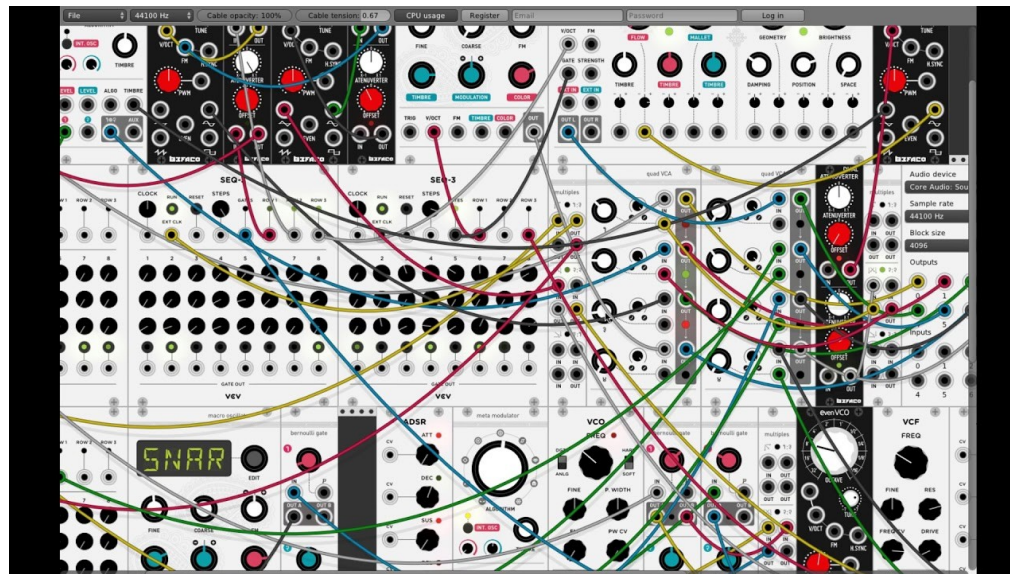


VORRAQ

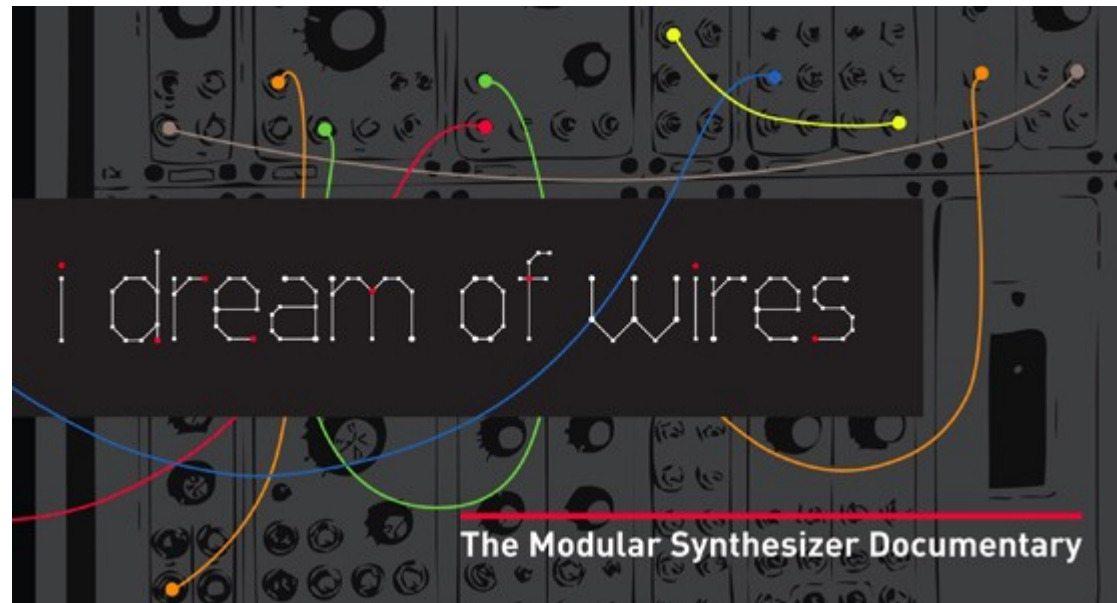


Y. Collette (ycollette.nospam@free.fr)
<https://audinux.github.io/>



Modular Synthesis

<http://www.idreamofwires.org/>



A documentary on modular synthesis.



Modular Synthesis

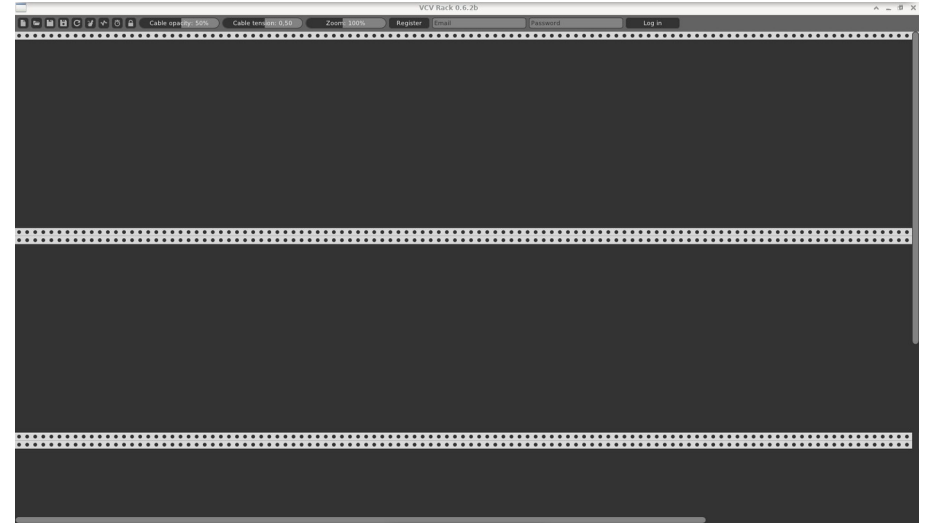
<https://sisterswithtransistors.com/>



A documentary on the female pioneers of modular synthesis.



