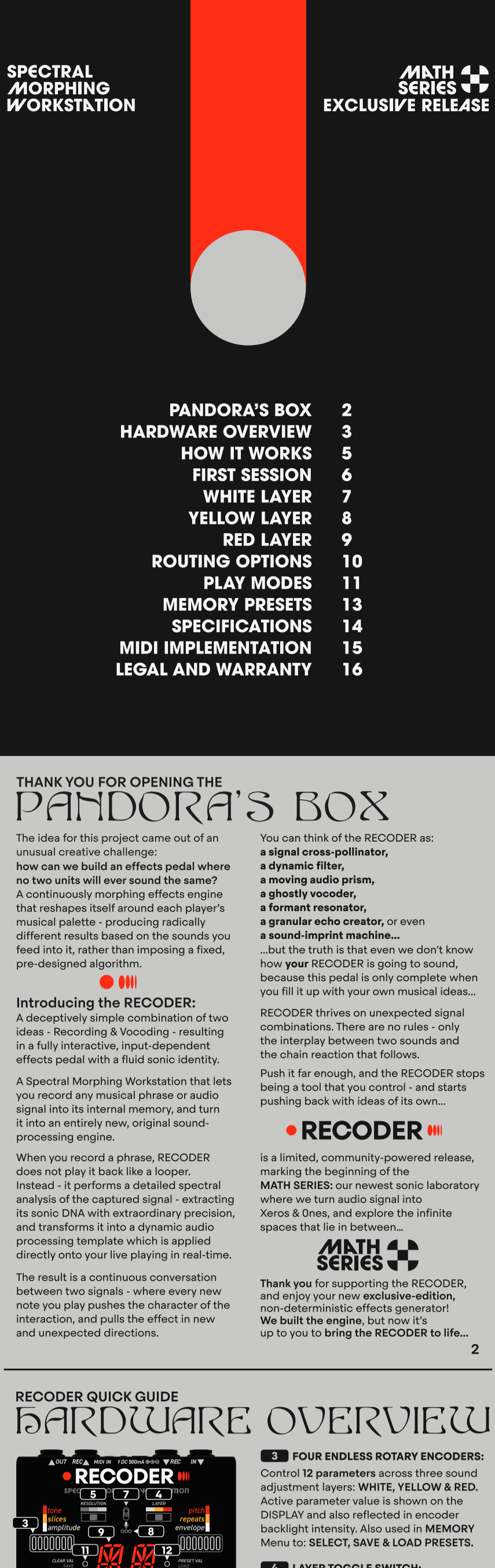


RECORDER USER MANUAL



SPECTRAL MORPHING WORKSTATION **MATH SERIES**
EXCLUSIVE RELEASE

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THANK YOU FOR OPENING THE PANDORA'S BOX

The idea for this project came out of an unusual creative challenge: how can we build an effects pedal where no two units will ever sound the same? A continuously morphing effects engine that reshapes itself around each player's musical palette - producing radically different results based on the sounds you feed into it, rather than imposing a fixed, pre-designed algorithm.

Introducing the RECODER: A deceptively simple combination of two ideas - Recording & Vocoding - resulting in a fully interactive, input-dependent effects pedal with a fluid sonic identity.

A Spectral Morphing Workstation that lets you record any musical phrase or audio signal into its internal memory, and turn it into an entirely new, original sound-processing engine.

When you record a phrase, RECODER does not play it back like a looper. Instead - it performs a detailed spectral analysis of the captured signal - extracting its sonic DNA with extraordinary precision, and transforms it into a dynamic audio processing template which is applied directly onto your live playing in real-time.

The result is a continuous conversation between two signals - where every new note you play pushes the character of the interaction, and pulls the effect in new and unexpected directions.

You can think of the RECODER as: a **signal cross-pollinator**, a **dynamic filter**, a **moving audio prism**, a **glitch vocoder**, a **warmth resonator**, a **granular echo creator**, or even a **sound-imprint machine**...

...but the truth is that even we don't know how your RECODER is going to sound, because this pedal is only complete when you fill it up with your own musical ideas...

RECODER thrives on unexpected signal combinations. There are no rules - only the interplay between two sounds and the chain reaction that follows.

Push it far enough, and the RECODER stops being a tool that you control - and starts pushing back with ideas of its own!

RECORDER

is a limited, community-powered release, marking the beginning of the MATH SERIES: our newest sonic laboratory where we turn audio signal into Xeros & Ones, and explore the infinite spaces that lie in between...

