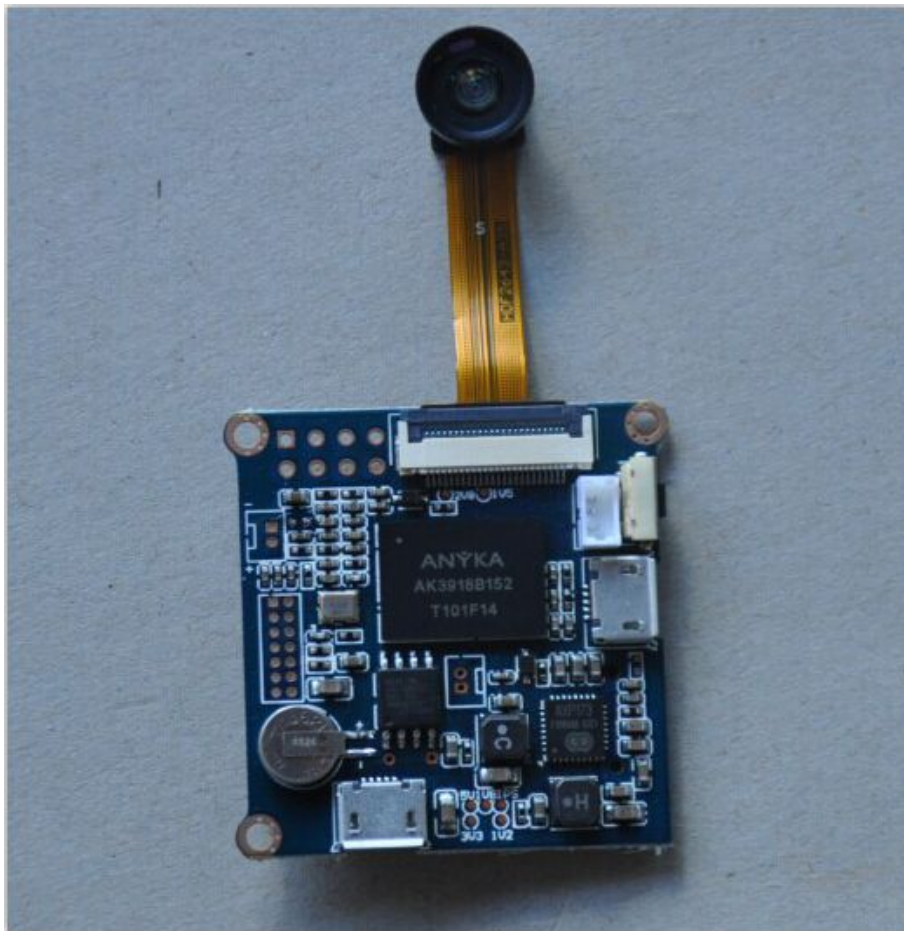


# **SinoVoip Co., Limited BPI-D1**

## **User Manual 2.0**



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## **Product Introduction**

The BPI-D1 is the smallest open-source development board around, with a built-in HD mini camera. At 38mm (w) x38mm (l) and weighing in at 10g, it's much smaller and lighter than any mini-cam or camera board out there. It allows you to create and customize your own mini-cam and can be a valuable part of any cool hardware you are working on. The BPI-D1 prides itself on providing high-resolution image quality: Both video and photos are captured at 1280x720p with a video capture rate of 30 fps.

The BPI-D1 is designed specifically to give you all the multimedia tools you need in one small package. Simply connect to an external battery source (with your desired power capacity), and the BPI-D1 does the rest: there's a HD mini-cam, audio sensor, microphone, CPU, GPIO, WiFi, and more - you name it, the BPI-D1 has it.