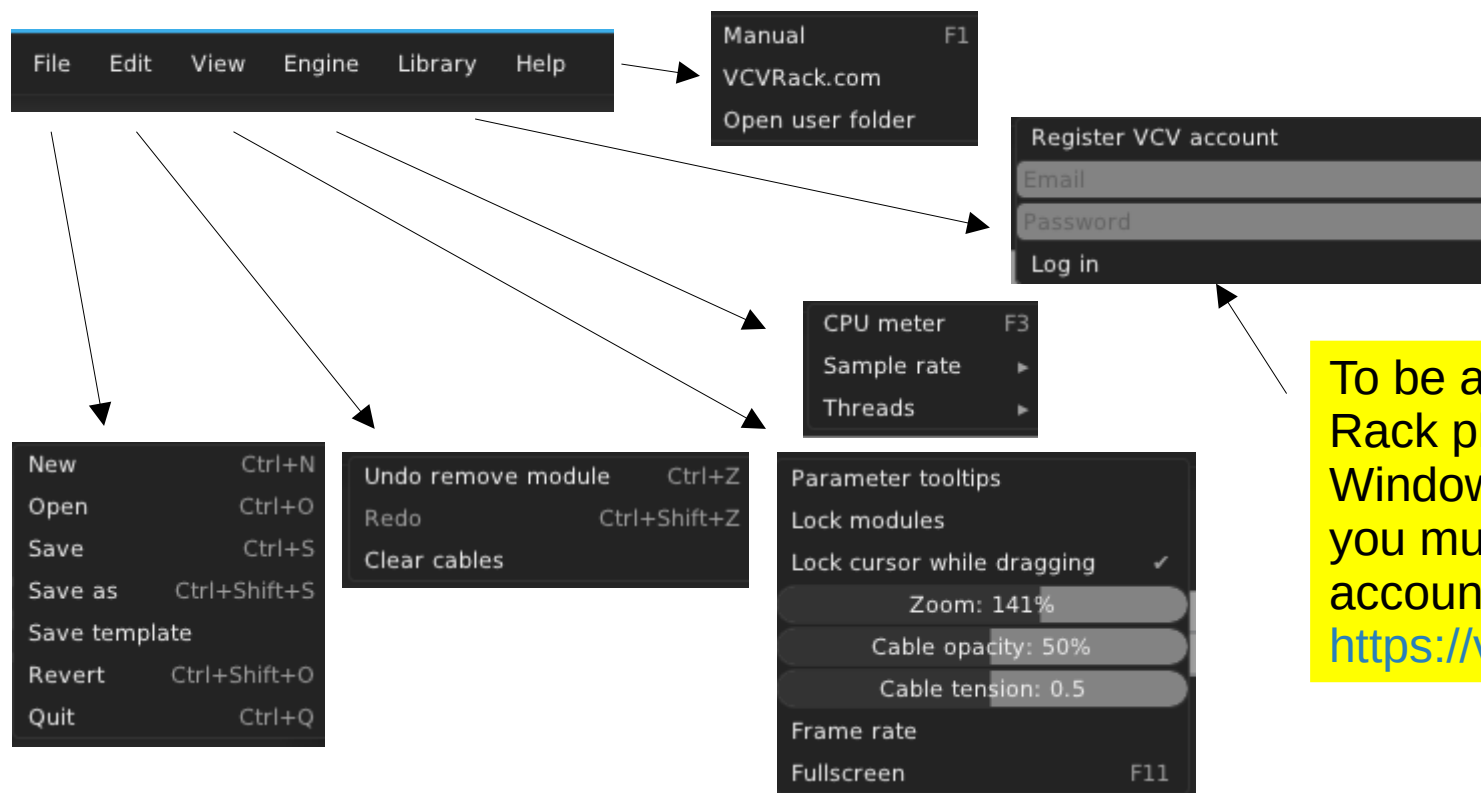
The starting Window



\$ Rack &



Menu bar



To be able to install VCV Rack plugins on Windows and MacOS, you must create an account on <https://vcvrack.com/>



Before we start

We will use the following modules from VCV Rack :

- Fundamental - <https://vcvrack.com/Fundamental>
- SV modular - <https://vcvrack.com/DrumKit>
- AS - <https://library.vcvrack.com/AS>
- Impromptu - <https://library.vcvrack.com/ImpromptuModular>
- Audible Instruments - <https://library.vcvrack.com/AudibleInstruments>
- Squinky labs - <https://library.vcvrack.com/squinkylabs-plug1>
- aridacity - <https://library.vcvrack.com/aridacity>
- Befaco - <https://vcvrack.com/Befaco>
- Eseries - <https://vcvrack.com/ESeries>
- Aaron Static - <https://library.vcvrack.com/AaronStatic>
- BogAudio - <https://library.vcvrack.com/Bogaudio>
- Valley - <https://library.vcvrack.com/Valley>
- Bark - <https://library.vcvrack.com/Bark>



Before we start

To install these modules :

- on MacOS / Windows : create an account (it's free) and then click on each of the links and register to this module. An installation will be performed and once this is done, you will have to restart VCV Rack.

On Linux / Fedora, install the LinuxMAO COPR repository and then the VCV Rack plugins :

```
$ dnf copr enable ycollet/linuxmao
$ dnf install rack-v1-DrumKit \
    rack-v1-AS \
    rack-v1-ImpromptuModular \
    rack-v1-AudibleInstruments \
    rack-v1-squinkylabs-plug1 \
    rack-v1-aridacity \
    rack-v1-Befaco \
    rack-v1-ESeries \
    rack-v1-AaronStatic \
    rack-v1-Bogaudio \
    rack-v1-Valley \
    rack-v1-Bark
```

And then start Rack &.



VCV Rack

Control Voltage / Gate / Trigger

Two methods exist to control via a voltage (CV) :

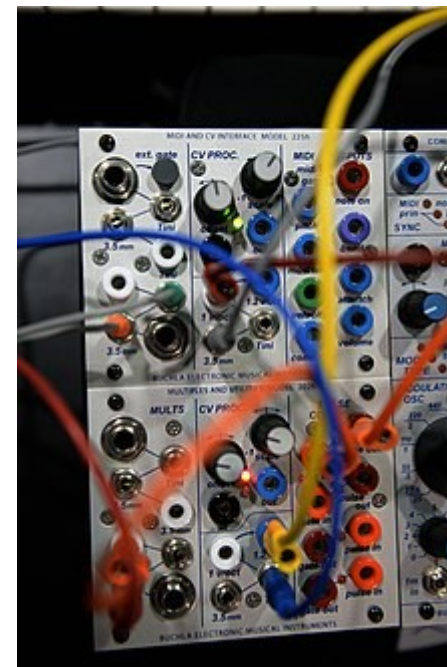
The **CV** (in octave per volt), which Robert Moog invented, is used by the majority of modular synth manufacturer, and also by the EuroRack norm.

To go to the next octave, you just have to add one volt (this will multiply by 2 the frequency), and subtract one volt to go to the lowest octave (this will divide the frequency by 2).

The **GATE** signal is used to notify the switching on / off of an action.

The **TRIGGER** signal is a pulse notifying the switching on / off of an action.

<https://fr.wikipedia.org/wiki/CV/gate>





Fundamental Modules





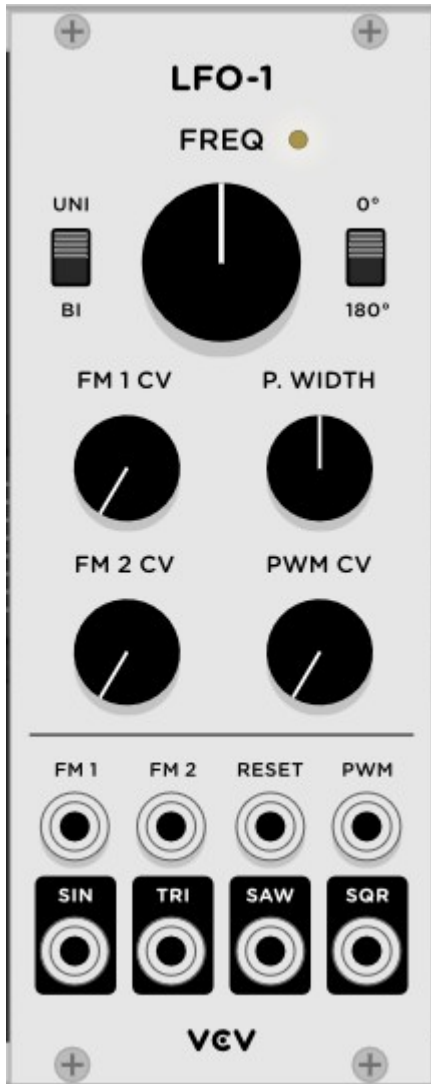
Fundamental Modules

The fundamental modules gives you access to all the basic modules we can find in modular synthesis. Really useful to learn modular synth.

We will present all these modules some slides after ...