Thank you for supporting the RECODER, and enjoy your new exclusive-edition, non-deterministic effects generator! We built the engine, but now it's up to you to bring the RECODER to life...

RECODER QUICK GUIDE

- ENGAGE FOOTSWITCH WITH LED:** Dual state - ON or OFF (buffered bypass). Press & Hold to activate RETIME function; RETIME behaviour changes across three PLAY MODES (see pages 11 & 12);
- REC FOOTSWITCH WITH LED:** Press & Hold to start recording PHRASE instantly; Release REC to stop. Recorded PHRASEs can be either extremely short: 0.1 seconds (snapshot) or very long - up to 10 minutes.
- Hold REC & ENGAGE to PLAY PHRASE:** This will add the RECORDED PHRASE through the MAIN OUTPUT: played back from memory with all RED LAYER adjustments active.
- SEGMENTED LED DISPLAY:** SHOWS PARAMETER VALUES w. polarity, PRESET SLOT identifiers (A1-Z9), REC & playback cursor position, effect intensity & other indications.
- VALUE POLARITY MARKERS:** MOST PARAMETERS have an active bipolar range between -99 and +99; DOT indicators show LIVE POLARITY: ⊕ Right Digit = value is positive ⊖ Left Digit = value is negative
- CLEAR VAL / SAVE BUTTON:** Hold Button & touch any encoder to RESET corresponding parameter to zero. Hold Button & press ENGAGE Footswitch to CLEAR ALL settings on the pedal.
- PRESET VAL / LOAD BUTTON:** Hold Button & touch any encoder to restore parameter to PRESET value.
- SAVE / MEMORY BUTTON:** Press together with SAVE to enter MEMORY Menu for loading presets.
- FOUR ENDS ROTARY ENCODERS:** Control 12 parameters across three sound adjustment layers: WHITE, YELLOW & RED. Active parameter value is shown on the DISPLAY and also reflected in encoder backlight intensity. Also used in MEMORY Menu to: SELECT, SAVE & LOAD PRESETS.
- NAVIGATE** across three independent adjustment layers: WHITE, YELLOW & RED
- RESOLUTION TOGGLE SWITCH:** Changes the FFT refresh rate and reduces active spectral resolution - affecting the sound of all RECODER engines: Low: 80ms FFT refresh rate, low resolution; Mid: 40ms FFT refresh rate, full resolution; High: 5ms FFT refresh rate, max resolution;
- PLAY MODE SWITCH:** Global toggle for switching between three distinct RECODER behaviours: LOOP, STEP ADVANCE & LIVE INPUT.
- MIC/LINE SELECTOR:** Upward = MAIN/REC INPUT; Downward = Built-in MIC
- MICROPHONE CAPSULE:** Built-in mono condenser microphone for capturing voice, instruments or various ambient sound sources.

FAST & FOURIEROUS HOW IT WORKS

The RECODER operates through the interplay between two signals: the Live Input from your instrument (INPUT), and a secondary MODULATOR signal - which can be any recorded PHRASE or a live MODULATOR input (REC INPUT). Internally, RECODER runs a real-time, high-resolution Fast Fourier Transform (FFT) spectral analysis engine - measuring the energy distribution of both signals across 1024 isolated frequency bands.

The pedal's RESOLUTION control adjusts how often these "spectral snapshots" are refreshed - from rapid 5ms intervals to slower, stepped windows (40ms, 80ms).

Once the spectral profiles of both signals are measured, RECODER can apply precise, band-specific adjustments to morph the INPUT signal to mimic the MODULATOR's AMPLITUDE or TIMBRE.

The RECODER can also isolate and extract the overlapping spectral content between both signals - generating entirely new sonic structures - SLICES & RESONANCES.

This FFT-driven system gives the RECODER an incredible range: from vocoding and spectral filtering to cross-synthesis, and hybrid behaviours that go beyond traditional FX categories.

All RECODER sound engines are controlled via 4 shared endless encoders across three color-coded control LAYERS: WHITE, YELLOW, and RED. Each control LAYER gives the encoders a different set of functions, letting you access 3 distinct processing domains:

- INPUT MODIFICATION & FEEL:** Apply the spectral & dynamic profile of the MODULATOR onto your INPUT; Adjust how the RECODER responds to your playing dynamics & signal level.
- GENERATIVE & SPATIAL FX:** Extract new harmonic structures from overlapping frequencies between MODULATOR & main INPUT. Then push them through time - creating unique variations of melodic feedback, echoes, delays and reverbs.
- RESHAPING THE MODULATOR:** Transform the MODULATOR before it drives the RECODER engines to redefine all interactions that follow: Adjust the MODULATOR'S TONE, ADIVE, apply PITCH & Time STRETCHING.

