

valence



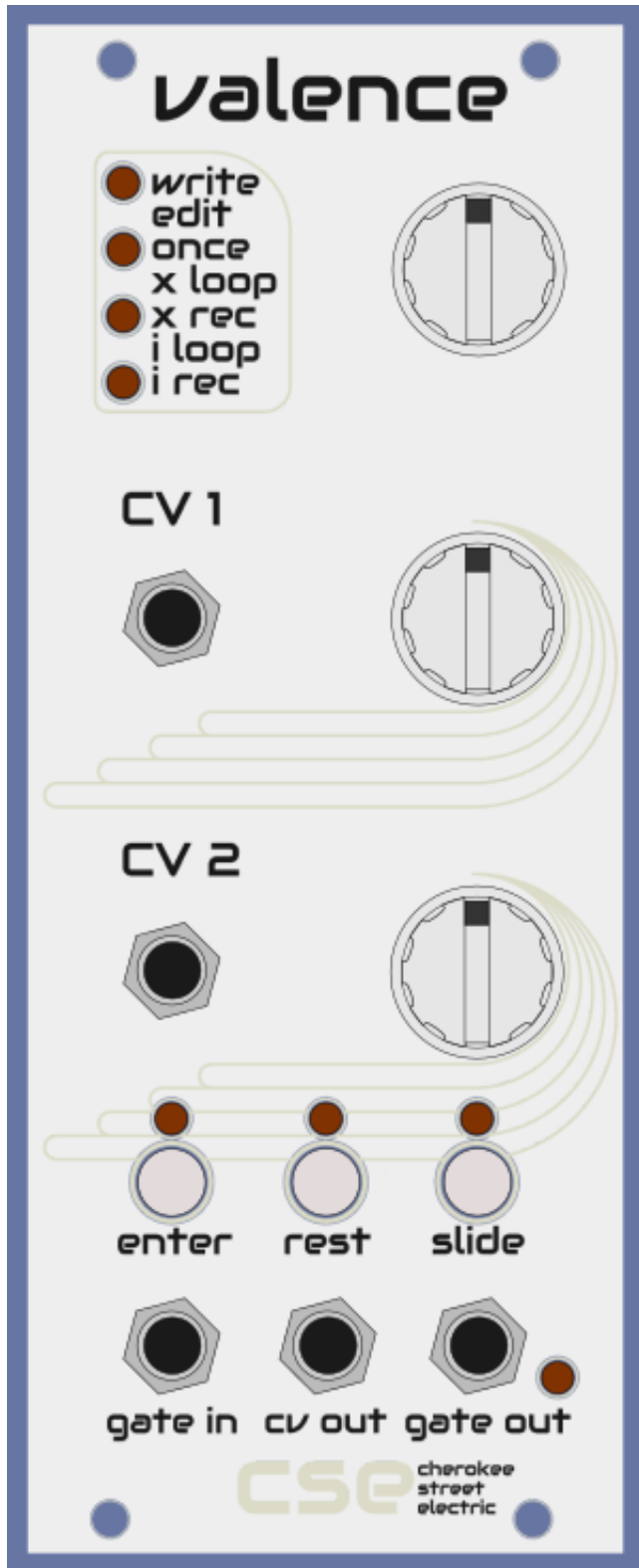
Operation Manual

Introduction

Valence is a programmable sequential voltage source with more than 500 steps. Each step is stored in memory as a voltage in the range 0-5v with 12 bit resolution, and each can be set to output a gate and/or begin a smooth transition to the next step when triggered. Step voltages are entered via a front panel knob or a CV input and optionally quantized to a variety of scales. It can be used as a sequencer, complex LFO, quantizer, envelope generator, motion recorder, or CV delay.

Stored voltages can be stepped sequentially in response to an external clock, clocked internally, or addressed via CV. Internally clocked modes include one-shot, loop, and live record, and can play forward or backward at a wide range of speeds.

Valence was designed for maximum functionality with a minimal interface. As such, it is a “read the manual first” module. You will need to commit very little of this content to memory to have fun with Valence, but to get the most out of it you will need to read, understand, and practice with the device.



INTERFACE

1. Mode Selection
 - a. Mode Indicator
 - b. Selection knob
2. CV 1
3. CV 2
4. Buttons
 - a. ENTER
 - b. REST
 - c. SLIDE
5. Gate In
6. CV Out
7. Gate Out
8. Gate LED

MODE OVERVIEW

INIT

INIT MODE is for management of the RAM and EEPROM. Set the number of memory subdivisions for patterns, initialize all patterns, clear the selected pattern, load all the patterns stored in EEPROM into memory, or store the entire setup into EEPROM.

