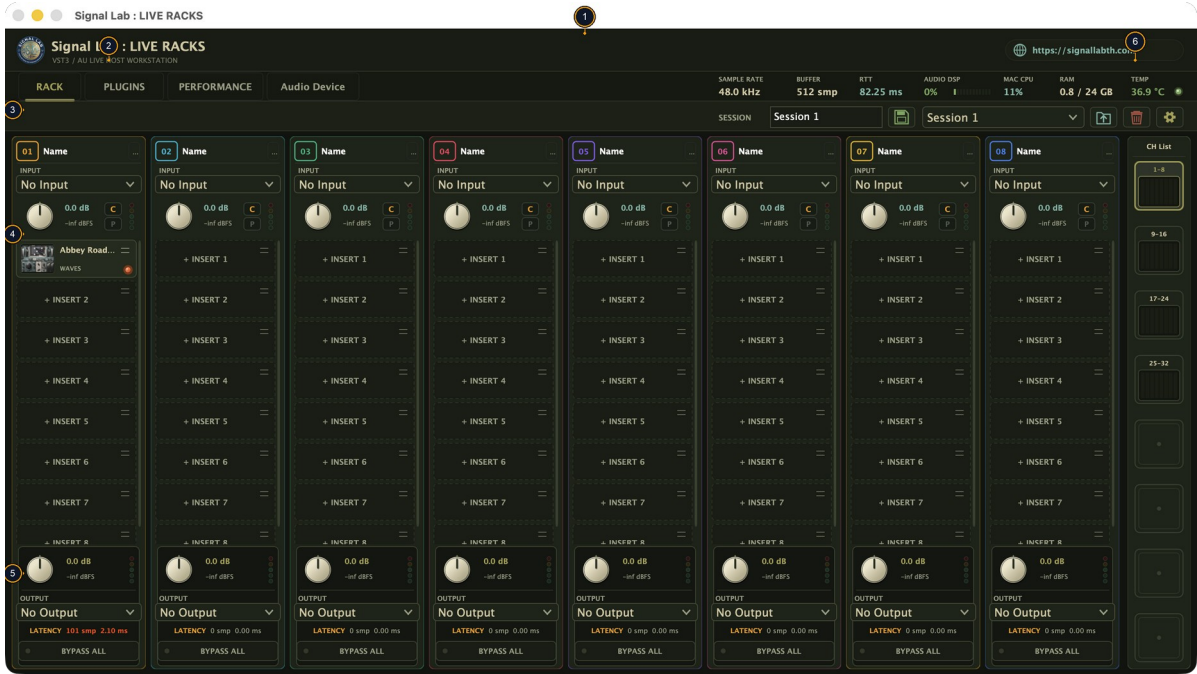


STUDIO & LIVE PERFORMANCE REFERENCE GUIDE

SIGNAL LAB : LIVE RACKS

Professional VST3 / AU host user manual

Low-latency architecture • 32 channels • Designed for live and studio workflows



Software version Version 1.0.0 (Universal)	Supported operating systems macOS & Windows 64-bit
Audio drivers CoreAudio & ASIO	Plugin formats VST3 (Windows/macOS), AU (macOS)
License protection & scanning Signal Lab Crypto-Guard & Isolation	Official support https://signallabth.com

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1. System Overview

Signal Lab LIVE RACKS is an audio plugin host for live performance, live broadcast and studio recording. Built on C++20 and JUCE, its audio and threading architecture is designed for low-latency processing and reliable operation.

Three Core Engineering Pillars

1. Real-Time Audio Thread Safety: The audio callback is designed to avoid dynamic memory allocation and blocking mutex locks, reducing the risk of dropouts, glitches and XRuns. Actual performance depends on the computer, driver and plugins.

2. Sandboxed Plugin Scanning: Plugin scanning and initial loading use a separate process to limit the impact of a faulty plugin during discovery.

3. Automatic Plugin Delay Compensation (PDC): Compensates for plugin latency across channels to reduce timing differences. Verify the result with your actual routing configuration.

Runtime limitation: Plugins running in a rack execute in the main application process. A plugin crash during a show can cause the application to close; scanning isolation does not provide complete runtime crash protection.

1.1 32 Channel Strips & Bank Switching

LIVE RACKS supports up to 32 independent channel strips. The main rack displays eight channels at a time for clear, practical control on stage. Use the Bank Selector Pads (CH List) on the right to switch between groups:

- Bank A (1-8): Channels 1-8, available in the free version with all channel functions.
- Bank B (9-16): Channels 9-16, unlocked with a Full License.
- Bank C (17-24): Channels 17-24, unlocked with a Full License.
- Bank D (25-32): Channels 25-32, unlocked with a Full License.

Working Across Multiple Banks

Changing the visible bank changes the controls shown on screen. The DSP engine continues processing channels in every bank, including channels that are currently out of view.

2. Master UI Map

The main window brings the essential controls into a single workspace. Switch between rack operation, the plugin library and performance monitoring while keeping the top status bar accessible.

