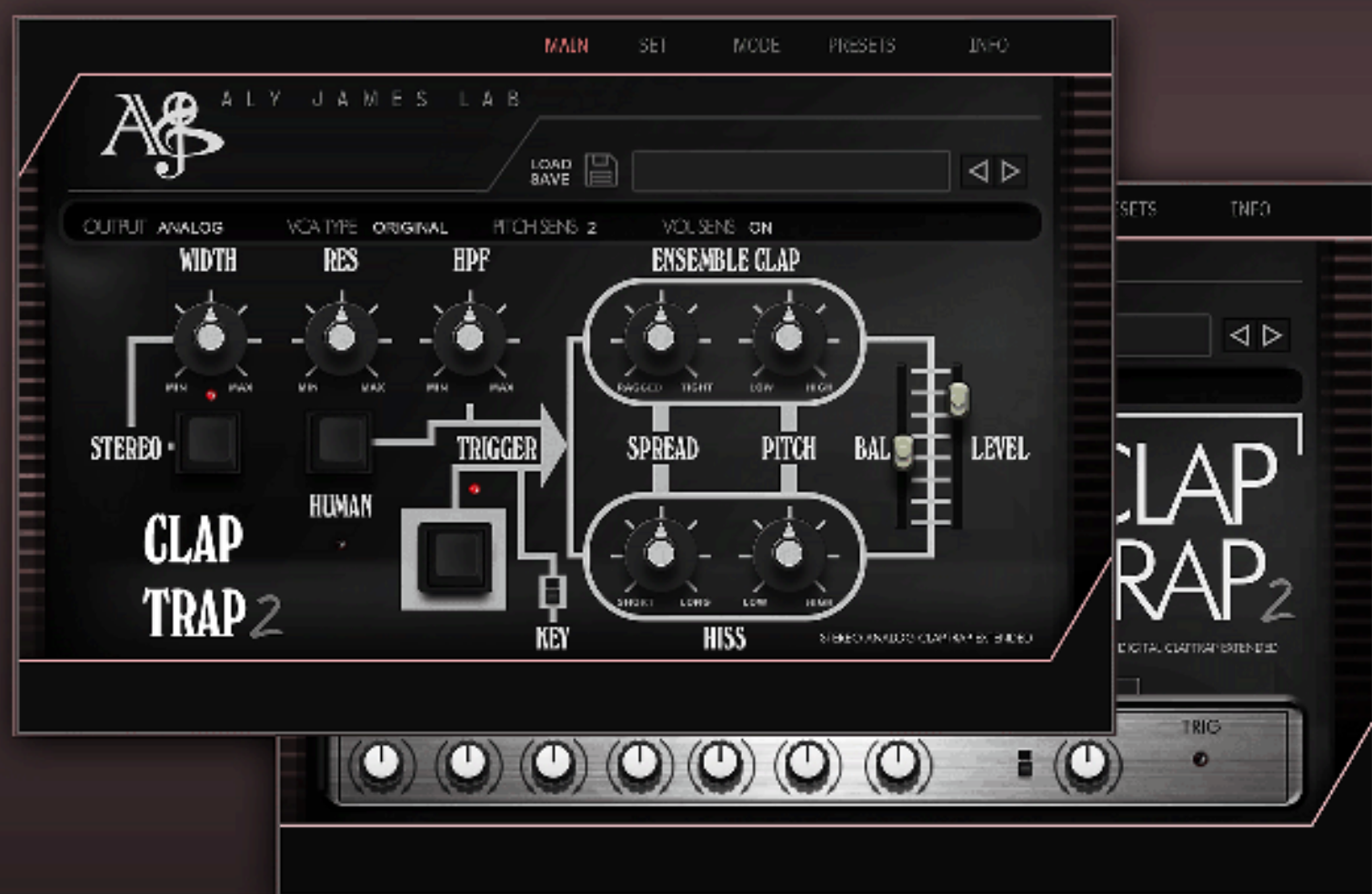


CLAPTRAP 2

A L Y J A M E S L A B

ANALOG OR DIGITAL EXTENDED MODELS

User Manual v2



MAC/PC 64bit

CLAPTRAP

STEREO ANALOG/DIGITAL CLAPTRAP EXTENDED

alyjameslab.com

USER MANUAL 2.0

by

Aly James



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2 INTRODUCTION

The first Claptrap was analog, built approximately 1979/80, likely assembled by Dave Simmons himself, followed by the analog Simmons Claptrap (adding a humanizer function and a slightly different case) and completed in 1984 by the digital version: the Simmons Digital Claptrap, one of Simmons most important bread and butter products.

