

G-BUS COMPRESSOR

Studio9 Plugins 2026

G-Bus Compressor is an emulation of the legendary SSL 4000 G-Bus stereo bus compressor — the defining sound of countless hit records since the 1980s. Like the original hardware, it uses a feedback topology where the detector reads the VCA output rather than the input, producing the natural self-regulating "glue" that the SSL console is famous for. It features true stereo-linked RMS detection, discrete attack and release time selections, sidechain high-pass filtering, and a soft-knee gain computer that closely mirrors the behaviour of the original circuit.

The Drive control adds subtle output transformer saturation modelled on the SSL 4000 series output stage — a gentle second-harmonic warmth that adds density and presence without heavy colouration. The plugin runs with 2x oversampling and a linear-phase filter around the saturation stage, keeping aliasing artefacts inaudible and preserving phase coherence for master bus use.



Fig. 1

CONTROLS

Threshold: Sets the level (dBFS) at which compression begins. Lower values engage the compressor earlier and produce more gain reduction.

Ratio: Selects the compression ratio: 2:1 for gentle glue, 4:1 for the classic SSL sound, or 10:1 for heavy limiting.

Attack: Selects the attack time from 0.1ms to 30ms, or AUTO for program-dependent attack that follows the musical material.

Release: Selects the release time from 0.1s to 1.2s, or AUTO for the dual time-constant program-dependent release that gives the SSL its glue.

Makeup: Applies output gain (0 to +20 dB) to compensate for gain reduction.

SC HPF: Engages a 60 Hz sidechain high-pass filter to prevent low-end content from triggering excessive gain reduction on every beat.

Stereo Link: Links the left and right sidechain detectors so both channels compress together, driven by the louder side.

Drive: Adds transformer saturation from subtle warmth to noticeable colour. Best kept low (under 30%) on the master bus.

Meter Mode: Switches the VU meter between Input level, Gain Reduction, and Output level display.

PRESETS

Drums Bus

Threshold -15 dB | Ratio 4:1 | Attack 3ms | Release 0.1s
Makeup +4 dB | SC HPF ON | Stereo Link ON | Drive 20%

Guitar Bus

Threshold -12 dB | Ratio 2:1 | Attack 10ms | Release 0.3s
Makeup +3 dB | SC HPF OFF | Stereo Link ON | Drive 35%

Mix Bus

Threshold -10 dB | Ratio 4:1 | Attack 30ms | Release AUTO
Makeup +2 dB | SC HPF ON | Stereo Link ON | Drive 10%

