

# SY-4X

## SYNCUSSION

SYNCUSSION EXTENDED

### User Manual



**SY-4X**  
*Abjames Lab* SYNCUSSION

OSC.MODE TUNE DECAY WIDTH SWEEP L.F.O S/H OUTPUT OSC2 FILTER

A B C D E F G H

TRIGGER

SPEED RANGE SPEED DEPTH

OFF ON

VOLUME HOLD CMOS OFFSET TUNE SPREAD RES

MODE TRIG RANDOMIZE BLEND Q-NOISE

OSC.MODE TUNE DECAY WIDTH SWEEP L.F.O S/H OUTPUT OSC2 FILTER

A B C D E F G H

TRIGGER

SPEED RANGE SPEED DEPTH

OFF ON

VOLUME HOLD CMOS OFFSET TUNE SPREAD RES

MODE TRIG RANDOMIZE BLEND Q-NOISE

**A&S**  
*Abjames Lab*

Mac/PC  
64bit

# SY-4X

## SYNCUSSION EXTENDED

[www.alyjameslab.com](http://www.alyjameslab.com)

### USER MANUAL 1.0.2

by

Aly James



# 1 TABLE OF CONTENTS

---

2	INTRODUCTION.....	3
3	INSTALLATION.....	7
4	MAIN FEATURES.....	8
5	CONTROL PANELS.....	9
5.1	MAIN PANEL.....	10
5.1.1	Analog Sliders and Selectors.....	10
5.1.2	Digital Sliders and Internal Mods.....	12
5.2	MATRIX PANEL.....	15
5.3	SET PANEL.....	16
5.4	MIDI MAP PANEL.....	22
5.5	PRESET BROWSER PANEL.....	24
6	PLAY MODES.....	25
6.1	DRUM KIT MODE.....	25
6.2	KEYBOARD MODE.....	25
6.2.1	Mono Synth – 1 Module, 2 Channels, 1 voice (4 oscillators).....	26
6.2.2	Poly Synth – 4 Modules, 8 Channels, 4 voices (16 oscillators).....	26
6.2.3	Mixed Mode.....	26
6.2.4	Scaling Rules.....	27
7	BERSERK MODE.....	32
8	OSC MODES.....	33
9	POLE SPREADING FILTER.....	35
9.1	An unusual filter design.....	35
10	PRESETS IMPORT / EXPORT.....	37
11	MIDI AUTOMATION.....	37
12	LINKS.....	38
13	DISCLAIMER.....	39

## 2 INTRODUCTION

---

The Pearl Syncussion SY-1, introduced in the late 1970s, is a legendary drum synthesizer celebrated for its unique sound-shaping capabilities and wide tuning range. At its core, the SY-1 features two identical modules, each containing two oscillators, a custom filter, two envelope generators, an LFO, a Sample & Hold circuit, and a noise generator. It has been the secret weapon of many musicians, often coming equipped with triggers built into small tom shells.

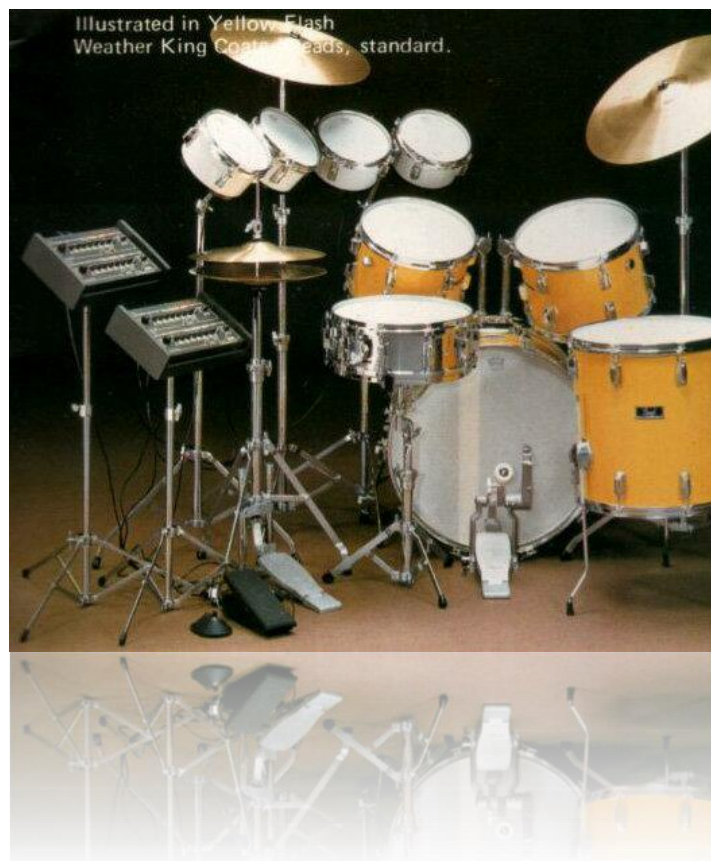
*(check any Purple Rain tour videos to see Prince's drummer Bobby Z using 2 of it).*

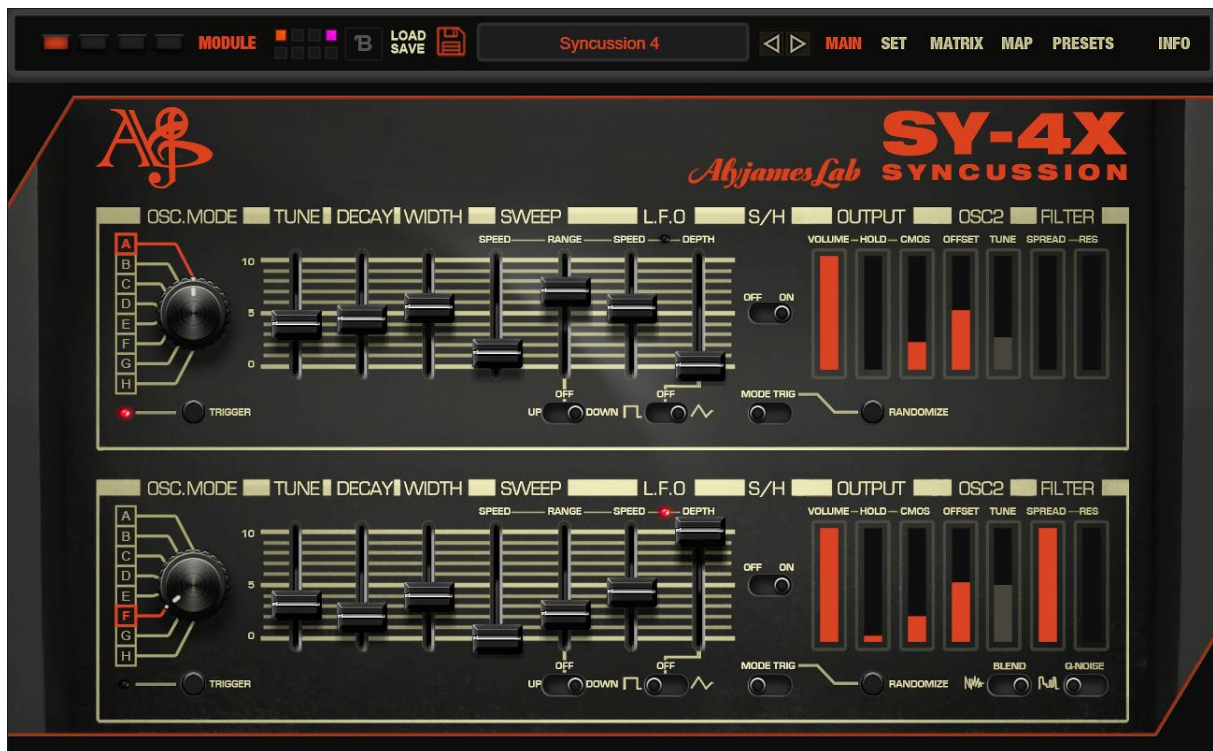
The SY-1 offers six oscillator modes, functioning as internal preset connections: single oscillator, FM, dual oscillator mix, dynamic oscillator mix, FM/Custom Ramp OSC, and pure noise. These modes provide an extensive range of sound possibilities, from deep bass kicks to high-pitched toms and intricate noise effects.

Having used the original SY-1 for quite some time, I eventually acquired two different modern clones, one of which is a 1:1 replica. I love the Syncussion as a random percussive sound generator and as a fantastic source for creating drum samples.

However, let's face it—recreating the same sound twice on the hardware is nearly impossible. A slight adjustment to the tuning slider, which spans over 8 octaves, can drastically alter the sound, and this classic piece of gear also drifts like any good old analog synth.

For years, I wished for more options with this wonderful sound source but found it limited in functionality and lacking in recallability by modern standards. That's why I decided it was time to create something like the SY-4X, and as always, I'm excited to share it with the world.

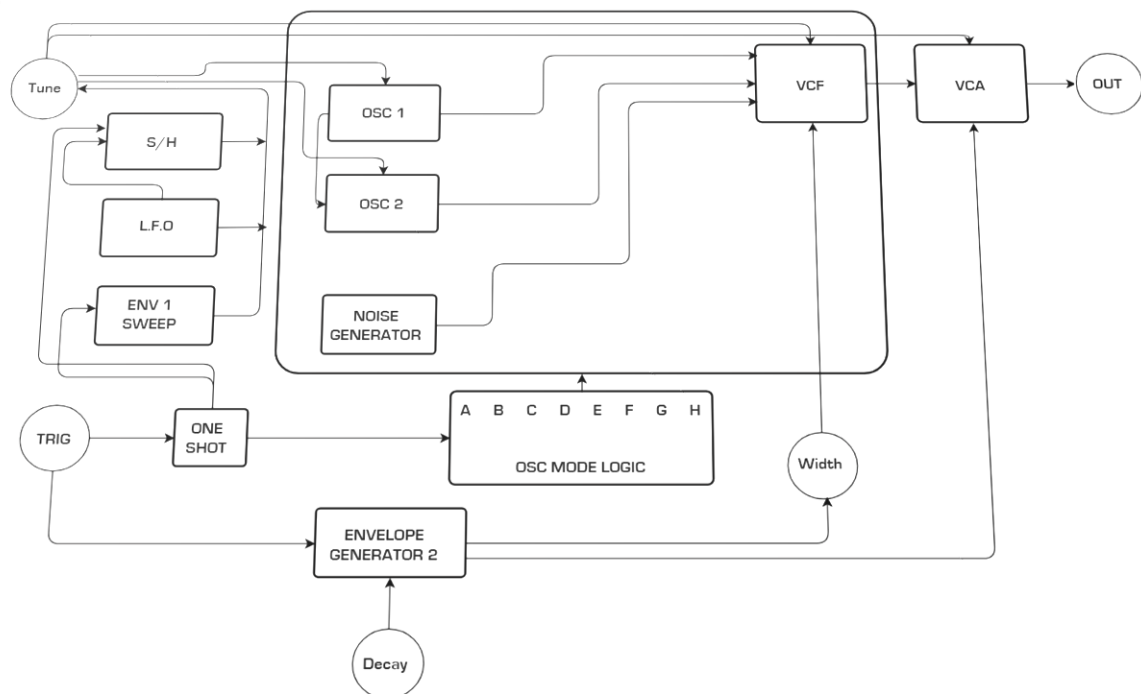




**The SY-4X packages four SynCUSSION SY-1 modules into one neat unit**, with some modules featuring additional modifications like noise direct injection and a Custom Mode A. These four modules enable you to create an 8-voice drum kit, four mono synths (with coupled voices = 4 oscillators per module), or a four-voice poly synth (4 x 4 oscillators). Mono and poly synth modes can be played musically or used to create monstrous layered drum sounds. You can also mix modes, such as three modules in Drum Kit mode and one in mono synth mode (keyboard controlled). In any play mode, you have full control over every voice parameter—sky's the limit!



The SY-4X is not only a faithful re-creation of the Pearl SY-1's inner circuitry, but it also offers significantly more options. These include two new modes—G & H, trigger-controlled 'mode scanning,' CMOS circuit 'defect' control for enhancing harmonics beyond the original, real-time VCF integrator cap offset for dynamic pole movement, fine-tuning of the envelope response to match your playing style, and additional features like the intense Berserk mode.



