NULL WEST // CHANNEL 77 // DOCUMENT SERIES

REDLINE

// USE SIGNAL

OPERATOR MANUAL

VOL. 01 // THE PROGRAMMING BENCH

PRODUCED BY SLOWFLOOD

WRITTEN BY ECHO, A HUMAN

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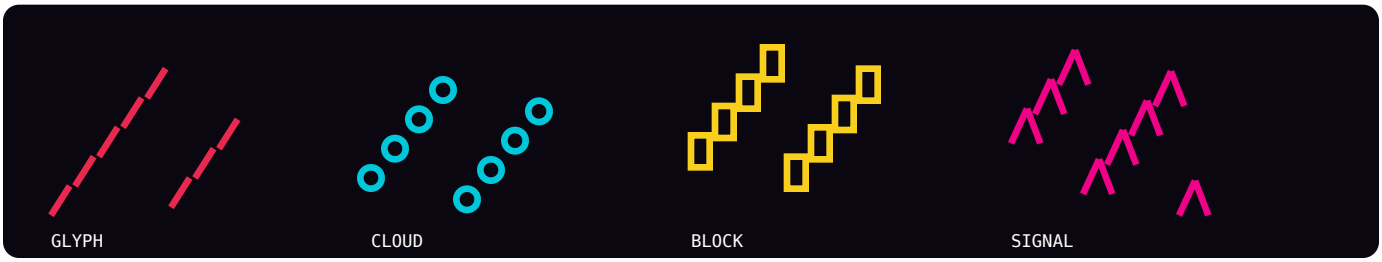
REDLINE 1.0 // USE SIGNAL 1.0 // 2026.10.22

THE BYTE IS THE TRUTH. // USE SIGNAL.

SIGNAL / 00

Read this first

This volume is for the person operating USE SIGNAL, preparing cartridges, assigning controls and running the live transmission.



REDLINE is a two-controller NES visual instrument. It synthesizes graphics into writable CHR-RAM, manages composition and palette territories, and responds to live gestures. USE SIGNAL is the browser-based programming bench that edits a compatible ROM and exports a new playable-format cartridge.

> **DO NOT CONFUSE THE TWO VOLUMES**
>
> This is the operator manual. Give the separate Controller Field Guide to someone who has been handed a controller. They do not need to know what CHR-RAM is.

Version status. This edition documents REDLINE 1.0 / USE SIGNAL 1.0, not the original v0.5 / Studio 0.3 manual. The 1.0 build has static and machine-code checks, but the final 1.0 ROM has not yet been reported as boot-tested in an NES emulator or physical NES Classic. Treat it as a release candidate until it passes field testing.

Performance doctrine. Build pressure, not indiscriminate noise. Contrast and readable movement are the baseline. A rhythmic fault is more powerful when the signal has something worth disrupting.

Document identity: NW-RL-077 / OPERATOR V1.0. Produced by slowflood. Written by Echo, a human, and Adi, a nonhuman.

SIGNAL / 01

The system at a glance

PROPERTY	REDLINE 1.0 FACTORY
Platform	NES-compatible .nes / iNES NROM, mapper 0
ROM / graphics	32 KB PRG, CHR-RAM synthesis; no CHR-ROM
Source grammars	GLYPH / CLOUD / BLOCK / SIGNAL; 16 motifs each
Performance inputs	Two NES controllers; 16 physical inputs routable one-to-one
Movement	Tap-to-latch autoscroll; diagonal; FREEZE suspends motion
Color	Five-position base ladder plus optional beat accent and manual blasts
Timing	Internal NTSC-frame clock; tap tempo, 1/2x / 1x / 2x division
Glitch	Beat-locked tracking displacement or legacy continuous WARP
Studio	USE SIGNAL 1.0 single-file browser application
Known limitation	No incoming audio/MIDI sync; browser witness is not an emulator

The original renderer was built around a bounded producer/consumer packet: visible CPU time prepares CHR work, NMI uploads it during vblank, and palette-upload frames do not pile on top of maximum graphics packets.

Factory HIGH VOLTAGE artwork deliberately separates visual grammars: GLYPH is sharp writing; CLOUD is organic mass; BLOCK is hard architecture; SIGNAL is repeated broadcast geometry. Black is negative space, not merely a backdrop.

> **FACTORY IS A STARTING POINT**
>
> The Studio can rewrite motifs, palettes, propagation order, attribute patterns, pressure curves, timing, and physical control assignments. Exported ROM bytes—not the browser picture—are authoritative.

