RENÉ

RENE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes / modifications not approved by the Make Noise Co. could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Make Noise warrants this product to be free of defects in materials or construction for a period of one year from the date of purchase (proof of purchase/invoice required).
Malfunction resulting from wrong power supply voltages, backwards or reversed eurorack bus board cable connection, abuse of the product or any other causes determined by Make Noise to be the fault of the user are not covered by this warranty, and normal service rates will apply.

During the warranty period, any defective products will be repaired or replaced, at the option of Make Noise, on a return-to-Make Noise basis with the customer paying the transit cost to Make Noise. Please contact technical@makenoisemusic.com for Return To Manufacturer Authorization.

Make Noise implies and accepts no responsibility for harm to person or apparatus caused through operation of this product.

Please contact technical@makenoisemusic.com with any questions, needs & comments, otherwise...
go MAKE NOISE!

http://www.makenoisemusic.com

René was developed in collaboration with firmware wizard Yerpa58. We spent nearly one full year realizing and growing the original concepts, and over that time we also became good friends. In all, it was wonderful project, and we hope to realize others.

Also of great help in developing René were Shawn "Packin' Peanuts!" Cleary, Josh "Wood-finger" Kay, Richard "don't like sequencers" Devine, Aaron "Leadfinger" Abrams, Surachai, James "Data Cadet" Cigler, Tim "Stone-Finger" Hurley and especially, Kelly Kelbel.

About This Manual:
Written by Tony Rolando
Edited by Walker Farrell
Illustrated by W.Lee Coleman

Electrocution Hazard!

Always turn the Eurorack case off and unplug the power cord before plugging or un-plugging any Eurorack bus board connection cable cable.
Do not touch any electrical terminals when attaching any Eurorack bus board cable.

The Make Noise Rene is an electronic music module requiring 80 mA of +12VDC and 0 mA of -12VDC regulated voltage and a properly formatted distribution receptacle to operate. It must be properly installed into a Eurorack format modular synthesizer system case.

Go to http://www.makenoisemusic.com/systems.shtml for examples of Eurorack Systems and Cases.

To install, find 34HP of space in your Eurorack synthesizer case, confirm proper installation of included eurorack bus board connector cable on backside of module (see picture below), plug the bus board connector cable into the Eurorack style bus board, minding the polarity so that the RED stripe on the cable is oriented to the NEGATIVE 12 Volt line on both the module and the bus board. On the Make Noise 6U or 3U Busboard, the negative 12 Volt line is indicated by the white stripe.

The René module is not compatible with power solutions using the MeanWell brand AC Adapters.
The René module will not work on power solution using the MeanWell brand AC Adapters.
Make Noise will not be able to provide support for René modules used on power solutions using the MeanWell brand AC Adapters.

-12V
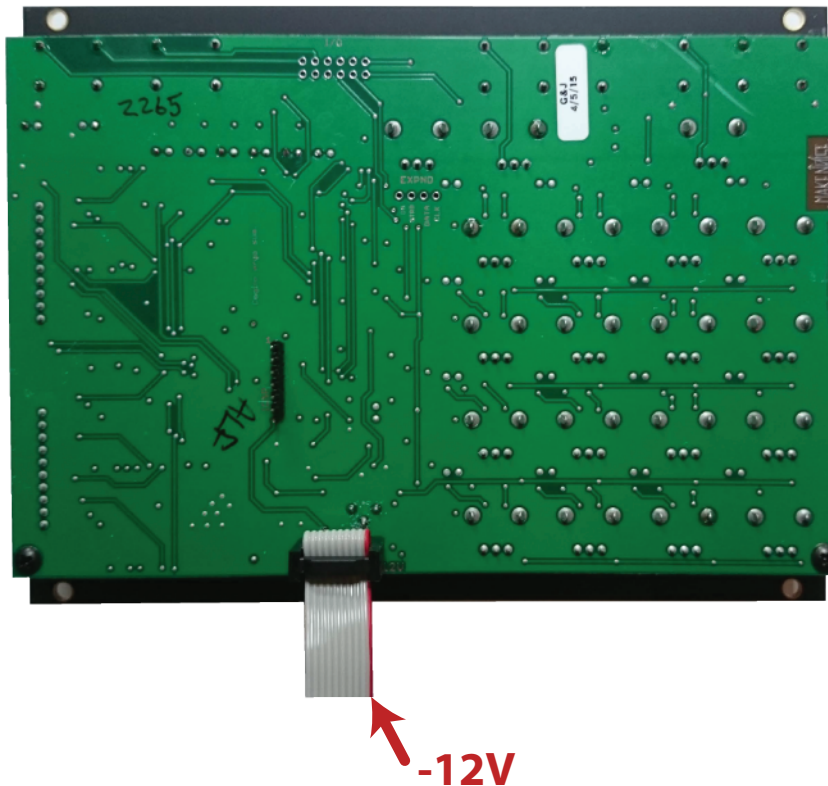
Please refer to your case manufacturers' specifications for location of the negative supply.

René is deep, but all you really need to know: Patch one clock to X-CLK, and a second clock to Y-CLK, adjust clock rates and/ or divisors, tune voltages per location (the knobs) as desired. Adjusting those two clocks relative to each other will create seemingly infinite variations on the theme that is your sequence. Much joy may be had without any further knowledge, but I am certain you will want to know more, so read on.

René is the world's first and only Cartesian Sequencer for music synthesizers. Named for the French philosopher and mathematician René Descartes, it uses his cartesian coordinate system to unlock the analog step sequencer from the shackles of linearity. Like the classic analog sequencers, there are only 16 steps on René, each having an associated knob with which the note for that step is tuned. However, using René the patterns are not limited to 16 steps in length because the path taken through those steps is, for all practical purposes, infinite. In fact, René does not "step" at all, but rather it maps coordinates to locations in a grid, and because if this, it is possible to move in ways that you would never imagine a step sequencer to move. For this reason, we call the 16 steps on René "LOCATIONS," and rather than one Clock input there are two; one each for the X-Axis, and the Y-Axis.

The primary goal of this sequencer is to have a maximum amount of artist controlled musical variation, with a minimum amount of data input. There are no menus, ALL editing is done real-time, and thus, the ProGraMming of René becomes a key performance element.

The basic concept for how René works: each
Axis is being driven by the corresponding clock and control voltages, to generate a number from 0 to 3. These numbers together make up the coordinates for the next location that René will go to. For example, if X hits 2 and Y is at 3, then René goes to location 14.

