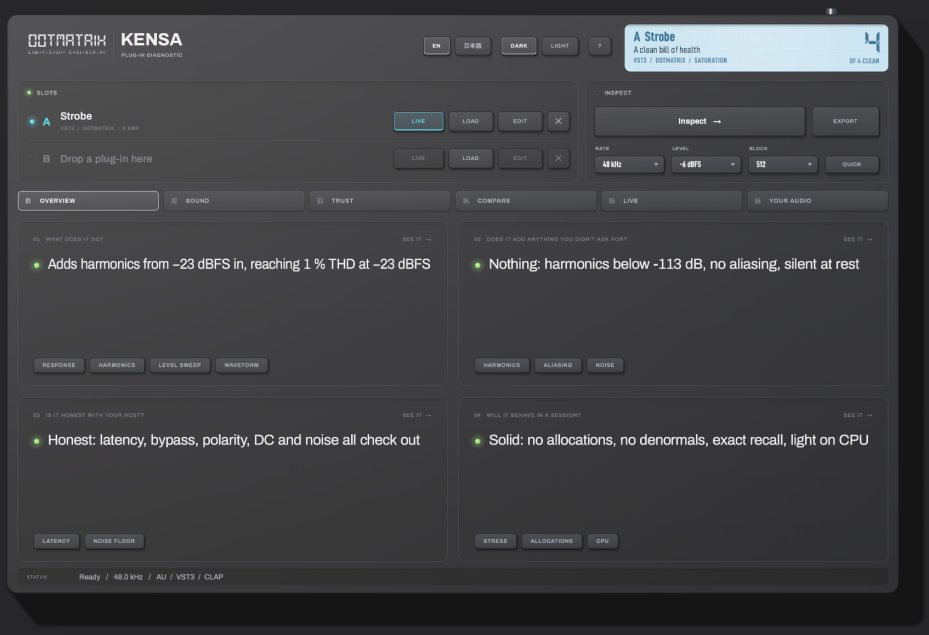
DOTMATRIX

DOTMATRIX / LIGHTWEIGHT AUDIO PLUGINS

KENSA

A plug-in diagnostic:
what it does, what it adds, and whether you can trust it.



Kensa by Dotmatrix

USER GUIDE | VERSION 1.1.0 | STANDALONE | AU | VST3 | CLAP | macOS 11+ | INTEL + APPLE SILICON

Kensa is Japanese for an inspection. Four questions, answered in plain words, with the evidence a click away.

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— ABOUT KENSA

Kensa is a plug-in diagnostic from Dotmatrix. Kensa is Japanese for an inspection. Load any AU, VST3 or CLAP effect and press Inspect: in about ten seconds Kensa measures it offline, in a separate process, and answers four questions in plain words. What does it do? Does it add anything you didn't ask for? Is it honest with your host? Will it behave in a session? Behind each answer is the evidence: the frequency response, the harmonics, aliasing, a level sweep, attack and release, latency, bypass and polarity, noise, stress tests, memory allocated on the audio thread, state recall and CPU. Put a second plug-in in slot B to null one against the other, or run your own audio through it and listen to the dry signal, the result and the difference. Live shows what it does to your track as it plays, and Save preset keeps the settings you dialled in.

— QUICK FACTS

Type	A diagnostic and benchmark for audio effects: it measures a plug-in offline and explains what it found.
Formats	A standalone app, plus Audio Unit, VST3 and CLAP versions to use inside your host. Universal: Apple Silicon and Intel, macOS 11 or later.
It tests	Audio Unit, VST3 and CLAP effects. Instruments get the session checks (CPU, allocations, NaNs, state) but not the sound tests.
Safe	Every measurement runs in its own helper process, offline. A plug-in that crashes under test takes only the helper with it, and it can't phone home.
Looks	The Dotmatrix house panel, dark or light, in English or Japanese, switched with the keys at the top and remembered. It opens large; drag the corner for any size.
Identity	Manufacturer Dotmatrix (Dtmx). AU code: Knsa.

SECTION 01

Getting started

Load a plug-in, press Inspect, read the four answers.

