KAGOUYAR
BY NOZOÏD

VCO1 VCO2 VCO3 MIX VCF1 ADSR AR.LFO1 AR.LFO2 AR.LFO3 LFO7 EFFECT1 EFFECT2 VCF2

FQ FQ FQ FQ ATTACK ATTACK.FQ ATTACK.FQ ATTACK.FQ FQ WET WET FQ

WF WF WF VCO1 Q DECAY RELEASE.MOD RELEASE.MOD RELEASE.MOD WF PARAM1 PARAM.MOD MOD

MOD1 MOD1 MOD1 VCO2 MOD1 SUSTAIN LFO4 LFO5 LFO6 SYM PARAM2.MOD

MOD2 MOD2 MOD2 VCO3 MOD2 RELEASE FQ FQ FQ GAIN

MOD3 MOD3 MOD3

MIDI

CV1 SAVE

CV2 LOAD

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	WAVE FORM						FQ RANGE					
VCO	SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	LOW	MED	FULL
VCO MOD	FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WFM	OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	NONE	HALF	FULL	FQ	Q	LP	HP
ADSR/KB	NONE	AD	ADSR	VCA	LPG	0	1	2	3	4	5	NORMAL	TOGGLE
AR/LFO	AR	SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

Table of contents

This manual covers the features and operations of Nozoïd Kagouyar version 1.02
Informations contained in this manual are subject to change without notice and does not represent a commitment on the part of Nozoïd.

Nozoïd want to thanks:
- Maylis for the graphical design
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Introduction

The Kagouyar is a semi modular polyphonic virtual analogue synthesizer. It combine a simple usage and a huge range of sonic possibilities. Thanks to state of the art technologies, it feel like an analogue synthesizer, but includes numerous feature and option never seen in a vintage synthesizer. Versatile and intuitive, it will surprise you in many way!

Oscillators include standard analogue waveform like sinus, saw or square, but also digital generators, chaotic variations and other specific waveforms. All of them include a modulation that add complexities to the shape of the wave.
With 3 inter-modulating oscillators per voice, this machine associate frequency, phase, amplitude and waveform modulation with subtractive synthesis. The 4 voices of polyphony creates lot's more than simple harmony!

On top of this, 2 audio effects allows more authority to your sound, and a more expressive range. The Kagouyar can produce anything from soft and round musical layer to fat glitch or digital raw sound.

The 7 LFO can intermodulate to create complexes rhythmic sequences, strange variations or automatic animation. Your sound is alive, be it generative music, simple groove or complex sound design.

Patching is simple thanks to it's semi modular conception. The Kagouyar use tactile switch in combination with a modulation matrix. There is no menu to dive in: every functionalities are available with only 2 simultaneous touch. The 46 potentiometers allow to control all parameters at the tip of your fingers.

Designed for sound exploration, the Kagouyar is the ultimate synthesizer for drone oriented performance, soft ambient music and hardcore techno. Compact, it will easily fit in your backpack to your next gig, but big enough to stay in the centre of your studio. Be ready to dive into sound synthesis, this machine will unleash your creativity!

Interface description

Panel labels (top to bottom, left to right):

VCO1 | VCO2 | VCO3 | MIX | VCF1 | ADSR | AR.LFO1 | AR.LFO2 | AR.LFO3 | LFO7 | EFFECT1 | EFFECT2 | VCF2

LM1 C1 | LM2 C2 | LM3 C3 | C4 | LM4 C5 | LM5 C6 | LM6 C7 | LM7 C8 | LM8 C9 | C10

P1 (FQ) | P6 (FQ) | P11 (FQ) | | P19 (FQ) | P23 (ATTACK) | P27 (ATTACK.FQ) | P30 (ATTACK.FQ) | P33 (ATTACK.FQ) | P36 (FQ) | P39 (WET) | P42 (WET) | P44 (FQ)

M12 | M13 | M14 | M16 | M17

P2 (WF) | P7 (WF) | P12 (WF) | P16 (VCO1) | P20 (Q) | P24 (DECAY) | P28 (RELEASE.MOD) | P31 (RELEASE.MOD) | P34 (RELEASE.MOD) | P37 (WF) | P40 (PARAM1) | P43 (PARAM.MOD) | P45 (MOD)

M1 | M4 | M7 | M10 | M15

P3 (MOD1) | P8 (MOD1) | P13 (MOD1) | P17 (VCO2) | P21 (MOD1) | P25 (SUSTAIN) | P38 (SYM) | P41 (PARAM2.MOD)

LFO4 LM9 C11 | LFO5 LM10 C12 | LFO6 LM11 C13

M2 | M5 | M8 | M11

P4 (MOD2) | P9 (MOD2) | P14 (MOD2) | P18 (VCO3) | P22 (MOD2) | P26 (RELEASE) | P29 (FQ) | P32 (FQ) | P35 (FQ) | GAIN LG

M3 | M6 | M9 | P46

P5 (MOD3) | P10 (MOD3) | P15 (MOD3)

LM12 C14 MIDI
LM13 C15 CV1 — S SAVE
LM14 C16 CV2 — L LOAD

Keyboard menu matrix:

	LK1	LK2	LK3	LK4	LK5	LK6	LK7	LK8	LK9	LK10	LK11	LK12	LK13
VCO — LR1	SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	LOW	MED	FULL
VCO MOD — LR2	FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2 — LR3	LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	NONE	HALF	FULL	FQ	Q	LP	HP
ADSR/KB — LR4	NONE	AD	ADSR	VCA	LPG	-3	-2	-1	0	1	2	NORMAL	TOGGLE
AR/LFO — LR5	AR	SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	LOW	MED	HIGH	MIDI
LFO MOD — LR6	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS — LR7	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13

KAGOUYAR

This notation will be used within this document :

P1 to P46: Potentiometers
LM1 to LM14: Led Modulation (display modulation and selection)
LK1 to LK13: Led Keyboard (display notes or options)
LR1 to LR7: Led Row (display the active row in the keyboard menu)
LG: Led Gain (switches on when the output clip)
C1 to C16: Configuration and assignation tactile switch
M1 to M17: Modulation tactile switch
K1 to K13: Keyboard tactile switch
S / L: Save and Load tactile switch

Connections description

1: Headphone out (stereo jack 1/4")
2: Audio out (mono - balanced jack 1/4")
3: MIDI IN (DIN 5 pin)
4: GATE IN (0 to 5 Volt - mono jack 1/8")
5: CV1 IN (Pitch or modulation : -5V to 5V - mono jack 1/8")
6: CV2 IN (Modulation : -5V to 5V - mono jack 1/8")
7: Power supply (9V or 12V, DC, 500mA max - 2.1mm power plug)
8: On/off switch

Capacitive touch sensor calibration

The Kagouyar use capacitive touch sensor to activate various switches. This sensors are calibrated every time you switch this synthesizer on. Please leave the surface free of any finger touch, or metallic object since it can interfere with the calibration process.

If a touch switch did not react as intended, please check that nothing interfere with this sensor and switch off and on the Kagouyar.

Warnings

This is the standard warning : in short, don't be an idiot and everything will be fine!

Reading the manual is the owner's responsibility. Please study this manual carefully before requesting service.

The instrument, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable, or a level that exceeds prevailing safety standards for hearing exposure. If you encounter any hearing loss or ringing in the ears, consult an audiologist immediately.

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, damages, fire or other risks.

The manufacturer's warranty does not cover service charges incurred due to a lack of knowledge relating to how a function or feature works (when the unit is operating as designed).

Do not place this product in a place or position where one might walk on, trip over, or roll anything over power cords or connecting cables.

The Kagouyar uses an external power adapter. Nozoïd accepts no responsibility for damage caused by use of an non adapted power supply.

Precautions include, but are not limited to, the following:
- Read and understand all the instructions.
- Always follow the instructions on the instrument.
- Before cleaning the instrument, always remove the electrical plug from the outlet. When cleaning, use a soft and dry cloth. Do not use gasoline, alcohol, acetone, turpentine or any other organic solutions; do not use liquid cleaner, spray or cloth that's too wet.
- Do not use the instrument near water or moisture, such as a bathtub, sink, swimming pool or similar place. Do not place the instrument in an unstable position where it might accidentally fall over.
- Do not place heavy objects on the instrument. Do not block openings or vents of the instrument; these locations are used for ventilation to prevent the instrument from overheating. Do not place the instrument near a heat vent or any place of poor air circulation.
- Make sure the line voltage in your location matches the input voltage specified on the AC power adapter.
- Do not open and insert anything into the instrument, as this could cause a fire or electrical shock.
- Do not spill any kind of liquid onto the instrument.
- Do not use the instrument when thunder and lightning are present.

- Do not expose the instrument to hot sunlight.
- Do not use the instrument when there is a gas leak nearby.
- Nozoïd is not responsible for any damage or data loss caused by improper operations to the instrument.

Quick start

Plug the Kagouyar to your mix table, or to your headphone.
Plug the power adaptor, switch it on: you are ready to go!

The Kagouyar use tactile switch and keyboard, you just need to touch it's front face to activate the switches.

You can press and hold a configuration switch:◎, a led indicate the line to read, other leds indicate current options. You can change them pressing key of the keyboard.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

Press and hold a modulation switch:◉and assign the potentiometer to a modulation source (with the modulation source configuration switch:◎). If you press a second time on the same modulation, it will dissociate it, and no modulation will be assigned. If you keep this 2 switch pressed for more than 1 second, the opposite of the modulation will be assign.

Finally… press a key on the keyboard to generate a note.

You can load preset of random connection pressing simultaneously LOAD, SAVE and KO3 switch to quickly explore possibilities…

Turn knobs and enjoy!

