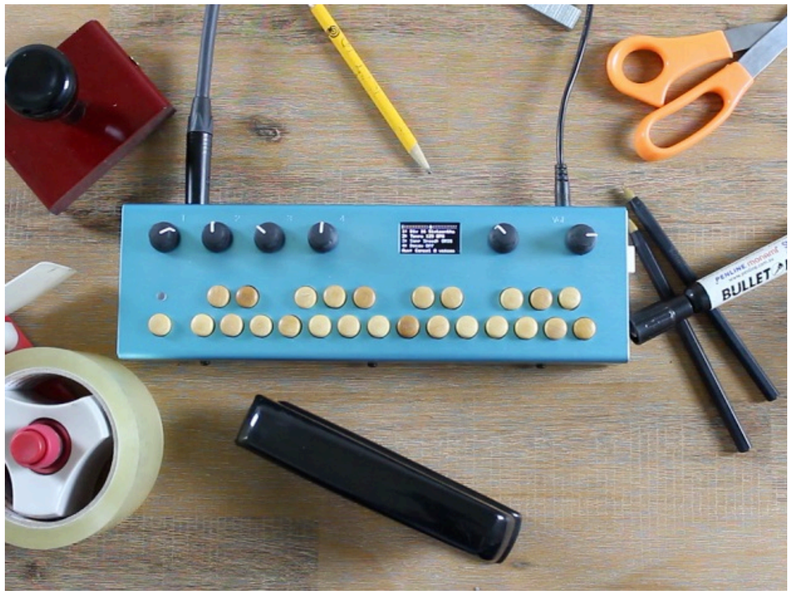
Embedded DSP device

General

- The idea is to have a small computer in tiny box
- Custom Linux Distro
- **Pure Data** or **SuperCollider**




bela
Bela.IO
rev. B1

bela.io

Built for speed.

Bela uses **Xenomai Linux** for hard real-time audio processing with latencies as low as 100us, a speed that even the best laptop can’t match.

Code, your way.

Code in **C/C++**, **Puredata**, **Supercollider**, or a variety of other languages. Use the in-browser IDE for C/C++ or your own environment. You develop it, Bela runs it.


ZED6FX
ALLEN&HEATH

RPi + PiSound

Pisound is an ultra-low latency high-quality **sound card** and **MIDI** interface specially designed for Raspberry Pi pocket computers.

Pisound works great with Raspbian, ArchLinux, Pixel, Ubuntu Mate, Audacity, Pure Data, Sonic Pi, SuperCollider, Volumio and any other Linux software!