— NEW IN VERSION 1.1

1.1	The Dotmatrix house panel (slate chassis, backlit display, raised keys, slot lights). Live: input and output spectra of the plug-in you play through, and the difference. Save preset hands your settings back to the plug-in's own preset menu. Sidechain plug-ins load safely; a hung plug-in can't freeze Kensa. Kensa reports the LIVE plug-in's latency to the host.
1.0.1	Exact gain readings at zero latency, and a fair state-recall test for CLAP plug-ins.
1.0	The first release: four plain-language answers; response, harmonics, aliasing, level sweep, attack and release, waveform; latency, bypass, polarity, DC and noise; stress, state recall, automation fuzz and sample rates; audio-thread allocations and CPU; an A / B null test; your own audio before and after; Markdown and JSON reports.

— INSTALLING

Copy each plug-in from the download's **Plug-Ins** folder into its folder: **~/Library/Audio/Plug-Ins/Components** (Audio Unit), **~/Library/Audio/Plug-Ins/VST3** and **~/Library/Audio/Plug-Ins/CLAP**. Copy **Kensa.app** into Applications to use it on its own. The release is not yet signed through Apple's developer program, so macOS needs one Terminal line before it will load it; **READ ME FIRST.txt** in the download has the exact steps. Logic Pro checks new Audio Units the first time it starts; Kensa appears under **AU Effects › Dotmatrix**.

— FIRST STEPS

1	**Open Kensa**	Start **Kensa.app**, or insert Kensa on a track in your host (in Logic: Audio FX › Dotmatrix › Kensa).
2	**Load a plug-in**	Press **LOAD** on slot A, type a few letters of its name and double-click it. Or drop a .component, .vst3 or .clap file onto the window.
3	**Set it up**	Press **EDIT** to open the plug-in's own window and set it the way you use it. Kensa measures the settings you leave it on.
4	**Inspect**	Press **Inspect**. The display counts up and the status strip names each test; about ten seconds later the four answers appear on **Overview**.
5	**Look closer**	Click an answer (or its chips) for the evidence on **Sound** and **Trust**. Load a second plug-in into slot B to compare them, or drop a song onto the window to hear the plug-in on your own audio.