Block diagram of internal connections
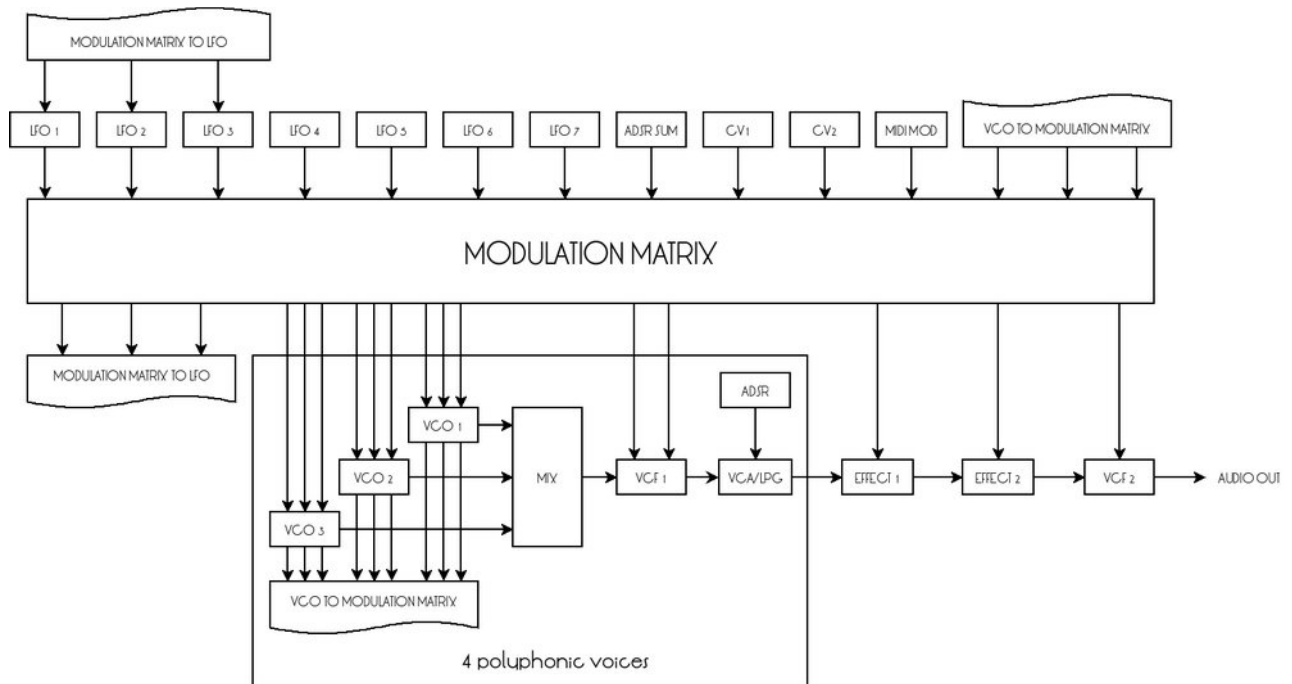
figure 1: internal path of the connections between modules

Audio signal path

Each one of the 4 voices is composed by:
- 3 oscillators (VCO)
- a mixer (MIX)
- a filter (VCF1)
- an envelop generator (ADSR)
- an amplifier (VCA or LPG)
- up to 3 AR envelop generator (that replace LFO1, 2 or 3)

The sound of this 4 notes are added together to pass through 2 audio effects and a filter (VCF2).

7 LFO creates multiples modulations. You can also modulate all parameters thanks to externals signals: 2 Control Voltage (-5V/5V) eurorack compatible, and 1 MIDI input for you DAW.

A modulation matrix route all this modulations input to desired modulation potentiometers.

Modulation matrix

The modulation matrix is used to route a modulation source to a modulation potentiometer.

A modulation source can be a LFO (or AR), the ADSR, a VCO waveform or an external control (MIDI or CV).

Modulation sources have a switch like this :

A modulation potentiometer allow to modulate various parameters of the sound synthesis, like the VCO frequency, the VCF cutoff frequency etc.

Modulation potentiometers have a switch like this :

To change the modulation source of a potentiometer, press and hold the modulation switch of the potentiometer: one LM led switches on to indicate the current modulation source (if any). Pressing any modulation C switch will associate the modulation source to this potentiometer.

If you press the C switch a second time, it deselect the source: the modulation will be unconnected.

If you keep both switch pressed for more than 1 second, the opposite of the modulation will be used, and the led blink quickly. (If the modulation source is positive, the opposite of the modulation will be negative)

Example : press and hold switch M10 and then press C9. Release both switch. This will allow LFO7 to control the VCF1 cutoff frequency.

The Oscillators section (VCO1, 2 and 3):

VCO1 VCO2 VCO3 MIX VCF1 ADSR AR.LFO1 AR.LFO2 AR.LFO3 LFO7 EFFECT1 EFFECT2 VCF2

FQ FQ FQ FQ ATTACK ATTACK.FQ ATTACK.FQ ATTACK.FQ FQ WET WET FQ

WF WF WF VCO1 Q DECAY RELEASE.MOD RELEASE.MOD RELEASE.MOD WF PARAM1 PARAM.MOD MOD

MOD1 MOD1 MOD1 VCO2 MOD1 SUSTAIN LFO4 LFO5 LFO6 SYM PARAM2.MOD

MOD2 MOD2 MOD2 VCO3 MOD2 RELEASE FQ FQ FQ GAIN

MOD3 MOD3 MOD3

MIDI

CV1 SAVE

CV2 LOAD

KAGOUYAR

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	KB KEY HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

VCO Wave Form

The VCO admit multiple waveforms, all of them can be modulated thanks to the WF potentiometer.

The waveforms can be:
- Sinus (WF create an asymmetric distortion)
- Curve: a folded sinus (WF increased folding)
- Triangle (WF increase the spike)
- Rectangle (WF change the pulse width)
- Saw: 2 saws (WF change the phase difference between the 2 saws)
- Noise: a white noise generator (WF apply a high pass filter)
- Digital: a downsample white noise (WF apply a low pass filter)
- Line: random value interpolated (WF act as a waveshaper)
- Logistic: a chaos oscillator based on the logistic map (WF change the "chaos" characteristic)
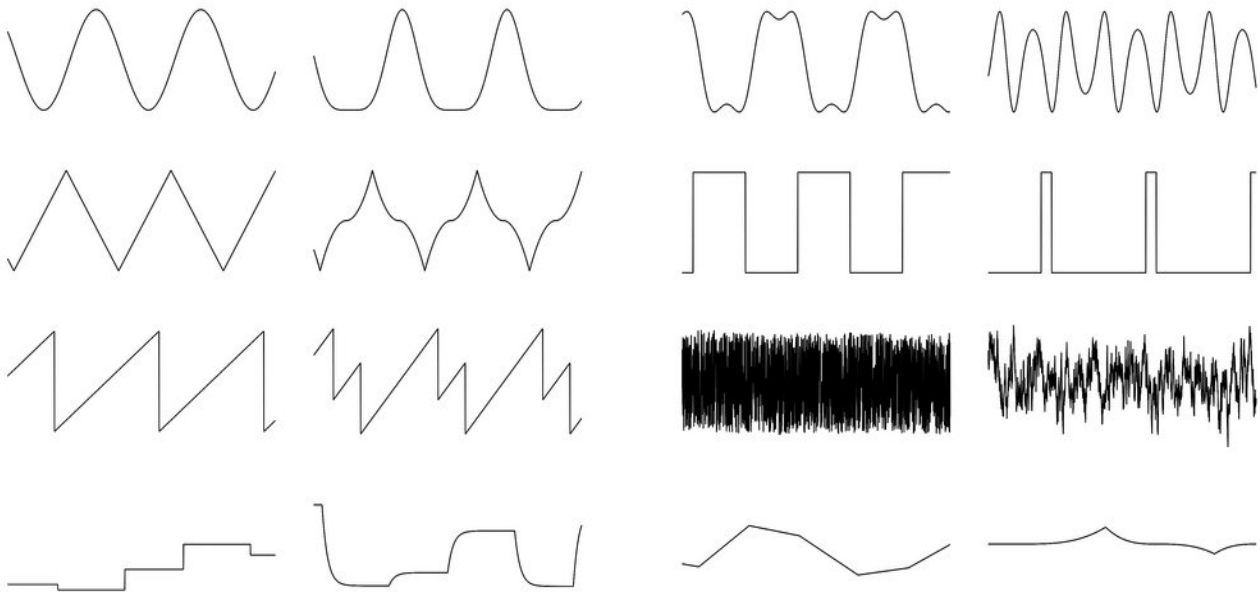
figure 2: VCO waveform with Wf=0 and Wf = 50%

To change the VCO waveform, press and hold C1, C2 or C3 depending on the VCO to modify: the LR1 Led switches on, to indicate that the keyboard is now configuring the VCO. One LK led switches on to indicate the current waveform. Pressing any K1 to K9 switch change the waveform. You can release both key after the selection.
Example: pressing C2 and K5 will configure VCO2 to a Saw waveform.

	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

Figure 3: figure 3: Keyboard option in VCO configuration mode

VCO Potentiometers

5 potentiometers allow to control various VCO parameters:
- Frequency (FQ)
- Wave form (WF)
- Modulation 1 (MOD1)
- Modulation 2 (MOD2)
- Modulation 3 (MOD3)

VCO frequency potentiometer

This potentiometer change the frequency of the oscillator. The range of this potentiometer can be (for the A3 key):
- low: 0.5 to 100 Hz"
- medium: about 290 to 660 Hz: (440Hz +/- 7 semitones)
- full: 20 to 12KHz

To change the range, press and hold C1, C2 or C3 depending on the VCO to modify. The LR1 Led switches on, to indicate that the keyboard is now configuring the VCO. One LK led switches on to indicate the current range. Pressing any K11 to K13 switch change the range. You can release both key when done.
Example: pressing C1 and K13 will configure VCO FQ potentiometer to full audio range.

VCO waveform modulation potentiometer (Wf)

All waveform can be modulate using this potentiometer. The waveform can also be modulated thanks to a modulation potentiometer, as we will see latter.
The previous VCO waveform graphics shows the effect of this modulation.

VCO modulation potentiometers

This potentiometers can use one of the modulation source to modulate the oscillator in various way.

To change the modulation source of a potentiometer, press and hold the modulation switch of the potentiometer: one LM led switches on to indicate the current modulation source (if any). Pressing any C switch will associate the modulation source to this potentiometer. If you press the C switch a second time, it deselect the source: the modulation will be unconnected and the potentiometer will have no effect.

The modulation type can be:
- FM exp: exponential (standard) frequency modulation
- FM Qtz: Modulate the frequency, but quantize the modulation to exact pitch value, in order to generate sequence of notes. The modulation amplitude is also lower than the FM exp.
- FM lin: modulate the frequency of the oscillator in a linear way (sub zero FM)
- AM: modulate the amplitude of the oscillator
- PM: phase modulation
- CLIP: clip the waveform
- Wf: modulate the waveform parameter (on top pf the value set by the Wf potentiometer)

When pressing a VCO modulation switch, The led LR2 switches on to indicate that the keyboard is now configuring the VCO modulation potentiometer. One LK led switches on to indicate the modulation type of this potentiometer. Pressing any K1 to K7 will change this modulation type.

