SboomTchac Manual v1.0

M4L Deep Drum Synth for Windows and Mac

Reference manual by Tomavatars

SboomTchac

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Main information

1.1 Plugin overview

SboomTchac is a Max for Live instrument made by Tomavatars.
It's a monophonic drum synthesizer with two parallel engines, a unique mix engine and a lot of modulation possibilities.
Sboom Tchac is a drum machine that refuses to pick a single sound. Every hit comes from two engines at once, and they don't just layer: they collide.

Two engines, one hit. Pick any two of 14 sound sources (kicks, snares, metallic resonators, claps, hats, FM bells, pulsar buzz, noise, chord synths, samplers) and give each its own two FX slots.

Twelve ways to merge them. The Mix slider doesn't only crossfade. It can ring-modulate, vocode, fold, granulate, phase-distort or throw both engines across a mathematical landscape. Each end of the slider is one engine on its own, and the strange stuff lives in between.

Eight sounds in one. Every instrument holds eight snapshots of itself. Rotate through them or morph smoothly between them, at audio rate, so one pad can drift from a dry click to a ringing metal crash without a single automation lane.

Everything moves. Hand-drawn envelopes shape amplitude, pitch and the Mix, extra modulators can be routed to any knob, and a modulation matrix adds step-based motion on top.

One knob away from a new idea. The Randomizer has a knob per section (Engine, FX, Mix, Routing, Matrix), from a gentle nudge to a complete rebuild. Lock what you love, roll the dice on the rest.

Built for happy accidents, tuned so they sound good.

The uniqueness of SboomTchac comes from these features :

- A dozens of engine algorithms (and the possibility for me to add more)
- A dozens of mixing algorithms that blends the two engines in unique ways

- MSEG (multi segment enveloppe generators) based modulations and mix section. Perfect for sculpting the sound.
- 2 multi effects slots per engines
- A Master section with 3 mastering algorithms
- 5 universal MSEG to modulate what you want
- Steppy modulation system for every parameters. Powerful way to add movement to your sound
- Snappy preset system, with a selection wheel and on the fly recalling of presets for easy automation
- A fun randomizer
- Full Push control

There are a lot of little features and ease of life to cover, so let's dig in!

Special Thanks

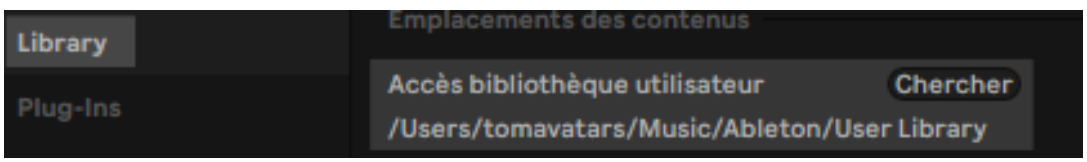
To all the Unfiltered Audio Underground peeps, thank you all for your support , knowledge and your kindness! To Chapelier Fou for the playtests. Thanks to Darren at Isotonik for the support and distribution. Peter Kirn, folks on Max For Live Facebook group and Instagram for your interest. To Graham Wakefield and Gregory Taylor for all the knowledge shared in the Generating Sound and Organizing Time book. This instrument wouldn't exist without it.
To my patrons on Patreon: Sam Lundell, François E., Dawesome Music, Dylan Ratner, Naomi, Nils Fitzek and Josh.

1.2 System Requirements

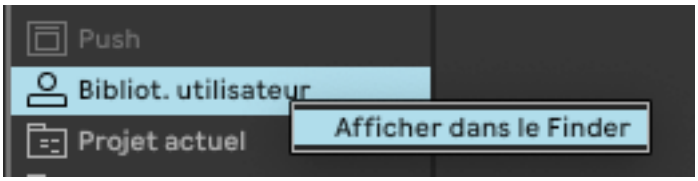
- Live Version: 12 with Max for Live
- Developed using Max version 9
- Operating System: Windows, Mac

1.3 Installation Instructions

Unzip the ZIP file and copy the plugin amxd file to your User Library folder.
There are two ways to find where your User Library is located: Go to Preferences – Library – Location of User Library



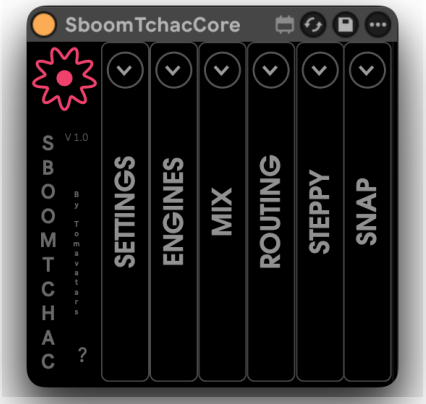
Or [right-click] on the User Library in the Browser – Show in Finder (Explorer)



1.4 Navigation

There are 6 sections in SboomTchac. All sections are collapsible with the arrows of their title tab.

SboomTchac folded unit



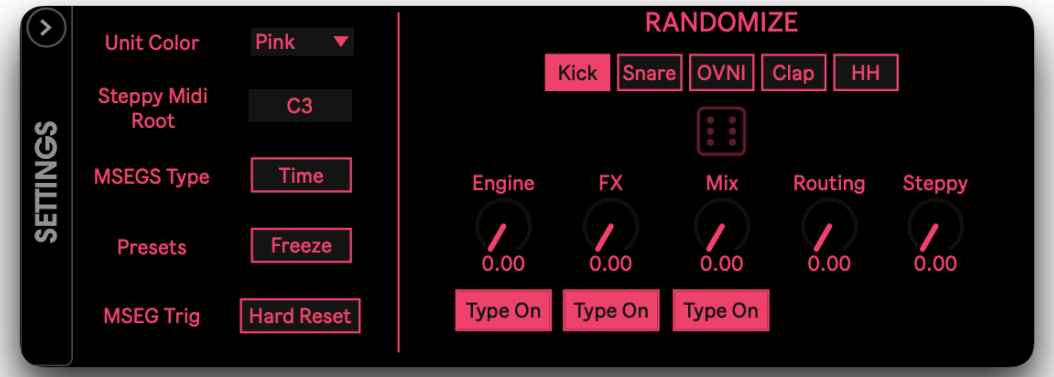
SboomTchac folded unit



SboomTchac unfolded unit

1.5 Sections

Settings: Settings of a few features + a randomizer



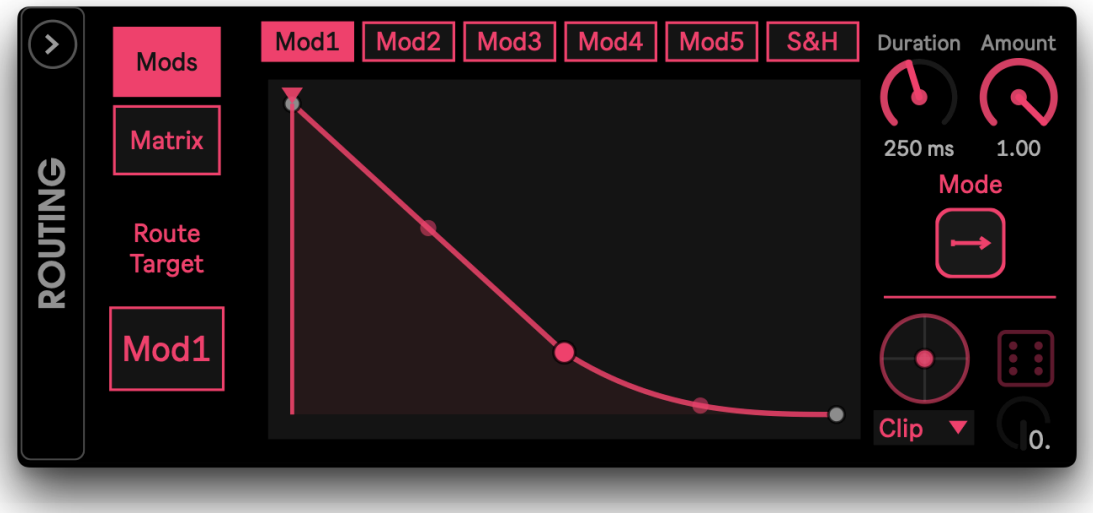
Engines: The core of SboomTchac. Two parallel engines with their parameters.



Mix: The output and the mix of the engines along with a master output section.



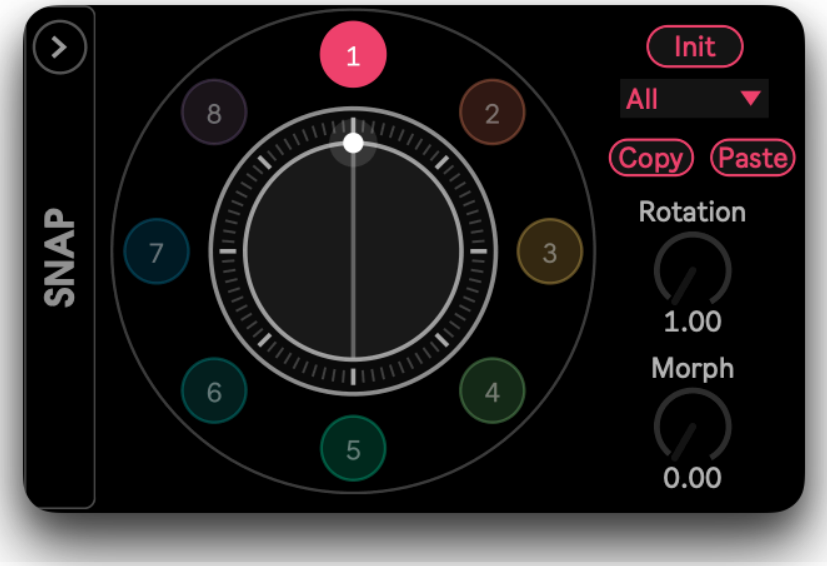
Routing: The MSEG modulation matrix



Steppy: a unique controlled sample and hold modulator



Snap: the preset panel with a morphing wheel, two control knobs and handy copy paste buttons.