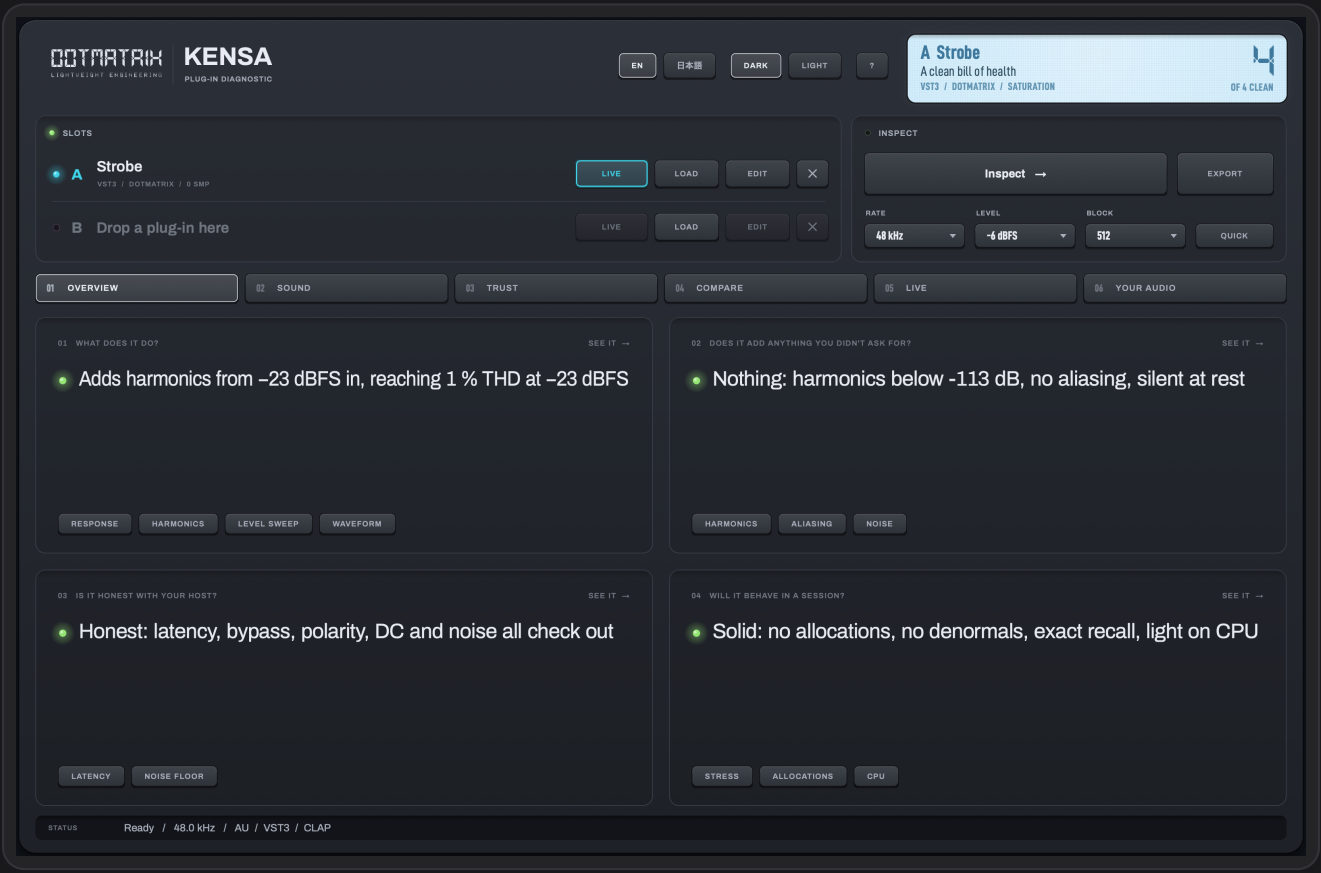
— BASIC HANDLING

The display	The backlit display at the top right: the plug-in in slot A, its verdict, what kind of processor it is, and how many of the four questions came back clean. While Kensa measures, it counts up in percent.
Status lights	Green is clean. An amber ring is worth knowing. Orange is a weak spot. Red means something is broken. Every light sits next to words that say the same.
Slots	A (cyan light) and B (magenta light). LOAD picks a plug-in, EDIT opens its window, the x removes it (and offers to save its settings as a preset first). LIVE runs Kensa's input through that slot, so you can play through it; its key lights in the slot's colour.
Inspect	Measures everything that is loaded: A, then B, then A against B. Press it again (it reads Cancel) to stop.
Settings	**RATE** (44.1 to 96 kHz, 48 by default), **LEVEL** (the test tone, -18 to 0 dBFS, -6 by default) and **BLOCK** (the buffer size, 64 to 2048, 512 by default). **QUICK** gives a faster, rougher pass.
Plots	Hover for exact values. Slot A is drawn cyan, slot B magenta, the raw signal grey, guides dashed. Orange marks something that wants your attention: aliasing, a threshold, a difference.
Export	Saves a Markdown report and every number as JSON, side by side.
Audio	In the standalone app, the Audio pill at the top opens the audio device settings.
Language and look	EN / Japanese and Dark / Light are the keys at the top. Kensa opens in English and dark, and remembers what you pick.

SECTION 02

The panel

The header and display, the slot rack and the Inspect bay, the six page keys, the page itself, and the status strip.



Header	The Dotmatrix mark and the name, the language and look keys, Audio (standalone) and help.
Display	Slot A's plug-in, its verdict, its kind and its score (or the progress while measuring).
Slots	Slots A and B with their lights, LIVE, LOAD, EDIT and remove.
Inspect	Inspect and Export, with RATE, LEVEL, BLOCK and QUICK under them.
Pages	Overview, Sound, Trust, Compare, Live and Your audio.
Status	What Kensa is doing, with a progress bar while it measures.
Overview	One card per question, with each slot's answer and shortcuts to the evidence.

