

PAS GAS

USER MANUAL

Version 2.0.200

LUNASOUND



Eight circuit-inspired voices • 16-step sequencing • standalone, AU and VST3

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MANUAL SCOPE This edition covers PAS GAS v2.0.200 standalone, Audio Unit and VST3, including installation and LunaSound licence activation, host automation, the module spectrum EQs, KICK Drive Circuit, GEN A waveform and polyphony controls, CHORD PULLER FM/OBH synthesis, chord recording, independent Kick Duck, standalone MIDI clock output offset and bar-aligned clock switching.

1. Before you begin

What PAS GAS is

PAS GAS is a standalone electronic-music workstation built for fast, playful rhythm and sound design. It is rooted in the foundations of Luke Slater's Planetary Assault Systems releases and features newly modelled versions of circuits used on those early records, recreated from equipment in his own studio.

It incorporates KICK, SNARE, RIM, CLOSED HAT, OPEN HAT, SYNTH GEN A, BASS BIN and CHORD PULLER modules. Each module contains modelled synthesizer circuits with enough versatility to shape, tune and vibe into something uniquely your own.

Alongside its synthesis controls, every module has an independent sequencer with randomisation, velocity control, adjustable step length and much more. All eight modules run together from the PAS GAS master clock or synchronise to your DAW. The standalone application can also send MIDI clock and route individual modules to separate audio outputs.

We hope you enjoy creating sound with PAS GAS.

What's new in v2.0.200

- Every module now opens a draggable GS3-style spectrum EQ with live analyser, selectable filter shapes, per-band enable and pre/post placement.
- KICK Model 2 has a dedicated red Drive Circuit switch that removes the complete 424 drive circuit when off.
- GEN A now has Sine, Triangle and Square waveforms, a full ADSR and MONO/POLY operation with up to four voices.
- GEN C is now CHORD PULLER, with FM or OBH subtractive synthesis, ADSR control and reliable two-, three- and four-note chord capture.
- The master limiter uses a 10 ms attack and 20 ms release without built-in ducking. Independent Kick Duck provides immediate ducking, about 10 dB maximum depth and 180 ms recovery.
- All new sound, switch, envelope, EQ and polyphony controls are published for AU/VST3 host automation in Logic Pro and Ableton Live.
- Standalone MIDI clock now has a centred -50 to +50 ms output-delay trim, a double-click 0 ms reset and next-bar re-entry when a clock output is enabled while running.
- One LunaSound purchase installs the standalone application, Audio Unit and VST3 from a single notarised installer and licenses up to two Macs through the License menu.

Minimum system requirements

CONTROL	WHAT IT DOES
Computer	Apple silicon Mac. The distributed v2.0.200 binaries are arm64 and do not include an Intel build.
Operating system	macOS 12 Monterey or later.
Memory	Any supported Apple silicon Mac configuration. 8 GB RAM is the practical baseline.
Storage	Allow at least 100 MB free for the application, plug-ins, installer package and user presets.
Display	The interface resizes down to 900 × 682 pixels. A 1440 × 900 or larger working area is recommended for comfortable editing.
Standalone audio	A Core Audio output device. A MIDI keyboard/controller is optional.
Plug-in host	An Apple-silicon DAW that supports Audio Units or VST3 instrument plug-ins.

Installed formats and locations

CONTROL	WHAT IT DOES
Standalone	/Applications/PAS GAS.app
Audio Unit	/Library/Audio/Plug-Ins/Components/PAS GAS.component
VST3	/Library/Audio/Plug-Ins/VST3/PAS GAS.vst3

Installation and licence activation

Your LunaSound purchase supplies one download containing the PAS GAS standalone application, Audio Unit and VST3. The same licence authorises up to two Macs.

1. Download the PAS GAS ZIP from the Wix download email, open the ZIP and double-click the notarised PAS GAS installer package.
2. Follow the macOS Installer. It places PAS GAS in Applications and installs the Audio Unit and VST3 in the system plug-in folders listed above.
3. Open the standalone PAS GAS application and choose License > Activate PAS GAS from the macOS menu bar.
4. Paste the licence key from the separate LunaSound licence email, then choose Send code.
5. LunaSound sends an eight-digit confirmation code to the purchaser's checkout email address. Paste that code into the activation window within 10 minutes, then choose Confirm activation.

6. If macOS asks to use confidential information in your login keychain, enter the Mac login password and choose Always Allow. This lets the standalone, Audio Unit and VST3 share the same activation securely on that Mac.

7. Repeat steps 1-6 on a second Mac if required. Contact LunaSound support if you need to replace an authorised Mac.

Internet connection Activation and periodic licence renewal require an internet connection. PAS GAS does not send audio, MIDI, presets or DAW project content during activation or renewal.

