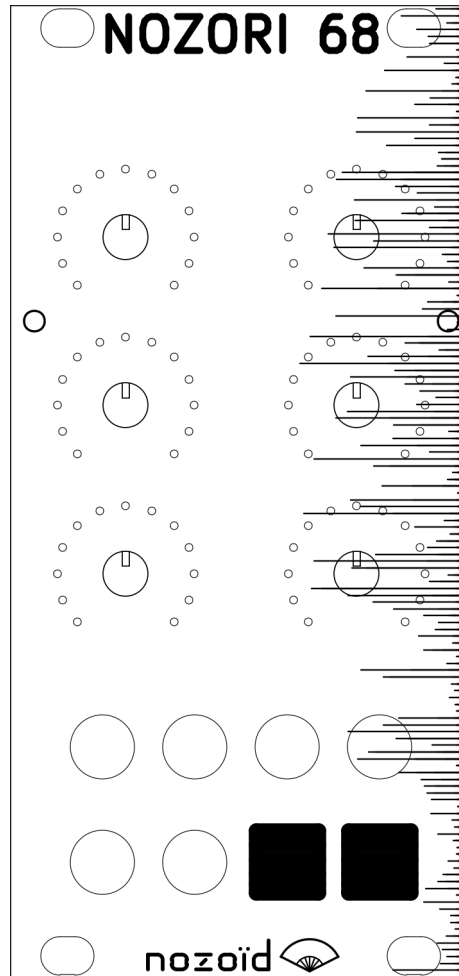


# NOZORI 68 modules documentation

A single piece of paper can be folded into innumerable shapes. In the same way, a single Nozori hardware can morph into multiple modules. Changing functionality is as simple as changing jumpers position!



## Nozori common specification

Lot's of Nozori module share the same philosophy. Unless specified, here are some behaviors commonly found on various module.

The 3 way toggle of audio source usually deal with the range of the frequency (FQ) potentiometer:

- On top, (HIGH) the frequency potentiometer scan on the full audio range.
- In the middle position, (MEDIUM) the range is reduce in order to be easily used with a 1V/Octave input.
- On the bottom (LOW), the frequency range is very low in order to generate low frequency modulation.

For audio effect module, the 3 way toggle can be used to select the audio mode of the module:

- On top (STEREO), the module admit 2 audio inputs. This inputs are processed with the same parameters.
- In the middle (OPPOSITE), the module admit 2 audio inputs, but the processing parameters can be different for the 2 inputs: the modulation CV are applied at opposite polarity on the left and the right channel.
- On the bottom, (MONO + PAN), the module accept only 1 audio input. If plugged, the other input is used as a panoramic control to split the out.

In STEREO and OPPOSITE mode, if the IN right jack is not plugged, the left signal is used for the right channel. (you can generate a stereo output using a mono input in the OPPOSITE mode). In MONO mode, when the PAN jack is not plugged, the signals out are at full amplitude on both output.

Audio source module (like VCO), output 2 different octave of the same signal, unless a jack is plugged in the panoramic input. In this situation, a single signal is splited to the left and right out. The panoramic input range should be in the -5 / +5V range

The amplitude of an audio out is in the -5 / +5V range, unless a jack is plugged in the GAIN input. In this situation the output is amplified thanks to a VCA . The gain is exponential with input ranges from 0 to +5V.

Most of the time, when no modulation jack is plugged, the associated potentiometer control the amplitude of a chaotic LFO included in the module. A notable exception is the frequency modulation potentiometer that is used as a “fine tune” : it’s range is 1 octave.

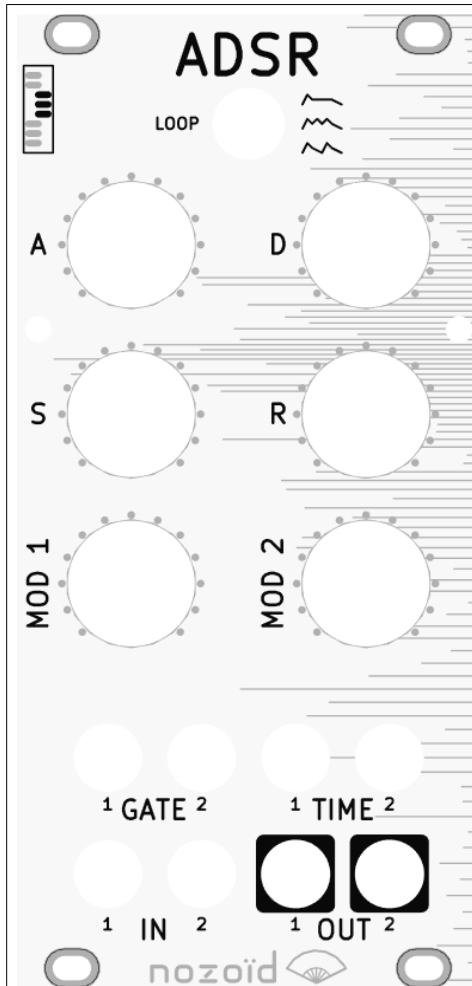
When a pitch modulation potentiometer is at full modulation, the range is 1V/Octave.

Modulation CV should be in the -5/+5V range. Positive voltage added to the controlled value, while negative voltage are subtracted. The total value is clipped in the range of the main control: you can not go higher or lower than the potentiometer range thanks to a modulation. (this rule accept some exception like for oscillator frequency). The range of the modulation is the half of the main range : in order to sweep the full range, you should put the main potentiometer halfway, and the modulation potentiometer at full modulation.

When the module do generate CV, the leds indicate CV input value (or default value).

When a signal is provide on a SYNC input, the frequency potentiometer adjust a divider/multiplier of this clock (1/16, 1/8, 1/4, 1/2, 1, 2, 4, 8, 16), while the frequency modulation potentiometer adjust fraction of this clock : (1, 3/4, 4/5, 7/8, 8/7, 5/4, 4/3). In this situation, the frequency Potentiometer should be halfway, and the MOD Potentiometer should be at 0 in order to use the frequency of the input. The phase is not respected between the clock input and the internal clock.

# ADSR



Dual ADSR with modulation speed and integrated VCA

Module number : 56 (00111000)

Potentiometer 1: Attack time (from 0.5ms to 90s)

Potentiometer 2: Decay time (from 0.5ms to 90s)

Potentiometer 3: Sustain level (from 0 to 100%)

Potentiometer 4: Release time (from 0.5ms to 90s)

Potentiometer 5: ADSR 1 time modulation

Potentiometer 6: ADSR 2 time modulation

CV 1: Gate for ADSR 1 (0V if unplugged)

CV 2: Gate for ADSR 2 (Gate 1 if unplugged)

CV 3: ADSR 1 Time modulation value (-5V if not plugged)

CV 4: ADSR 2 Time modulation value (-5V if not plugged)

Audio In 1: VCA 1 In

Audio In 2: VCA 2 In

Audio Out 1: VCA 1 Out (or ADSR 1 if audio in 1 is unplugged)

Audio Out 2: VCA 2 Out (or ADSR 2 if audio in 1 is unplugged)

