

Substrike

A kick drum designer for every style



Version 1.1.0

CLAP and VST3 instrument for Linux and Windows

Part of the Audio Plugins

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Substrike — manual

Eight synthesised layers, effect chains in any order, a rumble floor, modulation and over a hundred presets. Linux and Windows, CLAP and VST3.

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1. What it is



The whole window: the lanes on the left, the selected lane's controls, its source with the pitch curve, and its effect chain on the right.

Substrike builds kick drums. Not one kind of kick: the soft round thud of deep house, the dusty knock of a hip hop loop, a long tuned sub boom, the overdriven brick of hard techno with a rumble floor underneath it, the zap and the screeching tail of hardstyle, the distorted wall of gabber, an acoustic bass drum in a room, or something that has never been a kick before.

Everything is synthesised. There are no samples inside. A kick is made of up to **eight lanes**, each a layer with its own sound source and its own chain of six effects; a **master** chain shapes the sum. Lanes can feed one another, which is how a rumble is made: a copy of the kick, driven into a reverb, flattened into a deep floor and tucked under the next hit.

A **modulation matrix** lets velocity, the note, a random value, LFOs, drawn envelopes, macros and the lanes' own levels move almost any control, so a kick can change with how hard it is played, drift from bar to bar, or never sound the same twice.

2. Installing

Copy the plugin where your host looks for plugins:

	CLAP	VST3
Linux	<code>~/ .clap/Substrike.clap</code>	<code>~/ .vst3/Substrike.vst3</code>
Windows	<code>C:\Program Files\Common Files\CLAP\Substrike.clap</code>	<code>C:\Program Files\Common Files\VST3\Substrike.vst3</code>

Then let the host rescan its plugins. Substrike is an instrument: put it on an instrument track and play it with notes. The factory presets are inside the plugin; there is nothing else to install.

Your own presets, exported hits and settings are kept in `~/ .local/share/Substrike` and `~/ .config/Substrike` on Linux, and in `%APPDATA%\Substrike` on Windows.

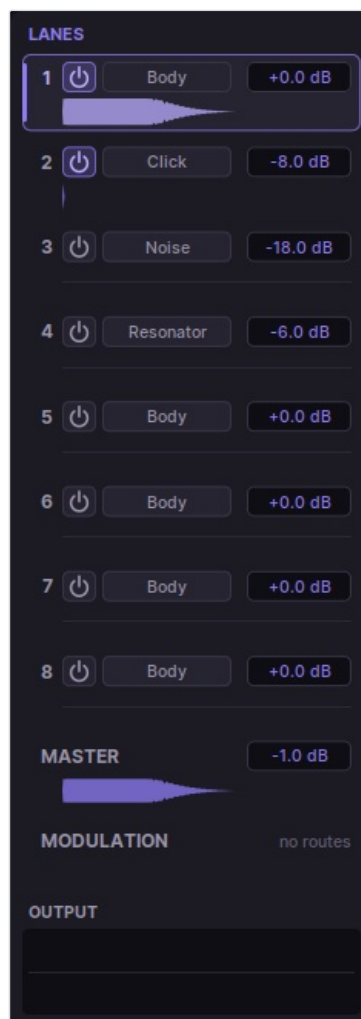
3. The first five minutes

1. Click the **preset name** at the top of the window. The browser opens.
2. Pick a category on the left, then click presets in the middle: each one loads and plays at once. **Up** and **Down** step through the list.
3. Close the browser (**Esc**) and play the kick from your keyboard or a clip. Any note plays it; the note **C2** plays it as it was designed.
4. Click the **waveform in the top bar** to hear the hit without a keyboard, or click **Play**.
5. Change something. Every change is redrawn in the waveform at once, and **Ctrl+Z** takes it back.
6. When you like it, **drag the waveform** from the top bar into your host's arrangement: it arrives as a 24-bit WAV.

4. The window

The window has four areas.

- **The top bar:** the preset name with the previous and next arrows, **undo** and **redo**, the current hit as a waveform (click it to play, drag it out to export), **Play**, **Export** and the menu.
- **The rack on the left:** the eight lanes, the master and the modulation, each a row. Click a row to edit it. A lane's row has its power switch, its source, its level and its share of the hit as a small waveform. At the foot of the rack, **Output** is a live oscilloscope of what the plugin plays right now.
- **The right side** shows the selected row: for a lane its strip of controls, its source and its effect chain; for the master its controls, the whole hit and the master chain; for the modulation the macros, the modulators and the matrix.
- **Notices** appear briefly at the top (a saved file, nothing to undo).



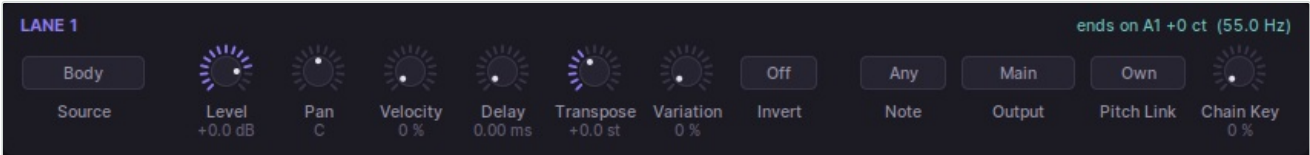
The rack: eight lanes, the master, the modulation and the live output.

Every knob works the same way: **drag** up and down (**Shift** for fine steps), turn the **mouse wheel**, **double-click** to type a value (units work: **1.5 s** , **2.4k** , and note names for frequencies: **A1**), **Ctrl-click** for the default. **Right-click** a knob to modulate it.

The menu (the three lines at the top right) sets the window size and scaling, whether exported hits are normalised, and whether presets play when you load them.

5. Lanes

Each lane is one layer of the kick. Lane 1 starts as the body; lanes 2, 3 and 4 start as a click, a noise layer and a resonator, switched off, so switching one on gives something sensible at once.



A lane's strip. The note it ends on is shown at the right.

CONTROL	WHAT IT DOES
Source	What the lane plays: Body, Click, Noise, Resonator or Bus (see below).
Level, Pan	The lane's level and position in the mix.
Velocity	How much a soft note lowers the lane. At 0 % every note is full level, the usual setting for a club kick.
Delay	Plays the lane up to 100 ms after the note, to line up layers or to flam them.
Transpose	Moves every frequency of the lane's source, filters included, by semitones.
Variation	Changes pitch, level, decay and noise slightly from hit to hit. At 0 % every hit is identical.
Invert	Turns the lane's polarity, for when two layers cancel each other.
Note	Any note, or one note only: give lanes different notes and Substrike becomes a kit.
Output	Main output, the lane's own output, or both (see <i>Outputs</i>).
Pitch Link	Lets the lane follow another lane's pitch drop, so a click or a resonator stays in tune with the body.

BODY

The body is the tone of the kick: an oscillator whose pitch falls from **Pitch Start** to **Pitch End** over **Sweep Time**, and whose level holds for **Body Hold** and then dies over **Body Decay**.



The Body source with its pitch curve. The knobs under the curve scale it.

- **Wave:** sine, triangle, saw, square, or **Additive:** eight partials shaped by **Tilt**, **Even** and **Stretch**.
- **Shape** saturates the wave (more harmonics, a fatter body). **Phase** sets where the wave starts, which changes the very

first click of the hit.

- **FM** modulates the body with its own oscillator (**FM Ratio**, **FM Decay**); **Feedback** lets it modulate itself. **Drift** adds a slow wander.

The **pitch curve** and the **amplitude curve** (the Pitch and Amp tabs) are drawn. Drag a point to move it (**Shift** for fine steps), drag the small diamond on a segment to bend it, **double-click** to add or remove a point or to straighten a segment, **right-click** for a menu. A curve has up to sixteen points. The knobs under it scale what you drew: Start, End, Sweep and Bend for the pitch, Attack, Hold, Decay and Bend for the level. They can be automated and modulated, the drawing stays.



The amplitude curve.

Key Track makes the body follow the keys: at 100 % it plays in tune chromatically, around the **Root Note** set on the master. A tuned sub boom is a long body with Key Track at 100 %.

CLICK

A short transient: an **Impulse**, a burst of **Noise**, a tonal **Blip** or a **Zap** that sweeps down through several octaves in a few milliseconds. **Decay** sets its length; its own **Filter** (with **Cutoff** and **Reso**) shapes it. A click on its own lane, a few decibels under the body, is the classic beater.