WIR FAHREN FAHREN FAHREN AUF DER... FIRST SESSION

- BASIC SETUP:** Plug your instrument into the MAIN INPUT and route the MAIN OUT to amp/mixer.
- CLEAR ALL PARAMETERS:** Hold the CLEAR VAL button and press the ENGAGE footswitch - to CLEAR all parameter values to zero - effectively loading a blank slate on the pedal.
- RECORD A PHRASE:** Press & Hold the REC Footswitch to start recording instantly. Play something simple, such as a muted strumming pattern, a short melody, etc.
- TURN KNOBS:** Use ENCODERS to adjust 12 values across 3 LAYERS; Use the LAYER switch to move between layers.
- TRY THE BUILT-IN MICROPHONE:** Change the INPUT to the built-in MIC!
- SAVE PRESET:** Press the SAVE and LOAD buttons together to enter the MEMORY Menu.

You can CLEAR all 12 parameters individually by holding the CLEAR VAL button and touching the corresponding encoder.

All PARAMETER VALUES are bipolar, typically ranging from -99 to +99; Value polarity is indicated with dots on digit display.

Press the SAVE button! This will permanently store the current PHRASE values as a PRESET.

INPUT MODIFICATION WHITE LAYER

AMPLITUDE: Tracks the MODULATOR's main amplitude peaks in real-time and applies them to the INPUT, creating frequency-specific boost and cut zones. You can use a recorded PHRASE or a secondary live REC INPUT.

MODULATOR PEAKS **LIVE INPUT ZONES**

Side-Chained Boost: Boosts frequency bands where the MODULATOR signal is strongest. At max AMPLITUDE values, the dominant bands are pushed into overdrive.

Side-Chained Cut: Dips the frequency bands where the MODULATOR's signal is strongest - producing a moving side-chain cut or a variety of tremolo effects.

ENVELOPE: Shapes the attack & transient behaviour between the INPUT and the MODULATOR across all RECODER modes & engines:

- Rising Envelope:** introduces a blooming response and a slower, more gradual exchange between signals.
- Transient Shaping:** emphasizes the MODULATOR's attacks, producing sharper more percussive interactions.

TIMBRE: FFT analysis tracks the energy distribution of both INPUT & MODULATOR in real-time: The INPUT is then rebalanced across the full frequency spectrum to mirror and mimic the MODULATOR's tonal profile.

RESHAPED INPUT: Just like a vocoder: TIMBRE Transfer lets you alter the INPUT tone, while keeping your playing in tune!

TIMBRE Transfer: Makes the INPUT mimic the sound of the MODULATOR - think of it as a vocoder, operating at a 1024-band FFT resolution. Inactive or silent MODULATOR bands do not produce dips in the INPUT signal.

Inverted TIMBRE Transfer: Flips the TIMBRE mapping so the frequency relationships are inverted. MODULATOR's high-end energy is applied to the low end of the INPUT & vice versa.

SENSITIVITY: Controls how reactive RECODER is to the INPUT signal, and your playing dynamics: At 0, all RECODER engines are calibrated to a normalised INPUT level.

Increased Responsivity: to INPUT: consistent output at all playing volumes.

Reduced Sensitivity: needs louder playing to produce a fully WET output.

GENERATED SIGNAL & TIME PROCESSING YELLOW LAYER

SLICES: Extracts small audio fragments from the MODULATOR - triggered by matching or coinciding frequencies in the INPUT. The AMOUNT & behavior of the SLICES will always depend on each unique signal combination; SLICES always stay in tune.

SLICES Volumes: Adjust the output level of the SLICES extracted from the MODULATOR signal. White layer SENSITIVITY control sets SLICE density & trigger activity.

Inverted SLICES: Matching lower frequencies will extract matching SLICES from the MODULATOR's high frequency range & vice versa.

REPEATS & DISTANCE: A flexible TIME & REGENERATION engine that processes both YELLOW Layer signals SLICES & RESONANCES simultaneously.

REPEATS: controls the direction and amount of regeneration;

DISTANCE: controls the spacing or duration between REPEATS.