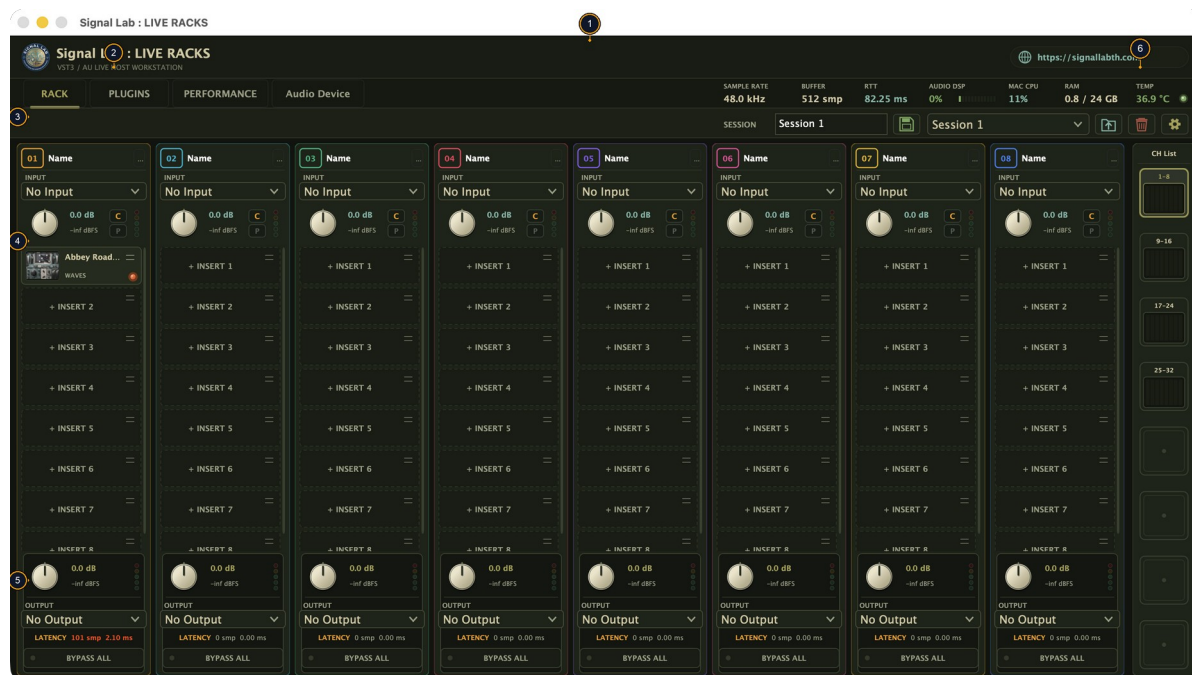


Figure 1. Main LIVE RACKS window with six numbered control areas.

No.	Control / Area	Function
1	Top Performance Bar & HUD	Real-time status for sample rate, buffer size, round-trip latency, audio DSP load, CPU and RAM. On macOS, the temperature display is an estimate based on CPU load, not a sensor reading.
2	View Switcher & Setup	Switch between RACK, PLUGINS and PERFORMANCE. Use Audio Device to open hardware and system settings.
3	Strip Header & Input Stage	Channel number and editable name, hardware input selector, Input Gain (-24 to +24 dB), Clear Peak (C) and polarity inversion (P). Double-click the channel name to rename it.
4	Insert Effect Slots (1–8)	Eight plugin slots per strip, processed from top to bottom. Each loaded card shows the plugin name, vendor, thumbnail, latency indicator and controls for moving the plugin or opening its editor.
5	Output Stage & Latency	Output Trim (-24 to +24 dB), output bus selection, post-fader metering, the channel LATENCY readout and the strip-wide BYPASS ALL control.
6	Bank Selector Pads (CH List)	Four channel groups: 1-8, 9-16, 17-24 and 25-32. Miniature meters show channel activity in each group.

2.1 Top Performance Bar & HUD

The top Head-Up Display (HUD) provides continuous feedback on latency and system load during operation.

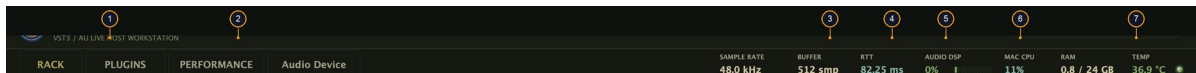


Figure 2. Top control bar and telemetry HUD, with seven numbered indicators.

