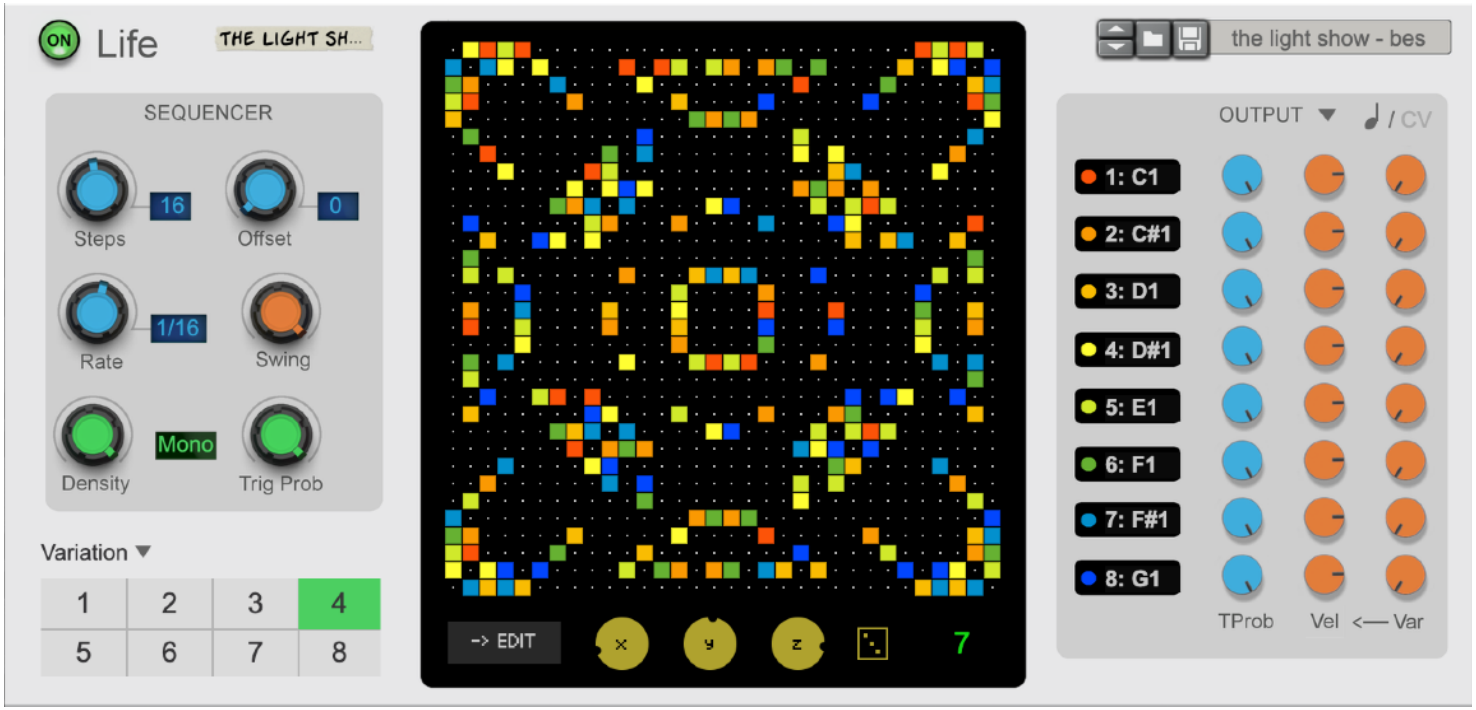
# Life

## Generative Sequencer Player

### Rack Extension for Reason




## USER MANUAL

version 1.1.0

# Table of Contents

# 1. Introduction

Life is a generative sequencer player based on John Conway's famous "Game of Life" cellular automaton. Its versatile architecture makes it suitable for a variety of applications, such as drum sequencer, melodic sequencer or arpeggiator.

The central display with its 32x32 dot matrix is where the game is played. Create a seed cell configuration, then press play and watch the cells evolve. As they move across the dot matrix, they trigger the output channels and generate notes and modulation signals via the CV output jacks.

Once you have something playing, there are several options to modify the sequence. First, you can morph the dot matrix using the x, y and z controls, which can be randomized or modulated using CV signals. Second, you can customize the notes and CV assigned to each channel, set a trigger probability and velocity with some amount of velocity or CV variation. Third, you have control over the sequencer parameters, including the number of steps, the step offset, the rate, the amount of swing, the density of the notes and CV produced and the overall trigger probability.

All these parameters can be stored inside 8 Variations with instant recall of your settings.

The factory patches include a folder named "Pattern Library" with many interesting seed cell configurations. Additionally, it is possible to insert "pre-made" configurations known as "oscillators" from a contextual menu. When you want to create your own configurations, there is a complete suite of editing tools at your disposal. You can easily select, copy/paste, shift, rotate and flip cells.

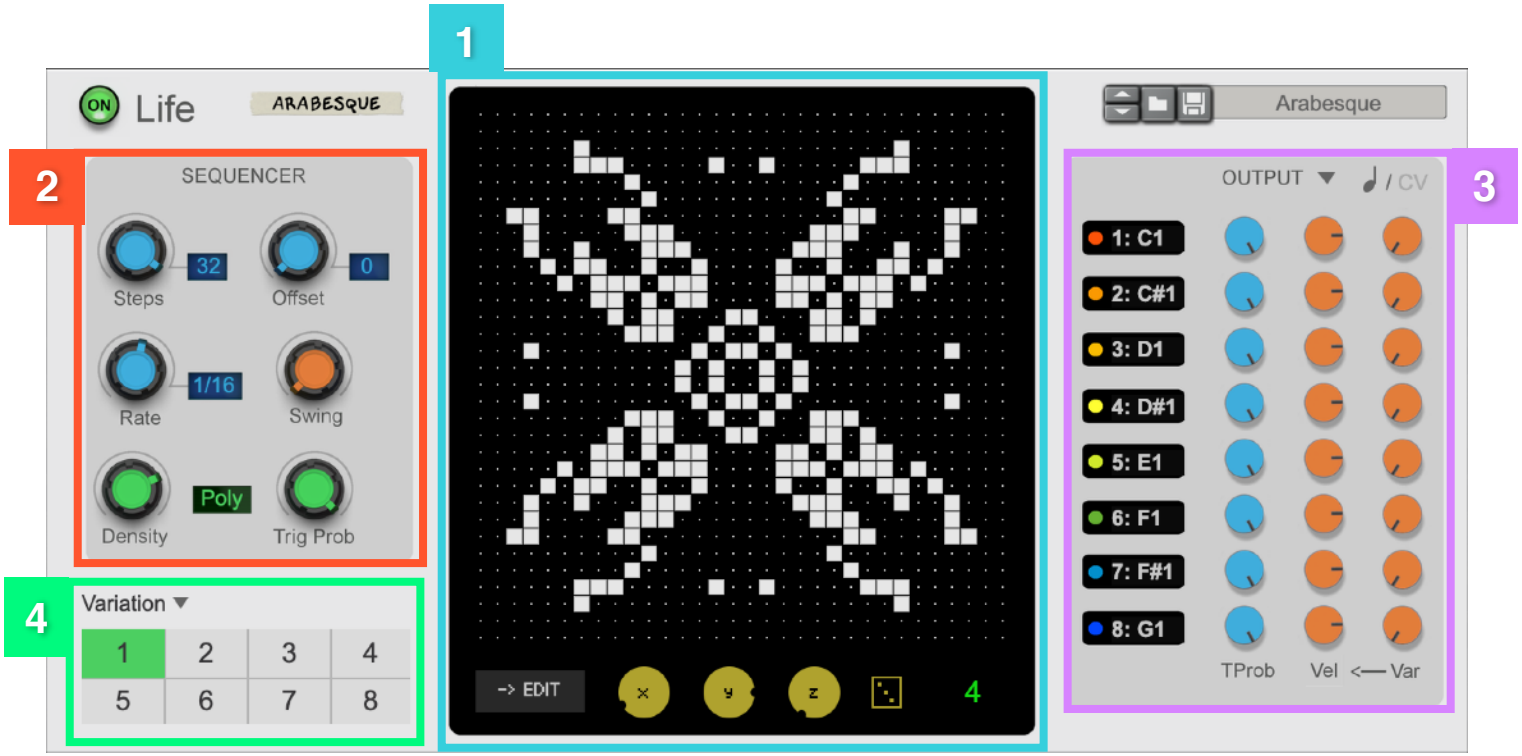
Lastly, the player has an External MIDI mode which allows it to receive notes from an external input, for example another player, a midi clip or keyboard. This is where the device shines as a very capable arpeggiator which can generate interesting sequences with minimum effort.

**Product Details**:

- Color 32 x 32 dot matrix to play the original "Game of Life" and 3 other game variants, with morphing controls plus randomization
- 32 step sequencer with step offset, selectable rate and swing amount, plus "infinite" mode for ever evolving sequences ("infinite" mode can be reset at any step by using a CV signal to create sequences of arbitrary lengths)
- Polyphonic or monophonic mode, plus density and global trigger probability to control the amount of notes generated per step
- Output section comprised of 8 color coded channels with custom note and CV assignments, plus individual trigger probability, velocity, velocity and CV variation
- Output Edit menu with commands for duplication, shifting, shuffling and randomization of notes and CVs, velocities, velocity and CV variations
- Fully featured edit mode for creating your own cell configurations with cut/copy/paste, plus shift left/right/up/down, rotate left/right, flip horizontal/vertical commands
- Ready to use "oscillators" patterns which can be inserted via a simple mouse click
- 8 Variations which can store snapshots of all the parameter settings and can be switched instantly for fun performances
- External MIDI mode to dynamically assign notes to the output channels from an external midi source with 4 different modes, including "As Played" and "Note Number" which are great for creating arpeggios, plus "Drum Kit" and "Drum Kit (inv)" to play live with drum patterns
- Note, Gate and Modulation CV jacks for each output channel, plus special CV jacks for "Mono" mode
- CV inputs for modulation of the X, Y and Z morphing controls
- Comprehensive MIDI and Remote implementations

# 2. Overview

## 2.1 Front



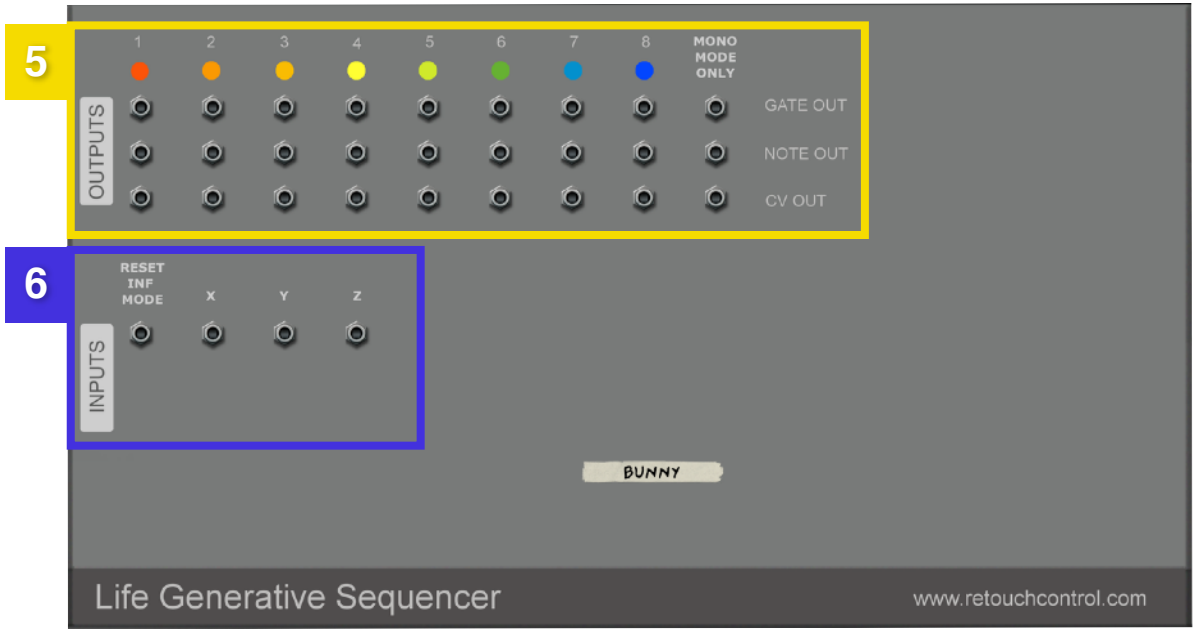

**1**. Main display which shows the live evolution of cells as the sequence progresses. By pressing on the "Edit" button, users can create or modify the starting configuration of cells. With a full palette of editing functions, it's easy to create even the more complex patterns. The X, Y and Z knobs allow to modify the underlying 32x32 dot matrix (more info in section 3.1).

**2**. Sequencer area with the main parameters which include the number of steps, the steps offset, the sequence rate in musical divisions, the amount of swing, the density of notes, and the overall trigger probability. There is a poly/mono switch which sets how many notes are played simultaneously.

**3**. Configuration area for the 8 output channels. For each channel, it is possible to set the output note or CV, the trigger probability, the velocity of the note and the amount of velocity or CV variation. There is an edit menu with several options to modify the various parameters.

**4**. Variation area which can store 8 different snapshots of all the main parameters.

## 2.2 Back




**5**. Gate, Note and Modulation CV outputs for each of the 8 output channels, plus specific outputs for when the device operates in Mono Mode.

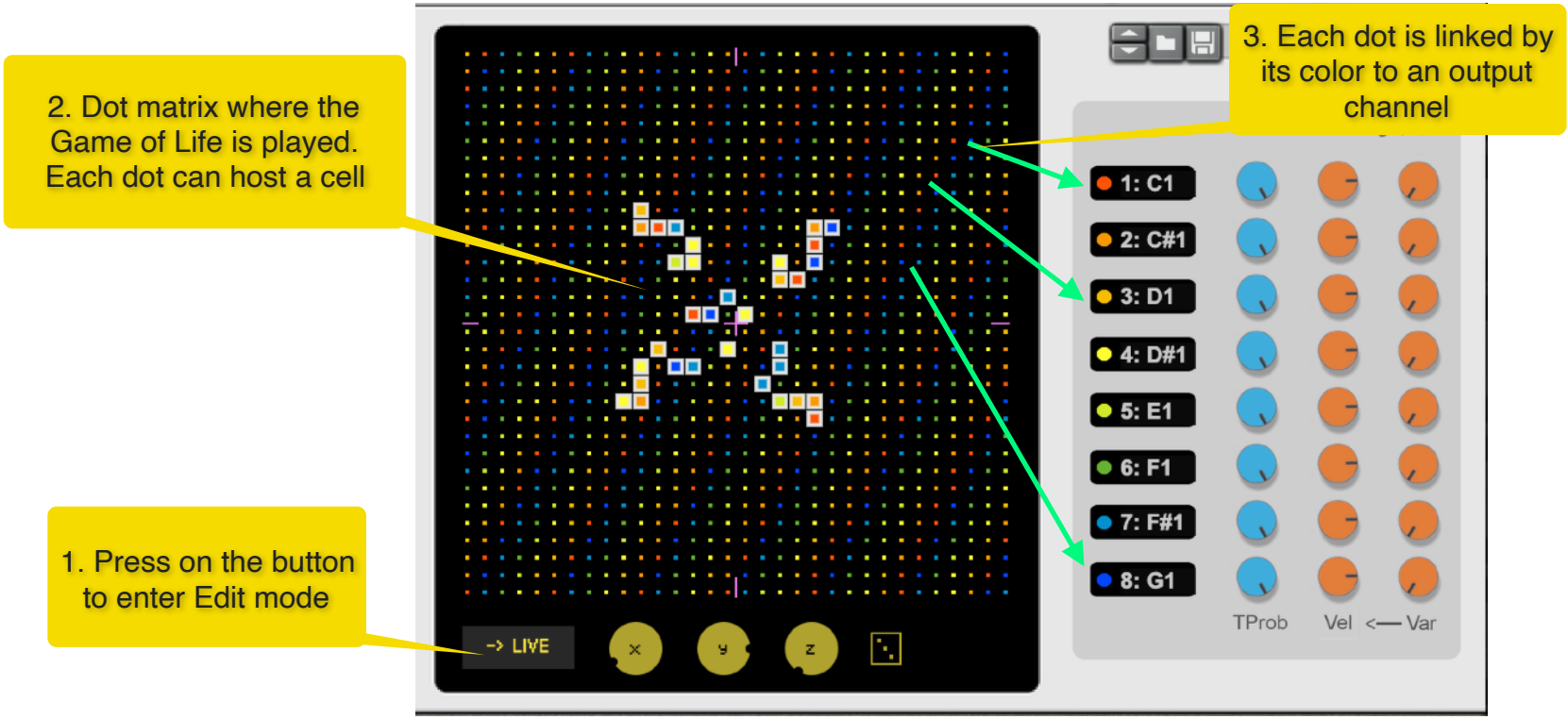
**6**. CV Inputs for resetting the number of steps when in INF mode, plus modulation inputs for the X, Y and Z controls

# 3. Usage

Life Sequencer is a player device and hence it needs to be instantiated on top of an instrument. This can be a synth or a sampler. The next sections explain the basic principle of operation, how to create a starting cell configuration, how to modify the dot matrix, how to set up the sequencer and finally how to configure the output channels.

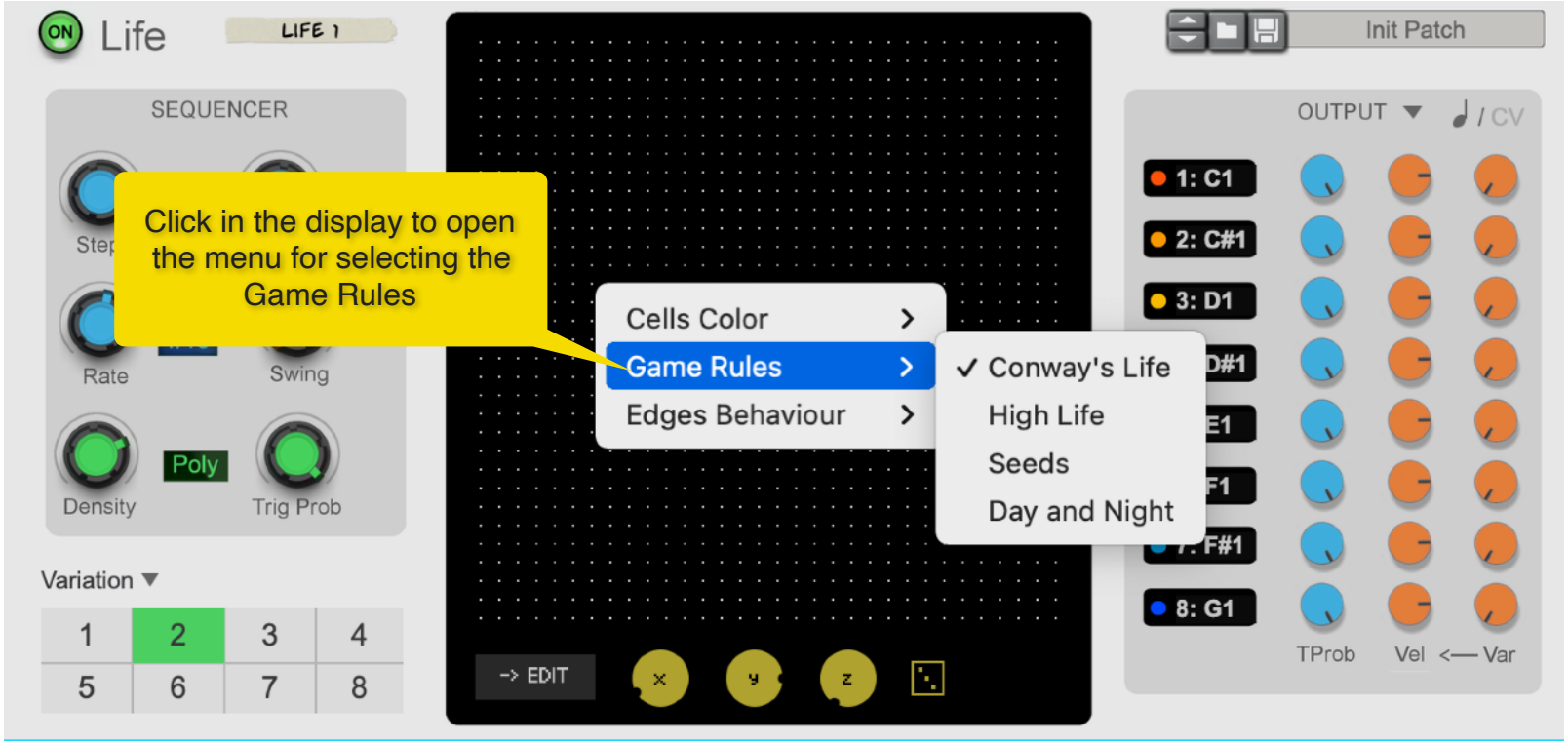
## 3.1 The basic principle of operation

The main part of the device is the 32 x 32 dot matrix shown in the central display. Each dot location is where a cell of the "Game of Life" can exist. If you press the "Edit" button, you'll notice that each dot has a color. What exactly do these colors represent? Basically, the color of each dot corresponds to the color of one of the 8 output channels. As the cells evolve and move over the dot matrix, they trigger the notes or CV corresponding to the color of the output channels. This is the basic mechanism by which the sequencer generates notes and CV signals.