Together these controls allow you to create four distinct regeneration effects: Delay, Reverse Delay, Reverb & Feedback

RESONANCE: Creates new sine-wave components from the strongest over-lapping frequency peaks between INPUT & MODULATOR - creating responsive, melodic resonances that evolve with your playing.

RESONANCE Amount: Sets the volume & decay length of the melodic resonators. Raising SENSITIVITY increases the density of the resonators, and makes them easier to trigger.

Inverted RESONANCES: Combines opposite frequency peaks to produce unpredictable, and sometimes inharmonic resonances.

REVERSE REGENERATION **REPEATS** **FORWARD REGENERATION**

with REPEATS at 0: ALL regeneration is DISABLED

REVERB CLOUDS **DISTANCE** **DELAY TIME (UP TO 1600MS)**

with DISTANCE at 0: REPEATS will become FEEDBACK

SHAPING THE MODULATOR RED LAYER

TONE: Applies a powerful tilt EQ onto the MODULATOR, affecting all interactions. In subtractive modes, such as AMPLITUDE CUT, a darker MODULATOR will yield brighter results (and vice versa). With TIMBRE, SLICES & RESONANCES, the MODULATOR's tone is directly transferred.

DAMAGE: A dual distortion engine designed to increase the harmonic complexity of the MODULATOR, thus producing a richer and more intricate interaction between the two signals in all RECODER modes.

Digital Drive: Enhances the MODULATOR harmonics & boosts volume.

Sample-Rate Reduction: Degrades the MODULATOR signal, producing aliasing, grit & lo-fi textures.

PITCH: Shifts the MODULATOR's pitch UP/DOWN by up to 4 OCTAVES with changing the MODULATOR's playback speed; PITCH encoder ranges from -48 to +48;

PITCH UP: by up to 4 octaves (+48 max); changing the MODULATOR's sound and introducing new harmonics.

PITCH DOWN: by up to 4 octaves (-48 min); pushing the MODULATOR into lower frequency bands, and generating additional subharmonic content.

STRETCH: Adjusts the MODULATOR's playback speed, without changing it's PITCH. Knob range is ±99; putting up to 10x STRETCH in both directions.

Small STRETCH adjustments can be useful for correcting the timing of a PHRASE. Extreme STRETCH values will produce a variety of glitches and artifacts.

Speed Up: Increases recorded PHRASE playback speed by up to 10x.

STRETCH: Slows down recorded PHRASE playback speed by up to 1/10th.

STRETCH is Disabled in LIVE PLAY MODE

PLAY ADVANCE FUNCTION: In LOOP or STEP ADVANCE mode - press both footswitches simultaneously to audition the MODULATOR with all the RED LAYER adjustments via MAIN OUTPUT.

PHRASE Playback: is momentary - only active while both footswitches are pressed and held; auditioned PHRASE will always restart from the beginning. Release footswitches to stop playback.

During the PHRASE audition, your DRY SIGNAL (INPUT) will remain active, but the WET OUTPUT (RECODER FX) will be muted.

MANY WAYS TO SET UP ROUTING OPTIONS

- BASIC SETUP:** The simplest configuration where your instrument is both the MAIN INPUT and the LIVE INPUT used for processing. Pressing REC allows you to capture PHRASES from MAIN INPUT, and you can use LIVE MODE to achieve real-time RECODER effects.
- BUILT-IN MICROPHONE:** The internal mono condenser capsule overrides all inputs as the recording source. Capture vocals, spoken word, acoustic instruments, or various sound FX without the need for extra cables. Automatically disabled in LIVE INPUT MODE.
- SEPARATE MODULATOR SOURCE:** Record a PHRASE from a separate source in parallel to your main instrument. LIVE MODE Enables unique cross-spectral workflows - allowing you to process your MAIN INPUT through the MODULATOR, while keeping it clean and independently routable for further mixing, recording, or processing.
- FULL DUAL ROUTING:** REC OUT offers a clean buffered though-output for the REC-IN signal. This allows you to use a separate instrument or sound source as the MODULATOR, while keeping it clean and independently routable for further mixing, recording, or processing.
- SEPARATED WET & DRY OUTPUTS:** When nothing is connected to the REC INPUT, the REC OUTPUT Jack offers a fully separated WET OUTPUT from all RECODER engines. This routing unlocks a wide range of creative possibilities for layering, processing and total experimentation.

