Getting Started with M2 Zero

Contents

Introduction

- Read more about : Banana Pi BPI-ZERO

BPI-M2 Zero

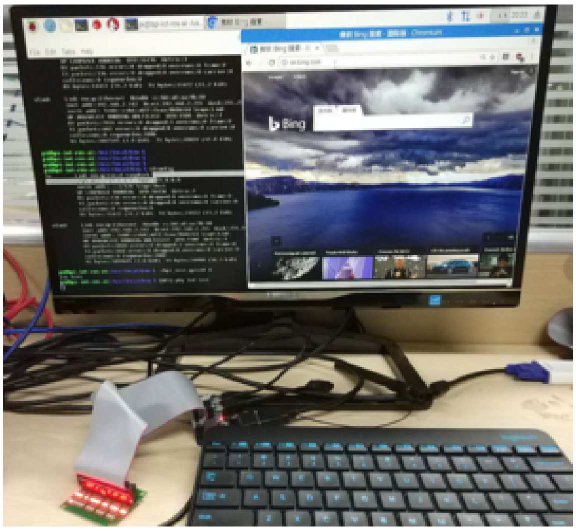
Banana Pi M2 Zero is an ultra compact single board computer measures only 60mm*30mm. It uses quad-core Cortex A7 allwinner H2+ processor, with 512MB RAM memory. It's ideal for light-weight systems with some space-limited applications. Like other members of Banana Pi, it supports both linux and android operating system.

Overview Banana Pi BPI-M2 ZERO

Key Features

- Quad Core ARM Cortex A7 CPU H2+

- 512MB SDRAM.
- WiFi (AP6212) & Bluetooth onboard.
- Mini HDMI.



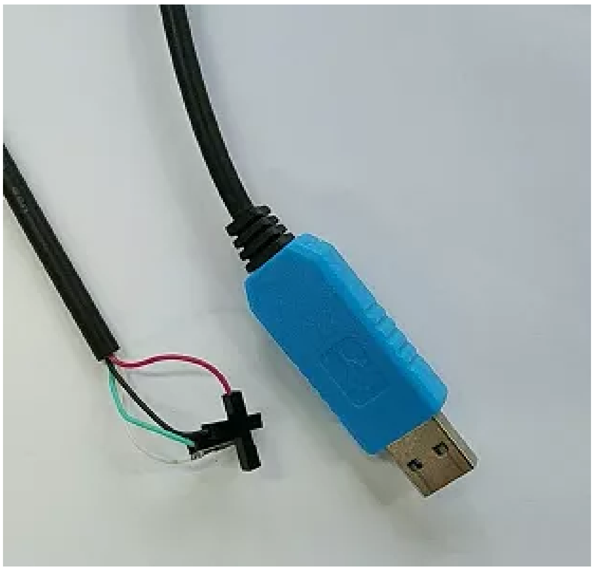
Overview: BPI-M2Z raspbian

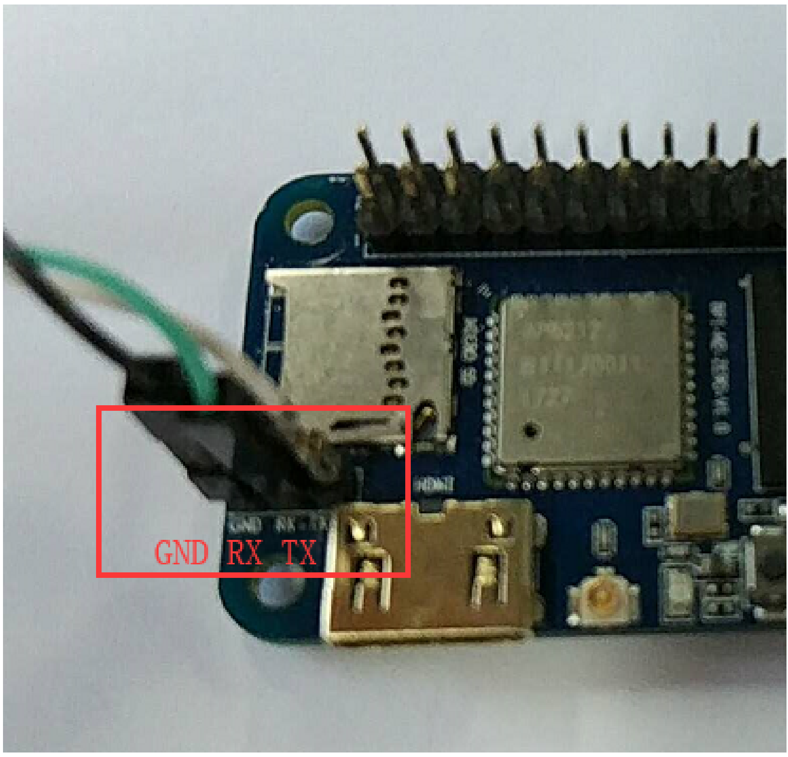
Development

Basic Development

Prepare to develop

```
* Prepare 8G/above TF card, USB-Serial interface, PC with Ubuntu
* Using your USB-Serial Connect debug console on M2 Zero
```





Android 4.4

Ubuntu Linux

Load your first image on M2 Zero

```
1.You could download latest image from our forum
* Here is the example: http://forum.banana-pi.org/t/bananapi-bpi-m2z-h2-new-image-raspbian-ubuntu-release-2018-07-09/

2.Install bpi-tools on your system
* apt-get install pv
* curl -sL https://github.com/BPI-SINOVOIP/bpi-tools/raw/master/bpi-tools | sudo -E bash

3.After you download the image, insert your TF card into your Ubuntu
* Execute "bpi-copy xxx.img /dev/sdx" to install image on your TF card.

4.After step 3, then you can insert your TF card into M2 Zero, and press power button setup M2 Zero
```