Selector: loop mode

Top : no loop

Middle : AD loop : start an attack at the end of the decay time

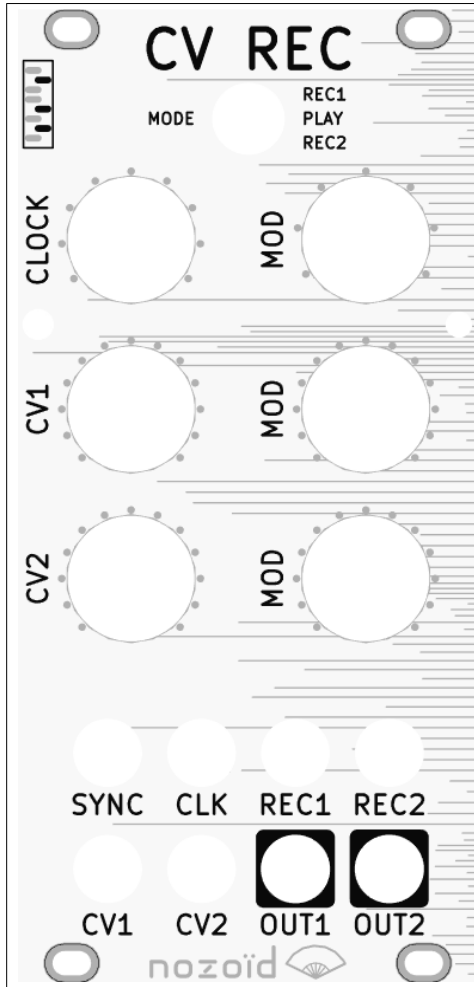
Bottom : ADSR loop : start a release at the end of the decay time and start an attack at the end of the release time

A dual ADSR with associated VCA. If an audio signal is not plugged, the output is the ADSR signal. The 2 ADSR share the same parameters except the modulation that allow to change the global timing of each ADSR. When the TIME input are not plugged, the MOD potentiometer allow to speed up the value, in order to have 2 different ADSR timing.

# Bitcrusher

	<p>Stereo Down-sampler / Bitcrusher</p> <p>Module number : 88 (01011000)</p> <p>Potentiometer 1: Wet / dry</p> <p>Potentiometer 2: Wet / dry modulation</p> <p>Potentiometer 3: Down Sampler Frequency (create aliasing effect)</p> <p>Potentiometer 4: Down Sampler Frequency modulation</p> <p>Potentiometer 5: Bitcrush</p> <p>Potentiometer 6: Bitcrush modulation</p> <p>CV 1: bypass (0 if unplugged)</p> <p>CV 2: Wet / Dry modulation value (chaos attractor if unplugged)</p> <p>CV 3: Bitcrush modulation value (chaos attractor if unplugged)</p> <p>CV 4: Downsample Frequency modulation value (chaos attractor if unplugged)</p> <p>Audio In 1: In 1 (0V if unplugged)</p> <p>Audio In 2: In 2 (Audio In 1 if unplugged for stereo Bitcrusher, center for mono+pan)</p> <p>Audio Out 1: Out 1</p> <p>Audio Out 2: Out 2</p> <p>Selector: Audio mode          Top : Stereo Bitcrusher with identical control          Middle : Stereo Bitcrusher with different control (Modulation are opposite between Left and Right Bitcrusher)          Bottom : Mono Bitcrusher with a panoramic control (In 2)</p>
<p>A stereo bitcrusher, associated with a downsampler to “destroy” and add harmonics to any signal.</p>	

# CV Recorder



Record and play back 2 independent CV

Module number : 74 (01001010)

Potentiometer 1: Clock speed or click divider in sync mod (loop time from less than 1s to 110s)

Potentiometer 2: Clock speed modulation

Potentiometer 3: Record 1 value

Potentiometer 4: Record 1 modulation

Potentiometer 5: Record 2 value

Potentiometer 6: Record 2 modulation

CV 1: Syncro (when plugged, the clock will always be multiple of this input)

CV 2: Clock modulation speed (chaos attractor if unplugged)

CV 3: Record CV1 (0V if unplugged)

CV 4: Record CV2 (0V if unplugged)

Audio In 1: Record 1 modulation value (chaos attractor if unplugged)

Audio In 2: Record 2 modulation value (chaos attractor if unplugged)

Audio Out 1: Loop 1 out

Audio Out 2: Loop 2 out

Selector:

Top : record loop 1

Middle : play mode

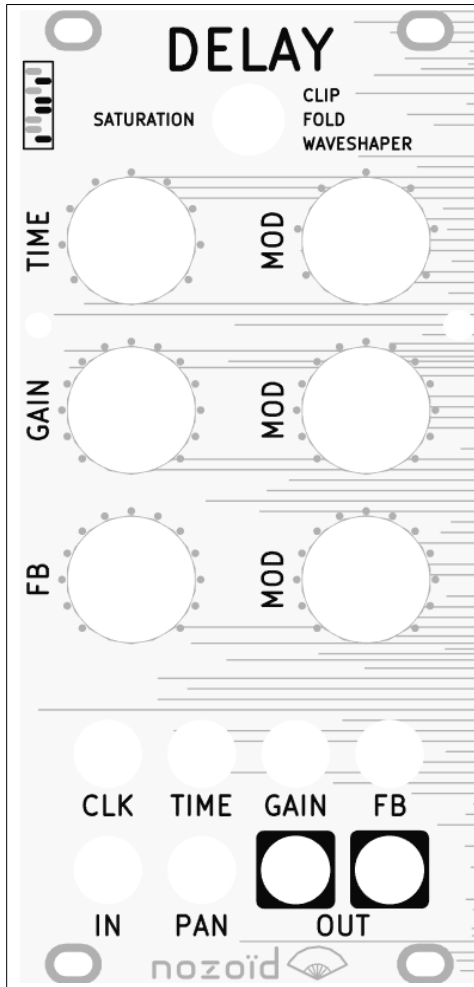
Bottom : record loop 2

This module allow to record an external CV or an audio input and to play it at different speed.

For example, a potentiometer movement can be record and used as a sequencer or LFO. An audio sound can be freeze, pitch and even used as a low speed to create a modulation CV.

Sampling rate range from 48KHz to 400Hz depending of the clock speed.

# Delay



Audio Delay

Module number : 89 (01011001)

Potentiometer 1: Delay time (direct value or clock divider) (from 0 to 660ms)

Potentiometer 2: Delay time modulation (or clock fractional divider)

Potentiometer 3: Audio Input gain

Potentiometer 4: Audio input gain modulation

Potentiometer 5: Feedback (from 0 to 100%)

Potentiometer 6: Feedback modulation

CV 1: clock synchronization (0V if unplugged)

CV 2: delay time modulation value (chaos attractor if unplugged)

CV 3: gain modulation value (chaos attractor if unplugged)

CV 4: feedback modulation value (chaos attractor if unplugged)

Audio In 1: delay audio input

Audio In 2: panoramic (chaos attractor if unplugged)

Audio Out 1: delay out left

Audio Out 2: delay out right

Selector: Saturation mode :

Top : clip

Middle : fold

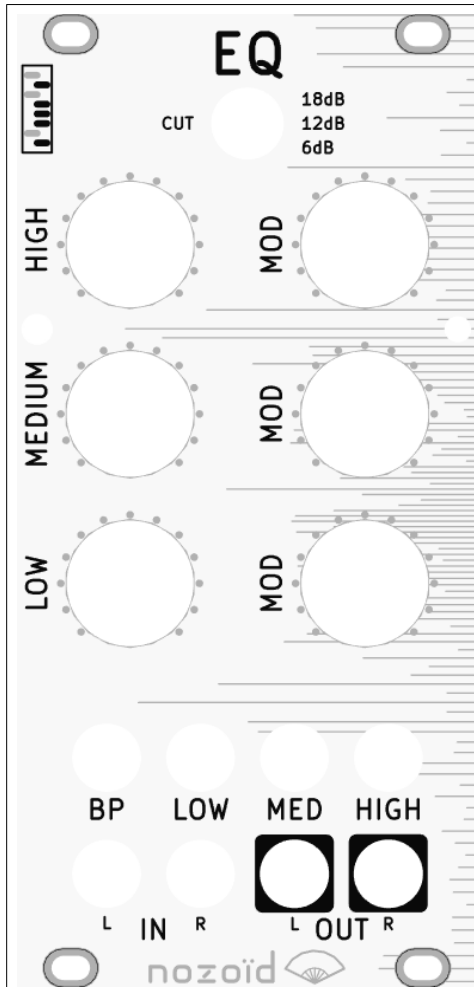
Bottom : waveshaper

This module is a simple audio delay with feedback accepting modulation on all parameter.

