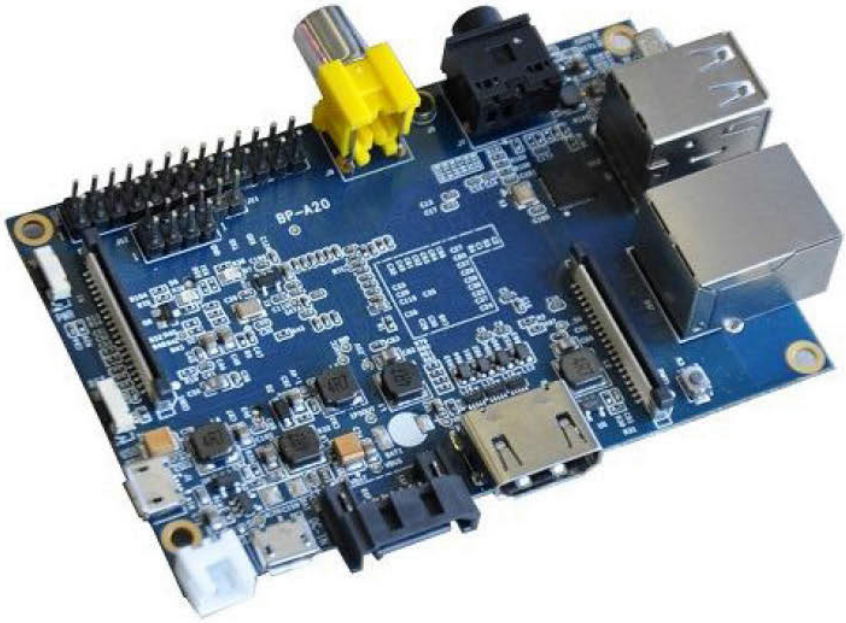
Banana PI
User Manual
<Version: V2.0 >



Banana PI is the open source hardware platform which published to assistant the Elastos.org open source OS, Banana PI M1 is the dual core Android 4.2 product which more better than the Raspberry Pi.

Banana Pi series run Android,Debian linux,Ubuntu linux, Raspberry Pi imange and cubieboard iinange.

Elastos coordinate inulti CUP to froin the family cloud entirinnent which based on the "software/hardware service"

Banana PI hardware: 1Ghz ARM7 dual-core processor, 1GB DDR3 SDRAM,

Banana PI with Gigabit ethernet port, SATA Socket. It can run with Android 4.2.2 smoothly. The size of Banana PI 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	
CPU	A20 ARM Cortex™-A7 Dual-Core
GPU	ARM Mali400MP2Complies with OpenGL ES 2.0/1.1
Memory (SDRAM)	1GB DDR3 (shared with GPU)
Onboard Storage	SD (Max. 64GB) / MMC card slot UP to 2T on 2.5 SATA disk
Onboard Network	10/100/1000 Etheruet RJ45,optional WIFI
Video Input	A CSI input connector allows for the connection of a designed camera module
Video Outputs	HDMI, CVBS , LVDS/RGB
Audio Output	3.5 mm Jack and HDMI
Power Source	5 volt via MicroUSB(DC In Only) and/or MicroUSB (OTG)
USB 2.0 Ports	2 (direct from Allwinner A20 chip)
Buttons	Reset button: Next to MicroUSB connector Power button: Next to Reset button Boot button (Optional): Behind HDMI connector

