VEIRA

ANALOG DELAY

VEIRA Analog Delay

User Manual

A bucket-brigade delay in a vintage program-equalizer panel: the longer the delay, the darker and grainier the repeats, every repeat a little darker than the last, and the pitch bends as you turn DELAY.



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Welcome

Thank you for choosing **VEIRA Analog Delay**. It is a model of the classic analog delays built on **bucket-brigade chips** (BBDs): a long chain of tiny capacitors that pass the sound along, one step at each tick of a clock. Those chips gave the analog delay its sound: warm, dark repeats that sit behind the music, get grainier as the delay gets longer, and bend in pitch when you turn the knob.

The front panel is styled after the classic program equalizers: blue-grey enamel, white engraving, big black knobs with their scales printed around them, chrome toggle switches, a red pilot lamp and one huge VU meter in the middle. There are no screens or graphs: you set it by ear and by the needle, as you would the hardware.

What makes it different

- **The delay is the clock.** DELAY sets the speed of the chips' clock. A long delay is a slow clock, which leaves less bandwidth: up to 170 ms the repeats reach 8 kHz; at 1 s they stop at about 1.35 kHz, darker and grainier, as on the real units.
- **Every repeat a little darker.** Each repeat goes round the chips and TONE again, so the repeats darken as they fade into the distance.
- **The pitch bends.** Turn DELAY while the repeats ring and everything in the chips bends in pitch on the way, down as the delay gets longer and up as it gets shorter, and never backwards.
- **Chorus and warble from the same chips.** MOD RATE and MOD DEPTH wobble the clock: a chorus or vibrato on short delays, a tape-like warble on long ones, with the same pitch swing at any DELAY.
- **Self-oscillation that stays musical.** REPEATS goes to 120 %. Past about 106 % the loop runs away into the chips' saturation and is held there: the echoes never pass −1 dBFS.
- **Drive without the level jump.** INPUT pushes the op-amp and the chips; the echoes keep their level, and the drive is in their sound.
- **No latency.** At MIX 0 %, or with the DELAY switch at OUT, the output is the input, bit for bit.
- **Legible at any size.** Plain, clear lettering on the vintage panel, and a window you can scale from 75 % to 200 %.

How this manual is organised. *Getting started* covers installing and activating. *The panel at a glance* names every part of the window and gives a quick start. *How an analog delay works* is a short primer on bucket-brigade delays; read it if words like *clock*, *feedback* or *self-oscillation* are new to you. *Controls* explains every knob and switch with drawings measured from the plugin, *The VU meter and the pilot lamp* teaches you to read the panel, and *Inserts and sends*, *Presets*, *Recipes*, *Specifications* and *Troubleshooting* follow.

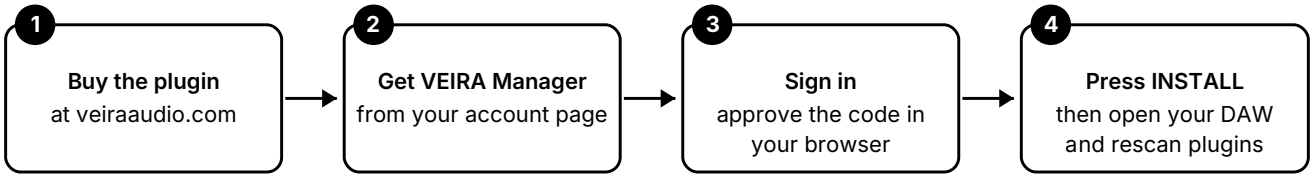
Getting started

What you need

macOS	macOS 11 Big Sur or later. Native on Apple silicon and Intel Macs (universal).
Windows	Windows 10 or 11, 64-bit.
Plugin formats	VST3 (macOS and Windows), Audio Units (macOS), and a standalone app. Pro Tools (AAX) versions arrive once they are signed for Pro Tools.
Hosts	Any DAW that loads VST3 or Audio Units: Logic Pro, Cubase, Nuendo, Ableton Live, Studio One, Reaper, FL Studio, Bitwig and others.
Account	A VEIRA account at veiraaudio.com, and the free **VEIRA Manager** app.
Internet	Needed to install and to refresh the licence. The plugin itself never goes online.

Install with VEIRA Manager

VEIRA plugins are not downloaded from the website one by one. You install them with **VEIRA Manager**, the free VEIRA app that installs, updates and activates everything you own. Its own manual covers it in full; the short version is:



One account works on up to three computers. Updates are free for life.

FIGURE 1 From purchase to first sound in four steps.

1. **Buy** VEIRA Analog Delay at **veiraaudio.com**. It's a one-time purchase: you own it for good, with free updates.
2. **Download VEIRA Manager** from your account page (or veiraaudio.com/manager) and install it.
3. **Sign in.** VEIRA Manager shows a short code and opens your browser; confirm the code there. Your password is never typed into the app.
4. Find VEIRA Analog Delay in the list and press INSTALL. When it says SHOW, it's installed. Open your DAW and let it rescan its plugins.

After installing, VEIRA Analog Delay appears in your DAW under the manufacturer **VEIRA** (in Logic Pro: Audio Units ▸ VEIRA ▸ VEIRA Analog Delay).

Activation and the licence

VEIRA Manager keeps a licence on your computer that the plugins check. It is refreshed every time VEIRA Manager opens and stays valid for 30 days offline, so you can work without internet as long as you open VEIRA Manager now and then.

Without a valid licence, VEIRA Analog Delay still loads and works, but **its sound fades out for 1.5 seconds every 30 seconds**, and a strip along the bottom of its window says why (for example, *NOT ACTIVATED ON THIS COMPUTER. SIGN IN WITH VEIRA MANAGER.*). Clicking the strip opens your account page.

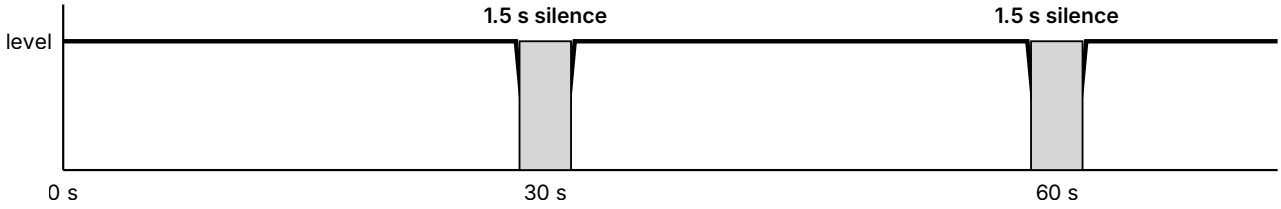


FIGURE 2 What an unlicensed copy does. With a valid licence the audio is never touched.

- **Activating while your DAW is open** takes effect within about two minutes. You don't need to reload the plugin.
- **"Not activated on this computer"**: open VEIRA Manager and sign in.
- **"Expired"**: open VEIRA Manager while online; it renews the licence at once.
- **"Not included"**: the signed-in account doesn't own VEIRA Analog Delay. Check that you're signed in with the account you bought it with.

Formats and where the files go

VEIRA Manager puts every format in the standard place, so you never need to copy files by hand:

Format	macOS	Windows
VST3	`~/Library/Audio/Plug-Ins/VST3` (just for me, the default) or `/Library/Audio/Plug-Ins/VST3` (all users)	`C:\Program Files\Common Files\VST3` (all users, the default) or `%LOCALAPPDATA%\Programs\Common\VST3`
Audio Units	`~/Library/Audio/Plug-Ins/Components` or `/Library/Audio/Plug-Ins/Components`	(Audio Units are macOS only)
Standalone	`~/Applications/VEIRA` or `/Applications/VEIRA`	`C:\Program Files\VEIRA` or `%LOCALAPPDATA%\Programs\VEIRA`

You choose *just for me* or *all users* in VEIRA Manager's install settings.

The standalone app runs VEIRA Analog Delay on its own, with your audio interface's input and output, which is handy for trying presets without a DAW.

The panel at a glance



FIGURE 3 VEIRA Analog Delay with the *Init* preset loaded.

	Part	What it does
1	Preset browser	Steps through and saves presets. See *Presets*.
2	DELAY	The delay time, 20 ms to 1 s: the speed of the chips' clock.
3	REPEATS	The feedback: how many repeats, up to self-oscillation.
4	INPUT	How hard the op-amp and the chips are driven.
5	TONE	A gentle filter on every repeat, from dark to open.
6	VU meter	LEVEL INTO THE CHIPS: the input at the INPUT level.
7	TEMPO switch	SYNC: the delay follows your DAW's tempo. FREE: DELAY sets it.
8	NOTE	The delay as a note value, while TEMPO is at SYNC.
9	DELAY switch	IN or OUT: the whole delay in, or the input untouched.
10	Pilot lamp	Lit while the delay is IN.
11	MOD RATE	How fast the clock is wobbled.
12	MOD DEPTH	How far the echoes' pitch swings.
13	MIX	The echoes against the dry signal.

	Part	What it does
14	OUTPUT	The final level.

The panel reads like the hardware it is styled after: the **delay** on the left (DELAY and REPEATS above, INPUT and TONE below), the **meter and the switches** in the middle, and the **modulation and the output** on the right.