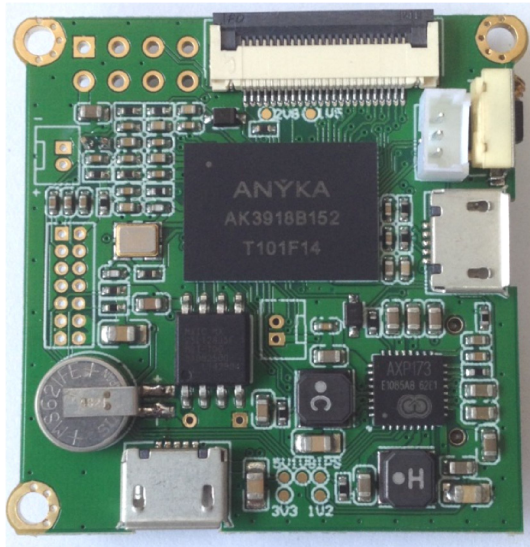
## Specification

### Hardware Specification

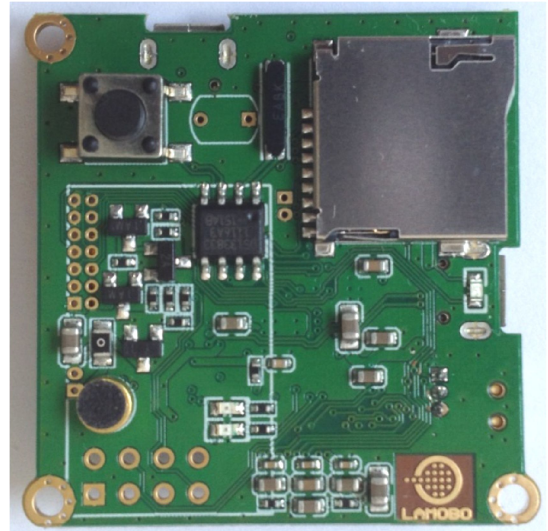
<b>Product Size</b>	PCB 38x38mm
<b>CPU</b>	400MHz ARM926EJ 32Bits RISC Core
<b>RAM</b>	64MB DDR2
<b>Flash</b>	16MB SPI-FLASH
<b>Storage</b>	Micro SD Card Seat ,supportable for 8G,16G, 32G TF cards
<b>CMOS</b>	CMOS Image Sensor SoC30FPS@720P, Visible light with 940 nm two-way infrared lens filter, with infrared night vision function
<b>Lens</b>	M7*P0.35 EFL=3.0mm/F.NO=2.8/View Angle=60°
<b>Video</b>	It achieves H.264 hardware encoding at 1280x720p_30fps. 32G TF card can store 120 hours of video data
<b>Audio</b>	MP3/WMA/AAC
<b>WIFI</b>	USB WIFI ( <b>OPTION</b> ):WiFi module can be switch between the AP and the SLAVE mode, easy to configure the WiFi module; BPI-D1 support WPS mode
<b>RTC</b>	RTC circuit, and supporting OSD
<b>PM</b>	Support Li-ion Charging with Built-in AXP173 power management chip
<b>MIC</b>	Embedded electrets microphone
<b>Power Consumption</b>	Recording: 5V-200mA; WiFi On: 5V-350mA; continuously record 720P video or audio data for 24hour when a mobile power of 10000mAH is available.
<b>GPIO</b>	1UART/2GPIO; 2PWM/2GPIO; I2C; Audio Line IN; HP Audio Out L; HP Audio Out R; 1SPI Interface
<b>UART</b>	Independent UART debugging interface
<b>USB</b>	USB programmatic interface/ OTG device (WiFi module/USB drive)
<b>DC IN</b>	Micro-USB single +5V power input
<b>Battery</b>	3.7V Li-ion socket
<b>OS</b>	Running on Linux3.4.35, Kernel Operation system that makes secondary development possible

## Hardware

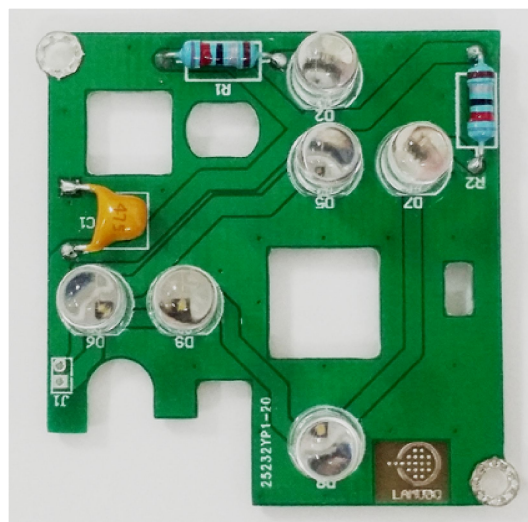
- **Product Image**



(Figure 1-Front)



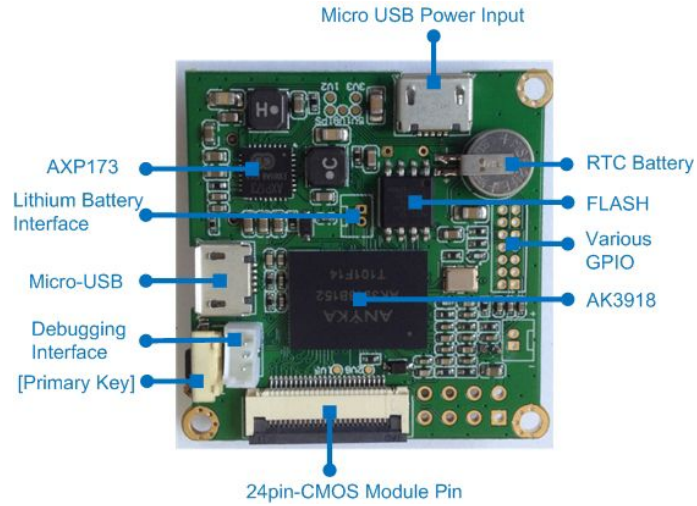
(Figure 2-Back)



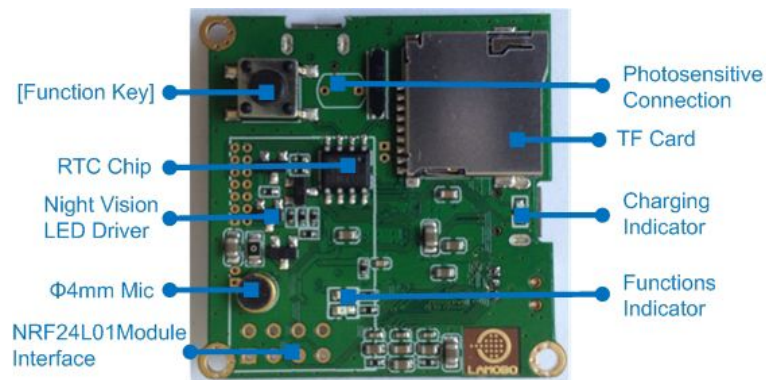
(Figure 3-Night Vision Module)