*This extended emulation is based on reverse engineering and old datasheets; it uses a C++ custom core with modeled analog circuitry.*

**SY-4X offers extensive MIDI triggering capabilities.** In Drum Kit Mode it primarily follows the General MIDI (GM) Drums mapping. When triggered via MIDI, each note/trigger will be processed through many circuits dynamically shaping different parts of the sound. The resulting output is then amplified introducing unique characteristics depending on the trigger or volume level. The analog behavior emulation faithfully reproduces the changes that occurs between the tuning, decay time and filter.

To provide maximum control over the sound generation process, each voice in SY-4X is equipped with dedicated knobs. These knobs allow you to fine-tune the parameters for the eight provided channels, each with their own distinct settings.

Two sets of parameters are available, the first set of “analog” sliders are faithful to the original while the second “digital” set is dedicated to “under the hood” fine tuning and extra controls only accessible through electronic adjustments or modifications.

SY-4X gives you option to set any of the four modules to **Drum Kit Mode** operation or **Keyboard Mode** Operation, additionally if all modules are in Keyboard Mode you can activate a “channel rotate” operation which basically gives you a 4 voices polyphonic synth where you keep full control over every voice parameter, see play modes section.

**Here is the basic layout for MIDI channels requirement related to play-modes:**


<i>PLAY MODE</i>	<i>MODULE</i>	<i>RECOGNIZED MIDI CHANNEL</i>
• Drum Kit MODE	- ALL	: MIDI channel ANY
• Keyboard MODE	- Module 1	: MIDI channel 02
• Keyboard MODE	- Module 2	: MIDI channel 03
• Keyboard MODE	- Module 3	: MIDI channel 04
• Keyboard MODE	- Module 4	: MIDI channel 05
• Keyboard MODE	+ Rotate	: MIDI channel ANY

In **Drum Kit Mode**, SY-4X can receive any MIDI channel as main source for triggers. It can be triggered with a standard MIDI Keyboard/Pads or even a MIDI Drum Kit. The default mapping follows almost the same mapping as GM MIDI Standard and can also be customized.

*note: In Drum Kit Mode Channel 6 (42,44,46) have a special function to simulate close and open states (for example to make a hi-hat), the first two notes (42 and 44) reduce the currently set decay time while the third note (46) doesn't.*

# SY-4X

## SYNCUSSION



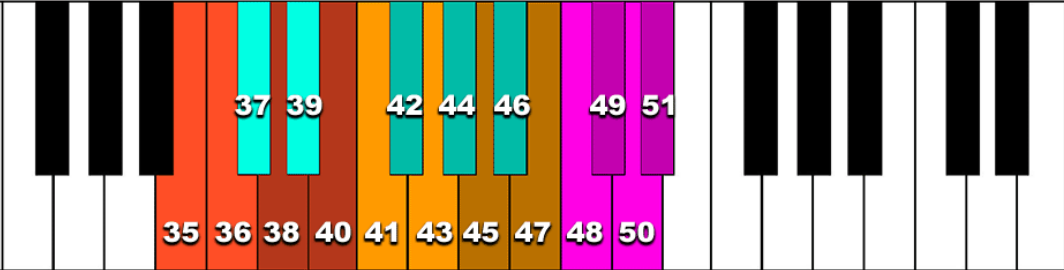
MODULE I

MODULE II

MODULE III

MODULE IV

**v1.0 DEFAULT MIDI DRUM MAP**



**MIDI NOTE NUMBER**



*SY-4X gives you 4 Syncussion unit to play with in various configuration.*

### **3 INSTALLATION**

---

#### **Compatibility**

- Windows 10 +  
64bit Host VST3
- Mac OS 10.10 +  
64bit host VST3 AU  
Universal 2 (Native Silicon/Intel)

#### **Install Windows:**

- Run SY-4X Installer

#### **Install Mac:**

- Run SY-4X plug-in Installer
- Run SY-4X plug-in Presets Installer

*Additional installation info can be found in your "download link" Email and at the website.*



## 4 MAIN FEATURES

---

### **CMOS BASED OSCILLATOR:**

This type of VCO uses a CMOS inverter chip and a bias circuit to control oscillation. If the circuit isn't ideal, one half of the resulting waveform might differ slightly from the other, resulting in a distorted waveform and additional harmonics. In the SY-4X, each of the 8 voices has a CMOS parameter that allows you to control or enhance this 'defect.' The reset value replicates the original hardware's response behavior.

### **UNUSUAL 2-POLE SPREADING FILTER:**

The SY-4X models the Syncussion's unique filter design—a 2-stage low-pass SVF with a twist. The control voltage has a greater impact on the second stage, which is intentionally set to a higher cutoff. This design causes the two filter poles to spread apart depending on the control voltage, creating an almost vowel-like effect. The two cutoff points have a ratio of roughly 4:1, and the CV has a ratio of 2.13:1. The SPREAD parameter allows you to adjust or modulate the frequency ratio, controlling the distance between the poles.

### **SEPARATE OUTPUTS:**

The SY-4X provides dedicated outputs for each module, with each module containing two voices, giving you a total of eight channels. You can choose to output all voices to one stereo channel or assign separate channels for each voice in your DAW.

### **TRIGGER SENSITIVITY CONTROL & VELOCITY:**

The drum synth is responsive to the intensity of a drum hit. The SY-4X offers a global trigger sensitivity setting, velocity tracking and a custom decay sensitivity.

### **GUI & AUTOMATION:**

The GUI encompasses all SY-4X parameters, most of which can be MIDI-learned and controlled via external MIDI hardware or DAW automation.

### **MIDI MAP:**

By default, SY-4X triggers are mapped to the MIDI GM standard, but you can customize this mapping using its MIDI learning function. The map can be saved globally and will be automatically recalled each time.

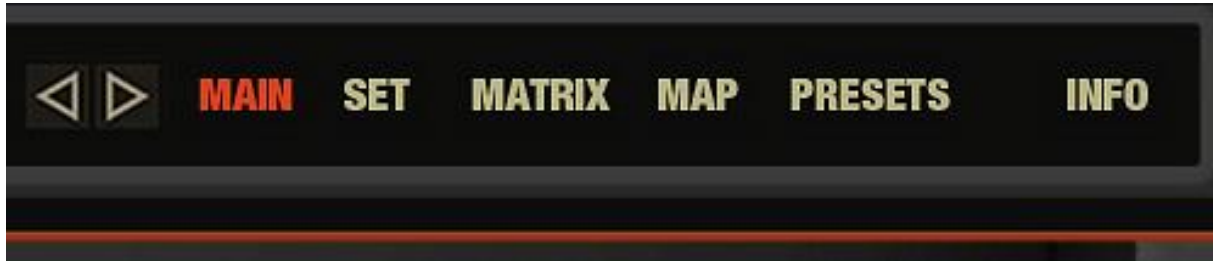
### **LOAD & SAVE FULL PATCH & BANKS:**

SY-4X allows you to load and save full patches and banks in multiple formats (additional technical information is available in this manual).

## 5 CONTROL PANELS

---

The SY-4X GUI interface is designed to be user-friendly and intuitive, organizing different parameters into separate sections/panels for easy access.



**MAIN:** Main view area where you will control the selected Syncussion module.

**SET:** Access global settings and modules settings area.

**MATRIX:** Future area for cross-modulation between channels.

**MAP:** MIDI notes mapping area for Drum Kit Mode.

**PRESETS:** Internal presets browser.

**INFO:** User Info, plug-In info and main circuit diagram.



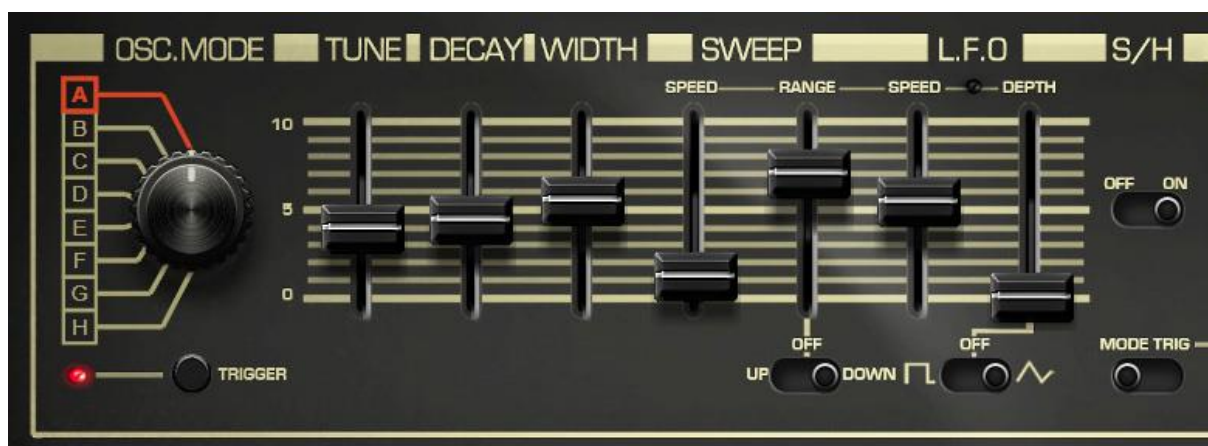
The main section also includes a **MODULE** select section in the top left corner, allowing you to display and control the selected module.

*Each of the four modules is color-coded, including the trigger LEDs, for easy identification.*

## 5.1 MAIN PANEL

The main interface allows you to select the voice/module you want to edit. For each voice, you will find the following basic controls and a TRIGGER button to quickly monitor a sound from the GUI (triggers at max velocity):

### 5.1.1 Analog Sliders and Selectors



1. **OSC.MODE** Knob: The OSC.MODE knob selects the current preset mode (refer to the OSC Modes section). However, this knob is disabled or bypassed when MODE TRIG is activated. Each mode affects the tuning of the oscillators, filter cutoff, and various modulation points by establishing predefined connections.
2. **TUNE** Slider: The TUNE slider adjusts the frequency of both oscillator 1 and oscillator 2. By default, the Syncussion is configured with a slight frequency offset between these two oscillators. In the SY-4X, this offset can be fine-tuned using the digital slider labeled OFFSET.

Additionally, the TUNE slider affects the filter and overall decay. Raising the TUNE setting produces a brighter sound and reduces the decay time. Like all sliders, you can make fine adjustments by holding CTRL while moving the mouse, which is particularly useful given the tuning range spans over 8 octaves.

3. **DECAY** Slider: The DECAY slider controls the decay time of envelope generator 2, which shapes the overall body of the sound and influences the filter, depending on the WIDTH setting. Changes to the decay time are applied immediately and don't require waiting for the next trigger to take effect.

The HOLD parameter significantly affects the perceived decay time, depending on its setting (refer to HOLD for more details).

4. **WIDTH** Slider: The WIDTH slider determines the amount of modulation from envelope generator 2 that is sent to the filter, effectively controlling the envelope-to-VCF amount. You might wonder why it's called WIDTH—this name relates to the unique design of the Syncussion filter, where increased modulation expands the

width between the two filter poles. For more details, see the **Pole Spreading Filter** section.