WRITE

WRITE MODE is where step programming happens. Here you can program steps sequentially into a pattern, giving each a CV of 0-5v and optionally a REST or SLIDE. This mode can also function as a live quantizer.

EDIT

EDIT MODE lets you edit steps to change the CV, REST or SLIDE parameters. You can also address, scan or scrub through the steps in a pattern with CV and play the stored voltage and articulation.

ONCE

ONCE MODE can be used as an envelope or automation generator. The pattern starts or restarts when triggered, plays each step and stops at the last stored step or when the gate is released. The speed and direction is determined by the internal clock.

X LOOP

EXTERNAL LOOP MODE functions like a sequencer. The pattern plays through its steps sequentially, moving to the next step every time a clock pulse is received and loops to the beginning when the last stored step is reached.

X RECORD

EXTERNAL RECORD MODE loops through the stored steps much like the loop modes, but allows voltages and articulation to be recorded or changed in real time. The changes can be played immediately or after the pattern repeats, functioning as a CV delay or recorder.

I LOOP

INTERNAL LOOP MODE is just like X LOOP, but it uses the internal clock for speed and direction.

I RECORD

INTERNAL RECORD MODE is just like X RECORD, but uses the internal clock instead.

QUICK START

This procedure will get you up and running quickly with Valence. It will clear all pattern memory and create 16 empty patterns. Each will then be filled with 16 random notes with a random articulation (rest and/or slide) and each note will be quantized to a minor 7th scale. A random slide curve will be chosen for each pattern.

Let's get started!

Turn MODE all the way to the left.

You are now in INIT mode. No LEDs will be lit.

Holding ENTER, turn CV1 all the way to the right.

This is selecting a memory subdivision, dividing the memory into 16 pattern slots.

Turn CV2 to 3 o'clock.

This selects a minor 7th quantization scale for the patterns.

Hold ENTER and push REST, then release both.

This clears and initializes all memory and creates space for 16 patterns.

Hold ENTER and push SLIDE, then release both.

This creates a random 16 step pattern in each of the 16 slots.

Turn MODE to 4 o'clock.

The LEDs above and below **I LOOP** will light, indicating you are in the internally clocked LOOP PLAY mode. The sequence will begin playing.

Hold ENTER and slowly turn CV1.

This selects between the 16 patterns you've created. They are evenly distributed between pattern 1 fully left, and pattern 16 fully right.

Turn CV2 to adjust speed and change direction.

To the right of 12 o'clock is forward, to the left is reverse.

Now let's modify a pattern while its playing.

Turn MODE fully right.

The LED next to **I REC** will light, indicating that you've switched to the internally clocked RECORD mode. The sequence will continue playing.

Hold REST and wiggle CV1 around.

Valence will begin to play what you're doing with the CV1 knob and record the value of CV1 over the steps in the playing pattern. These voltages will be quantized to the scale you selected before (min7).

Hold REST for 3 seconds to LOCK the record function

The MODE LEDs will all flash, and you don't have to hold REST down anymore to continue recording. Tap any button to cancel the LOCK and stop recording, but continue playing.

Hold ENTER and tap REST and SLIDE a few times.

This records articulations into the playing steps.

Push REST and SLIDE simultaneously.

This deletes the playing step. Hold them both down for a bit to clear out the pattern.

Hold SLIDE and wiggle CV1 around.

This adds steps to the pattern with the voltage set by CV1. If you hold this longer than 3 seconds it will LOCK just as REST did before. You can only store a maximum of 27 steps per pattern when you've selected 16 subdivisions.

Modify this new pattern further by changing articulations and voltages as before.

CV1 AND CV2 INPUTS

CV1 and CV2 knobs control Valence parameters. When a plug is inserted into the jack, the knob becomes an attenuator and the CV at that input controls the parameters instead. The voltage range for the CV inputs is 0-5v.

THE INTERNAL CLOCK

In internally clocked modes, CV2 controls the clock speed and direction. CV2 fully clockwise sets the clock to maximum speed in the forward direction, and fully counter-clockwise corresponds to maximum speed in reverse. Just to the right of vertical is the slowest speed in the forward direction and just to the left of vertical is the slowest speed in reverse. The time base can be adjusted by tapping a tempo.