CHARTS

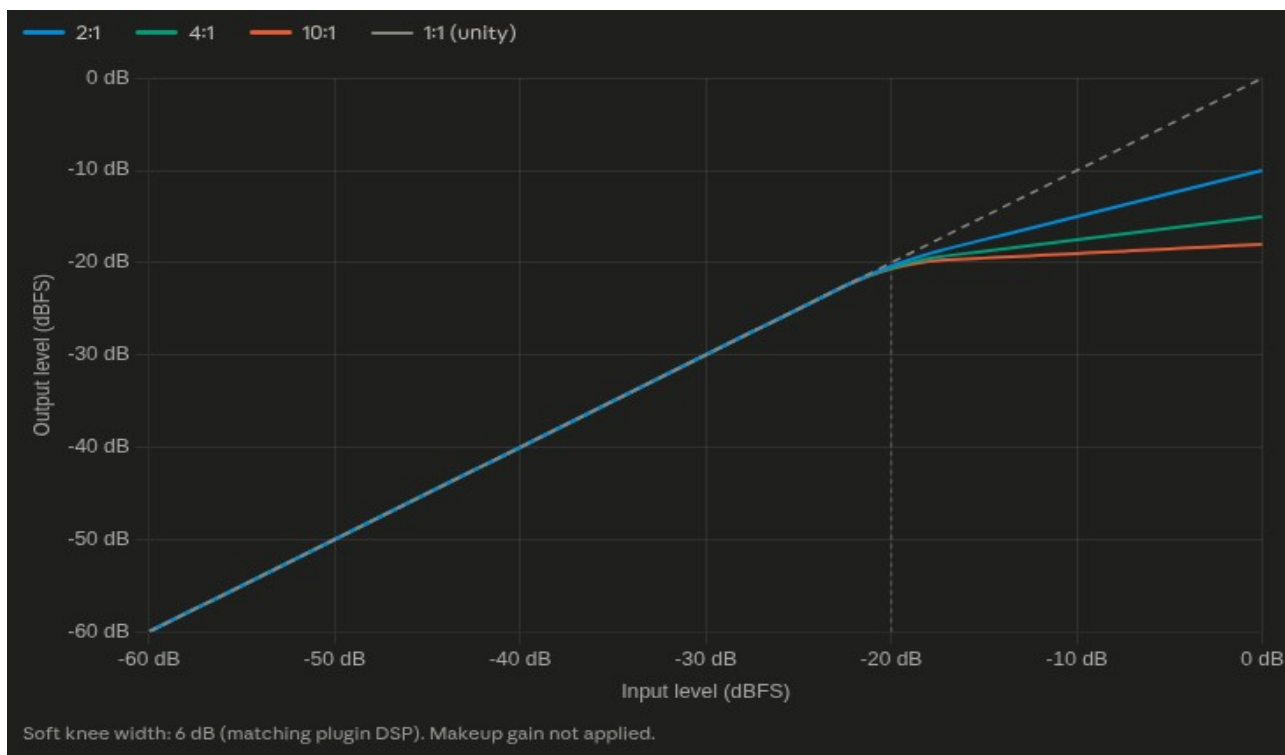


Fig 2

The chart plots output level vs. input level - soft knee formula, 6 dB knee width. A few things worth noting:

The soft knee region is visible as the gentle curve around the threshold. Below the knee the signal passes through untouched on all three ratios. The 10:1 ratio approaches limiting behavior, with the output barely rising past the threshold - but it's not a true limiter because of the feedback topology's self-regulating nature. The 2:1 curve is nearly indistinguishable from unity at gentle settings, which matches why it sounds so transparent.

