INDEPENDENT AUDIO SOFTWARE

LYNCH Tape Recorder

Give the recording some memory.



Move between studio, mastering, valve-reel, Porta, cassette and microcassette character. Record Drive and Headroom shape density, while bias, head response and transport movement make the colour part of the recording, not a separate file recorder.

Complete colour user guide · version 0.3.0 · Apple Silicon Mac AU · macOS 12+

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Start with the part

Move between studio, mastering, valve-reel, Porta, cassette and microcassette character. Record Drive and Headroom shape density, while bias, head response and transport movement make the colour part of the recording, not a separate file recorder.

01 / Pick a machine and enable Tape.

02 / Select Speed and Formula. Start at 15 ips for Studio, 30 ips for Mastering,

03 / 5 ips for Valve Reel, 3.75 ips for Porta, 1.875 ips for Cassette or Microcassette.

04 / Raise Record Drive until the attack and texture feel right. Adjust Output

05 / for a fair comparison at a similar listening level.

06 / Use Headroom and Bias to refine density and high-frequency character.

07 / Add a little Wow or Flutter for movement. Add Wear, Crosstalk or Dropouts

08 / when an older or damaged recording is wanted.

09 / Use Mix for parallel tape color, or Bypass for the aligned dry signal.

Inside the sound

What It Does

Tape Recorder adds magnetic density, format-dependent frequency response, head resonance, pitch movement and optional age to existing audio.

Vintage Hardware View

The physical reels (and the cassette hubs in the small-format voices) move when this instance is processing audio with Tape enabled and Bypass off.

Quick Start

7.5 ips for Valve Reel, 3.75 ips for Porta, 1.875 ips for Cassette or Microcassette.

The Six Machines

Studio 2-inch Full-range studio weight with a low head bump, moderate record pre-emphasis and relatively gentle magnetic memory.

Record And Tape Controls

Tape Enables the magnetic/color path and its transport/degradation effects.

Tone And Head Response

Playback Bass / Treble —±6 dB Broad playback shelves after the magnetic recording and reproduction filters.

Quick Start

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6. Use Mix for parallel tape color, or Bypass for the aligned dry signal.

What It Does

Tape Recorder adds magnetic density, format-dependent frequency response, head resonance, pitch movement and optional age to existing audio. Use it on individual tracks, instrument buses or a complete mix. It records and reproduces the sound in one continuous effect; it does not store audio files or record a multitrack session.

Init is a clean starting point. Enable Tape to hear the selected machine. There are 48 curated starting points plus Init, arranged into six machine groups. Each starting point has its own settings. Vintage noise is off in every factory setting, so hiss is always a deliberate choice.

Vintage Hardware View

The physical reels (and the cassette hubs in the small-format voices) move when this instance is processing audio with Tape enabled and Bypass off. Live input monitoring also counts as processing. Reels stop when the host stops rendering, Tape is disabled or Bypass is enabled. Animation pauses with the editor closed; reopening it resumes visual motion without changing audio or stored settings.

Reel speed follows the selected virtual ips setting. The graphics represent the transport visually; they do not measure tape length or create a recorded file. The existing effect controls, processing, presets and latency are unchanged.

The illuminated INPUT and OUTPUT meters use the existing combined input/output RMS readings, with -18 dBFS displayed as 0 VU. They are not separate L/R meters, true-peak meters or a certified analog VU

instrument. The numeric output/peak readouts and the four transport meters remain available below the controls.

The Six Machines

Studio 2-inch Full-range studio weight with a low head bump, moderate record pre-emphasis and relatively gentle magnetic memory. A useful starting point for drums, bass, vocals and multitrack-style instrument color.

Mastering Half-inch Wider clean bandwidth, deeper low extension, lower coercive memory and more headroom. Good for subtle density on a mix or a bright instrument bus. It is still a tape effect and can distort strongly when driven.

Valve Reel A warmer reel-to-reel voice with model-specific asymmetric amplifier color, stronger low-mid resonance and a softer high end. The added even harmonics come from this voice's amplifier design; Bias is a separate tape-alignment control.

Porta 4-track Compact cassette multitrack character: stronger record pre-emphasis, earlier saturation, narrower bandwidth and more pronounced transport character. Try it on indie drums, layered guitars, bass and bedroom keys.

Cassette More magnetic memory, a small-format low-frequency contour, a softer top and an easier transition into dense saturation. Formula and Speed can move it from fresh high-output color to worn ferric character.

