OPEN VLC
INSTALLING DEBIAN (MACHINEKIT) OPERATING SYSTEM TO EMPTY SD CARD
Guide for MAC OS users.

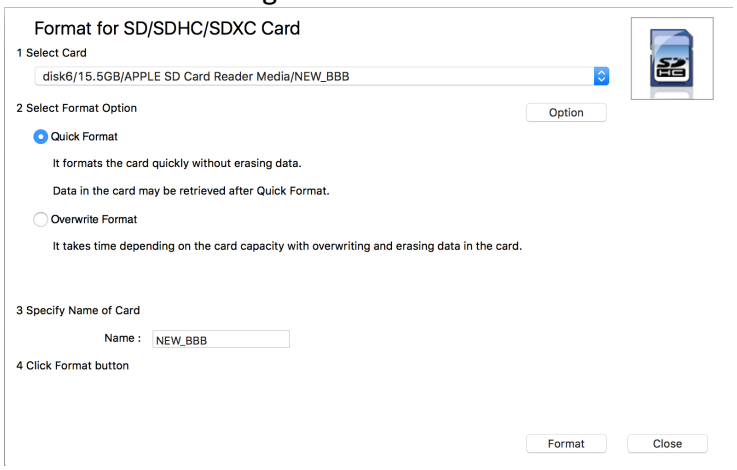
This document follows the instructions to do the Experimental setup for OPENVLC. Similar procedure is shown at openvlc.org web page: http://www.openvlc.org/openvlc.html.

STEPS

1. Download Debian image, current link is
   https://drive.google.com/file/d/0BwGT2J3dvAfNOEVibS1KQ2d5MGc/view
   Remove the. xz extension and keep it with .ISO
   Save it, we will use it in the next steps.

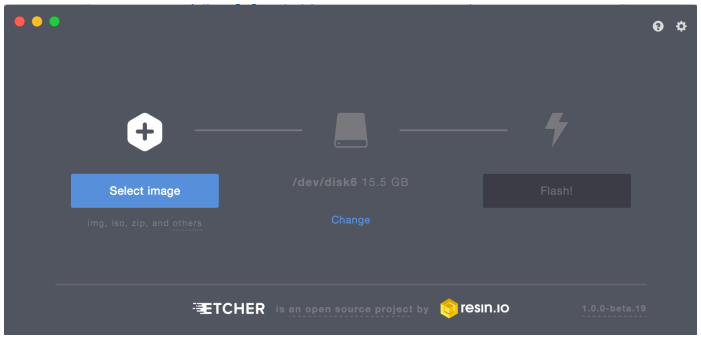
2. Format the SD card, SDFormatter can be used to do this.
   Download it at: https://www.sdcard.org/downloads/formatter_4/eula_mac/

   The interface should look something like this.



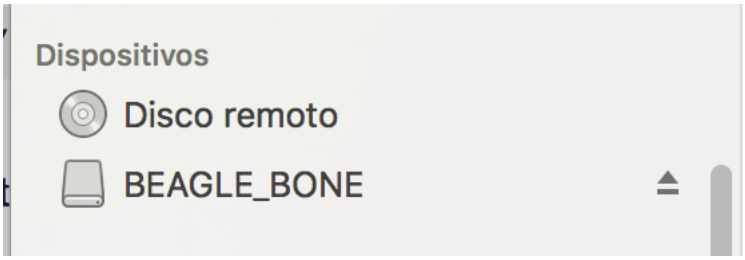
   Select your card and click Format. It should take a few seconds.

3. Now it's time to burn the image into the SD, for simplicity, download Etcher: https://etcher.io/ . Select the Debian ISO file and your SD card.