Example: pressing M4 and K4 will configure VCO2 MOD1 potentiometer to amplitude modulation.

VCO	(WAVE FORM) SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	(FQ RANGE) LOW	MED	FULL
VCO MOD	(MOD TYPE) FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	(MOD SOURCE) OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	(VCF1 TYPE) LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	(PITCH TRACK) NONE	HALF	FULL	(MOD TYPE) FQ	Q	(VCF2 TYPE) LP	HP
ADSR/KB	(LOOP) NONE	AD	ADSR	(GAIN) VCA	LPG	(KB OCTAVE) -3	-2	-1	0	1	2	(KB KEY) NORMAL	TOGGLE
AR/LFO	AR	(LFO WAVE FORM) SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	(FQ RANGE) LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	(EFFECT 1) WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	(EFFECT 2) DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

Figure 4: Keyboard menu in VCO MODULATION mode

When using a VCO as a modulation, you can use one of the many VCO waveform: When pressing a M1 to M9 switch, if the source of the modulation is set to a VCO, a led LK8 to LK13 indicate the VCO waveform used as the modulation. This waveform can be:
- OUT: the output of the VCO (post modulation)
- SIN: a sinusoidal waveform
- TRI: a triangle waveform
- SQUARE: a square waveform
- RAMP: a rising line
- SAW: a falling line

Only the "OUT" modulation waveform is affected by the VCO amplitude, phase and waveform modulation.

VCO tuning

In order to simplified tuning of the 3 VCO together, you can set VCO2 and VCO3 to be controlled by the VCO1 frequency potentiometer. It's the "LINK VCO1" option on the keyboard. This option can be toggled on and off when pressing C2 or C3 and K10.

When this option is on, the 3 VCO frequency are controlled with VCO1 frequency potentiometer. VCO2 or VCO3 frequency potentiometer are used to tune VCO2 and VCO3 regarding VCO1 frequency.

In addition to the frequency potentiometers, the 3 VCO frequency change according to the pitch of the played note.

MIX section

The panel reference matrix (printed on the module):

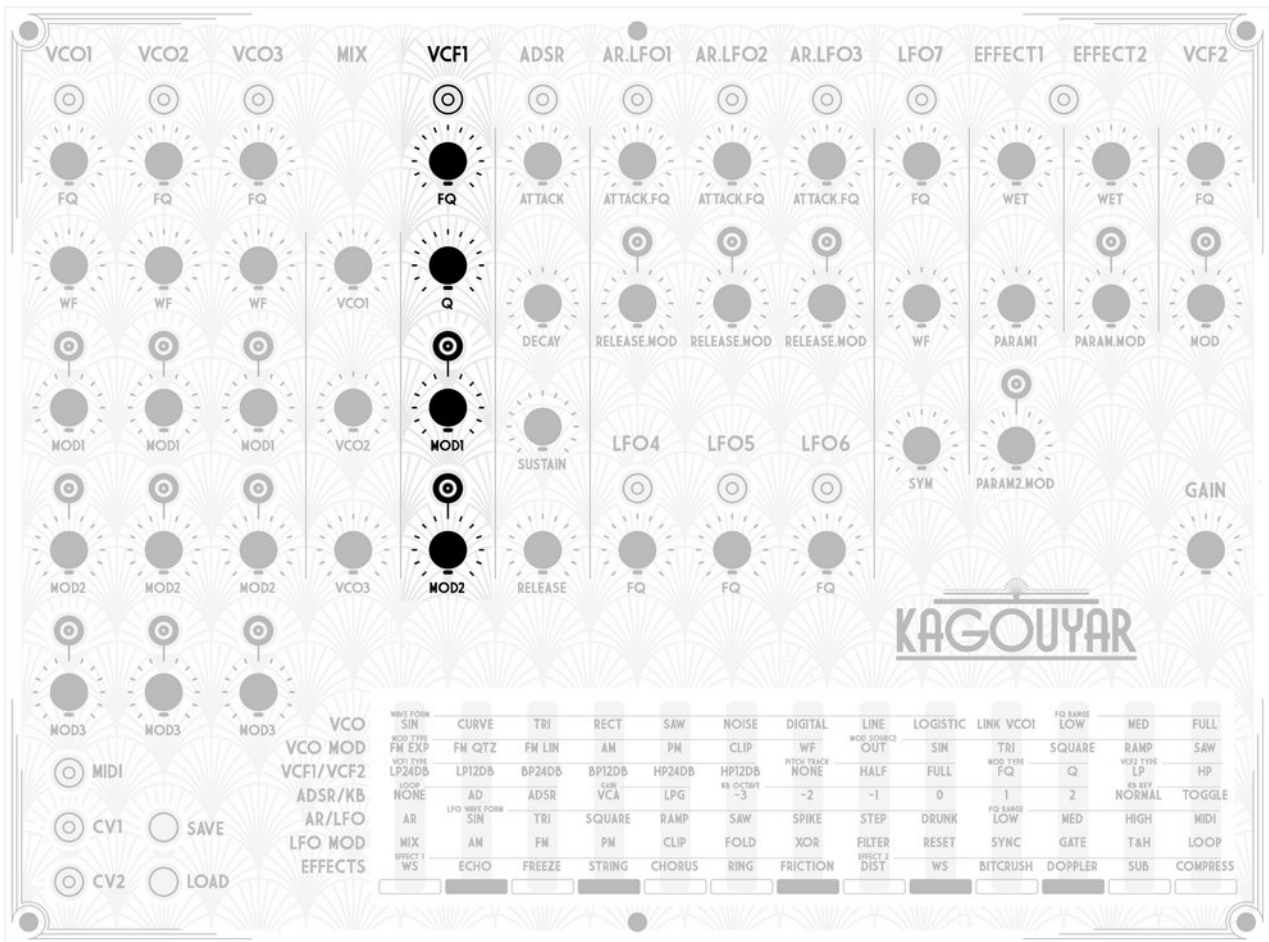|	1	2	3	4	5	6	7	8	9	10	11	12	13
VCO (WAVE FORM)	SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	LOW (FQ RANGE)	MED	FULL
VCO MOD (MOD TYPE)	FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	OUT (MOD SOURCE)	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2 (VCF TYPE)	LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	NONE (PITCH TRACK)	HALF	FULL	FQ (MOD TYPE)	Q	LP (VCF2 TYPE)	HP
ADSR/KB (LOOP)	NONE	AD	ADSR	VCA (GAIN)	LPG	-3 (KB OCTAVE)	-2	-1	0	1	2	NORMAL (KB KEY)	TOGGLE
AR/LFO	AR	SIN (LFO WAVE FORM)	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	LOW (FQ RANGE)	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	WS (EFFECT 1)	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	DIST (EFFECT 2)	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

3 potentiometers set the amplitude of each VCO.

This mix did not admit any modulation.

The sound resulting of this mix is send to the VCF1. At full amplitude, you may experience a small overdrive in the filter section.

filter section (VCF1)

VCO1 VCO2 VCO3 MIX VCF1 ADSR AR.LFO1 AR.LFO2 AR.LFO3 LFO7 EFFECT1 EFFECT2 VCF2

FQ   FQ   FQ   FQ   ATTACK   ATTACK.FQ   ATTACK.FQ   ATTACK.FQ   FQ   WET   WET   FQ

WF   WF   WF   VCO1   Q   DECAY   RELEASE.MOD   RELEASE.MOD   RELEASE.MOD   WF   PARAM1   PARAM.MOD   MOD

MOD1   MOD1   MOD1   VCO2   MOD1   SUSTAIN   LFO4   LFO5   LFO6   SYM   PARAM2.MOD   GAIN

MOD2   MOD2   MOD2   VCO3   MOD2   RELEASE   FQ   FQ   FQ

MOD3   MOD3   MOD3

MIDI   CV1   SAVE   CV2   LOAD

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	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO													
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	MOD TYPE FQ	SQUARE	RAMP	SAW
VCF1/VCF2	VCF TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

This is a multimode resonant filter. The frequency response can be set to:
- Low pass 24dB/Octave
- Low pass 12dB/Octave
- Band pass 24dB/Octave
- Band pass 12dB/Octave
- High pass 24dB/Octave
- High pass 12dB/Octave

To change the VCF filter type, press and hold C4. The LR3 Led switches on, to indicate that the keyboard is now configuring the VCF1: one LK led switches on to indicate the current filter type. Press any K1 to K6 switch to change it. You can release both key.
Example: pressing C4 and K5 will configure VCF1 to a High pass 24dB/Octave.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 5: Keyboard menu in VCF configuration mode

When holding this C4 key, you can also configure the behaviours of the cutoff frequency regarding to the played note: With pitch track to "full", the filter frequency follow the oscillator pitch. With pitch track to "none", the cutoff frequency of the filter is the same for all notes. "half" is a in between configuration.

VCF potentiometers

The VCF is controlled thanks to 4 potentiometers:
- FQ: cutoff frequency
- Q: resonant factor
- Modulation 1
- Modulation 2

The cutoff frequency potentiometer ranges on the full audio spectrum.

The Q potentiometer change the resonant factor of the filter. It set from no resonance to auto-oscillate.

The VCF modulation potentiometer can be set to modulate the cutoff frequency or the resonant factor of the filter.

When pressing the M10 Or M11 Switch, the led LR3 switches on, and the led LR10 or LR11 indicate the behaviours of the potentiometer. To change the function of this potentiometer, you can press K10 or K11.

For example, pressing M1 And K10 set potentiometer P21 to modulate the cutoff frequency of the VCF1.