5. **SWEEP Speed** Slider: The SWEEP Speed slider adjusts the speed of envelope generator 1. This envelope generator operates independently of triggers and is unaffected by velocity. You could call envelope generator 1 the sweep envelope.
6. **SWEEP Range** Slider: The SWEEP Range slider controls how much of envelope generator 1's output is sent to various modulation points. These points can vary between modes (especially in newer MODES like G and H), but generally, the sweep influences both the oscillators' frequency and the filter.
7. **SWEEP Direction** Selector: The SWEEP Direction selector determines the direction of the sweep. For example, setting it to DOWN is ideal for creating kick drums or percussive sounds that start at a high frequency and quickly decrease, mimicking the behavior of real drums. Additionally, the center position of the selector acts as an ON/OFF switch, disabling the sweep by removing it from the circuit when set to OFF.
8. **LFO Speed** Slider: The LFO Speed slider adjusts the oscillation speed of the LFO. This setting also influences the sample and hold output, as the sample and hold function derives its source from the LFO output, even when the LFO is turned off.
9. **LFO Depth** Slider: The LFO Depth slider controls the intensity of the LFO modulation, determining how much modulation is sent to various modulation points. These points may differ between modes (especially in newer MODES like G and H), but typically, the LFO affects both the oscillators' frequency and the filter.
10. **LFO Sync** Selector: The LFO Sync selector toggles LFO's waveform phase reset on trigger, the cool thing is that it doesn't retrigger S&H which, in this case, is processed separately.
11. **LFO Waveform** Selector: The LFO Waveform selector provides two LFO shapes to choose from: Square or Triangle. The center position of the selector doubles as an ON/OFF switch, deactivating the LFO modulation by removing it from the circuit when set to OFF.
12. **S&H (Sample & Hold)** Selector: The S&H selector toggles the Sample & Hold function ON or OFF. When activated, it samples and holds the LFO voltage upon receiving a trigger, serving as a simple but entertaining random generator. You can globally adjust the amount of S&H modulation or scale its voltage to "musical tuning" per module in the SETTING section.

You may notice a slight lag or glide in oscillator pitch modulation when the LFO approaches audio rate speed, which is due to the inherent characteristics of analog circuits. This subtle effect mirrors the behavior found in hardware systems.

13. **MODE TRIG** Selector: The MODE TRIG selector is a special feature that automatically changes the current OSC.MODE with each trigger, following a randomly generated musical pattern with a length of 8. You can create a new random pattern at any time by pressing the RANDOM button next to it.

What's particularly useful is that the currently generated random pattern is saved within your DAW session (not in presets), allowing you to reproduce any interesting MODE scanning patterns you come up with. The modulation can handle up to 50Hz,

meaning it can process triggers up to 50 times per second, though it's not designed for audio-rate modulation.

*With the exception of the MODE TRIG selector, the previous controls are identical to those found on the original hardware.*

## 5.1.2 Digital Sliders and Internal Mods



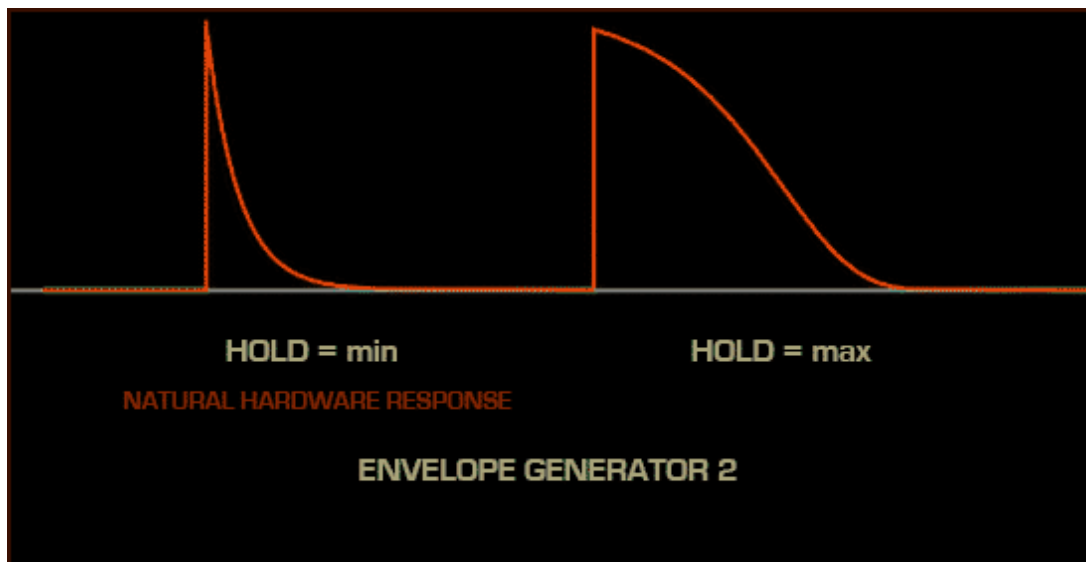
To the right of each voice, there is a set of digital sliders providing direct circuit control. Additionally some voices feature new selectors with custom functions.

*Note: Highlighted are two selectors called **BLEND** and **Q-NOISE**, these custom functions are only available for Channel 2 and Channel 6.*

*Only Channel 8 features a MODE A OSC selector which introduces a custom MODE A preset.*

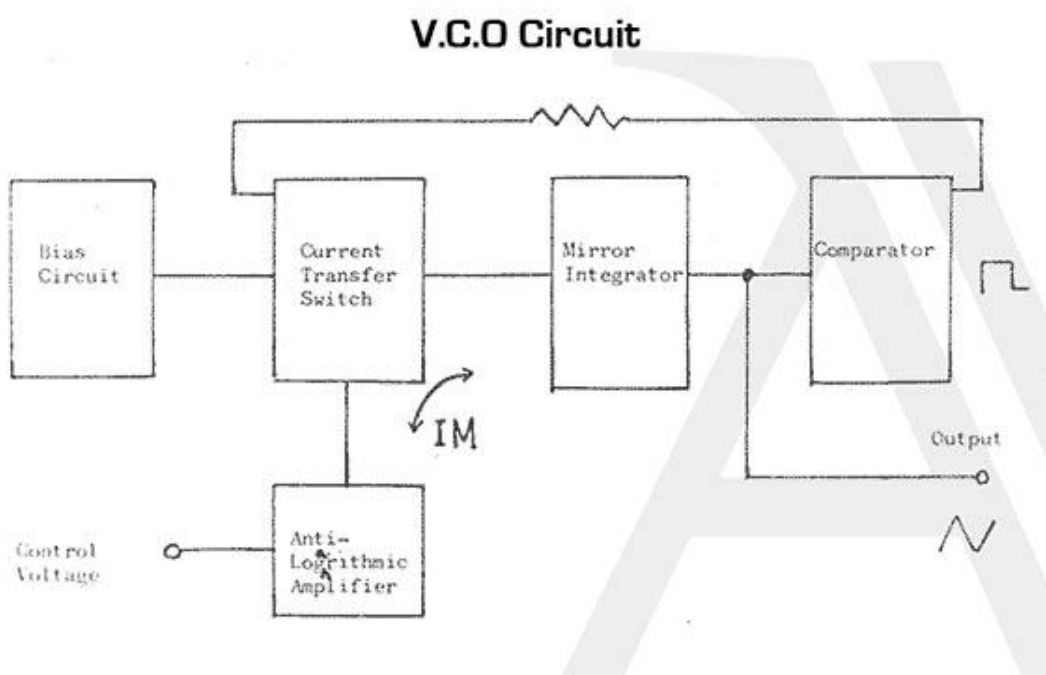
1. **VOLUME**: Set the overall volume of the module, can reach analog clipping if pushed hard in BERSERK Mode.
2. **HOLD**: This setting Controls the shape of envelope generator 2 or I should I say better the output VCA response. If you remember, envelope 2 controls the VCA, the filter, and, depending on the selected MODE, the tuning. The envelope generator's triggering pulse levels vary with attack strength, providing adequate accent to the output.

When HOLD is set to its lowest value, it replicates the response of the original hardware. Increasing the value, however, changes the envelope response to a more linear shape. This is particularly useful when you need a near-gated response or, in other words, more body with an ultra-fast decay. *(Note that the perceived decay time will also increase along the HOLD amount and you will need to lower the decay if you want to keep the same perceived decay time you had with no HOLD.)*



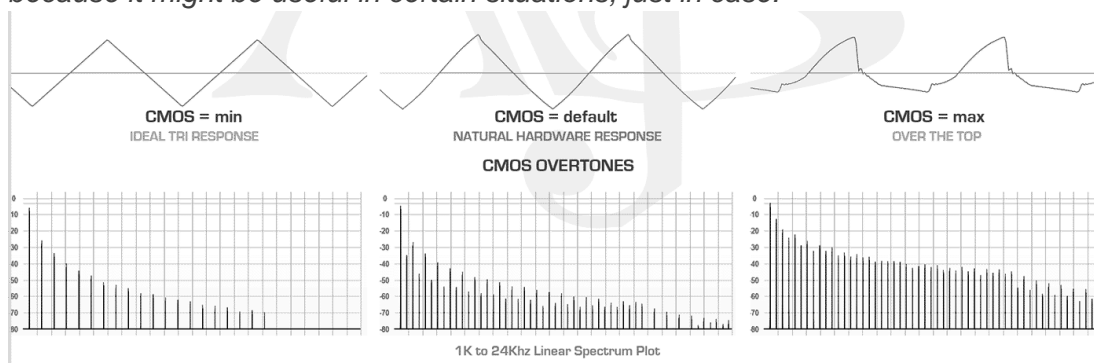
*Default response is the typical capacitor discharging shape—snappy and punchy. But what if you could change that at will with a simple modification, turning the response from exponential to logarithmic? This setting alone can dramatically change the resulting sound, giving you way more mileage out of this synth.*

3. **CMOS:** The CMOS slider adjusts the amount of "defect" or non-linearities introduced by the use of CMOS inverters in various parts of the circuit, particularly within the oscillators. This type of oscillator design relies on a CMOS inverter chip and a bias circuit to control oscillation.



If the bias is not optimal, one half of the resulting waveform might differ slightly from the other, leading to a distorted waveform and additional harmonics. The reset value (accessible by holding ALT Gr + Click on the digital slider) replicates the original hardware's response behavior. This slight imperfection is what gives the Syncussion its particular harmonic color.

When set above factory value, the CMOS parameter can rapidly exceed what is typically found in a well-made circuit, allowing for extreme color. However, if set to 0, it loses some of its characteristic "nastiness." I included the option to set it to 0 because it might be useful in certain situations, just in case.



4. **OFFSET:** The OSC.2 OFFSET slider controls the frequency offset between OSC.2 and OSC.1. In the original hardware, this small frequency offset was set by a trimmer according to factory specifications, but a popular modification was to make this offset adjustable, allowing users to alter the FM ratio in modes where OSC.1 modulates OSC.2's frequency. In the SY-4X, the OFFSET range spans approximately half an octave in either direction. The reset value (accessible by holding ALT Gr + Click on the digital slider) returns the OFFSET to factory settings.

If you're experimenting with FM (OSC.MODE B, E, adjusting the OFFSET can help you find frequency ratios between the oscillators that produce harmonically related overtones (quick tip -set OFFSET to max). However, because the original oscillators didn't maintain pitch tracking well across octaves, the perfect ratio you discover might shift. Fortunately, SY-4X offers a solution: go to the SETTING panel and toggle the "OSC1 & 2 Tuning SYNC" button for the module you're working with. This feature stabilizes pitch tracking between the two oscillators, ensuring they stay in sync regardless of tuning.

Harmonic FM is just one aspect; adjusting the OFFSET can also yield different harmonic flavors. The default imperfect pitch tracking of the oscillators introduces subtle variations in the FM ratio as the tuning changes, adding dynamic movement to the sound.

5. **TUNE:** This is an additional tuning slider specifically for OSC2, active only in MODE G or H, where the hardware tuning slider no longer directly controls OSC2's frequency. The lowest position sets OSC2 approximately 2 octaves above OSC1 and can go as high as +9 octaves.
6. **SPREAD:** This controls set the "distance" of the filter's second pole related to the first pole (see Pole Spreading Filter section).
7. **RES:** This slider introduces resonance to the filter, a feature that wasn't available on the original hardware without internal modifications but doable.

8. **BLEND**: This additional function is available only on **channel 2 and channel 6**. When activated, it takes a direct feed from the noise generator output and blends it with the output VCA. This can be particularly useful for adding noise that isn't influenced by the filter, such as when creating snare-like sounds, without the need to use two voices from a module.
9. **Q-NOISE**: This extra function is available only on **channel 2 and channel 6**. When activated it applies a sample-and-hold effect to the noise generator output, with a rate that depends on the current oscillator tuning. Essentially, this simulates downsampling the noise generator, which can be useful for creating "clap-like" sounds or "8-bit sweeps."
10. **MODE A OSC**: Available only on **channel 8**, this selector activates a modified version of MODE A. Instead of just connecting OSC1's triangle waveform to the filter, MODE A becomes: OSC1 + OSC2, both connected to the filter and both wave-shaped into square waves. And who doesn't love detuned square waves?