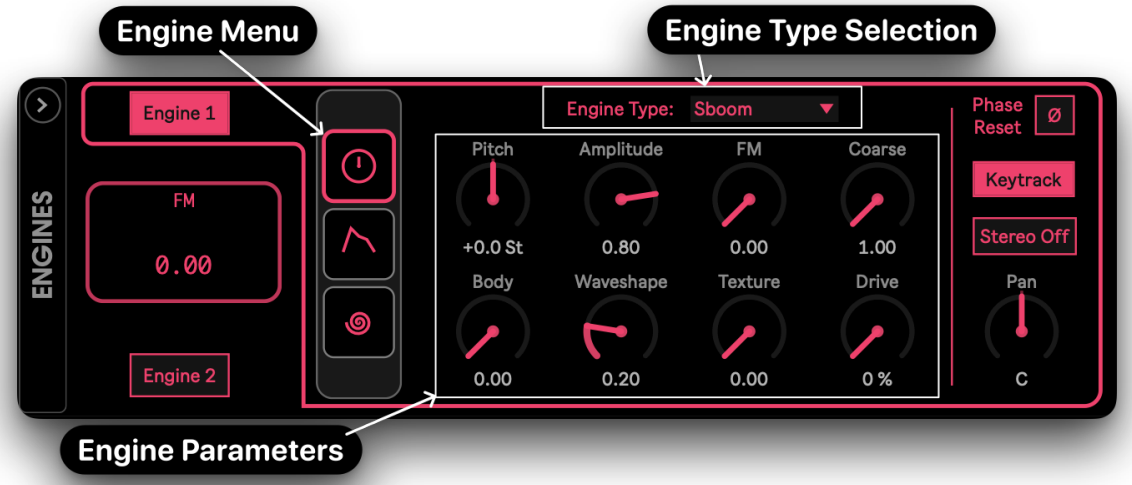
SboomTchac

2.1 First steps

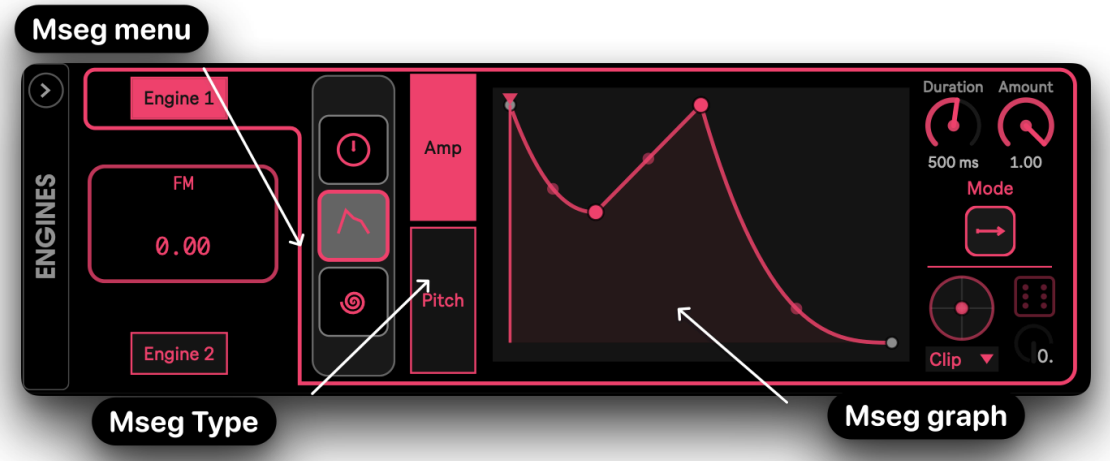
Engines

Drop the unit on a MIDI track.
Write notes in a midi clip or sequence the unit with a midi sequencer.

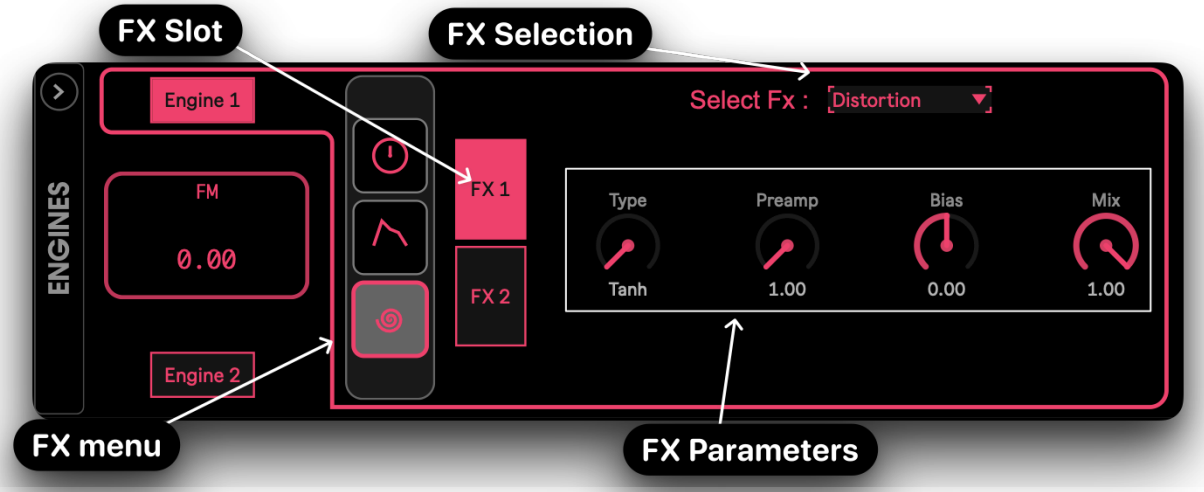
Select the type of **Engine** 1. Tweak parameter knobs.



You can change the Amp and the Pitch enveloppes with these **MSEG** graphs. **MSEGS** are multi segments enveloppe generators, meaning that you can draw the shape you'd like.

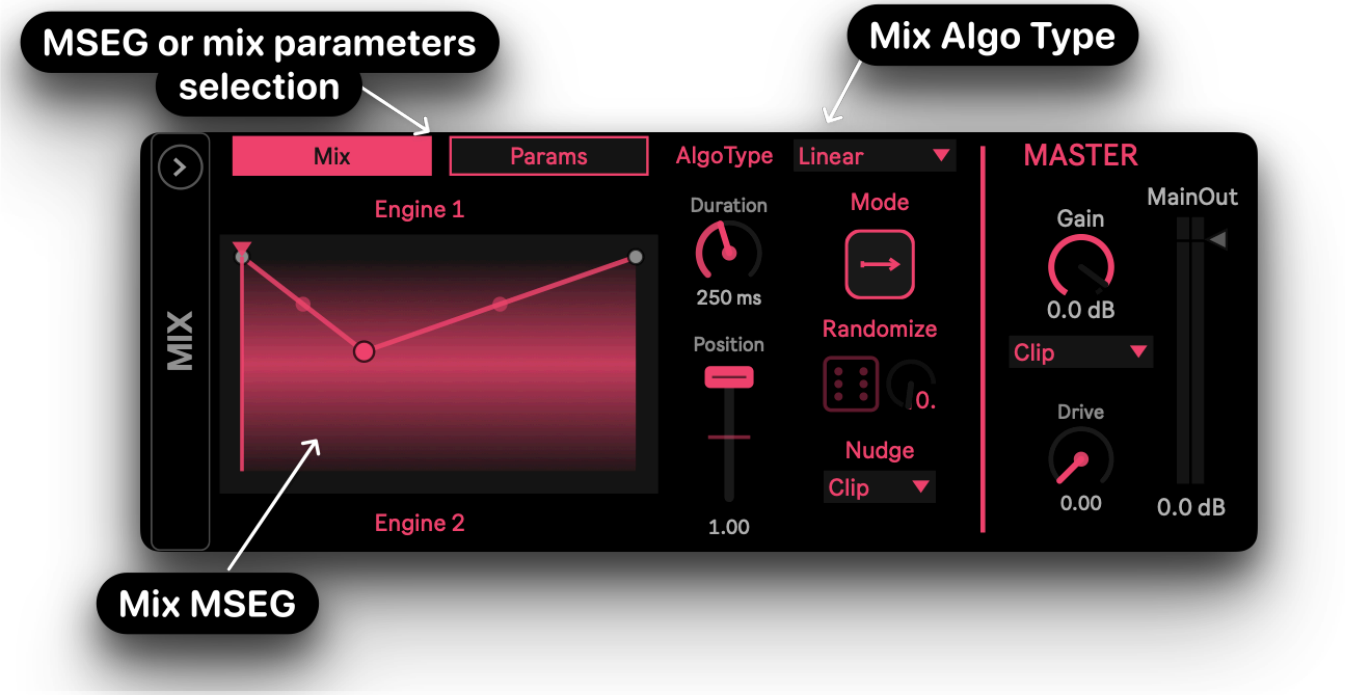


Add **Fx** in the third menu element.
You can do the same with engine 2 selecting « Engine 2 » tab.

