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!

Software V1.0 : 2019 03 27
Http://nozoid.com

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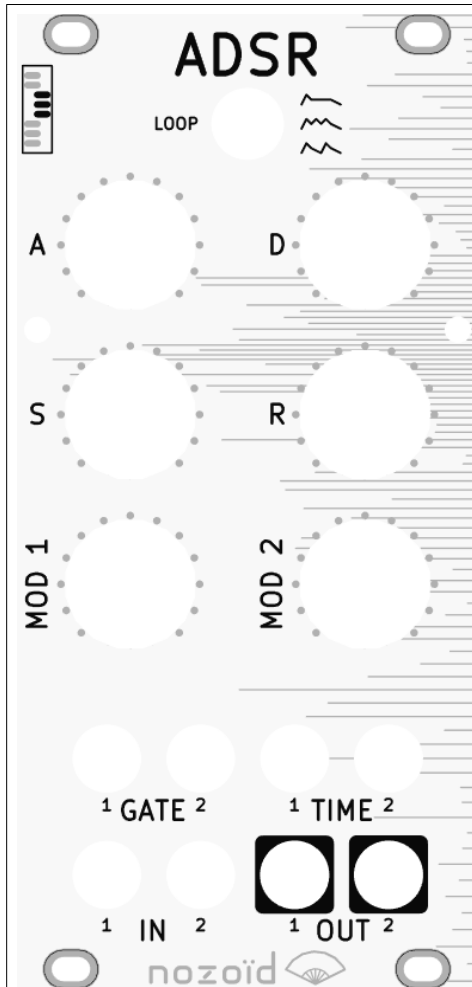
When a pitch modulation potentiometer is at full modulation, the range is 1V/Octave.

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 : (2/3, 3/4, 4/5, 1/1, 5/4, 4/3, 3/2). 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.

Leds: when both leds quickly blink alternately, the configuration switches are not set to a useful module.

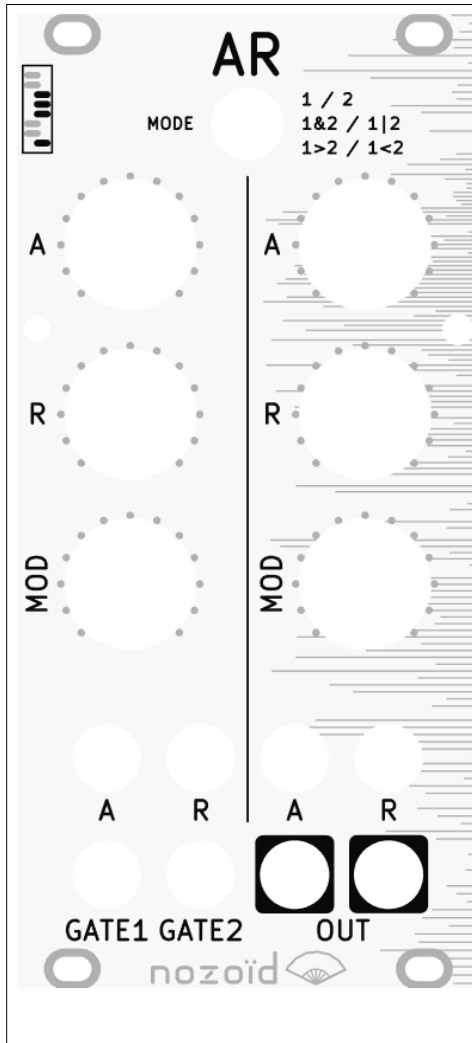|	
	Dual ADSR with modulation speed and integrated VCA A dual ADSR with associated VCA. If an audio signal is provided, the output is the ADSR signal. The 2 ADSR share the same parameters except the modulation that allow to change the global timing independantlly.When the TIME jack are not plugged, the MOD potentiometer allow to slow down (ADSR1), or speed up (ADSR2) the values, in order to have 2 different ADSR timing.
	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

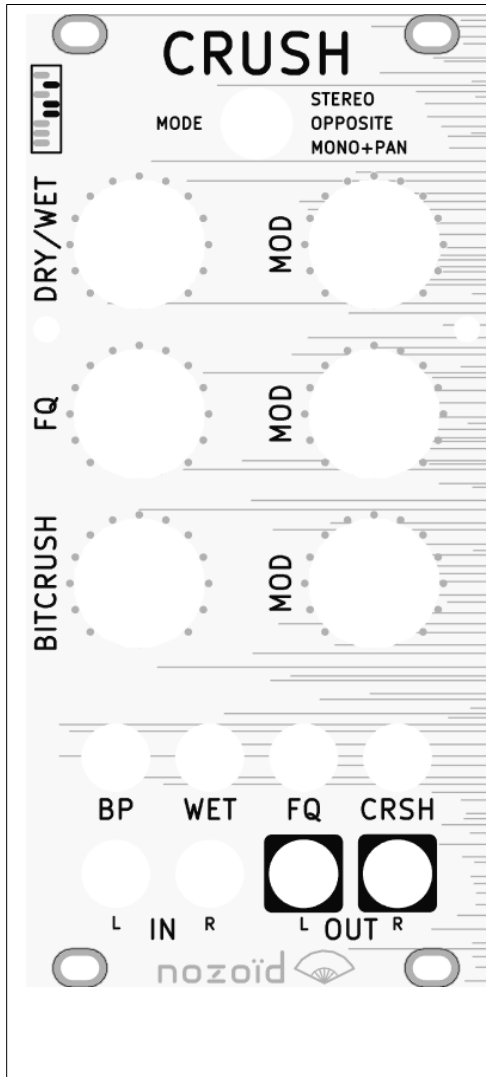|	
	Dual Attack Release with independent modulation
	Module number : 57 (00111001)
	Potentiometer 1: Attack time 1 (from 0.5ms to 90s)
	Potentiometer 2: Attack time 2 (from 0.5ms to 90s)
	Potentiometer 3: Release time 1 (from 0.5ms to 90s)
	Potentiometer 4: Release time 2 (from 0.5ms to 90s)
	Potentiometer 5: AR 1 time modulation
	Potentiometer 6: AR 2 time modulation
	CV 1: Attack time 1 modulation value (0v if unplugged)
	CV 2: Release time 1 modulation value (0v if unplugged)
	CV 3: Attack time 2 modulation value (0v if unplugged)
	CV 4: Release time 2 modulation value (0v if unplugged)
	Audio In 1: Gate for ADSR 1 (0V if unplugged)
	Audio In 2: Gate for ADSR 2 (0V if unplugged)
	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: mode