NOISE

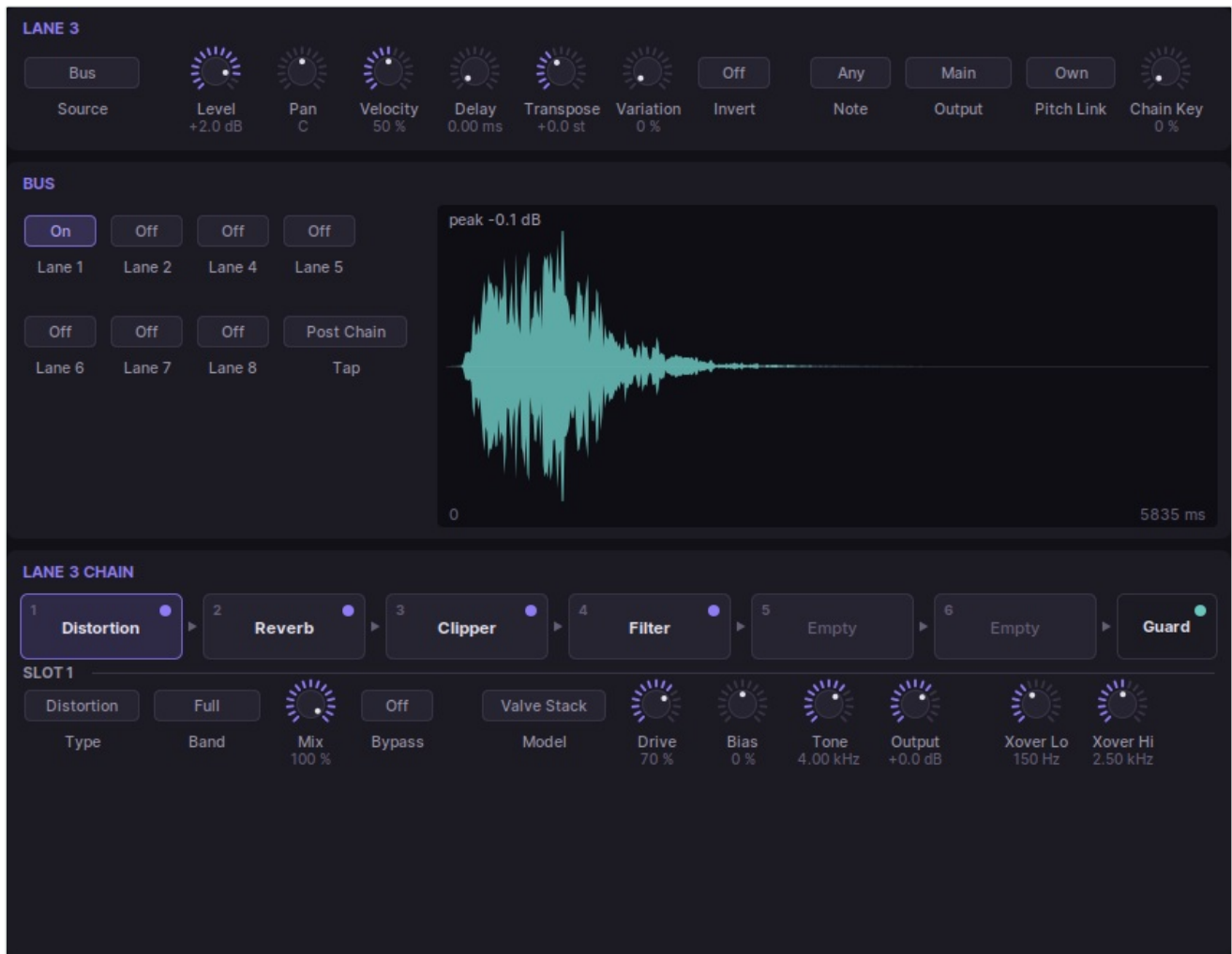
Filtered noise with its own envelope: **White**, **Pink**, **Brown** or **Crackle** (with a **Density**), a **Width** for stereo, a filter whose cutoff can fall with each hit (**Filter Env**, **Env Decay**), and attack, hold and decay. For beaters, shell noise, air on top, or texture under a rumble.

RESONATOR

Two to eight damped modes struck by an impulse, a mallet or a burst of noise: a drum skin (**Membrane**), a harmonic or odd series, or a **Bar**. **Tune**, **Decay**, **Damping** (how fast the higher modes die), **Brightness**, **Hardness** of the strike, and a pitch **Drop** after the hit. Acoustic kicks, tom-like knocks and tuned, ringing drops start here.

BUS

A Bus lane makes no sound of its own. It plays the lanes switched on in its panel, taken **before** or **after** their chains (*Tap*), through its own chain. This is how one kick is used twice: once clean, once as raw material for a rumble, a delay or a reverb that the other layer never touches.

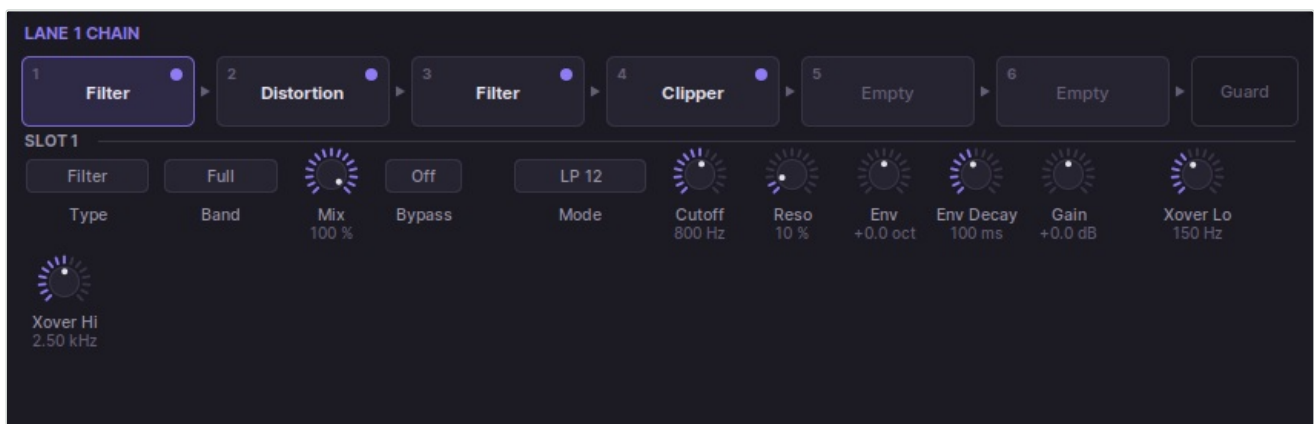


A Bus lane playing lane 1 through distortion, reverb, a clipper and a lowpass: the rumble.

A lane can only take from lanes that do not take from it in turn; two lanes feeding each other hear silence from each other rather than a loop.

6. Effect chains

Every lane and the master have six **slots**, in signal order from left to right. Click a slot to edit it below the chain; **right-click** or **double-click** it to choose a type; **drag** it onto another slot to swap the two; click its **dot** to bypass it.



A chain of four slots: a lowpass, a distortion, a second lowpass and a clipper — a hard techno kick.

Every slot has a **Type**, a **Band**, a **Mix** and **Bypass**, and up to six controls whose names and ranges come from the type.

- **Band** processes only part of the spectrum: Full, Low, Mid, High, Low+Mid or Mid+High, split at the chain's two

crossovers (**Xover Lo**, **Xover Hi**). The rest passes the slot untouched, and the sum stays flat. Distortion on *Mid+High* drives the body's harmonics and leaves the sub clean.

- **Chain Key**, at the right of the lane strip, moves the chain's tuned controls with the note: a Filter's **Cutoff**, an EQ's **Mid Freq**, a Comb's **Start** and **Spacing**, and a Ring Mod's **Frequency**. At 100 % they follow the note exactly, as a Body with Key Track at 100 % does, so a notch set on the kick's second harmonic stays on it in every key. At 0 % they stay where they are set.
- **Mix** blends the effect with what went in. For Delay and Warp the output is the input *plus* the echoes, so Mix is the echo level; for Reverb the output is the reverb alone, and 100 % is what a rumble wants.