OUTPUT FORMAT The AU and VST3 versions use a conventional stereo output. In standalone, each module's OUT menu lists the mono and stereo destinations supplied by the selected Core Audio interface and ticked in Audio/MIDI Settings.

Interface overview



- The top strip contains tempo, transport, window management, presets, the limiter and the shared delay.
- The eight module panels contain voice controls, output/mute/solo controls, EQ, volume and sequencing.
- The upper row is KICK, SNARE, RIM and CH. The lower row is OH, GEN A, BASS BIN and CHORD PULLER.

2. Quick start

Standalone application

1. Open PAS GAS from the Applications folder. If this Mac is not yet authorised, choose License > Activate PAS GAS and complete the emailed confirmation-code steps in Section 1.
2. Choose Audio/MIDI > Audio/MIDI Settings and select your Core Audio output. Leave module outputs at OUT 1-2 for a normal stereo mix.
3. Press START / STOP, or press the spacebar. The moving step lights show that the sequencer is running.
4. Click steps in any module's SEQ row to turn hits on or off.
5. Adjust TEMPO by dragging the BPM number vertically. Click the BPM number to type an exact value, including decimals.
6. Turn the module VOL controls down before making large changes to distortion, resonance, feedback or limiter drive.

AU or VST3 in a DAW

1. Insert PAS GAS as an instrument on a MIDI track.
2. Enable SYNC TO DAW. PAS GAS automatically places START / STOP in its running state and follows the DAW tempo and transport.
3. Start the DAW transport. The internal patterns now advance from host timing.
4. Use MIDI notes C1 through G1 to audition the eight modules, or use each module's internal step row.
5. The plug-in output is stereo. Route and process that stereo track using the DAW mixer.

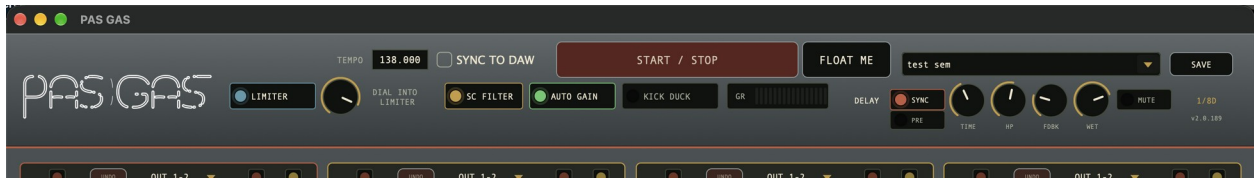
SPACEBAR The spacebar starts and stops PAS GAS only in the standalone application, including when a floated module is frontmost. In a plug-in, the spacebar remains under the DAW's control.

Automation in Logic Pro and Ableton Live

- Logic Pro (AU): choose PAS GAS parameters in the track automation menu. Switches appear as On/Off, waveform and filter shapes as named choices, and continuous controls as writable/rampable values.
- Ableton Live (VST3 or AU): enable Configure, move a PAS GAS control, then automate the exposed device parameter in Arrangement or Session automation.

- The new Kick Duck, KICK Drive Circuit, GEN A waveform/polyphony/ADSR, CHORD PULLER FM-OBH/polyphony/ADSR and every GS3 EQ band/shape control are host-automatable.
- SAVE, FLOAT ME, DOCK ALL and standalone window/menu actions are application commands rather than audio parameters and are intentionally not automation lanes.

3. Transport, timing and presets



Tempo

CONTROL	WHAT IT DOES
BPM readout	Drag up or down to change whole BPM steps while retaining the existing fractional part. Click to type an exact value, including decimals. It is available when SYNC TO DAW is off.
SYNC TO DAW	Uses host tempo and transport in AU/VST3. Enabling it also arms START / STOP so host playback can begin the sequence.
START / STOP	Arms or stops the sequencer. In host-sync mode it must remain armed, but actual playback follows the DAW.

Presets

- Groove 1 is the factory patch supplied with a new installation.
- Choose a preset from the menu to recall its sounds, patterns and mixer settings.
- Preset changes deliberately preserve SYNC TO DAW and START / STOP, so changing sounds does not interrupt a running synced performance.
- SAVE opens a file dialog and writes a .pasgaspreset user preset. Saved presets appear in the preset menu.

Interface skins

- Deep is the original dark PAS GAS interface. Wake uses warm off-white module panels, dark labels, stronger red control rings and black faders.
- Standalone: choose Deep or Wake from the macOS Skins menu.
- AU/VST3: use the DEEP / WAKE switch in the plug-in header.
- Changing skin alters appearance only; sounds, patterns, routing and transport state are unchanged.