## 3.1.1 Game Rules and Edges Behaviour

**Game Rules:** in addition to Conway's original "Game of Life", there are 3 other popular game variants which use different rules for the survival and the birth of cells, and they are known as "High Life", "Seeds" and "Day and Night". Simply click in the display to open the menu and select a different rule. You'll find that each rule has its own characteristics and produces different results for the same initial cells configuration.

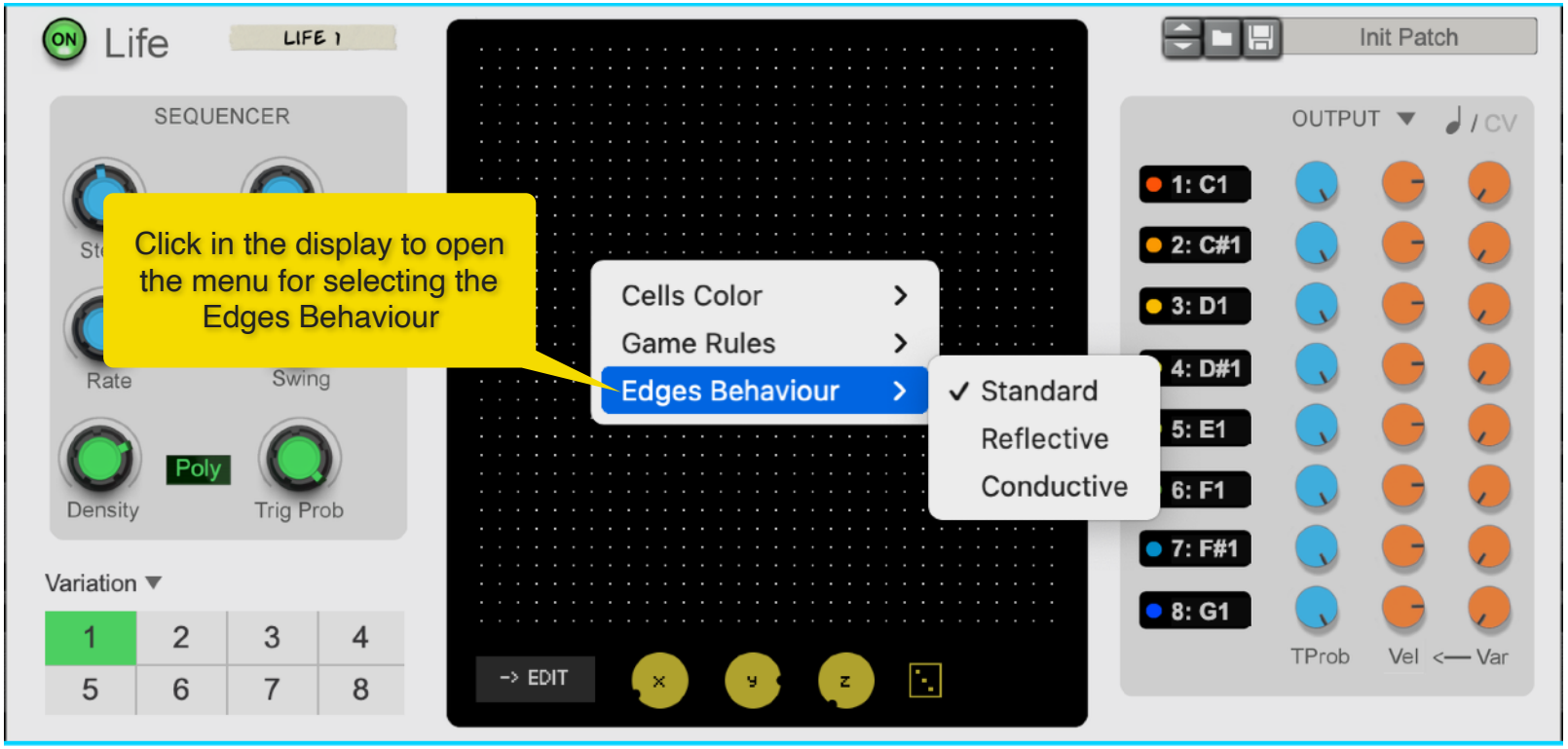


**Edges Behaviour:** there are also 3 different choices for how the edges of the matrix behave, which will influence the cell evolution.

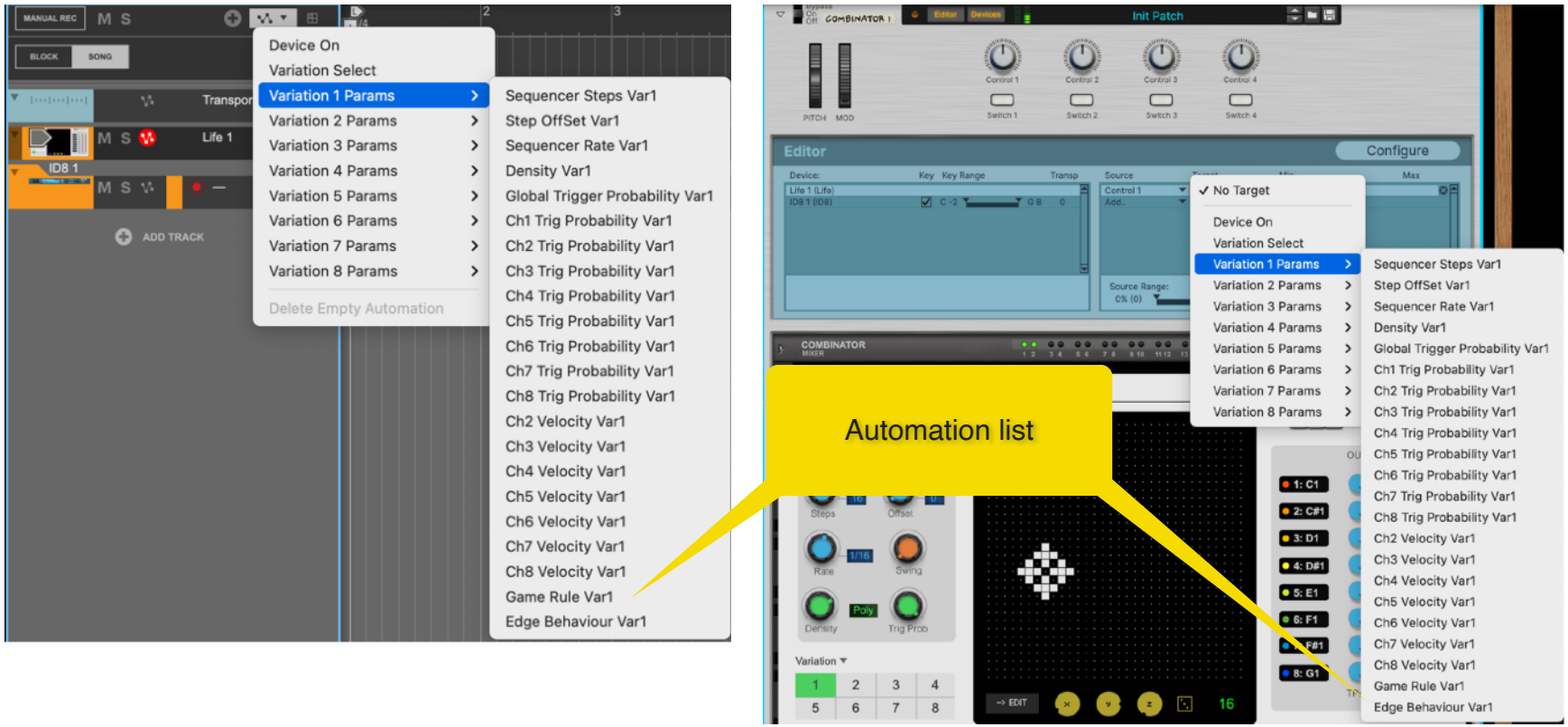
The "Standard" behavior is the original implementation where cells at the edge effectively have a reduced number of potential neighbors, compared to cells inside the matrix (there are no neighbors outside of the matrix edges).

If the behavior is set to "Reflective", a cell at the edge of the matrix will have its neighbors mirrored right outside of it, thus making the cell have the same number of potential neighbors as cells inside the matrix.

If the behavior is set to "Conductive", a cell at the edge of the matrix will "feel" the effect of any neighbors on the opposite edge of the matrix, also making the cell have the same number of potential neighbors as cells inside the matrix.

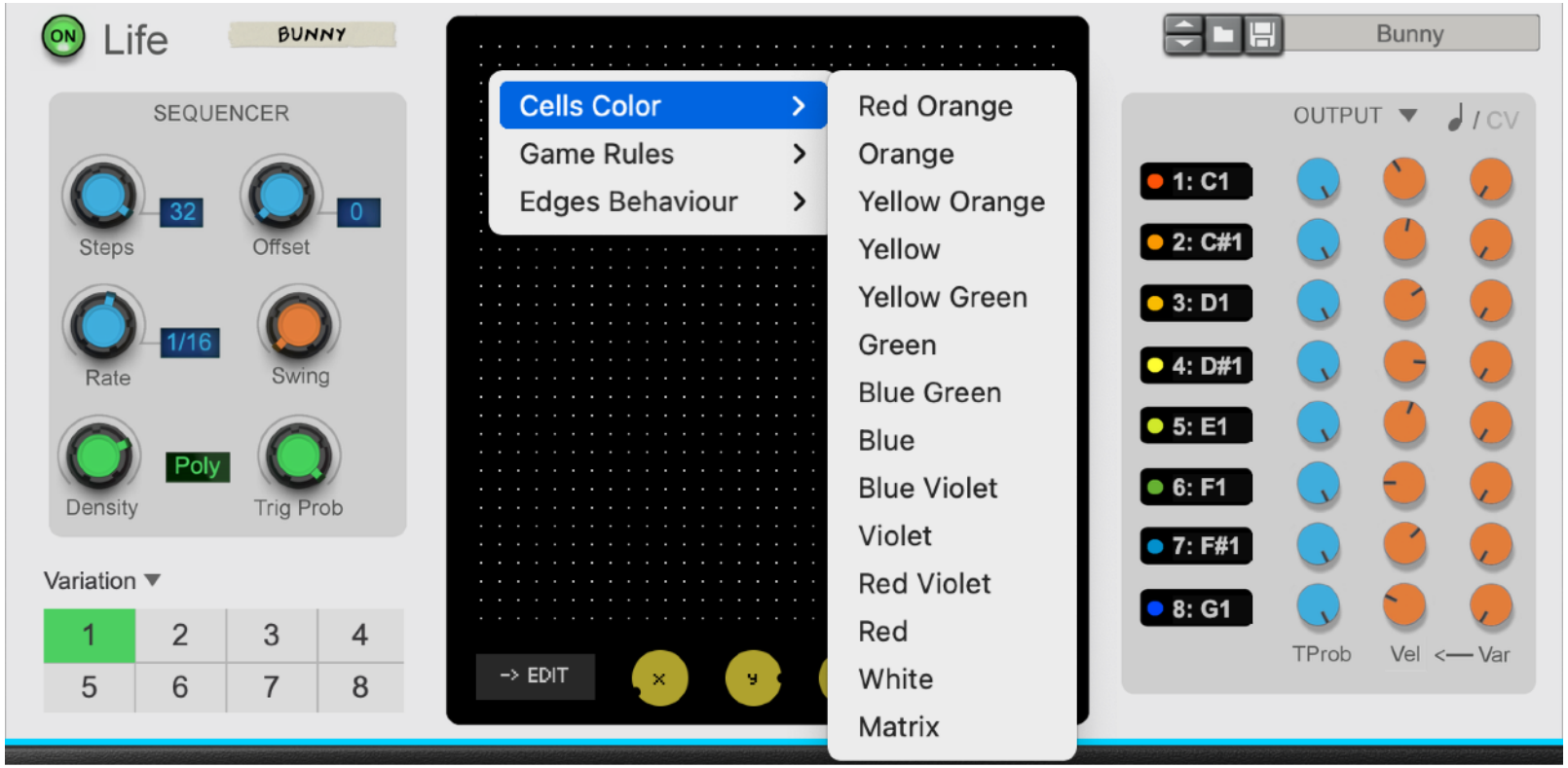


Both the Game Rules and the Edges Behavior are automatable parameters in the Reason sequencer.



## 3.1.2 Changing the cell colors

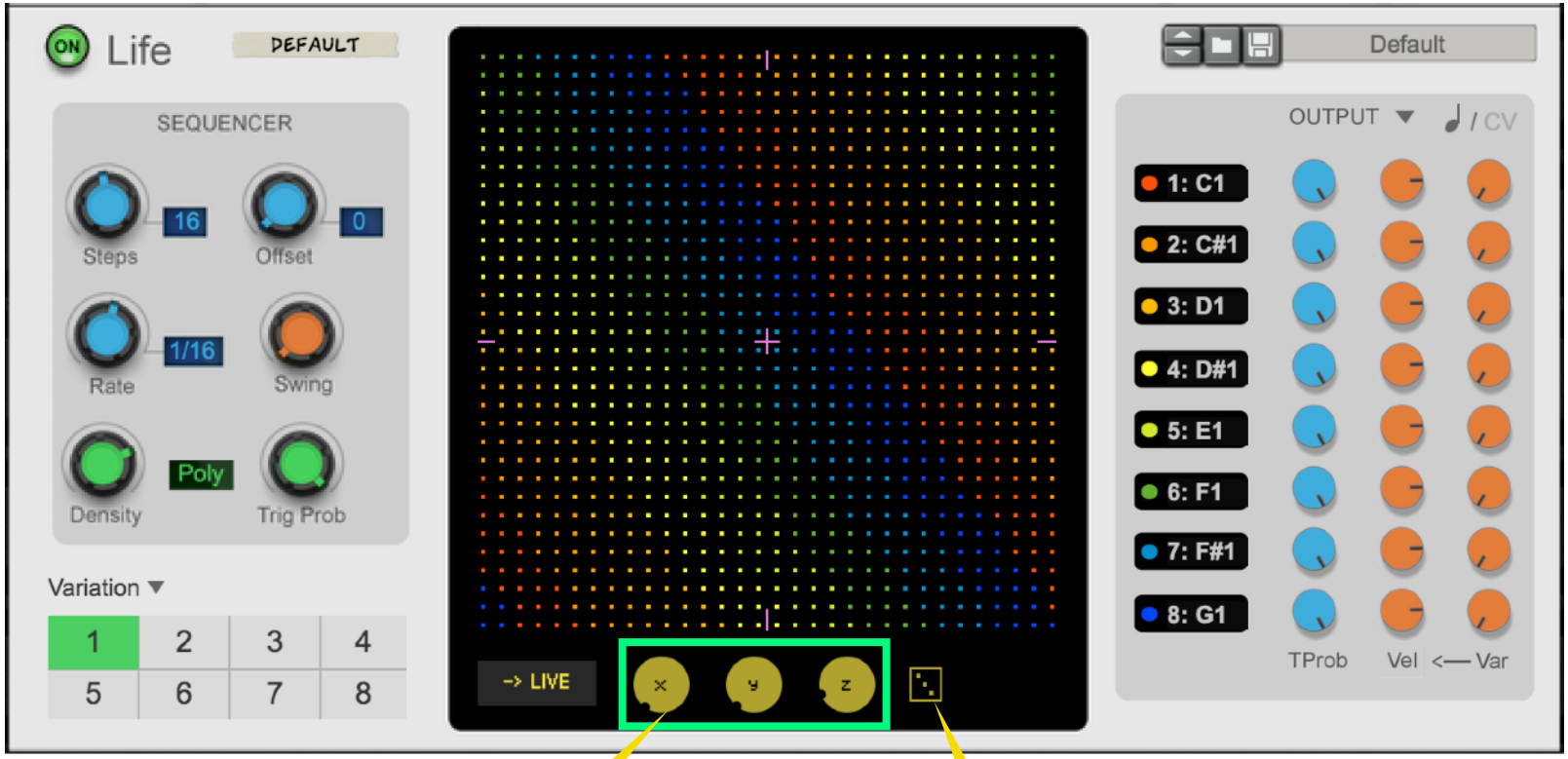
At any point, you can change the colors of the cells when in Live mode. Simply click in the display and from the menu, choose Colors and then pick one of the available options. If "Matrix" is selected, the cell take on the colors of the underlying dot matrix (see next section).



## 3.2 The dot matrix

As discussed in the previous section, each dot in the matrix has a color assignment which ultimately corresponds to an output channel. The color assignment can be easily changed by using the X, Y and Z morph controls. These are available in both "Live" and "Edit" mode. Additionally, you can use the randomize button (shown as a die) to assign random values to the three knobs, or modulate the X, Y and Z position via the CV input jacks int the back of the device.

**Tip**: Changing the color assignments is one of the most important tools to create new sequences or variations of existing sequences.

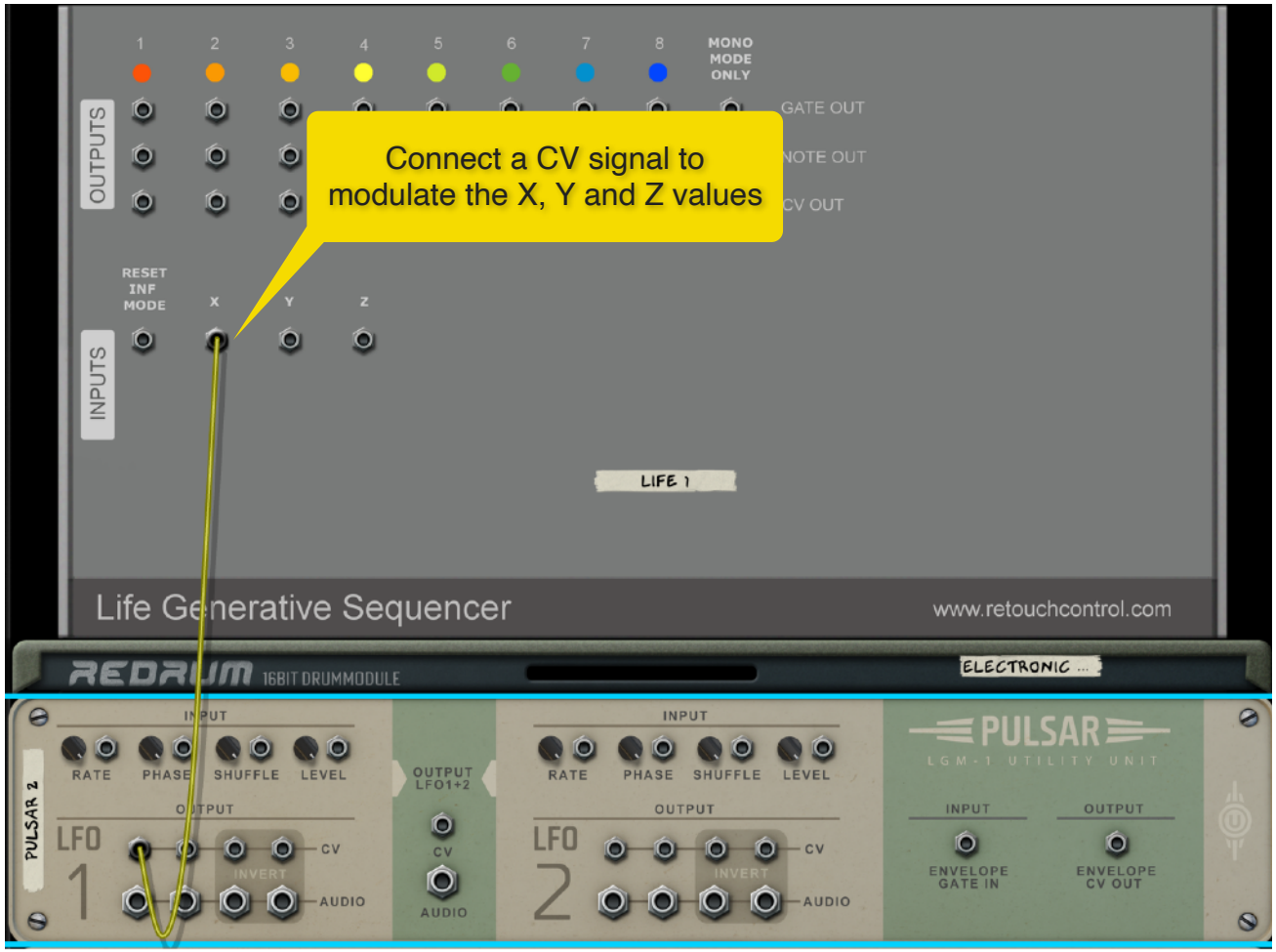



1. Adjust the X, Y and Z knobs to change the color assignments.
Cmd/Ctrl + click to reset to default values

2. Click on the die to randomize the position of the X, Y and Z knobs

## 3.2.1 X, Y and Z CV Modulation Inputs

CV signals can be used to modulate the values of the X, Y and Z knobs. Any incoming CV input signal is added to the current values of the knobs. To modulate the knobs around their set value in both the negative and positive direction, use bipolar CV signals.



