

SPRITE SPORES

IMPOSSIBLE MULTI-CHIP INSTRUMENT • OWNER'S
MANUAL • REV 0.25.3



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01 THE INSTRUMENT

SIX CHIPS AND A GHOST ON ONE BUS

Sprite Spores is a polyphonic synthesizer built from register-level emulations of six classic sound chips, side by side, plus a lane made of the noise those chips leak into each other, a shared sample-memory chip that can record all the others, and a physics field that makes the chips collide. You can play one chip at a time, crossfade between them, or stack all of them as if they shared one board.

SAA1099

PHILIPS

Six stereo square channels, two noises, and envelopes that can run at audio rate. SAM Coupé, CMS.

AY / YM

AY-3-8910 • YM2149

Square tones, noise, and a hardware envelope that doubles as a buzzy oscillator.

6581 / 8580

MOS SID

Three oscillators, combined waveforms and a warm, gritty analogue filter.

YM2612

OPN2

4-operator FM: modulators shape the tone of the carriers you hear.

YM2151

OPM

4-operator FM with coarse detune and a noise operator: the arcade sound.

RF5C68

RICOH PCM

Eight PCM channels reading one 64 KB memory: record the other chips into it and play them back.

GHOST

no silicon

The instrument's own invented chip: what leaks between the others.

The two Yamaha chips share one FM lane: **FM CHIP** picks which one plays. Five lanes sit on the Chip DNA line: SAA, PSG (AY/YM), SID, FM and Ghost. The RF5C68 is one shared chip after the voices, with its own level.

WHAT IT IS ACTUALLY MODELLING

Each chip page has an **ENGINE** knob that blends from a simple, forgiving "legacy" tone (at 0) to the register-accurate model of the real chip (at 1). The SID, SAA1099 and RF5C68 are always the chip model; the Ghost has no chip to model. With ENGINE at 0 the register controls on that page are dimmed and a banner tells you to raise ENGINE to hear them.

SIGNAL FLOW

1. Inside each of the 12 voices: the five chip lanes are mixed (by Chip DNA, or by the lane faders in MANUAL MIX), the wave and chord layers are added, then the chip filter and the amp envelope.
2. The shared RF5C68 plays its memory and can record the others into it.
3. The damage bus: bus rot, video RAM and the bitplane chain.
4. The output bus: power sag, hum, RF, stereo skew, speaker drive, output colour and trim, then a guard against overload.
5. Delay, then reverb, then VOLUME and BYPASS.
6. A final safety stage that passes everything below -1 dBFS untouched and never lets the output reach 0 dBFS.

Effects that make sound on their own (hum, hiss, resonators) fade out when no notes are playing, so the instrument is silent at rest.

02 INSTALLING

WINDOWS • MACOS • LINUX

PLATFORM

FORMATS AND WHERE THEY GO

Windows (64-bit)	VST3 and CLAP. Copy Sprite Spores.vst3 into C:\Program Files\Common Files\VST3\ and Sprite Spores.clap into C:\Program Files\Common Files\CLAP\ .
macOS 11 or later	VST3, AU and CLAP in one universal installer (.pkg) for Apple silicon and Intel, signed and notarised. It installs to /Library/Audio/Plug-Ins/VST3 , /Library/Audio/Plug-Ins/Components (AU) and /Library/Audio/Plug-Ins/CLAP .
Linux (64-bit x86)	VST3 and CLAP. In the unzipped folder run bash install.sh : it copies the VST3 to ~/vst3 and the CLAP to ~/clap (no sudo), or copy them there by hand. Needs glibc 2.30 or newer (Ubuntu 20.04+, Debian 11+, Fedora 32+ ...), X11 or Xwayland, and OpenGL (any desktop driver; software rendering also works).

Then rescan plug-ins in your host and load Sprite Spores as an instrument. There is no standalone app.

The window opens at a size that fits your screen. Drag the corner to resize it from 70% to 250%, or use the **SIZE** key: 70%, 85%, 100%, 125%, 150%, 175%, 200% or FIT TO SCREEN. The size is saved with your session.

03 YOUR FIRST SOUND

FIVE MINUTES ON THE BOARD

1. **Play a note.** A fresh instance plays a clean AY square through MANUAL MIX. The NOW PLAYING display shows what you hold.
2. **Pick a preset.** Click the preset box and choose a category: KEYS, BASS, LEAD, PLUCK, PAD, TEXTURE, one of the per-chip banks, RF5C68 or FIELD. ◀ ▶ step through the current category.
3. **Turn CHIP DNA** on the PERFORM page to sweep from the SAA1099 through AY, SID and FM to Ghost.
4. **Turn REGISTER MORPH**, the main tone-shaping knob, to move the chips through their six internal snapshots.
5. **Press SPROUT** (under the chip picture) for a brand new patch, or **MUTATE** to nudge the one you have. Ctrl+Z steps back.

HOVER HELP

Press **TIPS** and hover any control for an explanation. Double-click any knob to reset it; hold SHIFT while dragging or scrolling for fine moves.

04 THE FRONT PANEL

EVERYTHING ABOVE THE PAGE AREA



FIG 1 The board on the PERFORM page.

- 1 **NOW PLAYING.** The notes you hold, lowest first (e.g. "A3 C4 E4", with +N beyond three), or READY. Six bars (SAA, AY, SID / FM, GHOST, RF) show how much of the newest note each chip is making, and the RF5C68's level; after the sound stops they keep the last note's mix, dimmed.
- 2 **BYPASS and VOLUME.** BYPASS mutes smoothly. VOLUME is the final level, shown in dB.
- 3 **PRESET.** The preset box and ◀ ▶ (section 20). Reads CUSTOM / UNSAVED PATCH once you change something.
- 4 **TIPS and SIZE.** TIPS turns hover help on and off for every instance. SIZE opens the window-size menu.
- 5 **Chip picture.** The chip of the current Register Morph frame, e.g. "A - AY-3-8910". While notes play its die glows with the output and its pins flicker.
- 6 **SPROUT.** Builds a whole new patch (section 05).
- 7 **The CRT** (section 07).
- 8 **DISPLAY.** MODE, BEAM, PERSIST and STATIC, with MORE for the display setup.
- 9 **REVERB cover.** Shows OFF or the reverb mix; click to open (section 06).

- 10 Function keys** in three bays: RESET, PLAY and PATCH.
- 11 DELAY cover.**
- 12 Page keys**, grouped SOUND (PERFORM, CHIPS, WAVE, CHORDS), MOVE (SEQUENCER, SCANNER, MACROS, FIELD), DAMAGE (BITPLANE, VIDEO RAM) and OUT (OUTPUT).
- 13 Page heading**, e.g. SOUND / PERFORM.
- 14 Silkscreen.** The board's revision, which is the version number.