Using the controls

Every VEIRA plugin is played like a piece of hardware. The same few parts appear on every panel:

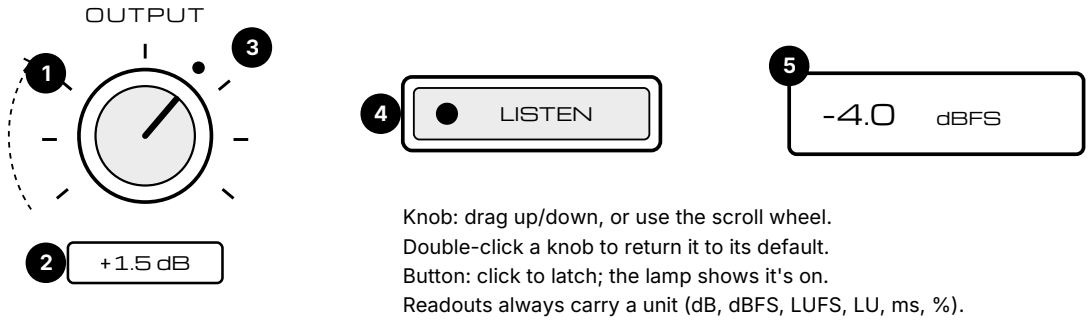


FIGURE 4 The parts you'll find on every VEIRA panel (the labels are examples).

- 1 **Knob.** Drag up to turn it clockwise, down to turn it back, or use your mouse wheel. **Double-click** returns it to its default. The engraved pointer and the small dot on the scale show where it's set.
- 2 **Value window.** The backlit window under each knob shows its exact value with its unit.
- 3 **Silkscreen label.** The control's name, as it appears in your DAW's automation list.
- 4 **Push button.** Click to switch on; the lamp lights and the cap sits lower in its bezel. Click again to switch off.
- 5 **Readout.** Live numbers update ten times a second so you can read them while the meters move. A value over 0 dBFS shows as a warning.

Tooltips: hover over any control or display for a short explanation. On displays, the tooltip depends on where you point.

Automation: every knob and button is a host parameter, so you can automate it in your DAW and control it from a MIDI controller or control surface that your DAW maps.

Units: VEIRA never shows a bare number. **dBFS** is level against digital full scale (0 dBFS is the loudest a digital signal can be); **dB** is a change in gain; **LUFS** is loudness as streaming services and broadcasters measure it; **LU** is a difference in loudness (1 LU = 1 dB).

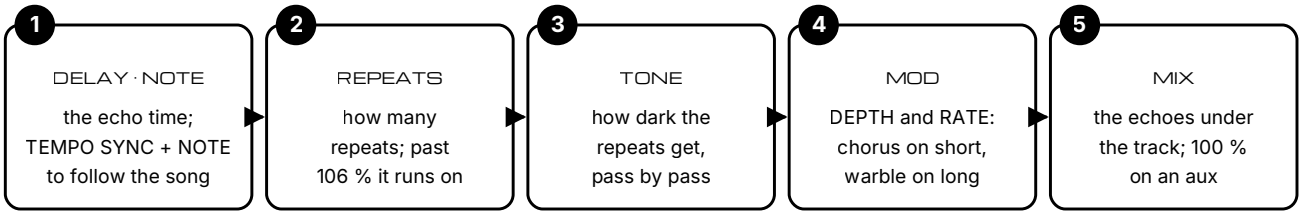
This panel has no value windows. The big knobs have their scales printed around them instead. To read a knob's exact value, hover over it (or turn it): a small tag under the knob shows the value with its unit, for example 350 ms or +4.0 dB. TONE and MOD DEPTH are printed 0 to 10, as on the old units; their tags and your DAW show them as 0 to 100 %.

The switches are chrome toggles. Click one to flip it: the lever points up for the upper legend ([SYNC], [IN]) and down for the lower one ([FREE], [OUT]). In your DAW they are the parameters *Sync* and *In*.

Dimmed knobs. While [TEMPO] is at [SYNC], [NOTE] sets the delay and [DELAY] is dimmed; at [FREE], [NOTE] is dimmed. A dimmed knob still turns, and its value is kept for when you switch back.

Resize the window: drag its bottom-right corner (the small diagonal lines). It scales from 75 % to 200 % of its normal size and keeps its proportions, so the scales, the meter and the lettering stay sharp. Your DAW saves the size with the session. The legends around the knobs and switches are printed in a plain, legible type, 12 points and up at the normal size.

Quick start: an echo in five moves



Then drive the chips with INPUT (watch the VU meter) and match the level with OUTPUT.

FIGURE 5 The quickest way to a good analog echo. The rest of this manual explains each step.

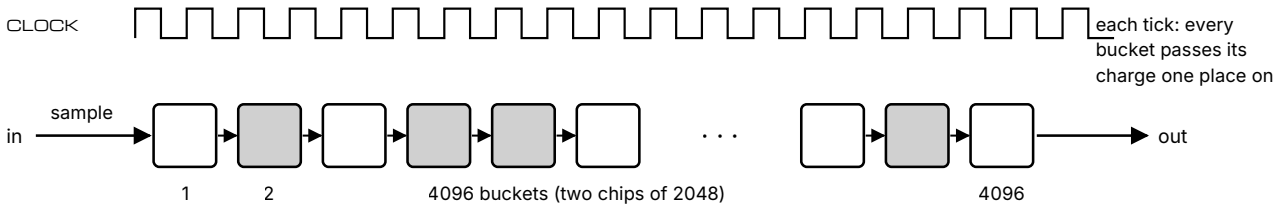
Or load a factory preset close to your job (see *Presets*): each preset's note says which control to set first, usually [DELAY], [REPEATS] or [MIX].

How an analog delay works

If you already know bucket-brigade delays, skip to *Controls*. If not, these pages explain what the plugin does, and why the sound of an analog delay is still so sought after.

A bucket brigade

Before digital delays, a delay pedal or rack unit had no memory to store sound in. It used **bucket-brigade chips** instead: a chain of thousands of tiny capacitors, the *buckets*. A **clock** ticks thousands of times a second. At each tick the first bucket takes a sample of the incoming sound, and every bucket passes its charge to the next one along, like a line of people passing buckets of water. After as many ticks as there are buckets, the sample comes out at the other end: that is the delay.



delay = buckets ÷ clock rate

DELAY	clock	the chips' filters	the sound
20 ms	205 kHz	8 kHz	bright, clean
170 ms	24 kHz	8 kHz	still bright
350 ms	11.7 kHz	3.9 kHz	warm
600 ms	6.8 kHz	2.3 kHz	dark
1 s	4.1 kHz	1.35 kHz	darkest, grainy

FIGURE 6 A bucket brigade. At each tick of the clock the first bucket takes a sample of the sound and every bucket passes its charge one place on; the sound comes out at the end, delayed by the number of buckets over the clock's speed. VEIRA Analog Delay has 4096 buckets, so its clock runs from about 205 kHz (20 ms) down to 4.1 kHz (1 s), and the chips' filters follow it.

So the delay time is set by the **speed of the clock**: a fast clock gives a short delay, a slow one a long delay. That has two famous side effects:

- **Long delays are darker.** A clock can only carry sound up to half its speed, so the chips sit between two filters that follow the clock: they keep what the chips can carry and smooth what comes out. A slow clock (a long delay) closes them down, and a little of what is left above half the clock folds back down as a soft grain. That is the dark, grainy repeat of a long analog delay.
- **Turning the knob bends the pitch.** Change the clock while sound is in the chain, and that sound comes out at a different speed from the one it went in at: lower in pitch while the delay gets longer, higher while it gets shorter.

The chips also add a little **noise**, so the units used a **compander**: a compressor before the chips and a matching expander after them, which keeps the noise down and makes it rise and fall with the music.

Feedback: the repeats

Send part of the echo back into the input, and each echo goes through the chips again and comes out once more, a little quieter: that is **feedback**, on this panel REPEATS. At low settings you hear one or two repeats; at high settings a long trail; and past the point where each repeat is as loud as the one before, the loop feeds itself and grows into a howl or a drone: **self-oscillation**, which dub engineers play like an instrument.

On a digital delay each repeat is a perfect copy of the last. On an analog delay each repeat has been through the chips and their filters once more, so it comes back **a little darker every time**: the repeats fade into the distance instead of competing with the dry sound.