SIGNAL / 02

Live controls / factory wiring

The following chart is the shipped default. A custom cartridge may remap every logical action.

CONTROLLER 1 // SHAPE

INPUT	ACTION	WHAT THE PLAYER SEES
D-pad LEFT / RIGHT	Latch horizontal scroll	Tap once to move, tap same direction again to stop; opposite reverses
D-pad UP / DOWN	Latch vertical scroll	Can combine with horizontal movement for diagonals
A / B	Density + / -	Thicken or thin the active field
SELECT	Next generator	GLYPH → CLOUD → BLOCK → SIGNAL
START	Propagate	Echo a sampled tile relationship across the programmed trace

CONTROLLER 2 // ENERGY

INPUT	ACTION	WHAT THE PLAYER SEES
LEFT / RIGHT	Palette previous / next	Move along L2 / L1 / CENTER / R1 / R2; clamps at ends
UP / DOWN	Synthesis speed + / -	Changes engine pressure cadence
A	Manual blast	Temporary full-field palette event; unless repurposed as HOME
B	Tap tempo / beat bloom	Physical taps establish/resync tempo and produce structure
SELECT	Glitch gate / shift	Tap-release toggles beat glitch; hold for performance chords
START	FREEZE	Suspends motion, glitch and accent timers until released

ROUTING RULE

Controls are logical actions, not fixed buttons. Controller Routing swaps conflicting assignments rather than dropping an action. Every cartridge handed to a guest should be accompanied by its current routing sheet.

SIGNAL / 03

Palette ladder / the five positions

A navigable color instrument with a stable home position; no wraparound and no RANDOM stop.



POSITION	FACTORY CHARACTER	PERFORMANCE USE
L2	Electric cyan on black	Cold extreme; isolated bright forms
L1	Cobalt blackout	Blue, spare, low color noise
CENTER	Voltage red	Reference palette; HOME returns here
R1	Signal yellow	Hard contrast and geometric aggression
R2	Hostile magenta	Hot extreme; strong silhouette separation

Press the routed PALETTE PREVIOUS / NEXT actions to move exactly one position. At L2 or R2, further presses stay at the endpoint. The five base states can be edited in USE SIGNAL; the names describe the factory edition only.

The palette data is NES color bytes. The Studio shows an approximate RGB interpretation; a literal byte such as $25 is the actual color index that gets written to the cartridge.

> **HOME IS NOT A RESET**
>
> HOME returns to CENTER and turns off beat accent and rhythmic glitch. It does not erase the current generator, autoscroll, or synthesis state. This is a performance landing, not a hard reboot.

SIGNAL / 04

Beat clock / glitch / accent

One musical clock drives two distinct optional effects: a tracking fault and a color accent.

SYSTEM	BEHAVIOR
Tap tempo	Factory C2 B establishes and rephases the internal clock; no audio detection
Beat glitch	Short horizontal tracking displacement; enabled/disabled by GLITCH GATE tap-release
Beat accent	Temporary 16-slot palette override; $FF means leave underlying slot unchanged
Beat division	1/2x, 1x, 2x; affects glitch and accent pulses
Phase reset	Restarts beat phase without changing BPM
Manual blast	Overrides accent while active; base/beat color returns afterward
FREEZE	Suspends visual motion and accent/glitch timers; underlying main clock still advances

The beat system uses integer NES frames (approximately 60 Hz on NTSC), so BPM is quantized. A long DJ track may drift against REDLINE; use tap tempo or phase reset to bring the instrument back onto the downbeat.

The Glitch Clock panel sets startup BPM (40–240), tracking displacement (2–32 pixels), glitch duration (1–8 frames), and beat-locked versus legacy continuous WARP mode. The performance panel controls accent duration (1–8 frames), beat division and accent-at-boot.

> **TWO COLOR BEHAVIORS, NOT TWO BACKGROUND LAYERS**
>
> BASE is the five-position palette ladder. ACCENT temporarily overrides selected palette bytes at the beat. The NES is not compositing a second graphics layer. This is deliberate palette scheduling.

SIGNAL / 05

The performance shift / HOME

Hold the routed GLITCH GATE action (factory C2 SELECT), then tap another routed logical action. The modifier follows remapping; it is not hardwired to a physical SELECT button.

