

SinoVoip CO.,LTD

Banana PI BPI-M1+

User Manual

<Version: V2.0 >





Banana PI BPI-M1+ is the open source hardware platform, Banana PI BPI-M1+ is the dual core Android 4.4 product which more better than the Raspberry Pi.

Banana Pi BPI-M1+ series run Android, Debian linux, Ubuntu linux, Raspberry Pi imange and cubieboard imange.

Elastos coordinate multi CUP to from the family cloud entirment which based on the “software/hardware service”

Banana PI BPI-M1+ hardware: 1Ghz ARM7 dual-core processor, 1GB DDR3 SDRAM, WIFI support onboard

Banana PI BPI-M1+ with Gigabit ethernet port, SATA Socket. It can run with Android 4.4 smoothly. The size of Banana PI BPI-M1+ like the credit card, it can easily run with the game it support 1080P high definition video output, the GPIO compatible with Raspberry Pi and can run the ROM Image directly

Hardware Specification of Banana pi BPI-M1+

| | |
|-------|--|
| Soc | A20 ARM Cortex™-A7 Dual-Core |
| CPU | ARM® Cortex™-A7 Dual-Core 1GHz (ARM v7 instruction set) |
| GPU | Mali400MP2 Complies with OpenGL ES 2.0/1.1 (hardware acceleration support) |
| SDRAM | 1GB DDR3 (shared with GPU) |
| Power | 5V @ 2A via MicroUSB (DC in Only) and/or MicroUSB (OTG) |
| PMU | AXP209 |

Features

| | |
|-----------------------|--|
| | 40 Pins Header, 28×GPIO, some of which can be used for specific functions |
| Low-level peripherals | including UART, I2C, SPI, PWM, CAN, I2S, SPDIF, LRADC, ADC, LINE-IN, FM-IN, HP-IN. |
| On board Network | 10/100/1000Mbps ethernet (Realtek RTL8211E/D) |
| Wifi Module | WiFi 802.11 b/g/n (AP 6181 module on board) |
| Bluetooth | Optional |
| On board Storage | MicroSD (TF) card, SATA 2.0 |



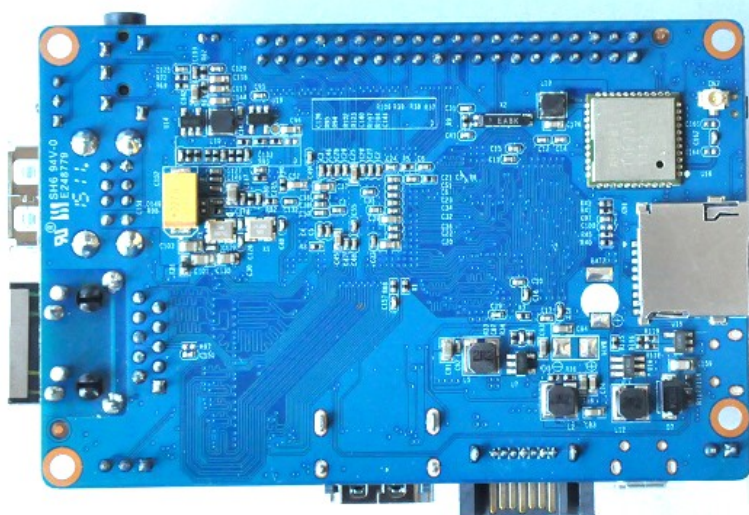
| | |
|----------------------|---|
| | Supports multi-channel HD display: |
| | HDMI 1.4 (Type A - full) |
| Display | LVDS/RGB/CPU display interface (DSI) for raw LCD panels |
| | Composite video (PAL and NTSC) (via 3.5 mm TRRS jack shared with audio out) |
| | 11 HDMI resolutions from 640×480 to 1920×1080 plus various PAL and NTSC standards |
| | HD H.264 2160p video decoding |
| Video | Mutil-format FHD video decoding, including Mpeg1/2, Mpeg4, H.263, H.264, etc |
| | H.264 high profile 1080p@30fps or 720p@60fps encoding |
| Audio outputs | HDMI,analog audio (via 3.5 mm TRRS jack shared with composite video out),I2S audio (also potentially for audio input) |
| Camera | Parallel 8-bit camera interface |
| Audio input | On board microphone |
| USB | 2 USB 2.0 host, 1 USB 2.0 OTG (all direct from A20 chip) |
| Buttons | Reset button Power button U-boot button |
| Leds | Power status led (red),User defined led1 (green) , |
| Other | IR reciever |
| Interface definition | |
| Sizes | 92 mm × 60mm |
| Weight | 45g |

