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OWNER'S MANUAL · ISSUE 5

00

THE INSTRUMENT

GHOST-ASIC · 64K VRAM · FOUR CHIPS ON ONE BUS

Sprite Spores is a multi-chip synthesiser. It runs four register-level emulations of real sound hardware side by side, plus a fifth lane made of the noise those chips leak into each other, and lets you crossfade between them as if they were sitting on one board fighting over the same address bus.

PSG

AY-3-8910 / YM2149

Three square-wave channels, a 17-bit noise LFSR, sixteen hardware envelope shapes, and the DAC differences between the General Instrument and Yamaha parts.

SID

MOS 6581 / 8580

Three voices with a 24-bit accumulator, 23-bit pitched noise, combined waveforms, ring mod and hard sync, the ADSR delay bug, and a nonlinear filter inside the loop.

OPN2

Yamaha YM2612

Four-operator FM on a log-domain operator core, eight algorithms, SSG-EG, channel-3 special mode, and the Model 1 DAC ladder.

OPM

Yamaha YM2151

The same operator core plus DT2, four LFO waveforms, operator-4 noise, and YM3012 floating-point DAC behaviour.

GHOST

Ghost-ASIC lane

Not a real chip. Bus leakage, contact corrosion and a video-RAM resonator — the sound of the other four bleeding into each other.

WHAT IS ACTUALLY BEING MODELLED

These are hardware-aware, register-level musical emulations. Pitch is quantised the way the real registers quantise it, envelopes step on the real rate counters, and the DAC nonlinearities are in the signal path. They are not transistor-level, cycle-exact replacements for the original silicon, and they are not advertised as such.

Each chip has an **AUTHENTIC** control that blends between a friendlier synth-flavoured lane and the hardware model. At zero you get something musical and forgiving; at one you get the chip, quirks included.

RUNNING IT IN A HOST

Sprite Spores runs four chip models at once, and how hard that hits your CPU depends mostly on how many notes are held and how many lanes are actually contributing. Version 0.16.8 moved a large amount of per-sample work up to per-block — chip configuration, sequencer lane settings, filter coefficients, scope publishing — and capped the CRT's OpenGL redraw at 30 Hz with

hidden pages not repainting at all. On the audit machine's deliberately extreme case (twelve held notes, every engine and lane running, both effects on) throughput went from about 1.6x to about 2.3x real-time. That is a stress test, not a promise about your session.

If you need to claw back more, the cheapest wins are leaving the plug-in on a page you are not watching, dropping unused chip lanes to zero, and turning off sequencer lanes B and C when you are not using them.

The plug-in handles unusual host behaviour explicitly: odd sample rates, block sizes from one sample to very large, mono busses, and repeated suspend and resume. Oversized blocks are processed in bounded internal chunks, buffers are kept across suspension rather than reallocated, and a non-finite value arriving from the host cannot get stuck circulating in the delay or VRAM feedback loops.

```
FORMAT   VST3 · Windows
VERSION  0.16.8 · Issue 5
MAKER    Phantomexposure
```

01

INSTALLING

WHERE THE FILE GOES

Sprite Spores is a VST3 plug-in for Windows. Copy the `Sprite Spores.vst3` folder into your system plug-in directory:

```
INSTALL TO
C:\Program Files\Common Files\VST3\
```

You will need administrator rights to write there. Once it is copied, rescan in your host — the plug-in appears as **Sprite Spores** by **Phantomexposure**, categorised as an instrument. If your host caches its plug-in list, force the rescan rather than waiting for it.

Nothing else is installed. There is no separate licence file, no registry entry, and no phone-home; removing the folder removes the plug-in completely.

02

YOUR FIRST SOUND

FIVE MINUTES, NO THEORY

1. Load the plug-in and press **INIT**. This applies the **00 INIT / Clean Boot** preset and clears any latch.
2. Play a note. INIT boots in **Manual Mix** with all four lane faders open, so you are hearing the chips summed rather than crossfaded.
3. Open **Chip Lanes** and pull three of the four faders down. Whichever one you leave up is what you hear — in Manual Mix the faders behave like an ordinary mixer.
4. Now set **LANE MODE** to **DNA Blend** and sweep **CHIP DNA** from left to right. The instrument crossfades PSG → SID → FM → Ghost, and the chip portrait beside the screen changes to match. This is the mode the factory patches are built in.
5. Open **Chip Control**, press the **YM2612** key and turn **ENGINE** up. The FM lane switches from the friendly version to the real chip. Flip **FM CHIP** to YM2151 to hear the arcade part instead.
6. Go back to **Perform** and set **REGISTER MORPH** to about a quarter. This is a different control from Chip DNA — it drives the register frame rather than the blend, and it is what makes the instrument sound like it is being written to rather than played.
7. Press **SPROUT** a few times. Every press generates a complete musical patch. When one is close, press **MUTATE** to nudge it rather than replace it.

TIP Press A / B to store the current patch. Keep editing, press it again to jump back. Lit means A is stored and you are hearing B.

03

THE FRONT PANEL

READING THE BOARD

The window is laid out like a piece of hardware, and the layout is stable: nothing moves except the page area in the middle.

FIG 1 The full board, showing the Perform page. Header and wordmark at the top, chip portrait and CRT below, function keys across the middle, page selector, and the page area beneath it.

HEADER

The matt-black plate carries the wordmark, whose second half is tinted by the live **REGISTER MORPH** value — a colour readout you can see from across the room. To its right sit the master **BYPASS** and **MIX** controls, then the LED cluster and the output meter.

THE REGISTER PLATE

Between the wordmark and the master strip is a small black plate showing the PSG's actual state. The top line is the machine identity — profile, silicon and clock, so `ZX128 AY8912 1.773M` tells you at a glance which of the machine profiles is in force. Below it, laid out three to a row, are registers R0 to R13 as live hex, read straight from the chip's shadow register image.

This is the real register file, not a decorative activity meter. Change a mixer routing and R7 changes; change a level and R8, R9 or R10 changes; run the envelope and you can watch R11, R12 and R13. It is the fastest way to confirm the chip is being programmed the way you think it is.

THE CRT AND ITS PORTRAIT

Left of the screen is the chip portrait: a drawing of whichever chip currently dominates the blend, with the part number printed underneath, and the SPROUT button beneath that. The screen itself is a real scope with eighteen display modes and twenty beam colours; **MODE**, **BEAM**, **PERSIST** and **GLITCH** are in the Display panel on its right, reachable from every page. Everything about the screen is a proper automatable parameter, so display settings save with your presets, but nothing on it touches the audio.

Across the top of the CRT the plug-in prints its own state: the dominant chip at the left, and the live Morph, Conflict, Ghost and Tear values as hex bytes at the right.

FUNCTION KEYS

Nine mechanical keys across the middle of the board, colour-coded by what they do. Red is destructive or captures, olive is a latch, blue is generative, charcoal is administrative. See chapter 16.

REVERB AND DELAY DOORS

The two cover plates in the middle strip are hinged. Click **REVERB** or **DELAY** and the plate opens to reveal the controls underneath on a circuit-board backdrop; click the close button to shut it again. Only one door opens at a time.

PRESET BROWSER

The preset box opens a categorised teletext menu — seven categories with counts, styled after a BBC Micro page. The arrows either side step through presets one at a time without opening the menu.

PAGE SELECTOR

Eleven pages along the bottom. **Perform**, **Chip Lanes**, **Motion/Bus**, **Video RAM**, **Macro Scene**, **Snap Scan**, **Bitplane**, **Output Bus**, **Chord Bus**, **Wave**, **Chip Control**. The current page name is printed in the top-right corner of the grid area.

04

CHIP DNA & THE LANES

THE ONE THING TO UNDERSTAND BEFORE ANYTHING ELSE

Almost every "why can't I hear this chip" question has the same answer, so it is worth reading this chapter properly.

CHIP DNA IS A CROSSFADE, NOT A SELECTOR

CHIP DNA runs 0 to 1 and positions the instrument along a line of four chips. Each chip has a centre and a width, and its weight falls to zero outside that width:

LANE	CENTRE	WIDTH	AUDIBLE RANGE OF CHIP DNA
PSG	0.00	0.45	0.00 – 0.45
SID	0.34	0.38	0.00 – 0.72
FM	0.67	0.38	0.29 – 1.00
Ghost	1.00	0.45	0.55 – 1.00

The four weights are then normalised so they always sum to one. That is why the instrument stays at a consistent level as you sweep — you are moving a fader between chips, not adding them up.

LANE MODE DECIDES WHAT THE FADERS MEAN

The **LANE MODE** selector sits next to the four faders on **Chip Lanes** and has two positions. It is the single most important control on that page.

DNA BLEND

The four faders are **trims inside the crossfade**. Each fader is multiplied by its lane's Chip DNA weight, so a lane whose weight is zero stays silent wherever its fader sits. This is the mode that gives the instrument its chip-morphing character, and every factory patch is built in it.

MANUAL MIX

The Chip DNA weights are bypassed and the four faders behave like an ordinary mixer. Raise a lane, hear that lane. **INIT boots in this mode**, so a fresh patch does the obvious thing.

```
SAME PATCH, BOTH MODES  CHIP DNA 0.05, FM FADER AT MAX
DNA BLEND   FM share 0.000  ← silent
MANUAL MIX  FM share 1.000  ← audible
```

IF A LANE FADER APPEARS TO DO NOTHING

You are in **DNA Blend** and Chip DNA has that lane's weight at zero. At Chip DNA 0.05 the FM and Ghost weights are exactly zero, so those two faders are inert — not broken, just multiplied by nothing. Either bring Chip DNA up past 0.29 for FM and 0.55 for Ghost, or switch Lane Mode to Manual Mix.

```
DNA BLEND WEIGHTS AT CHIP DNA 0.05
PSG   0.79   ← audible
SID   0.21   ← audible
FM    0.00   ← fader has no effect
GHOST 0.00   ← fader has no effect
```

SPROUT always generates in DNA Blend, because the crossfade is what makes a generated patch sound like a chip rather than a stack of them. INIT always returns you to Manual Mix.