•

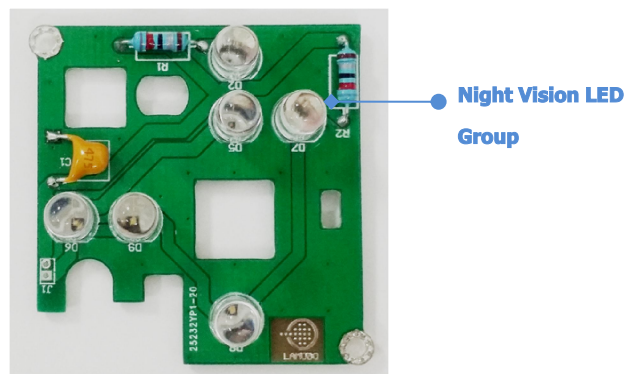
• **Interface:**



**(Figure 4-Front Interfaces)**



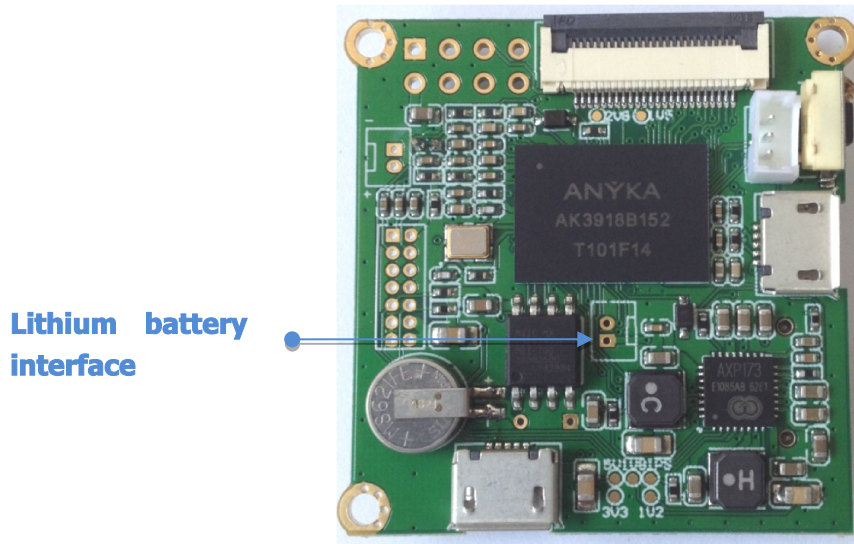
**(Figure 5-Back Interfaces)**



**(Figure 6-Night Vision Module Interfaces)**

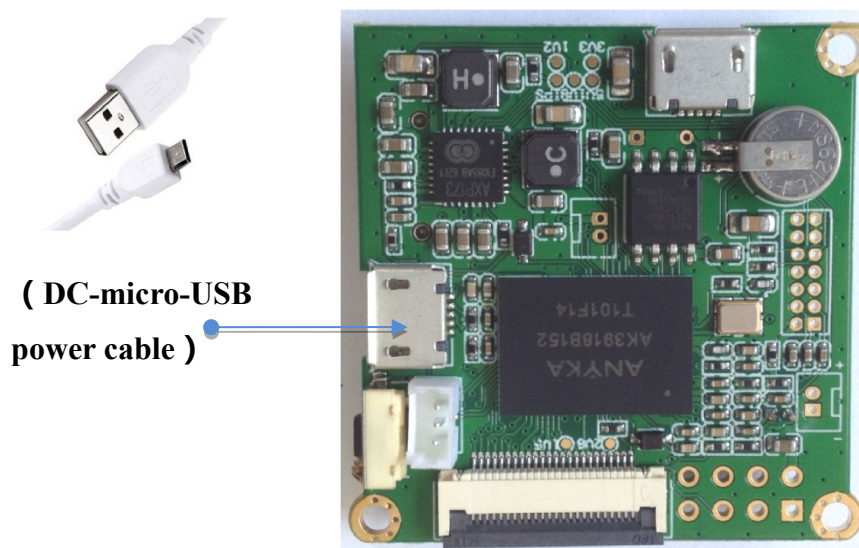
## Power Supply

**Battery mode:** Built-in lithium battery power supply independently.



(Figure 7)

**External power supply mode:** DC-micro-USB power cable at the same time for charging the BPI-D1 built-in lithium battery.



**(Figure 8)**

## **Use Method**

### **1. How to record a video**

In a fully charged or connecting micro - power USB cable, BPI-D1 will automatically start the default set of video application. Start recording the video and sound and generate file storage to TF card. Recorded 30 minutes to automatically generate and save for a video file. Click the "function key " button, then manually stop recording the current task and generate a complete video file, start the next record files after 10 seconds.