The delay time can be set using an external clock (maximum delay time is about 0.7s).

With high feedback, the signal can accumulate, and distortion can appear. The 3 way switch deal with the distortion shape. Be very careful with the waveshaper : it can bite!

### 3 Bands Equalizer



3 band equalizer

Module number : 93 (01011101)

Potentiometer 1: High gain (-inf. To maximum gain)

Potentiometer 2: High gain modulation

Potentiometer 3: Medium gain (-inf. To maximum gain)

Potentiometer 4: Medium gain modulation

Potentiometer 5: Low gain (-inf. To maximum gain)

Potentiometer 6: Low gain modulation

CV 1: Bypass (0V if unplugged)

CV 2: Low gain modulation CV (chaos attractor if unplugged)

CV 3: Medium gain modulation CV (chaos attractor if unplugged)

CV 4: High gain modulation CV (chaos attractor if unplugged)

Audio In 1: Audio in Left (0V if unplugged)

Audio In 2: Audio in Right (Audio in Left if unplugged)

Audio Out 1: Audio out left

Audio Out 2: Audio out right

Selector: filter attenuation slope

Top : 18dB

Middle : 12dB

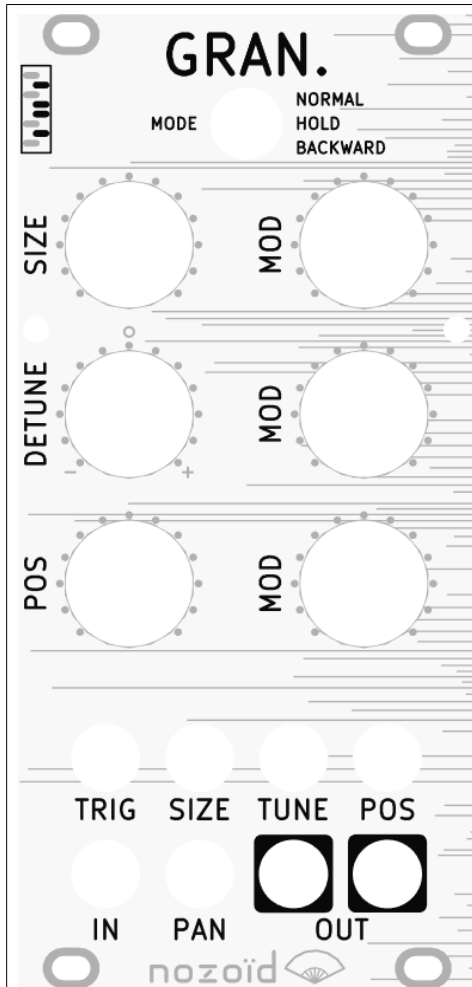
Bottom : 6dB

Gain of all band can go up to +6dB, so saturation may occur.

The 3 filter slope allow different separation between bands.



# Ganulator



Audio Granulator

Module number : 90 (01011010)

Potentiometer 1: Grain size (10 to 100ms)

Potentiometer 2: Grain size modulation

Potentiometer 3: Grain Detune (-/+ 2 octaves for full range)

Potentiometer 4: Grain Detune modulation

Potentiometer 5: Grain Position (from 0 to more than 500ms)

Potentiometer 6: Grain Position modulation

CV 1: Start one grain (continuous trigger if unplug)

CV 2: Grain size modulation (chaos attractor if unplugged)

CV 3: Detune modulation value (chaos attractor if unplugged)

CV 4: Position modulation value (chaos attractor if unplugged)

Audio In 1: Audio input

Audio In 2: Audio in panoramic (center if not plugged)

Audio Out 1: granulator left out

Audio Out 2: granulator right out

Selector: grain mode

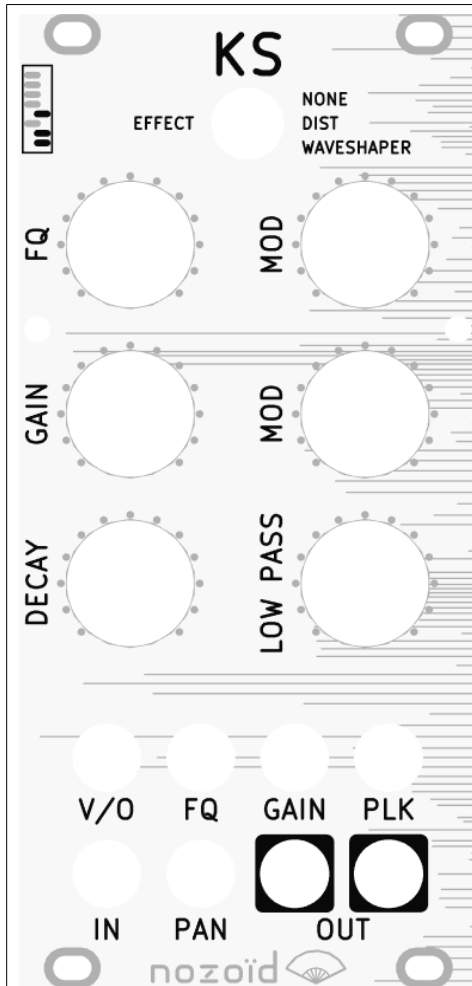
Top : normal mode

Middle : do not update the buffer and freeze audio input

Bottom : reverse play grains

This module is design as an audio effect. It “granulate” the audio input. It can play up to 2 grains on the same time. A complex sound should be used for input for better result.

# Karplus-Strong



Karplus-Strong string model

Module number : 11 (00001011)

Potentiometer 1: Pitch of the string (from 16Hz to 10KHz)

Potentiometer 2: Pitch modulation

Potentiometer 3: Audio input gain

Potentiometer 4: audio input gain modulation

Potentiometer 5: Decay of the string

Potentiometer 6: low pass filter

CV 1: Pitch (1V/Oct) (0V if unplugged)

CV 2: Frequency modulation value (1Volt if unplugged, for a “fine tune” parameter)

CV 3: Audio input gain modulation (chaos attractor if unplugged)

CV 4: Pluck (a trigger generate a small impulse on the string)

Audio In 1: Audio input (white noise if “pluk” and audio in is not plugged)

Audio In 2: Panoramic (center if unplugged)

Audio Out 1: Audio out left

Audio Out 2: Audio out right

Selector: Effect type on overflow

Top : None

Middle : Distortion

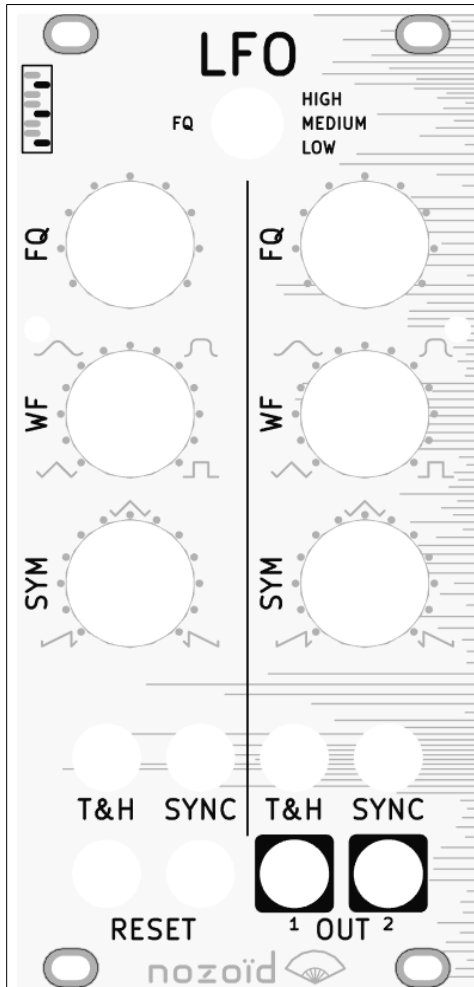
Bottom : Waveshaper

This is a string model. It can be used as an oscillator or as a resonator to “filter” an audio input.