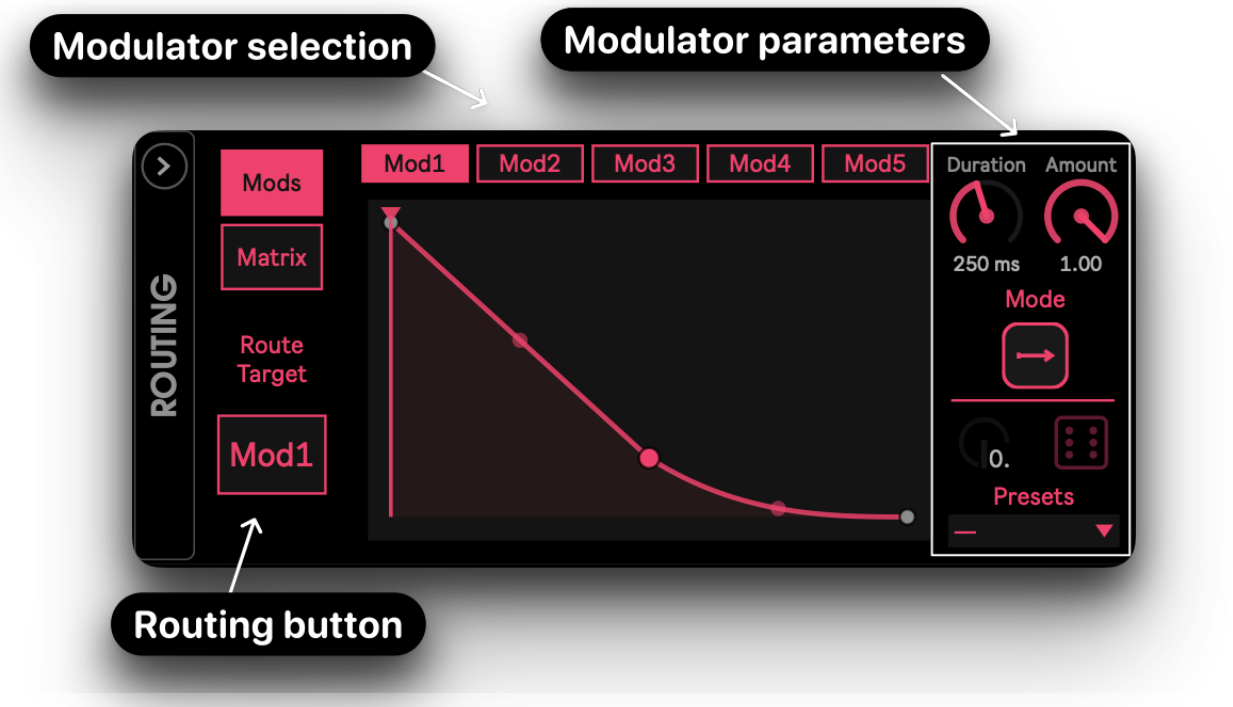


Mix

One of the core feature of SboomTchac is the **Mix** section. It allows you to mix the 2 engines with an MSEG and unique mixing algorithms. There's also a **Master** output section to control the main output.



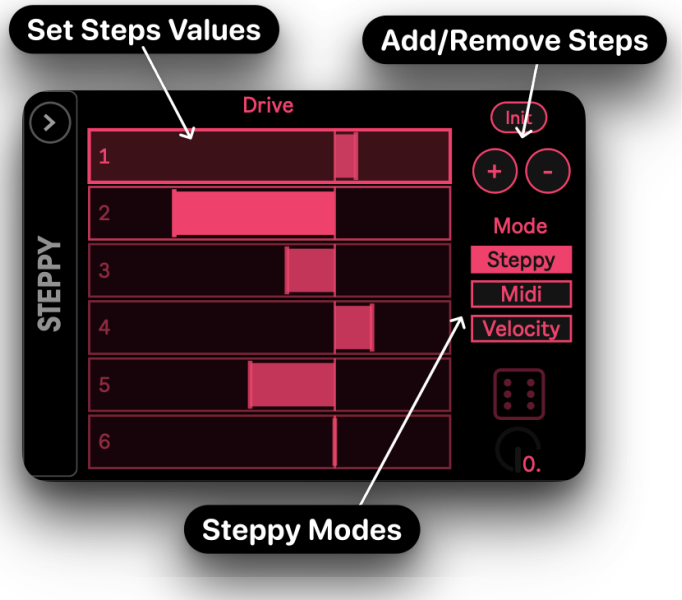
Modulate



The **Routing** section contains 5 modulation sources and a modulation matrix. Select the modulation tou wish to apply, click the Route Target button and drag a parameter to apply the modulation.

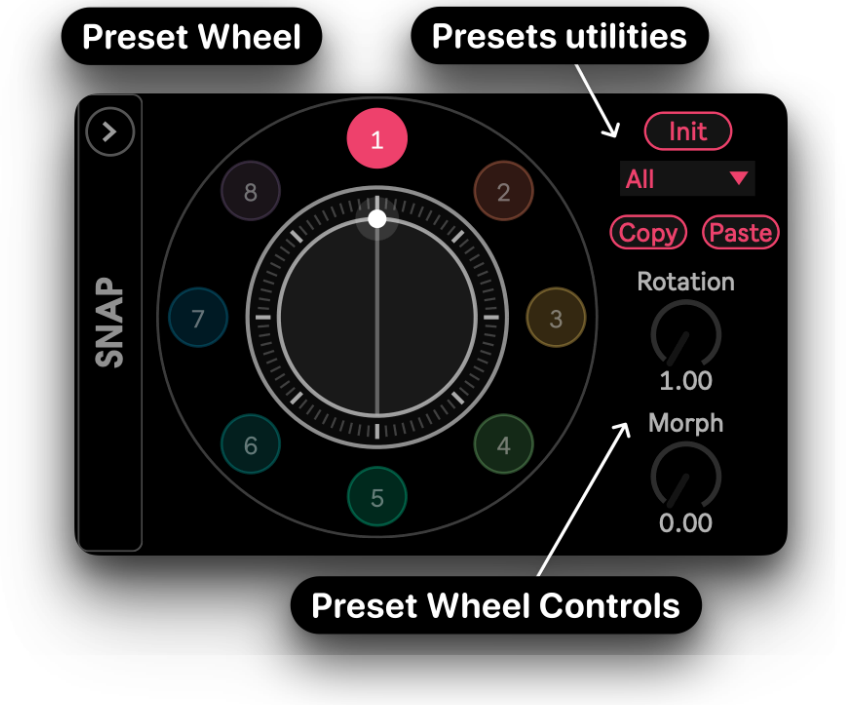
Step modulator: Steppy

The **Steppy** section is a variable length vertical step sequencer for each SboomTchac parameters! Just click on a parameter and draw the values for each steps to modulate them. There are three modes to select the steps, but we'll explore this in the Steppy section.



Presets Wheel: Snap

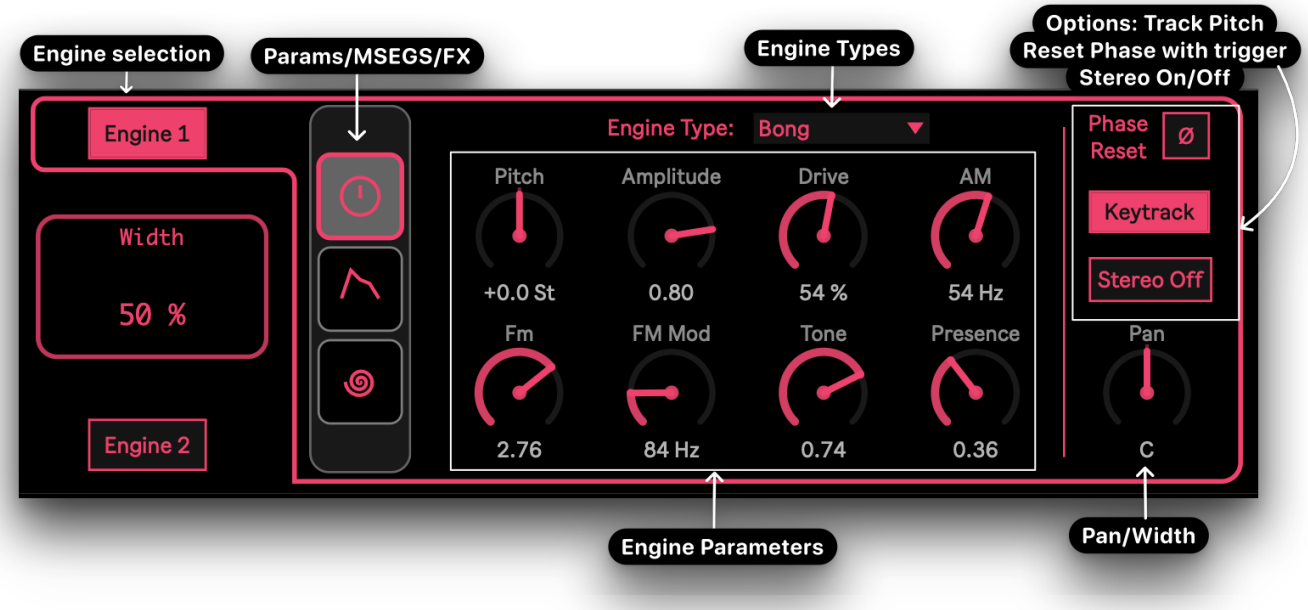
The **Snap** section is a preset wheel and a preset manager. You can morph between presets (presets contains nearly all SboomTchac parameters) initialise the preset and copy/paste to other presets. There are 8 presets slots available.



Features

3.1 Engines

SboomTchac have two parallel engines. You can access each engines through their own tab.



Engines parameters

There are 3 sections in an engine:

Engine parameters

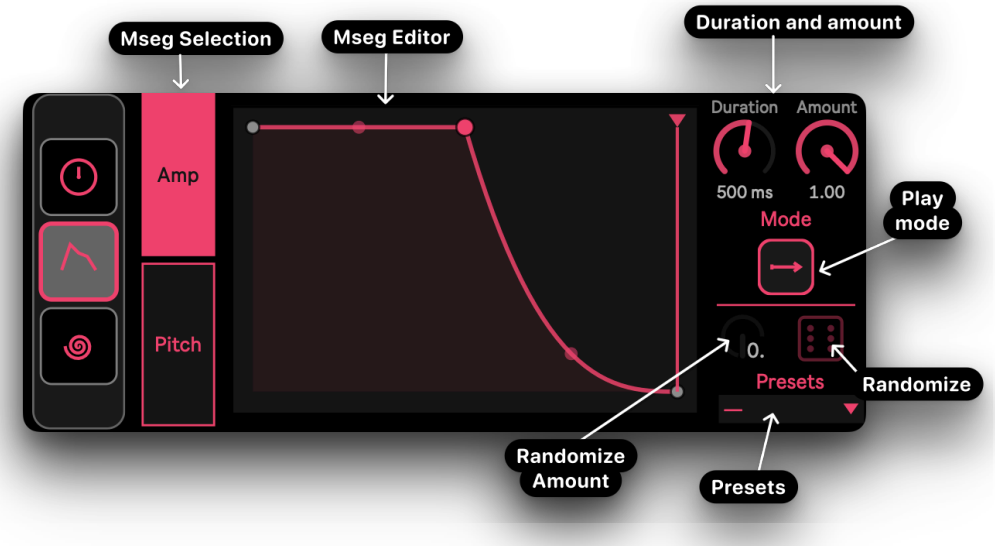
- **Engine type:** where you select the engine used for engine slot. There are a dozens of engines and I will add more engines in future updates
- **Parameters:** there are 8 parameters per engines. Except *Pitch* and *Amp*, common to all engines, all engines have their own parameters. Pitch and Amp have their own *Enveloppes* that you can modify in the MSEG section.
    - Pitch sets the note height of the engine
    - Amp sets the volume
- **Options:** All engines have three options

- Phase Reset: will reset the phase of the oscillator when a new note is played. Good for snappy drums.
- Keytrack: when on, the midi note played will set the pitch.
- Stereo On/Off: when off, the output will be mono.When on, the output will be stereo .