REC ♪ 3
1
rec level

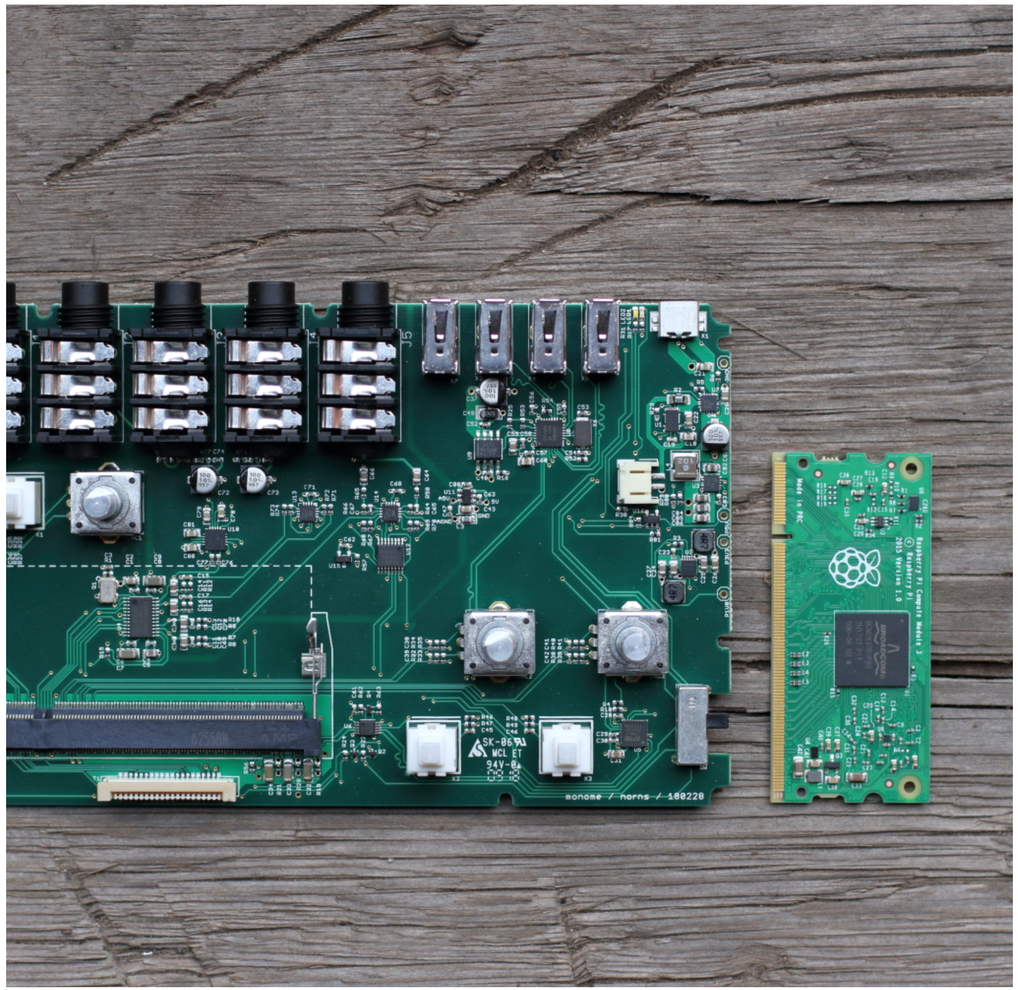
Norns

Processsing

- **compute module 3 SoC**. quad core 1.2ghz, 1gb RAM, 4gb eMMC (faster and more reliable than an sd card)
- **cs4270** i2s audio codec (low latency)