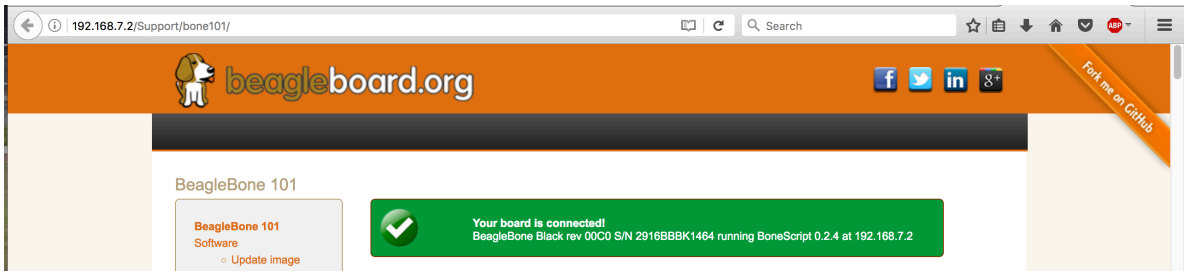
Depending on the size of the SD cards this could take up to 20 minutes.

Remove and insert the SD card. You should now see BEAGLE_BONE in your devices



4. INSERT the SD card into the Beagle Bone Board and plug it in via the USB cable to the computer, give it some time to recognize the board. At this moment, the default IP address for the BBB it 192.168.7.2. Now we will ssh the BBB but before we need to install two drivers.

   Open a browser, then type the IP before mentioned, you should see this:



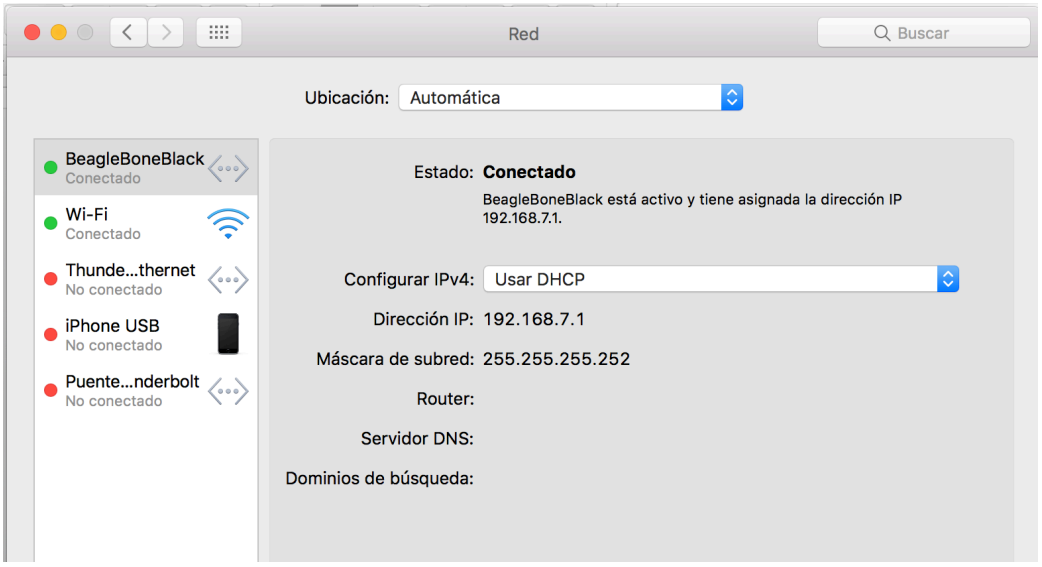
   If you get that green message, then we are good to go, if not, something was made wrong in the previous steps.

   Divers for MAC are located in the *get started* section in the beagleboard.org page, goto: https://beagleboard.org/getting-started#step2

Operating System	USB Drivers	Comments
Windows (64-bit)	64-bit installer	If in doubt, try the 64-bit installer first. • **Note #1:** Windows Driver Certification warning may pop up two or three times. Click "Ignore", "Install" or "Run" • **Note #2:** To check if you're running 32 or 64-bit Windows see this: https://support.microsoft.com/kb/827218. • **Note #3:** On systems without the latest service release, you may get an error (0xc000007b). In that case, please install the following and retry: https://www.microsoft.com/en-us/download/confirmation.aspx?id=13523. • **Note #4:** You may need to reboot Windows. • **Note #5:** These drivers have been tested to work up to Windows 10
Windows (32-bit)	32-bit installer	
Mac OS X	Network Serial	Install both sets of drivers.
Linux	mkudevrule.sh	Driver installation isn't required, but you might find a few udev rules helpful.