- **Pan/Width knob:** sets the pan if mono, and the stereo width if stereo.

Engine MSEG

There are 2 Engine MSEGS. One for the amplitude control (sound enveloppe) and one for the pitch control.

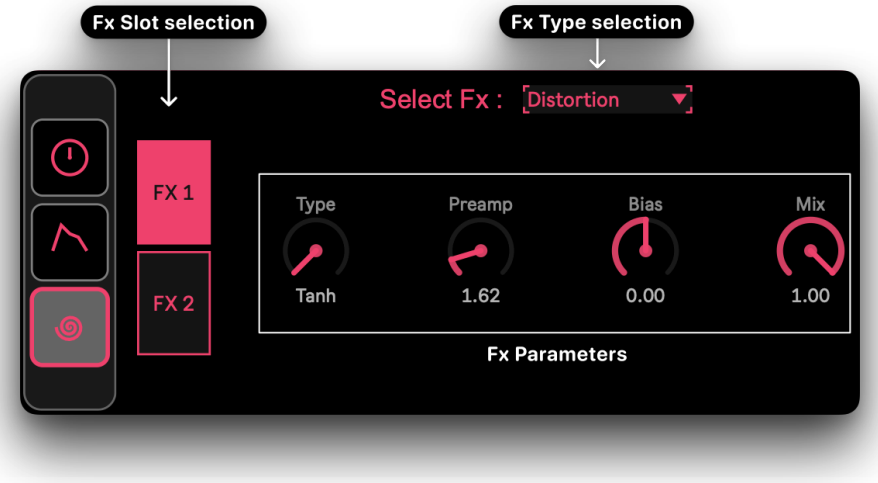


MSEGS

- **MSEG Selection:** Select which of Amp or Pitch envelop you wish to edit
- **MSEG Editor:** You can edit the MSEG Shape. You can add up to 8 points with left click. Drag the points to move them. The first and last points always stay on the extremities. You can change the curve of a segment clicking on the central handle of the segment. To remove a point, double click or shift click on it.
- **Duration:** The duration of the MSEG in milliseconds
- **Amount:** The Amount of the MSEG applied to the target
- **Play Modes:** There are 5 play modes for the MSEGS
  - *One Shot*: play once per note trigger. Reset every time.
  - *Free Loop*: looping the MSEG, the time of the loop been determined by duration.

    - *Retrig Loop:* Looping the MSEG but re triggered with each notes. Loop time set with duration.
    - *S&H:* Sample and hold. Loop the MSEG but only apply the current value taken from the loop when triggering a note.
    - *Random:* Randomly picking value on the MSEG with each triggers.
- **Randomize Amount:** sets the amount of the MSEG shape randomization.
- **Randomize button:** Apply randomization.
- **Presets:** A selection of MSEG presets to be applied on the graph.

Engine FXs



FXs

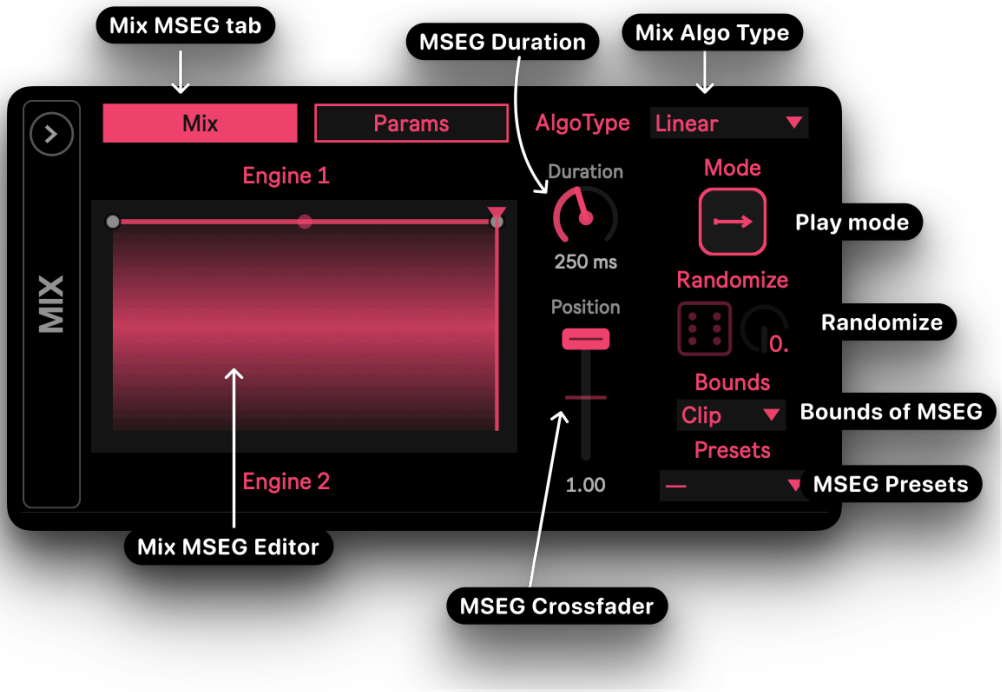
- **FX Selection:** Select FX 1 or FX 2 window
- **FX Type:** Select which FX you wish to apply. FX are in stereo de facto.
- **FX Parameters:** Generally, Fxs have 4 parameters to play with.

3.2 Mix

Th Mix tab has two sections: one for the **Mix** of the two engines and one for the **Master** of the unit.

The **Mix** section consists of an MSEG enveloppe to mix between the two engines following a Mix algorithm and a parameters section where you can tweak the mix algorithm, well, parameters. There are a dozens of mix algorithms to play with in order to radically change how the sound of the engines are mixed together.
But keep in mind that the top section of the MSEG is full engine 1 volume, the bottom, full engine 2 volume and the middle, full mix of both engines.
Generally, engine 2 tends to be the modulator of engine 1 through the chosen algorithm but again, it depends on the algorithm.

The **Master** section has 3 algorithms to boost or saturate the output plus volume controls.

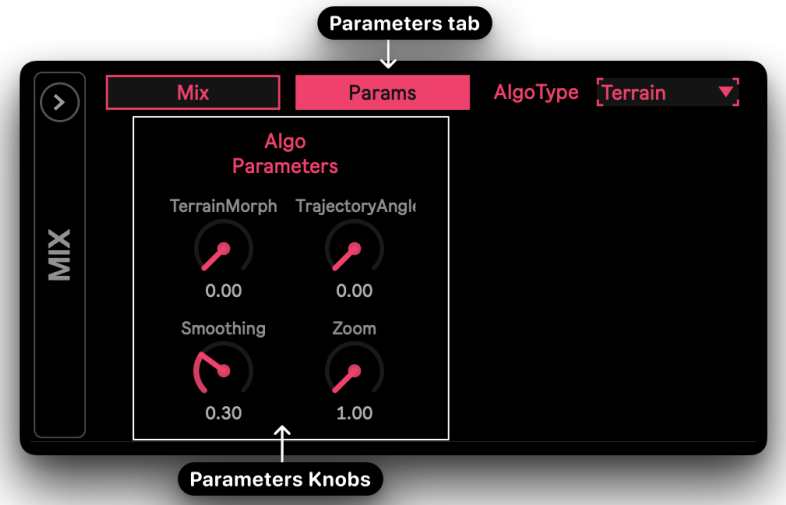


Mix MSEG

Mix MSEG panel

- **MSEG Tab:** Select Mix MSEG or Parameters panel
- **MSEG Editor:** You can edit the MSEG Shape. You can add up to 8 points with left click. Drag the points to move them. The first and last points always stay on the extremities. You can change the curve of a segment clicking on the central handle of the segment. To remove a point, double click or shift click on it.
- **Duration:** The duration of the MSEG in milliseconds
- **Play Modes:** There are 5 play modes for the MSEGS
    - *One Shot*: play once per note trigger. Reset every time.
    - *Free Loop*: looping the MSEG, the time of the loop been determined by duration.
    - *Retrig Loop:* Looping the MSEG but re triggered with each notes. Loop time set with duration.
    - *S&H:* Sample and hold. Loop the MSEG but only apply the current value taken from the loop when triggering a note.
    - *Random:* Randomly picking value on the MSEG with each triggers.
- **Randomize Amount:** sets the amount of the MSEG shape randomization.
- **Randomize button:** Apply randomization.
- **MSEG Position (Crossfader):** The Position crossfader allows you to quickly offset the position of the MSEG relatively to its current position on the graph. This way you can change and modulate the mix behavior without changing the shape (super fun with Steppy)
- **MSEG Bounds:** The Mix MSEG has a bound option. When playing with the Position crossfader, shapes can behave differently providing different sculpting tools in realtime
    - **Clip**: Shapes are clipped to the bounds of the graph.
    - **Wrap:** Shapes are wrapped to the opposite of the graph
    - **Fold:** Shapes are folded in symmetry
- **Presets:** A selection of MSEG presets to be applied on the graph.

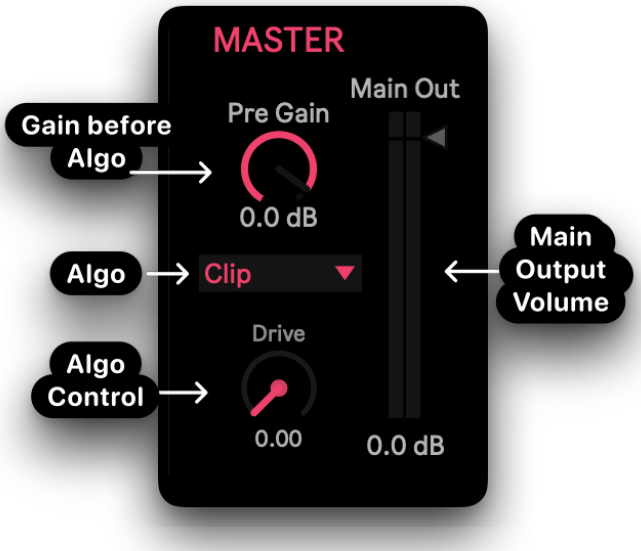
Mix Parameters panel



Mix MSEG

Parameter Knobs: The mix algorithms all have up to 4 parameters to modify the algorithm sound.