VCO / LFO



Some basic building blocks :

VCO : Voltage Control Oscillator

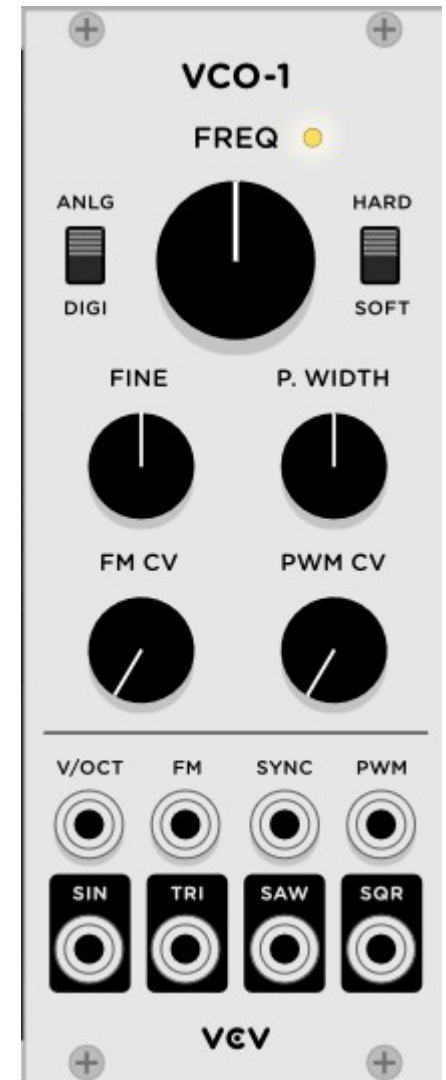
Black connectors : outputs

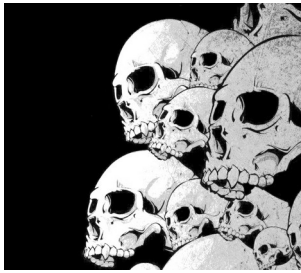
Grey connectors : CV inputs

This oscillator produces audible frequencies

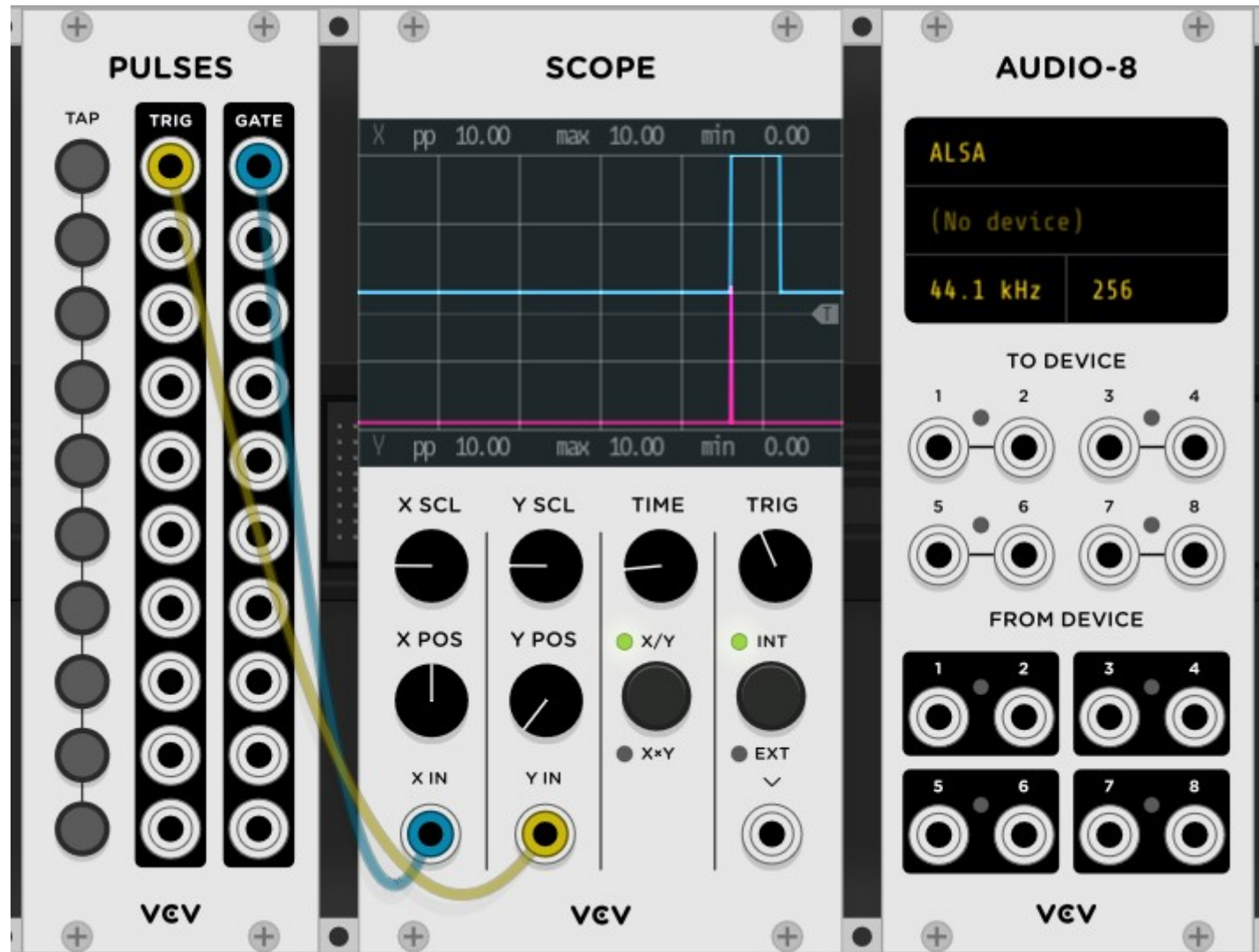
LFO : Low Frequencies Oscillator

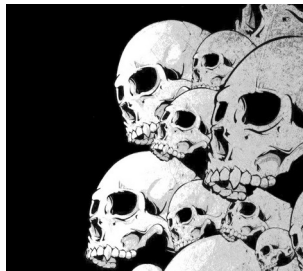
The oscillator produces low frequencies. It will be used to control other devices.





