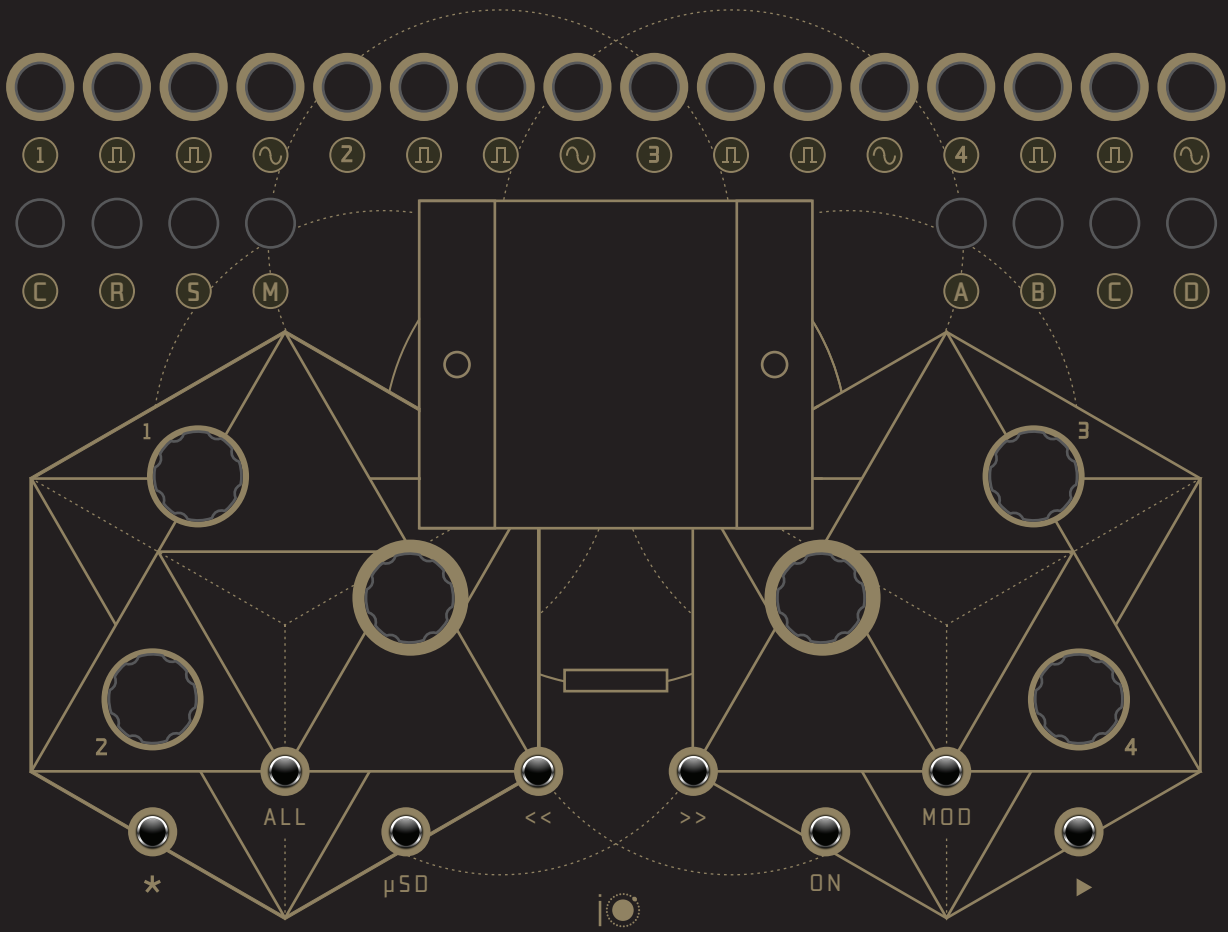# FLUX
## Open Beta V1.07
## Boolean Logic Update
## User Manual

## Installation

Install Flux in your modular case using the Eurorack power cable supplied in your box. While reverse polarity protection is included, it is essential, as always, to take care when connecting the power cable between the module and your case. Flux uses a boxed header on the back of the module to make sure that the red stripe of the supplied power cable will always align with -12V (as is standard practice for Eurorack modules). Align the smaller 10-pin power header of the cable so that it fits naturally into the boxed header and insert. -12V is also indicated on the back of the module's PCB for reference. Take extreme care to plug the other end of the supplied power cable (the larger 16-pin header) into your case with the red stripe aligned to -12V. If you are unsure of how to locate -12V in your case, please consult your case manufacturer's documentation for guidance.

## Power Requirements

Flux requires 160mA from the +12V rail of your case and 50mA from the -12V rail. The 5V rail is not used.

## MIDI IO

As of V1.06, Flux now supports full MIDI IO including clocks, note outs and control messages. Please download the MIDI guides from iolabs.co.uk/downloads for info on using MIDI with Flux.

# Contents

## An Introduction to Flux

Thank you for purchasing Flux. Flux is the result of many years of R&D. A Kickstarter campaign was successfully completed in 2020 to launch the module and the sequencer has grown in scope substantially from the initial specs, based on the feedback and thanks to the support from the modular community. We are proud of the compositional possibilities that Flux enables and are continually expanding the firmware to bring new and exciting features to the module. The module can be a little overwhelming initially, but we believe that the UI is logically structured and after a few sessions you will be able to program any compositional ideas with ease.

To introduce you to the module, we would like to outline the concept of the sequencer and highlight some of the core features. We hope that the user manual will give you enough information to explore the module with a complete understanding of the features while leaving space for you to experiment and find your own approach to utilizing the algorithms.

### Temporal Modulation Synthesis®

Temporal Modulation Synthesis® is an algorithm developed by IOLabs LTD to allow composers to explore polyrhythms and complex rhythms without the constraints of quantization grids. TM Synthesis allows you to apply a curvature to time, creating non-linear, density flexible, fully programmable distributions of rhythm hits across the length of each step of your sequence. TM synthesis enables all kinds of experimental and polyrhythmic possibilities with extremely fine control of curvature. TM curve (**CURV**), Value (**VAL**), step length (**LENG**) and density (**DENS**) are the most important parameters to get to grips with to unlock the potential of the TM synthesis algorithm. When combined with compression/expansion, phase shifting, masking, our humanize algorithm and differential curvature parameters, we hope that you will have the tools to create any rhythmic structure imaginable.

The first patch that we suggest is a single step with a high density setting (>32) and long **LENG** (>8). With these settings, experimenting with **CURV** and **VAL** will demonstrate the algorithm's rhythmic potential. Negative **VAL** settings produce logarithmic distributions of triggers and positive settings produce exponential distributions. A **VAL** setting of 0 produces a linear (evenly spaced) distribution of triggers within the step. Reducing density and introducing humanize (**HUMA**) to your rhythm when familiar with the concept and will produce realistic drumming patterns.

### Parameters are Selected Per Step

Most Flux parameters are set per-step. Each step of your sequence can have an entirely unique set of parameter values selected for each of the 4 channels (for both rhythm and CV parameters). Changing a parameter value in the Flux UI changes the value for the active step only (unless **ALL** mode is active). Each channel can sequence up to 16 steps. With 4 channels of 16 steps, Flux can sequence up to 64 unique sets of parameters across the 4 channels. We suggest that in your first sessions, you leave the **LAST** parameter (last step in the sequence) at the default value of 1 (a single step) and explore the possibilities offered by the range of parameters within a single step before moving on to more complex multi-step patterns.

### Auxiliary Outputs

Each Flux channel includes 2 auxiliary rhythm outputs alongside the main rhythm output. The Aux outputs are designed to generate a rhythm algorithmically by processing the main output's triggers through a selected **AUX** mode. Utility AUX modes are also available to help when syncing Flux to other modules, utility modes are unaffected by the channel parameters. A different AUX mode for both outputs may be selected per step of the sequence.

*An Introduction to Flux*

*CV Outputs*

A CV output per channel can send envelopes, a free running LFO, random voltages (updated once per step or once per trigger within the step) or a single programmable voltage per step. The CV outputs can be set in mV steps from 0V to 8V and the range of the CV outputs can be set per step with the **MINV** and **MAXV** parameters. CV outputs are intended to support modulation of your percussion's dynamics/amplitude/timbre by patching to VCAs/filters/processors in your system. The CV output of each channel comes with per-step quantization options, offering the ability to quantize each single volt range into 1-24 equally spaced quantization nodes. Each quantization point can be switched on or off in the UI at the **QUAN NODES** to create an optional unique scale per step, per channel.

*Modulation*

There are 3 options available to modulate the parameter values selected in the main UI: Macro Pots (manual potentiometers), CV inputs or the 'Evolve' internal LFOs. The 85 internal Evolve LFO parameters are saved with presets and enable recallable modulation.

*Presets*

Presets can be stored and loaded via the micro SD UI, accessed by clicking the μSD interface button. Presets can be given a name and loaded in sync with your current session. Micro SD cards should be formatted as FAT16.

*Avoiding Unexpected Silences*

Some Flux parameters can result in 0 triggers being sent at the rhythm outputs. This is extremely useful when you are familiar with the parameters and can use this functionality as a compositional or performance tool but has the potential to cause confusion in initial sessions. Here are some tips and things-to-know to avoid unexpected silences in your first sessions with the module:

- Phase shifting (**PHAS**) can push triggers outside of the step's length and is applied before Compression/Expansion (**COMP**).

- The Compression/Expansion parameter (**COMP**) has the ability to expand triggers within the step beyond the end of the selected step length (if a negative parameter value is selected). Triggers pushed outside of the boundaries of the step length through expansion are not sent. When the step's length has passed, the next step's parameters become active.

- The MASK parameter applies a logical mute mask to the step with options such as '1in2' (mute 1 in every 2 triggers). The Mask Shift (**MSK>**) parameter controls the starting trigger of the mask within your step.

- A step's trigger density can be set and modulated to 0. While density defaults to 1 when the module is booted, if the trigger density of a step is set to 0 by the density UI parameter (**DENS**) or by subtractive modulation with Macro Pots, CV inputs or Evolve LFOs, then no triggers will be generated until the density is modulated back to a higher value than 0. The ability to set density to 0 allows you to control the rhythm's density with modulation, starting from silence, but modulation matrix values and polarities should be considered carefully to avoid unexpected 0 density settings.