**SINCE 1.0.2 EACH MODULE FEATURES A COPY/PASTE FUNCTION TO SHARE SETTINGS BETWEEN MODULES OR BETWEEN PRESETS.**

## 5.2 MATRIX PANEL

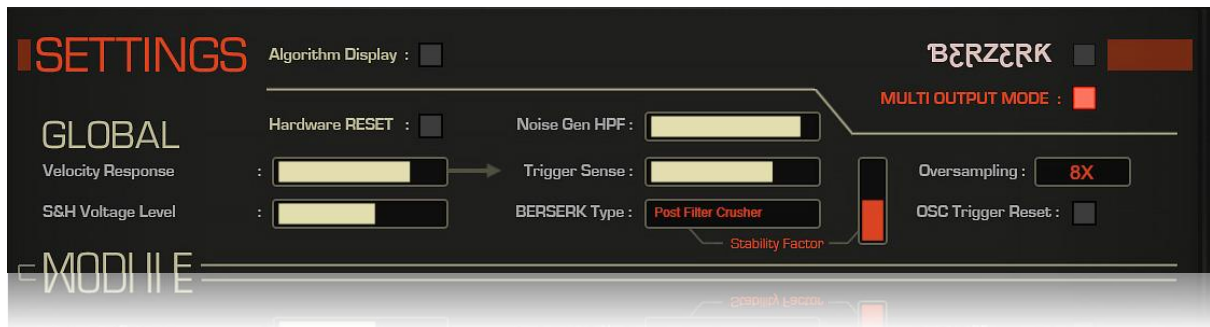
- Place Holder for a future cross-modulation matrix between channels...

????



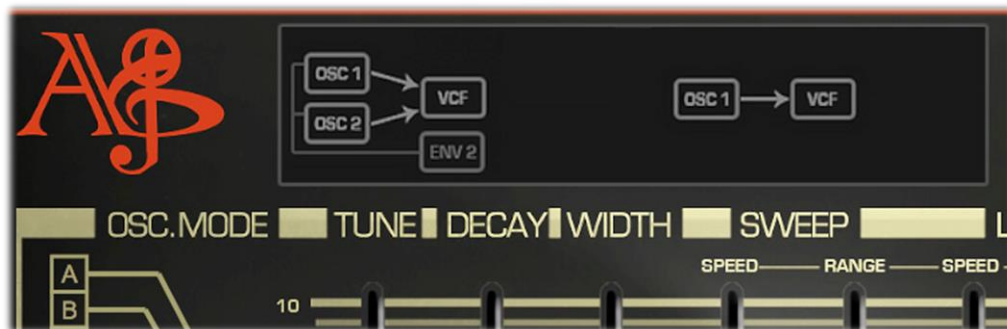
## 5.3 SET PANEL

The settings panel, the heart of SY-4X.



### GLOBAL SECTION


**Algorithm Display:** If activated, a display screen appears on the MAIN panel, showing the block diagram of the currently selected MODE algorithm. Please note that these diagrams do not display all internal offsets and additional modulation connections involved in each MODE, still useful to familiarize with modes.





**Hardware Reset:** This function resets **all digital sliders across every module** and all global settings sliders to their factory settings in one go, eliminating the need to manually perform an ALT Gr + Click on each one.


**BERSERK:** Activates BERSERK mode. You can also toggle this mode from the main panel by clicking the small capital "B" next to the trigger LEDs. (Refer to the BERSERK Mode section for more details.)


**MULTI OUTPUT MODE:** Enables SY-4X multi-output routing. Instead of sending all channels to the main stereo channel, the plug-in will route each channel to a dedicated stereo channel in your DAW, allowing you to mix each channel individually with the full range of DAW features, including inserts, sends, EQ, and more. Since every DAW handles multi-output plug-ins differently, refer to your DAW's documentation for specific instructions.


 **OSC Trigger Reset:** Resets the oscillator's phase with each trigger. Unlike free-running mode, phase reset can yield more predictable results, especially when working with drum sounds. This is another popular modification found in hardware Syncussion.


 **VCF Poles CV 1:1 Ratio:** Set both CV resistors to the same value, bringing the two poles closer together when the envelope fires and making the SPREAD parameter even more crucial by controlling a more consistent ratio. With this option enabled, the poles will maintain an almost constant ratio governed by the SPREAD parameter, while receiving the same amount of CV. (Refer to the POLE SPREADING FILTER section for more details.)


 **EG Fast Attack:** Bypass the envelope attack phase smoothing that reduces the original circuit "clicking attack phase", when this setting is ON you will hear a more pronounced click, this is the default reset value since 1.0.2.

 **Noise Gen HPF:** Adjusts the high-pass filtering of the noise generator. The default setting filters out a significant amount of low frequencies, but you can lower the cutoff point of the high-pass filter to allow more bass to pass through, tailoring the sound to your preference.

 **Velocity Response:** This control determines how much MIDI velocity influences the circuit. In the Syncussion, it primarily affects envelope generator 2. Set it to maximum for full velocity sensitivity, or to the hardware default for a more traditional response. The minimum setting will effectively set the velocity to maximum at all times, useful if you prefer a "fixed" velocity.

 **Trigger Sense:** This slider works in conjunction with the Velocity Response control, adjusting how much envelope 2 is influenced by trigger force. Lower this setting if you want less modulation. Keep in mind that envelope 2 affects volume, filter, and, depending on the MODE (e.g., MODE D), the tuning.

 **Decay Sense:** This slider works is a new custom feature since 1.0.2 that is not available on the hardware, it works in conjunction with the Velocity Response control, adjusting how much envelope 2 decay time is influenced by velocity. Turn off this setting if you want the original hardware response as this is an additional sensitivity circuit. The more you will increase the value the more velocity will affect the overall decay time, the sound will become more dynamic than the hardware, good for drummers!

 **S&H Voltage Level:** This slider adjusts the amount of modulation produced by the sample & hold circuit. Since S&H primarily modulates oscillator's pitch, this control is especially useful for managing the pitch

modulation range, particularly when using pitch scaling functions. At the maximum setting, the range extends approximately  $\pm 2$  octaves. Lower the setting if you want random notes that are closer in pitch to each other.



**BERSERK Type and Stability Factor:**

This option allows you to choose the Berserk distortion type, either a **Post Filter Crusher** or a **Pre Filter Clipper**.

The associated Stability Factor controls the overall distortion intensity. Lower settings push the effect beyond conventional limits, which is where the real fun begins... (Refer to the BERSERK Mode section for more details.)

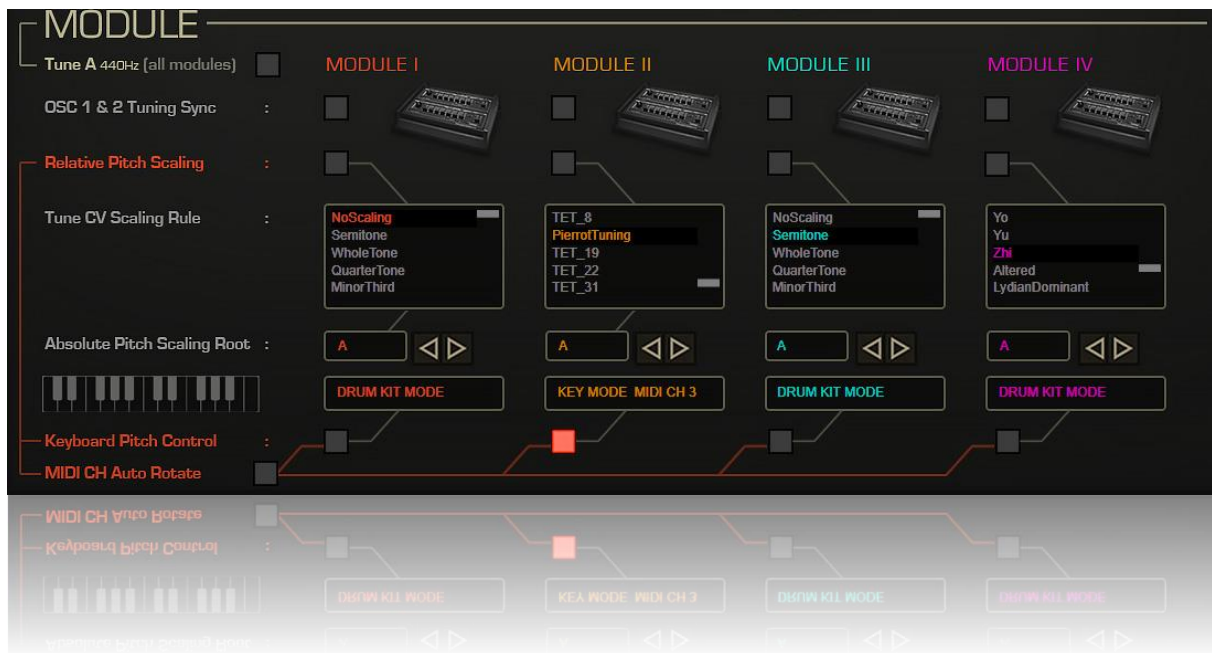


**Oversampling:** This feature is essential for a synth like this, which spans a wide tuning range and employs FM and other intense modulations. Oversampling is applied where

and when it's needed, with special care taken to avoid unnecessary oversampling, keeping the CPU load relatively light. A setting of 4X at 96Khz or 8X at 48Khz is typically sufficient for high-pitched sounds, but you can adjust it to your preference or even disable it entirely. Some aliasing isn't always undesirable and can be used creatively. *Be aware that in frequency-modulated modes like B or E, you might notice intermodulation at high tunings—this is normal and also occurs in analog FM synthesis.*

**MODULE SECTION**

This section provides per-module functions primarily related to tuning. For a detailed overview of keyboard modes, please refer to the **Play Modes section**.



■ **Tuning A 440Hz:** This convenient feature sets all module voices to A 440Hz with a single click, which can be particularly useful when using MIDI channels in auto-rotate mode to ensure all voices are in tune before making further adjustments.

■ **OSC 1 & 2 tuning Sync:** This feature stabilizes pitch tracking between the two oscillators of the selected module, ensuring they remain in sync regardless of tuning. While the original Syncussion oscillators didn't maintain pitch tracking well across octaves, which contributes to its charm, "perfect" tracking can sometimes be beneficial for maintaining a fixed frequency ratio (see FM and the OFFSET parameter).

■ **Relative Pitch Scaling:** This function activates relative pitch scaling when using **Keyboard Pitch Control**, treating the currently played note as the ROOT note of the scale. When this button is off, the system defaults to absolute pitch scaling, which uses the selected ROOT note (see below) as the scale root.



**Absolute Pitch Scaling Root:** When activated, absolute pitch scaling uses the selected ROOT note as the scale's foundation when using Keyboard Pitch Control.



**Tune CV Scaling Rule:** This feature scales the pitch CV (control voltage) to a musical pitch based on a chosen scaling rule, with around 60 scales available. The TUNE slider and incoming CV will be scaled accordingly, whether to a 1-step scale (e.g., whole tone) or a full scale. This scaling applies in both Drum Kit mode (great with S&H) and Keyboard Modes. In absolute pitch mode, you set the ROOT of the scale, while in relative mode, the currently played note

becomes the root. For a detailed list of scales, please refer to the **Play Modes section**.

■ **Keyboard Pitch Control:** Activates Keyboard Mode for the selected module. Unlike Drum Kit mode, in Keyboard Mode, all MIDI notes will trigger the selected module, and the actual MIDI note pitch will influence the tuning. The tuning slider voltage remains active, functioning like a wide-range synth tuning, similar to an ARP 2600. Note that pitch-bend is not currently recognized but may be supported in the future.

