VPROM 3

A L Y J A M E S L A B

EPROM DRUMS

User Manual

Mac/Pc 64bit
Universal 2.0

EPROM DRUMS

www.alyjameslab.com

USER MANUAL v3.0.1

by

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INTRODUCTION

VProm was first released in 2014 as a groundbreaking software plugin that faithfully emulated the internal circuitry and filtering of one of the most iconic drum machines of the early ‘80s. This legendary device revolutionized music production by being the first to incorporate real drum samples, setting a new industry standard and shaping the sound of an era.

Early sample-based drum machines relied on recorded acoustic drum sounds, captured with minimal processing and no anti-aliasing. The result? A raw, punchy, and unmistakable sound that cut through mixes like no other. The vintage drum machine that inspired VProm remains a revered piece of music history, known for its distinct sonic character—something that simple sample-based reproductions fail to capture. With a dedicated DAC and clock per voice, plus unique analog filtering, this rare instrument (with only 500 units ever made) continues to be sought after by producers worldwide.

Used by industry legends such as Prince, Phil Collins, The Thompson Twins, Stevie Wonder, Gary Numan, Depeche Mode, The Human League, Jean-Michel Jarre, Vangelis, John Carpenter, Todd Rundgren, and The Art of Noise, this drum machine left an undeniable mark on music history.

As a musician myself, I understand the high standards that artists expect. Since no accurate plugin version of this classic existed, I set out to create VProm.

This was then…

Welcome to the next chapter

Over the years, VProm has become a staple in music production, celebrated for its accurate **variable sample rate emulation of classic DACs** and its ability to load swappable EPROM samples. Now, with the release of VProm 3.0, I am taking things to the next level. This major upgrade enhances both features and usability. While previous versions excelled at replicating EPROM-based drum machines, primarily the LM-1, Version 3.0 expands its capabilities even further.

This extended emulation is based on reverse engineering and old datasheets; it uses a C++ custom core with modeled analog circuitry.

VProm is designed to receive MIDI input from any channel, making it highly versatile for various setups. It can be triggered using a standard MIDI keyboard, pad controller, or even a MIDI drum kit. The default MIDI mapping closely follows the General MIDI (GM) standard but can also be customized to suit your needs.

When a trigger is received, VProm initiates a binary counter that sequentially reads the EPROM's data, byte by byte. This data is then processed by the emulated AM6070 DAC, faithfully replicating the behavior of the original hardware. The DAC's output is further amplified and filtered according to the specific voice configuration, preserving the sonic character of classic drum machines.
VProm features a main mixer that allows you to control the volume of each drum voice before it reaches the output stage. In the original Linn LM-1, sounds were assigned hard-panned positions (left, center, or right) using simple toggle switches. However, in VProm,

these switches have been replaced with full-range pan knobs, giving you greater control over the stereo field.

To switch between pan and tuning controls, simply click on the "TUNE" label above the mixer. This toggles the function of the knobs, allowing you to adjust either panning or tuning for each voice.
Each drum voice includes a dedicated tuning knob, controlling the playback speed of the EPROM data. The available tuning range spans from 1,000 Hz to 52,000 Hz, offering a much broader range than the original hardware. (See Sample Tuning for more details.)

All of the stock LM-1 EPROMS can be replaced by external compatible ones and two additional extra voices (loaded by default with a delay less LM-1 snare and a cymbal) can also be used. This opens up to Linndrum sounds (often called LM-2), DMX, Drumtracks etc. and even your own created EPROM content (See EPROM Loading.)

Default MIDI implementation:

VProm can receive any MIDI CH as main source for triggers.
It can be triggered with a standard MIDI Keyboard/Pads or even a MIDI Drum Kit.
Custom drum trigger maps can be created within VProm 3 for more versatility.
The default mapping follows almost the same mapping as GM MIDI Standard.

VProm allows you to assign two custom MIDI notes per drum using the MIDI-Learn feature. This can be configured in the MIDI panel, providing flexible triggering options for different playing styles and controllers. Additionally, a choke/mute function is available for the EXT 2 drum voice. This feature enables you to instantly mute or "choke" the assigned sound, preventing overlapping playback. By default, this slot is loaded with a Cymbal EPROM, making it useful for realistic hi-hat-style muting or other percussive effects.

VProm 3 Default Trigger Map

Bass – MIDI notes 35, 36	**Conga High** – MIDI notes 63, 67
Snare – MIDI notes 38, 40	**Conga Low** – MIDI notes 64, 66
Hihat Closed – MIDI notes 42, 44	**Claps** – MIDI notes 33, 39
Hihat Open – MIDI note 46	**Rim Shot** – MIDI notes 31, 37
Cowbell – MIDI notes 56, 57	**Tambourine** – MIDI notes 54, 55
Tom High – MIDI notes 48, 50	**Cabasa** – MIDI notes 69, 70
Tom Low – MIDI notes 41, 43	**Extra Voice 1** – MIDI notes 45, 47
Extra Voice 2 – MIDI notes 49, 51	**Choke (Ext2)** – MIDI note 52

MAIN FEATURES

VProm version 3 features many improvements and changes over version 2

- **Faithful Hardware Emulation** – The closest software recreation of the legendary 80s drum machine, with real-time DAC and EPROM sound processing.
- **New Mac & Apple Silicon Support** – Native VST3 & AU support for both Intel & M1/M2 Macs with Universal 2 compatibility.
- **Built-in WAV Resampler & EPROM Burner** – Convert and preview samples, then burn them into authentic 8-bit EPROM images.
- **Real-Time µLaw DAC Curve Control** – Modify decompression ratios for unique transient shaping and distortion effects.
- **Enhanced Mixer with Multi-Output Routing** – Choose between Single Mix, Multi Post-Mixer, or Multi Pre-Mixer for flexible DAW integration.
- **Expanded Voice Card Features** – New DMX-based controls, CEM filters, and optional VCA envelopes for deeper sound sculpting.
- **New 48 PPQN Internal Clock & Clock Drift** – Accurately recreates vintage groove timing with adjustable humanized drift.
- **Revamped GUI & Skins** – LM1, DMX, and Linndrum skins with vector graphics, DPI scaling, and HD visuals.
- **Amazing New EPROM Management Panel** – View all 14 custom EPROMs in one window with waveform visualization, an internal EPROM library browser.
- **Advanced EPROM Playback Controls** – Adjust start, loop modes, and memory playback in real time.
- **New "EPROM Kit" Format** – Save and recall full custom EPROM drum sets separately from plugin presets.
- **New Drum Voice: "Ext2"** – Expanding the kit to 14 sounds.
- **Enhanced Oversampling** – New "X16 ALL" mode for full high-frequency processing.
- **Backward Compatible with VProm v2.0** – Load existing presets, including custom EPROMs, directly in VProm 3.0.
- **No Fake Samples – 100% Authentic** – No EQ, no FX, just pure raw drum machine sounds.

INSTALLATION

Compatibility

PC
System Requirements

- Windows 10, or newer
- 64bit Host
- VST3
- Intel i5 or better CPU and 4GB ram recommended

MAC
System Requirements

- Catalina (10.15) or higher
- 64bit Host
- VST3 or Audio-unit Host
- Intel or ARM processor - Universal 2 (Native Silicon/Intel)

Install VProm 3

Install PC:

• Run VProm Installer

Install Mac:

• Run VProm plug-in Installer

• Run VProm plug-in Presets Installer

Additional installation info can be found in your "download link" Email and at the website.

Install Factory EPROM Library

The Factory EPROM Library is an optional collection of μ-law companded 8-bit binary EPROM images, sourced from vintage drum machines around the world, as well as from my personal collection. These sounds are freely available for use in VProm 3 or even with real vintage drum machines.

Downloading & Installing the EPROM Library:

Step 1: Download the Library

1. Visit the **Aly James Lab** website.
2. Navigate to the **Downloads** section under **VProm**.
3. Click the **download link** for the **Factory EPROM Library**.

Step 2: Extract & Place the Files

1. Unzip the downloaded archive.
2. Move its contents to the **VProm Library folder** in your user documents directory.

Default Installation Paths:

- **Mac:** `Users/YourUserName/Music/VPROM Library/` *(also written as `~/Music`)*
- **Windows:** `C:\Users\YourUserName\Documents\VPROM Library\`

Note: The exact path may vary depending on your **system language settings** and **environment variables** (`%USERPROFILE%` on Windows). However, the **VProm Library folder** is always located within your **Documents (Windows)** or **Music (Mac)** folder.

Step 3: Verify Installation

1. If you have **launched VProm 3.0 at least once**, the **VProm Library folder** should have been **automatically created** when accessing the **EPROM browser**.
2. Starting from **update 3.0.1**, an **"OPEN Library" button** is available from the **EPROM browser**, allowing you to quickly access the folder directly from your **OS file explorer**.

EPROM Browser & Library Location:

The **internal EPROM browser** in VProm uses this folder as its **root directory**, meaning all loaded EPROMs will be accessed from this location.

CONTROL PANELS

Overview

VProm's **graphical user interface (GUI)** is designed to be **user-friendly and intuitive**, with different parameters organized into **separate sections** for easy access and control.

Additionally, the **main panel** includes **alternate control sections** that can be accessed dynamically. When you **hover your mouse** over labels such as **TUNE, MIXER, DRUMS, or MTU**, a **highlighted rectangle** will appear, indicating an interactive area. Clicking on these labels allows you to toggle between different control functions, optimizing workflow and usability.

Clicking on the highlighted areas in the **main panel** unlocks **alternate functions**, providing additional control over VProm's sound shaping and behavior. These alternate sections include:

- **PAN** – Adjusts the stereo positioning of each drum voice.
- **DAC ULAW** – Provides control over the **digital-to-analog conversion** characteristics, affecting how the EPROM data is processed.
- **CONTROLS** – Offers additional parameter adjustments for fine-tuning playback behavior.
- **VOL** – Manages global volume level.

Each of these sections offers specific parameters that will be explained in detail throughout this manual.

Hi-Hat Decay Control:

- The **horizontal slider** located at the **bottom-left** of the GUI controls the **decay time** for the **closed hi-hat circuit**, allowing you to fine-tune its cutoff duration.

Triggering Sounds from the GUI:

- You can manually trigger any drum voice **directly from the GUI** by clicking on its corresponding drum pad.
- Some drum pads support **two velocity levels**, replicating the behavior of the original **Linn LM-1 control panel** for dynamic playing.

Section Panel Navigation:

VProm's interface includes a **left-side keypad**, allowing you to switch between different section panels for detailed control:

- **MAIN** – Displays the **mixer, tuning, and triggers**, along with the **Converter & PPQN Events** section.
- **CEMS** – Controls the **CEM 3320 filter settings** for **Bass, Toms, Congas, Extra 1, and Extra 2 voices**.
- **PROM** – Provides access to the **EPROM configuration panel**.
- **SETS** – Manages **global settings**, including **velocity handling, oversampling, and voice output routing**.
- **MIDI** – Opens the **MIDI mapping panel** for configuring MIDI triggers.
- **PSET** – Loads the **global preset browser** for managing and switching between saved configurations.

Each of these panels offers specific controls, which will be explained in more detail throughout this manual.

Advanced Control Shortcuts:

VProm provides several convenient shortcuts for precise control and customization:

- **Right-Click on Sliders or Knobs** – Opens the **MIDI Learn** function (if available), allowing you to assign MIDI controllers for real-time adjustments.
- **Ctrl + Click + Move** – Enables **fine-tuning**, allowing for more precise parameter adjustments.
- **Shift + Click on TUNE Knobs** – Allows for **direct sample rate input** in **Hz**, enabling highly accurate tuning.
- **Alt Gr + Click** – Resets the selected control to its **global default value**, restoring its original setting.

These shortcuts enhance workflow efficiency, giving you greater precision and flexibility when adjusting parameters.

THE AM6070 DAC

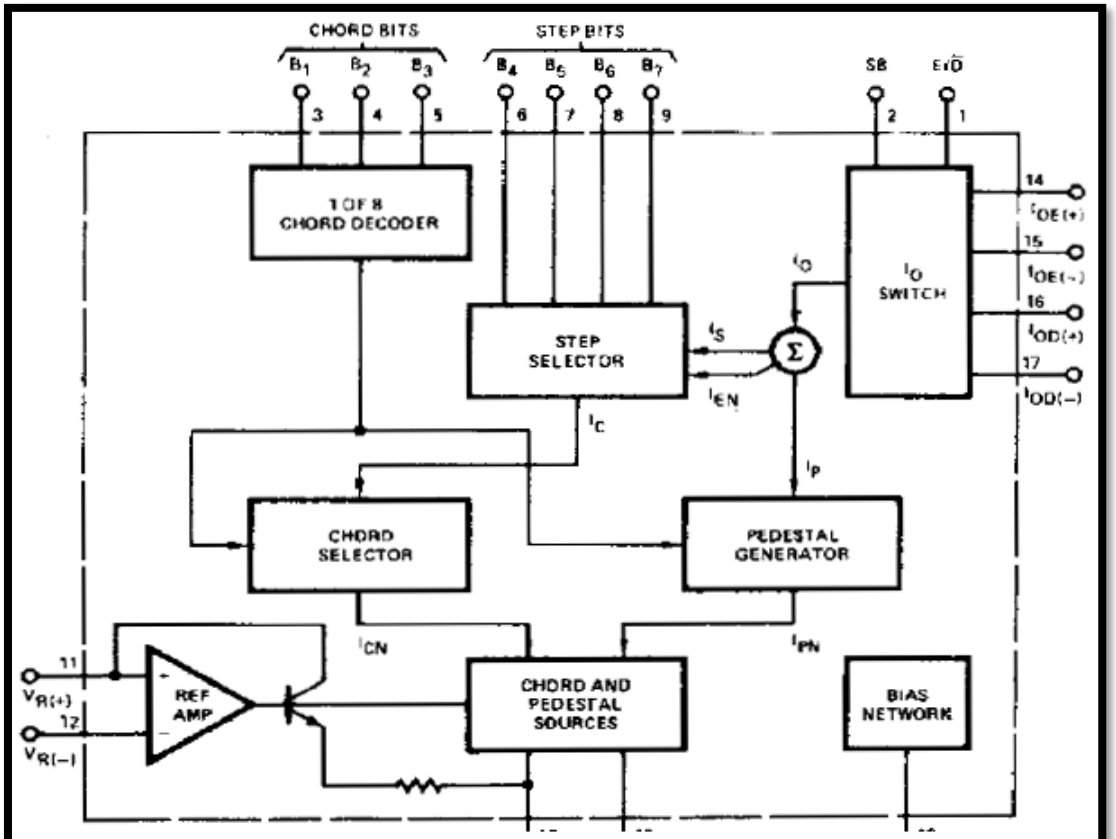
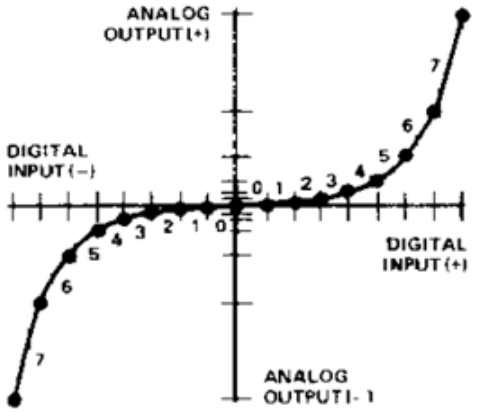