MODULATOR & GLOBAL BEHAVIOUR PLAY MODES

The RECODER offers three distinctive behaviour modes - each offering a new way to interact with the MODULATOR:

- LOOP MODE:** This is the most straightforward PLAY MODE and the recommended starting point for exploring the RECODER: Use the RECORD footswitch to capture a looping phrase, which is then played back continuously and used as MODULATOR.
- STEP ADVANCE MODE:** Instead of playing the recorded PHRASE as a continuous loop, STEP ADVANCE mode automatically divides it into chunks based on sensitive note detection:

You can now move through the STEPS with your playing (e.g. strums or plucks) - essentially turning any recorded PHRASE into a spectral sequence.

As you play - each new note will advance the MODULATOR to the next STEP, wrapping back around after the final STEP.

STRETCH IN STEP ADVANCE: Just as in LOOP MODE - the STRETCH encoder adjusts the playback speed of individual STEPS without affecting PITCH.

Positive Stretch values will move the playback faster, while negative STRETCH values will extend the segments. Playback always advances to next STEP when new note or transient is detected.

SENSITIVITY IN STEP ADVANCE: Use the WHITE LAYER SENSITIVITY knob to adjust how easily your playing triggers the next step in STEP ADVANCE MODE.

234 SLOTS FOR STORING PHRASES & PARAMETERS MEMORY + PRESETS

PRESET ARCHITECTURE: RECODER has 234 PRESET SLOTS (A1-Z9), arranged across 26 letter BANKS (A-Z), with 9 numeric SLOTS each (1-9). Each PRESET is a complete snapshot, storing the recorded PHRASE at full fidelity together with 12 parameter values across the WHITE, YELLOW & RED LAYERS + RESOLUTION & PLAY MODE settings.

Any recorded PHRASE is stored as part of the PRESET, and you can SAVE multiple variations of the same recording with different parameter settings - each becoming its own distinct PRESET.

SAVING & LOADING PRESETS: PRESS SAVE + LOAD simultaneously to enter MEMORY Mode - indicated by the DISPLAY and blinking encoders.

Use the LEFT encoder to navigate to a SAVE slot, or the RIGHT encoders to select a PRESET slot to LOAD.

When navigating PRESET SLOTS: upper encoder selects the letter (A-Z); lower encoder selects the number (1-9).

PRESS SAVE again to confirm saving; or PRESS LOAD to confirm loading; Only filled PRESET SLOTS can be loaded!

Slot overwrite Warning: When attempting to SAVE over an already populated SLOT - the RECODER will show an OVERWRITE Warning on the DISPLAY. Tap the SAVE button a second time to confirm & overwrite on the chosen SLOT.

CLEARING VALUES: Hold the CLEAR VAL button and touch individual ENCODERS to instantly reset their value to zero. Use the LAYERS toggle to navigate between the three layers.

QUICK Wipe ALL VALUES: Hold the CLEAR VAL button and press the ENGAGE footswitch. This will reset all PARAMETERS VALUES in all pages to zero.

STEP ADVANCE MODE: CLEAR STEPS: Hold the CLEAR VAL button and press the REC footswitch to remove all manually entered STEPS and restore the automatically generated STEPS.

RELOADING PRESET VALUES: Hold the PRESET VAL button and touch any encoder to RESTORE that parameter back to the value of the LOADED PRESET. No action if no PRESET is loaded & active.

LOAD ALL PRESET VALUES: Hold the PRESET VAL button and press the ENGAGE footswitch. This will RESET all PARAMETERS in all pages to the saved PRESET VALUES - without loading the saved PHRASES.

RECODER does NOT auto-save PHRASES: Unsaved PHRASES are permanently lost when you POWER OFF the unit, or if you LOAD a NEW PRESET without saving first!

FILES ARE NOT USB-ACCESSIBLE: Currently the RECODER does not support access to the internal memory; USB-C port is for FW updates & MIDI only

TECHNICAL SPECIFICATIONS

PARAMETER	VALUE
ENGINE	Spectral processing engine Maximum frequency bins RESOLUTION positions Max INPUT latency
AUDIO	Signal path Bypass type Built-in microphone
MEMORY	Total internal storage Preset slots Maximum PHRASE length Recording fidelity PHRASE storage quality File access via USB
CONNECTIVITY	Instrument input Main Output REC Input REC Output MIDI In USB-C Power

PHRASE TRIMMING: Hold both footswitches to PLAY PHRASE. While it plays - touching any of the four encoders will lock playback into a continuous loop - allowing you to release the footswitches.