The **Clap Trap** has been designed to produce **authentic and repeatable ensemble handclaps** at your command - it can produce other sounds such as percussive crashes and bursts of noise to give a long decay to snare drums.

The instrument assembles its characteristic sound by controllably blending a digital recording of people clapping, stored in memory, with a general background crash of white noise. The recording is approximately 1.5 seconds long; however, both the clap and noise components of the sound have individual controls governing pitch and decay time. A switchable "humanizer" allows a different part of the digital recording to be outputted each time the unit is triggered, giving a random, human feel.

In the **MK3 version**, the digital part is played using variable sample rate technology, used to change the pitch. This vintage technology produces additional harmonic content and contribute to the sound character we all love. In the **MK1/2 version** claps were generated by a crazy mixture of oscillator modulations, modulated comparators generated envelopes and other nasty things.

The analog part in both models is a pitched noise, produced by filtering the noise source with a custom filter.

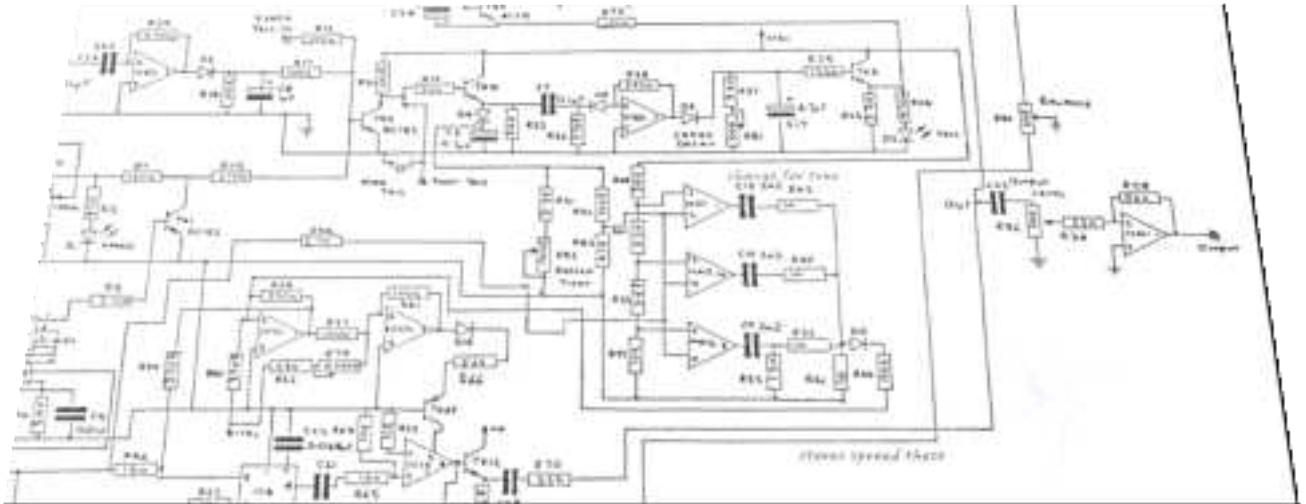
I have made Claptrap 2.0 to be **a one-on-one recreation in plug-in form**. Thanks to reverse engineering my hardware unit, the digital source is bit accurate, the random technique (HUMANIZER) is perfectly replicated and the virtual analog parts are modeled as closed as possible, in addition I did some modifications like true stereo capabilities, extended ranges, fine tuning and CV/MIDI response options.

For the first time available as a plug-in version 2.0 now adds the full analog circuit of MK1. Claptrap gives you **full control over the clap synth generation circuit**.





Each model has specific parameters and can be set differently.



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

Claptrap offers 2 trigger modes.

- **Default mode** uses any incoming MIDI note to trigger the claptrap.
- **Key mode** when engaged uses MIDI note pitch as an offset to the currently set clap tuning, effectively tracking the pitch.

note that is an offset and not a “note frequency” tracking.



3 INSTALLATION

Compatibility

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

Install Windows:

- Run Claptrap Installer

Install Mac:

- Run Claptrap plug-in Installer
- Run Claptrap plug-in Presets Installer

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



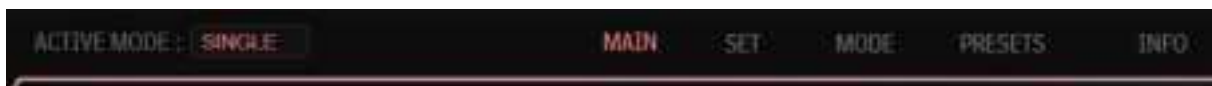
4 MAIN FEATURES

Two circuit MODELS: Digital MK3 and the “freshly emulated” Analog MK1/2 model.

