Zynthian first try

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After trying to set up the Helm synthesizer on a Raspi, without success, I found Zynthian.
Zynthian is an operating system for the Raspi that has already a bunch of interesting software synthesizers and effects readily installed.
They can be combined so you can play different instruments in parallel.
The interface is however not the original one, but all synths are configured over the special Zynthian GUI.

There are kits containing everything you need (without the Raspi) but I found it more challenging to start with a simple synth, and go on adding buttons etc. later.
So my first Zynthian consisted of a Rapi4, an USB MIDI keyboard, a mouse and a HDMI screen (lacking a touchscreen). My first try was even done in headless mode, but I would not recommend this, as I missed important debugging info while booting and so had a bad time looking for the problem. What had gone wrong was that I used a 16GB SD card instead of a 32GB one. I didn’t notice it at the beginning, because the imager didn’t tell me about an error.

OS Image

This is found here:
https://os.zynthian.org/zynthianos-last-stable.zip
Use a 32GB SD card to be sure to have enough space!

First boot

If a monitor is connected you see a lot of messages from the Linux operating system. This is a good sign. When looking carefully you see more: after booting a first time, there is some configuration activity, then the system boots again with the new configuration.

If something goes wrong, it is a bad idea to boot again with the same SD card.
If hardware can't be detected, the SD-card is configured as "custom hardware" and first boot is disabled. You must re-burn the SD-card or reset the SD-card from the terminal with this command:

```
set_first_boot.sh
```

You can reach the terminal from webconf or using SSH.

From the terminal, you can check the first boot log with this command:

cat /root/first_boot.log

Web Interface

For configuration purposes the Zynthian can be reached via web interface.
The address is http://zynthian.local/ with password opensynth.

Here it is possible to do configuration, read the file system, execute Linux commands in a terminal, view debugging logs etc.

VNC: view the screen on a remote computer

VNC can be enabled via web config.

To use it seems very tempting, but the problem is that it slows down everything and you can have glitches in the sound. So it should only be enabled for tests and not when playing music.

With gvncviewer you can see the Zynthian screen:

http://zynthian.local:6080/vnc.html

(password: opensynth)

Sound

Out of the box you have a sound output on the headphone jack.

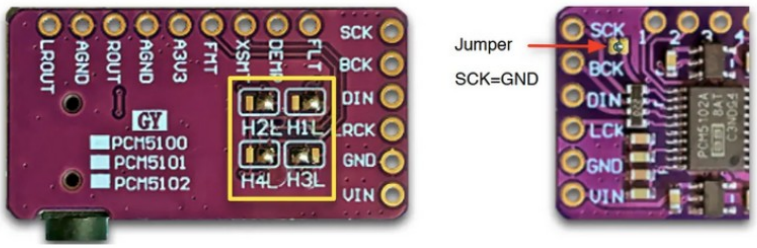
To have better quality it is advisable to use an audio DAC.

I have connected an audio DAC PCM5102 (breakout board) with these connections:

```
SCK         > Not wired (Internally generated) or better connected to GND
BCK         > GPIO18
DIN         > GPIO21
LRCK        > GPIO19
GND         > GND
VIN         > 5V      (The board has a 3.3V regulator)
```

PIN FUNCTIONS : Select = RED : Selected state at time of purchase

H	Name	Description	LOW (GND)	HIGH (D 3.3V)
H1L	FLT	Filter select	Normaly latency	Low latency
H2L	DEMP	De-emphasis control for 44.1KHz sample rate	Off	On
H3L	XMST	Soft mute control	Soft mute	Soft un-mute
H4L	FMT	Audio format selection	I2S	Left justified



(From https://raspberrypi.stackexchange.com/questions/76188/how-to-make-pcm5102-dac-work-on-raspberry-pi-zerow)

Info for PCM5102:

https://chouffy.net/Electronic/PCM510x/#gy-pcm5102-board

https://macsbug.wordpress.com/2021/02/19/web-radio-of-m5stack-pcm5102a-i2s-dac/

Normally SCK could be left open, it is then internally generated.
On my setup I got grewsome interferences that stopped when touching SCK with the oscilloscope

input (1M// 30pF). This brought me to the idea to solder an 1M resistance from SCK to GND. This worked! A direct connection to GND should also work.

Sometimes I had no sound after resetting Zynthian. It seemed to be a problem of the PCM5102 not also being resetted. This problem was solved by switching power off and on.

Configuration:
The PCM5102 is configured as HiFiberry-DAC+ light:

There are some other settings that can be configured, I left them at default values.

Music finally

Klicking in the top left corner brings us the main menu.
There you can do

- Add instrument chain to add instruments or
- Snapshots: select a ready made collection of instruments

I don't tell more about this, as it is explained on the Zynthian web pages for example here:

https://wiki.zynthian.org/index.php/Zynthian_Users_Guide