Window controls, floating and docking

CONTROL	WHAT IT DOES
FLOAT ME	Releases all eight modules into separate resizable windows and reduces the main interface to the long transport/control bar.
DOCK ALL	Returns every module to the main interface, including modules that were hidden while floating.
Red window button	Standalone: hides the frontmost PAS GAS window without quitting the application. A floated module can be reopened from View. The main transport can be reopened with View > Show PAS GAS Transport.
Yellow window button	Minimises the selected standalone window to the Dock.
Green window button	Native macOS full screen is available for the docked standalone interface. In Float mode the green control is not a full-screen control.
Command-W	Standalone only: hides the frontmost PAS GAS window. Closing the last floated module leaves the compact transport running.
View menu	Standalone only: reopen the transport or any hidden KICK, SNARE, RIM, CH, OH, GEN A, BASS BIN or CHORD PULLER window without docking the others.
PAS GAS > Quit PAS GAS	Quits the standalone application. Closing all PAS GAS windows does not quit it.

- If FLOAT ME is pressed while the docked standalone is full screen, PAS GAS first returns to the normal desktop and then opens the floating modules.

- The standalone prevents Float mode from remaining in a native full-screen Space. This keeps reopened modules at their normal saved size.
- Floating positions, sizes and front-to-back order are remembered with the plug-in session.
- Clicking the main PAS GAS plug-in window or returning to its DAW track brings its floating modules back in front of the host in their remembered order.
- The main interface and floated modules scale their controls proportionally when resized.
- In AU/VST3, the DAW controls the main plug-in window. If a floated module is hidden, use DOCK ALL and FLOAT ME to restore the complete floating set.

4. Limiter and delay

Master limiter

CONTROL	WHAT IT DOES
LIMITER	Engages the master glue/limiting stage on the summed OUT 1-2 mix. Its detector uses a 10 ms attack and 20 ms release.
DIAL INTO LIMITER / OUTPUT GAIN	With LIMITER on, drives the summed OUT 1-2 mix progressively harder into the limiter. With LIMITER off, it is a clean master OUTPUT GAIN control from 0 to +12 dB.
SC FILTER	High-passes the limiter detector at 100 Hz so the deepest bass has less influence on gain reduction.
AUTO GAIN	Compensates output level as the limiter drive is increased, making tone and punch easier to compare. It applies only while LIMITER is on.
GR meter	Shows current gain reduction. More illuminated segments mean stronger limiting.
KICK DUCK	Independently ducks every non-kick module around each KICK trigger. Attack is effectively immediate, maximum reduction is about 10 dB, and recovery is 180 ms. The KICK itself stays unattenuated. The circuit is separate from the limiter and works whether LIMITER is on or off.
DIRECT OUTPUTS Standalone direct module routes are post-voice and post-module-EQ, but bypass the summed master bus and limiter.	



Red Drive Circuit and Kick Duck indicators enabled.

Shared delay

CONTROL	WHAT IT DOES
Module FX button	Sends that module to the shared wet delay.
SYNC	Locks delay time to the master/DAW tempo. The gold readout displays the selected note division.
PRE	When on, a muted module still feeds the delay. When off, muting the module also stops its delay send.
TIME	Sets milliseconds when SYNC is off, or selects a musical note division when SYNC is on.
HP	Removes low frequencies from the repeats before they re-enter the feedback path.
FDBK	Sets tape-style feedback. The final part of the range can move into self-oscillation, so raise it carefully.
WET	Sets the wet-only delay return level.
MUTE	Immediately mutes the delay and clears all repeats; no tail remains.

5. Controls shared by every module

CONTROL	WHAT IT DOES
OUT menu	In standalone, choose OUT 1-2 MASTER or any available ticked mono/stereo hardware destination. AU/VST3 remain stereo, so direct choices are unavailable.
Module name / note	Shows the voice name and its normal MIDI trigger note.
MUTE	Silences the module's dry output using a short approximately 3 ms transition to reduce clicks. With delay PRE on, an enabled FX send can still produce repeats.
SOLO	Auditions this module using the same short click-reducing transition. If any SOLO is active, only soloed modules pass to the dry mix.
V RAN	On: writes random velocities from soft to full across the 16 steps. Off: resets the steps to the normal velocity.
FX	Sends the module to the shared delay.
EQ	Opens that module's GS3-style three-band graphical EQ and live spectrum analyser. The EQ processes the individual module before it reaches its main or direct output.
VOL	Sets the module's final level before it joins the master mix or selected direct output.
LEN	Sets an independent sequence length from 1 to 16 steps. Different lengths create evolving polymetric patterns.
SEQ steps	Click steps 1-16 to enable or disable hits. Steps outside the current LEN are dimmed and skipped.

Graphical spectrum EQ

- Drag a numbered point left/right for frequency and up/down for gain. The selected band's frequency, gain, shape and Q appear above the graph.
- Right-click a point to choose Bell, Low Shelf, Low Cut, High Shelf, High Cut, Notch, Band Pass, Tilt Shelf, Flat Tilt or All Pass.
- Double-click a point to switch that band off. Double-click an empty part of the graph to add an available band again.
- PRE/POST places the EQ before or after the module's final saturation/drive stage. MUTE bypasses the complete EQ, and RESET restores the default curve.