## Efficient Navigation and Parameter Selection

The left encoder is used to select parameters and the right encoder is used to select a parameter value. The * and **ALL** buttons are the key to efficient navigation and parameter selection. * and **ALL** can be set to latching (press the button once to switch the mode on, then again to switch the mode off) or momentary (the mode is on while the button is pressed only). Both modes can be selected on page 3 of the main UI.

The * button multiplies the increments of parameter value selection (when using the right encoder) by an amount that is hand picked to make sense for each parameter (e.g. holding * while selecting a phase shift value will increase the parameter value in increments of 45 degrees). Holding * while navigating with the left encoder will jump between main UI pages or jump in large steps through the modulation matrix pages.

The **ALL** button allows you to program all steps in a channel's sequence at once. With 16 steps available per channel, setting all steps to the same value would be time consuming. With **ALL** mode active, all step values for a parameter can be set to the same value at once. In the Evolve UI, **ALL** adds to or subtracts from all **MAX**, **FREQ**, **LFO** or **VCA** values at once. In Modulation matrix screens, **ALL** mode being active sets all channel's Macro Pots or CV input nodes to the same value. **ALL** & * can be used together to quickly navigate and edit parameters. Blinking indicators will show if either is active to avoid accidental edits.

## Efficient Modulation Setup

If it is possible to modulate a parameter, pressing the **MOD** button from the main UI with that parameter selected will jump directly to the relevant modulation nodes. To quickly set up modulation, you can press **MOD** from the main UI and the sequencer will jump to the parameter's Evolve LFO nodes. You can press **MOD** again to jump to and set the parameter's Macro Pot node values and a third time to jump to and set the parameter's CV input nodes. Pressing **MOD** once more will return to the main UI with the relevant parameter still selected.

## Changing Channels

Flux channels are colour coded in the UI and at the output LEDs. Channels are selected by clicking the left and right encoder buttons to cycle through the channels, wrapping around at either end. Clicking the right encoder ascends through the channels and clicking the left encoder descends through the channels.

## Fast Trigger Streams

Flux is capable of sending dense trigger streams. Some experimentation is required to test the limits of your system's modules'/instruments' maximum response speed. Dropped triggers could occur if you send a module a trigger stream that is too dense for the module to have time to respond to all triggers. If you are experiencing dropped triggers with extreme Flux settings, try reducing the rhythm's density settings to give your modules/instruments more time to process incoming triggers.

## Persistent Configuration Parameters

The following parameters are auto-saved and recalled across power cycles: **BPM**, Shuffle (**SHUF**), Shuffle 16th (**SH16**), internal or external clock mode (**CLK**), **PPQN**, momentary or latching button modes and **BOOT** (boot the module in a started or stopped state).

*An Introduction to Flux*

*Burst Mode*

Burst mode is a single step mode in which the step is activated when a gate/trigger is received at the 4 gate inputs (for channels 1-4). Steps can also be triggered via MIDI messages (see MIDI guides). In Burst mode, the active step is selected with the LAST parameter. Compression/expansion is not limited to the step length in Burst mode. This means that compressing the active step (positive COMP values) effectively increases the BPM of that channel and expanding the step (negative COMP values) reduces the BPM. If a gate/trigger/MIDI note is received before a burst has concluded, it will be re-triggered. **You must start the sequencer in Burst mode before bursts can be triggered,** this enables the ability to start/stop as normal while using the mode but if you experience no output - double check that you have pressed the start button. MIDI clock output is active in Burst mode for easy syncing of MIDI triggers when slaving your DAW to Flux.

*Display Visibility*

The Flux display is an IPS display offering a wide horizontal viewing angle. Colours may appear dull if viewed from below straight on. Flux should ideally be mounted in your case so that the display is level with your eyes for the highest level of clarity.

*Update 'Too Large'*

The first time that you update the Flux firmware you may encounter a 'Too Large' error message in the updater. To fix this, please first upload the 'Too Large' HEX file from the firmware zip, then load the regular firmware. The procedure should only need to be completed once (and may not need to be completed at all), then subsequent updates will follow the standard update procedure.
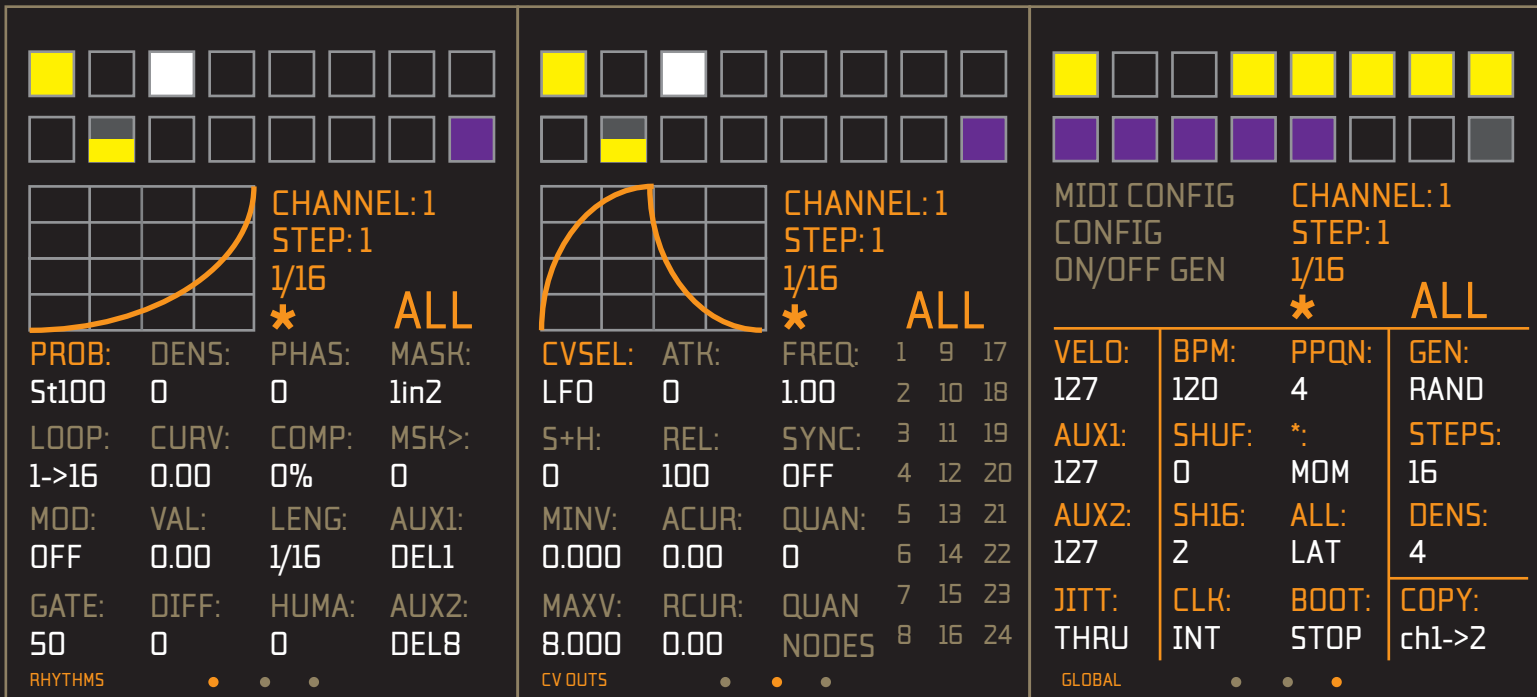
*Autoload Last Saved/Loaded Preset on Boot*

As of open beta V1.07, saving or loading a preset also flags it to autoload on the next power cycle. This will allow you to quickly pick up where you left off in your last session. Please save a preset titled 'DEFAULT' to your micro SD with Flux set to whichever state that you find most useful as a starting point (multiple defaults could be saved if you use multiple compositional approaches for efficiency).

*Slaving Flux to an External Clock*

If using Flux in external clock mode it is highly recommended to use EXTS mode. EXTS mode operates similarly to Din Sync and requires a clock at the 'C' gate input and a voltage at the 'S' input that is only present while the external clock is running. This allows Flux to precisely start and stop perfectly in sync with the external source. EXT mode can also be used along with a trigger at the 'R' input to reset the sequencer between starts/stops. Flux will analyze the incoming clock ticks on the first start for a few ticks then all subsequent starts will be without latency or 'settling time' which is important for smooth starts if your first step is densely packed and complex.

This concludes a brief introduction to Flux. The following pages of the user manual give a concise description and overview of each parameter with enough info (we hope!) for you to understand all unfamiliar parameters, allowing you to experiment to find your compositional approach with Flux.

Thank you once again for purchasing Flux. We hope that the module will bring years of rhythmic exploration to your compositional endeavors.

**Panel 1 — Rhythms (UI Page 1)**

CHANNEL: 1
STEP: 1
1/16
* ALL

| PROB: | DENS: | PHAS: | MASK: |
|---|---|---|---|
| St100 | 0 | 0 | 1in2 |
| LOOP: | CURV: | COMP: | MSK>: |
| 1->16 | 0.00 | 0% | 0 |
| MOD: | VAL: | LENG: | AUX1: |
| OFF | 0.00 | 1/16 | DEL1 |
| GATE: | DIFF: | HUMA: | AUX2: |
| 50 | 0 | 0 | DEL8 |

RHYTHMS

**Panel 2 — CV Outputs (UI Page 2)**

CHANNEL: 1
STEP: 1
1/16
* ALL

| CVSEL: | ATK: | FREQ: | 1 | 9 | 17 |
|---|---|---|---|---|---|
| LFO | 0 | 1.00 | 2 | 10 | 18 |
| S+H: | REL: | SYNC: | 3 | 11 | 19 |
| 0 | 100 | OFF | 4 | 12 | 20 |
| MINV: | ACUR: | QUAN: | 5 | 13 | 21 |
| 0.000 | 0.00 | 0 | 6 | 14 | 22 |
| MAXV: | RCUR: | QUAN | 7 | 15 | 23 |
| 8.000 | 0.00 | NODES | 8 | 16 | 24 |

CV OUTS

**Panel 3 — Config (UI Page 3)**

MIDI CONFIG
CONFIG
ON/OFF GEN

CHANNEL: 1
STEP: 1
1/16
* ALL

| VELO: | BPM: | PPQN: | GEN: |
|---|---|---|---|
| 127 | 120 | 4 | RAND |
| AUX1: | SHUF: | *: | STEPS: |
| 127 | 0 | MOM | 16 |
| AUX2: | SH16: | ALL: | DENS: |
| 127 | 2 | LAT | 4 |
| JITT: | CLK: | BOOT: | COPY: |
| THRU | INT | STOP | ch1->2 |

GLOBAL

*Rhythms (UI Page 1)*  *CV Outputs (UI Page 2)*  *Config (UI Page 3)*

## UI Pages

The FLUX main UI is split into 3 pages: Rhythms, CV Outputs & Config/On/Off Generator. Moving to the next UI page is achieved by scrolling past the last parameter on the current page with the navigation encoder (the leftmost encoder) or in one left encoder movement with * mode active.