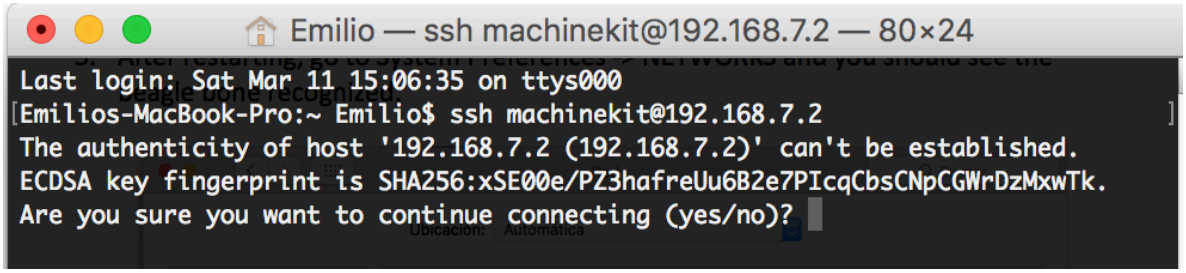
DONWLOAD AND INSTALL both: the Network and the Serial driver. After installing them, you will need to restart the computer. **IMPORTANT: DO NOT UNPLUG THE BEAGLE BONE BOARD WHILE RESTARTING OR IT WILL NOT WORK.**

5. After restarting, go to System Preferences -> NETWORKS and you should see the beagle bone recognized.



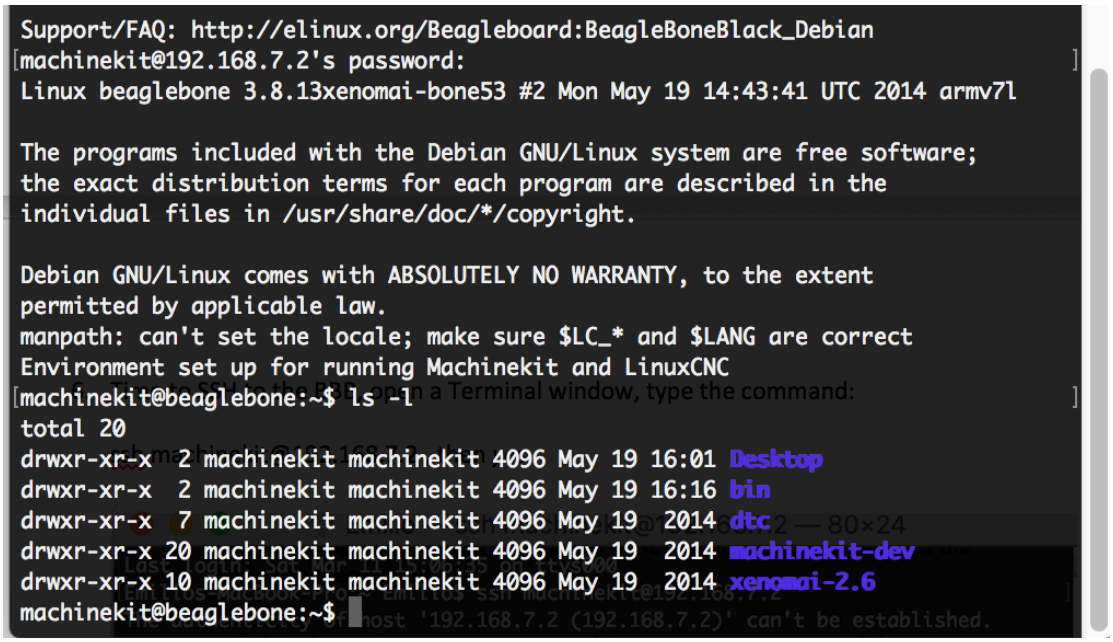
6. Time to SSH to the BBB, open a Terminal window, type the command:

   ssh machinekit@192.168.7.2 , then *yes*



   It will ask for a PASSWORD: it it the same as the user: machinekit

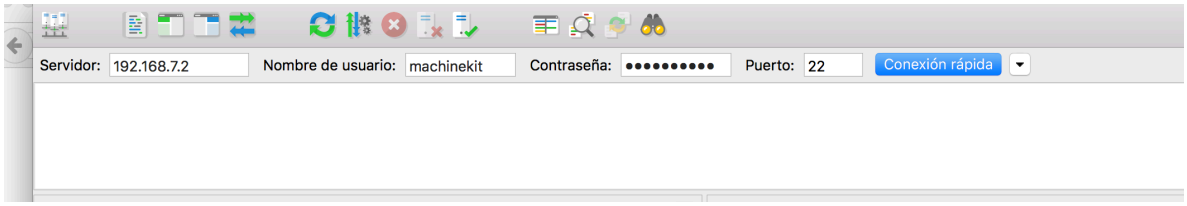
   After that, you'll be inside the board, try ls –l to see the folders.