A waveshaper on the audio out attenuate clipping at high gain and feedback.

If no audio input is provide, and no “pluck” jack is plugged, an internal white noise source is used.

# Dual LFO



Dual Low Frequency Oscillator, with parametric waveform

Module number : 73 (01001001)

Potentiometer 1: LFO1 Frequency

Potentiometer 2: LFO2 Frequency

Potentiometer 3: LFO1 Waveform

Potentiometer 4: LFO2 Waveform

Potentiometer 5: LFO1 Symmetry

Potentiometer 6: LFO2 Symmetry

CV 1: Trig and hold : when plugged, the output 1 is freeze at every trigger signal

CV 2: synchronization : when plugged, the LFO1 frequency is a multiple of this input

CV 3: Trig and hold : when plugged, the output 2 is freeze at every trigger signal

CV 4: synchronization : when plugged, the LFO2 frequency is a multiple of this input

Audio In 1: Reset LFO1 phase

Audio In 2: Reset LFO2 phase

Audio Out 1: LFO1 out

Audio Out 2: LFO2 out

Selector: frequency range

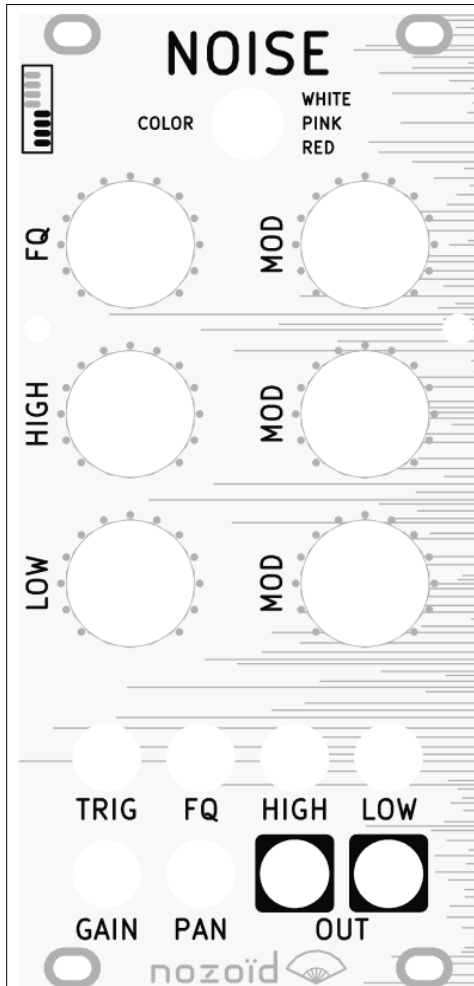
Top : High (0.2 (5Hz) ~ 0.25ms (4000Hz))

Middle : medium (5s ~ 5ms (200Hz))

Bottom : low (60s ~ 60ms (16Hz))

Dual LFO: they feature parametric waveform. A Trig&Hold allow to generate steps. Both LFO can synchronize to an external clock (with a divider/multiplier). The reset input restart the waveform.

# Noise Source



Stereo Noise source

Module number : 15 (00001111)

Potentiometer 1: Frequency of the noise source (0.1Hz to 20KHz)

Potentiometer 2: Frequency modulation

Potentiometer 3: High frequency filter

Potentiometer 4: High frequency filter modulation

Potentiometer 5: Low frequency filter

Potentiometer 6: Low frequency filter modulation

CV 1: Trig a new noise value (unused if unplugged) : when plugged, the FQ is unused

CV 2: Frequency modulation value (chaos attractor if unplugged)

CV 3: Low frequency filter modulation (chaos attractor if unplugged)

CV 4: High frequency filter modulation (chaos attractor if unplugged)

Audio In 1: Noise gain (full range if unplugged)

Audio In 2: Noise panoramic (center if unplugged)

Audio Out 1: Noise out 1

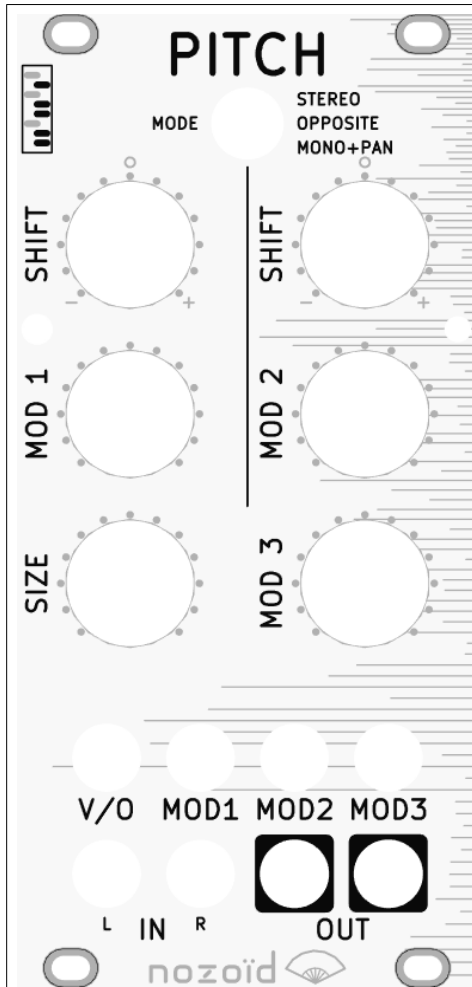
Audio Out 2: Noise out 2

Selector: Noise color

- Top :White
- Middle : Pink
- Bottom : Red

This module is dedicated to both audio and control CV generation. The filter parameters ranges are huge. For CV generation, potentiometers are typically used from 0 to 50%. For audio, the 50% to 100% range is more used.

# Pitch Shifter



Dual Pitch shifter using tape emulation

Module number : 91 (01011011)

Potentiometer 1: Pitch shift 1 (positive or negative shift, no shifting is on the middle position of the potentiometer)

Potentiometer 2: Pitch shift 2

Potentiometer 3: Pitch shift 1 modulation

Potentiometer 4: Pitch shift 2 modulation

Potentiometer 5: Pitch shift grain size (10 to 90ms)

Potentiometer 6: Pitch shift 1 and 2 modulation

CV 1: Pitch shift 1 frequency (1V/Oct / 0V if unplugged)

CV 2: Pitch shift Frequency modulation 1

CV 3: Pitch shift Frequency modulation 2

CV 4: Pitch shift Frequency modulation 3

Audio In 1: Pitch shift 1 input

Audio In 2: Pitch shift 2 input (if not plugged default to audio In 1 for stereo Bitcrusher for toggle mode up and middle)