No.	Indicator / Button	Meaning in Operation
1	Mode Tabs (RACK / PLUGINS / PERFORMANCE)	Switch between the rack, plugin library and performance dashboard.
2	Audio Device Button	Open the Setup & Activation window from the main views.
3	SAMPLE RATE	The current audio sample rate, such as 44.1, 48 or 96 kHz. Match this to the digital mixing console and the rest of the audio system.
4	BUFFER	Current driver buffer size, such as 64, 128 or 512 samples. A smaller buffer reduces latency but increases the processing demand per audio deadline.
5	RTT (Round-Trip Latency)	The displayed round-trip latency estimate combines the audio path and plugin delay compensation. Use it as an operational reference; confirm critical latency requirements with the actual system.
6	AUDIO DSP Load	Audio thread processing load shown as a percentage and LED ladder. Readings around 80-90% indicate limited headroom at the current buffer setting.
7	MAC CPU / RAM / TEMP	Overall CPU use, host/plugin memory allocation and estimated processor temperature on macOS. Temperature is inferred from CPU load, not measured by a hardware sensor; the temperature field is hidden on Windows.

3. Channel Strip Controls

Each channel strip contains an input stage, eight insert effect slots and an output/metering stage. The signal flows through the insert chain from top to bottom.



Figure 3. Channel strip anatomy, from input to output, with twelve numbered controls.

No.	Control	Operation
1	Channel Header (01 Name)	Displays the channel number and name. Double-click the name, enter a label such as Vocal Lead, Snare Top or Bass DI, then press Return to confirm.
2	INPUT Selector Dropdown	Select the audio interface input: No Input, a STEREO PAIR such as In 1+2 or In 3+4, or a MONO INPUT such as In 1 or In 2.
3	Input Preamp Gain Knob	Adjust the signal level before the plugin chain from -24.0 to +24.0 dB in 0.1 dB steps. Double-click to reset to 0.0 dB. The readout below shows the pre-gain peak level in dBFS.
4	Clear Peak (C) & Phase Invert (P)	C clears the held peak value. P inverts signal polarity, useful when checking multi-microphone combinations such as top and bottom snare microphones.
5	Loaded Insert Slot 1	A loaded slot shows the plugin thumbnail, name and vendor, such as Abbey Road Chambers by WAVES. Double-click the card to open its native editor.

No.	Control	Operation
6	Reorder Grip (=)	Drag the grip to reorder plugins within a strip or move them to another strip. Test changes before relying on them during a show.
7	Latency Status LED Indicator	Green indicates a plugin reported as zero latency. Orange indicates plugin latency for which the host applies delay compensation. This describes plugin delay, not the complete system latency.
8	Empty Insert Slots (+ INSERT 2..8)	Click + INSERT in an empty slot to search for and add a plugin at that position.
9	Output Trim Knob & Post Meter	Adjust the level after the entire effect chain from -24.0 to +24.0 dB. Double-click to reset to 0.0 dB. The adjacent meter shows the post-fader level.
10	OUTPUT Selector Dropdown	Choose a stereo pair or mono output on the audio interface. No Output prevents this strip from sending audio to external hardware.
11	Real-Time Latency & PDC Readout	Shows the combined reported latency of plugins in slots 1-8, in samples and milliseconds; for example, LATENCY 101 smp / 2.10 ms.
12	Master BYPASS ALL Button	Bypass all plugins in the strip together for A/B comparison or troubleshooting. Confirm the resulting level and signal path before using this during a performance.



Figure 3B. Insert Slot 1 close-up: thumbnail, vendor, drag grip and orange latency indicator.

4. Plugin Management & Editors

4.1 Insert Plug-in Dialog

Click + INSERT in a channel strip to open INSERT PLUG-IN. Search and category filters help you locate a plugin for the selected slot.



Figure 4. INSERT PLUG-IN dialog with six numbered search and selection controls.

No.	Function / Button	Operation
1	Search Filter Box	Type a plugin name, vendor or category to filter results immediately. Search is case-insensitive. Click [X] to clear the search.
2	Category Filter Chips	Filter by ALL, DYN (dynamics/compression), EQ, REV (reverb), DLY (delay), MOD (modulation/chorus/flanger) or OTHER.
3	Plugin Browser List	Lists plugins with their vendor, effect category and VST3 or AU badge. Use the Up/Down arrow keys to select an entry.
4	Rescan Button	Scan for newly installed plugins without leaving the application. Schedule scanning before the show rather than during critical audio operation.
5	Cancel Button	Cancel the selection and close the dialog, or press Esc.
6	Insert Button	Insert the selected plugin. You can also press Return/Enter or double-click its row.

4.2 Native Floating Plugin Window

Double-click a plugin card to open its native floating editor. The window shows the manufacturer's interface, with the rack and slot identified in its title bar.



Figure 5. Native floating editor, shown with Waves Abbey Road Chambers.

No.	Component	Operation
1	Title Bar (Rack Index & Slot Index)	The title uses Rack X - Slot Y : [Plugin Name], helping you distinguish multiple instances of the same plugin on different channels.
2	Native Plugin GUI Editor	Use the plugin's own knobs, faders, presets and meters to adjust its parameters.
3	Window Close Button ([x])	Close the editor and return to the rack. Closing this window hides the GUI only; the plugin continues processing audio.

