

Circuit Tracks mod manual, in plain English

A plain-English rewrite of the CIRCUIT-HACKS manual (RC0.9 and Beta 1.3, on Novation firmware 1.2.1, build 4486). Written by Claude on 15 October 2026 from the mod's English manual. I haven't tested any of this on a unit, and the mod isn't affiliated with Novation. If this disagrees with the original, trust the original: ghillermo.github.io/CIRCUITS-HACKS-RC

1. What it is

The mod is Novation's official Circuit Tracks firmware (1.2.1, build 4486) with extra features patched in. Anything this manual doesn't mention works exactly as on a stock unit, so Novation's own user guide still applies.

Most features are in every build. Features marked **Beta 1.3 only** need the beta build, and the author says the newest of them haven't been tested on a real unit. Where I've renamed something from the original manual, section 4 gives its original name.

2. Before you install

1. Back up the SD card. The mod's author says to do this before installing any version.
2. Back up your projects in Components.
3. Pick a build:
 - **RC0.9**: the main release (a release candidate, so near-final). It has every feature not marked Beta 1.3 only.
 - **RC0.9S** (the "safer" build): RC0.9 without anything that writes to the SD card. That means no pack management on the device (section 8), no saving resamples into packs, and no remote diagnostics.
 - **Beta 1.3**: RC0.9 plus everything marked **Beta 1.3 only**. The author says what was added since Beta 1.0 is untested on a real unit, so treat it as experimental.

Installing

- Use Chrome, with the Circuit Tracks connected over USB.
- Easiest: open `rc_uploader.html` from the project's `tools` folder. It downloads Novation's official firmware, patches it in your browser and sends it to the unit. Pick RC0.9, RC0.9S, Beta 1.3 or "Official". Older builds (RC0.8, RC0.8S, Beta 1.2) are listed too.

- Alternative: `ct_uploader.html` sends a ready-made .syx file and checks its SHA-256 against known-good values. The RC builds don't publish .syx files, because they're generated from the official firmware by `tools/patch_official.py`.
- Novation's bootloader isn't modified.
- **Internal memory:** the mod treats your Circuit's internal memory pack (the first pack in the packs view) as read-only. Saving resamples or patches into it is refused, and the Save light flashes red for about 1.5 seconds. With any build not ending in S, it's better not to keep projects in internal memory, and the installer asks about this.

Going back to stock

Send "Official" (or any other version) from the same uploader. If the unit won't start, hold **Scales + Preset + Note** while powering on. That's Novation's bootloader recovery mode. Then send the firmware again.

3. How to read the instructions

- Pads are numbered 1 to 32, left to right, top to bottom. Row 1 is pads 1-8 and row 4 is pads 25-32.
- Knobs: K1-K4 along the top, K5-K8 along the bottom.
- "Shift + X" means hold Shift while you use X.
- **Two-step confirm.** Several actions work like this: "Clear + pad" makes the pad blink, which is the unit asking if you're sure. "Clear + the same pad" again confirms. Pressing a different pad without Clear cancels it. With Clear, it moves the question to that pad. Waiting about 5 seconds also cancels.
- Knob LEDs show the value by brightness.

4. Words this manual uses

Some of these are my names for things the original calls something else. The original's term is in brackets.

- **Held / latched:** a held effect is on only while your finger is down. A latched one (Shift + pad) stays on until you touch it again.
- **Resample** (original: "capture"): a short recording of the Circuit's own output, up to about 3.5 seconds, made with pad 32 in Master FX. You can play it back, put it in a drum slot, or use it as a granular sample. The original doesn't say whether it survives power-off, so treat it as temporary unless you've replaced a drum with it and saved.

