



MONOLITH

AUTO-MASTERING · 1 : 4 : 9

USER MANUAL

Version 1.0 · VST3 + AU · macOS & Windows

Ghostnote LLC

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1. Introduction

MONOLITH is an auto-mastering plugin that works the way a mastering engineer does: it listens to the **whole song first**, then decides. One capture pass gives it the integrated loudness and the long-term spectrum of your track; from those it solves a single static master — loudness on target, tone corrected, harmonics enriched — with the dynamics of your mix preserved instead of pumped.



- **Whole-song, not moment-to-moment.** The loudness move is one solved static trim, so quiet verses stay quieter than big choruses — nothing breathes or drifts.
- **It knows when to stop.** MONOLITH measures how much work the song actually needs. Feed it a finished master and it applies only a whisper of colour and no tonal change — and tells you so.
- **Delivery-safe.** True-peak limiting with an adjustable ceiling, mono-compatible lows, subsonic clean-up, correlation metering and optional TPDF dither for the final bounce.

2. Installation & Compatibility

2.1 Formats and requirements

Item	Details
Formats	VST3 (macOS and Windows) · Audio Unit (macOS)
macOS	macOS 11.0 or later — universal binary (Apple Silicon + Intel)
Windows	Windows 10 or later, 64-bit
VST3 path (macOS)	/Library/Audio/Plug-Ins/VST3/Ghostnote MONOLITH.vst3
VST3 path (Windows)	C:\Program Files\Common Files\VST3\Ghostnote MONOLITH.vst3
AU path (macOS)	/Library/Audio/Plug-Ins/Components/Ghostnote MONOLITH.component
Window	640 x 500 px
Placement	Last on the master bus (before nothing except your DAW's meter)
Latency	198 samples at 48 kHz (~4 ms; oversampling + limiter lookahead), reported to the host for automatic compensation

2.2 First install — security warnings

The installer is not yet signed with an Apple / Microsoft code-signing certificate, so both systems show a one-time warning when you first run it. The file is safe — every release is built and validated automatically on GitHub's servers — the warning only reflects the missing certificate:

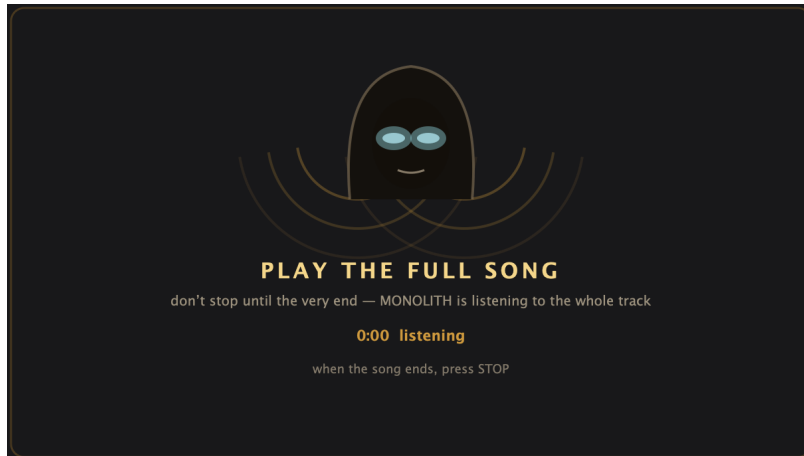
- **macOS 15 (Sequoia) and later:** double-click the .pkg. When macOS says it "could not verify" the installer, close that dialog, open **System Settings > Privacy & Security**, scroll to the bottom and click **Open Anyway** next to the installer's name, then confirm.
- **macOS 14 and earlier:** Control-click (right-click) the .pkg in Finder, choose **Open**, then click **Open** in the dialog.
- **Windows:** if SmartScreen shows "Windows protected your PC", click **More info**, then **Run anyway**.