Update your image

```
1.Clone M2Z repo: https://github.com/BPI-SINOVOIP/BPI-M2Z-bsp
* git clone https://github.com/BPI-SINOVOIP/BPI-M2Z-bsp
```

```
2.Build your project
* ./build.sh BPI-M2Z-720P
```

```
3.After finish built, Execute "cd SD", plug your Ubuntu TFcard in PC, then check your TFcard was recognised as /dev/s

4. Execute "bpi-update -c bpi-m2z.conf -d /dev/sdX", to update the compiled kernel to your TFcard
```

Advanced Development

How to create an image

- Prepare a SD card which have installed system(Ubuntu/Raspbian/..)
- Boot your SD card with M2 Zero, after M2 Zero finish starting, copy your files and config your system, then poweroff M2 Zero. [If you don't want to config your system, you can skip this step]
- Plug your SD card in PC(which is running Linux), "cd /media", then "ln -s <your account> pi"
- Execute "bpi-migrate -c bpi-m2z.conf -c ubuntu-mate-from-sd.conf -d /dev/sdx"
- Then you could get your own image now

OTG

1. On M2 Zero console:

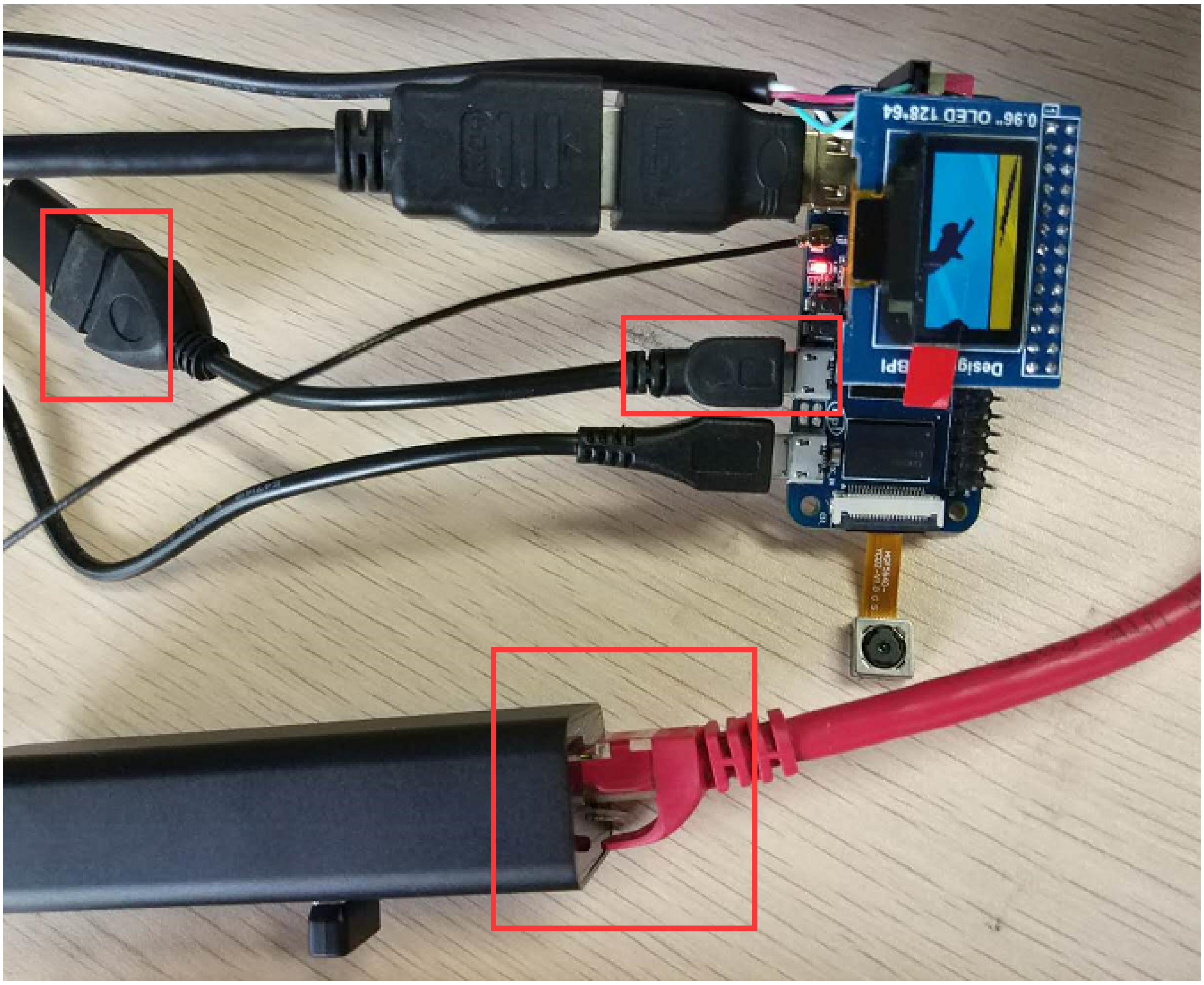
- Execute "./adbd.sh", then execute "ps -ax | grep adbd" to see if adbd is set up