Audio Out 1: Pitch shift 1 output

Audio Out 2: Pitch shift 2 output

Selector: audio mode

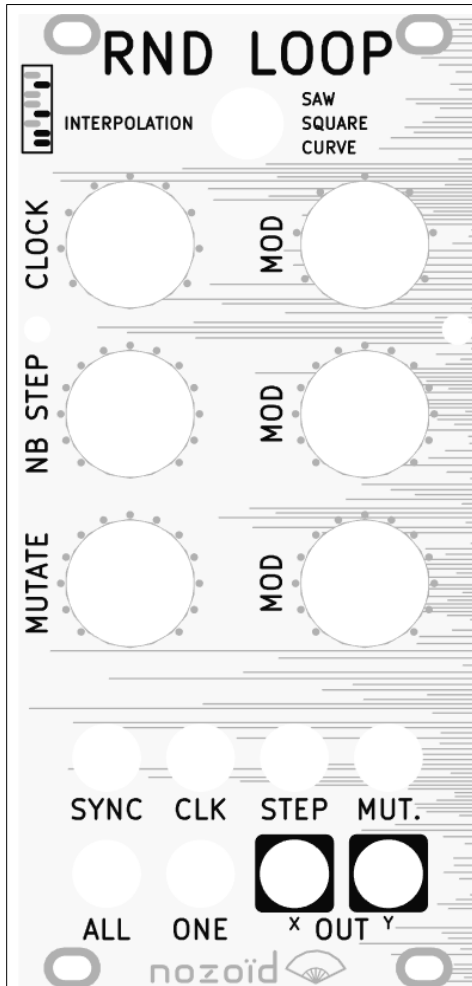
Top : Mod 1 + Mod 3 → Left, Mod 2 + Mod 3 → Right

Middle : Mod 1 + Mod 3 → Left, Mod 2 – Mod 3 → Right

Bottom : Mono PitchShifter (allow more frequency modulation) (modulation = Mod 1 + Mod 2 – Mod 3)

This module is a stereo pitch-shifter. It allow frequency shifting from +/- 2 octaves (3 octaves in mono mode).

# Random Loop LFO



Loop of Random Value

Module number : 75 (01001011)

Potentiometer 1: Clock speed (0.1Hz to 150Hz)

Potentiometer 2: Clock modulation speed

Potentiometer 3: Step number (1,2, 3, 4, 5, 6, 7, 8, 12, 16, 24, 32)

Potentiometer 4: Step number modulation

Potentiometer 5: Mutation speed of the value

Potentiometer 6: Mutation speed modulation

CV 1: Synchronization : when plugged, the LFO frequency is a multiple of this input

CV 2: Clock modulation speed value (1 Volt if unplugged)

CV 3: Step number modulation value (chaos attractor if unplugged)

CV 4: Mutation speed modulation value (chaos attractor if unplugged)

Audio In 1: A rising signal randomize all values

Audio In 2: A rising signal randomize next value

Audio Out 1: Random out 1

Audio Out 2: Random out 2

Selector: Interpolation mode

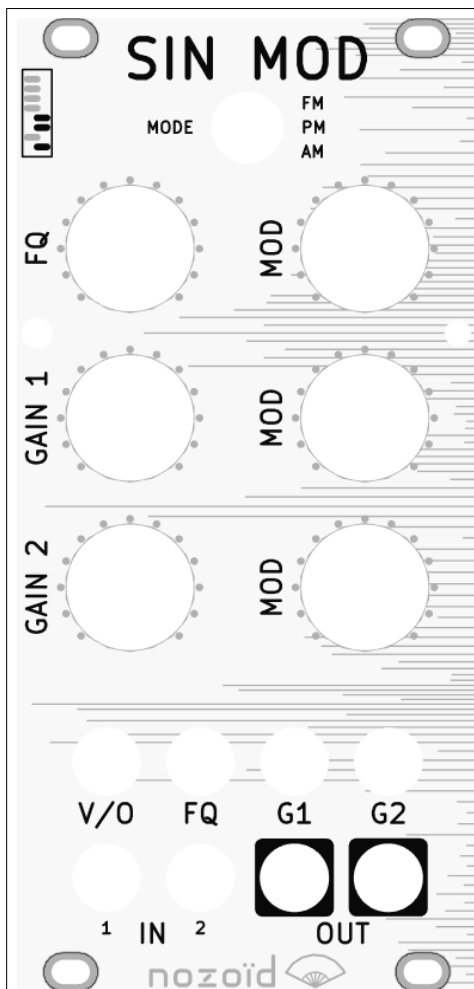
Top : linear (saw)

Middle : none (square)

Bottom : cubic (curve)

This module is half way between a LFO and a sequencer. Random steps are played in sequence. This steps can be interpolated in order to create curves, or ramp. The evolution speed of the steps (MUTATION) can be controlled manually or using an external CV. When “mutation” increase, the sequence vary faster at every loop.

# Sinusoidal modulation



Sinusoidal oscillator with 2 external modulation (PM / FM / AM)

Module number : 13 (00001101)

Potentiometer 1: Frequency of the sinusoid (from 0.3Hz to 5KHz)

Potentiometer 2: Frequency modulation

Potentiometer 3: Input 1 amplitude

Potentiometer 4: Input 1 amplitude modulation

Potentiometer 5: Input 2 amplitude

Potentiometer 6: Input 2 amplitude modulation

CV 1: 1V/Oct Pitch of the sinusoid (0V if unplugged)

CV 2: modulation frequency value (1Volt if unplugged, for a “fine tune” parameter)

CV 3: In 1 amplitude modulation (chaos attractor if unplugged)

CV 4: In 2 amplitude modulation (chaos attractor if unplugged)

Audio In 1: In 1

Audio In 2: In 2 (default to in 1 if unplugged)

Audio Out 1: Out 1

Audio Out 2: Out 2 (1 octave higher than out 1)

Selector: modulation type

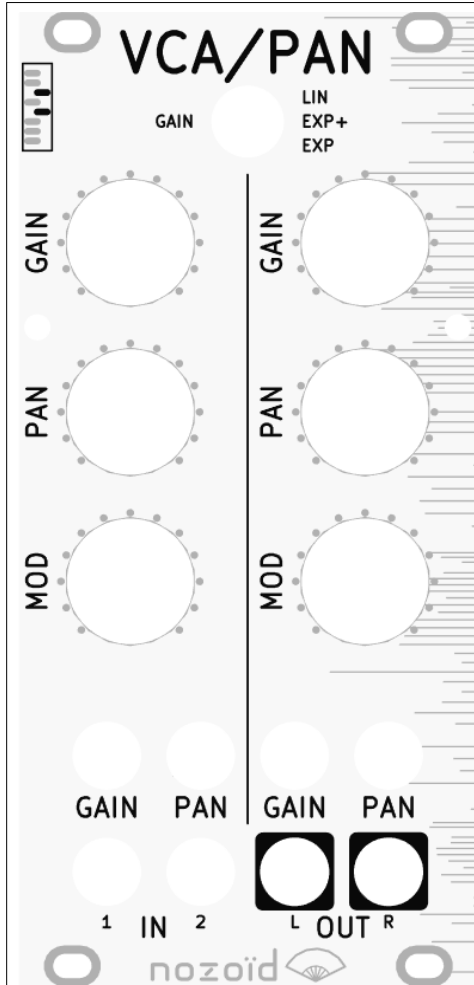
Top : Phase modulation

Middle : Frequency modulation

Bottom : Amplitude modulation

This module is based on a sinusoidal oscillator that can be modulate using 2 external sources. Modulation can be “Phase Modulation”, “Frequency Modulation” or “Amplitude modulation”.