05 FUNCTION KEYS

TWELVE KEYS IN THREE BAYS

KEY	WHAT IT DOES
RESET	
PANIC	Stops every sound (notes, voices, effect tails, video RAM, the RF5C68's channels and any capture) and releases HOLD. The RF5C68 memory is kept.
INIT	Loads "00 INIT / Clean Boot" (silent RF5C68 memory, the standard field start), clears HOLD and empties the A/B store.
PLAY	
HOLD	Latches: notes keep sounding after you let go. Turning HOLD off releases them.
FREEZE	Holds the current notes as a drone and freezes the display (it turns HOLD on and sets PERSIST high).
MORPH	Steps Register Morph to the next of its six snapshots, S, A, B, C, D, E, then wraps.
GLITCH	Writes a random burst of damage into Bitplane, Bus Conflict, Ghost Lane, Data XOR and Nibble Swap, and shakes the display. Two presses in a row always differ.
MUTATE	Nudges every sound control by up to $\pm 7\%$. Waveforms, algorithms, chip and model choices, routing, lane levels, levels, chord shape, scale, effect modes, the display, the sequencer's steps, the RF5C68's capture and driver settings and the FIELD's keys are left alone; the field is never switched on.
PATCH	
SAVE	Saves the current patch as a user preset.
COPY	Stores the current patch in the A/B store and lights A / B.
A / B	First press stores A. The next press brings A back and clears the store. Lit means A is stored and you are hearing B. The RF5C68 memory and the field starts swap too.
UNDO / REDO	100 steps of history, kept even when you close the window. Each key press, preset load or knob gesture is one step; host automation isn't recorded. Captures, CLEAR, TOOLS edits and preset loads include the RF5C68 memory; automatic captures are not undo steps. Ctrl+Z / Ctrl+Shift+Z also work.

SPROUT, under the chip picture, builds a whole new patch from scratch, with at most one noise accent and FM levels that suit the chosen algorithm. About one sprout in three gets a twist, shown in its name: + FIELD (the Collision Field switched on), + RF (the RF5C68 recording and playing) or both. Every sprout starts with silent RF5C68 memory. VOLUME and BYPASS are left alone, and the result is one undo step.

06 REVERB AND DELAY

BEHIND THE COVER PLATES

Each cover's lamp reads OFF or the effect's mix. Click a cover to open its panel over the keys and page row; **CLOSE** shuts it. Only one opens at a time.



FIG 2 The reverb panel.

SIZE / DAMP	Room size, across the whole range of the chosen MODE, and high-frequency absorption.
MIX	Off at 0 (the default). The reverb is silent until you raise it.
WIDTH	Stereo spread of the tail. Full by default.
PREDELAY	OFF to 120 ms before the tail starts.
MODE	ROOM, HALL, PLATE, SHIMMER, CATHEDRAL or GATED.

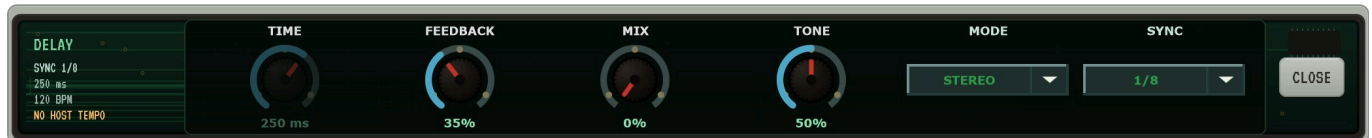


FIG 3 The delay panel synced to 1/8. The readout on the left shows the division, the real time and the tempo.

TIME	20 ms to 1.2 s when free. Greyed when synced, but its readout still shows the real synced time.
FEEDBACK	Up to 95%.
MIX / TONE	Level (off by default) and colour of the repeats.
MODE	STEREO, PING-PONG, TAPE (with a gentle wow) or MULTI-TAP.
SYNC	FREE, 1/4, 1/8, 1/16 or DOTTED 1/8 of the host tempo. With no host tempo it runs at 120 BPM and says NO HOST TEMPO.

07 THE DISPLAY

A PICTURE OF THE BUS, NEVER PART OF THE SOUND

Everything on the display is picture only: it is saved in presets and can be automated, but it never changes the audio. Each preset category sets its own display scene when you load a preset.

MODE	18 views: VECTORSCOPE, WAVEFORM, PHASE GRID, SPECTRUM, DUAL SCOPE, LISSAJOUS, RASTER BARS, STARFIELD, VRAM MATRIX, SPIRAL, HARMONOGRAPH, TUNNEL, ORBIT, RIBBON, MOIRE, KALEIDO, DNA HELIX and SCATTER.
BEAM	20 colours. FOLLOW MORPH tints the beam by the Register Morph frame; the others include PHOSPHOR GREEN, AMBER, ICE BLUE, C64 BLUE, GAME BOY, VAPORWAVE, PLASMA, RGB SPLIT and more.
PERSIST	How long the trace lingers.
STATIC	Picture noise only. The GLITCH key is the one that damages the sound.

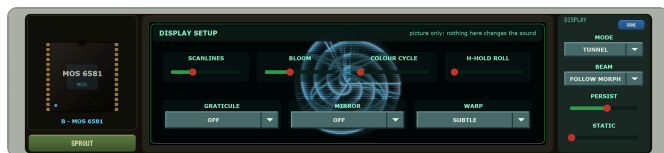


FIG 4 MORE opens DISPLAY SETUP over the screen; the picture keeps running underneath.

DISPLAY SETUP

SCANLINES, **BLOOM**, **COLOUR CYCLE** and **H-HOLD ROLL** amounts; **GRATICULE** (OFF, DOTS, GRID, CROSSHAIR, RINGS, POLAR, FINE GRID); **MIRROR** (OFF, HORIZONTAL, VERTICAL, QUAD, KALEIDO, FLIP-X); and **WARP** (FLAT, SUBTLE, CRT, FISHEYE). Press **DONE** to close it.

ON-SCREEN READOUTS

Top left shows the Register Morph frame (S:SAA1099, A:AY/YM ... E:GHOST); top right shows live MORPH, CFL, GHO and TEAR values. After 1.5 s of silence a slow Lissajous fades in and the screen reads IDLE - PLAY A NOTE.

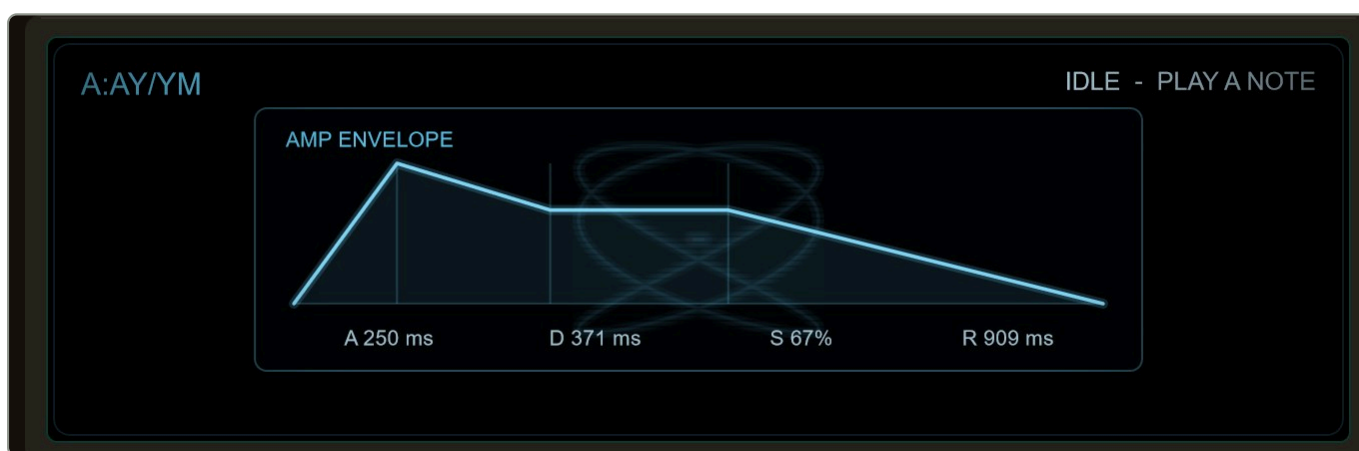


FIG 5 Moving ATTACK, DECAY, SUSTAIN or RELEASE draws the amp envelope over the screen for a couple of seconds.