2.3 First scan

- **FL Studio (macOS & Windows):** Options > Manage plugins > Find more plugins, or press the rescan button. The plugin appears as "Ghostnote MONOLITH" under Installed / Effects.
- **Logic Pro (macOS):** the AU is picked up automatically on launch; if not, restart Logic or rescan in Settings > Plug-in Manager.
- **Ableton Live:** enable VST3 (and Audio Units on macOS) in Settings > Plug-Ins, then rescan.
- **Other hosts (Cubase, Studio One, REAPER...):** any VST3-capable DAW on either platform works; run the host's plugin rescan after installing.

3. The Whole-Song Workflow

Step	Action
1	Insert Ghostnote MONOLITH last on the master bus and choose your TARGET loudness (–10 LUFS is the default; –14 is the streaming reference).
2	Press CAPTURE . The listening panel appears.
3	Play the song from the very beginning to the very end — do not stop, do not loop. MONOLITH is measuring the whole track.
4	Press STOP . MONOLITH solves the master and shows MASTER LOCKED : your input loudness, the predicted output loudness, and the static trim it chose.
5	Press OK and listen. Toggle BYPASS for an honest, latency-matched before/after.



3.1 Changing the target afterwards

You do **not** need to re-capture to change your mind about loudness. Pick a new **TARGET** and MONOLITH re-settles from the current gain in closed loop — it measures its own real output and locks again once it is within half a LU of the new target. The whole-song tonal solve is kept. Re-capture only when the song itself changed (new mix, new arrangement).

3.2 If the capture was too short

A capture needs at least a few seconds of real audio. If you stop too early the panel says **CAPTURE TOO SHORT** and nothing is changed — press **CAPTURE** and play the song again.

3.3 Live mode

MODE > Live skips the capture pass: a realtime servo settles the gain to target while the song plays, then freezes it static once stable (the button becomes **ANALYZE** to re-lock on demand). Use it for quick drafts and DJ-style workflows; Whole-Song remains the accurate way, and only Whole-Song enables the auto-restraint assessment.

4. How MONOLITH Works



*one static gain solved from the whole song — the dynamics of the mix are preserved,
the limiter only catches peaks on the way to the ceiling*

4.1 Loudness, measured properly

All loudness in MONOLITH is BS.1770-4 / EBU R128: K-weighted, gated, integrated — the same measurement Spotify, Apple Music and YouTube use. The meter also shows momentary (400 ms) loudness, true peak (8x oversampled), PSR (punch), and limiter gain reduction. The release tests verify the measurement against the ITU reference to within 0.1 LU.

4.2 The loudness waterfall

INTENSITY walks the track down a waterfall of loudness tools in order of transparency: harmonic saturation first (density without squashing), then soft clipping (shaves transient tips), then glue, and only last the true-peak limiter. A PSR governor watches punch in real time: if sustained limiting starts flattening the track, work is shifted from the limiter to the clipper, and the meter warns PUNCH BUDGET LOW when a hot target genuinely cannot be reached without crushing.

4.3 Whole-song tone

During capture MONOLITH accumulates the long-term average spectrum of the song and compares four bands (bass, mud, presence, air) against a house target curve. The correction is deliberately conservative — moves are halved and capped at 3–4 dB — so it fixes tendencies (muddy low-mids, missing air) without re-EQing your mix. TONE then tilts the overall balance warm or bright on top, and the tests verify the tilt lands within a fraction of a dB of its nominal ± 6 dB range.

4.4 Harmonics and width

Enhancement happens in Mid/Side at 4x oversampling: the mid's low band gets even-harmonic weight so bass survives on small speakers; the rest morphs tube-to-tape with TONE; a gentle exciter adds air above 7 kHz; the sides get only light saturation to keep width clean. WIDTH itself is multiband — lows below ~120 Hz stay mono for translation and vinyl/club safety.

4.5 Knowing when to stop

After a capture MONOLITH scores how far the song is from target loudness, target tone and healthy crest factor, and scales its own processing by that need. A finished master reads as ready: corrective EQ falls to zero, dynamics processing falls away, and only a whisper of colour (a deliberate 10 % floor) remains — the readout says "already well-mastered — light touch". RESTRAINT controls how adaptive

this is: 100 % = fully adaptive (default), 0 % = always apply the full treatment regardless.