# Stereo VCA / Panoramic



Stereo VCA-Panoramic, with modulation of the panoramic control

Module number : 40 (00101000)

Potentiometer 1: Gain of source 1

Potentiometer 2: Gain of source 2

Potentiometer 3: Panoramic of source 1

Potentiometer 4: Panoramic of source 2

Potentiometer 5: Panoramic 1 modulation

Potentiometer 6: Panoramic 2 modulation

CV 1: Gain of source 1 (0V if unplugged)

CV 2: Panoramic 1 modulation value (chaos attractor if unplugged)

CV 3: Gain of source 2 (0V if unplugged)

CV 4: Panoramic 2 modulation value (chaos attractor if unplugged)

Audio In 1: Source 1

Audio In 2: Source 2 (default to source 1 if unplugged)

Audio Out 1: Out 1

Audio Out 2: Out 2

Selector: VCA curve type

Top : Linear (from -5V to +5V)

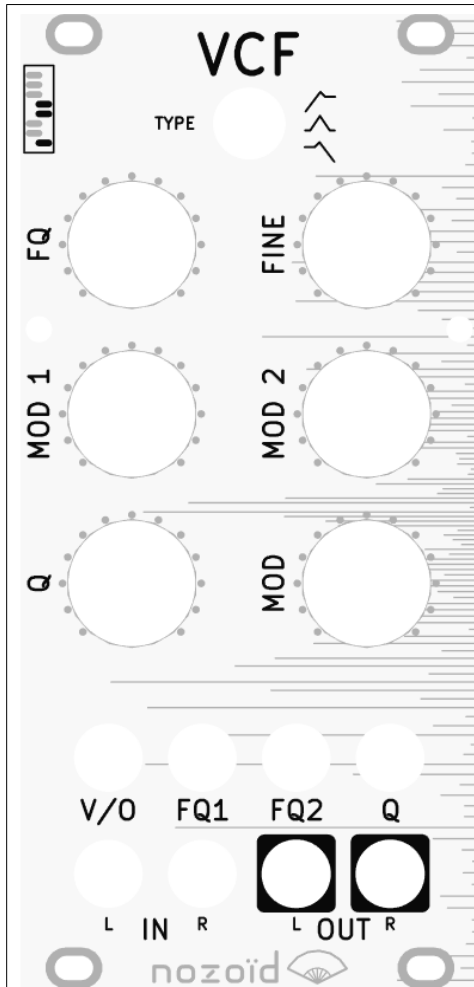
Middle : Exponential for positive value (0V to +5V)

Bottom : Exponential (from -5V to +5V)

Generate stereo sound using 1 or 2 mono inputs! This dual VCA allow inputs to be mixed in stereo. Since 2 signal can be mixed in 1, clipping can occur if gain is more than halfway.



# Stereo VCF



Stereo VCF

Module number : 25 (00011001)

Potentiometer 1: Cutoff frequency (from 0.1 to 17KHz)

Potentiometer 2: Cutoff frequency fine tune (1 octave range)

Potentiometer 3: Cutoff frequency modulation 1

Potentiometer 4: Cutoff frequency modulation 2

Potentiometer 5: Filter resonance

Potentiometer 6: Filter resonance modulation

CV 1: Cutoff frequency (1Volt / Octave)

CV 2: Cutoff frequency modulation 1 value (chaos attractor if unplugged)

CV 3: Cutoff frequency modulation 2 value (chaos attractor if unplugged)

CV 4: Filter resonance modulation value (chaos attractor if unplugged)

Audio In 1: Left audio input

Audio In 2: Right audio input (audio in 1 if unplugged)

Audio Out 1: Left audio output

Audio Out 2: Right audio output

Selector: Filter mode

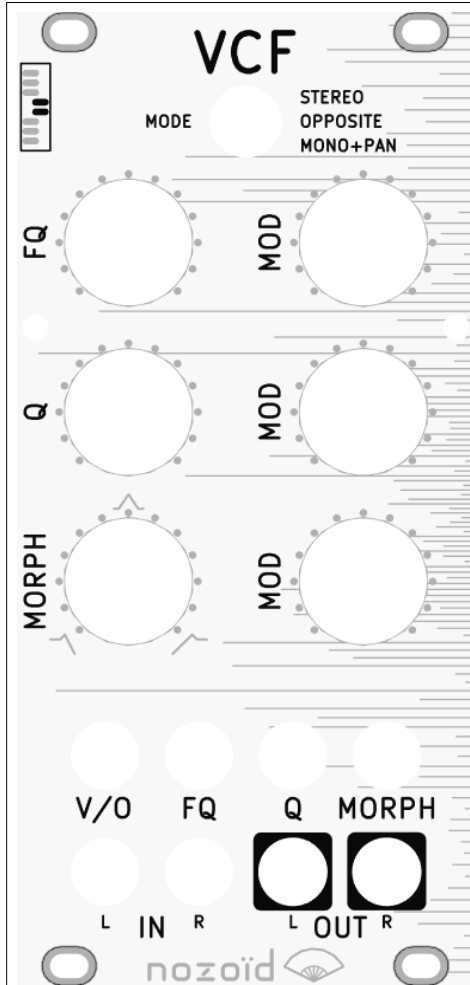
Top : High pass

Middle : Band pass

Bottom : Low Pass

A standard multi-mode filter with clean sound, and auto oscillation at high feedback. This filter is stereo : it can filter 2 different inputs using the same parameters.

# Morphing VCF



Parametric stereo filter : it can pass from LP to BP and HP in a continuous way

Module number : 24 (00011000)

Potentiometer 1: Cutoff frequency of the filter (from 0.1 to 17KHz)

Potentiometer 2: Cutoff frequency modulation

Potentiometer 3: Resonance

Potentiometer 4: Resonance modulation

Potentiometer 5: Frequency response (low pass 24dB/Oct, low pass 12dB/Oct, Band Pass, High pass)

Potentiometer 6: Frequency response modulation

CV 1: 1V/Oct cutoff frequency (0V if unplugged)

CV 2: Cutoff frequency modulation value (1Volt if unplugged, for a “fine tune” parameter)

CV 3: Filter resonance modulation value (chaos attractor if unplugged)

CV 4: Filter frequency response modulation value (chaos attractor if unplugged)

Audio In 1: Left audio in

Audio In 2: Right audio in (if not plugged default to audio In 1 for stereo Bitcrusher, center for mono+pan)

Audio Out 1: Left audio out

Audio Out 2: Right audio out

Selector: audio mode

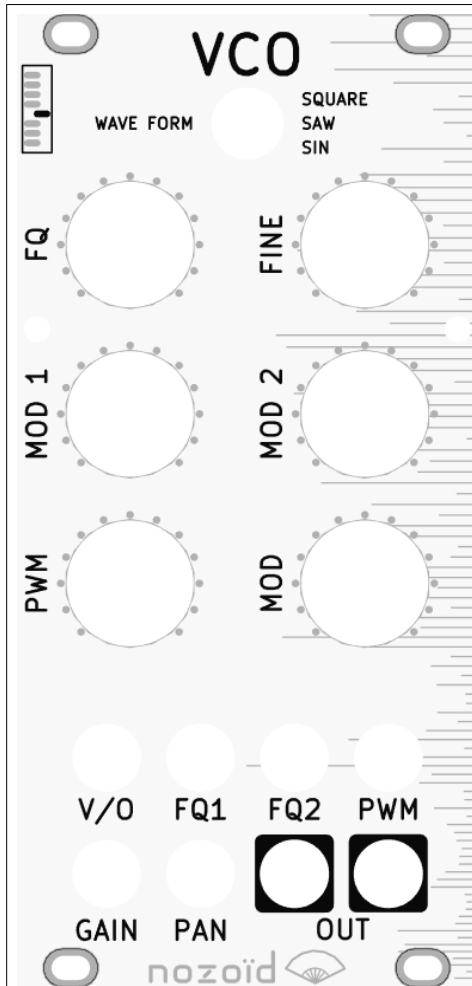
Top : Dual : stereo filter with identical control

Middle : Stereo filter with different control (Modulation are opposite between Left and Right filter)

Bottom : Mono filter with a panoramic control (In 2)

This parametric filter can morph between low pass (LP), band pass (BP) and high pass (HP). All of the filter parameters (cutoff frequency, resonance (Q) and the filter shape) can be controlled via CV inputs. LP 24dB is at 0%, LP12dB is at 25%, BP is at 50% and HP at 100% of the “morph” potentiometer.