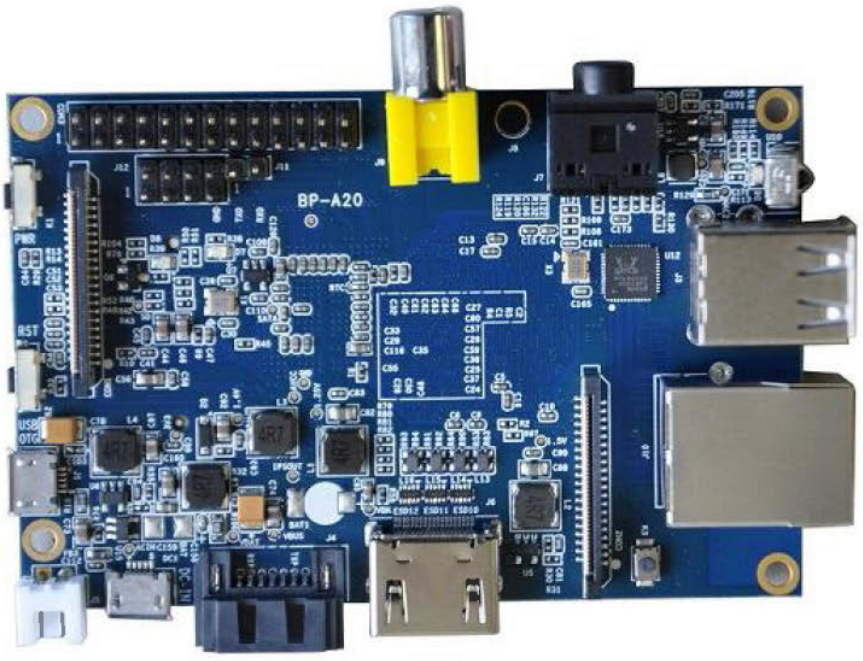
GPIO(2X13) pin	GPIO,UART,I2C bus,SPI bus with two chip selects, CAN bus,ADC,PWM,+3.3v,+5v,ground.
LED	Power Key & RJ45
Remote	IR (Optional)
OS	Android 4.2,Firefox OS and Linux etc. OS

Interface definition

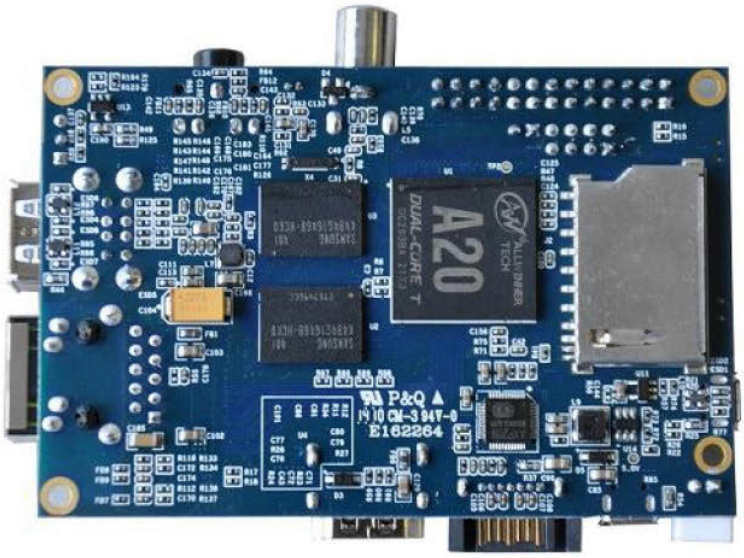
Product size	92 mm × 60mm
Weight	48g
working temperature range	-15~75℃

Hardware

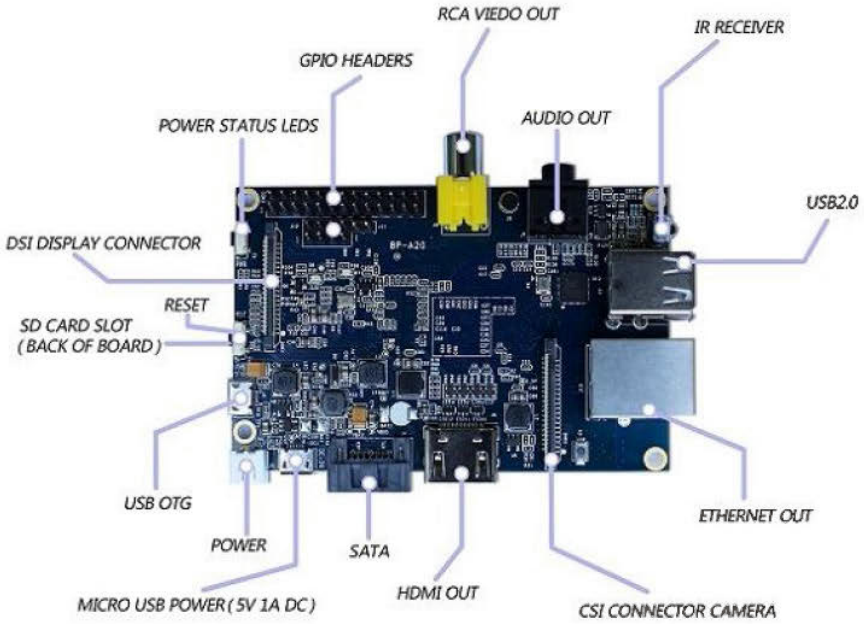
Front:



