2.1.3 Setup Operating System onto the Orange Pi Zero 2

Foreword

The *Orange Pi Zero 2* hardware looks to be an interesting and *available* Single Board Computer (SBC). See http://www.orangepi.org/html/hardWare/computerAndMicrocontrollers/details/Orange-Pi-Zero-2.html for the hardware details.

[i ordered from https://de.aliexpress.com/item/1005002002861625.html with a plastic case for approx 40 EUR - including delivery in May 2022]

USB-Hub

With one single USB jack, you'll need an USB-Hub to connect multiple USB devices (RTL-SDR dongle, GPS-Mouse and additional micro-SD card).

Unfortunately, the first two USB-2.0-Hubs, i tested, didn't work: data-transfer from RTL-SDR (reception) did break the connection. I assume, that higher power consumption is the reason. Not sure.

With following devices, the connection looks good:

- https://www.amazon.de/gp/product/B09Z2128H7
- https://www.amazon.de/gp/product/B09Q2P3NZZ

Not working builtin components

Be aware, that following things are **NOT** working with Linux:

- Mali GPU

- Video codec

The info about that can be found - sort of hidden - in the User Manual in chapter 3.2 `Linux4.9 kernel driver adaptation status` of the file `orangepi zero2_h616_user manual_v1.6.pdf`. Happily, none of these are necessary for the FMLIST-Scanner.

Wiring

Wiring (ATX-buttons, LEDs or Piezo-buzzer) is tested meanwhile - but with **not so good** results:

Output / LEDs

Using https://github.com/orangepi-xunlong/wiringOP can set output pins, e.g. LEDs. This does work.

Tone output / Piezo buzzer

Ideally, this is done utilizing hardware PWM support - to save CPU interrupts. But i could not find any GPIO pin, capable of hardware PWM. Software/emulated PWM for the buzzer might work - haven't tested so far.

Input / ATX-knobs

Sensing/reading GPIO input with internal pull-up/down resistors doesn't work with the WiringOP library. This, ATX-button won't give correct state - without external resistors. See https://kalitut.com/raspberrypi-gpio-pull-up-pull-down-resistor/, how external resistor would need to be wired. I didn't try for now.

Upload of result - by pressing the button - won't work.
But, shutdown and reboot can be performed with the builtin *power switch*.

Resume

Happily, at least for static (non-mobile) use, you won't need any of LEDs, buzzer or ATX-knobs. Buzzer and LEDs are nice to see/hear some progress, but you can go mobile without .. and check progress through an internet connection over phone/tablet and WiFi.

Temperature

I would recommend some heatsinks for the CPU - as temperature does temporarily rise over 80°C. Ideally, i'd also suggest a CPU fan, but couldn't find a suitable housing.

Download the image

Orange Pi does provide a *Debian Image* for the *Orange Pi Zero 2* at http://www.orangepi.org/html/hardWare/computerAndMicrocontrollers/service-and-support/Orange-Pi-Zero-2.html.

There are also some *Ubuntu* images ; but i did only try the latest Debian one from May 9th 2022. An older Ubuntu image failed running `rtl_test` and `rtl_sdr`.

Following the *Debian* download link to Google Drive, choose `Orangepizero2_3.0.0_debian_bullseye_server_linux5.16.17.7z`
(as i did), cause the scanner doesn't need a desktop.

Write to micro-SD card

Please follow the instructions in chapter 2 `Instructions to use the development board` of the user manual to write the image to a micro-SD card.

First boot from micro-SD card

You should be able to boot and login with one of following user accounts as described in the user manual

User	Password
root	orangepi
orangepi	orangepi

i strongly recommend to change the default passwords!

Default hostname is `orangepizero2`.

You should be able to connect with

```
ssh orangepi@orangepizero2
```

Connecting multiple devices through an USB-Hub

It depends on the USB-Hub, if devices can be resetted .. and run flawlessly afterwards.
With a tested USB-Hub, after a `resetScanDevice.sh`, the device was listed but freezed on `rtl_test` and `rtl_sdr`. In the scanner configuration file, `FMLIST_SCAN_RESET_DEVICE` needs to be disabled.
`FMLIST_SCAN_DEAD_REBOOT` might be enabled instead.

anyway, i could NOT run `rtl_sdr` at all, when using an USB-Hub!!!
i could run the scanner, when connecting the RTL-SDR dongle directly to the *Orange Pi Zero 2*, having

no free USB jack to connect GPS mouse or a memory-stick!

If you intend to use the scanner installed at a fixed place, e.g. at you home, you won't need to connect a GPS mouse, by configuring the GPS coordinates manually. And, i'd dislike, but you could write the results directly onto the same SD-card - as the OS, by configuring `FMLIST_SCAN_MOUNT="0"` and setting `FMLIST_SCAN_RESULT_DIR`.
However, i would prefer an Orange Pi 3 LTS for a slightly higher price.

System Update & Configuration

Please continue with 2.2 Setup on a pre-installed Pi or PC