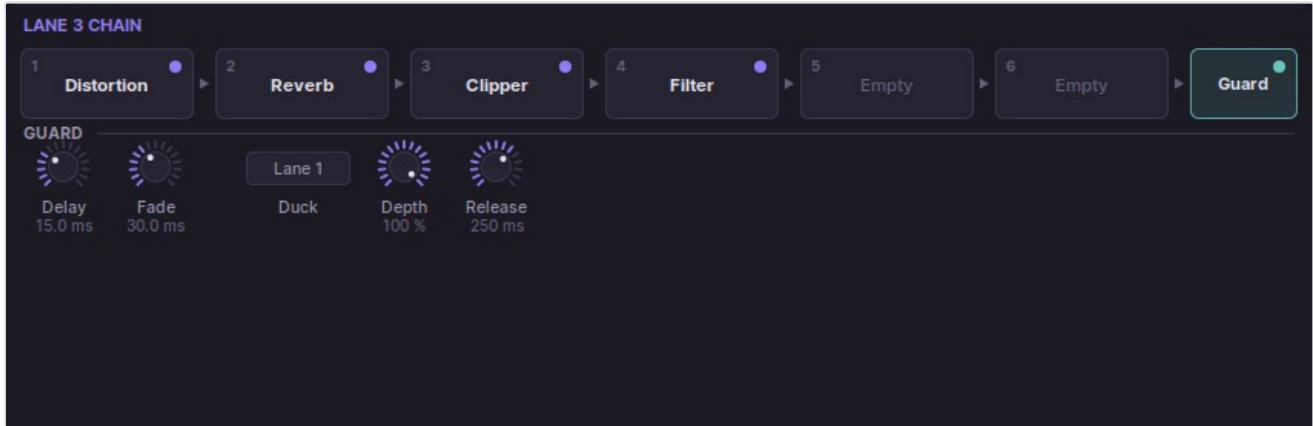
GROUP	TYPES
Drive	Distortion (ten models, from Soft Clip to Rectifier), Clipper , Wavefolder , Bitcrush
Tone	Filter (low and high pass at 12 and 24 dB, band pass, notch, peak; an envelope per hit), EQ (shelves, a bell, tilt), Comb (a row of cuts or boosts, see below)
Dynamics	Compressor , Transient (lifts or cuts the attack and the sustain), Gate (on level, or <i>Hit</i> : from every hit, to cut a tail where you want it), Limiter
Time	Reverb (a dense room for smearing and rumble, not a hall), Delay (synced to the host's tempo, colour, drive, ping-pong), Warp (echoes that climb or fall in pitch, play backwards, or come as taps), Smear (spreads the attack in time without a tail)
Other	Ring Mod (ring modulation or a frequency shift up or down), Stereo (width, a short delay on one side), Utility (gain, polarity, channels)

The **Comb** is a row of narrow cuts or boosts. **Start** is the first band, **Spacing** the distance from one band to the next, and **Bands** how many there are, so together they set where the comb begins and how far it reaches. **Gain** below 0 dB cuts, above it boosts. **Width** is each band's width as a share of the spacing; the bands keep that width all the way up, so they never run into each other. **Taper** fades the gain out towards the last band (positive) or in from the first (negative). With Start and Spacing both on twice the kick's pitch it cuts every even harmonic; with both on the pitch itself it shapes every harmonic at once. Set **Chain Key** to 100 % and it follows the notes.

Quality on the master oversamples the drive slots (1x, 2x or 4x): more is cleaner and costs more processing.

THE TRANSIENT GUARD

The **Guard** at the end of every lane's chain keeps a layer out of the attack. **Delay** keeps the lane silent for that long after each of its hits, **Fade** then brings it in. **Duck** lowers the lane while another lane sounds, by **Depth** at that lane's full level, recovering over **Release**: a sidechain with no cable.



The guard of a rumble lane: ducked by lane 1.

7. Making a rumble

A rumble is a deep floor under the kick, centred on the kick's own pitch, held about ten to fifteen decibels under the kick between the hits and swelling back towards the next one. Substrike makes it from the kick itself:

1. Make the kick on lane 1.
2. Switch on another lane and set its source to **Bus**, with lane 1 on.

- 3. In its chain: **Distortion** to give the reverb something to ring with; **Reverb** with **Size** at 100, a long **Decay** (two to four seconds), low **Damping** (dark) and **Width** at 0 (mono); a **Clipper** driven about 30 dB, which turns the reverb's decay into a level; a **Filter**, LP 24, around 100 to 150 Hz.
- 4. In its **Guard**: a short **Delay** and **Fade** (15 and 30 ms), and **Duck** from lane 1 with a **Release** around 250 ms.
- 5. Set the lane's **Level** until the floor sits where you want it.

The Rumble category has this recipe in many variations: with a hard techno kick over it, gated, rolling in sixteenths, moved by an LFO, pitched below the kick, diffused. **Mono Below** on the master keeps everything under its frequency in the middle.

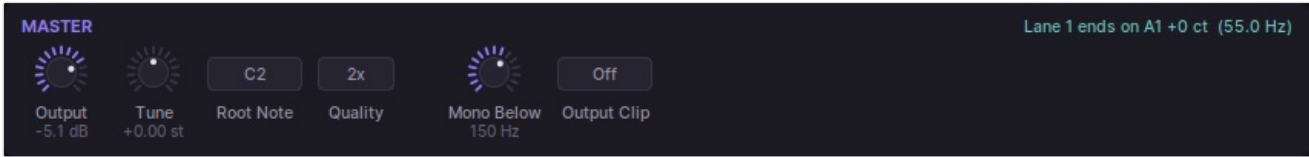
8. Making a hardstyle kick

A hardstyle kick is a kick driven into heavy distortion and then shaped with EQ. Three things give its tail its sound: the fundamental stays on top, the second harmonic is cut deep while the third stays strong (the hollow, nasal tone), and above that sits a dense, bright wall of harmonics, flat up to about 1 kHz. In the first tenth of a second a punch around 500 to 700 Hz sits on top.

- 1. On lane 1, a **Body** with **Pitch Start** around 3 kHz, **Pitch End** on the key you want (F1 is 43.7 Hz, G1 49 Hz), **Sweep** about 190 ms, **Hold** about 360 ms, **Key Track** at 100 %.
- 2. In its chain: **Distortion**, *Rectifier*, **Drive** about 60 % and **Bias** about -50 %. The bias makes the drive lopsided, which brings the even harmonics.
- 3. A **Clipper** driven about 30 dB, which squares the tail off.
- 4. An **EQ**: **Low** +6 dB; **Mid** -16 dB with **Mid Freq** at twice the Pitch End and **Mid Q** about 5, which cuts the second harmonic and nothing else; **High** +12 dB and **Tilt** +7 dB for the top.
- 5. A **Filter**, LP 12, around 9 kHz, and a **Clipper** to catch the peaks.
- 6. **Chain Key** at 100 %, so the cut stays on the second harmonic in every key.
- 7. On lane 2, the punch: a short **Body** falling from about 2 kHz to 240 Hz, **Decay** about 120 ms, through a **Distortion** (*Fuzz*).

Euphoric Notch, **Raw Notch** and **Tight Notch** in the Hardstyle category are built this way: a long steady tail, a longer and rougher one, and a short one for fast patterns. Move the EQ's **Mid** to 0 dB to hear what the cut does.

9. The master



The master: Output, Tune, Root Note, Quality, Mono Below and Output Clip.

CONTROL	WHAT IT DOES
Output	The level of the main output.
Tune	Moves every lane at once, ±12 semitones to the cent, to put the kick in the key of the track. The strip shows which note the first Body lane ends on, and every Body lane shows its own.
Root Note	The note that plays the kick as designed; with Key Track, the others transpose from it.
Quality	Oversampling for the drive slots and the output clip.
Mono Below	Makes everything below this frequency mono. Off at the bottom of its range.
Output Clip	Soft or Hard clips at full scale; Limit is a limiter that holds the output under -0.3 dBFS without the distortion of a clip. Off by default.

The master has its own chain of six slots, after which come Mono Below, the output clip and the output level.

Tuning a kick to the track: look at the note shown at the top right of the lane or the master (“ends on G1 -36 ct”) and turn **Tune** until it names the key of your track, or a fifth of it. A kick a few cents out of tune with the bass beats against it; one in tune locks with it.

10. Modulation

Click **Modulation** in the rack.