- The blue analyser trace is read-only and continuously follows the fully processed module signal; moving or holding an EQ point does not pause the spectrum refresh.



GEN A three-band curve and continuously updating spectrum analyser.

Understanding the step display

- A bright outlined square is an active programmed hit.
- The moving highlight marks the current playback step.
- Step brightness reflects stored velocity, making accents visible.
- Step numbers 1, 5, 9 and 13 are emphasized as beat-group landmarks.

6. Sequencer and MIDI recording

Two ways to use external MIDI note input

- Normal module triggering: with no OVERWRITE SEQ button enabled, the adjacent notes C1 through G1 trigger KICK, SNARE, RIM, CH, OH, GEN A, BASS BIN and CHORD PULLER. This plays the modules without writing notes into their patterns.
- Pitched pattern recording: enable OVERWRITE SEQ on the module you want to record, then play different notes on the external MIDI keyboard. Each note's pitch and velocity are written into that module at the currently playing sixteenth-note step.

TWO MIDI MODES While one or more modules have OVERWRITE SEQ enabled, incoming notes are used for pitched step recording and the normal C1–G1 module-trigger map is temporarily suspended. More than one armed module can record the same input.

Recording a pitched pattern with OVERWRITE SEQ

OVERWRITE SEQ turns an external MIDI keyboard into a live step recorder for that module. While the sequence runs, an incoming note writes the current sixteenth-note step with the played pitch and velocity.

1. Start the sequencer and enable OVERWRITE SEQ on the module you want to record.
2. Play MIDI notes. Each note activates the current step and records its pitch and velocity.
3. Press UNDO to restore all steps changed since overwrite was armed.
4. Switch OVERWRITE SEQ off when recording is complete.

Step pitch when toggling

- With OVERWRITE SEQ off, turning a recorded step off and back on restores its recorded pitch.
- With OVERWRITE SEQ on, turning a step off and back on resets it to that module's normal trigger pitch and clears any stored chord on that step.

UNDO and RESET

CONTROL	WHAT IT DOES
UNDO	Restores the pattern, velocities, pitches and chord data captured before the current overwrite pass. It becomes available after something has been overwritten.
RESET	Clears all 16 active steps, resets velocities to normal, restores every step to the module's base pitch, clears chord data and clears overwrite history.

Pitch variation and chords

- BASS BIN RND NOTES randomises the pitch of active steps over three octaves; rhythm and velocity remain unchanged.
- CHORD PULLER records one to four notes per 1/16 step. The first note selects the step; notes belonging to the same held chord stay on that step even if their MIDI note-ons cross the next step boundary.
- Chord notes are stored low-to-high with their individual velocities. A second note automatically engages POLY; single-note entry remains MONO. Playback is quantized to the recorded 1/16 step.

7. Standalone Audio/MIDI settings

Open Audio/MIDI > Audio/MIDI Settings from the macOS menu bar. This window belongs to the standalone application; plug-in audio and MIDI routing are handled by the DAW.

Audio

- Choose the Core Audio output device, sample rate and buffer size.
- Enable enough hardware output channels for the direct routes you plan to use.
- Outputs 1–2 carry the PAS GAS master mix and delay return.
- Module direct routes on ticked outputs 3 and above bypass the summed mix and limiter.