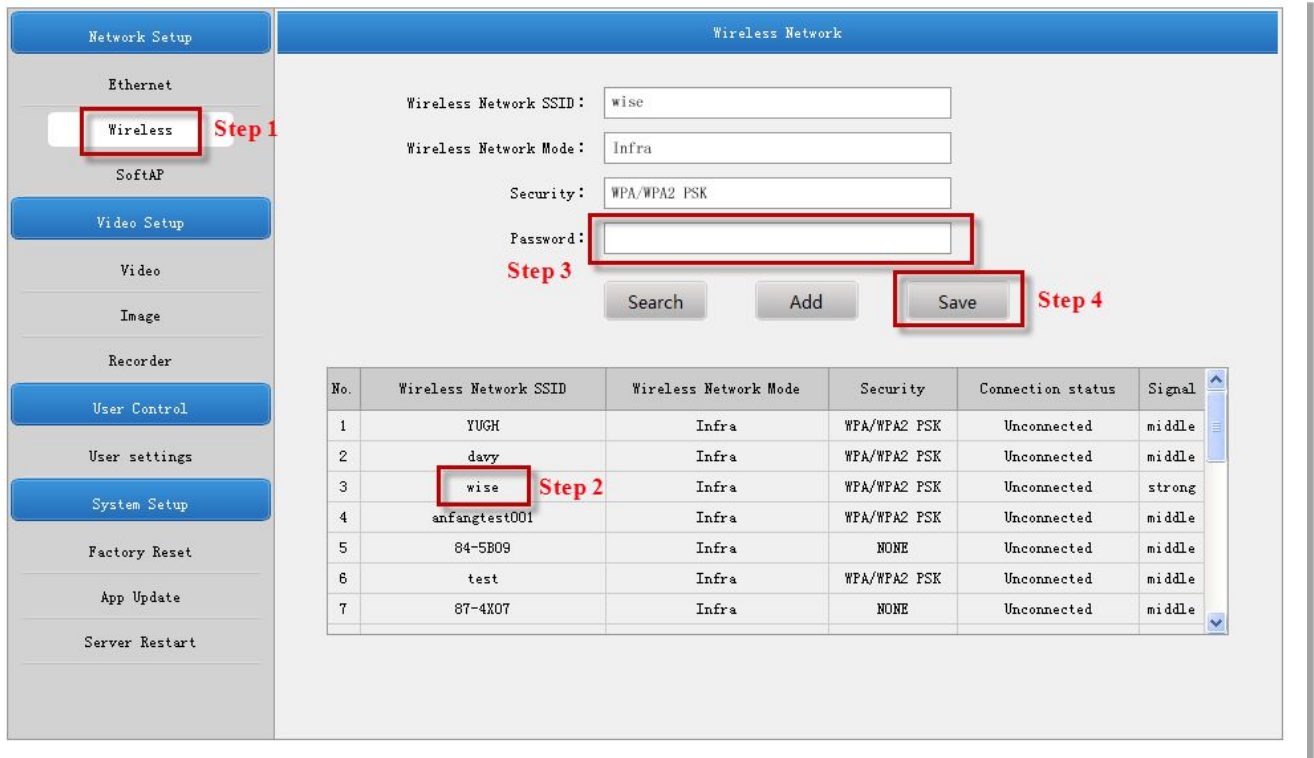
### **2. How to connect to the AP**

#### **Connect to the specified AP**

The USB-WiFi module is connected to the USB interface of OTG. Press the BPI-D1 "primary key" button, green LED will keep long bright after flashing about 8 seconds; it means BPI-D1 work in AP mode.

- 1) Connect any mobile devices (e.g. Smartphone, tablet or computer) to the WiFi connection "SSID= **XXX\_D1\_A39XXX**" and enter the default password "**12345678**".
- 2) In Internet Explorer, enter the FTP address "ftp://192.168.0.1". (**user name: admin, password: admin**)
- 3) Click "Ethernet", select one of the available WiFi. The SSID parameter will be displayed in the above, click password blank and enter the known password, then click the "save". After flashing on the screen, four parameters in the form disappeared that the connection is successful.
- 4) Click on the (39) Boot/WPS button, BPI-D1 switches to slave mode; you will see LED flashes from fast into slow, which has been connected to the specified WiFi-AP.





The screenshot shows the 'Wireless Network' configuration page. The sidebar on the left has 'Wireless' highlighted under the 'Network Setup' section. The main area contains the following configuration fields:

- Wireless Network SSID: wise
- Wireless Network Mode: Infra
- Security: WPA/WPA2 PSK
- Password: (empty)

Below the form are 'Search', 'Add', and 'Save' buttons. A table below the buttons lists existing wireless networks:

No.	Wireless Network SSID	Wireless Network Mode	Security	Connection status	Signal
1	YUGH	Infra	WPA/WPA2 PSK	Unconnected	middle
2	davy	Infra	WPA/WPA2 PSK	Unconnected	middle
3	wise	Infra	WPA/WPA2 PSK	Unconnected	strong
4	anfangtest001	Infra	WPA/WPA2 PSK	Unconnected	middle
5	84-5B09	Infra	NONE	Unconnected	middle
6	test	Infra	WPA/WPA2 PSK	Unconnected	middle
7	87-4X07	Infra	NONE	Unconnected	middle


(Figure 9)