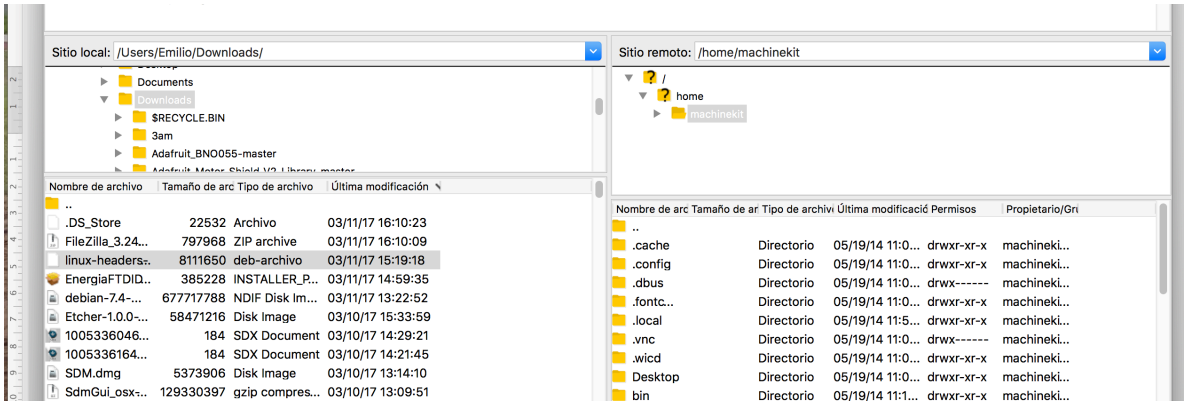
HERE IS WHEN THE FUN BEGINS!!!!!

7. Now we need to install Linux headers. Download them from https://drive.google.com/file/d/0BwGT2J3dvAfNcVljMTFUU2phQmc/view

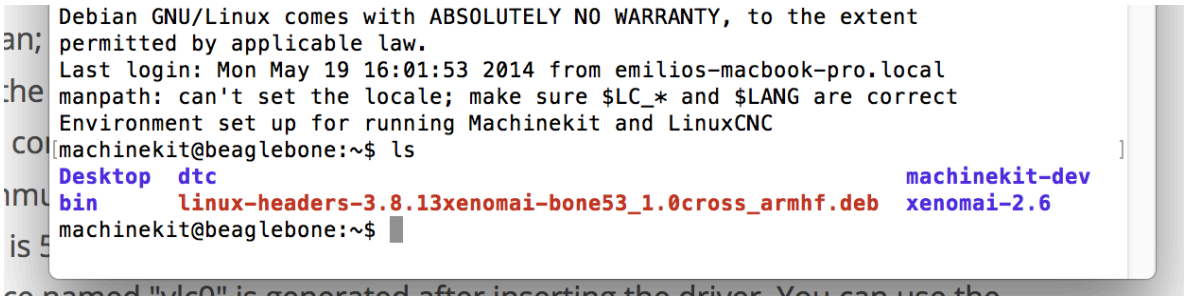
   We need to transfer this file to the BBB, there are many ways to pass this file, one is using FileZilla, download it and install it. Then connect to the BBB over port 22.