Gate / Trigger





VCO / LFO Example

You can use an attenuverter

Attenuator

Audio-8
Input / Output





A Simple Example



Fundamental
LFO1

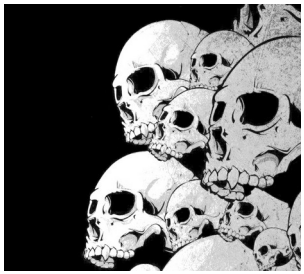
Fundamental
VCO1

Core
Audio

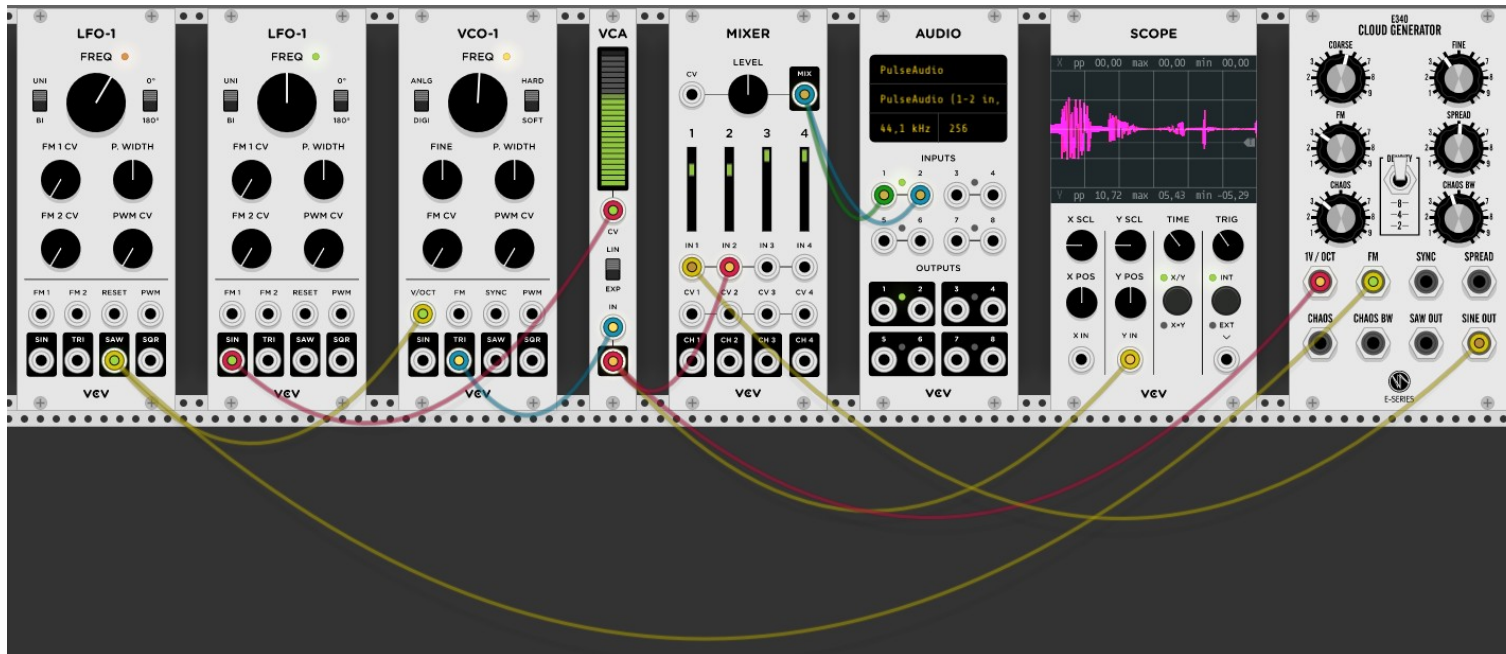
Fundamental
LFO1

Fundamental
VCA1

Fundamental
Scope



An Example with the Cloud Generator



Fundamental
LFO1

Fundamental
VCO1

Fundamental
Mixer

Fundamental
Scope

Fundamental
LFO1

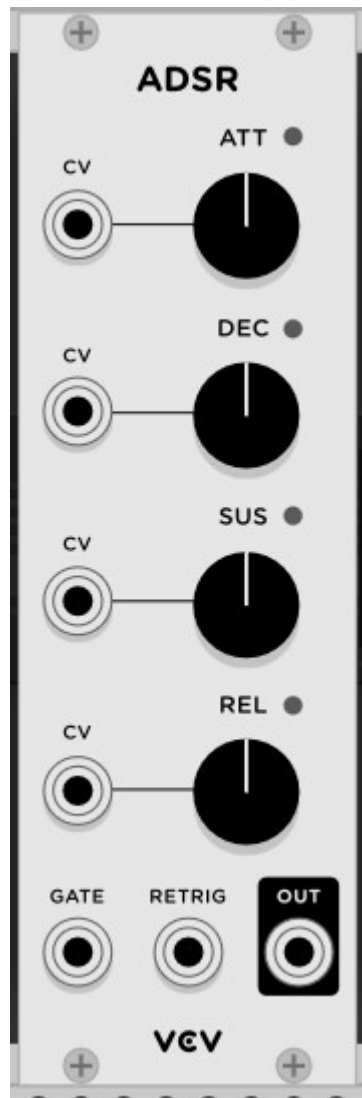
Fundamental
VCA1

Core
Audio

Befaco
Cloud Generator

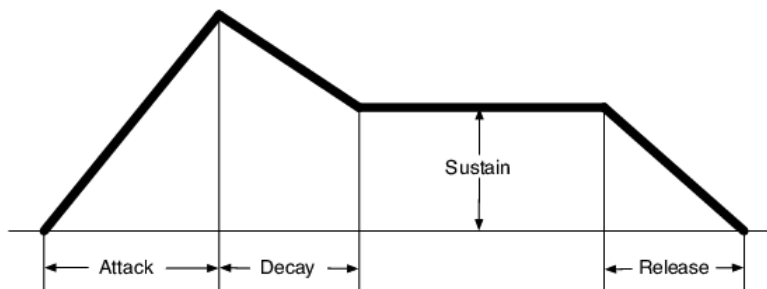


ADSR / VCA



ADSR :