- **Knob sequencer** (original: “step-drummer”): an extra layer on top of a track's pattern. The pattern still decides when notes play. The knobs give each pair of steps its own value, such as a pitch shift or a velocity (sections 9 and 10).
- **Send**: how much of one track goes into the shared delay or reverb (section 6).
- **Master FX**: live effects that act on the whole output at once (section 6).
- **Slot / bottom row**: pads 26–30 in Master FX and the FX view. Each can store an effect together with its knob settings.
- **Song pointer**: Master FX pads 9–24, one per step 1–16, for repeating or looping the pattern live.
- **Engine**: a sound source the mod builds into a MIDI track, picked with pad 27 (section 10).
- **FX sequencer**: a mode where each pair of steps triggers a Master FX slot.
- **Pack**: Novation's collection of samples and synth patches.
- **Strips 3 and 4**: the mixer strips where the MIDI tracks' own sounds come out.

5. Quick finder: I want to...

- **Play a drum sample like a keyboard**: select a drum, press Shift + Preset (section 8).
- **Reset a knob to its default**: hold Clear and turn the knob right.
- **Open Master FX**: press Mixer, then Mixer again.
- **Record the Circuit's own output**: Master FX, pad 32. Play it with pad 7.
- **Replace a drum with that recording**: Drum Preset view, Clear + the same pad twice.
- **Swap two drum samples**: Drum Preset view, hold Duplicate, tap pad A then pad B.
- **Kill every latched effect**: Master FX, pad 8.
- **Set a track's level to 100 or 0**: Mixer, Shift + turn the knob right or left.
- **Loop part of the pattern live**: Master FX, hold two song-pointer pads.
- **Use a MIDI track as a synth**: MIDI 1 or 2, Preset view, pad 27 (section 10).
- **Rotate a pattern by steps (nudge)**: Pattern Settings, pad 26. Beta 1.3 only (section 11).
- **Get back to stock**: pick “Official” in the uploader.

6. Effects: sends and Master FX

The Circuit has two kinds of effect. Delay and reverb are shared by all tracks, and each track has a send that controls how much of it goes in. Master FX is a separate set of live effects that act on everything at once.

Delay and reverb sends

- The Circuit has one delay and one reverb, shared by every track. A **send** is how much of one track goes into one of them. At 0 the track is dry. The higher the send, the more of that track you hear through the effect.
- Press **FX** to open the FX view. **Octave ▲** makes the eight knobs the **delay** sends, one per track as on a stock unit. **Octave ▼** makes them the **reverb** sends.
- Hold **Shift** and turn a knob to change the effect itself, for every track at once. Reverb: K1 type, K2 decay, K3 damping. Delay: K1 time, K2 sync, K3 feedback, K4 width, K5 ratio, K6 slew. These are saved with the project.
- **Duplicate** resets everything: sends to 0, master filter centred, Master FX off.
- **1-16 / 17-32** raises the resonance of the master filter.
- If you route the reverb or delay return through mixer strip 3 or 4 (section 12), the sends on those strips stop at half range and move at half speed.

Master FX

- **What it is:** live effects on the whole output at once. Hold a pad to hear an effect, and let go to stop it. **Shift + pad** latches it so it keeps going.
- **Open it:** press **Mixer**, then **Mixer** again. Any other view button leaves.
- **What's on the pads:** pads 1–6 are the effects, pad 7 plays your resample, pad 8 switches everything off, pads 9–24 are the song pointer, pads 26–30 are slots for your own effect choices, pad 31 is Glitch, and pad 32 records the resample. Section 7 covers each.
- The bottom row (slots, Glitch and record) is also available in the FX view.

Which one do I use?

- Use **sends** to set how wet each track sounds in the mix, and leave them.
- Use **Master FX** to play with the whole mix live: gate it, filter it, glitch it, loop a few steps.

7. Master FX tools

The effects (RC0.9)

Pads 1–6, each with four knobs. Hold a pad to use the effect. Hold **Shift** and tap to latch it.

- **Pad 1 Gater:** division, depth, width, smoothing.
- **Pads 2 and 3 Auto-Filter, low pass and high pass:** speed, depth, resonance, centre frequency.
- **Pad 4 Digitise:** sample-rate reduction, bit reduction. K3 and K4 do nothing.