08 CHIP DNA AND THE LANES

HOW SIX CHIPS BECOME ONE INSTRUMENT

CHIP DNA decides which chip you hear. As you turn it from 0 to 1 it crossfades SAA → PSG → SID → FM → Ghost; in between, neighbouring chips overlap so the blend always sounds like one board rather than a stack.

LANE	CENTRE	WIDTH
SAA1099	0	0.25 (below 0.25 only)
PSG (AY / YM)	0.25	0.34
SID	0.505	0.285
FM (YM2612 / YM2151)	0.7525	0.285
Ghost	1.0	0.34

LANE FADERS AND LANE MODE

The lane faders sit in the header of the CHIPS page, one under each chip key: SAA1099, AY / YM, 6581 / 8580, the two Yamahas (sharing one), GHOST and RF5C68. A fader at 0 reads MUTE. **LANE MODE** sets what they do:

- **DNA BLEND** (the default): Chip DNA picks the chips and the faders trim them.

- **MANUAL MIX:** Chip DNA is ignored and the faders are plain levels. 100% is that chip at full level, and lanes add up, so all of them up is louder than one. INIT uses MANUAL MIX with the SAA at 0.
- The **RF5C68** fader is a plain level in both modes; the RF5C68 is not on the Chip DNA line.

CHIP DNA IS NOT REGISTER MORPH

REGISTER MORPH moves the chips' internal settings through six snapshots: S:SAA1099 (0.0), A:AY/YM (0.2, the default), B:SID, C:YM2612, D:YM2151 and E:GHOST (1.0). Each snapshot also sets the SAA1099's detune, fan, envelope speed and amplitude bits, and the RF5C68's DAC crush, loop length, spray and driver rates. It is the main tone-shaping knob, and it picks the chip picture, the CRT tag and the colour of SPORES in the logo, but it does not change which lanes you hear. A sequencer step can pin a chip (S or A-E), which briefly overrides Chip DNA for that step.

ENGINE REVISIONS

Patches remember which engine they were made with. Projects and .spore files from older versions keep their own sound; the preset menu then says which engine the patch uses and offers **Upgrade patch to the current engine**. When a patch is up to date the menu reads "Engine: current (hardware-exact chips, calibrated level)". Factory presets and SPROUT always use the current engine.



CONTROL

CHIP DNA

WHAT IT DOES

Which chip you hear, from the SAA1099 (far left) to the Ghost (section 08).

REGISTER MORPH

Moves the chips through six snapshots. The main tone-shaping knob.

BUS CONFLICT

Two chips writing the bus at once: collisions and bleed.

GHOST LANE

How much of the Ghost lane's leakage is heard.

CHIP FILTER / FILTER BITE

The voice filter (80 Hz to 18 kHz) and its resonance. FILTER MODE sets the type.

ATTACK · DECAY · SUSTAIN · RELEASE

The amp envelope.

OUTPUT

-24 to +6 dB into the output stage; also sets how hard SPEAKER DRIVE and OUTPUT COLOR are hit.

SPEAKER DRIVE	A small speaker pushed into distortion.
BEND RANGE	Pitch-bend range, OFF or ± 1 to 24 semitones.
WHEEL DEPTH / MOD WHEEL	What the mod wheel does and how much: VIBRATO, FILTER, MORPH, CHIP DNA or GHOST.
FILTER MODE	LOWPASS, BANDPASS, HIGHPASS or NOTCH.
GLIDE MODE	POLY, MONO, LEGATO or GLIDE.
OSC DRIFT	OFF, SUBTLE, VINTAGE or BROKEN pitch wander.

10 CHIPS

SOUND / CHIPS: ONE PAGE PER CHIP

Choose a chip with the keys along the top (SAA1099, AY / YM, 6581 / 8580, YM2612, YM2151, GHOST, RF5C68); its tabs appear beside LANE MODE. Every chip has a **QUICK** tab with the handful of controls that matter most. Every control here is a second view of a parameter, so presets and automation see the same thing. Each chip sits on its own board, drawn with its part number, traces and machine cues.

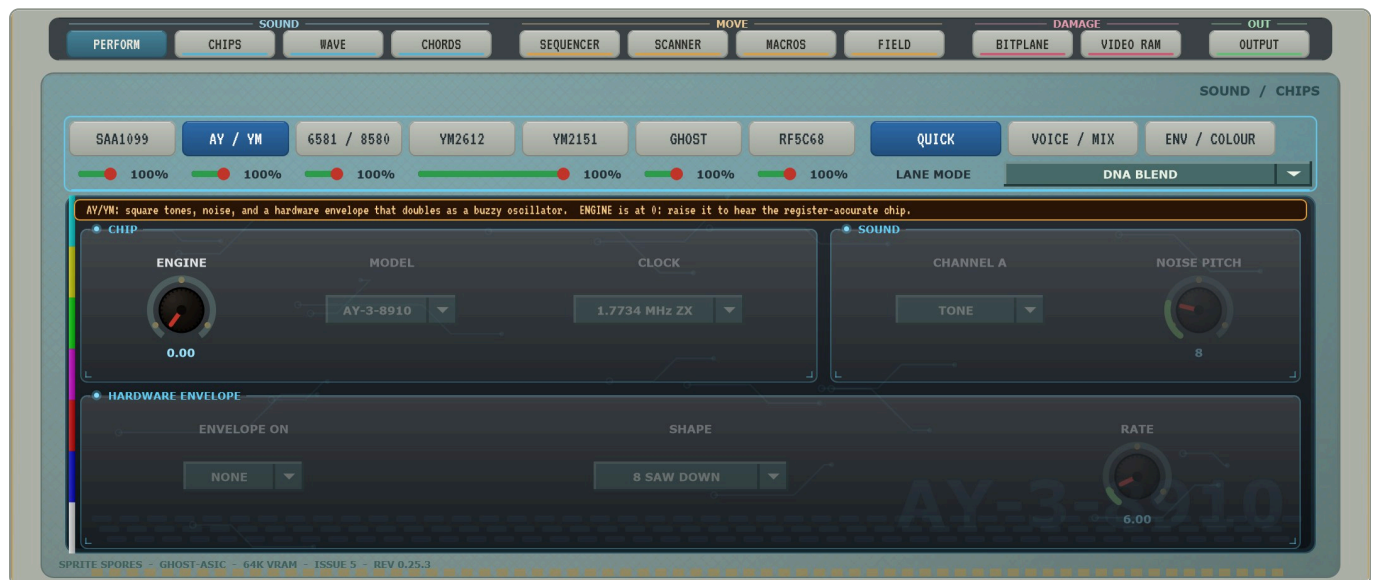


FIG 7 The CHIPS header (chip keys, lane faders, LANE MODE) and the AY / YM QUICK tab.