MACROS

Macro 1

0 %

Macro 2

0 %

Macro 3

0 %

Macro 4

0 %

Macro 5

0 %

Macro 6

0 %

Macro 7

0 %

Macro 8

0 %

MODULATORS

LFO 1

LFO 2

LFO 3

LFO 4

Env 1

Env 2

Env 3

Env 4

Sine

Shape

Rate

4.00 Hz

Free

Sync

Phase

0 deg

On

Retrigger

two cycles · 4.00 Hz · restarts with every note

MATRIX

Right-click any knob to modulate it

1-16

17-32

SOURCE	DESTINATION	AMOUNT	CURVE	SOURCE	DESTINATION	AMOUNT	CURVE		
1	Macro 1	L1 Slot 1 Drive	85 %	0 %	9	Off	No destination	0 %	0 %
2	Macro 1	L1 Slot 1 Output	-10 %	0 %	10	Off	No destination	0 %	0 %
3	Macro 2	L1 Body Decay	30 %	0 %	11	Off	No destination	0 %	0 %
4	Macro 2	L1 Body Hold	40 %	0 %	12	Off	No destination	0 %	0 %
5	Macro 3	L2 Level	25 %	0 %	13	Off	No destination	0 %	0 %
6	Macro 4	Master Slot 1 Mix	45 %	0 %	14	Off	No destination	0 %	0 %
7	Off	No destination	0 %	0 %	15	Off	No destination	0 %	0 %
8	Off	No destination	0 %	0 %	16	Off	No destination	0 %	0 %

The modulation page: macros, the modulators, and the matrix.

Sources

SOURCE	WHAT IT IS
Velocity	How hard the note was played.
Note	The note against the root note; ±1 at two octaves.
Random	A new value with every hit.
LFO 1-4	Sine, triangle, saw up and down, square, sample-and-hold or smooth random. Rate in Hz, or Sync to note values from the host’s tempo. Retrigger restarts it with every note; without it, it runs on, and a synced one locks to the song position.
Env 1-4	A curve you draw (like the Body’s), run over its Time from every note, once or looped.
Macro 1-8	Knobs of your own, to map to a controller: one macro can move several controls.
Follow 1-8	The level of a lane as it plays.

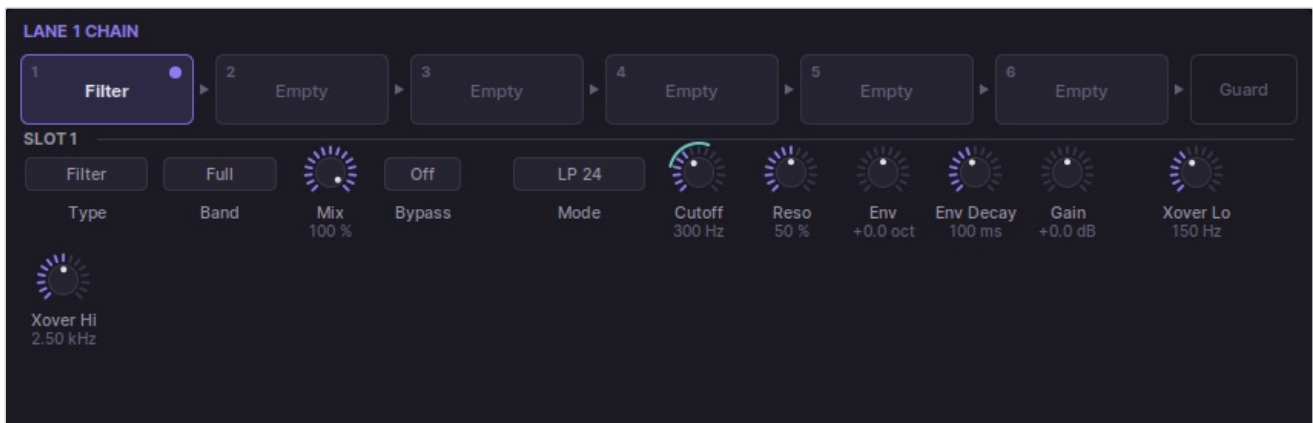
Velocity, Note and Random belong to each lane: a route onto a lane's control reads the note that lane played, so in a kit every lane keeps its own velocity, and each lane draws its own random value.



An envelope: drawn like the body's curves, run over its Time.

The **matrix** has 32 routes, sixteen on each page. Each route has a **Source**, a **Destination**, an **Amount** and a **Curve**. The amount is a share of the destination's whole range, either way: +25 % moves a knob a quarter of its travel at the source's full value. Routes on the same control add up. **Curve** bends the source: above 0 it rises early, below 0 late. Click a destination to choose from every control, grouped by lane and module; right-click it to clear it.

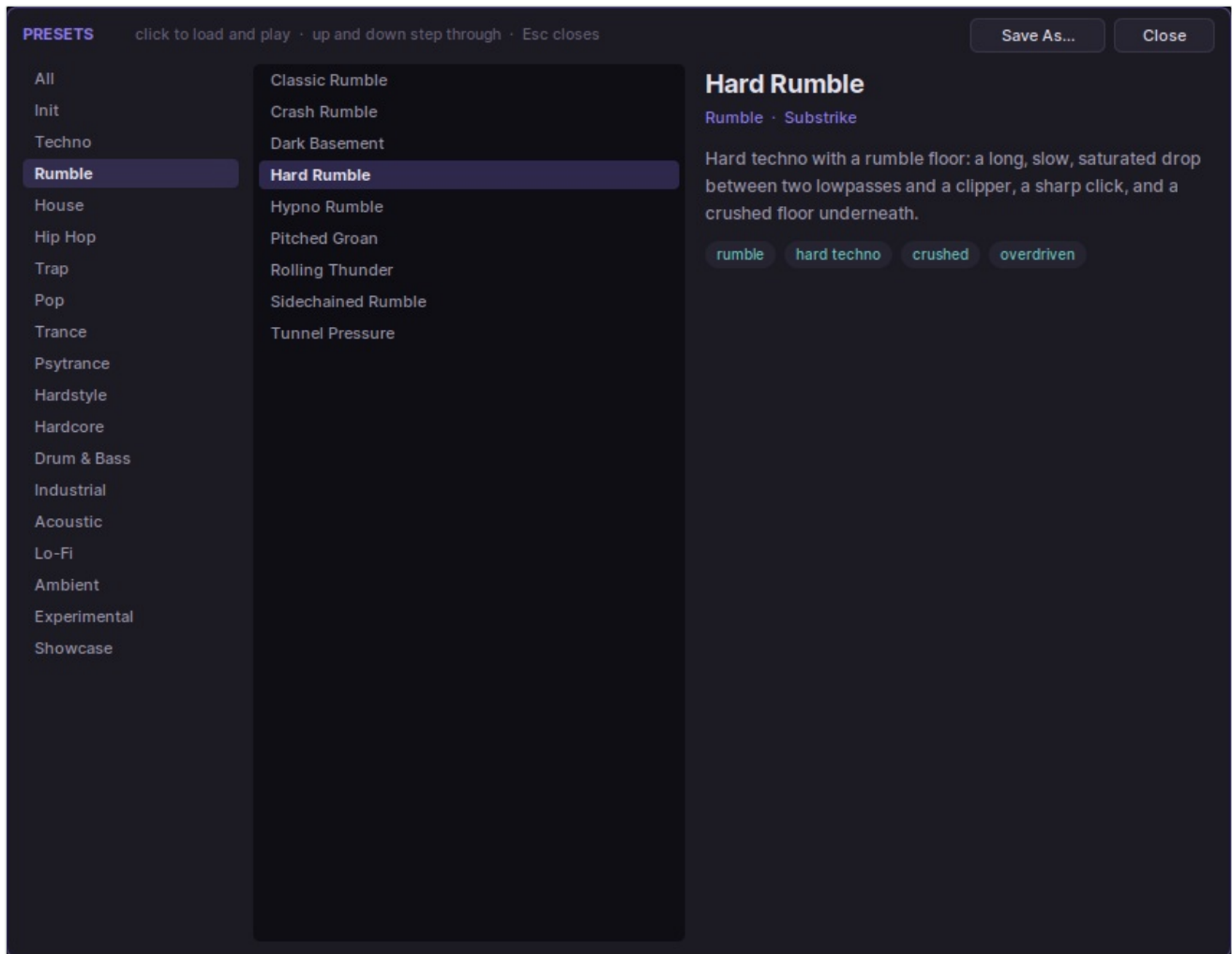
The quickest way in is **right-click on a knob**: *Add* puts a source on it in the first free route at +25 %, and the routes already on it are listed there too, to remove or to find in the matrix.



A modulated knob: the teal arc is how far the matrix can move it, the bright dot where it is now.

A modulated knob shows a **teal arc** for how far its routes can move it, and a **bright dot** where the modulation has it right now.

11. Presets



The preset browser.