Table 6
Decoder Chord Size Summary

Chord	Chord Endpoints Normalized to Full Scale	Chord Endpoints in μA with 2007.75μA FS	Chord Endpoints as a % of Full Scale	Chord Endpoints in dB Down from Full Scale
0	30	7.5	0.37%	−48.55
1	93	23.25	1.16%	−38.73
2	219	54.75	2.73%	−31.29
3	471	117.75	5.86%	−24.63
4	975	243.75	12.1%	−18.32
5	1983	495.75	24.7%	−12.15
6	3999	999.75	49.8%	−6.06
7	8031	2007.75	100%	0



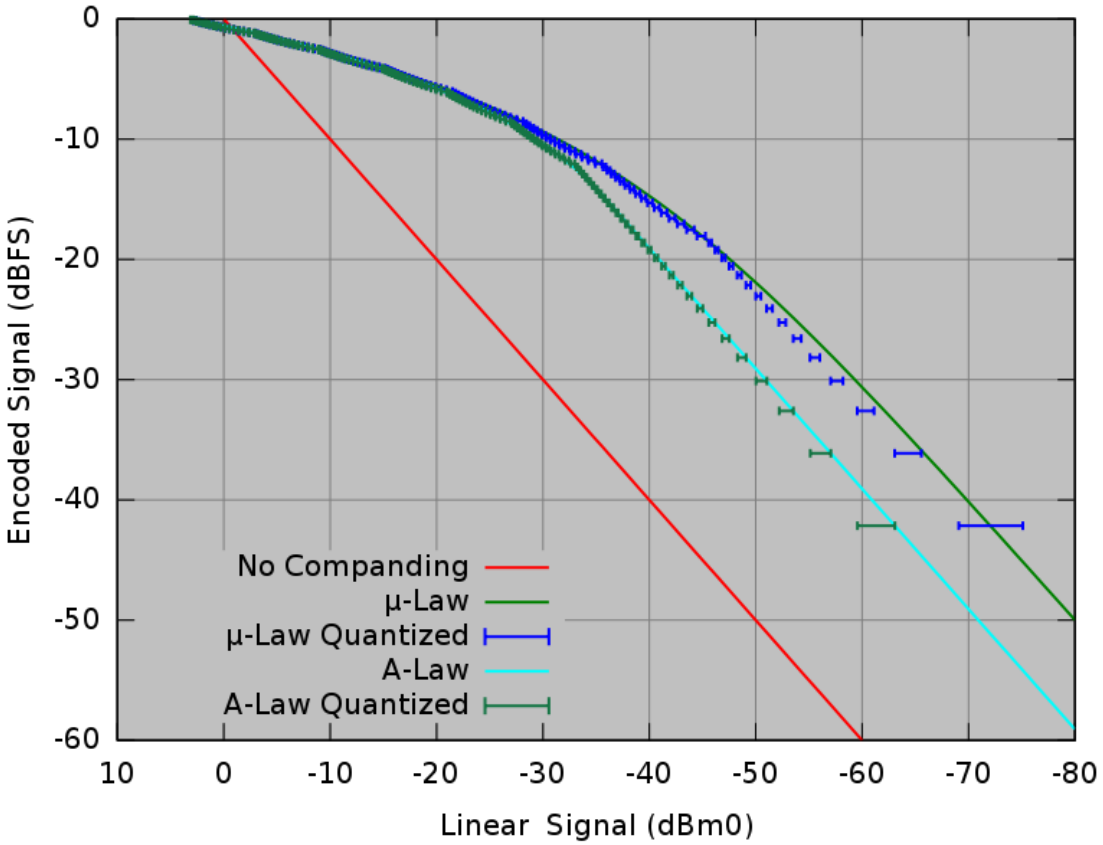
The **AM6070 DAC** was the key component responsible for **decoding** the **8-bit EPROM sound data** in the original **LM-1** drum machine, converting it into a **linear voltage signal**.

This DAC utilizes a **15-segment linear approximation** of the **Bell System μ-255 companding law**, which enhances the dynamic range and resolution of the audio.

How μ-255 Companding Works

- The μ-255 law **compresses** the signal before storage and **expands** it upon playback, effectively improving resolution.
- It achieves this by:
  - Using **three bits** to select one of **eight binarily-related segments (chords)**.
  - Using **four bits** to define one of **sixteen linearly-related steps** within each segment.
  - A **sign bit** determines the signal's **polarity**.
  - An **encode/decode mode input** sets the chip to **companding** or **expansion** mode.

This approach allowed **8-bit EPROM data** to achieve **12-bit performance**, making the AM6070 DAC a popular choice in **1980s pro-audio equipment**, including the **LM-1** and other vintage drum machines.



Memory Constraints & Digital-to-Analog Conversion in the LM-1

During the early 1980s, **memory was extremely expensive**, so efficiently storing digital audio was a high priority. The **Linn LM-1** addressed this by encoding its drum samples in an **8-bit μ-255 companded format**, which allowed for **higher dynamic range** while using less memory.

The **AM6070 DAC** played a crucial role in this system. Its primary function was to **convert the encoded 8-bit digital data into an analog voltage**, processing it **byte by byte** and reconstructing the original waveform.

- **Challenges with Importing Raw EPROM Data**

If you attempt to **import a raw binary EPROM file** (such as an LM-1 drum sample) into an **audio editor like Audacity**, you'll hear **a stream of noise** instead of a recognizable drum sound. This happens because **μ-255 companded data is non-linear** and requires proper **decoding** before it can be heard as intended.

- **Reconstruction & The Vintage Digital Sound**

A **DAC (Digital-to-Analog Converter)** holds each sample's value **until the next one arrives**, creating a **stair-step waveform** rather than a smooth signal. In theory, a **reconstruction filter** should remove the unwanted high-frequency artifacts and restore the original waveform, resulting in a clean signal.

However, **vintage digital hardware** often **lacked proper reconstruction filtering**, or implemented it poorly. This **technical limitation** resulted in a **bright, gritty sound**, which became a defining characteristic of **early drum machines like the LM-1**.

- **Why Modern Sample Playback Sounds Different**

Modern samplers and digital audio workstations (DAWs) use **high-quality interpolation** and **phase accumulators** to recreate audio at different pitches. While this produces a **more mathematically accurate signal**, it lacks the **aliasing and harmonic artifacts** that gave vintage samplers their unique sound.

This becomes particularly noticeable when **lowering the pitch** of an LM-1 sample. In a **modern sampler**, pitch shifting often results in a **dull and lifeless** sound due to the removal of these extra harmonics. However, on the **original LM-1 hardware**, lowering the sample rate **retains the crunchy, bright character** because of how the DAC handles the signal.

- **VProm Recreates This Behavior**

To faithfully reproduce the **authentic LM-1 sound**, **VProm was designed to maintain the original 8-bit grit and character** at any pitch. This ensures that LM-1 samples sound as they would on the **original hardware**, rather than suffering from modern interpolation artifacts.

Comparison: Down-Pitched LM-1 Claps in Modern Audio Editor vs. VProm

When an **LM-1 Claps sample** is pitched down to **13,000 Hz** in a **modern audio editor** versus being played at **13,000 Hz** in **VProm**, several key differences emerge.

Key Observations:

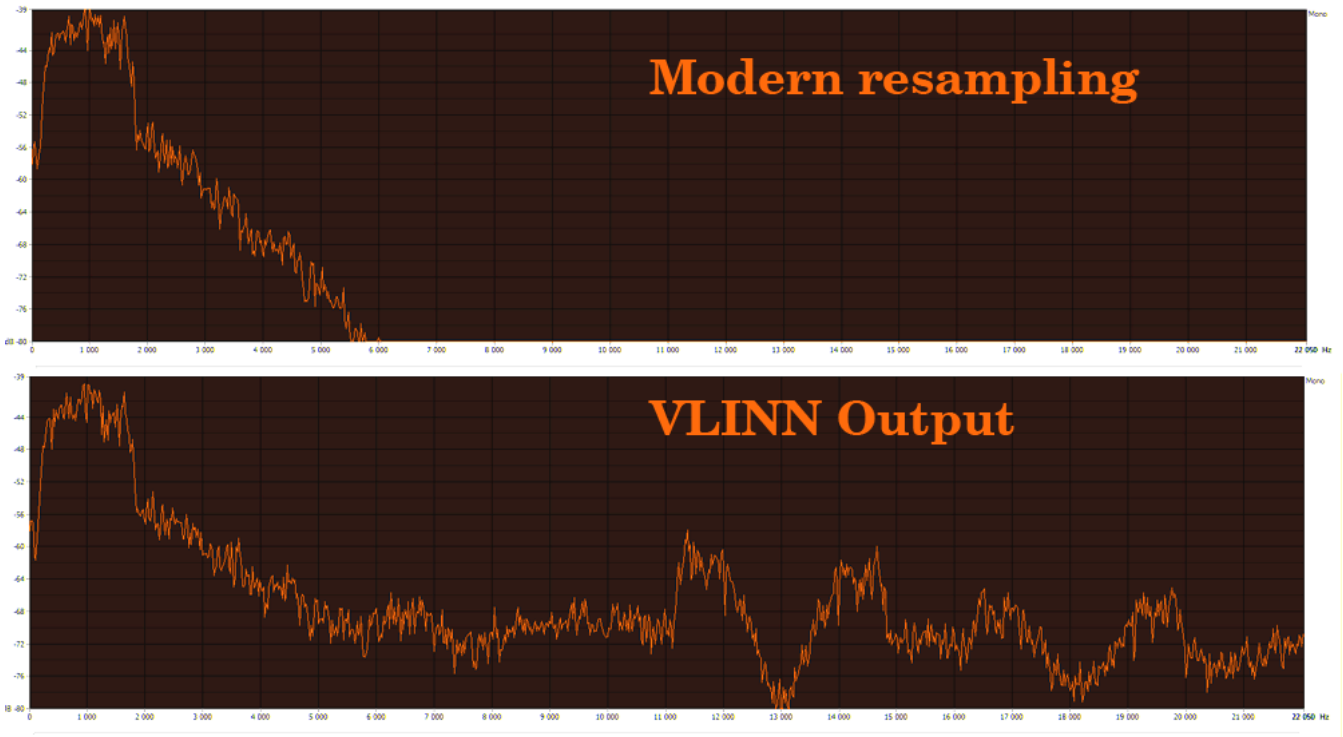
1. **Loss of High Frequencies in Modern Audio Editors**
    - In a modern DAW or sampler, the **down-pitched** clap **loses significant high-frequency content** due to how modern interpolation works.
    - Most DAWs use **high-quality resampling algorithms** that aim for a "smooth" pitch shift, unintentionally filtering out the aliasing and harmonics that were present in the original hardware.
2. **VProm Preserves the Original Character**
    - In **VProm**, the same sample tuned to **13,000 Hz** retains its **bright, gritty sound** because it follows the **same DAC behavior as the original LM-1**.
    - The lack of sophisticated **interpolation and filtering** ensures that the down-pitched sample **still has its characteristic high-frequency artifacts**, making it sound much closer to the original hardware.

Why This Happens

- **Modern sample playback** methods use **smoother interpolation** (such as linear, cubic, or sinc-based resampling), which **removes unwanted artifacts but also eliminates the aliasing that contributed to the LM-1's unique sound**.
- **The LM-1's DAC**, on the other hand, plays back samples **without modern filtering**, preserving the raw **8-bit digital "stair-step" sound** along with its inherent aliasing and imperfections.

By replicating this behavior, **VProm ensures that samples sound authentic at any pitch**, avoiding the **dull, lifeless playback** often heard in modern software.

Image from version 1.0 (VProm was called VLinn back then) The graphic ranges from 0Hz to 22050Hz.



DAC µ-Law Transfer Function Tweaking

VProm 3.0 introduces a powerful new feature: **modifying the DAC's µ-Law transfer function**.

What Does This Mean?

The **µ-Law transfer function** is essentially a **compression curve** that determines how the **AM6070 DAC** translates 8-bit digital data into an **analog-like voltage signal**. In real hardware, **different AM6070 chips could have slight variations** in their response, affecting the overall character of the sound.

Now, with **VProm 3.0**, you can **tweak this function** to fine-tune how the DAC behaves, either for **authentic hardware variations** or for creative sound shaping.

Creative Applications & Sound Shaping

At **subtle settings**, adjusting the transfer function helps to **better approximate the response of real-world AM6070 chips**, adding a **touch of realism** to the emulation.