Hardware

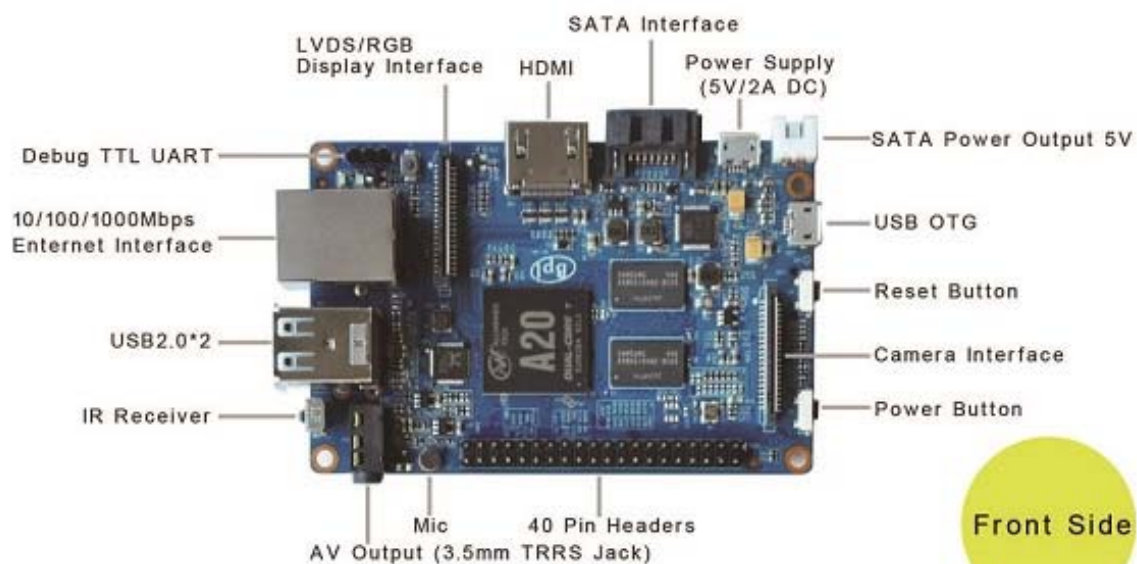
Front:



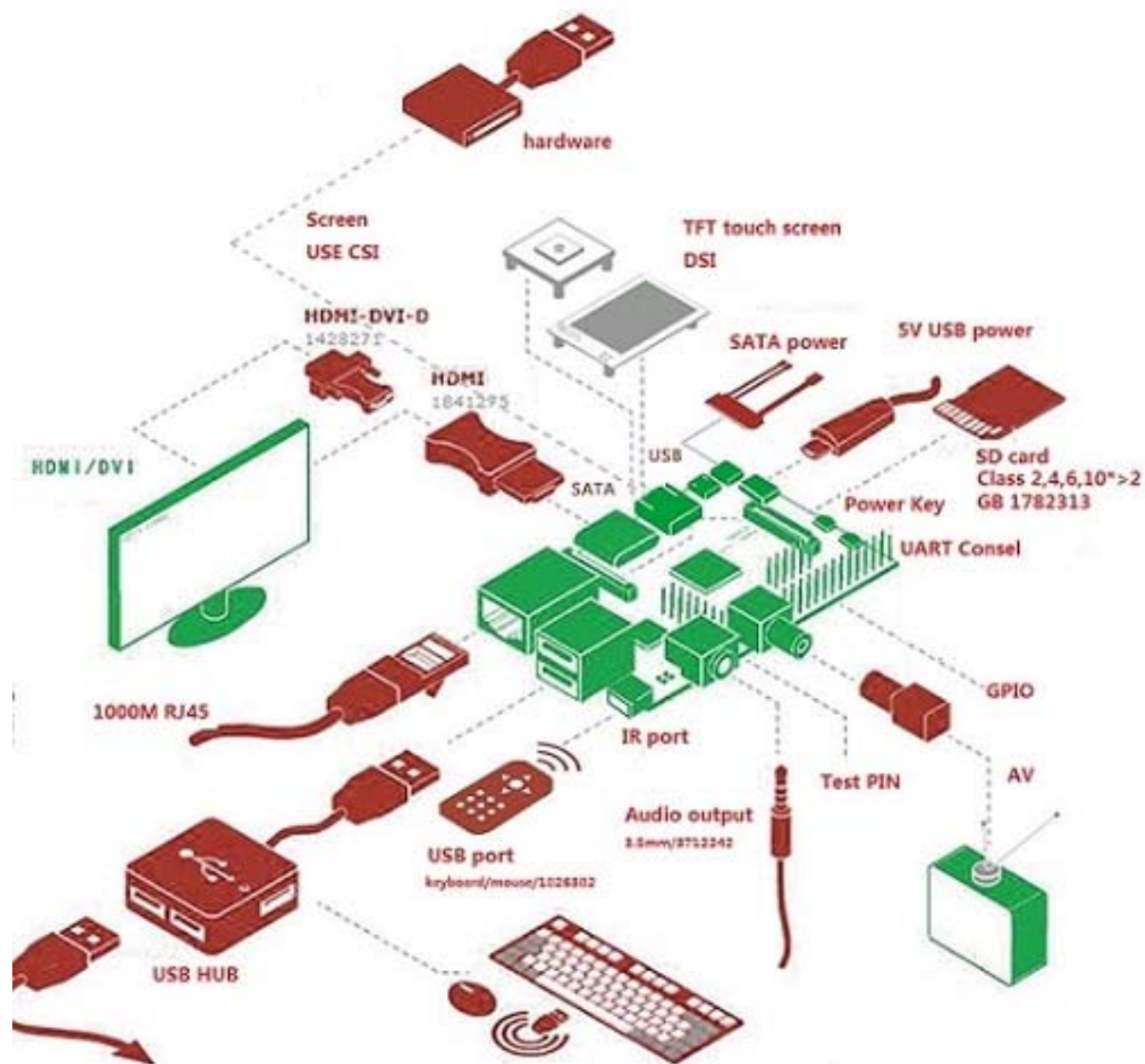
Back:



Interface



Hardware connect sketch map



Use method

Step 1: Get what you need

First time to enjoy your Banana Pi, you need at least the accessories in the table below.

| No. | Item | Minimu recommended specification & notes |
|-----|-------------------------------------|--|
| 1 | SD card | <ul style="list-style-type: none">• Minimum size 4Gb; class 4 (the class indicates how fast the card is).• We recommend using branded SD cards as they are more reliable. |
| 2a | HDMI(Full sized) to HDMI / DVI lead | <ul style="list-style-type: none">• HDMI to HDMI lead (for HD TVs and monitors with HDMI input).OR• HDMI to DVI lead (for monitors with DVI input). |
| 2b | AV video lead | <ul style="list-style-type: none">• A standard AV video lead to connect to your analogue display if you are not using the HDMI output. |
| 3 | Keyboard and mouse | <ul style="list-style-type: none">• Any standard USB keyboard and mouse should work.• Keyboards or mice that take a lot of power from the USB ports, however, may need a powered USB hub. This may include some wireless devices. |
| 4 | Ethernet cable/USB WiFi(Optional) | <ul style="list-style-type: none">• Networking is optional, although it makes updating and getting new software for your Banana Pi much easier. |
| 5 | Micro USB power adapter | <ul style="list-style-type: none">• A good quality, micro USB power supply that can provide at least 700mA at 5V is essential.• Many mobile phone chargers are suitable—check the label on the plug. |
| 6 | Audio lead (Optional) | <ul style="list-style-type: none">• You can choose a 3.5mm jack audio lead to connect to audio port to get stereo audio. |
| 7 | Mobile Hard disk (Optional) | <ul style="list-style-type: none">• You can choose to connect a mobile hard disk to SATA port to store more files. |



Step 2: Download the relevant Image file:

Please visit our webmaster: www.banana-pi.com to download image, banana pi all image can be download form this web.

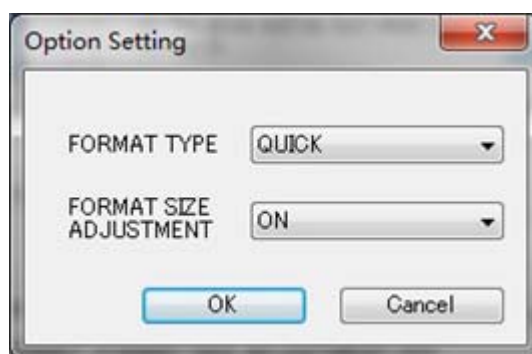
Step3: Prepare your SD card for the Banana Pi

In order to enjoy your Banana Pi, you will need to install an Operating System (OS) onto an SD card. Instructions below will teach you how to write an OS image to your SD card under Windows and Linux.