FIG 2 The Chip Lanes page. Four lane faders and the Lane Mode selector, here set to DNA Blend.

CHIP DNA IS NOT REGISTER MORPH

These two are easy to confuse because both are large knobs on the Perform page and both change the character of the sound. Note that Register Morph works the same way in both lane modes; only Chip DNA is bypassed by Manual Mix.

CHIP DNA	Which chip you are hearing. Controls the blend weights described above.
REGISTER MORPH	How hard the register frame is being driven. Drives the chip portrait and the wordmark tint. Does not affect the blend at all.

The portrait can read `YM2151` from Register Morph while Chip DNA still has the FM weight at zero. Watch the lane, not the portrait, when you are chasing silence.

PINNING A CHIP PER STEP

The sequencer's chip lane overrides Chip DNA on a per-step basis. A pinned step drives the blend to a fixed position — A is full PSG, C is the midpoint, E is full Ghost — and steps left at OFF follow the live knob, so knob automation still flows through. The switch is declicked over about two milliseconds. Because it works by moving Chip DNA, the chip lane has no audible effect in Manual Mix. See chapter 07.

05

PERFORM BANK

PAGE 1 · THE CONTROLS YOU PLAY WITH

Fifteen controls that shape the instrument as a whole, downstream of whichever chips are sounding.

FIG 3 The Perform bank: four character knobs on the top row, filter and envelope below, voicing and output at the bottom.

THE FOUR BIG ONES

CHIP DNA — The chip crossfade. See chapter 04.

REGISTER MORPH — How aggressively the register frame is rewritten. Low values are stable; high values push into the noisier, more corrupted end of each chip's behaviour.

BUS CONFLICT — Two chips writing the same address. Adds hardness and intermodulation that belongs to neither lane on its own.

GHOST LANE — How much of the Ghost-ASIC leakage layer is mixed in on top, independent of the Ghost lane's own blend weight.

FILTER AND ENVELOPE

CHIP FILTER (80 Hz – 18 kHz, default 9 kHz) and **FILTER BITE** are the instrument's own filter, downstream of the chips and separate from the SID's internal filter. **FILTER MODE** selects lowpass, bandpass, highpass or notch.

ATTACK, **DECAY**, **SUSTAIN** and **RELEASE** are the outer amplitude envelope. The chips have their own envelopes as well — the AY hardware envelope, the SID's rate-counter ADSR, the FM operator envelopes — and those are on the Chip Control pages. This one runs over the top of all of them.

VOICING AND DRIFT

GLIDE MODE	**Poly** snaps to each new note. **Mono**, **Legato** and **Glide** add progressively slower portamento. The glide time constants are sample-rate invariant, so a patch behaves identically at 44.1 kHz and 96 kHz.
OSC DRIFT	**Off**, **Subtle**, **Vintage**, **Broken**. Detuning instability, from a warm shimmer to something that has been in a loft since 1987.
OUTPUT	−24 to +6 dB, default −6 dB. Leave headroom — the Ghost lane and Bus Conflict both add level.
SPEAKER DRIVE	Small-transducer saturation, as if the output were going through a machine's internal speaker.

06

CHIP CONTROL

FIVE MINI SYNTHS, ONE PAGE

The **Chip Control** page is where each chip becomes an instrument in its own right. Five keys along the top select the chip; each chip's controls are grouped into named sections and laid out over one or two tabs. There is no scrolling — everything for a chip fits its pages.

Every control here is a second view onto a parameter that already exists. Editing the SID's cutoff on this page and editing it from your host's automation lane are the same parameter, and the Chip Lanes page keeps working as the lane mixer while you are in here. The two Yamaha pages go further and share their Engine and FM Chip controls outright, because they drive one lane.

THE ENGINE CONTROL

The PSG lane and the FM lane each have an **ENGINE** knob at the top of their **Chip** section, defaulting to zero. It blends between a legacy synth-flavoured lane and the hardware model. Turn it up and you get register quantisation, real envelope stepping and DAC nonlinearity; leave it down and you get something smoother that plays nicely with anything. The SID and Ghost lanes have no Engine knob — the SID is always the chip model, and the Ghost lane is not modelled on anything.

With Engine at zero the chip's controls are drawn dimmed and an amber banner appears across the top of the board reading `ENGINE AT 0`, telling you the controls below are bypassed. That is the plug-in warning you before you spend ten minutes editing operators you cannot hear.

06A AY-3-8910 / YM2149 — PSG

Three square-wave tone channels, one noise generator, one hardware envelope generator, and a three-bit mixer register deciding what each channel hears.

MACHINE PROFILES

Before touching anything else on this page, decide what machine you are pretending to own. **MACHINE** offers four profiles, and choosing one of the three strict profiles locks the chip, the clock, the divider and the stereo wiring together so they cannot drift into a combination that never existed.

PROFILE	SILICON	CLOCK	WIRING
FREE LAB	your choice	your choice	your choice
ZX 128 / AY-3-8912	AY-3-8910	1.77345 MHz	mono, no divider
ATARI STF	YM2149	2.00531 MHz	mono, no divider
ATARI STE	YM2149	2.00265 MHz	mono, no divider

The strict profiles are genuinely mono, because those machines were. If a saved patch carries a stereo value into a strict profile it is ignored rather than honoured. The two stereo positions are labelled **ZX Mod ABC** and **ZX Mod ACB** for that reason — they are the aftermarket stereo modification, not stock wiring, and they are available in Free Lab.

Strict profiles also model the real R7 behaviour when both gates are high, giving you the constant DAC state rather than silence. Free Lab keeps the convenient digital meaning of **Off** in the mixer, which is easier to work with when you are designing rather than reconstructing.

SPROUT picks a coherent profile rather than rolling chip, clock, divider and stereo independently, so a generated PSG patch is always a machine that could have existed.

TAB 1 — CHIP / MIXER / TONE

FIG 4 The AY / YM page, Voice / Mix tab. Chip section at the left, the three-channel mixer at the right, tone and period controls below.

ENGINE — Blend to the hardware PSG model. At zero the lane is the friendlier legacy version and the rest of this page is bypassed.

MACHINE — The profile, as above. Set this first.

MODEL — **AY-3-8910** (General Instrument) or **YM2149** (Yamaha). Different logarithmic DAC tables, so the two sound measurably different at low levels; the AY steps through 16 envelope levels where the YM2149 steps through 32 at twice the cadence, over the same total envelope time.

CLOCK — 1.000 MHz, 1.77345 MHz (ZX), 1.7898 MHz (Amstrad CPC), 2.000 MHz (Lab), 2.00531 MHz (STF), 2.00265 MHz (STE). The clock sets the register quantisation grid, so it changes how in-tune high notes are.

DIVIDER — The `/SEL` half-clock pin. This is a YM2149 feature only — the AY-3-8910 and 8912 ignore it, as they do on hardware.

STEREO — **Mono**, **ZX Mod ABC** or **ZX Mod ACB** — the two hard-panned stereo modifications, available in Free Lab.

MIX A / B / C — Per-channel routing from register 7: **Off**, **Tone**, **Noise**, or **Tone+Noise**. Default is channel A on tone, B and C off.

LEVEL A / B / C — The 4-bit level registers, 0–15.

DETUNE B / C	±24 semitones on the second and third channels, for chords and buzz.
PERIOD MODE	**Track Note** follows the keyboard. **Absolute** pins channels B and C to fixed register periods regardless of the note — the classic drone and buzzer trick.
PERIOD B / C	The raw 12-bit period registers, 1–4095, used when Period Mode is Absolute.

TAB 2 — ENVELOPE / NOISE / LEGACY LANE

All sixteen hardware envelope shapes are present, named the way the datasheet names them: shapes 0–7 are one-shot decays and attacks, 8–15 are the looping and holding shapes (saw down, decay-hold, triangle, saw up, and their inverses). **ENV ROUTE** chooses which channels the envelope generator drives — none, any single channel, or any combination. **ENV RATE** is set in full cycles per second, 0.05 to 60.

Envelope timing follows the documented full-cycle formula — master clock divided by 256 times the envelope period. The generic and Yamaha profiles keep the documented half-period behaviour when the period register is zero; the Atari profiles use the measured real-ST behaviour, where zero equals one.

R13 RETRIGGER is a rate in writes per second, up to 4000, for repeatedly writing the same value to R13. On hardware this restarts the envelope on the chip's own clock and is how sync-buzzer and tracker envelope effects were programmed. It defaults to off, and SPROUT never enables it — it is a deliberate effect, not a flavour.

NOISE PERIOD is the 5-bit noise register, 1–31. **NOISE TYPE** and **NOISE BEND** reshape the noise source beyond what the chip could do.

The **Legacy Lane** section holds the pre-0.14 colouring controls — **PSG MORPH**, **CLOCK LOCK**, **LEGACY ENV**, **HARDWAVE**, **SYNC BUZZER**, **YM ARP**. They are kept because existing presets use them, and several are musically useful in their own right.

06B MOS 6581 / 8580 — SID

Three full voices, each with its own waveform, pulse width, envelope and filter routing.

TAB 1 — CHIP, VOICE 1, FILTER, MOD

FIG 5 The 6581 / 8580 page, Voice 1 / Filter tab, with the chip, voice, filter and modulation sections.

MODEL — **6581** or **8580**. The 6581 has the nonlinear integrators in the filter loop and a much more coloured DAC; the 8580 is cleaner and its combined waveforms behave differently.

CLOCK — **PAL 985248 Hz** or **NTSC 1022727 Hz**. As on the AY, the clock is the tuning grid the oscillators quantise to, so switching regions shifts the fine tuning of every voice.

VOICES — **1 Voice** or **3 Voice**. Three-voice mode gives you the full chip.

UNIT TRIM — Unit-to-unit filter variance. Real SIDs differ wildly from chip to chip; this dials in which one you own.

TEST BIT — Holds a voice's accumulator at zero. **Run**, or test on voice 1, 2, 3, or all. Used on hardware for hard-syncing and for the noise lock-up trick.