If any of the X, Y and Z knobs are modulated via CV, there is a red circle around the knob's label as shown below.

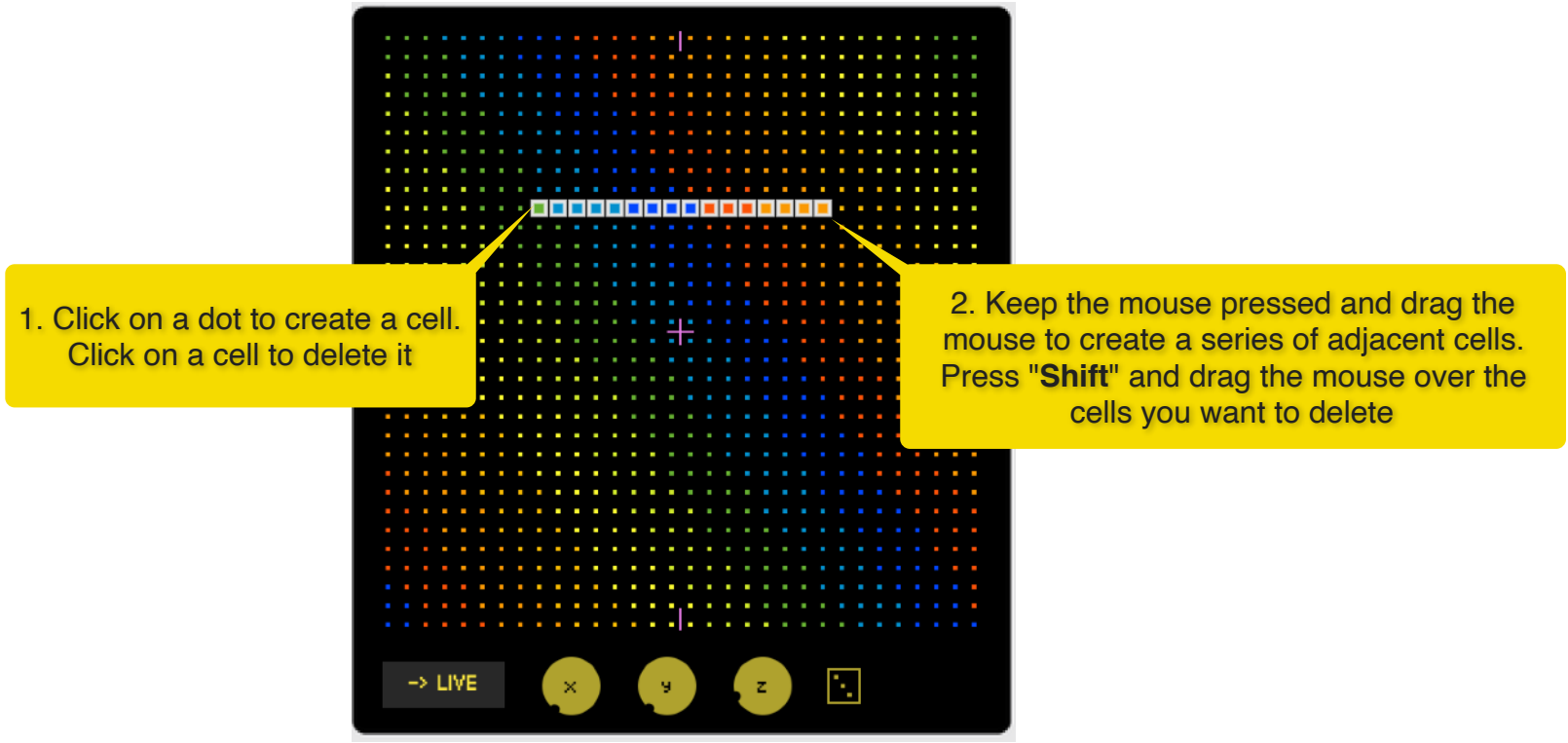
## 3.3 Initial Seed Cell Configuration

Creating the seed configuration of cells is essential to start the "Game of Life" and thus to produce notes and CV. To do that, press the "Edit" button to enter "edit mode".

**Tip**: Changing the seed cell configuration is another important way to create new sequences or variations of existing sequences.

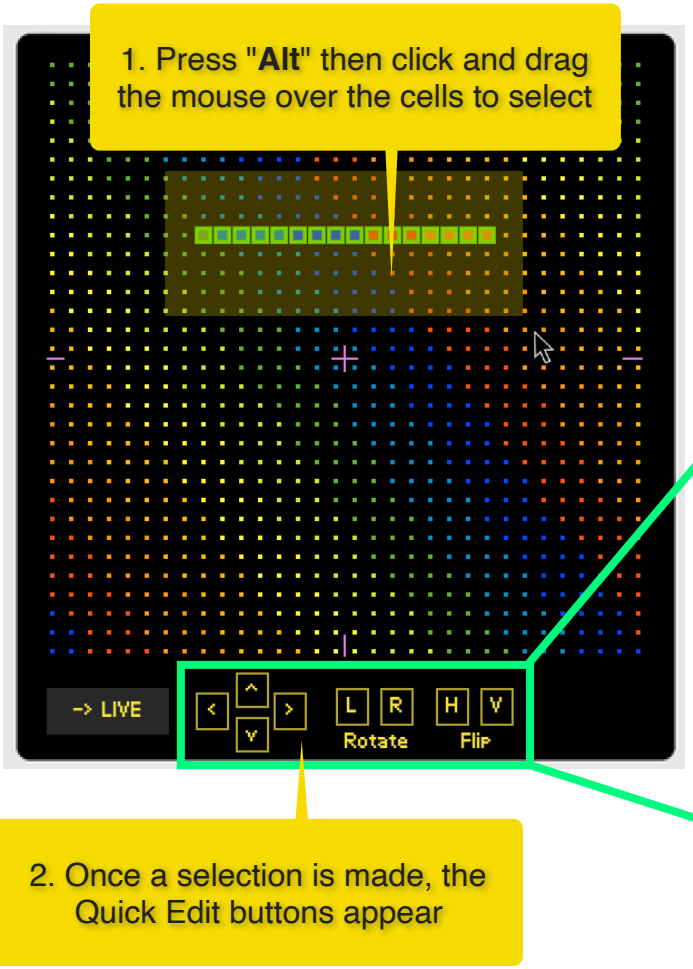
### 3.3.1 Creating and Deleting Cells

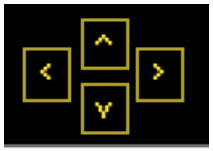
While in "edit mode", clicking on a dot will create a cell at that position while clicking on an existing cell will delete it. To create a series of cells, keep the mouse pressed and move over the desired dots. Similarly, to erase a series of existing cells, press "Shift" and mouse over the cells you want to delete.



## 3.3.2 Selecting cells for editing

It is possible to select several cells for editing. Press "Alt" and drag the mouse over the desired cells. Once selected, the cells are shown in green and several editing functions become available from the buttons below the matrix. Additional editing options are available from the contextual edit menu which is accessed by pressing "Cmd/Ctrl" and clicking inside the matrix area (see section 3.3.3 for more details).



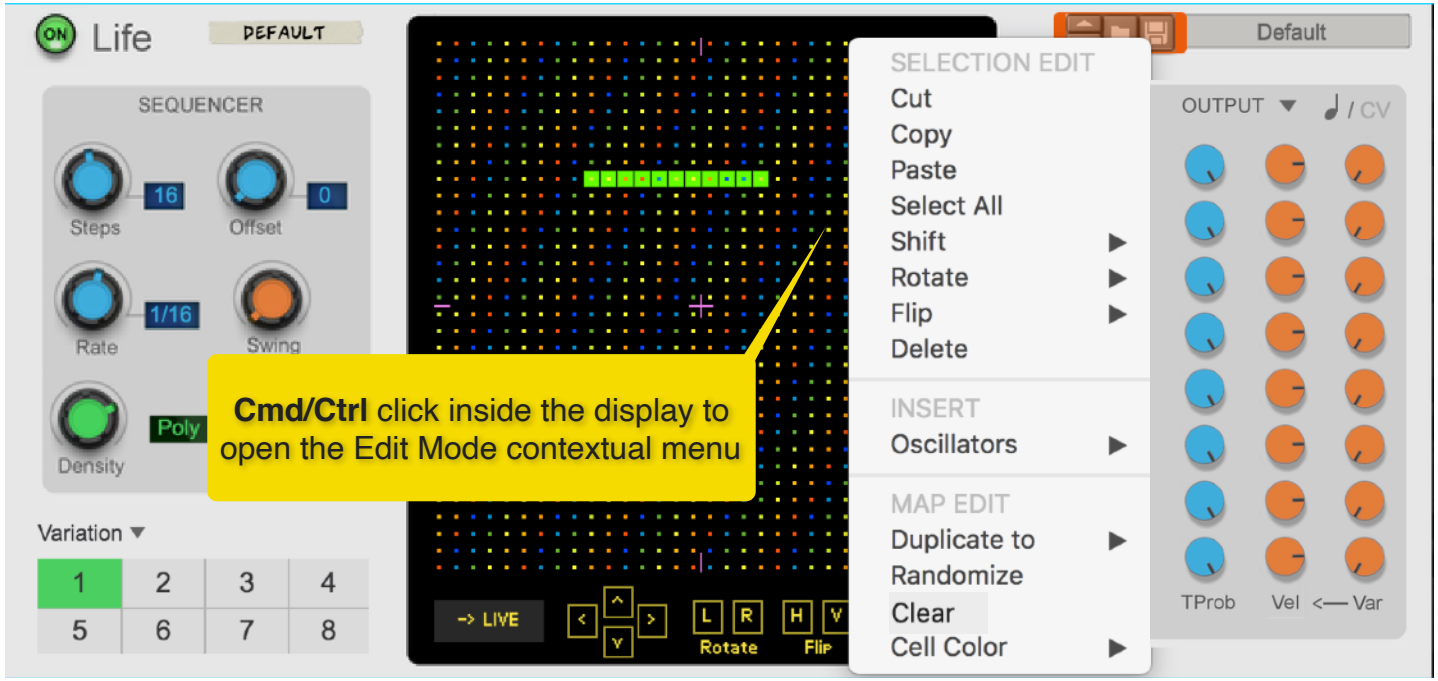

**Shift Buttons**: use these buttons to move the selection up, down, left or right


**Rotate Buttons**: use these buttons to rotate the selection to the left or to the right

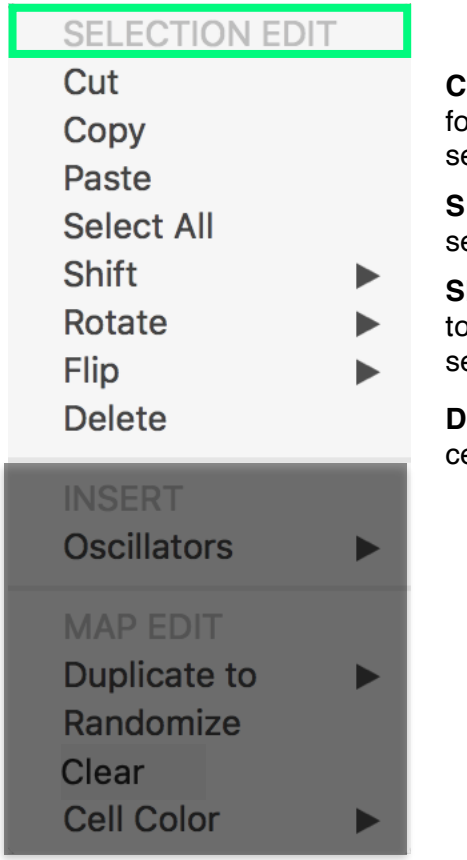

**Flip Buttons**: use these buttons to flip the selection along the Horizontal or Vertical axis

## 3.3.3 The Edit Mode contextual menu

The contextual Edit Mode menu offers many useful commands. To open it, "**Cmd/Ctrl**" and click inside the matrix area. The menu is divided in 3 sections. The first section called "Selection Edit" is very useful when working with a cell selection. From here you can cut/copy/paste and also shift, rotate, flip and delete a selection.
The second section called "Insert" allows to easily insert several pre-made cell configurations also know as "oscillators" because their evolution pattern repeats after a certain number of iterations. These oscillators are ordered according to their period, that is, to the number of steps needed for the pattern to start over.
The final section called "Map Edit" has commands for duplicating both the dot matrix and the cells to other Variations, for creating a random configuration of cells, for deleting all cells and for changing their appearance.
All these commands are described in more details on the following pages.



## Copy and Paste details

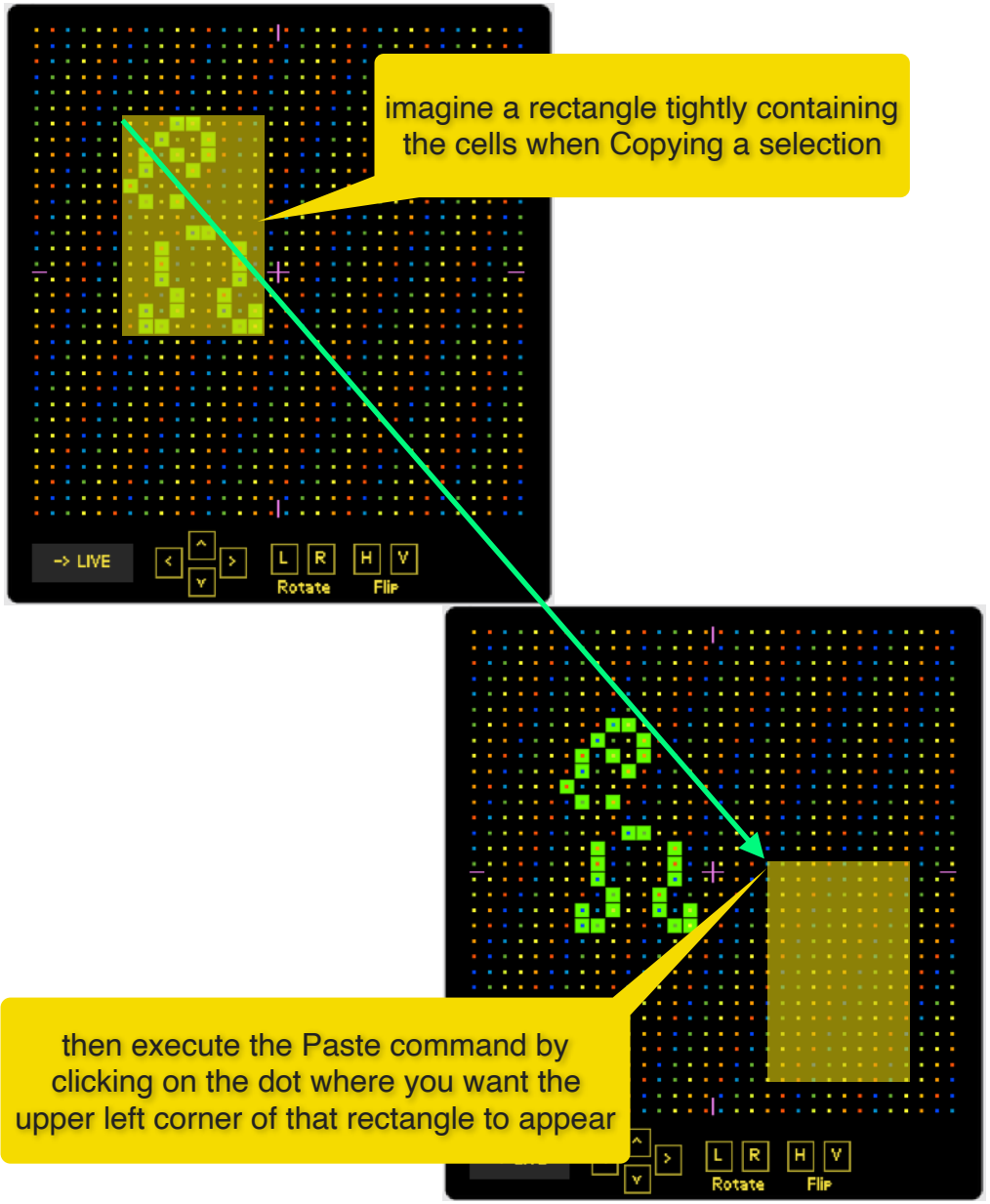


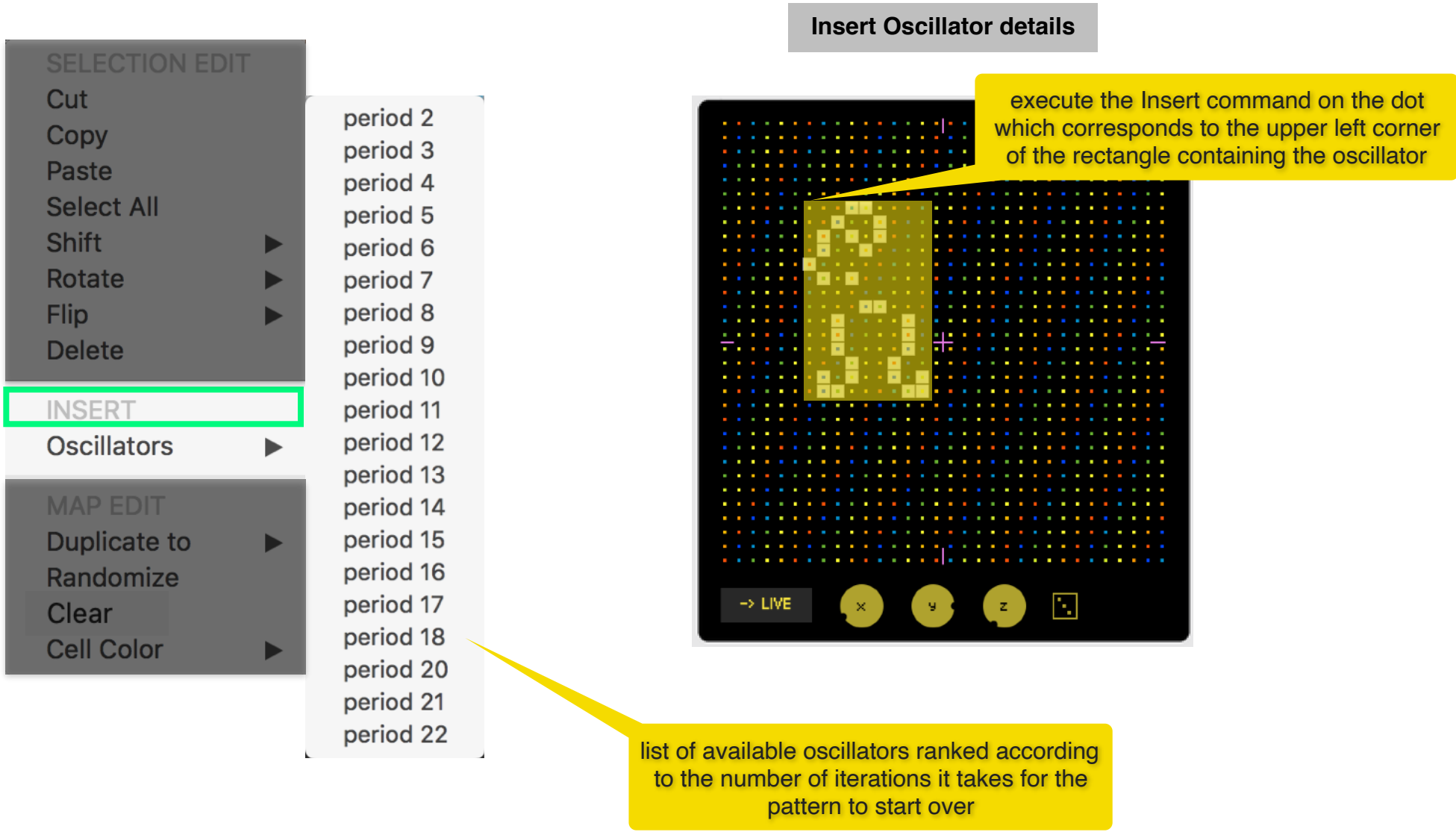

**Cut/Copy/Paste**: commands for copying and pasting the selected cells

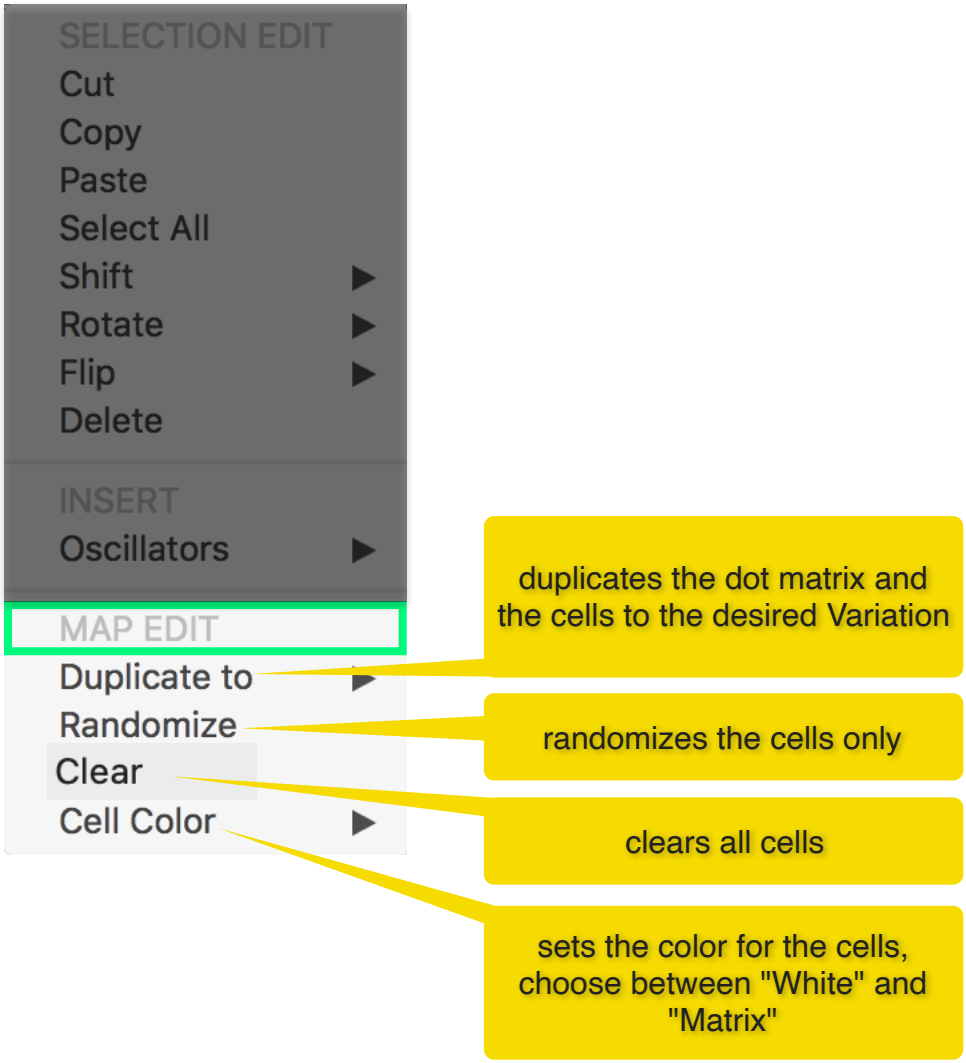
**Select All**: command for selecting all cells