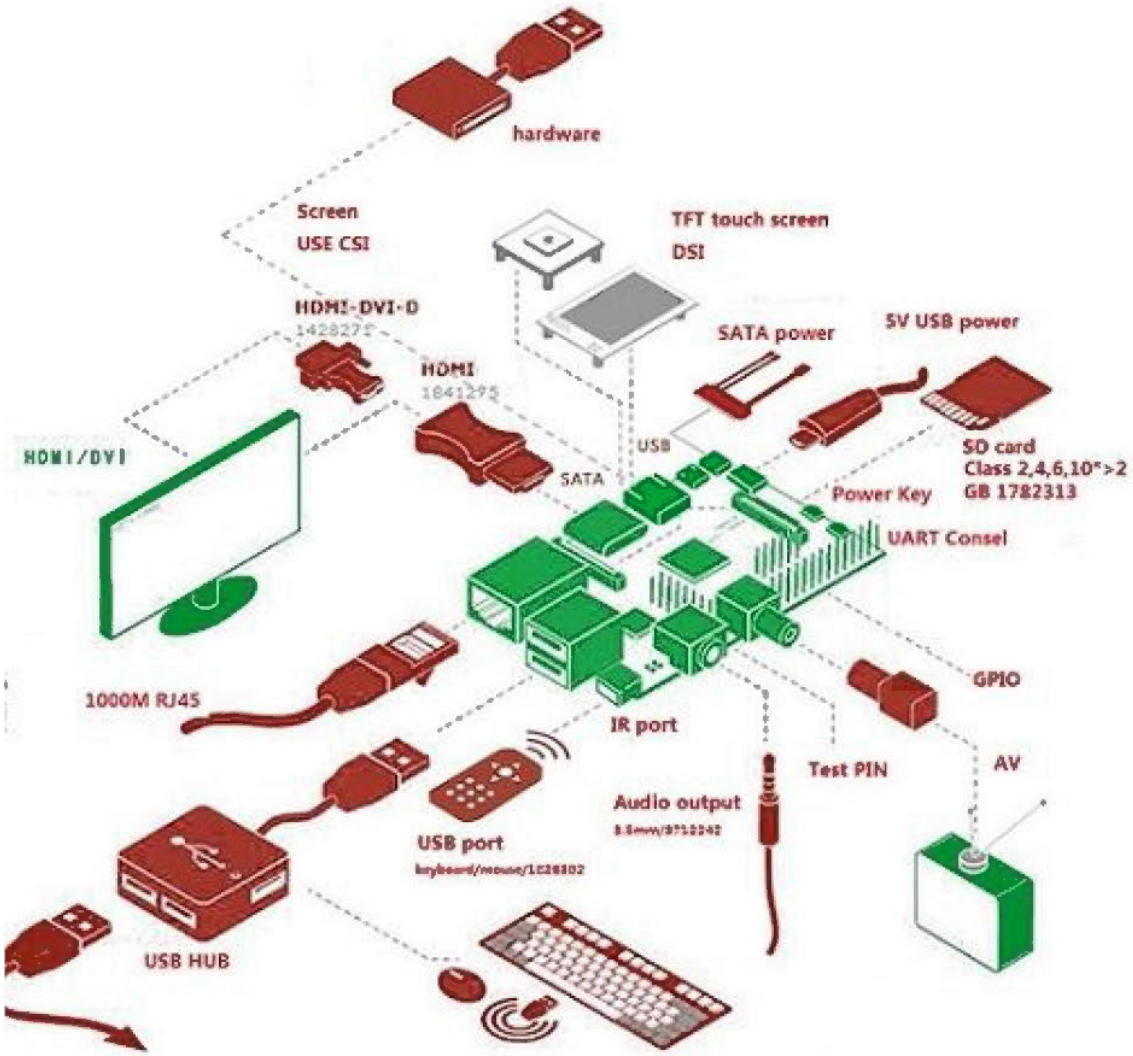
Back:



Interface



Hardware connect sketch map

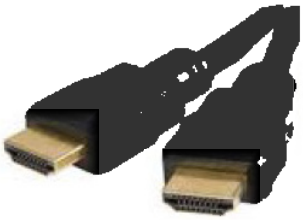


Use method

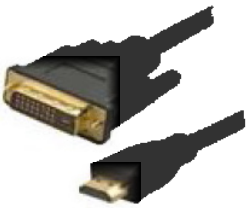
Step 1: Get what you need

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	• 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	• 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	• A standard AV video lead to connect to your analogue display if you are not using the HDMI output.
3	Keyboard and mouse	• 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)	• Networking is optional, although it makes updating and getting new software for your Banana Pi much easier.
5	Micro USB power adapter	• A good quality, micro USB power supply that can provide at least 700mA at 5Vis essential. • Many mobile phone chargers are snitable—check the label on the plng.
6	Andio lead (Optional)	• You can choose a 3.5mm jack andio led to connect to audio port to get stereo andio.
7	Mobile Hard disk (Optional)	• You can choose to connect a mobile hard disk to SATA port to store more files.



HDMI to HDMI lead



HDMI to DVI lead

AV video lead

SD card

Micro USB power adapter

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.

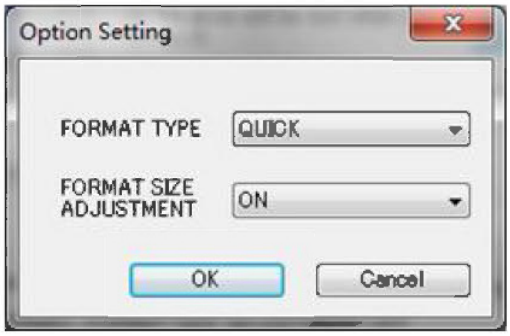
1. Insert your SD card into your computer. The size of SD should be larger than the OS image size, generally 4GB or greater.
2. Format the SD card.

   Windows:

   i. Download the a SD card format tool snch 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.

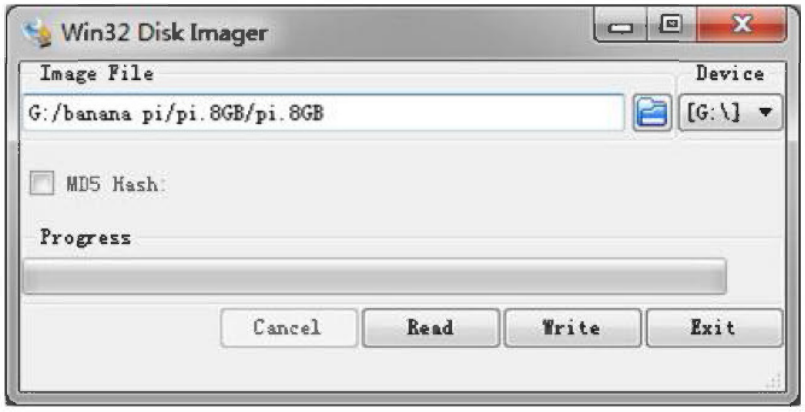
5. Write the image file to the SD card.

   Windows:

   i. Download a tool that can wirte 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=[imagename] 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.

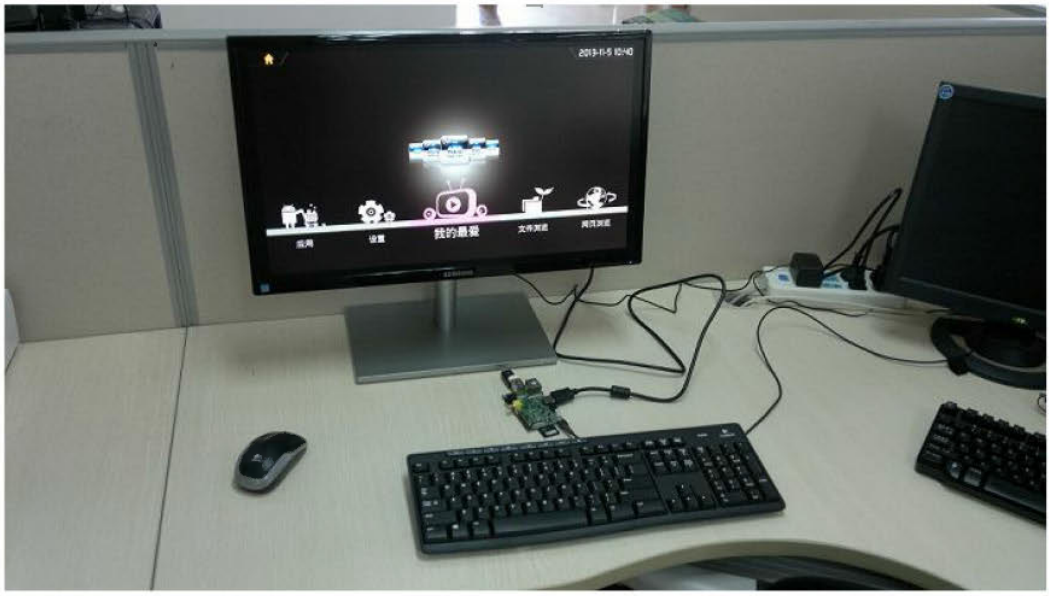
   If you don't have an TV/Monitor with a HDMI or DVI-D port you can use the