WHILE HOLDING GLITCH GATE	FACTORY BUTTON	ACTION
PALETTE NEXT	C2 RIGHT	Beat accent ON / OFF
PALETTE PREVIOUS	C2 LEFT	Cycle 1/2x → 1x → 2x
SPEED +	C2 UP	HOME: CENTER; glitch and accent OFF
SPEED -	C2 DOWN	Phase reset; BPM unchanged

Important: pressing and releasing GLITCH GATE by itself toggles beat glitch. Using a chord suppresses that release-toggle, so you can change accent or division without accidentally arming the glitch.

The optional ONE-BUTTON HOME setting replaces the MANUAL BLAST logical action with HOME. It is a trade: that cartridge loses manual blast on that logical button until the setting is changed and re-exported.

> **LIVE RECOVERY SEQUENCE**
>
> If the room becomes too chaotic: use HOME to return to CENTER and disable both beat effects; use FREEZE if you need to hold the frame; lower density/speed or change generator. HOME does not stop autoscroll.

In LEGACY WARP mode, the GLITCH GATE is a continuous deformation toggle rather than the beat-locked tracking fault. The operator should label the mode on any guest handoff.

SIGNAL / 06

USE SIGNAL / operator workflow

The browser is an authoring bench. The cartridge is the instrument.

PANEL	WHAT IT PROGRAMS
Transmission Window	256×240 deterministic witness: motif/palette/density/attribute composition; not live emulation
Palette Wound	Literal NES palette bytes; LIFT / GRAFT; color-slot editing
Shape Vocabulary	Four banks × 16 motifs × 8×8 pixels at 2 bpp
Propagation Trace	64-step path; center-out, spiral, snake, diagonal, edge-in, random
Color Territory	Eight attribute patterns controlling 16×16 subpalette regions
Controller Routing	One-to-one mapping of 16 physical inputs to 16 logical actions
Five-Position Palette + Beat Accent	Ladder, 16 accent overrides, division, duration, one-button HOME
Glitch Clock	BPM, fault duration, displacement, beat-locked or legacy mode
Engine Pressure	Density, synthesis speed and jobs-per-packet curves

Recommended sequence: open the Studio → choose or load the correct 1.0 ROM → set graphics and color → lock your witness seed for comparisons → set routing → configure performance defaults → SAVE FIELD STATE → PRINT TO CARTRIDGE → test the exported ROM in the intended emulator/hardware.

The Studio includes RESTORE / factory settings and save/load JSON controls. Save a matching JSON alongside every keeper ROM. Do not overwrite your known-good cartridge with a new experimental export.

SIGNAL / 07

Programming color and form

PALETTE WOUND

Choose a palette slot, then an exact NES color. Black should remain a deliberate compositional choice. HIGH VOLTAGE puts black in slots 0 and 2 of each subpalette to preserve negative space. Avoid bright-background full-screen strobes; test room brightness before a show.

BEAT ACCENT OVERRIDES

The accent table has 16 entries. An entry of $FF leaves the corresponding base-palette slot untouched. Other values substitute literal NES colors for the configured number of frames. Default factory accents affect visible colors without replacing universal black.

SHAPE VOCABULARY

Every generator has 16 source motifs. Each motif is an 8×8 tile with pixel values 0–3. Edit the shapes for what they do when multiplied, rewritten and scrolled—not how handsome they look in isolation.

COLOR TERRITORY / PROPAGATION

Attribute patterns determine which of four subpalettes colors 16×16 regions. Propagation samples a tile and echoes that identity through a 64-step 8×8 neighborhood trace; it is relationship-building rather than unrelated noise.

> **WITNESS DISCIPLINE**
>
> The preview is a deterministic, frozen approximation, not a live ROM emulator. Keep the same seed while comparing edits. The final .nes output and emulator/projector behavior are the truth.

SIGNAL / 08

Renderer / boundaries

Why REDLINE survives aggressive performance, and where operators can still push it too far.

ENGINE COMPONENT	KNOWN ARCHITECTURE
Synthesis	Visible CPU time handles controller parsing, synthesis, RNG, scroll and scheduling
Upload	NMI performs bounded contiguous CHR upload, NAM/attribute updates, scroll restore
CHR budget	1–15 complete 8×8 tiles per packet; 15 = 240 bytes of CHR data
Shadow NAM	960-byte CPU nametable shadow; writes mirrored to physical nametables
Palette timing	Palette upload frames do not stack with maximum CHR packet traffic
Baseline stock curve	Speed divisors 12,12,9,7,5,4,3,2,1; jobs 1,1,2,3,4,6,9,12,15

The old v0.5 manual documents an estimated worst-case ~2,100 6502 NMI cycles for a maximum stock packet. This is a historical design estimate, not a fresh cycle-accurate validation of every 1.0 performance path.