Click the preset name in the top bar to open the browser: the categories on the left, the presets of one in the middle, and what the preset under the pointer is on the right. Click a preset to load it and hear it; **Up** and **Down** step through the list, **Esc** closes. The arrows beside the name step through presets without opening the browser.

Save As... saves the current sound as one of your presets, in the *User* category. Right-click one of your presets in the browser to delete it. A preset is a small text file ending in `.substrike`, which you can copy and share.

Hosts with their own preset browser list Substrike's presets there too, with their categories and tags.

Loading a preset is a clean start: whatever is still sounding fades out over a few milliseconds, then the new preset begins from silence, so nothing of the old sound carries over.

THE FACTORY LIBRARY

121 factory presets come with Substrike, in the categories the browser shows.

Init

Init

The plain kick every new instance starts with: a sine dropping onto 48 Hz with a medium tail. (*clean, starting point*)

Techno

Acid Floor

A kick with an acid edge: a squarish body through a resonant lowpass whose envelope snaps shut with every hit. *(squelchy, resonant, acid)*

Berlin Pressure

A heavy, long hard techno kick: a slow drop onto 50 Hz through a valve stack, held back by lowpasses so it is thick, not fizzy. *(hard techno, heavy, saturated, long)*

Brick Wall

A brick of a kick: saturated hard, clipped flat and limited, so its body stays at full level until it stops. *(hard techno, compressed, brick)*

Concrete Thump

A hard, overdriven techno kick: a long drop onto 55 Hz, a saturated body clipped into a solid block, a sharp click. *(hard techno, overdriven, punchy)*

Detroit Round

A warm, rounded kick with soul: a triangle body gently shaped, a soft beater noise and no hard edges. *(warm, round, soulful)*

Dub Chamber

A soft dub techno kick whose echoes fall back into a dark room: a dotted-eighth delay with a closing lowpass in its feedback. *(dub, echo, deep)*

Hard Groove

A rounder hard groove kick: the same long drop and saturation, but softer clipping and more room on top. *(hard groove, round, saturated)*

Hydraulic Press

An industrial hard techno hit: a fuzzed body and a burst of filtered noise slamming in with it. *(hard techno, industrial, noise)*

Hypnotic Loop

A kick that never quite repeats: a slow free-running LFO moves its tuning and its filter from bar to bar. *(evolving, lfo, hypnotic)*

Minimal Tick

A short, tight kick for minimal grooves: a quick knock at 60 Hz that leaves room for everything else. *(short, tight, minimal)*

Peak Time

A big peak-time hard techno kick: a fast, hard attack, an overdriven body and a click that cuts through a wall of sound. *(hard techno, loud, big room)*

Schranz Hammer

A fast, hammering schranz kick: short, high and rectified, for 150 BPM and up. *(schranz, fast, distorted)*

Tail Driver

A hard kick with a long, driven tail that hums on 52 Hz under the groove. *(hard techno, long tail, overdriven)*

Warehouse Punch

A drum-machine style kick with a triangle body, a short blip on the attack and a little tube warmth. *(punchy, classic, drum machine)*

Rumble

Classic Rumble

The rumble floor under a hard kick: a bus lane drives the kick into a big dark reverb, clips the reverb flat into a deep level and ducks under each kick so the floor swells back towards the next. *(rumble, hard techno, bus, reverb)*

Crash Rumble

Hard Rumble with the kick's last lowpass open: brighter, harder and louder at the top, over the same crushed floor. *(rumble, hard techno, crushed, bright)*

Dark Basement

A deep, round 40 Hz kick with no click at all over a very long, very dark floor: everything above 75 Hz gone. *(rumble, dark, deep, long)*

Hard Rumble

Hard techno with a rumble floor: a long, slow, saturated drop between two lowpasses and a clipper, a sharp click, and a crushed floor underneath. *(rumble, hard techno, crushed, overdriven)*

Hypno Rumble

A rumble floor whose lowpass opens and closes with a synced LFO, sixteenth by sixteenth. *(rumble, lfo, moving)*

Pitched Groan

A tonal 62 Hz kick with a skin on it that follows the keys, and a floor shifted below its note that growls under it. Root C2. *(rumble, tonal, dark, playable)*

Rolling Thunder

A punchy hard kick on 54 Hz with a fuzzed floor that rolls in sixteenths: the echoes go into the reverb with the kick. *(rumble, delay, rolling, punchy)*

Sidechained Rumble

A short, tight hard kick on 58 Hz with a crunchy floor that swells in after each hit and stops short of the next, for a pumping groove. *(rumble, gated, groove, tight)*

Tunnel Pressure

A long, rounded 46 Hz kick over a smooth, diffuse floor: soft clipping and a Warp full of diffusion, so it breathes like air in a tunnel. *(rumble, warp, diffuse, smooth)*

House

Deep Round

A deep house kick: a round sine at 55 Hz with a soft attack and a gentle tail. *(deep, round, soft)*

Disco Thud

A short, woody disco thud: a triangle body with a resonator knock and a scooped middle. *(disco, thud, short)*

Garage Skip

A tight, skippy garage kick at 65 Hz, short enough to swing. *(garage, tight, punchy)*

Jackin Box

A punchy, slightly crunchy kick for jackin house, with a bit of the box it came from. *(jackin, punchy, saturated)*

Soulful Pillow

A soft pillow of a kick: warm, low and wrapped in a small room. *(soft, warm, roomy)*

Tech House Tok

A compressed tech house kick with a knocky top that cuts through a busy groove. *(tech house, knock, compressed)*

Hip Hop

Boom Bap Dust

A dusty boom bap kick: crunched to twelve bits, rolled off at the top, with vinyl crackle riding on it. *(boom bap, dusty, lo-fi)*

Cardboard Box

A boxy, papery kick: a damped bar resonator and a body that ends almost before it begins. *(boxy, lo-fi, quirky)*

Dusty Knock

A knocking kick with a skin: a resonator membrane over a short body, darkened like an old record. *(knock, acoustic, warm)*

Golden Era

A punchy, saturated sampler-era kick with a hard transient and a mid-range bump. *(punchy, saturated, classic)*

Head Nod

A round, head-nodding kick: a tuned body with a velocity-sensitive punch. *(punchy, round, boom bap)*

Jazz Pocket

A soft, acoustic-leaning kick for jazzy loops: felt on a skin, a little room, no edges. *(jazzy, soft, acoustic)*

West Coast Thump

A long, smooth sub thump with a soft click, for laid-back beats. *(sub, long, smooth)*

Trap

Distorted Boom

A saturated boom that growls on small speakers and still holds the sub. Tuned to the keys, root C1. *(sub, distorted, tuned)*

Glide Boom

A boom that slides down into its note after the attack, like a portamento into each hit. Root C1. *(sub, glide, tuned)*

Punchy Boom

A boom with a proper kick in front of it: a clicky transient layer over a long tuned sub. Root C1. *(sub, punchy, click)*

Rattle Boom

An aggressive boom whose tail rattles: a wavefolder on the mids only, the sub left clean. Root C1. *(sub, folded, aggressive)*

Sub Boom Long

A long tuned sub boom: it follows the keys, so play it as a bassline. Root note C1. *(sub, boom, tuned, long)*

Velocity Boom

Soft notes are clean, hard notes distort and ring longer: velocity drives the drive and the decay. Root C1. *(sub, velocity, dynamic)*

Pop

Ballad Soft

A soft, warm kick for ballads: felt beater, round skin, a breath of room. *(soft, warm, ballad)*

Bright Beater

A modern kick with a bright, papery beater that cuts through dense mixes. *(bright, clicky, modern)*

Radio Punch

A polished, radio-ready kick: tight low end, a clear beater and a compressor holding it all together. *(punchy, polished, radio)*

Stadium

A big anthemic kick with a hall around its top: the low end stays dry, the reverb sits above it. *(big, reverb, anthemic)*

Tight Pop

A short, clean kick for busy pop productions. *(tight, short, clean)*

Trance

Classic Tok

A classic late-nineties trance kick: short, knocky and tight on the low end. *(classic, knock, short)*

Hard Trance Stomp

A hard trance stomp: a distorted body clipped flat, with a long, tight tail. *(hard, distorted, stomp)*

Progressive Round

A smooth progressive kick with a rounded attack and a warm tail. *(round, smooth, progressive)*

Rolling Offbeat

A trance kick with a short rolling tail from a bus lane, ducked so the next bass note has room. *(rolling, bus, offbeat)*

