

Sigmon: Version History

What changed, and the problem behind each change

A light, chronological log of how Sigmon evolved from an in-browser experiment to a native macOS spectrum analyzer. Each entry states the problem that prompted the work and what was changed. The deeper signal-processing rationale is covered separately in the spectrum-rendering report.

Origins

V0 | Browser analyzer (Web Audio)

Problem. We wanted to see a live spectrum of the system’s audio without installing specialised software.

Change. Built a single self-contained HTML page using the Web Audio API: it captured a loopback input, ran an FFT, and drew the spectrum. It auto-selected the “Background Music” device, filtered out physical microphones, and pre-armed the permission prompt. Workable, but it had to be served over `localhost` and depended on browser audio-input permissions and a loopback device.

V1 | Native “Sigmon” (Core Audio process tap)

Problem. The browser route needed a loopback device, `localhost`, and browser permissions; we wanted a real app that captures all system audio directly.

Change. Built a native macOS app (Swift/SwiftUI) using Core Audio *process taps* (macOS 14.2+) that capture system audio with no virtual device — the sound still plays normally — using the System Audio Recording permission rather than a microphone. Compiled with the Command Line Tools via Swift Package Manager and a script that assembles and ad-hoc-signs the `.app`.

Signal & display quality

V2 | Resolution, smoothing & adaptive scale

Problem. Low frequencies were starved of FFT bins (flat bass plateaus), peaks looked jagged, the vertical scale didn’t adapt to volume, and the pop-out broke when the window was in full screen.

Change. Raised the FFT to 8192 points with 75% overlap for real low-frequency resolution; added Gaussian shaping to round peaks; added a level-adaptive floor; fixed the pop-out to leave native full screen first; and made the app run as a menu-bar agent.

V6 | Spectral contrast — peaks that stand out

Problem. A locally dominant motif didn’t visually separate from its neighbours, but we didn’t want to delete the neighbours and lose fidelity.

Change. Added local-contrast (unsharp) enhancement on the frequency-band axis, strength $k = 0.75$, applied to both the live trace and the peak line. Neighbours of a peak are reduced by at

most a clamped amount, never removed. Because the comparison is *local*, a loud bass region cannot smother a distant melody.

V7 | Steady scale & the “boom”

Problem. The whole graph lurched vertically on loud transients; a fully fixed scale would instead clip loud peaks into flat tops; and we wanted a tasteful accent on big moments.

Change. Slew-rate-limited the adaptive floor so the scale can only glide, never jump; added a soft-knee limiter so loud peaks ease into the ceiling instead of clipping; and added an onset-triggered “boom” — a palette-coloured bloom plus a brief, decaying shake on sharp rises in loudness.

V8 | Stronger boom

Problem. With the scale steadied, the boom no longer rode on top of a scale-jump, so it read as weaker than before.

Change. Lowered the trigger threshold, brightened and enlarged the bloom, strengthened the glow surge on the trace, and increased the shake amplitude.

V10 | Auto-range toggle

Problem. We wanted the option to freeze the drifting background grid without weakening the boom.

Change. Added an *Auto-range* setting: on, the dB axis follows loudness; off, it is pinned to a fixed floor for a rock-steady grid. The boom is independent of the scale and is unaffected either way.

Behaviour, modes & windowing

V3 | Concurrency warning

Problem. The build emitted a Swift warning: a token was “mutated after capture by a sendable closure” in the full-screen observer.

Change. Stored the observer token as a property instead of a captured local variable. Behaviour identical; the warning is gone.

V4 | App mode by default, with a menu-bar toggle

Problem. Menu-bar-only operation felt wrong as a default, and clicking the menu-bar icon didn’t reliably open the window.

Change. Made Sigmon a normal Dock app by default, with a toggle to switch into menu-bar mode (Dock icon hidden); introduced a small controller to own the presentation mode; and made a left-click on the icon always open and raise the window.

V5 | Window lifecycle

Problem. After closing the window, the menu-bar icon couldn’t bring it back, and “Show Dock Icon” quit the app entirely.

Change. Switched to a single `Window` scene that is reliably re-opened through SwiftUI’s `openWindow`; stopped the app from auto-quitting when the last window closes; and added Dock-icon reopen handling. Open/close now works in both modes.

V9 | Layer-1 polish

Problem. We wanted the app to feel like a polished, App-Store-grade product.

Change. Added a standard Settings window (palette, boom intensity, mode); a hidden-title-bar window for a flush, modern look; an onboarding empty state; a compact palette picker; VoiceOver labels; Reduce-Motion support (which suppresses the shake); and hover and transition micro-interactions.

V11 | Two new themes (+ first settings-in-menu-bar attempt)

Problem. We wanted a 1960s-lab oscilloscope theme and a thermionic-valve orange theme; also, Settings would not open from the menu-bar icon.

Change. Added the *Oscilloscope* (CRT phosphor green on a green graticule) and *Valve* (warm tube orange) palettes — which inherit the boom automatically, recoloured to match — and made a first attempt at opening Settings from the menu-bar menu.

V12 | Settings reliability

Problem. From the menu bar, Settings either did nothing or opened an empty, title-bar-only window, because the standard Settings action has no menu/responder chain to travel in menu-bar mode, and the content had no defined height.

Change. Replaced the SwiftUI Settings scene with a self-managed window that opens directly in any mode, and gave the settings content a definite size so it always renders. One consistent panel from both the Command-comma shortcut and the menu-bar menu.

V13 | Pop-out corner

Problem. The floating pop-out defaulted to the bottom-right; we preferred the top-right.

Change. Changed the panel's anchor to the top-right of the screen's visible area.

V14 | Window sizing

Problem. The window launched covering the whole desktop, snapped back to that size when another app was clicked and when toggling modes, and at one intermediate step could not be resized at all.

Change. Made the content *fill* the window rather than dictate its size; removed the resizable setting that tied the window to the content's resolved size (which, with filling content, forced the greedy maximum and fought every resize); set a sane default launch size; and stopped mode-switches from re-creating the window and re-imposing a size. Result: opens at a comfortable size and resizes freely.

V15 | Pop-out back on-screen

Problem. After the sizing rework, the pop-out panel could land off the top edge of the screen.

Change. Positioned the panel using the window's *actual* resulting size and clamped it inside the visible frame, so it is always fully on-screen, re-applying once the panel layout settles.

V17 | Configurable Start/Stop shortcut

Problem. The Start/Stop toggle was bound to a fixed spacebar key; we wanted to define our own keystroke for it.

Change. Added a key recorder in Settings (Controls): press any key, optionally with the **Cmd**, **Opt**, **Ctrl**, or **Shift** modifiers — it captures the chosen combination, persists it, and a local key monitor toggles capture when that combo is pressed while Sigmon is active. The previous spacebar binding became the editable default. Scope is in-app (active application only); a system-wide hotkey remains a possible opt-in extension.

Distribution

V16 | Disk image

Generated a distributable `.dmg`.