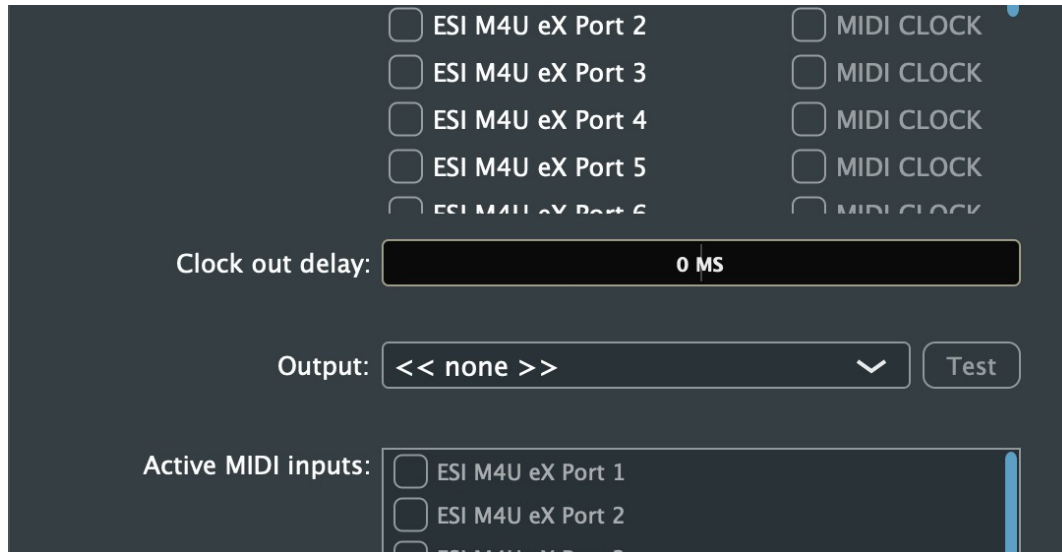
MIDI inputs and outputs

- Enable the MIDI input devices you want to use for module triggering or overwrite recording.
- Each available MIDI output has a device enable box and a separate MIDI CLOCK box.
- Enable the device first, then enable MIDI CLOCK if it should receive clock.
- More than one MIDI output can be enabled at the same time.
- Clock-enabled outputs receive MIDI Start, Stop and 24 pulses per quarter note (24 PPQN). Each enabled output follows the same Clock out delay setting.

CLOCK BEHAVIOUR Starting or stopping PAS GAS sends MIDI Start or Stop only to outputs whose MIDI CLOCK box is enabled. Ordinary device enablement alone does not send clock.

MIDI clock alignment

Use Clock out delay to align external drum machines, sequencers or other MIDI-clocked hardware with PAS GAS.



Clock out delay is centred at 0 ms. It resets to 0 ms at launch unless the loaded preset stores a different value.

- Drag the LED bar horizontally for fine adjustment from -50 ms to +50 ms. Double-click it to return exactly to 0 ms.
- The offset changes outgoing MIDI clock only. It does not move PAS GAS audio, its sequencer, the DAW sync position or internal timing.
- If MIDI CLOCK is switched on for an output while PAS GAS is already running, that output waits for the next bar boundary before sending Start and clock, so the external device joins in phase.

8. Module reference

The following pages explain the controls unique to each sound generator. The common output, mute, solo, FX, EQ, volume, length and step controls work as described in Section 5.

KICK — C1



KICK is the expanded KIK 9 circuit-inspired voice. It combines a tunable body, pitch contour, transient, drive, compression and six alternative model switches, followed by its module spectrum EQ.

STARTING POINT Start with DIST and COMP low. Set TUNE, TUNE DEC and TUNE DEP first, then use ATTACK and NOISE to place the transient in the mix.

Voice controls

CONTROL	WHAT IT DOES
TUNE	Sets the settled fundamental pitch of the kick body.
TUNE DEC	Sets how quickly the initial pitch sweep falls to the settled tuning.
TUNE DEP	Sets the starting depth of the pitch sweep.

CONTROL	WHAT IT DOES
DECAY	Sets the amplitude tail from tight to long.
ATTACK	Shapes the initial transient and click character.
NOISE	Adds noise to the attack for more beater definition.
DRIVE	Adds harmonic drive. In Model 2 this feeds the switchable 424-inspired circuit.
COMP	Adds internal compression and density.
LEVEL	Sets the KIK 9 voice level before the module VOL control.
ACCENT	Sets how strongly higher MIDI/step velocity emphasizes the voice.
LF FREQ	Selects the low-shelf frequency: 60 or 120 Hz.
LM FREQ	Sweeps the low-mid band from 100 Hz to 1.5 kHz.
HM FREQ	Sweeps the high-mid band from 1 kHz to 15 kHz.
HF FREQ	Selects the high-shelf frequency: 8 or 12 kHz.
LF / LM / HM / HF	Set gain for the four Trident 80B-inspired EQ bands.
DRIVE CIRCUIT	Red LED switch for Model 2. On routes audio through the complete 424-inspired drive stage. Off removes that stage entirely, including when the DRIVE dial is at minimum.
MODEL 2-7	Select the alternative KIK 9 voicings: 424-driven Model 2, initial-knock Model 3, separated-body Model 4, stronger-harmonic Model 5, tuned-decay-fundamental Model 6 and fundamental-forward Model 7.

SNARE — C#1



SNARE is an 808-inspired dual-resonator voice with a separate noise path, adjustable bit reduction/filtering and an optional smash limiter. It also carries the same four-band Trident 80B-inspired desk EQ arrangement as KICK.

STARTING POINT Balance the two body pitches before adding SNAP. Short NOISE DECAY gives a dry crack; longer settings produce a broader wash.

Voice controls

CONTROL	WHAT IT DOES
SYN PITCH	Tunes the main resonant snare body.
SYN DECAY	Sets the decay of the synthesized body.
OSC2	Enables or disables the second body resonator.
OSC2 PITCH	Tunes the second resonator.
NOISE PITCH	Changes the colour and apparent pitch of the snare noise.
NOISE DECAY	Sets the noise tail independently from the body decay.
SNAP	Balances snappy noise/crack against the resonant body.
12 BIT	Blends in 12-bit style quantisation.
CUT	Sets the character filter cutoff after the voice mix.

