

OPEN VLC

INSTALLING DEBIAN (MACHINEKIT) OPERATING SYSTEM TO EMPTY SD CARD

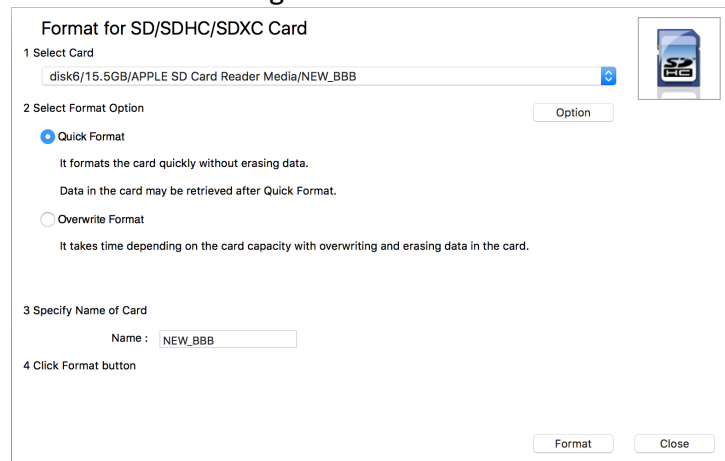
Guide for MAC OS users.

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

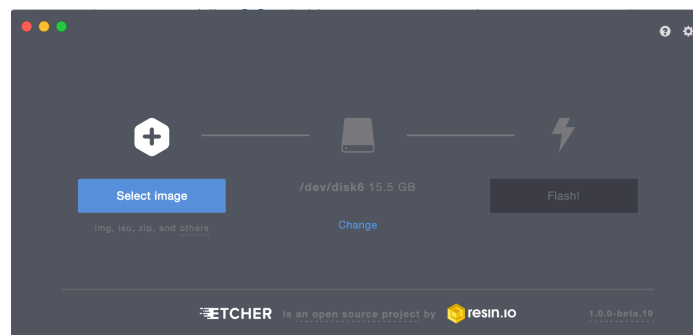
1. Download Debian image, current link is <https://drive.google.com/file/d/0BwGT2J3dvAfNOEVibS1KQ2d5MGc/view>
Remove the .xz extension and keep it with .ISO
Save it, we will use it in the next steps.
2. Format the SD card, SDFormatter can be used to do this.
Download it at: https://www.sdcard.org/downloads/formatter_4/eula_mac/

The interface should look something like this.

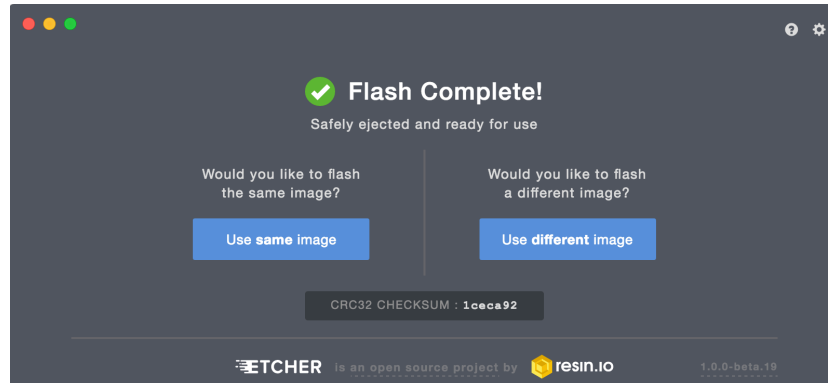


Select your card and click Format. It should take a few seconds.

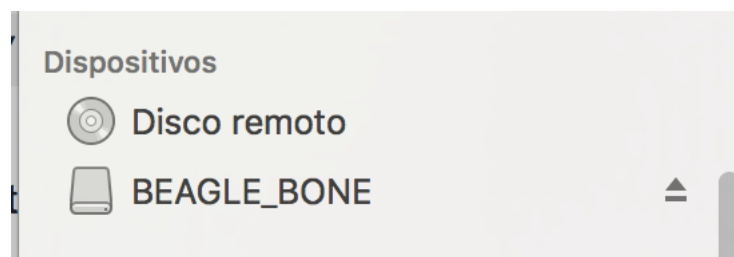
3. Now it's time to burn the image into the SD, for simplicity, download Etcher: <https://etcher.io/>. Select the Debian ISO file and your SD card.