- **Pad 5 Phaser:** speed, depth, feedback, mix.
- **Pad 6 Vinyl:** crackle, hiss, tone, wear.
- **Pad 8** releases everything latched, including the bottom row, switches the song pointer off, stops the resample and bypasses the FX.
- While **Clear** is held, the knobs of the selected effect show blue at their default and red elsewhere, and turning one right resets it.

Beta 1.3 changes to Master FX

- **Pad 6 becomes Glitch**, replacing Vinyl. It can be held, latched, put in a slot and used by the FX sequencer like the other effects.
- **Pad 31 becomes a mechanical gesture.** On press the audio slows to a stop, and on release it starts again. K1 is moves per gesture (1–8), K2 is the type (tape stop, baby scratch, tear, back spin, rattle), K3 is stop time and K4 is start time.
- **Digitise** gains K3 (a momentary send to the delay while you hold the pad) and K4 (an envelope on the amount).
- Master FX settings are **saved with each project**: the top-row knobs and the slot assignments. Latched effects aren't saved.

Song pointer

Pads 9–24 are steps 1–16 of the pattern. They let you repeat or loop parts of the pattern live.

- Hold **one** step: it repeats while you hold it.
- Hold **two** steps: the pattern loops between them while you hold.
- **Shift + two steps** latches that loop. Pad 9 turns white, and touching it clears the loop.
- **Phrase mode:** Shift + a step starts a phrase at that step, ending at step 16. Touching another step moves the end. Shift + another step moves the start. Shift + the start step, or the white pad 9, exits.
- The playhead shows white while the sequencer runs. It starts switched off when you load a project.

Resample: record the Circuit's own output

Think of it as a quick sampler for whatever the Circuit is playing right now. You record a few seconds, then play it back, pitch it, loop it or turn it into a drum sound.

To record (pad 32, red):

- Hold the pad to record while held, for up to about 3.5 seconds. Or tap it once to start and again to stop.

- **Shift + pad 32** arms it. With the sequencer running, it records the next bar. When stopped, it waits for Play, then records the first bar from the first beat.
- The recording leaves out the Master FX effects. The effects are applied when it plays back.

To play (pad 7, yellow): press it, and the knobs change to:

- **K1** pitch, ± 24 semitones.
- **K2** mode, by colour: yellow one-shot, green gate, blue loop. These have the usual sampler meanings: one-shot plays once, gate plays while you hold the pad, and loop repeats while you hold it.
- **K3** start point. **K4** end point. If the end is before the start, it plays backwards.
- **Shift + pad 7** latches it playing, in any mode, until you press pad 7 again (or pad 8).

Where else it works:

- Hold pad 7 and touch a slot (pads 26–30) to store the sample there with its knob settings.
- Put it in a drum slot (section 8).
- Use it as the sample for a granular MIDI track (section 10).

Glitch (RC0.9, pad 31)

Hold **pad 31**. The output breaks up and lags like a tape. While held:

- **K1** speed. Fully up is normal, lower slows it like a tape brake, the centre stops it, and below that it runs backwards.
- **K2** repeat size. At maximum there is no repeat, just a continuous delay.
- **K3** delay, up to about 2.6 seconds.
- **K4** lower half is chaos (random jumps, cuts, reversals). Upper half is overload (late blocks and clicks, then slowing down from about three-quarters up).
- Hold pad 31 and touch another bottom-row pad to make that slot a Glitch with the current knob settings (it lights turquoise). If two Glitch slots are pressed, the last one plays.

Slots (the bottom row)

Pads 26–30 can each store an effect with its settings. Hold an effect (pads 1–6, pad 7 for the resample, or pad 31 for Glitch) and touch a slot to store it. Touch the slot to use it while held, or Shift + slot to latch. Slots are saved with the project. An empty slot is the stock performance effect of the FX view.

8. Drums

Play a drum like a keyboard

Select a drum, then press **Shift + Preset**. Three rows of pads now play that drum's sample at different pitches, following the scale and root note set in the Scales view.

- **K1** shifts the pitch in semitones. **Shift + K1** fine-tunes in cents.
- When recording, each pitch is written only to its own step.
- In the Note view of the drums, pads 25–28 are drums 4 to 1.