## Channels & Colour Coding

There are 4 channels. Each channel controls 4 outputs (3 trigger/gate outs & 1 CV out). The 4 channels are colour coded in the UI and at the output LEDs:

**CH1 = ORANGE**,
**CH2 = GREEN**,
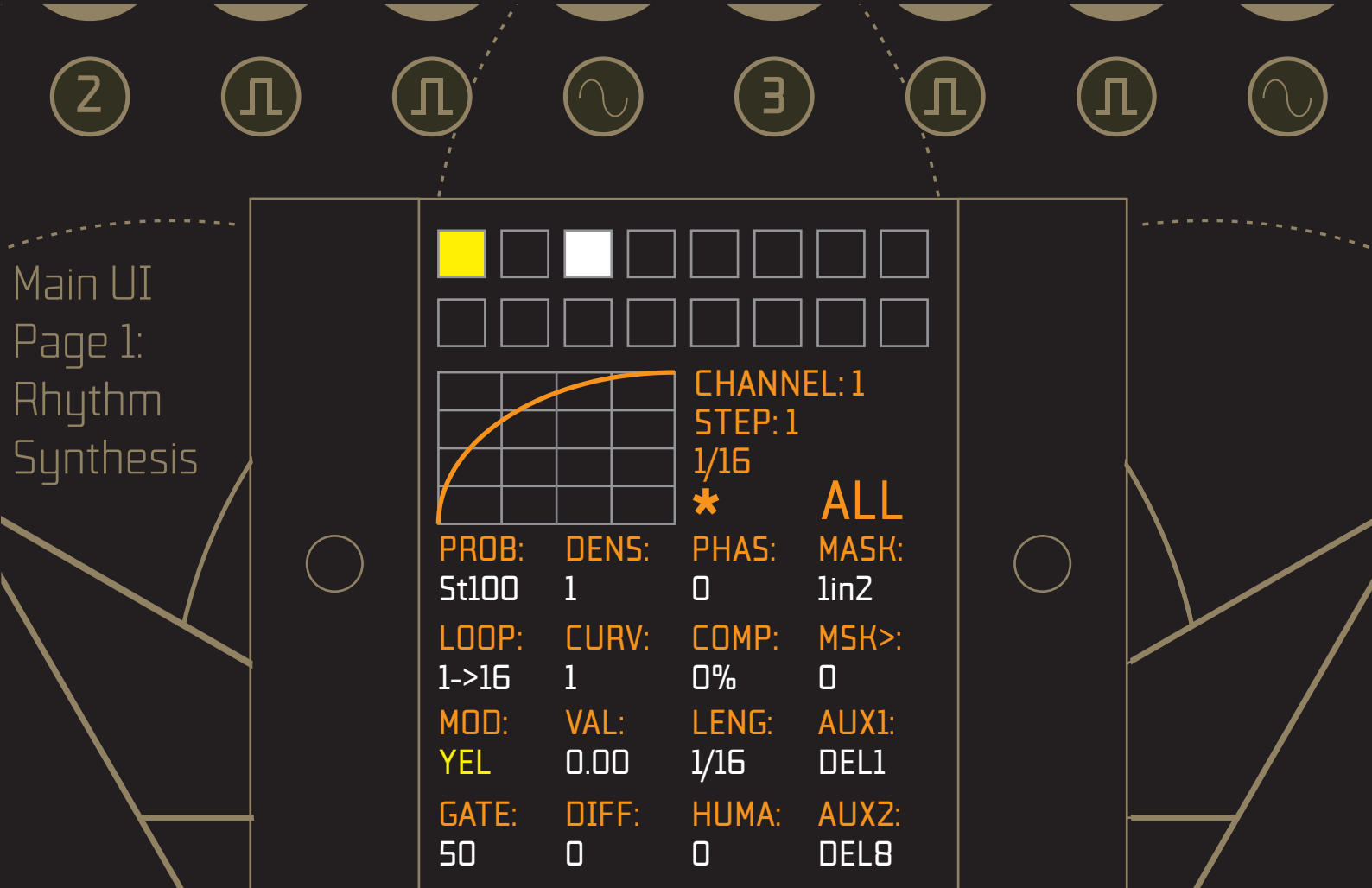**CH3 = BLUE** &
**CH4 = RED**.

## Changing Channels

In the above graphics, **CH1**'s parameters are shown on the display so the graphics & the currently selected parameter title are displayed in **ORANGE**. Channel 2-4's parameters can be accessed by pushing the right encoder's button (+) or the left encoder's button (-). For example, if **CH1** is active, pressing the right encoder (+) will load **CH2**'s UI while pressing the left encoder (-) will wrap the displayed channel around to **CH4**.

## Editing Steps

Selecting a step to edit is achieved by pressing the **<<** and **>>** interface buttons. FLUX is a 16 step sequencer. Each step of the sequence in each channel has a unique set of parameters. Nearly all visible parameters apply only to the current step. If you would like to program all steps at once, pressing the **ALL** button on the interface will activate **ALL** mode. Any changes made to a parameter's value will be applied to all steps. When all-steps-editing is active, **ALL** is displayed and blinks in the UI. Take care not to edit values in **ALL** mode accidentally.

## Mod Buses

FLUX offers 3 modulation buses: **YELLOW**, **GREY** & **PURPLE**. Parameters are added to a modulation bus in the modulation matrix screens. A mod bus is selected for the current step with the **MOD** parameter. The step's UI box will change colour to display the active bus. Any combination of buses is possible. If **MOD** is set to OFF, then no modulation will be applied to that step. If a step is set to **YELLOW**, then only modulations mapped to the **YELLOW** bus will be applied. The 3 modulation buses allow you to create up to 3 on/off step sequences for the Macro Pot and CV inputs modulation. By default, all steps and buses are set to the **YELLOW** bus so that modulation will be active on all steps.

## Main UI Page 1: Rhythm Synthesis

**CHANNEL: 1**
**STEP: 1**
**1/16**
**∗**    **ALL**

| PROB: | DENS: | PHAS: | MASK: |
|-------|-------|-------|-------|
| St100 | 1 | 0 | 1in2 |
| LOOP: | CURV: | COMP: | MSK>: |
| 1->16 | 1 | 0% | 0 |
| MOD: | VAL: | LENG: | AUX1: |
| YEL | 0.00 | 1/16 | DEL1 |
| GATE: | DIFF: | HUMA: | AUX2: |
| 50 | 0 | 0 | DEL8 |

**PROB**
% Probability of a trigger being sent. **St 1-100** selects the probability of the whole step's triggers being sent. **Tr 1-100** applies the probability calculation to each trigger in the step individually.

**LOOP**
Select the start and end points for the sequence.

**MOD**
Select a modulation bus for the step.
**\*\*IMPORTANT\*\***
If MOD is set to OFF, CV and Macro Pot modulations will not be applied to the step. A modulation bus (or combination of buses) must be selected for Macro Pot or CV modulation to be applied to the step.