Envelope section (ADSR)
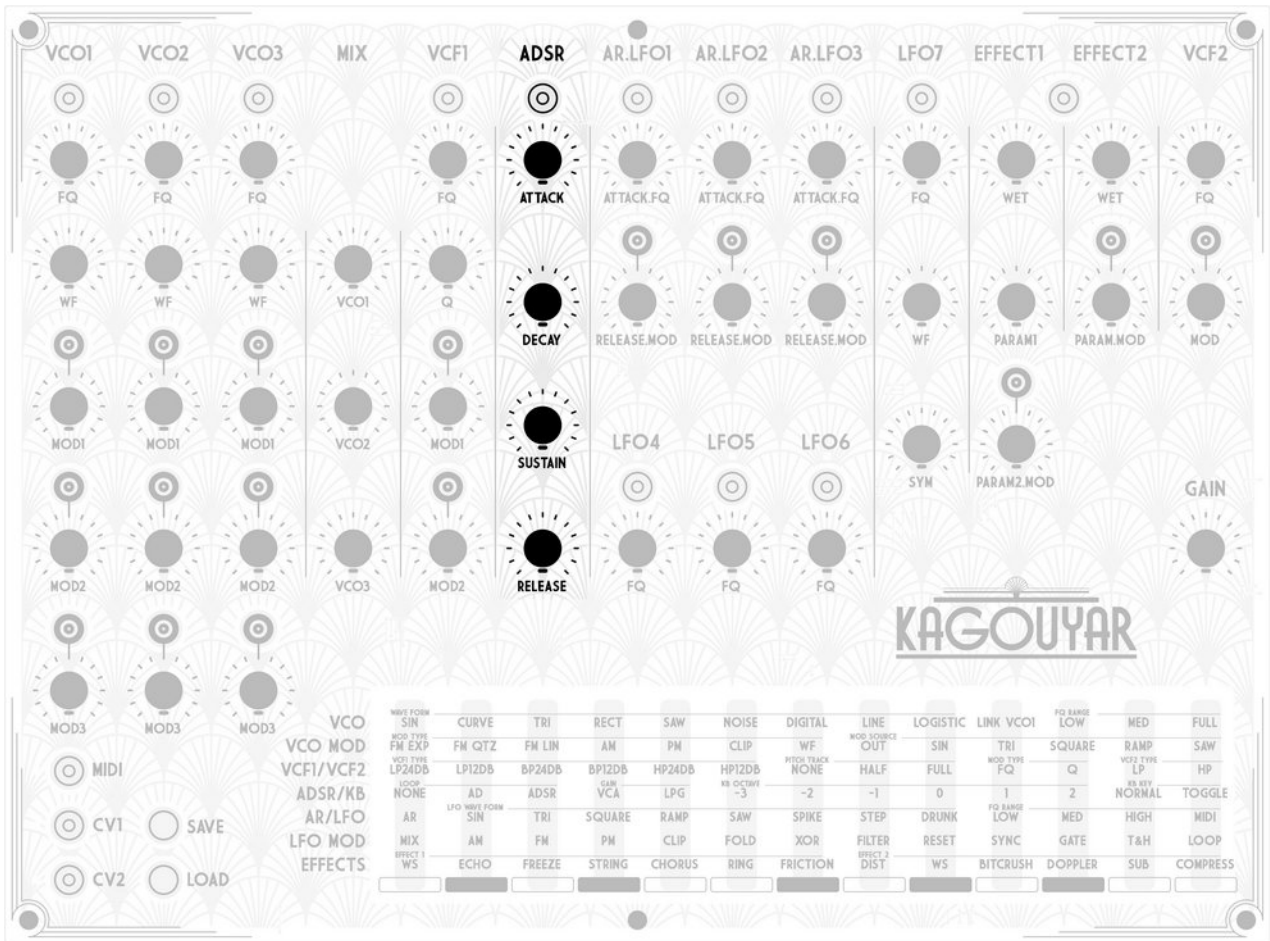
The ADSR stand for Attack, Decay, Sustain, Release. It's a standard exponential envelope generator. This ADSR is trigged by a GATE signal that came from the embedded keyboard, from a MIDI signal or from the analogue GATE IN jack.

This ADSR can however behave in different ways: looping through different parts of the envelope. The loop mode are:
- NONE: Their is no loop, the module act like a standard ADSR.
- AD: as soon as the decay signal is near the sustain, an attack is trigged. As long as a gate signal is present, the output loop through attack and decay.
- ADSR: As long as the gate signal is present, the release is trigged as soon as the ADSR signal is near the sustain, and an attack is trigged as soon as the signal is zero.
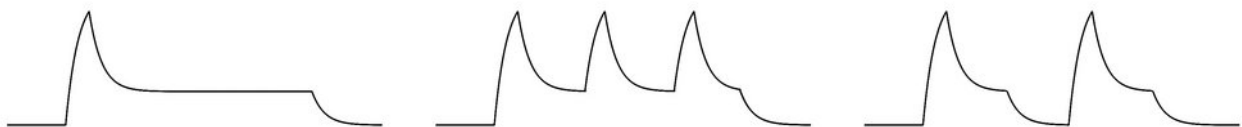
Figure 6: ADSR LOOP mode: NONE , AD loop, ADSR loop, for the same gate signal

To change the ADSR loop mode, Press and hold the ADSR configuration switch (C5) and use K1, K2 or K3 to select the loop mode.

Attack, Decay or Release can last for almost 0ms to 40s.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	FQ RANGE 1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 7: Keyboard option in the ADSR/KEYBOARD configuration mode (when C5 is pressed)

Amplification section (VCA - LPG)

The amplification section amplify the MIX audio signal thanks to the ADSR control signal.

This amplification can be made thanks to a standard exponential amplifier (VCA), or thanks to a Low Pass Gate (LPG).

To change the amplification module (VCA or LPG), you have to press the ADSR configuration switch (C5): the LR4 switches on, and the led LK4 or LK5 indicate the current amplification module. Press K4 or K5 to change to VCA or LPG.

This module amplifies each of the polyphonic notes thanks to the ADSR envelopes.

LFO section

(Front panel illustration — KAGOUYAR)
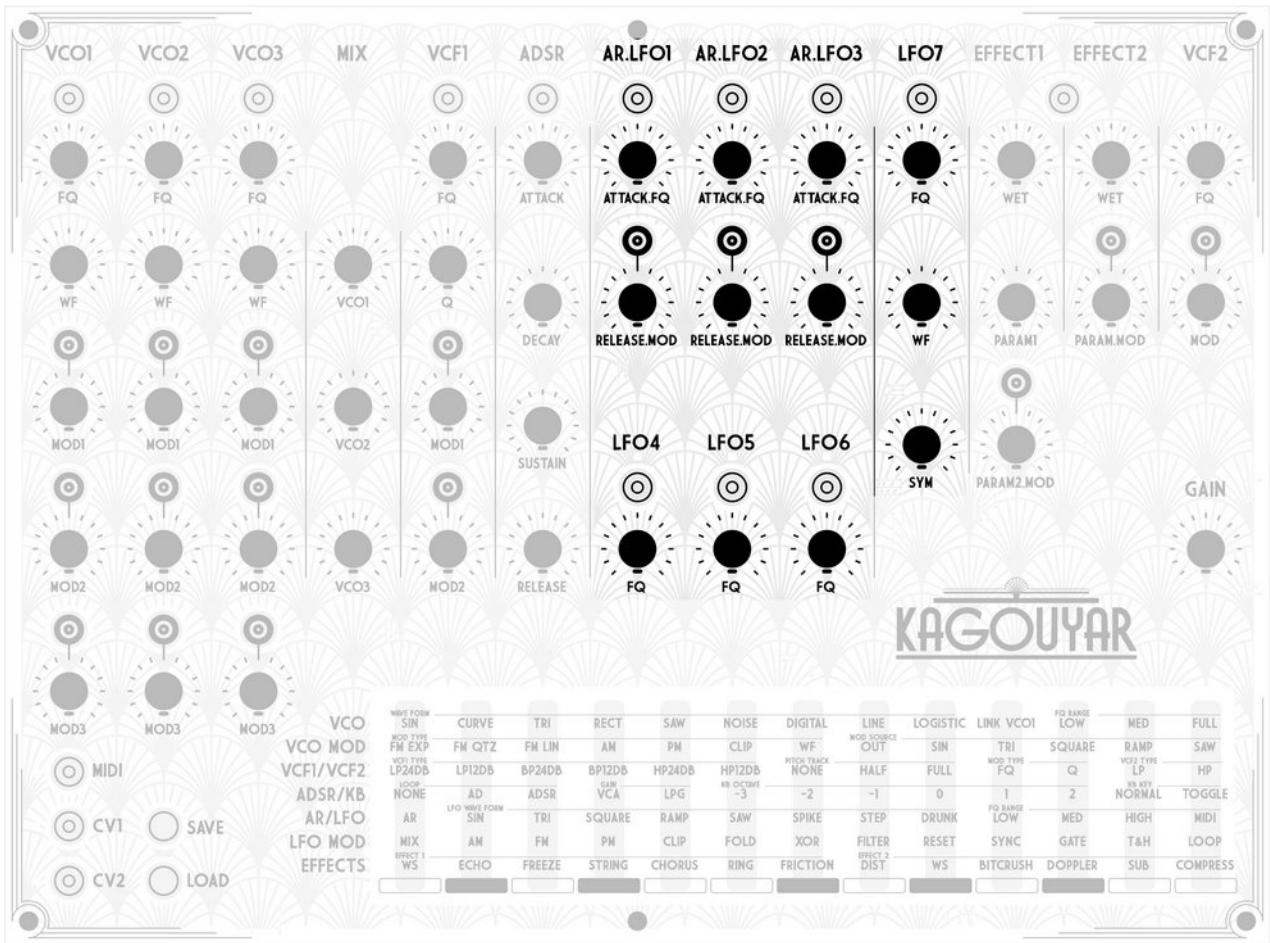
AR.LFO1, 2 or 3

This 3 modulations behave in the same way. They can be set to an Attack-Release modulation, or to a LFO with multiple waveforms.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 8: Keyboard menu in LFO configuration mode

When pressing configuration switch C6, The led LR5 switches on to indicate that the keyboard is now used to configure this AR.LFO module. When pressing the K1 to K9 key, the behaviours of this module change. It can be set to :
- AR (Attack/Release)
- SIN
- TRI
- SQUARE
- RAMP
- SAW
- SPIKE
- STEP
- DRUNK

The AR module

This is a standard Attack-Release module with exponential curve. Potentiometer P27 And P28 controls the attack time and the release time of the AR.LFO1 module. (respectively P30 and P31 for AR.LFO2...). Unlike for the LFO, the generated signal is different for all polyphonies voices.