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 ±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.

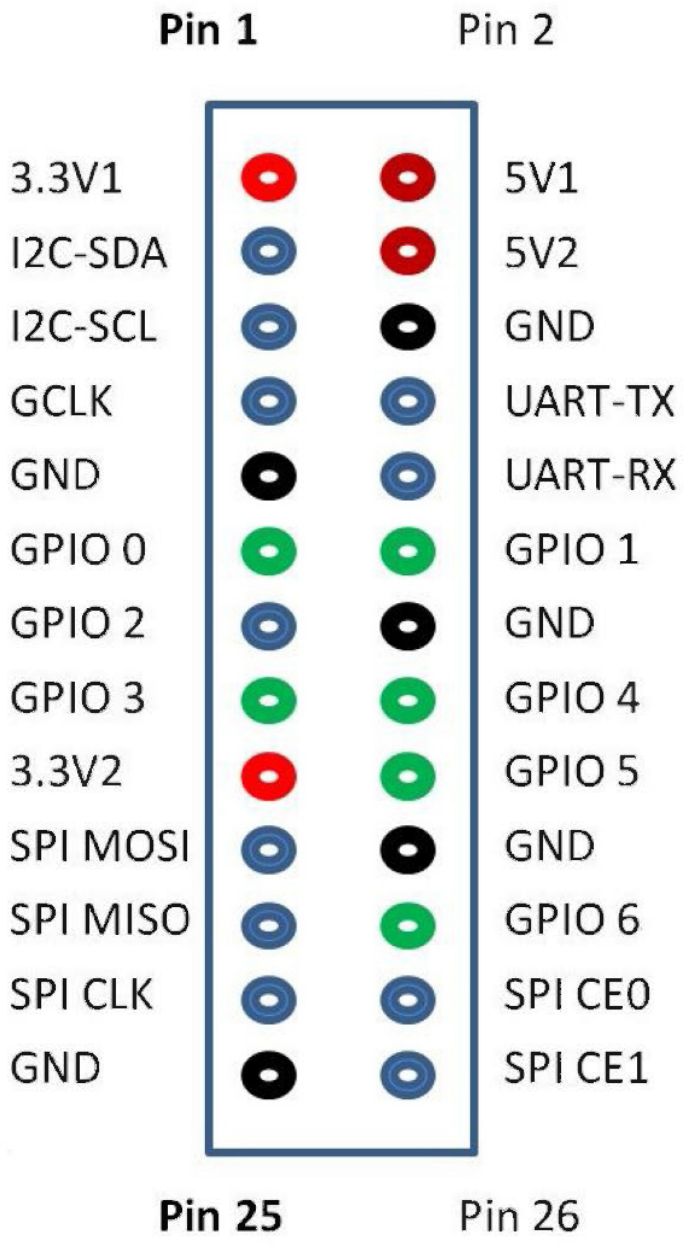
This will shut down the PI safely, (just use the power key to turn off might damage the SD-cards file system). After that you can press the power key for 5 seconds to turn it off.

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

GPIO specification

Banana Pi 26-pin GPIO

Banana Pi has a 26-pin GPIO header that matches that of the Model A and Model B Raspberry Pi. Following is the Banana Pi GPIO Pinout:



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	Pin Name	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	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	Pin Name	Multiplex Function Select Multi 1	GPIO Multi 2
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 jumper J11 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.