**Shift/Rotate/Flip**: commands to move, rotate or flip the selected cells

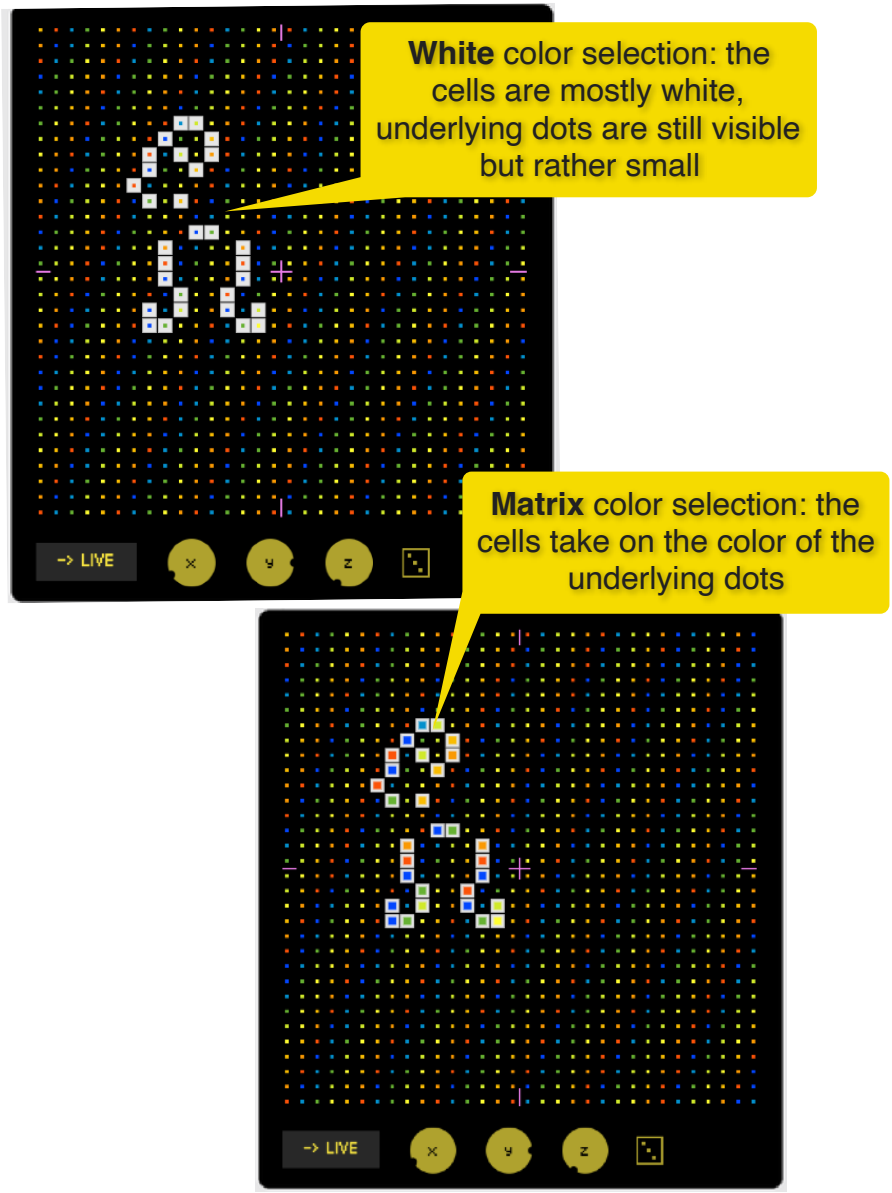
**Delete**: remove the selected cells




Insert Oscillator details
SELECTION EDIT
Cut
Copy
Paste
Select All
Shift
Rotate
Flip
Delete
INSERT
Oscillators
MAP EDIT
Duplicate to
Randomize
Clear
Cell Color
period 2
period 3
period 4
period 5
period 6
period 7
period 8
period 9
period 10
period 11
period 12
period 13
period 14
period 15
period 16
period 17
period 18
period 20
period 21
period 22
execute the Insert command on the dot which corresponds to the upper left corner of the rectangle containing the oscillator
-> LIVE
x
y
z
list of available oscillators ranked according to the number of iterations it takes for the pattern to start over

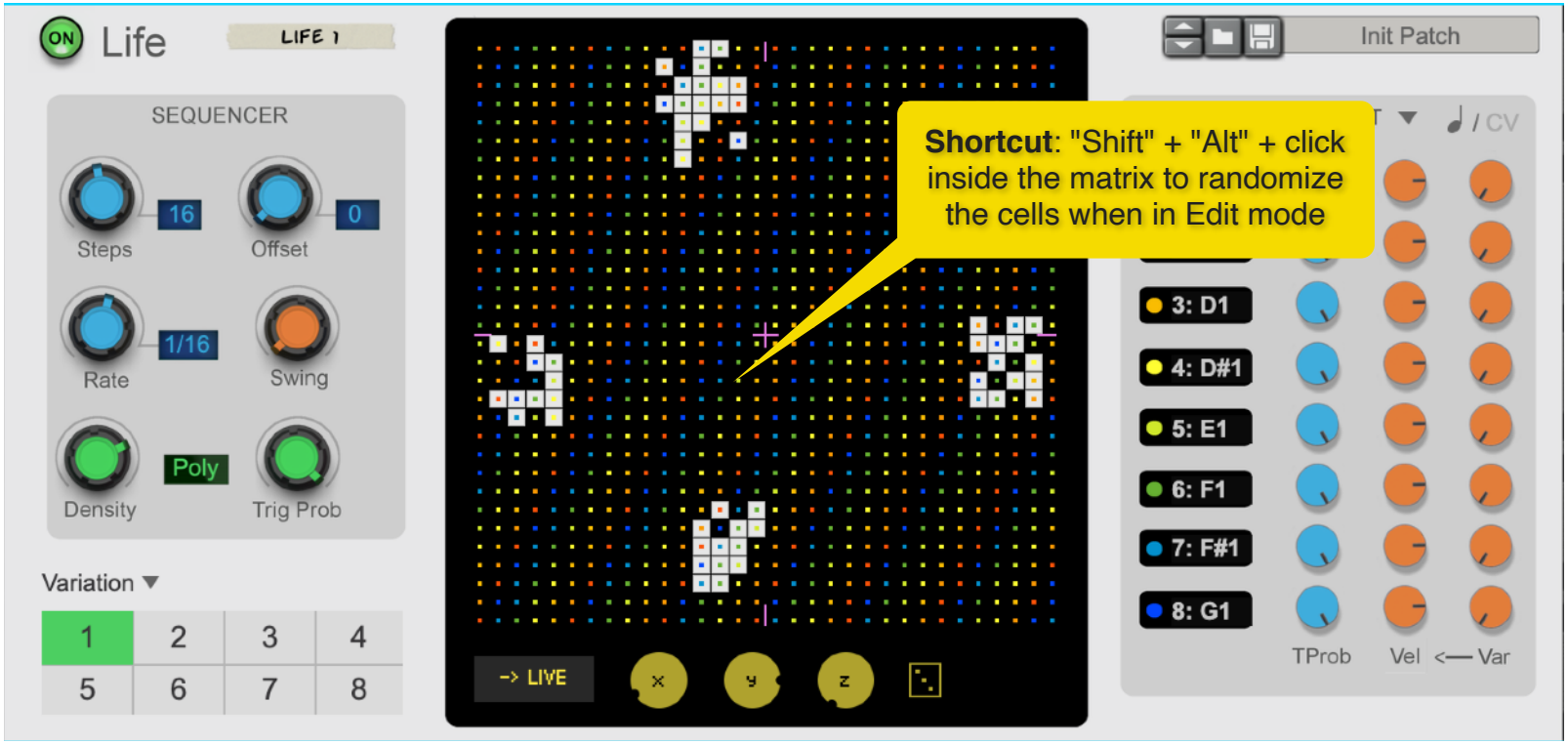



**Cell Color details**



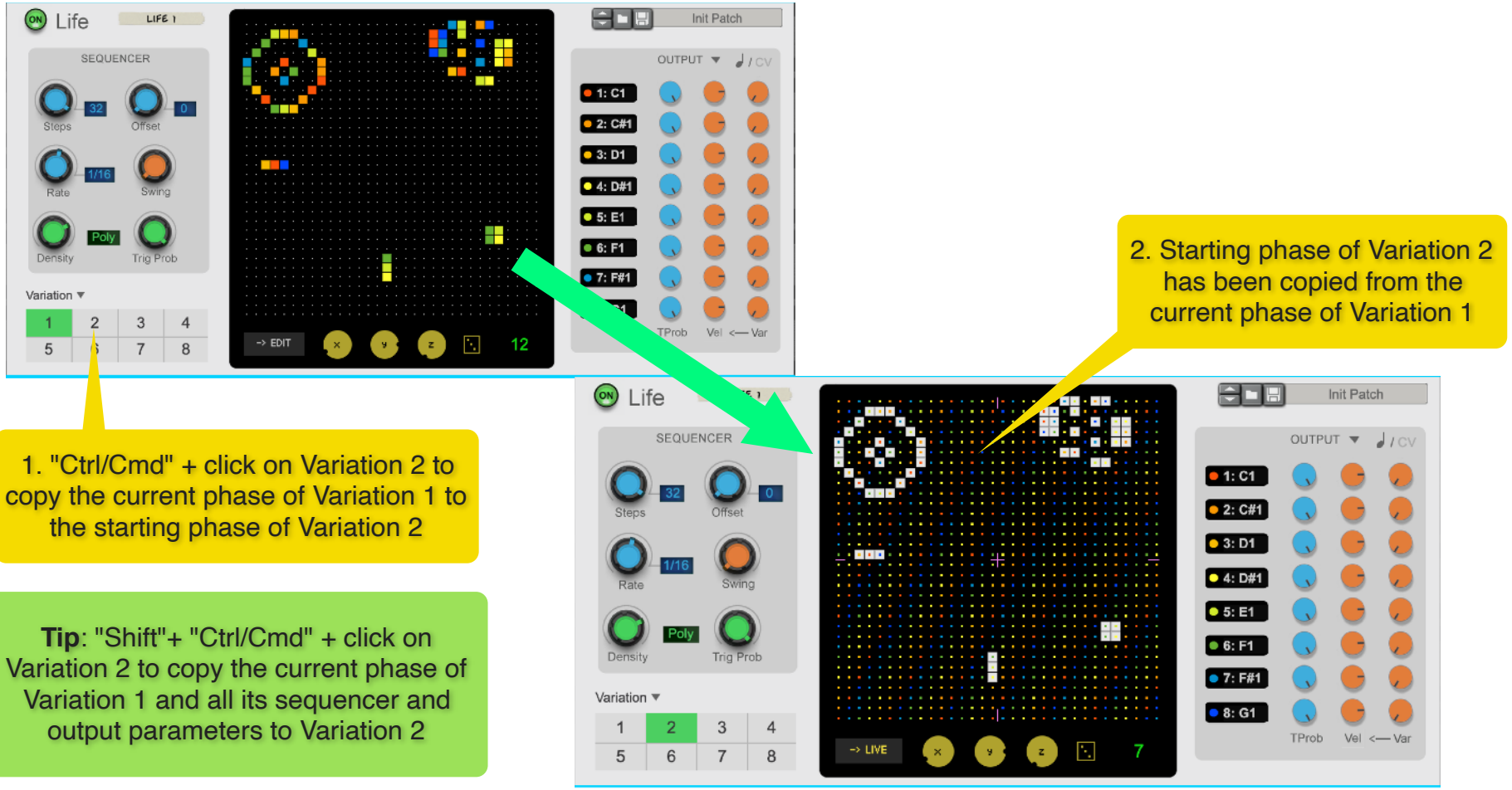
## 3.3.4 Using Randomization to create the initial seed configuration

You can use randomization to create the initial seed configuration. The "Randomize" option is available from the Edit menu (Ctrl/Cmd + click to open the Edit menu). There is also handy shortcut by pressing "Shift" + "Alt" and clicking inside the matrix when in "Edit" mode.



## 3.3.5 Capture the current phase as the initial seed configuration

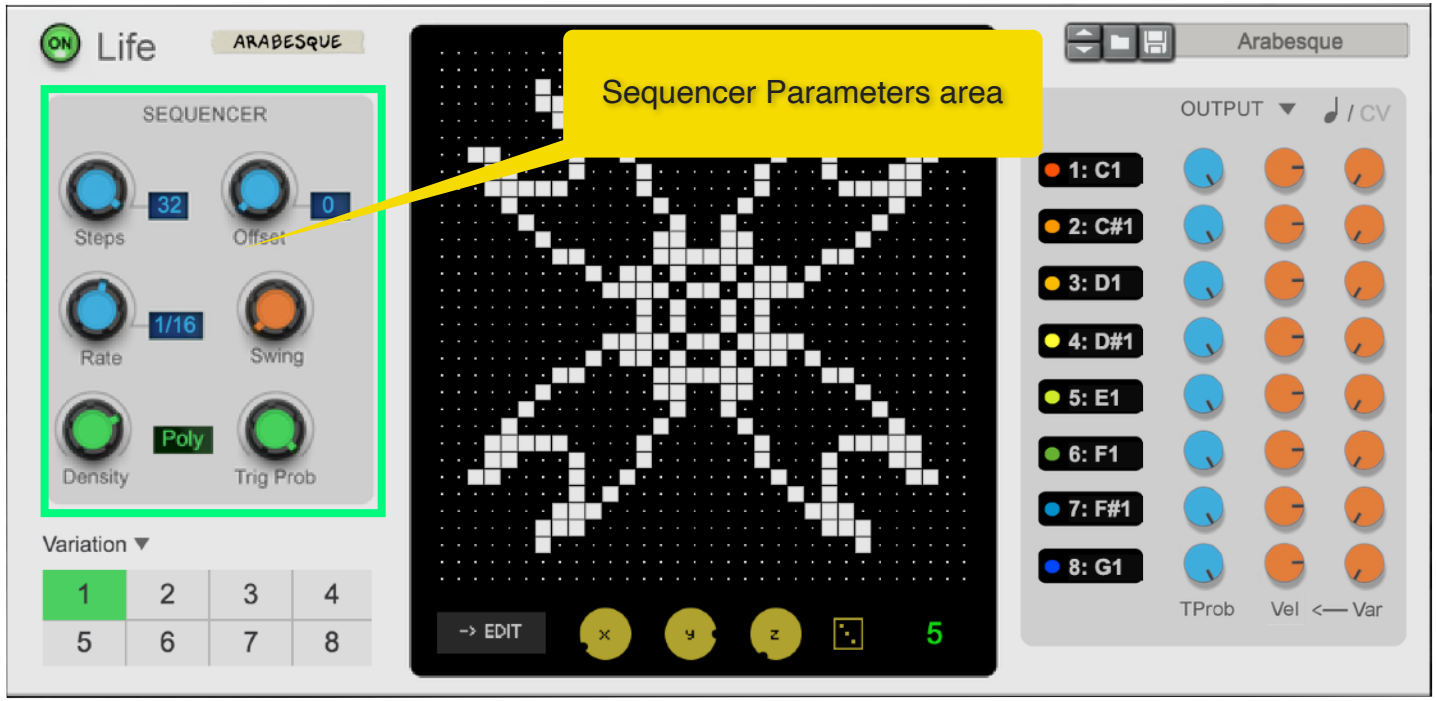
At any point during the cells' evolution, it is possible to capture its state and save it as the seed configuration for another Variation or even for the same Variation. This is done by "Ctrl/cmd" + clicking on the target variation. For example, if Variation 1 is selected and you would like to capture the current phase of the cells as the starting point for Variation 2, simply "Ctrl/cmd" + click on the Variation 2 button as shown below. By using "Shift" + "Ctrl/Cmd" + click, you don't only copy the current phase, but also all the other parameters of the starting Variation to the target Variation.