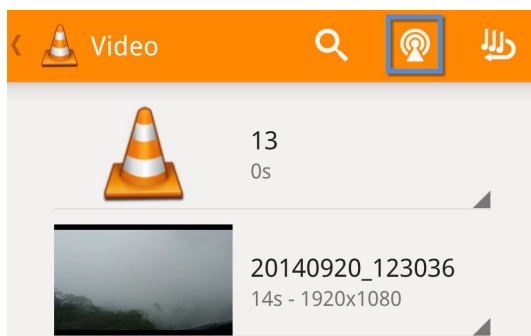
### 3. View Real-time Video

#### View in range of LAN

At present, viewing real-time video can be achieved in the LAN through VLC player or MX Player. If the two players installed on your PCs or mobile devices, it could be view via network stream. To do this:

**【Notes】** : Just take the case of VLC player.

- ① Install VLC player on your PCs or mobile devices.
- ② Connect any mobile devices (e.g. Smartphone, tablet or computer) to the WiFi connection “SSID= XXX\_D1\_A39XXX” and enter the default password “12345678”.
- ③ Open VLC player and click  ”and open network stream.



- ④ Enter the AP of BPI-D1“rtsp://192.168.0.1”, click “open” and view the real-time video.



**[Reminder]:** Real-time video may be delay, which related to the network transmission.

---

#### **4. How to view files**

**Option ① :** Remove the SD card from the board and insert it into the SD card reader of a computer.

**Option ② :** Battery mode, using micro-USB data cable to connect the BPI-D1 and PC. PC client can access the contents of TF card through the data cable, while charging the lithium battery.

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**[Reminder]:** Micro-USB interface supports USB flash disk connected through USB female port of OTG cable, Support directly copy files from the TF card to the external USB drive.

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**Option ③ :** Connect PC or mobile devices to the SSID access point named“XXX\_D1\_A39XXX”, and access files at the FTP address ftp://192.168.0.1.

---

**[Reminder]:** Support IE, Chrome, Opera, Safari or Firefox browser login FTP to view or download. If you need play the video you will need to install player support for H.264 or MJPEG decoding format.

---

## 5. How to set

### Record Parameters Settings

When BPI-D1 power is ON, video recording will start automatically according to the default set. If you want to set the BPI-D1 video parameters, you can refer to the following steps:

1. Switch on the WiFi and switch to the AP mode ( The LED light will remain steady ). Connect any mobile devices (e.g. Smartphone, tablet or computer) to the WiFi, connection “SSID= “XXX\_D1\_A39XXX” and enter the FTP address “ftp://192.168.0.1”.

---

**[Reminder]: User Name: admin; Password: admin**

---

2. Click the "Video Settings" or "Record Settings" can adjust the record parameters.

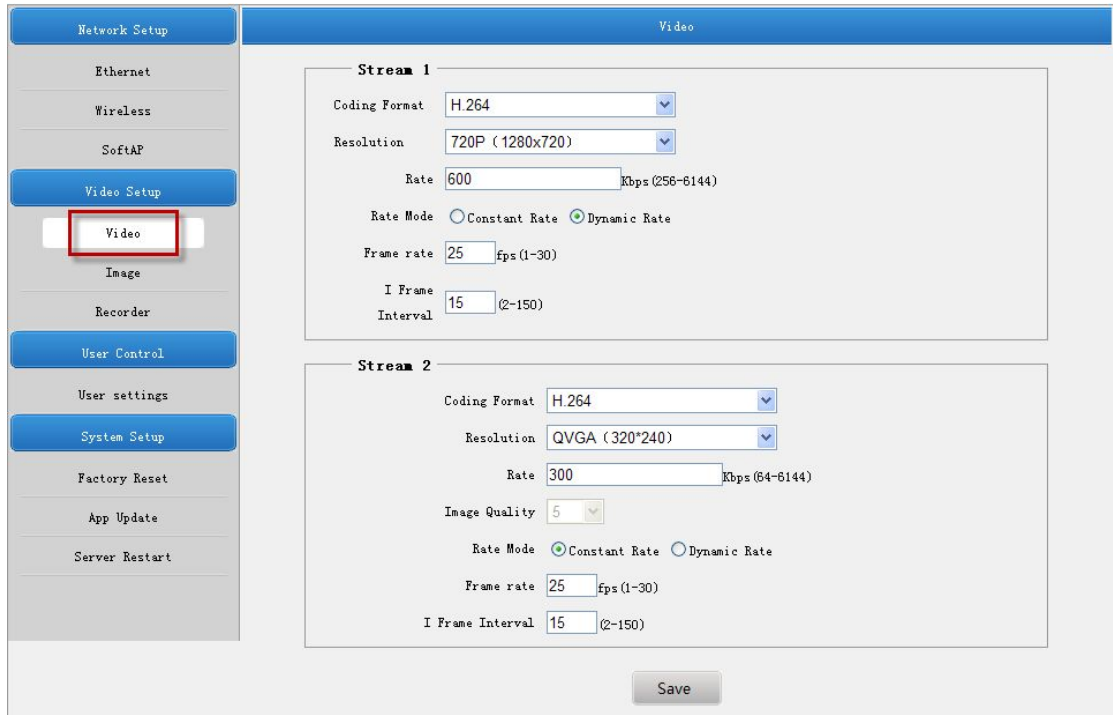
---

**[Reminder]:** After saving the changed settings , all setup are validated only after manually re-open after switching off the device.