   Search for the Linux headers and drag them to the machine kit folder on the other side.



   you should see the file from the terminal



run the command

sudo dpkg -i linux-headers-3.8.13xenomai-bone53_1.0cross_armhf.deb

8. Now, download most recent version of openvlc from its github page, this is the link: https://github.com/openvlc/openvlc
   Since at this time your BBB won't have internet access, download and unzip it in the computer and then pass the folder using FileZilla as in the step before.

```
machinekit@beaglebone:~$ ls
Desktop  dtc                                                machinekit-dev  xenomai-2.6
bin      linux-headers-3.8.13xenomai-bone53_1.0cross_armhf.deb  openvlc-master
machinekit@beaglebone:~$ cd openvlc-master/
```

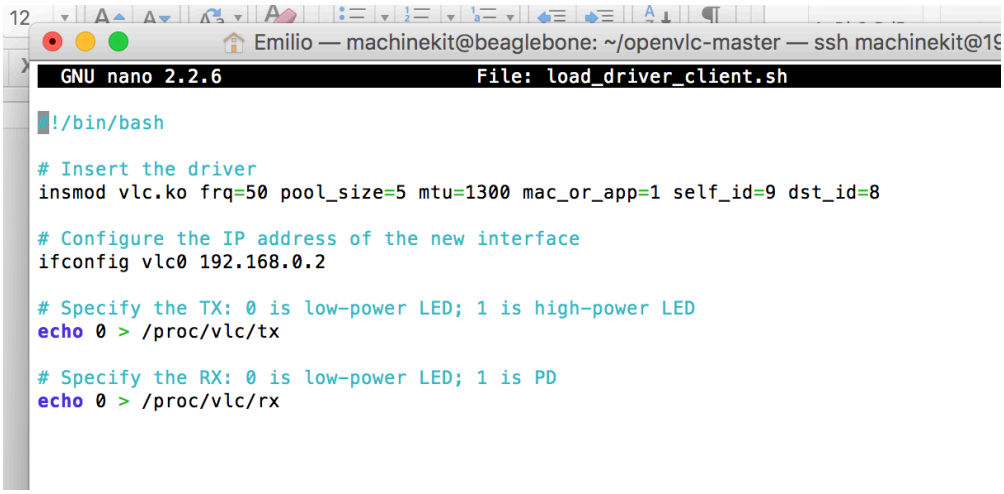
9. Move to the openvlc folder, *cd openvlc-maste.* You should see the next files, makefiles simplify life, I'm I wrong? Now just type *make*

```
machinekit@beaglebone:~/openvlc-master$ ls
LICENSE.md  README.md    encode_rs.c      iperf_server.sh       load_driver_server.sh  openvlc.h       rs.c
Makefile    decode_rs.c  iperf_client.sh  load_driver_client.sh  openvlc.c              reed_solomon.c  rslib.h
```

10. **We have finished the setup! You can run the load_driver_server or load_driver_client to set up the new interface for the BBB.**

Now, the cape board allow two types of transmission and reception. By default it could be configured to use the HIGH powe LED and the PhotoDiode. We will be using the LED's to do this, therefor we need to modify the load_driver files.

For **both files and both lines** change the echo > 1 to echo > 0. You should leave it as the image. Remember, **both files and both lines.**



Modify the file, and run the script, (LED will turn off), now you will have the new interface, you can see it using ifconfig.

```
machinekit@beaglebone:~/openvlc-master$ nano load_driver_client.sh
machinekit@beaglebone:~/openvlc-master$ sudo ./load_driver_client.sh
machinekit@beaglebone:~/openvlc-master$ ifconfig
eth0      Link encap:Ethernet  HWaddr 04:a3:16:ba:2d:81
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
          Interrupt:40

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

usb0      Link encap:Ethernet  HWaddr ee:f3:b1:fc:8f:9f
          inet addr:192.168.7.2  Bcast:192.168.7.3  Mask:255.255.255.252
          inet6 addr: fe80::ecf3:b1ff:fefc:8f9f/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:317 errors:0 dropped:0 overruns:0 frame:0
          TX packets:186 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:36189 (35.3 KiB)  TX bytes:36968 (36.1 KiB)

vlc0      Link encap:Local Loopback
          inet addr:192.168.0.2  Mask:255.255.255.0
          UP RUNNING NOARP  MTU:1300  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Once those files are modified, and the driver is loaded, try the ping command.

Ping 192.168.0.1

The LED will start blinking !!!

Note: if you try to ping something that is not in you LAN, you will get the message:
`connect: Network is unreachable`

So just ping something inside of the VLC interface network. Try 192.168.0.3. If you have done everything ok the LED will for sure blink!