What each drum knob does

Each knob does what its panel label says, with a second function under Shift. Everything is saved with the project and also sent over MIDI.

- **K1** pitch, in exact semitones. Shift: pitch envelope amount.
- **K2** ring mod frequency. Shift: ring mod amount.
- **K3** decay. Turned left of zero it sets the sample start point.
- **K4** envelope to cutoff. Shift: envelope shape.
- **K5** filter or EQ. Shift: filter type (DJ, band pass, notch, comb, EQ tilt).
- **K6** resonance.
- **K7** LFO amount. Shift: LFO speed.
- **K8** distortion. Turned left of zero it is bitcrush. Shift: distortion type (stock, soft, hard, folded).

Reset a knob

Hold **Clear** and turn the knob right to reset it to its default. This resets both layers of the knob, plain and Shift. On drums the LED turns blue. Turning left instead deletes the knob's automation, as on a stock unit, and the LED turns red. The same reset works on the MIDI track engine and in Master FX.

Sidechain between drums

Press **Shift + FX**, then **Octave ▼**. Rows 3–4 hold the ducking pages for each drum, and pads 5–8 in row 1 pick which drum triggers the ducking.

- **Beta 1.3 only:** K1–K4 set the attack, hold, decay and depth of the sidechain for the track you last touched, and K7 / K8 set the attack and release of the master compressor.

Replace a drum with your resample

In the Drum Preset view, press **Clear + a pad**. The pad blinks. Press **Clear + the same pad** again to confirm. That drum now plays your resample.

- It's temporary until you save the project. Saving writes it into the pack as a file called `PCM/NN_PCM.wav`, if it fits in sample memory.
- In the safer build it lasts only until the pack is reloaded.
- It's refused for the internal memory pack (section 2).

Swap or copy samples and patches

These aren't in the safer build, because they write to the SD card.

- **Swap two samples** in one pack: Drum Preset view, hold **Duplicate**, tap pad A (it blinks blue), then pad B. You hear the change at once.
- **Copy a sample to another pack**: in the sample's pack, press Duplicate + pad A. Load the other pack. While holding Duplicate, pad A's number blinks yellow. Press Duplicate + pad B. The sample is copied over B, and the original pack is untouched. Duplicate + A again cancels. B can be an empty pad.
- If the sample fits in B's place it goes there. Otherwise it goes into free import memory (about 44 seconds). If there's no room, nothing changes, and a copy never overwrites a sample that's playing.
- **Synth patches** work the same way in the Synth 1 or 2 Preset view. A pack's 128 patches are shared by both synths.
- **Delete a pack**: open the packs view (Shift + Projects) and tap **Clear**. For about 5 seconds the packs that can be deleted blink (never the loaded one). Touch the pack, then tap Clear again within 5 seconds. The slot can be reused after a restart.
- **Save** also writes any resamples used as drum samples to the card.

9. Synth tracks (Synth 1 and 2)

Source view

With a synth's view on screen, press its button again. Pads 25–29 pick the source: noise (normal), input 1, input 2, input 1 inverted, input 2 inverted. Pad 30 opens the knob sequencer. The patch needs some noise level (CC 56) for the source to be heard. The source is saved with the project. Any button closes the view.

Knob sequencer

A second, simple sequencer that sits on top of the track's pattern. Your pattern still decides which steps play notes. The knob sequencer adds one value to each pair of steps, and you set those values with the eight knobs. It's the original manual's "step-drummer".

- **Pairs of steps:** K1 is the first pair (steps 1-2), K2 the next pair, and so on. The **1-16 / 17-32** button switches to the second half of the pattern.
- **Two pages:** **Octave ▲ / ▼** switches between the pitch page and the velocity page.
- **Pads 1-16** show the steps. Bright means a note, white means playing now. Touch to listen. **Shift + touch** adds or removes a note.
- **Pads 17-24** pick what the pitch page changes (see below).
- With **Record** on, steps you play are recorded in real time.
- **Opening it:** on a synth, press pad 30 in the source view. On a MIDI track, press pad 30 in the Preset view with an engine on. Bright pad 30 means it's open. On MIDI tracks, **Shift + pad 30** turns it off.