4.3 Insert Slot Commands & Shortcuts

- Move: Drag the = grip to another slot in the same strip or to another strip. Processing order follows the new position. Rehearse changes before using them during a show.
- Duplicate with State: Hold Option (macOS) or Alt (Windows) while dragging a card to an empty slot. This copies the plugin together with its current parameter settings.

- Right-Click Context Menu: Right-click a slot for these commands:
Float Plug-in: Open the plugin editor.
Disable / Enable Plug-in: Bypass or enable that plugin; a bypassed card shows [BYPASS].
Remove Plug-in: Remove the plugin from the slot.
Copy / Paste Plug-in: Copy a plugin between slots.
Slot Latency: View its latency in samples and milliseconds.

5. Plugin Library

The PLUGINS view brings the installed plugin collection into a searchable library. Choose one of four display combinations, using either compact text lists or visual thumbnails.

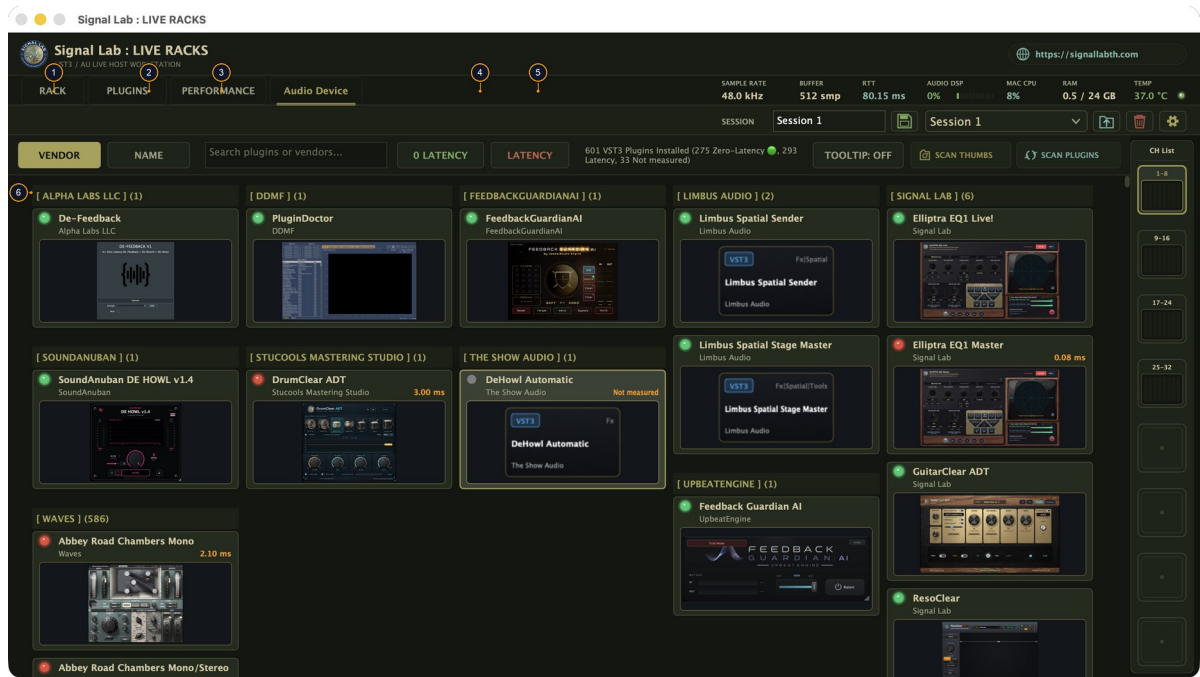


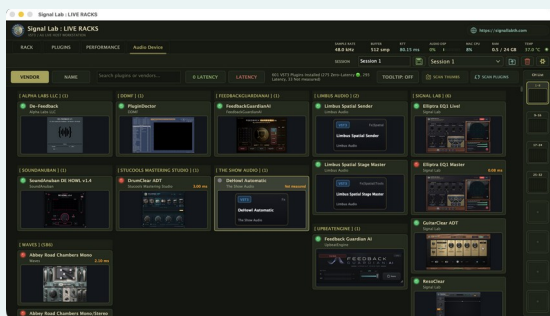
Figure 6A. Library grouped by vendor with names and thumbnails; six numbered controls.

No.	Toolbar Control	Purpose
1	VENDOR / NAME Toggle	VENDOR groups entries by manufacturer, such as Waves, Soundtoys or FabFilter. NAME sorts entries alphabetically from A to Z.
2	Search Filter Bar	Type to filter the plugin list in real time.
3	0 LATENCY Filter Button	Show only plugins reported as having zero samples of latency. Plugins with reported latency greater than zero are hidden. Hardware and buffer latency still remain.
4	SCAN THUMBS Button	Capture plugin interfaces and store local thumbnails for visual browsing. Run this preparation before the show.
5	SCAN PLUGINS Button	Scan for installed plugins in a separate isolated process. This isolation applies to discovery and initial loading, not to plugins running in a rack.