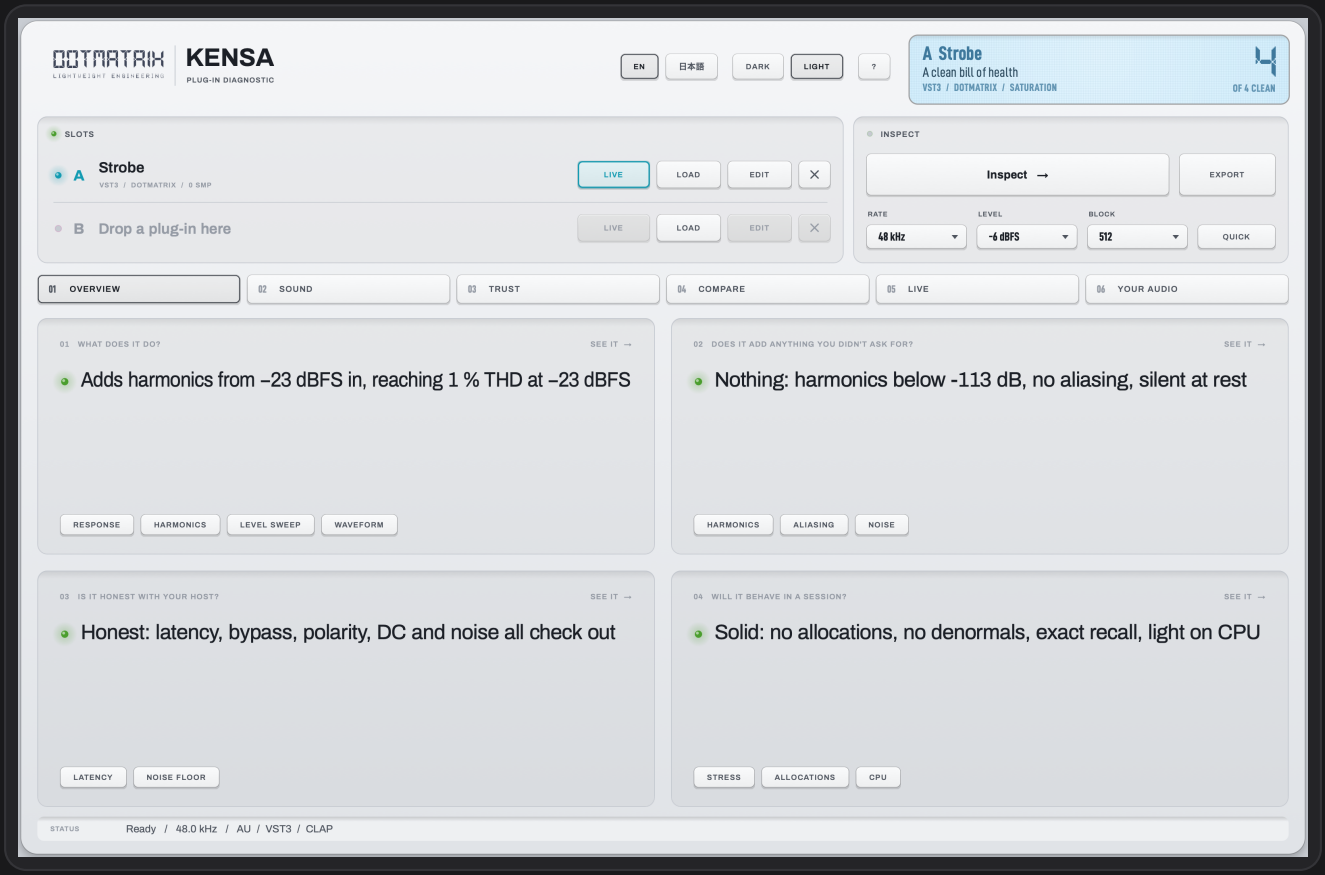
SECTION 03

Dark or light, English or Japanese

The same window, four ways. The switches are at the top right.

— LIGHT

For bright rooms: the same layout on a light panel. The display and the lights stay lit.



