VSDS-X
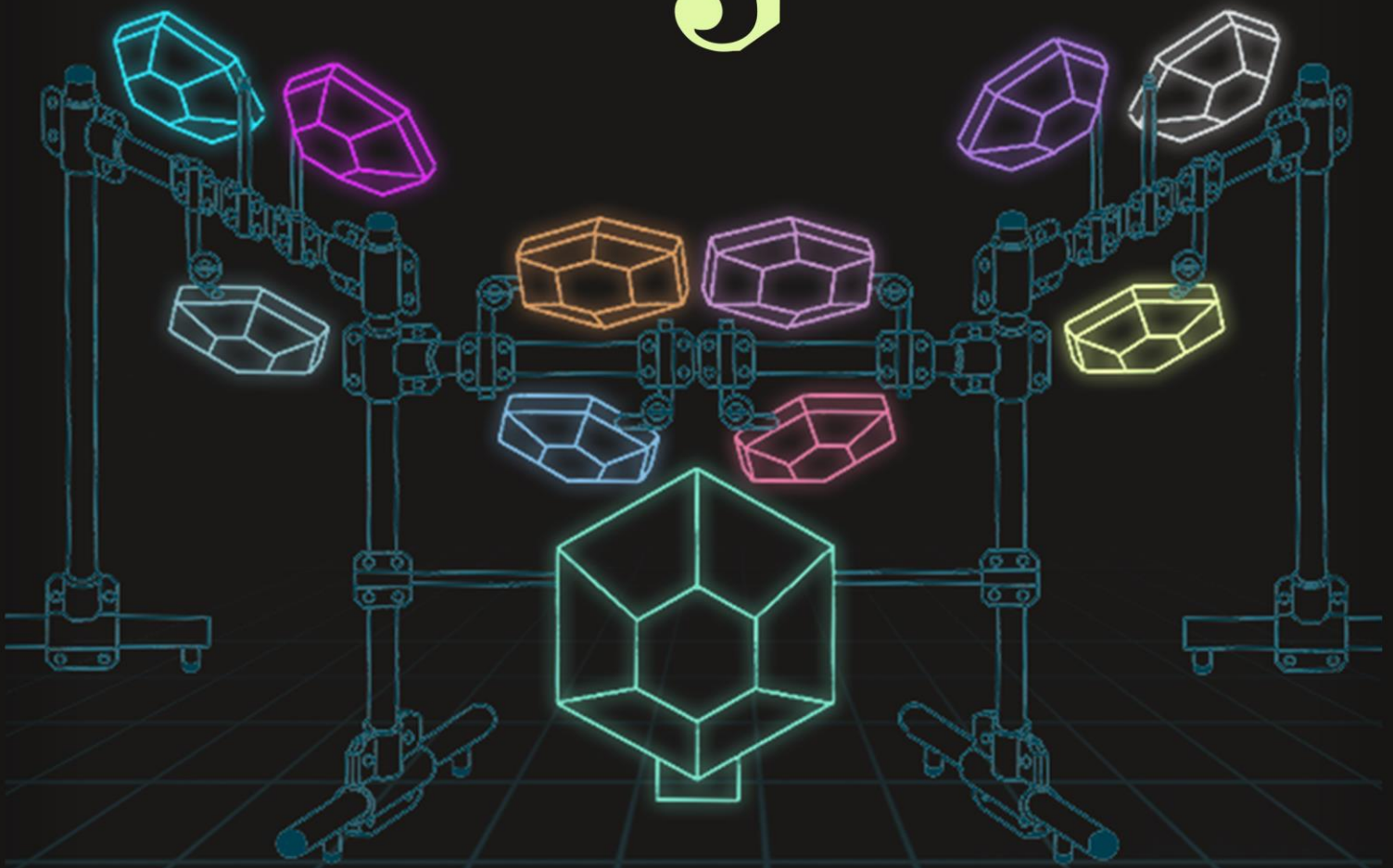
User Manual
Version 2.3

VSDSX

SIMMONS SDS-V EXTENDED DRUMS

www.alyjameslab.com

USER MANUAL 2.3

BY

Aly James

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2 INTRODUCTION

Welcome to VSDSX, the ultimate drum synth plug-in designed to capture the essence of the legendary Simmons drum synthesizers. My name is Aly James, a funky musician, composer, and creator of Aly James lab. As a passionate enthusiast of the Simmons drum sound, I embarked on a journey to create an accurate virtual instrument dedicated to the first great analog drum synth in history.

The Simmons hexagonal-shaped electronic drums revolutionized the music scene in the 80s, leaving their mark on countless records and electrifying live performances by iconic artists and bands such as Genesis, King Crimson, Jean Michel Jarre, Prince, Herbie Hancock, Pink Floyd, and many more. While the sound of Simmons drums was not particularly realistic, its goal was to deliver a colossal and versatile sonic experience. Invented by Dave Simmons, the most famous drum brain, known as SDSV or SDS5, introduced the concept of drum synthesis, placing the power of sound creation in the hands of drummers.

Often associated with the distinctive "pewww pewww" tom tom sounds, the SDSV module was capable of producing a wide range of drum tones. With its remarkable punch, sensitivity, and truly unique character, it became a cult favorite and found its way into various musical genres. The successor to SDSV, the SDS7, expanded the sonic palette by incorporating digital low-fi samples and additional features like bend direction and FM modulation, opening up even more possibilities.

The SDSV is an iconic piece of equipment that contributed significantly to the sound of the 80s and continues to be a coveted secret weapon today. However, with only around 5000 units in existence, finding a working one can be a challenge, not to mention the high cost. Recognizing the absence of an accurate VST representation of this legendary drum brain, I took it upon myself to create the VSDSX. In the process, I also introduced some tweaks to enhance its versatility while staying true to the original system.

Growing up, the sound of Simmons drums permeated the 80s music I listened to. The SDS-V, with its predominantly analog architecture, became a secret weapon for drum layering alongside real drums or drum machines like the Linn LM-1 or DMX. Its clever design allowed for a wide range of drum sounds, spanning from realistic acoustic drums to sci-fi and experimental tones. Even today, many acclaimed drummers praise the unique qualities of Simmons kits. In recent years, the electronic music scene has once again embraced the allure of analog, elevating Simmons drums to new heights of appreciation. In this manual, you will discover the distinctiveness of the special sample-based hi-hats and cymbals that set Simmons apart.

The raw analog character and astounding punch delivered by the original Simmons drum brains were key factors in their appeal. With meticulous study and precise sound generation reproduction, I believe that VSDSX captures the essence of this iconic sound. In fact, I have gone a step further and granted you even greater control over the sound generation compared to the original Simmons brains. VSDSX is based on the SDS-V but also incorporates features from SDS3, SDS7, and SDS1, offering you a comprehensive and versatile drum synthesis experience.

So, let's embark on this journey together and bring back the timeless sound of Simmons drums with VSDSX!
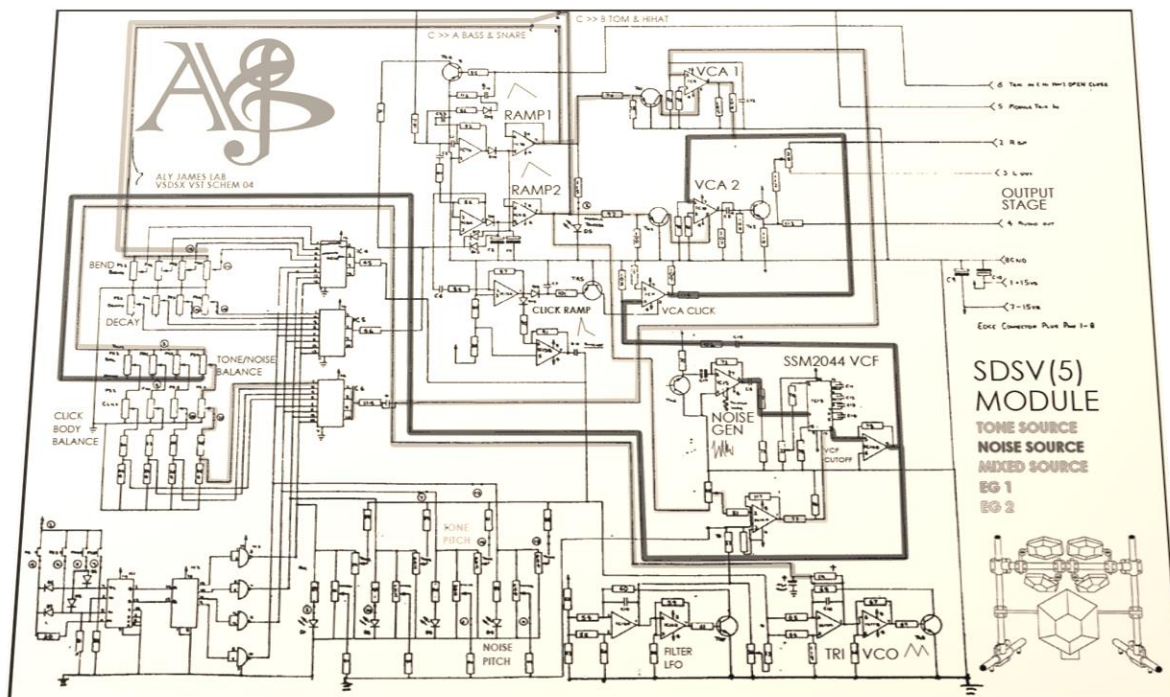
This emulation is based on reverse engineering and old datasheets; it uses a C++ custom core with modeled Analog circuitry. Since Version 2.3 two additional modules: Tom Bass and PROM 2 are available in addition to the CLAP module added in v2.0 which is closely based on the mighty Simmons Digital ClapTrap.

A special thanks to Dave Simmons (Simmons drums Creator) & Wolfgang Stoelzle (simmonsmuseum.com)
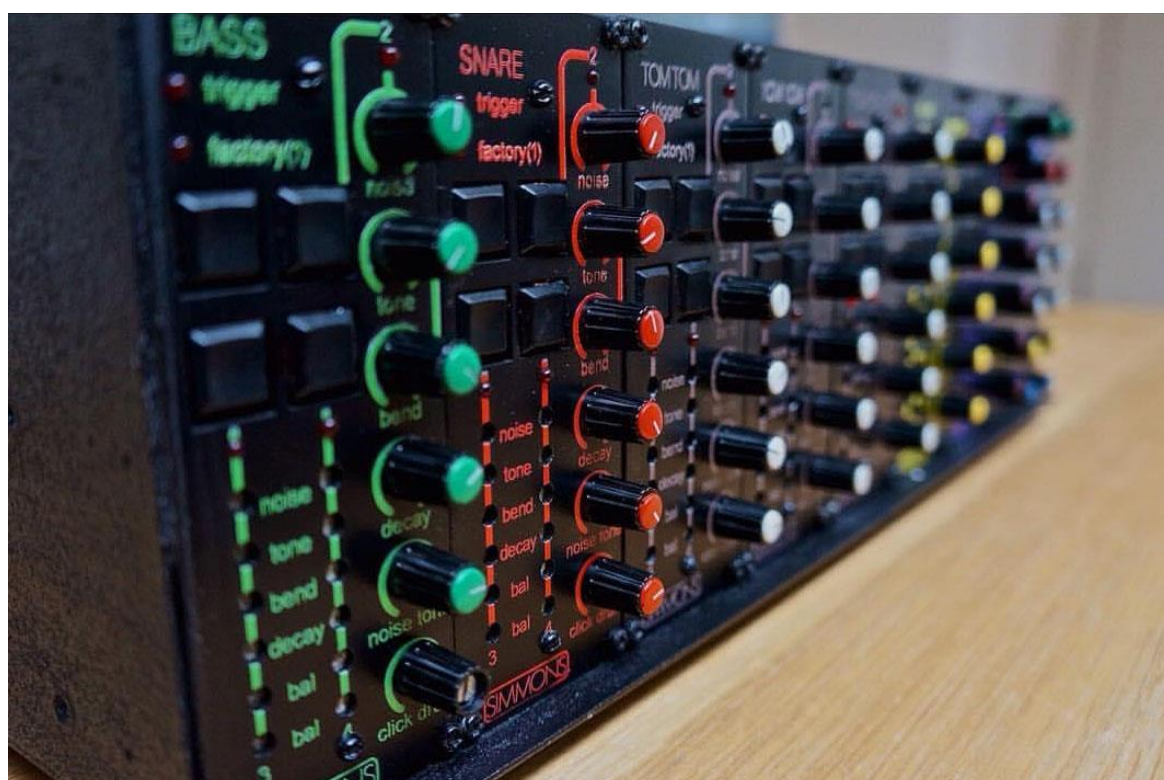
VSDSX offers extensive MIDI triggering capabilities, primarily following the General MIDI (GM) Drums mapping. When triggered via MIDI, each note/trigger will be processed through many circuits dynamically shaping different parts of the sound. The resulting output is then amplified introducing unique characteristics depending on the volume level. The analog behavior emulation faithfully reproduces the soft and hard clipping that occurs when the signal is pushed to its limits.

To provide maximum control over the sound generation process, each voice in VSDSX is equipped with dedicated knobs. These knobs allow you to fine-tune the parameters for Bass, Snare, Toms, Proms, Clap, Hihat and Cymbal, each with their own distinct tuning.

Additionally, VSDSX features two voices that are based on virtual Electrically Programmable Read-Only Memory (EPROM) which are named "PROM". These voices can be loaded with compatible (.bin) image files which are 1/1 sound data dump burnt or extracted from real EPROM chips, expanding the sonic possibilities even further. You can import original vintage Simmons samples, as well as samples from renowned drum machines like Linn, DMX, Drumtracks, and more. Furthermore, you have the flexibility to load your own custom EPROM content, providing endless creative opportunities (for more details, refer to the EPROM Loading section of this manual).

VSDSX 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.

