

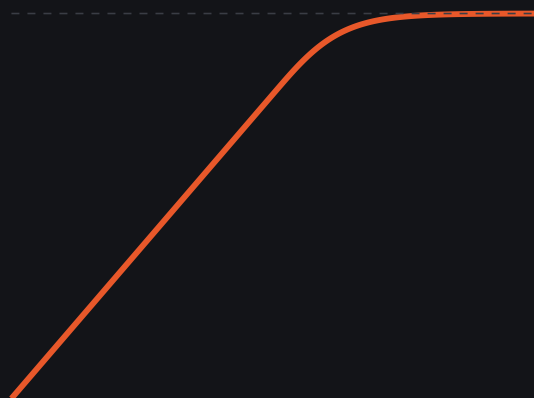


EMBER DRUMS

User Manual · v1.6

Ember Drums - drum-bus processor

VST3 for FL Studio and other DAWs · Windows and macOS (VST3 / AU)



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1 Quick start

Install. Download Ember Drums from emberaudiolabs.com and unzip it: one download holds both versions. On Windows, copy **Ember Drums.vst3** from the **Windows** folder into C:\Program Files\Common Files\VST3\. On macOS, copy the two files in the **macOS** folder: **Ember Drums.vst3** into /Library/Audio/Plug-Ins/VST3 and **Ember Drums.component** into /Library/Audio/Plug-Ins/Components. Close your DAW first if an older version is installed. In FL Studio, run **Options > Manage plugins > Find installed plugins**.

The version is shown in each plug-in's header (v1.6) and matches the zip name and this manual.

Ember Drums in five minutes.

1. Put Ember Drums on the drum bus. It starts completely neutral.
2. Give the drums punch with **Attack** (+20 to +40 %), or tame clicky hits with negative Attack.
3. Add weight or bite per band: raise a band's **Input** and **Emphasis**, then balance with its **Output**.
4. Add **Drive** for density, shape with the **EQ** knobs (click a frequency window to type a new frequency), and use the **Ceiling** to cap the peaks.
5. Optional: switch on **WIDTH** (the low end stays mono below 300 Hz by default) and add a little **Reverb** to the highs.
6. Flip **GAIN MATCH** on to compare at equal loudness, so you judge the sound and not the volume.

Trial and activation

Ember Drums runs as a **full 14-day trial** from the first time you open it. After the trial it goes silent for 2 seconds every 45 seconds until you activate it. Your settings and projects are never affected.

To activate: buy a licence at emberaudiolabs.com; your licence key arrives by email. Click the status light at the top of Ember Drums (it reads TRIAL: ... DAYS LEFT), paste the key and click **ACTIVATE**. Activation needs an internet connection once; after that it works offline.

Two computers per licence. To move to a new computer, open the licence panel on the old one and click **DEACTIVATE THIS COMPUTER**, then activate on the new one. Reinstalling on the same computer does not use up an activation.

About once a month, when online, the plug-in quietly confirms the licence with the server. If you are offline it keeps working. Activation sends only your licence key and an anonymous code identifying the computer.

Tip. Ember Drums works relative to its **Ceiling**. Curves in this manual are drawn with the ceiling at 0 dB, so behaviour is identical whether your ceiling is 0 dBFS or -1 dBFS.

What's new in v1.6

- Ember Drums is now available from emberaudiolabs.com, with a 14-day trial, licence activation and a licence panel (click the status light at the top right of the faceplate).
- One download holds both the Windows and the macOS versions.