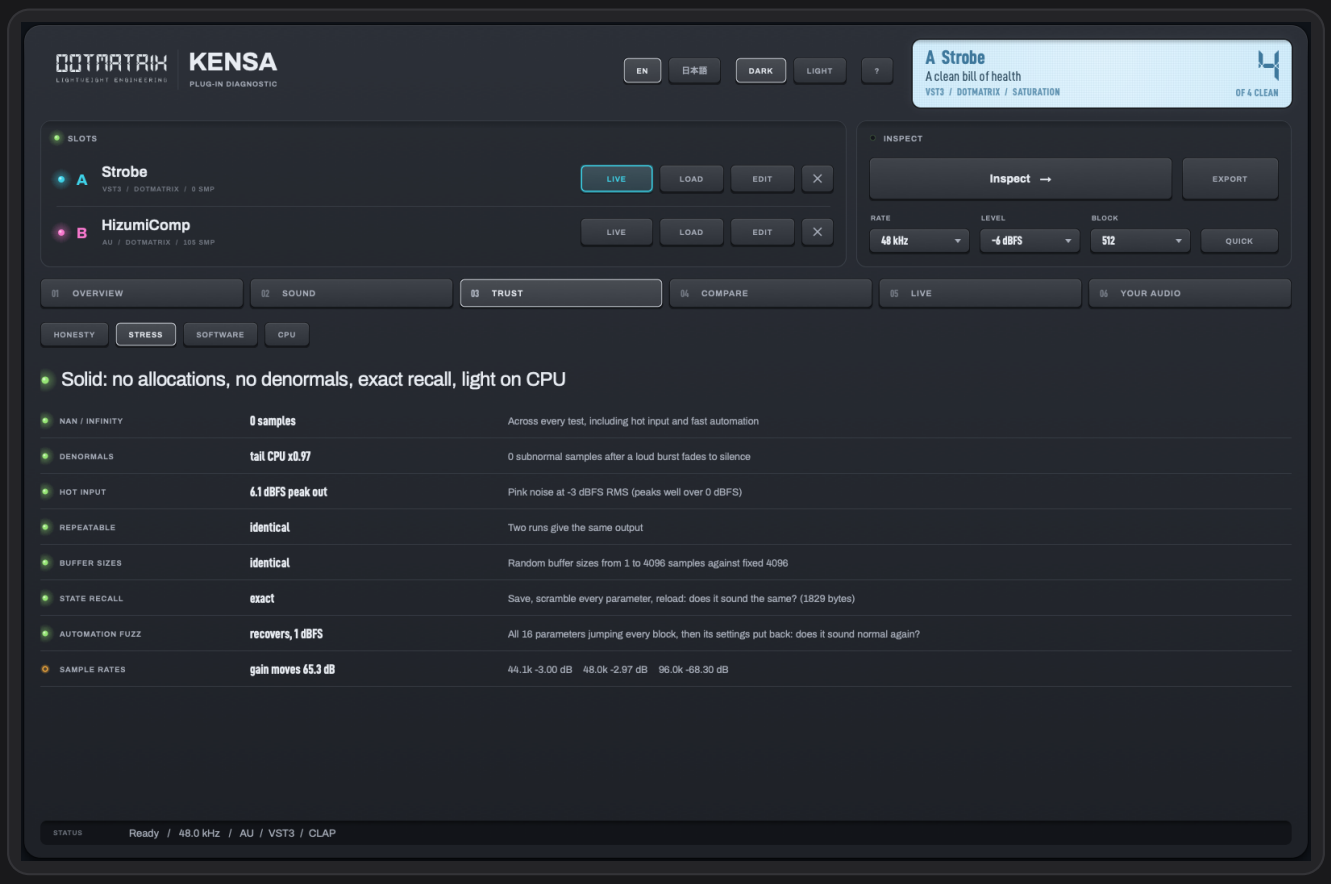
— JAPANESE

Every label, answer and explanation in Japanese. Plug-in names stay as they are.



— TRUST: STRESS

Every session check on one page, each with a dot, a result and what it means.