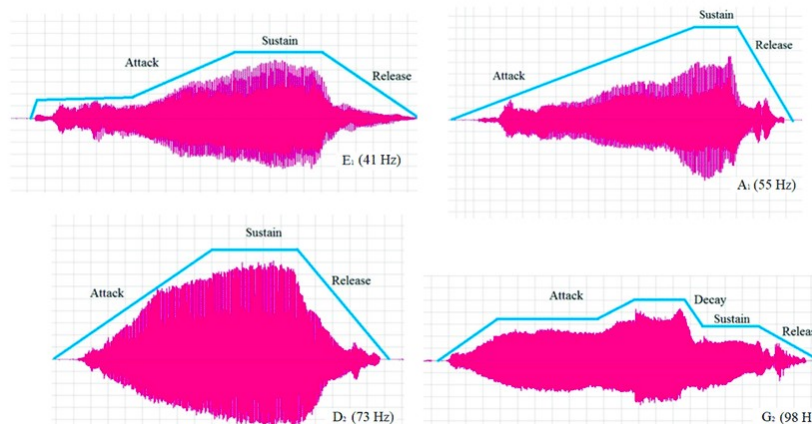
Attack
Decay
Sustain
Release



Produces a signal which will be used to control the amplitude of a sound

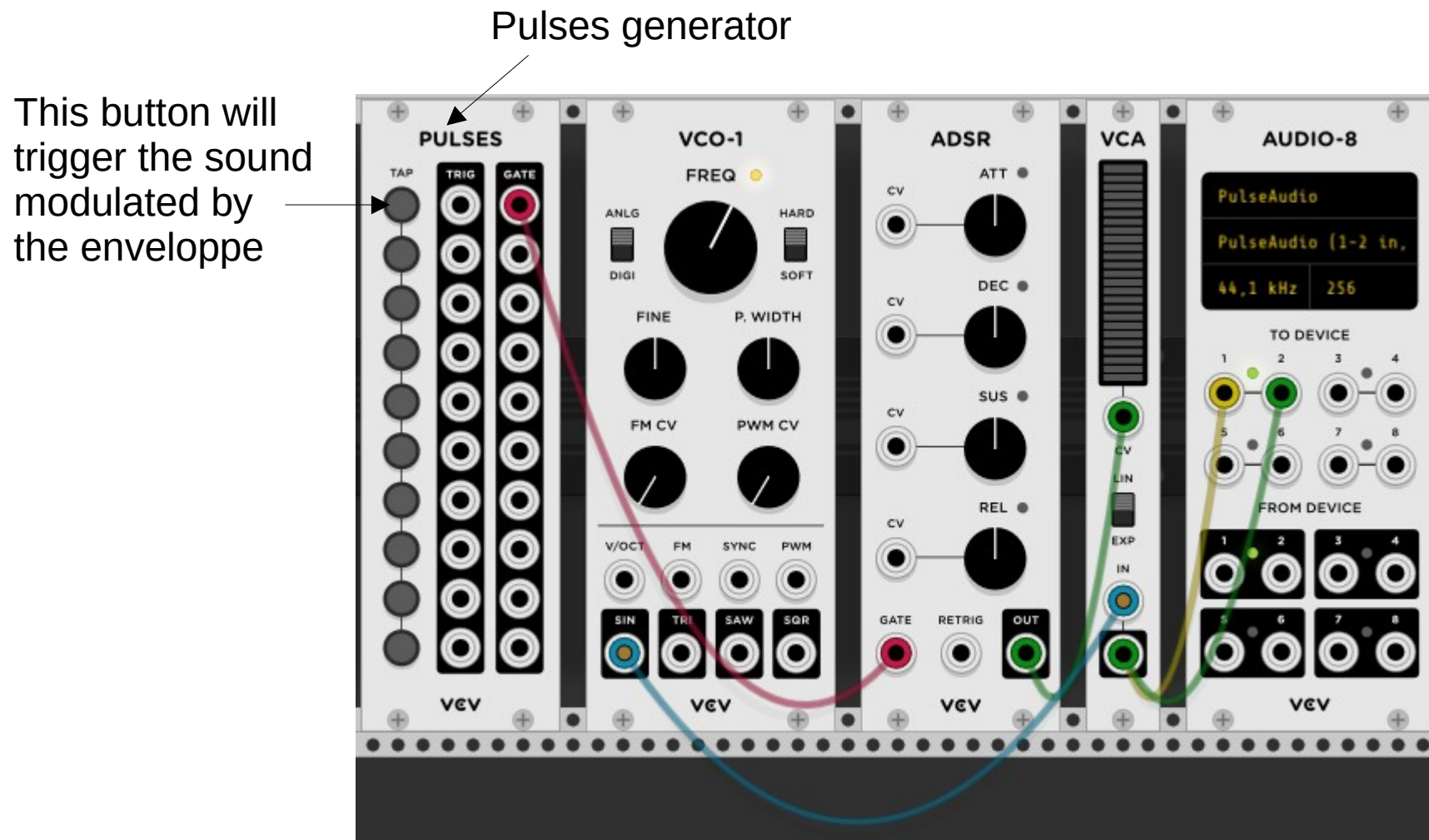
VCA : Voltage Control Amplifier

Most of the time,
an ADSR
enveloppe is
used with a VCA





ADSR / VCA Example



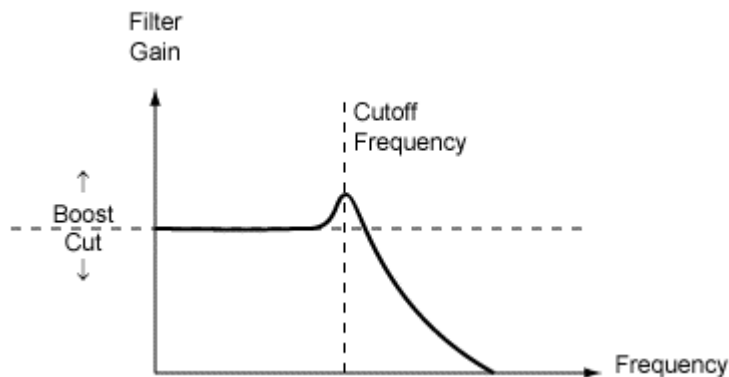
VCF Example

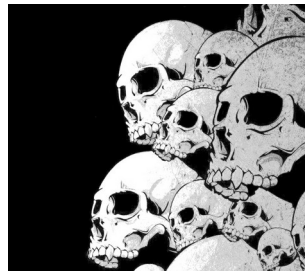
VCF : Voltage Control Frequency

A filter (low pass or high pass) controlled by a CV signal.

FREQ/CV : the sensivity to the of the cutoff frequency wrt the CV signal amplitude.

RES : The resonance of the filter





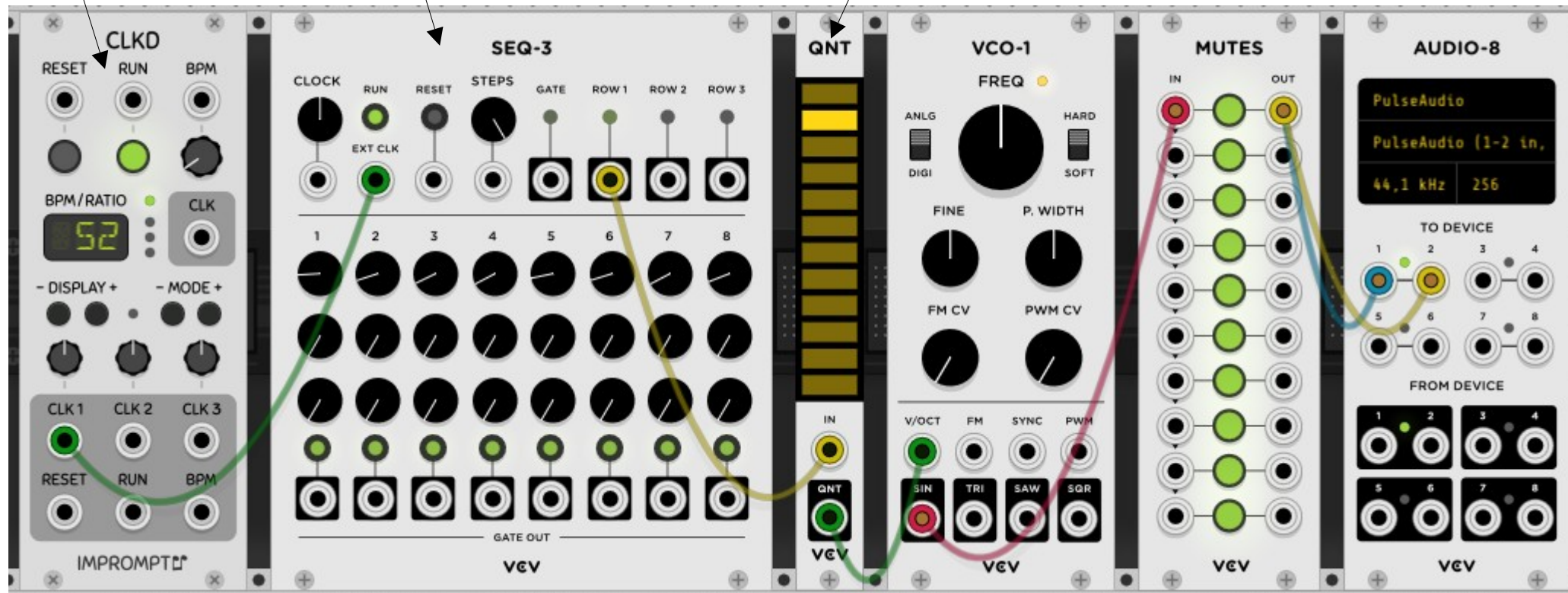
Sequencer Example

Clock module
To adjust the
speed of the
sequencer

8 notes sequencer

Quantizer
To transform the
continuous signal
into discrete levels

You can disable
some levels by
clicking on them





Drum Sequencer

Bass drum, snare, hit hat from
SV modular
Drum sequencer from SV
modular

Mixer and Reverb from AS

Clock from Impromptu





Drum Sequencer 2



Bass drum, snare, hit hat from SV modular
AUDIO-8 from Fundamental
PULSES from Fundamental
Sums from Mental
DelayPlus from AS



Playing with randomness

Macro oscillator and Bernoulli gate from Audible Instruments

Clock from Impromptu

Bass drum from SV Modular

Mixer from AS

All the other modules from Fundamental





Some melodies ?