- Multi Outputs routing capability.
- Single or Dual operation.
- Settings and preset browser pages.
- Modelled SVF Noise Filter topology.
- Option to switch from original hardware noise SVF filter to a custom "fixed gain" peak filter.
- Digital Clap Tone EPROM swapping.
- Analog Clap Ensemble circuit bending: Pulses shape, Humanizer mod amount, reversed key-tracking...
- Trigger "thump" and Filter noise bleed emulation.
- Option to delay incoming trigger (max 100ms) on one unit.
- True stereo capability by running 2 modelled Claptrap internally or 4 in DUAL mode.
- Option to enable global circuit saturation (also reduces dynamic range).
- Most parameters respond to automation

5 CONTROL PANELS

The Claptrap 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 Claptrap model.

SET: Access global settings and model specific settings area.

MODE: Select between SINGLE, DUAL or MULTI OUT output modes.

PRESETS: Internal presets browser.

INFO: User Info, plug-In info and noise filter topology.

The main section displays the currently active output mode.



Top left displays either:
single, dual or multi-out output mode.

5.1 MAIN PANEL

The main interface allows you to select the claptrap model you want to edit via the **MODEL** button. For each model, 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 Digital Claptrap MK3








The digital claptrap is composed of two main elements that can be controlled independently:

- **A digital source** stored into an EPROM chip is read at variable sample rate, the EPROM reading speed is defined by the pitch knob and the final output is shaped by

a volume envelope which decay time is controlled by the decay knob.

- **An analog noise generator** filtered and “tuned” by a particular resonant SVF filter, the filter frequency is controlled by the pitch knob, it is further shaped by an envelope which decay is controlled by the decay knob.
- 1. **OUTPUT** selector: Choose between CLEAN or ANALOG, clean is the pure signal without any extra bandwidth reduction whereas ANALOG simulates the high frequency loss for the original machine.
- 2. **VCA TYPE** selector: Choose between the VCA original response (pretty linear) and EXP for an exponential response.
- 3. **PITCH SENS** selector: The selected value defines how trigger velocity affects the sound’s pitch, a value of 0 turns the pitch velocity modulation CV off and OCTAVE is the highest possible setting, note that although it says “octave” the resulting 1V/Oct CV is further shaped and does not exactly end up being an exact octave jump in the circuit.
- 4. **VOLUME SENS** selector: Choose between the ON or OFF, when ON the trigger velocity will affect the final volume of the circuit, if OFF is selected the volume is always equal to full velocity.
- 5.  **TRIGGER** button: This will manually trigger the claptrap from the GUI for quick and handy monitoring, the trigger is done at full velocity.
- 6.  **HUMANIZER** button: The Humanizer is a key feature of Claptrap that ensures each digital clap sound is unique by constantly looping the EPROM counter. It is most effective at moderate to lower clap pitches; you may not hear the effect as clearly at higher pitches.
- 7.  **STEREO** button: Activates a second “cloned” claptrap circuit running in parallel, both cloned and current claptrap are panned hard L & R producing a wider phase separation and stereo effect depending on the WIDTH.
- 8.  **WIDTH** knob: Working when STEREO is activated, the associated WIDTH knob offsets the EPROM clock and filter setting for the second cloned generator thus increasing the perceived stereo effect.
- 9.  **CLAP PITCH** knob: Controls the tuning or clock frequency for the digital EPROM, this is basically the sample rate of the digital part.
- 10.  **CLAP DECAY** knob: Clap envelope’s decay.

11.  **NOISE PITCH** knob: Controls the frequency of the tuning filter, the filter is special as its resonance peak will increase with pitch (see noise filter). On the digital claptrap model, you can set (see settings) the noise filter to a custom designed variable bandwidth peak filter I used in Claptrap version 1.0.
12.  **NOISE DECAY** knob: Noise envelope's decay.
13.  **HPF** knob: Output's high pass filter frequency.
14.  **BALANCE** Knob: Balance between the Clap and the Noise part.
15. **KEY** selector: activate keyboard pitch tracking.
16.  **VOL** knob: Digital Claptrap MK3 main volume.