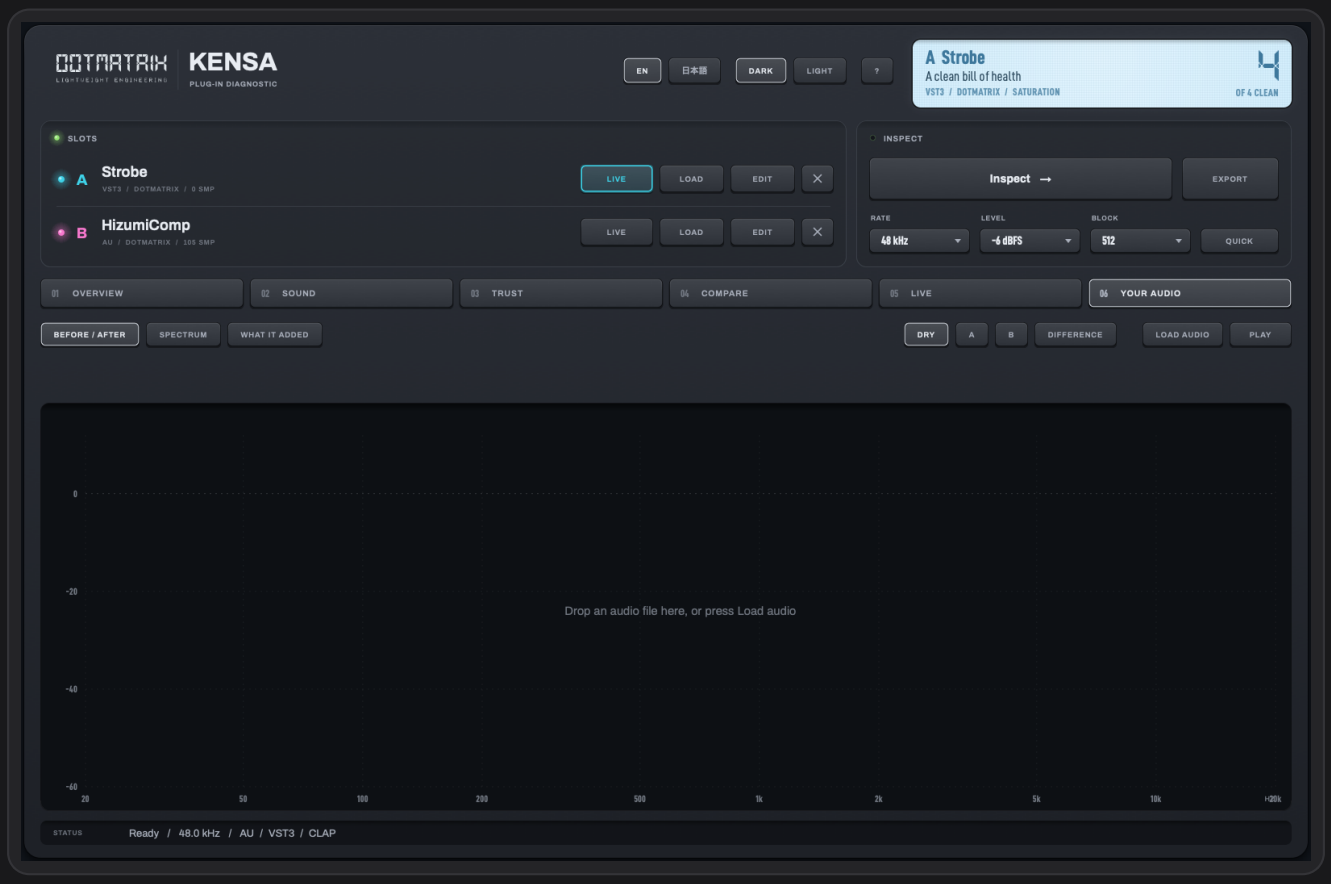
— COMPARE

Two plug-ins nulled against each other, with the difference drawn under them.



— YOUR AUDIO

A song before and after, with the loudness, range and tone changes above it.



SECTION 04

The four questions

Overview answers four questions about the plug-in in slot A (and B). Each answer comes from the tests on the later pages; click it to see them.

— WHAT DOES IT DO?

Kensa decides what kind of processor it is from how it measures, then describes it: an EQ's biggest boost and cut, a compressor's ratio, threshold, attack and release, where a saturator starts to add harmonics and where it reaches 1 % distortion, a reverb's decay, or that it changes only the level.

— DOES IT ADD ANYTHING YOU DIDN'T ASK FOR?

Harmonics where they are not the point, aliasing (tones folded back from above the top of the range), DC offset under a signal, and noise when nothing is playing.

— IS IT HONEST WITH YOUR HOST?

Does it report its real latency? Does its bypass give back the dry signal, and on time? Does it keep polarity, and stay silent and centred on silence?

— WILL IT BEHAVE IN A SESSION?

No NaNs, no slow-downs on silent tails (denormals), the same sound at any buffer size and after a session reload, recovery after fast automation, no memory allocated while it processes audio, and how much CPU it needs.

SECTION 05

Sound

What the plug-in does to the signal. Each tab has its own readouts and plot; slot B is drawn over slot A.