Microcassette A deliberately small, voice-recorder-inspired bandwidth with the earliest saturation, stronger low-frequency filtering and the most pronounced transport scaling. Useful for pocket-recording textures, parallel dirt and damaged pads. It remains a stereo creative effect, not a literal model of a mono dictaphone.

These are original Lynch musical designs. Studio recorder manuals, cassette formats and research informed the feature set. The voices are not calibrated replicas of particular Studer, Ampex, Revox, Tascam or Sony machines, and there are no third-party recordings, neural weights or manufacturer algorithms inside.

Record And Tape Controls

Tape Enables the magnetic/color path and its transport/degradation effects. The filters, Input/Output trims and optional Vintage Noise remain separately controllable. Turning Tape off smoothly returns its sound toward clean audio.

Speed —1 7/8, 3 3/4, 7 1/2, 15 or 30 ips Changes the tonal calibration of a simultaneous recording and reproduction. Slower settings generally reduce high-frequency extension and move the head bump lower. Faster settings open the top and move the bump upward. Speed does not change the song's pitch or tempo. The common menu is a creative virtual calibration available in every voice, including combinations unavailable on real hardware. Real microcassette speeds such as 1.2/2.4 cm/s are not claimed to match

the ips labels of this shared control.

Formula — Oxide / High Output / Chrome Oxide is the reference formulation. High Output raises the saturation headroom and opens the bandwidth slightly. Chrome opens high-frequency extension with a different headroom balance. These are original tonal formulations, not branded tape-stock measurements. Formula interacts with Drive, Headroom, Bias and Speed.

Record Drive —0..30 dB Raises the signal hitting the magnetic stage. Higher values increase density, compression and harmonics. This is a real level change into the tape, not a loudness-neutral distortion amount. Use Output to compare fairly.

Headroom —−12..+12 dB Positive values allow more clean magnetic level; negative values make tape saturate earlier. Headroom changes the saturation threshold rather than acting as an output fader.

Bias —−100..+100% An AC-bias alignment proxy. Negative settings increase coercive/reversal character and brighten the recording. Positive settings reduce that memory and soften the high frequencies. This control does not add a DC offset and does not literally run an ultrasonic bias oscillator.

Tone And Head Response

Playback Bass / Treble —±6 dB Broad playback shelves after the magnetic recording and reproduction filters. Use them to recover presence, soften a driven edge or balance the low end.

Head Bump —0..100% Controls the format-specific low-frequency resonance. The frequency and maximum height depend on machine and Speed. Zero removes the bump while retaining the rest of the tape response. A large bump can increase output level.

High Pass / Low Pass Independent musical fixed-Q filters after the tape transport. High Pass 20 Hz is open/bypassed; its maximum is 20 kHz. Low Pass 0 Hz is fully closed and 20 kHz is open/bypassed. Enable each filter separately. Filters are not tape bias or head-gap measurements.

Transport

Wow / Wow Rate —0..100%, 0.1..2 Hz Slow, continuously varying tape delay creates real pitch movement. The main cyclic movement is blended with a slower component to avoid a single sterile vibrato. Depth is a musical percentage, not an IEC weighted wow specification.

Flutter / Flutter Rate —0..100%, 2..15 Hz Faster pitch movement from the same causal band transport. Start low on a mix and use more for unstable keys or damaged recordings.

Stereo Drift —0..100% Separates the cyclic transport phase between channels. Zero keeps the cyclic wow/flutter together. Worn channel randomness and dropouts are independently generated per channel and can still differ when Stereo Drift is zero.

The transport uses a 16-tap fractional reader. Its real 512-sample center delay provides room for modulation in both directions without reading future audio. Maximum movement stays within the preallocated recording buffer. It is pitch modulation, not an echo or a tempo-synced delay.

Age And Damage

Wear —0..100% Reduces high-frequency extension, increases coercive texture and introduces a small irregular transport component. Zero removes these added age effects.

Crosstalk —0..100% Introduces format-scaled leakage between the left and right channels. Zero gives exact channel isolation. It is inactive in mono. Leakage can raise the level of correlated stereo audio; adjust Output as needed.

Dropouts —0..100% Adds deterministic, individually timed short amplitude losses to the tape path. Higher settings deepen them. Smooth event envelopes avoid abrupt mute clicks. Zero removes dropout attenuation completely. This control is a creative damage amount, not a probability or a fixed event count.