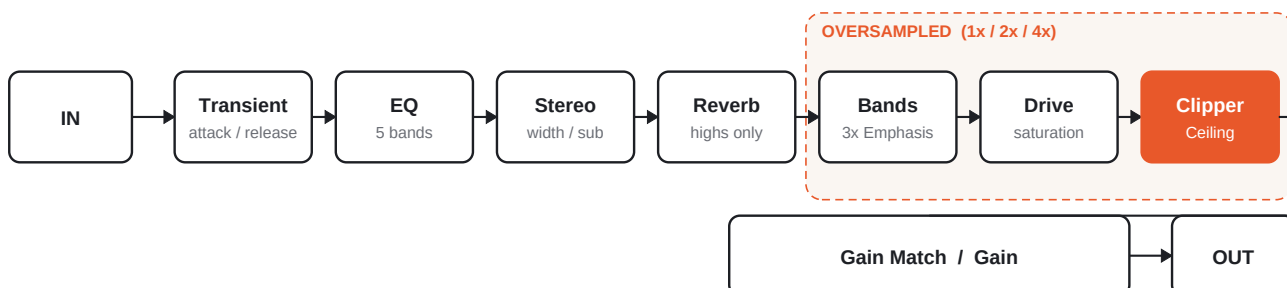
Earlier, in v1.4

- Ember Drums has digital meters (left/right input and output, clip and stereo width, each with a numeric read-out) in place of the needle meters.
- Ember Drums frames each of its LOW, MIDS and HIGHS band columns.

Ember Drums

2 Overview and signal flow

Ember Drums is a drum-bus processor: transient shaping, tone, width and space first, then multiband saturation, drive and a clipper with a hard ceiling. With every control at its starting position it passes audio unchanged (flat within 0.01 dB in testing), so you build the sound up from clean.



Ember Drums with Width and a little Attack, Drive, Emphasis and Reverb in use.

The faceplate is laid out like a piece of rack hardware. Along the top, the **meter bridge** holds four digital meters: INPUT, CLIP, OUTPUT and STEREO WIDTH. Below it, **BANDS** (with the LOW, MIDS and HIGHS columns each framed), **TRANSIENT** and **SATURATION** (Drive and oversampling) sit in the top row, **EQ** and **STEREO / SPACE** in the bottom row, and the **CLIP / OUTPUT** controls stack vertically down the right-hand side.

3 Bands and Emphasis

The signal is split into **LOW**, **MIDS** and **HIGHS** with phase-aligned 24 dB/octave crossovers (default 200 Hz and 3 kHz; adjustable with the **Low | Mid** knob from 60 to 500 Hz and the **Mid | High** knob from 1 to 10 kHz, always at least twice the low split). Each band has three knobs:

Knob	Range	Mapping
Input	0 to 24 dB (default 0)	Gain into the band. On its own it makes the band louder; with Emphasis it also drives the saturation harder.
Emphasis	0 to 100 % (default 0)	Blend of a soft saturation curve: $y = v + E \cdot (\tanh(1.5 \cdot v) / 1.5 - v)$. Quiet material stays clean; loud material is rounded and thickened, approaching about -3.5 dBFS at 100 %.
Output	-24 to 0 dB (default 0)	Band level after Emphasis. Use it to rebalance a band you pushed with Input.

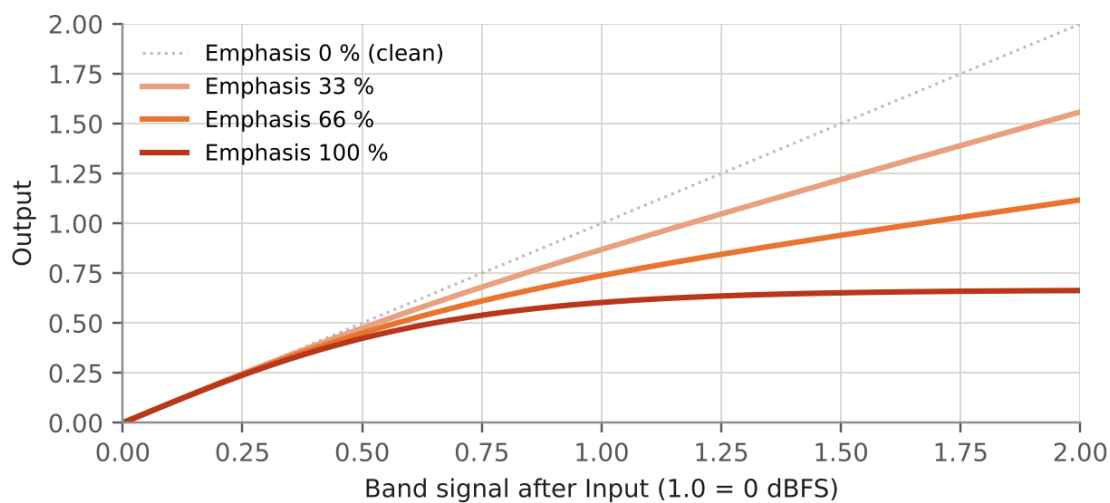


Figure 1. Emphasis curves. At low levels every setting is identical to the clean signal.