EXTERNAL CLOCKS

In externally clocked modes, Valence will respond to a pulse sent to its GATE IN jack by playing or beginning the transition to the next step. In these modes, CV2 sets the direction. To the right of vertical is forward, and to the left is reverse. Furthermore, in order to follow swung clocks, Valence keeps track of the previous two clock times in pairs, alternating between the two, and makes use of both times to calculate the time at which a slide is expected to end.

SLIDES

SLIDES in Valence are constant time, meaning that the CV output moves from the previous CV to the current one in a specified amount of time instead of at a given rate of change. Valence estimates the time that the next step is expected to arrive based on the clock rate, or the time between the previous two steps. It then aims to arrive at the target note at the end of that period of time. The slide type algorithm is variable per pattern and can be selected from a Catmull-Rom quadratic spline, an RC and inverse RC charge/discharge simulation with variable time constant, linear, and Hermite spline interpolations.

Knob Position	Full left		Vertical		Full right
Slide Type	Catmull-Rom Spline	Variable Exponential RC Curve	Linear	Variable Logarithmic RC Curve	Hermite Spline

One of two types of slides can be programmed for each step, a **"TO"** slide or a **"FROM"** slide. A **"TO"** slide begins its interpolation at the CV of the step that just finished and transitions TO the CV for the step that has just begun, arriving there at the end of the step time. A **"FROM"** slide begins immediately on the new step's CV and transitions FROM that to the CV of the subsequent step. Slides that are adjacent will take their **"TO"** or **"FROM"** setting from the first slide in the chain. This means that if two or more slides follow one another, the slides after the first one cannot have their **"TO"** or **"FROM"** changed.

TIES

A TIE is defined as two or more steps that each slide in the same direction (up or down) and are not interrupted by a gate (all rests). When these conditions are met, Valence figures out how many steps are in the tie and creates a smooth transition from the first note to the last note over its entire length. In this way, slides that move from one note to another over multiple steps can be created. When Valence plays a TIE, the ENTER led lights up for its duration. TIEs can begin with either a gate or a rest. Those that begin with a gate have the gate held high until the end of the tie, and those that begin with a rest have the gate held low throughout.

NOTE QUANTIZATION

Step CVs are quantized as they are stored. When the pattern is created and any time a new step is stored into a pattern in WRITE mode, the quantization scale you've chosen with CV2 is saved in that pattern's settings for use in live variation and recording modes. The quantization scales available are as follows, arrayed around CV2 evenly from left to right.

Knob	Fully Left							Fully Right
Scale	None	Chromatic	Major	Minor	Pentatonic	Major 7	Minor 7	Octave

DELAY / IMMEDIATE PLAYBACK

DELAY Mode is a per-pattern option and affects how voltages are recorded in RECORD Modes. In DELAY Mode, CVs will not be played as they are recorded, but will be played the next time the sequence repeats. In this way it is possible to create a CV delay. The opposite of DELAY Mode is IMMEDIATE MODE, where the recorded CV is immediately sent to CV OUT. **DELAY Mode defaults to OFF for all patterns.**

MIRROR / NAIVE PLAYBACK

MIRROR playback is a per-pattern option that affects how a pattern plays steps. In MIRROR Mode, patterns played in reverse will be a mirror image of the pattern played forward. Not only will the notes be played in reverse order, but the slides and ties, when they start, and their curves will be reversed to make the pattern a reflection of its forward counterpart. The opposite of MIRROR mode is NAIVE Mode which plays the notes in reverse order as if they were playing forward. Notes and slides are played as they are encountered in reverse and curves play as they would in the forward direction. **MIRROR Mode defaults to ON for all patterns.**

PATTERN RANDOMIZATION

Valence allows you to control the range of voltage randomization when creating banks of randomized patterns, re-randomizing a single existing pattern, creating new randomized steps, and while creating random live variations during loop modes. CV1 controls the range of randomization around around the center CV of 2.5v, with full left being the full range of 0-5v and 12 o'clock vertical being a range of 0 where all the voltages are the same. CV1 to the right of vertical operates in the same way in regards to range, with straight up being 0 range and full right being full range. However, when creating banks of randomized patterns or re-randomizing a single existing pattern, CV1 to the right of vertical allows for randomized repeats: a chance that the last 2-5 notes will be repeated, and a further chance that this will happen more than once.

PLAY AND RECORD MODE: FUNCTION BUTTON LOCKING

Long press ENTER, REST, or SLIDE for 3 seconds to lock that function to CV1. When successful, the mode LEDs will flash.

IN PLAY modes

Locking ENTER will allow you to turn CV1 or send a CV to change the pattern without holding down the ENTER button.