V1 WAVE — Triangle, sawtooth, pulse, noise, and the combined waves — saw+tri, pulse+tri, ring mod, hard sync, noise+saw, noise+pulse.

V1 RING / V1 SYNC — The ring-modulation and hard-sync register bits, as their own switches. On the chip these are bits in the control register rather than waveform selections, so they combine with whatever waveform you have chosen instead of replacing it. Voices 2 and 3 have the same pair on the second tab.

V1 ROUTE	**Direct** or **Filtered**. Per-voice, exactly as on the chip.
FILTER MODE	Off, lowpass, bandpass, highpass or notch — the SID's own filter, distinct from the Perform page's Chip Filter.
SID ENV	How much the voice envelope opens the filter.

The envelope controls (**ATTACK**, **DECAY**, **SUSTAIN**, **RELEASE**) run 0–15 because they are register values, not seconds. They step on the chip's rate counter and exponential divider, which is why fast attacks sound the way they do rather than the way a modern envelope sounds.

```
NOTE  The ADSR delay bug is modelled. Retriggering a voice at the
wrong point in the envelope counter can swallow the attack — that
is the hardware, not a fault.
```

TAB 2 — VOICES 2 AND 3

Voices 2 and 3 each get a complete set: waveform, ring and sync switches, detune (±24 semitones), pulse width, filter route, and their own four-stage envelope. **3OFF** is the register bit that disconnects voice 3 from the output while leaving it running — used on hardware to drive the filter or ring modulation without hearing the voice.

06C YAMAHA YM2612 — OPN2

Four-operator FM. The operator core is log-domain with 256-entry sine and exponential tables, and the envelope generator runs on the hardware EG counter with its real increment patterns.

TAB 1 — CHIP, LFO, CH3 SPECIAL

FIG 6 The YM2612 page, Voice tab. Engine and FM Chip sit in the Chip section alongside the algorithm.

ENGINE — Blend to the hardware FM model, shared by both Yamaha chips. At zero the whole FM lane is the legacy version.

FM CHIP — **YM2612 (OPN2)** or **YM2151 (OPM)**. One lane, one choice — see 06d.

ALGORITHM — The eight operator topologies, printed as routings: `1>2>3>4` through `1+2+3+4`. Which operators are carriers — and therefore which Level controls you can actually hear — depends entirely on this.

FEEDBACK — 0–7, operator 1 into itself.

SILICON — Extra analogue-ish colour on the FM lane.

DAC LADDER — The asymmetric Model 1 DAC ladder. This is the crunch on early Mega Drive bass.

LFO RATE / PITCH MOD / AMP MOD — The chip LFO and its two depth registers.

LFO AM ENABLE — Four switches, one per operator. On the real chips the amplitude-modulation depth is global but each operator decides individually whether to listen to it, and these are those per-operator enable bits. Amp Mod does nothing audible until at least one of them is on. The four switches are shared by both Yamaha pages, like the rest of the operator section.

CH3 SPECIAL

Channel-3 special mode gives each operator its own pitch. With the three detune controls beside it you get four independent frequencies in one voice — the standard trick for drums and metallic clangs.

TAB 2 — THE OPERATOR MATRIX

Four identical rows, one per operator, same registers in the same columns so operators are directly comparable.

FIG 7 The YM2612 Operators tab. Four operators, identical layout, SSG-EG on each. (Captured before the dB readout; TL now reads in decibels below full scale.)

CONTROL	RANGE	WHAT IT IS
TL	0 – 127	Total Level. This is **attenuation**: 0 is fully open, 127 is silent. The readout is in dB, so a fully open operator shows `-0.0 dB` and the top of the range shows `SILENT`.
MUL	0 – 15	Frequency multiple. 0 means half.
DETUNE	0 – 7	DT1, fine detune in the chip's own units.
ATTACK	0 – 31	Attack rate. Higher is faster.
DECAY	0 – 31	First decay rate (D1R).
SUSTAIN	0 – 15	Sustain level (SL), where the first decay stops.
SUS RATE	0 – 31	Second decay rate (D2R), the slope after sustain.
RELEASE	0 – 15	Release rate.

CONTROL	RANGE	WHAT IT IS
KEY SCL	`0 – 3`	Key scaling — how much higher notes shorten the envelope.
SSG-EG	`9 modes`	The looping envelope modes, named by shape. Musically useful on modulators; on carriers it mostly buzzes.

> **TL IS ATTENUATION, NOT LEVEL**
>
> Turning a **TL** control up makes that operator *quieter*. The dB readout is there to keep this straight: `-0.0 dB` is wide open. The defaults are set for algorithm 0 (`1>2>3>4`), where operator 4 is the carrier — so operator 4 sits at 0 and operators 1–3 sit at 42 as modulators. Change the algorithm and you will usually need to move the TLs to match its carrier topology.

06D YAMAHA YM2151 — OPM

The arcade chip. It shares the operator core, the algorithm list and the whole operator matrix with the OPN2 — the same nine parameters per operator, plus one more.

ONE LANE, ONE CHIP

Both Yamaha chips are fed by a single FM lane, and there is one control that decides which one plays: **FM CHIP**, a plain two-position choice in the **Chip** section of either page. **ENGINE** is shared too — whichever of the two pages you are looking at, you are turning the same knob.

The chip is latched at note-on, so the first note of a patch gets its own chip's key-on behaviour: the OPM resets its LFO phase per note, the OPN2 lets it free-run.

FIG 8 The YM2151 page with FM Chip set to YM2612 — the cyan banner across the top says so, and names which controls belong to the other chip.

> **HEADS UP** Open the YM2151 page while FM Chip is set to YM2612 and a cyan banner tells you so. The operator controls are shared and live either way — but **DT2**, **LFO Wave** and **OP4 Noise** only do something when the chip is the YM2151, and **CH3 Special** and **DAC Ladder** only when it is the YM2612.

DT2	The second detune register, 0–3, one per operator. Coarse, inharmonic, and the reason OPM bells sound like OPM bells rather than OPN2 bells.
LFO WAVE	Saw, square, triangle or noise. The saw is descending, as on hardware, and the LFO phase resets on key-on.
OP4 NOISE / NOISE FREQ	Replaces operator 4's output with the noise generator. This is how the chip makes cymbals and snares.
LFO AM ENABLE	The same four per-operator switches described on the YM2612 page — one set, shared.
YM3012 DAC	Depth of the floating-point DAC behaviour — the companding artefacts of the external DAC chip.

FIG 9 The YM2151 Operators tab. Same matrix as the YM2612 but with DT2 in place of SSG-EG.

06E GHOST LANE

The fifth lane is what the other four leak. One tab, three sections.

FIG 10 The Ghost page — lane, bus and VRAM sections. No engine control, because there is no chip to model.

GHOST LEAK	How much signal escapes between lanes.
GHOST TONE	The colour of the leakage, dark to bright.
FEEDBACK	Up to 0.92. The lane feeds itself; high values self-oscillate into a drone.
BUS ROT	Oxide on the traces. Intermittent, level-dependent dropout.
CONTACT FAULT	Bad connections. Sparser and more violent than Bus Rot.
VRAM RESONATOR	Mix of a resonant bank fed by the video-RAM contents. Tuned, ringing, and the source of most of the instrument's pad textures.
VRAM DECAY	Up to 0.995. How long the resonator rings. Near the top it becomes an infinite wash.

07

MOTION / BUS

THREE SEQUENCER LANES AND A 32-STEP GRID

The register sequencer does not sequence notes. It sequences the machine — each step writes a value to whatever target you have chosen, so the same pattern can be a melody, a tremolo, a chip-switching pattern or a corruption rhythm depending on where you point it.

THREE LANES

The four knobs on the page proper are the ones you reach for constantly — depth, rate, steps and glide. Everything else is behind the **Extra** button, which opens a second row of controls and the Lane B / Lane C selector.

Lane A is the full-featured lane: per-step value, gate, probability, ratchet, trig condition and chip pin. **Lanes B and C** are simpler — value and gate per step — but each has its own length, target, direction, phase offset, swing and polarity, and can either follow Lane A's clock or run free at its own rate. Click the **Lane** label in the grid header to switch which lane you are editing.

CONTROL	LANE A	LANES B / C
LENGTH	2 – 32 steps (default 8)	2 – 32 steps (default 12)
TARGET	Pitch, Level, Morph, Conflict, Ghost, or All	
DIRECTION	Forward, Reverse, Ping-pong, Random, Drunk, Skip 2	Forward, Reverse, Pingpong, Random
CLOCK	Free or host sync, with division	Follow Lane A, or free at its own rate
PHASE	—	0 – 31 steps of offset
POLARITY	—	Bipolar or Unipolar

WHAT THE TARGETS DO

PITCH Transposes in **quantised** semitones, then snaps to the chosen **SEQ SCALE** and **SEQ KEY**. Nine scales are available, so melodic patterns stay in tune however you draw them.

LEVEL Scales voice amplitude per step. This is the velocity lane, and the default target for Lane C.

MORPH Drives Register Morph. The default target for Lane B.

CONFLICT / GHOST Drive Bus Conflict and the Ghost lane respectively.

ALL All of the above at once, scaled by depth.

EDITING THE GRID

The grid is a 32-column display with a value row, a gate row and a chip row.

FIG 11 The Motion / Bus page. Sequencer controls above, the pattern grid below; the header strip names the lane, the scene and the editing gestures.

GESTURE	WHERE	EFFECT
Click / drag	Value bars	Draw step values. Drag across to paint a phrase.
Right-drag	Value bars	Set per-step probability. Top is 100%, bottom is 0%.
Click	Gate row	Toggle the gate. Drag across to toggle a run of steps, once per column.
Wheel	Value or gate row	Ratchet count for that step, 1–8. The step retriggers that many times.
Ctrl + wheel	Value or gate row	Trig condition for that step.
Click	Chip row	Cycle that step's chip pin: `-` → A → B → C → D → E → off.
Right-click	Chip row	Cycle backwards.