---

## Video Settings

"Video" related to the format of the final recorded and resolution, devices support the two coding formats which are H.264 and MJPEG; relevant parameters can be set manually according to the required. After setting , click "Save".



The screenshot displays the "Video" configuration page. On the left is a navigation menu with categories: Network Setup (Ethernet, Wireless, SoftAP), Video Setup (Video, Image, Recorder), User Control (User settings, System Setup), and Factory Reset (Factory Reset, App Update, Server Restart). The "Video" option is highlighted with a red box. The main content area is titled "Video" and contains two sections: "Stream 1" and "Stream 2".

**Stream 1**

- Coding Format: H.264
- Resolution: 720P (1280x720)
- Rate: 600 Kbps (256-6144)
- Rate Mode:  Constant Rate  Dynamic Rate
- Frame rate: 25 fps (1-30)
- I Frame Interval: 15 (2-150)

**Stream 2**

- Coding Format: H.264
- Resolution: QVGA (320\*240)
- Rate: 300 Kbps (64-6144)
- Image Quality: 5
- Rate Mode:  Constant Rate  Dynamic Rate
- Frame rate: 25 fps (1-30)
- I Frame Interval: 15 (2-150)

A "Save" button is located at the bottom center of the configuration area.

(Figure 10)

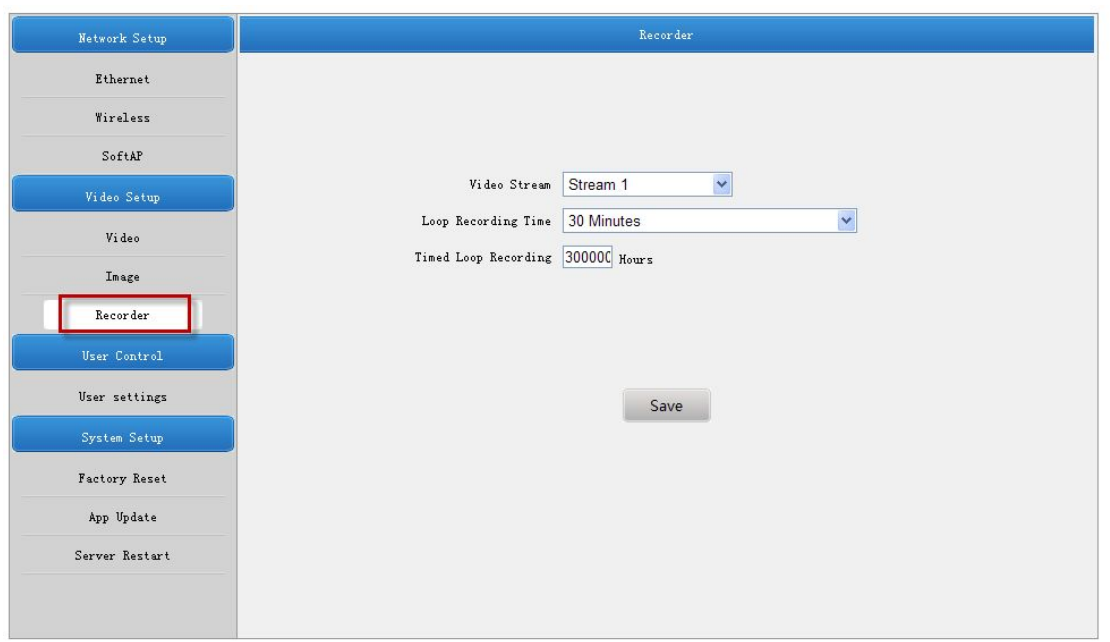
## Record Settings

“Record “related to recording save time, the number of video files and the size of video files, devices support the two coding formats, setting Loop Recording Time and Timed Loop Recording; relevant parameters can be set manually according to the required. After setting , click "Save".

**Video Stream:** Choose the two streams in the “Video” which are H.264 and MJPEG.

**Loop Recording Time:** Finish a video and save a file according to setting recording time.

**Timed Loop Recording:** Start recording according to Loop Recording Time setting after switch on the device , beyond the setting time automatically stop recording.



(Figure 11)

**[Reminder]:** Video resolution depends on choosing a different video stream, and the generated video file size will be different.

## Relevant Information

### WiFi LED at work

BPI-D1 "function key" button, click open WiFi AP mode, and then click close. "Green LED" will flash for about 8 seconds:

LED Status	Description
<b>Light</b>	WiFi work in AP mode, you can search the AP SSID. ( for example, XXX_D1_A39XXX )
<b>Flash</b>	WiFi work in slave mode, it will automatically connect the AP that set the parameters before.

### WiFi ON/OFF Energy Consumption

WiFi ON/OFF to save the power consumption, the two statuses generally as follows:

1. WiFi OFF, BPI-D1 is recording and saved to TF card, current 5V power is about 250mA.
2. WiFi ON, BPI-D1 is recording and saved to TF card, at the same time BPI-D1 connected to the network through WiFi , current 5V power is about 350mA.
3. It can be used to predict 500mah lithium batteries can maintain BPI-D1 work 1 to 2 hours.