VSDSX closely reproduce SDS-V modules configuration while adding more user control and extra features.
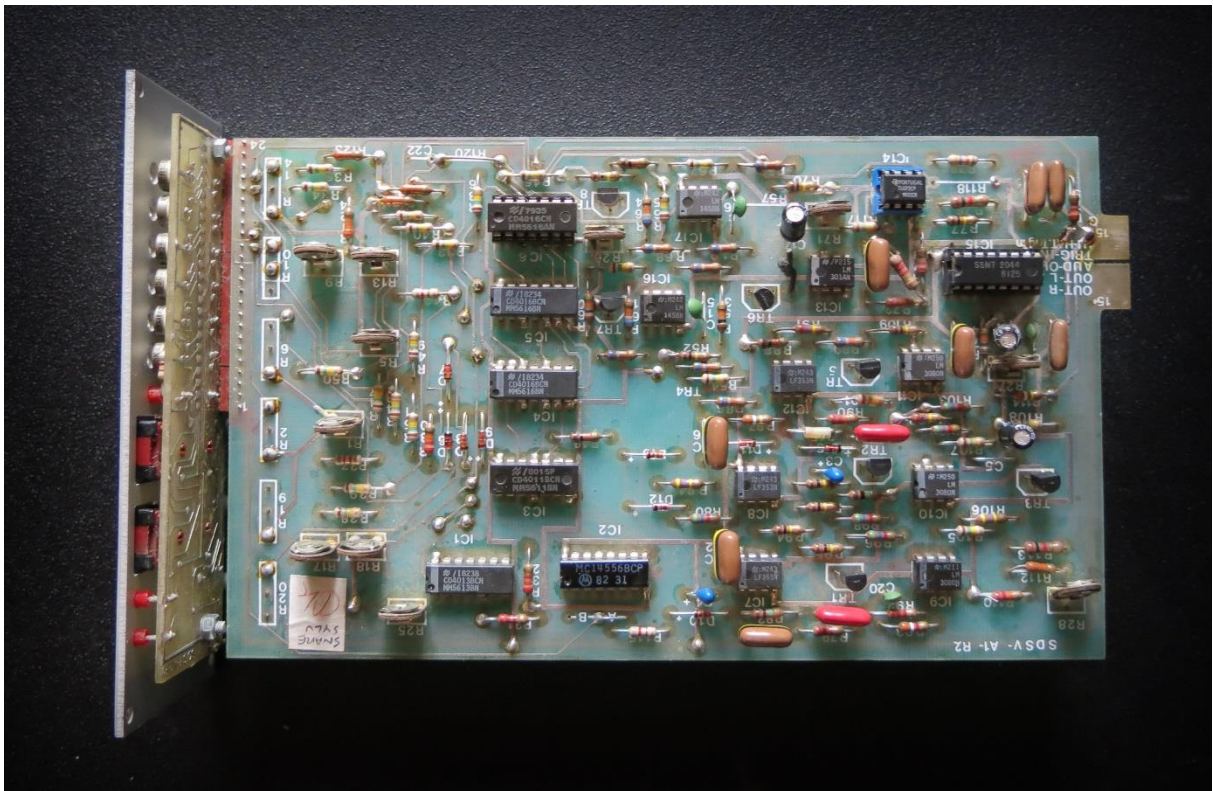
3 INSTALLATION

Compatibility

- Windows 10 +
  64bit Host VST3

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

Install Windows:
- Run VSDSX Installer

Install Mac:
- Run VSDSX plug-in Installer
- Run VSDSX plug-in Presets Installer

Additional installation info can be found in your "download link" Email.

4 MAIN FEATURES

ANALOG MODELED OSCILLATOR:

The special tone character of the drum synth is mainly caused by the raw analog waveform generation and by the circuitry itself, it generates harmonics that are normally not present in an ideal triangle waveform, VSDSX emulates that behavior and also models the analog clipping that occurs when pushed hard. You can also switch to a clean mode which will behave like an ideal system without OPAMP bandwidth limitation (more highs). These features alone offer a great versatility for sound design. A custom mode can switch all oscillators from the typical Simmons shape to a Sine shape that can be used if you would need less harmonics

NOISE GENERATOR CIRCUITRY TWEAKING:

The sound source of the drum synth was mainly a mix between a triangle oscillator and a transistor-based noise generator. The way it was initially connected could be tuned for more or less frequency content. Each voice has different configuration and VSDSX offers user control over the internal noise filtering (especially useful on the snare voice card).

A lot of the circuitry parameters can also be fine-tuned, CV and VCA response, Trigger types (that will mostly impact the click attack generator time) etc.

SSM2044 Filters:

The noise source was filtered by an SSM2044 lowpass filter chip, the filter acts on the noise and click part and behave differently depending on the voice, on bass & toms the resonance resistor was usually set to no resonance, but this can be tweaked inside the VSDSX if you want.

PITCH BENDING & SDS7 LFO FM modulation:

One of the obvious things that must be there in a drum synthesizer is a pitch envelope to simulate the behavior of real drums. The SDSV module featured a bending down or up effect that can be set to more or less amount of bending. VSDSX also features an optional FM modulation (only originally made available on the SDSV snare drum module) taken from the SDS7 module, the LFO can go from very slow to audio range modulation and can be optionally controlled by velocity.

SEPARATE OUTPUTS:

The VSDSX have dedicated outputs for every voice like an original SDSV + PROM and CLAP modules.

You can choose from ALL to 1 Stereo Channel or Separate Channels for each voice.

TRIGGER SENSITIVITY CONTROL & VELOCITY:

The drum synth is highly sensitive to the power of which a pad or a key is hit, VSDSX gives independent access to sensitivity tuning for each voice, the pitch of the tone, VCF cutoff, click trigger etc... You can also disable the volume velocity tracking and only set a pitch sensitivity which gives access to a similar feature than the "run generator" found in certain Simmons Systems.

GUI & AUTOMATION:

The GUI features all the SDSV controls (with the same weird naming) but can also give access to a full module display with more in-depth controls, most of the parameters can be MIDI learned and controlled by an external MIDI Hardware or automation.

MIDI MAP:

By default, VSDSX triggers are mapped to the MIDI GM standard but you can customize it to your liking using its MIDI learning function. The map can be saved globally and will be recalled every time.

CLAPTRAP VOICE:

The VSDSX provides one voice which is based on the mighty Simmons ClapTrap, finely tuned against an original unit it reproduces the digital circuit, EPROM looping, Human feature and pitched noise source.

The original VCAs got something between an exponential and linear behavior useful for those almost gated claps, VSDSX adds a more pronounced exponential option, slightly increased tuning range on the low.

LOADING EXTERNAL EPROM DATA:

The VSDSX provides two voices which are EPROM based (like SDS1 or SDS7) the imported original EPROM image(sample) will benefit from the bend and noise mixing feature with that crunchy 8bit sound.

Load your own custom-made EPROM image. EPROM format is the same as VProm (U255 companded) for easy compatibility but it can also now load Linear PCM format (most of Simmons original EPROMS were Linear PCM).

VSDSX supports any size EPROMS binaries (.bin) between 1K to 64K.

LOAD & SAVE FULL PATCH & BANKS:

in many formats (additional technical info in manual.)

5   CONTROL PANELS

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

MAIN: Main view area.
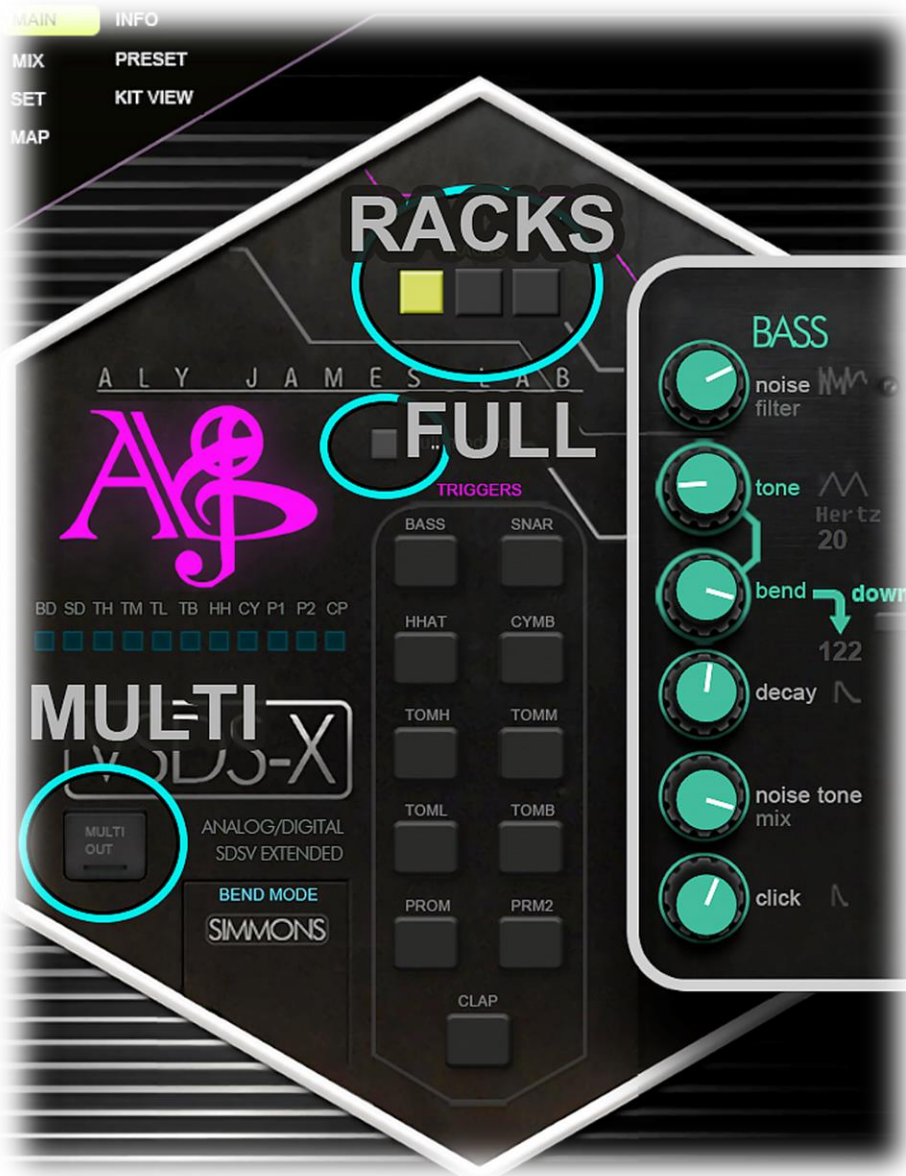
MIX: Access the built-in level mixer.

SET: Access the global settings area.

MAP: MIDI notes mapping area.

INFO: User Info, Plug-In info and main circuit modes diagram.

PRESETS: Internal presets browser.

KIT VIEW: A retro-sci-fi view/ trigger indicator of the drum kit.

In addition to the section menu 3 important controls can be found:

FULL: this button reveals module's additional controls on MAIN view.

RACKS: Switches between the 3 racks of modules on MAIN view, respectively:

1. **BASS, SNARE, HIHAT, CYMBALS**
2. **TOM H, TOM M, TOM L, TOM B**
3. **PROM, PROM2, CLAP**

MULTI: Will set the plug-in to multiple output configuration.

When enabled, all module's output will be sent to their respective channel in your DAW. Each DAW have a way of doing this but it is generally straight forward. Multiple outputs let you easily mix VSDSX voices in your DAW using a plain channel strip for each one. When OFF all module's output are summed into the first output channel stereo pair: BASS L & R.

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:

1. **NOISE** Knob: The NOISE knob sets the cutoff frequency of the Noise Voltage-Controlled Filter (VCF). It functions differently for Hi-hat and Cymbal voices. It's important to note that the NOISE knob also affects the click sound, as it is generated from the filtered noise source.

2. **TONE** Knob: The TONE knob sets the base tone frequency of the Voltage-Controlled Oscillator (VCO) for the selected voice.

3. **BEND** Knob: The BEND knob adjusts the amount of bend applied to the tone pitch and VCF cutoff (excluding the snare's noise VCF, which is not affected by the envelope). A push button allows you to invert the envelope generator CV, enabling a bend effect that goes **up or down**. Detailed information about the bend system can be found in the "Circuit Modes" section.

4. **DECAY** Knob: The DECAY knob controls the decay time of the sound body. It also affects the envelope generator and influences the bend time. Additionally, the sensitivity VCA response setting can alter the control voltage (CV) type specifically for the sound body VCA, switching between a natural exponential type (Db) and a linear CV type.

5. **NOISE TONE** Mixer Knob: The NOISE TONE mixer knob blends the noise generator with the VCO according to your desired mix ratio.

6. **CLICK** Knob: The CLICK knob mixes the sound body (noise + VCO) with a short click sound. The precise behavior of the CLICK knob differs slightly for Hi-hat and Cymbal voices, as the CLICK component for these voices is generated through cross-

modulation between oscillators. In the case of Hi-hat and Cymbal voices, the CLICK component is referred to as BELL.

By providing these comprehensive control panels, VSDSX empowers you to sculpt and shape the drum sounds to your liking, enabling precise control over parameters such as pitch, decay, noise, and more.

If you activate the FULL MODULE view, additional controls will be displayed.

Full mode gives you access to every fine-tuning setting of a voice card.

1. **VOL**: Set the overall volume of the module, can reach analog clipping if pushed hard.

2. **HPF**: This setting Controls the internal filtering of the noise generator, usually set to high excepted for snare, you can tune this parameter like you want.

3. **RES**: This is the SSM2044 VCF lowpass resonance, usually set to none on SDS-V, excepted for snare; you can tune this parameter like you want.

4. **CLICK / BELL Trigger Shape**: This is useful to emulate different type of trigger CV, Simmons pads generates a richer trigger pulse than sequencer CV for example. This

will affect the length of the click; this parameter ranges from 78ms to 315ms more or less depending on the module, reset button will restore factory setting, worth noting that on HIHAT and CYMB modules the click is named BELL for a reason: it is not generated the same way.
(cf. HIHAT / CYMBAL module chapter).