Master Section



Master Section

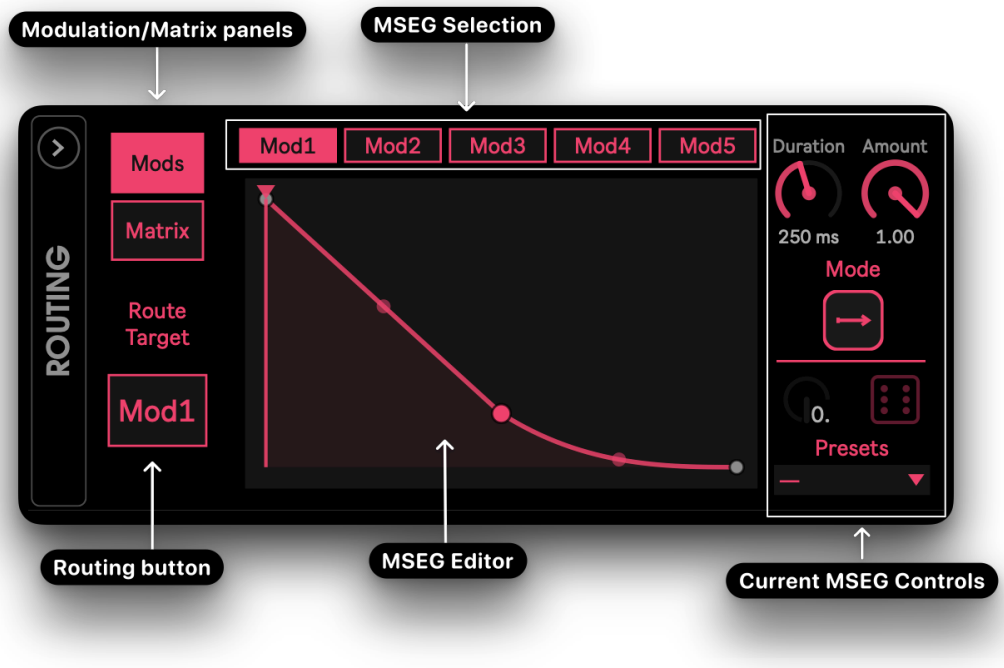
Pre Gain: The pre gain Knob sets the gain of the signal before it goes through the Master algo.
Algo Type: There are three algorithms to process the sound before the main output: Clip, Maximizer and OTT
Algo Control: This knob drives the amount of the algorithm.

- **Clip - Drive -** Pushes the sound (up to +12 dB) into a soft ceiling that rounds off the peaks. It gets louder, denser and more saturated as you turn it up.
- **Maximizer -** Push - A limiter that raises the level (up to +12 dB) while keeping peaks under the ceiling. The result is louder and tighter.
- **OTT -** Depth - Aggressive 3-band compression (lows, mids, highs) that works both ways: quiet details are pulled up and peaks are squashed. The sound becomes in-your-face, dense and bright.

Main Output Volume: Sets the volume of the main output after the signal goes through the Master Algo.

3.3 Routing

The routing section contains 5 routable MSEGS. You can route the MSEGS to nearly all the unit parameters except other MSEGS parameters, Master parameters, Steppe and Snap parameters.
When you trigger the Route button, parameters that can be modulated are highlighted.



Routing Panel

You have two main panels in the Routing section: Mods and Matrix

Mods Panel

Mods panel is the panel where you can edit the 5 MSEGS.

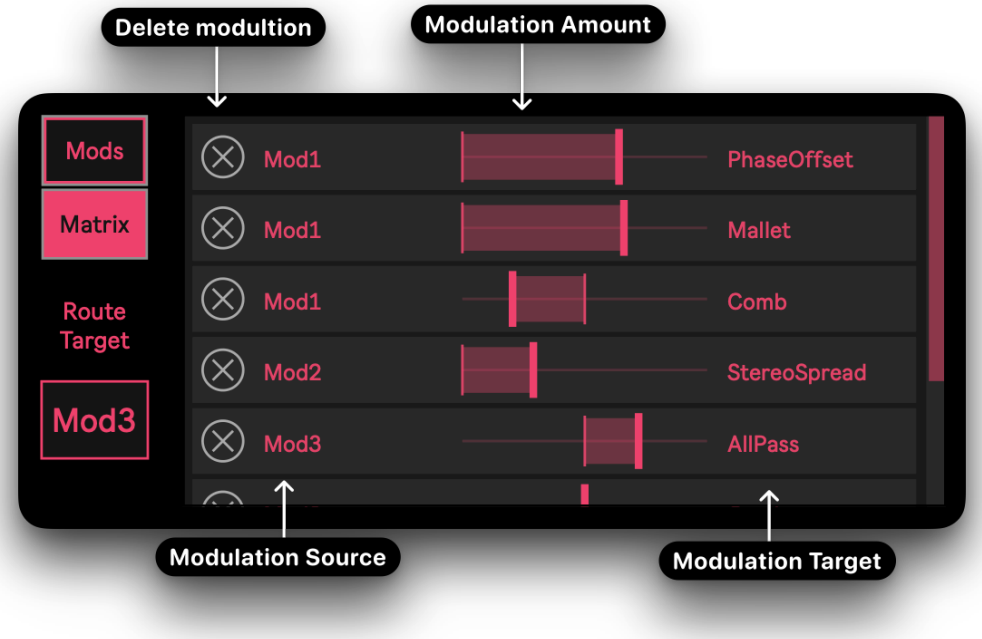
MSEG Selection: In the mods panel you can switch between 5 different MSEGS with the help of the top tabs.
Routing Button: The routing button show the currently selected MSEG and allows you to route the actual MSEG towards parameters. Click on the button (it'll blink) and turn any highlighted knob. An outer ring will be displayed on the knob, showing the amount of modulation applied to the parameter. During play, the ring of the parameter will display the current modulation in realtime. When you finished the routing process, click again on the Routing Button to disable modulation routing.

The rest of the MSEGS controls are the same as the engines controls.
MSEG Editor: You can edit the MSEG Shape. You can add up to 8 points with left click. Drag the points to move them. The first and last points always stay on the extremities. You can change the curve of a segment clicking on the central handle of the segment. To remove a point, double click or shift click on it.

- **Duration:** The duration of the MSEG in milliseconds
- **Amount:** The amount knob to set the overall amount of the MSEG. Convenient if you wish to modify the amount of all MSEGS at the same time (playable with Steppy).
- **Play Modes:** There are 5 play modes for the MSEGS
    - *One Shot*: play once per note trigger. Reset every time.
    - *Free Loop*: looping the MSEG, the time of the loop been determined by duration.
    - *Retrig Loop:* Looping the MSEG but re triggered with each notes. Loop time set with duration.
    - *S&H:* Sample and hold. Loop the MSEG but only apply the current value taken from the loop when triggering a note.
    - *Random:* Randomly picking value on the MSEG with each triggers.
- **Randomize Amount:** sets the amount of the MSEG shape randomization.
- **Randomize button:** Apply randomization.
- **Presets:** A selection of MSEG presets to be applied on the graph.

Matrix Panel

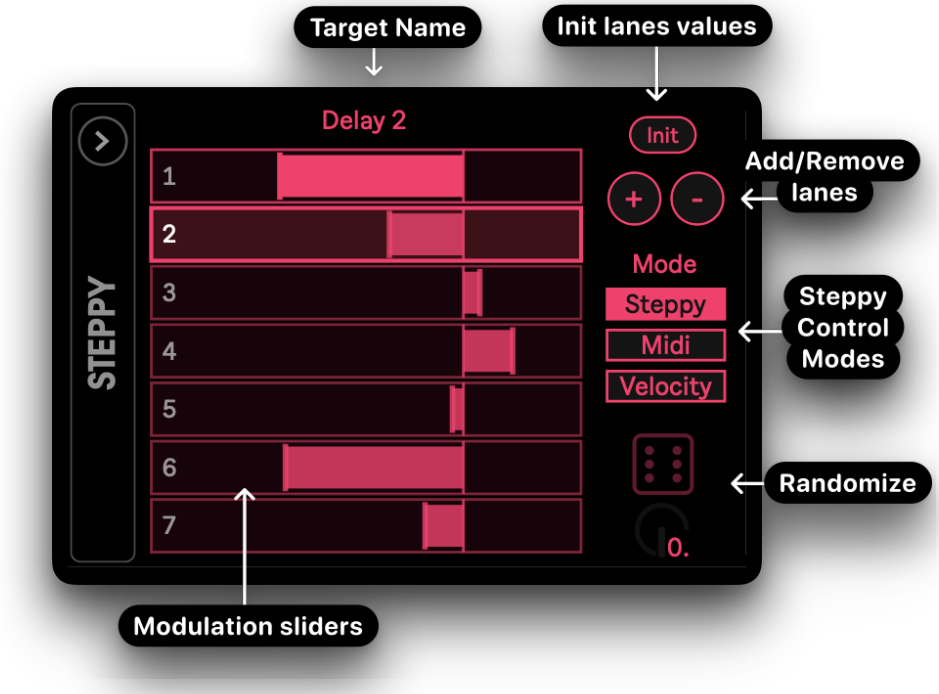
The Matrix panel is the panel where you can view, modify and delete existing routings. Note that routings are per presets (Snap section).



Matrix Panel

Delete Modulation: the X at the start of the lane will delete the associated modulation lane
Modulation Source: The name of the modulation source
Modulation Amount: The amount of the modulation. Can be modified here as well as it can be modified on the knobs in routing mode
Modulation Target: the target of the modulation

3.4 Steppy



Steppy Section

Steppy is a unique modulation system. Based on parameters lock or per steps commands on trackers, it allows parameters to jump to values for each steps/ midi note/velocity range depending on the mode you choose.
Each parameter has it's own steppy table with its own control mode.
Steppy is read during play in vertical fashion.
Each lane is a step with an horizontal slider representing the value offset applied to the selected parameter.