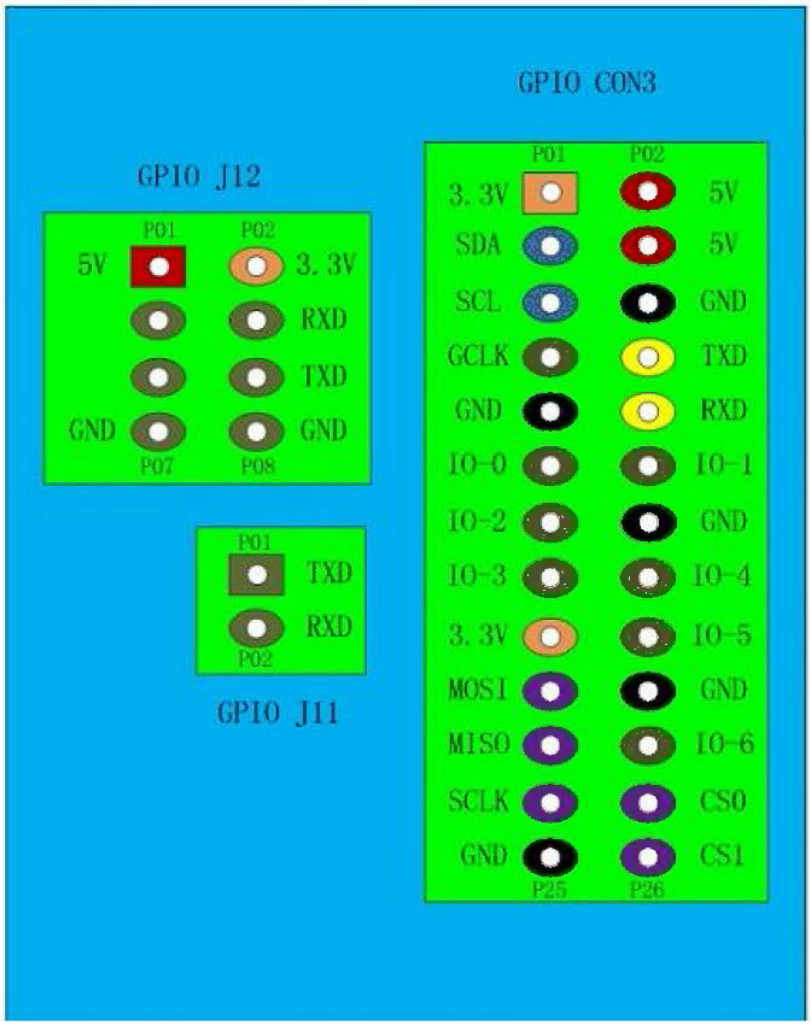
J11 Pin	Pin Name	Multiplex Function Select Multi 1	GPIO Multi 2
J11 Pin1	TXD	UART0-TX	PB22
J11 Pin2	RXD	UART0-RX	PB23

The jumper J12 provides the power source including 3.3V and 5V. There is a pair of UART TX/RX signals output here.

J12 Pin	Pin Name	Multiplex Function Select Multi 1	GPIO Multi 2
J12 Pin 1	5V		
J12 Pin2	3.3V		
J12 Pin3	NC	IO-7	PH5
J12 Pin4	RXD	UART7_RX	PI21
J12 Pin5	NC	IO-8	PH3
J12 Pin6	TXD	UART7_TX	PI20

J12 Pin7	GND
J12 Pin8	GND

All GPIO define list:



Banana Pi V1.4 PIN define

PIN	PIN define	GPIO
CON1-P01	LINEINL	
CON1-P02	LINEINR	
CON1-P37	HPL	
CON1-P36	HPR	
CON1-P07	FMINL	
CON1-P09	FMINR	

CON1-P04	ADC_X1	
CON1-P06	ADC_X2	
CON1-P08	ADC_Y1	
CON1-P10	ADC_Y2	
CON1-P13	LRADC0	
CON1-P15	LRADC1	
CON1-P33	RESET#	
CON1-P17	CSI-D0	PE4
CON1-P19	CSI-D1	PE5
CON1-P21	CSI-D2	PE6
CON1-P23	CSI-D3	PE7
CON1-P25	CSI-D4	PE8
CON1-P27	CSI-D5	PE9
CON1-P29	CSI-D6	PE10
CON1-P31	CSI-D7	PE11
CON1-P20	CSI-PCLK	PE0
CON1-P24	CSI-MCLK	PE1
CON1-P28	CSI-VSYNC	PE3
CON1-P30	CSI-HSYNC	PE2
CON1-P18	CSI0-STBY-EN	PH19
CON1-P26	CSI0-RESET#	PH14
CON1-P32	CSI1-STBY-EN	PH18
CON1-P34	CSI1-RESET#	PH13
CON1-P14	TWI1-SDA	PB19
CON1-P16	TWI1-SCK	PB18
CON1-P12	CSI-FLASH	PH17
CON1-P22	CSI0-PWR-EN	PH16
CON1-P35	CSI-IO0	PH11
CON1-P38	IPSOUT	
CON1-P40	IPSOUT	
CON1-P05	GND	
CON1-P11	GND	
CON1-P39	GND	
CON1-P03	VCC-CSI	

CON2-P09	LCD0-D00	PD0
CON2-P11	LCD0-D01	PD1
CON2-P13	LCD0-D02	PD2
CON2-P15	LCD0-D03	PD3
CON2-P17	LCD0-D04	PD4

CON2-P19	LCD0-D05	PD5
CON2-P21	LCD0-D06	PD6
CON2-P23	LCD0-D07	PD7
CON2-P25	LCD0-D08	PD8
CON2-P27	LCD0-D09	PD9
CON2-P29	LCD0-D10	PD10
CON2-P31	LCD0-D11	PD11
CON2-P33	LCD0-D12	PD12
CON2-P35	LCD0-D13	PD13
CON2-P37	LCD0-D14	PD14
CON2-P39	LCD0-D15	PD15
CON2-P40	LCD0-D16	PD16
CON2-P38	LCD0-D17	PD17
CON2-P36	LCD0-D18	PD18
CON2-P34	LCD0-D19	PD19
CON2-P32	LCD0-D20	PD20
CON2-P30	LCD0-D21	PD21
CON2-P28	LCD0-D22	PD22
CON2-P26	LCD0-D23	PD23
CON2-P22	LCD0-CLK	PD24
CON2-P20	LCD0-CS	PH6
CON2-P18	LCD0-HSYNC	PD26
CON2-P16	LCD0-VSYNC	PD27
CON2-P14	LCD0-DE	PD25
CON2-P12	LCD0-IO2	PH9
CON2-P10	PWM0	PB2
CON2-P08	LCD0-IO1	PH8
CON2-P06	LCD0-IO0	PH7
CON2-P04	TWI3-SCK	PI0
CON2-P02	TWI3-SDA	PI1
CON2-P07	LCDIO-03	PH12
CON2-P01	IPSOUT	
CON2-P03	IPSOUT	
CON2-P05	GND	
CON2-P24	GND	
CON3-P18	CAN_RX	PH21
CON3-P16	CAN_TX	PH20
CON3-P23	SPI0_CLK	PI11
CON3-P21	SPI0_MISO	PI13

CON3-P19	SPI0_MOSI	PI12
CON3-P24	SPI0_CS0	PI10
CON3-P26	SPI0_CS1	PI14
CON3-P05	TWI2-SCK	PB20
CON3-P03	TWI2-SDA	PB21
CON3-P15	UART2_CTS	PI17
CON3-P22	UART2_RTS	PI16
CON3-P11	UART2_RX	PI19
CON3-P13	UART2_TX	PI18
CON3-P10	UART3_RX	PH1
CON3-P08	UART3_TX	PH0
CON3-P12	PH2	PH2
CON3-P07	PWM1	PI3
CON3-P01	VCC-3V3	
CON3-P17	VCC-3V3	
CON3-P02	VCC-5V	
CON3-P04	VCC-5V	
CON3-P09	GND	
CON3-P25	GND	
CON3-P06	GND	
CON3-P14	GND	
CON3-P20	GND	
J12-P03	PH5	PH5
J12-P05	PH3	PH3
J12-P04	UART7_RX	PI21
J12-P06	UART7_TX	PI20
J12-P01	VCC-5V	
J12-P02	VCC-3V3	
J12-P07	GND	
J12-P08	GND	
J11-P01	UART0-TX	PB22
J11-P02	UART0-RX	PB23