Locking REST will allow you to change the gate duty.

Locking SLIDE will allow you to change the slide type.

IN RECORD modes

Locking REST allows you to continuously record CV1 into the module without holding down the button (useful for DELAY mode!) The lock is cancelled as soon as any other button is pressed.

IN PLAY LOOP modes (I LOOP, X LOOP)

Holding REST and ENTER for 3 seconds locks Auto Random Live Variation. This will play the sequence steps with its existing slides and rests, but will replace the step CV values with new notes quantized to the pattern's settings. See details in the [PLAY functions](#) section below.

Holding REST and SLIDE for 3 seconds locks Live Variation. This will play the sequence steps with its existing slides and rests, but will output the quantized value of CV1 instead of the stored step's voltage. See details in the [PLAY functions](#) section below.

INIT MODE

Manage memory and EEPROM in this mode. Valence can be configured to subdivide its step memory into 1, 2, 4, 8, or 16 patterns slots to meet your needs. Each pattern contains its own steps and settings, and all of these patterns and settings can be stored into non-volatile EEPROM memory. When powered on, the module will automatically load the patterns stored in EEPROM back into its internal memory. To access INIT MODE, turn **MODE** fully counter clockwise. **No MODE LEDs** will be lit.

While in INIT MODE you can:

Press ENTER to clear the selected pattern. This will delete all steps and initialize all settings for this pattern to the defaults.

Press REST to LOAD and restore the all patterns and steps from the EEPROM.

Press SLIDE to SAVE all pattern memory and settings into the EEPROM. All mode LED's will light up. This takes a couple of seconds.

HOLD ENTER to configure Valence with a new memory subdivision.

While **holding ENTER**:

Turn CV1 to choose the number of pattern memory slots.

Knob position	Full left		vertical		Full right
Pattern slots	1	2	4	8	16
Max steps per slot	507	251	123	59	27

NOTE: the maximum number of steps in each pattern subdivision represent the total EEPROM memory available for steps remaining after the overhead of each pattern's settings. The maximum number of steps seem a little strange but represent an equal division of all remaining memory.

Turn CV1 to set a variance range for randomly generated notes.

Turn CV2 to choose a scale quantization.

Press REST (while still holding ENTER) to finalize the selection. This will erase everything in memory, clear and initialize all pattern slots. Valence will be completely blank and configured with the number of pattern slots you've chosen.

Press SLIDE (while still holding ENTER) to fill each slot you've created with a random set of steps and articulations, with a range set by CV1 and quantized to the scale you've chosen with CV2.

HOLD REST to modify the duty cycle for every pattern at once.

HOLD SLIDE to modify slide type for ALL patterns at once.

WRITE MODE

Program steps sequentially in this mode. Programming steps in this mode gives you complete control over the notes and articulations in your patterns.

To program a note:

CV1 sets the voltage to be stored.

CV2 sets a quantization scale.

CV OUT will output the quantized value of the CV1 input in real time.

Push REST to toggle a rest for the step. This means that the step will not fire a gate pulse when it begins. Push again to toggle the REST off.

Push SLIDE to toggle slide for the step. This means the note should begin a transition to the voltage you've programmed for it when it starts. Push again to change to a "FROM" slide, beginning on the voltage you've selected and transitioning to the voltage for the following step. Push SLIDE again to toggle the slide off.

Push ENTER to store the step with these settings. The step will be added to the end of the currently selected sequence.

The **GATE LED** will blink once to indicate the step was stored and will blink 4 times when storing every 4th step. For instance steps 4, 8, 16, 20, 24, etc.

REST and **SLIDE** indicators will be cleared for the next step.

When storing a step, the quantize scale will be stored into the pattern settings, and will be used in other modes (when recording voltages live into the sequence for instance). The quantize scale can be changed from step to step but the last one to be used when saving a step will be stored along with the pattern.

Hold SLIDE and REST and then press ENTER to delete the last step in the pattern.

Hold REST to duplicate the pattern's existing steps onto the end of the pattern. Keep holding to duplicate those steps a second or more times.

Hold ENTER to generate a random step with random articulation in the selected scale. Turn CV1 to the desired variance around 2.5v, turn CV2 to the desired scale and hold ENTER until the GATE LED flashes once. This creates one random step. Continue holding ENTER until the GATE LED flashes once again to create another random step. Continue holding ENTER to double the number of steps entered.