Selector: mode
    Top : 2 independent AR envelope generator : GATE 1 control AR 1 // GATE 2 control AR2
    Middle : AR 1 is ON if GATE 1 and GATE 2 are ON, AR 2 is on if GATE 1 or GATE 2 are ON
    Bottom : AR 1 is ON if GATE 1 > GATE 2, AR 2 is on if GATE 1 < GATE 2

Panel labels:

AR

MODE 1 / 2
1&2 / 1|2
1>2 / 1<2

A   A
R   R
MOD MOD

A   R   A   R
GATE1 GATE2   OUT

nozoïd

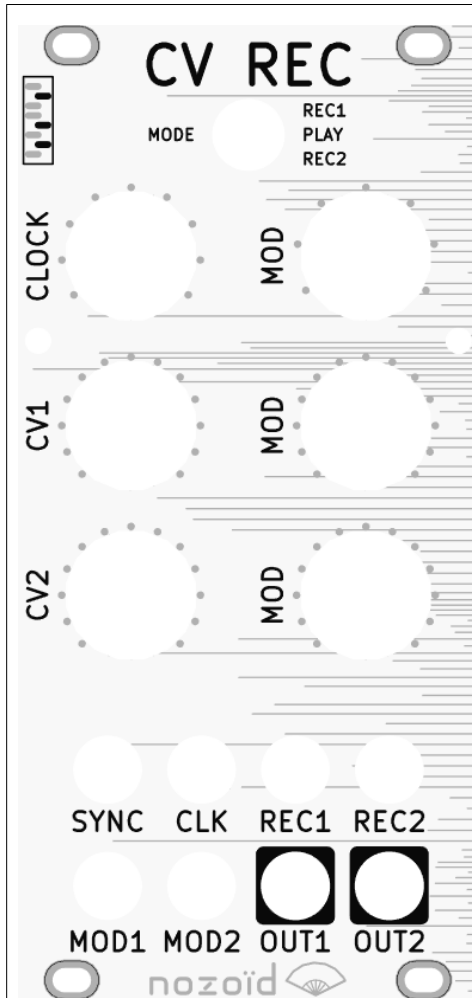|	
CRUSH	Stereo Down-sampler / Bitcrusher A stereo bit-crusher, associated with a down-sampler to "destroy" and to add harmonics to any signal.
	Module number : 88 (01011000)
	Potentiometer 1: Wet / dry
	Potentiometer 2: Wet / dry modulation
	Potentiometer 3: Down Sampler Frequency (create aliasing effect)
	Potentiometer 4: Down Sampler Frequency modulation
	Potentiometer 5: Bitcrush
	Potentiometer 6: Bitcrush modulation
	CV 1: bypass (0 if unplugged)
	CV 2: Wet / Dry modulation value (chaos attractor if unplugged)
	CV 3: Bitcrush modulation value (chaos attractor if unplugged)
	CV 4: Downsample Frequency modulation value (chaos attractor if unplugged)
	Audio In 1: In 1 (0V if unplugged)
	Audio In 2: In 2 (Audio In 1 if unplugged for stereo Bitcrusher, center for mono+pan)
	Audio Out 1: Out 1
	Audio Out 2: Out 2

	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)

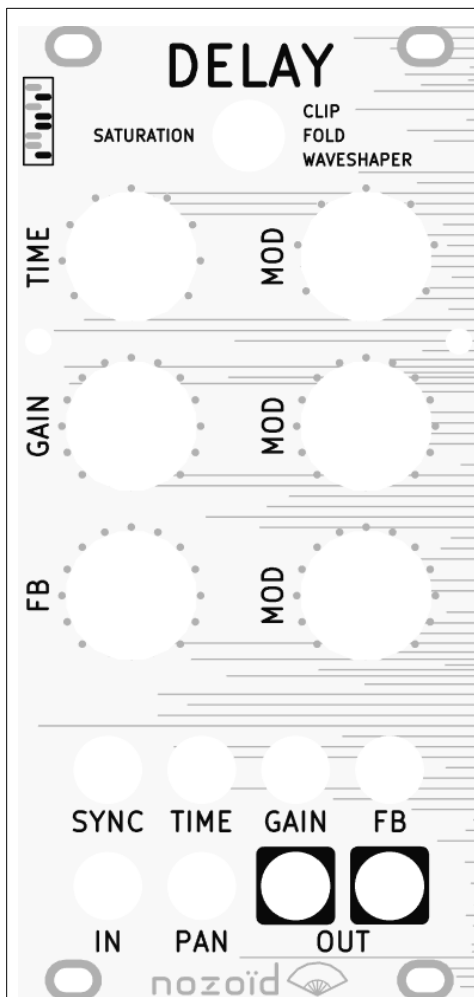|	
	Record and play back 2 independent CV This module allow to record an external CV or an audio input and to play it at different speed. For example, a potentiometer movement can be record and used as a sequencer or LFO. An audio sound can be freeze, pitch and even used as a low speed to create a modulation CV. Sampling rate range from 280Hz to about 40KHz depending of the clock speed. A potentiometer is a direct control of the recording, but this value can be modulated via CV input (and a modulation potentiometer). Sampling a high pitch signal using a low clock speed result in sub-sampling and lower frequency will appear.
	Module number : 74 (01001010)
	Potentiometer 1: Clock speed or click divider in sync mod (loop time from less than 0.4s to 55s)
	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: A Gate signal will record CV1 (0V if unplugged)
	CV 4: A Gate signal will record CV2 (0V if unplugged)
	Audio In 1: Record 1 modulation value (0V if unplugged)
	Audio In 2: Record 2 modulation value (0V 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