The LFO module

The waveforms of the LFO are mostly standard. The only exotic waveforms are SPIKE, STEP (random steeps), and DRUNK (slow evolving value: the name comes from the walk of someone that lost his balance).
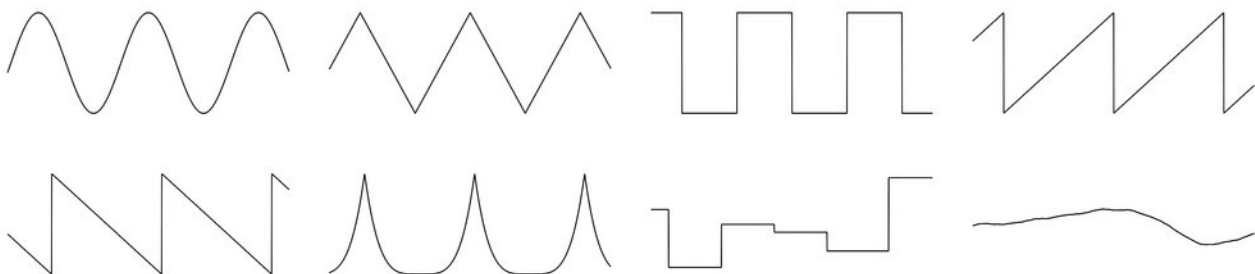
figure 9: Waveforms of the LFO

The LFO FQ potentiometer change the frequency of this oscillator. The range of this potentiometer can be adjust to 4 different values:
- LOW: from 0.01Hz (100s period) to 2Hz
- MEDIUM: from 0.2 to 20 Hz
- HIGH: from 2Hz to 800Hz
- MIDI: the frequency is sync to MIDI input clock (from 1/8 to 8 midi black notes)

When pressing the C6 to C11 switch, led LK10 to LK13 indicate the current frequency range of the LFO. Use key K10 to K13 to change this frequency range.

The LFO modulation

This 3 LFO also admit a modulation fader that modulate the LFO output in multiple way.

	1	2	3	4	5	6	7	8	9	10	11	12	13
VCO	*WAVE FORM* SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	*FQ RANGE* LOW	MED	FULL
VCO MOD	*MOD TYPE* FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	*MOD SOURCE* OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	*VCF1 TYPE* LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	*PITCH TRACK* NONE	HALF	FULL	*MOD TYPE* FQ	Q	*VCF2 TYPE* LP	HP
ADSR/KB	*LOOP* NONE	AD	ADSR	*GAIN* VCA	LPG	*KB OCTAVE* -3	-2	-1	0	1	2	*KB KEY* NORMAL	TOGGLE
AR/LFO	AR	*LFO WAVE FORM* SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	*FQ RANGE* LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	*EFFECT 1* WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	*EFFECT 2* DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 10: Keyboard menu in LFO MODULATION mode

When pressing the M12 To M14 switch, you can press a C1 to C16 switch to select a modulation source. Also, the led LR6 switches on to indicate that the keyboard now controls the LFO modulation type. LK1 to LK13 indicate the current modulation type of the LFO. Use key K1 to K13 to change this modulation type.

This modulation can be:
- MIX: mix between the LFO and the input modulations
- AM: modulate the amplitude of the LFO
- FM: modulate the frequency of the LFO
- PM: modulate the phase of the LFO
- CLIP: clip the LFO regarding the modulation signal
- FOLD: fold the output
- XOR: perform binary operation to create strange and complex waveform
- FILTER: filter the output to attenuate fast variations, or completely stop it
- RESET: reset the phase of the LFO
- SYNC: synchronise the output with the modulation source
- GATE: switch on / off the output
- T&H: trig and hold the value of the LFO
- LOOP: generate sequence of slowly evolving parameter

In the lasts modes, even with the MOD potentiometer to 0, the LFO signal can be altered.

In all of this modes, auto modulation (modulate a LFO with the same LFO), or no modulation can offer few surprises.
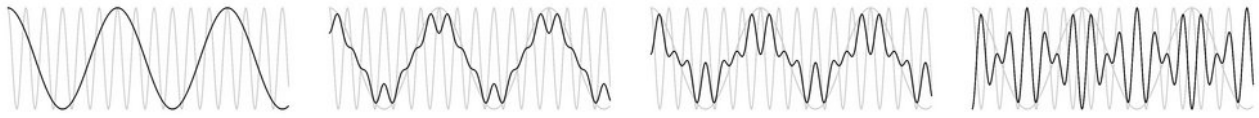
LFO MIX mode

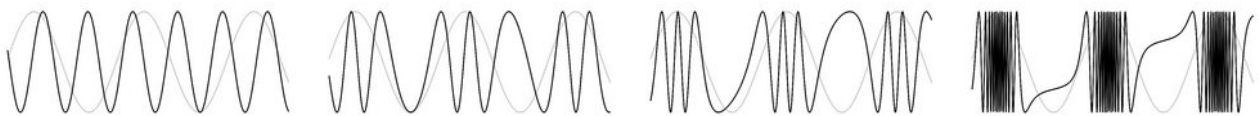A simple morphing between the source LFO and it's modulation
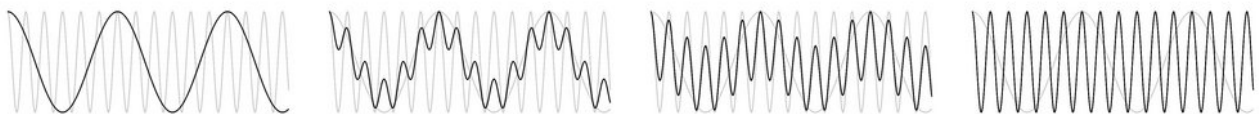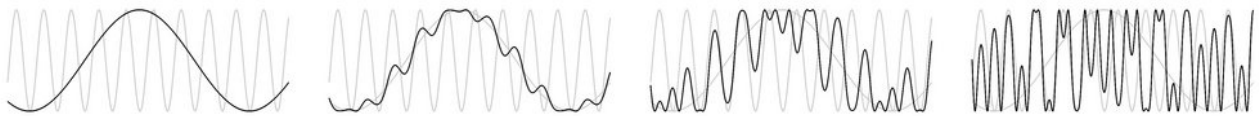
LFO AM mode

Modulate the amplitude of the LFO

LFO FM mode

Modulate the frequency of the LFO

LFO PM mode

Modulate the Phase of the LFO
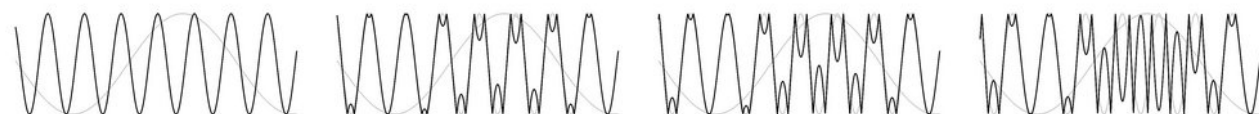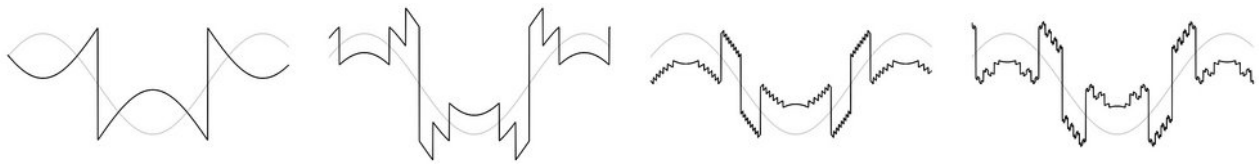
LFO CLIP mode

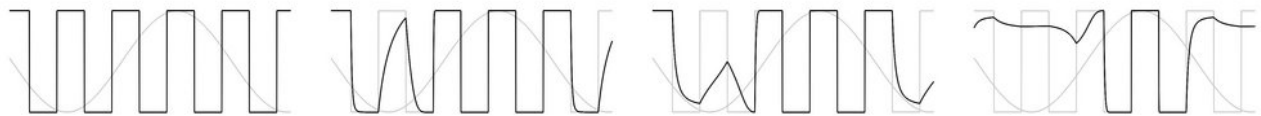Clip the output of the LFO

LFO FOLD mode

fold the LFO

LFO XOR mode

Apply a XOR binary operation between the 2 signals

LFO FILTER mode

filter the LFO to reduce fast variation

LFO RESET mode

Reset the LFO phase to synchronize it with the modulation, The amplitude of the reset is proportional to the wet potentiometer. At O%, the phase is unchanged. At 100%, a full reset occurs: the new phase is O. At 50%, the new phase is halfway between the current phase and O. This can result in complex sub-frequency generation.
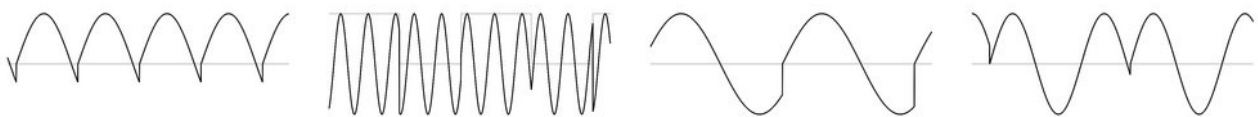
LFO SYNC mode

The LFO use the modulation as a clock source. The Frequency potentiometer is used as a divider or a multiplier of this external clock. The output frequency is 1/8, 1/4, 1/3, 1/2, 1, 2, 3, 4, or 8 time the input. The Mod potentiometer is a phase offset to the input clock. It allow to have 2 LFO at the same frequency (or at a integer multiple), but at different phase offset.
The waveform is unchanged, only the frequency is altered.