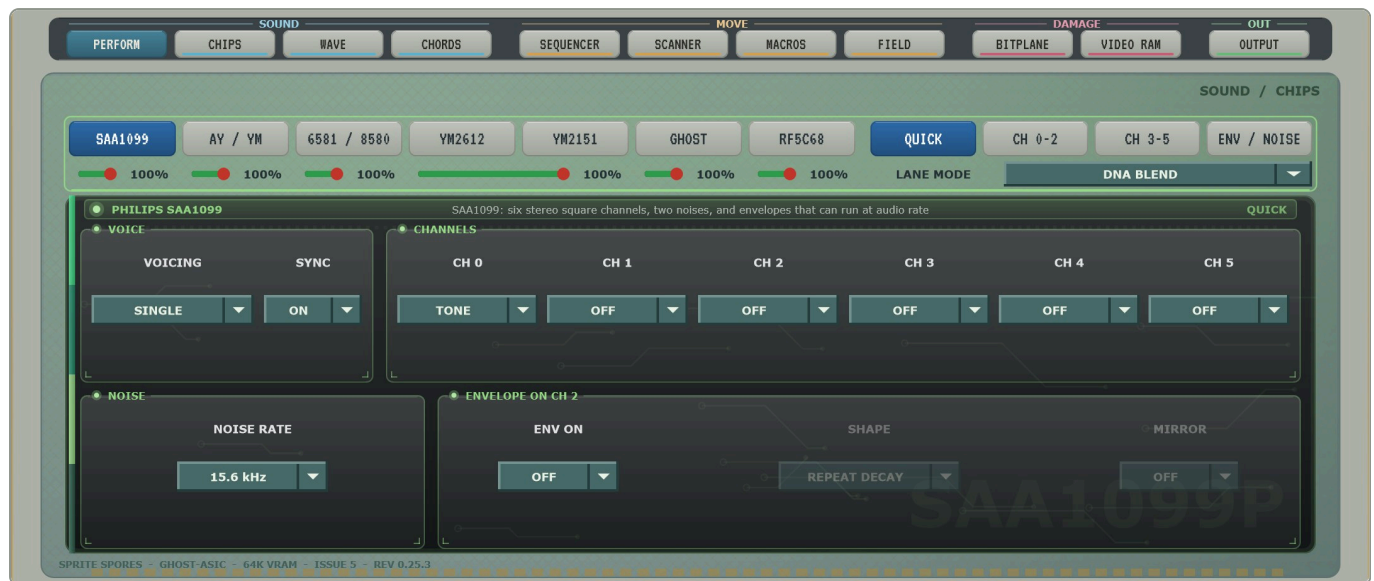


FIG 7a The SAA1099 QUICK tab.



FIG 7b CH 0-2: one row per channel.

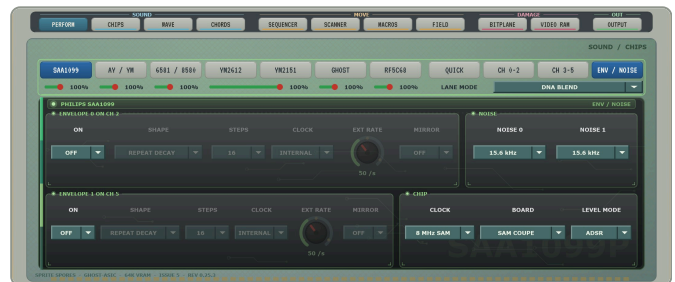


FIG 7c ENV / NOISE.

QUICK **VOICING** fills all six channels at once: SINGLE, STEREO UNISON, OCTAVES, DRONE (CUSTOM after a hand edit). **SYNC** restarts all six tones together at each note. **CH 0-CH 5** mix (OFF, TONE, NOISE, TONE+NOISE). **NOISE RATE**. **ENV ON**, **SHAPE** and **MIRROR** for the envelope on channel 2.

CH 0-2 · CH 3-5 Per channel: MIX, **LEFT** and **RIGHT** amplitude (0-15, true per-channel stereo), **PITCH** (TRACK NOTE or ABSOLUTE), **DETUNE** ± 24 st, and in ABSOLUTE the chip's own **OCTAVE** (0-7) and **N** (0-255). Channel 0 plays the note.

ENV / NOISE Two envelopes (on channels 2 and 5): ON, SHAPE (eight shapes from ZERO to REPEAT ATTACK), STEPS 16 or 8, CLOCK INTERNAL or EXTERNAL with EXT RATE (1-20000 /s, so they can run at audio rate), MIRROR (the right side upside down). NOISE 0 and NOISE 1 rates (or following CH 0 / CH 3).

CHIP **CLOCK** 8 MHz SAM or 7.159 MHz CMS; **BOARD** SAM COUPE, SOUND BLASTER 1.0 or CHIP ONLY (each board's output filtering); **LEVEL MODE** ADSR or DRIVER ENV (steps the amplitudes at 50 Hz like a game driver).

The SAA1099 is heard below CHIP DNA 0.25 in DNA BLEND, whenever its fader is up in MANUAL MIX, or on an S-pinned sequencer step.



FIG 8 VOICE / MIX.



FIG 9 ENV / COLOUR.

ENGINE · MODEL · CLOCK	Legacy-to-hardware blend; AY-3-8910 or YM2149; 1.000 MHz CPC, 1.7734 MHz ZX (default), 1.7898 MHz MSX or 2.000 MHz ST.
DIVIDER · STEREO	DIVIDE 1 / DIVIDE 2 (YM2149 only); MONO, ABC or ACB channel placement.
MIX · LEVEL A/B/C	Each channel OFF, TONE, NOISE or TONE+NOISE, at level 0–15.
DETUNE · PERIOD	B and C detune ±24 st. PERIOD MODE: TRACK NOTE, or ABSOLUTE with fixed periods for B and C (drones).
ENV SHAPE · ROUTE · RATE	The hardware envelope: 16 shapes, routed to any channels, at 0.05–60 cycles a second. At audio rates it becomes the buzzy "buzzer" oscillator.
NOISE	PERIOD 1–31; TYPE AY 17-BIT, PERIODIC, WHITE, CRACKLE or METAL; BEND.
LEGACY LANE	PSG MORPH, CLOCK LOCK, LEGACY ENV, HARDWARE, SYNC BUZZER and YM ARP shape the legacy tone (ENGINE low).

6581 / 8580



FIG 10 VOICE 1 / FILTER.



FIG 11 VOICES 2 + 3.

MODEL · CLOCK · VOICES	6581 or 8580; PAL or NTSC; 1 VOICE or 3 VOICE.
SID ENVELOPE	Use the chip's own ADSR (per voice, 0–15) instead of the main envelope.
WAVE	TRIANGLE, SAWTOOTH, PULSE, NOISE, SAW+TRI, PULSE+TRI, RING MOD, HARD SYNC, NOISE+SAW, NOISE+PULSE; PULSE WIDTH.
Voices 1–3	WAVE, RING, SYNC, WIDTH, ROUTE (DIRECT or FILTERED) and ADSR each; DETUNE for voices 2 and 3; 3OFF silences voice 3.
FILTER	OFF, LOWPASS, BANDPASS, HIGHPASS, NOTCH and the combined modes; CUTOFF, RESONANCE, DRIVE, SID ENV.
MOD	RING RATIO, RING MOD amount, SUB OSC, SID FX; UNIT TRIM and TEST BIT for the chip.

YM2612 AND YM2151



FIG 12 QUICK, with the algorithm drawn as boxes: carriers bright, modulators dim, OP1's feedback loop and each operator's level.