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

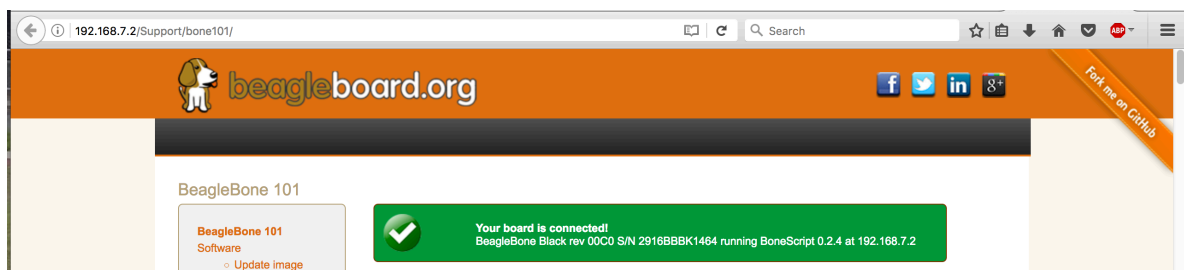


Remove and insert the SD card. You should now see BEAGLE_BONE in your devices



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 is 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:



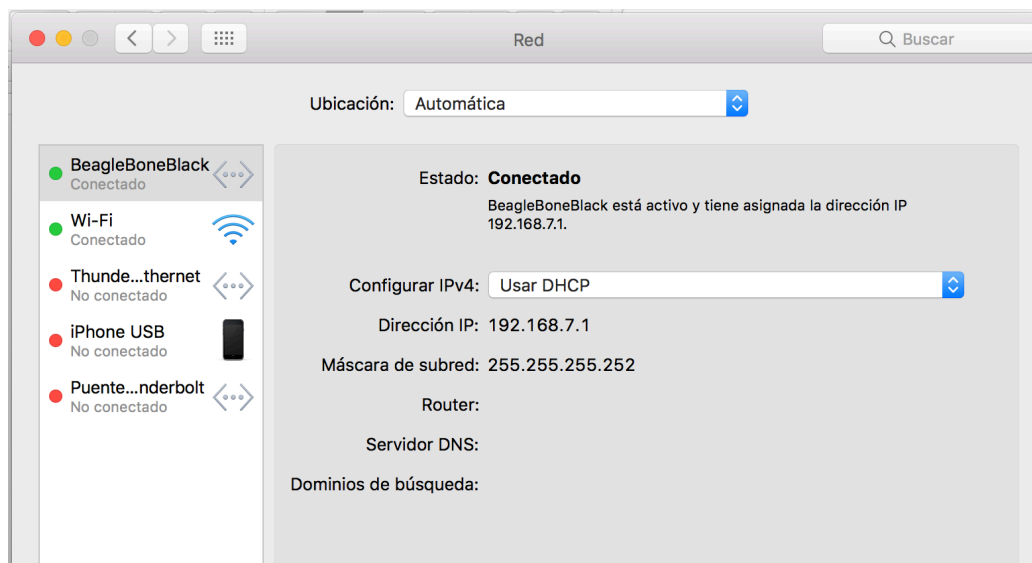
If you get that green message, then we are good to go, if not, something was made wrong in the previous steps.

Drivers 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. <ul style="list-style-type: none"> • 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.

