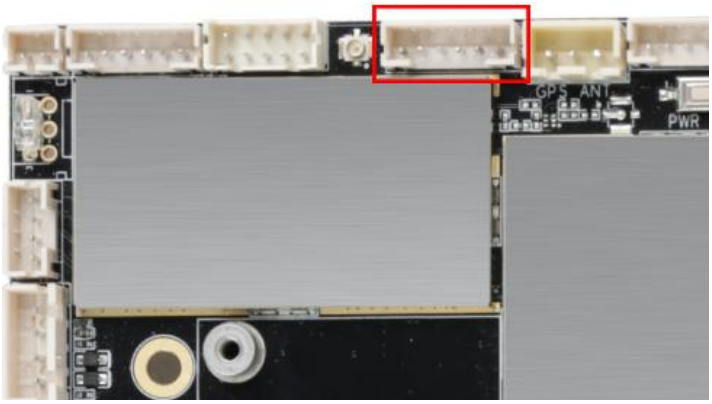

| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | RP | OUTPUT | Audio Output Right+ |
| 2 | RN | OUTPUT | Audio Output Right- |
| 3 | LN | OUTPUT | Audio Output Left- |
| 4 | LP | OUTPUT | Audio Output Left+ |

## ◆ GPIO



| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | GPIO0_B5 | INPUT/OUTPUT | IO Port |
| 2 | GPIO0_B1 | INPUT/OUTPUT | IO Port |
| 3 | GPIO0_A1 | INPUT/OUTPUT | IO Port |
| 4 | GPIO0_A7 | INPUT/OUTPUT | IO Port |
| 5 | GPIO6_A5 | INPUT/OUTPUT | IO Port |
| 6 | GPIO7_A4 | INPUT/OUTPUT | IO Port |
| 7 | MIPI_BL_PWM | NC | NC |
| 8 | GPIO6_A6 | INPUT/OUTPUT | IO Port |
| 9 | GND | GROUND | Ground |
| 10 | ADC_IN | INPUT | ADC Signal |

## ◆ Button




| SN | DEFN | Property | Description |
|---|---|---|---|
| 1 | VCC | Power | 5V Output |
| 2 | ADC | INPUT | ADC Signal |
| 3 | RST | INPUT | Reset Signal |
| 4 | UBOOT | INPUT | Connect To A Upgrade Button |
| 5 | PWR_ON | INPUT | Connect To A Power Button |
| 6 | GND | GROUND | Ground |

## ◆ Other Standard Interfaces And Functions

| | | |
|---|---|---|
| Storage | TF card | Data storage, maximum 1T |
| | USB | HOST interface， support data storage/input, USB mouse/key board, camera, touch screen etc. |
| Ethernet | RJ45 | Support 1000M wired internet |
| HDMI | Standard | Support HDMI data output, maximum definition 4K |
| Audio | Standard | 3.5mm standard interface |
| 4G | PCI-E Standard | Support HUAWEI,ZTE or other brand’s PCI-E 3G/4G module |
| SIM | Standard | Support all standard(depend on 4G module) |

# Chapter 4 Electrical Parameter

| ITEM | | MIN | NORMAL | MAX |
|---|---|---|---|---|
| Power | Voltage | -- | 12V | -- |
| | Ripple | -- | -- | 50mV |
| | Current | 3A | | |
| Working parameter(HDMI screen only) | Work | -- | 200mA | 350mA |
| | Standby | -- | 17mA | 20mA |
| | USB Supply | -- | -- | 500mA |
| LVDS | 3.3V | -- | 400 mA | 500 mA |
| | 5V | -- | 550 mA | 1A |
| | 12V | -- | 580 mA | 1A |
| | USB Supply | -- | -- | 500mA |
| EDP | 3.3V | | 400 mA | 500 mA |
| | 5V | -- | -- | -- |
| | 12V | -- | -- | -- |
| | USB Supply | -- | -- | 500mA |
| Total output | Current | 3.3V | -- | 800mA |
| Environment | Relative humidity | -- | -- | 80% |
| | Operating temperature | -20℃ | -- | 70℃ |

**Remark 1:**

Please chose the right backlight working voltage(3.3V,5V) for LVDS screen. To prevent device burnout, please confirm LVDS screen′ s maximum working current before connect it to our motherboard.

**Remark 2:**

When connect motherboard to EDP/LVDS screen, motherboard′ s working voltage and current is depend on EDP/LVDS screen, therefore we didn′ t list those parameter on above list.

# Chapter 5 Assembling Cautions

**During assembling, please pay attention to notes below.**

1. No short circuit between board and device;

2. Avoid motherboard bend or twist when mounted on user's device frame;

3. Confirm LVDS/EDP screen's requested voltage and current is correspond to motherboard output, mind the connector's pin definition and connect the pin correctly;

4. If backlight power requested is beyond 20W, please connect backlight to another power board;

5. When user mounting peripheral device(USB,IO etc), please mind the IO level and current output ;

6. When mounting serial port,pleas mind whether 232/485 device is connected and TX/RX pin connected correctly;

7. Check whether power input connected to input interface, make sure total input voltage and total input current suit user's request, please don't use backlight interface to supply power to other device.

# MotherBoard Series
# Embedded Android CPU
# OVMB-ARM-A32G