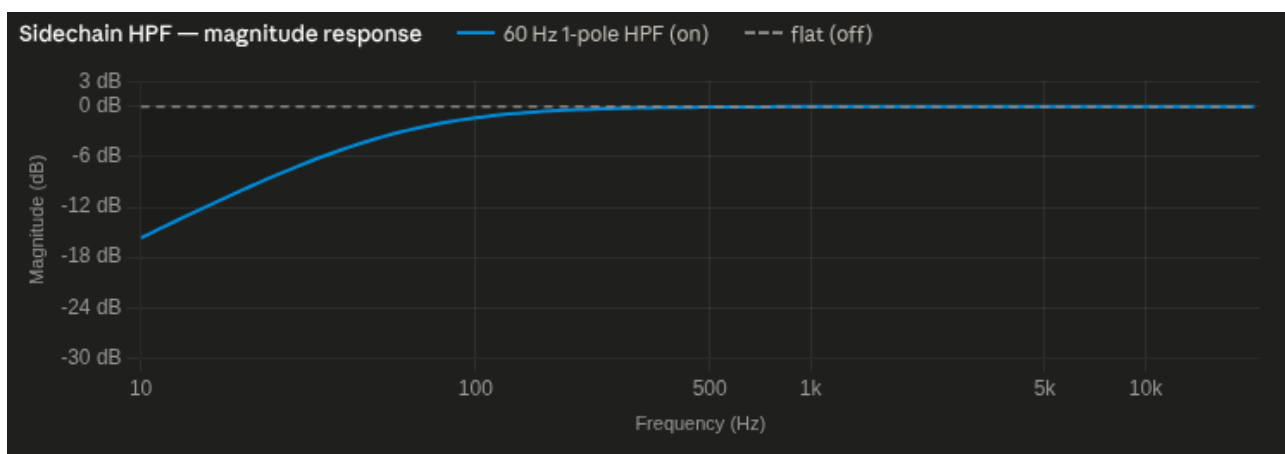


Fig 3

The HPF panel uses the exact transfer function of the 1-pole IIR: $H(f) = jf/f_c / (1 + jf/f_c)$, giving a clean -6 dB/oct rolloff below 60 Hz and -3 dB exactly at the cutoff. We can observe why it's effective - it's attenuating kick drum fundamentals (~60 Hz) by 3 dB and sub-bass (~30 Hz) by about 9 dB, preventing those from triggering large bursts of gain reduction on every beat.

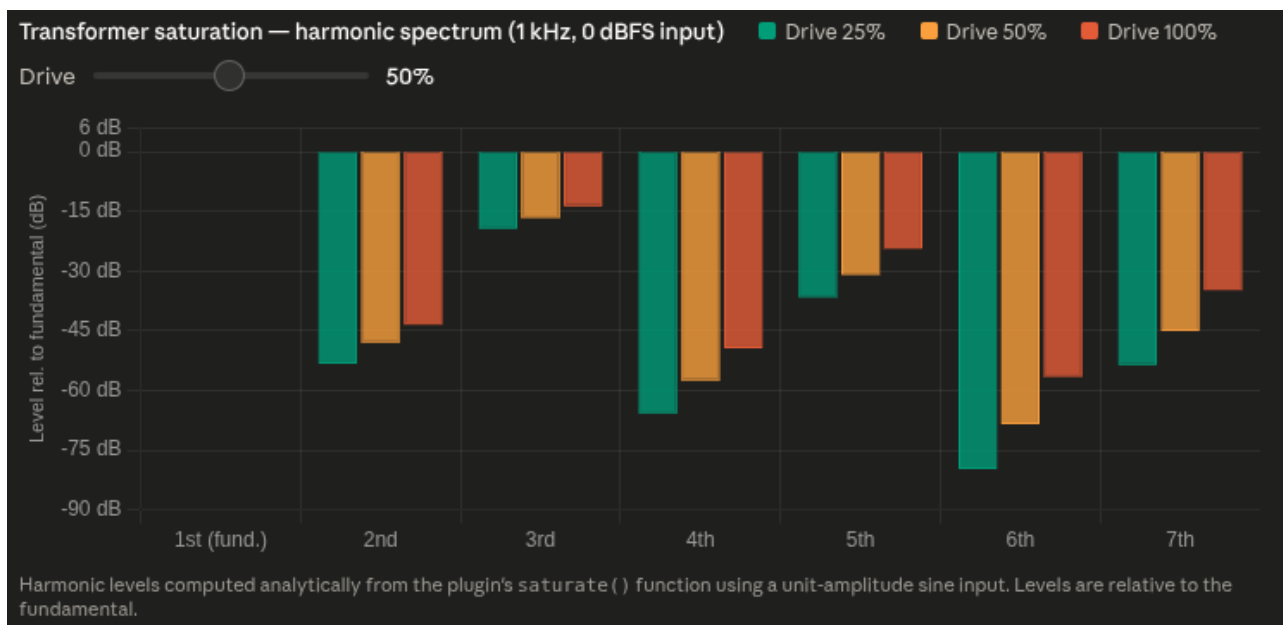


Fig 4

The harmonics panel runs a DFT analysis of the actual Saturate formula output for a unit sine wave. A few things stand out:

The 2nd harmonic dominates heavily over the odd harmonics at all drive levels - this is the even-order character the harmonic amount is deliberately adding on top of the Tanh.

At 100% Drive the 2nd sits around -30 dB relative to the fundamental, the 3rd around -50 dB, and the 4th and above are essentially buried. That profile is characteristic of transformer-style saturation - warm and dense rather than harsh.