When in KEY MODE, the display will indicate this status along with the MIDI channel that the module responds to. For example, if you activate Keyboard Pitch Control for MODULE 2, it will display "KEY MODE MIDI CH 3," meaning you need to send your notes on MIDI channel 3 for this module to recognize them.

In Keyboard Mode, **you control an entire module**, not just a single channel. This means both voices in the module will be triggered simultaneously, while all other

controls remain independent. For instance, activating Keyboard Pitch Control for MODULE 2 will trigger SY-4X channels 3 & 4 simultaneously.

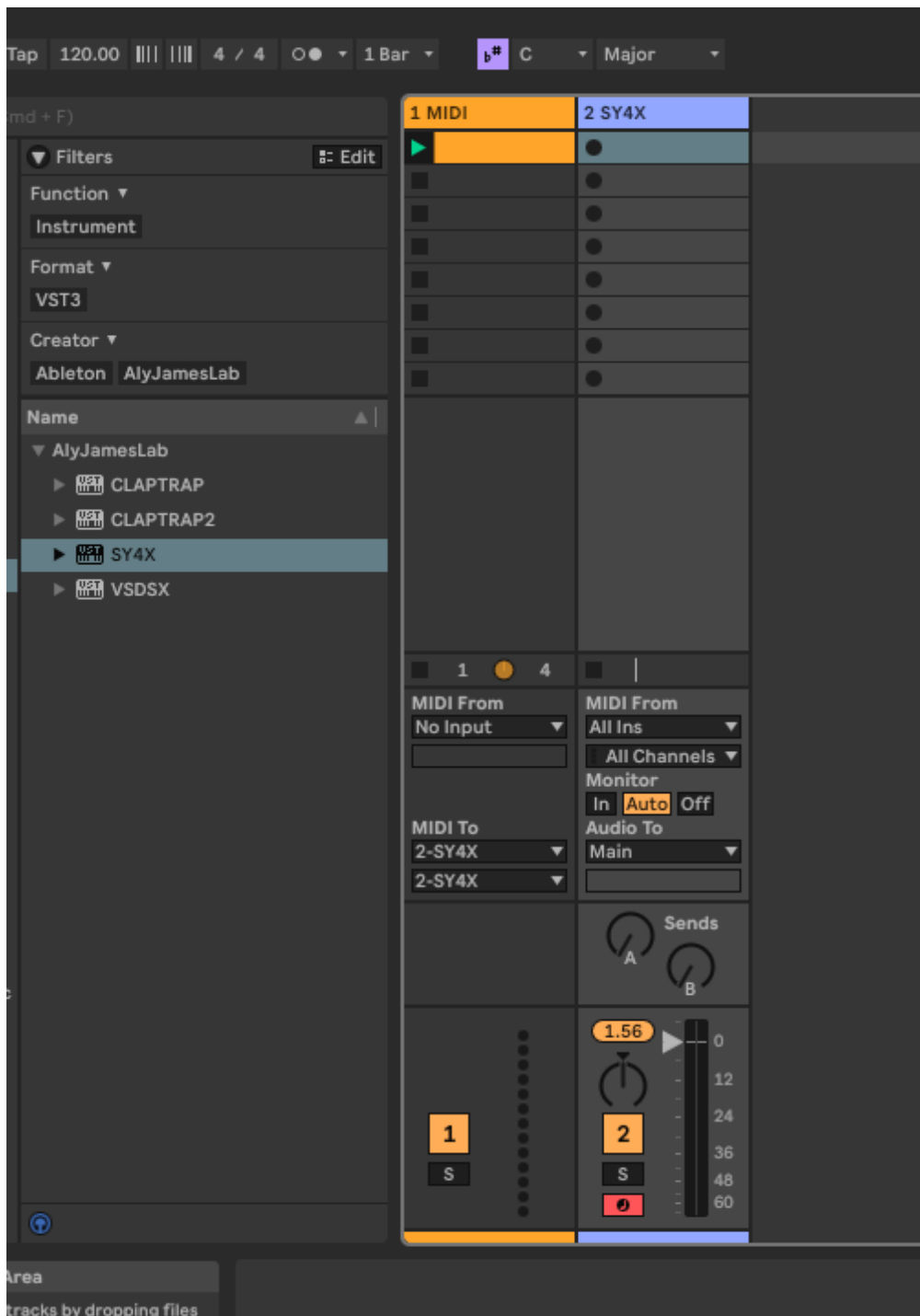
Triggering two voices at once can lead to creative possibilities. You can tune them differently (which works wonderfully with scaling rules and S&H), use them as layered voices—such as having one short layer and one long layer to treat the attack and body of the sound differently, and more.

Every DAW has its own method for handling MIDI channels. Refer to your DAW documentation to learn how to change the MIDI channel of your notes, set up a MIDI track, and route it to a VST event input, among other tasks.

If you prefer separate note tracks for multiple modules, the goal is to create a MIDI track dedicated to routing MIDI messages to the plugin, you can also use the plugin track directly if your DAW supports multiple MIDI channels on the same track. Additionally, you can set the MIDI channel directly from your input device (MIDI keyboard, MIDI pads, etc.), in which case the DAW should record notes while preserving the incoming MIDI channel—though this may vary by DAW.

For example, in Cubase, it's straightforward to choose the desired MIDI channel for a track and even assign different MIDI channels on the same track. In Ableton Live, it might be a bit more limited, but since I'm not a Live expert, I recommend doing some research to discover more features that suit your workflow.

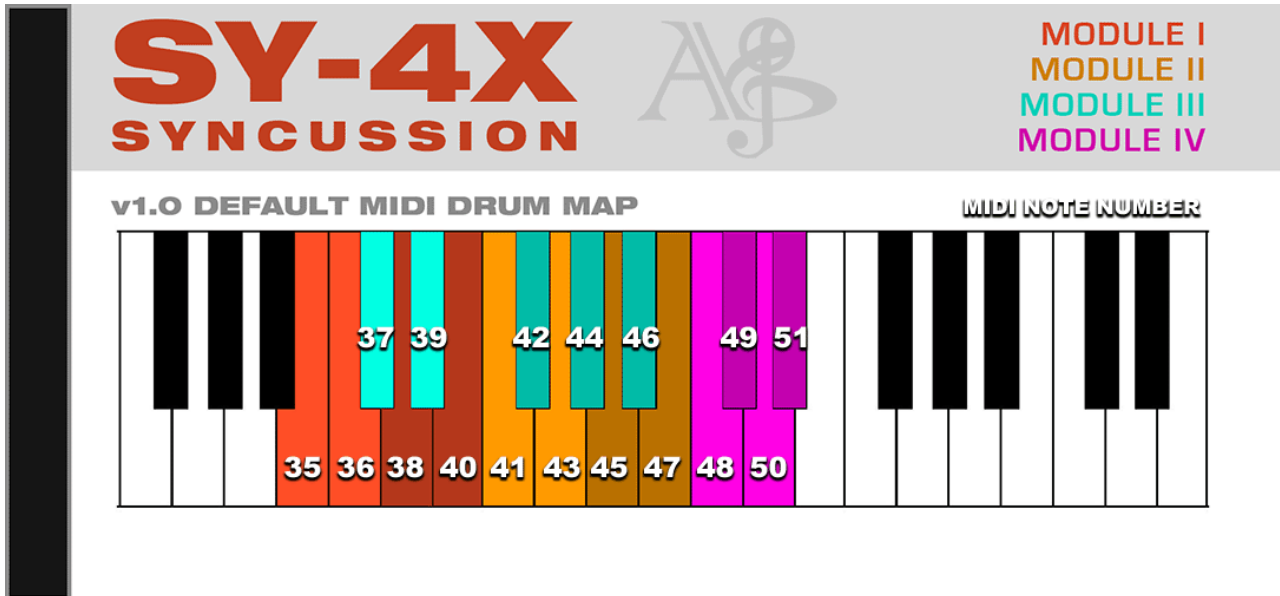
***Example of a simple Ableton Live setting to control SY-4X MODULE 1 from an external MIDI track set to send on MIDI Channel 2 (note the “MIDI To” settings)***



**MIDI CH Auto Rotate:** This function activates what you can call POLY synth mode where each new trigger will trigger the next module, each module must be in KEY MODE to respond, if any module is in Drum Kit mode it will simply not trigger. In this mode you don't need to care about the MIDI channel anymore and you can send from any channel, SY-4X will do the routing internally.

## 5.4 MIDI MAP PANEL

In **Drum Kit Mode**, SY-4X can receive triggers from any MIDI channel, making it compatible with standard MIDI keyboards, pads, or even a MIDI drum kit. The default mapping closely follows the GM MIDI Standard but can be fully customized.



**Creating a Custom Mapping:** The process for creating a custom MIDI map is straightforward:

1. First, set **SELECT DRUM** to the drum you wish to customize.
2. Engage **LEARN MODE** by clicking the **LEARN** button (a blue LED will light up when engaged). Now, each new incoming MIDI note will be assigned to the selected drum. (Each drum can have two notes assigned, except for Channel 6, which has two notes for closed and one for open.)
3. While in **LEARN MODE**, you can switch the **SELECT DRUM** to customize another drum.
4. Once you're finished, click the **LEARN** button again to disengage **LEARN MODE**.

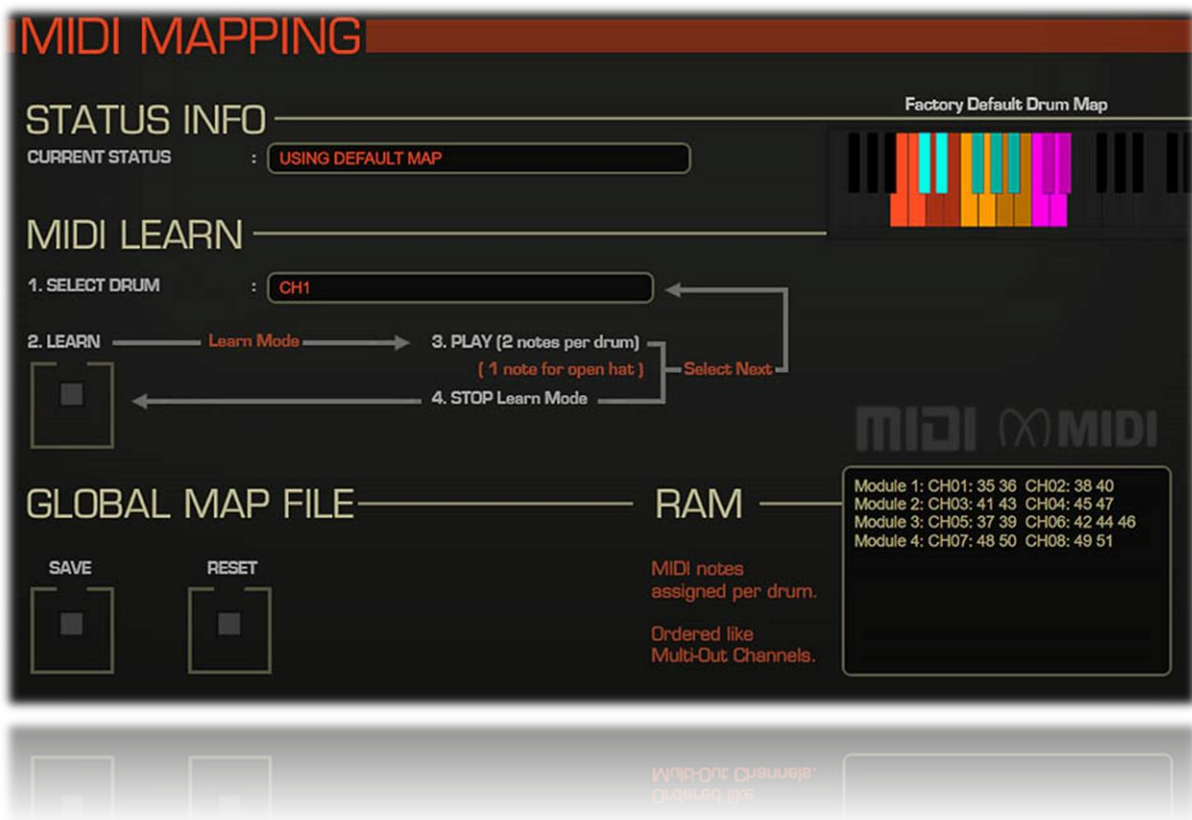
Your custom map is now stored in memory. To save your map permanently so that it's available every time you load the plugin, click **SAVE**. If you want to revert to the default mapping at any time, click **RESET**.