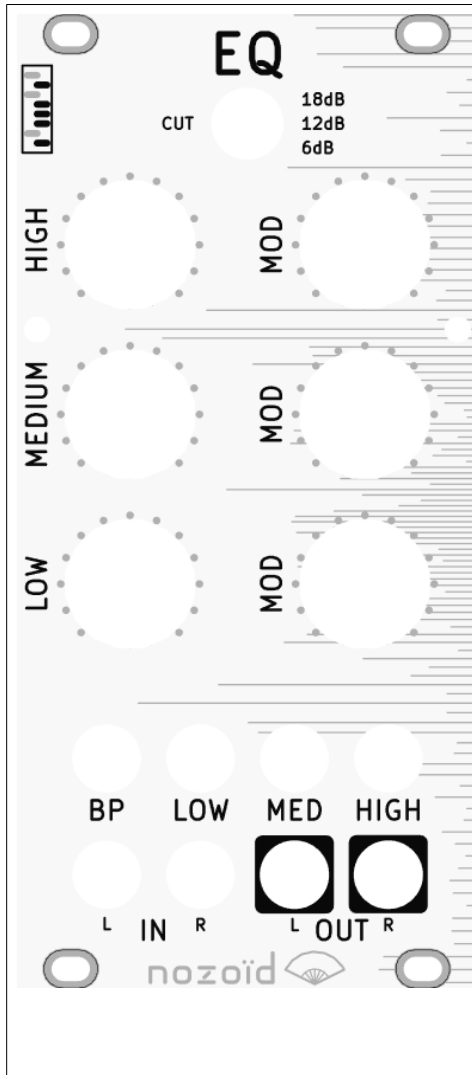|	
	Audio Delay This module is a simple audio delay with feedback accepting modulation on all parameter. The delay time can be set using an external clock (maximum delay time is about 0.7s). With high feedback, the signal can accumulate, and distortion can appear. The 3 way switch deal with the distortion shape. Be careful with the waveshaper : it can bite!
	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 (center if unplugged)
	Audio Out 1: delay out left
	Audio Out 2: delay out right

	Selector: Saturation mode :
	    Top : clip
	    Middle : fold
	    Bottom : waveshaper

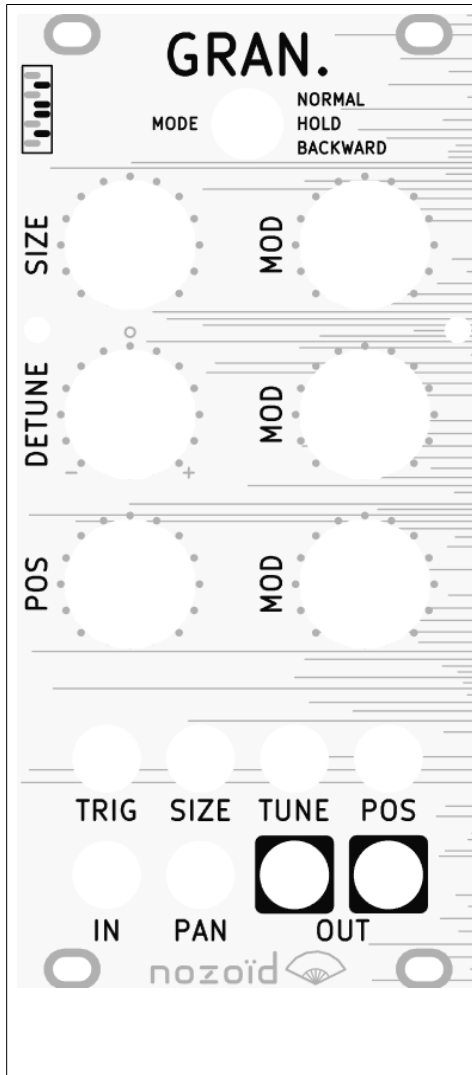|	
EQ CUT 18dB 12dB 6dB HIGH MOD MEDIUM MOD LOW MOD BP LOW MED HIGH L IN R L OUT R nozoïd	3 band equalizer Gain of all band can go up to +6dB, so digital saturation may occur. The 3 filter slope allow different separation between bands.
	Module number : 93 (01011101)
	Potentiometer 1: High gain (-inf. 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

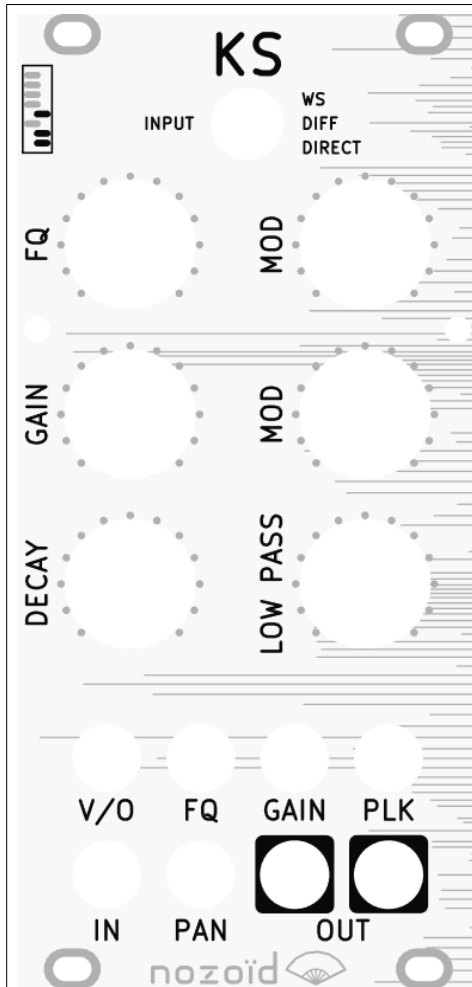|	
	Audio Granulator This module is design as an audio effect. It "granulate" the audio input. It can play up to 2 grains on the same time. A complex sound should be used as input for better result.
	Module number : 90 (01011010)
	Potentiometer 1: Grain size (10 to 100ms)
	Potentiometer 2: Grain size 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: panoramic (center if unplugged)
	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

GRAN.