The concept is simple, but the results are madly complex, especially when combined with some of the other math that René will do.
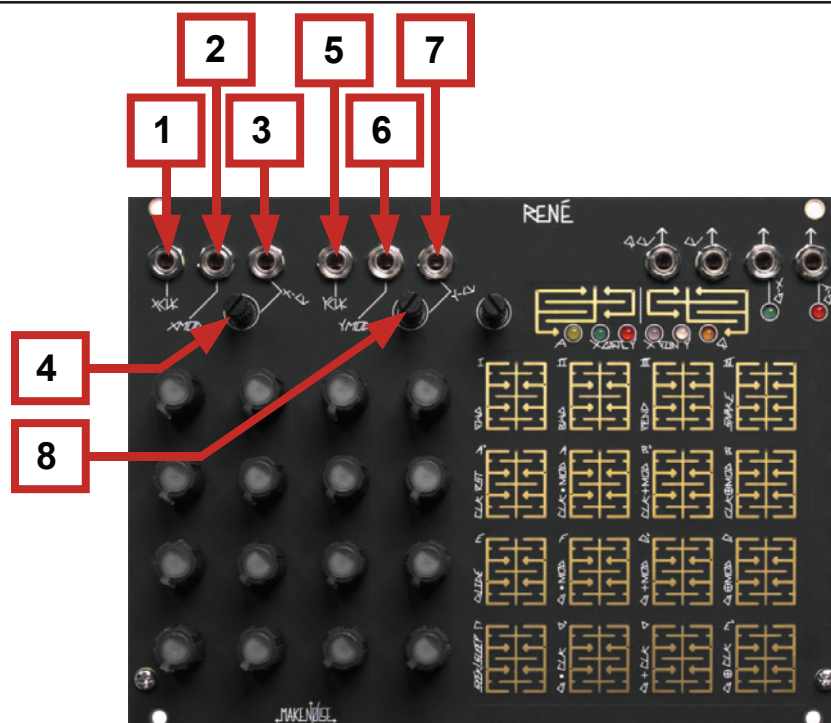
René Panel Controls

Inputs:

1. X-CLK Input: Clock/Gate signal (of width greater than .5ms and amplitude greater than 2.5V) applied to this input drives the X-Axis Counter. If using MATHS to clock, then set Vari-Response to LINEAR. When René counts Snake Style, X-CLK steps linearly through a stored set of coordinates; it drives the sequence.

2. X-MOD Input: The state of this input (either HI or LO) further determines behavior of René depending upon the selections made in the X-Fun PGM Page. For example, when CLK-RST is selected under X-Fun a logic HI at this input will Reset the X-Axis Counter to 0.

3. X-CV Input: Control signal at this input generate a number that is added to the number generated by the X-Axis Counter, to create the X coordinate. When René counts Snake Style, X-CV scans linearly through a stored set of coordinates. X-CV is normalled to +5V so that with nothing patched the attenuator acts as offset generator

4. X-CV Input CV Attenuator

5. Y-CLK Input: Clock/Gate signal (of width greater then .5ms and amplitude greater then 2.5V) applied to this input drives the Y-Axis counter. If using MATHS to clock, then set Vari-Response to LINEAR. When René counts Snake Style, Y-CLK selects stored coordinates set.

6. Y-MOD Input: The state of this input (either HI or LO) further determines behavior of René depending upon the selections made in the Y-Fun PGM Page. For example, when Glide is selected under Y-Fun a logic HI at this input will engage the glide function.

7. Y-CV Input: Control signal at this input generate a number that is added to the number generated by the Y-Axis Counter, to create the Y coordinate. When René counts Snake Style, Y-CV selects stored set of coordinates.. Y-CV is normalled to +5V so that with nothing patched, the attenuator acts as an offset generator.

8. Y-CV Input CV Attenuator

7
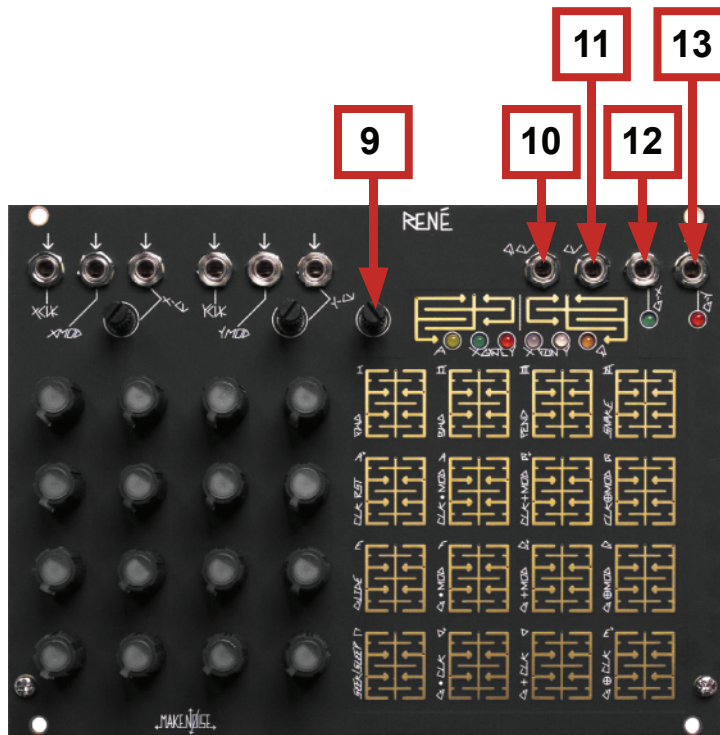
René Panel Controls (cont'd)

Sensivity:

9. **Touch Grid sensitivity control.** To increase sensitivity, set the position 100% clockwise.

Outputs:

10. **QCV:** The Quantized Control Voltage for the currently active location will appear at this output. QCV may also yield a Stored Quantized Voltage (if selected on Q Page), in which case the corresponding location potentiometer is no longer "live." Value: 4 octaves.

11. **CV:** An unquantized Control Voltage of the currently selected location will appear at this output. At the CV OUT, the location potentiometers are always "live." Value: 0 to 4.5V.

12. **Gate X:** This output reflects the ProGraMming on the X-Gate Page. When René arrives at a location, and the location is set to ON (lighted) at the X-Gate PGM Page, this output goes HI for duration determined by the XCLK width and any ProGraMmed Logic Operations that Axis Clock or Gate. When counting SNAKE style, the Gate output is always a skinny pulse (2ms) perfect for ringing Low Pass Gates. Value: 0V or +8V.