5.1.2 Analog Claptrap MK1/2












The analog claptrap is composed of two main elements that can be controlled independently:

- **An analog clap source** made out of an analog oscillator, frequency modulated so fast by unequally spaced pulses envelope and sine generator in order to produce synthesized claps, those modulated analog comparators generated envelopes will be affected by the SPREAD, PITCH, HUMANIZER knobs and also by internal settings like: *ensemble pulse shape, humanizer mod amount or mod LFO speed*. These internal settings can generate a more or less “tonal sound, a particularity you can also find on real hardware MK1/2 claptraps depending on their internal settings or electronic parts condition. Overall, this clap synth design can get nasty pretty quick and can produce some weird noises while also being capable of emulating very usable claps.

- **An analog noise generator** filtered and “tuned” by a particular resonant SVF filter, the filter frequency is controlled by the pitch knob, it is further shaped by an envelope which decay is controlled by the SPREAD knob.

1. **OUTPUT** selector: Choose between CLEAN or ANALOG, clean is the pure signal without any extra bandwidth reduction whereas ANALOG simulates the high frequency loss for the original machine.
2. **VCA TYPE** selector: Choose between the VCA original response (pretty linear) and EXP for an exponential response.

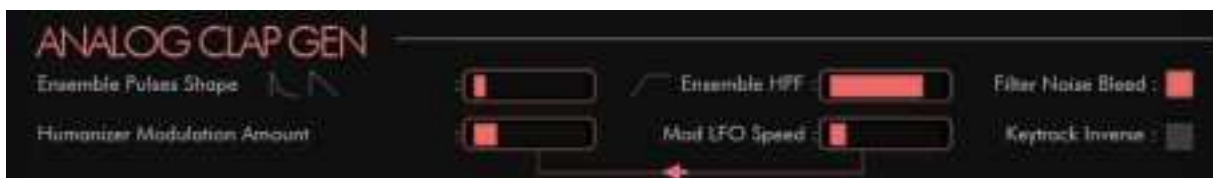
3. **PITCH SENS** selector: The selected value defines how trigger velocity affects the sound's pitch, a value of 0 turns the pitch velocity modulation CV off and OCTAVE is the highest possible setting, note that although it says "octave" the resulting 1V/Oct CV is further shaped and does not exactly end up being an exact octave jump in the circuit.
4. **VOLUME SENS** selector: Choose between the ON or OFF, when ON the trigger velocity will affect the final volume of the circuit, if OFF is selected the volume is always equal to full velocity.
5.  **TRIGGER** button: This will manually trigger the claptrap from the GUI for quick and handy monitoring, the trigger is done at full velocity.
6.  **HUMANIZER** button: The Humanizer in the analog version introduces extra modulation, how much precisely can be set from the SET panel control named Humanizer Modulation Amount and its associated Mod LFO Speed.
7.  **STEREO** button: permits the panoramic spreading of the discrete analog clap envelopes panned left, right and center while also cloning the 2nd filter. This will produce a stereo effect depending on the WIDTH.
8.  **WIDTH** knob: Working when STEREO is activated, the associated WIDTH knob increases the stereo width.
9.  **ENSEMBLE CLAP PITCH** knob: Controls the tuning of the analog modulated oscillator effectively producing low to high pitched "claps".
10.  **ENSEMBLE CLAP SPREAD** knob: Clap envelope's decay, labelled ragged to tight for slow to fast, the decay internally acts on the comparators reference signal.
11.  **HISS PITCH** knob: Controls the frequency of the noise (here labeled "hiss") tuning filter, the filter is special as its resonance peak will increase with pitch (see noise filter).
12.  **HISS SPREAD** knob: Noise envelope's decay.
13.  **HPF** knob: Output's high pass filter frequency.
14. **BALANCE** lever: Balance between the Clap and the Noise part.
15. **KEY** selector: activate keyboard pitch tracking.
16. **VOL** lever: Analog Claptrap MK1/2 main volume.


5.2 SET PANEL

The settings panel, full control over the internal circuit.



ANALOG CLAP GEN



 **Ensemble Pulses Shape:** Adjusts the ensemble claps generation circuit by changing internal capacitors, a low value gives atonal short pulses while higher value will make the tone of internal oscillator more audible while using longer pulse length. It is a crucial setting for analog claps depending on what type of sound you are after. If you listen to some real vintage analog claptrap in person or in online videos you might hear some differences between units and this setting right here is often the reason why.



