How to flash Raspberry Pi OS onto the Compute Module 4 eMMC with usbboot in ClodPi Labs ATOM Hub for Home Assistant?

The Raspberry Pi Compute Module 4 comes in two main flavors:

- one with built-in eMMC storage
- one without built-in eMMC storage

ClodPi Labs ATOM Hub for Home Assistant comes with the first flavor. If you want to write a new OS image to the Compute Module, or manually edit files on the boot volume, you can do that just the same as you would a microSD card but you need to first make the eMMC storage mountable on another computer.

Pre-Requisite:

1) We need to open up the ATOM Hub enclosure using a screw driver (PH0 / PH1)
2) A computer (Windows / Linux / Mac)
3) USB cable to connect computer to micro-USB port Raspberry Pi Compute module
4) Uninterrupted internet supply and power supply

Steps:

1) Take the device, do not connect to power and internet.

2) Keep the device upside down
3) Remove the rubber feet.
4) Take a screw driver (PH0 / PH1) and remove all the four screws

5) Cautiously pick the device and keep it in a way with cover is at the top
6) Remove the top cover
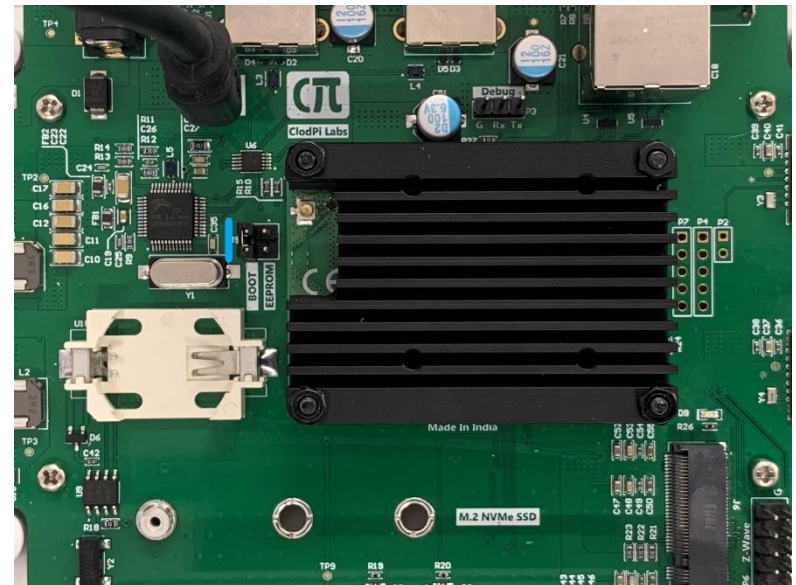7) Observe RaspberryPi CM4 module is below the Heat Sink (Black color)

8) Prepare the IO/base Board for mounting:

- Before you can set the eMMC storage into 'USB mass storage' mode, Observe the current state of the set of pins on the jumper, labelled "Boot" (highlighted in blue), on the base IO Board.
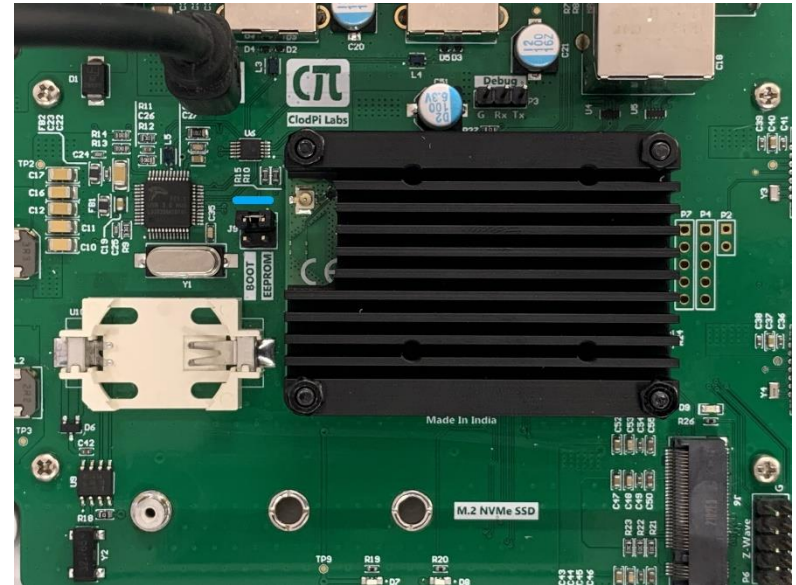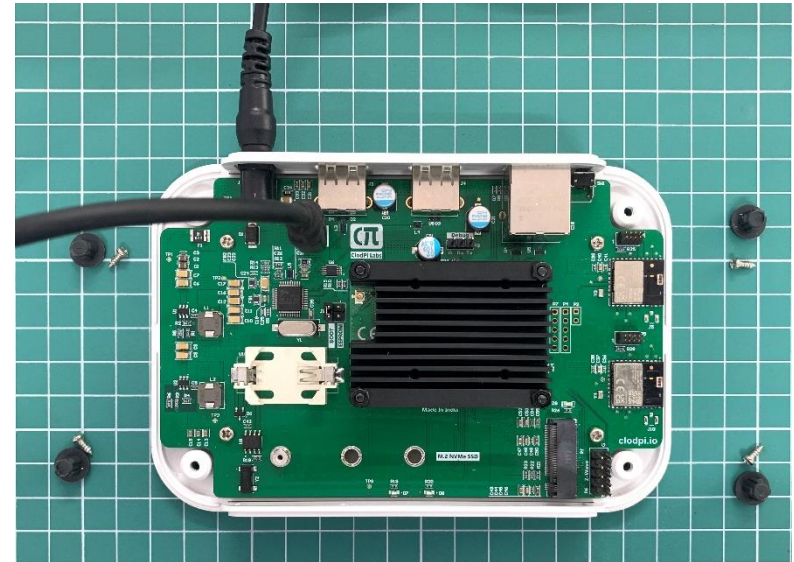