What happens inside VEIRA Analog Delay

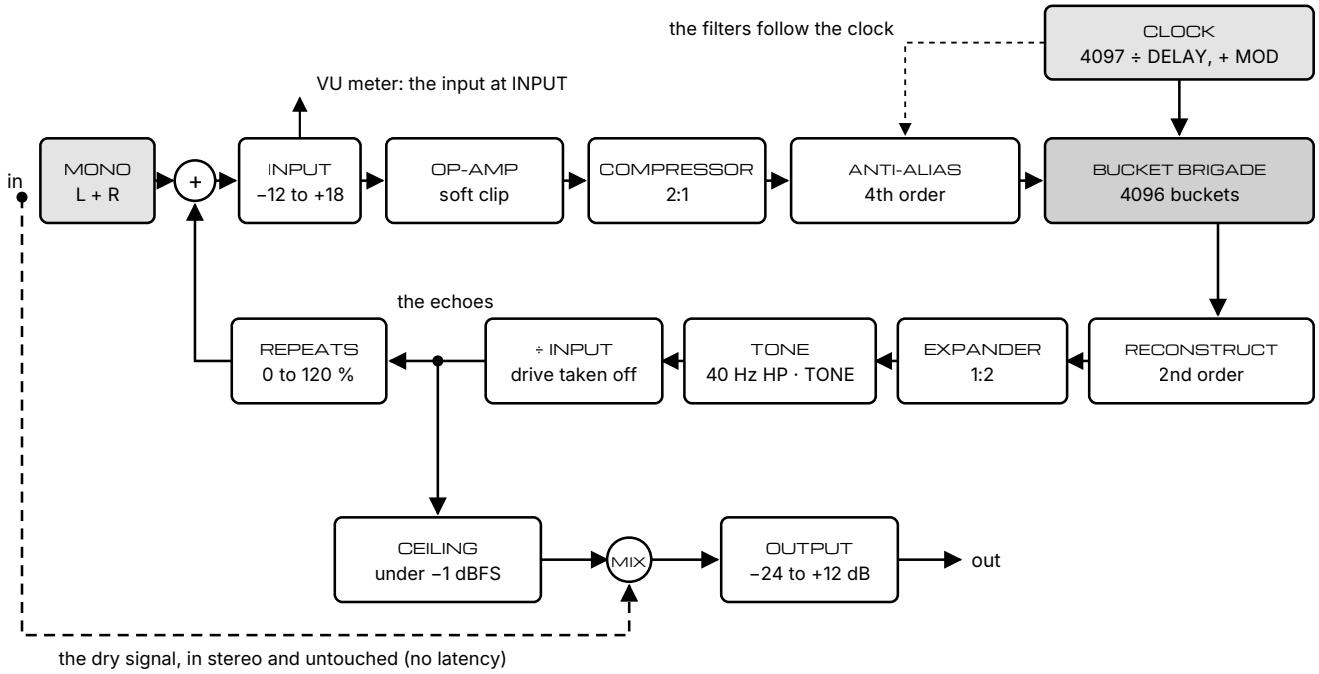


FIGURE 7 Signal flow. The input, summed to mono, and the repeats go through INPUT, the op-amp and the compressor into the bucket brigade, between its two filters; the expander, the 40 Hz coupling filter and TONE follow, and INPUT's gain is taken back off. The result is the echoes: they go round again at REPEATS, and are held under −1 dBFS before MIX blends them with the untouched dry signal.

Step by step:

1. **The input** is summed to mono (the chips carry one signal, as on the units) and the repeats are added to it.
2. INPUT sets how hard the next stages are driven. The **VU meter** shows the input at this level (not the repeats).
3. **The op-amp** clips softly when pushed. What its clipping takes off the level is given back over about 50 ms, so driving it changes the echoes' sound, not their level.
4. **The compressor** (2:1) lifts quiet passages before the chips, so they stay clear of the chips' noise.
5. **The anti-alias filter** (4th order) takes off what the clock can't carry. Its corner sits at a third of the clock's speed, never above 8 kHz.

6. **The bucket brigade**: 4096 buckets, clocked at 4097 ÷ DELAY ticks a second and wobbled by MOD. Each bucket saturates softly, with a touch of the even harmonics real chips have, and the chips add their noise.
7. **The reconstruction filter** (2nd order, on the same corner) smooths what comes out, and **the expander** (1:2) undoes the compressor exactly: the compressor's gain travels the chips beside the signal, so the two always match. The chips' noise rises and falls with the music, as on the real units, without pumping the echoes.
8. **A 40 Hz coupling filter and** TONE follow, and INPUT**'s gain is taken back off**. What comes out is the echoes.
9. **The loop:** the echoes go back to step 1 at REPEATS (with a little loss on every pass), so every repeat goes through the chips and TONE again.
10. **The output:** the echoes are held under −1 dBFS by a soft ceiling (untouched below −3 dBFS), MIX blends them with the dry input, which stays in stereo and untouched, and OUTPUT sets the final level.

There is **no latency**: the dry signal is never delayed, and the echoes land on their times. The chips' clock is not heard: there is none of the clock whine some real units leak.

Controls

DELAY and REPEATS



FIGURE 8 1 DELAY and 2 REPEATS.

Control	Range	Default	
DELAY	20 ms to 1 s, in 1 ms steps	350 ms	The delay time: the chips' clock.
REPEATS	0 to 120 %, in 1 % steps	35 %	The feedback: how many repeats.

DELAY

DELAY is the time from the sound to its echo: from 20 ms (a metallic flam) through slapback (70 to 130 ms) and the classic quarter and dotted-eighth echoes to a full second. Its knob is logarithmic, so the short times get as much of its travel as the long ones; the scale is printed at 20, 50, 100, 200 and 500 ms and 1 s. Above 999 ms its tag reads in seconds (1.00 s).

DELAY sets the **speed of the chips' clock**, and two things follow from that.

A longer delay is a darker one. The chips' filters follow the clock, at a third of its speed, up to 8 kHz:

DELAY	The chips' filters	The sound
20 to 170 ms	8 kHz	Bright: slapback and short echoes keep their top end
250 ms	5.4 kHz	Warm
350 ms (the default)	3.9 kHz	Warm and round
500 ms	2.7 kHz	Dark
600 ms	2.3 kHz	Dark
750 ms	1.8 kHz	Very dark
1 s	1.35 kHz	The darkest, and grainy

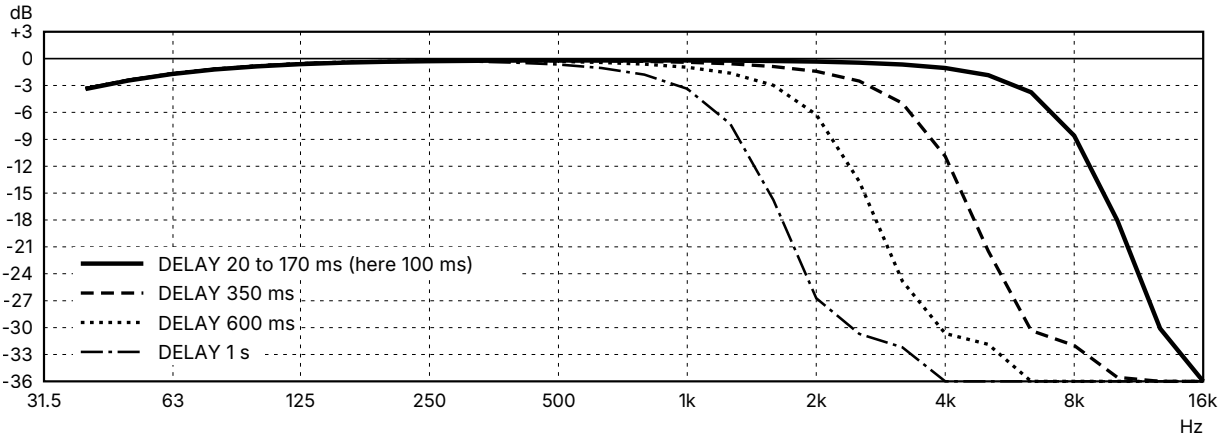


FIGURE 9 The first echo's frequency response (REPEATS 0, TONE open), measured from the plugin. Up to 170 ms the echo is flat to about 4 kHz and rolls off from there, 9 dB down at 8 kHz; at 350 ms it is 11 dB down at 4 kHz, at 600 ms 14 dB down at 2.5 kHz, and at 1 s 16 dB down at 1.6 kHz. The gentle fall below 100 Hz is the 40 Hz coupling filter: 0.8 dB at 100 Hz, 4.5 dB at 31.5 Hz.

At the longest delays a little of what lies above half the clock folds back down as a soft, inharmonic grain, as on the real chips: at DELAY 1 s (a clock of 4.1 kHz), a 3 kHz tone comes back as a faint 1.1 kHz tone, about 32 dB down. The anti-alias filter keeps it a texture rather than a clang. The darkening is the analog delay's character, and you can't switch it off; if you want a brighter long echo, use a shorter DELAY (or SYNC with a shorter NOTE) and more REPEATS.

The pitch bends when you change it. The clock glides to its new speed (most of the way in about a third of a second, settled after about a second). While it changes, the sound already in the chips comes out at a different speed from the one it went in at: lower while the delay gets longer, higher while it gets shorter.