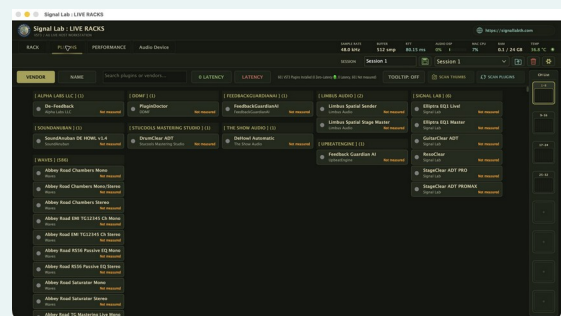
No.	Toolbar Control	Purpose
6	Plugin Card Display	Each card shows a green/orange latency indicator, plugin thumbnail, name, vendor, latency in milliseconds and a VST3/AU format badge.

5.1 Four Display Modes

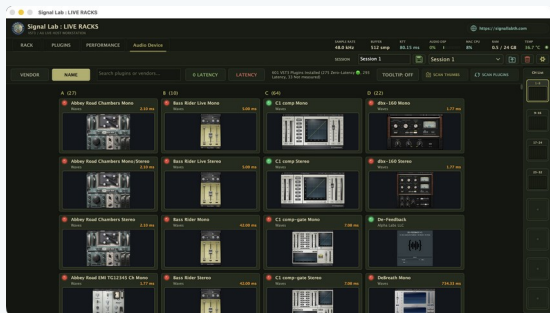
Combine the VENDOR / NAME toolbar setting with Name only / Name & Thumbs in Plugin Setup to choose your preferred library layout:



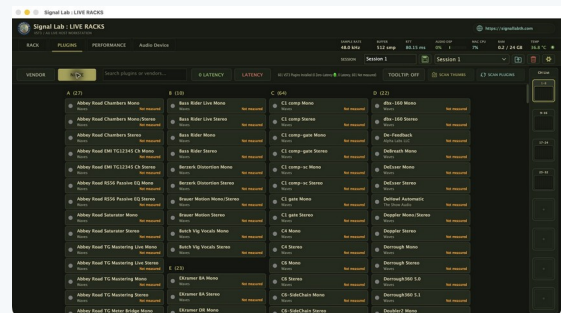
Mode 1: Vendor + Names & Thumbs (Figure 6A)
Group by manufacturer and show thumbnails. Useful when you recognize a plugin by its interface or vendor.



Mode 2: Vendor + Name Only (Figure 6B)
Group by manufacturer with compact text entries. Useful on smaller displays and when you need to see more entries at once.



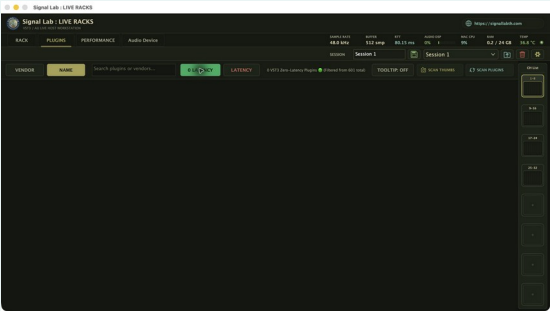
Mode 3: Alphabetical + Names & Thumbs (Figure 6C)
Sort A-Z with thumbnails. Useful when you know the plugin name and want visual confirmation.



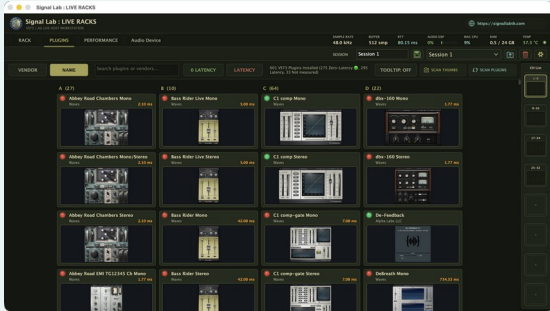
Mode 4: Alphabetical + Name Only (Figure 6D)
A compact A-Z text list for browsing a large collection with the scrollbar.

5.2 Zero-Latency Filter & Quick Routing

The 0 LATENCY filter helps identify plugins with no reported processing delay. The context menu also lets you send a plugin directly to a target rack and slot.



0-Latency Filter (Figure 6E)
Enable 0 LATENCY to show plugins with zero reported plugin delay. This does not remove driver/buffer latency or guarantee dropout-free operation.



Quick Channel Assignment (Figure 6F)
Right-click a plugin card to choose Rack 1-32 and the destination slot without switching to the rack view.

6. Audio Device & Setup

Click Audio Device on the top HUD or the gear icon to open Setup & Activation. Its four tabs are Audio Device, Plugin Setup, Activate and About.