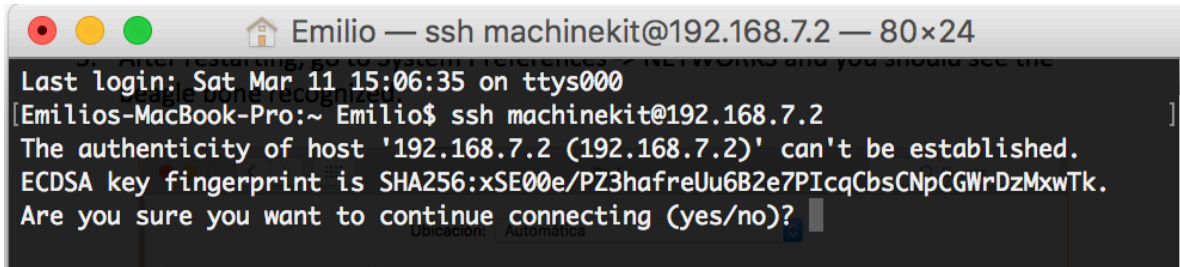
DONWLOAD AND INSTALL both: the Network and the Serial driver. After installing them, you will need to restart the computer. **IMPORTANT: DO NOT UNPLUG THE BEAGLE BONE BOARD WHILE RESTARTING OR IT WILL NOT WORK.**

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:

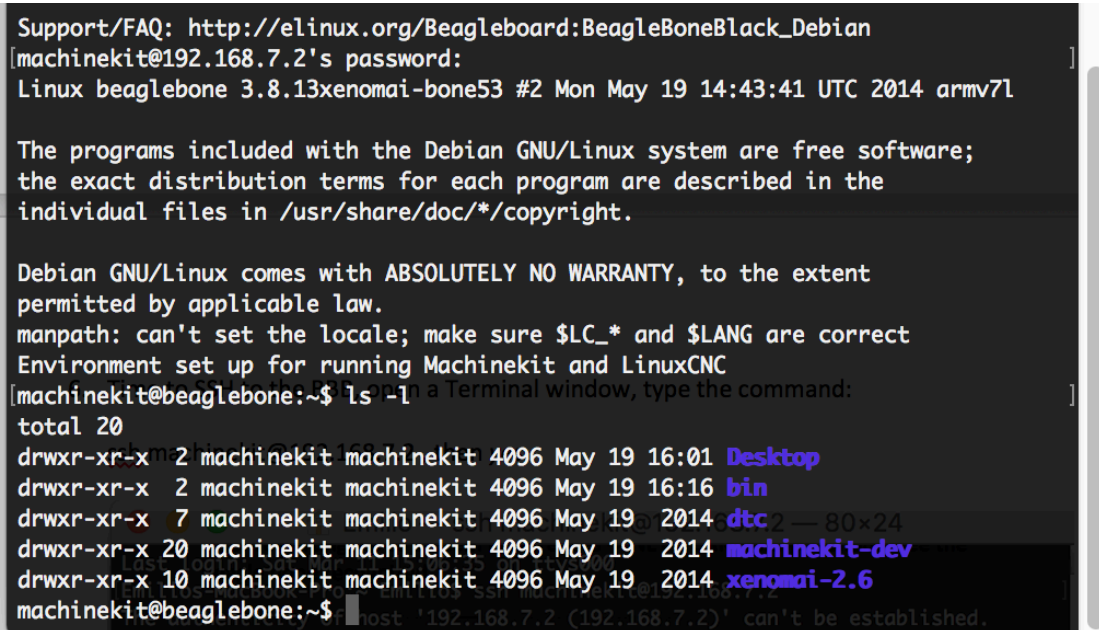
ssh machinekit@192.168.7.2 , then yes

A terminal window titled "Emilio — ssh machinekit@192.168.7.2 — 80x24". The prompt is "Emilio\$". The user has entered "ssh machinekit@192.168.7.2". The terminal shows the output: "Last login: Sat Mar 11 15:06:35 on ttys000", "The authenticity of host '192.168.7.2 (192.168.7.2)' can't be established.", "ECDSA key fingerprint is SHA256:xSE00e/PZ3hafreUu6B2e7PIcqCbsCNPcGWrDzMxwTk.", and "Are you sure you want to continue connecting (yes/no)?".

```
Emilio$ ssh machinekit@192.168.7.2
Last login: Sat Mar 11 15:06:35 on ttys000
The authenticity of host '192.168.7.2 (192.168.7.2)' can't be established.
ECDSA key fingerprint is SHA256:xSE00e/PZ3hafreUu6B2e7PIcqCbsCNPcGWrDzMxwTk.
Are you sure you want to continue connecting (yes/no)?
```