You can view the RAM memory assignments in the **RAM DATA** memory box, which shows the assigned MIDI note numbers in decimal value. **The MIDI map is global and will be shared across all instances of the plugin.**

If for any reason you don't want to mess with this, for example when using an electronic drum kit, you can usually create a custom mapping directly from your drum module, assigning each drum pads to match the SY-4X default map.

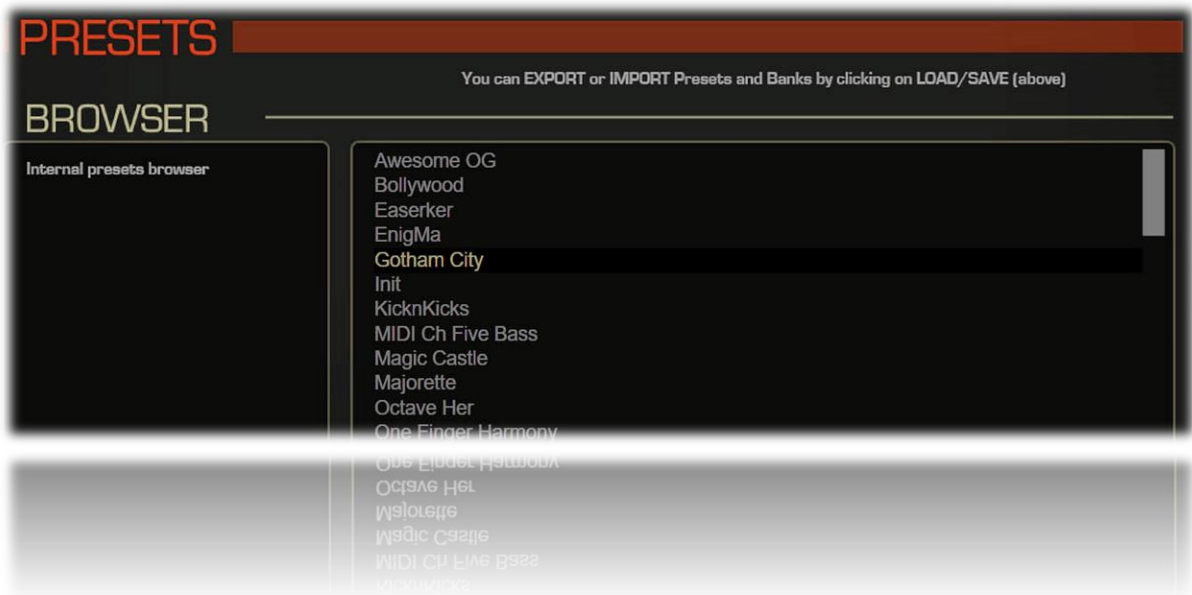
If you need to save or store different custom maps externally, the current map file, "SY4X\_MIDIMAP.ajmap," can be found at the following locations:

- **PC:** C:\Users\YourUserName\AppData\Local\SY4X
- **Mac:** ~/Library/Preferences/SY4X (This is your user library, also accessible via users/yourusername/Library/Preferences/SY4X.)





## 5.5 PRESET BROWSER PANEL



The preset browser is a convenient way to select presets, in next revisions it will feature categories.

At the top of the GUI, you can find a **LOAD/SAVE** disk icon from where you can load or save individual presets or banks in either. vstpreset (VST3). aupreset (AU) or plain text .xml.

For banks the xml format is the preferred one.

## 6 PLAY MODES

---

The SY-4X is designed to be highly versatile, offering several PLAY modes to cater to different musical needs. These modes determine how the modules and voices interact, whether you're creating a complex drum kit, a rich polyphonic synth, or something in between, in any case you also benefit from the multi-output feature of the plug-in where each voice can have a dedicated DAW channel.

### 6.1 DRUM KIT MODE

In Drum Kit Mode, the SY-4X functions as a powerful percussive sound generator. Each module can be configured independently, allowing you to create a full 8-voice drum kit. This mode is perfect for those looking to create layered drum sounds or full drum kits, where each voice can be tuned, filtered, and modulated differently while being controlled by selected note on your keyboard. The MIDI mapping is based on the GM MIDI standard but can be customized to fit your setup, making it easy to integrate with MIDI keyboards, pads, or even a MIDI drum kit.

- **Features:**
  - Independent control of each voice.
  - Versatile sound design options with per-voice tuning, filtering, and modulation.
  - Customizable MIDI mapping for easy integration.

### 6.2 KEYBOARD MODE

Keyboard Mode transforms the SY-4X into a musical instrument where each MIDI note triggers a specific module, and the pitch of that note directly affects the tuning of the oscillators.

This mode allows for more melodic play, making the SY-4X behave like a traditional synthesizer with wide-ranging tuning capabilities. The two voices in each module are triggered simultaneously, providing opportunities for rich, layered sounds.

- **Features:**
  - Direct pitch control via MIDI notes.
  - Simultaneous triggering of both voices in a module.
  - Ideal for melodic and harmonic content, including basslines, leads, and pads.

### 6.2.1 Mono Synth – 1 Module, 2 Channels, 1 voice (4 oscillators)

Mono Synth Mode is active when a module is set to **Keyboard Pitch Control**, it uses a single module but combines its two voices to create a more complex monophonic synthesizer sound. This mode is perfect for creating thick basses, leads, and other monophonic sounds where having two oscillators per voice can add depth and character.

- **Features:**
  - Monophonic synthesis with two oscillators per voice.
  - Ideal for layered drums, basses, leads, FX and thick, layered sounds.
  - Allows for complex sound design within a single voice.

### 6.2.2 Poly Synth – 4 Modules, 8 Channels, 4 voices (16 oscillators)

Poly Synth Mode is active when all modules are set to **Keyboard Pitch Control and MIDI CH Auto Rotate is active**, in this mode the SY-4X acts as a four-voice polyphonic synthesizer.

Each module is essentially a separate voice in the poly synth, and you can play chords and complex harmonies. This mode is especially powerful when combined with SY-4X's extensive modulation capabilities, allowing for dynamic and evolving polyphonic textures.

- **Features:**
  - Four-voice polyphony for playing chords and harmonies.
  - Extensive modulation per voice options for rich sound design.
  - Great for pads, chords, and other polyphonic sounds.
  - Crazy with S&H and Pitch Scaling.



### 6.2.3 Mixed Mode

Mixed Mode is where the true flexibility of the SY-4X shines. In this mode, you can combine different play modes across the four modules. For example, you might set up three modules in Drum Kit Mode and one in Keyboard Mode, allowing you to simultaneously generate percussive sounds and melodic lines. This makes the SY-4X a powerful tool for live performance and complex studio setups.

- **Features:**
  - Combine different play modes within a single setup.
  - Simultaneously generate drums, melodies, and harmonies.
  - Perfect for live performances and intricate studio arrangements.

## 6.2.4 Scaling Rules

The Syncussion could also be controlled from external CV, it could track more or less over 4 octaves and can be used to play actual notes.

SY-4X introduces pitch scaling where the TUNE slider and the incoming CV will both be scaled, whether to a 1-step scale (such as a whole tone) or a full musical scale. This scaling function works seamlessly in both Drum Kit Mode (especially useful with Sample & Hold) and Keyboard Modes. In absolute pitch mode, you define the ROOT of the scale, while in relative mode, the currently played note becomes the root.

### *Exploring Pitch Scaling in SY-4X: Tips and Insights*

#### ➤ Unlock New Sonic Possibilities:

The pitch scaling feature in SY-4X takes your sound design capabilities to new heights. Whether you're looking to create traditional musical tones or explore uncharted microtonal territory, the variety of scales available ensures that you'll find the perfect pitch scaling rule for your needs. With over 60 different scales to choose from, ranging from classic Western scales to exotic and experimental microtonal systems, you have the tools to craft unique sonic landscapes.

#### ➤ Tailor Your Sound with Precision:

In both Drum Kit and Keyboard Modes, the TUNE slider and incoming CV can be scaled to either a simple 1-step interval or a full musical scale. This is especially powerful when using Sample & Hold (S&H) or when layering voices in Keyboard Mode. Imagine setting one module to a whole tone scale while another follows a pentatonic minor scale—suddenly, your sound has a new level of harmonic complexity.

#### ➤ Evolving Textures:

You can dynamically switch between scales or even mix different scales across modules to create rich, evolving textures. For instance, set a couple of modules to the same scale and activate S&H for evolving, randomized melodies that still adhere to a harmonic structure.

#### ➤ Harmonic Complexity with Minimal Effort:

By using scaling rules like Major, Minor, or Diminished, you can effortlessly maintain harmonic consistency across your tracks. This is perfect for creating complex layered sounds that still fit together musically. Want to explore something more unconventional? Try the Bohlen-Pierce or Tritone scales for a sound that challenges traditional harmonic norms.

#### ➤ Dynamic Pitch Control:

In absolute pitch mode, you define the root of the scale, providing a stable foundation for your melodies. In relative pitch mode, the currently played note becomes the root, offering dynamic and responsive pitch control that's ideal for expressive performances or generative music.

➤ Creative Use of One-Step Scaling:

One-step scaling options like Whole Tone or Quarter Tone are particularly useful for creating dissonant, otherworldly sounds. For example, setting the pitch to a Quarter Tone scale can give your music a modern classical or non-Western feel, while scaling to Minor Thirds or Major Sixths can create unexpected melodic leaps.

**Quick Tip:**

*For an intriguing effect, try choosing the same scaling rule for multiple modules and activate S&H while applying different tunings. This will generate random notes that are harmonically related yet varied, resulting in a complex, evolving sound texture. Vary the S&H voltage level to change the range of modulation.*

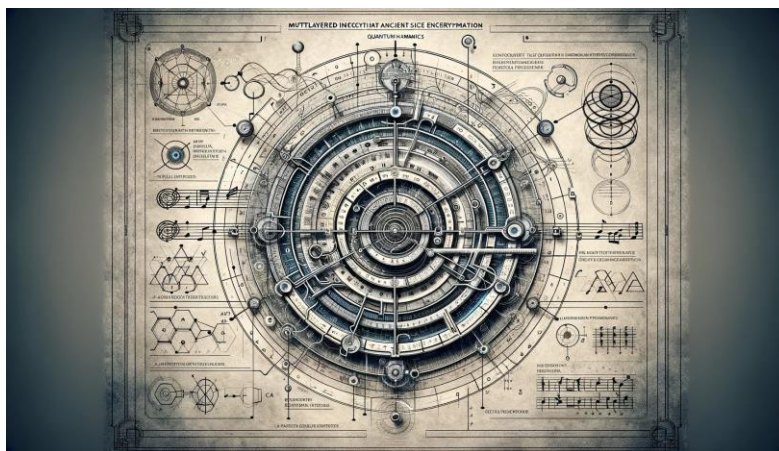
➤ No Scaling, No Problem:

If you prefer the raw, unscaled sound of the original Syncussion, simply select "No Scaling." This option lets you experience the full range of pitch possibilities without any constraints, perfect for those who love to push their gear to the limits.

➤ A Playground for Microtonal Exploration:

The inclusion of microtonal scales like TET\_31, Pierrot Tuning, and Bohlen-Pierce allows you to dive deep into microtonal music. Whether you're a seasoned microtonal composer or just curious, these scales offer a fresh perspective on pitch, leading to innovative and unexpected musical results.