— TESTS

TEST	SIGNAL	CLEAN WHEN	WHAT IT TELLS YOU
Response	Log sweep, 10 Hz to 24 kHz, at -18 dBFS	as designed	The gain at every frequency (and the phase), the biggest boost and cut, and the -3 dB points. For reverbs and delays, the decay time (RT60).
Harmonics	1 kHz tone at LEVEL	nothing you didn't ask for	The spectrum relative to the tone, with H2 to H9 marked: THD, THD+N, the noise floor, the gain and any DC under the tone.
Aliasing	A tone at 0.148 x the rate (7.09 kHz at 48)	below -100 dB	Kensa works out where each harmonic above the top of the range folds back, and looks for a clear line there. Noise, wow and gain ripple are not counted.
Level sweep	1 kHz, -60 to +6 dBFS in 1 dB steps	as designed	Output against input, with distortion drawn dashed: where it starts to distort, where it reaches 1 %, the threshold, the ratio and the peak ceiling.
Attack / release	1 kHz, 20 dB up at 1 s, down at 2 s	as designed	The gain over time, and how long it takes to get 63 % of the way to where it settles.
Waveform	100 Hz, three cycles	as designed	The shape of the wave out against in, lined up for latency.

SET IT LIKE YOU USE IT Kensa measures the plug-in exactly as it is set in its window. Inspect again after you change it.

SECTION 06

Trust

Whether it is honest with your host and solid in a session.

— HONESTY

TEST	SIGNAL	CLEAN WHEN	WHAT IT TELLS YOU
Latency	3 s of pink noise at -18 dBFS	reported = measured	The delay it tells the host about against the delay it really has (to a tenth of a sample), so the host lines it up with your other tracks.
Bypass	pink noise, bypass on	dry, on time	Whether its own bypass gives back the input exactly, and at the same moment as when it is on. If not, switching it makes the audio jump in time.
Polarity	pink noise	normal	Whether a positive input comes out positive.
DC and noise	silence, then a tone	below -90 / -100 dBFS	Any offset or hiss it makes on its own, with the spectrum of what comes out on silence.
Level	pink noise at -18 dBFS	-	The loudness change in LU and the true peak out.

— STRESS

TEST	SIGNAL	CLEAN WHEN	WHAT IT TELLS YOU
NaN / infinity	every test	0 samples	Values that would make a host mute or blow up a channel.
Denormals	a loud second, then 8 s of silence	no slow-down	Some plug-ins get much slower as a tail decays into tiny numbers. Kensa compares the CPU in the silence with the loud part.
Hot input	pink noise at -3 dBFS RMS	finite, bounded	Peaks well over 0 dBFS.
Buffer sizes	random buffers, 1 to 4096 samples	identical	Hosts change buffer sizes all the time. The result should never depend on them.
State recall	save, scramble, reload	exact	Every parameter is scrambled and the saved state loaded back. A plug-in that forgets a setting comes back from a session sounding different.
Automation fuzz	every parameter, every block, 6 s	recovers	Then its settings are put back: it must sound normal again without a reset.
Sample rates	44.1, 48 and 96 kHz	consistent	The same gain and character at each rate, and the latency at each.

— SOFTWARE AND CPU

Audio-thread allocations: Kensa plays every program, moves every parameter and steps every switch, and counts each time the plug-in asks for memory while it processes audio, with where in its code it happened. Allocating there can stall a host and cause clicks. **CPU**: ten seconds of processing at the BLOCK size, timed block by block: the average, the 99th percentile, the worst block and the time per block, plus the average at 64 samples. Measured offline on one core, so it compares plug-ins fairly.

A FINDING IS A LEAD, NOT A VERDICT Some results are by design: a tape plug-in that differs between runs, or a clipper that aliases on purpose. The explanations say what each test means.

SECTION 07

Live, compare and your audio

What it does to your track as it plays, two plug-ins against each other, and any plug-in on your own music.

— LIVE

Set a slot to **LIVE** and play. **Spectrum** draws what goes in (grey) and what comes out (in the slot's colour); **Difference** draws output minus input, so a boost rises above the line and a cut falls below it. Choose 1/3, 1/6 or 1/24-octave smoothing, **Tilt** (4.5 dB an octave, so a mix reads flat), **Slow** averaging or **Hold**. The readouts name what you're hearing and its latency.

> **KEEP WHAT YOU DIALLED IN** **Save preset** writes the LIVE plug-in's settings into its own preset menu (AU and VST3), named **Kensa pick** with the date. Load the plug-in on your track and pick it there. The x on a slot offers the same before it removes the plug-in.