1. Insert your SD card into your computer. The size of SD should be larger than the OS image size, generally 4GB or greater.
2. Format the SD card.

Windows:

- i. Download the a SD card format tool such as **SD Formatter** from https://www.sdcard.org/downloads/formatter_4/eula_windows/
- ii. Unzip the download file and run the setup.exe to install the tool on your machine.
- iii. In the "Options" menu, set "FORMAT TYPE" option to QUICK, "FORMAT SIZE ADJUSTMENT" option to "ON".



- iv. Check that the SD card you inserted matches the one selected by the Tool.
- v. Click the “Format” button.

Linux:

- vi. Run `fdisk -l` command to check the SD card node.
- vii. Run `sudo fdisk /dev/sdx` command to delete all partition of SD card.
- viii. Run `mkfs -t vfat /dev/sdx` command to format the entire SD card as FAT.

(x should be replaced according to your SD card node)

3. Download the OS image from Download district.
4. Unzip the download file to get the OS image.

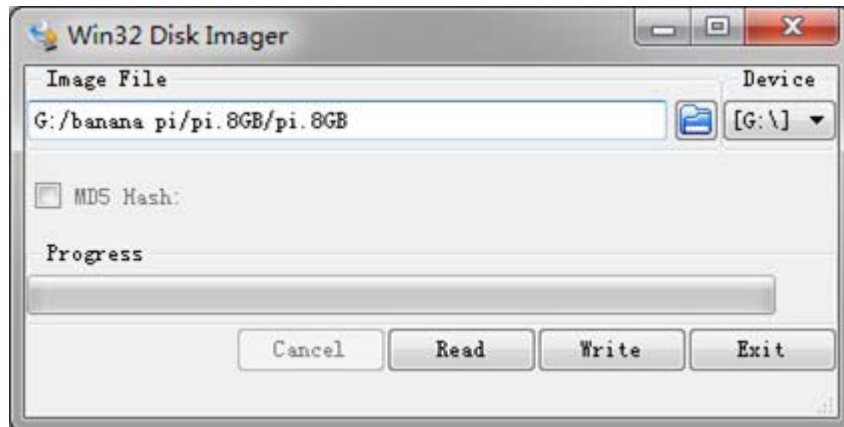
Windows: Right click on the file and choose “Extract all”.

Linux: Run `unzip [downloaded filename]` command.

5. Write the image file to the SD card.

Windows:

- i. Download a tool that can write image to SD card, such as **Win32 Diskimager** from:
<http://sourceforge.net/projects/win32diskimager/files/Archive/>
- ii. Open the unzipped image file.



- iii. Click Write button. Wait patiently to successfully complete writing.

Linux:

- iv. Run `fdisk -l` command to check the SD card node.
- v. Run `dd if=[imagenname] of=/dev/sdx` command to write image file to SD card. Wait patiently to successfully complete writing.

Step4: Set up your Banana Pi

According to the set up diagram below, you can easily set up your Banana Pi.

1. Insert the written-image SD card that to the SD card spot on the left side edge of the underside of the board.
2. On the bottom "edge" in the middle of the board is the HDMI Type A (Full sized) port, just on the right of the SATA port. Just connect any HDMI cable from the board to your TV or HDMI Monitor.

If you don't have an TV/Monitor with a HDMI or DVI-D port you can use the

yellow AV jack located in the middle of the "top" edge and the 3.5 mm stereo headphone jack to the right of it.

3. Plug a USB keyboard and mouse into the USB slots located on the right edge.
4. Just under the USB ports on the right edge is the ethernet connector for anyone who wants to plug the Banana Pi into a wired network.
5. Finally, at the very left of the bottom edge is the micro-usb power connector. Plug in a regulated power supply that is rated at $5V \pm 5\%$ and at least 700mA (or 0.7A). Any number bigger than 700 mA (like 1000mA) will also work. Avoid using the smaller chargers used for small GSM phones, as these are often unregulated, even if they claim "5V 1A", they may do "5V" and may do "1A", but not at the same time!

The mini-USB (on the left) is the wrong one. It's thicker and looks like a trapezoid with its sides pinched in. The micro-USB (on the right) is the correct one. It is thinner and also looks like a trapezoid except it's sides are rounded outward.



If all goes well, the Banana Pi will boot in a few minutes. The screen will display the OS GUI.