Tip. To add weight to kicks and 808s: Low Input +6 dB, Emphasis 50 %, then pull Low Output down until the level matches. To add crack to snares: the same on Mids. Leave Highs clean to keep cymbals smooth.

4 Transient shaper

Attack makes hits punchier (positive) or softer (negative). **Release** makes tails and room longer (positive) or tighter (negative). Both run from -100 to +100 % with 0 % (centre) doing nothing. Detection is stereo-linked, so the stereo image never shifts, and the shaper switches itself off below about -80 dBFS so it never lifts noise.

How the knobs are mapped

Stage	Detail
Detectors	Three peak followers on the louder channel: fast (attack 0.3 ms, release 30 ms), slow (attack 15 ms, release 30 ms) and long (attack 0.3 ms, release 250 ms).
Onset	fast - slow, in dB (only positive): large for the first few milliseconds of each hit.
Sustain	long - fast, in dB (only positive): grows as a hit decays.
Gain	$\text{gain dB} = \text{Attack} \times 1.2 \times \text{onset} + \text{Release} \times 0.6 \times \text{sustain}$, limited to +/-15 dB and smoothed over 1 ms.

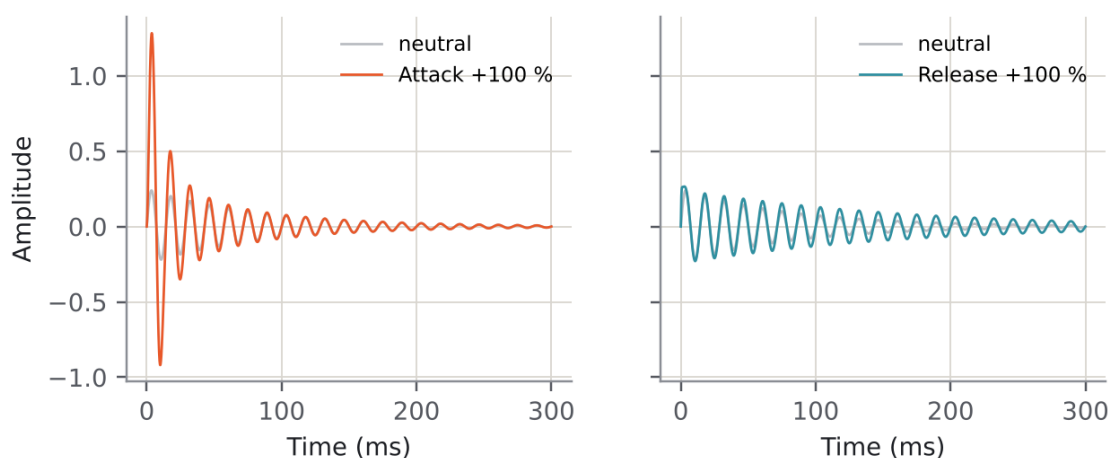


Figure 2. A kick-like hit with Attack +100 % (left) and Release +100 % (right), compared with the original.

Measured on that hit: the peak-to-tail ratio goes from 17 dB (neutral) to 29 dB at Attack +100 % and 3 dB at Attack -100 %; Release +100 % raises the tail by about 6 dB. The SHAPE window in the section shows the gain change in dB as it happens.

Tip. Extreme Attack settings can lift the very first cycle of a hit by over 12 dB, which the clipper then catches. Start around +20 to +40 % and use the Ceiling and clip type to decide how much of that new peak survives.

5 Drive

Drive (0 to 18 dB) is a saturation stage just before the clipper. It uses a curve normalised so that a full-scale sample stays at full scale, while everything quieter is lifted and thickened:

$$y = x + a \cdot (\tanh(g \cdot x) / \tanh(g) - x)$$

where **g** is the Drive gain and **a** fades the effect in over the first 3 dB so the knob starts smoothly. In testing, Drive 12 dB lifted a -26 dBFS tone by 11.9 dB while a full-scale tone gained only 1.9 dB of extra density. The result is a denser, louder drum bus, with the Ceiling still deciding the final peak level.