A random generator from
Squinky labs

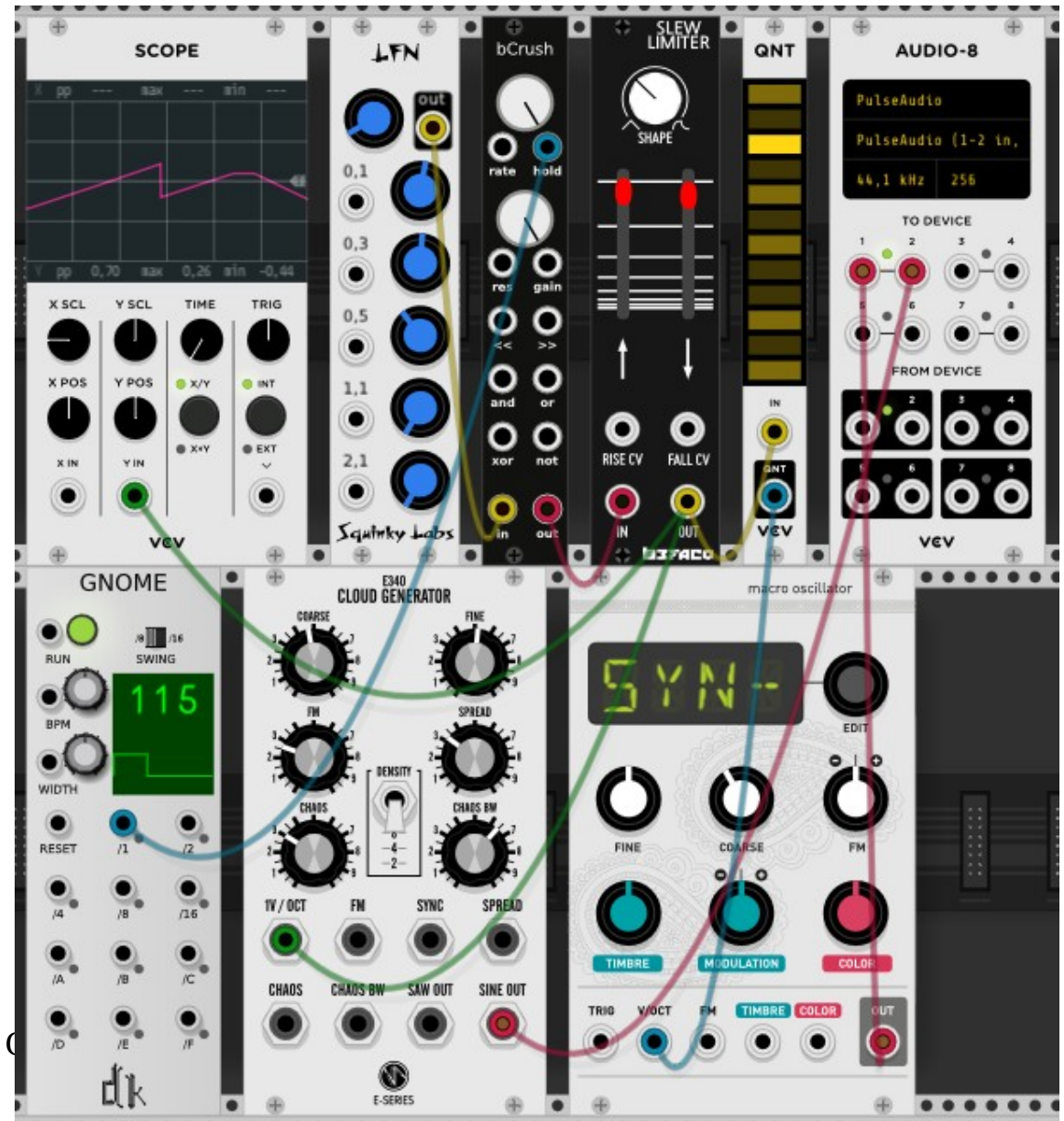
bCrush from aridacity

Slew Limiter from Befaco

Cloud Generators from Eseries

Clock from SV Modular

Macro oscillator from Audible
Instruments





Chords progression

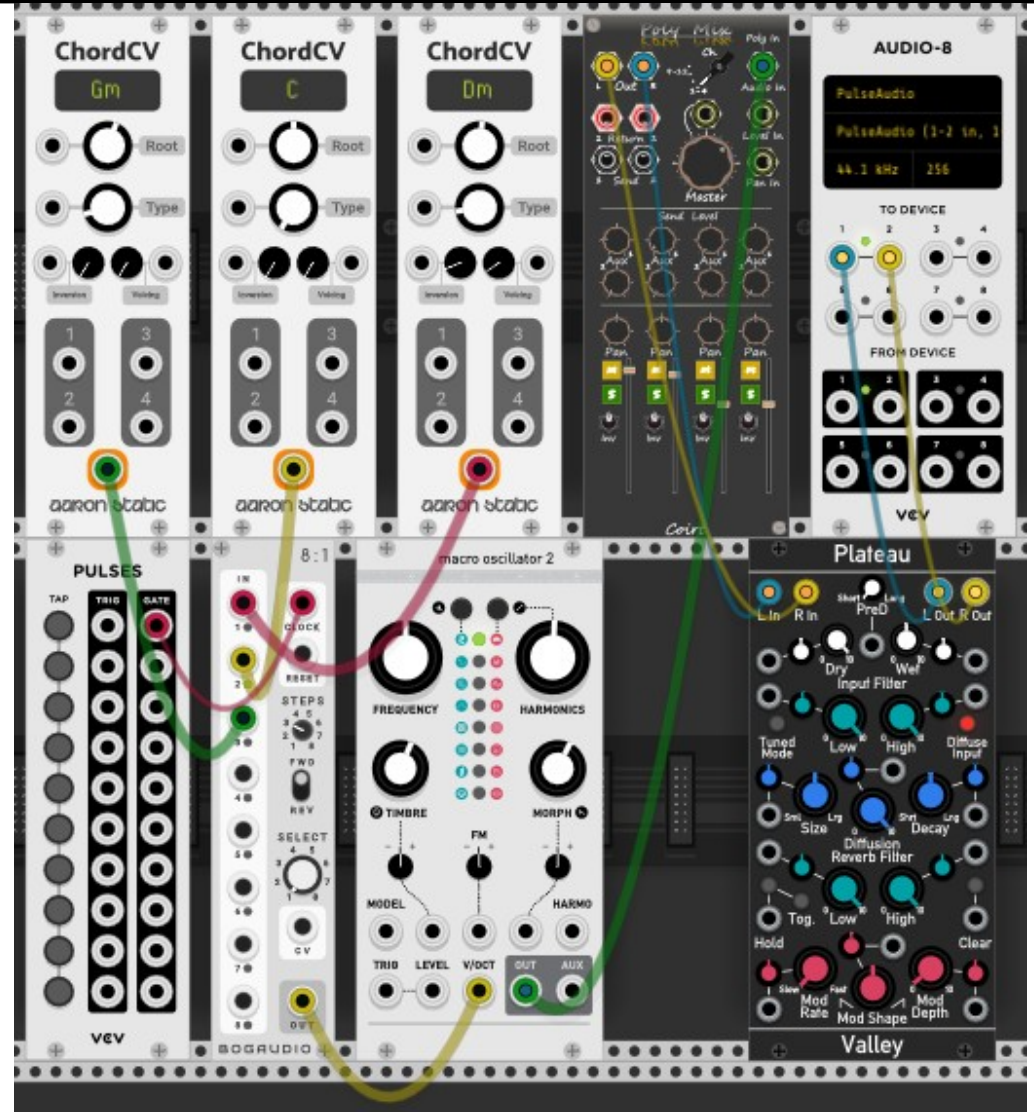
ChordCV from Aaron Static

8 to 1 from BogAudio

Macro Oscillator 2 from Audible Instruments

Plateau from Valley

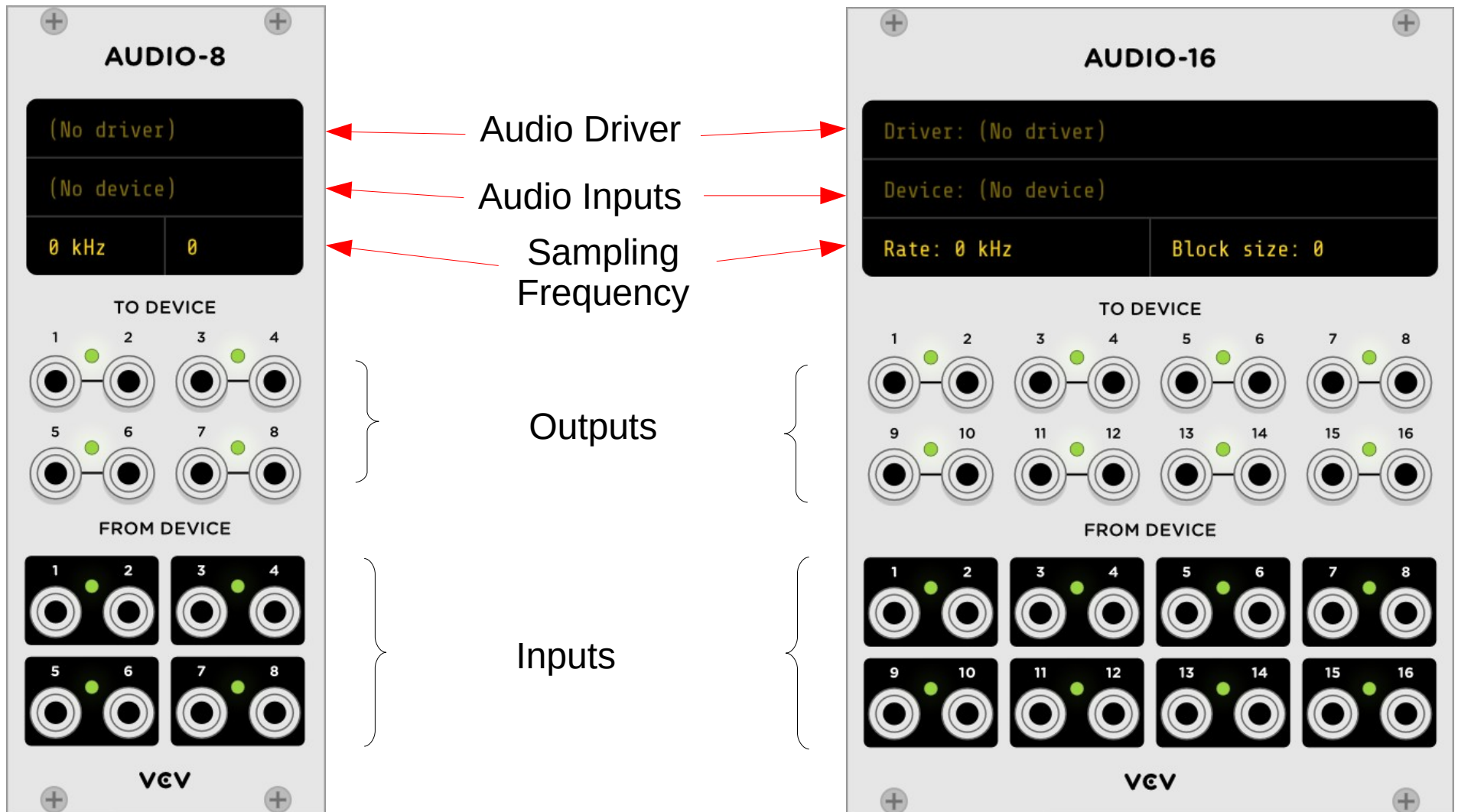