**GATE**
Gate length for all triggers in the step in % of time to the next trigger or the end of the step.

**DENS**
Density of triggers in the step.

**CURV**
Select a temporal modulation curve to control the distribution of triggers within the step.

**VAL**
Select a value for the TM curve (positive = exponential, negative = logarithmic and 0 = linear).

**DIFF**
In TM curves with more than 1 division, this parameter differentiates division curve values.

**∗**
Indicates that coarse navigation/parameter change is active.

**COMP**
Compress (positive values) or expand (negative values) the triggers within the step length.

**PHAS**
Phase shift the trigger starting point (in degrees) within the step (applied before compression / expansion).

**LENG**
Select a step length in 16ths.

**HUMA**
Apply the Humanize algorithm (1-100 = subtle, 101-127 = extreme).

**MASK**
Select a logical mute mask for the step.

**MSK>**
Mask shift moves the starting trigger of the selected mute mask.

**AUX1**
Select a mode for the first Aux output (per step, select a mode with ALL active to set all steps to the same mode).
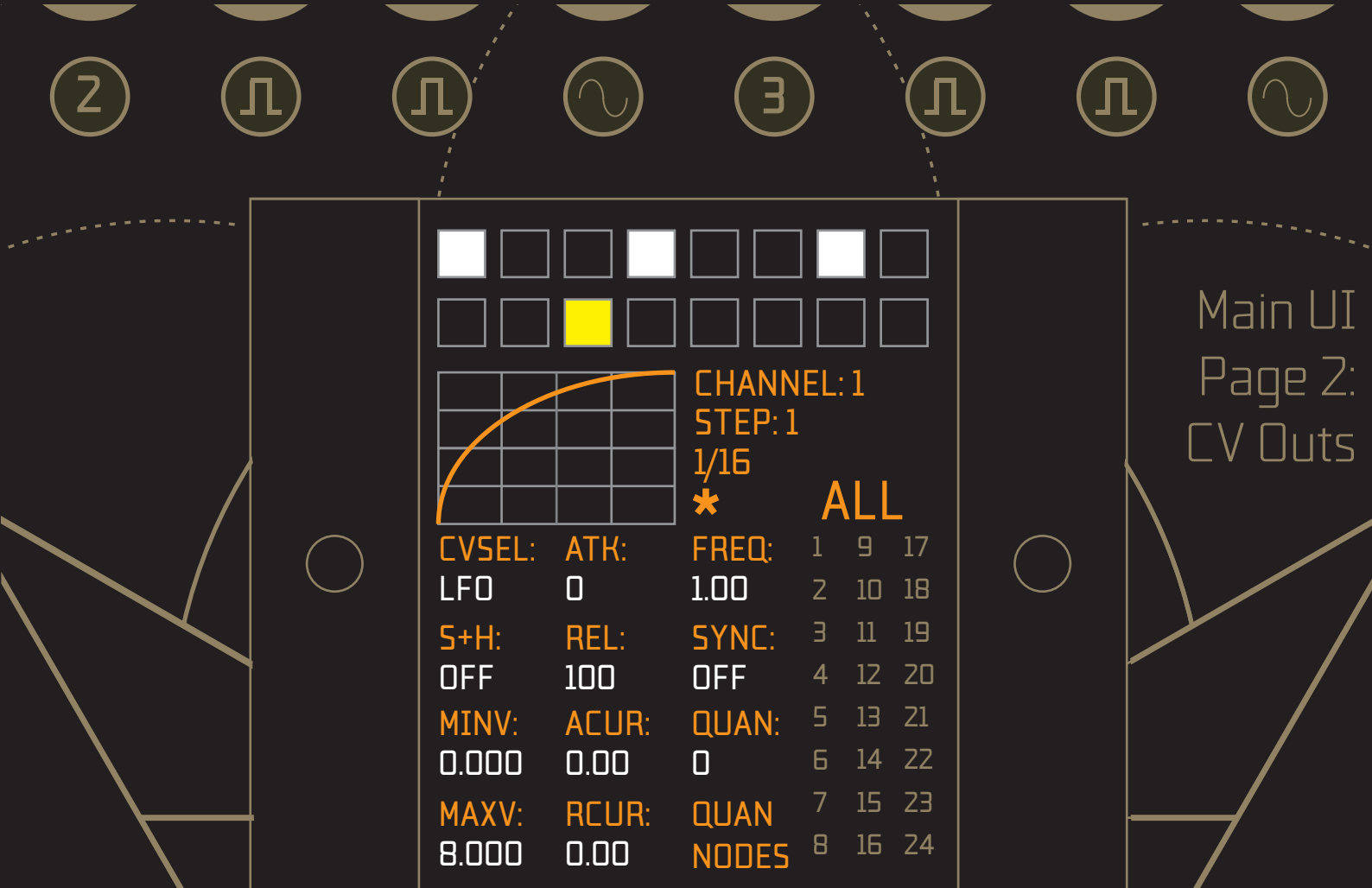
*V1.07 Update:*

**AUX2**
Select a mode for the second Aux output (per step).

**ALL**
Indicates edit-all-steps is active.

**1/16**
Displays the total triggers / the number of 16ths in the programmed sequence.

**CHANNEL: 1**
**STEP: 1**
**1/16**
**\* ALL**

| CVSEL: | ATK: | FREQ: | 1 | 9 | 17 |
|--------|------|-------|---|---|-----|
| LFO | 0 | 1.00 | 2 | 10 | 18 |
| S+H: | REL: | SYNC: | 3 | 11 | 19 |
| OFF | 100 | OFF | 4 | 12 | 20 |
| MINV: | ACUR: | QUAN: | 5 | 13 | 21 |
| 0.000 | 0.00 | 0 | 6 | 14 | 22 |
| MAXV: | RCUR: | QUAN | 7 | 15 | 23 |
| 8.000 | 0.00 | NODES | 8 | 16 | 24 |

**CVSEL**

Select the CV output mode for this step:
**LFO**: Free running LFO
**ENV+** : AR Envelope
**ENV-** : Inverted AR Envelope
**VOLT**: Single voltage for the step (set by the **MAXV** value)
**RANDS**: Generate a random voltage between **MINV** and **MAXV** (once at the start of the step)
**RANDT**: Generate a random voltage between **MINV** and **MAXV** (once per main rhythm output trigger)

**S+H**

Sample & hold per step. If on, the CV output voltage is only updated when a main output trigger is generated.

**MINV**

The minimum output voltage for this step (0-8 volts).

**MAXV**

The maximum output voltage for this step (0-8 volts).

**ATK**

Attack time for AR envelope modes.

**REL**

Release time for AR envelope modes.

**ACURV**

The response or curvature of the attack portions of LFO and envelope modes.

**RCURV**

The response or curvature of the release portions of LFO and envelope modes.

**FREQ**

The frequency of the free running LFO (in Hz).

**SYNC**

Sync can be applied inthe free running LFO or to envelope modes and can be set per step. The options are:
**'OFF'**
**'STEP'**
**'TRIG'**
In LFO mode, 'STEP' will reset the LFO to the **MINV** value of this step, at the start of this step. 'TRIG' will reset the LFO to the **MINV** value of this step, every time a trigger is generated during this step.
In Envelope modes, 'OFF' and 'STEP' both result in a single envelope across the step. 'TRIG' re-triggers the envelope when a trigger is generated.

**QUAN**

Optional equal temperament quantization. This parameter offers the ability to apply quantization to the CV output's 0-8 volts range. Each 1V step of the range can be quantized into a set of equally spaced nodes. The number of quantization points within each 1V step is set by the **QUAN** parameter. Each sequencer step can have a unique quantization value (from 1-24). For a 12-TET scale, select a value of 12 and switch each of the 12 nodes on.

**QUAN NODES**

Turn on or off individual quantization points within the number of divisions selected at the **QUAN** parameter for each 1V range.

*The CV outputs UI includes an oscilloscope view of the currently selected parameters but does not display quantization.*

MIDI CONFIG          CHANNEL: 1
CONFIG               STEP: 1
ON/OFF GEN           1/16

\*         ALL

| VELO: | BPM: | PPQN: | GEN: |
|-------|------|-------|------|
| 127 | 120 | 4 | RAND |
| AUX1: | SHUF: | *: | STEPS: |
| 127 | 0 | MOM | 16 |
| AUX2: | SH16: | ALL: | DENS: |
| 127 | 2 | LAT | 4 |
| JITT: | CLK: | BOOT: | COPY: |
| THRU | INT | STOP | ch1->2 |

*All parameters in the **CONFIG** section below are auto saved and loaded between power cycles.*

**VELO**
Select a fixed or CV linked velocity for the Main out MIDI note.
**AUX1**
Select a fixed or CV linked velocity for the AUX1 MIDI note.
**AUX2**
Select a fixed or CV linked velocity for the AUX2 MIDI note.
**JITT**
Jitter lock. This parameter can be set to LOCK when the sequencer is running to eliminate jitter from unstable MIDI clocks.
**BPM**
Select a beats per minute value
(Internal clock & Burst mode only).
**SHUF**
Select a shuffle/swing depth (in degrees). Shuffle is unique to each channel and all 4 channels can have a unique shuffle setting. To set all channels at once, make sure that **ALL** mode is active when selecting a value.
**SH16**
Select the number of 16ths to pass before shuffle is applied. For traditional swing leave at the default 2 (apply shuffle once every 2 * 16ths). Set per channel. To set all channels at once, make sure that **ALL** mode is active when selecting a value.
**CLK**
Select the master clock source from:

**INT** - Internal clock

**EXT** - External clock with start/stop controlled by the interface button

**EXTS** - External clock with start/stop controlled by the start/stop input jack (Flux is started when a voltage is present and stopped if no voltage applied)

**MIDI** - External MIDI Clock (requires USB connection)

**BURST** - Single step mode (step selected with the LAST parameter). Triggers steps at any point with the 4 gate inputs or MIDI note messages (see MIDI documents)

**PPQN**
Pulses per quarter note (External/MIDI clock modes only).
**\***
Set the multiplier button to momentary or latching mode.
**ALL**
Set the **ALL** button to momentary or latching mode.
**BOOT**
Select if the sequencer boots in a started or stopped state.

*The remaining 3 parameters on this page combine to make an ON/OFF rhythm generator (algorithmically controlling the on/off state of up to 16 steps).*

**GEN MODE:**
Random or equal distribution of triggers.
**GEN STEPS:**
Select how many steps to include in the generated rhythm.
**GEN DENS:**
Select the density of on steps in the generated rhythm.

**VELOCITY OPTIONS**
The MIDI note velocity options at VELO, AUX1 & AUX2 offer a fixed 0-127 value along with many modes that calculate the velocity by mapping your currently active 0-8V CV output range to the 0-127 MIDI note velocity. Any of the 4 channels can be selected as the CV source and the CV modes below are repeated 4 times with numbers 1-4 representing channel source. Please note that a velocity of 0 = silence in most applications/samplers:

**CV** (Direct conversion from 0-8V to 0-127)

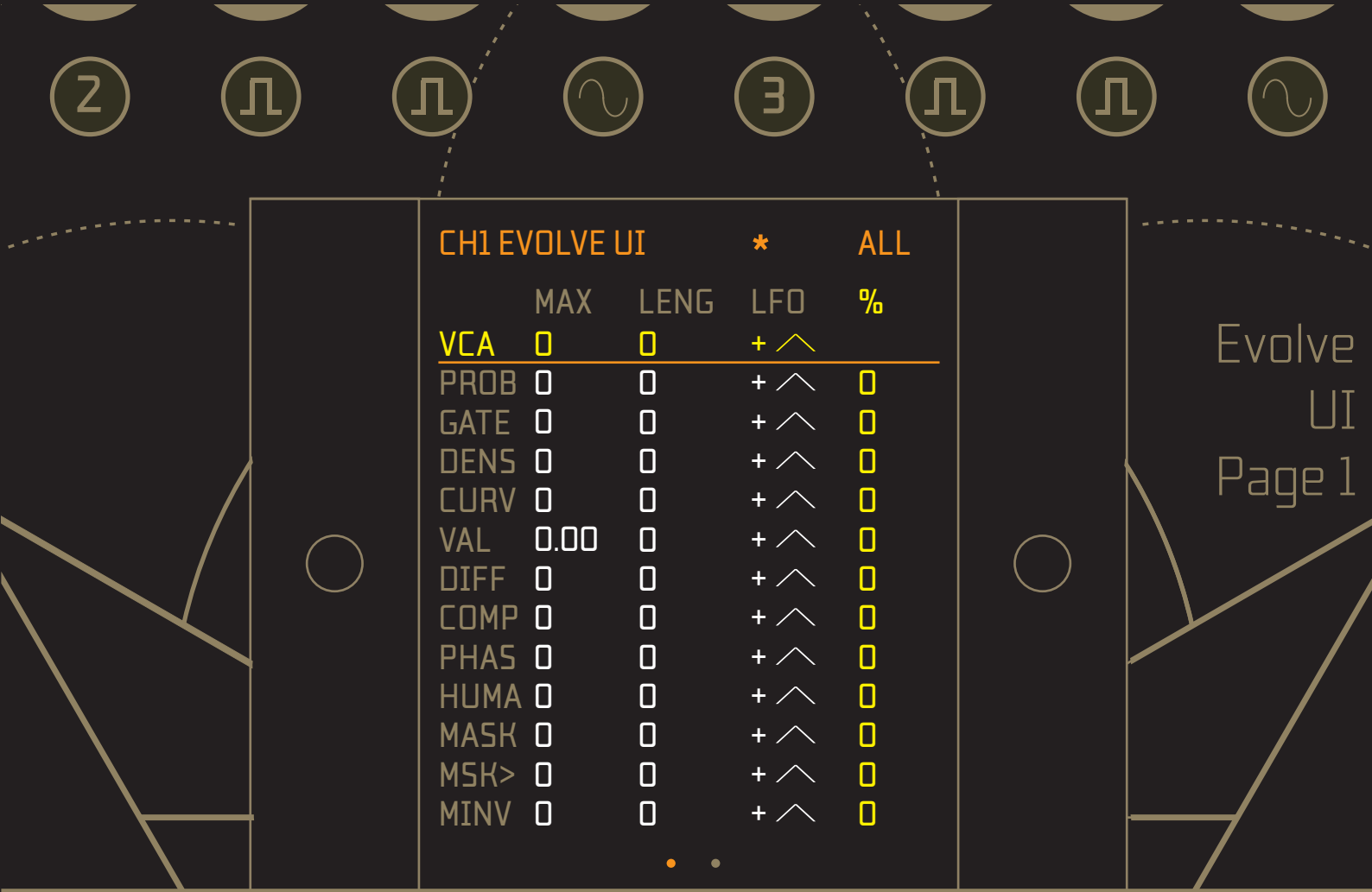**CV-** (Inverted conversion from 0-8V to 127-0)

**10-90% of CV** (attenuated CV value)

**10-90% of CV-** (attenuated inverted CV value)

**CV + 10-90** (CV + a fixed amount)

**CV - 10-90** (CV - a fixed amount)

**Random** (Random value between 0-127)

**Rand > or < 10-120** (Random greater/less than a fixed amount)

**CH1 EVOLVE UI          *          ALL**

| | MAX | LENG | LFO | % |
|---|---|---|---|---|
| VCA | 0 | 0 | + ︿ | |
| PROB | 0 | 0 | + ︿ | 0 |
| GATE | 0 | 0 | + ︿ | 0 |
| DENS | 0 | 0 | + ︿ | 0 |
| CURV | 0 | 0 | + ︿ | 0 |
| VAL | 0.00 | 0 | + ︿ | 0 |
| DIFF | 0 | 0 | + ︿ | 0 |
| COMP | 0 | 0 | + ︿ | 0 |
| PHAS | 0 | 0 | + ︿ | 0 |
| HUMA | 0 | 0 | + ︿ | 0 |
| MASK | 0 | 0 | + ︿ | 0 |
| MSK> | 0 | 0 | + ︿ | 0 |
| MINV | 0 | 0 | + ︿ | 0 |

**EVOLVE**
The Evolve UI is the first of the 3 modulation user interfaces and is accessed by pressing the **MOD** button. The Evolve UI controls a collection of 85 parameter LFOs that are savable and recallable with presets. Each parameter LFO can have a unique maximum offset (**MAX**), frequency in 16ths (**FREQ**) and LFO wave shape (**LFO**).

**\***

The multiplier button can be used to change parameter values in large increments for faster value selection, with the right encoder, and to navigate through the available nodes faster with the left encoder. When active, a blinking **\*** indicator appears at the top of the page.

**ALL**
The **ALL** button can be used to add to or subtract from all **MAX**, **FREQ**, **LFO** or **VCA** values simultaneously. An indicator blinks when **ALL** is active.

**MAX**
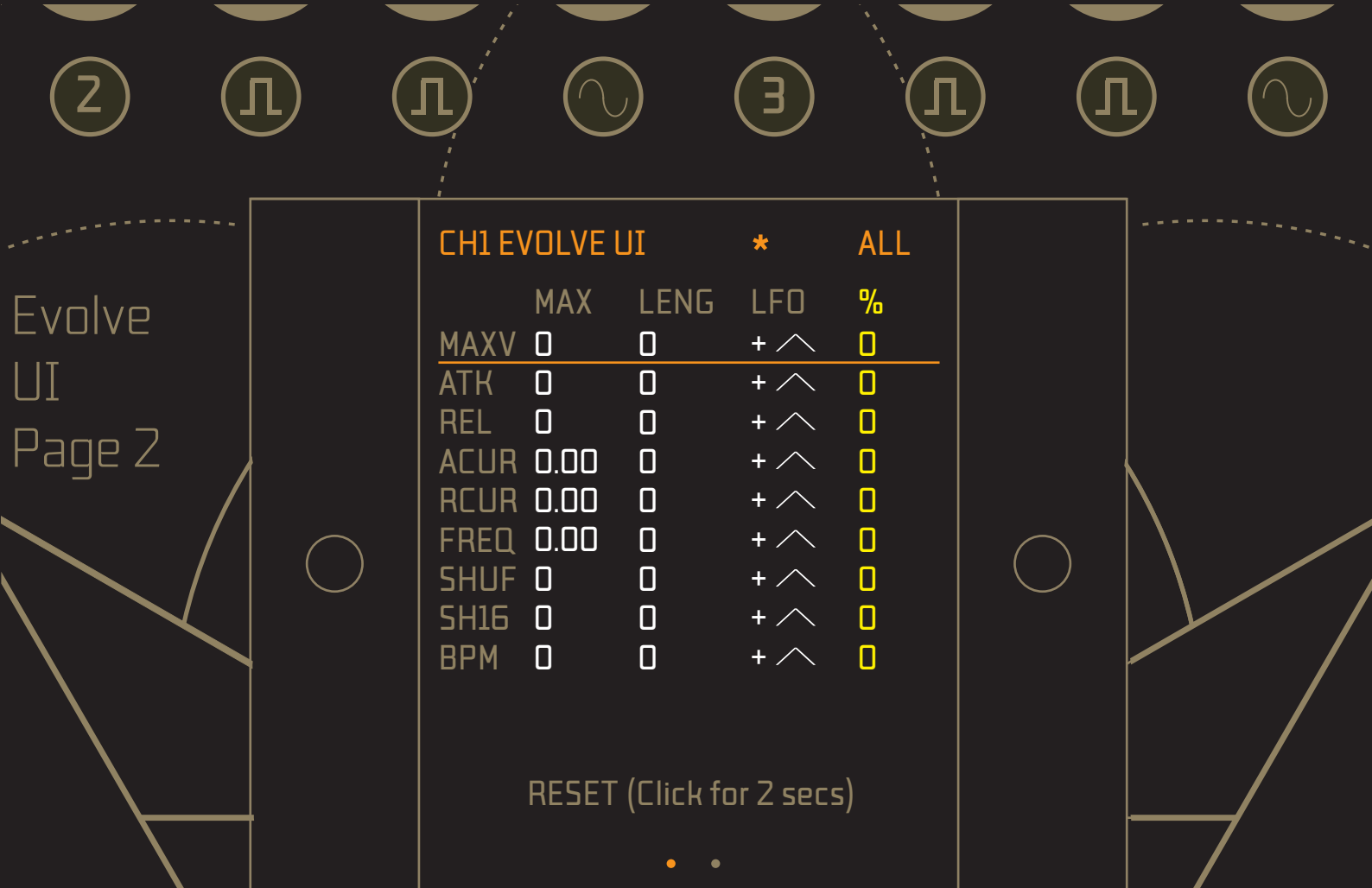The maximum offset the LFO can apply to the active parameter value.

**FREQ**
The frequency of the LFO in 16ths from 0-1024 (0=off).

**LFO**
The waveform of the LFO. Options are:

**+ Saw Down** (Additive Modulation)
**+ Saw Up**
**+ Triangle**
**- Saw Down** (Subtractive Modulation)
**- Saw UP**
**- Triangle**
**+ - Saw Down** (Bipolar Modulation)
**+ - Saw Up**
**+ - Triangle**
**+ Rand** (Additive Random Modulation)
**- Rand**
**+ - Rand**
**+ Square** (On First) 1-100% duty cycle
**- Square** (On First) 1-100% duty cycle
**+ - Square** (On First) 1-100% duty cycle
**+ Square** (Off First) 1-100% duty cycle
**- Square** (Off First) 1-100% duty cycle
**+ - Square** (Off First) 1-100% duty cycle

*If a random waveform is selected, **FREQ** controls how often in 16ths a new random modulation value is generated (between 0 and the **MAX** value).*

## Evolve UI Page 2

| CH1 EVOLVE UI | | | * | ALL |
|------|-----|------|------|------|
| | MAX | LENG | LFO | % |
| MAXV | 0 | 0 | + ⌒ | 0 |
| ATK | 0 | 0 | + ⌒ | 0 |
| REL | 0 | 0 | + ⌒ | 0 |
| ACUR | 0.00 | 0 | + ⌒ | 0 |
| RCUR | 0.00 | 0 | + ⌒ | 0 |
| FREQ | 0.00 | 0 | + ⌒ | 0 |
| SHUF | 0 | 0 | + ⌒ | 0 |
| SH16 | 0 | 0 | + ⌒ | 0 |
| BPM | 0 | 0 | + ⌒ | 0 |

RESET (Click for 2 secs)

### %
The % parameter is a dry/wet control for a dedicated 'Virtually Controlled Amplifier' for each Evolve LFO. Each LFO can select a unique VCA dry/wet %. The default dry/wet % is set to 0, resulting in the full modulation generated by the LFO passing to the relevant parameter, bypassing the LFO's VCA entirely. At 100%, the LFO is passed fully through the VCA. The VCA's amplification is controlled by the **VCA** LFO (the first LFO on page 1 of the Evolve UI). All **VCA** related parameters appear in **Yellow** to differentiate them visually from the other parameters. 1 **VCA** LFO is available per channel.