MODE

NORMAL
HOLD
BACKWARD

SIZE

MOD

DETUNE

MOD

POS

MOD

TRIG SIZE TUNE POS

IN PAN OUT

nozoïd

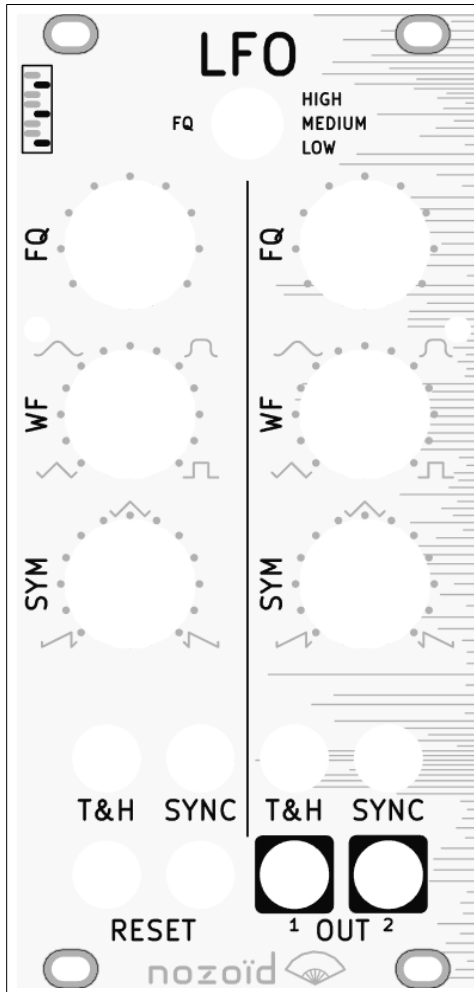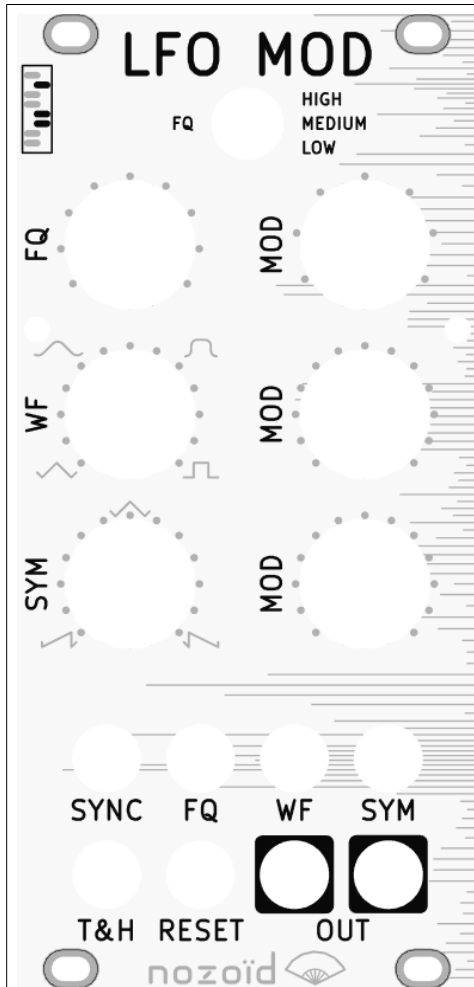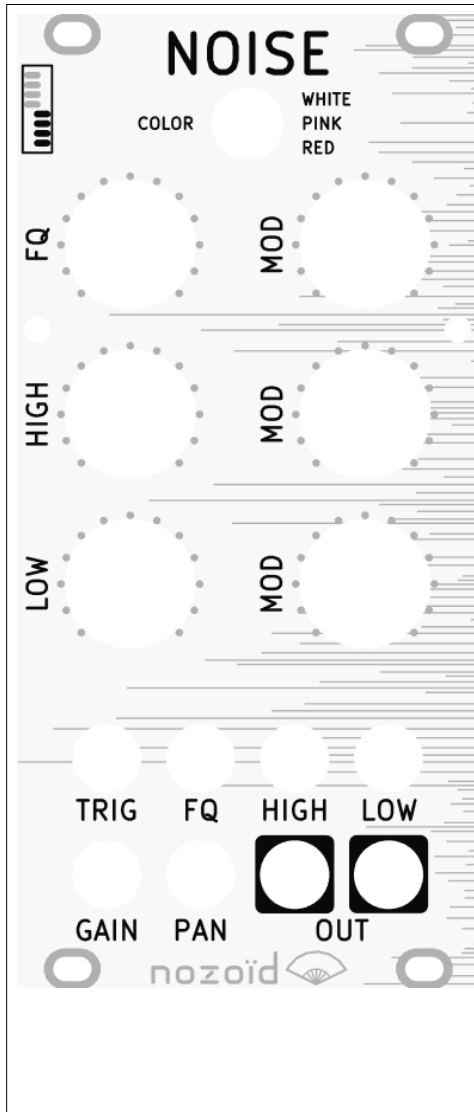|	
	Karplus-Strong This is a string model. It can be used as an oscillator or as a resonator to "filter" an audio input. A waveshaper on the audio out attenuate clipping at high gain and feedback. If no audio input is provide, and no "pluck" jack is plugged, an internal white noise source is used as input.
	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 (180° phase shift regarding out 1)

	Selector: input type
	    Top : wave shape of the difference (input - delay line)
	    Middle : Difference (input - delay line)
	    Bottom : direct

	Dual Low Frequency Oscillator, with parametric waveform
	Dual LFO: they feature parametric waveform. A Trig&Hold allow to generate steps.
	When a sync signal is provide, the frequency potentiometer select simple divider/multiplier of the frequency (1/16, 1/8, 1/4, ½, 1, 2, 4, 8, 16)
	The reset input restart the 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))

Low Frequency Oscillator, with parametric waveform, and modulation on all parameters.
When a sync signal is provide, the Frequency potentiometer select simple divider/multiplier of the frequency (1/16, 1/8, 1/4, ½, 1, 2, 4, 8, 16), while the modulation frequency potentiometer add complex fraction of this frequency (2/3, 3/4, 4/5, 1/1, 5/4, 4/3, 3/2).
A Trig&Hold allow to generate steps.
The reset input restart the waveform.