Hold for x flashes	1	2	3	4	5	6	7	...and so it continues until the
Total Steps Added	1	2	4	8	16	32	64	maximum pattern size is reached

EDIT MODE

This mode allows you to address and optionally edit the programmed steps. You can also use this mode to “scrub” the pattern back and forth with an external CV.

Turn CV2 or send a CV to address and select one of the steps.

Steps are arrayed around CV2 from 0-5v according to how many have been stored in the pattern. Step 1 is fully left, the last step is fully right.

After selecting a step with CV2, you can optionally change its properties.

Turn CV1 to set a new CV to be stored.

Push ENTER to store the value of CV1 into the step.

Push REST to toggle the rest on or off for the step.

Push SLIDE to toggle between a “TO” slide, a “FROM” slide, and no slide.

HOLD SLIDE and REST and PUSH ENTER to delete the selected step.

Hold ENTER and **turn CV1** to select a different pattern to edit.

Long press ENTER for 3 seconds to lock pattern switching to CV1. When successful, the mode LEDs will flash. This will allow you to turn the CV1 knob or send a CV to change the pattern without holding down the ENTER button and switch patterns with CV. The lock is cancelled as soon as any other button is pressed.

ONCE MODE

Once mode plays through all the steps once and stop at the end or when the gate is released. This is essentially a complex envelope generator.

Push ENTER or send a gate to the **GATE IN** jack to start or restart the pattern.

Turn CV1 to the left of vertical for TRIGGER mode and to the right for GATE mode. Trigger mode will play the sequence until the gate is released and then stop at the end. GATE mode will loop the sequence and stop as soon as the gate is released.

Turn CV2 to control the direction and speed of the internal clock and thus the speed of the sequence.

ONCE Mode is a “PLAY” mode. See [PLAY functions](#) section below for more details.

X LOOP MODE

Externally clocked looping mode. Play each step and then start again at the beginning, advancing to the next step when a GATE is received at the GATE IN input.

In externally clocked modes the timing of the incoming GATES determines the speed and CV2 sets the direction of pattern playback. To the right of vertical is forward, to the left is reverse. Note that it is possible to clock the loop with a swung clock source.

X LOOP Mode is a “**PLAY**” mode. See [PLAY functions](#) below for more details.

X RECORD MODE

Externally clocked looping record mode. Play each step and then starts again at the beginning, advancing to the next step when a GATE is received at the GATE IN input. Record new quantized voltages into the pattern and play them back.

In externally clocked modes the timing of the incoming GATES determines the speed and CV2 sets the direction of pattern playback. To the right of vertical is forward, to the left is reverse.

X RECORD Mode is a “**RECORD**” mode. See [RECORD functions](#) below for more details.

	PLAY / RECORD -- External Clock -- CV2				
Knob or CV	Full left 0v		Vertical 2.5v		Full right 5v
Direction	Reverse			Forward	

I LOOP MODE

Internally clocked looping mode. Play each step and then start again at the beginning. Restart when a gate is received on the GATE IN input.

In internally clocked modes the CV2 determines the speed and the direction of pattern playback. To the right of vertical is forward, to the left is reverse. Further right or left is faster.

Tap ENTER to restart the pattern at the beginning.

Tap REST to pause the sequence. Tap REST again to unpause, or ENTER to restart.

Tap SLIDE twice to set a quarter note tempo. On the second tap, the Valence will set the clock speed at the current knob position to the time between the two taps, which can then be adjusted with CV2. By changing the time base in this way, very slow sequences or LFOs can be created with a period of hours or even days.

I LOOP Mode is a **"PLAY"** mode. See [PLAY functions](#) below for more details.

I RECORD MODE

Internally clocked looping record mode. Play each step and then start again at the beginning. Restart when a gate is received on the GATE IN input. Record new quantized voltages into the pattern and play them back.

In internally clocked modes, CV2 determines the speed and the direction of pattern playback. To the right of vertical is forward, to the left is reverse. Further right or left is faster.

I RECORD Mode is a **"RECORD"** mode. See [RECORD functions](#) below for more details.

PLAY / RECORD -- Internal Clock -- CV2					
Knob or CV	Full left 0v		Vertical 2.5v		Full right 5v
Speed	fastest		slowest		fastest
Direction	Reverse			Forward	

PLAY mode functions

The following functions are common to all 3 “PLAY” modes ([ONCE](#), [I LOOP](#), [X LOOP](#))

Tap ENTER to restart the sequence at the first step.

Tap REST to pause the pattern at the current step. Tap REST to resume or ENTER to restart.