At **extreme settings**, this feature becomes a **powerful transient and distortion shaper**:

- **Ratios closer to 0.5:1 → Brings out quieter details**, making soft transients more prominent, like a compressor sustainer.
- **Ratios above 1:1 → Enhances snappiness & impact**, making transients more defined, reducing sustain.

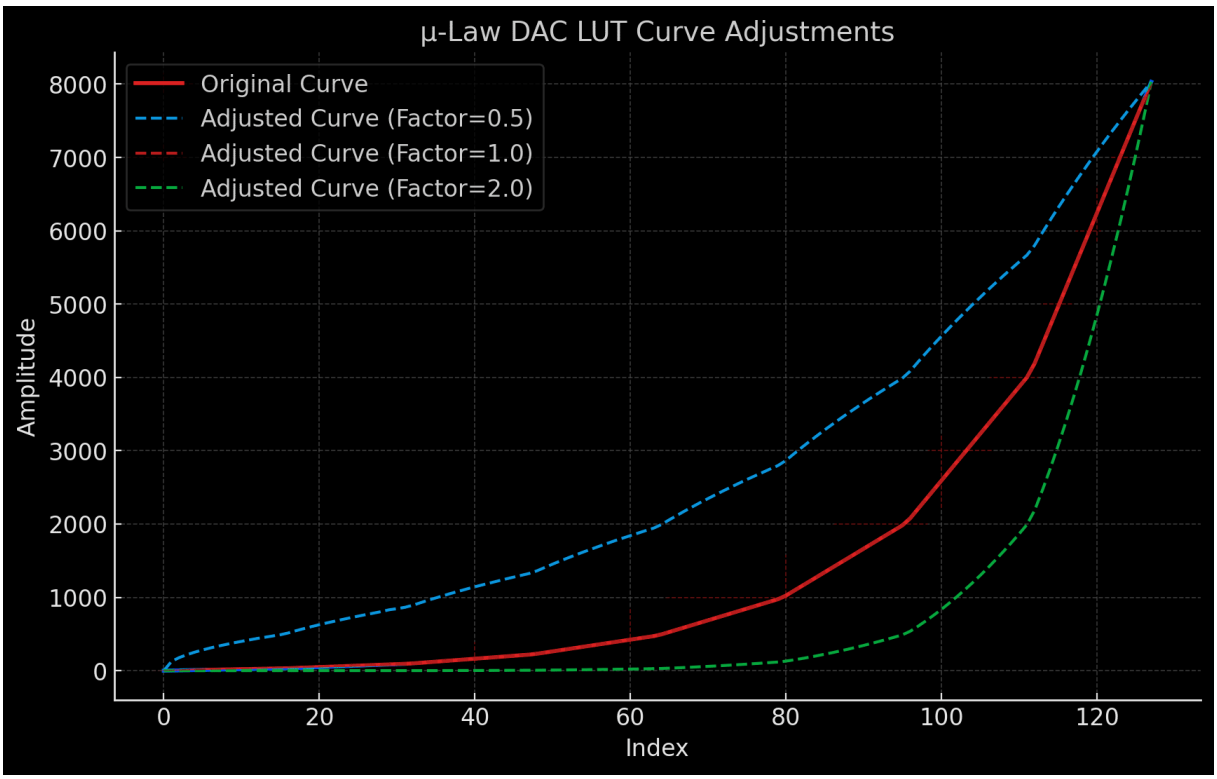
This allows for **dynamic tonal shaping** that blends the raw digital grit of vintage samplers with modern sound design flexibility.

Experiment & Explore

The way this feature affects the sound **depends on the source material**, so experimentation is key. A simple way to think about it:

- **Lower values = more compressed, more perceived loudness**
- **Higher values = punchier, snappier, sharper transients, less perceived volume**

In short, you can **treat it as a "nasty" transient shaper**, giving your drums and samples an **extra edge**, all while maintaining the authentic characteristics of vintage digital processing.



Per-Sound DAC Curve Customization

Since the original **Linn LM-1** used **one DAC per sound**, **VProm 3.0** faithfully replicates this by allowing you to set a **custom DAC curve for each individual drum voice**.

Accessing DAC Ratio Controls

- Click on the **MIXER** label in the interface.
- The label will change to **DAC ULAW**, replacing the **14 volume sliders** with **14 digital ratio sliders**.
- Each slider controls the **DAC transfer function ratio** for a specific drum sound, letting you **fine-tune or creatively distort each voice independently**.

Resetting to Default

- **ALT Gr + Click** on any slider to **reset it to a perfect 1/1 ratio**, restoring the default DAC behavior.

This per-sound customization provides **unmatched flexibility**, allowing either:

- **Accurately replicate variations between real AM6070 chips**, or
- **Use extreme settings for unique transient and distortion shaping per drum voice**.

VARIABLE SAMPLE RATE TUNING

One of the **most exciting features** of vintage drum machines and early samplers was their **dedicated tuning knob per drum voice**.

The system is quite simple:

- An **oscillator** served as the **clock source** for reading the **EPROM data**.
- The **oscillator frequency** determined how fast the **EPROM content was read**, effectively controlling the **sample rate** of each sound.

Since there was **no advanced interpolation or resampling**, changing the pitch (sample rate) introduced **aliasing**—but not the **bad** kind. Instead, it created **harmonically related reflections**, contributing to the signature **gritty and bright** sound of the LM-1.

Challenges in a Modern DAW

Unlike the **original LM-1**, which directly played back samples at varying rates, a modern **DAW operates at a fixed sample rate (e.g., 44.1kHz or 48kHz)**. If not handled properly, this could introduce **extra unwanted aliasing** due to the mismatch between the **plugin's processing rate** and the **DAW's sample rate**.

How VProm Handles This

To **accurately recreate** the hardware's behavior while avoiding unwanted digital artifacts, **VProm 3.0** employs **high-quality oversampling**:

- A massive **16x oversampling process** ensures that aliasing is **controlled properly**, while keeping the **desired harmonic reflections** intact.
- This means **VProm processes sound at 16 times your DAW's sample rate**, reducing unwanted digital artifacts **without excessive CPU usage**.

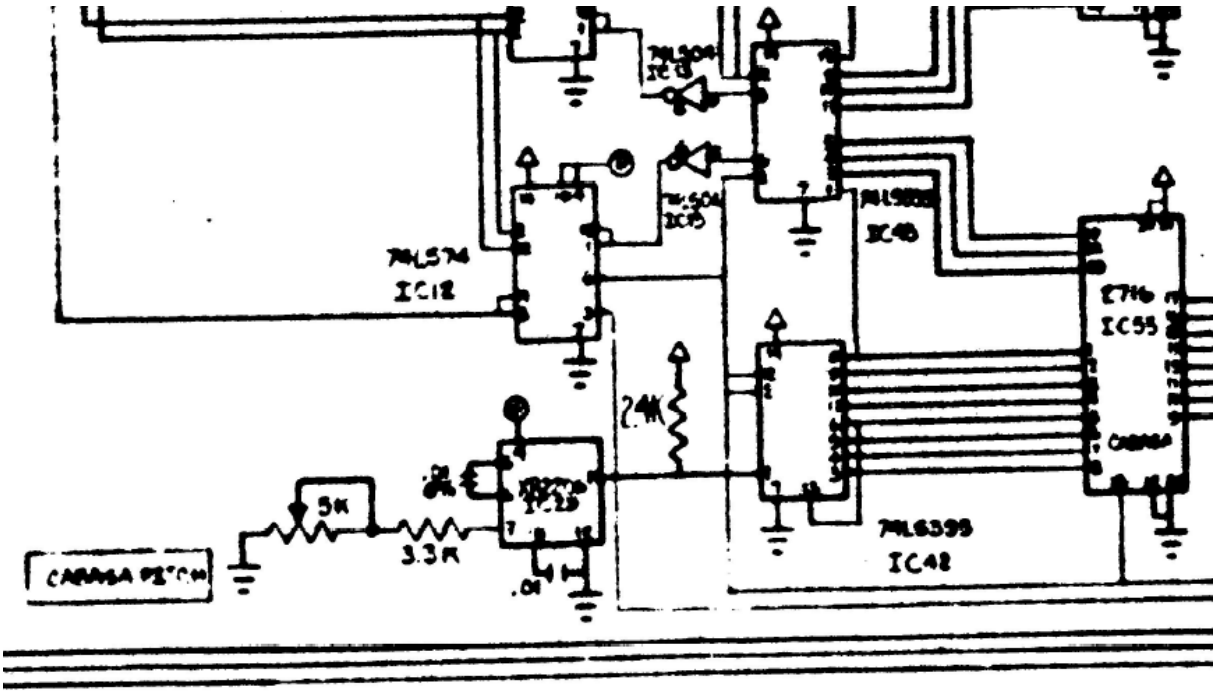
Oversampling Options (SETS Panel)

You can configure oversampling in the **SETS** panel. VProm 3.0 offers three modes:

1. **OFF** – No oversampling (may introduce unwanted aliasing in some cases, not necessarily a bad thing).
2. **X16** – Applies **16x oversampling only** to sounds with significant **high-frequency content** (same as VProm 2.0 behavior).
3. **X16 ALL** – Applies **16x oversampling to ALL sounds**, ensuring maximum fidelity at all tuning settings.

This **advanced processing technique** allows **VProm to retain the authentic LM-1 character** while eliminating digital artifacts that wouldn't exist in the original hardware.

Here you can see a part of an old LM-1 schematics that shows how the XR2206 (clock OSC) is connected and what values were used for the timing capacitor & timing resistor(s) for the Cabasa voice.



With this particular factory configuration, it gives us the following sample rates:

MAX = 1/0.000033 = 30303 Hz
MIN = 1/0.0000833 = 12005 Hz

Expanding the Tuning Range in Hardware:

- A **quick modification** to increase the **tuning range** was to **replace the 5K tuning potentiometer with a 10K pot**, which lowered the **minimum sample rate** to approximately **7,512 Hz**.
- These types of hardware modifications were often performed to customize drum sounds and extend tuning flexibility.

VProm 3.0 Extended Tuning Range

To offer **greater flexibility**, **VProm 3.0** provides a **much wider tuning range**:

- **1000 Hz to 52,000 Hz** (significantly beyond the LM-1's original range).
- This allows for deeper **low-pitch tuning** and **extreme high-pitch sounds**, making it more versatile than the original hardware.

Additionally, VProm introduces a **Master Tuning Rate Multiplier**, which further expands the tuning range:

- **Master Tuning = 1.0** → No change (default behavior).
- **Master Tuning = 1.5** → A sample tuned to **52,000 Hz** now plays at **78,000 Hz**.
- **Master Tuning = 0.5** → Extends the **low range**.

This feature enhances the creative possibilities of **VProm 3.0**, letting users push the sound beyond the limits of the **original LM-1** while maintaining its **authentic character**.

Quick Tip: Simulating Tuning Instability & Creative Modulation

You can slightly modulate the Master Tuning parameter using automation in your DAW to simulate tuning instability, mimicking the natural pitch drift that sometimes occurred in vintage hardware.

For subtle analog-style variations:

- Apply **gentle, slow automation** to Master Tuning to create a **slight pitch wobble**, adding realism and warmth.
- This can replicate the **drift of aging components** in real vintage drum machines.

For extreme sound design:

- **Dramatically automate Master Tuning** for wild, pitch-bending effects.

THE HIHAT CASE

The Unique LM-1 Hi-Hat Circuit & VProm's Advanced Loop Control

The **LM-1 Hi-Hat circuit** was unlike any other drum machine of its time, utilizing a **constant loop playback method** that gave it a **live, dynamic feel**.

How the LM-1 Hi-Hat Worked

Unlike the other drum voices, the **Hi-Hat EPROM** was set to **loop continuously** regardless of whether a note was triggered. The **open or closed Hi-Hat commands** simply controlled the **decay time** of a **volume envelope**, shaping how long the sound was heard.

- The **Hi-Hat EPROM contained a continuous burst of raw open Hi-Hat audio**. This worked perfectly for looping but **wouldn't function properly with a naturally decaying sound**.
- When a **closed Hi-Hat** was triggered, the **circuit discharged the current through an additional path**, controlled by the **decay potentiometer**.
- This **constantly looping behavior** meant that **each hit sounded slightly different**, introducing **subtle variations that made the Hi-Hat feel more natural and dynamic**.
- Interestingly, **the LinnDrum did not use this same technique**, making the **LM-1's Hi-Hat behavior unique** among early drum machines.

VProm's Evolution: From Fixed to Fully Controllable Looping

- **VProm 2.0** successfully **emulated** this **Hi-Hat looping behavior**, but it lacked user control. The loop was always active, and **if you replaced the Hi-Hat EPROM with a custom one, the looping function would always be turned off**.
- **VProm 3.0** now offers **full user control over the Hi-Hat loop**, allowing for more flexibility and creative options.

How to Control the Hi-Hat Loop in VProm 3.0

- **Click on the "DRUMS" label** above the trigger button section.
- This opens the **CONTROLS section**, where you'll find a **LOOP toggle** among other settings.

- **Turning the LOOP flag off** disables the Hi-Hat's looping behavior, allowing it to function like a regular one-shot sample.

Expanding Looping to Other Sounds

- **VProm 3.0** goes beyond just the **Hi-Hat**—it allows **looping to be enabled for other sounds as well**.
- This opens up **new creative possibilities**, such as **sustained sounds, rhythmic textures, or experimental looping effects** for non-Hi-Hat drum voices.