Coirt from Bark (Poly to stereo mixer)





The Core Plugins

<https://vcvrack.com/manual/Core>

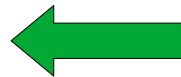
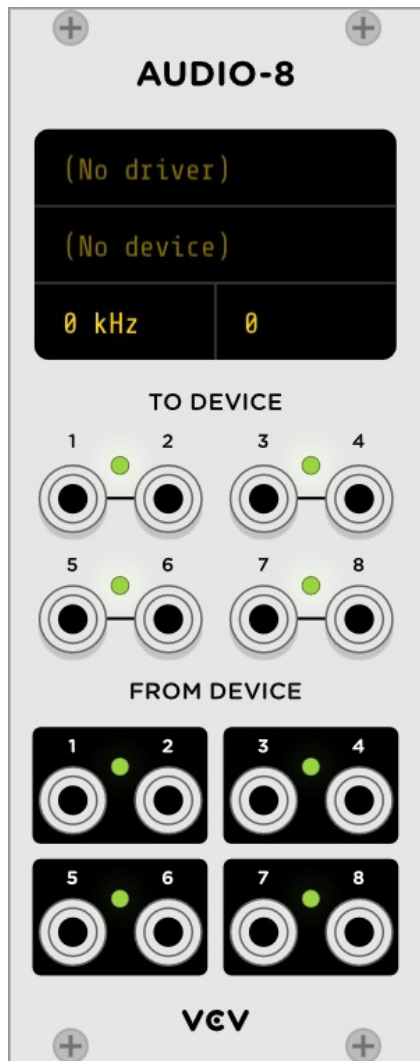


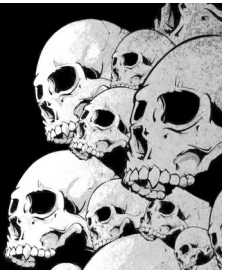


The Core Plugins

<https://vcvrack.com/manual/Core>

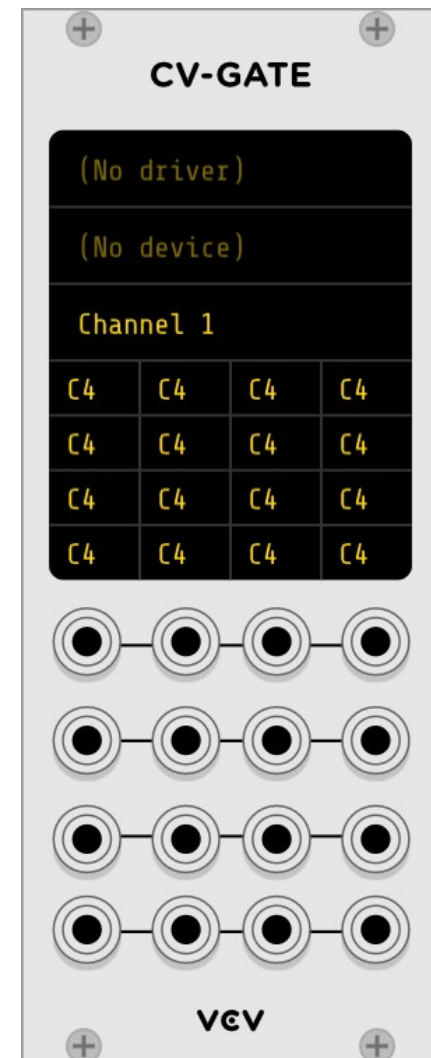
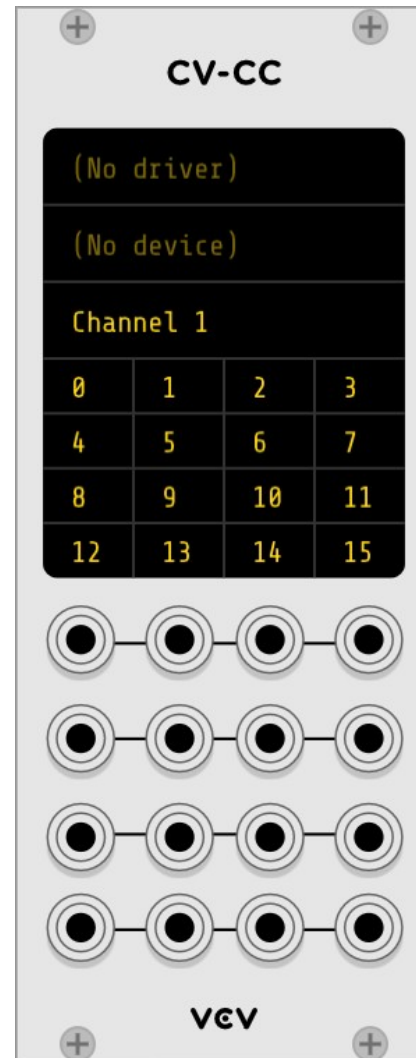
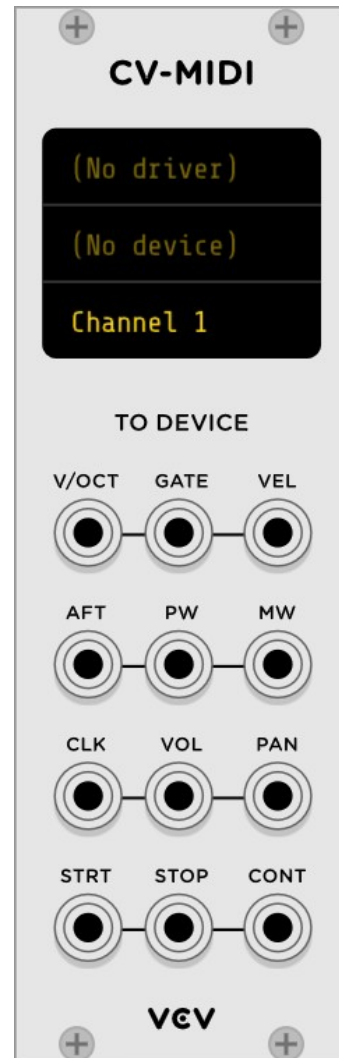
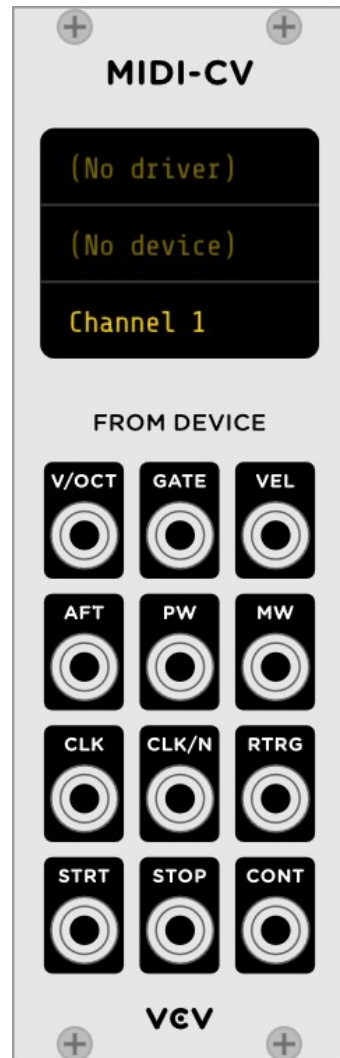
Scarlett 4i4