13. **Gate Y:** This output reflects the ProGraMming on the Y-Gate Page. When René arrives at a location, and the location is set to ON (lighted) at the Y-Gate PGM Page, this output goes HI for duration determined by the YCLK width and any ProGraMmed Logic Operations affecting the Axis Clock or Gate. When counting SNAKE style, the Gate output is always a skinny pulse (2ms) perfect for ringing LoPass Gates. Value: 0V or +8V.
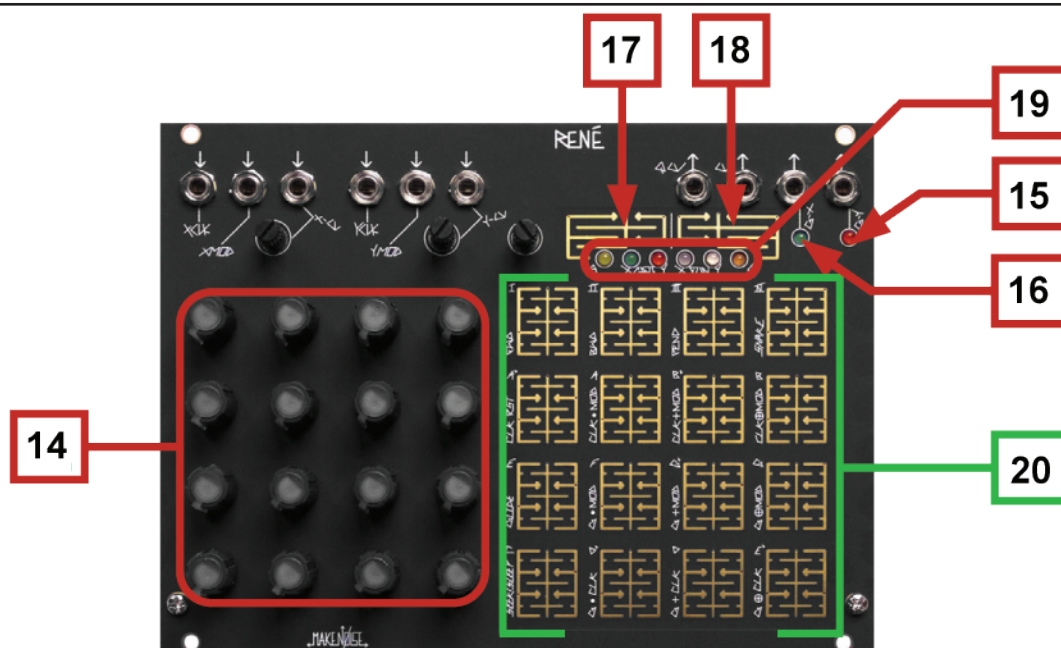
René Panel Controls (cont'd)

Interface:

14. **CV ProGraMming Grid**: Potentiometers used for ProGraMing. Contain Location LED's to indicate currently active Location(s).

17. **PGM 1:** [PRESS] to cycle through the ProGraM Pages

18. **PGM 2:** When in a ProGraM Page, [PRESS] to return to Play Mode. While in Play Mode, [PRESS] to latch currently-held Locations.

20. **Touch Grid:**   Used to select Locations for ProGraMming and latching.

Indicators:

15. **G-Y LED:** [FLASHES] to indicate Gate activity at the G-Y Output.

16. **G-X LED:** [FLASHES] to indicate Gate activity at the G-X Output.

19. **ProGraM Page LED's:** Light when associated ProGraM Page is being accessed. All ProGraM LED's will [FLASH] to indicate storage is taking place.

4x4 CV Programming grid: Potentiometers sets Tuned Voltage for corresponding Locations, 0 thru 15.

4x4 touch grid: In PLAY mode, the touch pads may be used to set ACCESS in real time, effectively allowing the performer to play
the ACCESS parameter. In use, this means that René will go to only the locations that the performer is touching.
Additionally, touching and releasing a single location while René is PLAYing will set a new start point, thus creating a
variation on your sequence. With no Clocks patched to René, touching any location on the Touch Grid will select said
location, and the CV and QCV value is held until the next location is touched, or a clock pulse is applied to either X-CLK or
Y-CLK. This is useful for Programming or Tuning Notes (with CV applied to VCO 1V/oct input, for example). In ProGraM
Pages, the Touch Grid is used select and deselect the various parameters available under each PGM Page.

PGM 1: This Touch Plate is used to cycle through the different ProGraM Pages. Each of the 6 ProGraM pages has an associated
LED which lights when selected. PGM1 returns to last selected PGM Page.

PGM 2: While PLAYing, this Touch Plate is used to Latch/Unlatch the steps held by the performer using the 4x4 Touch Grid. Once
within the PGM Pages, the PGM2 touch is used to EXIT the PGM Pages and return to PLAY. The PGM2 button is also used
to save the default start-up programming for René. To do this, make all changes to all ProGraM Pages. Touch PGM2 and
exit PGM Pages. Now, Touch and [HOLD] PGM2 until all PGM LED's blink.

Play:

This is the primary state of mind in which René will exist. The Location Lights (within the Knobs) show the Cartesian or Snake
motion of the sequence through the grid. While in PLAY, the performer may usethe touch grid to ProGraM ACCESS on the fly,
stop and hold the sequence at a particular note or set a new start point. Touching PGM1 brings up the PGM Pages (see below).
Touching PGM2 LATCHES locations currently touched by the performer (if any). All of the PGM Page LEDs will light until PGM2 is
touched again, at which point the Latched pattern is no longer. Movement is always governed by the X-CLK and Y-CLK inputs. For
example, the performer cannot select a three step sequence in the Y direction if there is no Y clock signal input. Touch and HOLD
PGM2 for 2 seconds, and the current state of René (all programming) is saved as the start-up state.

These pages give the performer real-time control over the deeper processes within René, allowing real time sculpting of the thought processes that drives the sequence.

ACCESS: the performer Grants ACCESS or Denies ACCESS to any of the 16 Locations in the Touch Grid. If a Location is ON (lighted), the René will be able to map those coordinates. If a location is OFF (not lighted), then René not be able to map those coordinates, and will either SEEK the nearest possible location, or SLEEP (keep in mind, that René counts in it's sleep) until mappable coordinates are conjured. Thus, ACCESS ProGraMming allows the performer to limit a pattern to certain Locations.

X-Gate: The performer may select/deselect which Locations in the 4x4 Touch Grid will generate a gate at the G-X Output.

Y-Gate: The performer may select/deselect which Locations in the 4x4 Touch Grid will generate a gate at the G-Y Output.

X-FUN: At this Page the 4x4 Touch Grid is used to edit the behavior of the X-Axis. For complete details of X-FUN's features, please see appendix A.

Y-FUN: At this Page the 4x4 Touch Grid is used to edit the behavior of the Y-Axis. For complete details of X-FUN's features please see appendix A.