LFO GATE mode

If the modulation signal is superior to the Mod potentiometer, the LFO passes through, otherwise, the signal is blocked
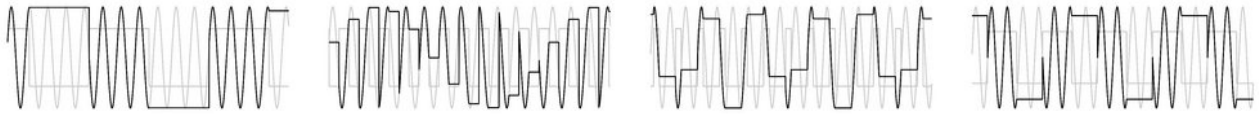
LFO T&H (Trig and Hold) mode

When the modulation cross the threshold defined by the Mod potentiometer, the input signal is sampled and the value is hold until next threshold crossing
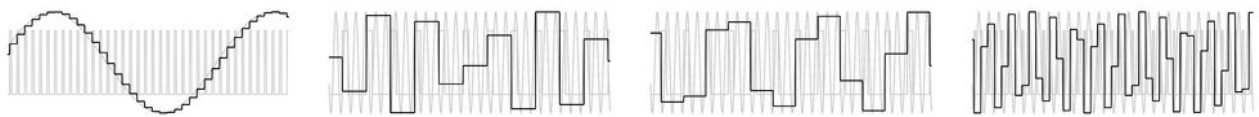
LFO LOOP mode

This is the most complex LFO mode. The aim is to generate a sequence that can evolve in various way.
The modulation is used as an index to read the sequence.
The LFO frequency potentiometer is used as the number of step in the sequence.
The LFO Mod potentiometer is used as the variation speed of each step.
The LFO waveform is used as the interpolation shape between steps.
The most simple way to understand this mode is to start with a simple configuration:
Configure LFO1 in STEP waveform, LFO Mod in LOOP mode, LFO1 Mod by LFO4 and LFO4 in RAMP waveform.
Then, put LFO1 FQ to midway, LFO4 MOD to 0.
Adjust LFO4 frequency to about 1 or 2 hertz.
Assign the output of LFO1 to VCO1 frequency and remove all other modulation.
You should hear a simple melody of 3 or 4 notes. Increase a bit the value of the modulation pot: the melody will vary: each note will slowly increase or decrease it's pitch.
If you change LFO4 to SAW, you will have the same melody but the opposite order. If you set it to TRIANGLE, you will have all notes in both order.
Changing LFO1 frequency potentiometer will change the number of notes in this melodies.
Changing LFO1 waveform will change the interpolation between this notes.
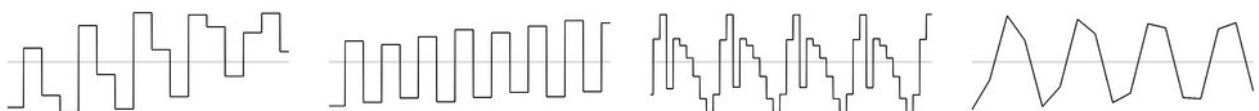
LFO 4, 5 or 6

The LFO 4, 5 or 6 are almost identical to LFO 1 to 3, but they did not have any modulation input, nor the possibility to be used as an AR module. Only the "standard" waveform can be generated.

Waveform selection process is the same: press switch C11, C12 or C13 and select the waveform with keyboard key K2 to K9.

LFO 7: a LFO with parametric waveform

This is an update version of the famous LFO from the OCS-2!

This LFO is controlled by 3 potentiometers. P36 adjust the frequency of the oscillator. The frequency range can be adjust in the same way than the other LFO.

The potentiometer P37 change the waveform: it interpolate between different form: triangle to sinus to a round square to a square.

The potentiometer P38 change the symmetry of the waveform. It adjust the ratio of the rising edge and the falling edge: it allow to interpolate between a ramp, a triangle and a saw waveform when the Wf potentiometer is set to 0.

When the Wf parameter is set to full, the symmetry adjust the pulse width of the rectangle wave.

In between this extreme value, a great range of shape can be create.
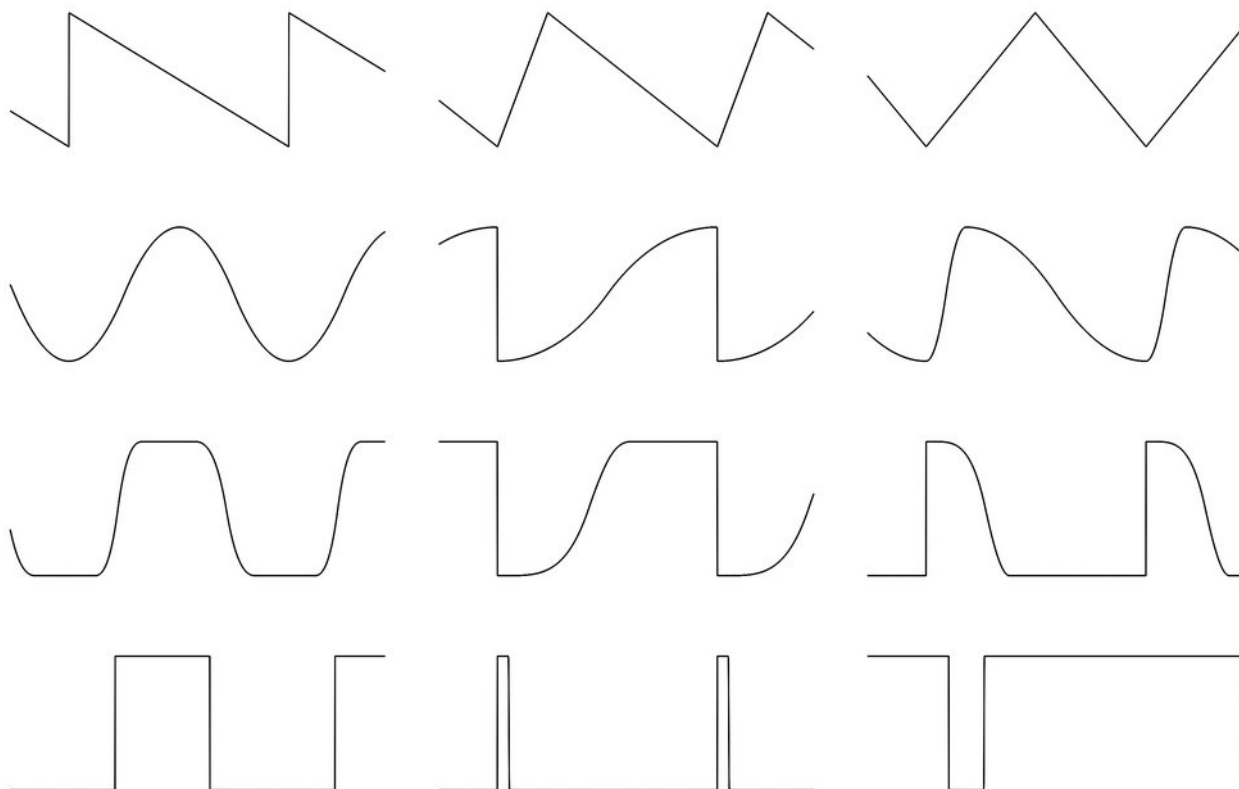
figure 11: Example of waveforms generated by LFO7

Other Modulations sources

CV1 and CV2

2 mini jack inputs are compatible with eurorack standard. It allow external ⁻5 volt to ⁺5 volt to be used as a modulation. Led LM13 and LM14 Display the modulation value.
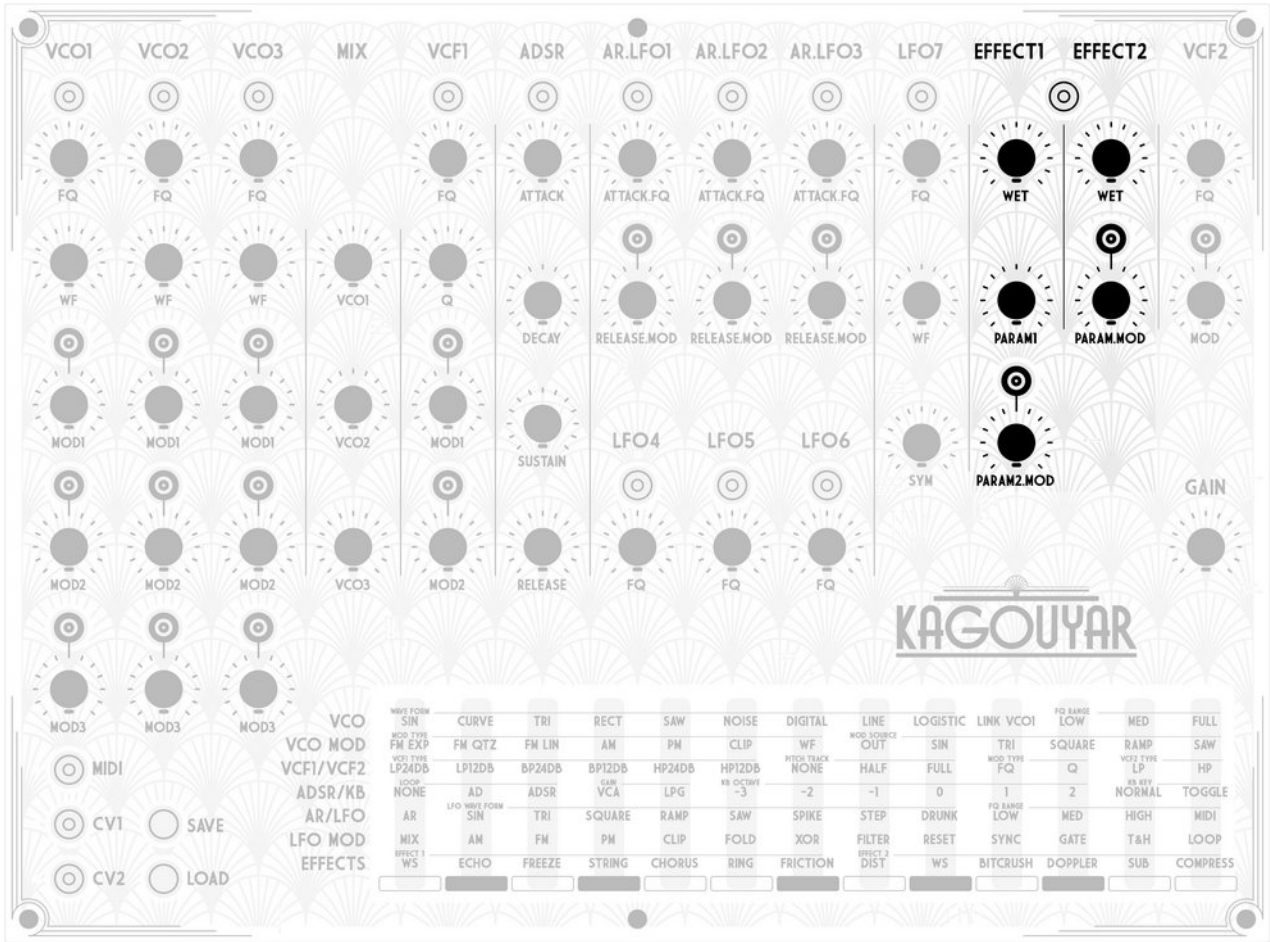When a GATE signal is received to play a note, CV1 is reserved as the 1V/Oct pitch input.