A filled gate block shows probability as fill height; a solid block with `#` means certain. Steps with a trig condition print the condition instead.

TRIG CONDITIONS

Elektron-style A:B conditions — the step fires only on matching passes of the loop. Available conditions are `1:2`, `2:2`, `1:3`, `1:4`, `2:4`, `3:4` and `4:4`. Use them to make an eight-step pattern take four bars to repeat.

EUCLIDEAN RESTS

Set **SEQ EUCLID** above zero and that many pulses are spread evenly across the active steps, with **SEQ ROTATE** turning the pattern. Non-pulse steps become rests, overriding the drawn gates. Set Euclid back to zero to return to your drawn pattern — the gates were never lost.

SCENES

Two full pattern scenes are stored per patch. Click the **Scene A / Scene B** label in the grid header to capture the live pattern into the current scene and recall the other. With **SEQ CHAIN** on, the two scenes play back to back as one long pattern.

SWING AND GLIDE

SEQ SWING delays every other step. **SEQ GLIDE** smooths the transition between step values — at zero the sequencer steps hard, and above zero it slews, which on the Pitch target gives portamento between steps.

TRACKER ENV, on the same page, applies a per-step envelope shape reminiscent of tracker instrument tables.

FIG 12 The Extra panel opened, revealing swing, Euclid, rotate and tracker envelope, the target and clock selectors, and the Lane B button.

08

WAVE

A DRAWN 32-STEP WAVETABLE

The Wave page holds a drawing pad and the controls that shape what is drawn. The pad is 32 steps wide; click and drag to draw, and the playhead sweeps across it while a note sounds.

Along the bottom of the pad is a row of shape buttons — sine, saw, square, triangle and random. Clicking one fills all 32 steps with that shape. The fill only triggers on a deliberate click in the button row, so drawing gestures that stray downward will not wipe your table.

FIG 13 The Wave page. The 32-step drawing pad sits below the shaping controls, with the fill buttons along its bottom edge.

WAVE DRAW	How much of the drawn wave is used. At zero the pad is inert.
WAVE MODE	How the drawn wave meets the chip mix: **Mix**, **Replace** (fades the chips out for the drawn wave), **Ring**, **FM**, **AM**, **Sync**, **Phase**.
WAVE BITS	Full down to 1-bit quantisation of the table.
WAVE WARP	Bends the read position — phase distortion on your drawing.
WAVE SYM	Shifts the symmetry point.

WAVE PHASE	Rotates the read start point.
WAVE FOLD	Wavefolding. Adds harmonics that were not in the drawing.
WAVE DRIVE	Saturation on the wave lane.
WAVE SUB / SUB OCTAVE	A sub voice under the drawn wave, at −1, −2 octaves, a fifth down, or +1 octave.

09

CHORD BUS

PLAYING MORE THAN YOU PRESS

The chord bus stacks extra voices onto every note.

FIG 14 The Chord bus: three fixed-interval buses on the top row, chord shaping below.

CHORD MEMORY	0–5. How many extra voices to stack. Zero is off.
CHORD SHAPE	Single, major, minor, sus2, sus4, maj7, min7, dom7, power, octaves, dim, aug, min9, add9.
CHORD VOICING	Root position, 1st inversion, 2nd inversion, drop 2, or wide.
CHORD WAVE	The waveform used by the stacked voices: pulse, square, saw, triangle, sine, narrow, rectified.
CHORD DETUNE	Spreads the stack in pitch. Small amounts thicken; large amounts chorus.
CHORD SPREAD	Spreads the stack in stereo.
STACK SPREAD	Spreads the stack in time — the voices do not all start together.
SUB / FIFTH / OCTAVE BUS	Three fixed-interval buses with their own levels, independent of the chord shape.

10

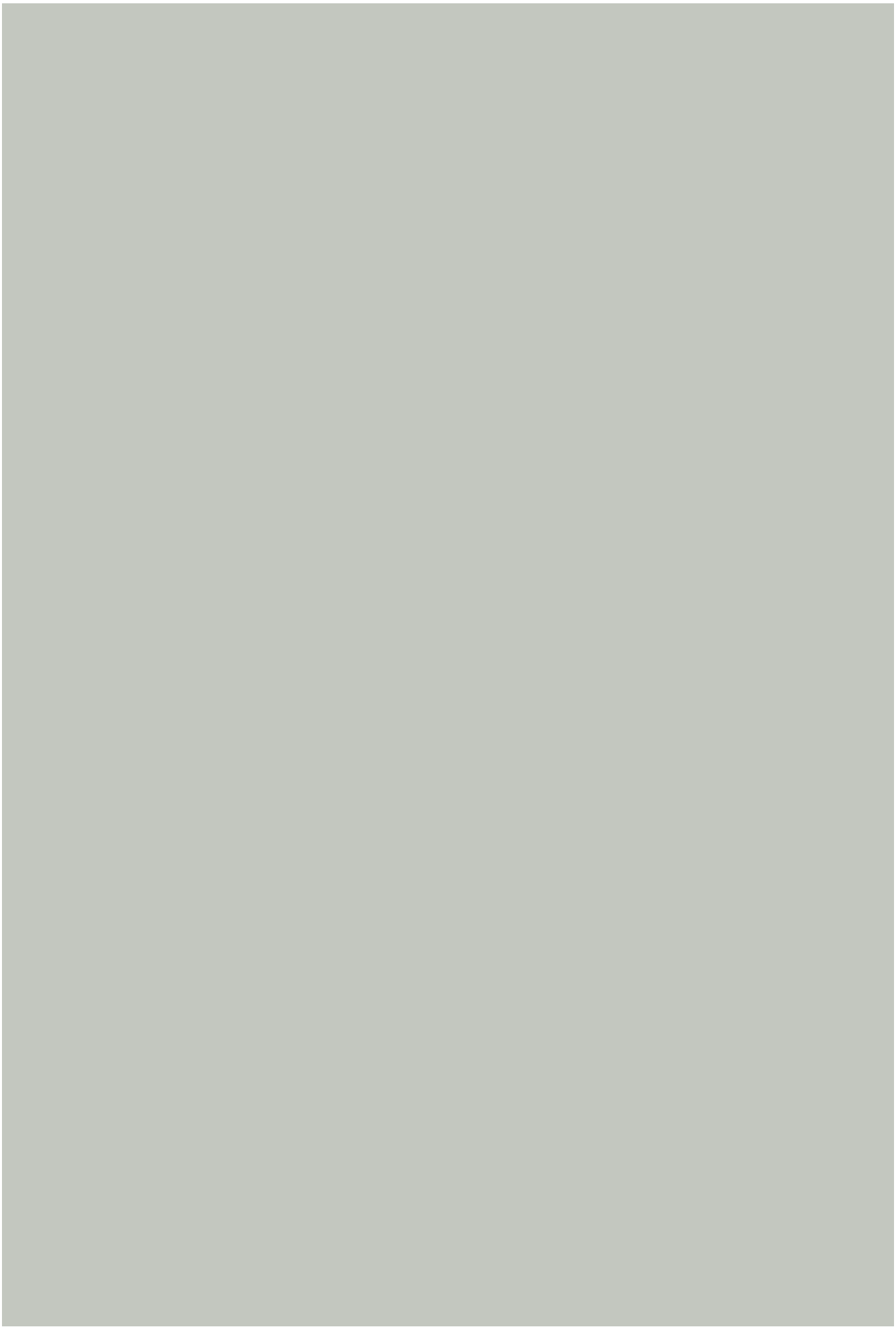
SNAPSHOT SCAN

A MODULATOR SHAPED LIKE A RASTER SWEEP

The scanner is a shape generator that sweeps a target parameter. Think of it as an LFO built out of a video scan rather than an oscillator.

FIG 15 The Snapshot scan page.

SCAN DEPTH	How far it moves the target. Zero is off.
SCAN SHAPE	Ramp up, ramp down, triangle, sample/hold, sine, log sweep, stairs.
SCAN RATE	0.05 to 24 Hz when free-running.
SCAN SYNC	Free, or locked to 1/1 through 1/16, plus 1/3 and 1/6 triplet divisions.
SCAN TARGET	Morph, Filter, Pitch, Ghost, Conflict, or All.
SCAN WIDTH	The duty of the shape — how much of the cycle is spent sweeping.
SCAN SPREAD	Offsets the left and right channels for stereo motion.
SCAN LATCH	Holds the scan value between updates rather than sliding, giving stepped motion.
SCAN JITTER	Instability in the scan clock. Small amounts breathe; large amounts stagger.



11

MACRO SCENE

FIVE AGEING CONTROLS AND AN XY PAD

The macros describe the physical condition of the imaginary machine. All five default to zero — a factory-fresh board.

FIG 16 The Macro scene page, with the Register Tear Field pad at the right.

ASIC AGE	Cumulative silicon degradation. Touches timing, level and noise floor together.
REGISTER TEAR	Values arriving mid-write. Fragmented, glitchy motion.
REGION FLIP	Drift between PAL and NTSC timing, and everything that depends on it.
SCREEN BLEED	Video circuitry bleeding into the audio path.
BUS WEIGHT	How heavily loaded the bus is. Adds sag and smear under dense material.
MACRO CURVE	The response curve applied to the macros: linear, exponential, logarithmic, stepped, S-curve.
SCENE MODE	How they combine: **Additive**, **Gentle**, **Extreme**, **Wild**, **Inverted**.

The XY pad on this page drives **ASIC AGE** horizontally and **REGISTER TEAR** vertically. It is a view onto those two parameters, not a separate control — automation and preset loads move the puck, and the puck leaves a phosphor trail as you drag.

12

BITPLANE BUS

DIGITAL DAMAGE, DELIBERATELY APPLIED

Everything on this page corrupts the signal at the bit level. All controls default to zero.

FIG 17 The Bitplane bus page.