5. **MOD AMOUNT**: This is the frequency modulation amount, an LFO is available **per voice**, it can be set to a triangular or square waveform by clicking on the waveform symbol, the modulation is applied to the VCO pitch. The snare module got an additional switch which let you additionally route the LFO to the VCF, in this case this is a pre-fader modulation (full modulation is sent regardless of the mod amount)

6. **RATE:** This controls set the LFO speed, the **divide** switch changes the speed range which can reach audio rate.
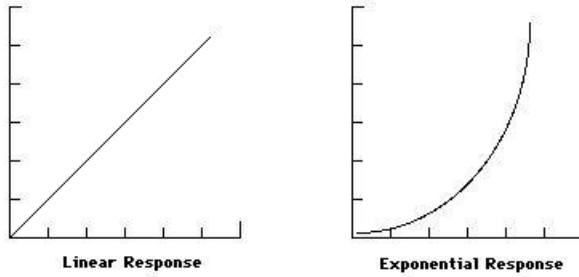
7. **SENSITIVITY Controls**:
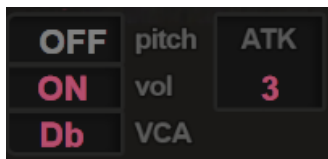
Located at the bottom of the interface when in "FULL VIEW" mode, the sensitivity controls fine-tune how trigger velocity affects the sound.
The **PITCH** setting offsets the tone pitch dynamically within a range of 0 to one octave in semitone steps *(In SIMMONS circuit mode the amount is fixed to a small range, less than a semi-tone).* The **VOL** control can be independently enabled or disabled, when ON velocity affects the sound body VCA normally, when OFF trigger's velocity is ignored and the trigger VCA is set to full volume, this disables the velocity tracking applied to the volume which can be useful to emulate the "run generator feature" found on certain Simmons systems, if you set the volume tracking to OFF and the pitch setting to 1 OCTAVE, hitting the pad at different velocity will only affect the pitch, which is useful to make tom runs on only one pad…

The **ATK** setting (Attack) set the strength of a short (milliseconds) pitch modulation envelope sent to the tone oscillator frequency, shaping the initial attack of the sound (refer to the "Triggers" section for more details). ATK circuit is only available for TOMS, BASS and SNARE. Modules without this feature will have no ATK.

The **VCA** setting refers to the control voltage response of the sound body VCA, typically having a decibel like response or more precisely a logarithmic response. It

can be switched to a linear response to drastically change the envelope shape, both Db or LIN setting have their pro and cons, usually a linear response will sound unnatural but can be useful for a "dry" or "in your face" sound.

Linear Response   Exponential Response

5.2 MIX PANEL

The main mixer is not a full featured mixer nor a replacement for proper mixing in your DAW using VSDSX's multi output capability but it is nonetheless useful for quick muting or balancing "nonlinearities".

By that I mean that **there is a noticeable difference between a module's output volume and the mixer "post" volume gain stage**.

You can now easily balance between clean volume and overdriven coloration.

MODULE VOLUME knobs reflect the main volume set on each drum module (full panel view) these are non linear and they will nicely saturate the output if pushed hard, use it for color.

POST VOLUME sliders are the opposite, they give you clean cut or boost use them for overall balance adjustment.

5.3 SET PANEL
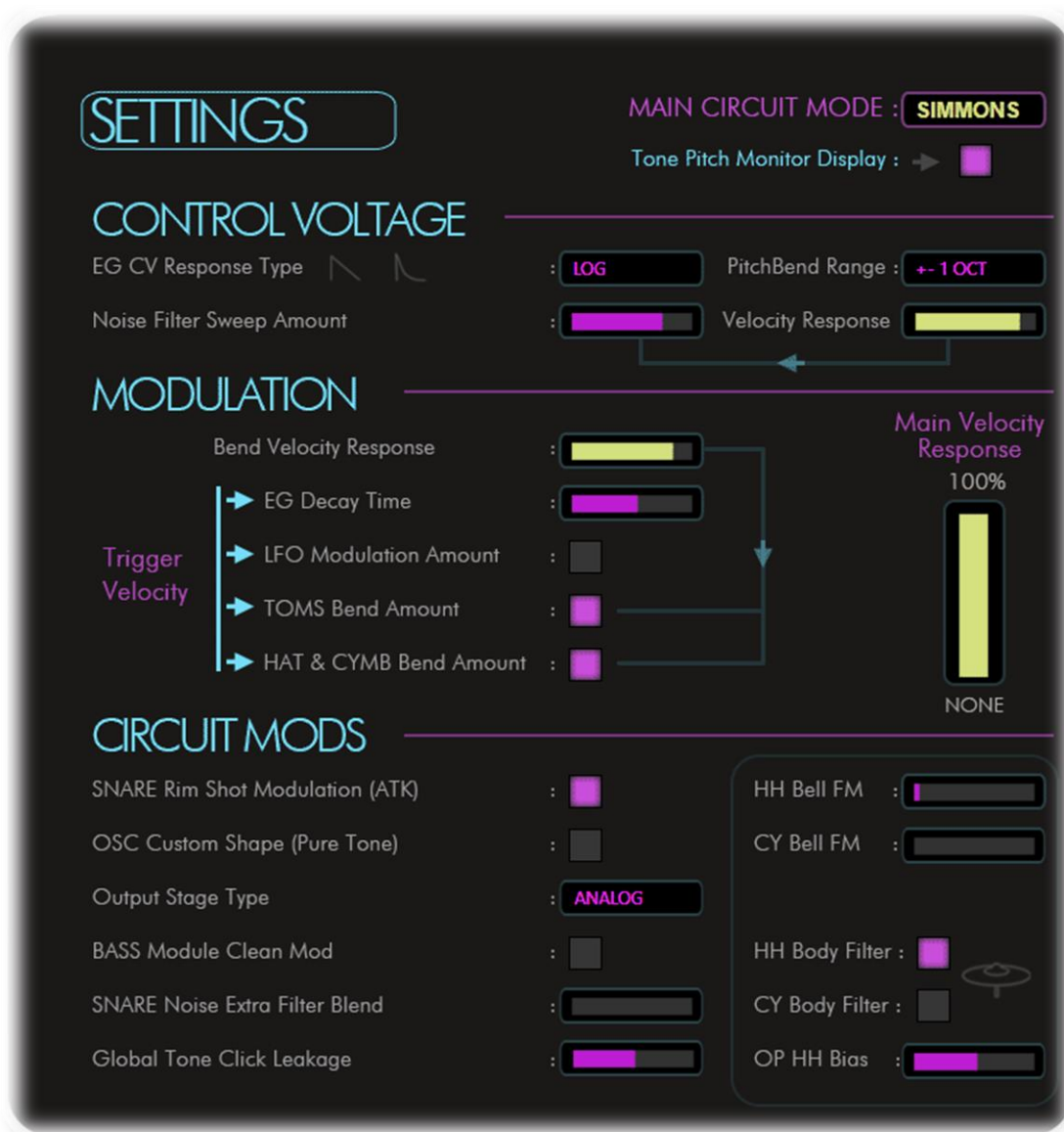
The main settings panel is the heart of VSDSX.

MAIN CIRCUIT MODE

This setting has its own dedicated section in this manual and is also reflected on the main panel.

There are 2 modes: **SIMMONS** or **LEGACY**, SIMMONS mode is closer to the real hardware circuit behavior and limitations while LEGACY is based on VSDSX's initial implementation which got more range and extra pitch modulation points. Both have their pros & cons but both are useful, this setting affects all circuits in VSDSX.

(cf. CIRCUIT MODES).

 Tone Pitch monitor Display

When activated a **LED ring** will follow the pitch envelope indicating its direction.
Very useful when experimenting between SIMMONS and LEGACY modes tand actually understand one of the key differences.

CONTROL VOLTAGE

The internal control voltage can be tweaked in VSDSX to tailor circuit response.

1. **EG CV Response type**: Envelopes Control voltage curve can be set to logarithmic or linear, these are mainly affecting the sound frequency bending and filter cutoff voltage.
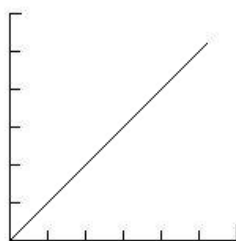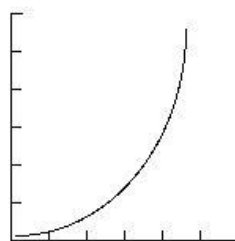
Linear Response   Exponential Response

2. **Noise Filter Sweep Amount**: Set the amount of envelope modulating the filter (VCF), depending on the module's configuration and velocity setting the harder you hit the more the envelope will affect the filter frequency, this is dependent to the **velocity response** setting.
Note that the VCF also affect the Click so you will notice that the sound gets duller while you decrease the sensitivity.

3. **Velocity Response**: This controls how much the trigger velocity affects the noise filter weep envelope

.
4. **Pitch bend Range**: VSDSX have a special function for the MIDI pitch bend signal, if set to anything but OFF an incoming MIDI pitch bend message will offset all modules oscillators frequencies, the range of the effect is defined by the setting. This is useful to quickly detune the whole kit or to make special FX as the modulation speed can reach near audio range (according to your MIDI settings and system capability).