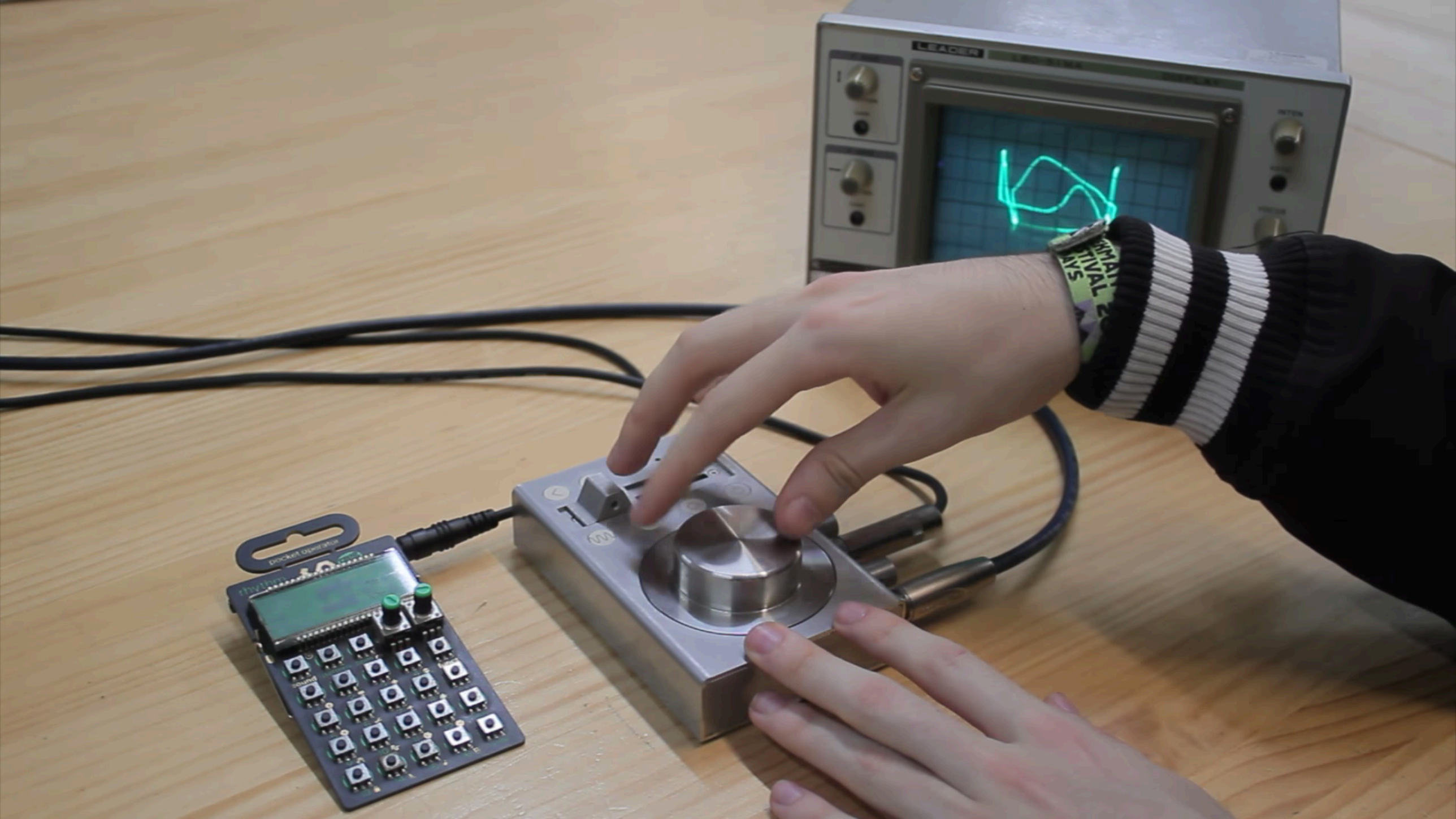
OS

- linux with realtime kernel. (2)