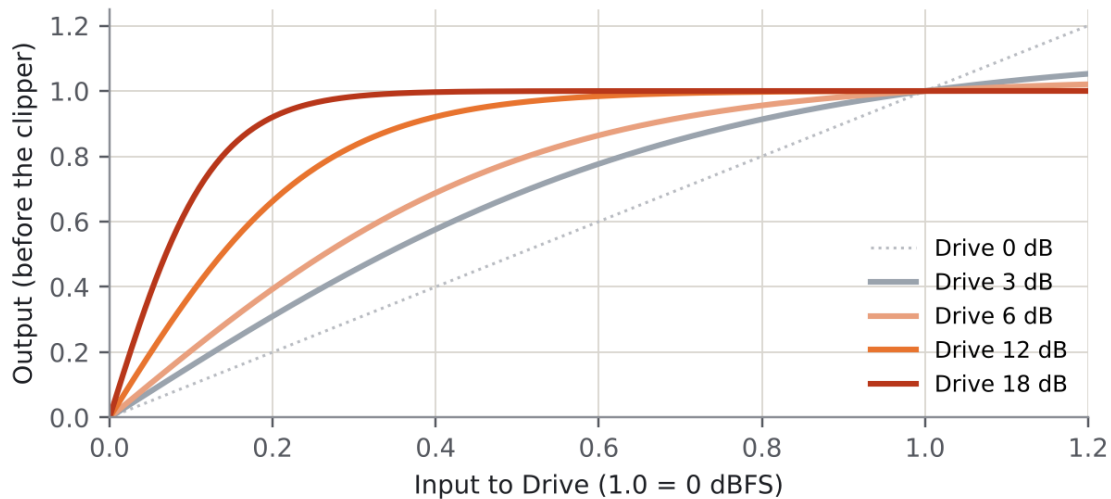


Figure 3. Drive curves. Full-scale input (1.0) stays at full scale at every setting.

The **OVERSAMPLING** selector (1x, 2x, 4x) sits under Drive in the SATURATION section; see section 8 for latency.

6 EQ

Five console-style knobs, colour-coded from low (brown) to high (red). Each knob sets the band's gain, +/-12 dB (centre = 0 dB, fully bypassed). Under each knob is a backlit **frequency window**: click it, type a frequency and press Enter. It accepts 120, 2.5k, 2k5 or 8 kHz. A value outside the band's range snaps to the nearest end of it.

Band	Default	Typed range	Type
Low Shelf	180 Hz	30 to 450 Hz	low shelf, slope 1
Low Mid	400 Hz	100 Hz to 1.5 kHz	peak, Q 1.0
Mid	2 kHz	500 Hz to 6 kHz	peak, Q 0.9
High Mid	5 kHz	1.5 to 16 kHz	peak, Q 0.9
High Shelf	10 kHz	3 to 20 kHz	high shelf, slope 1

In testing, moving the Mid band to 1 kHz with +6 dB put exactly +6.00 dB at 1 kHz. The EQ sits before the saturation and clipper, so boosting a band also makes that band hit the Emphasis, Drive and Ceiling harder.