MIDI Modulation

The midi modulation wheel is used as a modulation and Led LM12 Display it's value. See latter for MIDI usage.
This modulation is only positive.

Audio Effect section

2 audio effects modulate the audio signal. All notes are summed up and the resulting audio signal is routed through effect 1. The output of audio effect 1 is send to the input of the effect 2. Both this module admit different effect type.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 12: Keyboard menu in EFFECT configuration mode

Effect 1

3 potentiometers control this effect.
P39 Control the amount of the effect (WET).
P40 Control a parameter of this effect.
Depending of the effect type, P41 Is either another control parameter, either a modulation potentiometer.

The effect 1 can be configured when pressing C10 and K1 to K7.
The modulation source (if applicable) can be configured pressing M15 and the modulation source C switch.

The different audio effects are:

WS: a super waveshaper

With P40 Set to 0, this waveshaper act like a distortion. With P40 Set to full, this is a more aggressive waveshaper.
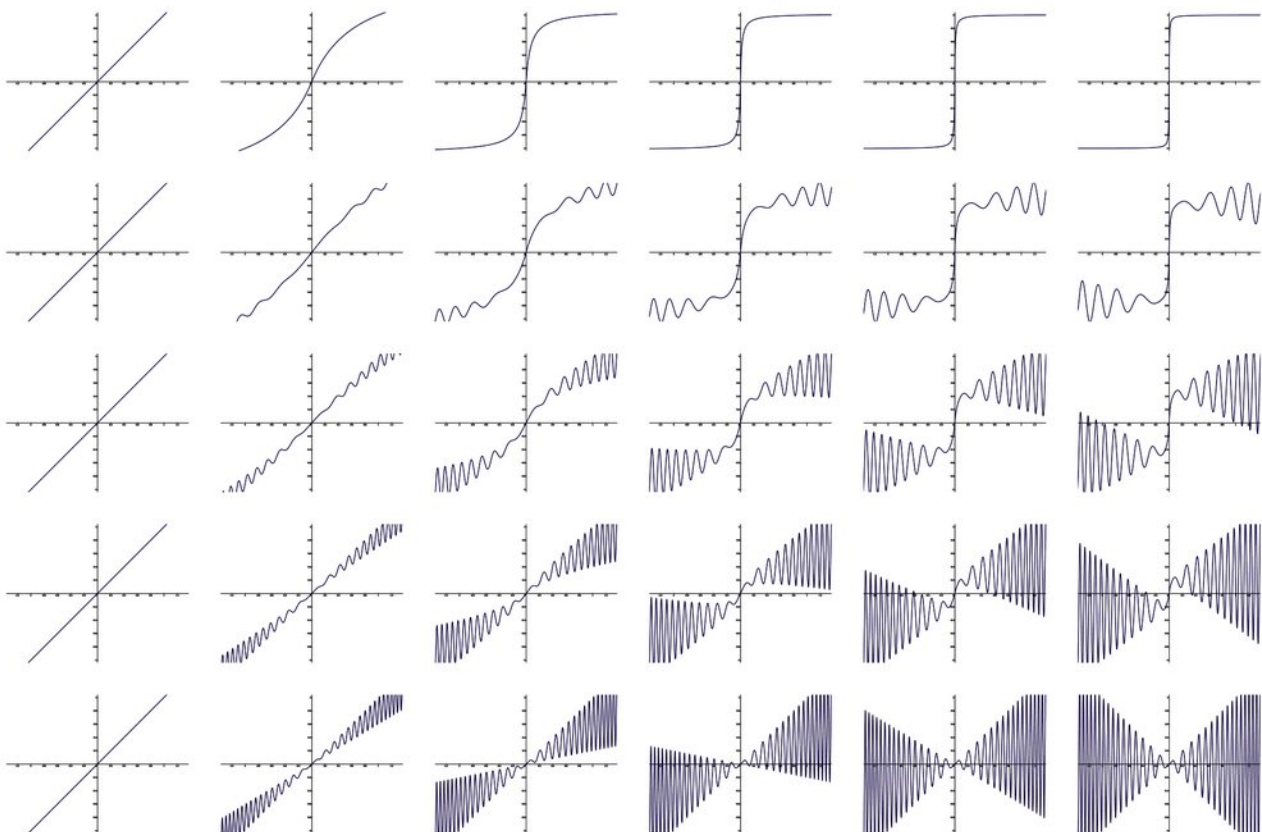P41 is a modulation control of the WET potentiometer.

Figure 13: IN/OUT relation of the Waveshaper: WET on the X axes PARAM on the Y axe

ECHO: a simple echo

The sound is delayed to be heard again.
Potentiometer 39: Wet
Potentiometer 40: Time (from 100ms to 5s)
Potentiometer 41: Feedback

FREEZE: an analogue tape delay emulation

This effect allow you to "freeze" time on a small grain of sound. Adjusting the time of this grain will pitch it in an analogue way.
Potentiometer 39: Wet
Potentiometer 40: time (from 0 to 100ms)
Potentiometer 41: time modulation

STRING: string emulation using Karplus-Strong algorythm

This effect create a string like resonance.
Potentiometer 39: Wet (resonance factor of the string)
Potentiometer 40: Resonant frequency of the string
Potentiometer 41: Frequency modulation

CHORUS

This is a 4 voices chorus. This chorus can auto-oscillate with high values.
Potentiometer 39: Wet
Potentiometer 40: Time
Potentiometer 41: Wet modulation

RING

A ring modulation between the signal and a carrier sinusoid at configurable frequency, with feedback.
Potentiometer 39: Wet
Potentiometer 40: Feedback time
Potentiometer 41: Carrier frequency

FRICTION

This is a very crude physical model of the friction between 2 materials. 1st material is moved according to the sound input, the movement of the 2nd material position is controlling the audio out of the effect. It sound a bit like a bitcrusher, but it is less predictable.
Potentiometer 39: Wet (speed of the return to normal: linked to kinetic friction amplitude)
Potentiometer 40: Dry friction factor
Potentiometer 41: Wet modulation

Effect 2

Only 2 potentiometers (P42 and P43) control this effect. WET controls the amount of the effect and MOD modulate the WET parameter thanks to a modulation source.

Use switch C10 and keyboard key K8 to K13 to select an effect.

Use switch M16 and a modulation source switch to change the modulation source of the potentiometer P43. This potentiometer change the WET value.

The available effects are:

DISTO

This is a simple distortion. Nothing fancy or exotic, but it make the job done!

BITCRUSH

This is a digital effect that add lot's of high pitch sound.

DOPPLER

The sound is used to change the delay time of the same signal. It sound like a surprising wave shaper with simple signals to a complete de-structuration of the input for complex sound.
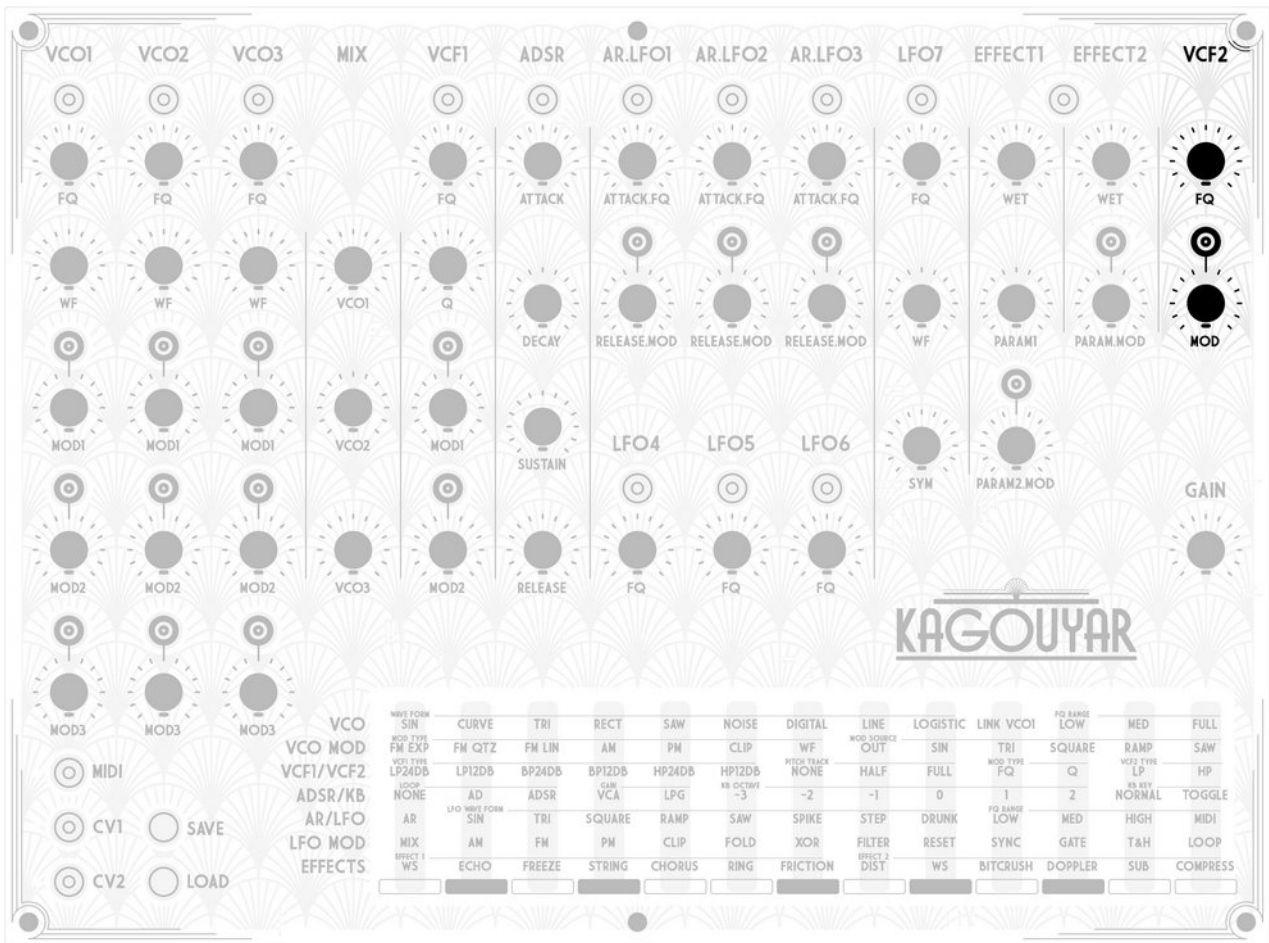
SUB

This granular sub frequency generator add a 1 octave lower signal to the incoming sound.