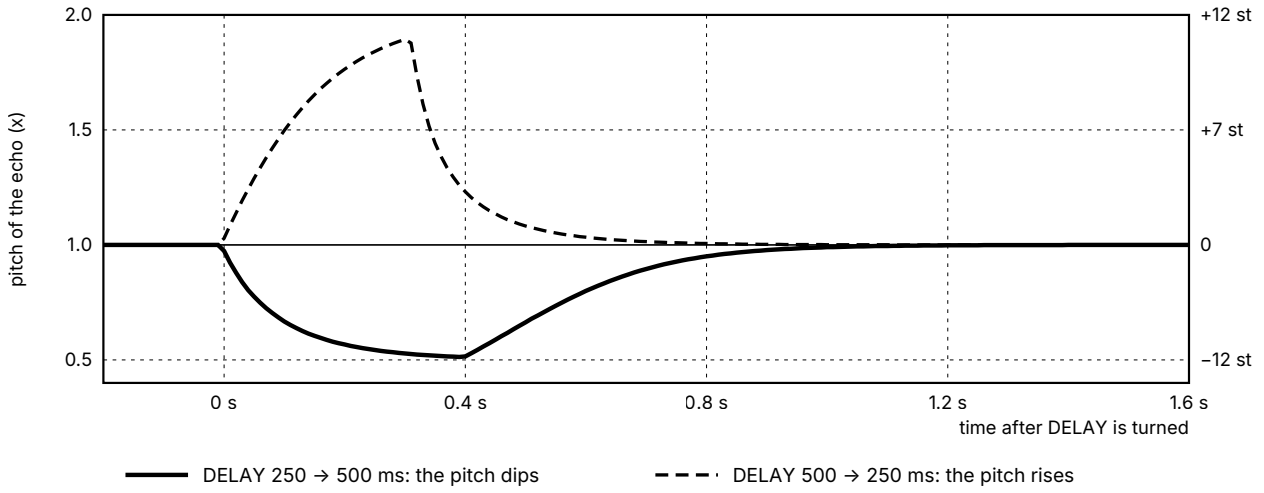


FIGURE 10 The pitch of a steady tone's echo when DELAY is turned, measured from the plugin. From 250 to 500 ms the echo dips to about 0.51 of its pitch (almost an octave down) and is back at its pitch after about a second. From 500 to 250 ms it rises to about 1.9 times its pitch for a third of a second, then falls back. Nothing stalls, runs backwards or clicks on the way.

This is the classic sweep of an analog delay: turn DELAY while the repeats ring (or automate it) for dives, rises and sirens. The preset *Creative FX: Pitch Dive Echo* is set up for it. If you don't want the bend, change DELAY between phrases. A tempo change in your DAW while TEMPO is at SYNC changes the clock too, so it bends the echoes in the same way.

REPEATS

REPEATS is the feedback: how much of the echo goes back into the chips. Each repeat comes back at about REPEATS times the one before, a little less at the top:

REPEATS	Each repeat	What you hear
0 %	No repeats	One echo: slapback, doubling, chorus.
25 %	About 12 dB quieter	Two or three repeats.
50 %	About 6 dB quieter	A clear trail of repeats.
80 %	About 2.4 dB quieter, and darker	A long trail that fades into the distance.
100 %	Under 1 dB quieter	A long sustain: the repeats take many seconds to fade.
Over about 106 %	Louder, until the chips saturate	Self-oscillation: the loop runs on by itself.

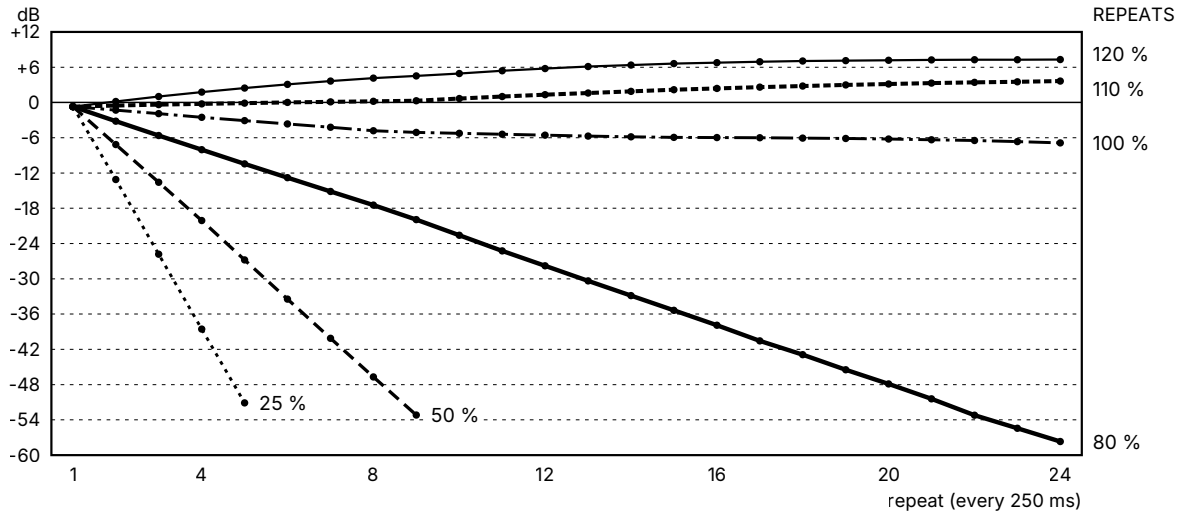


FIGURE 11 Each repeat's level against the input, measured from the plugin (DELAY 250 ms, TONE 5, a 1 kHz burst). The repeats fall in a straight line: about 12 dB each at 25 %, 6.4 dB at 50 %, 2.4 dB at 80 %. At 100 % they fall about 0.6 dB each at first and then only about 0.1 dB. At 110 and 120 % they grow, and then level off a few dB above where they started: the chips' saturation holds the loop.

Self-oscillation. Somewhere past 100 % each repeat comes back louder than the one before, and the loop runs away. Where exactly depends on the sound: TONE and the chips' filters take more off the highs on every pass, so low notes run away first.

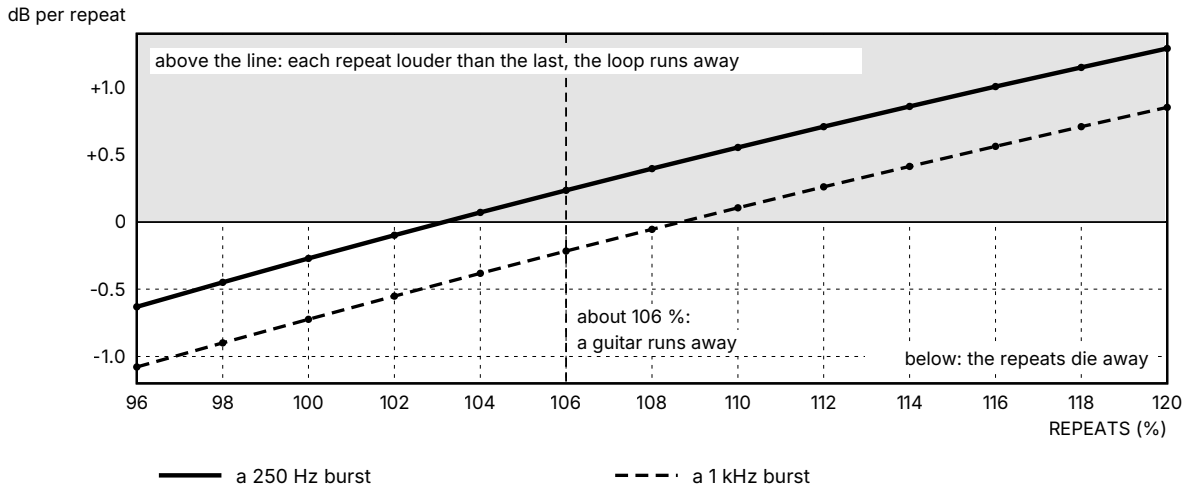


FIGURE 12 How much each repeat grows or falls against REPEATS (DELAY 350 ms, TONE 5), measured from the plugin. A 250 Hz note runs away from about 103 %, a 1 kHz note from about 109 %; on a guitar, from about 106 %. Between 100 % and the runaway point the repeats sustain for a long time.

It doesn't explode: it runs into the chips' saturation, which rounds it off, and a soft ceiling keeps the echoes themselves under −1 dBFS whatever you do (before MIX and OUTPUT). The loop becomes a sustained, saturated tone or drone whose pitch follows DELAY. Bring REPEATS back under 100 % to let it die away.

> **Tip:** Self-oscillation is a performance: automate REPEATS up past 106 % for a bar, sweep DELAY for a siren, then pull REPEATS back. The presets *Dub: Dub Siren Runaway*, *Dub: Self Oscillation Drone* and *Creative FX: Infinite Hold Loop* start there.

TEMPO, NOTE and the DELAY switch

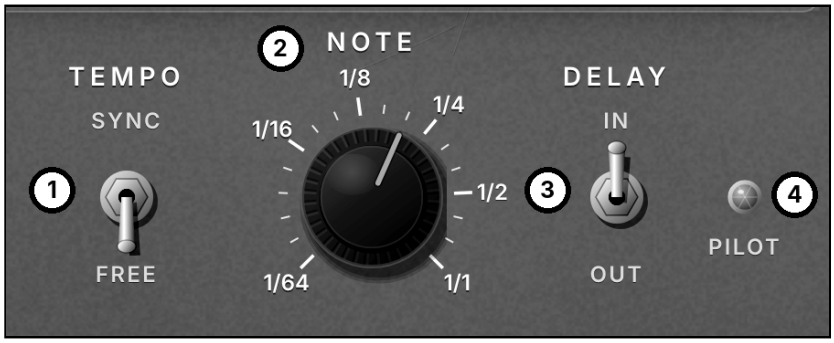


FIGURE 13 1 The TEMPO switch (here at FREE), 2 NOTE, dimmed, 3 the DELAY switch at IN and 4 the pilot lamp.

Control	Settings	Default	
TEMPO	SYNC, FREE	FREE	SYNC: the delay follows your DAW's tempo.
NOTE	1/64 to 1/1, 18 values	1/8D	The delay as a note value, at SYNC.
DELAY switch	IN, OUT	IN	The delay in, or the input untouched.