2. On PC terminal:

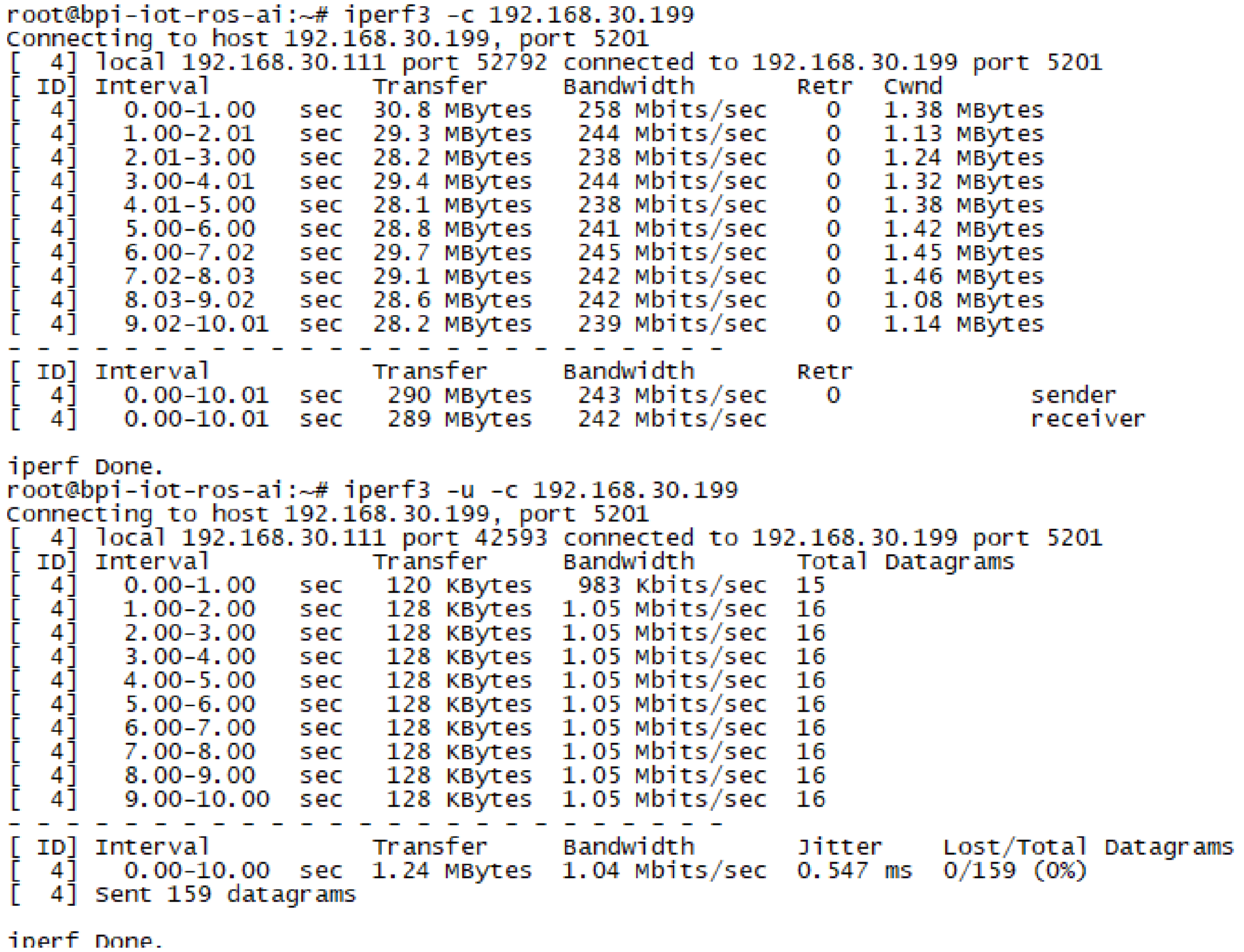
- If adbd was succeed to set up, insert OTG-USB interface to M2 Zero and PC(with Ubuntu system)
- Execute "adb devices" to see if PC has recognised M2 ZeroP OTG
- If yes, we could execute "adb shell" to connect M2 Zero by adb now