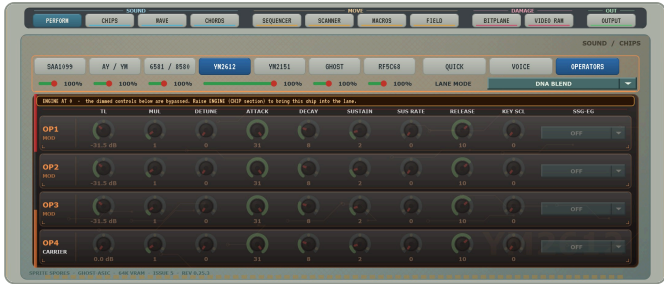


FIG 13 OPERATORS: one row per operator, register names across the top.

FM CHIP	YM2612 (OPN2) or YM2151 (OPM). The operator controls are shared; a banner names any controls that belong to the other chip.
ALGORITHM • FEEDBACK	The 8 classic algorithms (1>2>3>4 ... 1+2+3+4) and OP1 feedback 0-7.
QUICK	OP1-OP4 LEVEL (TL), each marked CARRIER or MOD for the current algorithm, and OP1-OP4 RATIO (MUL).
OPERATORS	TL (shown in dB, 0.75 dB a step, SILENT at the top), MUL, DETUNE, ATTACK, DECAY, SUSTAIN, SUS RATE, RELEASE, KEY SCL; plus SSG-EG (YM2612) or DT2 (YM2151).
LFO	LFO RATE, PITCH MOD, AMP MOD, per-operator AM; LFO WAVE on the YM2151.
YM2612 only	CH3 SPECIAL (independent detune for OP2-OP4) and DAC LADDER (the Model 1 crunch).
YM2151 only	YM3012 DAC, OP4 NOISE and NOISE FREQ (the arcade cymbal).
SILICON • LEGACY FB	Chip ageing; feedback used by the legacy tone while ENGINE is low.

TL IS ATTENUATION

Higher TL is quieter. If an FM patch is silent, check ENGINE, the FM lane fader and the carriers' TL.

GHOST LANE



FIG 14 GHOST LANE (no silicon).

LANE: GHOST LEAK, GHOST TONE and FEEDBACK. **BUS:** BUS ROT and CONTACT FAULT. **VRAM:** VRAM RESONATOR and VRAM DECAY. There is no ENGINE knob because there is no chip to model.

RF5C68 AND THE WAVE RAM LOOP

The RF5C68 is one shared PCM chip after the voices: eight channels reading one 64 KB memory of 8-bit samples, as in the Mega-CD, Sega System 18/32 and FM Towns. Sprite Spores can record the other chips into that memory and play it back, slice it or spray it.



FIG 14a WAVE RAM LOOP after a capture: the memory map (16 banks of 4 KB) with the region in brackets, CAPTURE, CLEAR, TOOLS and SLICES beside it.

Memory map	Banks 0–F, tinted by how recently they were written. The red write head pulses while recording; numbered read heads trail comets in their channel colours. Solid brackets show what the chip plays, dashed brackets where the next capture goes. The status reads REC, ARMED, PLAYS x.xx s or LOCKED BANK: CAPTURE REFUSED.
Gestures	Click a bank to start the region there, drag across banks for its length. Right-click a bank to lock or unlock it, clear it, copy it to another bank or export it as a WAV. Alt-click and hold to audition a bank.
CAPTURE · CLEAR	Hold CAPTURE to record into the region; CLEAR fills it with silence (locked banks are kept). Each is one undo step.
TOOLS	Normalize, Reverse, Fade out the tail, Trim to the sound, Import a WAV into the region, Export what it plays, Export the whole 64 KB, plus the bank tools.
CAPTURE section	SOURCE MIX, one chip LANE, OUTPUT or SELF; TRIGGER MANUAL, NOTE, BEAT (each bar) or ROLLING (never stops); AUTO GAIN (peaks at –1 dB) or CAPTURE GAIN ; FILTER NONE or GENTLE.
REGION · ARMING	START bank and LENGTH (1–16 banks, about 0.13 s each); FREEZE stops all writing; NEXT FREE BANK piles captures up; ARM AT ONCE, THRESHOLD or NEXT BAR with ARM LEVEL .
PLAY · DRIVER	MODE KEYS (an 8-voice sampler), SLICES (each note the next slice) or SPRAY (channels jump around the capture); ROOT , LOOP LENGTH , SLICES , SPRAY RATE , CHANNELS , STEREO SPREAD , DRIVER RATE .
CHIP	CLOCK 12.5 MHz MEGA-CD, 10 MHz SYSTEM 18 or 8 MHz FM TOWNS (memory holds 2.0–3.1 s); DAC BITS AUTO, 10 or 16.

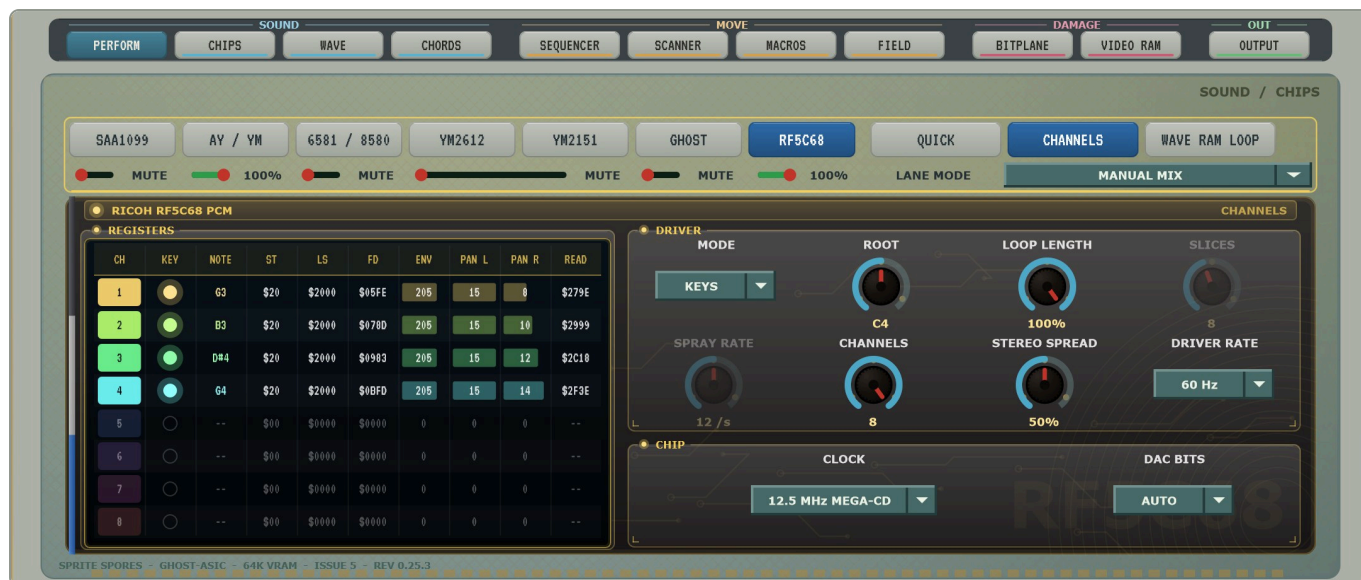


FIG 14b CHANNELS: the live register table (KEY, NOTE, ST, LS, FD, ENV, PAN, READ) while a chord plays.