BITPLANE	Bit-depth reduction expressed as planes, as a video chip would address them.
CRUSH MODE	How the reduction rounds: **Round**, **Floor**, **Fold**, **Wrap**, **Saturate**. Fold and Wrap are the aggressive ones.
SAMPLE CRUSH	Sample-rate reduction, separate from bit depth.
ADDRESS MIRROR	Reads from mirrored addresses — repeats and reflections in the waveform.
NIBBLE SWAP	Swaps high and low nibbles. Harsh and quantised.
DATA XOR	XOR corruption on the bus.
BIT ORDER	**Normal**, **Gray Code**, **Reversed**, **Invert**. Changes how the corruption maps onto amplitude.
ROM ECHO	Fragments of adjacent memory bleeding into the signal.
IRQ EDGE	Interrupt-timing artefacts — regular ticks locked to the frame rate.

GLITCH GATE Rhythmic gating at 1/4, 1/8, 1/16, 1/32 or stutter.

13

OUTPUT BUS

THE LAST FEW CENTIMETRES OF CABLE

OUTPUT COLOR	**Clean**, **Tape**, **Vinyl**, **Radio**, **Lo-fi**. Each adds its own continuous character, including a noise floor — which is why SPROUT never selects them.
POWER SAG	Supply droop under load. Level-dependent compression with a slow recovery.
RF HASH	Radio-frequency interference riding on the output.
GROUND HUM	Mains hum from a bad ground.
STEREO SKEW	Channel imbalance and timing offset.
OUTPUT GUARD	Defaults to 0.18. A soft limiter on the output stage — leave some in when using the Ghost lane or heavy Bus Conflict.
OUTPUT TRIM	Final gain, 0 to 2×.

14

REVERB & DELAY

BEHIND THE COVER PLATES

Both effects live under hinged plates in the middle strip. Click a plate to open it; only one opens at a time.

REVERB

FIG 20 The reverb plate opened.

MODE	Room, Hall, Plate, Shimmer, Cathedral, Gated.
SIZE / DAMP	Space and high-frequency absorption.
WIDTH	Stereo spread of the tail. Defaults to full.
PREDELAY	Delays the wet send only — the dry signal stays where it is.
MIX	Defaults to zero. The reverb is off until you bring this up.

DELAY

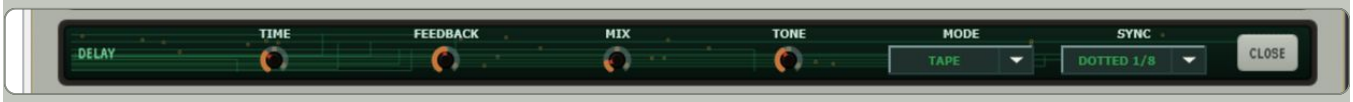


FIG 21 The delay plate opened.

MODE	Stereo, Ping-pong, Tape, Multi-tap.
SYNC	Free, or 1/4, 1/8, 1/16, dotted 1/8 locked to host tempo.
TIME	20 ms to 1.2 s when free-running.
FEEDBACK	Up to 0.95.
TONE	Colour of the repeats, dark to bright.
MIX	Defaults to zero.

Both effects report a four-second tail to the host, so your DAW will not cut the release short when rendering.

15

VIDEO RAM

THE SCREEN, AND THE AUDIO THAT THINKS IT IS A SCREEN

This page mixes two different things: audio parameters borrowed from video hardware, and the display's own settings. The display settings are fully automatable and save with presets, but they never touch the audio.

AUDIO

PAL/NTSC	Region clock drift. Changes the timing everything else derives from.
VBLANK GATE	Gating locked to the vertical blank interval — a 50 or 60 Hz pulse in the signal.
PHOSPHOR	Smear. A short, bright smearing of transients.
SPRITE SIZE	Granularity of the sprite-derived modulation.
BUS WIDTH	How much data gets through per cycle. Narrower is coarser.
DSP HALO	A soft ringing halo around the signal.

DISPLAY

FIG 18 The Video RAM page. Note that Mode, Beam, Persist and Glitch live in the Display panel beside the screen, not on this page.

The screen's own settings are not on this page — **MODE**, **BEAM**, **PERSIST** and **GLITCH** sit in the Display panel to the right of the CRT, where you can reach them from any page. What lives here are the glass and beam treatments: scanlines, bloom, colour cycle, h-hold roll, graticule, mirror and warp.

Nineteen display modes: **Vectorscope**, **Waveform**, **Phase Grid**, **Spectrum**, **Dual Scope**, **Lissajous**, **Raster Bars**, **Starfield**, **VRAM Matrix**, **Spiral**, **Harmonograph**, **Tunnel**, **Orbit**, **Ribbon**, **Moiré**, **Kaleido**, **DNA Helix**, **Scatter**, and **Register Bus**.

REGISTER BUS MODE

The last mode is not a visualiser. Select it and the screen becomes an instrument panel showing what the engine is actually doing — the one display mode worth leaving on while you work rather than while you listen.

The title row carries the build version and, beside it, the live Chip DNA and Register Morph values as hex bytes, the currently dominant chip, the full PSG identity string, and the four lane mix levels. Beneath that are five frame meters, one per lane, in the order the crossfade runs them: `A AY/YM PSG`, `B SID 6581/8580`, `C YM2612`, `D YM2151`, `E GHOST ASIC`. Their fill is each lane's share of the blend, so this is the clearest answer the plug-in can give to "which chip am I hearing" — and the fastest way to see a lane sitting at zero. The PSG row additionally prints its R0–R13 register image inline.

The bottom strip is the register sequencer: sixteen step cells showing the live pattern with the playhead, and a readout at the right giving depth, target and rate. When the snapshot scanner is running, that readout switches to showing the scan shape and rate instead.

FIG 19 Register Bus mode on the CRT, with the register plate visible in the header above it. Five lane frames, the PSG register image, and the sequencer strip along the bottom.

Twenty beam colours, from **Follow Morph** (which tracks the wordmark tint) through **Phosphor Green**, **Amber**, **C64 Blue**, **Game Boy**, **CGA Magenta**, **Sodium**, **Ultraviolet** and the rest.

Persistence and glitch are on the Display panel; the rest are here. **GRATICULE** overlays dots, a grid, crosshair, rings, polar or fine grid. **WARP** curves the glass — flat, subtle, CRT or fisheye. **MIRROR** folds the image horizontally, vertically, into quadrants, kaleidoscopically, or flips it. **SCANLINES**, **BLOOM**, **PERSISTENCE** and **H-HOLD ROLL** do what their names say; **COLOUR CYCLE** sweeps the beam hue over time, and **GLITCH** corrupts the display independently of the audio.

```
NOTE  The display uses OpenGL for its post-processing where
available. If the shader fails to compile on your machine, the
plug-in detects it and falls back to software rendering
automatically — you may notice slightly softer bloom, nothing else.
```

16

FUNCTION KEYS

NINE KEYS, COLOUR-CODED BY CONSEQUENCE

KEY	TYPE	WHAT IT DOES
PANIC	momentary	Resets the engine and clears the sustain latch. Use it when something is stuck or ringing.
HOLD	latch	Swallows note-offs while lit. Everything held sustains until you switch it off, at which point it all releases.
INIT	momentary	Applies the clean-boot preset — which includes returning Lane Mode to Manual Mix — clears the hold latch and empties the A/B store.
MUTATE	momentary	Nudges the current patch by ±7% of each parameter's range. Waveforms, algorithms, routing, chip selection, lane levels and the master strip are deliberately left alone, so the patch still sounds like itself.
A / B	toggle	First press captures every parameter. Second press restores them. Lit means A is stored and you are auditioning B.
MORPH	momentary	Advances Register Morph by 20% and wraps at the top — five presses walk the whole palette.
COPY	momentary	Overwrites the A/B store with the current state.
FREEZE	momentary	Latches HOLD and pushes display persistence to maximum. The notes keep sounding under a frozen screen.
GLITCH	momentary	Throws fresh random values at Bitplane, Data XOR, Nibble Swap, Bus Conflict and Ghost Lane, and slams the display glitch. A chaos burst.
SPROUT	momentary	Generates a complete new patch from a clean state. Your master Mix and Bypass are never touched.

ABOUT SPROUT

SPROUT is not a randomiser in the usual sense. Every generation resets to defaults first, so an extreme setting from a previous patch cannot leak into a gentle result. It also always generates in **DNA Blend**, since the crossfade is what gives a patch its chip character. Within that, it follows rules: FM carrier and modulator levels follow the real topology of whichever algorithm it picked, pitch and chord choices are derived from a scale so they stay in tune, at most one deliberate noise accent is used, continuous noise floors are excluded, and Ghost and register ranges are bounded so the result stays compressor-friendly. Generated patches are digitally silent at idle.

Manual noise, coloured output modes and Ghost extremes are all still available — SPROUT just will not hand them to you unasked.

17

PRESET LIST

58 FACTORY PATCHES IN SEVEN CATEGORIES

The preset menu groups these into categories with counts. The arrows either side of the box step through the flat list in numerical order.