What the pitch page does:

- **On a synth track,** it sets the position of one of the patch's eight macro knobs, picked with pads 17-24 (macro 1-8). Each pair of steps gets its own macro value, written as automation.
- **On a MIDI track with an engine,** pads 17-24 pick a destination: pitch of both oscillators, oscillator 2 pitch, WAVE, FM, MIX, envelope to filter, SHAPE or decay. A knob value of 64 means no change. Other values shift that destination for those two steps.

Beta 1.3 only extras

- **Split keyboard:** hold Synth 1 and press Synth 2 (or the other way round). The top two rows play Synth 1 and the bottom two play Synth 2, each with its own scale, octave and velocity. Knobs and Octave follow the synth you pressed first. Any track or view button leaves. Play, Record, Octave and Shift don't close it.
- **Patch colours:** in the Preset view, mono patches are dark blue, glide patches lavender, and poly patches your track colour. The chosen patch is lighter.
- **Save a patch to the pack:** in the Preset view, Clear + pad, then Clear + the same pad again within about 5 seconds. It saves the patch as it sounds, replacing that slot. Stock firmware can't do this. It's refused for the internal memory pack.
- **Macro knob destinations:** in the source view, pad 32 opens an editor. Turn a knob to pick its macro. The knob changes the current field, and Octave ▼ / ▲ steps through the fields: slot (1-4), start, end, destination and depth. Any pad drops the macro, and pad 32 closes the editor. Destinations use the numbers in Novation's Programmer's Reference Guide, for example CC 74 is filter cutoff.

10. MIDI tracks as synths

Normally a MIDI track only sends MIDI notes. With the mod, MIDI 1 and MIDI 2 can each get their own sound, so they work as extra synth voices on the Circuit itself. The track's notes play that sound and still go out over MIDI.

Turning it on

In the MIDI 1 or 2 Preset view, press **pad 27**. Each press moves to the next mode, and the pad's colour shows which one you're on: off, then line input (yellow), oscillator (green), VA-drum (red), granular (magenta), FX sequencer (blue), then back to off.

The six modes in plain words

- **Off (pad dark):** a normal MIDI track. The knobs are the usual MIDI macros.
- **Line input (yellow):** plays whatever comes into the audio input (line 1 for MIDI 1, line 2 for MIDI 2) through the track's filter, envelope and LFO, triggered by the track's notes. Use it to shape an outside sound with the Circuit's filter.
- **Oscillator (green):** a two-oscillator synth. Use it for ordinary synth sounds.
- **VA-drum (red):** the same oscillator tuned for percussion, such as kicks, snares and toms. Notes play out one-shot.
- **Granular (magenta):** plays many tiny overlapping slices (grains) of a sample. Use it for textures and stretched or frozen sounds.
- **FX sequencer (blue):** makes no sound itself. Each step triggers a Master FX slot instead.

What the sound modes share

In every mode except off and FX sequencer, the sound goes through a VCA (volume), an effect and a filter, with an envelope and LFO, before it reaches mixer strip 3 or 4. Pad 29 swaps the order between VCA, effect, filter and filter, VCA, effect.

Pads in the MIDI Preset view

- **Pads 1–5** pick the knob page: 1 VCA-VCF, 2 oscillator 1 (the granular controls in granular mode), 3 oscillator 2, 4 values you can automate, 5 modulation.
- **Pad 25** CC editor. **Pad 26** patch flip. **Pad 27** the mode. **Pad 28** one or two oscillators (oscillator and VA-drum only). **Pad 29** the order above. **Pad 30** knob sequencer. **Pad 31** (VA-drum only) lets velocity scale the pitch and filter envelopes.