MODULATION

```
                    ┌─────────────────────────────┐
             ┌─────►│ Envelope Decay Time          │
             │ ┌───►│ LFO Mod Amount               │
             │ │ ┌─►│ TOMS Bend Amount             │
             │ │ │ ►│ HAT & CYMB Bend Amount       │
 ┌─────────┐ │ │ │  │                              │
 │ Trigger │─┤ │ │  │ Noise Filter Sweep           │
 │ MIDI    │─┼─┤ │  │ ATK / Pitch                  │
 │ Velocity│─┼─┼─┤  │ Volume                       │
 └─────────┘ │ │ │  │ Open Hi-hat EPROM rate       │
             └─┴─┴──└─────────────────────────────┘
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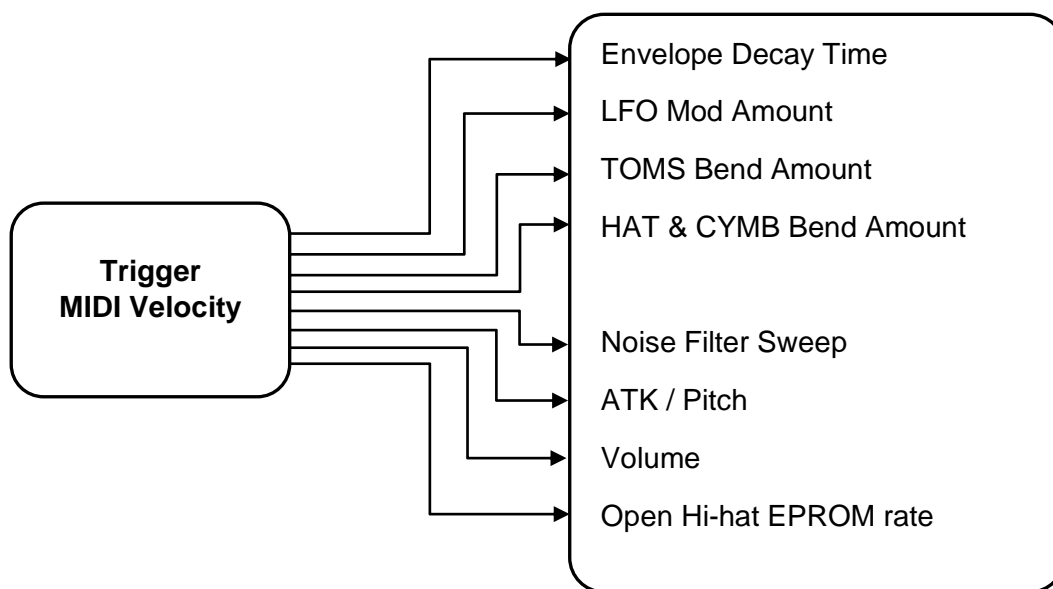
Trigger velocity can affect different part of the circuit, options to fine tune to which extend are available.

1. **Bend Velocity Response**: Set the amount of velocity controlling the bending voltage, the bending or frequency sweep is usually not affected by trigger force but in some modules like Toms, Hi-Hat and Cymbals it was usually set from the factory.
When set to full the frequency sweep will respond to velocity fully, set it according to taste.

2. **EG Decay Time**: Set the amount of velocity modulating the overall decay time of the sound frequency, this is dependent to the main **velocity response** setting.

3. ⬛ **LFO Modulation Amount**: ON OFF switch, affects velocity to LFO modulation amount (dependent on the actual LFO Mod amount).

4. **TOMS Bend Amount**: ON OFF switch, when ON the bend envelope amount will be affected by trigger velocity, depending on the main circuit mode (SIMMONS or LEGACY) the behavior will be different. Set the desired response using the Bend velocity Response slider.

5. **HAT & CYMB bend Amount**: ON OFF switch, when ON the bend envelope amount will be affected by trigger velocity, depending on the main circuit mode (SIMMONS or LEGACY) the behavior will be different. Set the desired response using the Bend velocity Response slider.

6. **Main Velocity Response**: this is the main velocity response setting affecting VSDSX globally, when set to full incoming MIDI velocity range will be 100% affecting every part of the circuit including volume and control voltages. Use it to make VSDSX respond more or less to velocity depending on your needs.

CIRCUIT MODS

Circuit modifications provide access to hidden settings and custom modifications.

1. **SNARE Rim Shot Modulation (ATK)**: ON OFF switch, when ON an extra frequency modulation circuit will act on the snare's tone OSC, it is activated on loud triggering only.

2. **OSC Custom Shape (Pure Tone)**: ON OFF switch, when ON this will transform all VSDSX oscillators (producing the classic Simmons filtered triangular waveform) into pure sine waves. This can be useful for extending the range of sounds you can make or when you would need a cleaner low end (808 style).

3. **Output Stage type**: let you choose between **CLEAN** and **ANALOG MODE**
- **CLEAN:** In this mode the circuitry will behave like an ideal system, pure triangle waveform and less filtering. This can be useful for a brighter and edgy sound.
- **ANALOG:** In this mode analog oscillators will have more harmonics but also more filtering. This is a dirtier sound closer to real hardware.

This graphics shows a comparison between the output of VSDSX and a real SDS-V at similar settings.
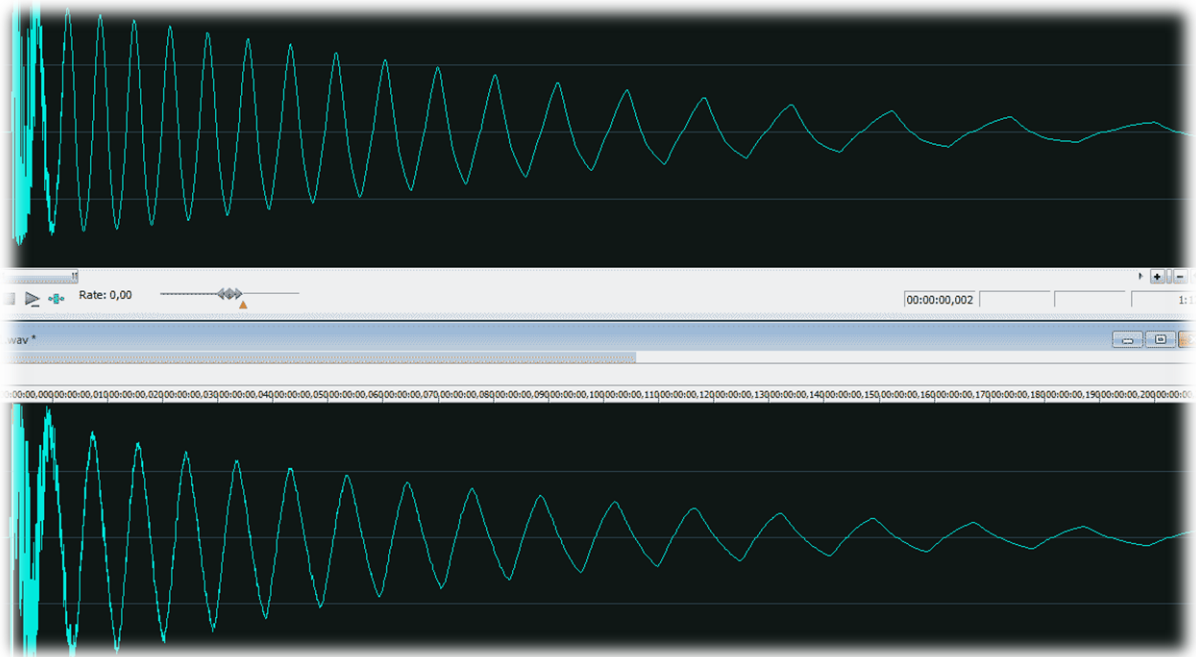
4. **BASS Module Clean Mod**: This is a special circuit tweak for a cleaner noise path and a steadier oscillator output, both modifications produce a somewhat cleaner bass drum sound using the exact same circuit but connected differently, experiment with it and choose what best fits your needs.

5. **SNARE Noise Extra Filter Blend**: Another VSDSX circuit add-on which let you blend an additional filtered noise path, this is using a custom designed filter with an emphasis on mid-range bump, use it to add another character to your snare sound.

6. **Global Tone Click leakage**: This sets the amount of "Click Leakage" going into the Tone circuit (Tone Oscillators), this setting let you adjust the amount from none to extreme. If you want to hear this analytically just set a module to full tone with no noise and no click and listen to the effect.
On real hardware you can find some "click defeat" mods which is equivalent to set this slider to zero.
This will add extra punch and attitude but watch your dynamics.

7. **HH & CY Bell FM**: this let you fine-tune the click/bell generation circuit.

8. **HH & CY Body Filter**: When ON the filter is applied to the whole module (Noise + Body) when OFF only the noise part is filtered, useful in both cases whether you would like to hear more the crunchy lo-fi sound of the digital body or a tighter hat sound.

9. **OP HH Bias**: Open Hi-hat bias setting affecting the Hi-hat EPROM sample rate, when open the sample rate will change slightly according to this setting, this produces variation to the somewhat sterile hi-hat.

5.4   MIDI MAP PANEL

VSDSX 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.

To create a custom mapping the process is straightforward:
First **SELECT DRUM** must be set to the drum you want to customize.