TEMPO and NOTE: echoes in time

Flip TEMPO up to SYNC and the delay follows your DAW's tempo. NOTE then sets it as a note value: 1/64, 1/32T, 1/32, 1/16T, 1/32D, 1/16, 1/8T, 1/16D, 1/8, 1/4T, 1/8D, 1/4, 1/2T, 1/4D, 1/2, 1/1T, 1/2D or 1/1 (T: triplet, D: dotted; the default is 1/8D, the dotted eighth). The knob clicks through them; its scale is printed at 1/64, 1/16, 1/8, 1/4, 1/2 and 1/1, and its tag shows the exact value.



FIGURE 14 The preset *Rhythmic: Dotted Eighth Sync*: 1 DELAY dimmed, 2 TEMPO up at SYNC and 3 NOTE at 1/8D, lit.

- The delay stays within DELAY's range, **20 ms to 1 s**. At slow tempos the longest values are held at 1 s: at 120 BPM a 1/2 is exactly 1 s, so 1/2D, 1/1T and 1/1 also play at 1 s. At fast tempos the shortest values are held at 20 ms.
- Remember that a long delay is a dark one, whether you set it with DELAY or with NOTE: at 120 BPM a 1/8 (250 ms) keeps the chips at 5.4 kHz, a 1/4 (500 ms) at 2.7 kHz.
- A tempo change in your DAW changes the clock, so the echoes bend in pitch on the way, as with DELAY.
- Without a tempo from the host (some standalone setups), SYNC uses 120 BPM.

At FREE (lever down), DELAY sets the time in milliseconds and NOTE is dimmed.

The DELAY switch and the pilot lamp

The DELAY switch puts the whole delay IN (lever up, the red pilot lamp lit) or takes it OUT (lever down, the lamp dark). At OUT the output is the input, bit for bit: MIX and OUTPUT are set aside too, so the level doesn't jump. The change is a quick, smooth fade, never a click.

The chips keep running while the switch is at OUT: whatever is still ringing in the loop carries on silently, and switching back to IN brings it back where it would have been. Automate the switch for echo throws that come and go without stopping the trail.

INPUT and TONE

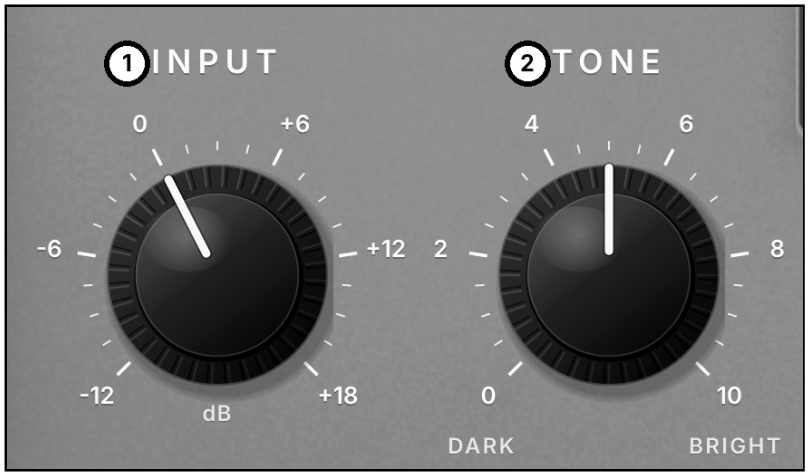


FIGURE 15 1 INPUT and 2 TONE, with DARK and BRIGHT under it.

Control	Range	Default	
INPUT	−12 to +18 dB, in 0.1 dB steps	0.0 dB	How hard the op-amp and the chips are driven.
TONE	0 to 10 (0 to 100 %, in 1 % steps)	5 (50 %)	A gentle filter on every repeat, from 600 Hz to open.

INPUT

INPUT sets how hard the sound hits the op-amp and the chips. Watch the VU meter (see *The VU meter and the pilot lamp*): around 0 VU and below the echoes are clean; above it they round off and thicken; well above, they saturate into grit, and more so with every pass through the loop.

Unlike a real unit's input knob, INPUT **doesn't change the echoes' level**: its gain is taken back off after the chips, and what the op-amp's clipping takes off is given back. So you can set the drive by ear and keep your MIX. Turned down (it goes to −12 dB), it keeps a hot track clean.

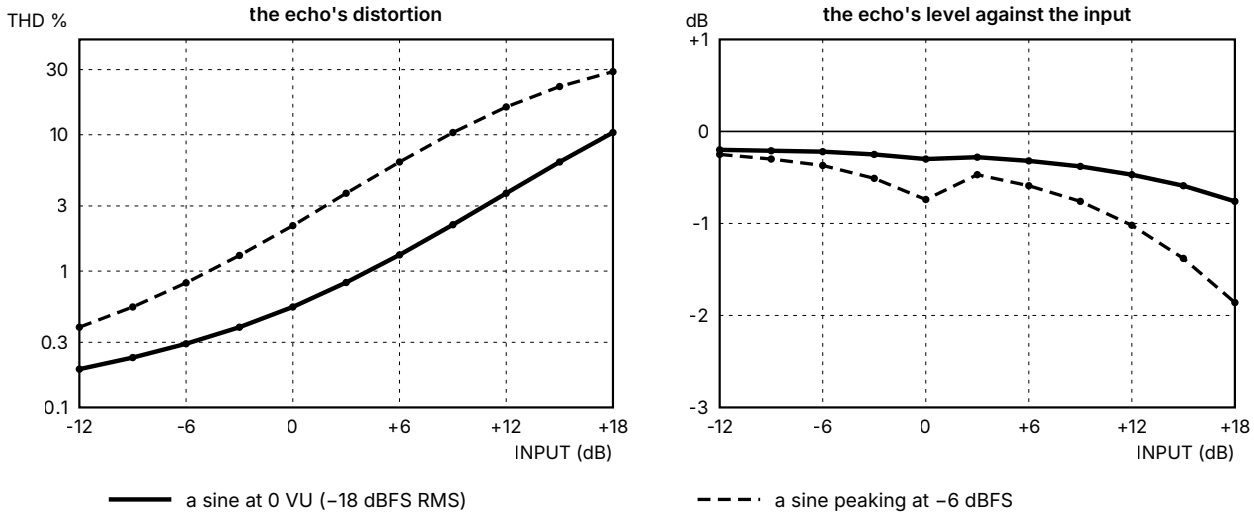


FIGURE 16 A 400 Hz sine's echo against INPUT, measured from the plugin (DELAY 100 ms, TONE open). Left: the distortion. A sine at 0 VU has 0.5 % THD at INPUT 0 dB, 2.2 % at +9 dB and 10 % at +18 dB; a hotter sine, peaking at −6 dBFS, 2.2 % at 0 dB and 29 % at +18 dB. Right: the echo's level stays within 2 dB of the input's, fully driven.

The factory presets were set on tracks peaking around −8 dBFS (drums −6, a mix −4). On a much hotter track the repeats saturate sooner; on a quieter one they're cleaner. Set INPUT by the meter first.

TONE

TONE is a gentle low-pass filter (6 dB per octave) on the repeats, after the chips. Its corner runs from 600 Hz at 0 (DARK) through about 1.7 kHz at 3 and 3.5 kHz at 5 to fully open at 10 (BRIGHT). It doesn't touch the dry signal.

It sits **in the loop**, so every repeat goes through it again: a gentle cut on the first echo becomes a deep one by the fifth. The repeats darken as they fade, on top of the darkening the chips' own filters give every pass.

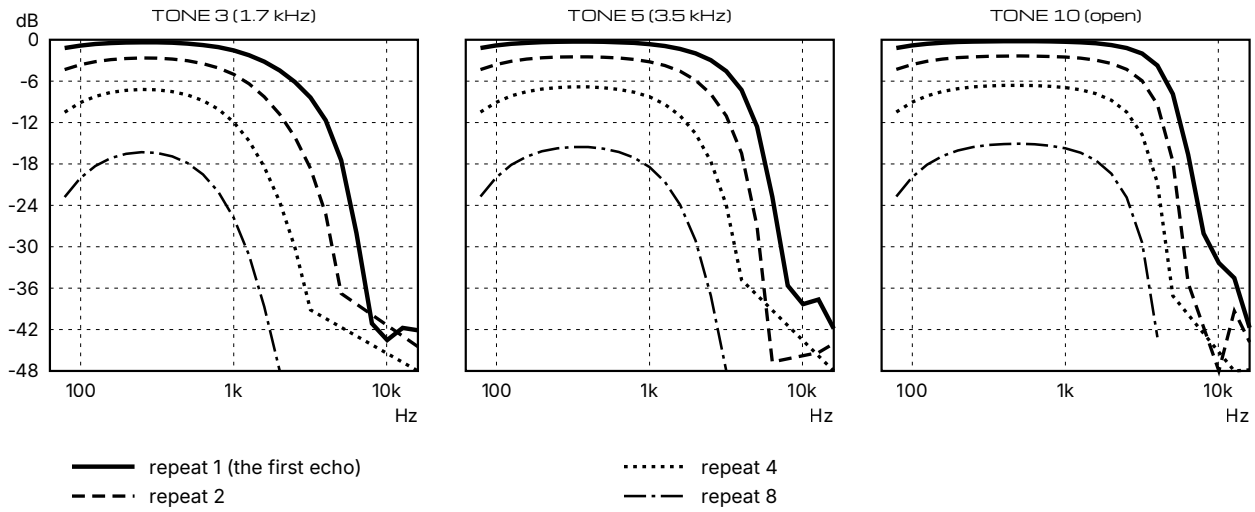


FIGURE 17 Repeats 1, 2, 4 and 8 at three TONE settings (REPEATS 80 %, DELAY 250 ms: the chips at 5.4 kHz), measured from the plugin, against the input. At TONE 10 only the chips darken the repeats: by the eighth, 2 kHz is about 4 dB down against the lows. At TONE 5 it is 13 dB down, and at TONE 3 33 dB: the later repeats are a dark murmur. Lines stop where the repeat sinks into the chips' noise.