Q: This PGM Page gives the performer the ability to define the Scale to which the QCV will be quantized. The performer is also given four slots to store Scales and the Voltages Programmed at the 16 Locations. For complete details of the Quantization Edit mode, please see appendix B.

(X-FUN and Y-FUN)

Counting:
> FWD: for every Clock Pulse, associated counter advances one digit. 0, 1, 2, 3. After 3, counter returns
>> to 0.
>
> BWD: for every Clock Pulse, associated counter recedes one digit. 3, 2, 1, 0. After 0, counter returns to
>> 3.
>
> PEND: for every Clock Pulse, associated counter advances from 0, 1, 2, 3 and then recedes 2, 1, 0. The
>> motion is like that of the pendulum of a clock.

Snake: When selected, the X-CLK and X-CV scan linearly through one of 8 sets of coordinates René has
> memorized (see Appendix C), the result is a more predictable, snake like movement through the 16
> Locations. The memorized coordinate sets are selected via pulses at the Y-CLK input and/or the Y-CV
> input and associated pot. Since the Y-CV is normalled to +5V, you may manually select a coordinate
> set by adjusting the Y-CV attenuator. Gates will be generated per axis, each time René moves along
> corresponding axis. So for example, moving from Location 2 to Location 3, G-X will pulse. Moving
> from Location 3 to Location 4, G-Y will pulse.

CLK RST: When selected, a pulse at the X-MOD input will reset the X Counter to 0, which is the left most
> column (coordinate 0, Y). A pulse at the Y-MOD input will reset the Y Counter to 0, which is the
> bottom most row (coordinate X, 0). If all of the zero coordinates are ACCESS DENIED by either
> ProGraMming or TOUCH ACCESS, and both X and Y Axis are Reset, then René will be forced to stop,
> since it has been Reset to a Location where there is no path out.
>
> In Snake Mode, a pulse at the X-MOD input will reset to the last stage touched. A pulse at the Y-MOD
> input will Reset the Snake pattern selection.

Glide: When selected under X-Fun and/or Y-FUN, the sequence will Glide between each step along the
> X-Axis when a gate is present at the X-MOD input. To use Glide, patch the Gate or Clock you wish to
> set glide on/off to one of the two MOD inputs. If you are using X-MOD, then go to X-FUN and set
> Glide to ON. If you are patched to Y-MOD, then go to Y-FUN in order to set Glide to ON. The Glide
> function is not Axis independent, and only one of the two axis needs to be used for programming
> Glides.

Seek/Sleep: When OFF (not lighted) René SEEKS, when ON (lighted) René SLEEPS. This refers to how René
> finds the next ACCESSible Location. If you have at least one Location set "Access Denied," you will
> hear the effect.
>
> **When René is plotting coordinates on the grid and it comes to a Location that has No ACCESS
> (ACCESS Denied) it will find ACCESS in one of two ways:**
>
> Seek: With this behavior, René is restless. If René comes to a Location that is ACCESS Denied, it looks
>> for the next available Location and goes immediately to this location, and FAST.
>
> Sleep: With this behavior, René is more relaxed. If René finds a Location that is ACCESS Denied, it just
>> kicks back and continues to count until it produces coordinates for a Location that may be
>> ACCESSed.

Musically speaking, Seek moves more, and Sleep will rest more. Using Sleep and ProGraMming Accessand Gates, it is possible to create rests, pauses and etc...
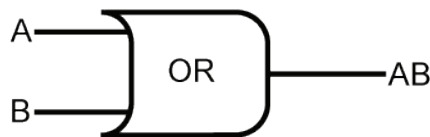
LOGIC OPERATIONS
There are 3 rows of the logic processing. CLK by MOD, Gate by MOD and Gate by Opposing CLK.With the Clock Logic Ops (locations 9, 10, 11) the MOD input is AND, OR, XOR against the CLocK and theresult drives the counter for the associated Axis.

With the Gate Logic Ops (locations 5, 6, 7) the MOD is AND, OR, XOR against the CLocK and the resultdrives the gate programming logic (X Gate or Y Gate pages). The LAST part of the chain is the GATE ON/OFF, thus giving Gate ProGraMming top level control in the grand scheme of René. When you want aparticular location to NOT generate an event, you turn off the Gate and there will be NO event.Truth Tables:
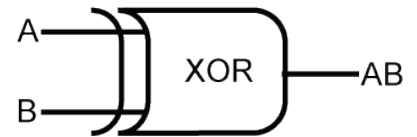
(NOTE: 0 = FALSE = OFF, 1 = TRUE = ON)
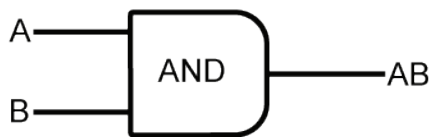
A	B	Out
0	0	0
0	1	0
1	0	0
1	1	1