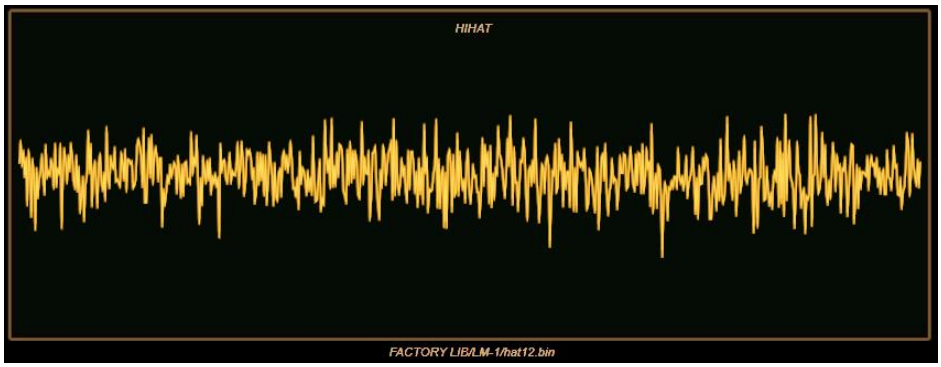
Hi-Hat EPROM Loop Settings in VProm 3.0

In **VProm 3.0**, you can customize the **Hi-Hat looping behavior** even further using a dedicated setting in the **SETS** section. This allows for more flexibility in how the **looped Hi-Hat EPROM** behaves during playback.

Hi-Hat EPROM Loop Modes

There are **two loop behavior options** available:

1. **Free Running** – The Hi-Hat **loops continuously**, just like the original **LM-1 behavior**.
    - The EPROM keeps cycling, and triggering an **open or closed Hi-Hat** simply controls the **volume envelope**, affecting how long the sound is heard.
    - This method introduces subtle **variations on each hit**, making the Hi-Hat feel more **dynamic and natural**.
2. **Trigger Sync** – The Hi-Hat **still loops continuously**, but **each trigger resets the playback to the beginning** of the EPROM sample.
    - This ensures that every Hi-Hat hit **starts from the same point**, creating a more consistent and controlled sound.
    - This mode can be useful for **tight, punchy rhythms** where you want more precise timing.



LM-1 Hihat EPROM Data.
Turning off the Hi-Hat LOOP is typically the preferred setting unless you're using the original LM-1 Hi-Hat sample or a custom-made "Hi-Hat burst." Alternatively, you can adjust the start and end points of a long cymbal sound and enable looping—plenty of ways to get creative!

The **SETS panel** also includes a **subtle Open Hat Decay adjustment** along with **Dynamic Tuning**, which allows velocity to slightly influence Hi-Hat tuning. Additionally, since **VProm 3.0.1**, a **Dynamic "Accent" feature** lets velocity affect the **closed Hi-Hat decay time**, adding a more natural variation to the performance.

If you listen to the **LM-1 open Hi-Hat in isolation**, the looping behavior is quite noticeable, but within a **full mix**, it becomes far less apparent.

MAIN PANEL

Each voice has a volume level, simples as old vintage hardware. These sliders can be MIDI learned or automated as most of the VProm parameters (See Automation.)

The **Main Panel** serves as the central hub for VProm's core functions, providing quick access to essential controls.

Top Row Controls:

- **LOAD/SAVE** – Manage **presets** and **banks**, allowing you to quickly recall your favorite settings. See Presets & Banks section.
- **INFO Button** – Displays **important details** about the plugin.
- **SKIN Setting** – Allows you to switch between different **graphical skins**, visually emulating iconic drum machines that share the same core architecture, including:
  - **LM-1**
  - **DMX**
  - **LinnDrum**

This feature lets you customize the look of VProm to match your preferred classic drum machine aesthetic while maintaining the same powerful functionality, note that with the correct custom EPROM set and CEMs settings you won't just have the look but the sound as well!

Central Section:

The **central section** of the **Main Panel** contains the core **mixer, tuning controls, and triggers**, all of which can be toggled to reveal alternate functions.

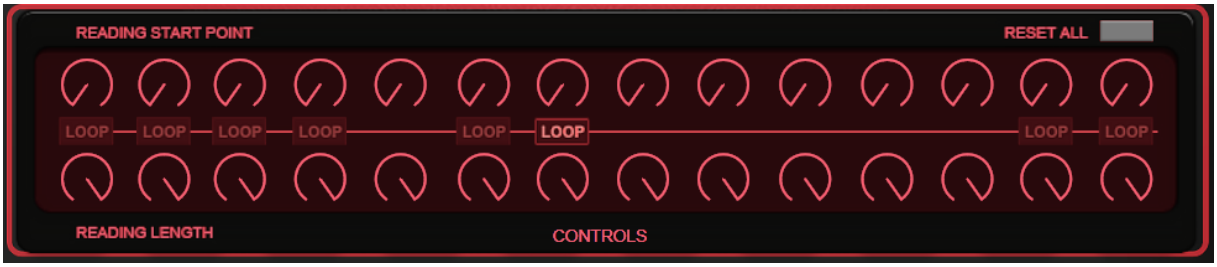
Main Controls & Toggle Functions

- **TUNE, MIXER, and DRUMS** labels can be **clicked to toggle between**:
  - **PAN** – Controls **panning** for each drum sound.
  - **DAC ULAW** – Modifies the **DAC compression curve** (explained in the AM6070 DAC section).
  - **CONTROLS** – Provides advanced sample manipulation options.

Mixer Features

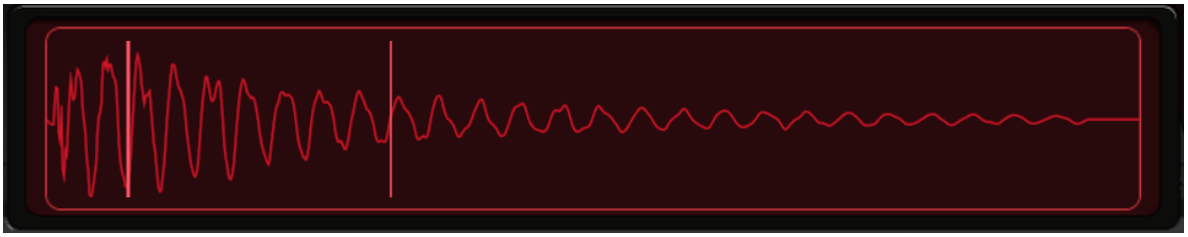
- Each voice has a **volume slider** and a **mute button** located underneath.
- **Trigger Indicators** (red LEDs) show when a sound is playing.
- If a **custom EPROM** is loaded, the **trigger LEDs change from red to yellow**, visually indicating the modified sound source.

Alternate CONTROLS Section:



This section allows **precise control over sample playback**, modifying how each sound is read from the **EPROM memory**.

- **Memory Start & Length Controls**
  - Adjust the **start point** and reading **length** of each sound directly.
  - Clicking or tweaking these settings displays a **waveform visual**, ensuring precise edits.



- **LOOP Flag (For Select Sounds):**

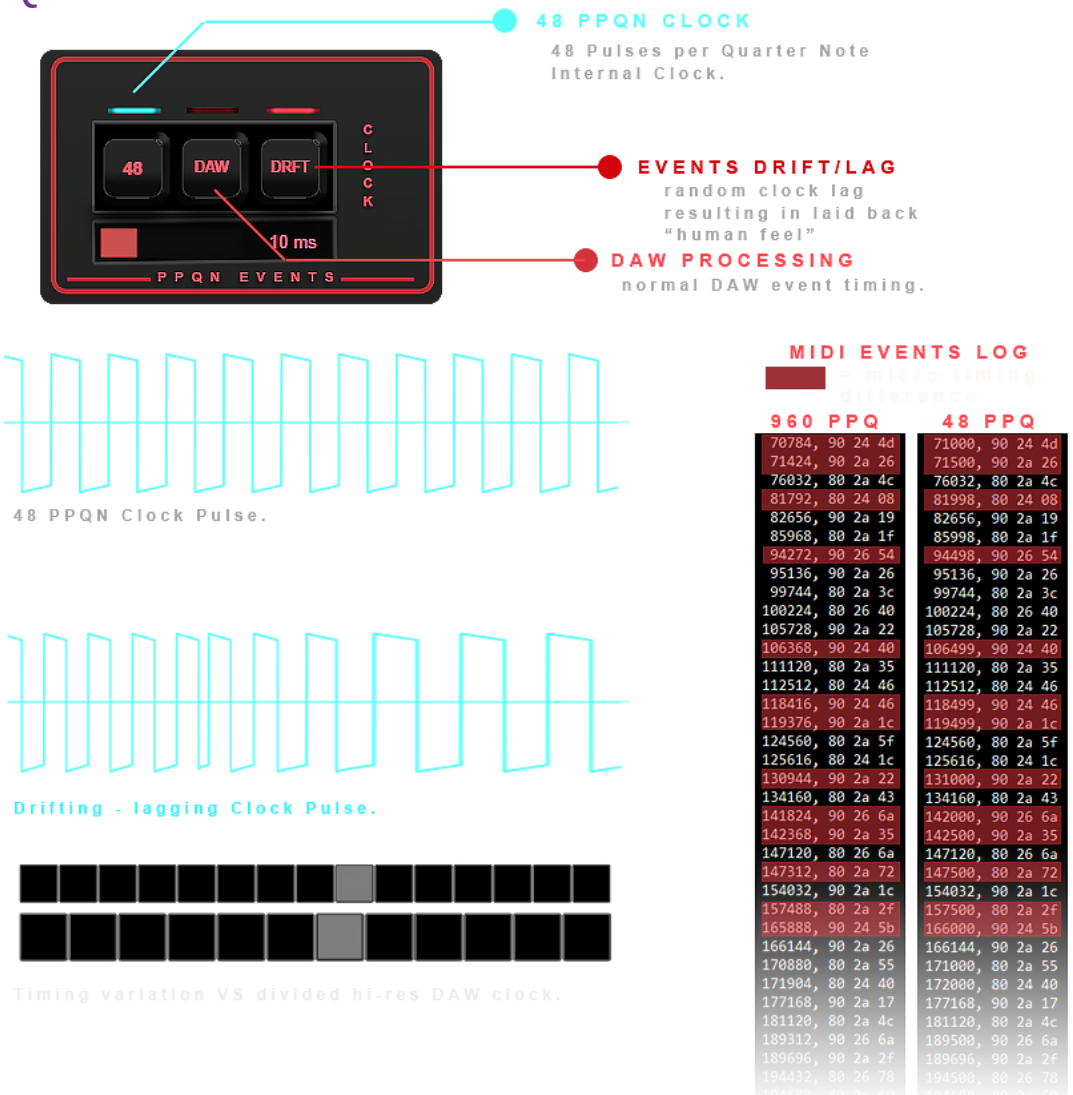
  - Certain sounds (like the LM-1 Hi-Hat) feature a **LOOP mode**, allowing continuous playback instead of one-shot triggering.
  - When enabled, the sample **repeats seamlessly**, similar to the **LM-1's looping Hi-Hat circuit**. (A loop envelope decay time is available under the CEMS panel when LOOP is engaged excepted for the Hi-Hat – see CEM FILTERS).

Experimental Sound Design: Wavetable-Like Behavior?

- If the **sample length is reduced to very small values** (minimum is **123 bytes**), the sample enters a **wavetable-like territory, the loop portion becomes an oscillator** where shifting the **start point** changes the harmonic content.
- While this is **not a full-fledged wavetable system by any means**, it can produce **unique tones** and be modulated for creative effects especially while using the CEM filters.
- At the **smallest length**, the sample will generate an **A3 tone (~220 Hz)** when the **sample rate is set to 27,060 Hz (tuning)**.
  note: 27060Hz is also the default sampling rate of the built-in converter.

A **RESET ALL** button is available to restore:
✓ **All start points**
✓ **All length settings**
✓ **All LOOP flags**
...back to their **default values**, providing a quick way to revert modifications.

PPQN Events Section:



The **PPQN (Pulses per quarter note) Events** system in VProm controls the **sequencer clock resolution**, essentially defining the **timing grid** for triggering events. This is what gives **vintage drum machines their distinct groove** compared to modern ultra-high-resolution sequencing.

48 PPQN Timing Emulation

The **48 PPQN pulse** replicates the **timing resolution of classic drum machines**, which had a much lower sequencing resolution compared to modern DAWs that operate at ~**960 PPQN** or

higher. Instead of allowing infinitely precise trigger placements, the 48 PPQN clock subtly locks events to a **low-resolution pulse grid**, syncing tightly to the DAW's tempo while preserving a slightly imperfect, human-like feel when used in conjunction with DRFT (Clock Drift). **VProm derives its on 48 PPQN clock from your DAW's current tempo and will try to stay in sync with start/stop events.**

The difference is subtle but noticeable, especially on swung or loosely played beats. This introduces slight differences in time placements as the time grid got fewer possible "options" to place an event in time. While this setting won't drastically change a beat, it may introduce the final touch of authenticity needed to replicate the feel of vintage drum machines.

Real-Time Clock Drift

VProm also introduces **real-time clock drift**, simulating the **natural instability** of vintage drum machine clocks. Unlike the **48 PPQN pulse grid**, which subtly influences timing, clock drift creates a **more noticeable, organic variation in trigger placement**.

In vintage hardware, internal clocks were never perfectly stable, and fluctuations in timing contributed to the characteristic feel of these machines. VProm allows control over this behavior, with a **drift range adjustable from 1 ms to 40 ms**. At lower settings, the effect is mild, introducing subtle realistic inconsistencies. At higher settings, the drift becomes more pronounced, mimicking a **laid-back, human groove** similar to a live drummer's natural timing imperfections.

How VProm Handles Timing & Drift

VProm dynamically generates a **real-time 48 PPQN clock** based on the **current DAW tempo**. This clock automatically readjusts when playback is paused or when the song position changes, keeping it in sync with the DAW.

The **PPQN Events section** offers three different modes for controlling timing behavior:

- **DAW Mode ("DAW")** – Uses the DAW's native trigger events without modification. This mode ensures that timing remains exactly as played or programmed in the sequencer.
- **48 PPQN Mode ("48")** – Activates VProm's internal **48 PPQN clock**, remapping all trigger events to fit the classic lower-resolution timing grid.
- **Drift Mode ("DRFT")** – Engages the **clock drift engine**, introducing randomized timing fluctuations based on the current drift setting (0 - 40 ms, with a default of 8 ms). When enabled, triggers will subtly shift in time, creating a more organic and unpredictable groove.