You can use Steppy on all parameters except the Settings, the Master section, the Steppy section and the Snap section.
In any case, just click on a parameter to view and edit its Steppy values on the Steppy panel.

Target Name: The current selected parameter
Modulation Sliders: The sliders to apply modulation offset to the selected parameters. Drag with left click to change value. You can drag vertically to set other lanes as well. Cmd/Ctrl + drag to fine tune values. Shift + click to delete lane value.
Init: Click to initialize the current parameter lanes

+/-: Add/Remove lanes on the current parameter. What's interesting is that you can modulate in a polymeter way.
Steppy Control Modes: Each parameter has its own Steppy panel with its own controls mode. Meaning that you can have parameters controlled by Midi and others controlled by velocity for example.
There are 3 modes to choose from:

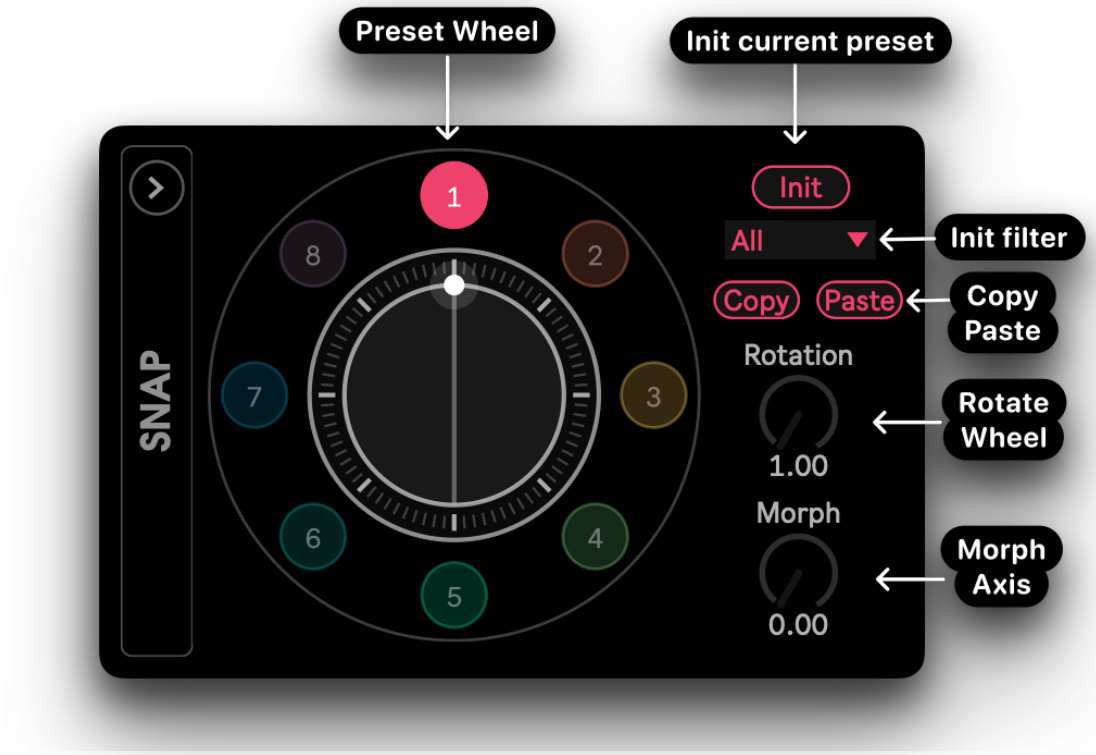
- *Steppy:* An incremental mode. Each midi trigger increment by one the Steppy table.
- *Midi:* Midi mode selects the lane based on the current note Midi. You can set each lane to a midi note modulo the range. If the root note is C3 and you have 4 lanes (C3, C#3, D3, D#3), then a E3 will jump back to lane 1 etc. The root note can be modified in the settings.
- *Velocity:* Velocity mode selects the lane based on the current note velocity. Velocity goes from 1 to 127. The lanes are ranges distributed between 1 and 127.

Randomize amount: The Randomize Amount knob sets the amount of randomization to be applied when you click the randomize button.
Randomize button: Apply randomization to all lanes.

3.5 Snap

The SNAP panel is a powerful preset manager. With it, you can set 8 different presets for all Engines/FX/Mix parameters as well as MSEGS, Routings and Steppy values, and morph them with 2 controls: Rotation and Morph.

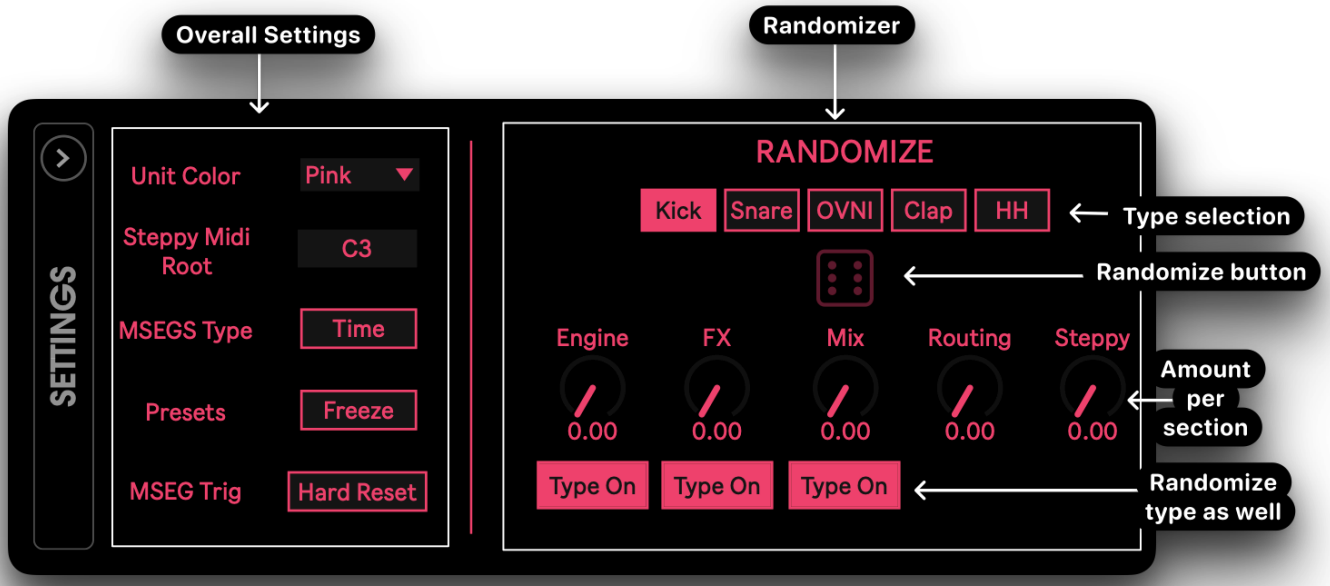
The **Preset wheel** can be manipulated with your mouse. Click on the preset number to select the current preset. Turn the wheel to rotate the preset. Move the morph point to travel to the opposite of the wheel.
While in transition between presets, you can't edit the parameters of the other sections.



The SNAP Panel

Init: Clicking this button will initialize the current preset based of the **Init Filter** menu.
Init Filter Menu: You can choose what section to init, between *All* (everything), *Engines* (just the engines parameters and MSEGS), *FX, Mix, Routings* and *Steppy.*
Copy: will copy the currently selected preset
Paste: will paste the current selected sequencer to the currently selected preset slot from the copy you made
Rotation: Rotation is a mappable control that will rotate the preset wheel
Morph: Morph is a mappable control that will morph between opposite presets

3.6 Settings



Settings

The **Settings** panel has a few useful settings and a fine **Randomizer.**

Settings

Unit Color: Sets the color of the unit controls
Steppy Midi Root: Sets the overall root note for the midi mode of Steppy
MSEGS Type: Change the MSEGS duration units from milliseconds to transport synced relative values (from x 0.1 to x 16, 1 being a beat)
Presets Freeze: When enabled, if you change **Engine, FX** or **Mix Algo** type, the parameters (and MSEGS for engines) will keep their values instead of jumping to the type default values.
MSEG Trig: Sets the behavior of Amp enveloppe re triggering if an enveloppe is not finished when a new trigger occurs.
Hard reset will re trigger at start whatever happens.
Soft Reset will keep the latest value to smooth clicks.

Randomize

The Randomizer is a smart and constrained randomizer based on a few settings.

Type Selection: Select which kind of sound you wish to generate from a selection of types
Randomize Button: Click on the dice to apply randomization
Amount knobs: These knobs apply a certain amount of randomisation to each of the sections. If 0, no randomization will be applied to the concerned section
Type On/Off: If on, the types of engines, FX or Mix can be randomized. If of, the type will stay still

---

Push compatibility

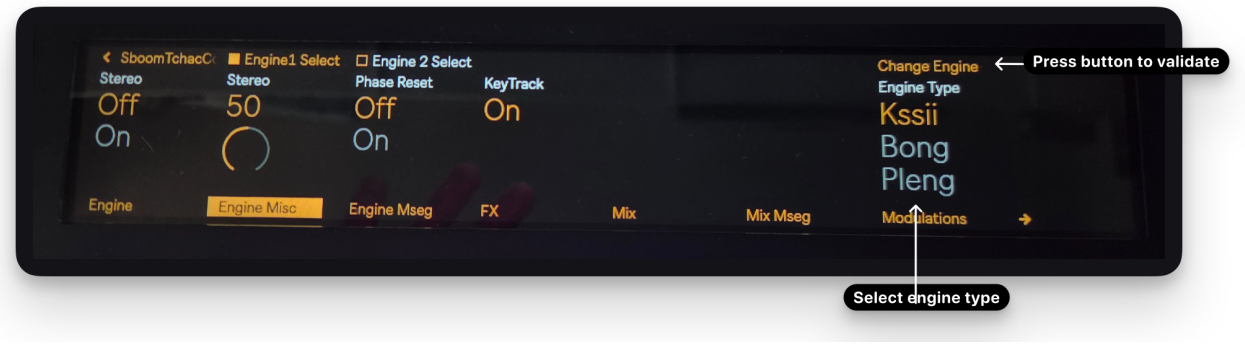
Even if the experience will be different, you can control a good amount of SboomTchac unit with Push. I had a lot of fun making this possible. I mean, I had a lot of fun with Push *after* I succeeded the compatibility.
Due to some limitations of live objects I had to name all parameters that are specific to Engines/FX and Mix to P[x]. Sorry for the inconvenience.