**Tip**: "Shift"+ "Ctrl/Cmd" + click on Variation 2 to copy the current phase of Variation 1 and all its sequencer and output parameters to Variation 2

## 3.4 Sequencer Parameters

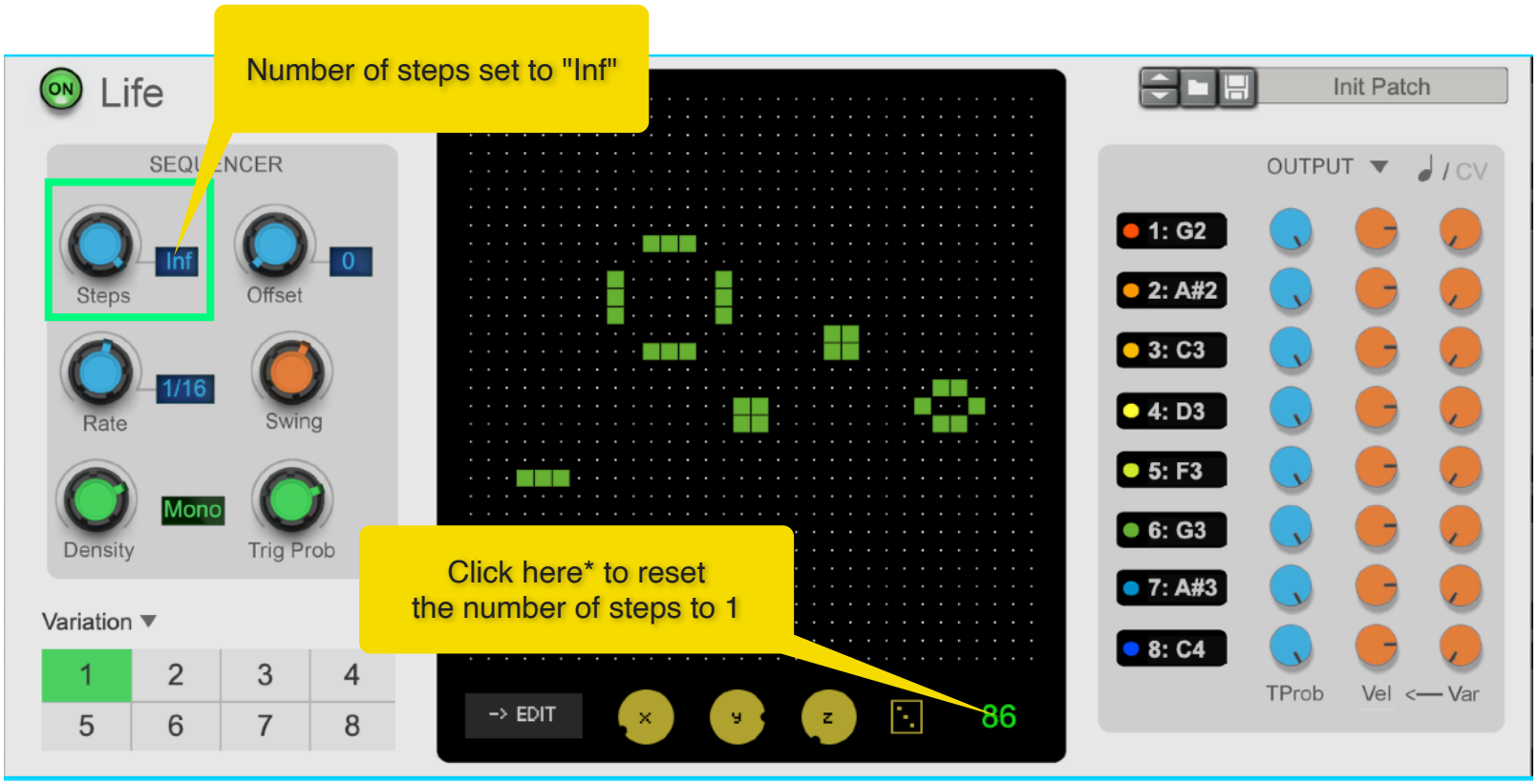
On the left side of the panel, you'll find the main sequencer controls. These are explained in details below.



| | |
|---|---|
|  | Here you set the number of steps in the sequence. You can choose any number between 1 and 32. Every time the sequence returns to step 1, the cell's initial configuration is reloaded so the same evolution pattern repeats. There is also an "infinite" mode where the sequence does not return to step 1 and the cells continue to evolve until they die or find a stable cyclic pattern (like in the case of oscillators) |
|  | The steps offset parameter allows you to shift forward in time the sequence by offsetting the step at which the cell's initial configuration is repeated. You can use this to align the sequence to the main beat measure. Of course you can also use this creatively to experiment with an existing sequence |
|  | The Rate knob sets the speed of the sequence. Values range from 4/4 to 1/64 |
|  | Turn the Swing knob to add various amounts of swing to the sequence. Values range from Light to Heavy |
|  | The Density knob controls how busy the generated note patterns are. A low density setting produces fewer notes during each step, while a higher density setting produces a higher number of notes |
|  | The Poly/Mono switch sets the polyphony mode for the sequencer. In Poly mode, more than one note can be generated at each step. In Mono mode, only one note is generated at each step. Click and drag the mouse upward to change from Poly to Mono mode, and vice versa. |
|  | The Global Trigger Probability knob controls the likelihood of notes being sent out to any connected device. At 100%, all notes generated by the sequencer are sent out. At lower percentages, only a fraction of the notes generated are sent out |

## 3.4.1 Resetting "Infinite" Mode

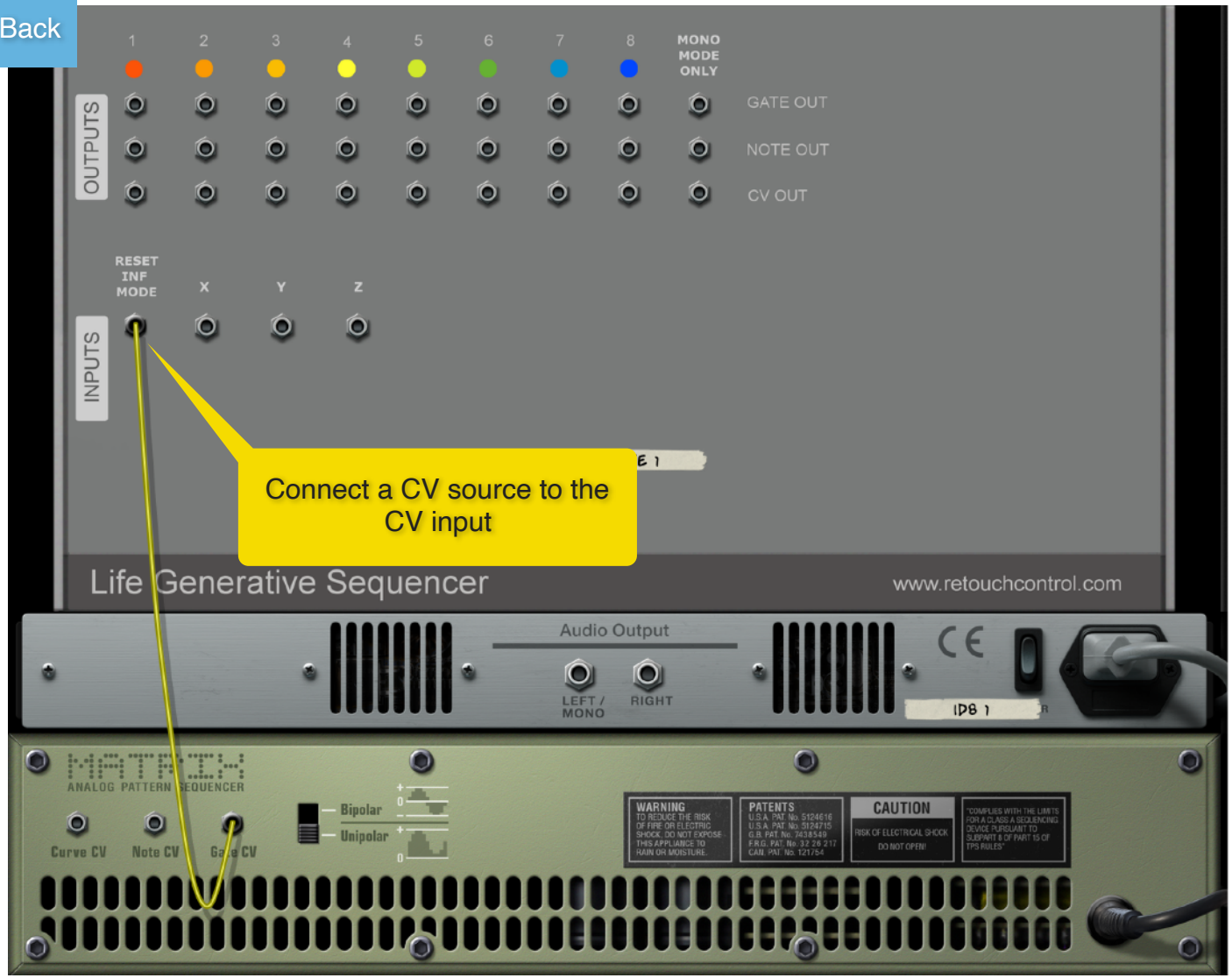
When the number of steps is set to "Inf", it is possible to reset back to step 1 in two different ways. The first one is to simply click on the steps display, as shown below.



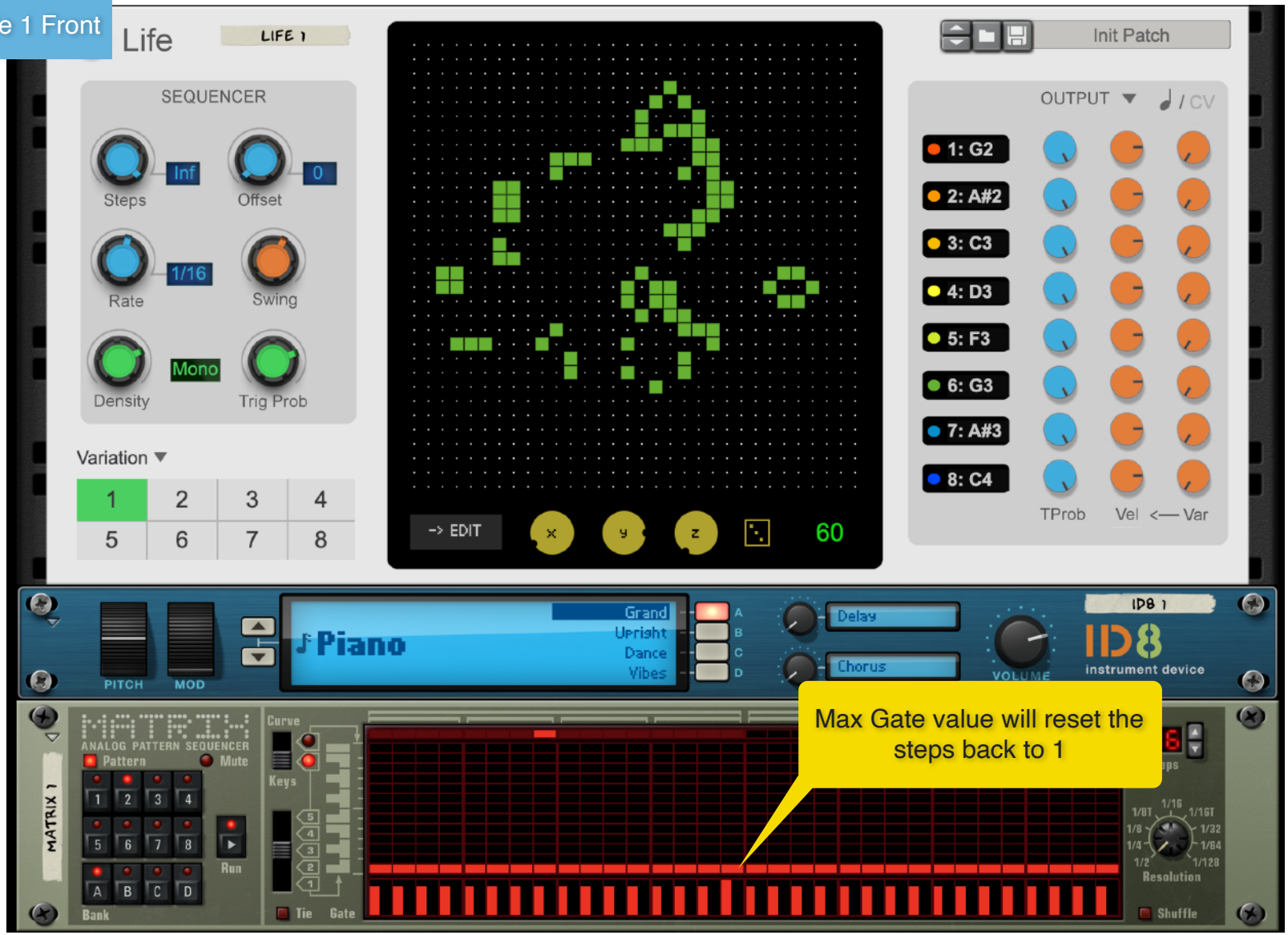

* *it is possible to assign the reset functionality to a MIDI button via Remote. The name of the remotable item is "Reset Sequencer".*

The second one is via the CV input in the back of the device. Any CV signal equal to its maximum value will reset the cell configuration and set the number of steps back to 1. By using a CV signal to reset the number of steps, it is possible to go beyond the limitation of the 32 steps and create sequences of an arbitrary number of steps.