CATEGORY	PRESETS
INIT	00 INIT / Clean Boot
KEYS (10)	01 AY Register Dust · 02 SID 6581 Filter Organ · 03 NES Pulse Keys · 04 Drawn Wave Bell · 05 Aurora Drift Keys · 06 Famicom Square Keys · 07 SID Pulse Serenade · 08 ZX 128K Stab · 46 AY Three Voice Chord · 49 SID 6581 Hardware Envelope
BASS (7)	09 MD DAC Frost Bass · 10 Corrupt Save Bass · 11 Sub Bass Monolith · 12 Deep Crush Bass · 13 Cold Iron Sub · 47 YM Buzzer Bass · 52 Model 1 DAC Crunch Bass
LEAD (9)	14 Hollow Saw Lead · 15 Glass Arcade OPM · 16 Wavefolder Lead · 17 Hyperspace Lead · 18 FM Aurora Mallets · 19 ZX Major Arp · 20 YM Spectrum Arp · 50 SID 8580 Resonant Sweep · 53 OPN2 Detuned Brass
PLUCK (6)	21 Demoscene Ghost Pluck · 22 Register Glass Pluck · 23 Ring Mod Clangbell · 24 Hammered Dulcimer · 25 Santur Shimmer · 51 SID Ring Bell
PAD (16)	26 Warm Silicon Pad · 27 Ghost ASIC Choir · 28 Spore Cloud Pad · 29 Glass Cathedral Min7 · 30 Kaleido Vector Hymn · 31 Nebula Choir · 32 Velvet Drift Pad · 33 Crystal Frost Pad · 34 SID Velvet Choir · 35 FM Glass Cathedral Bells · 36 SID/FM Dreamwave · 37 SID FM Aurora Chords · 38 Velvet FM Choir · 39 Crystalline SID Bloom · 54 OPM DT2 Bell Choir · 57 All Four Chips
TEXTURE (9)	40 Burned Sprite Memory · 41 Ambient ASIC Wash · 42 Glitch Gate Sequence · 43 Saturated Velvet Drone · 44 Tape Bloom Field · 45 Warm Saturated Haze · 48 Spectrum Noise Kit · 55 OPM Noise Cymbal · 56 Ghost Bus Decay

TRY 57 All Four Chips is the fastest way to hear what Chip DNA is doing — load it and sweep the knob.

18

PARAMETER INDEX

EVERY AUTOMATABLE PARAMETER, BY PAGE

Parameter IDs are stable across versions — automation and saved projects survive updates. Choice parameters list their options in order; the default is shown in the last column.

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
PERFORM BANK				
chipDNA	Chip DNA	float	0 – 1	0.05
registerMorph	Register Morph	float	0 – 1	0
busConflict	Bus Conflict	float	0 – 1	0
ghostAmount	Ghost Lane	float	0 – 1	0
cutoff	Chip Filter	float	80 – 18000	9000
resonance	Filter Bite	float	0 – 1	0.12
attack	Attack	float	0.001 – 2	0.004
decay	Decay	float	0.005 – 4	0.12
sustain	Sustain	float	0 – 1	0.78
release	Release	float	0.005 – 5	0.16
outputGain	Output	float	-24 – 6	-6
speakerDrive	Speaker Drive	float	0 – 1	0
filterMode	Filter Mode	choice	LOWPASS / BANDPASS / HIGHPASS / NOTCH	LOWPASS
glideMode	Glide Mode	choice	POLY / MONO / LEGATO / GLIDE	POLY
oscDrift	Osc Drift	choice	OFF / SUBTLE / VINTAGE / BROKEN	OFF
CHIP LANES				
laneMode	Lane Mode	choice	DNA BLEND / MANUAL MIX	DNA BLEND
psgLevel	PSG Level	float	0 – 1	1
sidLevel	SID Level	float	0 – 1	1
fmLevel	FM Level	float	0 – 1	1
ghostLevel	Ghost Level	float	0 – 1	1
MOTION / BUS				
seqDepth	Register Seq Depth	float	0 – 1	0
seqRate	Register Seq Rate	float	0.1 – 16	2
seqSteps	Register Seq Steps	float	2 – 32	8

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
seqTarget	Register Seq Target	choice	PITCH / LEVEL / MORPH / CONFLICT / GHOST / ALL	PITCH
seqGlide	Register Seq Glide	float	0 – 1	0
seqDraw	Seq Pattern Mode	switch	off / on	on
seqSwing	Seq Swing	float	0 – 1	0
seqDir	Seq Direction	choice	FORWARD / REVERSE / PING-PONG / RANDOM / DRUNK / SKIP 2	FORWARD
seqClock	Seq Clock	choice	x1 / x2 / x1/2 / x3 / x1/3 / DOTTED	x1
seqSync	Seq Tempo Sync	choice	FREE / SYNC	FREE
seqDiv	Seq Division	choice	1/1 / 1/2 / 1/4 / 1/8 / 1/16 / 1/4T / 1/8T / 1/4. / 1/8.	1/8
seqEuclid	Seq Euclid Pulses	float	0 – 32	0
seqRotate	Seq Euclid Rotate	float	0 – 31	0
seqScale	Seq Scale	choice	CHROMATIC / MAJOR / MINOR / PENTA MAJ / PENTA MIN / DORIAN / MIXOLYD / HARM MIN / WHOLE TONE	CHROMATIC
seqKey	Seq Key	choice	C / C# / D / D# / E / F / F# / G / G# / A / A# / B	C
seqChain	Seq Scene Chain	switch	off / on	off
seqEditLane	Seq Edit Lane	choice	LANE A / LANE B / LANE C	LANE A
seqBSteps	Seq B Length	float	2 – 32	12
seqBTarget	Seq B Target	choice	PITCH / LEVEL / MORPH / CONFLICT / GHOST / ALL	MORPH
seqBDepth	Seq B Depth	float	0 – 1	0
seqBGlide	Seq B Glide	float	0 – 1	0
seqBClock	Seq B Clock	choice	LANE A / FREE	LANE A
seqBRate	Seq B Rate	float	0.1 – 16	2
seqBDir	Seq B Direction	choice	FORWARD / REVERSE / PINGPONG / RANDOM	FORWARD
seqBOffset	Seq B Phase	float	0 – 31	0
seqBSwing	Seq B Swing	float	0 – 1	0
seqBPolar	Seq B Polarity	choice	BIPOLAR / UNIPOLAR	BIPOLAR
seqCSteps	Seq C Length	float	2 – 32	12
seqCTarget	Seq C Target	choice	PITCH / LEVEL / MORPH / CONFLICT / GHOST / ALL	LEVEL
seqCDepth	Seq C Depth	float	0 – 1	0

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
seqCGlide	Seq C Glide	float	0 – 1	0
seqCClock	Seq C Clock	choice	LANE A / FREE	LANE A
seqCRate	Seq C Rate	float	0.1 – 16	2
seqCDir	Seq C Direction	choice	FORWARD / REVERSE / PINGPONG / RANDOM	FORWARD
seqCOffset	Seq C Phase	float	0 – 31	0
seqCSwing	Seq C Swing	float	0 – 1	0
seqCPolar	Seq C Polarity	choice	BIPOLAR / UNIPOLAR	BIPOLAR
trackerEnv	Tracker Env	float	0 – 1	0
VIDEO RAM				
regionClock	PAL/NTSC Clock	float	0 – 1	0
vblankGate	VBlank Gate	float	0 – 1	0
phosphor	Phosphor Smear	float	0 – 1	0
spriteSize	Sprite Size	float	0 – 1	0
busWidth	Bus Width	float	0 – 1	0
dspHalo	DSP Halo	float	0 – 1	0
dispMode	Display Mode	choice	VECTORSCOPE / WAVEFORM / PHASE GRID / SPECTRUM / DUAL SCOPE / LISSAJOUS / RASTER BARS / STARFIELD / VRAM MATRIX / SPIRAL / HARMONOGRAPH / TUNNEL / ORBIT / RIBBON / MOIRE / KALEIDO / DNA HELIX / SCATTER / REGISTER BUS	VECTORSCOPE
dispBeam	Beam Colour	choice	FOLLOW MORPH / PHOSPHOR GREEN / AMBER / ICE BLUE / FULL SPECTRUM / WHITE P4 / C64 BLUE / GAME BOY / VAPORWAVE / PLASMA / RGB SPLIT / CGA MAGENTA / MONO RED / NEON CYAN / AURORA / TOXIC GREEN / SODIUM / ULTRAVIOLET / EMBER / ELECTRIC	FOLLOW MORPH
dispGraticule	Graticule	choice	OFF / DOTS / GRID / CROSSHAIR / RINGS / POLAR / FINE GRID	OFF
dispMirror	Mirror	choice	OFF / HORIZONTAL / VERTICAL / QUAD / KALEIDO / FLIP-X	OFF
dispWarp	Disp Warp	choice	FLAT / SUBTLE / CRT / FISHEYE	SUBTLE
dispScanline	Scanlines	float	0 – 1	0.3
dispBloom	Bloom	float	0 – 1	0.35
dispColorCycle	Colour Cycle	float	0 – 1	0
dispRoll	H-Hold Roll	float	0 – 1	0
dispPersist	Display Persistence	float	0 – 1	0.55

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
dispGlitch	Display Glitch	float	0 – 1	0
MACRO SCENE				
macroAge	ASIC Age	float	0 – 1	0
macroTear	Register Tear	float	0 – 1	0
macroRegion	Region Flip	float	0 – 1	0
macroScreen	Screen Bleed	float	0 – 1	0
macroWeight	Bus Weight	float	0 – 1	0
macroCurve	Macro Curve	choice	LINEAR / EXPONENTIAL / LOGARITHMIC / STEPPED / S-CURVE	LINEAR
macroScene	Macro Scene	choice	ADDITIVE / GENTLE / EXTREME / WILD / INVERTED	ADDITIVE
SNAPSHOT SCAN				
scanDepth	Scan Depth	float	0 – 1	0
scanRate	Scan Rate	float	0.05 – 24	0.75
scanShape	Scan Shape	choice	RAMP UP / RAMP DN / TRIANGLE / SAMPLE/HOLD / SINE / LOG SWEEP / STAIRS	RAMP UP
scanLatch	Scan Latch	float	0 – 1	0
scanSpread	Scan Spread	float	0 – 1	0
scanJitter	Scan Jitter	float	0 – 1	0
scanSync	Scan Sync	choice	FREE / 1/1 / 1/2 / 1/4 / 1/8 / 1/16 / 1/3 / 1/6	FREE
scanTarget	Scan Target	choice	MORPH / FILTER / PITCH / GHOST / CONFLICT / ALL	MORPH
scanWidth	Scan Width	float	0 – 1	0.5
BITPLANE BUS				
bitplaneDepth	Bitplane	float	0 – 1	0
addressMirror	Address Mirror	float	0 – 1	0
nibbleSwap	Nibble Swap	float	0 – 1	0
romEcho	ROM Echo	float	0 – 1	0
irqEdge	IRQ Edge	float	0 – 1	0
sampleCrush	Sample Crush	float	0 – 1	0
dataXor	Data XOR	float	0 – 1	0
bitOrder	Bit Order	choice	NORMAL / GRAY CODE / REVERSED / INVERT	NORMAL
glitchGate	Glitch Gate	choice	OFF / 1/4 / 1/8 / 1/16 / STUTTER / 1/32	OFF
crushMode	Crush Mode	choice	ROUND / FLOOR / FOLD / WRAP / SATURATE	ROUND
OUTPUT BUS				
powerSag	Power Sag	float	0 – 1	0