Page 1: VCA-VCF

- K1 attack (Shift: sustain). K2 release (Shift: decay).
- K3 envelope to level (Shift: LFO to level). K4 envelope to filter (Shift: LFO to filter).
- K5 filter (Shift: filter type: DJ, 12 dB low pass, 12 dB high pass, band pass, notch, 24 dB low pass, 24 dB high pass). K6 resonance (Shift: VCA gain, up to +18 dB with saturation).
- K7 LFO speed. K8 effect amount (Shift: effect type: soft, hard, folded, wavefold, ring, comb, chorus).

Pages 2 to 5

- **Page 2, oscillator 1:** K1 tune (Shift: fine), K2 shape (Shift: mix of oscillators 1 and 2), K3 envelope to pitch (Shift: bitsync), K4 envelope to shape, K5 LFO to pitch, K6 LFO to shape, K7 WAVE, K8 LFO to morph (Shift: envelope to morph).
- **Page 3, oscillator 2:** K1 tune 2 (Shift: fine 2), K2 shape 2 (Shift: FM), Shift + K3 ring mod, K7 WAVE 2.
- **Page 4:** the eight values you can automate: tune, release, envelope to level, envelope to filter, filter, resonance, LFO speed, effect amount.
- **Page 5:** ADSR on the top row, LFO on the bottom row.

The engines in more detail

- **Oscillator:** WAVE morphs continuously from sine (0) through triangle (42) and saw (84) to square (126). SHAPE folds the sine or triangle, bends the saw, or changes the square's width. Oscillator 2 adds FM, ring mod and bitsync. One note gives unison, and two notes give one per oscillator.
- **VA-drum:** the VCA is one-shot. The Sustain knob sets pitch envelope decay, Release sets filter envelope decay, and LFO speed sets noise level. For a kick try a sine wave, Decay around 70, Sustain around 30 and envelope to pitch turned right. For a snare use more noise, a short Decay and a band pass filter.
- **Granular:** up to 16 grains per track, from any pack sample or your resample. Page 2 holds the controls. K1 pitch (± 24 semitones; Shift: fine). K2 position (Shift: position spray). K3 scan: centre freezes, right moves forward, left backwards (Shift: chance of a reversed grain). K4 grain size, 5–500 ms (Shift: pitch spray). K5 density, 1–16 grains (Shift: window shape). K6 length of the scan zone (Shift: note mode). K7 LFO to position (Shift: LFO to size). K8 envelope to position (Shift: source, pack sample 1–64, or turned left your resample). It goes through the page 1 VCA-VCF.
- **Granular note modes:** pitch (the note changes grain pitch) and slicer (the note picks one of 16 slices). Beta 1.3 adds stretch, which plays from the position to the end of the sample over a set number of steps without changing pitch.

- **FX sequencer (blue):** first put effects in the Master FX slots (section 7). Then open the knob sequencer with pad 30 and put notes on steps with Shift + pad. Each knob (a pair of steps) picks a slot: 0 none, 1–5 pads 26–30, 6 the Glitch on pad 31. Every step with a note switches on what that slot holds, and the knob LED takes the effect's colour. The knob is slow, so turn it a long way to move one slot. The track makes no sound itself, but its notes still go out over MIDI. Leaving blue switches the knob sequencer off. **Beta 1.3 only:** at the end of the knob's travel is a random value (white LED), where one of the assigned slots plays at random on each note step.

Other MIDI-track tools

- **CC editor** (pad 25): move a knob to pick it. Its CC number is drawn on the pads. Octave ▼ / ▲ steps through its fields and turning the knob changes the value. For a plain CC the fields are number, start and end. NRPN adds MSB and LSB fields. Save with pad 26. Any view button or pad 25 discards.
- **Patch flip** (pad 26): every note is sent as a Program Change. It switches off when an engine is on, and the other way round.
- **Automation:** with Record + Play, the eight page 4 values are recorded into the pattern. With the knob sequencer on, the tune lane is used by its pitch page.