Humanizer Modulation Amount: When Humanizer is ON this setting controls the amount of modulation used in the circuit, a **shaped sine wave LFO** is internally responsible for the clever modulation, a low value will produce a decent number of “random” claps while highest values will artificially increase the number of perceived claps.



Not modulated ensemble clap output.



Modulated (Humanizer) ensemble clap output.



Mod LFO Speed: When Humanizer is ON this setting controls the speed (frequency) of the main sine LFO modulator, this goes hand in hand with the **Humanizer Modulation Amount**.



Ensemble HPF: This is controlling the frequency of the ensemble clap output filter. The filter is a simple high-pass filter, you can set it to taste for let more or less bass frequency pass-through.




Filter Noise Bleed: If activated, a portion of direct un-filtered noise is passing through the noise filter.




Key-track Inverse: Inverse the key tracking (if KEY mode is ON). This can be interesting when working in DUAL mode; the analog claptrap would have an inverted key-track while the digital would not, going up on the keys would increase the pitch of one and decrease the other.


DIGITAL CLAP GEN




 **Clap EPROM DATA:** The digital claptrap used a variable sample-rate controlled EPROM to store its body clap sound. Claptrap 2 offers the original Simmons sound and a selection of custom sounds to choose from. This is useful feature notably in DUAL mode where the digital clap could be used as a second layered drum.

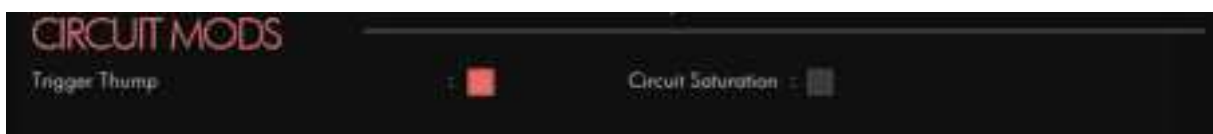
note that the humanizer function will be deactivated unless you select "ORIGINAL SIMMONS".


 **Delayed Trigger:** Activates a short delay on the incoming trigger, useful in DUAL mode to slightly delay one clap from the other.


 **Delay Time:** Sets the actual delay time applied to the trigger delay (if activated).

 **Custom Noise Peak Filter:** Uses a custom peak filter designed in Claptrap initial version 1.0 (see noise filter).

CIRCUIT MODS



 **Trigger Thump:** When on this recreates the trigger pulse bleed on the output effectively creating a short thump/click sound at the beginning of the sound, this is part of the charm. If you struggle to hear what it does and think this is snake oil just drop the volume to minimum and listen.

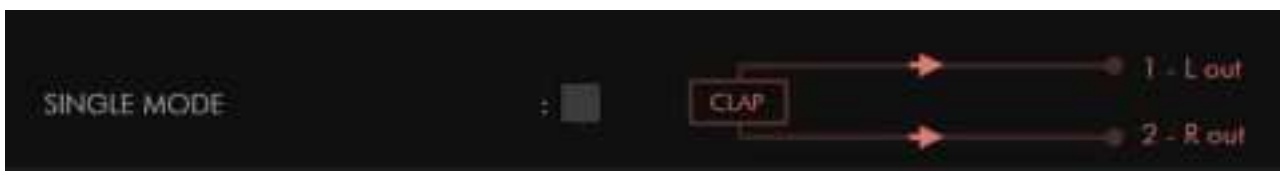
 **Circuit Saturation:** Engage soft analog saturation on the output stage, reducing dynamics.

5.3 OUTPUT MODE PANEL

Claptrap 2 benefits from having two models in one, you can either use them separately or in various combo modes.

We will call the digital clap unit: *D-CLAP* and the analog clap: *A-CLAP*, when none are specified, we will simply use *CLAP*

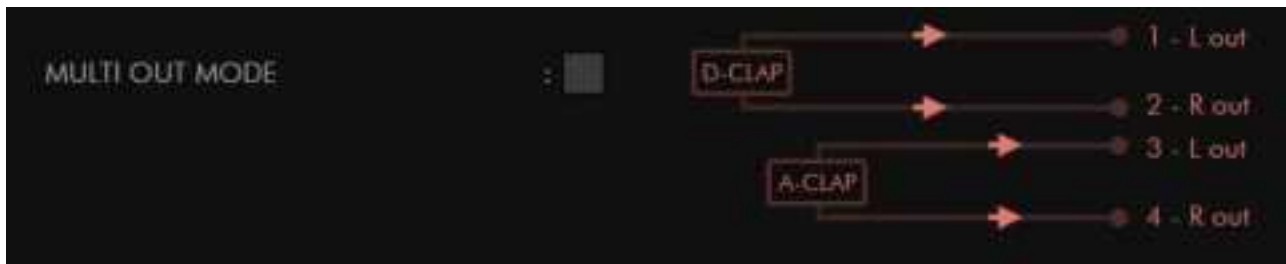
SINGLE MODE: Only one unit is used, useful when you just need one steady clap module.