A unique feature of VProm is that **clock drift can also be applied in DAW mode**, allowing for slight variations in timing even when using the DAW's native trigger events.

Tech Note: While VProm is capable of generating a 48 PPQN clock and remapping incoming MIDI events in real time, it operates within the constraints of plugin processing. Due to these limitations, VProm cannot generate events retroactively (i.e., trigger events that would have occurred in the past).

MIDI event remapping happens in real time, but plugin processing prevents outputting an event at a block position that is significantly in the past without introducing latency and I didn't want to add any extra latency. For this reason, in rare cases where a clock event remap would have fallen outside the current processing block (this can happen sometimes), the event is either ignored or scheduled for the closest clock tick. In most cases, this won't occur, as VProm still retains a degree of past-event handling within the current processing block.

Using Clock Drift for a More Natural Groove

The effect of clock drift varies depending on tempo. Higher drift values work best at slower tempos, where loose timing can create a relaxed, natural groove. Lower drift values are more suitable for faster tempos, keeping the rhythm tight while adding subtle variations.

Since clock drift is **truly random**, VProm will not reproduce the same drift pattern twice. For users who want to lock in a specific groove, it is recommended to **record VProm's output as audio** once the desired feel is achieved.

This level of **timing control** allows VProm to accurately emulate the imperfections of vintage drum machines while also offering creative possibilities for more organic and funky evolving rhythms.

Converter Section:

Located just above the **PPQN Events** section, the **Converter** section is a new addition to VProm, introducing a **built-in EPROM creator**. This allows users to generate **custom EPROM binary files** directly within the plugin, eliminating the need for external tools. The generated files are **ready for use in VProm** or even **real hardware drum machines**.

With this feature, any **.wav file** can be imported and sampled using a process that **mimics classic hardware workflows**. The resampling is handled by an **emulated R2R ADC**, which introduces a **tweakable input stage** along with proprietary processing techniques before final conversion at **approximately 27 kHz**.

If the original **.wav file** has a sample rate **less than or equal to 27 kHz**, resampling is automatically **bypassed** to preserve the original data. Users can also **disable the resampling stage** if needed for complete control over the conversion process.

For detailed instructions on how to sample, convert, and burn EPROM files, refer to the **Sample/Convert/Burn** section.

Master Tuning & Volume Control (MTU/VOL Knob)

Just above the **display screen**, which reflects **sampling conversion info** and other **settings details**, you will find a knob next to the **MTU** label. This knob has **two functions**, depending on its toggle state.

Similar to how **TUNE/PAN** toggles between functions, clicking on **MTU** switches it to **VOL**, changing its behavior:

- **MTU (Master Tuning)** – Controls the **global tuning rate multiplier**, affecting the overall pitch of all sounds.
    - **ALT Gr + Click** resets the tuning multiplier to a **perfect 1x rate** (default setting).
- **VOL (Volume)** – Controls the **overall master volume** of VProm.

This dual-function design allows quick access to **both pitch control and master volume** within a compact interface.

CEM FILTERS PANEL

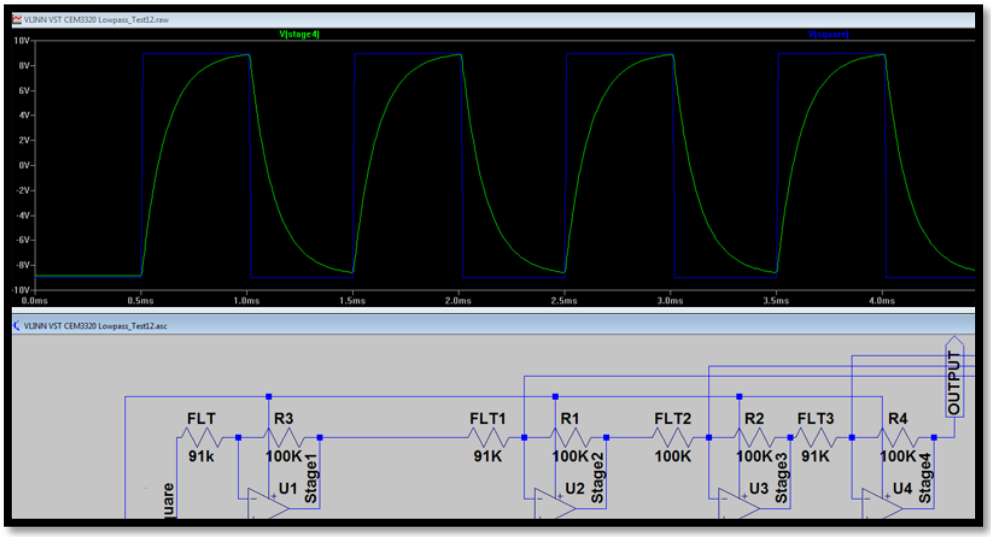
Quantized Noise Filtering & the LM-1's CEM3320 Implementation

Unlike the **earliest LM-1 units**, which were produced **without noise filters**, later **revisions** introduced **CEM3320 Voltage-Controlled Filter (VCF) chips** to refine the output of specific drum voices.

The purpose of these filters was to **reduce the 8-bit quantized noise** inherent in the LM-1's digital samples while **enhancing low-end response**. The **BASS, TOMS, and CONGAS** voices were routed through these filters to create a **fuller, warmer sound**.

The **CEM3320 chip** is a highly flexible filter that can be configured in multiple ways. In the **LM-1**, it was implemented as a **4-pole low-pass filter with no resonance**, meaning it effectively smoothed out high-frequency noise while maintaining the fundamental tone of the drum samples.

VProm 3.0 accurately models this **filter behavior**, preserving the **authentic tonal shaping** of later LM-1 units while also providing users with control over the filtering process.



The **control voltage (CV)** that governs the **frequency of the CEM3320 Voltage-Controlled Filter (VCF)** was designed in a way that allowed **transients to pass through relatively unfiltered**.

This means that while the **steady-state portion of the sound was smoothed out**, the **initial attack** of the **Bass, Toms, and Congas** retained its sharpness, preserving the punch and impact of the original drum samples. This approach helped maintain the **natural percussive character** of the sounds while still reducing the **8-bit quantized noise** in the sustained portion of the waveform.

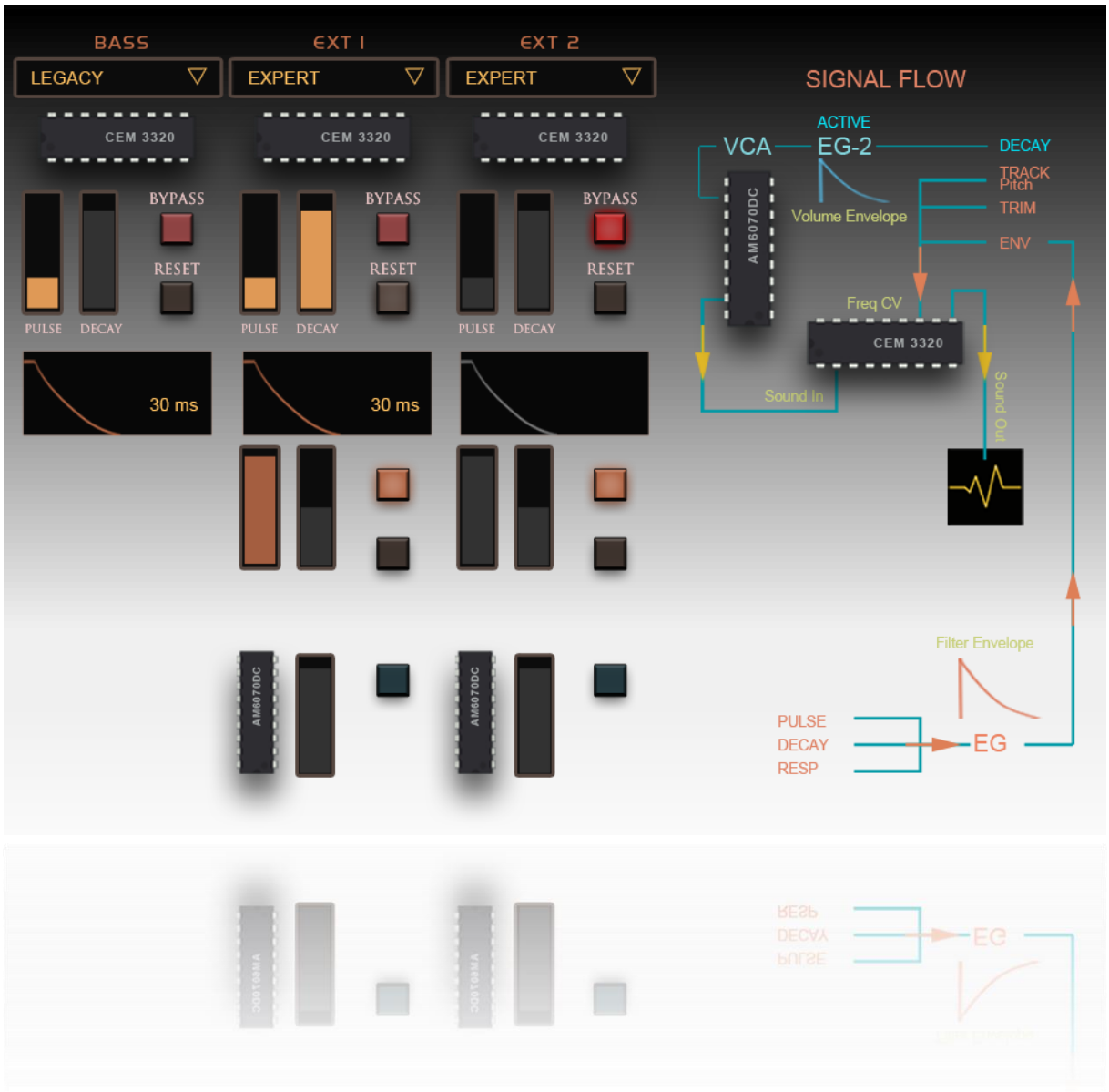
CEM Filters:

Advanced Controls in VProm 3.0

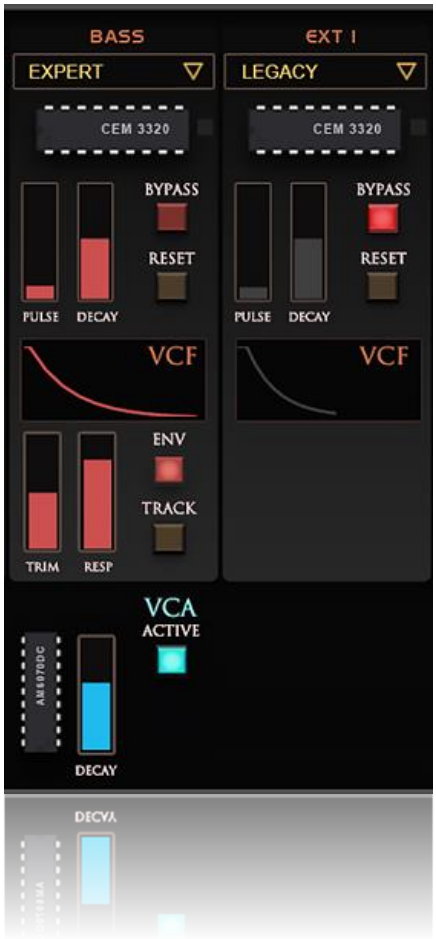
In **VProm 2.0**, basic control over the **CEM3320 filter envelope pulses** was available, allowing for limited tweaking. However, **VProm 3.0** greatly expands these capabilities.

While the **VProm 2.0 behavior** remains accessible as **LEGACY mode**, a new **EXPERT mode** unlocks deeper control over the **CEM filters**, including additional filtering for **Extra 1 and Extra 2 voices**.

Additionally, some features found in **DMX voice cards**, such as **Volume Envelopes** and **Filter Tracking**, have been implemented, providing even more control over the sound-shaping process.

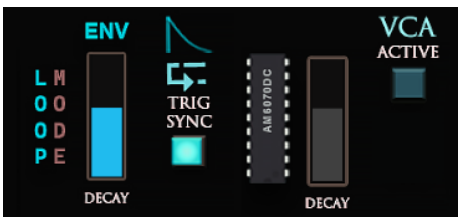


Breakdown of CEM Filter Controls



Each **CEM-enhanced** voice in VProm 3.0 features the following parameters:

- **MODE** – Switches between:
  - **LEGACY Mode** – Replicates the **fixed** filter envelope from VProm 2.0, allowing control over **pulse time only**.
  - **EXPERT Mode** – Unlocks **full CEM filter controls** for advanced shaping.
- **BYPASS** – Completely removes the **CEM3320 filter** from the circuit, leaving the sound unfiltered.
- **PULSE** – Controls the **envelope pulse duration** (0 - 300 ms).
  - The default setting is **30 ms or less**.
  - Higher values act as a **hold stage**, keeping the filter open longer before decay begins.
- **DECAY** – Adjusts the **decay time** of the filter envelope (**EG1**), controlling how quickly the filter closes after the initial pulse.
- **RESET** – Resets all **CEM filter settings** (including **VCA settings**) to their default LM1 values.
- **TRIM** – A **bipolar filter frequency offset**, allowing fine adjustments to **open or close the filter**.
  - **ALT Gr + Click** resets the control to the default **center position**.
- **RESP** – Controls the **envelope response curve**, ranging from **linear to exponential** for different dynamic behaviors.
- **ENV (Envelope On/Off)** –
  - **ON** – Activates the **filter envelope** for dynamic filtering.
  - **OFF** – Disables the envelope, keeping the filter static.
- **TRACK (Filter Tracking)** –
  - **ON** – Engages **filter tracking**, where the **sample rate (tuning)** affects the filter's **cutoff frequency**.
- **VCA Active** – Enables a **secondary envelope (EG2)** that treats the **DAC as a VCA**, shaping the overall **volume envelope**.
  - This technique was used in hardware such as the **DMX bass drum** to dynamically shape volume.
- **VCA Decay** – Controls the **decay time of the volume envelope**, shaping how long the sound sustains after triggering.