Beta 1.3 only extras

- **Own-synth patches:** rows 2–3 of the Preset view are 16 patch slots, with four pages (Octave ▼ / ▲) for 64 per pack, shared by MIDI 1 and 2. Touch a slot to load it. Clear + the pad twice saves. Duplicate + slot A + slot B swaps them. Dim peach pads have a patch, bright peach is the last loaded or saved, and violet is empty. A patch holds the engine, both oscillators, the order, every page value and the knob sequencer setting. The steps belong to the pattern.
- **Reset a page:** Clear + a page pad (1–5) resets that page's values, with and without Shift. The chosen mode stays. **Clear + the track button** resets the whole engine.
- **Copy a patch to another pack:** with the source pack loaded, press Duplicate + slot A. Load the other pack and go back to the Preset view, where Duplicate lights yellow. Press Duplicate + slot B. Nothing is copied if A is empty or the other pack lacks that patch bank.

11. Pattern tools (Beta 1.3 only)

Nudge and play orders

In the Pattern Settings view: **pad 26** is Nudge (orange), **pad 27** is fractal order and **pad 28** is deconstructed order. They work on every track, drums included.

- **Nudge** rewrites the pattern so the step you choose becomes step 1, and what was in front of it goes to the end. It moves whole steps with their automation, over 16 steps for a pattern of up to 16, or over 32. The pattern's last step moves with it, so steps 6–13 become steps 1–8. In effect, choosing step 2 as the new first step moves everything one step earlier.
- The original doesn't spell out the exact button sequence for choosing the step, so try it on a copy of a pattern first.
- **Fractal order** plays steps 1, then 1 2, then 1 2 3, then 1 2 3 4, and so on up to the last step, then starts again.
- **Deconstructed order** plays the grid's diagonals: 1 6 11 16, then 2 7 12 13, then 3 8 9 14, then 4 5 10 15 (and the same for 17–32). Steps outside the pattern are skipped.
- Pad 27, pad 28 and the four direction pads (29–32) exclude each other. The order is saved with the pattern, and clearing the pattern removes it.

Random-mutate

Each step can get a chance of its notes jumping an octave or moving to another note of the scale when they play. Hold a step that has notes and touch a pad in **row 4**:

- Pad 25 turns it off. Pad 26: 6% octave. Pad 27: 6% scale. Pad 28: 6% octave and 6% scale. Pad 29: 12% scale. Pad 30: 12% octave. Pad 31: 25% scale. Pad 32: 25% octave and 50% scale.
- Without Record the change plays once. With Record it's written into the step, so the sequence drifts. Tied notes aren't changed, and every note of a chord is drawn separately.
- The original describes how to get to this in two places that don't fully agree. Try **Shift + Pattern Settings** first. If row 4 shows step frequency instead, press pad 25 in Pattern Settings.

Step frequency and dynamics

- **Step frequency**: press **Pattern Settings** twice. Row 3 is the usual probability. Row 4 is frequency, in yellow: with n, the step sounds on the last of every n plays of the pattern (1–8). Each pattern counts its plays from Play.
- **Dynamics**: press **pad 25** in Pattern Settings. Row 3 becomes random dynamics: pad 1 no change, pad 2 timing –2 to +2 micro steps, pad 3 the same plus velocity 0 to +32, pad 4 velocity 0 to +32, pad 5 timing –1 to +3 plus velocity 0 to +32, pad 6 timing –1 to +3, pad 7 velocity –32 to +32, pad 8 velocity –32 to +64. With Record on, what sounds is written into the pattern.

Pattern chains and scenes

A pattern can carry a rule like “play n times, then jump to B, next time to C”.

- **Chain mode** is project-wide. In the Patterns view, **Shift + Octave ▲** switches it on (Octave ▲ turns green) and **Shift + Octave ▼** switches it off. With it off, the rules stay stored but aren't followed.
- **Editing a rule** (mode on): press a pattern to make it **A** (yellow). Press A again for one more play, up to 8 (the knob LEDs count). Press another pattern of the same track to make it **B** (green), and the next one **C** (red). With n = 3 that plays A A A B A A A C. B and C play once, then the track returns to A.
- **Clear + pattern** in chain mode removes the rule. Outside chain mode, Clear clears the pattern, its rule and its play order.
- **Scenes**: a scene saved with chain mode on remembers it and shows in peach. Loading it brings the mode back. In the Mixer, **Shift + pads 9–16** set 1–8 repeats of the current scene. Tracks following a rule blink in the Mixer.