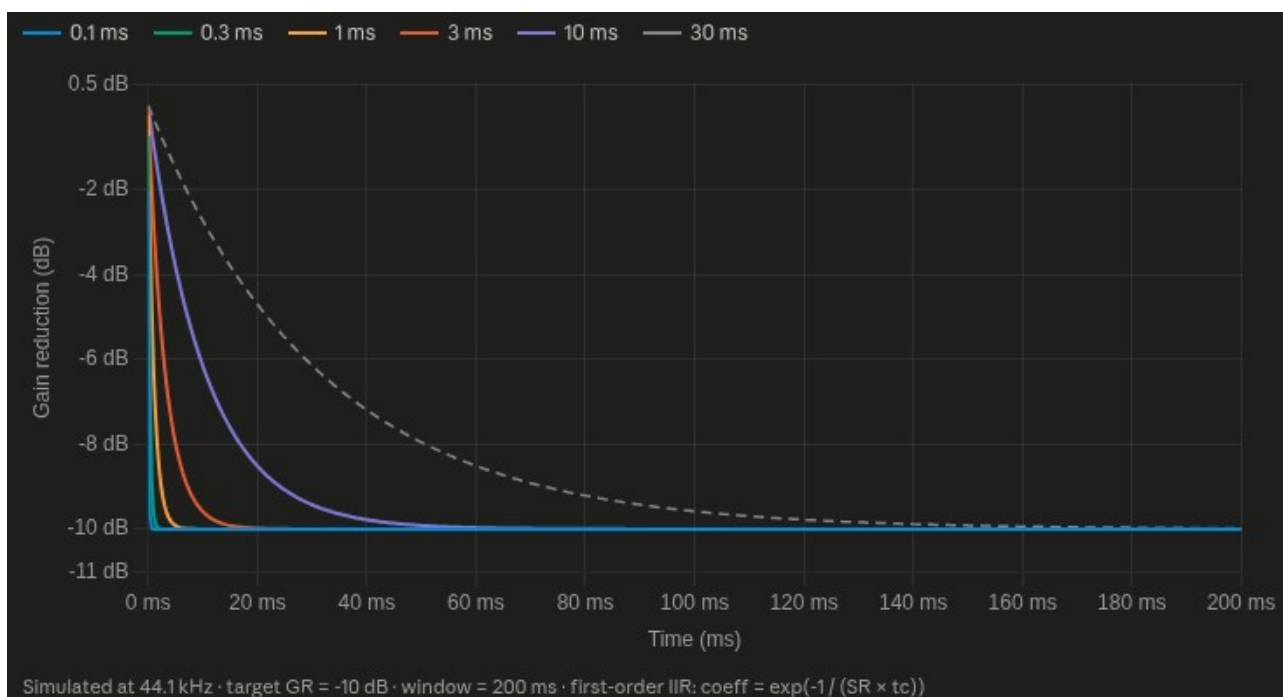


Fig 5

All six curves converge toward the same -10 dB target but on very different timescales. A few observations:

The 0.1 ms and 0.3 ms curves are nearly indistinguishable at this scale — both reach -9 dB within the first 5 ms. The 1 ms curve visually separates from those at around 3–5 ms. The 3 ms setting is the classic SSL "glue" sweet spot - enough attack to let transient punch through while still clamping

quickly on sustained material. The 10 ms and 30 ms curves never fully reach -10 dB within the 200 ms window, which is the expected behaviour of a first-order IIR: it asymptotically approaches the target, never hitting it exactly. In practice, the 30 ms setting at this depth would still be noticeable compression, just with significant transient passthrough.