Note that when LOOP is active any active VCA is replaced by a dedicated LOOP envelope, you also control the LOOP behavior (free running or trigger synced) from here.

PROM PANEL

*Manage all 14 custom EPROMs in one window with **waveform visualization**, direct loading on click, real-time auditioning, quick reset, and more.*

PROM Panel: Custom EPROM Loading & Management

One of the most exciting features in **VProm** is the ability to **replace or swap EPROMs**, allowing users to move beyond the default **LM-1 sounds**.

An **EPROM binary image** is essentially a **raw data dump of an EPROM chip's content**. VProm is capable of reading **real .bin EPROM images in µ-Law 255 format**, providing full compatibility with **vintage drum machine sounds**.

EPROM Compatibility & Supported Formats

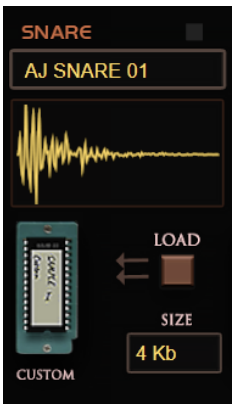
VProm 3.0 expands on previous versions by supporting **EPROM sizes ranging from 512 bytes up to 64K**, opening the door to a vast array of vintage drum machine samples, including:

- **Oberheim DMX & DX**, **LinnDrum, Linn 9000, Emu SP-12, Drumulator, Sequential Circuits Drumtraks, TOM…**
- **And many more…such as custom EPROM binaries created in the built-in Converter (see Sample/Convert/Burn section)**

PROM Panel Overview

The **PROM panel** provides a clear overview of all **14 EPROM slots** at once.

- When a **custom EPROM is loaded**, a **yellow waveform view** appears, along with a **loaded ZIFF socket indicator**, signaling that the default sound has been replaced.
- The **original LM-1 sound** assigned to the slot is displayed in **orange** as a reference.
- Clicking the **LOAD** button opens the **internal EPROM Browser**, allowing users to browse and load new EPROMs quickly.
- The **top row of the PROM panel** includes **global functions** for managing EPROM configurations.



Global Functions in the PROM Panel:

- **RESET ALL**
  - Unloads any **custom EPROMs** and resets the **Hi-Hat LOOP** state to **ON**, restoring the **LM-1 default behavior**.
- **LOAD/SAVE KIT**
  - Loads or saves a **.vpromKit file**, which acts as a **sub-preset** containing:
    - **Custom EPROM file paths** (all currently loaded EPROMs).
    - **CEM filters settings**.
    - **Hi-Hat LOOP state**.
  - Unlike full presets, **.vpromKit files** save only the **EPROM & CEM configurations**, making them useful when **switching drum kits without affecting other settings**.

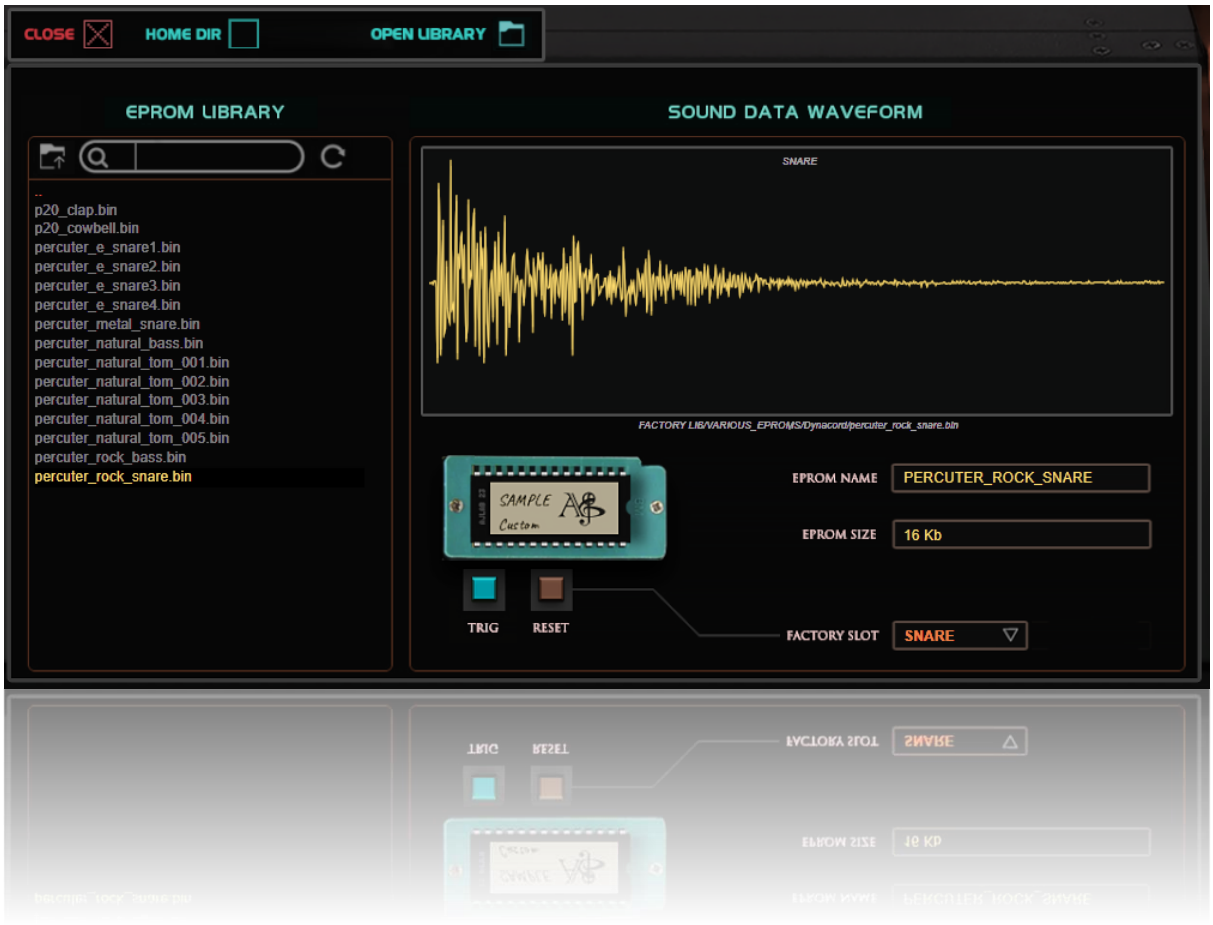
    Of course most of the time you will want to save everything so just use the main preset LOAD/SAVE located at the top of the GUI, a .vpromKit is just another handy option but you don't NEED to use it.

- **IMPORT VProm 2.0 Presets**
    - Allows users to **import old VST2 .fxp presets** from **VProm 2.0**.
    - **.fxb banks are not supported**, so in case you only have a VProm 2.0 bank (.fxb), first **export individual .fxp presets** from VProm 2.0.
    - If the imported **VProm 2.0 preset** contained custom EPROM data, **VProm 3.0 will extract and save these EPROMs** in the **VProm Library** under:
        - `/USER_IMPORTED/PresetName/`
    - This feature enables users to **reorganize and reuse EPROMs** in ways that were **not possible in VProm 2.0**.

Note: In **VProm 2.0**, loading a **custom EPROM into the Hi-Hat slot** would **automatically disable looping**. This limitation no longer exists in **VProm 3.0**, so when importing older presets, ensure that the **Hi-Hat LOOP setting** is set to OFF, you can later tweak it based on your preference.

Internal EPROM Browser:

Easily access, preview, and organize your custom and vintage EPROMs from a dedicated internal library.



The **Built-In EPROM Browser** provides a streamlined way to manage **EPROM files** within **VProm**, listing only **.bin files** that are stored inside the **VProm Library**. To ensure quick and easy access, users should **place any new .bin files in the VProm Library**.

Any EPROM .bin files **created by VProm**—whether from the **Sampler/Converter** or the **Import v2.0 function**—are automatically stored in the **VProm Library**, organized into **subfolders**.

VProm Library Default Path

By default, **VProm** creates the **VProm Library** folder in your user documents directory, but this path may vary depending on your **operating system, language settings, and system environment variables**.

The typical default paths are:

- **Mac:** `Users/YourUserName/Music/ VPROM Library/` *(also written as `~/Music`)*
- **Windows:** `C:\Users\YourUserName\Documents\VPROM Library\`

Why the Path May Vary

- On **Windows**, the folder location depends on the system's **%USERPROFILE%** environment variable, meaning it adapts to different user configurations and document folder locations.
- On **Mac**, it is stored in the **Music folder** by default but may be adjusted depending on **user-specific preferences or system settings**.

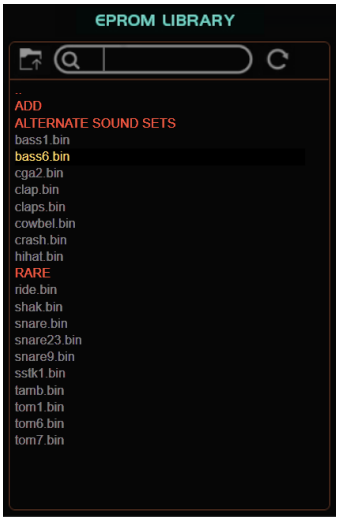
Regardless of system differences, the **VProm Library folder** will always be located in the **user's personal file directory**—either **Documents (Windows)** or **Music (Mac)**—ensuring easy access and organization of EPROM files.

Main Functions & Navigation

The **top row** of the EPROM Browser provides key navigation and management functions:

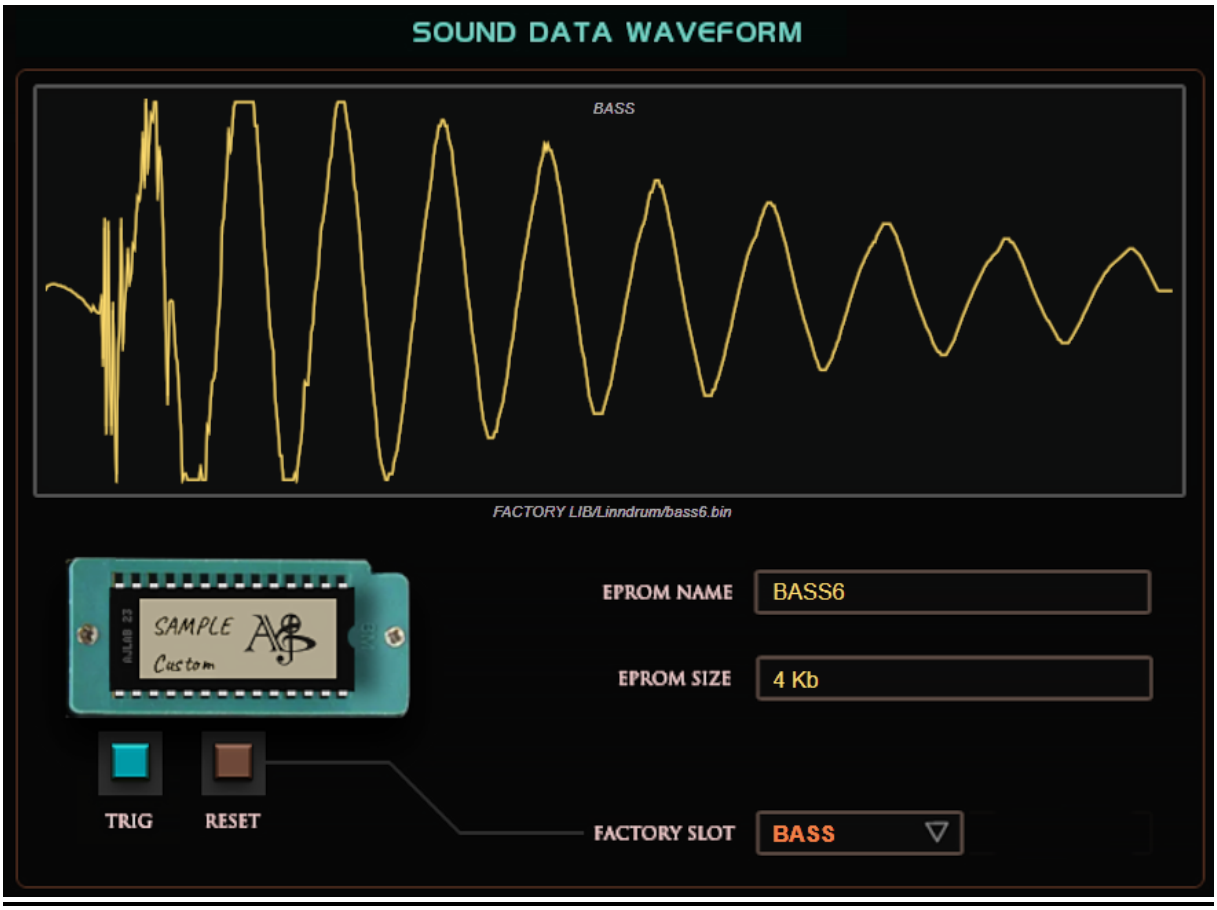
- **CLOSE** – Closes the **EPROM Browser** and returns to the **PROM panel**.
- **HOME DIR** – Returns the browser to the **VProm Library root directory**.
- Since **VProm 3.0.1**, an **OPEN LIBRARY** button has been added. This opens the **VProm Library** folder directly in your **OS file explorer**, allowing for fast file and folder management.

On the **left side**, the **actual EPROM file browser** is displayed:



- **FOLDERS** are listed in **UPPERCASE orange**.
- **.bin files** are displayed in **lowercase grey**.
- The **last selected file** appears in **bright yellow**.
- The **parent folder ("..")** can be accessed to navigate up one directory level.
- A **back folder icon** allows quick navigation to the previous directory.
- A **search filter** enables quick file lookup within the current folder.
- A **refresh icon** updates the file list—useful when adding new EPROM files while the browser GUI is still open.