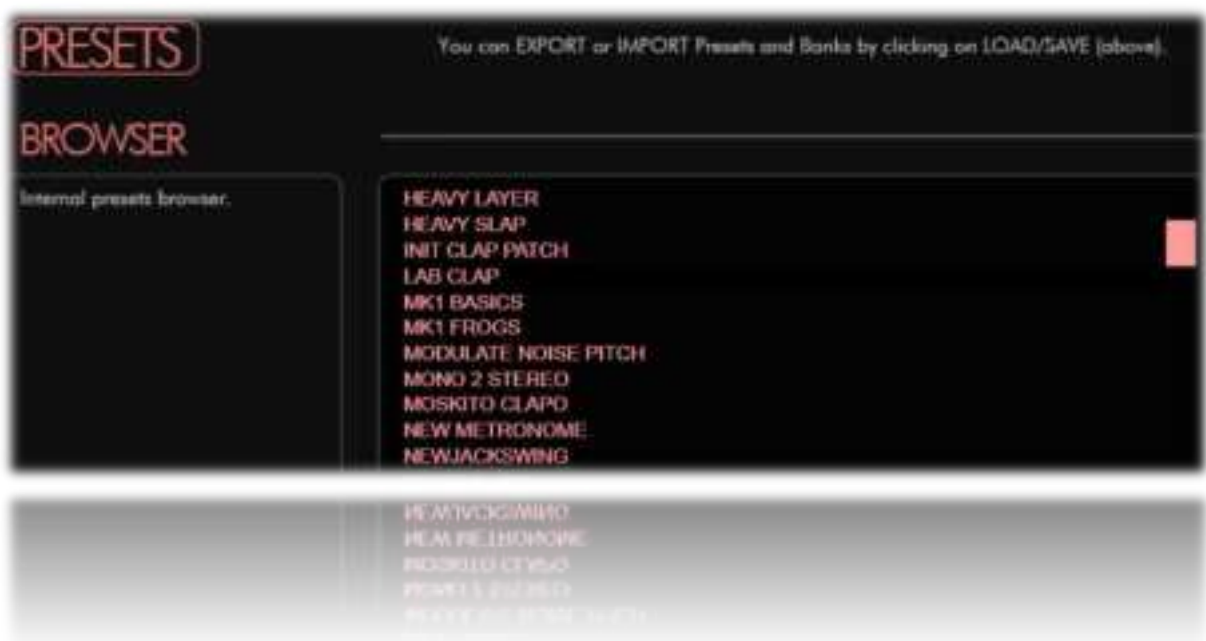
DUAL MODE: Both units are used and mixed, great for a richer clap sound or for layering. When in dual mode you can use the digital clap with a delayed trigger and/or with a different clap body sound.



MULTI OUT MODE: Both units are used, each one got a specific stereo output channel, typically used when you need to mix both parts differently in your DAW.



5.4 PRESET BROWSER PANEL



The preset browser is a convenient way to select presets.

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.

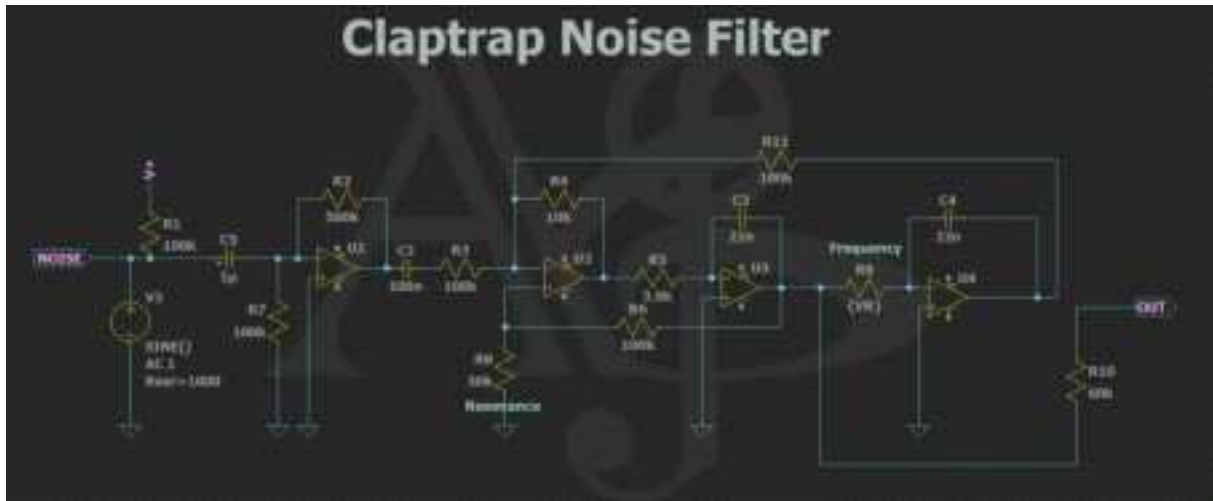
For banks the xml format is the preferred one.