12. Setup and MIDI

- **Setup pad 16**: channel 16 for receive and send (project and FX).
- **Setup pads 22 and 23**: send the reverb (cream) or delay (peach) return through mixer strip 3 or 4.
- **Shared channels**: MIDI 1 and 2 may use a channel another track already uses. What a MIDI track sends then also reaches that track internally.
- **Beta 1.3 only, record internal routes**: in the Setup view, **Record** decides whether what a MIDI track sends to an internal synth over a shared channel is also recorded into that synth. Yellow means yes. Dark means no, which is the default. It resets at power-off.
- **Beta 1.3 only, MIDI Thru modes**: in Advanced Setup, Duplicate steps through Thru (dim red), Out 2 (green), Merge (yellow: DIN In plus the device's own MIDI) and Filter (blue: DIN In without the channels the device listens to). SysEx isn't copied in Merge or Filter. If Clock Tx is on in Merge, you may get two clocks, so switch Clock Tx off. With stock firmware, Merge and Filter fall back to Out 2.

13. Copying projects (Beta 1.3 only)

In the Projects view, press **Duplicate + pad A** (the source, blinking yellow), then **Duplicate + pad B**. An empty B is written at once. A B that holds a project blinks white, and you repeat Duplicate + B within about 5 seconds to replace it. The loaded project's slot is never written. To copy into another pack, pick the source, load the other pack, open

Projects and press Duplicate + pad B. Save first, because it copies what's on the card, and the unit doesn't respond for a moment while copying. A project stores patch and sample numbers, not the sounds, so it plays with the other pack's patches and samples.

14. What's saved where

- **In the project:** new drum knobs, Master FX slots, synth source, reverb and delay settings. In Beta 1.3 also the Master FX knobs, pattern chain rules and scene data.
- **In device settings:** the MIDI track mode (pad 27 choice, granular, FX sequencer), page 1-2 values, and whether the knob sequencer is on.
- **In the pattern:** knob sequencer notes and pitch row, FX sequencer values, and in Beta 1.3 chain rules, play order, and step frequency and dynamics settings.
- **In the pack, on save:** resamples used as drums.
- **Not saved:** oscillator 2 values, MIX, FM and RING, the granular Shift parameters, latched effects and the song pointer.

15. What the mod doesn't do

As far as the manual shows, there are no patterns longer than 32 steps, and no way to change what type each track is. The closest thing is section 10, where a MIDI track becomes a synth voice, a drum voice or a granular sampler. Nudge exists only in Beta 1.3 (section 11).

This rewrite also leaves out the original's developer tools and DSP internals. See the original manual for those.

16. MIDI reference

- **Drums:** NRPN MSB 5-8 are Drums 1-4, LSB 1-12, on the drum channel. LSB: 1 pitch envelope, 2 ring frequency, 3 LFO, 4 LFO speed, 5 envelope to cutoff, 6 resonance, 7 envelope shape, 8 ring amount, 9 filter mode, 10 start point, 11 bitcrush, 12 distortion type.
- **Master FX:** NRPN MSB 9 on channel 16, LSB = $4 \times \text{effect number} + \text{knob}$. Gater 0-3, Auto-Filter 4-7, Digitise 8-11, Phaser 12-15, Vinyl 16-19.
- **MIDI track engine,** on the track channel: filter CC 74, resonance 71, envelope to filter 79, attack 73, decay 75, sustain 70, release 72, effect 91, gain 59, tune 26, fine 27, wave 20, shape 21, tune 2 37, fine 2 39, wave 2 30, shape 2 31, mix 52, ring 54, LFO speed NRPN 0:76. The rest use NRPN MSB 4.
- All of these follow the CC Tx / Rx filters in Setup.