USB Ethernet

- Prepare a USB to OTG wire, usb ethernet adapter



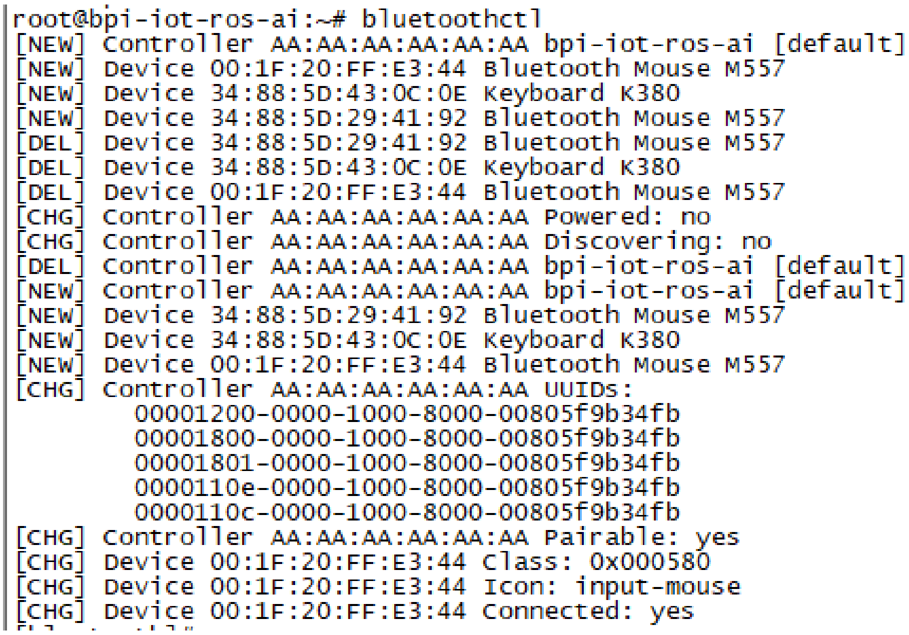
- Use iperf3 to test network



```
root@bpi-iot-ros-ai:~# iperf3 -c 192.168.30.199
Connecting to host 192.168.30.199, port 5201
[  4] local 192.168.30.111 port 52792 connected to 192.168.30.199 port 5201
[ ID] Interval           Transfer     Bandwidth       Retr  Cwnd
[  4]   0.00-1.00   sec  30.8 MBytes   258 Mbits/sec    0   1.38 MBytes
[  4]   1.00-2.01   sec  29.3 MBytes   244 Mbits/sec    0   1.13 MBytes
[  4]   2.01-3.00   sec  28.2 MBytes   238 Mbits/sec    0   1.24 MBytes
[  4]   3.00-4.01   sec  29.4 MBytes   244 Mbits/sec    0   1.32 MBytes
[  4]   4.01-5.00   sec  28.1 MBytes   238 Mbits/sec    0   1.38 MBytes
[  4]   5.00-6.00   sec  28.8 MBytes   241 Mbits/sec    0   1.42 MBytes
[  4]   6.00-7.02   sec  29.7 MBytes   245 Mbits/sec    0   1.45 MBytes
[  4]   7.02-8.03   sec  29.1 MBytes   242 Mbits/sec    0   1.46 MBytes
[  4]   8.03-9.02   sec  28.6 MBytes   242 Mbits/sec    0   1.08 MBytes
[  4]   9.02-10.01  sec  28.2 MBytes   239 Mbits/sec    0   1.14 MBytes
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Retr
[  4]   0.00-10.01  sec   290 MBytes   243 Mbits/sec    0             sender
[  4]   0.00-10.01  sec   289 MBytes   242 Mbits/sec                  receiver

iperf Done.
root@bpi-iot-ros-ai:~# iperf3 -u -c 192.168.30.199
Connecting to host 192.168.30.199, port 5201
[  4] local 192.168.30.111 port 42593 connected to 192.168.30.199 port 5201
[ ID] Interval           Transfer     Bandwidth       Total Datagrams
[  4]   0.00-1.00   sec   120 KBytes   983 Kbits/sec  15
[  4]   1.00-2.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   2.00-3.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   3.00-4.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   4.00-5.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   5.00-6.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   6.00-7.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   7.00-8.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   8.00-9.00   sec   128 KBytes  1.05 Mbits/sec  16
[  4]   9.00-10.00  sec   128 KBytes  1.05 Mbits/sec  16
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Total Datagrams
[  4]   0.00-10.00  sec  1.24 MBytes  1.04 Mbits/sec  0.547 ms  0/159 (0%)
[  4] Sent 159 datagrams

iperf Done.
```

Bluetooth

- Use bluetoothctl tool to operate BT
- Execute "bluetoothctl"
- If you don't know how to use bluetoothctl, type "help", you will see more commands
- Execute these commands:



```
root@bpi-iot-ros-ai:~# bluetoothctl
[NEW] Controller AA:AA:AA:AA:AA:AA bpi-iot-ros-ai [default]
[NEW] Device 00:1F:20:FF:E3:44 Bluetooth Mouse M557
[NEW] Device 34:88:5D:43:0C:0E Keyboard K380
[NEW] Device 34:88:5D:29:41:92 Bluetooth Mouse M557
[DEL] Device 34:88:5D:29:41:92 Bluetooth Mouse M557
[DEL] Device 34:88:5D:43:0C:0E Keyboard K380
[DEL] Device 00:1F:20:FF:E3:44 Bluetooth Mouse M557
[CHG] Controller AA:AA:AA:AA:AA:AA Powered: no
[CHG] Controller AA:AA:AA:AA:AA:AA Discovering: no
[DEL] Controller AA:AA:AA:AA:AA:AA bpi-iot-ros-ai [default]
[NEW] Controller AA:AA:AA:AA:AA:AA bpi-iot-ros-ai [default]
[NEW] Device 34:88:5D:29:41:92 Bluetooth Mouse M557
[NEW] Device 34:88:5D:43:0C:0E Keyboard K380
[NEW] Device 00:1F:20:FF:E3:44 Bluetooth Mouse M557
[CHG] Controller AA:AA:AA:AA:AA:AA UUIDs:
        00001200-0000-1000-8000-00805f9b34fb
        00001800-0000-1000-8000-00805f9b34fb
        00001801-0000-1000-8000-00805f9b34fb
        0000110e-0000-1000-8000-00805f9b34fb
        0000110c-0000-1000-8000-00805f9b34fb
[CHG] Controller AA:AA:AA:AA:AA:AA Pairable: yes
[CHG] Device 00:1F:20:FF:E3:44 Class: 0x000580
[CHG] Device 00:1F:20:FF:E3:44 Icon: input-mouse
[CHG] Device 00:1F:20:FF:E3:44 Connected: yes
```

WiFi Client

You have two ways to setup WiFi Client

1. Use commands to setup WiFi client

- ip link set wlan0 up
- iw dev wlan0 scan | grep SSID
- vim /etc/wpasupplicant/wpa_supplicant.conf

```
network={
ssid="ssid"
psk="password"
priority=1
}
```

- wpa_supplicant -iwlan0 -c /etc/wpa_supplicant/wpa_supplicant.conf
- dhclient wlan0

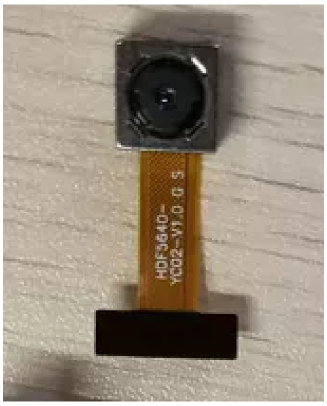
2. Use UI interface to setup WiFi Client

Clear boot

- git clone https://github.com/BPI-SINOVOIP/BPI-files/tree/master/SD/100MB
- bpi-bootsel BPI-cleanboot-8k.img.gz /dev/sdX

Camara function

We use HDF5640 camara.