The memory is saved with your project and in .spore files. Factory presets start with silent memory, except the RF5C68 presets that bring their own.

11 WAVE

SOUND / WAVE: A DRAWN WAVETABLE LAYER



Draw a 32-step wave on the pad, or fill it with **SINE** **SAW** **SQR** **TRI** **RND**. **WAVE DRAW** mixes it in (the pad says RAISE WAVE DRAW TO MIX IN while it is at 0). **WAVE WARP**, **SUB**, **SYM**, **PHASE**, **FOLD** and **DRIVE** shape it; **WAVE BITS** (FULL to 1-BIT) crushes it; **WAVE MODE** (MIX, REPLACE, RING, FM, AM, SYNC, PHASE) sets how it meets the chips; **SUB OCTAVE** picks the sub layer.

12 CHORDS

SOUND / CHORDS: PLAYING MORE THAN YOU PRESS



FIG 15 The keyboard shows each layer in its own colour: white the note you play, violet SUB, amber FIFTH, green OCTAVE, cyan MEMORY.

SUB / FIFTH / OCTAVE BUS	Fixed-interval layers under and over every note.
CHORD MEMORY	With CHORD SHAPE on SINGLE, adds one tone above the note: OFF, FIFTH, MAJOR 3RD, MINOR 3RD, 4TH or TRITONE. With a chord shape chosen it plays that chord instead, and the number sets its level (LEVEL 1–5).
CHORD SHAPE	SINGLE, MAJOR, MINOR, SUS2, SUS4, MAJ7, MIN7, DOM7, POWER, OCTAVES, DIM, AUG, MIN9 or ADD9. Needs CHORD MEMORY above 0.
VOICING · WAVE	ROOT, 1ST INV, 2ND INV, DROP 2 or WIDE; and the chord layer's waveform. Need a shape other than SINGLE.
STACK SPREAD · DETUNE · SPREAD	Width and detune of the stacked voices.

13 SEQUENCER

MOVE / SEQUENCER: THREE LANES OF MODULATION



FIG 16 Lane A on PITCH. The top row follows the lane selected in the grid.

Three lanes, A, B and C, each step through a pattern and move a target: **PITCH**, **LEVEL**, **MORPH**, **CONFLICT**, **GHOST** or **ALL**. Lane A runs on its own clock (FREE in Hz, or SYNC to a note division); lanes B and C follow lane A's clock or run FREE, with their own length. A lane is silent until its DEPTH is raised.

THE GRID

- **EDIT** picks the row you draw: VALUE, GATE, PROB (chance), RATCH (ratchets), and for lane A, COND (trig conditions 1:2 ... 4:4) and CHIP (pin a step to chip S or A-E).
- Drag to draw. Right-drag sets chance; the wheel sets ratchets 1-8; Ctrl+wheel sets the condition. Click the gate strip to toggle steps.
- Tools: << >> (shift), REV, CLEAR, COPY, PASTE, the dice (re-rolls the lane you are editing) and **PATTERNS**: pitch figures (arps, octave bounce, bassline...), rhythms (four on the floor, offbeats, tresillo, trance gate...) and shapes (ramps, triangle, random walk).
- **SCENE A / SCENE B** hold two patterns; click to swap. **CHAIN** plays A then B on lane A.
- The header shows the clock, e.g. "SYNC 1/8 @ 108 BPM, 278 ms a step". Pitch lanes print each step's semitone offset.



FIG 17 EXTRA: per-lane settings. SCALE, KEY and TRACKER ENV apply to every lane.

Lane A SEQ MODE (HASH or PATTERN), DIR (FORWARD, REVERSE, PING-PONG, RANDOM, DRUNK, SKIP 2), CLOCK multiplier, SWING, EUCLID (0–32 hits) and ROTATE.

Lanes B / C DIR, PHASE offset, SWING and POLARITY (BIPOLAR or UNIPOLAR).

All lanes SCALE (CHROMATIC, MAJOR, MINOR, the pentatonics, DORIAN, MIXOLYD, HARM MIN, WHOLE TONE), KEY and TRACKER ENV (a per-step envelope like a tracker's instrument table).

14 SCANNER

MOVE / SCANNER: AN LFO BUILT FROM A VIDEO SCAN



SCAN DEPTH • TARGET

How far, and what it moves: MORPH, FILTER, PITCH, GHOST, CONFLICT or ALL. At depth 0 the scanner is off.

SCAN SHAPE

RAMP UP, RAMP DN, TRIANGLE, SAMPLE/HOLD, SINE, LOG SWEEP or STAIRS.

SCAN RATE • SYNC

0.05–24 Hz free, or FREE / 1/1 ... 1/16 / 1/3 / 1/6 of the host tempo.

LATCH • SPREAD • JITTER • WIDTH

Hold, voice spread (GHOST, CONFLICT or ALL only), timing jitter and sweep width.

15 MACROS

MOVE / MACROS: THE CONDITION OF THE MACHINE



FIG 18 The REGISTER TEAR FIELD pad moves ASIC AGE (across) and REGISTER TEAR (up) together and leaves a trail.

Five macros describe the imaginary machine's condition, all at zero on a factory-fresh board: **ASIC AGE** (silicon wear), **REGISTER TEAR**, **REGION FLIP** (PAL to NTSC), **SCREEN BLEED** and **BUS WEIGHT**. **MACRO CURVE** sets their response (LINEAR, EXPONENTIAL, LOGARITHMIC, STEPPED, S-CURVE) and **SCENE MODE** their strength: ADDITIVE, GENTLE (60%), EXTREME (140%), WILD (190%) or INVERTED.

16 COLLISION FIELD

MOVE / FIELD: THE CHIPS AS SPRITES THAT COLLIDE



FIG 18a FIELD-01 Ricochet Choir with a chord held: the field on the left, the EVENTS controls, the Event Bus and the inspector.

Each lane is a hardware sprite in a square field: SAA, AY, SID, FM, GHOST and RF. A sprite's height is its pitch (snapped to the sequencer's SCALE and KEY within PITCH RANGE) and its position across is its pan; its mass is its lane's share of the sound. When sprites meet, the chips trade settings:

RICOCHET The two chips swap BRIGHT, MOTION and GRIT for HOLD TIME, and both lanes retrigger.

ABSORB The heavier sprite takes the lighter, and the two lanes lock together (RING, SYNC or FM).

SPLIT A third sprite hits the pair harder than SPLIT FORCE and the lock releases.

FEED Two sprites within FEED RANGE: the louder one brightens the other.

WALL The lane retriggers; a side wall flips its pan.

CONTROLS

PHYSICS **FIELD DEPTH** (at 0 the sound is unchanged; the field still moves), **SPEED**, **GRAVITY**, **ELASTICITY**, **PITCH RANGE**, **MODE** MODULATE or PLAY, **GRID SYNC** (events land on 1/4 to 1/32 of the host tempo).

EVENTS **ABSORB**, **SPLIT FORCE**, **FEED RANGE**, **HOLD TIME**, **LOCK MODE** AUTO/RING/SYNC/FM, **RESTART** (ON PLAY, every 1, 2 or 4 bars, or FREE), **ON ABSORB** NOTHING or CAPTURE (records the merged pair into the RF5C68).

Keys The six sprite keys switch sprites on or off. **LAUNCH** goes back to the start; **SET START** stores the current state into START A or START B; **THROW** makes a new random start; **FREEZE** pauses the physics (drag the arrow to set a sprite's speed); **ZOOM** fills the window with the field.