6.1 Audio Device Settings

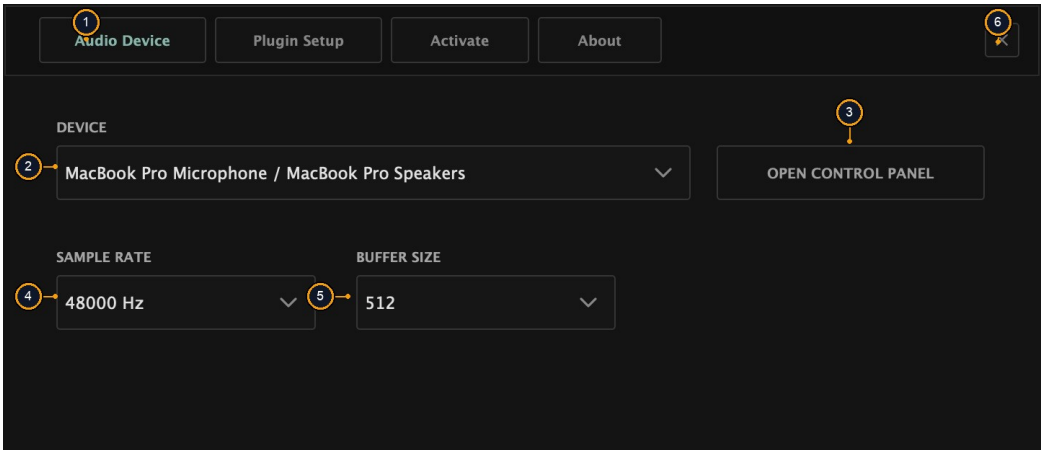


Figure 7. Audio Device setup window, with six numbered controls.

No.	Setting	Operation & Guidance
1	Modal Navigation Tabs	Switch between Audio Device, Plugin Setup, Activate and About.
2	DEVICE Selector	Select the connected audio device, such as Audient EVO 8, Focusrite Scarlett, Universal Audio Apollo, Dante Virtual Soundcard or the computer's built-in output.
3	OPEN CONTROL PANEL	Open the driver's hardware control panel. On Windows, this opens the interface manufacturer's ASIO panel; on macOS, Audio MIDI Setup.
4	SAMPLE RATE	Match the sample rate to your digital console and connected system. 48000 Hz / 48 kHz is a common live-sound setting.

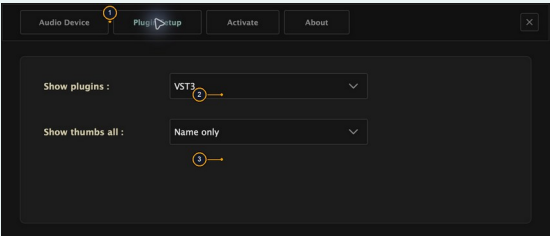
No.	Setting	Operation & Guidance
5	BUFFER SIZE	Start with 64 or 128 samples if the system runs reliably. Confirm the actual round-trip latency and processing headroom; buffer size alone does not guarantee a latency below 5 ms.
6	Close Modal Button ([x])	Close the setup window. Audio device changes take effect without an additional Save command.

macOS & Windows: Key Differences

macOS (Apple Silicon & Intel): Uses CoreAudio and supports VST3 and AudioUnit (AU) plugins.

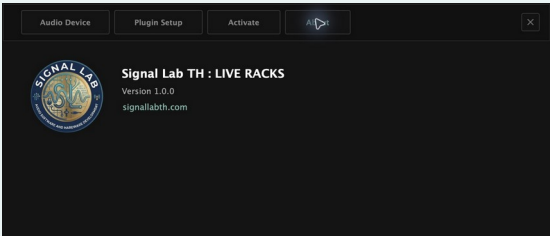
Windows: Use the audio interface manufacturer's ASIO driver for professional live operation. The Windows release is built with ASIO support. Avoid general-purpose DirectSound/MME drivers for critical low-latency work.

6.2 Plugin Setup & About



Plugin Setup (Figure 8)

Choose plugin format filters (VST3, AU, Show all) and thumbnail display (Name only or Name & Thumbs).



About / System Info (Figure 9)

View the application version, copyright information and official Signal Lab Thailand support links.

7. License & Activation

Signal Lab Crypto-Guard uses RSA-2048 digital signatures and a machine-specific hardware identity to validate the license.