Module number : 76 (01001100)

Potentiometer 1: LFO Frequency

Potentiometer 2: LFO Frequency modulation

Potentiometer 3: LFO Waveform

Potentiometer 4: LFO Waveform modulation

Potentiometer 5: LFO Symmetry

Potentiometer 6: LFO Symmetry modulation

CV 1: Synchronization : when plugged, the LFO1 frequency is a multiple of this input

CV 2: Frequency modulation value

CV 3: Waveform modulation value

CV 4: Symmetry modulation value

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

Audio In 2: Reset LFO phase

Audio Out 1: LFO out

Audio Out 2: LFO out (180° out of phase regarding output 1)

Selector: frequency range
        Top : High (0.2 (5Hz) ~ 0.25ms (4000Hz))
        Middle : medium (5s ~ 5ms (200Hz))
        Bottom : low (60s ~ 60ms (16Hz)

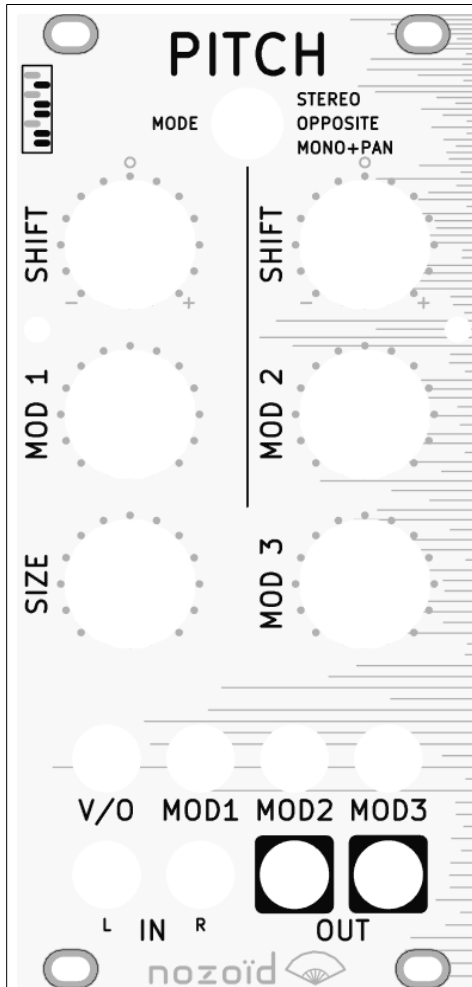|	
NOISE COLOR / WHITE PINK RED / FQ MOD / HIGH MOD / LOW MOD / TRIG FQ HIGH LOW GAIN PAN OUT / nozoïd	Stereo Noise source This module is dedicated to both audio and control CV generation. The filter parameters ranges are huge. For CV generation, potentiometer are typically used from 0 to 50%. For audio, the useful range is from 50% to 100%.
	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: 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

PITCH	Dual Pitch shifter using tape emulation
MODE	This module is a stereo pitch-shifter. It allow frequency shifting from +/- 2 octaves (3 octaves in mono mode).
STEREO OPPOSITE MONO+PAN	In mono mode, the shift 2 potentiometer is unused.

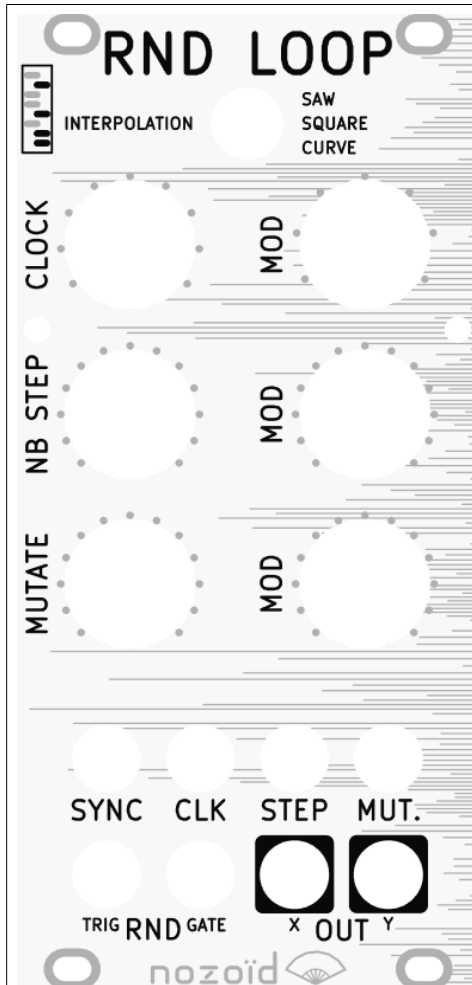| |
|---|
| Module number : 91 (01011011) |
| Potentiometer 1: Pitch shift 1 (positive or negative shift, no shifting is on the middle position of the potentiometer) |
| Potentiometer 2: Pitch shift 2 |
| Potentiometer 3: Pitch shift 1 modulation |
| Potentiometer 4: Pitch shift 2 modulation |
| Potentiometer 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) |