Holding ENTER

Turn CV1 to change the selected pattern. To avoid jumping to a different pattern immediately, the knob or CV must move through the currently selected pattern before the pattern will change.

Press REST to toggle GATE ALL mode, every note will start with a gate.

Press SLIDE to toggle SLIDE ALL mode, every note will be slid.

Holding REST

Turn CV1 to set the gate duty cycle between 0 and 110% for the pattern.

Hold SLIDE and turn CV1 for Live Variation.

Live variation will sample CV1 at the beginning of every new step, quantize it to the scale stored with the pattern for the duration of that step, and then send this to CV OUT. During SLID notes (or TIES) CV1 is sent directly to CV OUT and will change as CV1 changes. Try it out for a while... it will start to make sense.

Hold ENTER and adjust CV1 for Auto Random Live Variation

Will generate randomized voltages against the steps' stored articulations, quantized to the scale stored with the pattern. The variability range is set by CV1. To the right of vertical will produce random voltages centered around 2.5v. To the left produces voltages centered around the patterns original notes.

Push ENTER AND SLIDE to re-randomize the pattern

The pattern will be rewritten with a new set of randomized steps and articulations using the patterns existing length, quantization, slide type, and other settings.

Holding SLIDE

Turn CV1 to set the slide type for the pattern.

Press REST to toggle **MIRROR Mode**. In MIRROR Mode, sequences played in reverse are a mirror image of the sequence in the forward direction.

Press ENTER to toggle **DELAY Mode**. In DELAY Mode, a CV that is recorded is not played immediately, but stored and played the next time the sequence repeats. This delays the sequence by one loop, or the number of steps in the pattern.

RECORD mode functions

The following functions are common to the 2 “**RECORD**” modes (**I RECORD**, **X RECORD**)

Holding ENTER

Push or hold REST to toggle rests on the currently playing step(s).

Push or hold SLIDE to toggle slides on the currently playing step(s).

Holding REST

Turn CV1 or input a CV to record new voltages into the currently playing step(s).

Holding SLIDE

To record new voltages into the pattern AND extend that pattern. For every clock received a new step is added the pattern. NOTE: at least one step must be written to the pattern before steps can be added this way. Select a quantize scale and add at least one step in WRITE mode.

Holding REST AND SLIDE

Delete steps from the pattern. The current step is deleted and the pattern is reduced in length by 1.

Valence can switch between X PLAY and X RECORD or I PLAY and I RECORD without stopping.

Switch to the corresponding PLAY mode to change things like the duty cycle, slide type, playback settings, etc. Then switch back to modify the pattern's voltages in real time.

PROGRAMMING EXAMPLES

Initialize a pattern:

Each programming example will start with selecting a pattern and clearing it in INIT mode. Here's how:

Turn MODE knob to EDIT mode

Hold ENTER and turn CV1 to choose and select a pattern

Turn MODE full left to INIT mode

Push ENTER to clear the pattern

Simple two step square, triangle, sine(ish), or asymmetric LFO.

Choose and initialize a pattern

Turn MODE to WRITE mode

Turn CV2 full left for no quantization

Turn CV1 full left for 0v

Push ENTER to store the step

Turn CV1 full right for 5v

Push ENTER to store the step

Turn MODE to I LOOP mode

Adjust speed of square LFO with CV2

Hold ENTER and press SLIDE to toggle ALL SLIDE

Hold SLIDE and turn CV1 to adjust wave shape, sine (full left or right) or triangle (center).

Simple two step sawtooth LFO

Choose and initialize a pattern

Turn CV2 full left for no quantization

Turn CV1 full left for 0v

Push SLIDE to toggle slide for the step

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Push SLIDE again to toggle a “FROM” slide for the step

Push ENTER to store.

Turn CV1 full right for 5v

Push SLIDE to toggle a slide for the step (this is a normal “TO” slide)

Push ENTER to store the step

Random Spline LFO

Enter I LOOP or X LOOP mode and choose any pattern

Hold ENTER and press SLIDE to toggle ALL SLIDE for the pattern

Hold REST and then hold ENTER for 3 seconds to lock Live Auto Random Variation

Turn CV1 to adjust random variation range

Turn CV2 to adjust speed and direction

TRICKS

Very fast or very slow internal clock

Turn CV2 full right and tap **SLIDE** twice about 30 seconds apart.. Then turn CV2 to just right of vertical. You’ve just set the clock to somewhere around 1 step every 50 minutes. Try the opposite of this: with CV2 vertical, tap SLIDE twice as fast as you can. Now turn CV2 fully clockwise for a very fast sequence.