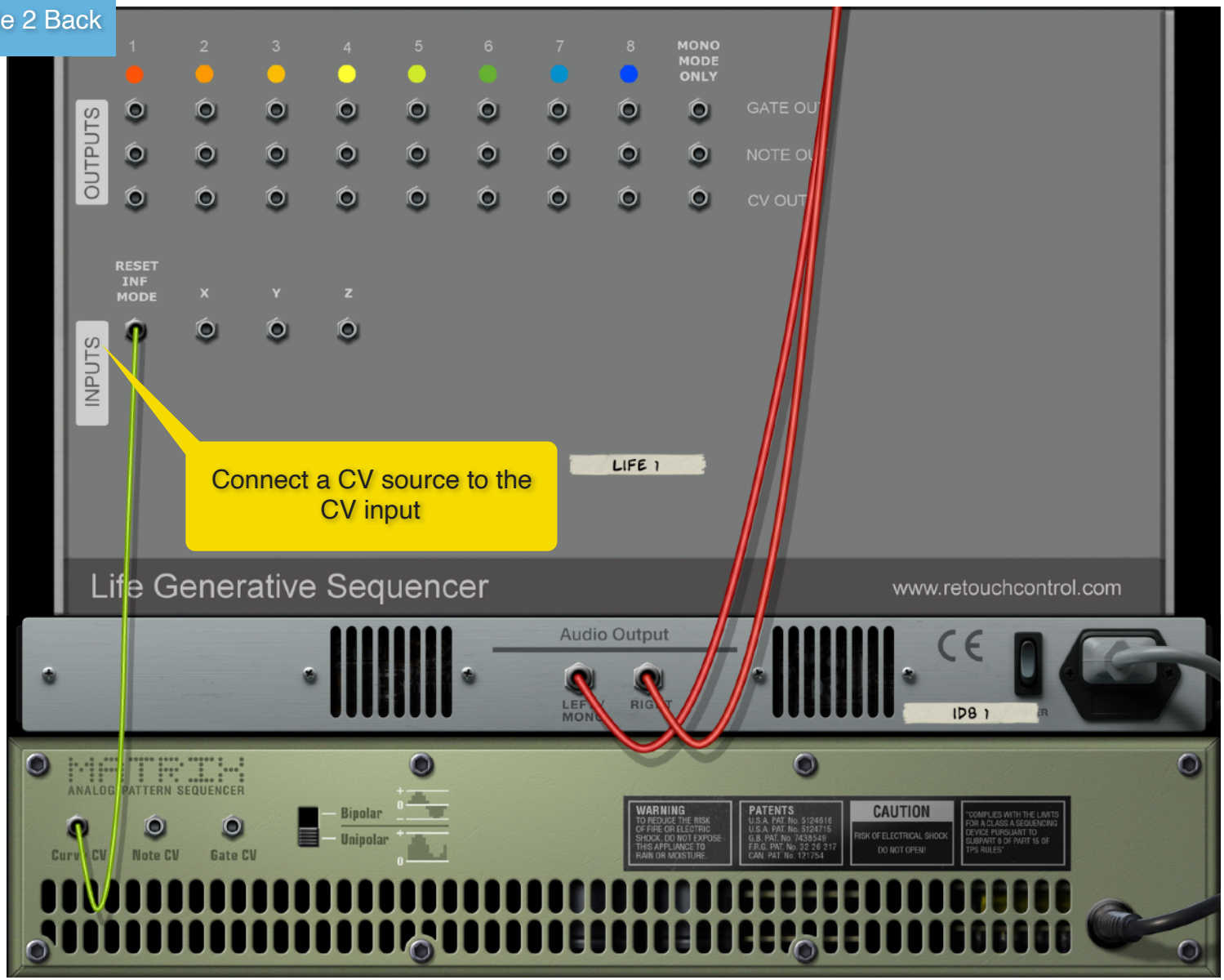
Example 1 Back



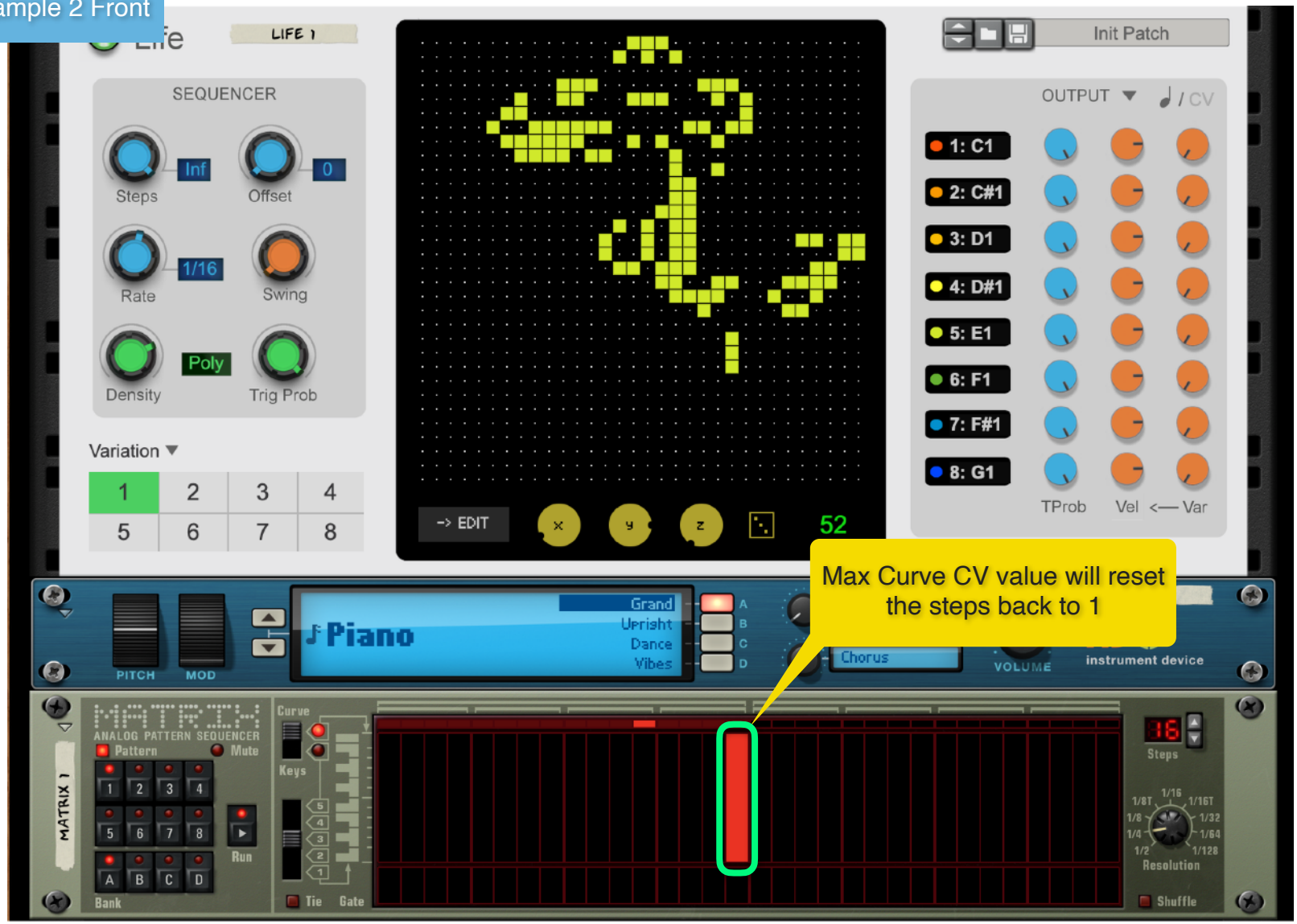
Example 1 Front



Example 2 Back

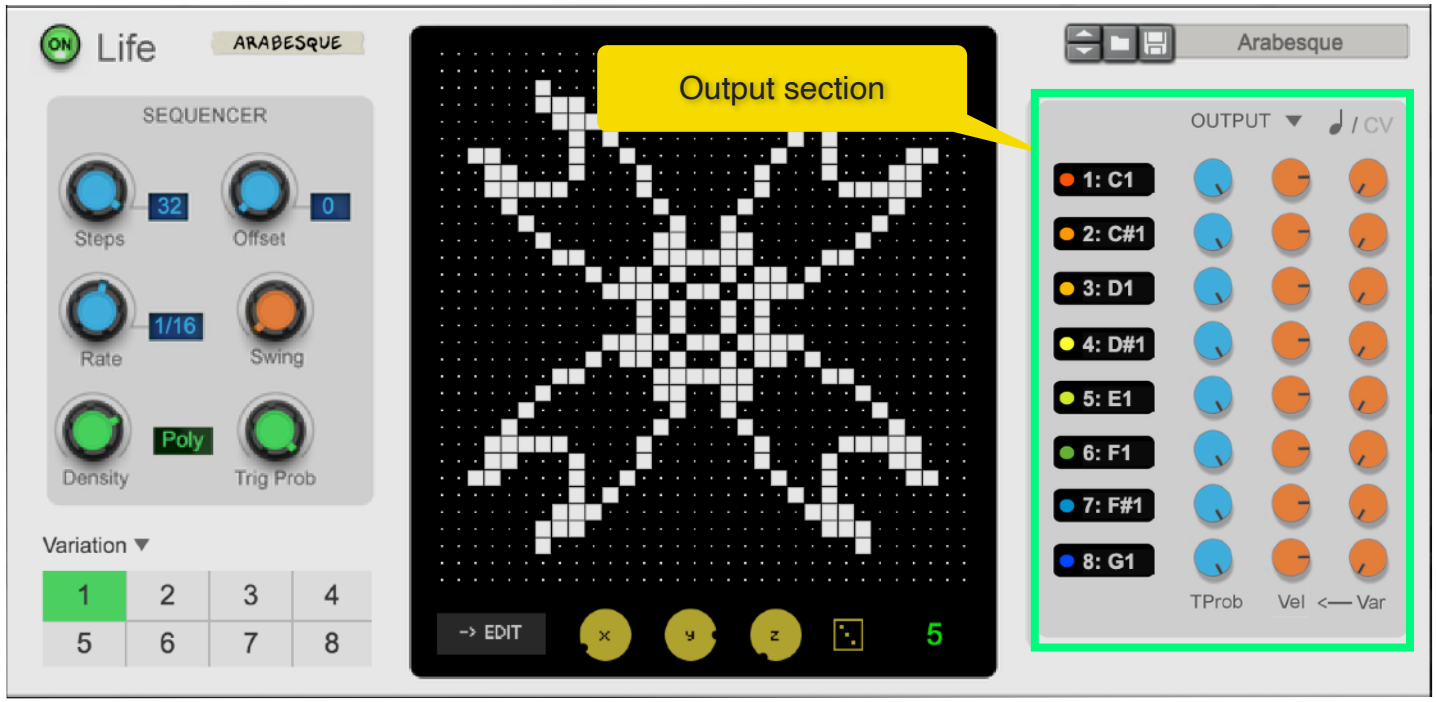


Example 2 Front



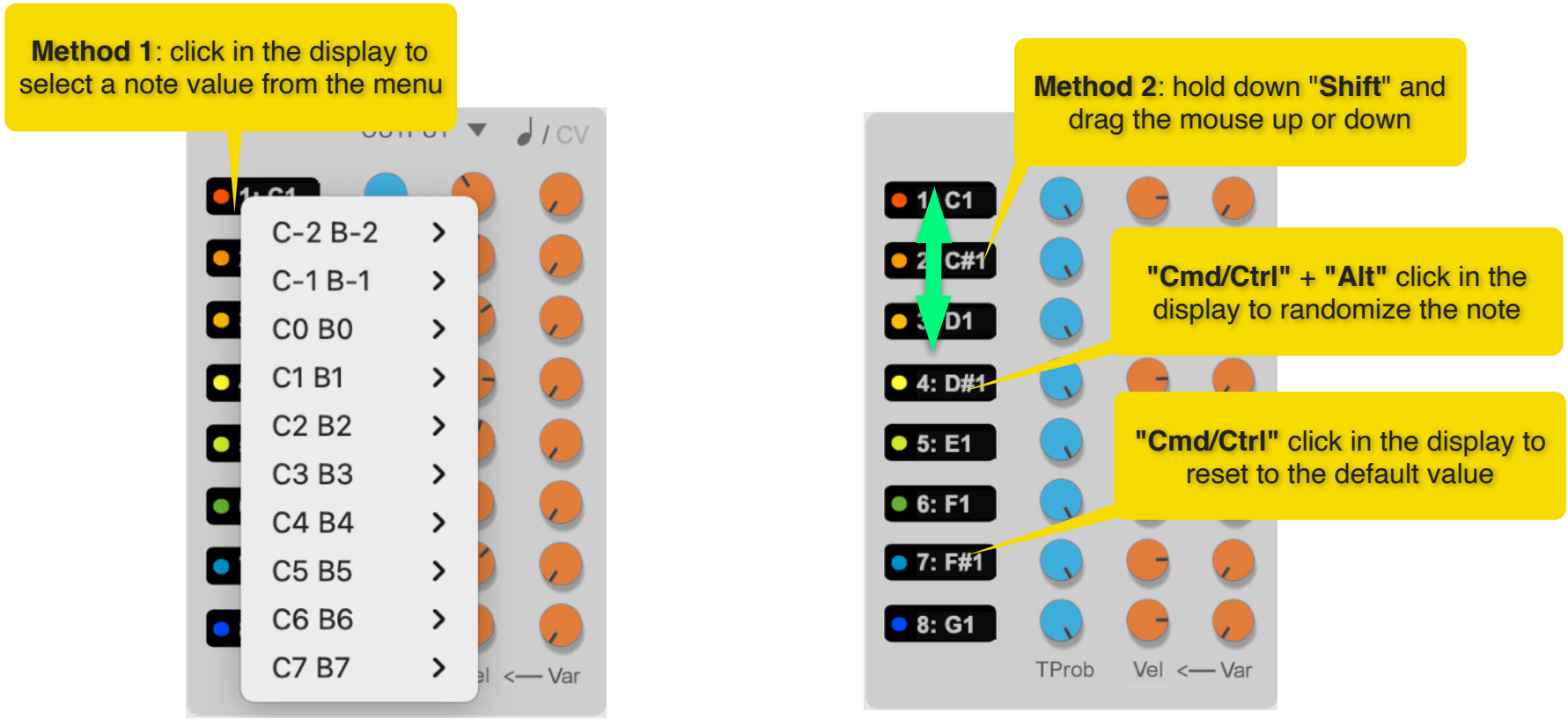
## 3.5 The Output Section

The Output section is where you configure the notes and CV modulations which are sent from the 8 output channels. As discussed in section 3.1 "The Basic Principle of Operation", each channel is assigned a color with corresponding dots in the matrix. As the cells evolve, they move over the different colored dots and trigger the corresponding output channels. This section explains how to assign notes to each channel, along with the trigger probability and the velocity. Then it explains how to configure the CV modulation outputs. It also discusses the "Ext MIDI" mode which further expands the potential uses for the device.



## 3.5.1 Assigning Notes to Channels

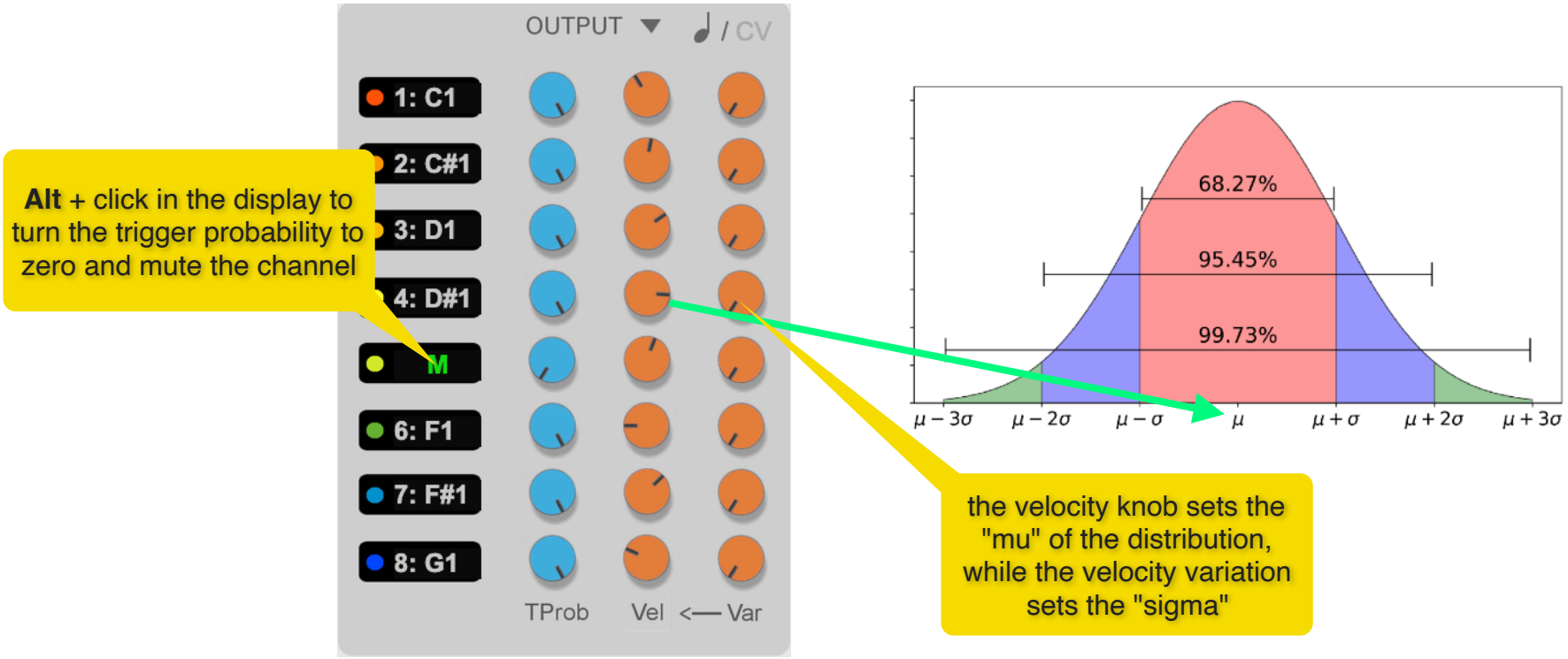
To assign a note to a channel, simply click on the corresponding display and choose a note value from the menu. Alternatively, hold down "Shift" and drag the mouse up or down. You can randomize a particular channel by holding down "Cmd/Ctrl" + "Alt" and clicking on its display. To reset a channel to default values, hold down "Cmd/Ctrl" and click on the display.



## 3.5.2 Assigning a Trigger Probability and Velocity to Channels

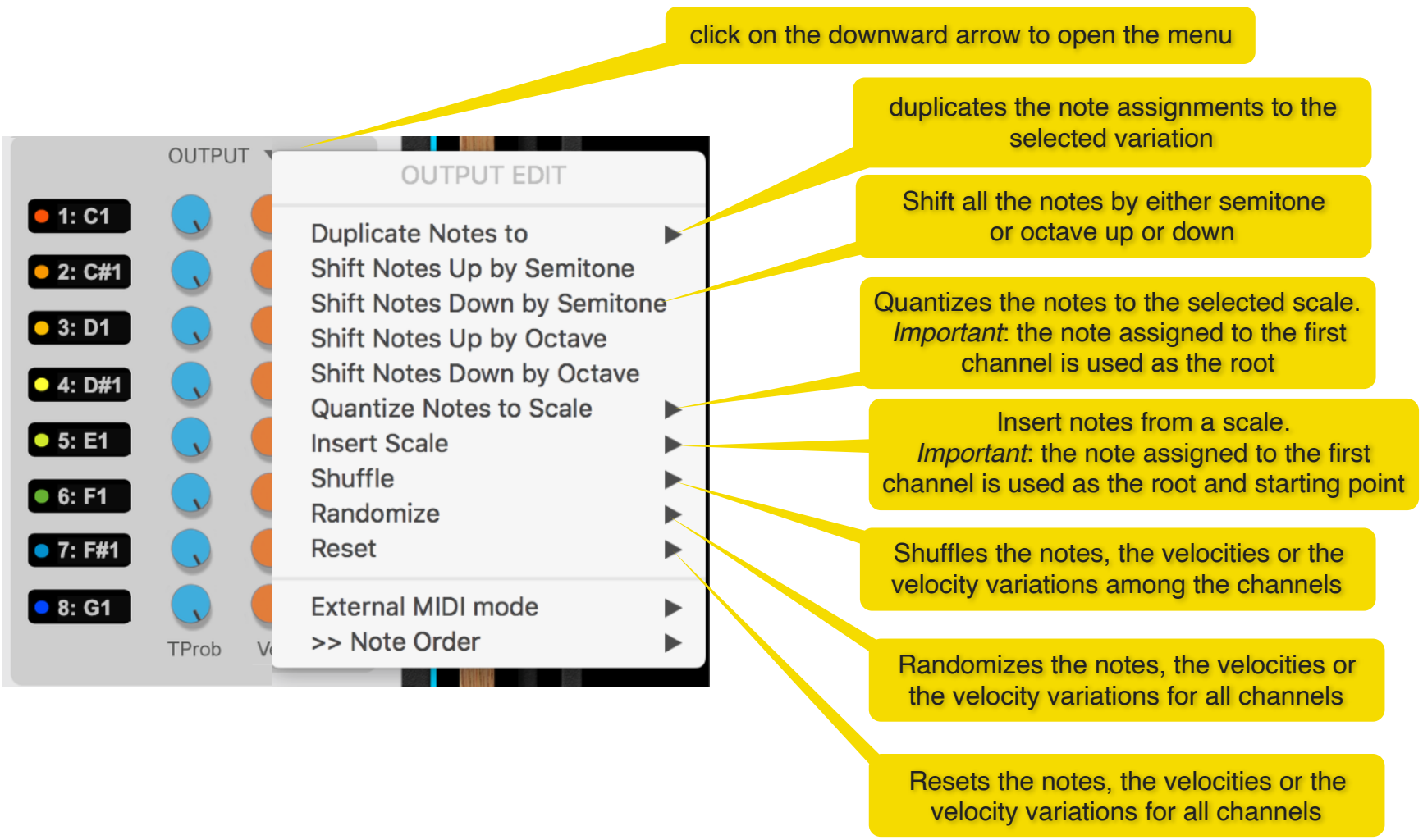
For each note channel, you can set a trigger probability and a velocity with velocity variation.
The trigger probability is particularly useful for injecting a bit of variation into otherwise static sequences.Turning the trigger probability all the way to zero effectively mutes the corresponding channel. You can also use a shortcut to do that by holding down "**Alt**" and then clicking in the note display. When a channel is muted, the display shows an "M".

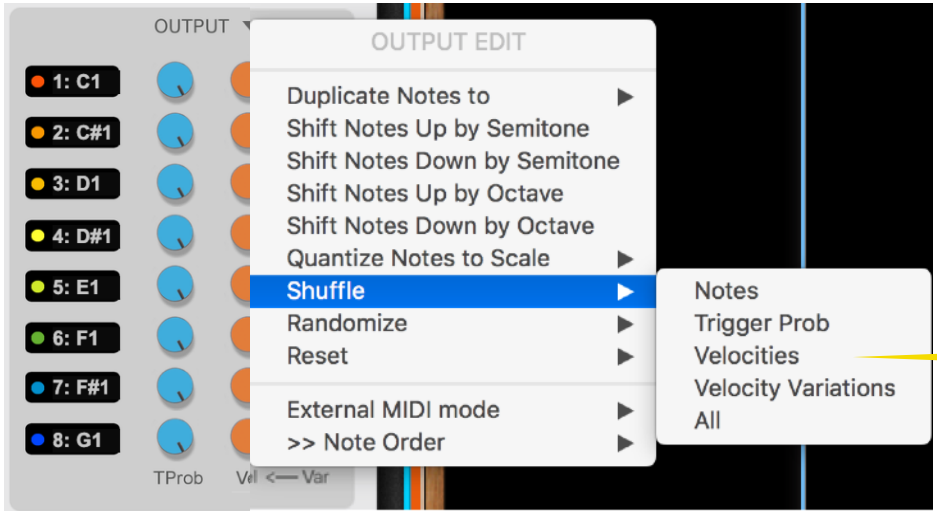
The velocity knob sets the velocity of the outgoing note. If the velocity variation is zero, then all the notes are sent with the same velocity. If the velocity variation is greater than zero, then the velocity of the outgoing notes is randomly assigned according to the normal distribution where the value set by the velocity knob represents the center of the distribution "mu" and the value set by the velocity variation represents the "sigma".



## 3.5.3 The Output edit menu (Notes)

The Output edit menu offers several commands which make it easier to work with note and velocity assignments. Also, from this menu you can enable "Ext MIDI Mode" which will be discussed in more details in the next section. To open the Output edit menu, click on the downward arrow next to the "Output" label.

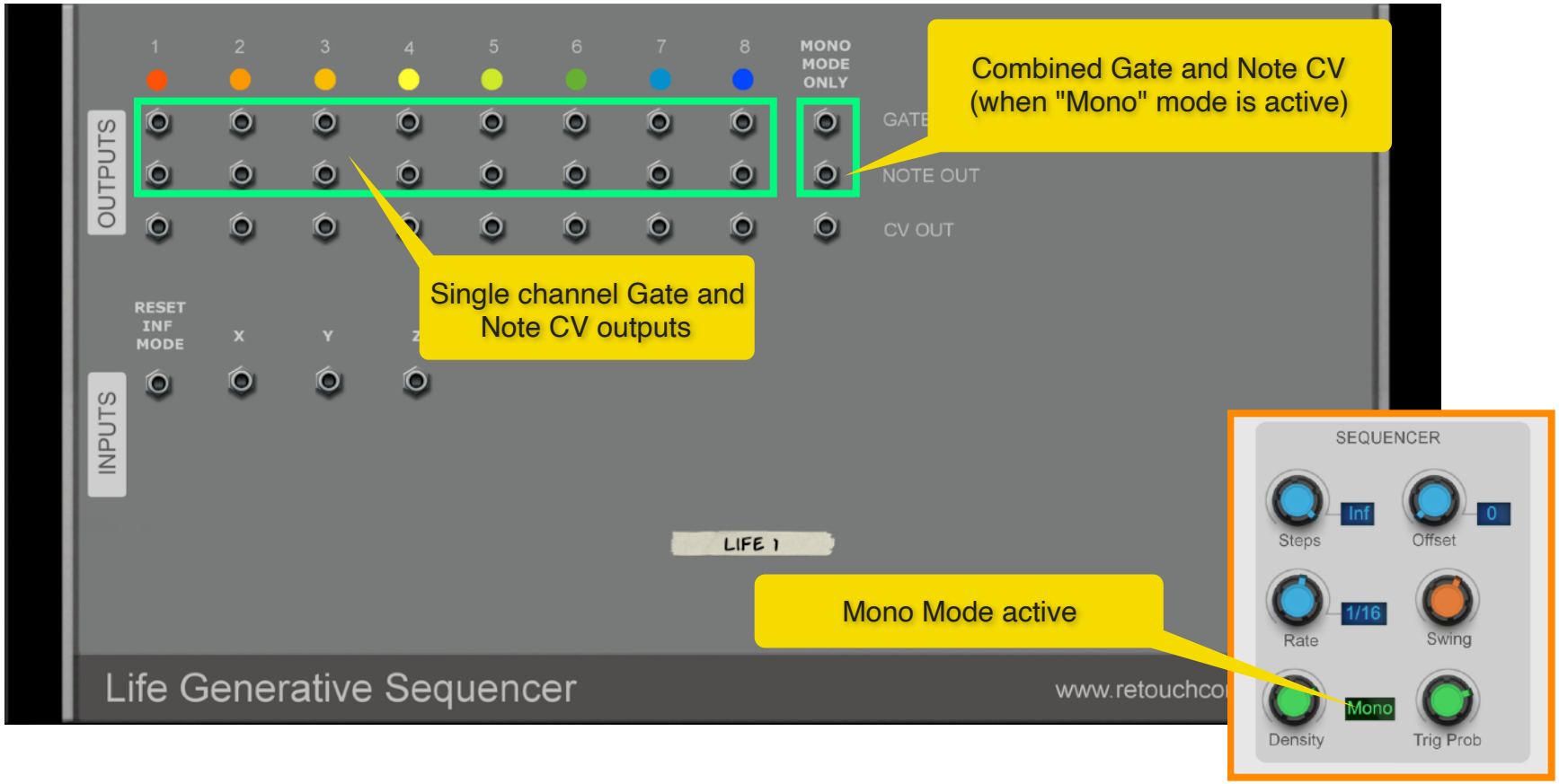





You can choose to shuffle/randomize/reset only the notes, only the velocities, only the velocity variations or all of them at the same time

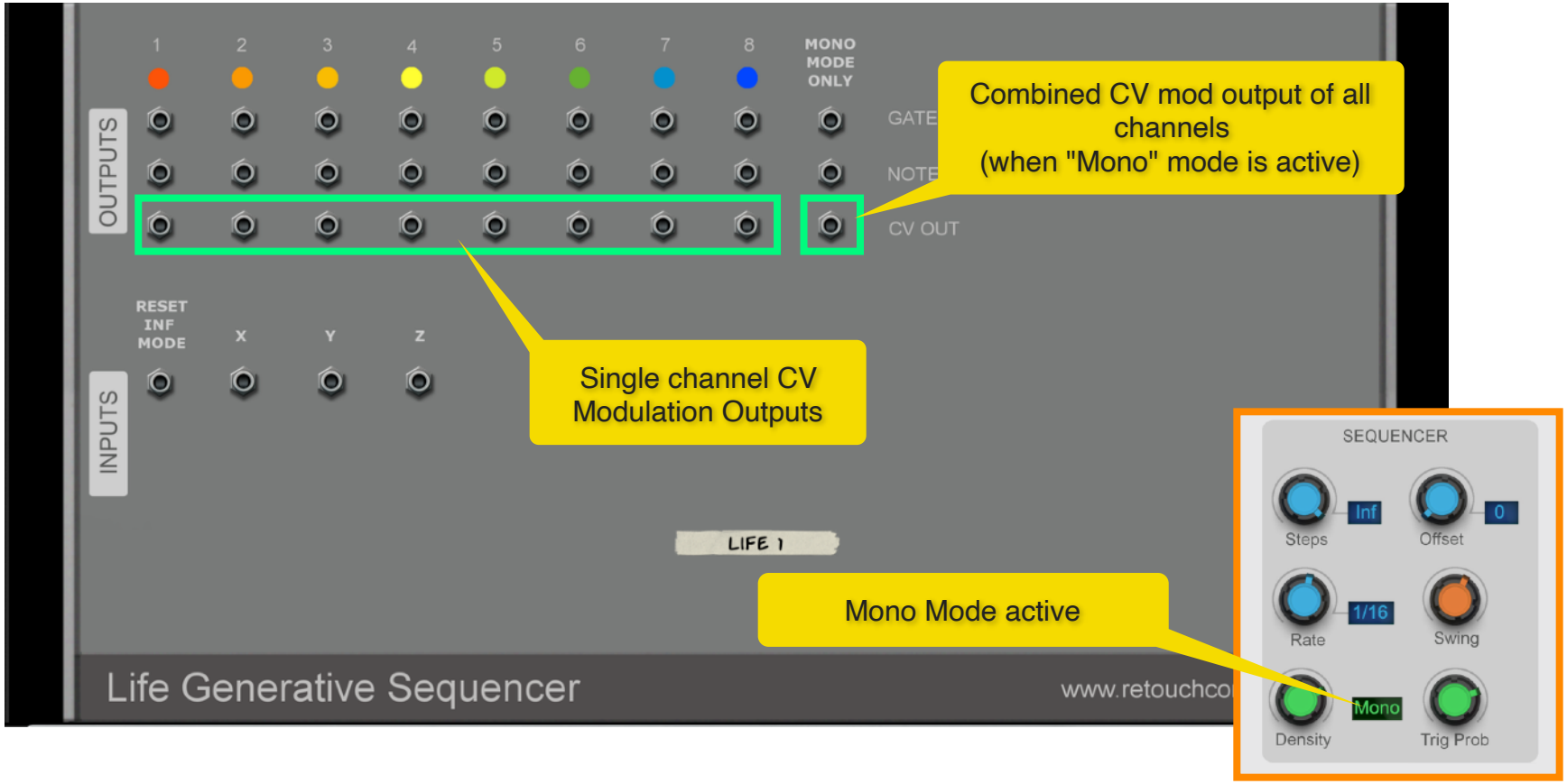
## 3.5.4 Note Output via CV

Each channel can also output a note via Gate and Note CV from the back fo the device. When "Mono" mode is active, the combined note outputs are sent via the dedicated Mono mode Gate and Note CV jacks, as shown below.