SHIFT

SHIFT

MOD 1

MOD 2

SIZE

MOD 3

V/O MOD1 MOD2 MOD3

L IN R   OUT

nozoïd

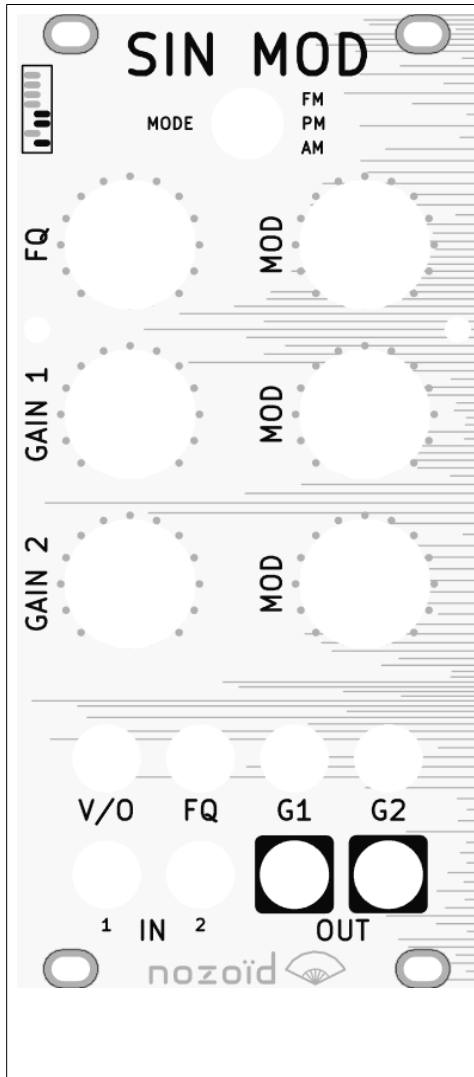| RND LOOP	
Loop of Random Value This module is halfway between a LFO and a sequencer. Random steps are played in sequence. This steps can be interpolated in order to create curves, ramp or steps. The evolution speed of the values (MUTATION) can be controlled manually or using an external CV. When "mutation" increase, the sequence vary faster at every loop.	
Module number : 75 (01001011)	
Potentiometer 1: Clock speed (0.2Hz to 300Hz)	
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 gate 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)	

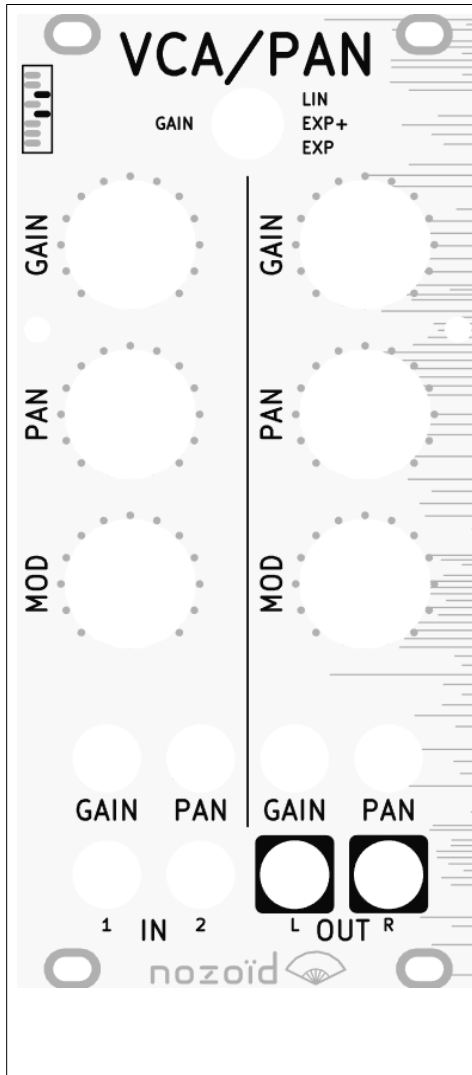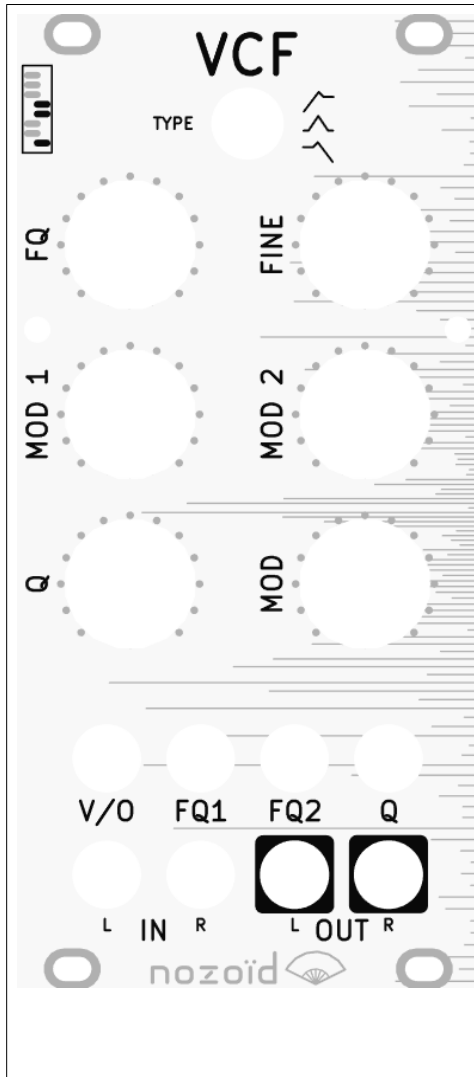| |
|---|
| Sinusoidal oscillator with 2 external modulation (PM / FM / AM) This module is based on a sinusoidal oscillator that can be modulate using 2 externals sources. Modulation can be "Phase Modulation", "Frequency Modulation" or "Amplitude modulation". |
| Module number : 13 (00001101) |
| Potentiometer 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 |

Stereo VCA-Panoramic, with modulation of the panoramic control 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.	
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)	