# VCO



Simple VCO, with VCA and VC Panoramic

Module number : 8 (00001000)

Potentiometer 1: Frequency (from 5Hz to 10KHz / 10Hz to 20KHz)

Potentiometer 2: Fine tune (1 octave range)

Potentiometer 3: Frequency modulation 1

Potentiometer 4: Frequency modulation 2

Potentiometer 5: Pulse Width Modulation (PWM)

Potentiometer 6: PWM modulation

CV 1: Frequency 1V/Octave

CV 2: Frequency modulation 1 value (chaos attractor if unplugged)

CV 3: Frequency modulation 2 value (chaos attractor if unplugged)

CV 4: PWM modulation value (chaos attractor if unplugged)

Audio In 1: VCA Gain (full amplitude if unplugged)

Audio In 2: VCO Pan (center if unplugged)

Audio Out 1: Left audio output

Audio Out 2: Right audio output (same waveform but 1 octave higher than left out)

Selector: Waveform

Top : Square

Middle : Saw

Bottom : Sinus (the PWM control the sinus distortion)

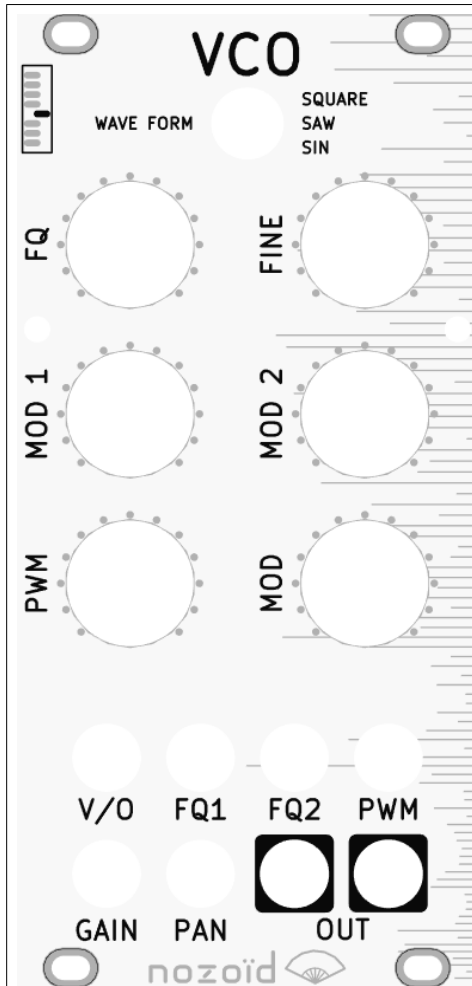
This module is a standard VCO. It admit 3 different waveform and 3 modulation frequency input.

PWM can be modulated from 0 to 50%.

In SAW mode, the PWM parameter control the phase of 2 saw, in order to have a double saw waveform.

In SIN Mode, the PWM parameter control the sinus deformation.

# VCO Quantized



Simple VCO, with VCA and VC Panoramic

Module number : 9 (00001001)

Potentiometer 1: Frequency (from 5Hz to 10KHz / 10Hz to 20KHz)

Potentiometer 2: Fine tune (1 octave range)

Potentiometer 3: Frequency modulation 1

Potentiometer 4: Frequency modulation 2

Potentiometer 5: Pulse Width Modulation (PWM)

Potentiometer 6: PWM modulation

CV 1: Frequency 1V/Octave, quantized to integer notes

CV 2: Frequency modulation 1 value (chaos attractor if unplugged)

CV 3: Frequency modulation 2 value (chaos attractor if unplugged)

CV 4: PWM modulation value (chaos attractor if unplugged)

Audio In 1: VCA Gain (full amplitude if unplugged)

Audio In 2: CV1 sample and hold

Audio Out 1: Left audio output

Audio Out 2: Right audio output (same waveform but 1 octave higher than left out)

Selector: Waveform

Top : Square

Middle : Saw

Bottom : Sinus (the PWM control the sinus distortion)

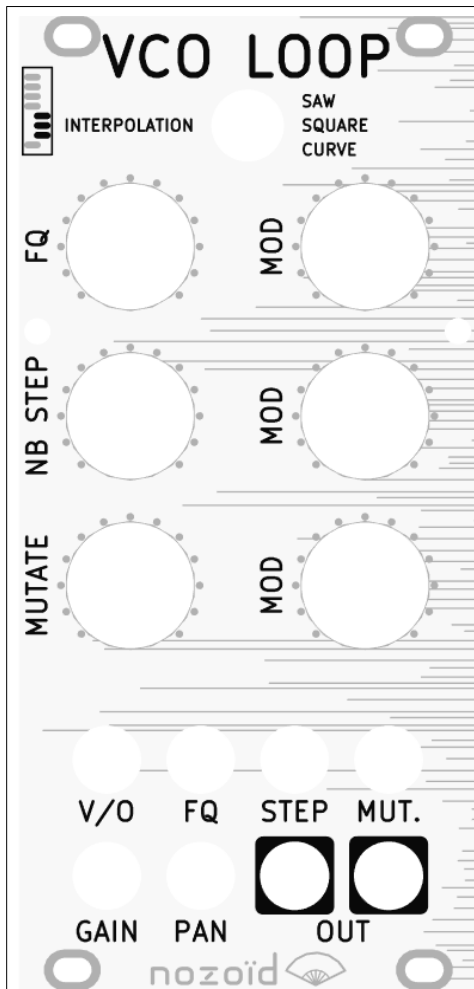
This module is a standard VCO. It admit 3 different waveform and 3 modulation frequency input. It is very similar to the standard VCO module. The differences are :

-the CV1 is quantized so only note scan be produce (no value in between).

-A trig&hold allow to accept notes only at rising edge of this input. Notes are update continuously if unplugged.

- if the CV1 is not plugged, then a random value is used for the trig&hold when it is plugged in.

# VCO Random Loop



Loop of Random Value at audio rate

Module number : 14 (00001110)

Potentiometer 1: frequency (from 1 to 1600 Hz)

Potentiometer 2: frequency modulation

Potentiometer 3: Step number (3...32)

Potentiometer 4: Step number modulation

Potentiometer 5: Mutation speed of the value

Potentiometer 6: Mutation speed modulation

CV 1: FQ (1V/Oct)

CV 2: Fq modulation speed value (fine tune if unplugged)

CV 3: Step number modulation value (0Volt if unplugged)

CV 4: Mutation speed modulation value (chaos attractor if unplugged)

Audio In 1: VCA gain (full amplitude if unplugged)

Audio In 2: Output panoramic (center if unplugged)

Audio Out 1: Random out 1

Audio Out 2: Random out 2

Selector: Interpolation mode

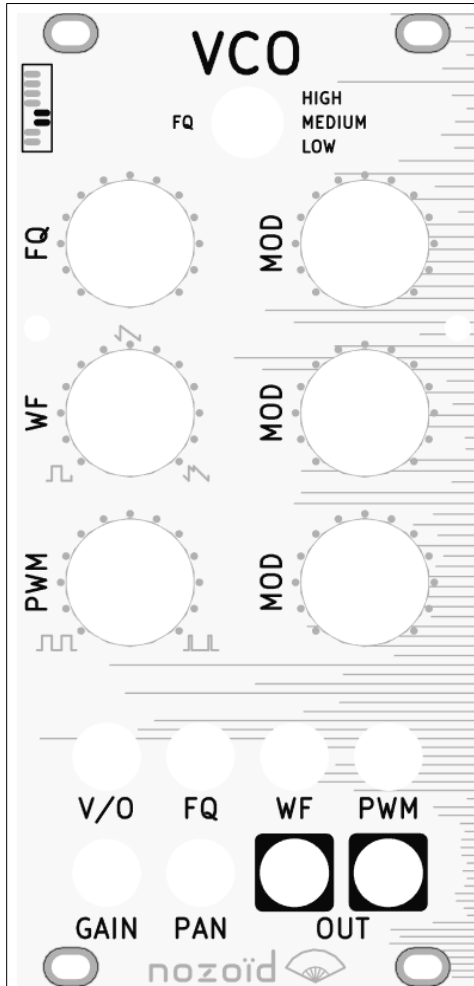
Top : linear (saw)

Middle : none (square)

Bottom : cubic (curve)

This module works the same way as the “LFO Random Loop”: random step are played in sequence, but at audio frequency. The interpolation allow to change the harmonics content of the signal.