Then engage the **LEARN MODE** by clicking on the **LEARN** button (when engaged a blue LED will be lit), now each new incoming MIDI note will be assigned to that drum (2 notes are available per drum, excepted the hi-hat which got 2 for closed and 1 for open)

While in learn mode you can change the SELECT DRUM to another drum. Once you are done, click **LEARN** button again to disengage the LEARN MODE.
The custom map is now in memory. If you want to save your map permanently so it will be used each time you load the plugin, click **SAVE**. To get back at the default mapping any time click **RESET**.

The RAM memory can be viewed in the RAM DATA memory box (those are assigned MIDI notes number in decimal value).

The MIDI map is global and will be shared by 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 should also be able to create a custom mapping directly from your drum module, assigning each drum pads to the VSDSX default map.

If you need to save or store different custom maps elsewhere the actual file: "*VSDSX_MIDIMAP.ajmap*" can be found at this location:

PC: C:\Users\YourUserName\AppData\Local\VSDSX

Mac: ~/Library/Preferences/VSDSX
*(cf. this is your user library).*

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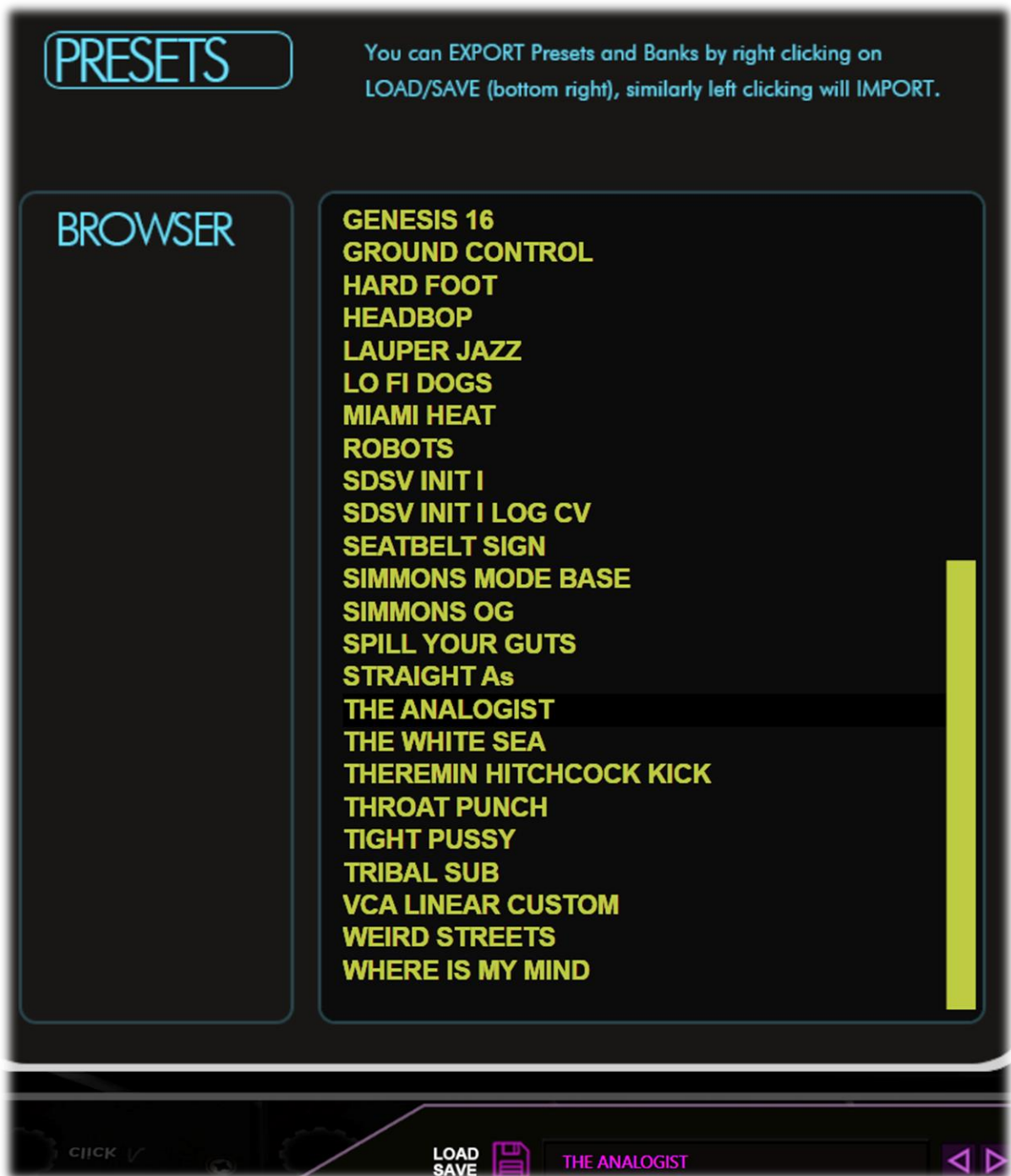
The preset browser is a convenient way to select presets, in next revisions it will feature categories.

At the bottom 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.

5.6 KITVIEW PANEL

The color-coded drum triggers will be reflected on this retro view panel.
This have no particular purpose other than being cool AF.
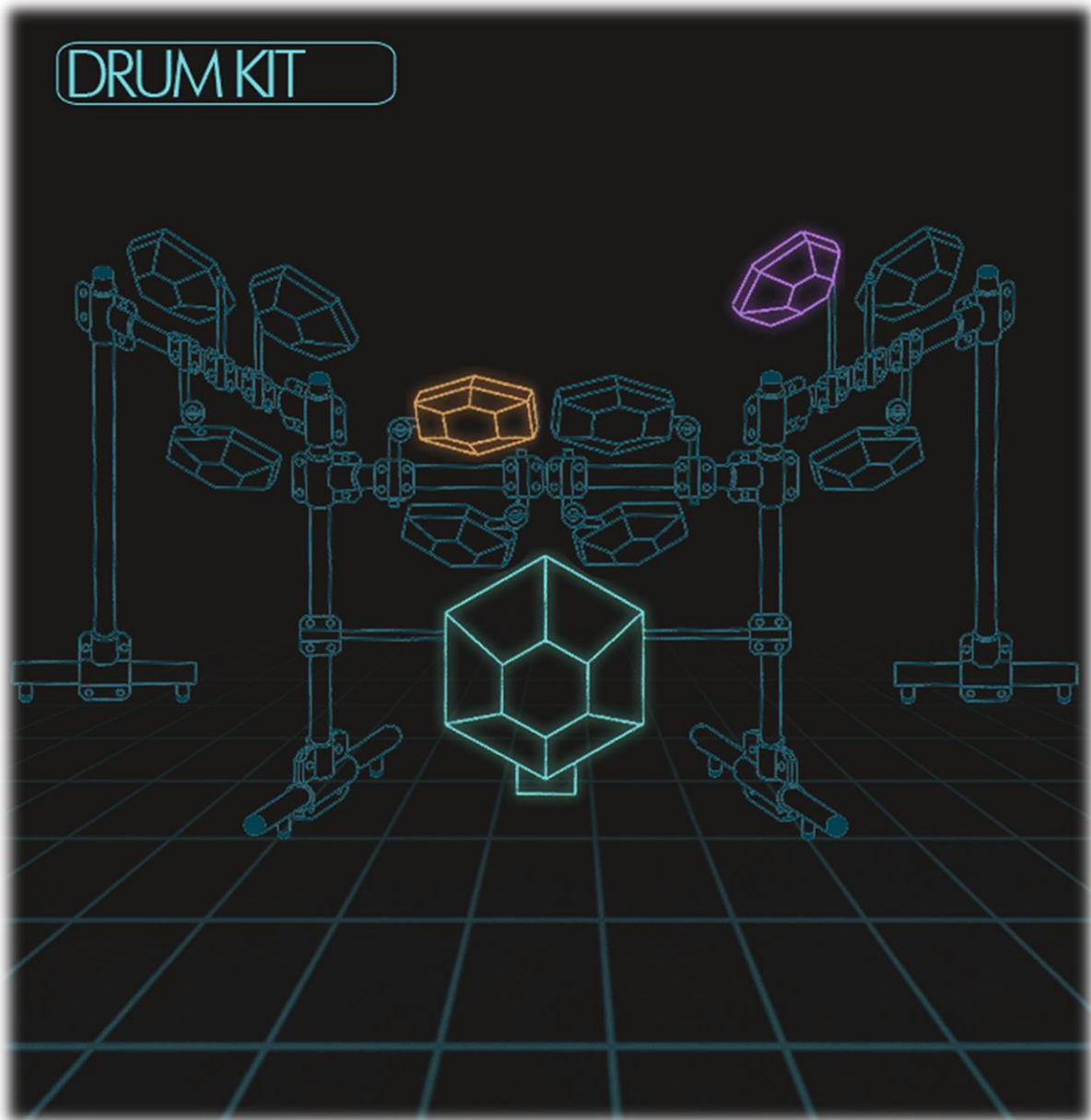
If somebody comes with a cool video animation using this I want to see!

6 CIRCUIT MODES

VSDSX features two main working modes which are slightly changing its capabilities and behavior. You can monitor the current mode at any time and change mode from the **SET panel**, the functional diagram can also be found at the **INFO panel**.

To understand what is happening let's start with a simplified explanation of the sound generation.
The drum sound is made from a combination of multiple sources, mainly a tonal part we will call the **tone source** and an atonal one we will call the **noise source**.

The **TONE** is a typical analog oscillator similar to what you can find in an analog synth.
It's pitch or frequency is set by the **TONE knob.**

The **NOISE** is a transistor generated noise, tuned and filtered by an analog low pass filter.
the cutoff frequency of this voltage-controlled filter (VCF) is set by the **NOISE knob.**

The SIMMONS drum brains were typically creating drum sounds by **modulating the TONE pitch and the NOISE filter frequency**, usually using generated envelopes which were either trigger level dependent or not.

Generated **envelopes** can have different decay times and can also be reverted to produce positive or negative voltage.
This is why the systems can have pitch bending in both **UP** or **DOWN** directions.

When a pulse triggers a module, generated envelopes will act on many parts of the circuit and one of them is the **bend amount and direction**, its timing is controlled by the **DECAY knob** which also controls the overall decay of the sound. A portion of this envelope is also applied to the noise filter cutoff frequency.
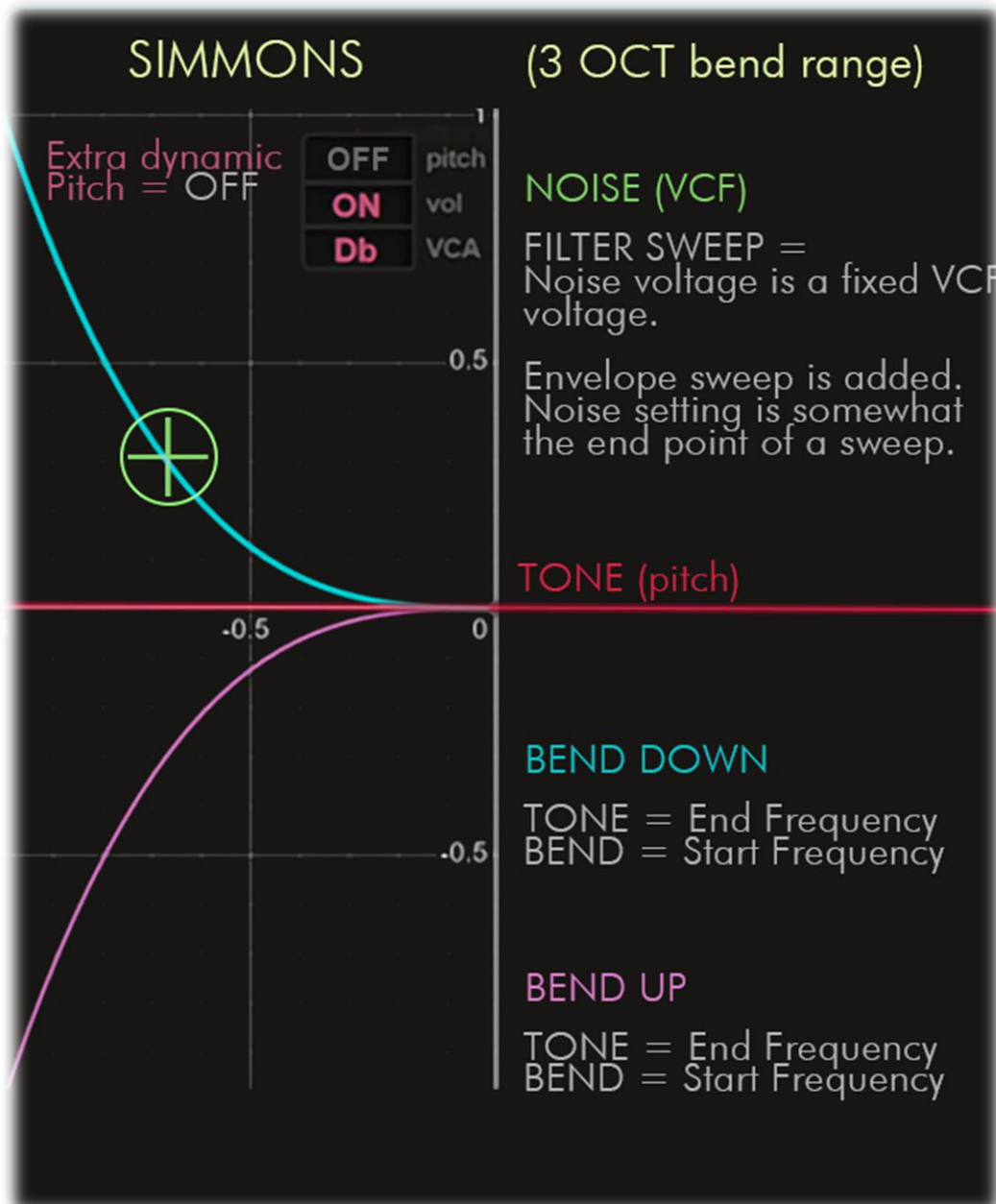
The way these envelopes are applied to the circuit is governed by the selected circuit mode.

6.1 SIMMONS MODE

BEND MODE

SIMMONS

In this mode VSDSX behaves in a similar fashion as the original Simmons implementation.

Let's look at this functional graphic is detail:

In this mode the **TONE knob** sets **the Tone VCO final frequency** and the **bend envelope** represented here in blue or pink will be either **added** in case of bending DOWN or **subtracted** in case of bending UP from the Tone value.

In other words, the pitch will start at the bending frequency and end at the tone frequency.

The TONE knob then sets the fundamental pitch of the drum.
You can use the **bend indicator LED ring** to see and monitor the pitch behavior, Tone and Bend frequencies are displayed in Hz so you can clearly see and set where the pitch starts and ends.

 Of course, if the bend envelope is dynamically controlled the pitch will go higher as more force is applied and vice & versa in case of bending up.
(This setting can be toggled for TOMS, Hat and Cymbal from the SET panel)

As for the **NOISE knob,** in this SIMMONS mode it sends a direct fixed voltage to the VCF setting the frequency and the envelope voltage is added in a similar way as the tone pitch.

The overall range of pitch envelopes is approximatively 3 Octaves and the Extra dynamic pitch circuit is deactivated (you can't set it like in LEGACY mode but a small voltage, less than a semi-tone is still dynamically applied).

« This mode can produce a wide range of sounds, maybe closer to real drums, pitch bends can reach higher spectrum region and the noise part can feel more "disconnected" in a good way, while the overall pitch bend range is less than LEGACY mode you also have a tighter range to work with which can sometimes be a good thing. »