*With SY-4X's pitch scaling feature, you're not just limited to traditional scales. The extensive list of available scales ensures that as musical trends evolve, your instrument remains a cutting-edge tool capable of producing the latest sounds.*



## One Step Scaling:

- **NoScaling:** No scaling is applied; the pitch remains unchanged.
- **Semitone:** Scales the pitch to the nearest semitone, which is the smallest interval used in Western music (1/12 of an octave).
- **WholeTone:** Scales the pitch to the nearest whole tone, which is equivalent to two semitones.
- **QuarterTone:** Scales the pitch to the nearest quarter tone, an interval half the size of a semitone, often used in modern classical and non-Western music.
- **MinorThird:** Scales the pitch to the nearest minor third, which is equivalent to three semitones.
- **MajorThird:** Scales the pitch to the nearest major third, which is equivalent to four semitones.
- **PerfectFourth:** Scales the pitch to the nearest perfect fourth, an interval equivalent to five semitones.
- **PerfectFifth:** Scales the pitch to the nearest perfect fifth, an interval equivalent to seven semitones.
- **MinorSixth:** Scales the pitch to the nearest minor sixth, which is equivalent to eight semitones.
- **MajorSixth:** Scales the pitch to the nearest major sixth, which is equivalent to nine semitones.
- **MinorSeventh:** Scales the pitch to the nearest minor seventh, which is equivalent to ten semitones.
- **Octave:** Scales the pitch to the nearest octave, an interval spanning twelve semitones.

## Musical Scaling:

- **Major:** Scales the pitch to the nearest note in the major scale, characterized by a happy and bright sound.
- **NaturalMinor:** Scales the pitch to the nearest note in the natural minor scale, characterized by a sad and melancholic sound.
- **HarmonicMinor:** Scales the pitch to the nearest note in the harmonic minor scale, which has a distinctive raised seventh degree.
- **MelodicMinor:** Scales the pitch to the nearest note in the melodic minor scale, which ascends with a raised sixth and seventh degree but descends like the natural minor.
- **PentatonicMajor:** Scales the pitch to the nearest note in the major pentatonic scale, a five-note scale common in folk music.
- **PentatonicMinor:** Scales the pitch to the nearest note in the minor pentatonic scale, a five-note scale often used in blues and rock music.
- **Blues:** Scales the pitch to the nearest note in the blues scale, which includes a flat fifth, adding a characteristic "bluesy" sound.
- **Dorian:** Scales the pitch to the nearest note in the Dorian mode, which has a minor third and a major sixth.
- **Phrygian:** Scales the pitch to the nearest note in the Phrygian mode, which has a minor second and a minor third, giving it a Spanish or flamenco feel.

- **Lydian:** Scales the pitch to the nearest note in the Lydian mode, characterized by a raised fourth degree.
- **Mixolydian:** Scales the pitch to the nearest note in the Mixolydian mode, similar to the major scale but with a lowered seventh.
- **Locrian:** Scales the pitch to the nearest note in the Locrian mode, characterized by a diminished fifth.
- **Chromatic:** Scales the pitch to the nearest note in the chromatic scale, which includes all twelve semitones within an octave.
- **Qawwali:** Scales the pitch to the nearest note in the Qawwali scale, used in Sufi devotional music with distinctive intervals.
- **Jegog:** Scales the pitch to the nearest note in the Jegog scale, used in traditional Balinese music, often featuring a unique tuning system.
- **BebopMajor:** Scales the pitch to the nearest note in the Bebop major scale, which includes an added chromatic passing tone.
- **BebopMinor:** Scales the pitch to the nearest note in the Bebop minor scale, which includes an added chromatic passing tone.
- **HungarianMinor:** Scales the pitch to the nearest note in the Hungarian minor scale, characterized by raised fourth and seventh degrees.
- **Persian:** Scales the pitch to the nearest note in the Persian scale, featuring half and three-quarter tone intervals, giving it an exotic sound.
- **SpanishGypsy:** Scales the pitch to the nearest note in the Spanish gypsy scale, also known as the Phrygian dominant scale, with a distinctive sound used in flamenco music.
- **Hirajoshi:** Scales the pitch to the nearest note in the Hirajoshi scale, a Japanese pentatonic scale with unique intervals.
- **RagaYaman:** Scales the pitch to the nearest note in the Raga Yaman scale, used in Indian classical music, characterized by a raised fourth.
- **RagaBhairav:** Scales the pitch to the nearest note in the Raga Bhairav scale, used in Indian classical music, with flattened second and seventh degrees.
- **Hijaz:** Scales the pitch to the nearest note in the Hijaz scale, common in Middle Eastern music, characterized by a raised third.
- **InSen:** Scales the pitch to the nearest note in the In Sen scale, a Japanese pentatonic scale with a minor third and a diminished fifth.
- **Yo:** Scales the pitch to the nearest note in the Yo scale, a Japanese pentatonic scale often used in traditional music.
- **Yu:** Scales the pitch to the nearest note in the Yu scale, another Japanese pentatonic scale with a distinctive sound.
- **Zhi:** Scales the pitch to the nearest note in the Zhi scale, a Chinese pentatonic scale used in traditional music.
- **Altered:** Scales the pitch to the nearest note in the altered scale, used in jazz and characterized by its altered fifths and ninths.
- **LydianDominant:** Scales the pitch to the nearest note in the Lydian dominant scale, which has a raised fourth and a flattened seventh.
- **HungarianGypsy:** Scales the pitch to the nearest note in the Hungarian gypsy scale, featuring raised fourth and seventh degrees.
- **Egyptian:** Scales the pitch to the nearest note in the Egyptian scale, a pentatonic scale with unique intervals giving it a distinct sound.
- **TET\_4:** This scale divides the octave into 4 equal parts, each 300 cents apart. It results in a very distinct and sparse scale.
- **TET\_5:** This scale divides the octave into 5 equal parts, each 240 cents apart. This creates wide intervals and can be used for unique harmonic structures.

- **TET\_7**: Scales the pitch to the nearest note in the 7-tone equal temperament scale, which divides the octave into 7 equal parts, each approximately 171.43 cents apart.
- **TET\_8**: Scales the pitch to the nearest note in the 8-tone equal temperament scale, which divides the octave into 8 equal parts, each 150 cents apart.
- **PierrotTuning**: A microtonal scale that divides the octave into 13 steps, each approximately 92.31 cents apart.
- **TET\_19**: Scales the pitch to the nearest note in the 19-tone equal temperament scale, which divides the octave into 19 equal parts, each approximately 63.16 cents apart.
- **TET\_22**: This scale divides the octave into 22 equal parts, each approximately 54.55 cents apart. It provides a good approximation of certain just intonation intervals.
- **TET\_31**: Scales the pitch to the nearest note in the 31-tone equal temperament scale, which divides the octave into 31 equal parts, each approximately 38.71 cents apart.
- **Diminished**: Scales the pitch to the nearest note in the diminished scale, also known as the half-whole scale, which alternates between half steps and whole steps.
- **Augmented**: Scales the pitch to the nearest note in the augmented scale, which alternates between minor thirds and half steps, creating a symmetric, exotic sound.
- **DoubleHarmonic**: Scales the pitch to the nearest note in the double harmonic scale, also known as the Byzantine scale, featuring a distinctive exotic sound with raised fourth and lowered seventh degrees.
- **BohlenPierce**: Scales the pitch to the nearest note in the Bohlen-Pierce scale, which divides the tritave (perfect twelfth) into 13 equal parts, creating a unique microtonal system.
- **Tritone**: Scales the pitch to the nearest note in the tritone scale, which alternates between half steps and minor thirds.
- **Hexatonic**: Scales the pitch to the nearest note in the hexatonic scale, a six-note scale that can have various symmetric patterns.
- **Prometheus**: Scales the pitch to the nearest note in the Prometheus scale, a six-note scale used by Scriabin, featuring unique intervallic structures.
- **AJLAB**: Scales the pitch derived from the Fibonacci sequence, where each number is the sum of the two preceding ones, they create a unique and intriguing set of pitches.



## 7 BERSERK MODE



This optional mode not only transforms the entire SY-4X unit into a more aggressive and unruly beast, but it also changes its appearance, turning the chassis into a glorious vintage white.

You can choose between a pre-filter **asymmetrical clipping stage** or a post-filter **crusher stage** (roughly 6kHz, variable bit rate).

Both Berserk types are controlled by the **Stability parameter**, allowing you to dial in the intensity. This mode can be automated, making it perfect for adding character to your sound.

### Quick Tips:

- Use automation to introduce intense distortion at specific parts of your drum loop.
- Set it to the post-filter crusher type with the Stability Factor at maximum for instant LO-FI grit.
- Set it to the pre-filter clipper with the Stability Factor at 50% for a subtle crunch.

The **Stability parameter** can be seen as the "clean factor." At its minimum setting, the distortion will be very intense, while at its maximum, the effect becomes a bit more restrained.

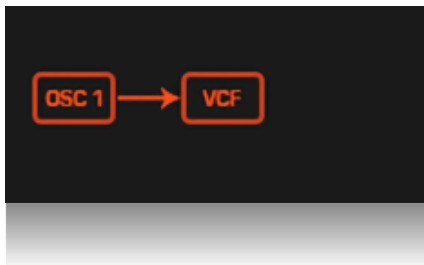
*Note that distortion might reduce dynamics in case you didn't know.*

## 8 OSC MODES

---

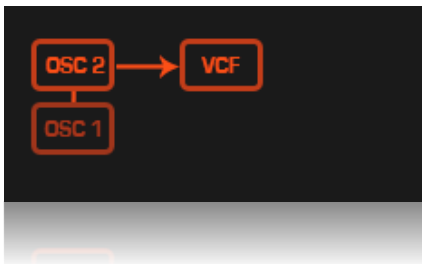
The Syncussion offered A, B, C, D, E and F Modes which are a predefined setting for Oscillators Pitch, Frequency Modulation, Volume levels and other modulation sources. SY-4X adds two additional modes G and H. Here is a description of each Mode, each one of them is better at producing certain types of sounds than others, experiment with them and you will find out!

### Mode A



Oscillator 1 outputs a triangular waveform to the VCF. Simple and effective, particularly nice in Keyboard Mode...

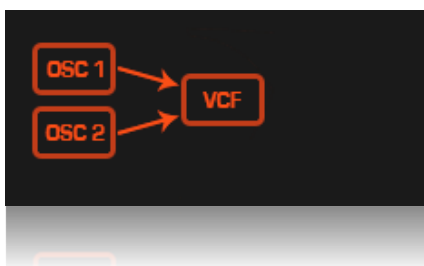
### Mode B



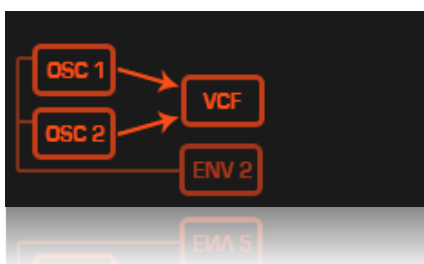
Oscillator 1 modulates the frequency of Oscillator 2, both triangular waveforms. Oscillator 2 outputs to VCF. Those classic Syncussion percussions...

### Mode C

Oscillator 1 and Oscillator 2, both triangular waveforms, output to VCF, with Oscillator 2 set to a higher frequency.

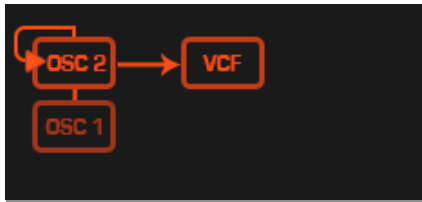


### Mode D



Oscillator 1 and Oscillator 2 are modulated by envelope generator 2. Both triangular waveforms output to VCF, with Oscillator 2 set to a higher frequency. Similar to Simmons, can produce nasty kicks...

## Mode E



Oscillator 1 modulates the frequency of Oscillator 2. Oscillator 2 is set to a **pseudo SAW\*** waveform and a higher frequency, outputting to VCF, which is set to a higher cutoff frequency. Close the filter for the Prince "explosion sound" heard in concerts in the early '80s...