CONTROL	WHAT IT DOES
RES	Sets resonance for the character filter.
LIMIT	Enables the internal smash limiter for a denser, more aggressive snare.
LF FREQ	Selects the low-shelf frequency: 60 or 120 Hz.
LM FREQ	Sweeps the low-mid band from 100 Hz to 1.5 kHz.
HM FREQ	Sweeps the high-mid band from 1 kHz to 15 kHz.
HF FREQ	Selects the high-shelf frequency: 8 or 12 kHz.
LF / LM / HM / HF	Set gain for the four Trident 80B-inspired EQ bands.

RIM — D1



RIM is a TR-808 rim-shot/cross-stick-inspired voice built from two bridged-T resonators, a short VCA contour and an output high-pass stage.

STARTING POINT Use LOW/HIGH TUNE and LEVEL together: similar levels give a full rim; emphasizing HIGH LEVEL and HP CUT gives a harder cross-stick click.

Voice controls

CONTROL	WHAT IT DOES
LOW TUNE	Tunes the lower bridged-T resonator.
HIGH TUNE	Tunes the upper bridged-T resonator.
DECAY	Sets the short VCA tail.
LOW LEVEL	Sets the amount of the lower resonator.
HIGH LEVEL	Sets the amount of the upper resonator.
HP CUT	Raises the output high-pass cutoff to make the rim thinner and more cutting.
VCA DRIVE	Drives the resonator sum into the VCA-style saturation curve.
SNAP	Adds and shapes the fast trigger edge.

CH — Closed Hat — D#1



CH is an 808-inspired closed hi-hat made from metallic oscillator partials and a noise path, with cassette-style 424 saturation and post-saturation gain.

STARTING POINT For a tight machine hat, keep DECAY short and METAL prominent. Add NOISE for a softer sprayed edge.

Voice controls

CONTROL	WHAT IT DOES
TUNE	Sets the frequency of the metallic oscillator bank.
DECAY	Sets the closed-hat tail.
STONE	Brightens the high-pass and noise filtering.
METAL	Changes the balance and edge of the metallic partials.
NOISE	Adds broadband noise to the metallic source.
424 SAT	Adds Tascam 424-inspired saturation.
POST GAIN	Restores or boosts level after saturation.

OH — Open Hat — E1



OH uses the updated PAS HAT 9 open-hat circuit, with resonant filtering, dedicated filter EQ, saturation and optional 12-bit conversion before the common module EQ.

STARTING POINT To hear RF CUT and RF RES, ensure RF BYP is off. Use HP CUT before boosting the top if the open hat occupies too much low-mid space.

Voice controls

CONTROL	WHAT IT DOES
OH DEC	Sets the open-hat decay; the lower range reaches very tight values.
OH TUNE	Tunes the PAS HAT 9 source up or down by semitones.
OH LEVEL	Sets the voice level before module processing.
ACCENT	Controls how strongly high velocity drives the accent circuit.
RF CUT	Sets the resonant-filter cutoff.
RF RES	Sets resonant-filter resonance.
HP CUT	Sets the dedicated output high-pass cutoff.
MID GAIN	Boosts or cuts the filter-EQ mid band.
MID Q	Sets the width/resonance of the mid band.
TOP GAIN	Boosts or cuts the filter-EQ top band.
TOP Q	Sets the top-band shape.
424 SAT	Adds Tascam 424-inspired saturation.
POST GAIN	Sets level after 424 saturation.
RF BYP	Bypasses the resonant filter when enabled.
EQ ON	Enables the dedicated PAS HAT 9 filter EQ.
SAT	Enables the dedicated PAS HAT 9 saturator.
12 BIT	Enables the PAS HAT 9 12-bit DAC stage.

GEN A — F1



GEN A is a flexible synthesized percussion voice with Sine, Triangle and Square oscillators, white noise, pitch sweep, deep low-pass filtering, foldback, a full ADSR and MONO/POLY operation up to four voices. Step and gate transitions are smoothed to avoid clicks.

STARTING POINT GEN A can cover toms, zaps and synthetic percussion. Start with NOISE and FOLD BACK at zero, establish the pitched contour, then add texture.

Voice controls

CONTROL	WHAT IT DOES
TUNE	Sets the oscillator pitch.
WAVE S/T/SQ	Three-position selector for Sine, Triangle or Square waveform.
MONO / POLY	Selects one voice or a four-voice pool for overlapping notes and chords.
TONE	Moves from rounder to brighter/folder oscillator character and also colours the noise.
SWEEP	Sets the amount and timing character of the downward-to-settled pitch transient.
NOISE	Sets the amount of filtered white noise.
FILT	Sets the low-pass cutoff; the minimum extends to approximately 24 Hz.
FENV	Sets how much the trigger envelope opens the filter.