# Morphing VCO



Parametric VCO, with VCA and VC Panoramic

Module number : 12 (00001100)

Potentiometer 1: Frequency (from 0.05Hz to 20KHz, depending of the selector position)

Potentiometer 2: Frequency modulation

Potentiometer 3: Waveform (mix between square, sax and double saw)

Potentiometer 4: Waveform modulation

Potentiometer 5: Pulse Width Modulation (PWM)

Potentiometer 6: PWM modulation

CV 1: 1V/Oct frequency (0V if unplugged)

CV 2: Frequency modulation value (1Volt if unplugged, for a “fine tune” parameter)

CV 3: Waveform modulation value (chaos attractor if unplugged)

CV 4: PWM modulation value (chaos attractor if unplugged)

Audio In 1: VCA Gain (full amplitude if unplugged)

Audio In 2: VCO Pan (center if unplugged)

Audio Out 1: Left audio output

Audio Out 2: Right audio output (same waveform but 1 octave higher than left out)

Selector: frequency range

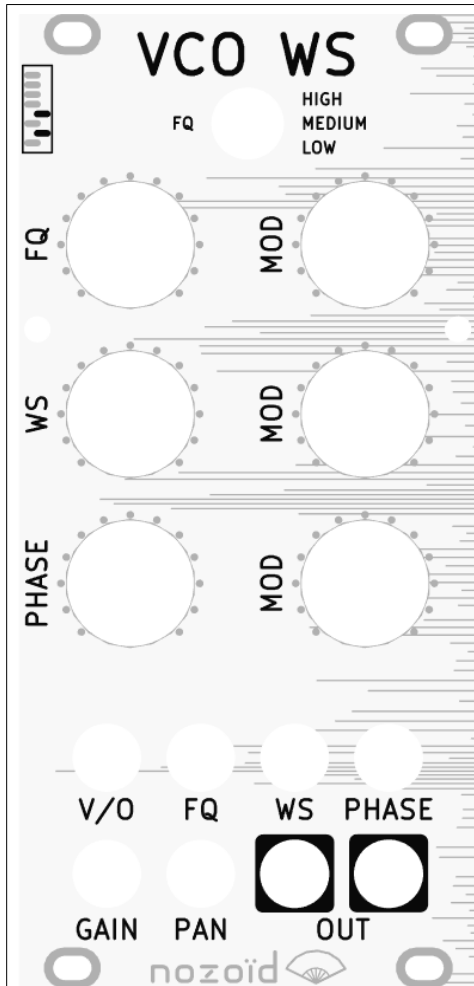
Top : High (1~20000Hz)

Middle : Medium (reduce to 50~1000Hz)

Bottom : low (0.05~1000Hz)

The waveform of this VCO can morph between a square, a rectangle, a saw or a double saw. The 2 parameters allowing this transformations can be controlled via CV inputs.

# Waveshaper sinusoidal VCO



Sinusoidal oscillator with VC waveshaper and VCA and VC Panoramic

Module number : 10 (00001010)

Potentiometer 1: Frequency (rom 0.05Hz to 20KHz, depending of the selector position)

Potentiometer 2: Frequency modulation

Potentiometer 3: Waveshaper

Potentiometer 4: Waveshaper modulation

Potentiometer 5: Phase (shape) of the waveshaper

Potentiometer 6: Waveshaper phase modulation

CV 1: 1V/Oct frequency (0V if unplugged)

CV 2: Frequency modulation value (1Volt if unplugged, for a “fine tune” parameter)

CV 3: Waveshape modulation value (chaos attractor if unplugged)

CV 4: waveshaper phase modulation value (chaos attractor if unplugged)

Audio In 1: VCA Gain (full amplitude if unplugged)

Audio In 2: VCO Pan (center if unplugged)

Audio Out 1: Left audio output

Audio Out 2: Right audio output (same waveform but 1 octave higher than left out)

Selector: frequency range

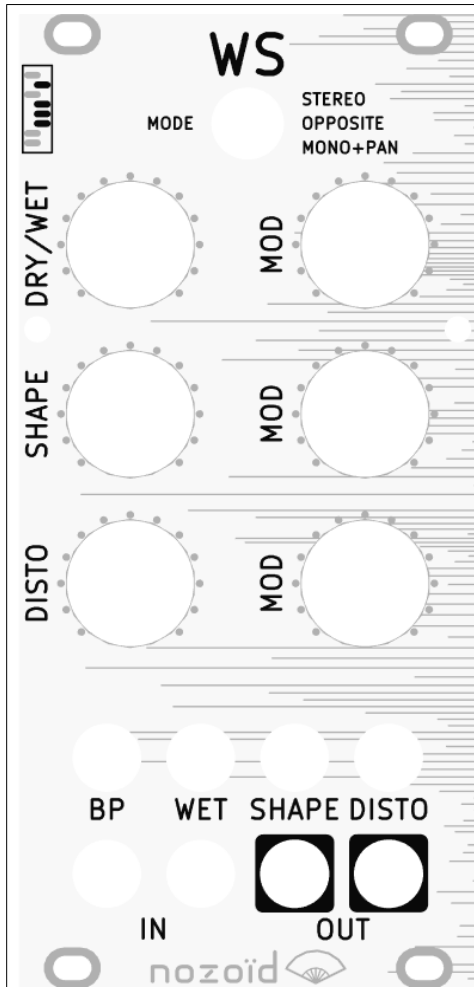
Top : High (1~20000Hz)

Middle : Medium (reduce to 50~1000Hz)

Bottom : low (0.05~1000Hz)

This module is a sinusoidal VCO passing thro a sinusoidal waveshaper. It result a VCO with a waveform that can be modulated in 2 different way (amplitude and phase of the waveshape). This VCO have an included VCA, or VC-Panoramic to generate a stereo output.

# Wave Shaper



Wave shaper and distortion with a VC Panoramic

Module number : 92 (01011100)

Potentiometer 1: Wet / dry of the effect

Potentiometer 2: Wave shaper wet / dry modulation

Potentiometer 3: Shape of the input deformation

Potentiometer 4: Shape modulation

Potentiometer 5: Distortion

Potentiometer 6: Distortion modulation

CV 1: Bypass (0V if unplugged)

CV 2: Distortion modulation value (chaos attractor if unplugged)

CV 3: Wet / dry modulation value (chaos attractor if unplugged)

CV 4: shape modulation value (chaos attractor if unplugged)

Audio In 1: Left audio in

Audio In 2: Right audio in (if not plugged default to audio In Left for stereo Bitcrusher, center for mono+pan)

Audio Out 1: Left audio out

Audio Out 2: Right audio out

Selector: Top : Dual : stereo Waveshaper with identical control

Middle : Stereo Waveshaper with different control (Modulation are opposite between Left and Right Waveshaper)

Bottom : Mono Waveshaper with a panoramic control (In 2)

This Wave Shaper is a stereo effect. The audio signal passes through a distortion before the waveshaper.