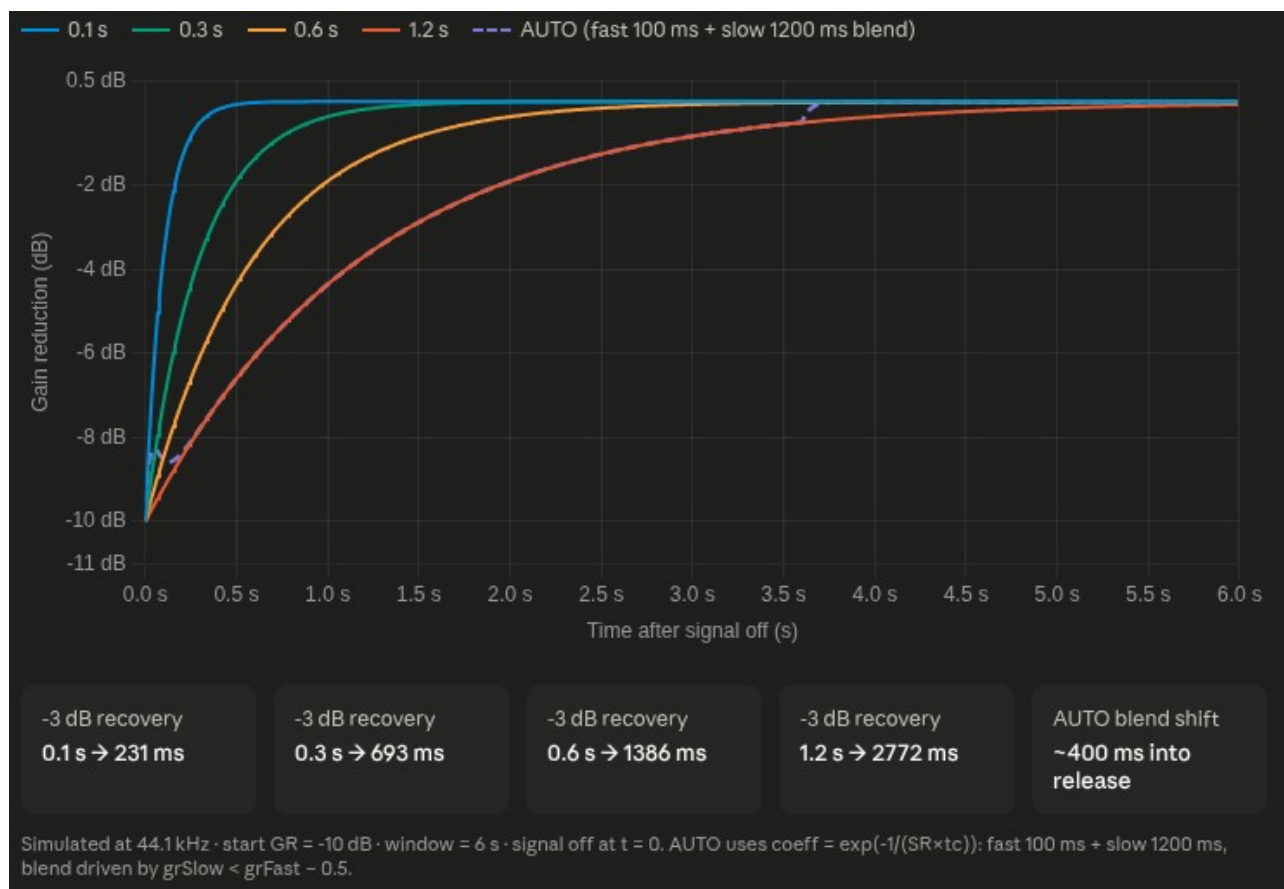


Fig 6

The separation between curves is much more dramatic here than in the attack chart - the 6-second window makes the 1.2 s curve visually the slowest by a wide margin.