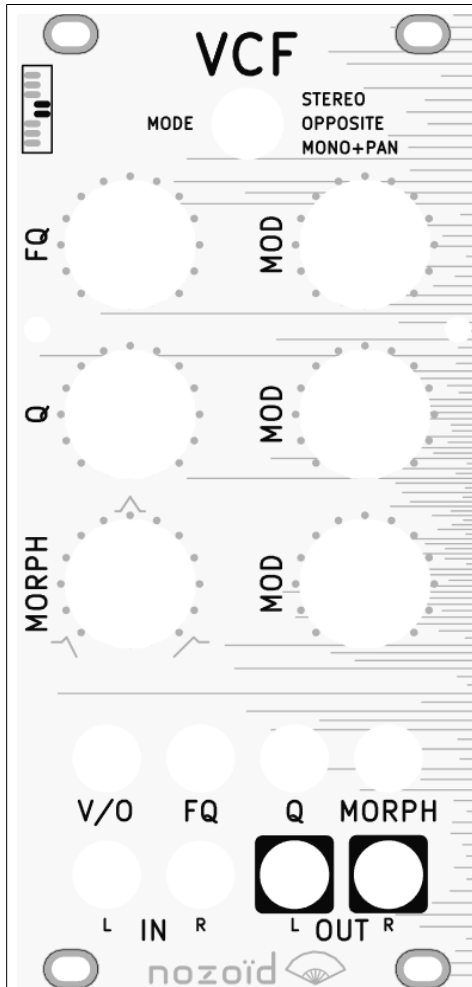|	
	Stereo VCF A standard multi-mode filter with clean sound, and auto oscillation at high feedback. This filter is stereo : it can filter 2 different inputs using the same parameters.
	Module number : 25 (00011001)
	Potentiometer 1: Cutoff frequency (from 0.1 to 17KHz)
	Potentiometer 2: Cutoff frequency 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: Righ 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

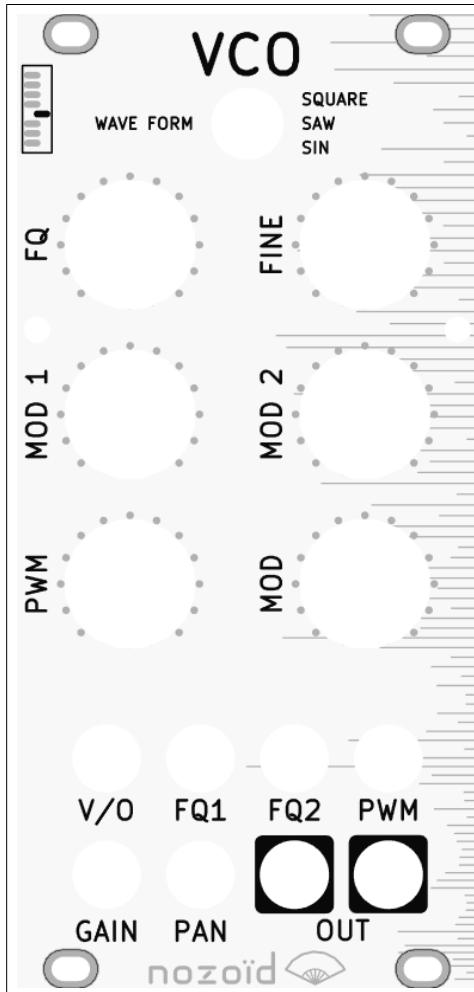|	
VCF module panel	Parametric stereo filter. This parametric filter can morph between low pass (LP), band pass (BP) and high pass (HP). All of the filter parameters (cutoff frequency, resonance (Q) and the filter shape) can be controlled via CV inputs. LP 24dB is at 0%, LP12dB is at 25%, BP is at 50%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

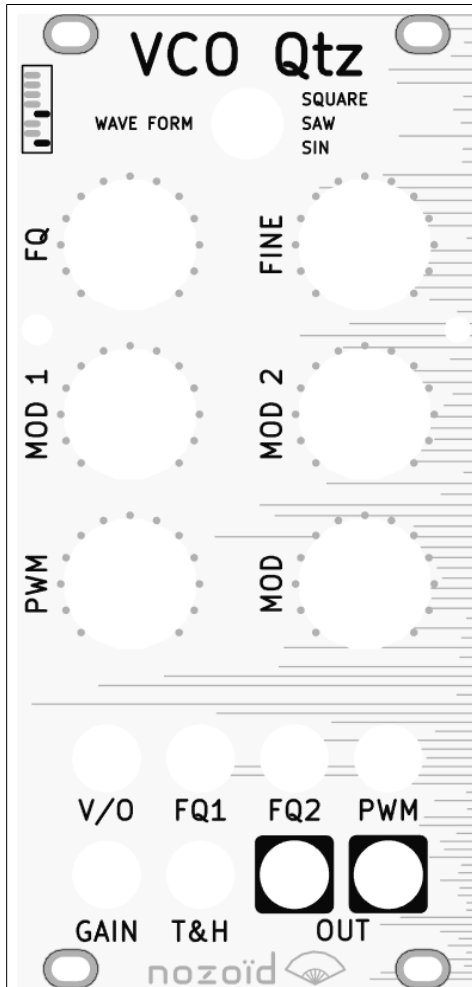|	
	Simple VCO, with VCA and VC Panoramic This module is a standard VCO. It admit 3 different waveform and 3 modulation frequency input. PWM can be modulated from 0 to 50%. In SAW mode, the PWM parameter control the phase of 2 saw, in order to have a double saw waveform. In SIN Mode, the PWM parameter control the sinus deformation.
	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: panoramic (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)