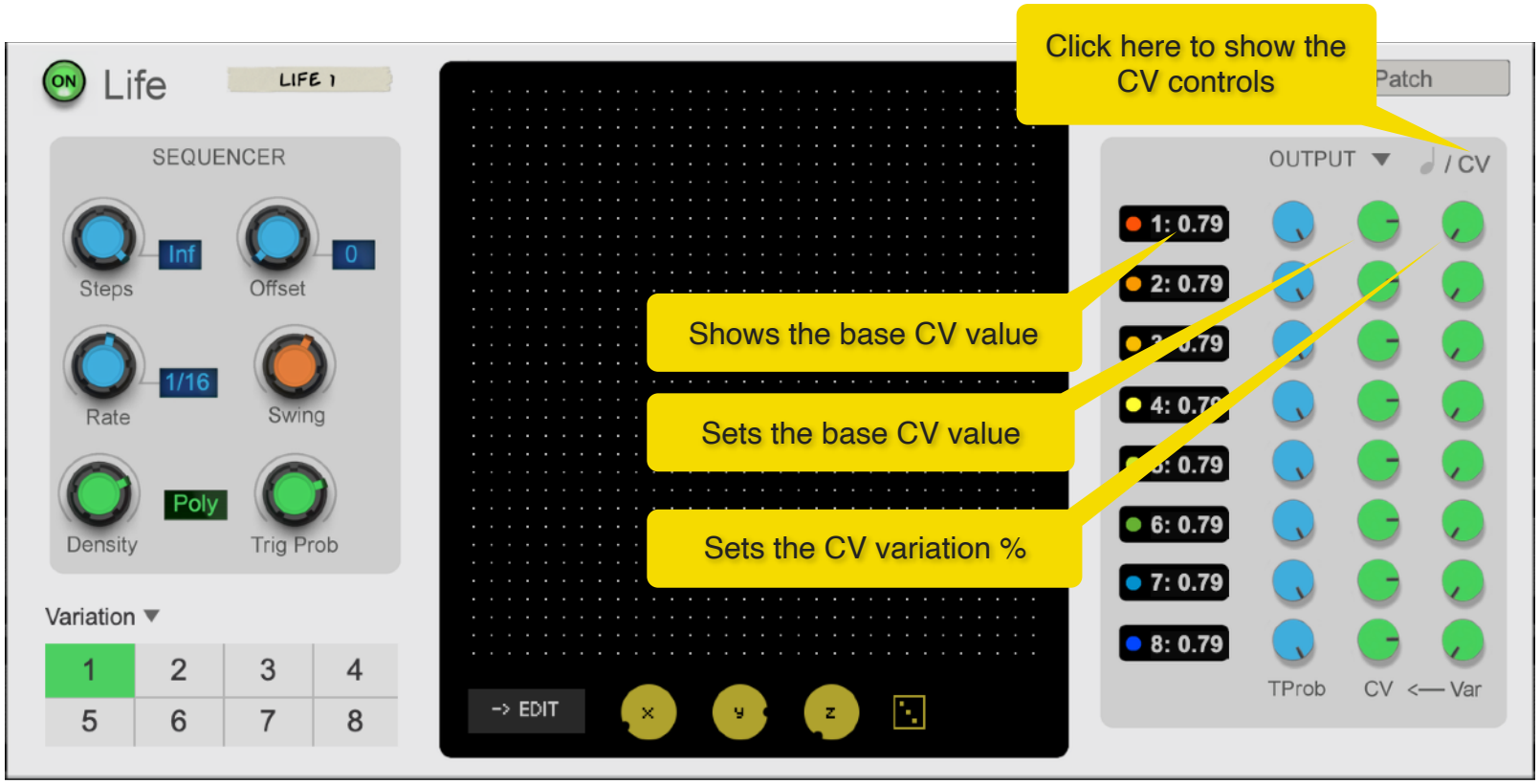


## 3.5.5 Assigning CV Modulations to Channels

As the cell moves across the dot matrix, they can trigger CV modulation signals as well. They are sent via the CV outputs jacks in the back of the device.

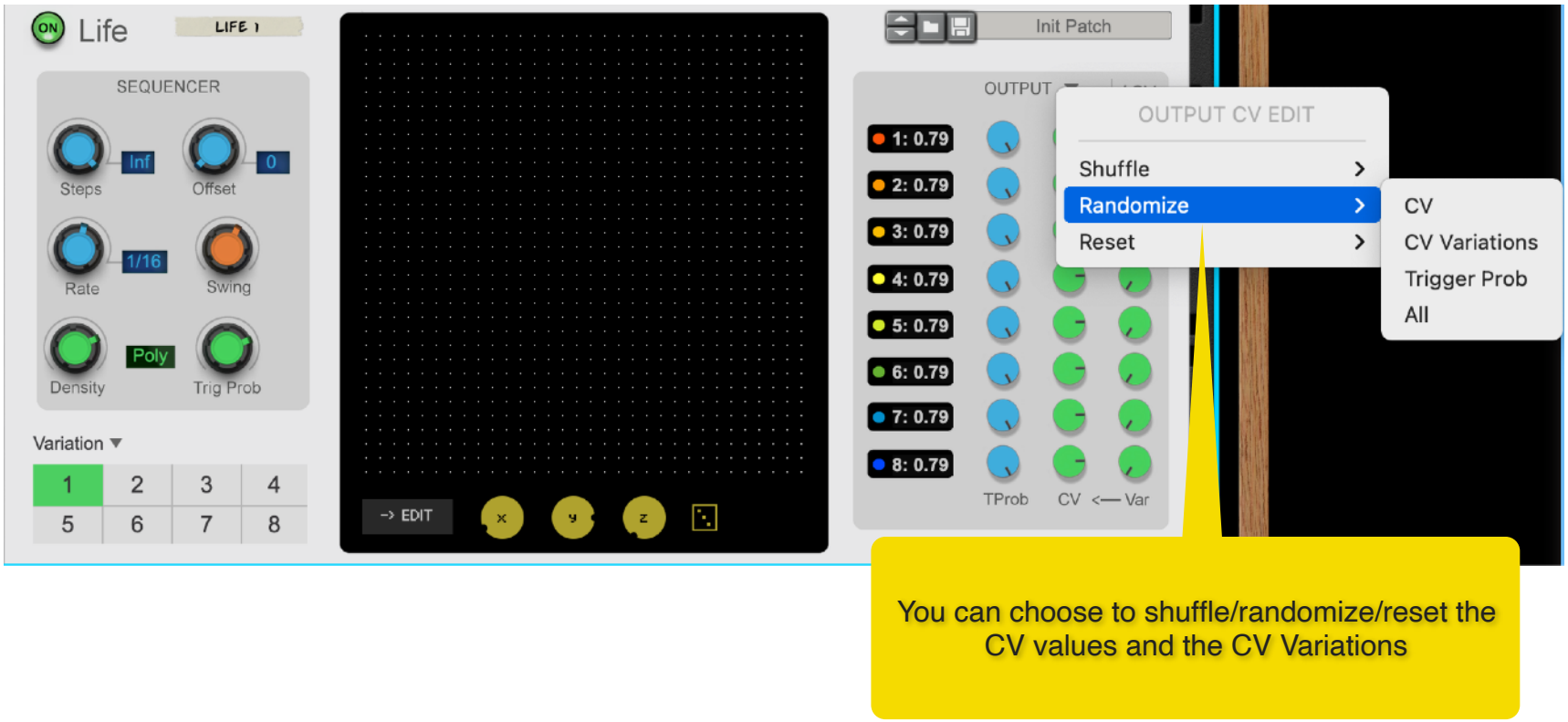


Each cell color has dedicated controls in the front of the device for setting the base CV value and any CV variation. There is a switch in the upper right corner of the Output section which allows access to the CV controls. Every time a channel is triggered, the CV modulation value is sent from the corresponding output channel and its value is equal to the base CV value, plus any CV variation.



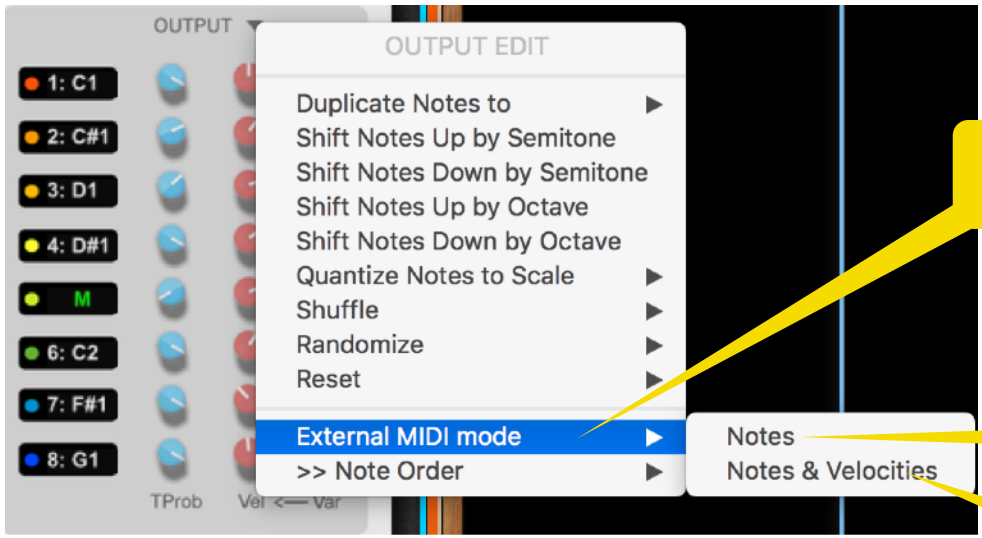
## 3.5.6 The Output Edit Menu (CV)

When CV editing is selected, the Output edit menu displays only information pertinent to the CV controls.



## 3.5.7 External MIDI mode

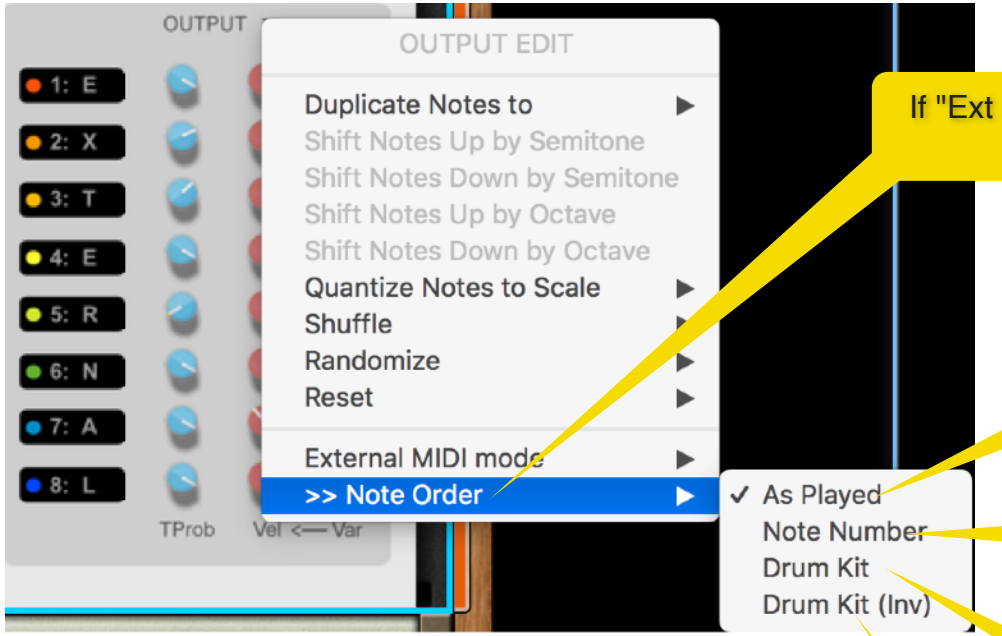
If External MIDI mode is enabled from the Output edit menu, the notes assignments for the output channels are bypassed. Instead the device works like an arpeggiator and it uses the notes which it receives. For example, if you play chords on your MIDI keyboard, then the notes of the chord are going to be used as the output notes for the sequence. The same thing is true if you use a chord player on top of the Life player.
There are several settings concerning how External MIDI Mode works. These are explained below. The "Note Order" has a few interesting options, so pay attention to that. When combined with the Poly/Mono switch in the Sequencer area, you'll find that External MIDI mode has a lot of fun uses and it can yield some great results.




Click on "Notes" or "Notes & Velocities" to enable "Ext MIDI mode"

If you choose Notes, then only the incoming MIDI note values are used. The velocity of the notes is set by the velocity and velocity variation knobs

If you choose Notes & Velocities, then both the MIDI note values and velocities are used.
The values of the velocity and velocity variation knobs are bypassed




If "Ext MIDI" mode is enabled, then the "Note Order" options become active

**As Played**: the currently held MIDI notes are assigned to the different output channels (starting from channel 1) in the temporal order in which they were received

**Note Number**: the currently held MIDI notes are assigned to the different output channels according to their note value, with the lowest note assigned to channel 1, and so on

**Drum Kit**: the device only listens for incoming notes in the range C1 to G1. If such a note is received, the corresponding channel is unmuted and that note is allowed to play

**Drum Kit (Inv)**: the device only listens for incoming notes in the range C1 to G1. If such a note is received, the corresponding channel is muted and that note is not allowed to play

# 4. Tips and Tricks

## 4.1 Creating Drum Patterns

Life is capable of creating a variety of drum patterns, from conventional to more experimental. Here are some tips for getting the best results.

**Tip#1 Start with the oscillators**
The easiest way to get started is to choose a "ready made" oscillator from the contextual menu in Edit mode (**cmd/ctrl** + click in the display to open it). Each oscillator in the list has a different period, so it will repeat its pattern after a certain number of steps. Experiment with putting together oscillators with periods which are multiples of each other. Another interesting option is to use oscillators with even and odd numbered periods.

**Tip#2 Mute and Unmute channels**
Hearing all of the 8 channels going at once can be a bit much. Try to pick out the interesting parts in the pattern by muting and then unmuting the channels. A quick way to mute/unmute a given channel is to "**Alt**" + click in the note display area.

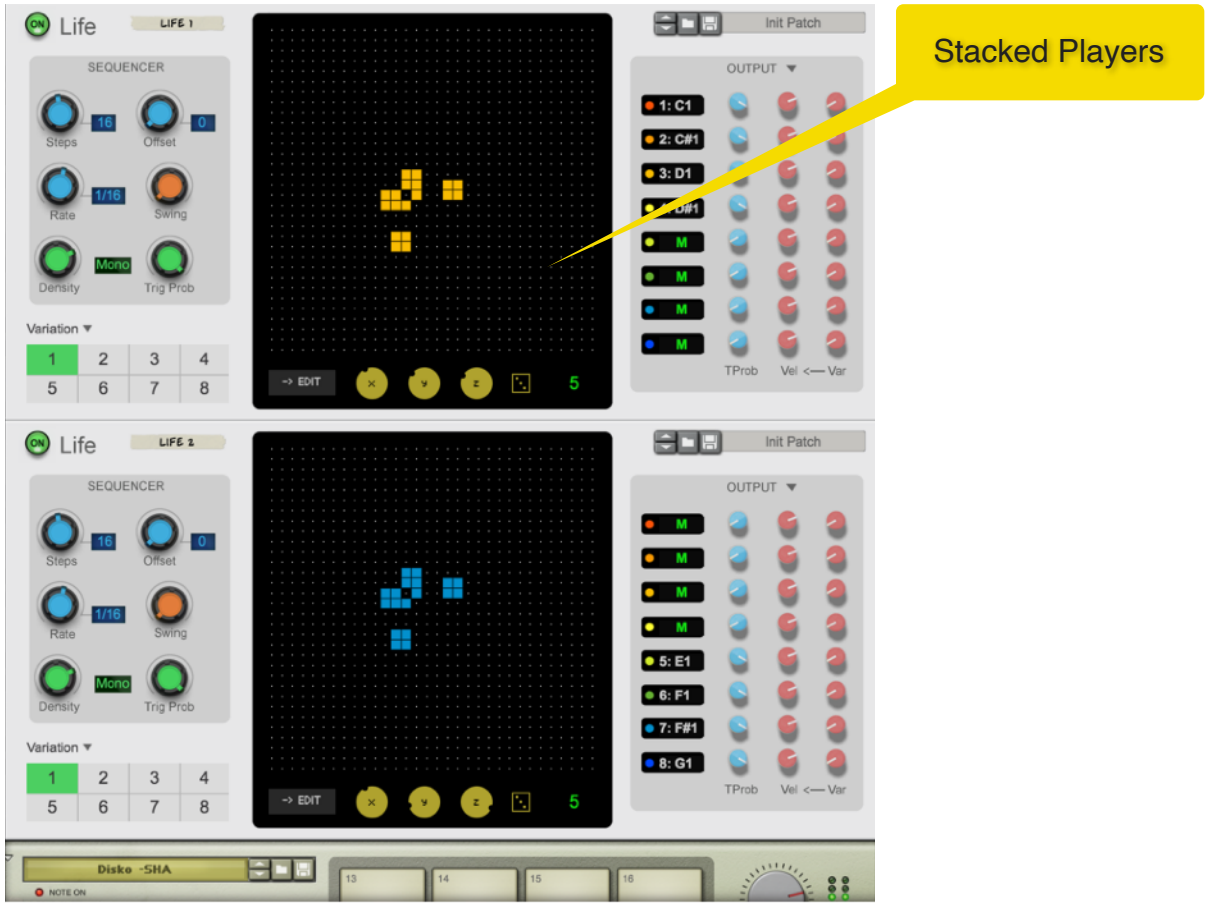
**Tip#3 Try both Poly and Mono modes**
Most of the time, Poly mode is the way to go. But sometimes switching the play mode to "Mono" can generate some interesting results. This style of programming is called "linear" drumming where only one drum instrument plays at once. When you switch to Mono mode, make sure to increase the note Density so that you get enough triggers.

**Tip#4 Shuffle the channel notes**
Once you have a pattern you like, it might be interesting to experiment with shuffling the channel notes around. You basically retain the basic rhythm of the pattern, but you re-assign the drum instruments. This can be done easily via the Output Edit menu. Choose "Shuffle" and then "Notes".

**Tip#5 Use External MIDI Drum Kit mode**
Similarly to Tip#2, in External MIDI mode with either the "Drum Kit" or "Drum Kit (Inv)" selected for "Note Order", you can experiment with drum parts by muting/unmuting certain drums directly from your midi keyboard. Just make sure to play notes C1 to G1 on the keyboard. This is a fun way to come up with drum variations.

**Tip#6 Stack players on top of each other**

Sometimes one is not enough. The great things about players in Reason is that you can stack them on top of each other. So if you find that one Life instance is not giving you the results you want, you might want to try stacking two of them (or more). Of course you'll have to manage the output channels and it might be a good idea to leave some on in one instance while muting them in the other. The advantages of having more than one instance is that you can create very different configurations so that it is easier to achieve more interesting patterns, especially for polyrhythms.