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

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

A terminal window showing the login process for machinekit@192.168.7.2. It displays the password prompt, the login success message, and the Debian GNU/Linux system information. The user then runs 'ls -l' and the terminal shows the directory listing for the machinekit user's home directory.

```
Support/FAQ: http://elinux.org/Beagleboard:BeagleBoneBlack_Debian
[machinekit@192.168.7.2's password:
Linux beaglebone 3.8.13xenomai-bone53 #2 Mon May 19 14:43:41 UTC 2014 armv7l

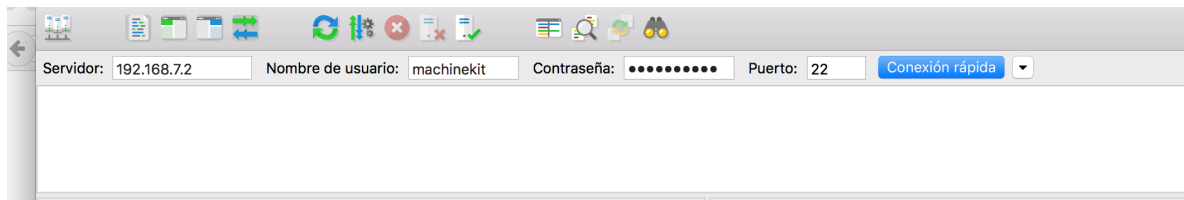
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
manpath: can't set the locale; make sure $LC_* and $LANG are correct
Environment set up for running Machinekit and LinuxCNC
[machinekit@beaglebone:~$ ls -l
total 20
drwxr-xr-x 2 machinekit machinekit 4096 May 19 16:01 Desktop
drwxr-xr-x 2 machinekit machinekit 4096 May 19 16:16 bin
drwxr-xr-x 7 machinekit machinekit 4096 May 19 2014 .dtc
drwxr-xr-x 20 machinekit machinekit 4096 May 19 2014 machinekit-dev
drwxr-xr-x 10 machinekit machinekit 4096 May 19 2014 xenomai-2.6
machinekit@beaglebone:~$
```

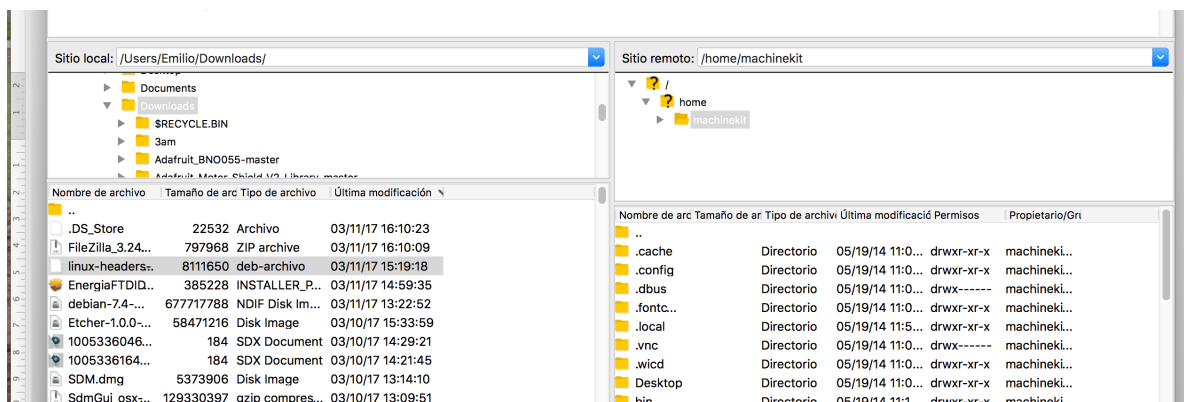
HERE IS WHEN THE FUN BEGINS!!!!