6 NOISE FILTER

6.1 ORIGINAL FILTER DESIGN

The VCF in the claptrap was a state-variable bi-quad bandpass filter, designed to “tune” the noise generator.

Its integrators configuration makes the set resonance increase with filter frequency.



Claptrap 2 models this filter giving you control over the noise filter pitch (like the original units) but also its internal (originally a trimmer) resonance.

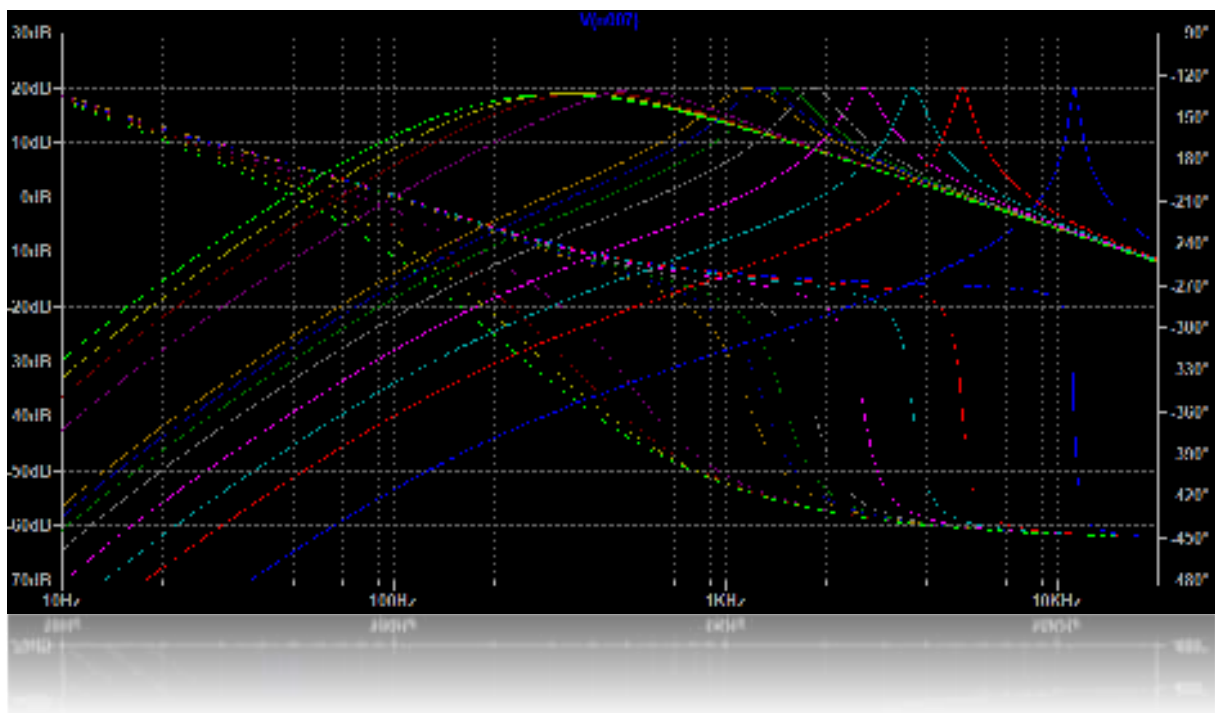


Figure 1 SVF Filter response plot

6.2 CUSTOM PEAK FILTER

In the first version of my claptrap plug-in which only modeled the digital MK3 unit, I opted for a custom designed peak filter instead of sticking 100% to the original filter, you can now choose between original or custom in version 2.