Tech Trance Drive

A driving tech trance kick: a long overdriven drop onto 50 Hz with a firm click, between hard techno and trance. *(tech trance, overdriven, driving)*

Uplifting Tail

A clean trance kick with a long, tuned tail for big breakdown drops. *(long, clean, tonal)*

Psytrance

Dark Psy Punch

A darker psy kick with a distorted knock and a dry, abrupt end. *(psy, dark, distorted)*

Forest Knock

A woody forest-psy knock: a bar resonator struck on top of a short body. *(psy, woody, dark)*

Full-On Tok

A short, tight psytrance kick: a hard knock with almost no tail, so the rolling bass fits in after it. *(psy, short, tight)*

Goa Drop

A goa kick that drops from very high: a zap of a sweep into a round, short body. *(goa, zap, tonal)*

Hardstyle

Comb Hollow

Euphoric Notch with the single cut replaced by a Comb on every even harmonic: twelve narrow cuts that fade out towards the top, for a hollow, square tail. The comb follows the keys; root C2, tail on F1. (*hardstyle, comb, hollow*)

Euphoric Hardstyle

A euphoric hardstyle kick: a punchy attack and a long distorted tail whose pitch climbs back after the drop. It follows the keys, root C2. (*hardstyle, tonal, distorted*)

Euphoric Notch

A hardstyle kick fitted to long, steady hardstyle tails: a biased drive and a hard clipper square off the tail, then an EQ cuts its second harmonic and lifts the top. The cut follows the keys (Chain Key Track); root C2, tail on F1. (*hardstyle, euphoric, notch, measured*)

Gated Hardstyle

A tight hardstyle kick cut by a Hit gate, for fast tempos. (*hardstyle, gated, tight*)

Layered Punch

Three layers the way hardstyle producers build them: a punch, a distorted tail on a bus, and a click, each with its own chain. (*hardstyle, layered, punch*)

Raw Notch

A raw hardstyle kick fitted to long, rough tails: a harder clip, a deeper and wider cut on the second harmonic and a longer decay. The cut follows the keys; root C2, tail on G1. (*hardstyle, raw, notch, measured*)

Raw Punch

A raw hardstyle kick: an aggressive punch and a gritty, folded tail. (*raw, punchy, hard*)

Reverse Bass Kick

A kick with its own reverse-bass swell: a second lane swells in after the hit and cuts off on the next beat at 150 BPM. (*hardstyle, reverse bass, offbeat*)

Tight Notch

A short hardstyle kick fitted to tight tails of about 400 ms, for fast patterns: overdriven, clipped, notched on the second harmonic and bright. The cut follows the keys; root C2, tail on F1. (*hardstyle, tight, notch, measured*)

Zaag Tail

A hardstyle kick with a buzzing saw tail that bends up and down under an envelope. (*hardstyle, saw, screech*)

Hardcore

Doomcore

A slow, huge doomcore kick: a deep distorted drop into a long dark tail. (*doom, slow, huge*)

Frenchcore Punch

A frenchcore kick: a big punch with a short, ringing distorted tail that you can play as a melody. (*frenchcore, punchy, tonal*)

Gabber Classic

The classic gabber kick: a long body driven into a fuzz until it buzzes, then clipped hard. (*gabber, distorted, classic*)

Industrial Hardcore

A dark industrial hardcore kick: distorted, then thrown into a short metal room and distorted again. (*industrial, dark, reverb*)

Terror Engine

A brutal, short terror kick for 250 BPM and up: fuzz on fuzz, cut short. (*terror, fast, brutal*)

Uptempo Crunch

An uptempo kick with a tonal, crunchy tail that follows the keys, root C2. (*uptempo, crunch, tonal*)

Drum & Bass

Jungle Break Kick

A jungle kick that sounds lifted from an old break: a skin, a room and twelve bits. (*jungle, breakbeat, lo-fi*)

Liquid Soft

A soft, round kick for liquid drum and bass. (*liquid, soft, round*)

Neuro Thump

A neurofunk kick: a distorted, compressed thump with a metallic top. (*neuro, distorted, punchy*)

Tight Roller

A tight drum and bass kick at 80 Hz: all punch, no tail, so the bass owns the low end. (*dnb, tight, punchy*)

Industrial

Factory Stomp

A stomp in a factory hall: a burst of filtered noise and a body, gated together. (*stomp, noise, gated*)

Hydraulic

A machine hit: a downward noise sweep with a body underneath, like a press coming down. (*noise, sweep, machine*)

Metal Plate

A kick struck on a steel plate: a bar resonator and a ring modulator over a short body. (*metallic, ring, harsh*)

Rust

A corroded kick: shifted, bitcrushed and saturated until it rattles. (*crushed, ring, dirty*)

Acoustic

Felt Beater

A soft felt beater on a loose head: dull, warm, close. (*acoustic, soft, felt*)

Frame Drum

A low frame drum struck by hand: a tuned membrane with a falling pitch, playable across the keys. (*hand drum, frame, tonal*)

Jazz Bass Drum

An open, ringing jazz bass drum, tuned higher and left to sing. (*acoustic, jazz, open*)

Marching Bass

A big marching bass drum in an open space. (*acoustic, marching, big*)

Rock Kick

A rock kick with a hard plastic beater up front and a deep, damped shell behind it. (*acoustic, rock, beater*)

Studio Kick

A studio bass drum: a tuned skin, a body under it, a felt beater and a small room, compressed like a close mic. (*acoustic, drum kit, studio*)

Lo-Fi

Bit Box

A kick from a toy computer: four bits, a low sample rate and a square body. *(bitcrushed, 8-bit, chiptune)*

Cassette Wobble

A worn cassette: the pitch wobbles slowly from hit to hit and the top is gone. *(cassette, wobble, detuned)*

Sampler Twelve

A punchy kick through a twelve-bit sampler with its aliasing left in. *(12-bit, sampler, punchy)*

Tape Kick

A kick bounced to tape and back: softly saturated, rolled off, and never quite the same twice. *(tape, warm, saturated)*

Vinyl Kick

A kick sampled off a scratchy record: crackle, a narrow band and a little hiss. *(vinyl, crackle, dusty)*

Ambient

Cloud Kick

A kick dissolved into a cloud: smeared, diffused and spread wide above the sub. *(ambient, smear, soft)*

Deep Space

A kick in a shimmering void: every echo is an octave higher and further away. *(shimmer, space, cinematic)*

Distant Thunder

A kick heard from far away: mostly room, low and rolling, like thunder over hills. *(ambient, reverb, cinematic)*

Heartbeat

A heartbeat: a soft first beat and a quieter second one 100 ms later, from one note. *(heartbeat, soft, double)*

Sub Pulse

Barely a kick: a soft sub pulse with a slow attack, for music that breathes. *(sub, soft, minimal)*

Tonal Drop

A tuned drop that plays in key: a resonator under a sine, both following the keys, with a soft echo. *(tonal, tuned, melodic)*

Experimental

Broken Robot

A malfunctioning machine: folded, ring-modulated and crushed, with a stuttering pitch. *(robotic, folded, ring)*

Chaos Engine

Nothing stays put: random values and free LFOs move the pitch, the decay, the drive, the filter and the noise on every hit. *(chaos, random, modulated)*

Glitch Kick

Every hit breaks differently: random pitch, and a sample-and-hold LFO tearing at the bit depth and the rate. *(glitch, random, crushed)*

Laser Thud

A metallic FM thud: an inharmonic modulator and feedback ring over the drop. *(fm, metallic, laser)*

Metallic Bloom

A kick that blooms into metal: its top is frequency-shifted and sent into a bright room. *(metallic, shift, reverb)*

Ping Pong Hall

A kick whose top bounces left and right across a hall while the low end stays in the middle. *(stereo, delay, wide)*

Reverse Swell

The kick, then itself backwards: a reversed echo swells up 300 ms after each hit. *(reverse, warp, swell)*

Rubber Band

A kick that goes up instead of down: the drawn pitch curve rises, like a plucked rubber band. *(rising, boing, funny)*

Shimmer Kick

A kick with a shimmer tail: echoes climb an octave each time and dissolve into a bright room. *(shimmer, octave, bright)*

Stutter

A kick that stutters: thirty-second-note echoes at high feedback, cut off by a gate after a beat. *(stutter, delay, glitch)*

Underwater

A kick heard underwater: a slow-moving lowpass and a smear that blurs the attack. *(filtered, lfo, submerged)*