## 4.2 Creating Arpeggios and Bass Lines in Ext MIDI Mode (with some help)

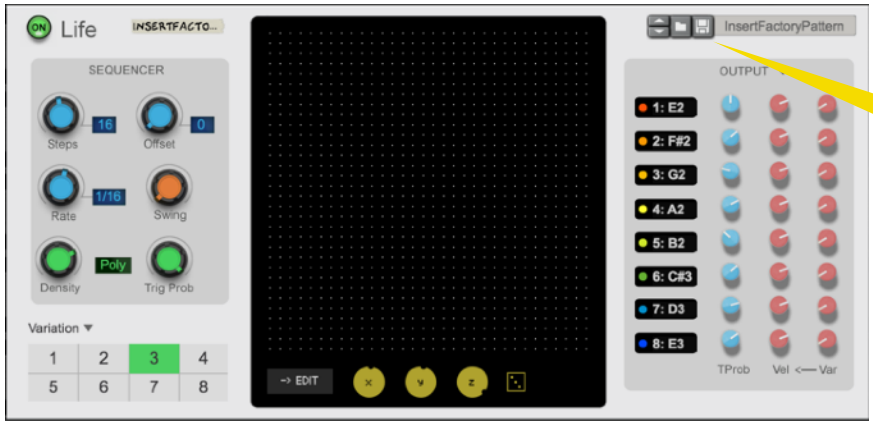
The External MIDI mode can be quite fun and rewarding in general, but it can produce even more interesting results with some help from the Note Echo player. Let's suppose we want to create an arpeggio of chords made up of 4 notes. As each chord is played, the 4 notes in the chord will fill up the first 4 output channels, while the other channels will remain empty. If we place a Note Echo on top of Life, we can fill up those 4 empty channels and thus create some more interesting arpeggios. For example, we could set Note Echo with a single repeat and a pitch shift of +5, or +7 or +12. These are usually good choices, but feel free to experiment. This approach can work quite well when creating bass lines as well. In that case, we could even increase the numbers of repeats.


Set "Note Echo" to 12 repeats and pitch shift of +3 or +4, and +7, and +12

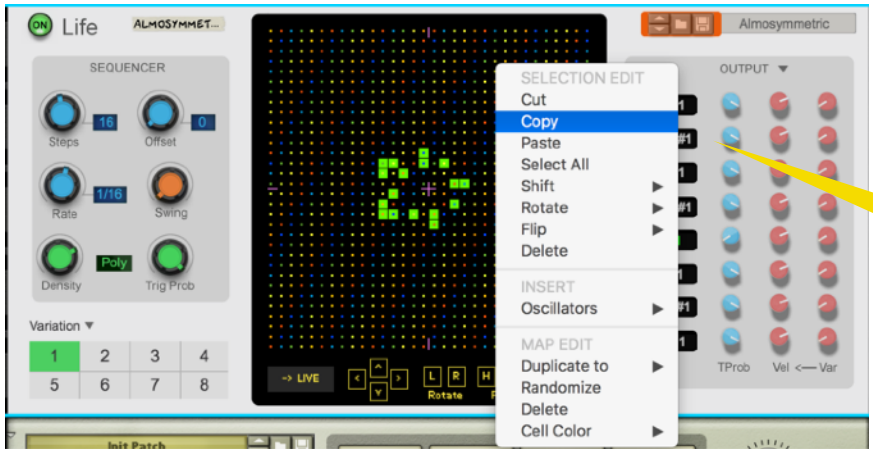
For a single note you play, additional notes are added by Note Echo at intervals suited for bass

## 4.3 Inserting patterns from the "Pattern Library" patch folder

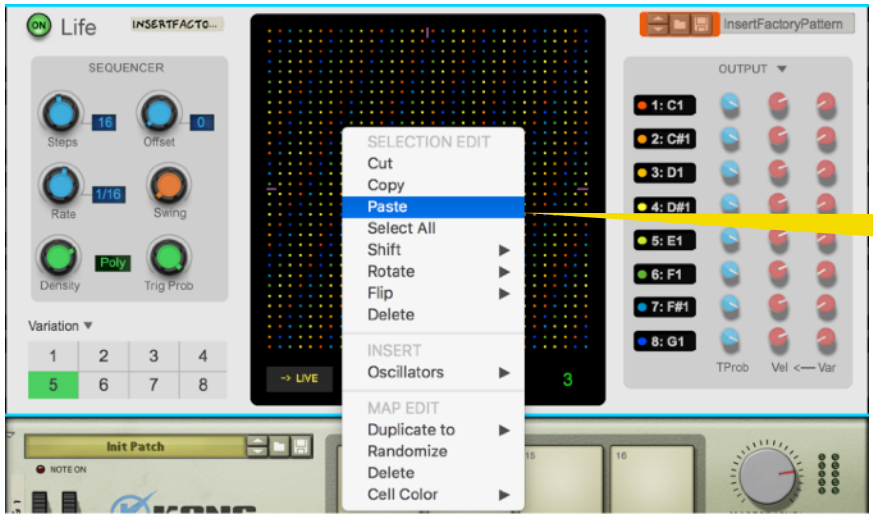
In the factory patches, there is a folder named "Pattern Library" which contains many pre-made patterns. Some of these are recreations of historical patterns which were discovered over the years by various researchers. In this paragraph, you'll find tips on how to "import" one of these patterns into an existing patch. Let's suppose you have a patch with a a few Variations already filled, but would like to add a factory pattern into an empty Variation. Follow the steps below to do just that.



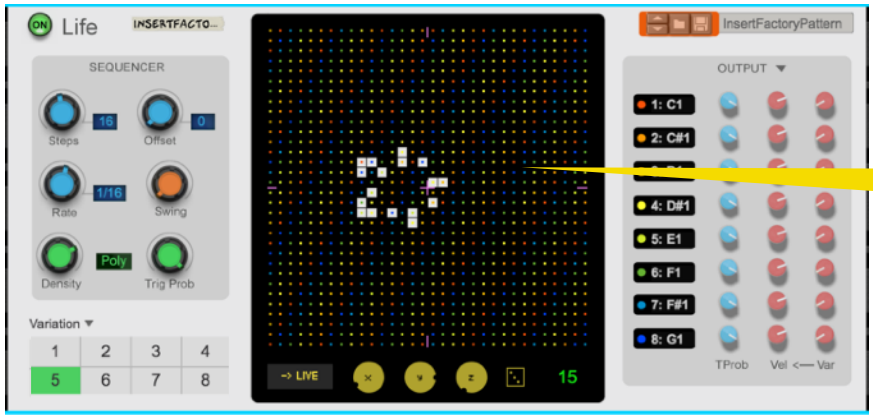

**Step 1**: save the starting patch into which you want to insert the factory pattern




**Step 2:** open the patch with the factory pattern, press "Edit" mode, Alt+click and drag to select the pattern and then copy it from the context menu (cmd/ctrl+click to open the menu)




**Step 3:** re-open the starting patch, select an empty Variation, then go to "Edit" mode and from the context menu, select "Paste"




**Step 4:** the factory pattern is now copied into the starting patch.

# 5. MIDI Implementation

**MIDI CC - Parameter**

[4] = Variation
[5] = OnOff
[33]=density_V1
[34]=density_V2
[35]=density_V3
[36]=density_V4
[37]=density_V5
[39]=density_V6
[40]=density_V7
[41]=density_V8
[42]=trigProb_V1
[43]=trigProb_V2
[44]=trigProb_V3
[45]=trigProb_V4
[46]=trigProb_V5
[47]=trigProb_V6
[48]=trigProb_V7
[49]=trigProb_V8
[50]=rate_V1
[51]=rate_V2
[52]=rate_V3
[53]=rate_V4
[54]=rate_V5
[55]=rate_V6
[56]=rate_V7
[57]=rate_V8
[58]=steps_V1
[59]=steps_V2
[60]=steps_V3
[61]=steps_V4

[62]=steps_V5
[63]=steps_V6
[65]=steps_V7
[66]=steps_V8
[67]=OffSetsteps_V1
[68]=OffSetsteps_V2
[69]=OffSetsteps_V3
[70]=OffSetsteps_V4
[71]=OffSetsteps_V5
[72]=OffSetsteps_V6
[73]=OffSetsteps_V7
[74]=OffSetsteps_V8
[76]=out1TrigProb_V1
[77]=out1TrigProb_V2
[78]=out1TrigProb_V3
[79]=out1TrigProb_V4
[80]=out1TrigProb_V5
[81]=out1TrigProb_V6
[82]=out1TrigProb_V7
[83]=out1TrigProb_V8
[84]=out2TrigProb_V1
[85]=out2TrigProb_V2
[86]=out2TrigProb_V3
[87]=out2TrigProb_V4
[88]=out2TrigProb_V5
[89]=out2TrigProb_V6
[90]=out2TrigProb_V7
[91]=out2TrigProb_V8
[92] =out3TrigProb_V1
[93]=out3TrigProb_V2
[102]=out3TrigProb_V3
[103]=out3TrigProb_V4
[104]=out3TrigProb_V5
[105]=out3TrigProb_V6
[106]=out3TrigProb_V7
[107]=out3TrigProb_V8

[108]=out4TrigProb_V1
[109]=out4TrigProb_V2
[110]=out4TrigProb_V3
[111]=out4TrigProb_V4
[112]=out4TrigProb_V5
[113]=out4TrigProb_V6
[114]=out4TrigProb_V7
[115]=out4TrigProb_V8
[116]=out5TrigProb_V1
[117]=out5TrigProb_V2
[118]=out5TrigProb_V3
[119]=out5TrigProb_V4
[128]=out5TrigProb_V5
[129]=out5TrigProb_V6
[130]=out5TrigProb_V7
[131]=out5TrigProb_V8
[132]=out6TrigProb_V1
[133]=out6TrigProb_V2
[134]=out6TrigProb_V3
[135]=out6TrigProb_V4
[136]=out6TrigProb_V5
[137]=out6TrigProb_V6
[138]=out6TrigProb_V7
[139]=out6TrigProb_V8
[140]=out7TrigProb_V1
[141]=out7TrigProb_V2
[142]=out7TrigProb_V3
[143]=out7TrigProb_V4
[144]=out7TrigProb_V5
[145]=out7TrigProb_V6
[146]=out7TrigProb_V7
[147]=out7TrigProb_V8
[148]=out8TrigProb_V1
[149]=out8TrigProb_V2
[150]=out8TrigProb_V3
[151]=out8TrigProb_V4

[152]=out8TrigProb_V5
[153]=out8TrigProb_V6
[154]=out8TrigProb_V7
[155]=out8TrigProb_V8
[156]=game_rule_V1
[157]=game_rule_V2
[158]=game_rule_V3
[159]=game_rule_V4
[160]=game_rule_V5
[161]=game_rule_V6
[162]=game_rule_V7
[163]=game_rule_V8
[227]=vel1_V1
[164]=vel1_V2
[165]=vel1_V3
[166]=vel1_V4
[167]=vel1_V5
[168]=vel1_V6
[169]=vel1_V7
[170]=vel1_V8
[171]=vel2_V1
[172]=vel2_V2
[173]=vel2_V3
[174]=vel2_V4
[175]=vel2_V5
[176]=vel2_V6
[177]=vel2_V7
[178]=vel2_V8
[179]=vel3_V1
[180]=vel3_V2
[181]=vel3_V3
[182]=vel3_V4
[183]=vel3_V5
[184]=vel3_V6
[185]=vel3_V7
[186]=vel3_V8

[187]=vel4_V1
[188]=vel4_V2
[189]=vel4_V3
[190]=vel4_V4
[191]=vel4_V5
[192]=vel4_V6
[193]=vel4_V7
[194]=vel4_V8
[195]=vel5_V1
[196]=vel5_V2
[197]=vel5_V3
[198]=vel5_V4
[199]=vel5_V5
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[201]=vel5_V7
[202]=vel5_V8
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[205]=vel6_V3
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[214]=vel7_V4
[215]=vel7_V5
[216]=vel7_V6
[217]=vel7_V7
[218]=vel7_V8
[219]=vel8_V1
[220]=vel8_V2
[221]=vel8_V3
[222]=vel8_V4

[223]=vel8_V5
[224]=vel8_V6
[225]=vel8_V7
[226]=vel8_V8
[227]=edges_V1
[228]=edges_V2
[229]=edges_V3
[230]=edges_V4
[231]=edges_V5
[232]=edges_V6
[233]=edges_V7
[234]=edges_V8

# 6. Remote Implementation

To obtain the complete list of all the available parameters which are controllable via Remote, use the "Extract Device Remote Info" from the File menu in Reason. Here is a partial list for the parameters of Variation 1.

| Remote Name | Min | Max | Input Type | Output Type |
|---|---|---|---|---|
| Sequencer Steps Var1 | 0 | 32 | Value | ValueOutput |
| Step Offset Var1 | 0 | 14 | Value | ValueOutput |
| Sequencer Rate Var1 | 0 | 9 | Value | ValueOutput |
| Density Var1 | 0 | 4 | Value | ValueOutput |
| Global Trigger Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch1 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch2 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch3 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch4 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch5 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch6 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch7 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch8 Trig Probability Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch1 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch2 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch3 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch4 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch5 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch6 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch7 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |
| Ch8 Velocity Var1 | 0 | 4194304 | Value | ValueOutput |

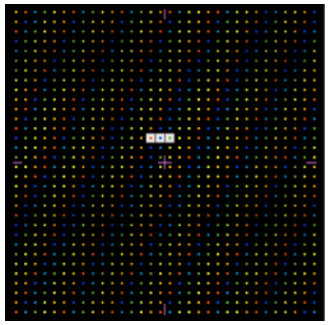
# 7. Version History

**Version 1.1.0:**
- New games rules ("High Life", "Seeds" and "Day&Night), plus new edge behaviors
- New CV panel controls and CV output jacks for generating modulation signals
- Gate, Note and CV jacks specific for "Mono" mode
- "Infinite" mode reset via mouse click or CV input
- CV modulation inputs for the X, Y and Z morphing controls
- Capture the current phase of the cells as the starting seed configuration
- Improved algorithm for generating random seed configurations, plus new randomization shortcut
- Expanded automation list including the game rules and edge behaviors
- New front panel knobs for the Output section

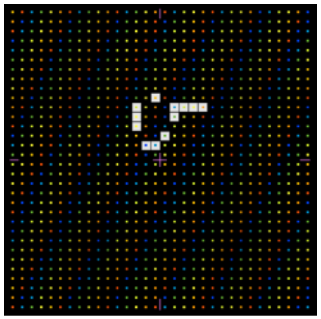
**Version 1.0.0:** initial release

# 8. Appedix A - Oscillator Shapes

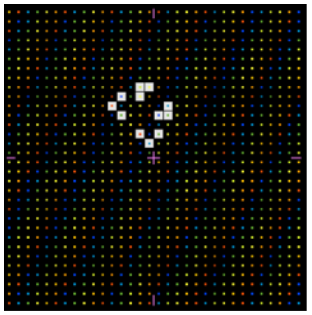
Here is the list of all the oscillators shapes available from the Edit menu (when in Edit mode, Cmd/Ctrl + Click in the display to open the menu).



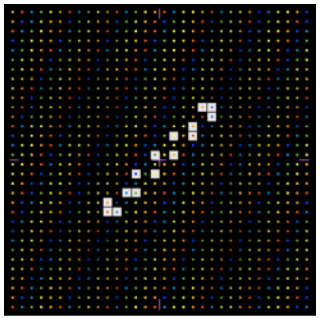
Period 2



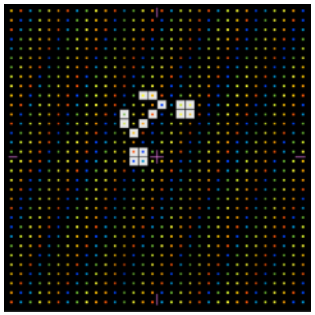
Period 3



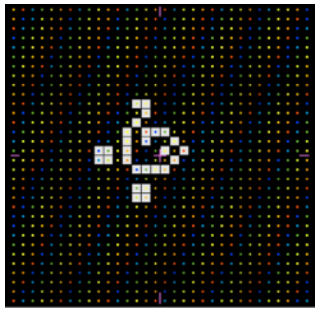
Period 4



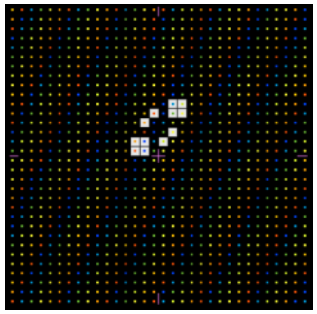
Period 5



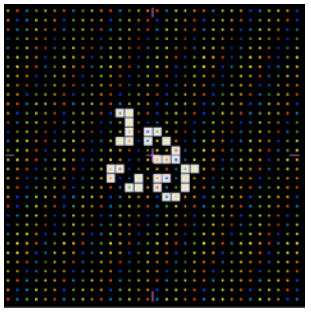
Period 6



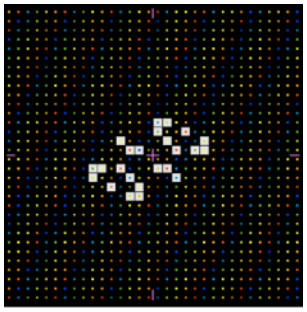
Period 7



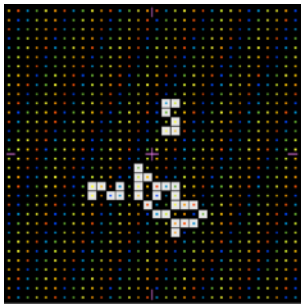
Period 8



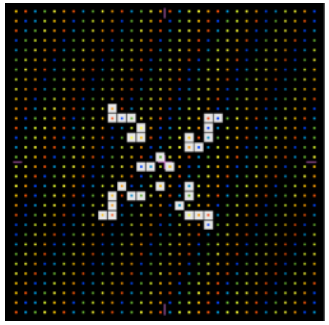
Period 9



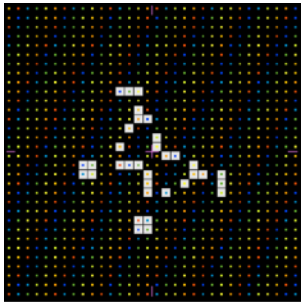
Period 10



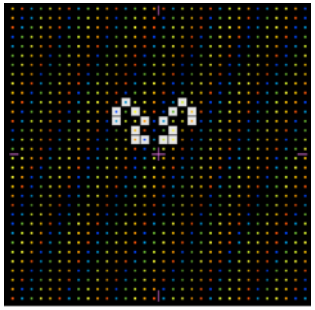
Period 11



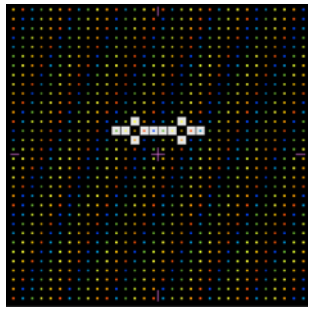
Period 12



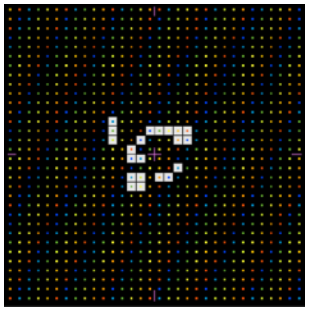
Period 13



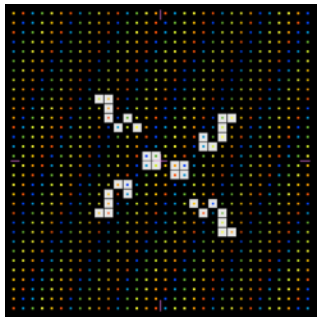
Period 14



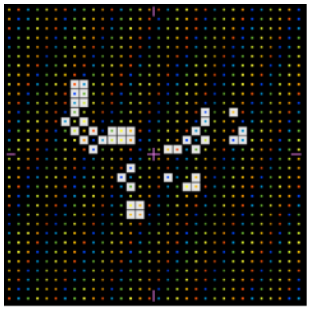
Period 15



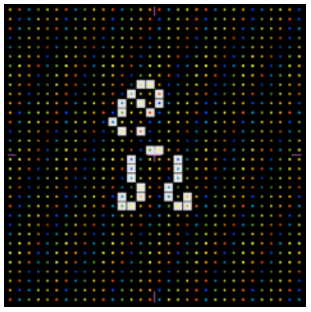
Period 16



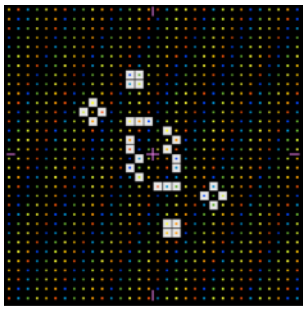
Period 17



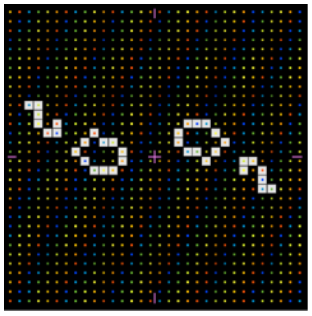
Period 18



Period 20



Period 21



Period 22

# 9. Appendix B - "Game of Life" web resources

The most complete list of patterns for the Game of Life can be found at this web address: https://conwaylife.appspot.com/library

For a list of the best known oscillators type, this wiki page is quite useful: https://conwaylife.com/wiki/Oscillator#cite_note-lcm-3

You can find all things related to the "Game of Life" at this site: https://conwaylife.com