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
rfHash	RF Hash	float	0 – 1	0
groundHum	Ground Hum	float	0 – 1	0
stereoSkew	Stereo Skew	float	0 – 1	0
outputGuard	Output Guard	float	0 – 1	0.18
outputColor	Output Color	choice	CLEAN / TAPE / VINYL / RADIO / LO-FI	CLEAN
outputTrim	Output Trim	float	0 – 2	1
CHORD BUS				
chordSub	Sub Bus	float	0 – 1	0
chordFifth	Fifth Bus	float	0 – 1	0
chordOctave	Octave Bus	float	0 – 1	0
chordMemory	Chord Memory	float	0 – 5	0
stackSpread	Stack Spread	float	0 – 1	0
chordShape	Chord Shape	choice	SINGLE / MAJOR / MINOR / SUS2 / SUS4 / MAJ7 / MIN7 / DOM7 / POWER / OCTAVES / DIM / AUG / MIN9 / ADD9	SINGLE
chordVoicing	Chord Voicing	choice	ROOT / 1ST INV / 2ND INV / DROP 2 / WIDE	ROOT
chordDetune	Chord Detune	float	0 – 1	0
chordWave	Chord Wave	choice	PULSE / SQUARE / SAW / TRIANGLE / SINE / NARROW / RECTIFIED	PULSE
chordSpread	Chord Spread	float	0 – 1	0
WAVE				
waveDraw	Wave Draw	float	0 – 1	0
waveWarp	Wave Warp	float	0 – 1	0
waveSub	Wave Sub	float	0 – 1	0
waveSym	Wave Sym	float	0 – 1	0
wavePhase	Wave Phase	float	0 – 1	0
waveBits	Wave Bits	choice	FULL / 12-BIT / 8-BIT / 6-BIT / 4-BIT / 3-BIT / 2-BIT / 1-BIT	FULL
waveMode	Wave Mode	choice	MIX / REPLACE / RING / FM / AM / SYNC / PHASE	MIX
waveFold	Wave Fold	float	0 – 1	0
waveDrive	Wave Drive	float	0 – 1	0
waveSubOct	Wave Sub Oct	choice	-1 OCT / -2 OCT / 5TH DOWN / +1 OCT	-1 OCT
CHIP CONTROL / AY-3-8910 / YM2149				

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
ayAuthentic	AY Authentic	float	0 – 1	0
ayProfile	AY Machine Profile	choice	FREE LAB / ZX 128 / AY-3-8912 / ATARI STF / ATARI STE	FREE LAB
ayChip	AY Chip	choice	AY-3-8910 / YM2149	AY-3-8910
ayClock	AY Clock	choice	1.000 MHz / 1.77345 MHz ZX / 1.7898 MHz CPC / 2.000 MHz LAB / 2.00531 MHz STF / 2.00265 MHz STE	1.77345 MHz ZX
ayDivider	AY Clock Divider	choice	DIVIDE 1 / DIVIDE 2	DIVIDE 1
ayStereo	AY Stereo	choice	MONO / ZX MOD ABC / ZX MOD ACB	MONO
ayMixA	AY Mix A	choice	OFF / TONE / NOISE / TONE+NOISE	TONE
ayMixB	AY Mix B	choice	OFF / TONE / NOISE / TONE+NOISE	OFF
ayMixC	AY Mix C	choice	OFF / TONE / NOISE / TONE+NOISE	OFF
ayLevelA	AY Level A	float	0 – 15	15
ayLevelB	AY Level B	float	0 – 15	15
ayLevelC	AY Level C	float	0 – 15	15
ayDetuneB	AY Detune B	float	-24 – 24	0
ayDetuneC	AY Detune C	float	-24 – 24	0
ayPeriodMode	AY Period Mode	choice	TRACK NOTE / ABSOLUTE	TRACK NOTE
ayPeriodB	AY Period B	float	0 – 4095	568
ayPeriodC	AY Period C	float	0 – 4095	758
ayEnvShape	AY Env Shape	choice	0 DECAY / 1 DECAY / 2 DECAY / 3 DECAY / 4 ATTACK / 5 ATTACK / 6 ATTACK / 7 ATTACK / 8 SAW DOWN / 9 DECAY HOLD / 10 TRIANGLE / 11 DECAY HOLD HI / 12 SAW UP / 13 ATTACK HOLD HI / 14 TRI INV / 15 ATTACK HOLD LO	8 SAW DOWN
ayEnvRoute	AY Env Route	choice	NONE / A / B / C / A+B / A+C / B+C / A+B+C	NONE
ayEnvRate	AY Env Rate	float	0.05 – 60	6
ayR13Rate	AY R13 Retrigger	float	0 – 4000	0
ayNoisePer	AY Noise Per	float	0 – 31	8
noiseType	Noise Type	choice	AY 17-BIT / PERIODIC / WHITE / CRACKLE / METAL	AY 17-BIT
noiseBend	Noise Bend	float	0 – 1	0
psgModel	PSG Model	float	0 – 1	0.35
psgClock	PSG Clock Lock	float	0 – 1	0
psgEnvShape	PSG Env Shape	choice	SAW DOWN / SAW UP / TRI /\\ / TRI \\/ / UP-HOLD / DOWN-HOLD / UP-GATE / DOWN-GATE	SAW DOWN

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
hardwaveShape	Hardwave Shape	float	0 – 1	0
syncBuzzer	Sync Buzzer	float	0 – 1	0
ymArp	YM Arp	float	0 – 1	0
CHIP CONTROL / MOS 6581 / 8580				
sidModel	SID Model	choice	6581 / 8580	6581
sidClock	SID Clock	choice	PAL 985248 Hz / NTSC 1022727 Hz	PAL 985248 Hz
sidPoly	SID Voices	choice	1 VOICE / 3 VOICE	1 VOICE
sidUnitTrim	SID Unit Trim	float	0 – 1	0.5
sidTest	SID Test Bit	choice	RUN / TEST V1 / TEST V2 / TEST V3 / TEST ALL	RUN
sidWaveSel	SID Wave	choice	TRIANGLE / SAWTOOTH / PULSE / NOISE / SAW+TRI / PULSE+TRI / RING MOD / HARD SYNC / NOISE+SAW / NOISE+PULSE	SAWTOOTH
sidRing1	SID Ring Mod 1	choice	OFF / ON	OFF
sidSync1	SID Hard Sync 1	choice	OFF / ON	OFF
sidPW	SID Pulse Width	float	0.02 – 0.98	0.5
sidFilt1	SID Filt V1	choice	DIRECT / FILTERED	FILTERED
sidAtk	SID Attack	float	0 – 15	2
sidDec	SID Decay	float	0 – 15	8
sidSus	SID Sustain	float	0 – 15	8
sidRel	SID Release	float	0 – 15	9
sidFilter	SID Filter	choice	OFF / LOWPASS / BANDPASS / HIGHPASS / NOTCH / LOW+BAND / BAND+HIGH / LOW+BAND+HIGH	OFF
sidCutoff	SID Cutoff	float	0 – 1	0.55
sidRes	SID Resonance	float	0 – 1	0.2
sidDrive	SID Filter Drive	float	0 – 1	0.3
sidEnvAmt	SID Env Amount	float	0 – 1	0
sidRingRat	SID Ring Ratio	float	0.25 – 4	0.7494
ringMod	Ring Mod	choice	OFF / LIGHT / MEDIUM / FULL	OFF
subOsc	Sub Osc	choice	OFF / -1 OCT / -2 OCT / -1 SQR	OFF
sidFx	SID FX	float	0 – 1	0

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
sidWave2	SID V2 Wave	choice	TRIANGLE / SAWTOOTH / PULSE / NOISE / SAW+TRI / PULSE+TRI / RING MOD / HARD SYNC / NOISE+SAW / NOISE+PULSE	TRIANGLE
sidRing2	SID Ring Mod 2	choice	OFF / ON	OFF
sidSync2	SID Hard Sync 2	choice	OFF / ON	OFF
sidDet2	SID V2 Detune	float	-24 – 24	0
sidPW2	SID V2 Pulse Width	float	0.02 – 0.98	0.5
sidFilt2	SID Filt V2	choice	DIRECT / FILTERED	FILTERED
sidAtk2	SID V2 Attack	float	0 – 15	2
sidDec2	SID V2 Decay	float	0 – 15	8
sidSus2	SID V2 Sustain	float	0 – 15	8
sidRel2	SID V2 Release	float	0 – 15	9
sidWave3	SID V3 Wave	choice	TRIANGLE / SAWTOOTH / PULSE / NOISE / SAW+TRI / PULSE+TRI / RING MOD / HARD SYNC / NOISE+SAW / NOISE+PULSE	TRIANGLE
sidRing3	SID Ring Mod 3	choice	OFF / ON	OFF
sidSync3	SID Hard Sync 3	choice	OFF / ON	OFF
sidDet3	SID V3 Detune	float	-24 – 24	0
sidPW3	SID V3 Pulse Width	float	0.02 – 0.98	0.5
sidFilt3	SID Filt V3	choice	DIRECT / FILTERED	DIRECT
sidAtk3	SID V3 Attack	float	0 – 15	2
sidDec3	SID V3 Decay	float	0 – 15	8
sidSus3	SID V3 Sustain	float	0 – 15	8
sidRel3	SID V3 Release	float	0 – 15	9
sid3Off	SID 3OFF	choice	VOICE 3 ON / VOICE 3 OFF	VOICE 3 ON
CHIP CONTROL / FM LANE (SHARED BY BOTH YAMAHA CHIPS)				
fmEngine	FM Engine	float	0 – 1	0
fmChip	FM Chip	choice	YM2612 (OPN2) / YM2151 (OPM)	YM2612 (OPN2)
fmAlgorithm	FM Algorithm	choice	1>2>3>4 / (1,2)>3>4 / 1>4 2>3>4 / 1>2>4 3>4 / 1>2 3>4 / 1>2/3/4 / 1>2 +3+4 / 1+2+3+4	1>2>3>4