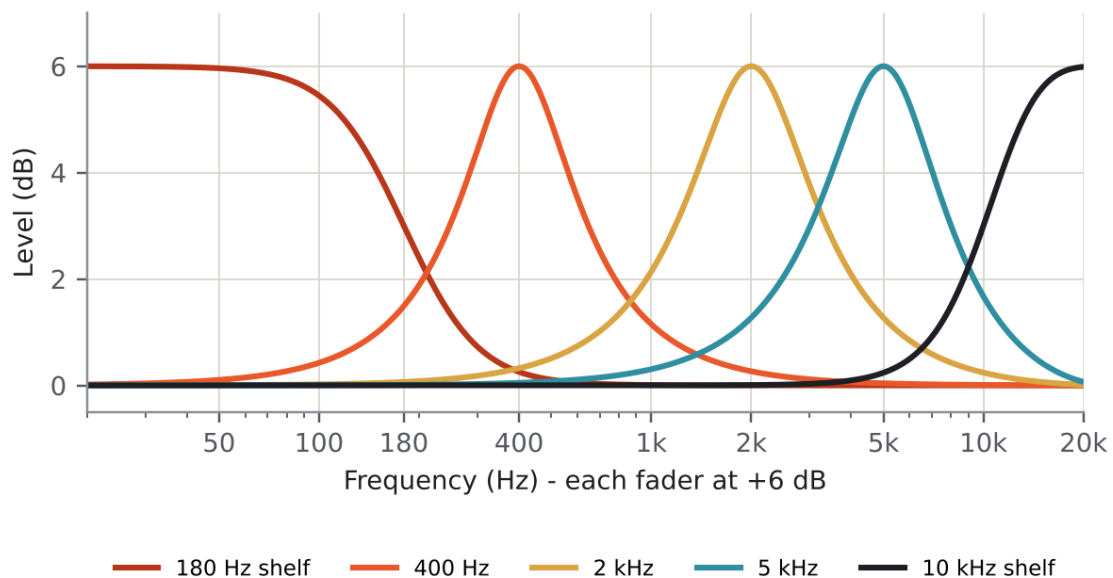


Figure 4. Each band at +6 dB at its default frequency.

7 Stereo and reverb

Control	Range	Mapping
WIDTH	switch (default off)	Turns the stereo section on; the lamp lights when it is on. Off = the stereo image is untouched. The section does nothing on mono tracks.
SPREAD	0 to 200 % (default 100 %)	Overall width: scales the side (L-R) signal. 0 % = mono, 100 % = unchanged, 200 % = twice as wide.
SEP	-100 to +100 % (default 0)	Where the width goes. The side signal is split at 1.5 kHz; below it is scaled by (1 - SEP), above it by (1 + SEP), both times SPRD. Positive = wider highs, narrower lows.
SUB MONO	Off (lowest position) or 20 to 500 Hz (default 300 Hz)	Keeps everything below the set frequency mono: a 24 dB/octave high-pass on the side signal. In testing it removed low side content by 62 dB.
REVERB	0 to 100 % (default 0)	Reverb on the high band only : the reverb is fed through a 24 dB/octave high-pass at the Mid High split, so kicks, bass and body stay dry. Room size 0.62, damping 0.45, full width; 100 % = 45 % wet level, added on top. It sits before the clipper. In testing an 80 Hz tone produced no reverb tail (-78 dB) while an 8 kHz tone produced a full tail (-12 dB).

STEREO WIDTH meter. Shows how wide the output is compared with the input: a bar from **M** (mono) to 200 %, with a marker at 100 % (unchanged) and the exact value in its read-out. It reads **MONO** when the input itself is mono. In testing it read exactly 2.00 times the input width with Spread at 200 %.

Tip. Sub Mono is on at 300 Hz by default, so widening never spreads the low end: wide bass sounds big on headphones but loses power on club systems and phone speakers.

8 Clip, output, gain match and meters

The **CLIP / OUTPUT** column stacks its controls vertically, top to bottom:

Control	Range	What it does
CLIP TYPE	Smooth / Warm / Hard	Rotary selector for the clipper character (Figure 5). The selected position lights up.
CEILING	-12 to 0 dB (default 0)	A hard maximum: after the clipper and the return from oversampling, a final guard makes sure no sample exceeds it.
GAIN	-24 to +24 dB (default 0)	Output level, after the Ceiling, so positive Gain raises the output above the Ceiling.
GAIN MATCH	switch (default off)	Automatic level matching, so you hear the processing and not just extra loudness. See below.