The 1.0 build preserves the v0.5 graphics engine and adds controller routing, latched scrolling, beat tracking, a five-position palette system and accent scheduling. The new behavior needs real emulator stress testing before hardware-stable claims.

> **IF THE TOP EDGE TEARS**
>
> Back off the jobs-per-packet curve, especially at maximum speed. A good-looking browser witness is not evidence that a custom pressure curve fits the vblank window.

SIGNAL / 09

Deployment / show preparation

BEFORE DOORS	OPERATOR ACTION
Cartridge	Keep a known-good .nes and matching .json; record version and ROM name
Controllers	Map both controllers; test every action after routing changes
Guest handoff	Print the Controller Field Guide; write in any nonfactory assignments
Projection	Check brightness, black levels, and rapid palette changes on the real projector
Music sync	Set a startup BPM or plan to tap tempo; remember frame quantization
Safety	Avoid aggressive strobe-like settings; test photosensitivity concerns in venue
Recovery	Rehearse HOME and FREEZE with both hands; test unfreeze/autoscroll resume

One-person performance: the operator can keep ENERGY while handing SHAPE to a guest. For a two-player setup, explain that both controllers affect the same living field; nobody is competing for a separate screen.

When controls are remapped, the factory guest guide becomes a conceptual reference, not a trustworthy button map. Use the Studio COPY ROUTING SHEET function or write the current mapping on the guide before handing it out.

> **HARDWARE STATUS**
>
> The current REDLINE 1.0 package has static ROM and machine-code checks. Emulator execution and NES Classic/projector testing remain field gates. Do not mark those boxes passed until you have actually run the exported cartridge.

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Field acceptance / try to break it

Mark each test PASS / FAIL / NEEDS WORK. Record emulator/device, controller mapping, ROM filename and any unusual screen behavior.

TEST	EXPECTED RESULT
Boot + baseline	HIGH VOLTAGE shapes and palette render; both controllers respond
Scroll	Tap right, release; tap down for diagonal; reverse and stop axes
Freeze	During diagonal movement + glitch + accent, FREEZE holds image; resume restores
Palette ladder	CENTER → R1 → R2 (stops); reverse through CENTER to L2 (stops)
Glitch gate	SELECT tap-release starts/stops; chord release does not toggle
Accent / division	SELECT+RIGHT accent; SELECT+LEFT cycles 1/2x / 1x / 2x
HOME / phase	SELECT+UP homes; SELECT+DOWN resets phase without BPM change
Routing	Swap cross-controller buttons; export; verify actions actually moved
Round trip	SAVE FIELD STATE / reload / export preserves edits
Pressure	Max density/speed with diagonal scroll, accent, glitch; watch for tearing

Ask the room: Which palette positions read from across the room? Does the beat accent feel like punctuation or a flash? Is tracking displacement musically legible? Which action would you want on a larger button?

Release rule: A failed emulator test means this remains a 1.0 release candidate. Do not quietly change the manual to say “stable.”

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Troubleshooting / version notes

SYMPTOM	FIRST RESPONSE
Picture tears or jumps at high pressure	Reduce jobs-per-packet; retest same sequence
Palette differs from browser witness	Check exact NES palette bytes and emulator palette profile
Accent invisible	Check 16 override slots; $FF means no change; confirm accent gate ON
Glitch not rhythmic	Confirm beat-locked mode, division, and valid tap tempo
SELECT seems to toggle unexpectedly	Distinguish tap-release from hold+chord; verify remapped action
HOME does not stop movement	Expected: HOME leaves autoscroll running; FREEZE stops it
Guest cannot follow printed buttons	Use the current routing sheet, not factory labels
Older ROM rejected by Studio	Use a compatible 1.0 cartridge/layout; do not force arbitrary patches

Lineage: the supplied 23-page ARTIFACT MANUAL documented REDLINE v0.5 / USE SIGNAL 0.3 (August 2026). This publication replaces its operational instructions for the 1.0 release candidate. The old manual remains useful for the original renderer design and historical curves, not for current controller mapping, palette behavior or Studio panels.

Credits: Produced by slowflood. Written by Echo, a human, and Adi, a nonhuman.

> **FINAL DIRECTIVE**
>
> USE SIGNAL. // INTERROGATE REALITY. FIND THE EDGE. MAKE IT EXIST THERE.