Guvcview

- Use your UI interface to operate camara
- Applications -> Sound & Video -> guvcview

Shell

- We also have built-in command in /usr/local/bin to test camara
- "./test_ov5640_image_mode.sh" to test picture taking function
- "./cameratest.sh" to test video recording function

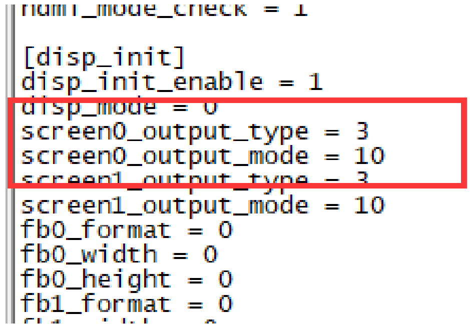
Display

How to change display resolution

For Example： we change M2Z HDMI display 1080P.

1. First, mount /dev/mmcblk0p1 /mnt, then enter to /mnt/bananapi/bpi-m2z/linux, find "sys_config.fex";

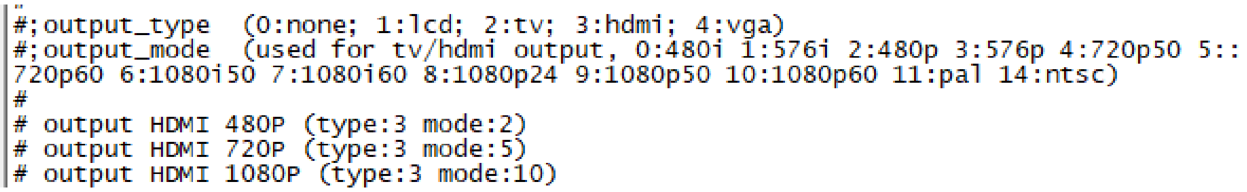
2. "vim sys_config.fex", change "screen0_output_mode = 5" to "screen0_output_mode = 10"



```
hdmi_mode_check = 1

[disp_init]
disp_init_enable = 1
disp_mode = 0
screen0_output_type = 3
screen0_output_mode = 10
screen1_output_type = 3
screen1_output_mode = 10
fb0_format = 0
fb0_width = 0
fb0_height = 0
fb1_format = 0
fb1_width = 0
```

3. After save changed, use "fex2bin" command to transfer sys_config.fex to bin file, "fex2bin sys_config.fex script.bin ", reboot.

parameters meaning：



```
#;output_type  (0:none; 1:lcd; 2:tv; 3:hdmi; 4:vga)
#;output_mode  (used for tv/hdmi output, 0:480i 1:576i 2:480p 3:576p 4:720p50 5::
720p60 6:1080i50 7:1080i60 8:1080p24 9:1080p50 10:1080p60 11:pal 14:ntsc)
#
# output HDMI 480P (type:3 mode:2)
# output HDMI 720P (type:3 mode:5)
# output HDMI 1080P (type:3 mode:10)
```

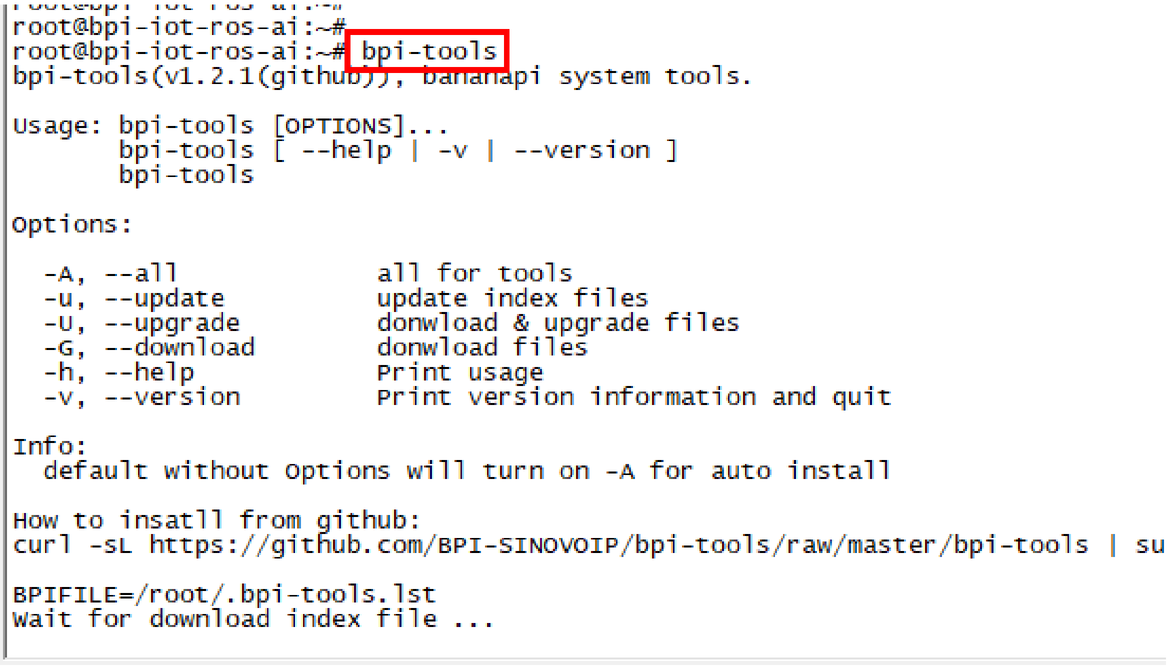
BPI-Tools

Install Bpi-tools

- Execute "curl -sL https://github.com/BPI-SINOVOIP/bpi-tools/raw/master/bpi-tools | sudo -E bash - "