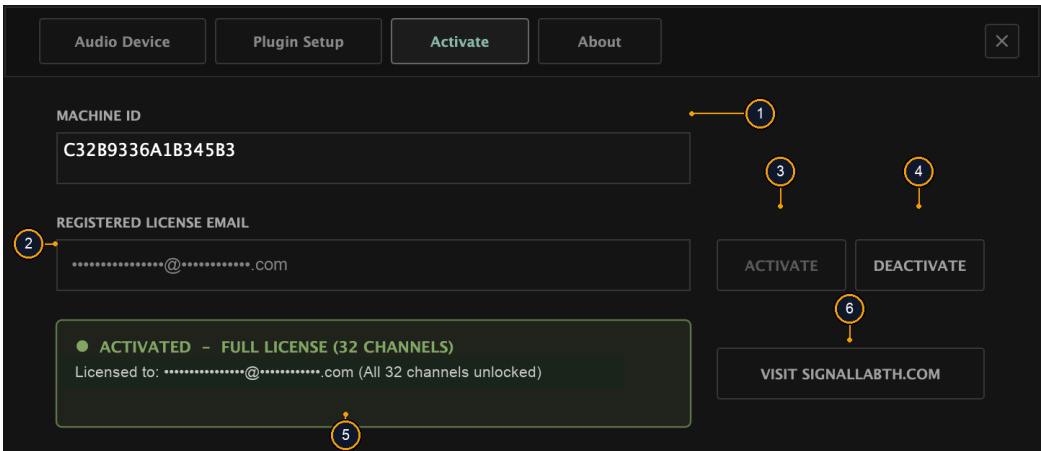


Figure 10. License activation window with six numbered controls. Personal information is redacted in the illustration.

No.	Component	Operation
1	MACHINE ID	A machine-specific hardware fingerprint used to identify the computer to the licensing system.
2	REGISTERED LICENSE EMAIL	Enter the email address registered with your purchase at signallabth.com. The email in this manual's illustration is hidden for privacy.
3	ACTIVATE Button	Activate the license online through the Signal Lab server. Successful Full License activation unlocks all 32 channels.
4	DEACTIVATE Button	Release the license from the current computer so its activation allowance can be used on another computer.
5	License Status Card	A green ACTIVATED - FULL LICENSE (32 CHANNELS) status indicates full access. Orange FREE VERSION (8 CHANNELS) indicates access to channels 1-8.
6	VISIT SIGNALLABTH.COM	Open the Signal Lab website to check purchase information or contact technical support.

Offline Live Operation

After successful online activation, the local license supports offline operation. Activate and verify access before going to the venue, then test your intended offline show workflow in advance.

8. Performance Dashboard

Click PERFORMANCE on the top bar, or double-click the statistics area, to open detailed telemetry for audio processing and system load.

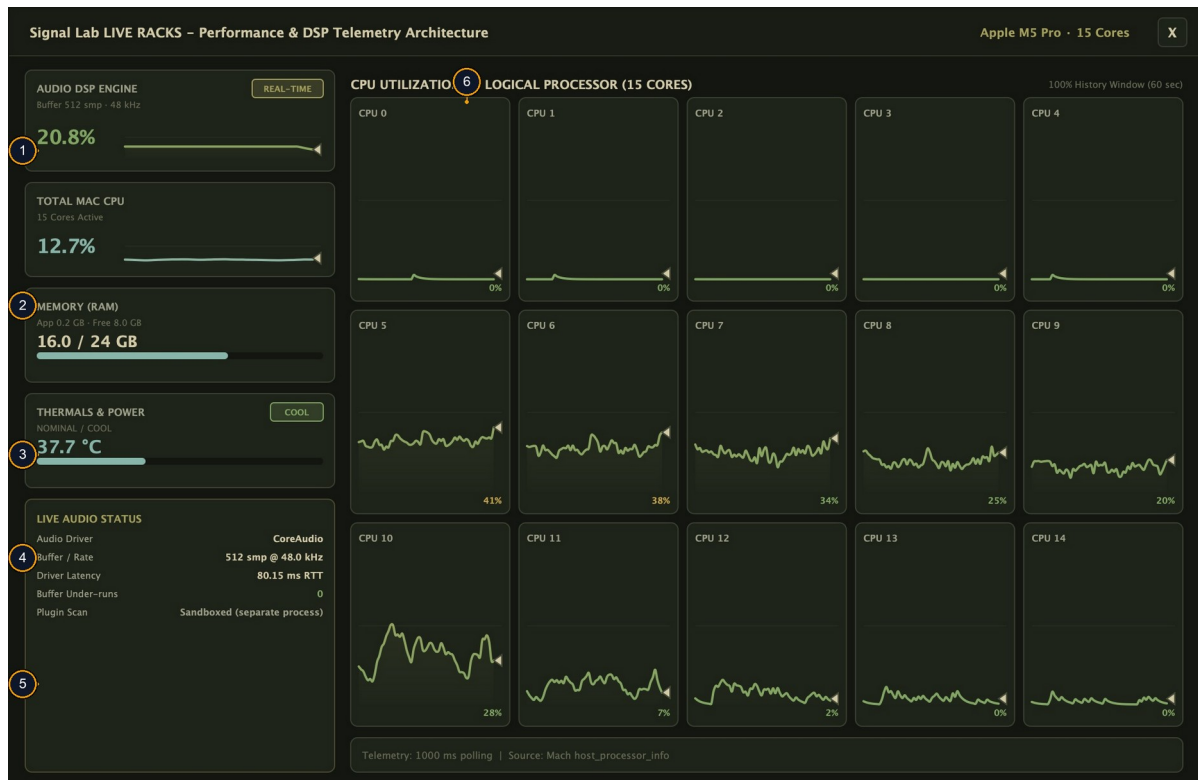


Figure 11. Performance dashboard with six numbered telemetry sections.