Use the LEFT & RIGHT encoders to TRIM the PHRASE from the start & end: making it shorter or adding silence as needed. Press either footswitch to confirm the trim and return to performance mode!

EXTERNAL CONTROL MIDI IMPLEMENTATION

	BIPOLAR 0 = 99; 127 = 99; 64 = 0	POSITIVE 0 TO +99	NEGATIVE 0 TO -99	CLEAR	LOAD PRESET VAL
AMPLITUDE	CC10(MSB), CC42(LSB)	CC64	CC16	PC70	PC 82
TIMBRE	CC11(MSB), CC43(LSB)	CC65	CC17	PC71	PC 83
ENVELOPE	CC12(MSB), CC44(LSB)	CC66	CC18	PC72	PC 84
SENSITIVITY	CC13(MSB), CC45(LSB)	CC67	CC19	PC73	PC 85
SLICES	CC14(MSB), CC46(LSB)	CC68	CC20	PC74	PC 86
RESONANCE	CC15(MSB), CC47(LSB)	CC69	CC21	PC75	PC 87
REPEATS	CC16(MSB), CC48(LSB)	CC70	CC22	PC76	PC 88
DISTANCE	CC17(MSB), CC49(LSB)	CC71	CC23	PC77	PC 89
REPEATS	CC18(MSB), CC50(LSB)	CC72	CC24	PC78	PC 90
DAMAGE	CC19(MSB), CC51(LSB)	CC73	CC25	PC79	PC 91
PITCH	CC20(MSB), CC52(LSB)	CC74	CC26	PC80	PC 92
STRETCH	CC21(MSB), CC53(LSB)	CC75	CC27	PC81	PC 93

PC MESSAGES	EXECUTE
MEMORY CONFIRM LOAD	PC 0
MEMORY LOAD BANK (A-Z)	PC10 - PC35
MEMORY LOAD SLOT (1-9)	PC1 - PC9
MEMORY NEXT LOAD & CONFIRM	PC36
MEMORY PREVIOUS (LOAD & CONFIRM)	PC 37
LOOP MODE (LOAD WITH OVERRIDE)	PC 50
CC5 (OVERRIDES TOGGLE)	PC 51
LIVE MODE (LOAD WITH OVERRIDE)	PC 52
LOW RESOLUTION (OVERRIDES TOGGLE)	PC 60
MEDIUM RESOLUTION (OVERRIDES TOGGLE)	PC 61
HIGH RESOLUTION (OVERRIDES TOGGLE)	PC 62

PEDAL OPERATION WITH CC MESSAGES
 0-63=OFF; 63-127 = ON

RECODER offers full MIDI control over all functions & parameters mentioned in this table via MIDI over USB (C-type) or via the MIDI Input - using a Type-B MIDI to 5-pin DIN cable (not included). RECODER does not transmit a MIDI Output.

IMPORTANT NOTICE LEGAL & WARRANTY

SAFETY INFORMATION FOR THE US: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: reorient or relocate the receiving antenna; increase the separation between the equipment and receiver; connect the equipment to a power outlet on a circuit different from that to which the receiver is connected; consult the dealer or an experienced radio/TV technician for help. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Unauthorized changes or modifications to this system can void the user's authority to operate this equipment. This document requires shielded interface cables in order to meet FCC Class B limits.

COMPLIANCE: CE, FCC, RoHS, REACH

NO USER SERVICEABLE PARTS INSIDE

FOR EUROPE: This product complies with the requirements of Electromagnetic Compatibility Directive 2014/53/EU.

FOR CANADA: This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. AVIS: cet appareil numérique de la classe B respecte toutes les exigences du règlement sur le brouillage électromagnétique canadien.

WARRANTY & RETURNS: You have a 30-day return period during which you may return the product and receive a full refund. You will only be responsible for return shipping charges. Each RECODER manufactured by Gamechanger Audio is warranted to be free from defects in materials and workmanship for one year from the date of shipping, or longer if required by relevant legislation. This warranty shall not apply to any unit which in the opinion of the manufacturer has been used improperly or has been mechanically or otherwise damaged by accident, misuse or negligence, or has been altered or repaired in such a way as to impair performance, nor shall it apply to cosmetic defects considered normal wear and tear. Other parts such as knobs, rubbers, cables, and cable connectors are non-replaceable. The manufacturer reserves the right to make changes in the design or construction of this equipment without obligation to install similar changes in equipment already sold.

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