Update Bpi-tools

- Execute "bpi-tools"



```
root@bpi-iot-ros-ai:~#
root@bpi-iot-ros-ai:~#
root@bpi-iot-ros-ai:~# bpi-tools
bpi-tools(v1.2.1(github)), bananapi system tools.

Usage: bpi-tools [OPTIONS]...
       bpi-tools [ --help | -v | --version ]
       bpi-tools

Options:

  -A, --all                all for tools
  -u, --update             update index files
  -U, --upgrade            donwload & upgrade files
  -G, --download           donwload files
  -h, --help               Print usage
  -v, --version            Print version information and quit

Info:
  default without options will turn on -A for auto install

How to insatll from github:
curl -sL https://github.com/BPI-SINOVOIP/bpi-tools/raw/master/bpi-tools | su

BPIFILE=/root/.bpi-tools.lst
Wait for download index file ...
```

RPi.GPIO

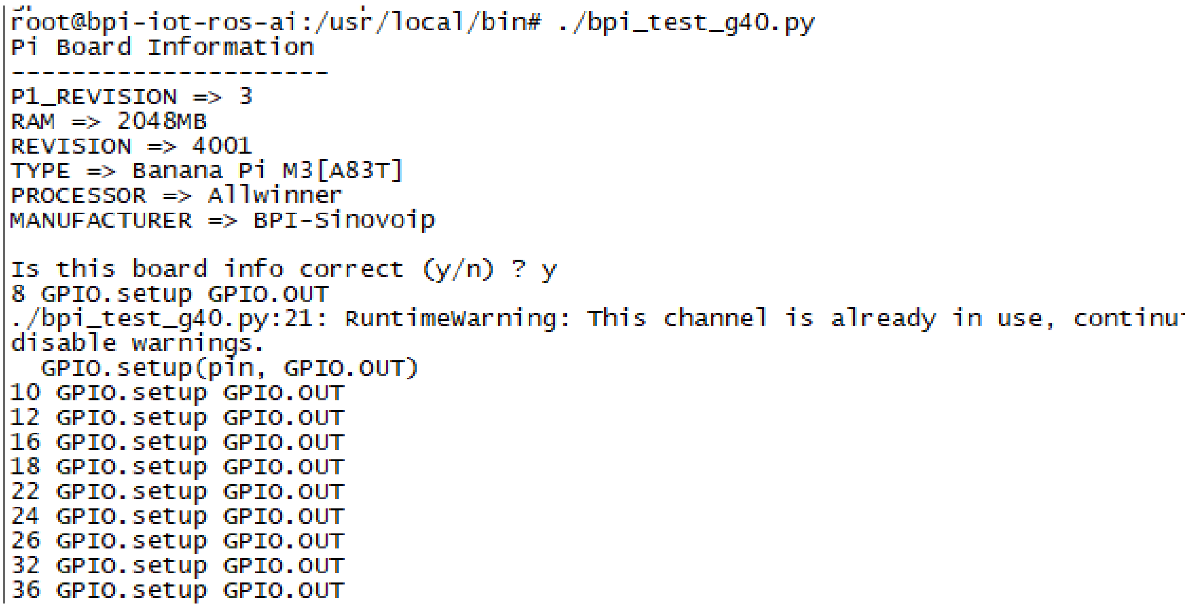
Install RPi.GPIO

- Execute "git clone https://github.com/BPI-SINOVOIP/RPi.GPIO"
- after clone the repo, cd RPi,GPIO
- Execute "sudo apt-get update"

- Execute "sudo apt-get install python-dev python3-dev"
- Execute "sudo python setup.py install" or "sudo python3 setup.py install" to install the module