### VCA LFO 'ON' Mode
The channel's **VCA** LFO can select a wave shape from all of the available positive LFOs. They also have access to a unique **ON** waveform (selected by scrolling to the end of the LFO waveform options).

With **ON** selected, the **VCA** LFO is static and opens all VCAs by the % value selected at the **VCA MAX** parameter. This offers the ability to control the output level of all VCAs with a static value. This value can also be controlled by Macro Pots or CV inputs via the VCA mod matrix parameter, offering manual or automated control of modulation depth for all LFOs.

### VCA Use Example
With the channel's density (DENS) set to 1 for all active steps, set the density's evolve LFO **MAX** to a maximum parameter offset of 15. Select a **LENG** value of 16 * 16ths. Select a + Saw Down LFO the (default). The trigger density will now modulate from 16 to 1 across 16 * 16ths.
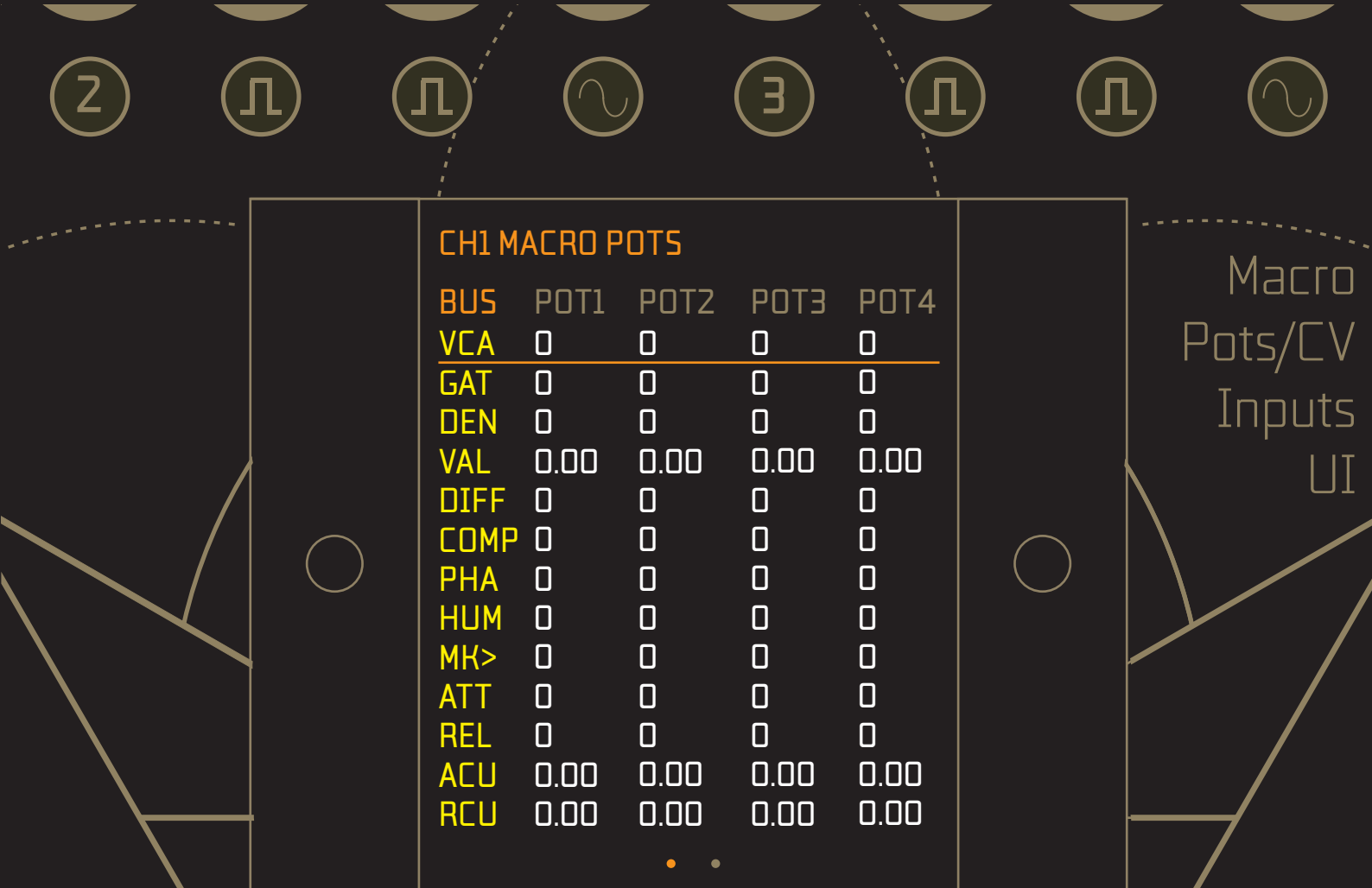
Set the density VCA dry/wet **%** to 100% so that the LFO output is sent through the VCA. Set the channel's **VCA** LFO MAX to 100%. Select a **VCA** LFO **FREQ** of 32 * 16ths and select a + square with a 50% duty cycle. The density modulation will now pass in full for 16 * 16ths while the **VCA** LFO's Square is in the 50% on phase, then no modulation will pass for 16 * 16ths while the VCA LFO's square is off.

### RESET
Highlight the **RESET** parameter then right click with the right encoder and hold for 2 seconds to clear all modulation values for the current channel and reset all to 0.

### BPM Modulation
BPM modulation is available in internal clock mode only. BPM modulation settings should be considered carefully. All LFOs are calculated in 16ths. Modulating the BPM to a low value will result in extremely long 16th times and will result in your sequence taking a long time to cycle.

## CH1 MACRO POTS

| BUS | POT1 | POT2 | POT3 | POT4 |
|-----|------|------|------|------|
| VCA | 0 | 0 | 0 | 0 |
| GAT | 0 | 0 | 0 | 0 |
| DEN | 0 | 0 | 0 | 0 |
| VAL | 0.00 | 0.00 | 0.00 | 0.00 |
| DIFF | 0 | 0 | 0 | 0 |
| COMP | 0 | 0 | 0 | 0 |
| PHA | 0 | 0 | 0 | 0 |
| HUM | 0 | 0 | 0 | 0 |
| MK> | 0 | 0 | 0 | 0 |
| ATT | 0 | 0 | 0 | 0 |
| REL | 0 | 0 | 0 | 0 |
| ACU | 0.00 | 0.00 | 0.00 | 0.00 |
| RCU | 0.00 | 0.00 | 0.00 | 0.00 |

• •

**BUS:**

Select one of the 3 available modulation buses (**Yellow**,**Grey** or **Purple**) for the parameter. The modulation buses allow incoming modulation to be switched on or off for each step of the sequence in the main UI. All combinations of colours are selectable per step or the **MOD** parameter in the main UI may be set to **OFF** to apply no Macro pot/CV input modulation to that step.

**POT 1-4:**

Select a source for the modulation. Assigning a value in the **POT1** column will apply the selected modulation as Macro Pot 1 is rotated etc.

*Attenuverter Nodes*

Each Macro Pot and CV input has a dedicated attenuverter node in the matrix for the positive or negative modulation of each parameter value. An incoming CV or single macro pot may be mapped to many different modulation destinations in different depths and polarities by selecting different values at the parameter attenuverter nodes.

*Accessing the Mod Matrix Screens*

The modulation UI pages are accessed by pressing the **MOD** button. Press once for the Evolve UI, again for the Macro Pots and once more for CV inputs. If a parameter is included in the **MOD** screens, pressing the **MOD** button from the UI will jump directly to that parameter's modulation nodes.

**Micro SD UI**

**SAVE:**
**RIGHT CLICK:** SAVE/LOAD/DELETE
**LOAD SYNC:** 16 * 16ths
**NAME:** _ _ _ _ _ _ _ _

**LOAD:**

| | |
|---|---|
| 1: | PRESET1 |
| 2: | PRESET2 |
| 3: | PRESET3 |
| 4: | |
| 5: | |
| 6: | |
| 7: | |
| 8: | |
| 9: | |
| 10: | |

**RIGHT CLICK**
Right click refers to the pushbutton that is built into the right encoder. The right click parameter offers **SAVE**, **LOAD** or **DELETE** modes. To save a preset, select **SAVE** mode, enter a name in the **NAME** field and right click. To delete a preset, select **DELETE** mode, scroll to a preset and right click. To load a preset, select **LOAD** mode, scroll to a preset and right click.

**LOAD SYNC**
This parameter offers the ability to synchronize your preset loads to the master 16th clock. The default 16 * 16ths mode will load your preset in sync with the master 16 * 16th clock after clicking load. Select 1*16th for the shortest time between clicking load and the preset loading.