Access controls



Engines



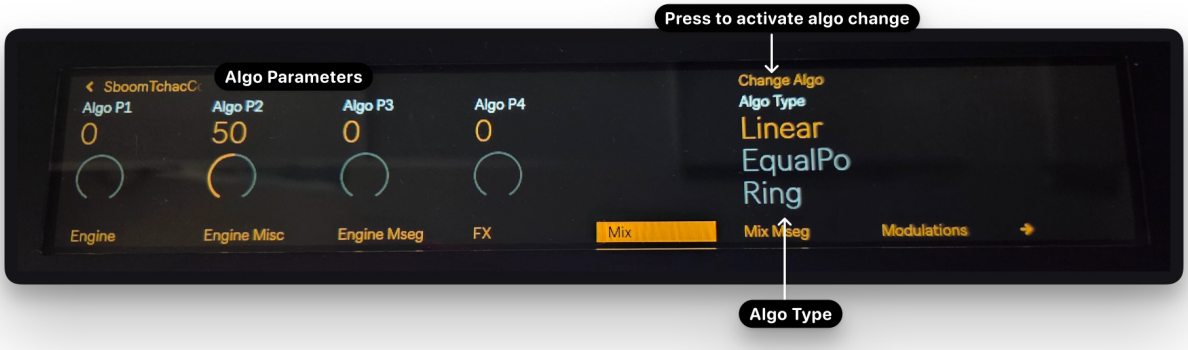
Engines types and options



Engines MSEGS



Engines FXs



Mix Parameters and type selection



Mix MSEG and Mix Slider



Master
Routings



Steppy



Snap

Appendix

4.1 Engine Types

There are as of 1.0 version, there are 14 engines that have been worked on with dedication and meticulous care. The way SboomTchac is designed means I can add as many engines to it as I like, so keep an eye out – I'll be adding more in the future!

Sboom

A sine kick with a sub-octave underneath, an FM layer and a filtered body.

Body: Fades in a second, filtered thump (500 to 1500 Hz) and delay lines a few milliseconds after the hit, for a fuller, double-skin punch.
Texture: Adds noise to the attack and to the body, from a clean sine to a dirty, papery hit.
Overtone: Balance between the sub octave and the main oscillator. Past the middle, it also brings in FM harmonics for more bite.
FM: Ratio of the FM modulators against the note: from a slight growl to a discrete metallic, clangy boom.
Mallet: A short FM noise at the start, like the beater hitting the skin. Higher values make the click brighter (300 to 3000 Hz).
Drive: Sigmoid saturation on the output, from warmth to full distortion.

Sbla

A two-operator FM voice kick with feedback.

Filter: Low-pass on the modulation signal itself. Closed, the FM turns into soft, slow pitch wobble. Open, the full bright FM comes through.
Fm Type: Morphs from linear FM (smooth, symmetrical sidebands) to exponential FM (harsher, more lopsided, more aggressive).
FM: FM index: how hard the modulator pushes the carrier. More means brighter and richer.

Coarse: Modulator ratio (1 to 16). Low ratios stay musical, high ratios get bell-like and metallic.
Feedback: Feeds the modulator back into its own frequency, from smooth to raspy and noisy.
Drive: Sigmoid saturation on the output. Below 1 the sound stays clean.

Tchac

A snare: tuned shell partials plus filtered noise, with a resonant peak on top.

Overtone: Pitch spread of the shell partials, from a dull thud to a higher, ringing shell.
Size: Length of the whole hit: the noise tail, the shell ring and the attack. Small is tight and dry, big is long and roomy.
Tone: Character of the snare wires. Left is darker and fuller, right is thinner, brighter and more hissy.
Bell: Frequency of a resonant peak EQ on the whole snare (250 to 1400 Hz). It sets where the "ping" sits.
BellBoost: Resonance of that peak, from a gentle bump to a sharp, ringing whistle.
Drive: Saturation on the output, with extra drive on the attack for more crack.

Tching

A metallic resonator: a short click excites a tuned delay network, then three comb filters.

Intensity: How hard the resonator is hit: longer, louder excitation and more saturation. Higher values sound brighter and more aggressive.
Tension: Delay time of the resonator loop. Low values ring very high and thin, high values ring lower and wider.
Swell: Brings in two extra resonant lines that blur the ring into a denser, washier metal.
Dispersion: Phase distortion inside the resonator loop: from a clean ring to a gritty, inharmonic shimmer.
Tone: Output color. High values are bright and thin, low values are dark and muffled.

Size: Size of the comb network and of the resonator's internal movement, from a small object to a larger, more spacious body.

Tprrrr

A pulsar synth: each cycle of the note fires a short windowed grain, which gives buzzy, rolling, "tprrrr" tones.

Window: Length of each grain compared to the note period. Low values make grains span several cycles, so they fire less often and roll. High values give a short grain on every cycle, for a steady buzz.
Carrier: Pitch of the waveform inside each grain, as a ratio of the note (1 to 32). It works like a formant: higher sounds more nasal and bright.
Mod: Ratio of the modulator applied to the carrier (1 to 16).
FM: How much the modulator bends the carrier.
Shape: Width of each grain's window, from a sharp, clicky pulse to a soft, rounded one.
Duty: Skews each grain's window, moving its peak earlier or later for a snappier or softer attack.

Clapch

A clap: a burst of filtered noise hits, then an optional smeared tail.

Spacing: Time between the hits in the burst (30 to 120 ms), with a bit of random jitter. Low is a tight clap, high is a loose, slow group of clappers.
Filter: Center frequency of the band-pass on the noise (500 to 4500 Hz). Each hit is slightly detuned at random.
Shape: Envelope of each hit, from short and snappy to longer and fuller.
Downsample: Sample-rate reduction on the hits (not the tail), for a grittier, more sibilant clap.
Tone: Width of the band-pass filters, from narrow and nasal to wide and full.
Tail: Filtered noise from a separate source behind the hits, like the sound of a room.

Kssii

A classic metallic hi-hat: six square-wave oscillators through band-pass and high-pass filters, plus noise.

Overtones: Spreads the six oscillators apart. Low values give a tighter, more tonal metal, high values a wider, clangier one.
Tone Filter: Moves all the hat filters up (up to 1000 Hz higher), for a brighter, thinner hat.
Tone Q: Resonance of those filters, from smooth to sharp and whistling.
Noise Filter: High-pass on the noise part (1000 to 8000 Hz). Left keeps more body, right leaves only the sizzle.
Enveloppe: Decay of the hat: closed hat on the left, open hat on the right.
Mix: Balance between the metallic oscillators and the noise.

Bong

A tuned percussion with five inharmonic partials over the fundamental, plus FM and AM.

Drive: Sigmoid saturation before the AM.
AM: Amplitude modulation rate (10 to 200 Hz). At the minimum it is off. Slow rates flutter, fast rates buzz and get rough.
FM: FM index on the fundamental and partials.
Mod: FM modulator frequency, fixed in Hz (50 to 1200) and not following the note, so it adds a constant color across pitches.
Tone: Stretches the ratios of the partials, from a woody, hollow tone to a more bell-like, inharmonic one.
Presence: Level and decay length of the partials. Low is just the fundamental, high gives a rich, ringing, longer tone.

Pleng

A plucked string (Karplus-Strong) tuned to the played note, then three comb filters. It covers a wide range of percussion sounds.

Intensity: How hard the string is plucked: length of the pluck and amount of saturation.
Tension: How long the string rings (50 to 500 ms).
Swell: Length of the three comb filters after the string, which gives the body its resonance and color.
Dispersion: Phase distortion inside the string loop: from a clean pluck to a bent, inharmonic, gong-like tone.

Tone: Color of the distortion inside the string loop.
Size: Movement inside the string loop and feedback of the comb filters: from a tight pluck to a bigger, more resonant body.

Kssaarch

A noisy metallic resonator with a long tail, built for crashes and long noises.

Intensity: How hard the resonator is hit, and how bright and resonant the excitation is.
Tension: Delay time of the resonator loop (2 to 2000). Low values are a high-pitched ring, high values a slow, flutter-like echo.
Swell: Vibrato on the resonator, which makes the tail wobble and shimmer.
Dispersion: Amount of phase distortion in the resonator, from a clean ring to a heavily smeared wash.
Tone: Removes low end from the output (high-pass from 150 to 550 Hz) and changes the color of the resonator.
Size: Size of the comb network and of the resonator's internal movement.

E-BipBoop

A simple four-voice synth with chord shapes.

Waveform: Morphs smoothly from sine (0) to triangle (1), saw (2) and square (3).
Chords: Picks one of 19 chord shapes: Unison, Octave, Full organ, Organ + fifth, Fifth, Major, Minor, Sus4, Sus2, Major 6, Minor 6, Major 7, Dominant 7, Minor 7, Add9, Quartal, Cluster, Diminished, Spread.
Motion: Detunes the four voices against each other (up to half a semitone), from clean to a thick, chorused sound.
Filter: Low-pass cutoff.
PWM: Pulse width of the square and saw waves: hollow in the middle, thin and nasal near the edges.
Drive: Tanh saturation on the output.

E-Shhhrrr

A noise generator with crackle, resonant grains and a comb filter.

Type: Noise color: Brown, Pink, White, Blue or Violet (darkest to brightest).
Texture: At zero the noise is continuous. Turning it up chops it into random, sparser bursts, from dense grain to scattered crackle.
Comb Mix: Amount of comb filtering on the noise.
Comb Freq: Comb frequency: gives the noise a pitch, from a low buzz to a metallic tone.
RezGrains: Sends each noise burst through a narrow resonant filter at a random pitch (200 to 2000 Hz), like rain on a tin roof.
Drive: Saturation on the output.