Zap Gun

A kick fired from a ray gun: a body that falls from 3 kHz, frequency-modulated, with a zap on top. *(zap, fm, sci-fi)*

Showcase

Eight Layer Monster

Every lane at once: two bodies, a click, noise, a resonator, a rumble bus, a pitch-linked harmonic and a sub. *(layers, huge, all lanes)*

Follower Duck

A noise wash that the kick pushes out of the way: lane 1's follower turns lane 3 down, with no sidechain cable. *(follower, duck, noise)*

Harmonic Stack

Three bodies locked to one pitch: lanes 5 and 6 follow lane 1 a fifth and an octave up, so the whole stack bends together. *(pitch link, tonal, chord)*

Humanizer

No two hits alike: Random nudges pitch, decay and click per hit, and Variation does the rest. *(random, variation, organic)*

Kick Kit

Four kicks in one: C2 a techno kick, D2 a tuned boom, E2 a hardstyle kick, F2 a soft acoustic one. Each lane listens to its own note. *(kit, note filter, multi)*

Macro Performance

Four macros to play live: Macro 1 drive, Macro 2 tail, Macro 3 click and Macro 4 room. Map them to your controller. *(macros, performance, modulation)*

Split Outputs

A kick with a rumble floor, spread over the outputs: the body on the main output and its own, the click and the rumble on theirs only, to mix and sidechain in the DAW. *(aux outputs, routing, mixing)*

Velocity Morph

Play it soft and it is a gentle thud; play it hard and it is a distorted, clicky, longer kick. Velocity drives five parameters. *(velocity, dynamic, modulation)*

Wide Top

A stereo kick that stays mono where it matters: a wide noisy top with a Haas delay, everything under 130 Hz in the middle. *(stereo, haas, mono below)*

Wobble Tail

A long kick whose tail wobbles: a retriggered LFO, synced to sixteenths, works on the pitch and on a filter. *(lfo, wobble, tonal)*

12. Outputs

Besides the stereo main output, Substrike has **eight stereo outputs, one per lane**. Set a lane's **Output** to *Aux* to send it only to its own output, or to *Main+Aux* for both. In the host, activate the plugin's extra outputs and route them to their own channels: the kick and its rumble on separate faders, each with its own processing and its own sidechain. The aux outputs carry each lane before the master chain and output level.

13. Exporting a hit

Export in the top bar renders the current hit at the host's sample rate and saves it as a 24-bit stereo WAV wherever you choose. **Dragging** the waveform in the top bar does the same into your host's arrangement or sampler; the dragged files are kept in the export folder so the host can go on using them. The menu's **Normalise Exported Hits** raises each export to -0.3 dBFS; without it, an export is as loud as the hit.

14. Undo

Every change you make is a step: **Ctrl+Z** undoes it, **Ctrl+Shift+Z** or **Ctrl+Y** redoes it, and so do the arrows in the top bar. A whole preset load is one step. The history stays while the plugin is open, even with the window closed, and starts afresh when a song is loaded.

15. Tips

- **A hard techno kick:** a long, slow pitch drop (Sweep Time around 300 ms), Shape around 40 %, then in the chain a lowpass around 700 Hz, a soft distortion, a lowpass around 350 Hz and a clipper, and a short impulse click on lane 2. The lowpasses around the drive make it thick instead of fizzy.
- **A tuned sub boom:** Root Note on the key's root, a long Body Hold and Decay, Key Track at 100 %, a little soft clipping. Play it as a bassline.
- **Layers that fight:** try **Invert** on one of them, or move one with **Delay** by a millisecond or two.
- **Variation** at 10 to 20 % makes a loop of the same kick sound played rather than pasted.
- **Velocity** at 0 % on a lane keeps a club kick at full level however the notes were played.

Appendix. Every parameter

Every parameter with its range and starting value, generated from the plugin itself when this manual was built, under the names the host shows for automation.

Substrike has 1344 parameters, 1225 of them automatable. Most of them repeat: eight lanes with the same controls, six slots on each lane and on the master, four LFOs, four envelopes and 32 routes. Each is listed once here; in the host they carry their lane, slot or number in front ("L3 Slot 2 Cutoff", "LFO 2 Rate").

MASTER

PARAMETER	RANGE	DEFAULT
Output	-inf dB to +12.0 dB	-3.0 dB
Root Note	C-1 to G9, 128 steps	C2
Quality	1x, 2x, 4x	2x
Tune	-12.00 st to +12.00 st	+0.00 st
Master Crossover Low	40.0 Hz to 1.00 kHz	150 Hz
Master Crossover High	500 Hz to 12.0 kHz	2.50 kHz
Mono Below	Off to 500 Hz	Off
Output Clip	Off, Soft, Hard, Limit	Off

LANE

Every lane has these, the transient guard among them.

PARAMETER	RANGE	DEFAULT
On	Off, On	On
Level	-inf dB to +12.0 dB	+0.0 dB
Pan	L100 to R100	C
Velocity	0 % to 100 %	50 %
Source	Body, Click, Noise, Resonator, Bus	Body
Delay	0.00 ms to 100 ms	0.00 ms

Invert	Off, On	Off
Note	Any to G9, 129 steps	Any
Output	Main, Aux, Main+Aux	Main
Pitch Link	Own to Lane 8, 9 steps	Own
Transpose	-24.0 st to +36.0 st	+0.0 st
Variation	0 % to 100 %	0 %
Crossover Low	40.0 Hz to 1.00 kHz	150 Hz
Crossover High	500 Hz to 12.0 kHz	2.50 kHz
Chain Key Track	0 % to 100 %	0 %
Guard Delay	0.00 ms to 500 ms	0.00 ms
Guard Fade	0.00 ms to 500 ms	0.00 ms
Duck Source	Off to Lane 8, 9 steps	Off
Duck Depth	0 % to 100 %	100 %
Duck Release	5.00 ms to 2.00 s	120 ms

BODY

PARAMETER	RANGE	DEFAULT
Pitch Start	20.0 Hz to 10.0 kHz	350 Hz
Pitch End	20.0 Hz to 2.00 kHz	48.0 Hz
Sweep Time	1.00 ms to 2.00 s	120 ms
Sweep Curve	-100 % to 100 %	55 %
Key Track	0 % to 100 %	0 %
Body Attack	0.00 ms to 100 ms	0.00 ms
Body Hold	0.00 ms to 2.00 s	30.0 ms
Body Decay	5.00 ms to 8.00 s	450 ms
Body Decay Curve	-100 % to 100 %	45 %
Body Phase	0 deg to 360 deg	0 deg
Wave	Sine, Triangle, Saw, Square, Additive	Sine
Shape	0 % to 100 %	0 %
Tilt	-100 % to 100 %	0 %
Even	0 % to 100 %	100 %
Stretch	0 % to 100 %	0 %
FM Amount	0 % to 100 %	0 %
FM Ratio	0.25 to 16.0	2.00
FM Decay	1.00 ms to 2.00 s	30.0 ms
Feedback	0 % to 100 %	0 %
Drift	0 % to 100 %	0 %

CLICK

PARAMETER	RANGE	DEFAULT
Click Type	Impulse, Noise, Blip, Zap	Noise
Click Decay	0.10 ms to 100 ms	6.00 ms
Click Filter	Off, Low Pass, Band Pass, High Pass	High Pass
Click Cutoff	20.0 Hz to 20.0 kHz	2.50 kHz
Click Reso	0 % to 100 %	10 %
Click Pitch	20.0 Hz to 10.0 kHz	1.50 kHz
Click Sweep	+0.0 oct to +8.0 oct	+3.0 oct

NOISE

PARAMETER	RANGE	DEFAULT
Noise Color	White, Pink, Brown, Crackle	White
Noise Density	0 % to 100 %	50 %
Noise Width	0 % to 100 %	30 %
Noise Filter	Off, Low Pass, Band Pass, High Pass	Band Pass
Noise Cutoff	20.0 Hz to 20.0 kHz	3.00 kHz
Noise Reso	0 % to 100 %	20 %
Noise Filter Env	-8.0 oct to +8.0 oct	+0.0 oct
Noise Env Decay	1.00 ms to 2.00 s	50.0 ms
Noise Attack	0.00 ms to 100 ms	0.00 ms
Noise Hold	0.00 ms to 2.00 s	0.00 ms
Noise Decay	5.00 ms to 8.00 s	120 ms
Noise Curve	-100 % to 100 %	50 %

RESONATOR

PARAMETER	RANGE	DEFAULT
Resonator Exciter	Impulse, Mallet, Noise	Mallet
Resonator Model	Membrane, Harmonic, Odd, Bar	Membrane
Resonator Modes	2, 3, 4, 5, 6, 7, 8	6
Resonator Tune	20.0 Hz to 2.00 kHz	80.0 Hz
Resonator Key Track	0 % to 100 %	0 %
Resonator Decay	10.0 ms to 8.00 s	400 ms
Resonator Damping	0 % to 100 %	50 %
Resonator Brightness	0 % to 100 %	40 %
Resonator Hardness	0 % to 100 %	50 %
Resonator Drop	+0.0 st to +24.0 st	+0.0 st
Resonator Drop Time	1.00 ms to 1.00 s	30.0 ms

BUS

PARAMETER	RANGE	DEFAULT
Bus Lane 1-8	Off, On	Lane 1 on
Bus Tap	Pre Chain, Post Chain	Post Chain

EFFECT SLOT

Every slot, on a lane or on the master. Type is a setting, not automatable.