No.	Meter / Data	Interpretation
1	AUDIO DSP ENGINE Card	Audio rendering time relative to the available buffer period. The history graph shows changes over the previous 60 seconds.
2	TOTAL MAC CPU Card	Overall CPU utilization across the system. Use this to identify competition for resources from other applications.
3	MEMORY (RAM) Card	Host and plugin memory usage (App RAM) compared with available system memory (Free RAM). Watch memory headroom when using large sample-based instruments or processors.
4	THERMALS & POWER Card	Estimated thermal status with labels such as COOL / NOMINAL. On macOS, temperature is inferred from CPU load, not read from a sensor; this temperature field is hidden on Windows.
5	LIVE AUDIO STATUS Card	Driver name, current buffer/sample rate, driver latency and buffer under-run count. Aim for zero under-runs; investigate any increase before the show.
6	CPU UTILIZATION BY LOGICAL PROCESSOR	Load graphs for individual logical processors. Use them to observe how work is distributed across the computer's available CPU cores.

9. Session Management

A LIVE RACKS session stores strip names, input/output selections, gain and trim values, mute/solo states, insert order and the saved parameter states of loaded plugins.

9.1 Save, Load & Delete

- 1 Save Session: Enter a name in SESSION, for example Live_Concert_StageA_Set1, then click the disk (Save) icon. If the name already exists, an overwrite warning helps prevent accidental replacement.
- 2 Load Session: Choose a saved session from the dropdown, verify its name, then click the folder (Load) icon. The application clears the current strips and restores the saved plugin configuration.
- 3 Delete Session: Select a session, click the trash (Delete) icon and confirm the warning dialog.

9.2 Backup Locations

Sessions are stored as .session files in the following application support folders:

- macOS: ~/Library/Application Support/SignalLab/SignalLiveRack/Sessions/
- Windows: %APPDATA%\Application Support\SignalLab\SignalLiveRack\Sessions\

Cross-Machine Transfer

Copy the .session file into the corresponding Sessions folder on the backup computer. Install the same plugin formats and versions on that machine before loading the session. AU plugins require macOS; confirm plugin compatibility when moving between operating systems.

10. Pre-Show Soundcheck & Cheat Sheet

10.1 Eight-Step Pre-Show Checklist

- 1 Mute PA / Physical Monitoring: Mute the console outputs or physical monitor path before opening the application or connecting the audio interface, to reduce the risk of pops and thumps.
- 2 Check Audio Device & Buffer Size: Confirm the correct hardware device, sample rate and planned buffer size. Start with 64 or 128 samples only if the system has adequate processing headroom.
- 3 Load the Show Session: Load the prepared session and confirm that every required plugin is present, with no missing-plugin or error indicators.
- 4 Check Input / Output Routing: Inspect all banks (1-8, 9-16, 17-24, 25-32). Confirm intended input assignments and output combinations, and check for unintended No Input settings or feedback paths.
- 5 Gain Staging & Soundcheck: With monitoring kept safely controlled, apply the intended source signals and check Input Gain. Avoid red/clipping indications. Peaks around -18 to -12 dBFS can provide useful starting headroom; adjust for the actual program and processing chain.
- 6 Check Latency & PDC: Review plugin latency LEDs and the RTT readout. Resolve any PDC LIMIT warning before the performance.
- 7 Check Performance Telemetry: Confirm zero buffer under-runs. A DSP load below 60% is a practical starting target for headroom, but verify stability under the full show workload.
- 8 Save the Final Revision & Enable Monitoring: Save the completed soundcheck session. Once routing and levels are verified, the operator can carefully restore physical monitoring and proceed with the show.

10.2 Keyboard Shortcuts & Quick Actions

Command / Action	Gesture / Shortcut	Result
Rename a channel strip	Double-click the strip name	Edit the name; press Return to confirm.
Reset gain to 0.0 dB	Double-click the knob	Reset Input Gain or Output Trim to 0.0 dB.
Open a plugin editor	Double-click the plugin card	Open the native floating editor.
Open the slot context menu	Right-click, or click =	Access Float, Disable, Remove, Copy, Paste and Slot Latency.
Move a plugin	Click and drag the plugin card	Move within the same strip or to another strip.
Duplicate a plugin with its state	Option + Drag (macOS) Alt + Drag (Windows)	Copy the plugin and its parameters to an empty slot.
Copy an entire plugin chain	C on the source strip P on the destination strip	Copy all eight insert slots to the target strip, including across banks.
Close a popup / modal	Esc	Close Audio Device, Plugin Setup, Insert Dialog or Performance.
Quit the application	Cmd + Q (macOS) Ctrl + Q (Windows)	Quit LIVE RACKS. Save the session before exiting.

Signal Lab LIVE RACKS • Audio plugin hosting for live and studio workflows
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