— COMPARE

Load plug-ins into A and B and press Inspect. Pink noise goes through both, the outputs are lined up to the sample, and B is taken away from A. **Null (raw)** is what is left; **Null (level-matched)** is what is left once their levels are matched, so a simple gain difference doesn't count. Below -90 dB they are the same. The Response and Harmonics tabs overlay the two.

— YOUR AUDIO

Drop a song (up to ten minutes) onto the window, or press **Load audio**. Kensa runs it through each loaded plug-in and shows the change in loudness (LUFS), loudness range (LU), peak-to-loudness, true peak, and tilt (how much darker or brighter it gets from 100 Hz to 10 kHz). Pick **Dry**, **A**, **B** or **Difference** and press **Play** to listen; click the waveform to jump.

> **HEAR WHAT IT ADDS** Play **Difference**: only what the plug-in changed. If it sounds harsh on its own, so does the change.

SECTION 08

Recipes

01	**Before a release**	Inspect each of your plug-ins in AU, VST3 and CLAP. Fix anything orange on **Will it behave in a session?** first: allocations, state recall and denormals cause the bug reports.
02	**Is the upgrade the same?**	Old version in A, new in B, same settings. A null below -90 dB means nothing changed; anything above, listen to the difference.
03	**Which saturator?**	Two in A and B at the same drive. Compare Harmonics, then Your audio with the same song and the levels matched.
04	**Will it keep up?**	Set BLOCK to the buffer size you record at and read CPU: the worst block is what causes dropouts.

SECTION 09

Reference and troubleshooting

— TECHNICAL NOTES

How it measures	Offline, not in real time: the plug-in is driven block by block with known signals in a helper process (KensaProbe), freshly prepared for each test, so results repeat exactly and don't depend on how busy your Mac is.
Latency	A whitened cross-correlation (GCC-PHAT) of pink noise in and out, interpolated to a tenth of a sample. It finds the bulk delay rather than a filter's own phase shift.
Response	An exponential sweep, deconvolved into an impulse response; distortion products fall outside the window, so the response is the linear part only.
Loudness	ITU-R BS.1770-4 K-weighting with EBU R128 gating; true peak at 4x oversampling.
Allocations	The helper process replaces the system's memory functions and counts calls made while the plug-in is processing audio. Kensa's own host code doesn't allocate there.
Offline	Plug-ins being measured can't reach the internet: as soon as the measuring helper has created a plug-in it locks itself into a macOS sandbox that refuses every outgoing connection, so licence checks and update pings never leave your Mac. Locking only after the plug-in is created keeps macOS from asking you to lower security settings. A plug-in open in a slot for listening or editing runs like it would in any host, with its usual network access.
Like a host	Audio runs on its own thread; preparing, state, programs and parameter edits happen on the message thread, exactly as in a host. Allocation counts therefore match what a host sees.
CLAP	Kensa has its own CLAP host, so CLAP plug-ins are tested the same way as AU and VST3.
Self-test	KensaProbe selftest checks the measurements against two reference processors with known answers: a naive clipper (must alias) and a clean gain (must not).
Trademarks	All product names are trademarks of their respective owners and are used only to identify the products studied. Dotmatrix is not affiliated with or endorsed by any of them.

— TROUBLESHOOTING

Nothing happens when I open the app	macOS is asking for microphone access; look for the prompt and click Allow. Kensa only uses the input when a slot is set to LIVE.
"Couldn't start KensaProbe"	The helper inside Kensa was blocked by macOS. Run the Terminal lines in READ ME FIRST.txt (or install.sh), then open Kensa again.
"The plug-in crashed the probe"	The plug-in under test crashed during the test named in the message. Kensa itself is fine; that is a finding about the plug-in.
Latency reads "unclear"	The output doesn't line up with the input: reverbs, delays and heavy modulation. That is expected for them.
A test says "differs between runs"	The plug-in uses randomness or free-running modulation. Buffer-size and recall results are less certain then.
LIVE makes no sound	In the standalone app, the input may be muted to avoid feedback through your speakers: open Audio and check the input device and the mute option.
It does not appear in Logic	Run the Terminal lines in READ ME FIRST.txt, then restart Logic. In Logic > Settings > Plug-in Manager, select it and click Reset & Rescan Selection.



Kensa by Dotmatrix

Lightweight audio plugins. Documentation for version 1.1.0.