- **TONE 6 to 10** for clear repeats: slapback, rhythmic echoes, a bright chorus.

- **TONE 4 to 5** for the classic warm analog echo that sits behind a voice or a lead.
- **TONE 2 to 3** for dub and dark tails: the repeats melt away pass by pass.
- **TONE 0** for an underwater sound (*Creative FX: Underwater Repeats*).

On long delays the chips are dark already (see *DELAY*), so TONE matters most on short and medium delays.

MOD RATE and MOD DEPTH

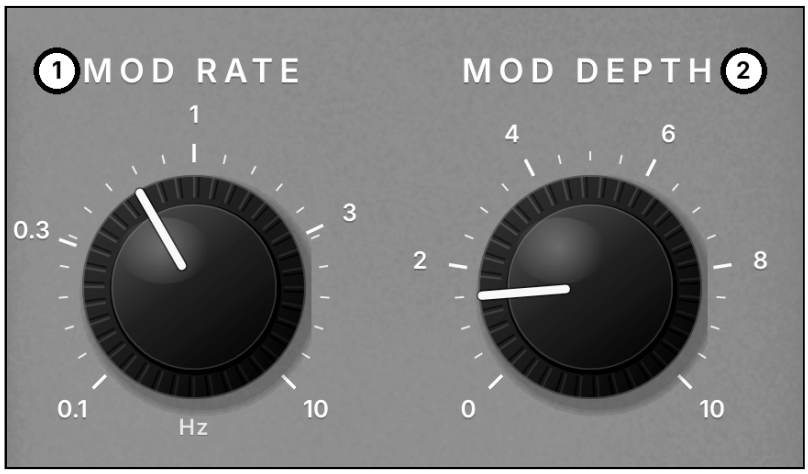


FIGURE 18 1 MOD RATE and 2 MOD DEPTH.

Control	Range	Default	
MOD RATE	0.10 to 10.0 Hz, logarithmic	0.60 Hz	How fast the clock is wobbled.
MOD DEPTH	0 to 10 (0 to 100 %, in 1 % steps)	1.5 (15 %)	How far the echoes' pitch swings.

The modulation is a sine wave on the chips' clock, as on the analog units that had a modulation circuit. Moving the clock bends the pitch of what is in the chips (see *DELAY*), so the echoes waver in pitch while the dry signal stays put:

- **Short delays** (15 to 35 ms) with MIX around 40 % give a **chorus**: the wavering copy beside the dry sound thickens it. At MIX 100 % and REPEATS 0 you hear only the wavering copy: a **vibrato**.
- **Long delays** give a **warble**: the repeats drift in pitch like a worn tape.

MOD DEPTH sets the echoes' **pitch swing**, the same at any DELAY: about ±52 cents at 10 (about half a semitone each way), ±26 cents at 5, ±13 at 2.5 and ±8 at the default 1.5. Under ±10 cents is a gentle movement; ±20 is a clear chorus; from ±35 it is a seasick wobble.

MOD RATE is how often it swings: 0.3 to 1 Hz for a slow chorus or drift, 1 to 3 Hz for a classic chorus or warble, 5 to 7 Hz for vibrato.

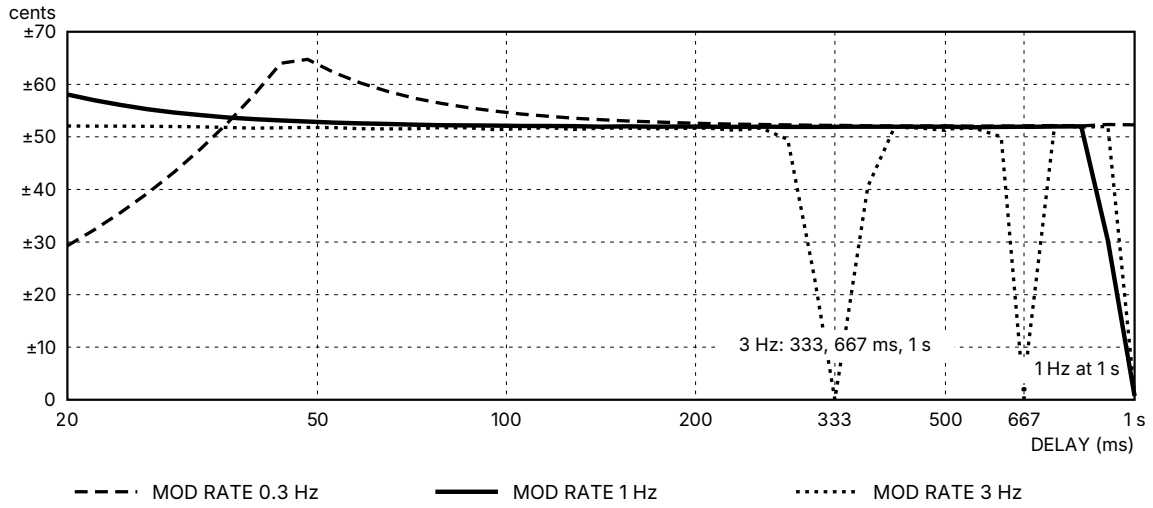


FIGURE 19 The echo's pitch swing at MOD DEPTH 10, against DELAY, measured from the plugin. At most settings it is ±52 cents. Where MOD RATE × DELAY is a whole number the swing cancels (1 Hz at 1 s; 3 Hz at 333 ms, 667 ms and 1 s). At 0.3 Hz on very short delays the clock's limit holds it down (±29 cents at 20 ms), and just above that it overshoots, up to about ±65 cents around 45 ms.

The cancellation. When the wobble makes a whole number of cycles in the time a sound spends in the chips, the sound comes out with the clock at the same point of its cycle as when it went in, and its pitch doesn't move. That is how the real units behave. At MOD RATE 1 Hz and DELAY 1 s, for example, the echoes don't waver at all; near it, they waver less. If a long, synced delay sounds unmodulated, move MOD RATE a little.

Two edges. On very short delays (under about 50 ms) at the slowest rates, the clock would have to swing too far, so it is held to ±35 % of its speed: at 0.3 Hz on 20 ms the swing stops near ±30 cents. Just above that, up to about 100 ms, a slow rate swings a little more than MOD DEPTH asks (up to about ±65 cents at 10). Neither is an issue at the depths most music uses.

At MOD DEPTH 0 the clock is steady: no modulation at all.

MIX and OUTPUT

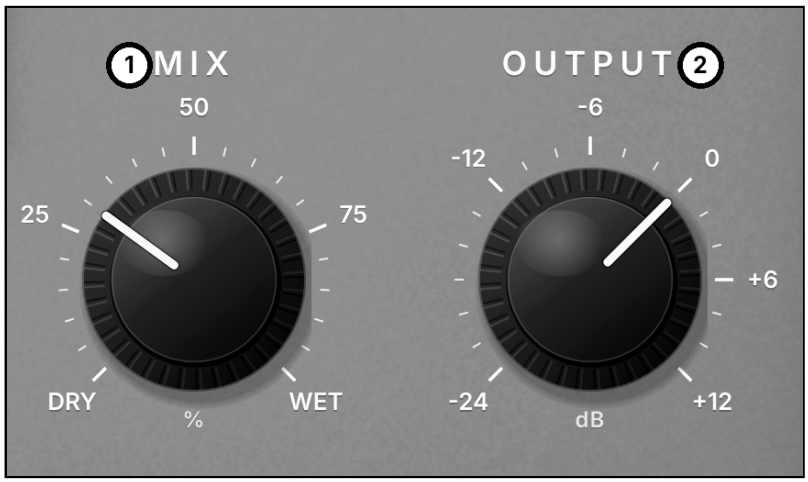


FIGURE 20 1 MIX, from DRY to WET, and 2 OUTPUT.

Control	Range	Default	
MIX	DRY to WET (0 to 100 %, in 1 % steps)	30 %	The echoes against the dry signal (equal power).
OUTPUT	−24 to +12 dB, in 0.1 dB steps	0.0 dB	The final level.

MIX blends the echoes with the dry signal, with an equal-power law: at 50 % both are 3 dB down. At 0 % (DRY) the output is the input, bit for bit. On an insert, 12 to 30 % is typical (most presets use 12 to 28 %, the Mix Bus presets 7 to 10 %, the choruses 40 to 45 %). On an aux return, and for a pure vibrato, use **100 %** (WET; see *Inserts and sends*).

OUTPUT sets the level leaving the plugin, after MIX. Use it to match the bypassed level: switch the DELAY switch between IN and OUT while the music plays (or bypass the plugin in your DAW) and adjust OUTPUT until the two sound equally loud.

The VU meter and the pilot lamp

The VU meter



FIGURE 21 The VU meter: 1 the needle, 2 the VU scale, 3 the red zone above 0 VU, 4 the percentage scale, 5 IN, the level going in, and 6 the calibration, 0 VU = −18 dBFS.