Gestures Click a sprite to inspect it, drag to move it, flick to throw it, double-click to pin it; right-click for Pin, Switch off, Solo and Back to its start. Tab walks the sprites, arrow keys nudge them, P pins.

In **PLAY** mode the field plays notes: each ricochet, wall hit or split plays the held note nearest the sprite's height, on that sprite's chip, with velocity from the impact. The **EVENT BUS** lists the last 32 events (filter with RIC, ABS, SPL, FEED, WALL) and the **INSPECT** panel shows the selected sprite's position, speed, state, mass and register bytes.

THREE FREEZES

The FREEZE function key holds your notes as a drone; the field's FREEZE pauses the physics; the RF5C68's FREEZE stops it recording.

17 BITPLANE

DAMAGE / BITPLANE: CORRUPTION AT THE BIT LEVEL



FIG 19 The chain lights the stages in use and shows a sample word with its dropped bits struck out.

BITPLANE

Bit depth from 16 bits down to 5 and a fold.

BIT ORDER • CRUSH MODE

NORMAL, GRAY CODE, REVERSED or INVERT (needs BITPLANE above 0); ROUND, FLOOR, FOLD, WRAP or SATURATE.

NIBBLE SWAP • SAMPLE CRUSH • DATA XOR • IRQ EDGE

Swaps, sample-rate crush, bit flipping and interrupt clicks.

ADDRESS MIRROR • ROM ECHO

Memory reflections and an 18–120 ms echo. Need VRAM RESONATOR or STEREO SKEW above 0.

GLITCH GATE

OFF, 1/4, 1/8, 1/16, STUTTER or 1/32. One on/off cycle per note at the host tempo, on the beat while the host plays. STUTTER is a fixed, very fast chop.

18 VIDEO RAM

DAMAGE / VIDEO RAM: THE FRAME THE SOUND LIVES IN



PAL/NTSC (50 or 60 Hz frame), **VBLANK GATE** (dips in the last part of each frame), **PHOSPHOR**, **SPRITE SIZE** (needs VRAM RESONATOR or STEREO SKEW), **BUS WIDTH** (16 down to 4 bits) and **DSP HALO**. The picture shows one video frame and the output level over the last third of a second. The screen's own settings live in the DISPLAY panel and under MORE.

19 OUTPUT

OUT / OUTPUT: THE LAST STAGE BEFORE YOUR MIXER



FIG 20 The OUTPUT BUS monitor: 12-band spectrum, L/R meters with peak hold, a PEAK readout in dBFS, LOAD, and lamps for OVER and each active stage.

POWER SAG · RF HASH · GROUND HUM

Supply droop, radio-frequency hash and mains hum.

STEREO SKEW

Left/right timing offset.

OUTPUT GUARD

Overload protection (18% by default).

OUTPUT COLOR	CLEAN, TAPE, VINYL, RADIO or LO-FI.
OUTPUT TRIM	Level after speaker drive and colour.

LEVEL

The OVER lamp lights within 1 dB of full scale. The final safety stage never lets the output reach 0 dBFS, so turn VOLUME or OUTPUT TRIM down rather than relying on it.

20 PRESETS

246 FACTORY SOUNDS IN 15 CATEGORIES

Click the preset box for the menu, headed SELECT A SOUND: your USER presets, then the factory categories. ◀ ▶ step through the current category and wrap around (through your own presets when one is loaded). Loading a factory preset resets everything except VOLUME and BYPASS and sets the category's display scene; loading a user preset also keeps the window size.

Save current patch as... asks for a name; **Save over** and **Delete** appear when a user preset is loaded; **Show presets folder** opens the presets folder (on Windows `%APPDATA%\Phantomexposure\Sprite Spores\Presets`). User presets are .spore files holding the whole patch, including both sequencer scenes, the RF5C68 memory and the field's start states. To add one, copy the file into that folder.

The factory presets also appear in your DAW's own preset list (VST3 and AU, not CLAP), and picking one there loads it as the preset box does. The last entry, **(Custom sound)**, shows when you are on your own sound (a user preset, SPROUT or an old project); picking it does nothing.

CATEGORY PRESETS

INIT (1)	00 INIT / Clean Boot
KEYS (15)	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 · 59 Chance Arp Keys · 65 Minor 9 Arcade Keys · 69 Sprite Echo Keys · 77 Fractured Lullaby · 86 Seam Echo Keys
BASS (11)	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 · 58 Polymeter Pulse Bass · 66 Euclid Tresillo Bass · 68 Nibble Swap Growl · 81 Hyperdrive Stutter Bass
LEAD (14)	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 · 63 Bitplane Stutter Lead · 74 Chip Hopper Sequence · 83 Crystal Cascade Arp · 84 Sprite Spores Showcase · 88 Rolling Seam Lead
PLUCK (11)	21 Demoscene Ghost Pluck · 22 Register Glass Pluck · 23 Ring Mod Clangbell · 24 Hammered Dulcimer · 25 Santur Shimmer · 51 SID Ring Bell · 60 Ratchet Rain Pluck · 70 Clockwork Aviary · 73 Broken Music Box · 75 Orbital Bell Garden · 78 Euclidean Gamelan
PAD (23)	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 · 61 Drop-2 Neon Pad · 67 Three Lane Drift Pad · 71 Glass Harmonic Rain · 72 Tidal Choir Engine · 80 Aurora Borealis Swell · 82 Velvet Machine Hymn · 85 Rolling Tape Halo
TEXTURE (14)	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 · 62 Scanner Tide Texture · 64 PAL Frame Pulse · 76 Datastream Cathedral · 79 Phantom Radio Drift · 87 Output Spray Cathedral
AY / YM (18)	AY-01 Hardware Buzzer Bass · AY-02 ZX Three Voice Chord · AY-03 Tracker Arpeggio · AY-04 Noise Snare Kit · AY-05 Absolute Period Drone · AY-06 Sync Buzzer Lead · AY-07 One Megahertz Toy Box · AY-08 Spectrum Beeper Hymn · AY-09 Envelope Bell Arp · AY-10 YM Buzz Wah Bass · AY-11 Three Channel Chorus Pad · AY-12 Breathing Noise Wind · AY-13 Amstrad CPC Chord Stab · AY-14 Mono Drawbar Organ · AY-15 Sync Triangle Lead · AY-16 Ticking Noise Hats · AY-17 MSX Glass Keys · AY-18 Spectrum Music Box
SAA1099 (13)	SAA-01 SAM Coupe Boot Chord · SAA-02 Envelope Buzz Bass · SAA-03 CMS Game Blaster Fanfare · SAA-04 Noise Snare Machine · SAA-05 Six Channel Unison · SAA-06 Drawbar Octave Organ · SAA-07 A Minor Drone Choir · SAA-08 Mirrored Envelope Pan · SAA-09 Eight Step Stutter · SAA-10 Tone Clocked Noise Growl · SAA-11 SAM Tracker Lead · SAA-12 Fixed Pitch Bell Chord · SAA-13 Six Voice Chip Choir