*\***MODE E** is often incorrectly labeled as a mix of FM and noise. In reality, there is no noise generator in this mode.*

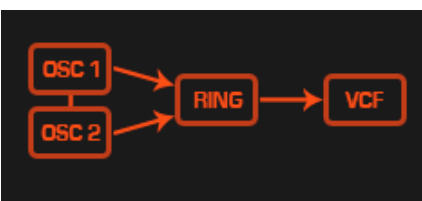
*What actually happens is that OSC2's TRI waveform is transformed into a pseudo SAW waveform using a clever technique: alternating pitch modulation. During half of the TRI waveform's period, the frequency is set super high, then returns to normal during the other half. How crazy is that? The artificially produced SAW waveform is approximately twice as high in frequency.*

## Mode F



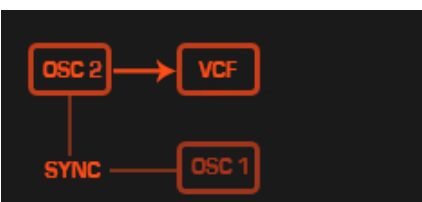
Noise generator only, outputs to VCF. Awesome while controlling the tuning—the key is to have one hand on the control while playing, so you can instantly shorten a long decaying envelope, making it really expressive...

## Mode G



Oscillator 1 and Oscillator 2 are cross-ring modulated. Both OSCs are set to produce a square waveform, output to VCF. An extra TUNE slider is available to control the frequency of OSC2 independently and within a wider range than the offset slider. Super nice for creating cymbal or bell sounds...

## Mode H



Oscillator 2 is synced to Oscillator 1. Oscillator 2 is set to a pseudo SAW waveform and outputs to VCF. An extra TUNE slider is available to control the frequency of OSC2 independently and within a wider range than the offset slider. Who doesn't like SYNC? SYNC drum sounds are nice too...

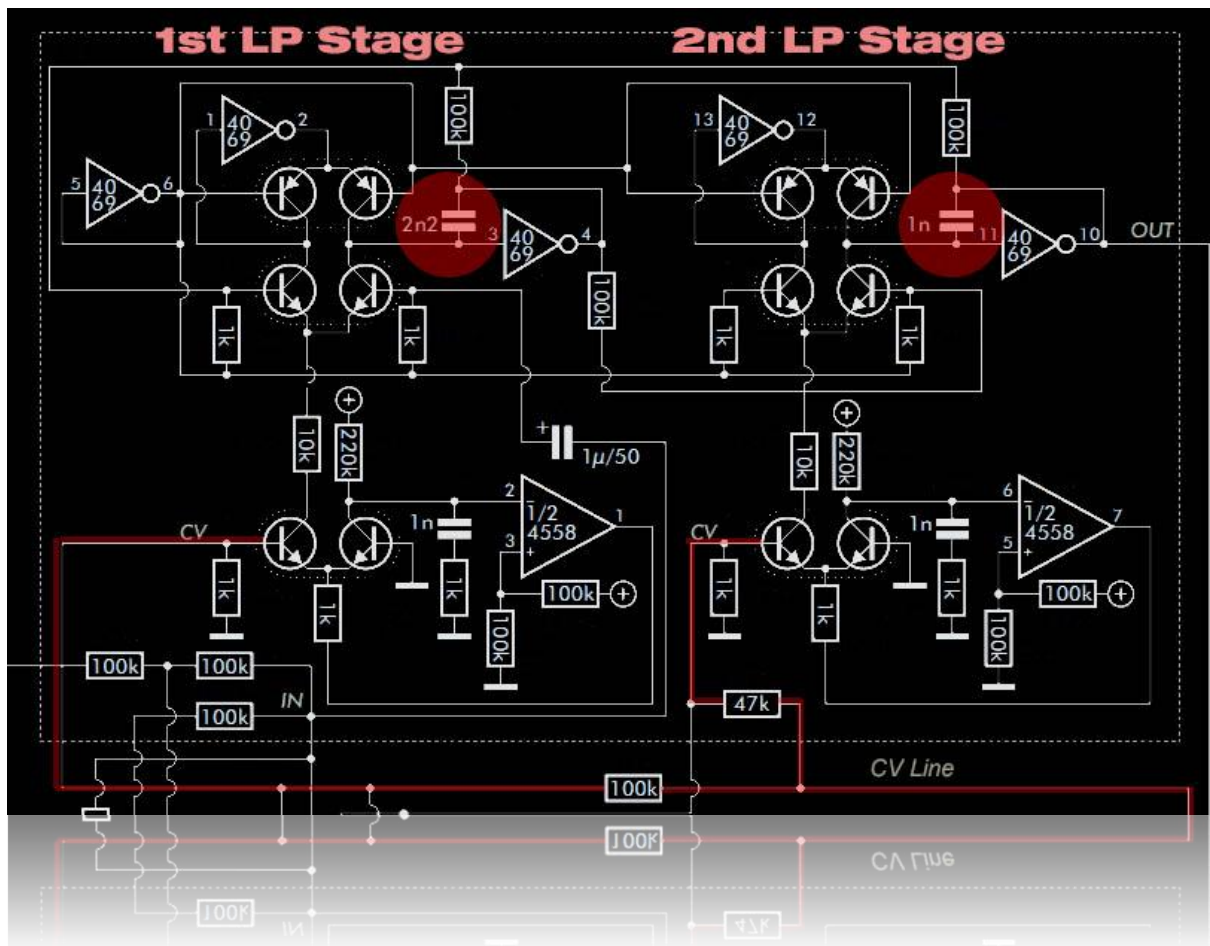
## 9 POLE SPREADING FILTER

### 9.1 AN UNUSUAL FILTER DESIGN

The VCF in the SY-1 was a state-variable filter using 4069 inverters. It stands out due to its unique characteristics (poles spreading), resulting from unequal integrator capacitors and the absence of direct resonance control, offering distinctive filter sweeps and tones.

SY-4X models the unique filter design of the Syncussion. this 2-stage low-pass SVF have a twist: the control voltage has more effect on the second stage, which is set to a higher cutoff by design. This causes the two filter poles to spread apart depending on the control voltage, creating an almost vowel-like effect. Both cutoff points have a ratio of roughly 4:1, and the CV is at a ratio of 2.13:1.

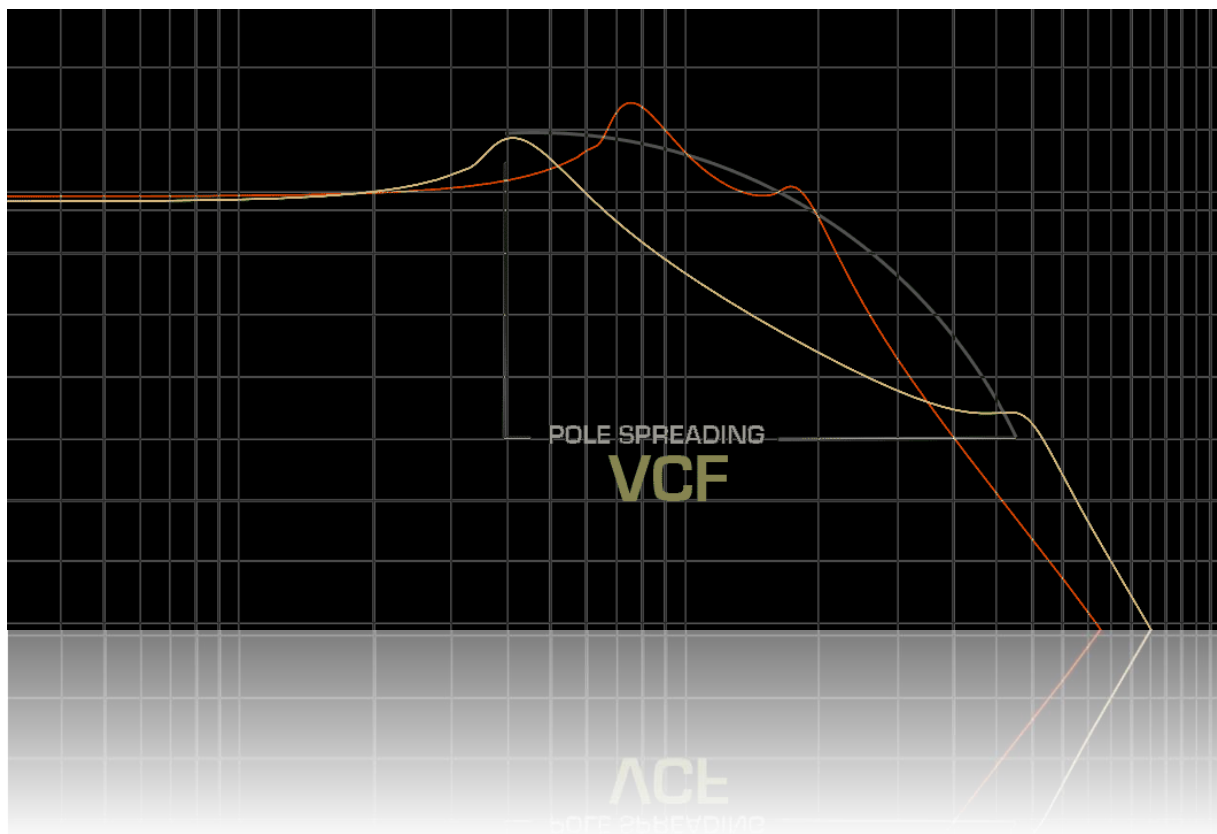
The SPREAD parameter allows you to change or modulate the frequency ratio, controlling how far apart the poles are set. SY-4X also adds resonance capability to the filter.



Technically what is happening is that the CV limiting resistor is lower for the second stage (47K vs 100K) resulting in a wider voltage span and the second integrator capacitor is roughly half the value of the first stage (1nF vs 2nF) which cause those 2 stages to be tuned differently (second one is higher).

**Note:** *The **VCF Poles CV 1:1 Ratio** option allows you to set both CV resistors to the same value, bringing the two poles closer together when the envelope fires and making the SPREAD parameter even more crucial by controlling a more consistent ratio. With this option enabled, the poles will maintain an almost constant ratio governed by the SPREAD parameter, while receiving the same amount of CV.*

*Filter response PLOT from SY-4X -increased resonance to better see the 2 poles moving differently.*



## 10 PRESETS IMPORT / EXPORT

---

### VST3, XML, AU preset.

SY-4X can load and import its own presets & banks.

Most parameters and all MIDI LEARNED & ASSIGNED parameters will be saved per patch.

At the top of the GUI, you will find a **LOAD/SAVE** disk icon from where you can load or save individual presets or banks in either. vstpreset (VST3). aupreset (AU) or plain text .xml.

For banks the xml format is the preferred one.

## 11 MIDI AUTOMATION

---

Almost all SY-4X parameters can be **automated via midi learn** or **DAW automation**.

Simply right click on a button, knob or slider to assign external MIDI Control or use DAW automation.

Almost all type of MIDI message can be assigned or MIDI learned.  
right-click unlearn to get rid of the learned assignation.

## 12 LINKS

---

Official Website <https://www.alyjameslab.com/>

HOPE YOU HAVE FUN WITH THE SY-4X!



## 13 DISCLAIMER

---

SY-4X (the software) is provided as-is, without warranty of any kind. Aly James Lab (the Author) disclaim all warranties relating to the Software, whether express or implied, including but not limited to any implied warranties of merchantability and fitness for a particular purpose, and all such warranties are expressly and specifically disclaimed. The Author shall not be liable for any indirect, consequential or incidental damages arising out of the use or inability to use the Software even if the Author has been advised of the possibility of such damages or claims. The user of the Software bears all risk as to the quality and performance of the Software. If your computer blows up, I say "I wasn't there!" of course that should not happen... 😊

All manufacturer and product names mentioned on this page are trademarks of their respective owners, which are in no way associated or affiliated with ALYJAMESLAB. The trademarks of other manufacturers are used solely to identify the products of those manufacturers whose tones and sounds were studied during ALYJAMESLAB sound development. All names of instrument and inventors have been included for illustrative and educational purposes only and do not suggest any affiliation or endorsement of SY-4X by any company or instrument inventor.