Right-Side Controls & Information Display



On the **right side** of the EPROM Browser:

- A **sound data waveform display** provides a **visual representation** of the currently selected EPROM file, this will be blank when using default LM1 sounds.
- A **ZIFF socket representation** with a loaded EPROM chip indicates that a custom EPROM is loaded.
- **Trigger and EPROM reset/unload buttons** provide quick ways to audition and remove EPROMs.
- The **FACTORY SLOT** button allows users to directly assign an **EPROM slot** from within the browser.

Below the **waveform display**, the **full relative path of any loaded custom EPROM** is displayed in light grey small font.

This is particularly useful when loading a global preset or .vpromKit file containing custom EPROM paths that do not match the current system's directory structure.

If an EPROM **fails to load properly**, the following troubleshooting steps can be taken:

- If a **custom EPROM name and size** appear, but **no waveform is displayed** and **no custom sound is heard**, this indicates that **the actual EPROM bin file is missing or cannot be found**.

- In this case, checking the **file path** displayed in the browser will help identify the issue.
  note: great care has been taken so paths stay compatible between Mac and PC, any .vpromKit or global preset made on any of those platforms can be loaded in the other.

Quick Tip: Remember that BASS, TOMS, CONGAS, EXT1 and EXT2 all have a dedicated CEM filter and extra functions available (LOOP, VCA...) you might be hearing/previewing a sound through its current filter setting, you can always completely bypass a CEM filter by activating its bypass state from the CEMS panel.

SAMPLE/CONVERT/BURN

VProm now includes a **built-in EPROM creator**, allowing you to generate **custom EPROM binary files** directly within the plugin—without the need for external tools. These EPROM files are ready for use in **VProm** or even **real hardware drum machines**.

Import & Resampling Process

- **Import any .wav file** and sample it just like in the classic hardware era.
- The **resampling process** uses a **crude emulated R2R ADC**, featuring **tweakable input settings** and proprietary enhancements before capturing at **≈ 27 kHz**.
- If the original **.wav file** has a **sample rate ≤ 27 kHz**, **resampling is bypassed** to preserve the original sound.
- The **resampling stage** can also be **disabled manually** if needed.
  (SET panel -resampling enable: OFF).

Compression & EPROM Export

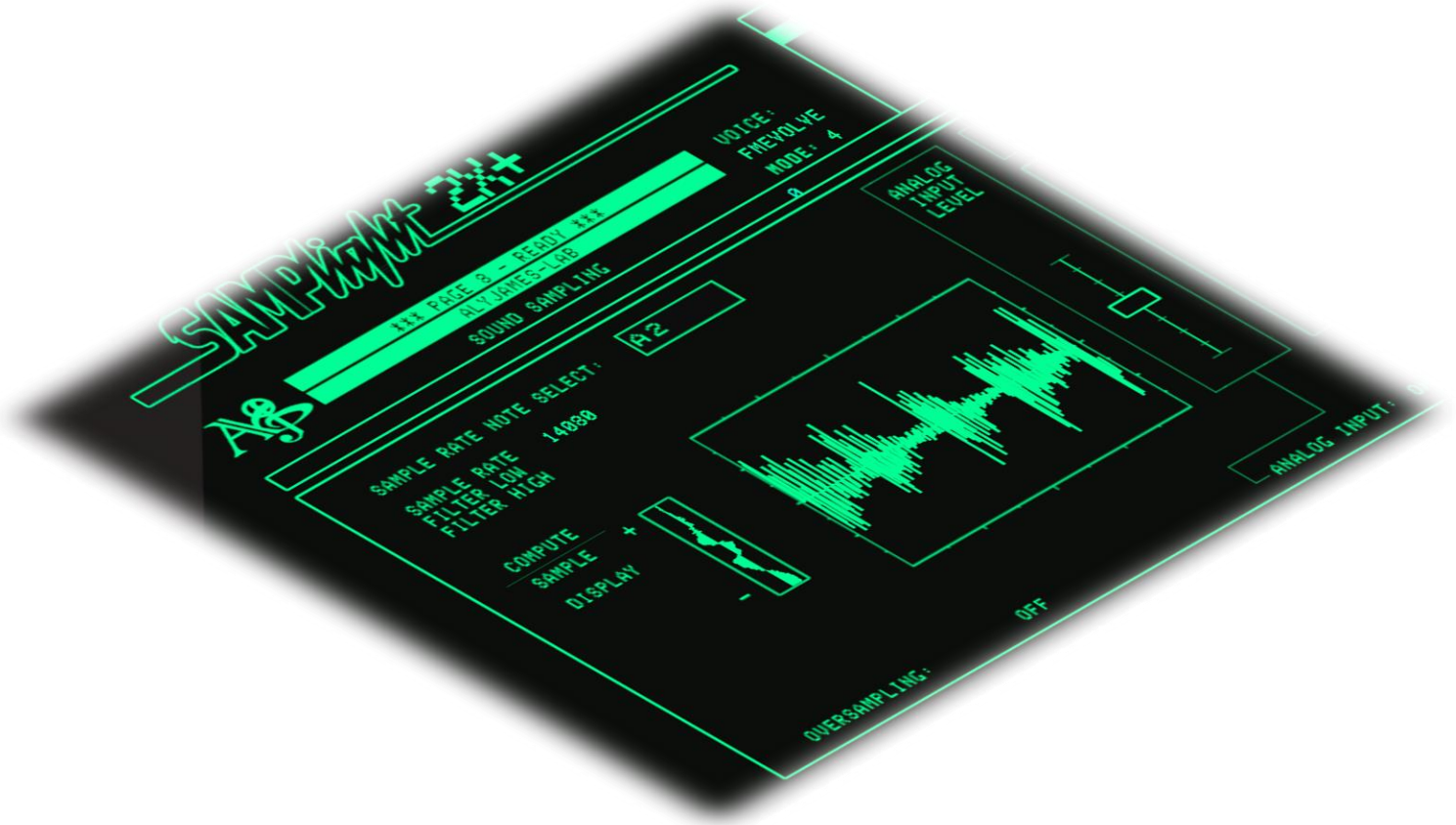
- After sampling, preview the file with **µ-Law 8-bit compression** (which delivers **12-bit perceived quality**).
- Save the processed sound as a **µ-Law encoded .bin EPROM file**, ready to be loaded into **VProm** or a **hardware drum machine**.

EPROM Size Limits & Automatic Truncation

- The **maximum EPROM size** is **64K**, which equates to ≈ **2.5 seconds at 27 kHz**.
- If a **.wav file exceeds this limit**, it is **automatically truncated** to fit within the available EPROM size during sampling.

Additional Processing

The **ADC-Optimized Bit Reduction** method ensures the most **satisfying vintage sampling experience**—a technique that certain classic sampler designers, like **Peter Vogel**, might recognize…



Step-by-Step Process: Sampling, Converting, and Burning EPROMs

The **SETS** button opens the **sampling parameters menu**, allowing customization of the conversion process before burning an EPROM.

Sampling Parameters (SETS Menu)

- **Fade-out** – Applies a fade-out as a percentage of the total sample length.
  - Default is **0%** (no fade).
  - If the input sample is **larger than the max allowed size**, it will be **automatically truncated**, and a **short fade** will be applied in the background.
- **Input Amp** – Adjusts the nominal input level.
  - **100% (default)** – Clean input, minimal preamp coloration.
  - **Up to 150%** – Introduces **saturation and distortion**, simulating an **overloaded vintage preamp** for added character.
- **Sampling Jitter** – Introduces imperfections in ADC timing, adding slight noise and character.
  - **0% (default)** – No jitter, clean sampling.
  - **Higher values** can add **grit or crispness**, depending on the sound source.

Step 1: Load a WAV File

1. Click the **LOAD** button to open the **OS file browser** and select a **.wav file**.

   - Any **WAV format** is supported, including **any sample rate and bit depth** (e.g., **16-bit, 24-bit**).
   - Recommended: **48 kHz, 16-bit** for best results, but **44.1 kHz** is still sufficient.
2. Once selected, **VProm will begin the sampling process**, and the display will update with:
   - `"27 kHz Sampling..... Success! Proceed to Burn or Preview."`

Step 2: Processing & Temporary Storage

- The **WAV file is resampled** to **27,060 Hz**. (27KHz)
- **Clever ADC bit truncation** is applied before **μ-Law 8-bit compression**.
- If **silence** is detected at the **end of the file**, VProm will **truncate it** to the nearest **2K size multiple**.
- The **temporary EPROM is stored in memory**, allowing **instant previewing** before burning.

Step 3: Preview & Adjust

- Click **PREV** to **audition** the processed sound at **27060 Hz tuning rate**.
  - The display updates with:
    - `"Previewing: 'soundName' You can adjust settings or proceed with EPROM burning."`
- Adjust any **sampling settings** in **SETS** and click **PREV** again to hear changes.
- Once satisfied, proceed to **burn the EPROM file**.

Step 4: Burn the EPROM

- Click **BURN** to finalize the EPROM.
  - The display updates with:
    - `"EPROM: 'soundName' burned successfully!"`
- The **EPROM .bin file** is saved in your **VProm Library** under:
  - `"USERCONVERTED/"`

Note:

- *The temporary preview memory is stored in the TEMP folder inside the VProm Library as "temppreview.bin".*
- *This file can be safely deleted when not in use, but it will be automatically recreated as needed.*

Special Feature: AUTO Mode (Batch Conversion)

The **AUTO** button allows **batch conversion** of multiple WAV files at once.

1. Click **AUTO** instead of **LOAD** to trigger **batch conversion mode**.
2. Select a **single WAV file** from a folder containing many.
3. **VProm will automatically process all WAV files in that folder**, applying the **current sampling settings** from the **SETS menu**.
4. The **folder name** containing the samples will be used for the output.

Key Differences from LOAD Mode:

- No **previewing** is available.
- All **.bin EPROM files** are **directly burned** without further adjustment.

When processing is complete, the display updates with:

- `"Auto processing complete. X EPROM burned: X successful, 0 failed."`

The new **EPROM files** can be found in:

- `"USERAUTOCONVERTED/YourSampleFolderName/"`

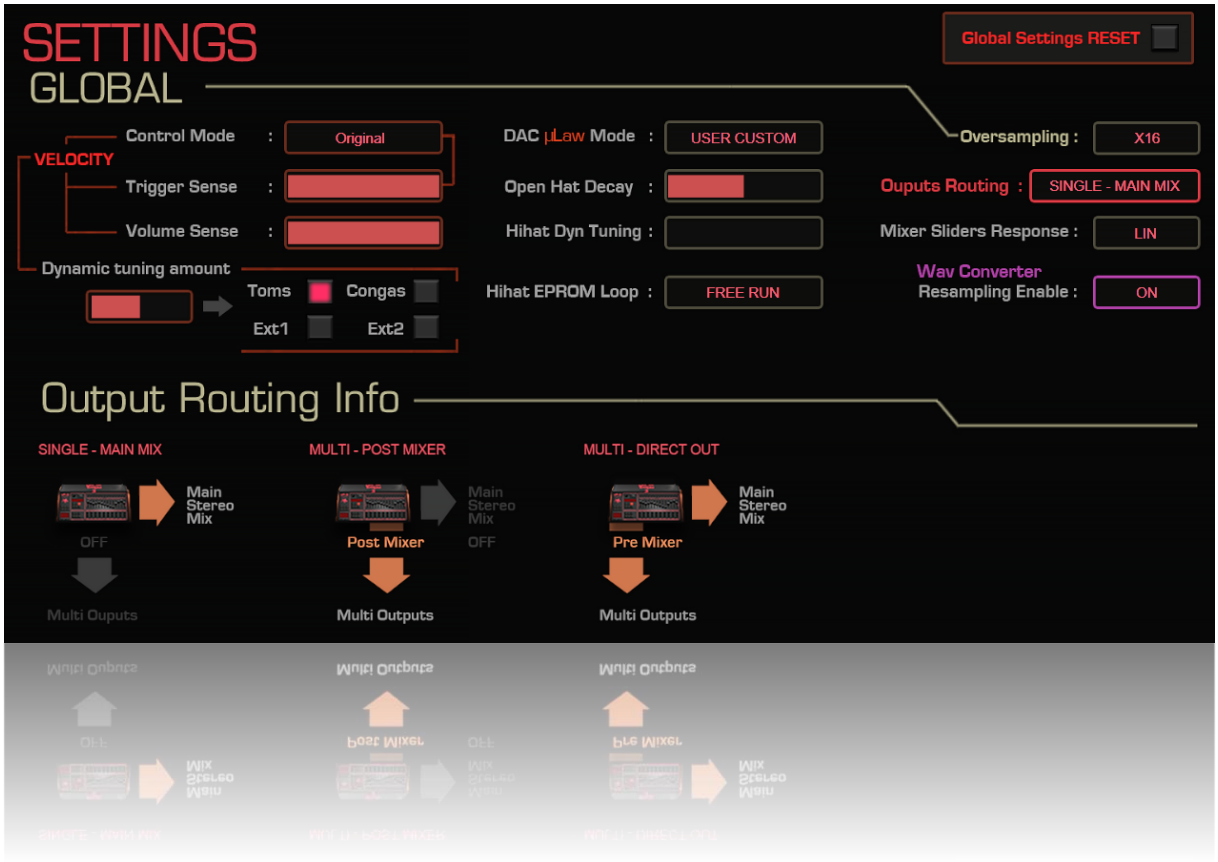
Exiting the Converter

At any time, click **ESC** to exit and reset the converter.