SID (26)	SID-01 6581 PWM Pad · SID-02 Ring Mod Bell · SID-03 Hard Sync Lead · SID-04 6581 Filter Bass · SID-05 Combined Wave Growl · SID-06 Three Envelope Chord · SID-07 Resonant Noise Sweep · SID-08 8580 Silk Strings · SID-09 Galway Arpeggio Lead · SID-10 8580 Filter Brass · SID-11 Hubbard Pulse Bass · SID-12 Ring Sync Laser Lead · SID-13 Triangle Flute Drone · SID-14 Noise Snare Machine · SID-15 PWM Brass Swell · SID-16 Ring Bell Choir · SID-17 Sync Sweep Bass · SID-18 8580 Bandpass Vox · SID-19 Pulse Triangle Reed · SID-20 Three Saw Unison · SID-21 Highpass Shimmer Pad · SID-22 Notch Filter Organ · SID-23 Resonant Acid Line · SID-24 Arpeggio Chord Pluck · SID-25 Wah Keys · SID-26 Ring Mod Gong
YM2612 (18)	01 Mega Drive Slap Bass · 02 Model 1 Ladder Crunch · 03 SSG-EG Buzz Lead · 04 Channel 3 Special Bell · 05 Genesis Electric Piano · 06 Console Brass Stab · 07 OPN2 Glass Harp · 08 LFO Vibrato Pad · 09 Streets Rage Bass · 10 Emerald Bell Lead · 11 Overdriven Guitar · 12 Detuned String Ensemble · 13 Funk Clavinet · 14 Breathly FM Flute · 15 Channel 3 Chord Organ · 16 SSG-EG Shimmer Pad · 17 Hollow Square Lead · 18 Metallic Kalimba
YM2151 (18)	01 Arcade Brass Fanfare · 02 DT2 Clangour Lead · 03 OP4 Noise Cymbal · 04 Square LFO Wobble · 05 Glass Tower Bell · 06 Arcade Snap Bass · 07 Marimba Wood · 08 Cabinet Choir Pad · 09 Night Drive Bass · 10 Noise Snare Drum · 11 DT2 Harpsichord · 12 Saw LFO Tremolo Pad · 13 Arcade Vibraphone · 14 Coastline Synth Lead · 15 Noise Wind Pad · 16 DT2 Bell Choir · 17 Random LFO Data Bleeps · 18 Glass Pluck Chorus
GHOST ASIC (18)	01 Illegal Bus Drone · 02 Latch Smear Choir · 03 Data Corruption · 04 VRAM Resonator · 05 Bitplane Glitch Rhythm · 06 Memory Bloom · 07 IRQ Stutter Bus · 08 Ghost Cathedral Hymn · 09 Bowed Bus Cello · 10 Glass Leak Bells · 11 Phosphor Wash · 12 Address Mirror Arp · 13 Power Sag Bass · 14 ROM Echo Choir · 15 Region Flip Pulse · 16 Bitcrush Lullaby · 17 Giant Sprite Drone · 18 Screen Bleed Texture
RF5C68 (23)	01 Captured Choir Keys · 02 Chopped Arcade Breaks · 03 Spray Cloud Glass · 04 Loop Buzz Lead · 05 Mega-CD Strings · 06 System 18 Stabs · 07 FM Towns Voice Spray · 08 Bitcrushed Bell Slices · 09 SAM Coupe Tape Loop · 10 Reverse Choir Keys · 11 SID Arp Slices · 12 FM Towns Bass Loop · 13 Mega-CD Kit Slices · 14 System 18 Vox Spray · 15 Note Echo Organ · 16 Beat Slice Machine · 17 Rolling Self Feedback · 18 Threshold Grab Keys · 19 CPC Chord Sampler · 20 Ghost Choir Slices · 21 Reverse FM Bass Loop · 22 Note Spray Echoes · 23 Morph Crushed Loop
FIELD (23)	01 Ricochet Choir · 02 Gravity Bass Engine · 03 Absorb Lock Drones · 04 Play Arp Collider · 05 Play Wall Bells · 06 Feed Network Texture · 07 Split Storm Lead · 08 Capture Collider · 09 Orbit Swap Pad · 10 Gravity Well Bass · 11 Wall Bounce Arp · 12 Feed Choir Swell · 13 Ring Lock Drone · 14 FM Lock Bells · 15 Sync Lock Lead · 16 One Bar Loop Groove · 17 Pinned Pinball · 18 Capture Spray Collider · 19 SAA Orbit Chimes · 20 Slow Motion Gravity Pad · 21 Bumper Car Bass · 22 Long Swap Bells · 23 Sync Storm Collider

The per-chip banks show each chip on its own and are a good way to learn its page. Some pads and drones have deliberately long tails. Some RF5C68 presets record themselves as you play (NOTE or ROLLING), and every FIELD preset brings its own start state.

21 MIDI, SYNC, AUTOMATION

TALKING TO THE HOST

- **Notes and velocity:** 12 voices, oldest note stolen first. Velocity sets each voice's level.
- **Pitch bend:** range set by BEND RANGE; applies to every lane, the chord and the wave layer. A note started with the wheel already bent starts at the bent pitch.
- **Mod wheel (CC1):** does what MOD WHEEL says, by WHEEL DEPTH. A note played after you move the wheel picks it up.
- Program change, aftertouch and MPE are not used. Notes the field plays in PLAY mode are internal and never leave the plug-in.
- **Tempo:** the sequencer, scanner, delay and GLITCH GATE sync to the host. With no host tempo they run at 120 BPM, and the readouts say so.
- **Automation:** 875 parameters with stable names, including the RF5C68's CAPTURE and CLEAR and the field's LAUNCH and SET START. Greyed controls still respond to automation.
- Latency is zero. The tail reported to the host grows with delay feedback and reverb size, from 4 s up to 20 s.

22 TROUBLESHOOTING

WHEN THE BOARD MISBEHAVES

SYMPTOM	TRY THIS
A lane fader does nothing	In DNA BLEND that chip's share is zero at this Chip DNA. Move CHIP DNA or switch LANE MODE to MANUAL MIX.
FM is silent	Raise ENGINE, check the FM lane fader and LANE MODE, then the carriers' TL (higher is quieter).
Some FM controls do nothing	They belong to the other Yamaha chip: DT2, LFO WAVE and OP4 NOISE are YM2151 only; CH3 SPECIAL and DAC LADDER are YM2612 only. Read the banner.
A chip page is dimmed	ENGINE is at 0. Raise it to hear the register-accurate chip.
Notes won't stop	HOLD or FREEZE is latched. Press HOLD, or PANIC.
An old project sounds different	It is on an older engine revision. The preset menu offers Upgrade patch to the current engine.
The display looks flat	The graphics card's shader didn't start and a simpler renderer is drawing. The sound is unaffected.
The SAA1099 is silent	In DNA BLEND it only sounds below CHIP DNA 0.25; check its fader (INIT sets it to 0).
The RF5C68 is silent	Its memory is empty (hold CAPTURE first), its fader is at 0, FREEZE is on, or the region's banks are locked.
The FIELD does nothing	Raise FIELD DEPTH and hold notes. A sprite whose lane is silent or under 2% of the sound is DIM and doesn't collide.
PLAY mode plays no notes	Hold keys: the field plays the held notes.
An old project's Chip DNA reads differently	Projects and .spore files from 0.17 on are converted as they load, Chip DNA / Morph automation and the old 1/32 glitch gate included, so they sound as they did; the knobs show today's positions. A factory preset, INIT or SPROUT moves the project onto today's settings (undo goes back).
Greyed control	Hover it with TIPS on: the help says what it needs (e.g. VRAM RESONATOR, a chord shape, or SYNC off).