**NAME**
Input a name (up to 8 characters) to give your preset a title.

*Selecting Characters*
Scroll right with the parameter change encoder (rightmost encoder) to select letters and scroll left to select numbers. Right click in **SAVE** mode to save to the next available preset slot when this task is completed. Presets will be overwritten automatically if the **NAME** selection already exists to enable quick overwrites when working on a patch. * mode can be used to speed up character and number selection.
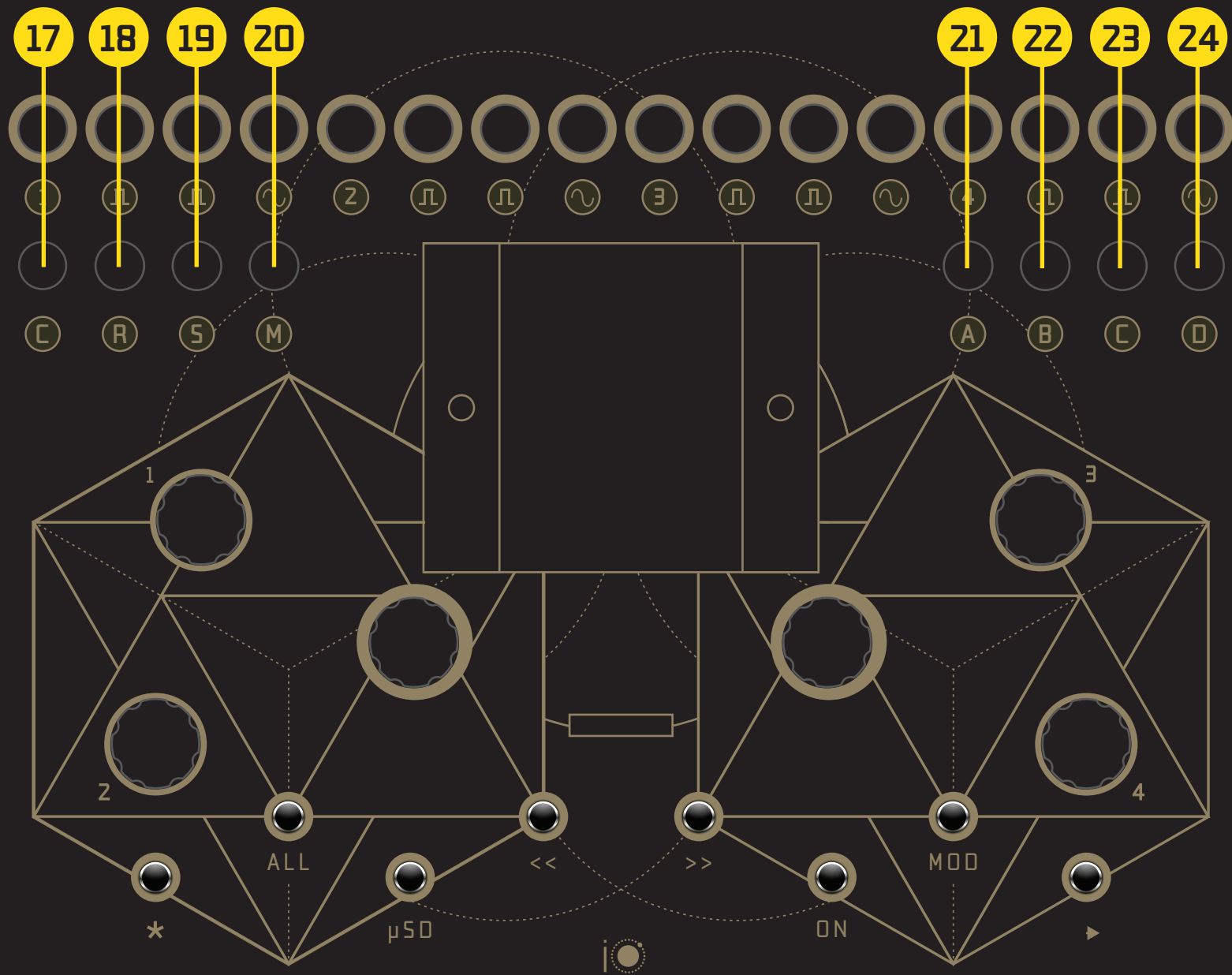
*SD Card & Storage Format*
Presets are stored in a **FLUX** folder on the root of your FAT16 formatted micro SD card. This folder will be created automatically when saving a preset if it does not already exist. Presets are around 4KB so a large micro SD card is not required. Flux now ships with a preformatted and installed 16GB micro SD.
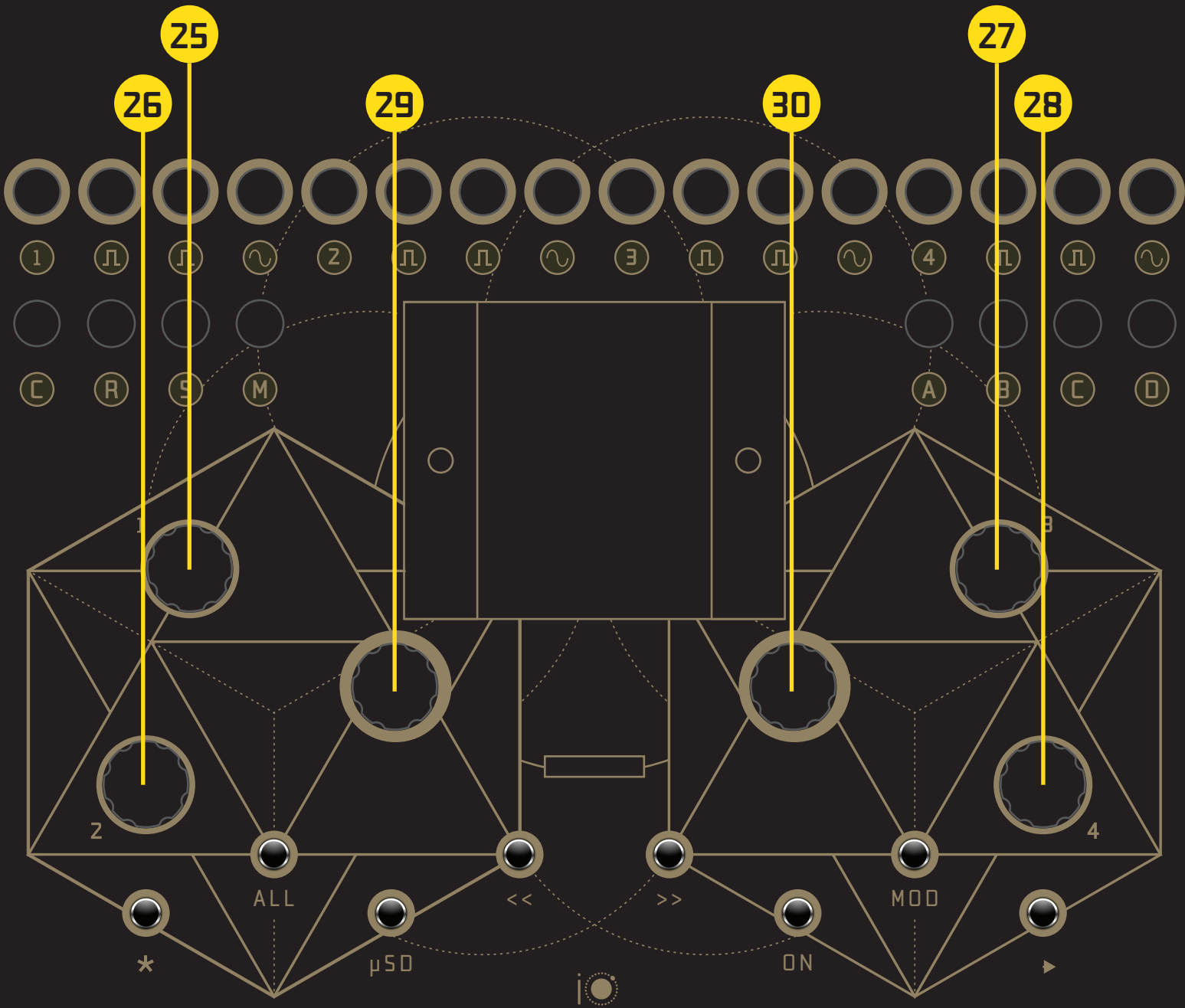
*Loading Presets*
In **LOAD** mode, scroll down the list of presets (displayed in groups of 10) and right click on a preset to load. The preset will load smoothly at the beginning of the next cycle of your selected **LOAD SYNC** length. Leaving the preset UI before the preset has loaded cancels the load. A confirmation message will appear to confirm that your preset has loaded successfully after the selected number of 16ths have passed. The preset **NAME** is also loaded so that you can overwrite your loaded presets easily to iterate on previous work. Scrolling past the last of the 10 displayed presets will load the next group of 10.