The big meter in the middle is labelled LEVEL INTO THE CHIPS. It shows the **input at the INPUT level**, summed to mono: what you are feeding the op-amp and the chips. It doesn't show the repeats, so the needle falls back when the music stops even while the echoes ring.

- **It is a true VU meter**, with the standard needle ballistics (IEC 60268-17): it shows the average level, rising and falling over about a third of a second, as a studio VU meter does.
- **The VU scale** 2 runs from −20 to +3 VU, with **0 VU = −18 dBFS RMS** printed on the face 6 .
- **The red zone** 3 above 0 VU is where the drive becomes audible: the further in, the more the echoes saturate (see *INPUT*).
- **The percentage scale** 4 under it is the studio meter's second scale: the level as a percentage of 0 VU (100 % = 0 VU).



FIGURE 22 The preset *Creative FX: Overdriven Echoes* (INPUT +14 dB): 1 the needle pinned past +3 VU. The echoes keep their level; the drive is in their sound.

A good place to start is the needle swinging around −6 to 0 VU on the loud parts, for clean but warm echoes. For drive, raise INPUT until the needle lives in the red. Hover over the meter for a reminder of what it shows.

The pilot lamp

The red jewel to the right of the DELAY switch, marked PILOT, is lit while the delay is IN and dark while it's OUT. Hover over it for a reminder.

Value tags and tooltips

Hover over any knob, or turn it, and its exact value appears in a small tag under it. Every knob, switch, the meter and the lamp have a tooltip that explains what they do.

Inserts and sends

VEIRA Analog Delay works both ways, and the factory presets are made for both.

On an insert (on the track itself), MIX sets how much echo you hear: 12 to 30 % is typical. The dry signal passes untouched and without latency. Every preset outside *Sends* is an insert preset, trimmed to within half a dB of bypass in loudness.

On a send (an aux or FX return that several tracks feed):

1. Create an aux (FX) track in your DAW and insert VEIRA Analog Delay on it.
2. Load a preset from **Sends** (or set MIX to **100 %**, so the aux returns only echoes).
3. Send the tracks you want to it, and set each one's send level.
4. Ride the aux's fader for the overall echo level.

The *Sends* presets aren't trimmed: each returns its echoes between 1.1 and 1.5 dB under the level sent to it.

> **Tip:** For dub *throws*, use a send: automate the send level up on the one word or snare hit you want to echo, and let the echoes ring after it. With REPEATS at 70 to 80 %, the repeats carry on for bars.

Mono and stereo. The chips carry one signal, as on the units, so the echoes are mono (the input is summed) and sit in the centre; the dry signal keeps its stereo. On a mono track, insert it mono, or mono in with stereo out.

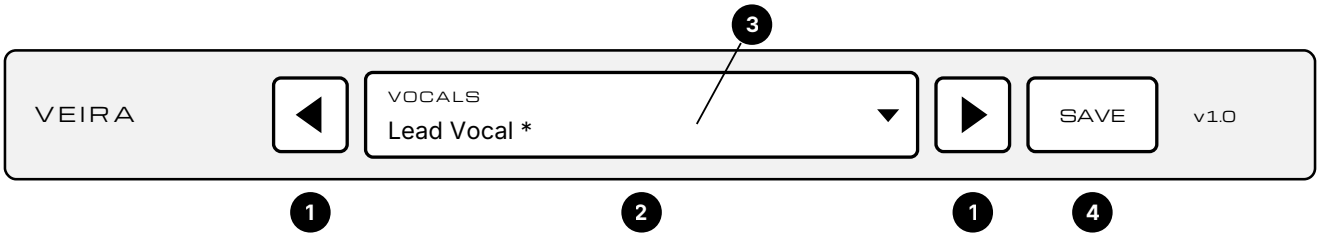
Bypass. When you bypass the plugin, its output is its input, without latency, and the chips keep running in the background: when you switch it back on, the echoes continue from where they would have been, not from silence. Your DAW keeps calling the plugin for 12 seconds after the sound stops (its *tail*), so the echoes ring out at the end of a region or a song.

Presets

VEIRA Analog Delay comes with **75 factory presets** in 14 folders. Each one is a starting point made for a real job. Load one close to what you need, then adjust the first control its note mentions.

The preset browser

The preset browser sits in the header, at the top of the window.



The header: logo and plugin name, then the preset browser, then the version.

FIGURE 23 The preset browser.

- 1 ◀ ▶ step to the previous or next preset, through every folder in order.
- 2 **The display** shows the folder (small, above) and the preset's name. Click it to open the preset menu. Hover over it to read the preset's note: what it's for and what to adjust first.
- 3 **An asterisk (*)** after the name means you've changed something since the preset loaded.
- 4 SAVE stores your current settings as a user preset.

The preset menu

Clicking the display opens a menu with:

- one submenu per **factory folder**, in the order shown below;
- **User Presets**, with your own presets in their folders;
- **Save...**, **Delete** (only for user presets: factory presets can't be deleted), **Rescan** (re-reads the user folder, if you copied presets in by hand) and **Show User Preset Folder** (opens it in Finder or Explorer).

Saving your own presets

1. Set VEIRA Analog Delay the way you like it.
2. Press SAVE. A dialog opens inside the plugin window.
3. Type a name, choose a folder or type a new folder name, and confirm.

Each user preset is one small .veirapreset file:

	Folder
macOS	~/Library/Audio/Presets/VEIRA/VEIRA Analog Delay/<Folder>/
Windows	%APPDATA%\VEIRA\VEIRA Analog Delay\Presets\<Folder>\

Copy these files to move your presets to another computer, or to back them up. Presets keep loading in future versions: any control added later simply starts at its default.

Presets in your DAW

The factory presets also appear in your DAW's own preset or program menu, named *Folder: Name* (for example *Vocals: Lead Vocal*). Whatever preset is selected is saved with your session and comes back when you reopen it, including the asterisk if you'd changed it.

The **Default ▸ Init** preset equals a fresh instance of the plugin: every control at its default.

The factory folders

Folder	Presets
Default	Init
Drums	Snare Slapback, Kit Thickener, Dark Dotted Snare, Tom Fill Eighths, Grainy Drum Room
Bass	Bass Slap Thickener, Synth Bass Eighths, Dub Bass Shadow, Round Bass Echo, Bass Doubler
Guitar	Rockabilly Slapback, Country Slap, Warm Lead Echo, Dotted Eighth Lead, Ambient Swells, Analog Chorus, Vintage Vibrato, Blues Lead Echo
Keyboards	Electric Piano Echo, Organ Room Slap, Synth Lead Repeats, Piano Halo, Keys Chorus
Strings	String Section Depth, Pizzicato Echoes, Solo Violin Echo, Cinematic Strings Wash
Brass	Horn Section Slap, Trumpet Ballad Echo, Sax Lounge Echo, Brass Stab Repeats
Woodwinds	Flute Air Echo, Clarinet Room Slap, Reed Warble Halo, Woodwind Eighth Echo
Vocals	Vintage Vocal Slap, Quarter Note Vocal, Dotted Vocal Throw, Vocal Doubler, Ballad Vocal Echo, Dark Vocal Tail
Mix Bus	Mix Ambience, Bus Glow Echo, Vintage Mix Depth, Mix Chorus Sheen
Sends	Send Analog Echo, Send Slapback, Send Dotted Eighth, Send Dark Repeats, Send Chorus, Send Long Wash
Rhythmic	Straight Eighths, Dotted Eighth Sync, Quarter Note Echo, Eighth Triplet Echo, Quarter Triplet Echo, Sixteenth Ripple, Dotted Quarter Echo, Half Note Echo
Dub	Dub Snare Throw, Steppers Echo, Skank Chord Repeats, Dub Vox Delay, Endless Dub Tail, Dub Siren Runaway, Self Oscillation Drone
Creative FX	Seasick Warble, Lo-Fi Grain Echo, Metallic Short Loop, Infinite Hold Loop, Deep Vibrato, Overdriven Echoes, Underwater Repeats, Pitch Dive Echo

- **Sends** presets have MIX at 100 %, for an aux.
- **Rhythmic** presets use SYNC for eighths, dotted and triplet values, sixteenths and halves.
- Many presets use SYNC: their notes give the time at 120 BPM, and in your session they follow your tempo.

- The **choruses and vibratos** (*Analog Chorus*, *Vintage Vibrato*, *Keys Chorus*, *Vocal Doubler*, *Mix Chorus Sheen*, *Send Chorus*, *Deep Vibrato*) use delays of 22 to 32 ms with [MOD].
- Two presets in **Dub** (*Dub Siren Runaway*, *Self Oscillation Drone*) and one in **Creative FX** (*Infinite Hold Loop*) run away on purpose: their [REPEATS] is 110 %, and their notes say to ride it back down. *Endless Dub Tail* sits at 97 %: a tail that takes half a minute to fade.

Levels. Each preset was measured on the real plugin, at 48 kHz and 120 BPM, on material that suits its folder: drums peaking at −6 dBFS, a mix at −4 dBFS, and bass, keys, strings, brass, woodwinds, vocals and guitar at −8 dBFS, with gaps between phrases so the echoes are heard. On that material each insert preset comes out within half a dB of bypass in loudness, so you can compare fairly, and the output peaks between −11.3 and −4.0 dBFS. The echoes die away in 0.4 to 23 seconds, except in the three presets that run away.