4.6 The limiter and the ceiling

The final limiter is true-peak: it runs 8x oversampled with 1.5 ms lookahead and a program-dependent release, and its sliding-minimum design cannot leak overshoots. CEILING sets the true-peak maximum (−1 dBTP default is streaming/codec-safe; −0.5 or 0 for maximum level). The output lands about 0.3 dB under the dial as inter-sample safety margin.

5. Controls Reference

Control	Range	Default	What it does
TARGET	−14 ... −7 LUFS	−10	The integrated loudness MONOLITH drives the master to. −14 = streaming reference (cleanest); −7 = maximum hot (trades dynamics — watch PSR).
INTENSITY	0–100 %	50 %	Overall mastering push down the waterfall (saturation → clip → glue → limit).
WIDTH	0–200 %	110 %	M/S stereo width; 100 % = neutral. Lows below ~120 Hz always stay mono.
STONE	−100 ... +100	−8	Tonal tilt: left = warm/dark, right = bright/present (shelves + saturation flavour). Slightly warm by default.
DE-ESS	0–100 %	30 %	Dynamic high-frequency control so the loudness processing never turns "S" sounds harsh.
RESTRAINT	0–100 %	100 %	How much MONOLITH holds back on material that does not need work. 100 = fully adaptive; 0 = always full treatment.
CEILING	−3 ... 0 dBTP	−1	Output true-peak limit. −1 is codec-safe; raise toward 0 for level.
MODE	Whole-Song / Live	Whole-Song	Whole-Song: capture then one static master. Live: realtime servo fallback.
SUB HPF	Off / On	On	24 Hz high-pass removing subsonic rumble that steals limiter headroom.
DITHER	Off / 16 / 24-bit	Off	TPDF dither for the final bounce. Use only if MONOLITH is the last plugin and you export fixed-point. Auto-blanks in silence — never adds a noise floor.
CAPTURE	—	—	Starts the whole-song analyse pass (ANALYZE re-locks in Live mode).
BYPASS	on/off	off	Latency-matched, click-free before/after (wired to the host bypass).

6. The Meters

Readout	Meaning
INTEGRATED	Whole-measurement average loudness — what streaming platforms read. Aim it at the target line; it turns jade when within 1 LU of target.
INSTANT	Loudness right now (400 ms momentary). Expect it to swing above and below INTEGRATED with the arrangement — that swing is your preserved dynamics.
The bar	Short-term loudness climbing toward the target line. Jade near target; terracotta if the true-peak ceiling is threatened.
AUTO-GAIN	The solved static trim and its status: LOCKED (settled), ADAPTING (still settling), PUNCH BUDGET LOW (the target is costing too much punch — consider a gentler target).
TRUE PEAK	Highest inter-sample peak since reset; red when over the safe line.
PSR	Peaks versus loudness — punch. 8+ is healthy, amber is working, red means crushed.
GR	Limiter gain reduction right now. Ideally small and occasional.
RESET	Restarts INTEGRATED, TRUE PEAK and PSR. Press it, then play from wherever you want to measure — e.g. reset, play the whole song, read the final integrated value. The locked master itself is untouched.

The bottom strip reports the restraint verdict after a capture: "already well-mastered — light touch", "mostly there — gentle master", or "needed work — full master", along with the applied percentage and the stereo correlation (mono-compatibility) figure.

7. Recipes

- **Streaming release:** TARGET −14 or −12, CEILING −1, INTENSITY 40–60. Reset the meter, play the song once, confirm INTEGRATED lands on target.
- **Competitive loud (rap/EDM):** TARGET −9 or −8. Watch PSR: if AUTO-GAIN says PUNCH BUDGET LOW, the honest options are a gentler target or a denser mix — not more limiter.
- **"Is my mix done?" check:** capture the mix and read the verdict. "Needed work — full master" with big corrective moves usually means the mix itself wants attention first. Readiness is diagnostic, not judgement.
- **Mastering someone else's finished master:** leave RESTRAINT at 100 — MONOLITH will only re-aim the loudness and add a whisper of colour. Verified: a finished master gets ~5 % applied treatment and ~0 dB of EQ.
- **Final bounce:** if you export to 16- or 24-bit fixed point and MONOLITH is last in the chain, set DITHER to match the export depth. Otherwise leave it Off.