CONTROL	WHAT IT DOES
FOLD BACK	Adds wave-folding distortion and extra harmonics.
AMP ATTACK	Sets the click-safe amplitude-envelope attack from 2 ms to 2 seconds.
AMP DECAY	Sets amplitude-envelope decay from 15 ms to 2.5 seconds.
AMP SUSTAIN	Sets the held amplitude level.
AMP RELEASE	Sets release after the gate ends, from 40 ms to 4 seconds.

BASS BIN — F#1



BASS BIN is a compact SH-101-inspired monophonic bass architecture: a CEM3340-style VCO source section, IR3109-style four-pole filter and BA662-style VCA contour. It is designed for both sequenced bass and playable MIDI lines.

STARTING POINT For classic plucks: short ATTACK, short DECAY, low SUSTAIN, moderate positive F ENV and some RES. Blend SAW, PULSE and SUB to taste.

Voice controls

CONTROL	WHAT IT DOES
OCT	Selects 32', 16', 8', 4' or 2' oscillator range.
TUNE	Fine-tunes the main oscillator by ± 50 cents.

CONTROL	WHAT IT DOES
SAW	Sets sawtooth oscillator level.
PULSE	Sets pulse oscillator level.
PULSE WIDTH	Changes the pulse duty cycle; narrow settings sound thinner and more nasal.
DETUNE	Detunes the sub oscillator by ± 35 cents.
SUB	Sets sub-oscillator level.
SUB TYPE	Selects one-octave square, two-octave square or two-octave pulse sub.
CUTOFF	Sets the four-pole low-pass filter cutoff.
RES	Sets resonance. As in the original architecture, strong resonance reduces low-frequency body.
F ENV	Sets bipolar filter-envelope amount. Clockwise opens the filter; anticlockwise inverts the contour.
LFO RATE	Sets LFO speed from 0.10 to 30 Hz.
LFO AMOUNT	Sets modulation depth.
LFO DEST	Routes the LFO to OFF, PITCH, FILTER or PWM.
AMP ATTACK	Sets VCA envelope attack.
AMP DECAY	Sets VCA envelope decay; the same envelope supplies the filter contour.
AMP SUSTAIN	Sets held VCA level.
AMP RELEASE	Sets release after the note/gate ends.
RND NOTES	Randomises the pitch of active steps across three octaves without changing rhythm or velocity.

CHORD PULLER — G1



CHORD PULLER is a dual-mode four-voice generator. FM mode makes metallic, inharmonic and tuned-percussion tones; OBH mode switches to subtractive synthesis with resonance. Its ADSR and stable 1/16 chord recorder handle two-, three- and four-note keyboard chords.

STARTING POINT Use low FM MOD for extra attack detail. Higher FM MOD plus FOLD BACK moves toward bells, clangs and digital percussion.

Voice controls

CONTROL	WHAT IT DOES
TUNE	Sets carrier/oscillator pitch.
DECAY	Sets the source contour used by the synthesis engine.
MODE	Changes harmonic balance and the mode-dependent oscillator/filter character.
SWEEP	Sets pitch sweep and transient movement.
NOISE	Sets filtered white-noise amount.
FILT	Sets the deep low-pass cutoff; the minimum extends to approximately 24 Hz.
FENV	Sets how much the trigger contour opens the filter.
FM MOD / RES	In FM mode, sets frequency-modulation depth. In OBH mode, sets filter resonance.

CONTROL	WHAT IT DOES
FOLD BACK	Adds wave-folding and complex upper harmonics.
FM / OBH	Switches between frequency-modulation synthesis and OBH subtractive synthesis.
MONO / POLY	Selects one voice or up to four voices. Recording a chord automatically engages POLY.
AMP ATTACK	Sets amplitude-envelope attack from 2 ms to 2 seconds.
AMP DECAY	Sets amplitude-envelope decay from 15 ms to 2.5 seconds.
AMP SUSTAIN	Sets the held amplitude level.
AMP RELEASE	Sets release after the gate ends, from 40 ms to 4 seconds.

9. MIDI note map and practical workflows

Normal MIDI trigger map

CONTROL	WHAT IT DOES
C1	KICK
C#1	SNARE
D1	RIM
D#1	CH
E1	OH
F1	GEN A
F#1	BASS BIN
G1	CHORD PULLER

OCTAVE NAMING Some DAWs label middle C differently. If the displayed octave numbers differ, locate eight adjacent notes beginning with the note that triggers KICK, then continue chromatically through CHORD PULLER.