### Program the Firmware

#### Important Notes before You Start:

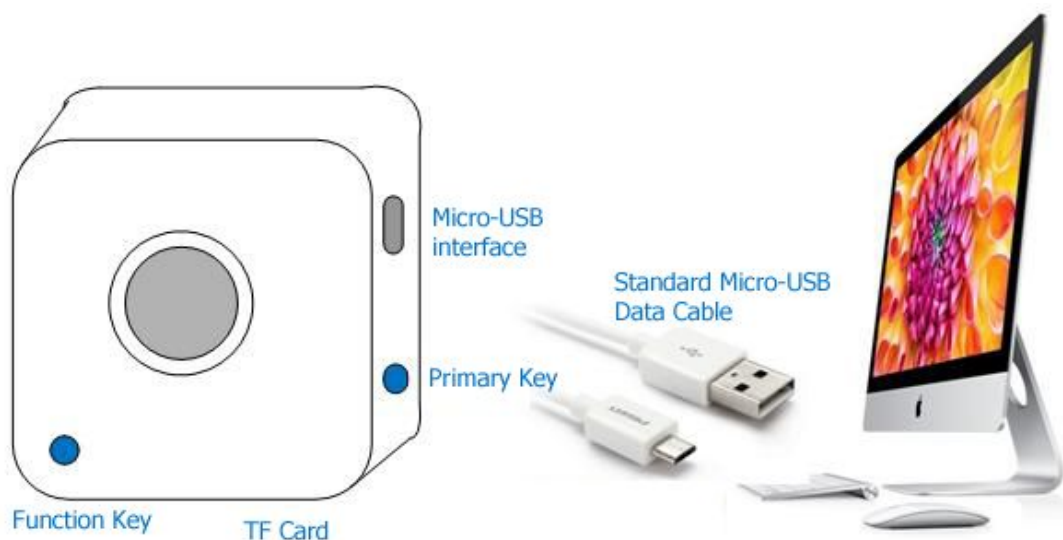
1. You must use the compatible version of the firmware programming software with source codes.
2. The software works on Windows XP Service Pack 3 and newer versions.
3. The software file path is located at: **/lamobo.dev/tool/burntool** in the code directory
4. Before programming the firmware, please make sure to copy and paste the 3 compiled files "**zImage,**" "**root.sqsh4,**" and "**root.jffs2**" to the root directory.

(**Note:** The compiled files are saved at: **/lamobo.dev/output**)

5,image download and forum: <http://www.bananapi.com>





### How to Program the Firmware

1. Battery mode, press and hold the "primary key" 5 seconds off BPI-D1 power. Before the PC inserts BPI-D1 micro - USB programming cable, double-click firm programming tools icon, runs the burn tool. Holding down the "function key" and the micro - USB programming cable connecting to the PC, the module enters the programming mode. At this time BPI-D1 LED no instructions. If there is no lithium battery, you do not need to connect the micro USB power cable.



(Figure 12)

2. After the PC inserts BPI-D1 micro - USB programming cable, the firm programming tools will detect the launch of the application. Once connected, a yellow status bar will appear next to the device in the window, and the status will show "Ready" (please recheck and repeat the steps above if no response). Press the "Start" button on the top to start the firm programming automatically.

Status	Number	Progress	Status	Timer	serial NO
	Device0	<input type="text" value="0%"/>	Ready	0:00:00	
	Device1	<input type="text" value="0%"/>		0:00:00	
	Device2	<input type="text" value="0%"/>		0:00:00	
	Device3	<input type="text" value="0%"/>		0:00:00	

(Figure 13)



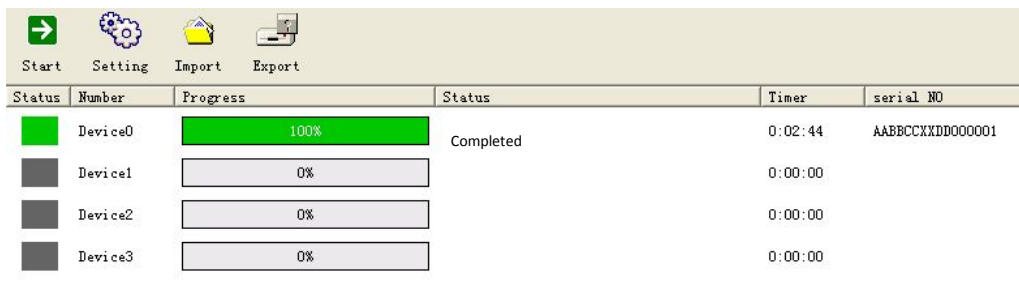
- Burning completed, micro-USB data cable disconnected with PC.

### Status Descriptions

The status, progress and elapsed time will appear in the programming window.

#### [Successful]

Once the status and progress bar turn green, the progress bar reaches 100%, and the status reads “Completed,” the firmware has been programmed successfully.