The AUTO curve (dashed purple) is the most interesting behaviorally. It starts recovering fast - tracking close to the 0.1 s curve initially - then around 400 ms you can see its slope flatten as the blend coefficient shifts weight toward the 1200 ms slow component. This is the Slow GR < Fast GR - 0.5 threshold condition triggering in the code: once the slow integrator has lagged far enough behind the fast one, the blend tips toward slow. The result is a release that sounds natural on transient hits (quick recovery) but holds down on dense sustained material (slow recovery) - which is exactly the SSL AUTO glue character.

The metric cards give the time-to -3 dB recovery for each manual setting, which follows the classic RC time constant relationship: $t = -\ln(\text{target}/\text{start}) \times tc$. For a 10 dB decay to -3 dB remaining, that works out to roughly $2.3 \times tc$, visible in the numbers.

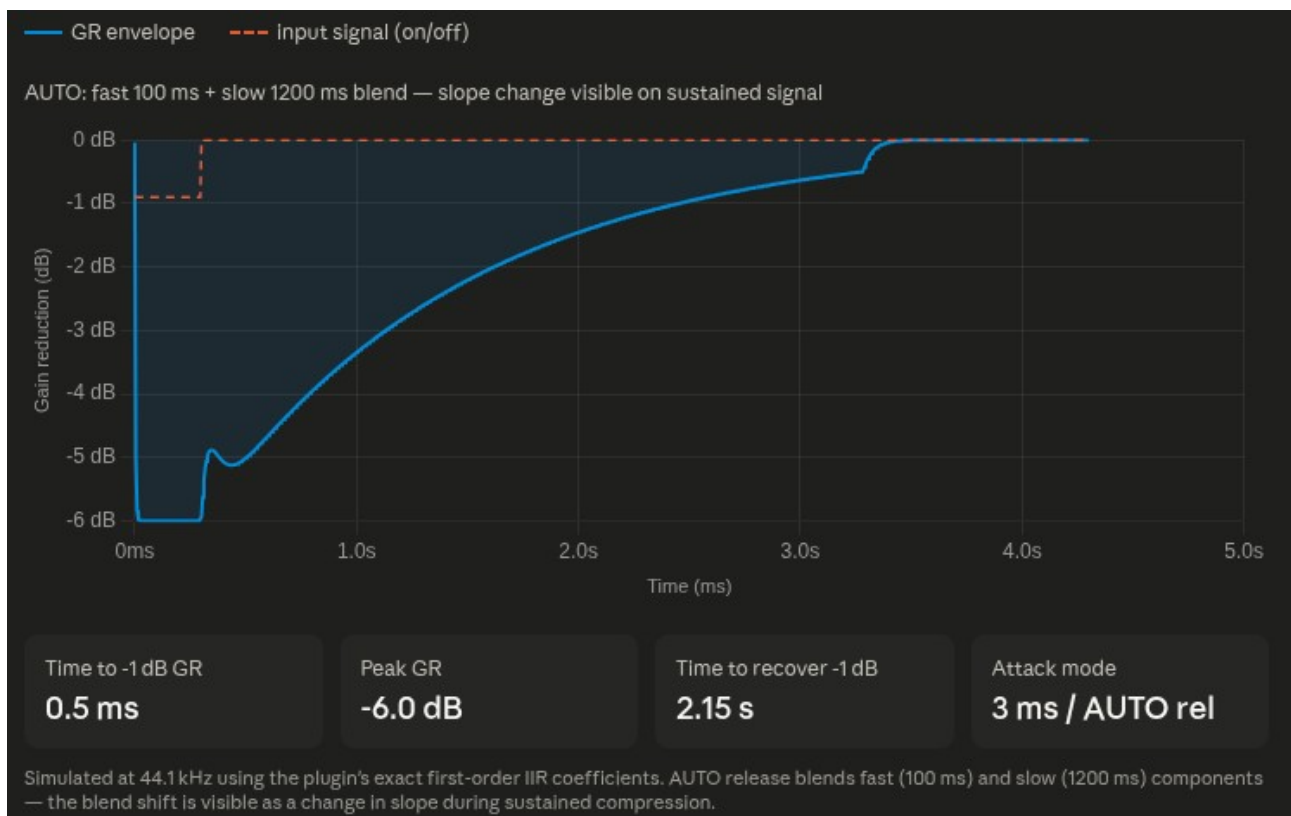
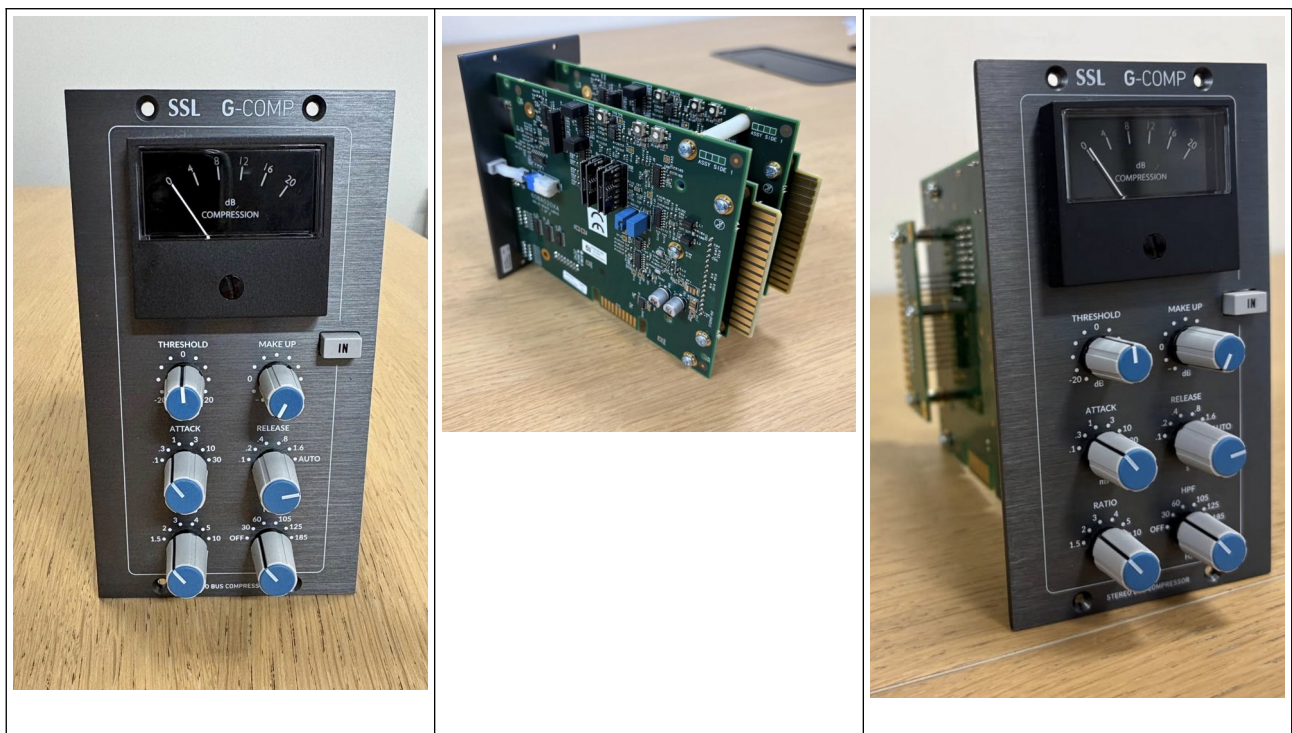


Fig 7

AUTO release is the most interesting setting to observe. With a longer "signal on-time" (1.2 s or 2.4 s), we can observe the slope of the release curve actually change mid-way — that's the blend coefficient shifting from the fast 100 ms component toward the slow 1200 ms component as sustained compression is detected. This is exactly the "glue" behaviour that makes AUTO special on dense mix material.

Photo Gallery



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