The custom filter produces a more aggressive noise and contains more unfiltered high frequencies.

you can try both and choose what sounds best for your application.

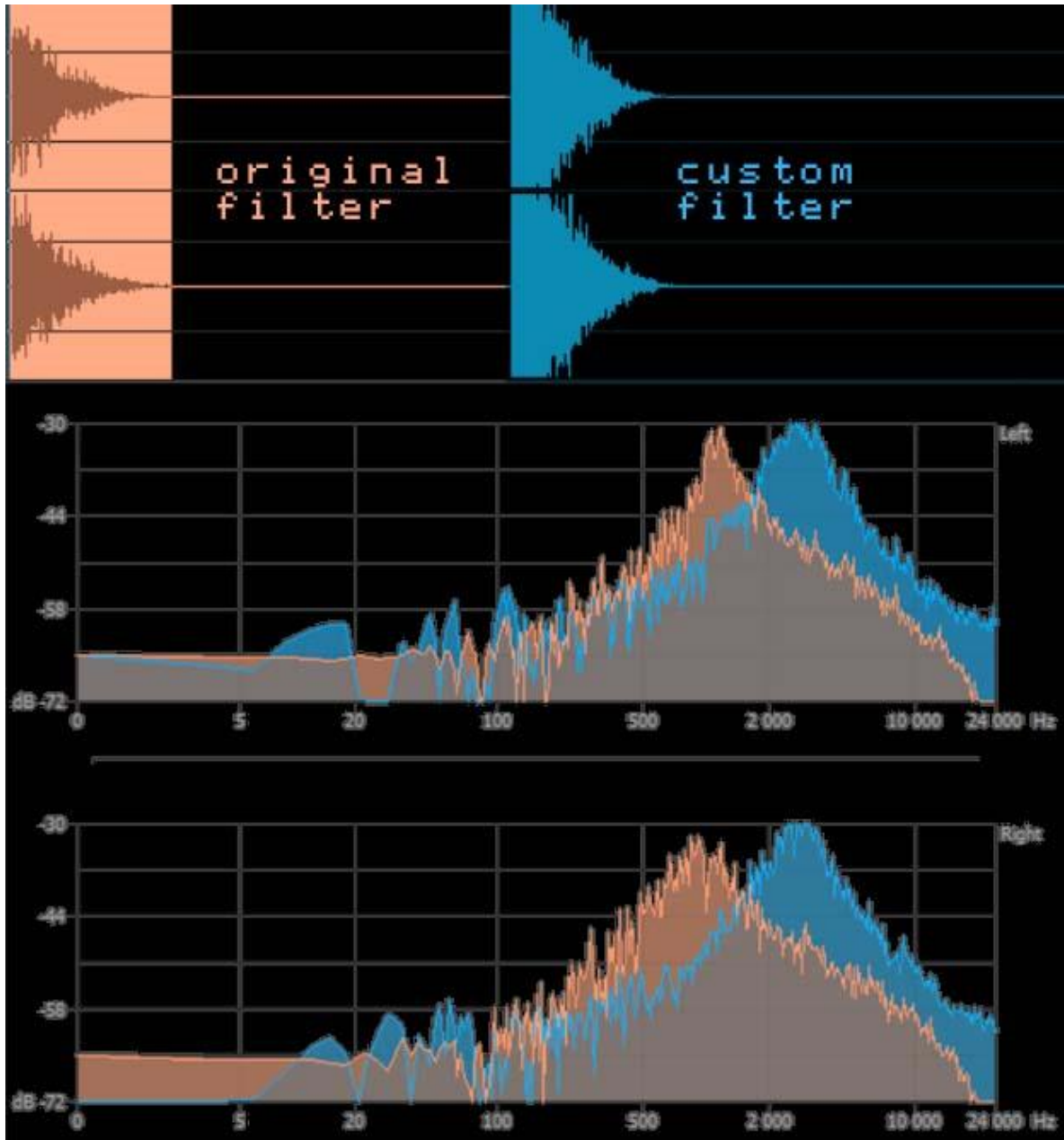


Figure 2 filters response at similar settings

7 PRESETS IMPORT / EXPORT

VST3, XML, AU preset.

Claptrap 2 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.

8 MIDI AUTOMATION

Almost all Claptrap 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.

9 LINKS

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

HOPE YOU HAVE FUN WITH THE CLAPTRAP!



10 DISCLAIMER

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