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

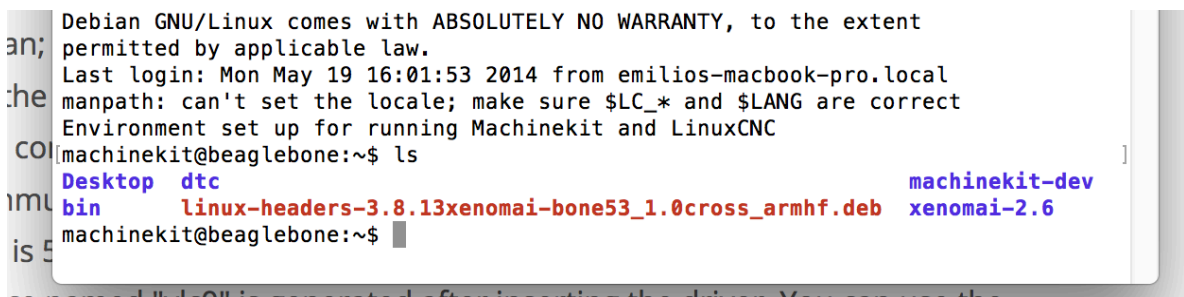
We need to transfer this file to the BBB, there are many ways to pass this file, one is using FileZilla, download it and install it. Then connect to the BBB over port 22.



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/
```

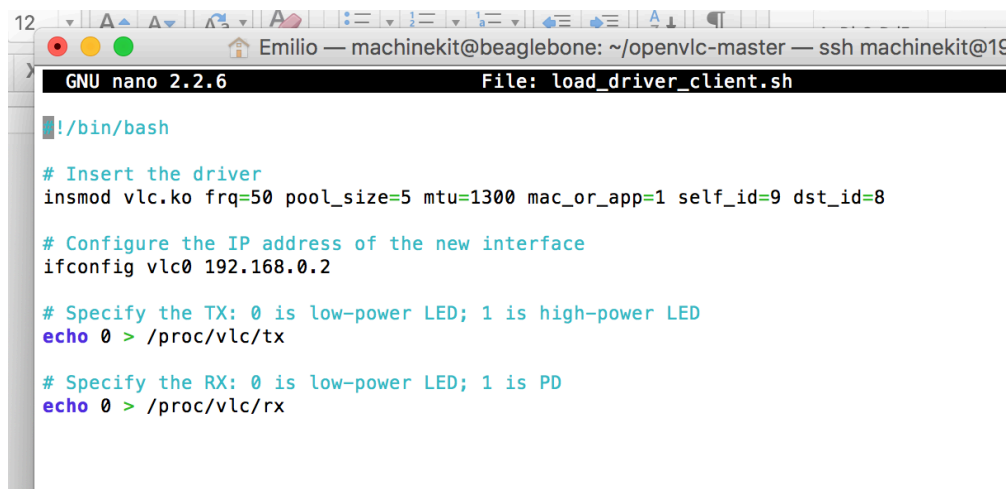
9. Move to the openvlc folder, *cd openvlc-master*. You should see the next files, makefiles simplify life, I'm I wrong? Now just type *make*

```
[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 power 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**.



```
12  GNU nano 2.2.6  File: load_driver_client.sh

#!/bin/bash

# Insert the driver
insmod vlc.ko freq=50 pool_size=5 mtu=1300 mac_or_app=1 self_id=9 dst_id=8

# Configure the IP address of the new interface
ifconfig vlc0 192.168.0.2

# Specify the TX: 0 is low-power LED; 1 is high-power LED
echo 0 > /proc/vlc/tx

# Specify the RX: 0 is low-power LED; 1 is PD
echo 0 > /proc/vlc/rx
```

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:fe8f: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)

vllc0     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!