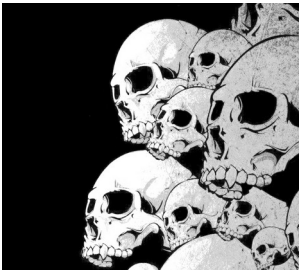




The Core Plugins

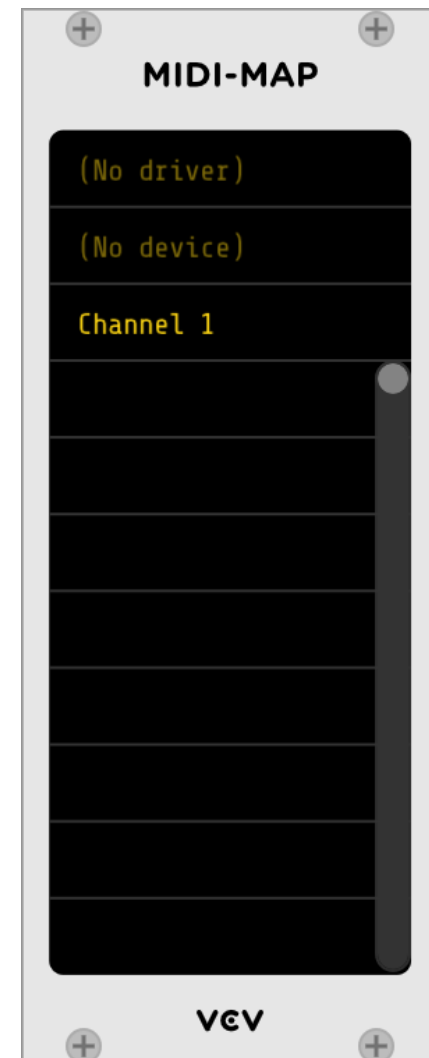
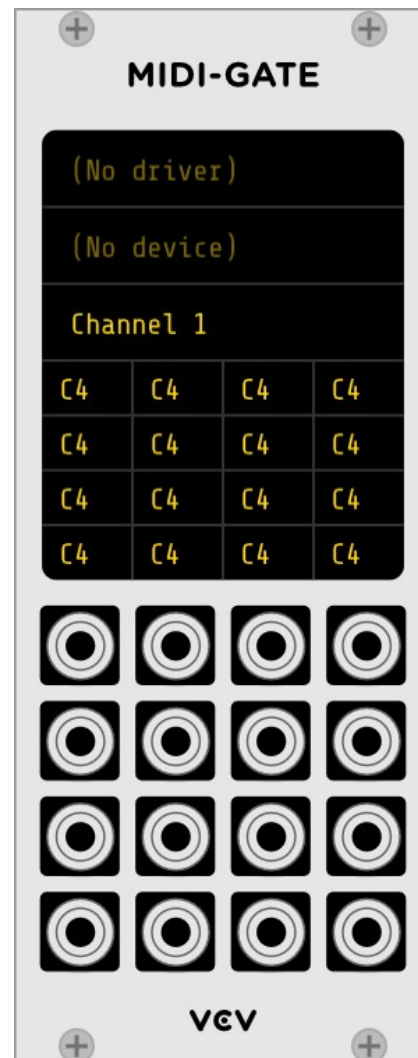
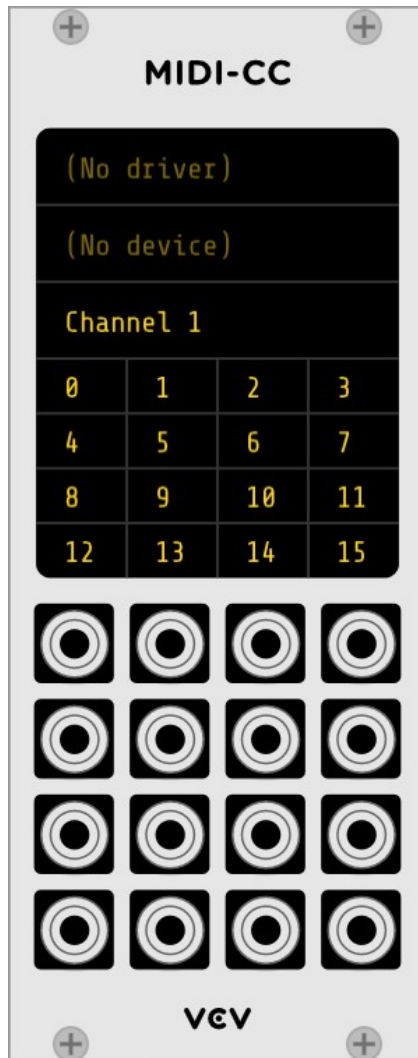
<https://vcvrack.com/manual/Core>

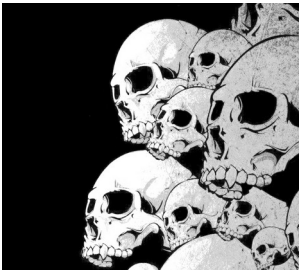




The Core Plugins

<https://vcvrack.com/manual/Core>





Control via MIDI

Click on one empty space

Rotate the knob



MIDI-MAP

(No driver)

(No device)

Channel 1

VCV

Rotate the knob in the module

And now the real knob is connected to the VCV Rack knob

LFO-1

FREQ

UNI
BI

0°
180°

FM 1 CV

P. WIDTH

FM 2 CV

PWM CV

FM 1

FM 2

RESET

PWM

SIN

TRI

SAW

SQR

VCV



Webbography

VCV Rack : <https://vcvrack.com/>

Forum : <https://community.vcvrack.com/>

Omri Cohen : https://www.youtube.com/channel/UCuWKHSHTHMV_nVSeNH4gYAg

Fedoramagazine article : <https://fedoramagazine.org/vcv-rack-modular-synthesizers/>

Eurorack :

- FR : <https://fr.wikipedia.org/wiki/Eurorack>
- EN : <https://en.wikipedia.org/wiki/Eurorack>

Mutable Instruments :

- <https://mutable-instruments.net/>