A	B	Out
0	0	0
0	1	1
1	0	1
1	1	1

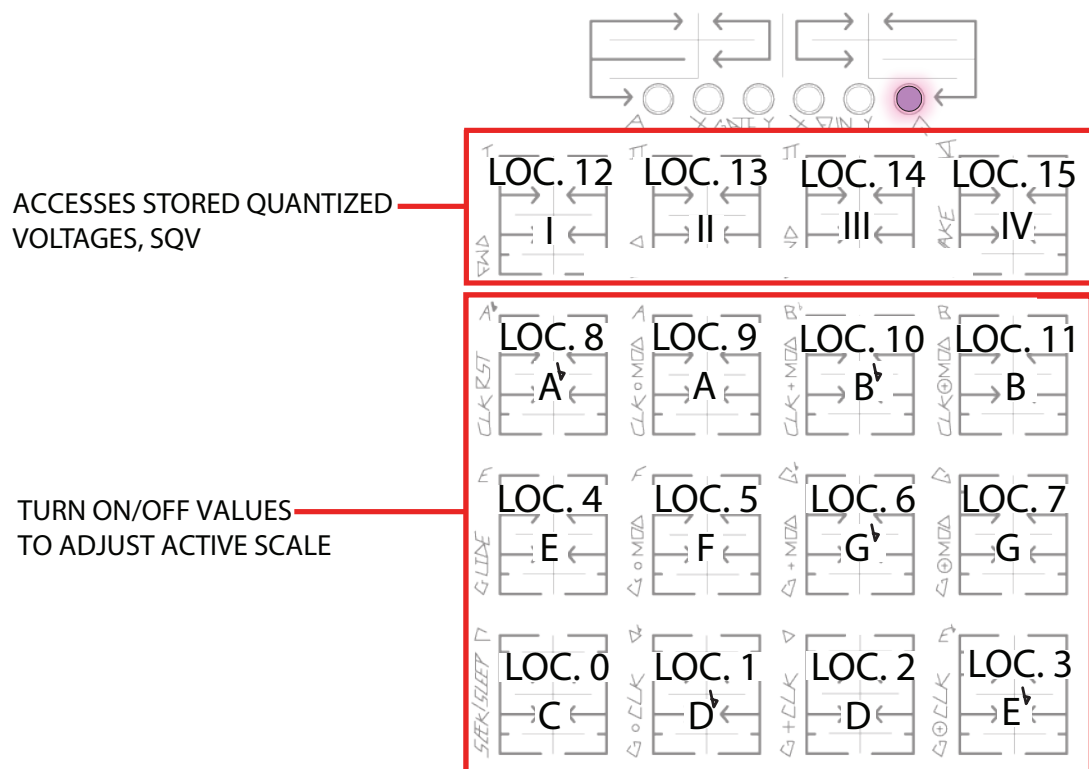| A	B	Out
0	0	0
0	1	1
1	0	1
1	1	0

For CLK by MOD logic operations the results apply to both the movement of the sequence and theassociated gate outputs. For Gate by MOD logic operations the results apply only to the associated gatesoutputs. It is easy to experiment with different logic operations, so do not be shy. In some cases theresults are wonderfully jumbled, while in others, they are barely noticeable. One parameter that has agreat deal of bearing on the outcome of these logic processes is Gate Width of the incoming CLocK andMOD signals.

Stored Quantized Voltages

While at the Quantize Page, to store all 16 Voltages as set by the potentiometers and the ProGraMmed Scale as set by touch grid Locations 0 thru 11, touch and hold either Location 12, 13, 14, or 15 until all 6 PGM LEDs flash. When Locations 12, 13, 14, or 15 is ON while accessing the Q Page, the QCV Out will produce voltages per location as well as the scale in which they were initially stored. The scale may still be edited on the fly, but the knobs will no longer be "live" while any one of the Stored Quantized Voltage (SQV) sets is in use. To turn OFF the Stored Quantized Voltages set, touch the location of the active set, thus toggling the SQV to OFF.

With the scale AND the Voltages you have programmed stored, you effectively have two channels of Control Voltages. The most common use would be to apply the QCV to 1V/ Octave input on your VCO, Program your scale and the notes you want to use in your composition. Store those to one of the 4 locations (12, 13, 14, 15). If you want variations, then store those variations to the remaining locations. Now, patch the CV out (un-Quantized) to a timbre control, such as FM Index, wave shape, or filter resonance. Because your QCV is using the Stored Quantized Voltages to drive the VCO, the un-Quantized CV out is now independent, as you are able to turn the knobs to program new voltages to controltimbre without changing the notes pattern driving your VCO. Apply the Gate outs to EG/ VCA combo or Low Pass Gate, and you have full control of one voice.

ACCESSES STORED QUANTIZED VOLTAGES, SQV

| LOC. 12 | LOC. 13 | LOC. 14 | LOC. 15 |
| I | II | III | IV |

TURN ON/OFF VALUES TO ADJUST ACTIVE SCALE

| LOC. 8 | LOC. 9 | LOC. 10 | LOC. 11 |
| A♭ | A | B♭ | B |

| LOC. 4 | LOC. 5 | LOC. 6 | LOC. 7 |
| E | F | G♭ | G |

| LOC. 0 | LOC. 1 | LOC. 2 | LOC. 3 |
| C | D♭ | D | E♭ |

Snake: Memorized Coordinate Sets:
These drawings illustrate the SNAKE like paths that René travels, reading coordinates from memory.
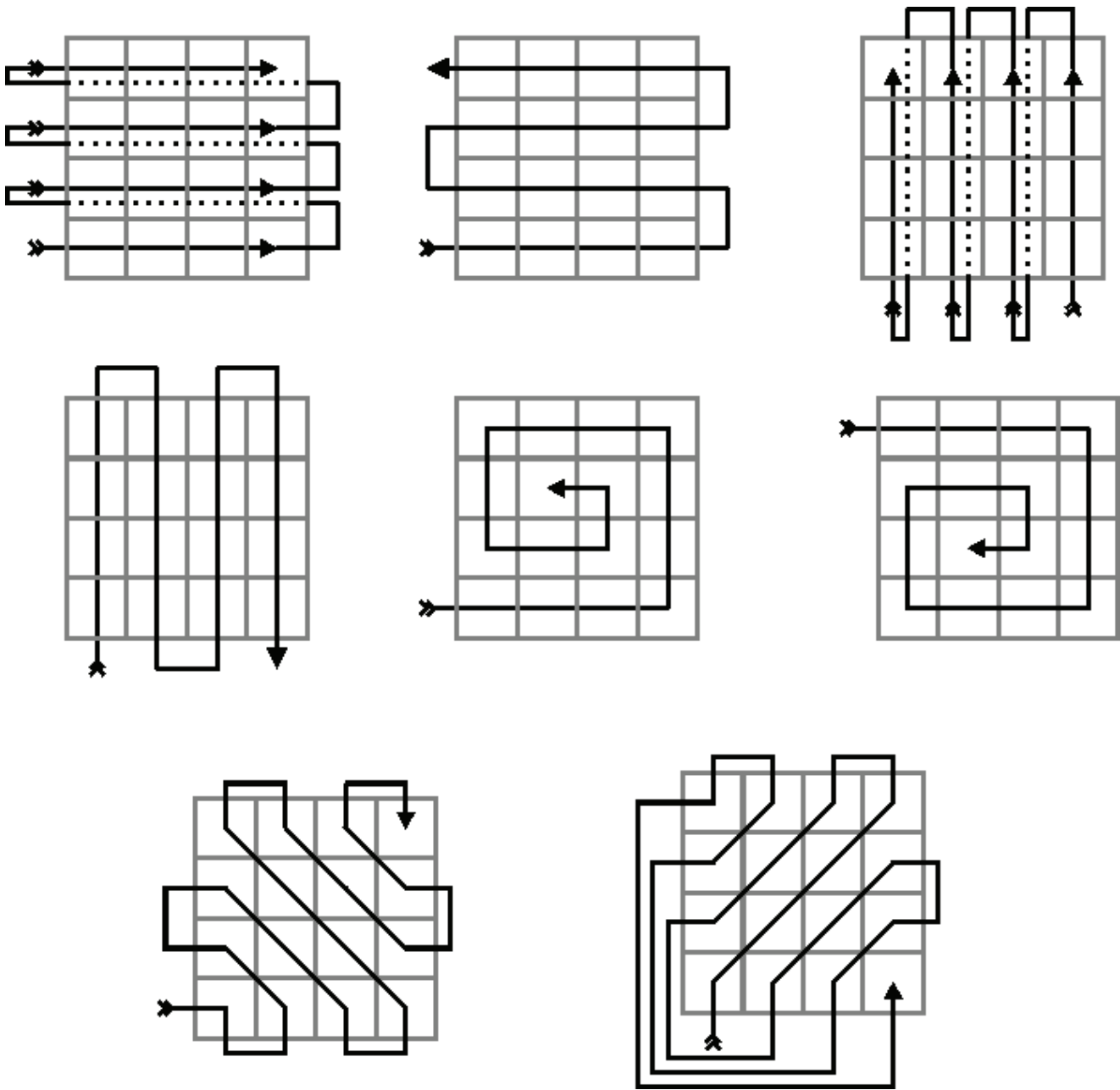
This section will provide a short walkthrough of the Logic portions of the X-FUN and Y-FUN pages.   These functions all take place "after" the ACCESS, X-GATE, and Y-GATE pages, so you can totally disable particular stages' Locations and Gates as an "over-ride" to the logic section. The ACCESS page can also be immediately overridden at any time by touching the Location Grid. This means that for each axis, there is a hierarchy:

- Touch
- Access Page
- Gate Page
- Clock Logic
- Gate Logic
- Opposing Clock Logic

To get started, activate all the locations on the ACCESS page and the X-GATE and Y-GATE pages. On the X-FUN and Y-FUN pages, and turn off all of the logic functions and make sure only Location 12 (FWD) is active, so that the Rene operates in Cartesian Mode. Now, you have an "init" state, as seen here.

Now, patch a clock source into the X-CLK input. Each clock pulse steps the Rene forward along the X-Axis and outputs a gate via the G-X Output.

The logic functions exist so that you can alter the two behaviors (Movement along the X-Axis and G-X Gates) independently. Specifically, it uses the COMBINATION of the signals at the X-CLK and X-MOD inputs to create new behaviors.

**On the X-FUN page, activate Location 9, AND:**
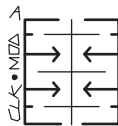
This is AND for the clock. Keep the clock patched to the X-Clock input. You'll see that the sequence is no longer advancing. Patch an Offset (for example, a Tuned Voltage from the Pressure Points or the EOC from a non-cycling Function/MATHS Ch4) to the X-MOD input. You'll notice the X-Axis will begin to advance again; however, only as long as the Gate stays high. AND logic means a signal needs to be present in BOTH inputs for a signal to appear at the output. In this case, X-CLK and X-MOD are the two inputs and the "output" refers to Rene X-Axis advancement; however, the Rene does fire Gates as well, which are available at the G-X Output. (Note: the Rene CAN advance without firing a Gate, but we'll get to that shortly.)

**Location 10 activates OR for the X-CLOCK:**
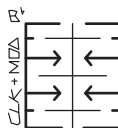
Activate it, and EITHER input will advance the Rene to the next X-Axis Location-- including if both are active. For example, if you were to patch two independent clock sources to the X-CLK and X-MOD inputs, the Rene would advance to the next X-Axis location whenever either clock goes "high." It is important to note, if one clock begins while the other clock is already HIGH, the Rene will NOT advance, as there is no state change: the output is already high and so it remains high.

Location 11 activates XOR (exclusive or):
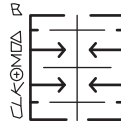
A clock patched to either the X-CLK or X-MOD input will advance the Rene to the next X-Axis Location; however, if both are high at the same time, the Rene does not advance. With this XOR activated, try running a low-frequency square wave into the X-CLK input for steady clock advancement while periodically sending a wide Gate signal to the X-MOD input in order to "invert" the clock.

The next row down contains the same three logic functions, but they only affect the Gates that appear at the G-X output-- not the Rene's movement/clock.

For example:
Location 5 activates G AND MOD for G-X:
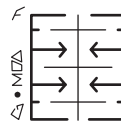
Now, the signals at the X-CLK and X-MOD inputs BOTH need to be high in order to cause a Gate to appear at the G-X Output. Notice, even when the Rene advances to the next X-Axis Location, no Gate appears at G-X until there is positive signal present in the X-MOD input as well.

Therefore, with a combination of the CLOCK and GATE logic rows, you can have X-Clock Advancement and X-Gates at G-X somewhat independent from one another, yet always related to some combination of the signals patched to the X-CLK and X-MOD inputs.

The final row (Locations 1, 2, and 3) contains GATE by OPPOSING CLOCK logic. This adds one more stage of logic operations to the G-X Output Gates, deriving the output state from the result of the two rows above as well as the Y-CLK Input.
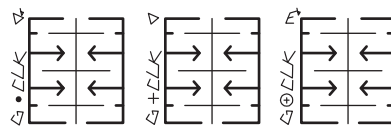
The Y-FUN Page contains the same logic functions; however, they control movement along the Y-Axis and its associated Y-CLK and Y-MOD inputs, as well as the G-Y output. The bottom row (Locations 1, 2, and 3) contains the same GATE by OPPOSING CLOCK logic as before, using the X-CLK Input to derive the output state.
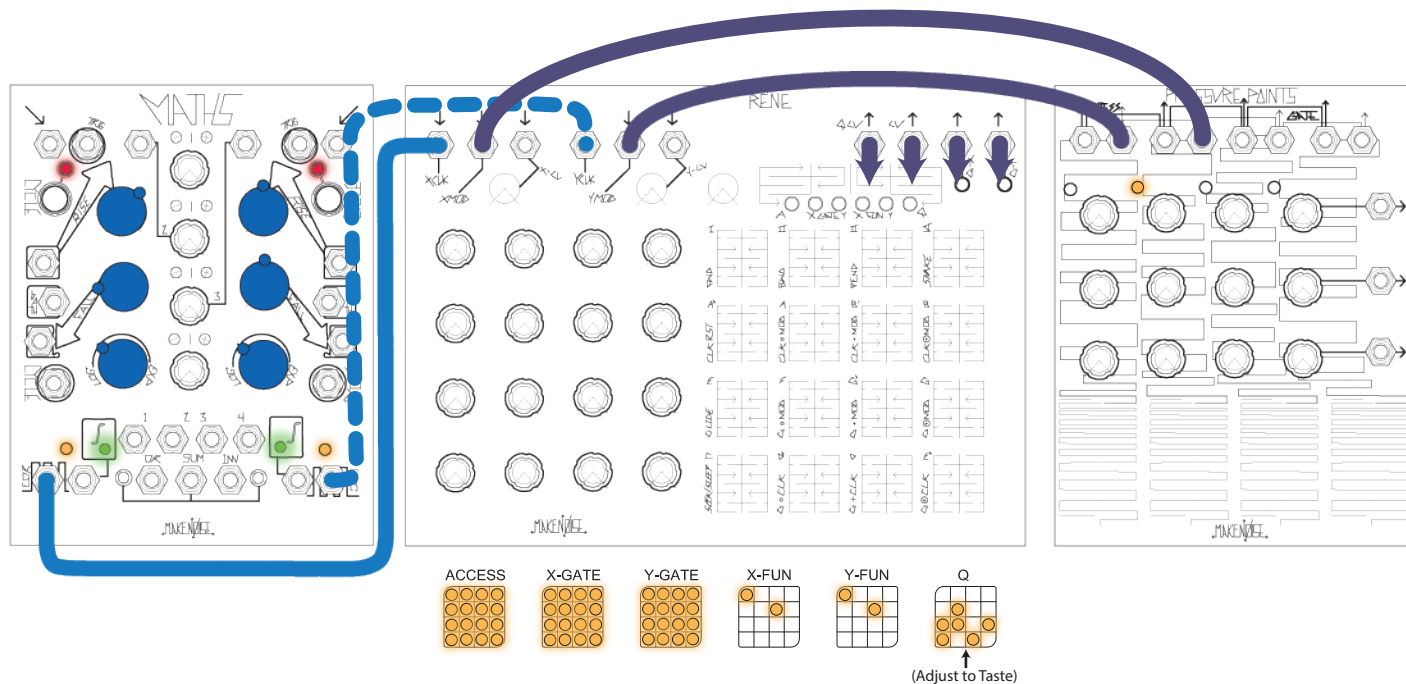
Patch Example:

Voltage Controlled Raga:
www.youtube.com/watch?v=DHf4q7pehtg

(Adjust to Taste)
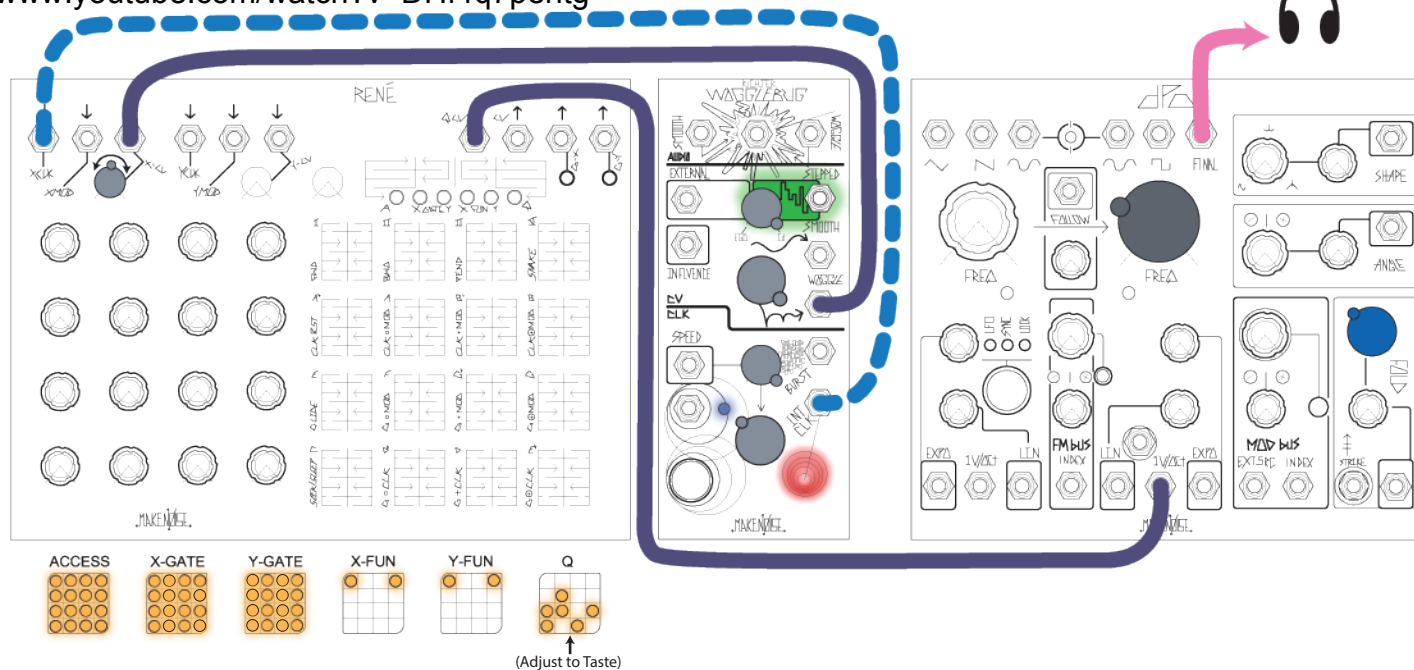
Adjust Rene's XCV input attenuator slowly up from 0% in order to gradually destabilize the sequence.
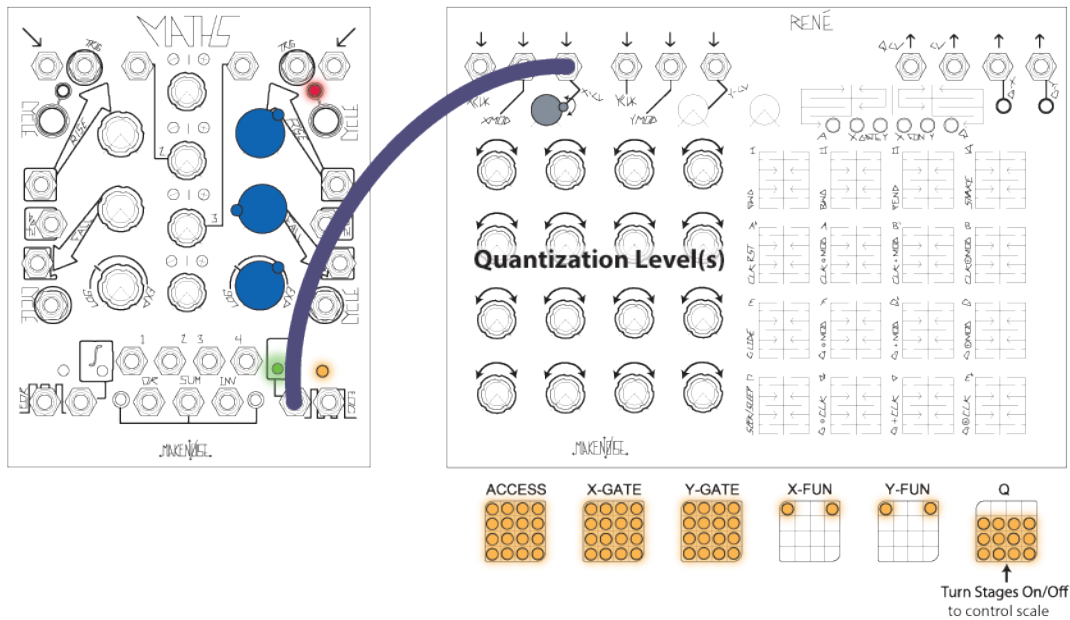
Variation:

1. Turn Fold CCW and patch one of Rene's Gate Outputs to the DPO's STRIKE Input.

Toggled Sequencing Concept
(No Sound as Depicted)

(Adjust to Taste)

Rene will only sequence along each axis when the associated touchplate is pressed.