- **In the Ghostnote chain:** SIREN → TALISMAN → VEIL → ... → **MONOLITH**, always last on the master bus.

8. Measured Performance

Every MONOLITH build must pass an automated measurement suite plus strict host validation before release. Shipping v1.0 results:

Test	Result
K-weighting filter accuracy	Matches the ITU-R BS.1770 48 kHz reference coefficients to within 1e-5
Integrated LUFS vs analytic reference (44.1/48/96 kHz)	Within 0.04 LU at every rate
Bypass null	Bit-exact: residual 7.5e-09 against the input delayed by the reported 198 samples
True-peak ceiling (hot program, re-measured at 16x oversampling)	Worst output peak -2.26 dBTP against a -1 dBTP ceiling — no overshoot
Target convergence	Settled to -13.98 LUFS against a -14 target (0.02 LU error), then auto-locked static
Whole-song capture (quiet boost, hot turn-down, hot target)	All three cases land within 1 LU of target and lock
Anti-aliasing (5 kHz tone through saturation + clipper)	Worst non-harmonic alias 71.6 dB down
Restraint on a finished master	Readiness above 0.8, applied treatment below 12 % (~5 % typical), corrective EQ under 0.3 dB — it leaves finished work alone
Silence null (dither auto-black)	Residual below 1e-9 in silence even with dither enabled — MONOLITH never adds a noise floor
Host validation	Apple auval (strict) passed; pluginval strictness 10 passed on Apple Silicon and Intel

9. Troubleshooting

Symptom	Cause & fix
Output lands shy of a hot target	The PSR governor is protecting punch (AUTO-GAIN reads PUNCH BUDGET LOW). Choose a gentler target, raise INTENSITY, or densify the mix itself.
Nothing seems to happen	If the readout says "already well-mastered — light touch", that IS the feature. Lower RESTRAINT toward 0 to force the full treatment anyway.
I changed TARGET — recapture?	No. MONOLITH re-settles to the new target in closed loop automatically. Re-capture only when the mix itself changed.
INTEGRATED does not match my streaming platform	Integrated loudness is defined over the whole song: press RESET, play the track end to end, then read it. A partial play reads only that section.
Master sounds crushed at -7/-8	Hot targets trade dynamics by definition. Watch PSR (keep it 5+), back off INTENSITY, or accept -9/-10 — they translate louder than they look.
CAPTURE TOO SHORT message	The pass needs at least a few seconds of audio. Capture again and play the song through.
Worried about added noise	MONOLITH adds no noise floor: dither is off by default, only runs when selected, never while bypassed, and auto-blanks in silence (verified to below 1e-9).

10. Specifications

Specification	Value
Loudness	BS.1770-4 / EBU R128: momentary, short-term, gated integrated; true peak per Annex 2 (8x)
Gain architecture	Whole-song solved static trim (closed-loop re-target without re-analysis); Live servo fallback
Tone	Whole-song LTAS corrective EQ (4 bands, conservatively capped) + tilt (warm/bright)
Enhancement	M/S band-split saturation at 4x OS: low-band weight, tube-tape morph, HF air exciter, side saturation
Peak control	Soft clipper + PSR governor + true-peak limiter (8x OS, 1.5 ms lookahead, program-dependent release)
Width	Multiband M/S width 0–200 %, lows below ~120 Hz mono
Delivery	Sub HPF 24 Hz, correlation guard, TPDF dither (16/24-bit) with auto-black
Latency	198 samples at 48 kHz, reported to host

Specification	Value
Sample rates	All standard rates (loudness filters derived per rate)
Formats	VST3 (macOS & Windows), AU (macOS)
Plugin codes	Manufacturer Ghst · Plugin Mnlt (stable across all versions)

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