Step5: Shut down your Banana Pi

You can use the GUI to shut down the Banana Pi safely.

Also you can run the command in the terminal:

sudo halt

or

sudo shutdown -h.

This will shut down the PI safely, (just use the power key to turn off might damage the SD-cards file system). After that you can press the power key for 5 seconds to turn it off.

If all is well ,so you can use banana pi now.



GPIO specification

Banana Pi 40-pin GPIO

Banana Pi has a 40-pin GPIO header that matches that of the Model B+ Raspberry Pi. Following is the Banana Pi GPIO Pinout:

| GPIO Pin Name | Default Function | Function2: GPIO |
|---------------|------------------|-----------------|
| CON3-P01 | VCC-3V3 | |
| CON3-P02 | VCC-DC | |
| CON3-P03 | TWI2-SDA | PB21 |
| CON3-P04 | VCC-DC | |
| CON3-P05 | TWI2-SCK | PB20 |
| CON3-P06 | GND | |
| CON3-P07 | PWM1 | PI3 |
| CON3-P08 | UART3_TX | PH0 |
| CON3-P09 | GND | |
| CON3-P10 | UART3_RX | PH1 |
| CON3-P11 | UART2_RX | PI19 |
| CON3-P12 | PH2 | PH2 |
| CON3-P13 | UART2_TX | PI18 |
| CON3-P14 | GND | |
| CON3-P15 | UART2_CTS | PI17 |
| CON3-P16 | CAN_TX | PH20 |
| CON3-P17 | VCC-3V3 | |
| CON3-P18 | CAN_RX | PH21 |
| CON3-P19 | SPI0_MOSI | PI12 |
| CON3-P20 | GND | |
| CON3-P21 | SPI0_MISO | PI13 |
| CON3-P22 | UART2_RTS | PI16 |
| CON3-P23 | SPI0_CLK | PI11 |
| CON3-P24 | SPI0_CS0 | PI10 |
| CON3-P25 | GND | |
| CON3-P26 | SPI0_CS1 | PI14 |
| CON3-P27 | TWI3-SDA | PI1 |
| CON3-P28 | TWI3-SCK | PI0 |
| CON3-P29 | I2S_MCLK | PB5 |
| CON3-P30 | GND | |



| | | |
|----------|----------|------|
| CON3-P31 | I2S_BCLK | PB6 |
| CON3-P32 | I2S_DI | PB12 |
| CON3-P33 | I2S_LRCK | PB7 |
| CON3-P34 | GND | |
| CON3-P35 | I2S_D00 | PB8 |
| CON3-P36 | UART7_RX | PI21 |
| CON3-P37 | IR0_TX | PB3 |
| CON3-P38 | UART7_TX | PI20 |
| CON3-P39 | GND | |
| CON3-P40 | SPDIF_D0 | PB13 |

CSI Camera Connector specification:

CSI Camera Connector

The CSI Camera Connector is a 40-pin FPC connector which can connect external camera module with proper signal pin mappings. The pin definitions of the CSI interface are shown as below. This is marked on the Banana Pi board as “CON1”.

| CSI Pin Name | Default Function | Function2: GPIO |
|--------------|------------------|-----------------|
| CON1 P01 | LINEINL | |
| CON1 P02 | LINEINR | |
| CON1 P03 | VCC-CSI | |
| CON1 P04 | ADC_X1 | |
| CON1 P05 | GND | |
| CON1 P06 | ADC_X2 | |
| CON1 P07 | FMINL | |
| CON1 P08 | ADC_Y1 | |
| CON1 P09 | FMINR | |
| CON1 P10 | ADC_Y2 | |
| CON1 P11 | GND | |
| CON1 P12 | CSI-FLASH | PH17 |
| CON1 P13 | LRADC0 | |
| CON1 P14 | TWI1-SDA | PB19 |
| CON1 P15 | LRADC1 | |
| CON1 P16 | TWI1-SCK | PB18 |
| CON1 P17 | CSI-D0 | PE4 |