Patch Example:

Concept: Non-Linear Quantization
(No Sound As Depicted)
www.youtube.com/watch?v=BnoFMimnK6s

Quantization Level(s)

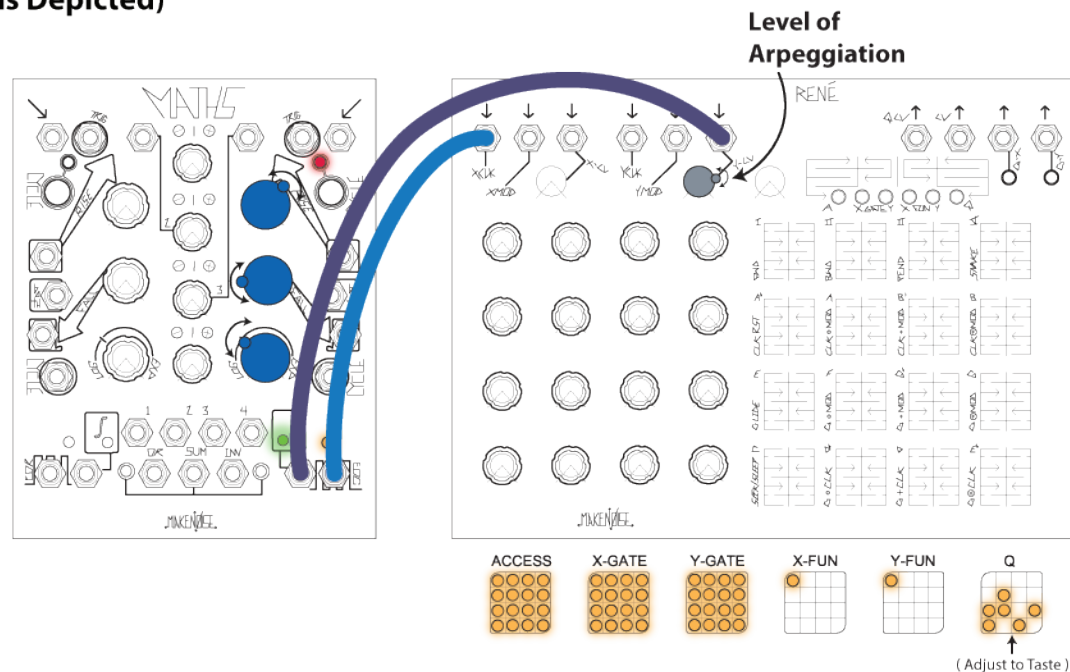| ACCESS	X-GATE	Y-GATE	X-FUN	Y-FUN	Q

↑
Turn Stages On/Off
to control scale

Variation:
Patch MATHS EOC Output to Rene Y-CLK Input in order to switch snake patterns aftern each MATHS Function/Envelope cycle.

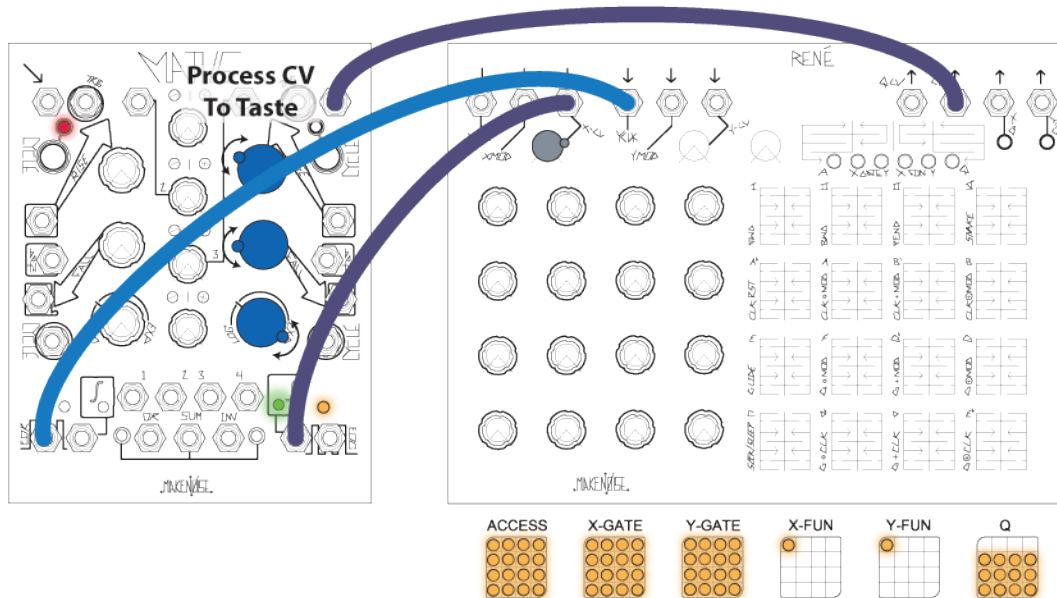## Concept: "Arpeggiation" of a 4-step Sequence
(No Sound as Depicted)

Level of Arpeggiation

ACCESS	X-GATE	Y-GATE	X-FUN	Y-FUN	Q

↑
(Adjust to Taste)

For best results, tune each Y-axis column to a chord using the knobs and the Q page.

Patch Example:

Concept: Cogito Ergo Sum Ergo Cogito Ergo Sum Ergo Cogito:
(Now Sound As Depicted)
www.youtube.com/watch?v=4aBjM08cndA

This feedback patch will cause Rene to jump locations every time it sends a CV value much greater than zero. Many nonlinear patterns await discovery. A "cluster" of higher CV values will cause extended sudden movement. "Eddies" can be created by setting several adjacent knobs to low values. Different clock sources in the X and Y clock inputs can create variation in the patterns.

Variation:
Recall a stored sequence on the Q page to allow constant reconfiguring of the knob settings for the feedback patch but with the same "melodic" values from the QCV output.