PARAMETER	RANGE	DEFAULT
Type	Off to Comb, 19 steps	Off
Band	Full, Low, Mid, High, Low+Mid, Mid+High	Full
Mix	0 % to 100 %	100 %
Bypass	Off, On	Off

EFFECT CONTROLS BY TYPE

A slot’s six generic controls take their name, range and default from its type.

Distortion

CONTROL	RANGE	DEFAULT
Model	Soft Clip to Lead, 10 steps	Soft Clip
Drive	0 % to 100 %	40 %
Bias	-100 % to 100 %	0 %
Tone	200 Hz to 20.0 kHz	20.0 kHz
Output	-24.0 dB to +12.0 dB	+0.0 dB

Clipper

CONTROL	RANGE	DEFAULT
Drive	+0.0 dB to +36.0 dB	+6.0 dB
Knee	0 % to 100 %	30 %
Ceiling	-24.0 dB to +0.0 dB	+0.0 dB

Wavefolder

CONTROL	RANGE	DEFAULT
Drive	+0.0 dB to +36.0 dB	+6.0 dB
Bias	-100 % to 100 %	0 %
Shape	0 % to 100 %	0 %
Output	-24.0 dB to +12.0 dB	+0.0 dB

Bitcrush

CONTROL	RANGE	DEFAULT
Bits	1.0 bit to 16.0 bit	8.0 bit

Rate	100 Hz to 48.0 kHz	48.0 kHz
Output	-24.0 dB to +12.0 dB	+0.0 dB

Filter

CONTROL	RANGE	DEFAULT
Mode	LP 12, LP 24, HP 12, HP 24, Band Pass, Notch, Peak	LP 24
Cutoff	20.0 Hz to 20.0 kHz	2.00 kHz
Reso	0 % to 100 %	10 %
Env	-8.0 oct to +8.0 oct	+0.0 oct
Env Decay	5.00 ms to 5.00 s	100 ms
Gain	-24.0 dB to +24.0 dB	+0.0 dB

EQ

CONTROL	RANGE	DEFAULT
Low	-18.0 dB to +18.0 dB	+0.0 dB
Mid	-18.0 dB to +18.0 dB	+0.0 dB
Mid Freq	30.0 Hz to 15.0 kHz	1.00 kHz
Mid Q	0.20 to 10.0	1.00
High	-18.0 dB to +18.0 dB	+0.0 dB
Tilt	-12.0 dB to +12.0 dB	+0.0 dB

Compressor

CONTROL	RANGE	DEFAULT
Threshold	-60.0 dB to +0.0 dB	-18.0 dB
Ratio	1.00:1 to 20.0:1	4.00:1
Attack	0.05 ms to 200 ms	3.00 ms
Release	5.00 ms to 2.00 s	80.0 ms
Knee	+0.0 dB to +24.0 dB	+6.0 dB
Makeup	+0.0 dB to +24.0 dB	+0.0 dB

Transient

CONTROL	RANGE	DEFAULT
Attack	-100 % to 100 %	0 %
Sustain	-100 % to 100 %	0 %
Speed	1.00 ms to 100 ms	20.0 ms
Output	-24.0 dB to +12.0 dB	+0.0 dB

Gate

CONTROL	RANGE	DEFAULT
Mode	Gate, Hit	Gate

Threshold	-80.0 dB to +0.0 dB	-40.0 dB
Attack	0.00 ms to 50.0 ms	0.50 ms
Hold	0.00 ms to 2.00 s	50.0 ms
Release	1.00 ms to 5.00 s	100 ms
Range	-inf dB to +0.0 dB	-inf dB

Reverb

CONTROL	RANGE	DEFAULT
Size	0 % to 100 %	40 %
Decay	50.0 ms to 10.0 s	800 ms
Damping	500 Hz to 20.0 kHz	6.00 kHz
Pre-Delay	0.00 ms to 250 ms	0.00 ms
Low Cut	Off to 1.00 kHz	Off
Width	0 % to 100 %	100 %

Delay

CONTROL	RANGE	DEFAULT
Time	1.00 ms to 2.00 s	250 ms
Sync	Free to 1/1, 16 steps	Free
Feedback	0 % to 95 %	35 %
Color	-100 % to 100 %	-30 %
Drive	0 % to 100 %	0 %
Ping-Pong	0 % to 100 %	0 %

Warp

CONTROL	RANGE	DEFAULT
Time	1.00 ms to 2.00 s	300 ms
Sync	Free to 1/1, 16 steps	Free
Feedback	0 % to 95 %	40 %
Pitch	-12.0 st to +12.0 st	-5.0 st
Mode	Forward, Reverse, Taps	Forward
Diffusion	0 % to 100 %	30 %

Smear

CONTROL	RANGE	DEFAULT
Time	0.50 ms to 80.0 ms	12.0 ms
Diffusion	0 % to 100 %	70 %
Stages	4, 8, 12, 16	8
Width	0 % to 100 %	0 %

Ring Mod

CONTROL	RANGE	DEFAULT
Mode	Ring, Shift Up, Shift Down	Ring
Frequency	1.00 Hz to 5.00 kHz	100 Hz
Env	-8.0 oct to +8.0 oct	+0.0 oct
Env Decay	5.00 ms to 5.00 s	100 ms

Stereo

CONTROL	RANGE	DEFAULT
Width	0 % to 200 %	100 %
Haas	-30.0 ms to 30.0 ms	0.00 ms

Utility

CONTROL	RANGE	DEFAULT
Gain	-inf dB to +24.0 dB	+0.0 dB
Polarity	Normal, Invert	Normal
Channels	Stereo, Mono, Swap, Left, Right	Stereo

Limiter

CONTROL	RANGE	DEFAULT
Gain	+0.0 dB to +24.0 dB	+0.0 dB
Ceiling	-24.0 dB to +0.0 dB	-0.3 dB
Release	5.00 ms to 1.00 s	80.0 ms

Comb

CONTROL	RANGE	DEFAULT
Start	20.0 Hz to 10.0 kHz	100 Hz
Spacing	5.00 Hz to 5.00 kHz	100 Hz
Bands	1 band to 32 bands	8 bands
Gain	-30.0 dB to +18.0 dB	-12.0 dB
Width	1 % to 100 %	10 %
Taper	-100 % to 100 %	0 %

MACROS

PARAMETER	RANGE	DEFAULT
Macro 1	0 % to 100 %	0 %
Macro 2	0 % to 100 %	0 %
Macro 3	0 % to 100 %	0 %
Macro 4	0 % to 100 %	0 %
Macro 5	0 % to 100 %	0 %
Macro 6	0 % to 100 %	0 %
Macro 7	0 % to 100 %	0 %
Macro 8	0 % to 100 %	0 %

LFO

Four of them, each with these.

PARAMETER	RANGE	DEFAULT
Shape	Sine, Triangle, Saw Up, Saw Down, Square, S&H, Smooth	Sine
Rate	0.01 Hz to 200 Hz	4.00 Hz
Sync	Free to 4/1, 18 steps	Free
Phase	0 deg to 360 deg	0 deg
Retrigger	Off, On	On

ENVELOPE

Four of them, each with these and its drawn curve.

PARAMETER	RANGE	DEFAULT
Time	1.00 ms to 10.0 s	300 ms
Loop	Off, On	Off

MATRIX ROUTE

32 of them, each with these.

PARAMETER	RANGE	DEFAULT
Source	Off to Follow 8, 28 steps	Off
Destination	any continuous parameter above	None
Amount	-100 % to 100 %	0 %
Curve	-100 % to 100 %	0 %