6.2 LEGACY MODE

In this mode VSDSX behaves in a similar fashion as the original Simmons implementation but with some twists, this was the default VSDSX implementation until version 2.3
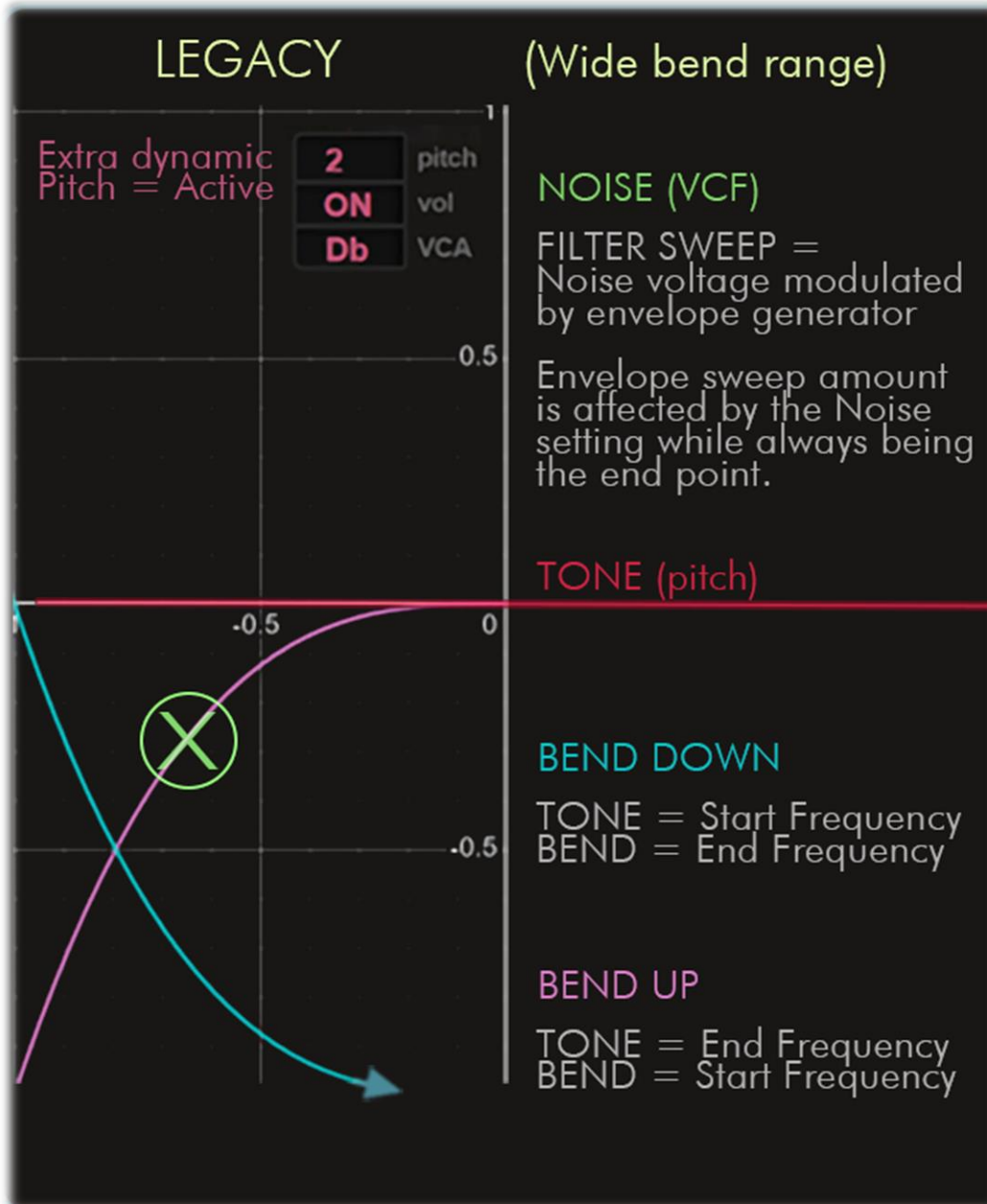
Let's look at this functional graphic is detail:

In this mode the behavior is different dependong on the bending direction.

In case of bending DOWN the **TONE knob** sets **the Tone VCO initial** and the **bend envelope** represented here in blue will be **subtracted.** In case of bending UP the behavior is

identical to SIMMONS mode; the **TONE knob** sets **the Tone VCO final frequency** and the **bend envelope** represented here in pink will be **subtracted** from the Tone value.

In other words when bending down, the pitch will start at the tone frequency and end at the bend frequency.

The TONE knob then sets the initial pitch of the drum. You can use the **bend indicator LED ring** to see and monitor the pitch behavior, Tone and Bend frequencies are displayed in Hz so you can clearly see and set where the pitch starts and ends.

Of course, if the bend envelope is dynamically controlled the pitch will go lower as more force is applied.
(This setting can be toggled for TOMS, Hat and Cymbal from the SET panel)

As for the **NOISE knob,** in this LEGACY mode it sends a direct fixed voltage which is modulated by the envelope before setting the VCF frequency. This connection made it so the VCF frequency will always end at the envelope's lowest point, **in other words the filter will always end up closed and the noise knob act as an envelope voltage multiplier.**

The overall range of pitch envelopes is more than 6 Octaves and the Extra dynamic pitch circuit is activated. The extra pitch circuit sends a fixed voltage offset to the VCO frequency depending on its setting; **this can** adjust the tone pitch within a range of 0 to one octave in semitone steps.

This pitch offset is always modulated by trigger force so if for example you set 2 semitones you will have 2 semitones offset at MAX velocity (MIDI 127), 1 semitone at MID velocity (MIDI 64) and so on.

« The interesting thing here is the wider bend range and the reversed bend down dynamics. Switching between the 2 modes in case of dynamically bending down can either make your drum go lower and bendier as you hit harder or the opposite.
The noise VCF will almost always end up closed and thus can feel shorter ».

7   THE SDS-V
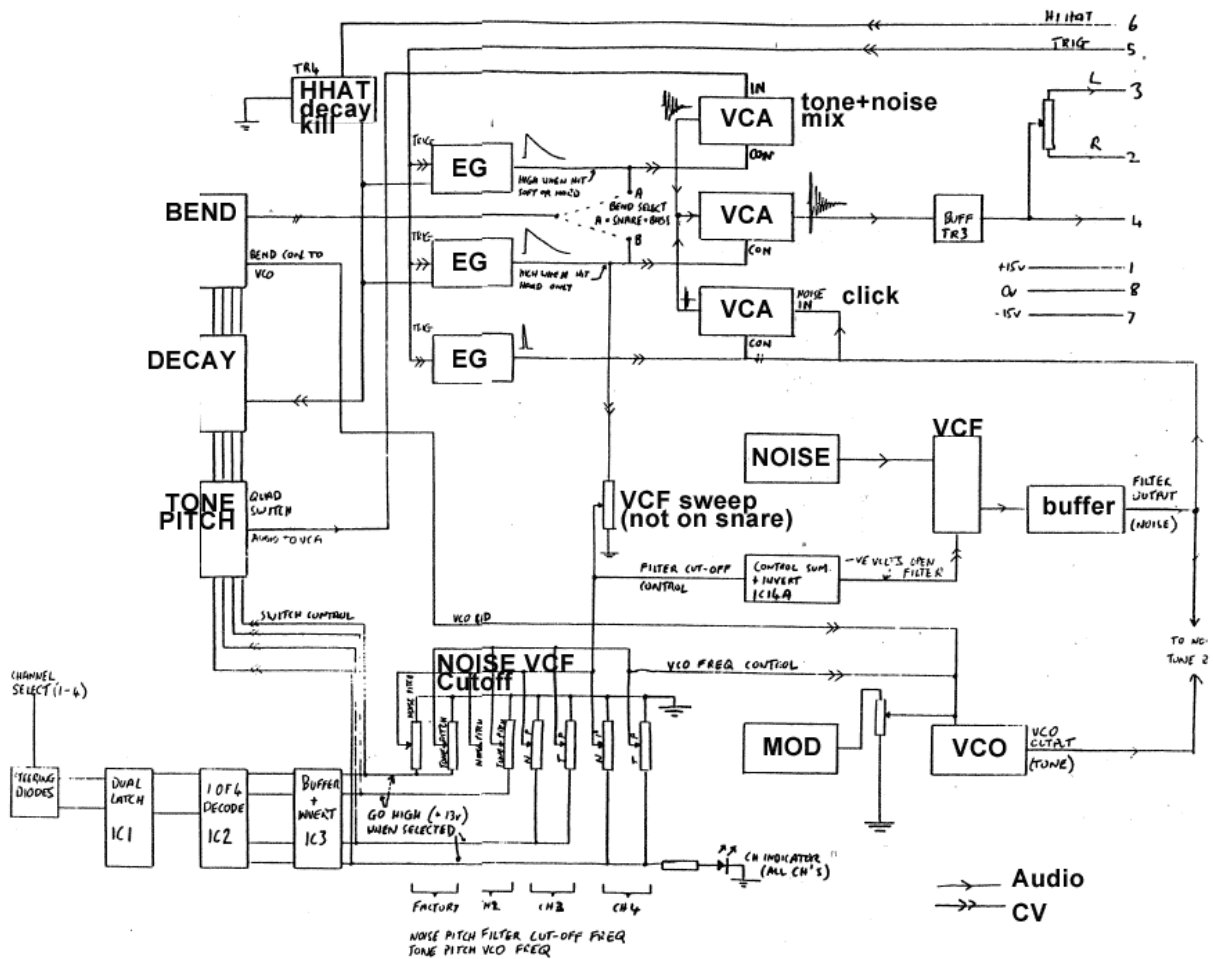
The SDS-V is often found with Bass, Snare + 3 Toms configuration, some lucky owners had the hi-hat and cymbal modules.

If you look at these circuit diagrams you can see how the signal flows, basically a trigger will engage fixed and dynamic envelope generators that will control Pitch, VCF and VCAs which will shape the noise generator, click and tone VCO. The click itself is composed of the same filtered noise source.

Let's look at the noise generator…

NOISE GENERATOR
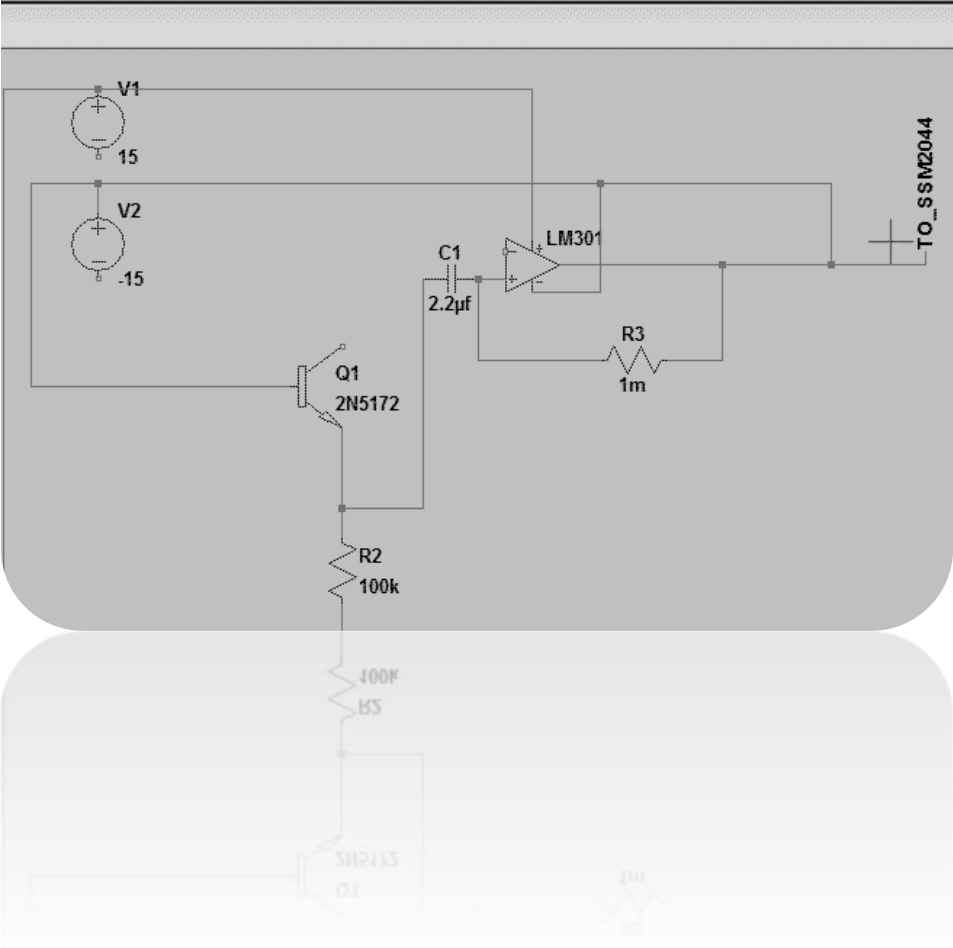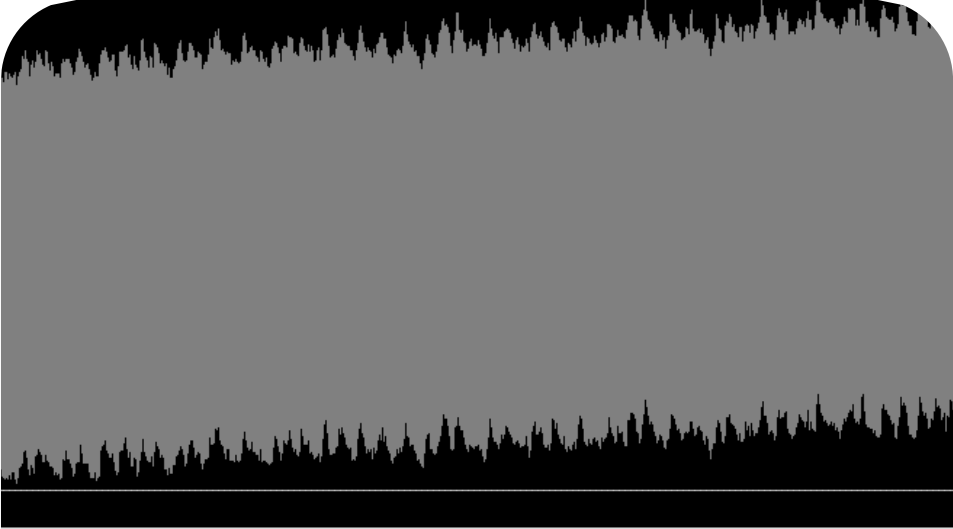
It is based on classic transistor noise amplification with a special thing, the twisted wires...

It is called a gimmick capacitor, used to get a very small pico-farad capacitance and it seems to let ones be able to 'tune' the noise easily, in VSDSX this can be adjusted and take the form of an **HPF** knob. It lets you filter out some of the noise generator frequencies or produce a fuller noise sound, the SNARE in VSDSX have an extra setting called **FULL NOISE** which will brings all of the noise generator frequencies.

THE SSM2044 VCF
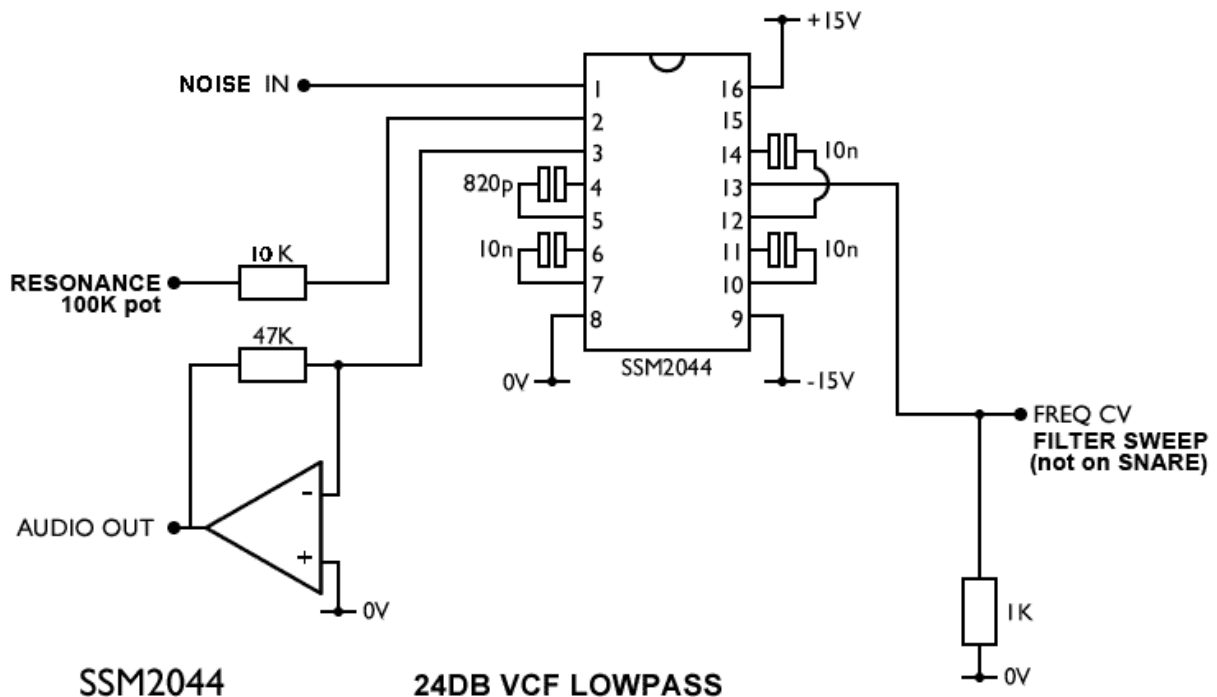
The iconic **Curtis chip SSM2044 (but also low cost) low pass filter** was used to filter the noise in the SDS-V, the resonance can be tweaked but never in a big amount and you will not reach self-oscillation. On the real hardware only the snare module used significant resonance, other were set pretty flat This is the type of filter that will not maintain the gain

around the cutoff resonance, so you will lose the bottom end. The filter frequency will be affected by envelopes and trigger velocity, the noise will get duller as the sound decay. The snare is connected differently and the envelope will not affect the frequency CV (which is more like a real snare).

THE VCO

The raw analog VCO triangular output is also filtered.

This filtering is only applied in VSDSX when the output stage is set to ANALOG mode.
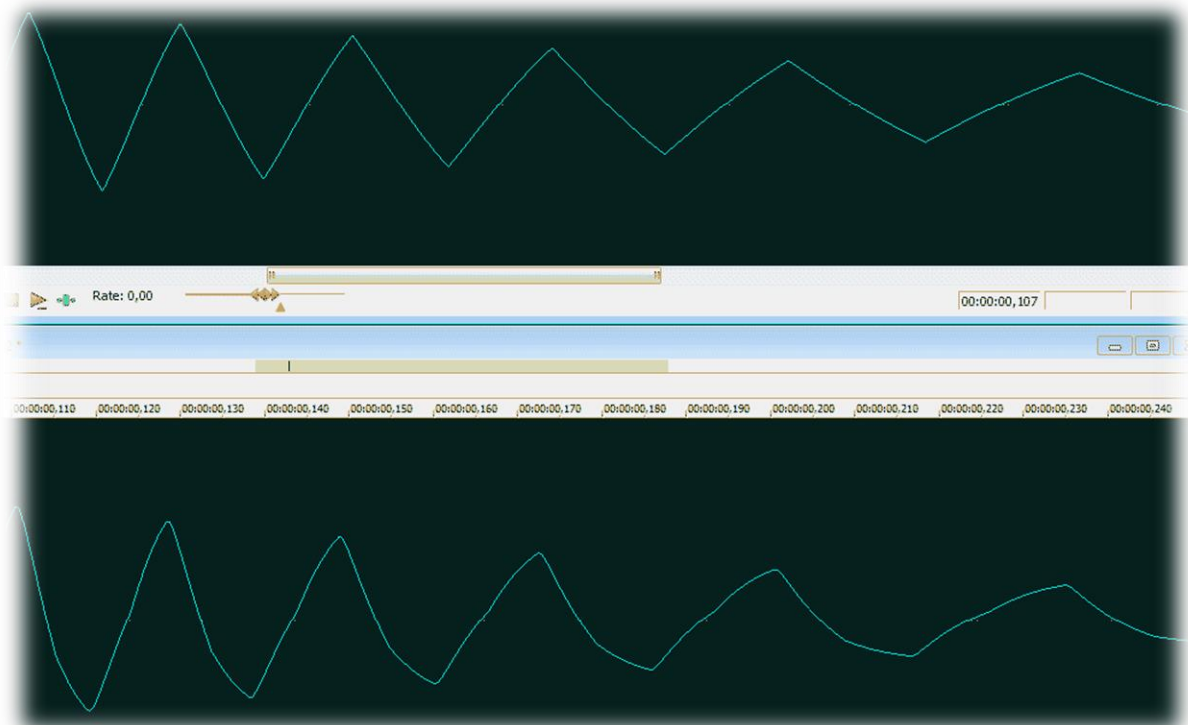
ANALOG SOUND

The nature of analog is that every part of the circuit will influence the other.

This will create extra harmonics and distortion.

VSDSX lets you switch between a CLEAN (read ideal mode) and ANALOG (harmonics and filtering) output stages.

The nature of the tone VCO will be affected by this setting, especially because an ideal triangle wave contains only odd harmonics, it has a characteristic sound, similar to a square wave. When in analog mode, different harmonics will be introduced; included even ones and the sound characteristic will change a bit.

The graphic shows differences between clean (ideal triangle) and analog