Vintage Noise

Noise On / Noise Level —−96..−30 dBFS Adds a shaped deterministic hiss texture. The voice selects a blend of tape, valve or cassette-style spectral shaping. The level is calibrated as an RMS engineering reference, before Output, Mix and Sample Protect.

Noise is input-armed. A signal above approximately−90 dBFS arms it; silence holds it for six seconds and fades it over the next two seconds. A cold silent instance produces no hiss even with Noise On. This makes the noise tail finite and lets a host stop processing after the reported tail. It is not a noise generator intended to play indefinitely on an empty track.

Noise is independent of Tape power. Turn Noise off for completely silent backgrounds. The generator and damage/motor seeds reset reproducibly, so identical audio, settings, reset and sample rate produce identical renders. Noise timing follows the processed sample stream rather than DAW bar numbers.

Technical Behavior

Mono, mono-to-stereo and stereo processing; supported host rates 8..192 kHz. 1/48/88.2/96/192 kHz and buffers 1/17/64/511/2048. Oversampled magnetic processing uses 16 x below 88.2 kHz and 8 x at higher host rates, with a 96-sample FIR pair. Antiderivative antialiasing reduces aliases in the static saturation part. It is combined with a stateful reversal-memory model; the complete system is not claimed mathematically alias-free.

Reported latency is 608 samples:96 FIR plus 512 transport centering. The small half-oversampled-sample antiderivative delay is compensated by the fractional transport read. At 48 kHz 608 samples is about 12.67 ms. The dry path is matched. No unrelated lookahead limiter or artificial extra release delay is added.

The reported tail is conservatively 1.2 s, or 8.2 s with Noise On. Full Bypass or Mix zero reports only a conservative dry-delay allowance. There is no feedback loop. No memory allocation, file access or host calls occur in the DSP render.

Noise, parameter motion, extreme saturation and time-varying resampling can create spectral components that a purely static EQ model cannot describe. Extreme settings should be judged in context and at matched levels. Engineering tests establish defined behavior and stability; they do not certify measured hardware equivalence, best-in-world sound or a replacement for musical listening.

Primary Reading And Design Context

Studer A 827 manufacturer service information: studio speeds and alignment.

Ampex ATR 100 manufacturer operation/maintenance manual: professional reel formats.

Ampex 351 manufacturer manual: valve recorder/electronics context.

Revox B 77 MKIII manufacturer instructions: reel transport and operating context.

Tascam 424 MKIII manufacturer manual: four-track cassette format and speeds.

Sony M 570 V manufacturer specification: actual microcassette 1.2/2.4 cm/s format.

Jatin Chowdhury, DAFx 2019: Real-time Physical Modelling for Analog Tape Machines. Research context for magnetic memory, tape response and transport; its software implementation is not incorporated here.

Otto Mikkonen et al., DAFx 2023: Neural Modeling of Magnetic Tape Recorders. Research context for separating magnetic/filter, transport and additive noise. This product contains no trained neural model or recording dataset.

Julian D. Parker, Vadim Zavalishin and Efflam Le Bivic, DAFx 2016: Reducing the Aliasing of Nonlinear Waveshaping Using Continuous-Time Convolution. Published antiderivative equations independently implemented in original C++.

Input, Output And Meters

Input / Polarity Input trims the wet processing feed; Polarity inverts that feed. The dry side of Mix and Bypass remains the original aligned input.

Output Controls the processed/noise signal before Mix. There is no hidden automatic gain matching. Heavy Record Drive can require a lower Output setting.

Mix Blends between aligned dry and processed audio. Zero is the exact dry sample with the same 608-sample compensation delay. Wow/flutter can produce chorus or combing when mixed with dry audio; that is the audible result of moving pitch and time, not a failure of latency compensation.

Bypass Returns the exact delayed dry sample when fully enabled. Processing histories stay warm for smooth reactivation. Native AU bypass and the visible Bypass parameter refer to this same state.

Sample Protect Optional soft sample-peak protection near full scale. It is not a lookahead limiter, a certified true-peak limiter or a mastering loudness target. Strong protection is a nonlinear stage and may add harmonics. Leave it off for the cleanest engineering comparison; use a suitable final limiter when

needed.

Input / Output / Peak Show input/output level and a decaying output sample peak. They are not LUFS or calibrated analog VU measurements.