- Remove the set of pins and place it as shown in next image.

9) Take your laptop, Plug the USB cable from your computer into the USB Slave micro-USB port, labelled "OTG", on the base IO Board

10) Plug in power to the base IO board

11) The board will power on, and the red 'R19' LED turn on, but the Compute Module won't boot. The eMMC module should now be ready for the next step.

Using usbboot to mount the eMMC storage:

a. First, make sure to have the 'libusb' library installed:

- On Mac, one can have [Homebrew](#) installed, run: brew install pkgconfig libusb
- On Linux (e.g. another Raspberry Pi), run: sudo apt install libusb-1.0-0-dev

b. Second, clone the usbboot repository to your computer:

$ git clone --depth=1 https://github.com/raspberrypi/usbboot

c. Third, cd into the usbboot directory and build rpiboot:

$ cd usbboot

```
$ make
```

d.   Now there should be an rpiboot executable in the directory. To mount the eMMC storage, run: $ sudo ./rpiboot

And a few seconds later, after it finishes doing its work, you should see the boot volume mounted on your Mac (or on whatever Linux computer you're using).

You might also notice the blue R20 LED lighting up; that means there is disk read/write activity on the eMMC.

Flashing Raspberry Pi OS onto the eMMC:

At this point, the eMMC storage behaves just like a microSD card or USB drive that you plugged into your computer. Use an application like the Raspberry Pi Imager to flash Raspberry Pi OS (or any OS of your choosing) to the eMMC:
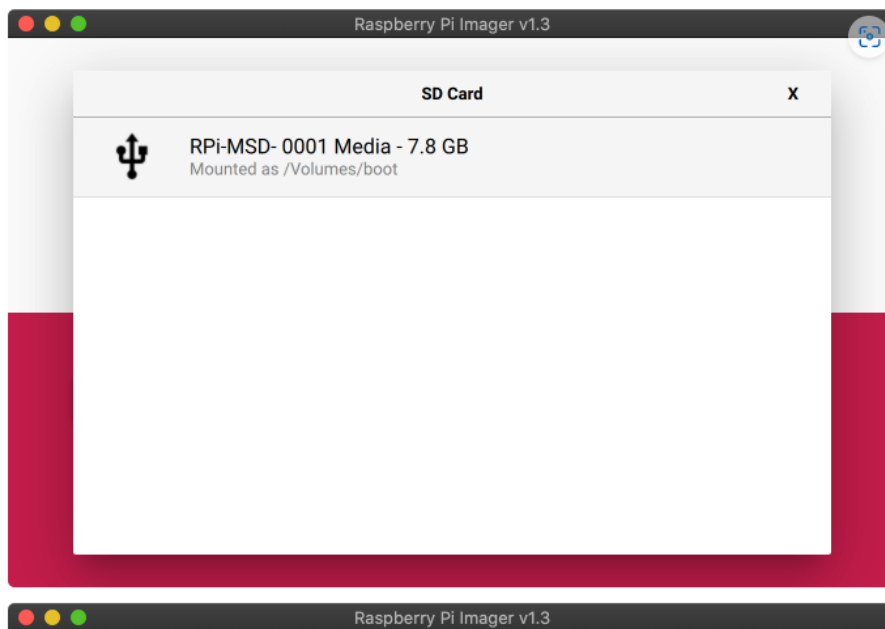
At this point, if you don't need to make any modifications to the contents of the boot volume, you could disconnect the IO board (eject the boot volume if it's still mounted!) USB slave port connection, disconnect power.

12) Remove the set of pins on the jumper, labelled "Boot" and place it back to its original position. Refer step 8.

Then plug power back in, and the CM4 should now boot off it's (freshly-flashed) eMMC storage!

If you ever need to mount the boot volume or re-flash the eMMC storage, just run sudo ./rpiboot again.

13) Place the top cover
14) Keep the device upside down
15) Tighten all the 4 screws
16) Place back all the 4 Rubber Feet
17) Keep the device with cover on the top. Your device is ready to use again.