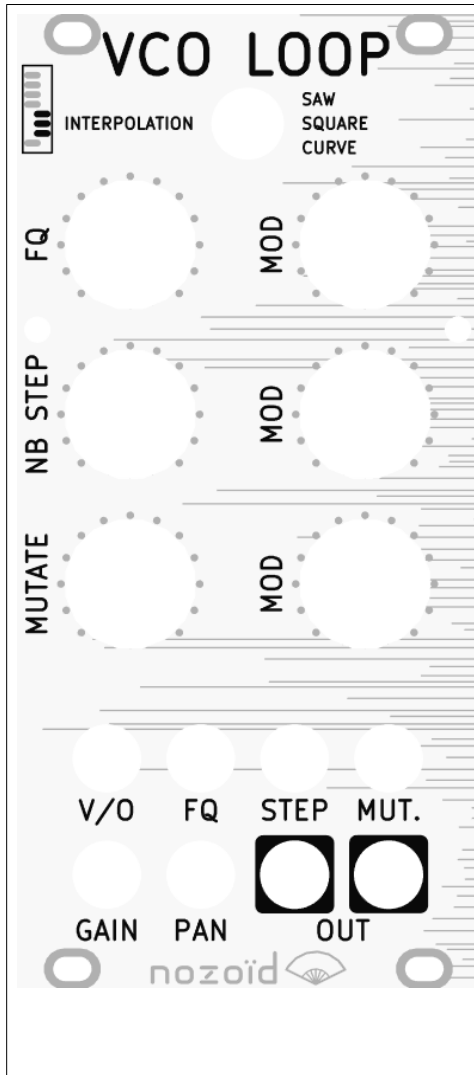|	
VCO Qtz module panel	**Simple VCO, with VCA** This module is a standard VCO. It admit 3 different waveform and 3 modulation frequency input. It is very similar to the standard VCO module. The differences are : -the CV1 is quantized so only note scan be produce (no value in between). -A trig&hold allow 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.
	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)

VCO LOOP	Loop of Random Value at audio rate
INTERPOLATION	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.
SAW SQUARE CURVE	Module number : 14 (00001110)
FQ	Potentiometer 1: frequency (from 1 to 1600 Hz)
MOD	Potentiometer 2: frequency modulation
NB STEP	Potentiometer 3: Step number (3...32)
MOD	Potentiometer 4: Step number modulation
MUTATE	Potentiometer 5: Mutation speed of the value
MOD	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)
V/O FQ STEP MUT.	Audio In 2: panoramic (center if unplugged)
	Audio Out 1: Random out 1
OUT	Audio Out 2: Random out 2
GAIN PAN	Selector: Interpolation mode
nozoïd	Top : linear (saw)
	Middle : none (square)
	Bottom : cubic (curve)

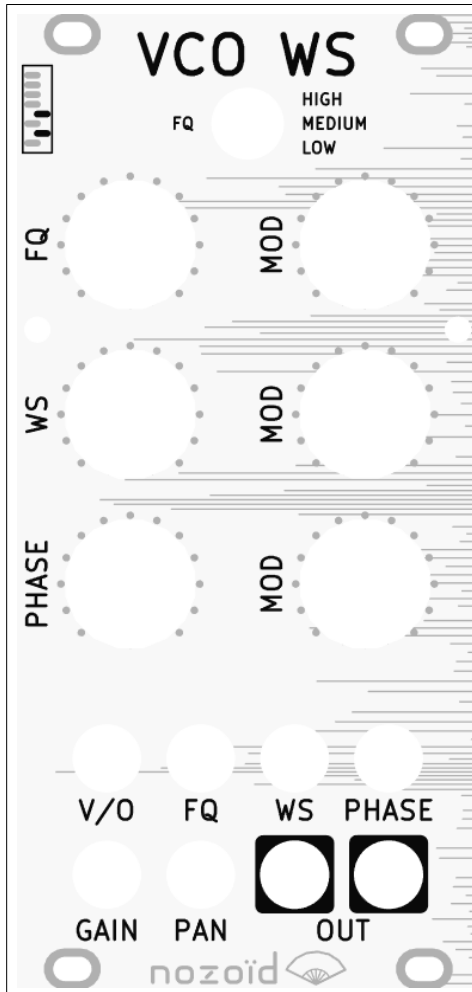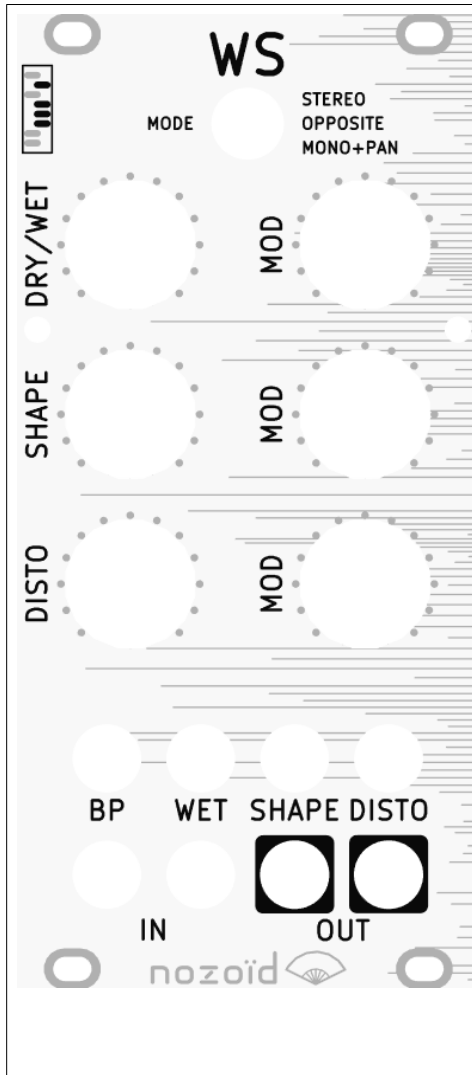|	
	Parametric VCO, with VCA and VC Panoramic The waveform of this VCO can morph between a square, a rectangle, a saw or a double saw. The 2 parameters allowing this transformations can be controlled via CV inputs.
	Module number : 12 (00001100)
	Potentiometer 1: Frequency (from 0.05Hz to 20KHz, depending 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: panoramic (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)

	Sinusoidal oscillator with VC waveshaper and VCA and VC Panoramic This module is a sinusoidal VCO passing throw 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.
	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: panoramic (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)

	Wave shaper and distortion with a VC Panoramic This Wave Shaper is a stereo effect. The audio signal passes throw a distortion before the waveshaper.
	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)

WS

MODE

STEREO
OPPOSITE
MONO+PAN

DRY/WET

MOD

SHAPE

MOD

DISTO

MOD

BP   WET SHAPE DISTO

IN   OUT

nozoïd