.

Analog clipping also happens in CLEAN mode and will affect the sound depending on the module's volume. Note that the more you balance CLICK with the sound body, the less volume the sound body will have. If you set the NOISE TONE mix to full tone and no click the volume will increase significantly and you might reach clipping earlier. The analog clipping is pretty nice and can bring some punch and presence to the sound, it depends what you are after. The mixer is also useful if you need clean gain or if you want to smash the module output stage while reducing volume afterward.

This graphic shows waveforms from really clipped to none.
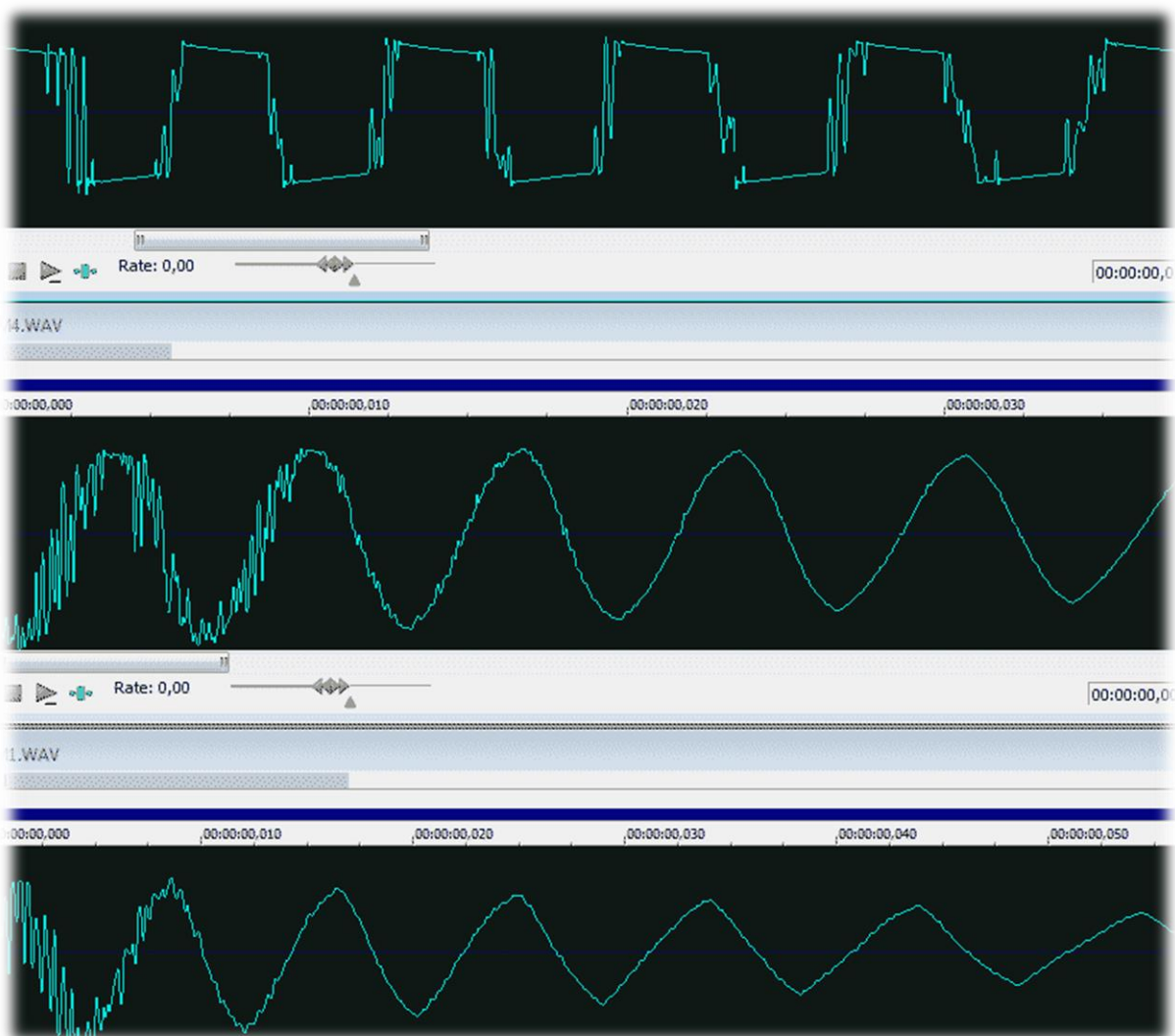
The volume can get pretty high so be sure to reduce your DAW channel volume to keep plenty of headroom.

8 BASS VOICE
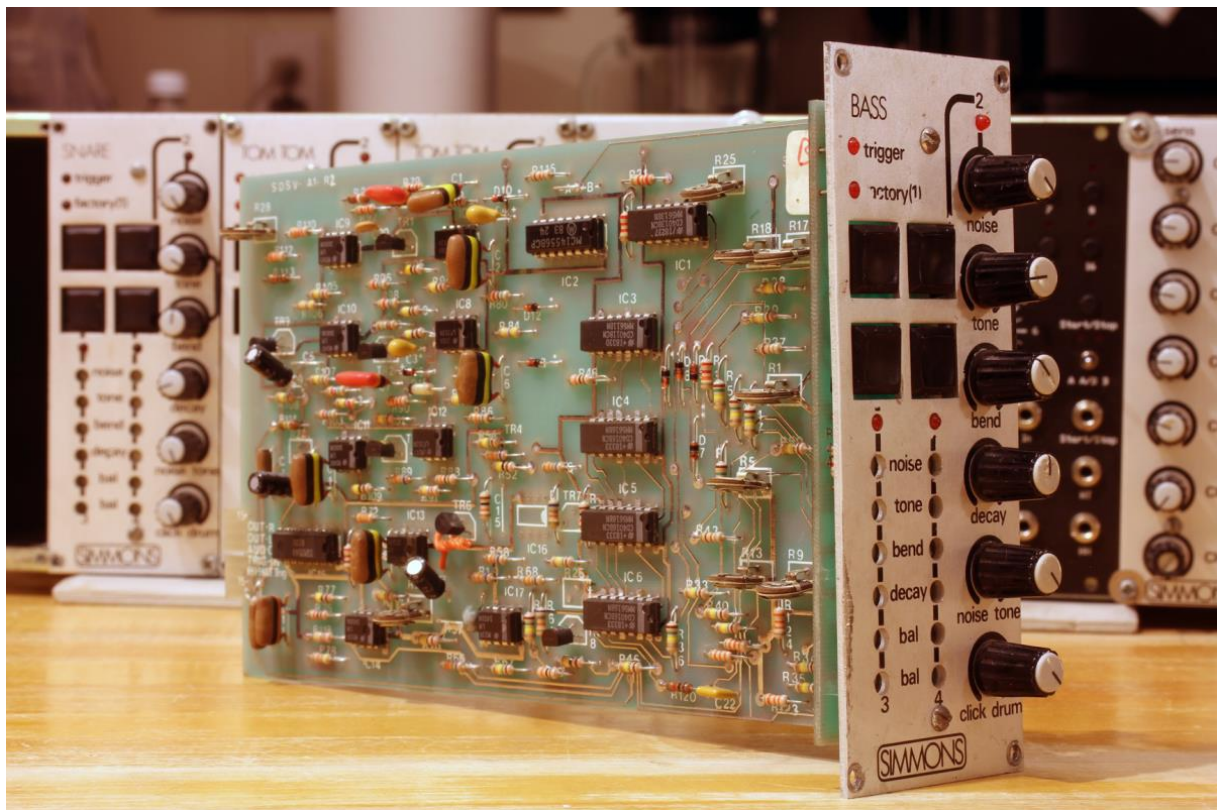
This is the classic configuration of the BASS card:

BASS: 30-440Hz

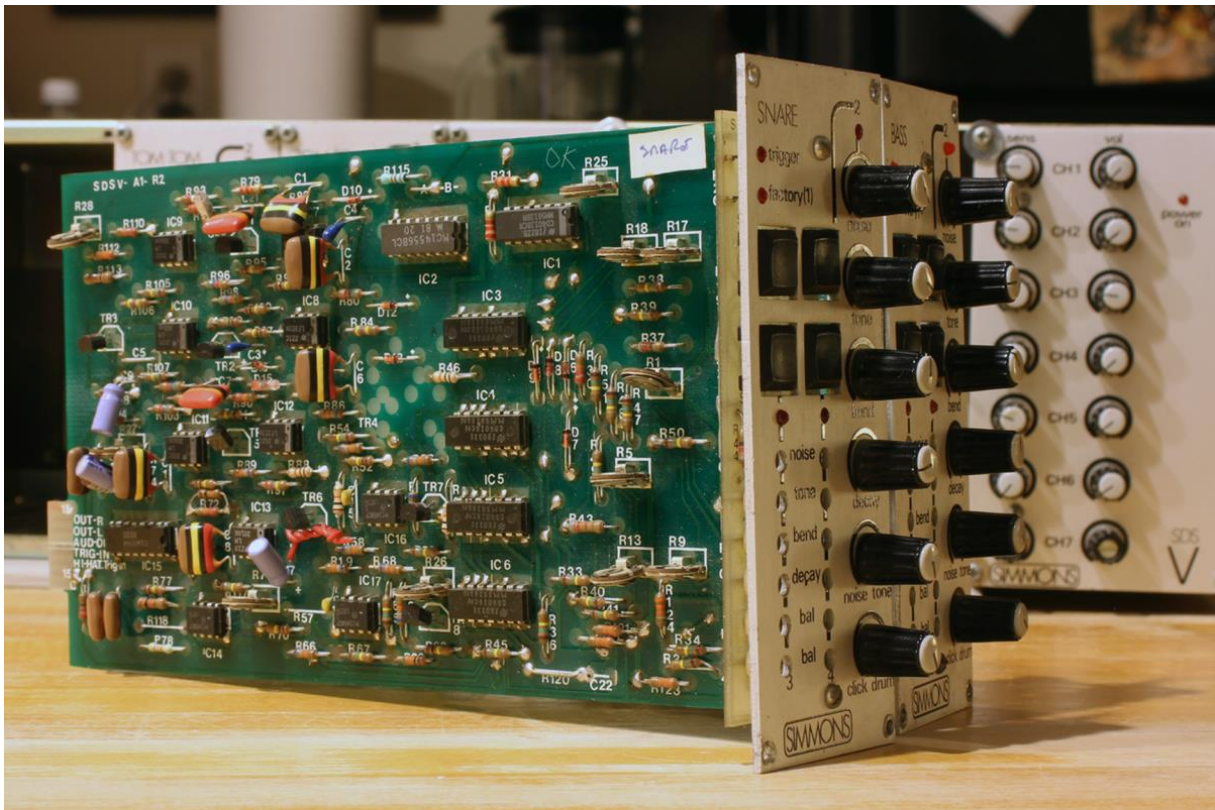Noise gets brighter with velocity

No bend velocity

R25 Filter Dynamic Sweep (Filter Cutoff envelope affect) 75%

R27 No resonance

R26 No mod Depth

R71 Noise is equal gain with tone 50/50

9 SNARE VOICE

This is the classic configuration of the SNARE card:

SNARE: 100 - 880Hz

No bend velocity

R25 Filter Dynamic Sweep (Filter Cutoff envelope affect) 0%

R27 Resonance Q should be 60%

R71 Slightly more noise than tone (lowers tone or boost noise level)

R26 50% Mod (on hard hits) ATK rim shot mod.

The SNARE featured 2 additional parameters, the **FULL NOISE** (which lets all the noise generator frequencies pass through) and the **VCF modulation switch** (it will send the full modulation amount to the VCF cutoff, regardless of the modulation amount).

10 TOM VOICES
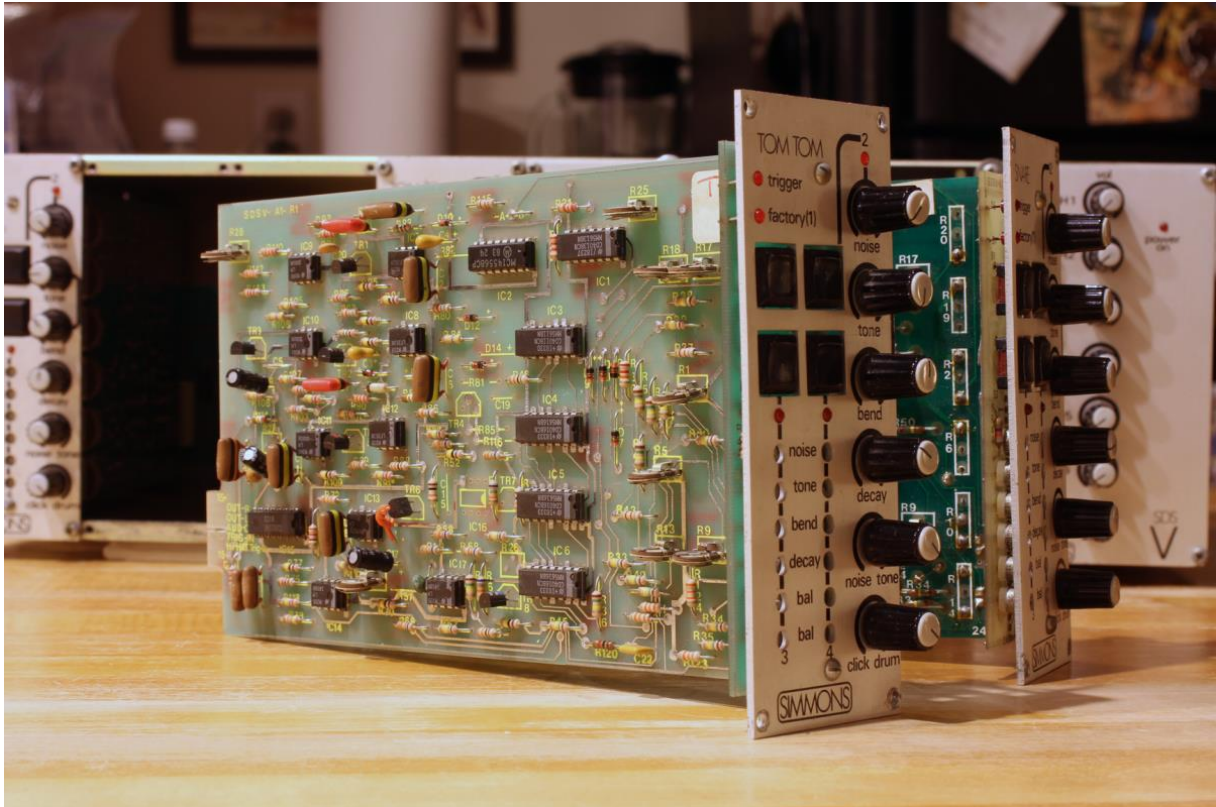
This is the classic configuration of the TOM cards:

TOM HI & TOM MED: 100 - 880Hz TOM LOW: 30 - 880Hz

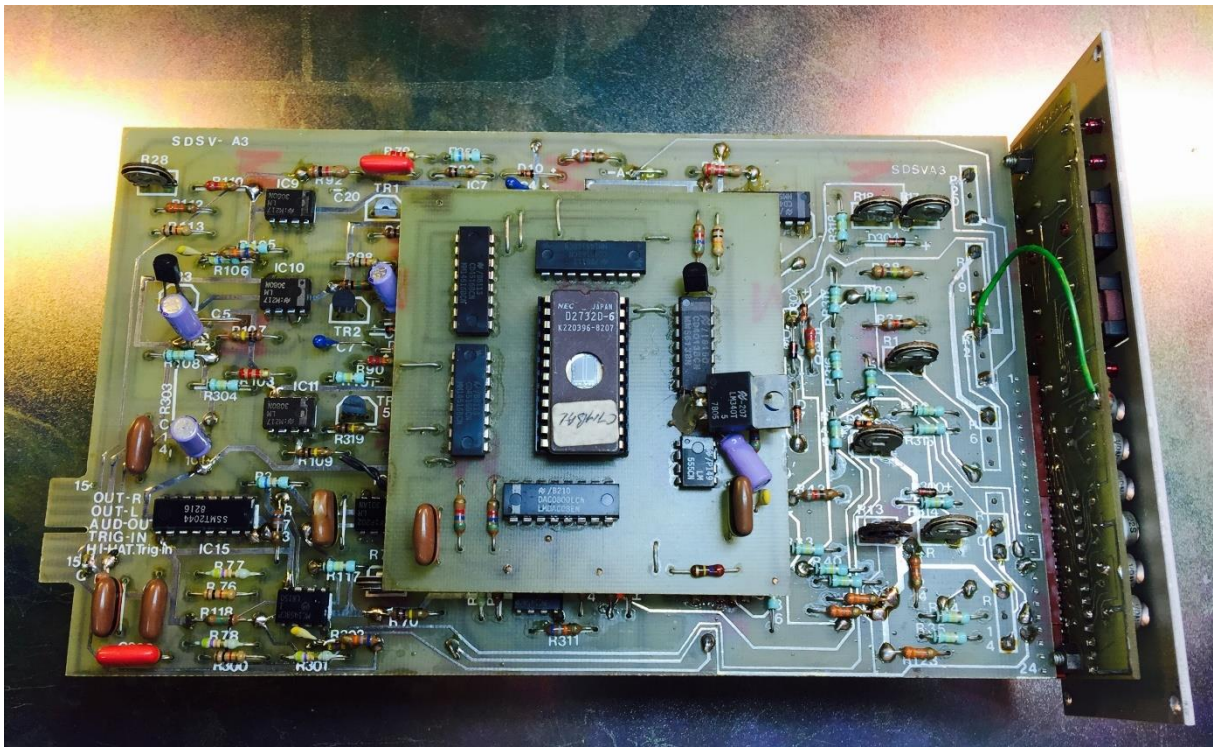Noise gets brighter with velocity

Bend amount velocity

R25 Filter Dynamic Sweep (Filter Cutoff envelope affect) 75%

R27 No resonance

R26 No mod Depth

R71 Slightly more tone then noise

11 HIHAT & CYMBAL VOICES

The Hi-hat & cymbal modules were pretty rare and unique sounding, mostly they were sample based, same configuration for both cards, but in a very particular way.

Honestly the metallic waveform has nothing to do with a real hi-hat or cymbal sound, you can hear its looping and the raw 8bit character, but: This is a CULT sound. If you play this with bending up or down while toying around with noise and filter, you get these famous cymbal sweeps.

Velocity can also act on the sample rate and this sounds pretty original.

Memory was expensive at that time so you cannot store long sample while being cost effective that's why Dave Simmons (Simmons Drums inventor) looped the short sound stored onto a 2732 EPROM, a trick noticeably used by Roger Linn in the LM-1 but this time, the sample is read forward then backward.

The loop plays all the time inside the SDSV digital module and only VCA and VCF are triggered, this was a cost-effective way for producing very long decaying cymbals.

The 555 Timer chip is the clock which set the speed for sample reading, the CD4516 are the counters and the CD4013 is changing the readout direction once the counter reaches the end.
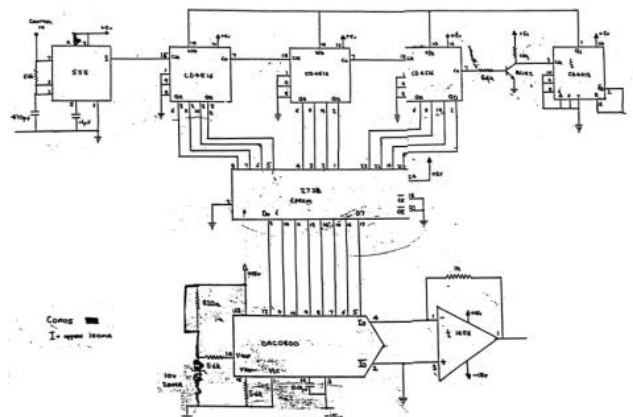
The data are stored as linear 8bit format and decoded by the emulated linear 8bit DAC.

The NOISE filter knob behaves differently than other modules, when set anti clock wise it behaves like the BASS and TOM voice (the noise gets duller as the envelope decays). When it is set at 12 o'clock it behaves like the SNARE voice (VCF cutoff is not affected by the envelope) and when set fully clock wise, the noise starts dull and gets brighter as the envelope decays.

The sweep marking and colored ring on the module panel will remind you of the particular behavior for these modules.

The fact that the raw sample source gets affected by the pitch bend envelope gives the HIHAT and CYMBAL that unique sound.

One thing that also happens on real hardware is when the EPROM rate happens to be set at 0Hz the sample source will not play anymore and will disappear until the speed change for a higher rate.

The click here is replaced by a "**bell**" sound which is generated in real time. In VSDSX the bell is mixed with the sound body for the hi-hat and is balanced with the sound body for the cymbal

module.

Last but not least you can find option to filter either just the noise part or the whole (noise + body) part.

This changes the EPROM output routing in order to be pre or post filter.

As explain earlier in this manual the **open hi-hat can also slightly affect the sample rate**, the bias setting gives you control over the amount.

12 PROM VOICES

VSDSX can load EPROM binary images in **.bin format**, this is a data dump of the exact content of an EPROM chip where samples were stored back in the days.

PROM and PROM2 modules can do that, they are loaded by default with:

- *PROM: Drumulator Snare*
- *PROM 2: EMU SP12 E Snare*