Using RPi.GPIO

- cd /usr/local/bin
- Execute "./bpi_test_g40.py" to test RPi.GPIO



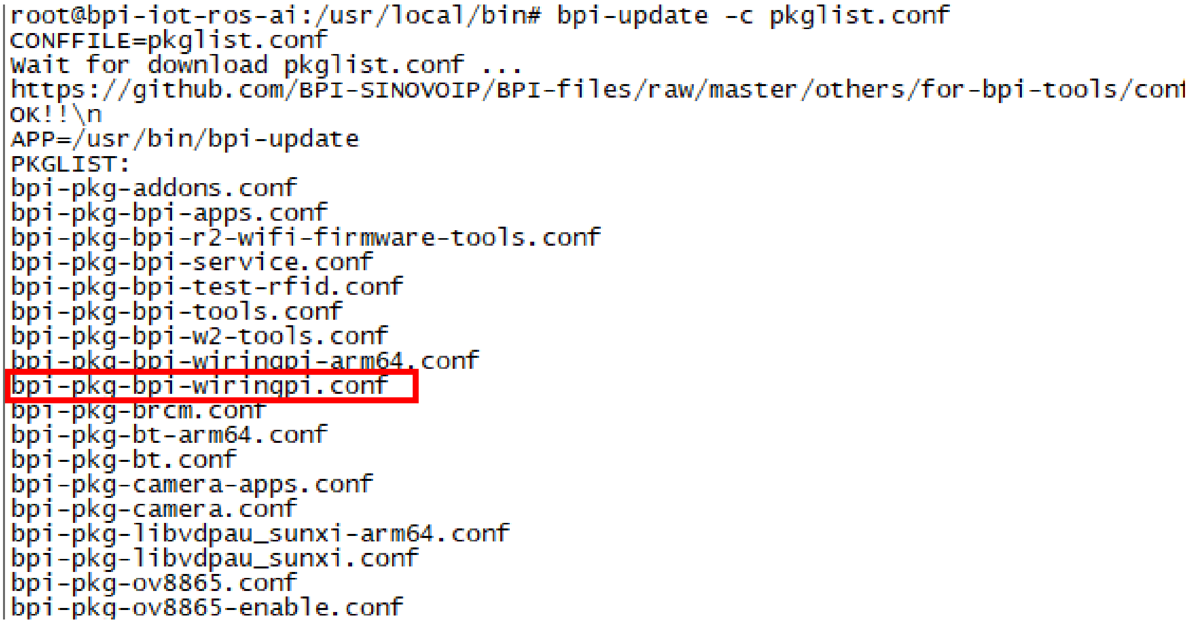
```
root@bpi-iot-ros-ai:/usr/local/bin# ./bpi_test_g40.py
Pi Board Information
---------------------
P1_REVISION => 3
RAM => 2048MB
REVISION => 4001
TYPE => Banana Pi M3[A83T]
PROCESSOR => Allwinner
MANUFACTURER => BPI-Sinovoip

Is this board info correct (y/n) ? y
8 GPIO.setup GPIO.OUT
./bpi_test_g40.py:21: RuntimeWarning: This channel is already in use, continu
disable warnings.
  GPIO.setup(pin, GPIO.OUT)
10 GPIO.setup GPIO.OUT
12 GPIO.setup GPIO.OUT
16 GPIO.setup GPIO.OUT
18 GPIO.setup GPIO.OUT
22 GPIO.setup GPIO.OUT
24 GPIO.setup GPIO.OUT
26 GPIO.setup GPIO.OUT
32 GPIO.setup GPIO.OUT
36 GPIO.setup GPIO.OUT
```

WiringPi

- GitHub: https://github.com/BPI-SINOVOIP/BPI-WiringPi2.git
- We also have built-in test command in "/usr/local/bin"

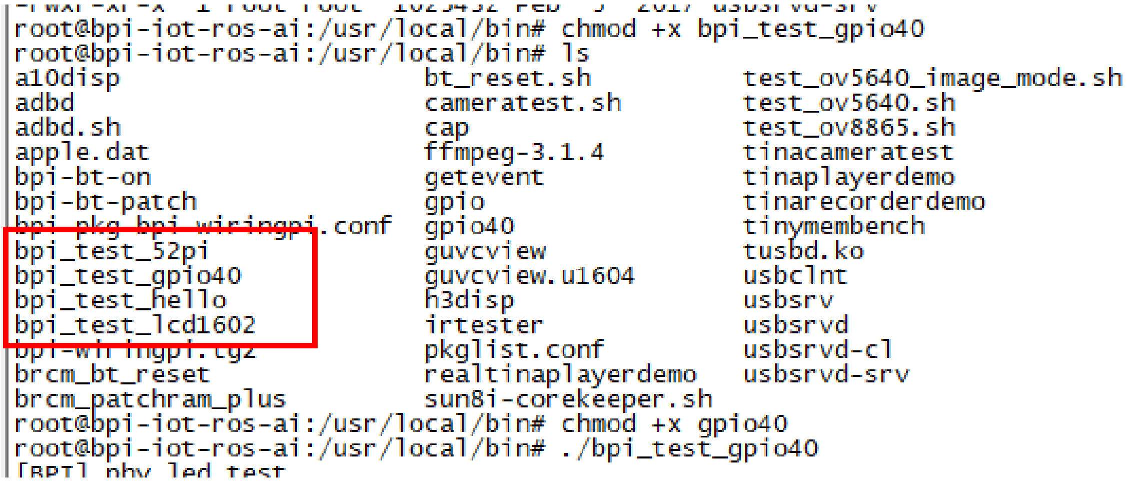
How to Update WiringPi

- Execute "bpi-update -c pkglist.conf"



```
root@bpi-iot-ros-ai:/usr/local/bin# bpi-update -c pkglist.conf
CONFFILE=pkglist.conf
Wait for download pkglist.conf ...
https://github.com/BPI-SINOVOIP/BPI-files/raw/master/others/for-bpi-tools/conf
OK!!\n
APP=/usr/bin/bpi-update
PKGLIST:
bpi-pkg-addons.conf
bpi-pkg-bpi-apps.conf
bpi-pkg-bpi-r2-wifi-firmware-tools.conf
bpi-pkg-bpi-service.conf
bpi-pkg-bpi-test-rfid.conf
bpi-pkg-bpi-tools.conf
bpi-pkg-bpi-w2-tools.conf
bpi-pkg-bpi-wiringpi-arm64.conf
bpi-pkg-bpi-wiringpi.conf
bpi-pkg-brcm.conf
bpi-pkg-bt-arm64.conf
bpi-pkg-bt.conf
bpi-pkg-camera-apps.conf
bpi-pkg-camera.conf
bpi-pkg-libvdpau_sunxi-arm64.conf
bpi-pkg-libvdpau_sunxi.conf
bpi-pkg-ov8865.conf
bpi-pkg-ov8865-enable.conf
```