Samplers : Drop the sample on the sample window. Set start and end with the handles. Click on the handles to modulate them with Steppy and Routing.

Smpler

Plays the loaded sample, with a resonant filter bank and frequency shifter.

Tilt: Moves a bank of resonant band-pass filters (around 850 to 3400 Hz). At zero the sound is dry. Left sounds darker, right sounds brighter and more nasal.
ShiftFreq: Spreads the filter bands apart and frequency-shifts them (plus or minus 2000 Hz), for metallic, inharmonic tones.
Start: Where playback starts in the sample.
End: Where playback stops in the sample. If End is before Start, the sample plays backwards.

Smplaizer

A sampler with vintage-style time-stretch, in the spirit of old Akai samplers.

Akaiser: Playback speed through the sample, without changing the pitch. At 1 the stretch is off. Lower values stretch the sound longer and make it grainier and more metallic.

Window: Size of the stretch grains (16 to 512), linked to the tempo. Small values give a fast, buzzy, metallic texture, large values give longer, stuttering chunks.
Start: Where playback starts in the sample.
End: Where playback stops in the sample. If End is before Start, the sample plays backwards.

4.2 FX Types

Distortion

Type: Saturation curve: Tanh, Logistic, Sigmoid, Gudermann, Atan or Softclip. Each one rounds the waveform differently, from warm to hard.
Preamp: Gain into the curve (1 to 100). More gain means more distortion.
Bias: Offsets the signal before the curve, which makes the distortion asymmetric and adds even harmonics.
Mix: Dry to wet.

Delay

Decay: How long the echoes take to fade out (in ms). The feedback is set so the echoes die away in that time.
Time: Time between echoes (1 to 2000 ms). Very short times turn into metallic coloring.
Damping: Darkens each repeat a bit more.
Mix: Dry to wet.

Comb Filter

Fully wet. The right channel is slightly detuned from the left for a touch of stereo.

Delay 1: Pitch of the comb filter (10 to 2000 Hz).
Delay 2: Pitch of the allpass filter (10 to 2000 Hz).

Comb: Feedback of the comb. Positive gives a pitched, ringing tone, negative a hollower one an octave lower.
AllPass: Feedback of the allpass. It smears the sound and adds a second, metallic resonance.

Filter

A steep filter (four stages in a row).

Type: Lowpass, Highpass, Bandpass, Resonant, Notch or Allpass.
Cutoff: Filter frequency.
Resonance: Emphasis around the cutoff.
Gain: Level boost inside each filter stage (1 to 2). Since there are four stages, the full range adds up to about +24 dB.

Bite

Lo-fi reduction.

S.Rate: Sample rate reduction. At 100 the sound is untouched. Lower values add more aliasing and digital crunch.
Smooth: Glides between the reduced samples instead of stepping, which tames the harshness.
BitDepth: Bit reduction, from 16 bits at 100 down to 1 bit. Lower values add more quantization noise.
Chaos: A chaotic modulator (Lorenz attractor) moves the reduction amounts constantly, for an unstable, glitchy sound.

Transient

Splits each note into its attack and its body, starting from the note trigger.

Type: Left keeps only the body and removes the attack. Right keeps only the attack and cuts the tail. In the middle both stay balanced.
Length: How long the attack zone lasts (1 to 100 ms).
Shaper: Saturation on the part that Type favors.
Mix: Dry to wet.

Reverb

A small, dense room (up to about half a second of tail).

Size: Room size.
Decay: Length of the tail.
Damping: Darkens the tail over time.
Mix: Dry to wet.

4.3 Mix Algorithms Types

Linear

A simple linear crossfade between the two engines.

Phase Offset: Shifts Engine 2's phase (0 to 360°) before the blend, for comb-like coloring where the engines overlap.
Phase Coupling: Pushes the blend towards what the engines share (right) or what sets them apart (left). In the middle it is a plain crossfade.
Stereo Spread: Moves the blend in opposite directions on the left and right channels, for a wider stereo image. Strongest with the blend in the middle, it has no effect when the blend sits fully on one engine.

Equal Power

The same as Linear, but the volume stays steady across the whole fade.

Phase Offset: Shifts Engine 2's phase (0 to 360°) before the blend, for comb-like coloring where the engines overlap.
Phase Coupling: Pushes the blend towards what the engines share (right) or what sets them apart (left). In the middle it is a plain crossfade.
Stereo Spread: Moves the blend in opposite directions on the left and right channels, for a wider stereo image. Strongest with the blend in the middle, it has no effect when the blend sits fully on one engine.

Ring

Engine 1 multiplied by Engine 2: metallic, bell-like, often inharmonic tones.

Dry/Wet: Balance between Engine 1 on its own and the ring-modulated sound.
Rectification: None, Half or Full. Half keeps only the positive side of Engine 2, Full flips the negative side up. Both make the result less symmetric and closer to a volume modulation.
Modulator LP: Low-pass on Engine 2 before the multiplication (20 to 20000 Hz). Lower values soften the modulation and remove the harshest sidebands.

AM

Engine 2 drives Engine 1's volume, with saturation on the result, from a subtle wobble to hard, gritty modulation.

Depth: How much Engine 2 moves the volume.
DC Offset: Offset added to the modulation (0 to 2). Low values let the volume dip to silence, close to a ring modulator. High values keep Engine 1 always present, for a classic AM sound.
Rectification: None, Half or Full. Half keeps only the positive side of Engine 2, Full flips the negative side up.
Modulator LP: Low-pass on Engine 2 before it drives the volume (20 to 20000 Hz). Lower values give a smoother, slower modulation.

Granular

Chops both engines into tiny grains taken from the recent past. Each grain comes randomly from one engine or the other.

Grain Size: Length of each grain (1 to 500 ms). Short grains buzz, long grains sound like stuttering chunks.
Rate: How many grains start per second (0.5 to 150 Hz).

Pitch Spread: Random pitch range for each grain (up to ±12 semitones). At zero the pitch stays untouched.
Scatter: How far back in time each grain can be picked. At zero the grains follow the live sound, higher values jumble the timeline.

Terrain

The two engines become X/Y coordinates on a mathematical landscape, and the output is the height at that point. It works as a 2D waveshaper that creates brand-new, often wild timbres.

Terrain Morph: Morphs between four landscapes (0 to 3), each with its own set of hills and folds.
Angle: Turns the path across the landscape (0 to 360°) to change the color.
Smoothing: Left is bright and edgy, right is rounder and darker.
Zoom: How far the engines travel across the landscape (1 to 8). Low stays close to the original sound, high folds it into dense, rich harmonics.

Wavefolder

Folds Engine 1's waveform back on itself, with Engine 2 setting how hard. It gives a brighter, richer, modular-synth sound.

Fold Amount: How much Engine 2 deepens the folding.
Symmetry: Shifts the fold off-center, which adds even harmonics and a hollower or buzzier edge.
Pre Gain: Drive into the folder (1 to 10). More gain means more folds and more harmonics.
Rectify: Blends Engine 2 towards its absolute value, so the folding pulses at twice the rate.

XPhase

A six-stage phaser on Engine 1 whose sweeping notches are pushed around by Engine 2, giving a swirling, moving tone.

PD Amount: How hard Engine 2 moves the notches. It also adds feedback, so the notches get sharper and more resonant.
PD Shape: Response curve of the modulation: Linear, Exponential or S-Curve.
Bias: Moves the center of the notches up or down (two octaves around 1 kHz).
Spread: Spreads the six stages apart, from one deep notch cluster to a wider, smoother sweep.

Vocoder

Engine 2 "talks" through Engine 1: Engine 1 takes on Engine 2's spectral shape and rhythm.

Bands: Number of filter bands (2 to 16). Few bands give a rough, robotic sound, more bands are more detailed.
Band Response: Width of each band. Low values are wide and smooth, high values are narrow, ringing and more pitched.
Drive: Saturation on the vocoded sound.
Shift: Moves all the bands up or down (±2 octaves), which shifts the formants.

Comb Merge

Two complementary comb filters: Engine 1 peaks exactly where Engine 2 is cut, so the two engines interlock instead of piling up.

Comb Freq: Pitch of the comb (20 to 20000 Hz).
Stages: 2, 4 or 8 combs stacked on the harmonics of Comb Freq. More stages give a denser, more tonal comb.
Cross Feed: Lets one engine's resonance bleed into the other. Left feeds Engine 2 into Engine 1, right feeds Engine 1 into Engine 2.
Resonance: Feedback of the combs. Higher values ring metallically.

Stochastic

Jumps to a random blend between the two engines at a set rate. It ranges from choppy textures to noisy grit.

Rate: How often a new random blend can be picked (1 to 5000 Hz). Low rates are rhythmic, high rates turn into noise.

Probability: Chance that each tick actually picks a new blend. Lower values hold the current blend longer and make the rhythm irregular.
Window: How the blend moves to each new point. Left jumps early, the middle glides evenly, right holds and jumps late.
Distribution: Uniform, Gaussian or Exponential. Uniform picks any blend, Gaussian stays near the middle, Exponential favors one engine or the other.

Phase Distortion

Engine 2 warps how Engine 1 is played back. The timbre changes but the pitch doesn't, which is great for shaping attacks.

Amount: How hard Engine 2 warps the playback.
Max Dev: Maximum warp range (20 to 500 samples). Low values color the tone, high values give a wobblier, more chorus-like smear.
Drive: Saturation on the warped sound.
Tone: Left is darker, right is brighter. The middle is neutral.

A final word

It took me about a year to create SboomTchac. I went through numerous iterations; my initial plan was to create a drum machine with four double engines, each with its own sequencer track.
But I got bogged down in the complexity and performance issues, so I put it aside for a while before deciding to pick it up again. I abandoned the idea of adding a sequencer, opting instead to make it solely a drum synthesiser. On the one hand, this allowed me to incorporate more advanced features, but also because I sell MIDI instruments that work well with it. I still intend to create a proper MIDI sequencer that will work hand in hand with SboomTchac.

This instrument was made with updates in mind. It is designed to accept more engines, more Fxs and more Mix algorithms.

I'm super proud of this instrument. I don't think I'll ever make something like this again :)

Thank you so much for purchasing SboomTchac!