Set INPUT first on a different level. [INPUT] drives the op-amp and the chips, so on a track recorded hotter than the presets assume, the repeats saturate sooner; on a quieter one they're cleaner. Their level stays about the same either way. Set [INPUT] by the VU meter, then [MIX].

Recipes

Step-by-step starting points. In each, finish by comparing with the DELAY switch at OUT (or with your DAW's bypass): on an insert the two should sound equally loud; trim OUTPUT if they don't.

Fifties slapback on a guitar or a voice

1. Load **Guitar ▸ Rockabilly Slapback** (or **Vocals ▸ Vintage Vocal Slap**): one bright repeat.
2. Set DELAY between 90 and 130 ms: shorter is tighter, longer is more obvious. Slapback is usually set by feel rather than with SYNC. Up to 170 ms the chips keep their top end, so the slap stays bright.
3. Keep REPEATS at 5 to 15 %: one repeat, perhaps a faint second.
4. Set MIX so the slap is felt more than heard (20 to 30 %).

The warm lead echo

1. Load **Guitar ▸ Warm Lead Echo** or **Guitar ▸ Dotted Eighth Lead** (SYNC, NOTE 1/8D).
2. Set DELAY to the song (or use SYNC), then REPEATS for the length of the trail: 35 to 50 %.
3. Turn TONE down to 4 if the repeats compete with the lead; up to 6 if they get lost.
4. Keep MOD DEPTH low (1 to 2): just enough wobble to sound analog.

Chorus, doubling and vibrato

1. Load **Guitar ▸ Analog Chorus** or **Keyboards ▸ Keys Chorus** for a chorus, **Vocals ▸ Vocal Doubler** or **Bass ▸ Bass Doubler** for doubling.
2. Keep DELAY between 20 and 35 ms and REPEATS low (0 to 10 %).
3. Set the movement with MOD DEPTH (2 to 4 for a chorus) and MOD RATE (0.6 to 1.3 Hz), then MIX (15 to 45 %).
4. For a vibrato, load **Guitar ▸ Vintage Vibrato** or **Creative FX ▸ Deep Vibrato**: MIX 100 %, REPEATS 0, MOD RATE 5 to 7 Hz.

Dub throws and a runaway siren

1. Put VEIRA Analog Delay on an aux with **Dub ▸ Dub Snare Throw** or **Dub Vox Delay**, and set MIX to 100 % (or start from **Sends ▸ Send Dark Repeats**).
2. Automate the send from the snare or the vocal up on the hit you want to throw, and back down after it.
3. For the long dub trail, set REPEATS to 70 to 80 % with TONE around 3, so each repeat gets darker.
4. For a siren, load **Dub ▸ Dub Siren Runaway**: REPEATS is 110 %, so the loop runs on. Sweep DELAY (at FREE) to bend it, and ride REPEATS under 100 % to let it fall away.

A dark echo on an aux for the whole mix

1. Create an aux and load **Sends ▸ Send Analog Echo** (a 1/4 at your tempo) or **Send Dark Repeats** (600 ms).
2. Send the vocal, a guitar and a keyboard to it, each at its own level.
3. Long delays are dark by design; for darker still, lower TONE; for brighter repeats, use a shorter NOTE.

4. Ride the aux's fader for the overall amount.

Lo-fi grain, overdrive and pitch dives

1. Load **Creative FX ▸ Lo-Fi Grain Echo** (1 s, the slowest clock, driven) or **Overdriven Echoes** (INPUT +14 dB).
2. Set the drive with INPUT, watching the VU meter: the further into the red, the grittier every pass.
3. For a warble, load **Creative FX ▸ Seasick Warble** (full MOD DEPTH at 3.3 Hz).
4. For dives and rises, load **Creative FX ▸ Pitch Dive Echo** and sweep DELAY while it plays.

Specifications

Type	Bucket-brigade (BBD) analog delay: 4096 buckets on a clock set by DELAY; op-amp, 2:1 / 1:2 compander, 4th-order anti-alias and 2nd-order reconstruction filters that follow the clock
Channels	Mono, mono in with stereo out, and stereo. The echoes are mono (the input is summed); the dry signal stays in stereo
Latency	None
Transparency	At MIX 0 %, with the DELAY switch at OUT, and when bypassed, the output is the input, bit for bit
Tail	12 s reported to the host
Calibration	0 VU = a sine at −18 dBFS RMS
DELAY	20 ms to 1 s, logarithmic, 1 ms steps (default 350 ms); clock 205 kHz to 4.1 kHz; the chips' filters at a third of the clock, up to 8 kHz (8 kHz to 170 ms, 3.9 kHz at 350 ms, 1.35 kHz at 1 s); glide about 1 s
REPEATS	0 to 120 % (default 35 %); 50 % ≈ −6 dB per repeat; self-oscillation from about 106 %; echoes held under −1 dBFS
TEMPO, NOTE	SYNC / FREE (default FREE); 1/64 to 1/1 with dotted and triplet values, 18 in all (default 1/8D); kept within 20 ms to 1 s
INPUT	−12 to +18 dB in 0.1 dB steps (default 0.0 dB); the echoes keep their level within about 2 dB
TONE	0 to 10 (0 to 100 %, default 5); a 6 dB/octave low-pass on every repeat, 600 Hz to open (3.5 kHz at 5)
MOD RATE	0.10 to 10.0 Hz, logarithmic (default 0.60 Hz)
MOD DEPTH	0 to 10 (0 to 100 %, default 1.5); the echoes' pitch swing, up to about ±52 cents (±3 %) at any DELAY
MIX	0 to 100 %, equal power (default 30 %)
OUTPUT	−24 to +12 dB in 0.1 dB steps (default 0.0 dB)
DELAY switch	IN / OUT (default IN), with the pilot lamp
Noise	The chips' noise about −92 dBFS at MIX 100 %, following the signal through the compander; no clock whine
Metering	LEVEL INTO THE CHIPS VU meter (−20 to +3 VU and 0 to 100 %, IEC 60268-17 ballistics)
Presets	75 factory presets in 14 folders, plus your own
Window	1400 × 720 points; resizable from 75 % to 200 %, saved with the session
Formats	VST3, Audio Units, standalone; AAX once signed
Plugin ID	Manufacturer Veir, plugin Vadl

Troubleshooting and questions

The sound drops out for a moment every 30 seconds. The plugin isn't activated on this computer. Open VEIRA Manager and sign in; the strip at the bottom of the plugin's window says exactly what's wrong. See *Getting started ▸ Activation and the licence*.

I don't see VEIRA Analog Delay in my DAW. Make sure VEIRA Manager shows SHOW (installed) for it, then rescan plugins in your DAW. In Logic Pro, open the Plug-in Manager and choose *Reset & Rescan Selection* if needed. Look under the manufacturer **VEIRA**.

I hear nothing from the plugin's echoes. Check that the DELAY switch is up at IN (the pilot lamp lit) and that MIX isn't at DRY.

The echoes keep growing and won't stop. REPEATS is past the runaway point (about 106 %, a little lower for bass), so the loop is self-oscillating. Turn it below 100 % and the echoes die away. The presets *Dub Siren Runaway*, *Self Oscillation Drone* and *Infinite Hold Loop* do this on purpose.

The long delays sound dark and muffled. That's the bucket brigade: a long delay is a slow clock, and the chips' filters close down with it (1.35 kHz at 1 s). Turning TONE up opens only its own filter. For brighter repeats, use a shorter DELAY or NOTE.

The pitch of the echoes bends when I change DELAY (or the tempo). That's the clock changing while sound is in the chips, as on the real units. Change DELAY between phrases if you don't want the bend.

The echoes aren't in time with the song. Flip TEMPO up to SYNC and choose a NOTE; at FREE, DELAY is in milliseconds and doesn't follow the tempo. Long note values at slow tempos are held at 1 s, the longest delay: at 120 BPM, 1/2D, 1/1T and 1/1 all play at 1 s.

MOD does nothing on a long delay. MOD RATE × the delay time is a whole number (for example 1 Hz at 1 s, or 2 Hz at 500 ms), so the wobble cancels, as on the real units. Move MOD RATE a little.

The echoes sound distorted. Check the VU meter: if the needle sits well into the red, the op-amp and the chips are driven hard. Lower INPUT, or lower REPEATS (the repeats go through the chips again on every pass).

I hear a faint hiss on the echoes. That's the chips' noise, about −92 dBFS at MIX 100 %, rising and falling with the music through the compander. It is far below the music and only on the echoes.

The VU meter falls back while the echoes still ring. It shows the level going in (the input at INPUT), not the repeats.

Is there a delay on the dry signal? No. VEIRA Analog Delay has no latency, so you can use it while you record or monitor a live input.

The window is too small (or too big) on my screen. Drag its bottom-right corner. It scales from 75 % to 200 % and keeps its proportions; the size is saved with your session.

Do my sessions keep my settings? Yes. Every control, the selected preset and the window size are saved with your session, and every control can be automated.

Contact: support@veiraaudio.com. Mention your computer (Mac or Windows and its version), your DAW and version, and what you see.



VEIRA Analog Delay · User Manual · Version 0.2.0

Support: **support@veiraaudio.com** · Web: **veiraaudio.com**

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