Norns / Specs

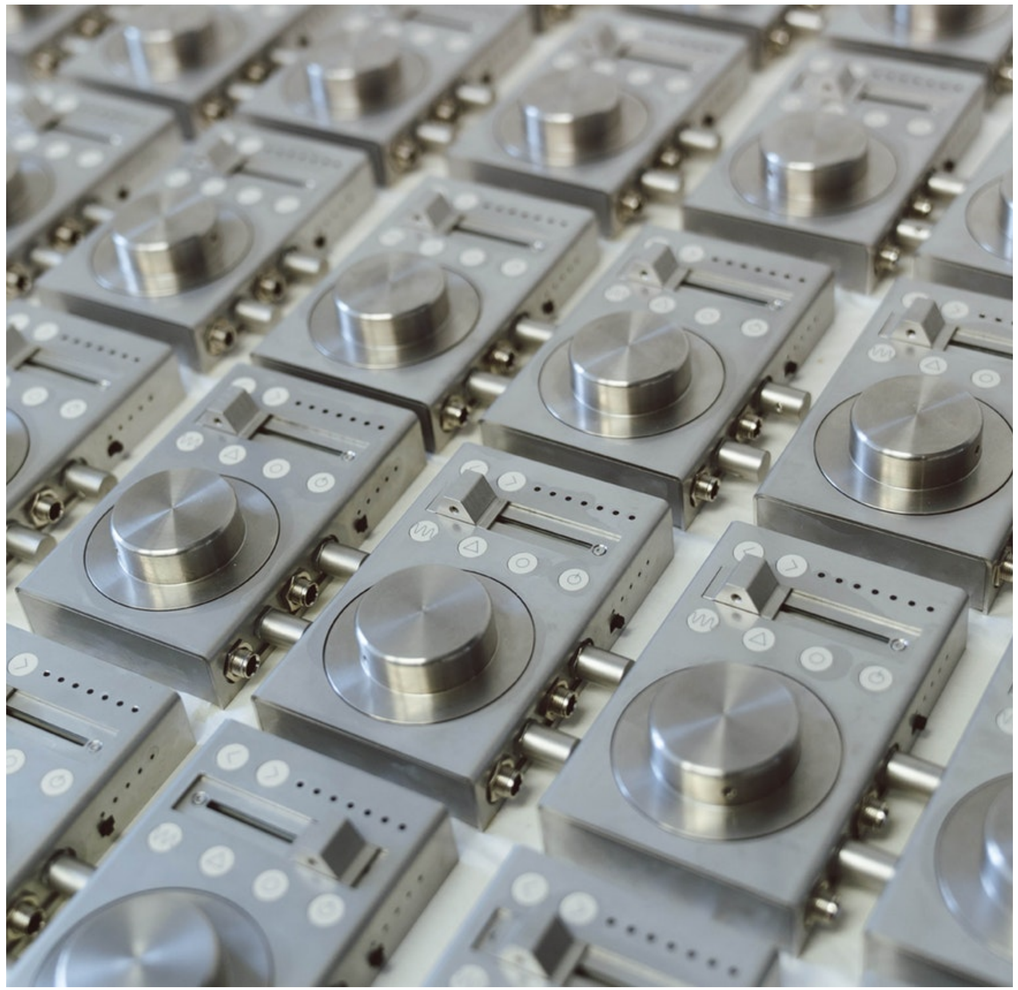
- norns has two sides: control scripts and sound engines.
- the script chooses which sound engine to use. and decides what to do with key and knob input and midi notes and grids. and then considers what to draw on the screen or start a sequencer. and tell the sound engine what to do. or how to sound.
- the sound engine tells the script what parameters it has and what kind of analysis data it produces.
- it’s a bit like a plugin in a DAW. except here the DAW is the language **lua**, and the plugin is the entire **supercollider** environment.
- both scripts and and sound engines are customizable. engines are reusable across different scripts. everything can get modified at runtime. supercollider has a huge library of generators (all the oscillators, filters, noise, transformers, crispers, sparklers, splappers) with which to assemble stuctures.