Tape Compression Shows the level loss across the nonlinear magnetic stage. It excludes playback EQ/head bump, Output, Mix and Sample Protect. It is not an external compressor gain-reduction measurement or an automatic target.

Pitch Movement / Dropout Depth / Speed Report current transport movement, dropout attenuation and effective virtual ips. Transport movement is an absolute cents magnitude, not weighted wow/flutter.

Automation, States And Presets

All 30 sound parameters are host parameters. Continuous controls smooth at a sample-based rate, independent of buffer size. Machine, Formula and Speed use smoothed internal voicing transitions. Reset/Init restores defined settings and deterministic histories. The wrapper validates state values before restoration. Factory starting points are full settings, not duplicate gain variants.

Install and choose the right host slot

Apple Silicon Mac, macOS 12 or later. Audio Unit only; no Intel Mac, Windows, VST3 or standalone application is included. Use an AU-compatible host and insert on an audio track, instrument audio output or bus.

Save your session before installation. Use the verified current installer and follow its installation prompts, then restart the host if the newly installed AU is not listed. Select the product under Lynch Audio Lab in the appropriate slot.

Trial and permanent licensing

Download the trial installer shown on the product page; the same installer is used for trial and purchase. No card is needed for the trial.

Open the plug-in, click Trial & Activation at the bottom and press Start trial to begin its full 14 days. Installing, opening a preset or downloading a guide does not start a new trial. Each product has its own trial. There is no subscription, automatic charge or periodic noise burst.

For a permanent purchase, use the exact Buy link on the product page. Lemon Squeezy supplies a license key in the receipt. Connect this Mac to the internet, click Trial & Activation at the bottom, paste the receipt key for this exact product and choose Activate. A permanent license allows a maximum of three computers. After successful activation, work offline.

To free a Mac’s activation, connect it to the internet, open Trial & Activation and choose Deactivate this Mac. This releases that computer without renewing or resetting trial dates. Presets, project settings and

updates do not renew the trial and retain settings.

The login Keychain stores trial and license-key records separately from presets. If it is locked, unlock it normally and press Refresh in Trial & Activation. Keep the system date correct.

At expiry, audio effects return latency-aligned dry audio with normal reported latency; instruments are silent; MIDI tools stop output and release held notes. Presets and project settings remain. Purchase activation restores licensed processing rather than a new trial.

Save, recall and automate

Save the host project to retain the AU instance. Use the product-specific preset operations described in the control chapters for reusable sounds. Preset files, complete project state and controller assignments can have different scopes; do not treat them as interchangeable.

When using host automation, choose an exposed sound parameter, record a short test pass and replay from before the first change. Check module enables, routing and output level. Only use product-local MIDI Learn when this manual explicitly documents it; otherwise use the host’s controller-assignment workflow.

Troubleshooting and support

If the AU is missing, save your session, install the current package and restart the AU-compatible host. Check the required macOS version and Apple Silicon architecture, then review the host’s plug-in manager. Do not delete a working production project to troubleshoot an insert.

For no sound or no processing, first check the correct slot, track input/output, incoming audio or MIDI, bypass/mute, module enables, mix/return amounts and trial or activation status. Test a simple documented starting point before adding a complex chain.

If the sound is too loud or distorted, reduce drive or output and inspect later inserts and the host master. Sample-peak protection does not guarantee intersample peaks. Source clipping cannot be repaired simply by lowering a later trim.

For dropouts, reduce active polyphony, unison, long returns or dense processing where applicable, or use the host’s freeze/bounce workflow. A larger buffer can help scheduling; it cannot cure sustained processing overload.

For activation trouble, check the internet connection and use the key for this exact product from the Lemon Squeezy receipt. For help, contact info@lynchaudiolab.com with product version, macOS version, AU host and a short description. Never send your private license key publicly.

About this guide

Lynch Audio Lab · Music records a brighter tomorrow. This guide describes the released Audio Unit package. The control chapters preserve the supplied public operating documentation, with current-operation addenda integrated and obsolete private-test release labels removed. Images show the real product interface; some original panel lettering may predate the current package version. Original TXT documentation remains available separately.

Original Lynch designs are not measured hardware replicas or equipment-maker endorsements. Listen in context, maintain headroom and check the final deliverable after downstream processing. Support: info@lynchaudiolab.com.