| | | |
|----------|--------------|------|
| CON1 P18 | CSI0-STBY-EN | PH19 |
| CON1 P19 | CSI0-D1 | PE5 |
| CON1 P20 | CSI-PCLK | PE0 |
| CON1 P21 | CSI-D2 | PE6 |
| CON1 P22 | CSI0-PWR-EN | PH16 |
| CON1 P23 | CSI-D3 | PE7 |
| CON1 P24 | CSI0-MCLK | PE1 |
| CON1 P25 | CSI-D4 | PE8 |
| CON1 P26 | CSI0-RESET# | PH14 |
| CON1 P27 | CSI-D5 | PE9 |
| CON1 P28 | CSI-VSYNC | PE3 |
| CON1 P29 | CSI-D6 | PE10 |
| CON1 P30 | CSI-HSYNC | PE2 |
| CON1 P31 | CSI-D7 | PE11 |
| CON1 P32 | CSI1-STBY-EN | PH18 |
| CON1 P33 | AP-RESET# | |
| CON1 P34 | CSI1-RESET# | PH13 |
| CON1 P35 | CSI-IO0 | PH11 |
| CON1 P36 | HPR | |
| CON1 P37 | HPL | |
| CON1 P38 | IPSOUT | |
| CON1 P39 | GND | |
| CON1 P40 | IPSOUT | |

LVDS specification

LVDS (LCD display interface)

The LVDS Connector is a 40-pin FPC connector which can connect external LCD panel (LVDS) and touch screen (I2C) module as well. The pin definitions of this connector are shown as below. This is marked on the Banana Pi board as "CON2".

| LVDS Pin Name | Default Function | Function2 | Function3: GPIO |
|---------------|-------------------|-----------|-----------------|
| CON2 P01 | IPSOUT(5V output) | | |
| CON2 P02 | TWI3-SDA | | PI1 |
| CON2 P03 | IPSOUT(5V output) | | |
| CON2 P04 | TWI3-SCK | | PI0 |
| CON2 P05 | GND | | |
| CON2 P06 | LCD0-IO0 | | PH7 |
| CON2 P07 | LCDIO-03 | | PH12 |



| | | | |
|----------|------------|-----------|------|
| CON2 P08 | LCD0-IO1 | | PH8 |
| CON2 P09 | LCD0-D0 | LVDS0-VP0 | PD0 |
| CON2 P10 | PWM0 | | PB2 |
| CON2 P11 | LCD0-D1 | LVDS0-VN0 | PD1 |
| CON2 P12 | LCD0-IO2 | | PH9 |
| CON2 P13 | LCD0-D2 | LVDS0-VP1 | PD2 |
| CON2 P14 | LCD0-DE | | PD25 |
| CON2 P15 | LCD0-D3 | LVDS0-VN1 | PD3 |
| CON2 P16 | LCD0-VSYNC | | PD27 |
| CON2 P17 | LCD0-D4 | LVDS0-VP2 | PD4 |
| CON2 P18 | LCD0-HSYNC | | PD26 |
| CON2 P19 | LCD0-D5 | LVDS0-VN2 | PD5 |
| CON2 P20 | LCD0-CS | | PH6 |
| CON2 P21 | LCD0-D6 | LVDS0-VPC | PD6 |
| CON2 P22 | LCD0-CLK | | PD24 |
| CON2 P23 | LCD0-D7 | LVDS0-VNC | PD7 |
| CON2 P24 | GND | | |
| CON2 P25 | LCD0-D8 | LVDS0-VP3 | PD8 |
| CON2 P26 | LCD0-D23 | | PD23 |
| CON2 P27 | LCD0-D9 | LVDS0-VN3 | PD9 |
| CON2 P28 | LCD0-D22 | | PD22 |
| CON2 P29 | LCD0-D10 | | PD10 |
| CON2 P30 | LCD0-D21 | | PD21 |
| CON2 P31 | LCD0-D11 | | PD11 |
| CON2 P32 | LCD0-D20 | | PD20 |
| CON2 P33 | LCD0-D12 | | PD12 |
| CON2 P34 | LCD0-D19 | | PD19 |
| CON2 P35 | LCD0-D13 | | PD13 |
| CON2 P36 | LCD0-D18 | | PD18 |
| CON2 P37 | LCD0-D14 | | PD14 |
| CON2 P38 | LCD0-D17 | | PD17 |
| CON2 P39 | LCD0-D15 | | PD15 |
| CON2 P40 | LCD0-D16 | | PD16 |

UART specification:

The header CON4 is the UART interface. For developers of Banana Pi, this is an easy way to get the UART console output to check the system status and log message.



| CON4 Pin Name | Default Function | GPIO |
|---------------|------------------|------|
| CON4 P03 | UART0-TXD | PB22 |
| CON4 P02 | UART0-RXD | PB23 |
| CON4 P01 | GND | |