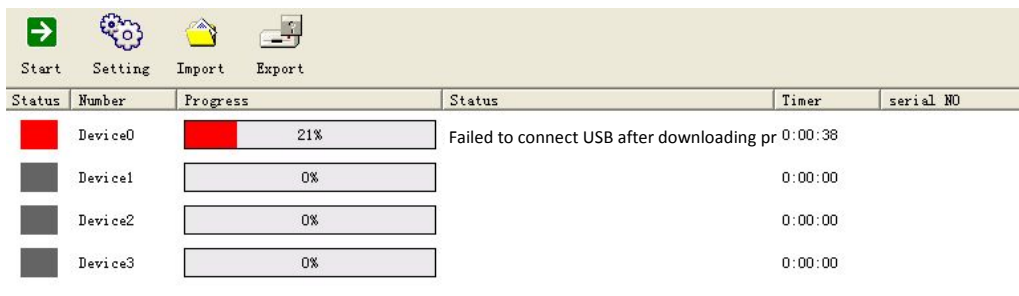


Status	Number	Progress	Status	Timer	serial NO
Green	Device0	100%	Completed	0:02:44	AABCCXXDD000001
Grey	Device1	0%		0:00:00	
Grey	Device2	0%		0:00:00	
Grey	Device3	0%		0:00:00	

(Figure 14-Programing Successful)

#### [Unsuccessful]

When the status and progress bar turn red, the status area will display one of several error messages, indicating an unsuccessful programming attempt.



Status	Number	Progress	Status	Timer	serial NO
Red	Device0	21%	Failed to connect USB after downloading pr	0:00:38	
Grey	Device1	0%		0:00:00	
Grey	Device2	0%		0:00:00	
Grey	Device3	0%		0:00:00	

(Figure 15-Unsuccessful Programming)

If the operation is unsuccessful, please retry after adjusting the following settings:

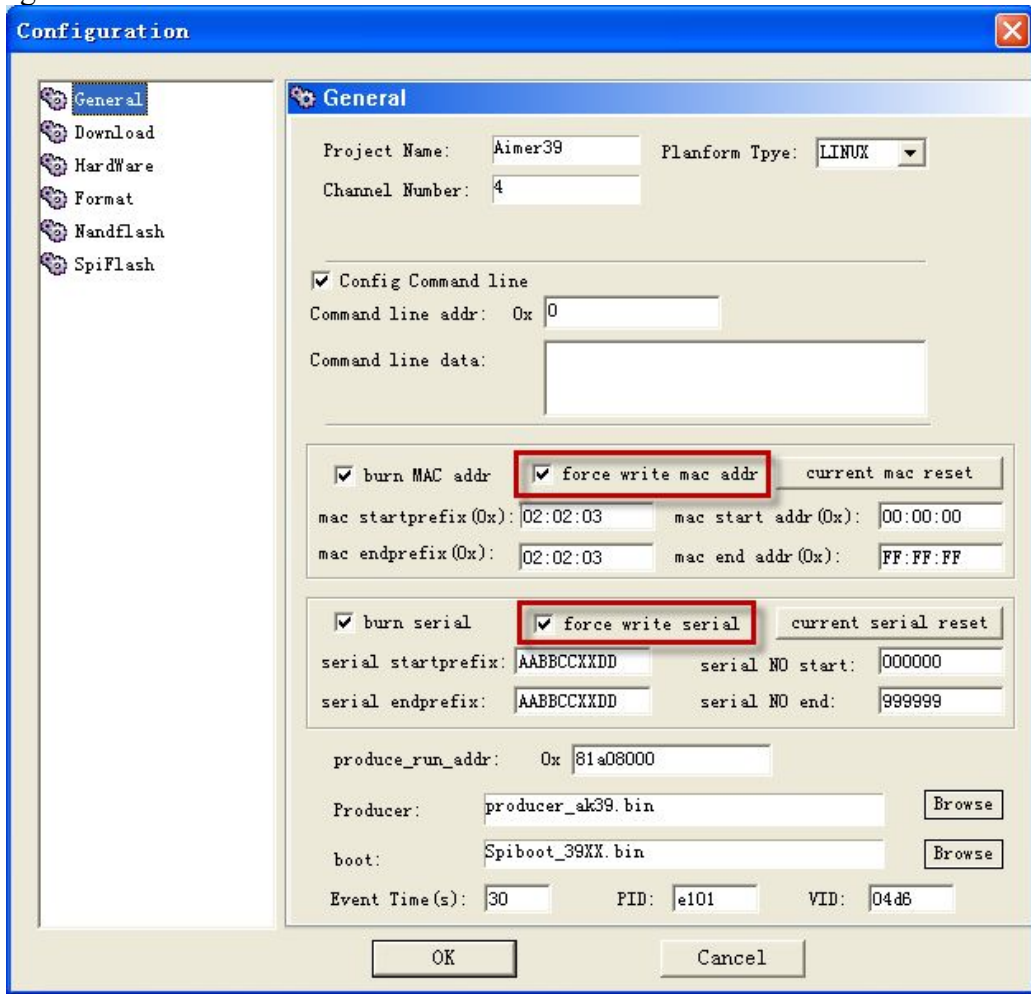
1. Click Settings, select “Researcher” as the User Name, leave the Password blank, and then select “OK”.



(Figure 16)

2. Choose “General” on the left-side menu and check the two boxes “force write to the Mac address” and “force write serial number,” and then select “OK.”

- Repeat steps 1-3 in the “How to Program the Firmware” and try again.



(Figure 17)