COMP

A simple compressor / attenuator. This effect reduce the dynamic range of the sound. WET control of the compression amount. The modulation however control an attenuation of the resulting signal, This works just like a linear VCA to create a tremolo effect.

VCF2

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

A filter (12db/Oct) is the final step in the audio signal path.

This filter is controlled by 2 potentiometers:

FQ (P44): the cutoff frequency

MOD (P45): a modulation of the cutoff frequency

This filter can be configured as a low pass or a high pass filter.

Press VCF configuration switch C4 and K12 or K13 to select the low or high pass filter.

The modulation is set as usual: M17 + a C switch.

Keyboard

The tactile keyboard can be used to configure various options. But when no configuration or modulation switch are pressed, the keyboard is used to play notes.

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

figure 14: Notes played by the keyboard

A key can generate a note only when pressed (like a normal keyboard), or can act as a toggle (1st touch to generate the note on and a 2nd touch generate the note off). Press configuration switch C5 and keyboard switch K12 or K13 to select one of this mode. The keyboard octave can also be adjusted. Press configuration switch C5 and keyboard switch K6 or K11 to select the octave from 0 to 5.

MIDI

A MIDI connector allow to receive MIDI informations, regarding MIDI protocol version 1. The MIDI channel to used can be set (from 1 to 13) when holding the MIDI C14 Configuration switch, and a K key. The channel can also be set to OMNI when deselecting the current channel (all LEDS are on in the OMNI mode).

The messages used by the Kagouyar are:
- Notes on/off.
- Pitch bend to transpose all notes.
- Modulation wheel that is used like any other modulation in the modulation matrix. Led LM12 Display it's value. It can then be assign to control numerous parameter of the synthesis. This modulation is however only positive.
- Expression wheel is used to change the VCF1 cutoff frequency. It's value is only positive.
- Time tick can be used as a clock for all LFO.
- "PLAY" reset the phase of all LFO, so you can synchronize them on you DAW.
- MIDI program change will load a memory preset. (from 1 to 13)
- RNPN (14 bits) controllers add their value to each potentiometers (RNPN 1 for P1, etc).
To use RNPN one must send CC 99 then CC 98 to select the channel to control, then CC 6 and CC 38 for coarse and fine tuning the parameter value.
The RNPN value are added to the potentiometer value. If you set all potentiometers to zero, you can control all of them with a DAW.

Load/Save switch:

This switches allow to load or to save all synth parameter.

Hold the save switch (S) and press one of the keyboard key (K1 to K13) to save to this bank.
The Position of the potentiometer are not saved.

You can load from any memory pressing the load switch (L) and one of the keyboard key.

When pressing LOAD and SAVE switch simultaneously, you can press:
- K1 to load an empty memory (basic waveform, no modulation),
- K2 to load a standard configuration (frequently used waveform and modulation),
- K3 to load a random configuration. A feature to explore if you need to boost your inspiration.

The current preset is saved and restored when switch off and on.

LED

During normal operation (when no switch are pressed), modulation leds (LM) indicate the value of the modulation (Except for the VCO).

Keyboard leds indicates the current notes being played.

The Gain led switches on when a hard clip occurs. If you see it: you should reduce the gain potentiometer!

When pressing a configuration or a modulation switch, the keyboard leds indicate various option.

FAQ: frequently asked questions

Where is the sequencer?

There is no sequencer. I believe that a sequencer should be an other piece of equipment. You can control the Kagouyar via MIDI or CV.
Also, the FMQtz modulation can be used to generate tones and LFO can be so complex that they can create sequences.

Where is the MIDI out?

There is no MIDI output plug, only a MIDI input!

How to connect a modulation?

Press and hold a modulation switch:◉ and assign the potentiometer to a modulation source (with the modulation source configuration switch:◎).

How to disconnect a modulation?

Just like for selecting a modulation, but If you press a 2nd time on the modulation, the led will switch off: the modulation is disconnected.

When pressing a modulation switch: why did a led blink? It use to be a solid light!

The blink is to indicate that the opposite of the modulation is used. This append if you keep pressed the switches used for the assignation for more than 1 second.

How to change a configuration?

Press and hold a configuration switch:◎ and configure things using the keyboard:

VCO	WAVE FORM SIN	CURVE	TRI	RECT	SAW	NOISE	DIGITAL	LINE	LOGISTIC	LINK VCO1	FQ RANGE LOW	MED	FULL
VCO MOD	MOD TYPE FM EXP	FM QTZ	FM LIN	AM	PM	CLIP	WF	MOD SOURCE OUT	SIN	TRI	SQUARE	RAMP	SAW
VCF1/VCF2	VCF1 TYPE LP24DB	LP12DB	BP24DB	BP12DB	HP24DB	HP12DB	PITCH TRACK NONE	HALF	FULL	MOD TYPE FQ	Q	VCF2 TYPE LP	HP
ADSR/KB	LOOP NONE	AD	ADSR	GAIN VCA	LPG	KB OCTAVE -3	-2	-1	0	1	2	KB KEY NORMAL	TOGGLE
AR/LFO	AR	LFO WAVE FORM SIN	TRI	SQUARE	RAMP	SAW	SPIKE	STEP	DRUNK	FQ RANGE LOW	MED	HIGH	MIDI
LFO MOD	MIX	AM	FM	PM	CLIP	FOLD	XOR	FILTER	RESET	SYNC	GATE	T&H	LOOP
EFFECTS	EFFECT 1 WS	ECHO	FREEZE	STRING	CHORUS	RING	FRICTION	EFFECT 2 DIST	WS	BITCRUSH	DOPPLER	SUB	COMPRESS

A led indicate the line to read.

How to change the configuration of VCF2? there is no configuration switch!

You should use configuration switch C4 (from the 1st VCF), to configure the VCF2.
Only key K12 and K13 can be used to control the VCF2 type.

How to change the keyboard configuration?

The keyboard associated with the ADSR, so you need to press the ADSR configuration switch (C5) to configure the keyboard.

How to load an empty preset?

Press simultaneously load and save and K1 to start with an empty preset. Most modulation are not connected. It's a good starting point if you like to start a patch from scratch.

How to load a basic preset?

Press simultaneously load and save and K2 to load a basic preset. Modulations are connected to LFO. It's also a good starting point if you prefer to have everything connected in a classic way.

How to load a random preset?

Press simultaneously load and save and K3 to load a random preset. It's a good way to explore the Kagouyar possibilities.

How to save on a computer the presets?

It is not possible to save presets on a computer.

What is the preset loaded on startup?

The preset is not lost during shutdown. The current preset is saved during a shutdown, and restored at startup.

I want to update the firmware, will I lost my presets?

No, the presets are preserved during update.

I've got an other question, how to contact nozoïd?

To contact nozoïd, you should use the online form on nozoïd website :
https://nozoid.com/contact/
Nozoïd do not have time to check it's social media : any question asked on facebook, instagram, vimeo etc, will not be answered!

Why "Kagouyar"?

In some part of France, where I was living when working on this synthesizer, a "cagouille" is the slang name for snails. Peoples loves snails so much, the mascot of a famous local sport team is named cagou!

A cagouillard became the name of someone who is very slow.

Since this synthesizer excels in generating slow and hypnotizing drones, it became obvious to call it the Kagouyar! (it spell different but pronounce the same.)

Troubleshooting

The sound is distorted!

Make sure the GAIN led is off. Reduce the gain to remove hard clipping of the signal. The effects or modulation can also create sound distortion.

The LFO react in a strange way

Check that the modulation knob is on the minimum. You can also check the waveform is not random (step or drunk). Check the modulation type : few of them modulate the LFO even when the modulation parameter is set to zero.

There is a strange stereo effect!

The LINE OUT is MONO and SYMMETRICAL. You should not plug it in a stereo input. If your need a stereo output, you can use the headphone jack.

There is no more sound!

There are lot's of possibilities for the sound to be absent:
- VCO frequency are set too high (above audible range)
- VCO Vf is set to full : this can cut the sound on few waveforms
- modulate a VCO with himself, or creating a modulation loop (VCO1→VCO2→VCO3→VCO1 for example) can create weird result (including no sound).
- All MIX potentiometers are set to zero
- VCF1 or 2 is high pass with high frequency cutoff (or a low pass with low cutoff)
- Attack is set too slow
- Sustain is set too low
- Effect can mess things up
- Gain potentiometer is set to low
If you can't fine the reason of the absence of sound, you can try to load a preset that works and reset all potentiometers to "safe" value.

I'm sure there is a hardware problem!

You can boot in a specific hardware test mode to check the way all hardware components behaves. See the specific documentation on the nozoïd website (https://nozoïd.com/kagouyar)

How to update firmware?

To update the firmware, you should follow the step found on the nozoïd website (https://nozoïd.com/kagouyar)

Pitch is not correct when I use the 1V/Oct CV input!

You need to recalibrate the pitch. You have to boot in hardware test mode (see previous question). Apply a voltage to CV input 1 and press simultaneously the "SAVE" switch and K0, Then apply a voltage exactly 1V higher than the previous voltage (1 octave), then press simultaneously the "SAVE" switch and K1. Finally, apply exactly 0V to CV1 and CV2 input (by

unplugging them, and press simultaneously the "SAVE" switch and K3. You can now reboot the synth.

Specifications

Size and Weight

L: 350mm
P: 250mm
H back:41mm, front:20mm, max:55mm
1.4Kg

Line out

Mono, balanced (TRS), 6.35mm Jack
Since this is a symmetrical plug, you should use a MONO input on your mix table. You should also use a stereo cable if your mix table accept symmetrical signals.
S/N: > 105dB
1.2 V_{PK} (+1 dBu)
100kOhm out impedance

Headphone out

Stereo 6.35mm Jack
S/N: > 105dB

Input

MIDI plug: 5 pin Din connector
CV1/CV2 IN: -5V/+5V input; 100KOhm impedance
GATE IN: 0/5V; 100KOhm impedance

Power

9 to 12V DC
2.1mm power plug (ground outside)
500 mA maximum (150mA average)