For easy access VSDSX creates an "**EPROM Library**" folder on your system when you first try to LOAD a custom EPROM.

Paths:

PC: C:\Users\yourusername\Documents\EPROM Library

Mac: /Users/yourusername/Music/EPROM Library

Two packs of original EPROMs can be found at the website's download section under VSDSX tab.

place them in the EPROM Library folder for easy access.

The DAC emulation can be switched from an AM6070 DAC to a linear 8bit DAC so you can import both companded and linear encoded EPROM image format (.bin)

Set the **ENCODING TYPE** to the appropriate format your EPROM sound was encoded with **ULAW** or **LINEAR PCM**.

If you don't which one is which, you will eventually hear it, the wrong type will sound distorted AF...which can sometimes be useful.

It is a good way to experiment as you can load anything in there… especially if you are creating your own bin images.

Here is a recall of the main functions:
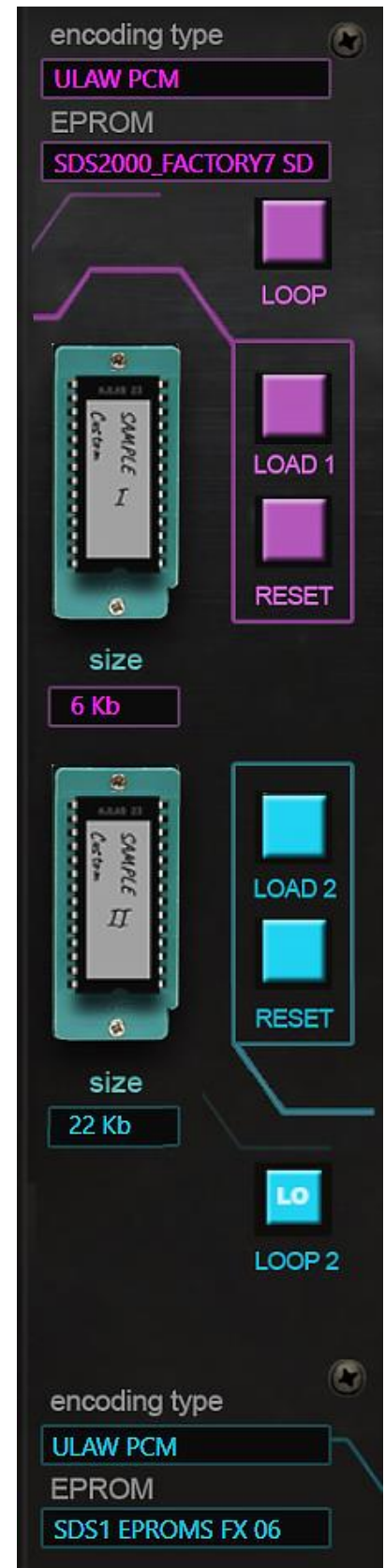
PROM Load: Access to custom EPROM loading panel (only on the PROM voices)
You can load from any location although a folder named *EPROM Library* is used by default.
This is the preferred location to put custom .bin EPROM images into.

PROM Loop: Will loop the EPROM data endlessly instead of one-shot playing (only on the PROM voices). Note that the loop time depends on the EPROM length.

PROM Reset: Will unload any custom loaded EPROM and revert to factory internal EPROM. Note that the factory EPROM for PROM2 is not the same as PROM.

PROM modules are similar to the cymbal modules in the sense that they have a bidirectional knob for noise sweep.
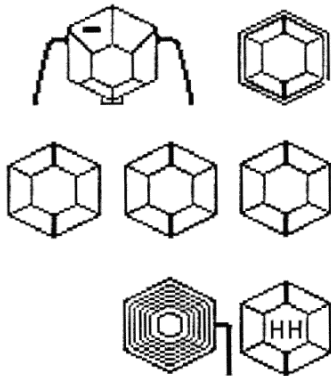

It behaves the same with the exception that the filter is always **POST body**, meaning all the sound is filtered (noise + body), that's why it is named "sound filter" and not "noise filter".

EPROM file name and file size are displayed for convenience.
VSDSX supports any EPROM size binary image (.bin) between **1K to 64K.**

13 PRESETS IMPORT / EXPORT

VST3, XML, AU preset.

VSDSX can load and import its own format presets & banks.
All Custom EPROMS file paths and all MIDI LEARNED & ASSIGNED parameters will be saved per patch.

At the bottom 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.

14 MIDI AUTOMATION

Almost all VSDSX 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.

15 VERSION 2.3

Change Log

- Introducing - Mac VST3 and Native Silicon (M1/M2), builds are "Universal 2" meaning VST3 and AU work on both Intel x86-64-and ARM64 Apple Silicon Mac natively.
- Introducing - Mac signed Installers.
- Introducing - Two more modules: TOM Bass and PROM 2.
- Introducing - GUI Trigger buttons.
- Introducing - GUI Rack system: now displays 4 modules at once.
- Introducing - built-in mixer to balance between "clean" volume and nonlinear modules outputs.
- Introducing - Improved GUI, new design, crisper look at different DPI (HD graphics, Vector knobs).
- Introducing - More global settings: bending behavior, voltage ranges, trigger velocity to module's decay time, modulation response etc.
- Introducing - Main Circuit MODES: LEGACY or SIMMONS giving you options to change the tone bend & filter sweep behavior between VSDSX legacy implementation and Simmons original behavior.
- Introducing - GUI full Kit View, retro sci-fi visual feedback.
- Added - More accurate Hi-hat\Cymbal module emulation (oversampling, decay acts on sample rate, FM Bell, cleaner analog noise source etc.).
- Added - Tone click leakage level, optional Cymbals body filter (filters noise + tone or just noise)
- Added - EPROM modules Reset & Loop function.
- Added - Preset Browser page.
- Added - Clean Bass Drum module optional mod (noise is less affected by the output non linearities, OSC now is driven before VCA).
- Added - Bending frequency readout (so you can know at which frequency a sound starts and where it ends).
- Added - MIDI Pitch Bend global modulation affects OSC pitch and VCF frequency for all modules (optional).
- Added - Optional parallel custom filtered Noise blend for SNARE module.
- Fix - Multi Out not recalling plug-in state again.
- Fix - Rare Mac OS graphic glitches.
- Fix - Snare's Rim Shot state (ATK) timing and trigger threshold.
- Fix - Added trigger velocity modulation for TOMs, HIHAT & CYMB's Bend Amount as an option (real hardware behavior).
- Fix - Inconsistent Noise Filter envelope direction and timing between Hi-hat/Cymbal modules.
- Fix - HPF now affects both OSC and Noise source on Snare module.
- Fix - Rare crash on receiving legacy MIDI Program Change.
- Fix - Improved CPU on EPROM based modules.
- Fix - Most parameters should now respond to automation.

- Fix - Improved VST3 MIDI support. (For example, it can: receive MIDI 2.0, Enable Ableton Live's "External Instrument rack" inputs detection etc.)
- Change - Some controls have now an increased range, notably VCF resonance.
- Change - Breaking: Hi-hat, Cymbal Modules may sound and respond slightly differently at the same settings because of many small circuit tweaks

16 LINKS

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

HOPE YOU HAVE FUN WITH THE VSDSX!

17 DISCLAIMER

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