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
opnFeedback	OPN Feedback	float	0 – 7	0
fmSilicon	FM Silicon	float	0 – 1	0
fmFbTap	FM Feedback	choice	OFF / LOW / MED / HIGH / SCREAM	MED
opnLfoRate	OPN LFO Rate	float	0.1 – 20	6
opnPMS	OPN Pitch Mod	float	0 – 1	0
opnAMS	OPN Amp Mod	float	0 – 1	0
opAM1	FM Operator AM Enable 1	choice	OFF / ON	OFF
opAM2	FM Operator AM Enable 2	choice	OFF / ON	OFF
opAM3	FM Operator AM Enable 3	choice	OFF / ON	OFF
opAM4	FM Operator AM Enable 4	choice	OFF / ON	OFF
CHIP CONTROL / YM2612 (OPN2) ONLY				
opnLadder	OPN DAC Ladder	float	0 – 1	0.5
opnCh3Mode	OPN Ch3 Special	choice	NORMAL / CH3 SPECIAL	NORMAL
opnCh3D1	OPN Ch3 OP2 Detune	float	-24 – 24	0
opnCh3D2	OPN Ch3 OP3 Detune	float	-24 – 24	0
opnCh3D3	OPN Ch3 OP4 Detune	float	-24 – 24	0
opnSsg1	OPN OP1 SSG-EG	choice	OFF / 8 SAW DOWN / 9 DECAY HOLD / 10 TRIANGLE / 11 DECAY HOLD HI / 12 SAW UP / 13 ATTACK HOLD HI / 14 TRI INV / 15 ATTACK HOLD LO	OFF
opnSsg2	OPN OP2 SSG-EG	choice	OFF / 8 SAW DOWN / 9 DECAY HOLD / 10 TRIANGLE / 11 DECAY HOLD HI / 12 SAW UP / 13 ATTACK HOLD HI / 14 TRI INV / 15 ATTACK HOLD LO	OFF
opnSsg3	OPN OP3 SSG-EG	choice	OFF / 8 SAW DOWN / 9 DECAY HOLD / 10 TRIANGLE / 11 DECAY HOLD HI / 12 SAW UP / 13 ATTACK HOLD HI / 14 TRI INV / 15 ATTACK HOLD LO	OFF
opnSsg4	OPN OP4 SSG-EG	choice	OFF / 8 SAW DOWN / 9 DECAY HOLD / 10 TRIANGLE / 11 DECAY HOLD HI / 12 SAW UP / 13 ATTACK HOLD HI / 14 TRI INV / 15 ATTACK HOLD LO	OFF
CHIP CONTROL / YM2151 (OPM) ONLY				
opmDacDepth	OPM DAC Depth	float	0 – 1	0.75

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
opmLfoWave	OPM LFO Wave	choice	SAW / SQUARE / TRIANGLE / NOISE	TRIANGLE
opmNoiseOp	OPM Noise Op	choice	OFF / OP4 NOISE	OFF
opmNoiseFreq	OPM Noise Freq	float	0 – 1	0.35
opmDT21	OPM OP1 DT2	float	0 – 3	0
opmDT22	OPM OP2 DT2	float	0 – 3	0
opmDT23	OPM OP3 DT2	float	0 – 3	0
opmDT24	OPM OP4 DT2	float	0 – 3	0
CHIP CONTROL / FM OPERATORS (SHARED)				
opTL1	OPN OP1 Total Level	float	0 – 127	42
opMUL1	OPN OP1 Multiple	float	0 – 15	1
opDT11	OPN OP1 Detune	float	0 – 7	0
opAR1	OPN OP1 Attack	float	0 – 31	31
opD1R1	OPN OP1 Decay	float	0 – 31	8
opSL1	OPN OP1 Sus Level	float	0 – 15	2
opD2R1	OPN OP1 Sustain R	float	0 – 31	0
opRR1	OPN OP1 Release	float	0 – 15	10
opKS1	OPN OP1 Key Scale	float	0 – 3	0
opTL2	OPN OP2 Total Level	float	0 – 127	42
opMUL2	OPN OP2 Multiple	float	0 – 15	1
opDT12	OPN OP2 Detune	float	0 – 7	0
opAR2	OPN OP2 Attack	float	0 – 31	31
opD1R2	OPN OP2 Decay	float	0 – 31	8

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
opSL2	OPN OP2 Sus Level	float	0 – 15	2
opD2R2	OPN OP2 Sustain R	float	0 – 31	0
opRR2	OPN OP2 Release	float	0 – 15	10
opKS2	OPN OP2 Key Scale	float	0 – 3	0
opTL3	OPN OP3 Total Level	float	0 – 127	42
opMUL3	OPN OP3 Multiple	float	0 – 15	1
opDT13	OPN OP3 Detune	float	0 – 7	0
opAR3	OPN OP3 Attack	float	0 – 31	31
opD1R3	OPN OP3 Decay	float	0 – 31	8
opSL3	OPN OP3 Sus Level	float	0 – 15	2
opD2R3	OPN OP3 Sustain R	float	0 – 31	0
opRR3	OPN OP3 Release	float	0 – 15	10
opKS3	OPN OP3 Key Scale	float	0 – 3	0
opTL4	OPN OP4 Total Level	float	0 – 127	0
opMUL4	OPN OP4 Multiple	float	0 – 15	1
opDT14	OPN OP4 Detune	float	0 – 7	0
opAR4	OPN OP4 Attack	float	0 – 31	31
opD1R4	OPN OP4 Decay	float	0 – 31	8
opSL4	OPN OP4 Sus Level	float	0 – 15	2
opD2R4	OPN OP4 Sustain R	float	0 – 31	0
opRR4	OPN OP4 Release	float	0 – 15	10
opKS4	OPN OP4 Key Scale	float	0 – 3	0

ID	NAME	TYPE	RANGE / OPTIONS	DEFAULT
CHIP CONTROL / GHOST				
ghostLeak	Ghost Leak	float	0 — 1	0.25
ghostTone	Ghost Tone	float	0 — 1	0.5
ghostFeed	Ghost Feedback	float	0 — 0.92	0.3
busRotOxide	Bus Rot Oxide	float	0 — 1	0
busRotContact	Contact Fault	float	0 — 1	0
vramMix	VRAM Resonator	float	0 — 1	0
vramDecay	VRAM Decay	float	0 — 0.995	0.5
REVERB / DELAY				
reverbSize	Reverb Size	float	0 — 1	0.5
reverbDamp	Reverb Damp	float	0 — 1	0.5
reverbMix	Reverb Mix	float	0 — 1	0
reverbWidth	Reverb Width	float	0 — 1	1
reverbPre	Reverb Predelay	float	0 — 1	0
reverbMode	Reverb Mode	choice	ROOM / HALL / PLATE / SHIMMER / CATHEDRAL / GATED	ROOM
delayTime	Delay Time	float	0.02 — 1.2	0.28
delayFbk	Delay Feedback	float	0 — 0.95	0.35
delayMix	Delay Mix	float	0 — 1	0
delayTone	Delay Tone	float	0 — 1	0.5
delayPing	Delay Ping-Pong	choice	STEREO / PING-PONG / TAPE / MULTI-TAP	STEREO
delaySync	Delay Sync	choice	FREE / 1/4 / 1/8 / 1/16 / DOTTED 1/8	FREE
MASTER				
masterMix	Mix	float	0 — 1	1
masterBypass	Bypass	switch	off / on	off

In addition, each of the three sequencer lanes exposes 32 per-step parameters. Lane A has value, gate, probability, ratchet, trig condition and chip pin per step; lanes B and C have value and gate. The wavetable exposes 32 step parameters of its own.

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TROUBLESHOOTING

KNOWN BEHAVIOURS AND HOW TO GET PAST THEM

A CHIP LANE FADER DOES NOTHING

You are in **DNA Blend** and Chip DNA has that lane's weight at zero. Switch **LANE MODE** to Manual Mix, or move Chip DNA into that lane's range. See chapter 04 — this is by far the most common cause of apparent silence.

THE FM LANE IS SILENT EVEN WITH THE FADER UP

Three things to check in order. Is **ENGINE** above zero? If not you will see the amber banner. Is the lane getting through — Lane Mode and Chip DNA, as above? Then check the operator TLs: TL is attenuation, and which operators you can hear depends on the algorithm.

A CONTROL ON THE FM PAGE SEEMS TO DO NOTHING

DT2, LFO Wave and OP4 Noise belong to the YM2151; CH3 Special and DAC Ladder belong to the YM2612. If **FM CHIP** is set to the other one, the cyan banner across the top of the board is telling you exactly that.

NOTES WILL NOT STOP

HOLD is latched. Press it again to release everything, or press PANIC.

CPU USE IS HIGHER THAN I EXPECTED

Check how many lanes are actually doing something. Four chip engines running with an inaudible lane fader still cost you. Leave the window on a page you are not watching, or close it — hidden pages and the CRT stop repainting. Sequencer lanes B and C cost nothing when their depth is at zero.

THE PATCH SOUNDS UNSTABLE AT A DIFFERENT SAMPLE RATE

It should not. Glide, envelope and DC-blocker coefficients are all sample-rate invariant, and the delay, reverb and VRAM buffers are allocated at prepare time for the host's rate. If you find something that does change, that is a bug worth reporting.

THE SCREEN LOOKS FLAT COMPARED TO A SCREENSHOT

The OpenGL post layer failed to compile and the plug-in fell back to software rendering. The audio is unaffected.

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