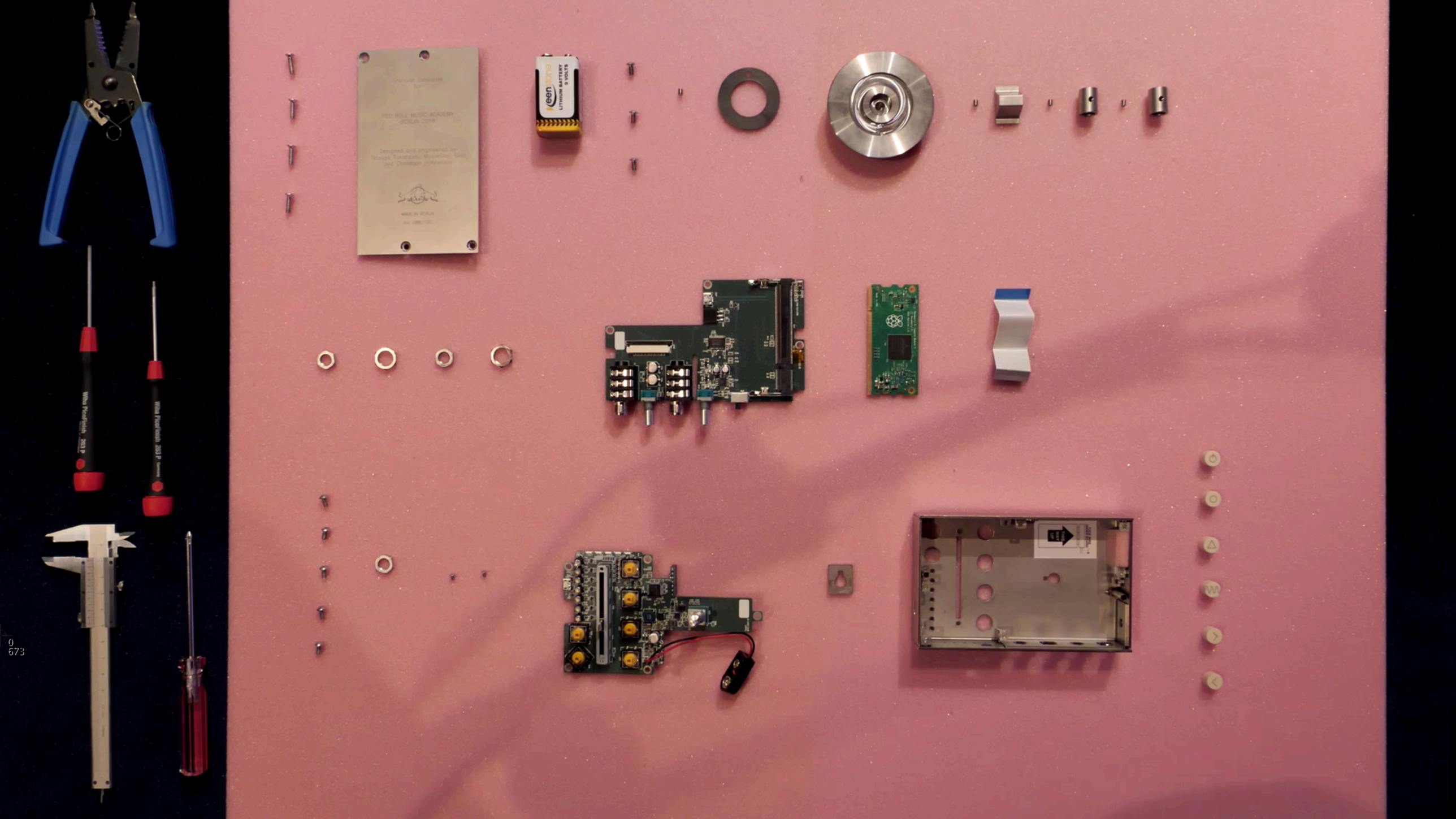

LEADER
pocket operator

Granular Convolver

The device allows you to **record sounds** and **slice** them into small **fragments** referred to as **grains**.

Once a sound is recorded, you can **convolve the grains** with any live input you care to send into the device. Essentially folding two signals, the instrument works to breed completely new sounds.




RED BULL MUSIC ACADEMY
BERLIN 2014
Designed and engineered by
Tobiasz Kazimierz, Maximilian Seidl
and Christoph Hohnerlein
MADE IN BERLIN
keen one
LITHIUM BATTERY
9 VOLTS
Wiha FlexFinish 263 P
Wiha FlexFinish 263 P

Granular Convolver / Specs

I am running a custom Linux on it, configured with **Buildroot**:
https://buildroot.org/

This way it is easy to make a small distribution with only the necessary bits, which makes flashing many of these devices super quick. And it is tailored to make read only systems, which don't destroy the flash memory when they crash. The samples are stored in a specific audio partition.

The audio stuff is running on **SuperCollider**:
https://supercollider.github.io/

It is connected with **Jack** and is started with a bootup script. The main guts are based on the Convolution2L object, but be careful when you experiment: it has a bug: https://github.com/supercollider/supercollider/pull/3687

Granular Convolver / Specs

GPIO (on the RPi) is not used really for the whole thing, except the power off signaling.

This is done through the kernel space file tree and a bash script demon.

The rest of the communication used **MIDI** over a serial port. The interface of the convolver is controlled by an **STM32** microcontroller, which speaks MIDI with the PI.

This is the end
but also the beginning