- Execute "bpi-update -c bpi-pkg-bpi-wiringpi.conf"



```
-rwxr-xr-x  1 root root  1025432 Feb  5  2017 usbsrvd-srv
root@bpi-iot-ros-ai:/usr/local/bin# chmod +x bpi_test_gpio40
root@bpi-iot-ros-ai:/usr/local/bin# ls
a10disp                    bt_reset.sh          test_ov5640_image_mode.sh
adbd                       cameratest.sh        test_ov5640.sh
adbd.sh                    cap                  test_ov8865.sh
apple.dat                  ffmpeg-3.1.4         tinacameratest
bpi-bt-on                  getevent             tinaplayerdemo
bpi-bt-patch               gpio                 tinarecorderdemo
bpi-pkg-bpi-wiringpi.conf  gpio40               tinymembench
bpi_test_52pi              guvcview             tusbd.ko
bpi_test_gpio40            guvcview.u1604       usbclnt
bpi_test_hello             h3disp               usbsrv
bpi_test_lcd1602           irtester             usbsrvd
bpi-wiringpi.tgz           pkglist.conf         usbsrvd-cl
brcm_bt_reset              realtinaplayerdemo   usbsrvd-srv
brcm_patchram_plus         sun8i-corekeeper.sh
root@bpi-iot-ros-ai:/usr/local/bin# chmod +x gpio40
root@bpi-iot-ros-ai:/usr/local/bin# ./bpi_test_gpio40
[BPI] phy led test
```

RGB 1602 LCD

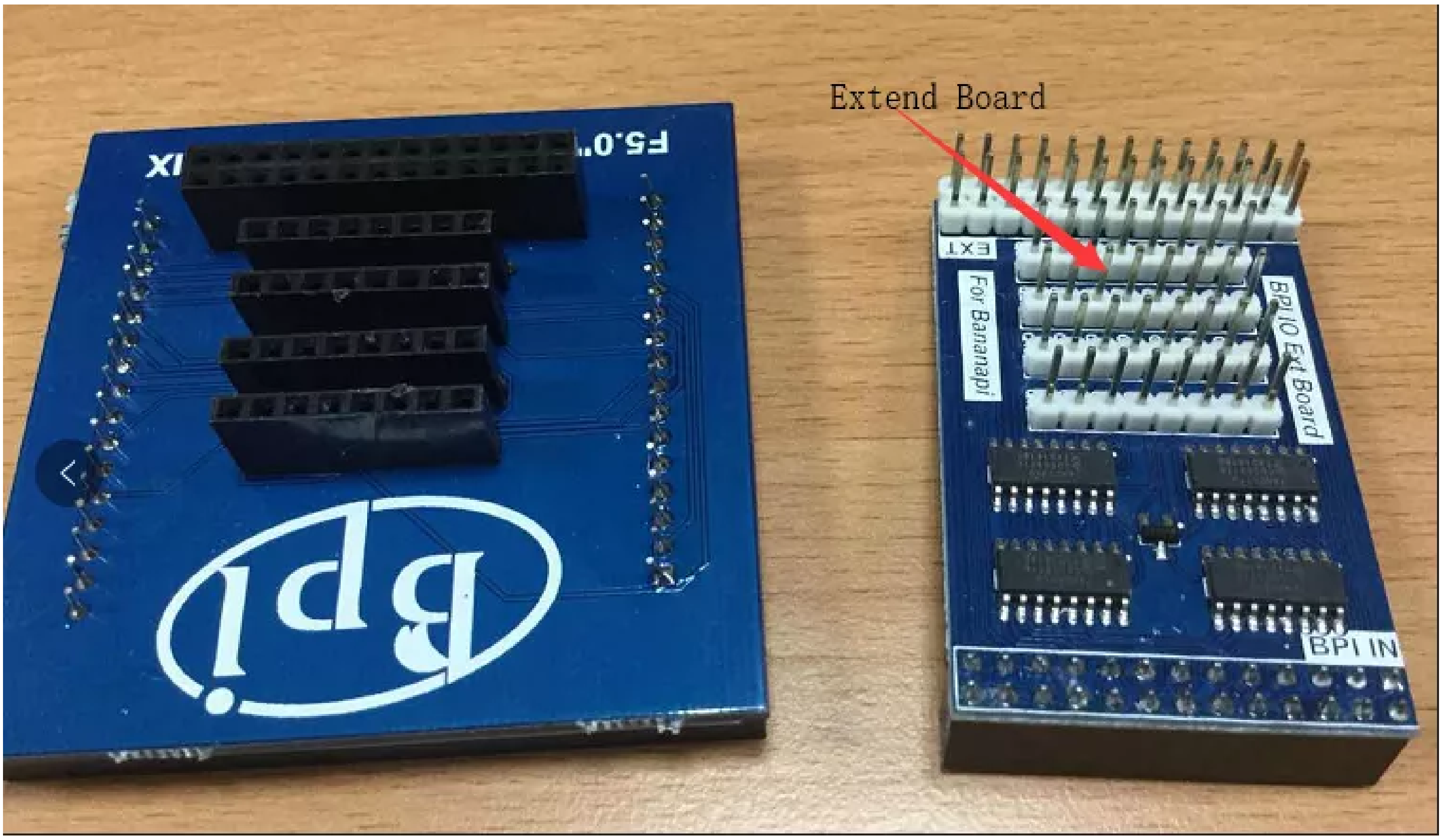
- Execute "/usr/local/bin/bpi_test_lcd1602.sh"

0.96 Inch OLED Display

- Execute "/usr/local/bin/bpi_test_52pi.sh"

8x8 RGB LED Martix

- Firstly you need a GPIO Extend Board for 8x8 LED Martix



- Execute "/usr/local/bin/bpi_test_gpio40.sh"

Retrieved from "http://wiki.banana-pi.org/index.php?title=Getting_Started_with_M2_Zero&oldid=7246"

- This page was last edited on 28 June 2019, at 16:53.