**1: Channel 1 Rhythm Output**
**2: Channel 1 Rhythm Aux 1**
**3: Channel 1 Rhythm Aux 2**
**4: Channel 1 CV Output**
**5: Channel 2 Rhythm Output**
**6: Channel 2 Rhythm Aux 1**
**7: Channel 2 Rhythm Aux 2**
**8: Channel 2 CV Output**
**9: Channel 3 Rhythm Output**
**10: Channel 3 Rhythm Aux 1**
**11: Channel 3 Rhythm Aux 2**
**12: Channel 3 CV Output**
**13: Channel 4 Rhythm Output**
**14: Channel 4 Rhythm Aux 1**
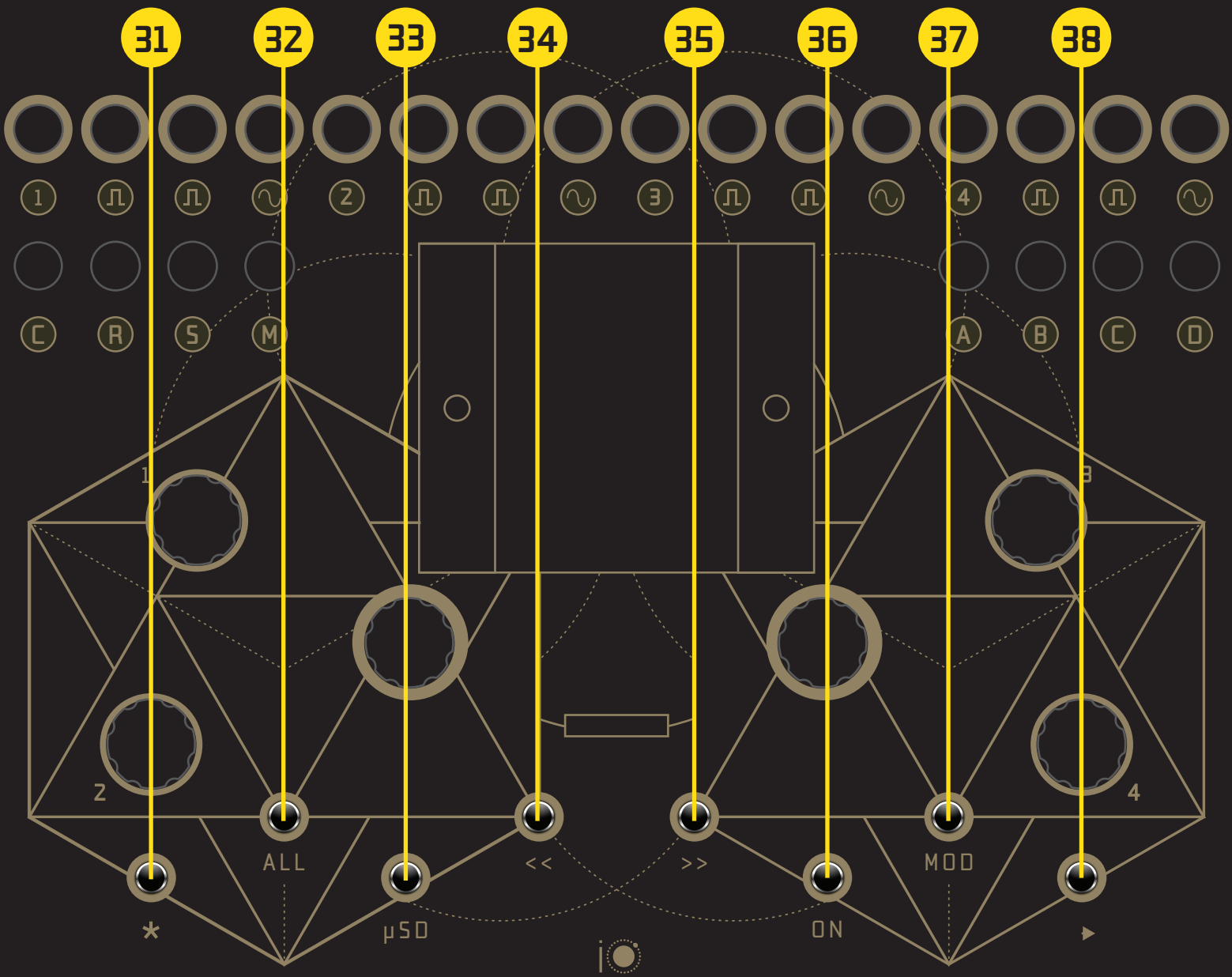**15: Channel 4 Rhythm Aux 2**
**16: Channel 4 CV Output**

17: **External Clock**
18: **Reset**
19: **Start Stop**
20: **Mute All Rhythm Outputs**
21: **CV In A**
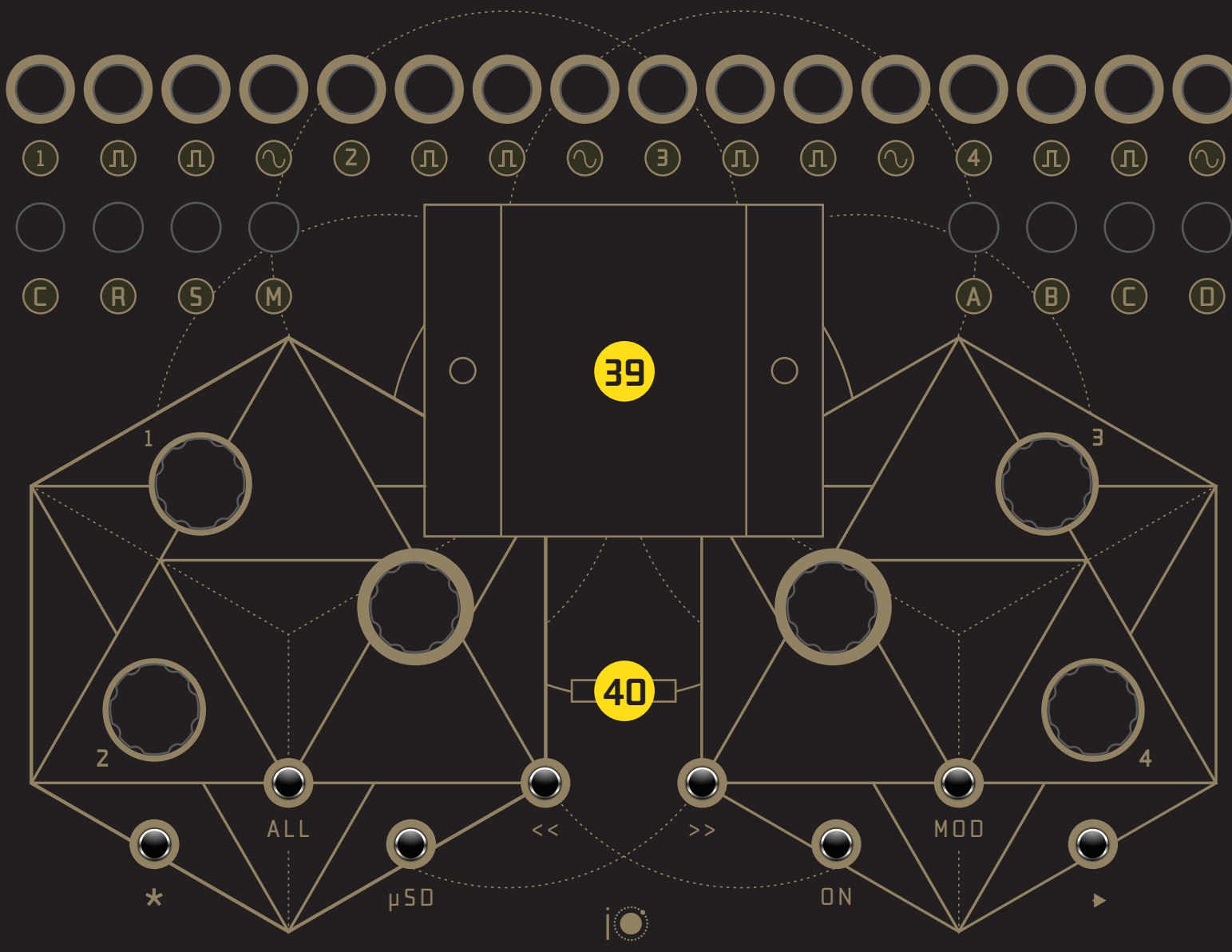22: **CV In B**
23: **CV In C**
24: **CV In D**

**25: Macro Pot 1**
**26: Macro Pot 2**
**27: Macro Pot 3**
**28: Macro Pot 4**

**29: Navigation Encoder**
*Pushing The Navigation Encoder Selects A New Channel To Edit (-)*

**30: Parameter Change Encoder**
*Pushing The Parameter Change Encoder Selects A New Channel To Edit (+)*

**31: Coarse Navigation/Parameter Change**
**32: Edit All/Group Editing**
**33: Micro SD UI**
**34: Step Select -**
**35: Step Select +**
**36: Step On/Off**
**37: Evolve/Macro/CV UI**
**38: Start Stop**

**39: UI Display**
**40: Micro SD Card Slot**

# *AUX modes in order of appearance:*

**OFF**:
No output will be sent for this step

**ON**:
The output will be ON (voltage high) while the sequencer is running

**START**:
A trigger will be sent when the sequencer starts (this only makes sense if it is selected for the first step of the sequence - set all steps to START if experimenting with LOOP and dedicating this AUX out to sync duties).

**SOS**:
Send a trigger at the start of this step

**1st**:
Send a trigger with the 1st main-channel-output trigger of this step

**Last**:
Send a trigger with the last main-channel-output trigger of this step

**DEL 1-8**:
Send a delayed copy of the main-channel-output's rhythm (also records gate length)

**TL 1-16**:
A clock divider that is advanced by the main out's triggers

*Boolean logic (tested in real time):*

**& (AND)**:
AUX output on (voltage high) if x&y(&z) are on

**!& (NEGATIVE AND)**:
AUX output on (voltage high) if x&y(&z) are not on

**|| (OR)**:
AUX output on (voltage high) if x OR y (OR z) are on

**!|| (NEGATIVE OR)**:
AUX output on (voltage high) if x OR y (OR z) are off

**x|| (EXCLUSIVE OR)**:
AUX output on (voltage high) if x OR y (OR z) are on but not if all are on

**CV>1-7V**:
AUX output on if the CV output is currently greater than the selected threshold

**CV<1-7V**:
AUX output on if the CV output is currently less than than the selected threshold

**PPQ 1-48**:
Send a clock with x no of pulses per quarter note (unaffected by the channel parameters)
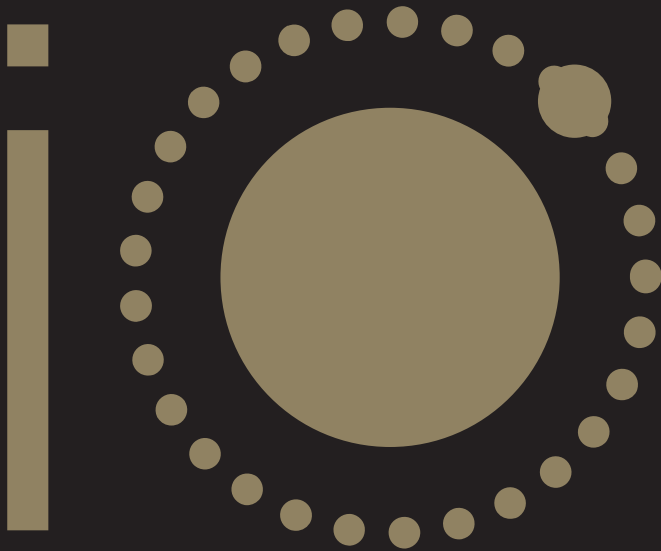
**/1-16**:
Master clock divider (unaffected by the channel parameters). Modes with > displayed shift the starting point of the divider.

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