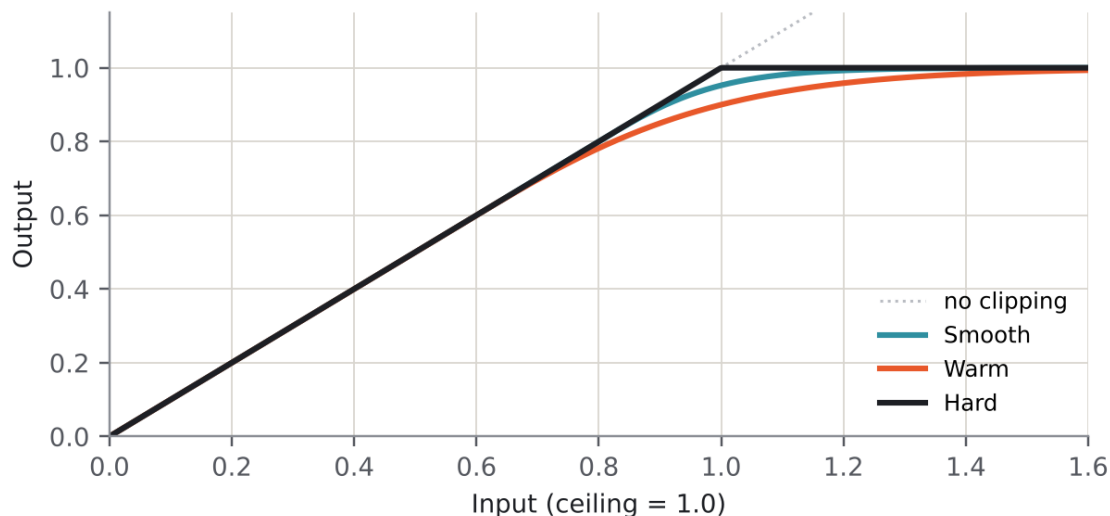


Figure 5. The three clip types (positive half shown). Smooth starts shaping 1.9 dB below the Ceiling, Warm 4.7 dB below (6.7 dB on the negative half, for a little even-order colour), Hard exactly at the Ceiling.

Gain Match

Gain Match measures the loudness (RMS, averaged over about 0.4 s) going into the plug-in and coming out of the processing, and trims the output so the two match. The trim moves smoothly (about 0.3 s), stays between -24 and +6 dB, and holds still when the input drops below about -70 dBFS so silence never pumps it. It is applied before the Ceiling, so peaks still respect the Ceiling; Gain comes after. The **TRIM** window beside the switch shows the trim in dB. In testing, settings that made a signal 17 dB louder were brought back to within 0.02 dB of the input loudness.

Meters

INPUT and **OUTPUT** show left (L) and right (R) peak levels on segment meters from -60 to 0 dBFS: green, yellow from -12 dB, amber from -3 dB and red at 0 dB. They fall at about 24 dB per second and keep a peak-hold segment lit for 1.5 seconds. The read-out above each meter shows the highest peak of the last two seconds (red above 0 dBFS). **CLIP** shows dB removed by the clipper (0 to 12 dB), and **STEREO WIDTH** is described in section 7. The **SHAPE** window in the Transient section shows the transient shaper's gain change as it happens.

Oversampling	Latency	When to use
1x	0 samples	Lowest CPU and zero latency, for tracking.
2x	4 samples	Light CPU, good quality.
4x (default)	6 samples	Best quality for heavy Emphasis, Drive and clipping.

9 Ember Drums parameter reference

Automation names as they appear in FL Studio, with ranges and defaults.

Parameter	Range	Default	Scaling
Low / Mid / High Input	0 to 24 dB	0 dB	linear dB
Low / Mid / High Emphasis	0 to 100 %	0 %	linear
Low / Mid / High Output	-24 to 0 dB	0 dB	linear dB
Low/Mid Split	60 to 500 Hz	200 Hz	logarithmic
Mid/High Split	1 to 10 kHz	3 kHz	logarithmic
Attack	-100 to +100 %	0 %	linear
Release	-100 to +100 %	0 %	linear
Drive	0 to 18 dB	0 dB	linear dB
EQ Low Shelf / Low Mid / Mid / High Mid / High Shelf Gain	-12 to +12 dB	0 dB	linear dB
EQ Low Shelf Freq	30 to 450 Hz	180 Hz	logarithmic
EQ Low Mid Freq	100 Hz to 1.5 kHz	400 Hz	logarithmic
EQ Mid Freq	500 Hz to 6 kHz	2 kHz	logarithmic
EQ High Mid Freq	1.5 to 16 kHz	5 kHz	logarithmic
EQ High Shelf Freq	3 to 20 kHz	10 kHz	logarithmic
Width	off / on	off	switch
Spread	0 to 200 %	100 %	linear
Separation	-100 to +100 %	0 %	linear
Sub Mono	Off (20 Hz) to 500 Hz	300 Hz	logarithmic
Reverb	0 to 100 %	0 %	linear
Ceiling	-12 to 0 dB	0 dB	linear dB
Clip Type	Smooth / Warm / Hard	Smooth	choice
Gain	-24 to +24 dB	0 dB	linear dB
Gain Match	off / on	off	switch
Oversampling	1x / 2x / 4x	4x	choice

Interface tips. Double-click any knob to return it to its default. Drag to turn; click a frequency window to type a frequency. The window can be resized from the bottom-right corner.

Ember Drums is a plug-in by Ember Audio Labs, built with JUCE. This manual describes version v1.6.