Building a first pattern

1. Load Groove 1 and press START / STOP.
2. Set KICK LEN to 16 and program the main pulse on steps 1, 5, 9 and 13.
3. Add SNARE on steps 5 and 13, then place CH between the main hits.
4. Try a shorter OH or GEN A length, such as 3, 5 or 7, for movement against the 16-step pattern.

5. Enable V RAN on a supporting module, then send one or two modules to FX. Sync the delay and adjust HP so the repeats do not crowd the kick.

Making a separate-output standalone setup

1. Open Audio/MIDI Settings and enable the physical outputs you need.
2. Keep master-mix modules at OUT 1-2 MASTER; route other modules to listed mono or stereo hardware destinations. Direct routes bypass PAS GAS master limiting, so apply external level control.

10. Troubleshooting

CONTROL	WHAT IT DOES
No sound in standalone	Open Audio/MIDI Settings, choose a valid Core Audio device, enable outputs 1-2 and confirm the module is not muted or routed to an unavailable direct output.
Sequence does not advance in a DAW	Enable SYNC TO DAW, ensure START / STOP is armed and start the DAW transport.
BPM readout is dimmed	SYNC TO DAW is enabled. Disable it to edit the internal BPM value.
MIDI notes trigger the wrong behaviour	Check whether OVERWRITE SEQ is enabled on any module. An armed overwrite module temporarily owns incoming MIDI.
Expected direct outputs are unavailable	Direct routing requires the standalone app. Tick the required channels in Audio/MIDI Settings; only channels supplied by the selected Core Audio device and currently active appear in module OUT menus. AU and VST3 are stereo.
Muted module still makes echoes	Delay PRE is on. Turn PRE off, disable that module's FX send, or use delay MUTE to clear all tails immediately.
Delay grows uncontrollably	Reduce FDBK. The upper range is deliberately capable of tape-style self-oscillation.
Floater are behind the DAW	Click the PAS GAS plug-in window or its track. PAS GAS restores the remembered floating-window order and brings them forward.
A floated module was closed	Standalone: choose its name from View. AU/VST3: press DOCK ALL, then FLOAT ME, to restore the complete floating set.
Only the transport is visible	The modules are floating but currently hidden. Reopen individual modules from the standalone View menu, or press DOCK ALL to restore the complete interface.
Float mode left a large empty window	v2.0.200 prevents floating modules from remaining in native full screen. Exit full screen, then use FLOAT ME again if necessary.
Old preset does not appear	Use SAVE to create a current .pasgaspreset, or place a compatible older PAS GAS/PAS Drums preset in the normal preset location and reopen the menu.
Plug-in does not appear in a DAW	Confirm the AU or VST3 is installed, restart the DAW and force a plug-in rescan. PAS GAS v2.0.200 requires an Apple-silicon host process.
PAS GAS opens but audio is muted	Open the standalone application and choose License > Activate PAS GAS. One successful activation authorises the standalone, Audio Unit and VST3 on that Mac.
Activation code email has not arrived	Check the purchaser's checkout inbox and junk folder. Codes are single-use and valid for 10 minutes. Wait at least one minute before choosing Send

CONTROL	WHAT IT DOES
	new code.
macOS asks for keychain access	Enter the password used to log in to the Mac and choose Always Allow so the standalone and plug-ins can use the same device-bound activation.
Two authorised Macs message appears	The licence already has two Mac activations. Contact LunaSound support to replace an authorised Mac.

Safety and level management

- Lower monitoring level before exploring extreme resonance, distortion, foldback, limiter drive or delay feedback.
- Use AUTO GAIN for easier limiter comparisons, but still watch your DAW/interface meters.
- Direct standalone outputs bypass the master limiter and may be louder than the OUT 1–2 mix.

11. Support and privacy

Support

LunaSound support can help with installation, plug-in scanning, MIDI, audio routing or operation questions. Email lunasound.info@gmail.com. Include your macOS version, Mac model, PAS GAS version, DAW name/version and whether the problem affects Standalone, AU or VST3.

Privacy summary

PAS GAS contains no advertising, tracking, telemetry or third-party analytics. Audio, MIDI, presets and DAW project content are processed locally and are not uploaded to LunaSound.

A purchase through lukeslater.com is processed by the LunaSound Wix store and its available payment providers. LunaSound receives the customer and order details needed to take payment, deliver the software, issue the licence, manage refunds and provide support. LunaSound does not receive full card or Apple Pay credentials.

Activation sends the licence key, a one-way hashed identifier for the Mac, a device public key and signed activation or renewal data to the LunaSound licence service hosted on Wix. The service checks purchase and refund status and keeps the hashed licence and up to two authorised-device records. The device private key and renewal credential are stored in the Mac login keychain; a signed licence file is stored in the user's local Application Support folder.

The complete PAS GAS Privacy Statement is published on the LunaSound page at lukeslater.com. Privacy and support enquiries can be sent to lunasound.info@gmail.com.