Quick Tips

- **Ensure Proper Sample Leveling**
  - VProm **automatically normalizes** the sample before input, but it's always best to ensure your **source sample is loud enough** before conversion.
  - If you're not afraid of a **gritty, overdriven sound**, try **increasing the Input Amp percentage** to add warmth and saturation.
- **No Need for Perfect Start Points**
  - You can **adjust the sample start point later** in the **EPROM memory reading settings**, so don't spend too much time fine-tuning start points before conversion.
- **Experiment with Loops**
  - Try **importing loops** to explore the unique **sampling color and character** that VProm applies. The vintage-style **resampling and compression** can add an interesting texture to rhythmic elements.

SETS PANEL



The **SETS panel** contains global settings that influence **velocity behavior, DAC response, tuning modulation, output routing, and other core functionalities** in VProm.

Velocity-Controlled Parameters

1. Velocity Control Mode

This setting determines how **velocity affects volume** when triggering drum sounds.

- **ORIGINAL** – Emulates the **LM-1's original velocity response**, where only **two volume levels** are used:
  - **Velocity ≤ 64** → Half volume.
  - **Velocity > 64** → Full volume.
- **FULL EXP** – Uses an **ultra-exponential curve**, meaning **velocity dynamically controls volume** for a more expressive response.
- **FULL IN** – Similar to **FULL EXP**, but with a **more natural linear response**, better suited for **MIDI keyboards**.
- **ORIGINAL 2** – Functions like **ORIGINAL**, but instead of using velocity to determine volume, it **assigns half and full volume levels to separate MIDI notes**.
  - Each **trigger has two MIDI notes**:

        - **First note** → Half volume.
        - **Second note** → Full volume.
    - The **open Hi-Hat** is an exception—it behaves like **ORIGINAL mode** since it only has **one MIDI note**.

2. Trigger Sense

- Adjusts how much **velocity influences volume triggers**.
- Setting it to **minimum** disables **velocity control**, making all hits play at **full volume**.

3. Dynamic Tuning Amount

- This slider **modulates sample tuning** based on **velocity**.
- Affects selected sounds: **Toms, Congas, Extra 1, and Extra 2**.
- Higher velocity **increases** the sample rate (pitch), creating a **natural, dynamic tuning effect**.

4. Volume Sense

- Works **alongside Dynamic Tuning Amount** to adjust **how much velocity influences volume** for dynamically tuned sounds.
- This allows you to have **velocity-based tuning** while keeping **volume changes minimal or disabled** if desired.

Other Global Parameters

DAC µ-Law Mode

- **FACTORY FIXED** – All **AM6070 DACs** use the **same factory-calibrated transfer function** for a **consistent response**.
- **USER CUSTOM** – Enables the **DAC Response Sliders** (on the **Main Panel**) for **manual per-DAC adjustments**, allowing for hardware variation emulation.

Mixer Sliders Response

- Defines how the **volume sliders** in the **Mixer Panel** behave:
    - **LIN (Linear)** – Equal volume increase per slider movement.
    - **LOG (Logarithmic)** – More **natural, human-ear-like** response (closer to how analog gear behaves).

WAV Converter Resampling

- **ON** – The WAV **converter resamples** imported sounds to **27 kHz** (default).
- **OFF** – Disables **resampling**, allowing the original WAV sample rate to be used.

Oversampling

- **OFF** – No oversampling (may introduce aliasing in some cases).
- **X16** – Applies **16x oversampling**, but **only to high-frequency sounds** (default VProm 2.0 behavior).
- **X16 ALL** – Applies **16x oversampling to ALL sounds**, ensuring the highest fidelity across all voices.

Hi-Hat Related Parameters

Open Hat Decay

- Fine-tunes the **decay time** of the **open Hi-Hat**, allowing for subtle adjustments.

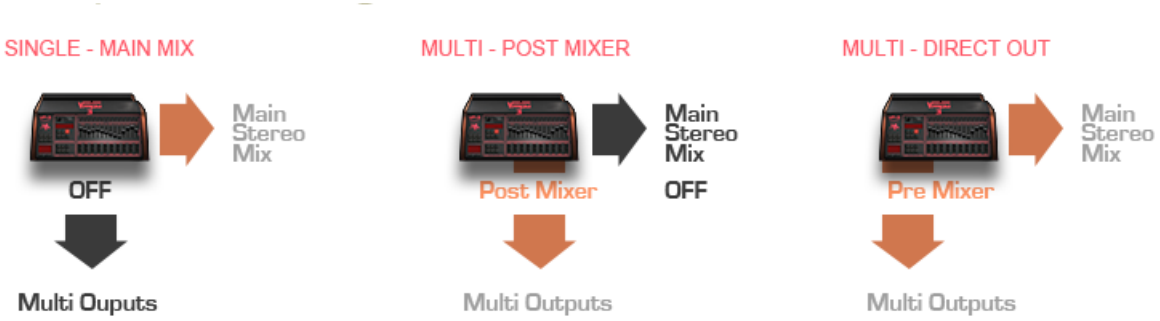
Hi-Hat Dynamic Tuning

- Similar to **Dynamic Tuning Amount**, but specifically for the **Hi-Hat**.
- Let's **velocity influence** the **pitch** of the Hi-Hat samples.

Hi-Hat EPROM Loop

- **FREE RUN** – The **default LM-1 behavior**, where the **Hi-Hat EPROM loops continuously**.
- **TRIG SYNC** – Resets the **EPROM playback to the start** each time the Hi-Hat is triggered, ensuring consistency in every hit.

Output Routing Modes



The **output routing** determines how sounds are processed and sent to the audio interface:

Single - Main Mix

- All voices are processed **through the internal mixer** (with volume, pan, etc.).
- Output is sent to the **Main Stereo Output**.
- **Dedicated individual outputs are disabled**.

Multi - Post-Mixer

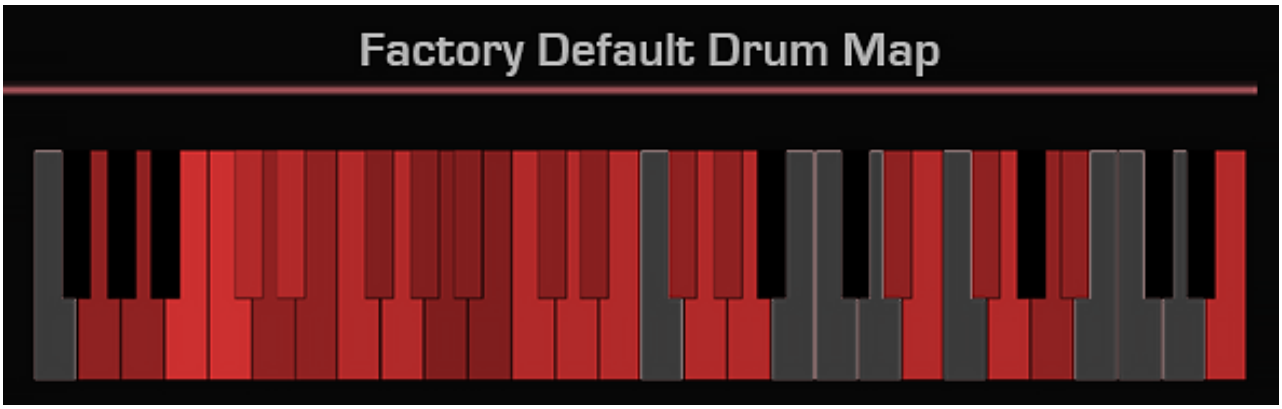
- Voices **still pass through the internal mixer** but are then routed to their **own dedicated stereo outputs** instead of the **Main Stereo Output**.
- The **Main Stereo Output is disabled** in this mode.

Multi - Pre-Mixer

- A **hybrid mode** where voices are sent **both** to:
  - **Main Stereo Output** (post-mixer, processed).
  - **Dedicated outputs** (pre-mixer, direct signal).
- Allows for **external processing** while retaining the **internal mix**.

MIDI PANEL

VProm can receive triggers from any MIDI channel, making it compatible with standard MIDI keyboards, pads, or even a MIDI drum kit. The default mapping closely **follows the GM MIDI Standard but can be fully customized.**



Creating a Custom Mapping: The process for creating a custom MIDI map is straightforward:

1. First, set **SELECT DRUM** to the drum you wish to customize.
2. Engage **LEARN MODE** by clicking the **LEARN** button (the button will light up when engaged). Now, each new incoming MIDI note will be assigned to the selected drum. (Each drum can have two notes assigned, except for the Hi-Hat, which has two notes for closed and one for open.)
3. While in LEARN MODE, you can switch the **SELECT DRUM** to customize another drum.
4. Once you're finished, click the **LEARN** button again to disengage LEARN MODE.

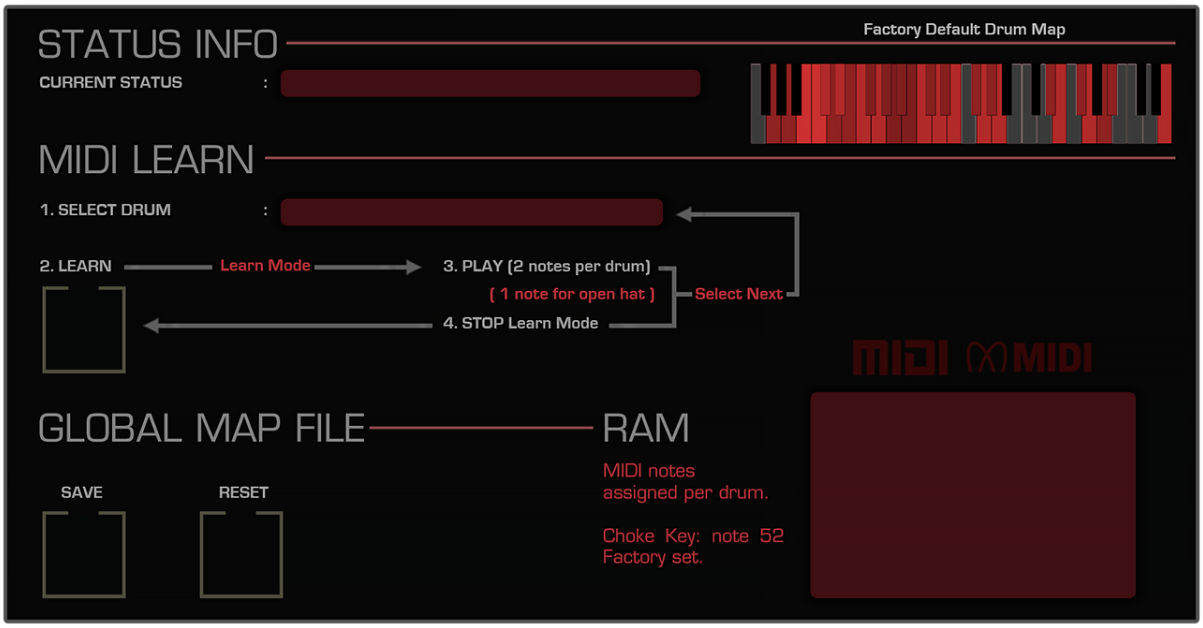
Your custom map is now stored in memory. To save your map permanently so that it's available every time you load the plugin, click **SAVE**. If you want to revert to the default mapping at any time, click **RESET**.

You can view the RAM memory assignments in the **RAM DATA** memory box, which shows the assigned MIDI note numbers in decimal value. **The MIDI map is global and will be shared across all instances of the plugin.**

If for any reason you don’t want to mess with this, for example when using an electronic drum kit, you can usually create a custom mapping directly from your drum module, assigning each drum pads to match the VProm’s default map.

If you need to save or store different custom maps externally, the current map file, "**VPROM_MIDIMAP.ajmap**," can be found at the following locations:

- **PC:** C:\Users\YourUserName\AppData\Local\VPROM3
- **Mac:** ~/Library/Preferences/VPROM3 (This is your user library, also accessible via users/yourusername/Library/Preferences/VPROM3).



PRESETS IMPORT / EXPORT

VST3, XML, AU preset.

VProm 3.0 can load and import its own presets & banks.
Most parameters and all MIDI LEARNED & ASSIGNED parameters will be saved per patch.

At the top of the GUI, you will find a **LOAD/SAVE** disk icon from where you can load or save individual presets or banks in either. vstpreset (VST3). aupreset (AU) or plain text .xml.

For banks the xml format is the preferred one.

Don’t be confused by the .vpromKit sub-preset format which has its own LOAD/SAVE menu found under the PROM section, this sub-preset is only needed in case you would like to save the custom EPROM configuration and only that, most of the time saving regular presets will be the way to go.

As stated in this manual (see PROM panel) VProm 3.0 can also import old .fxp (vst2 single preset format) presets made from/for VProm 2.0, again this is a distinct function from the main presets, import v2.0 can be found under the PROM panel.

MIDI AUTOMATION

Most common VProm parameters can be **automated via midi learn** or **DAW automation**.

Simply right click on a button, knob or slider to assign external MIDI Control or use DAW automation.

Almost all type of MIDI message can be assigned or MIDI learned.
right-click unlearn to get rid of the learned assignation.

LM-1 SEQUENCER

Behind the Myth… The Truth About Vintage Drum Machine Groove

Much has been said about the **distinct groove** of vintage drum machines, especially when compared to modern digital sequencing. Why do sequences programmed on vintage hardware sometimes feel different from those in modern DAWs, even when playing the exact same pattern?

The answer begins with **sequencer resolution**, measured in **PPQN (Pulses Per Quarter Note)**.

What is PPQN & Why Does It Matter?

The **PPQN value** defines the **number of possible timing positions** within a **quarter note**. This determines how precisely a sequencer can place notes in time.

- **Modern DAWs** typically use a **960 PPQN resolution** or higher, providing extremely fine timing accuracy.
- **Vintage drum machines**, such as the **Linn LM-1**, used a **48 PPQN resolution**—far lower than modern sequencers but still precise enough for **tight, musical timing**.

Swing & Quantization in the LM-1

Roger Linn introduced the **shuffle function** (now widely known as **swing**) with specific values:
50, 54, 58, 62, 66, and 70% swing.

These values were **not arbitrary**—they directly correspond to the **48 PPQN resolution** of the LM-1.

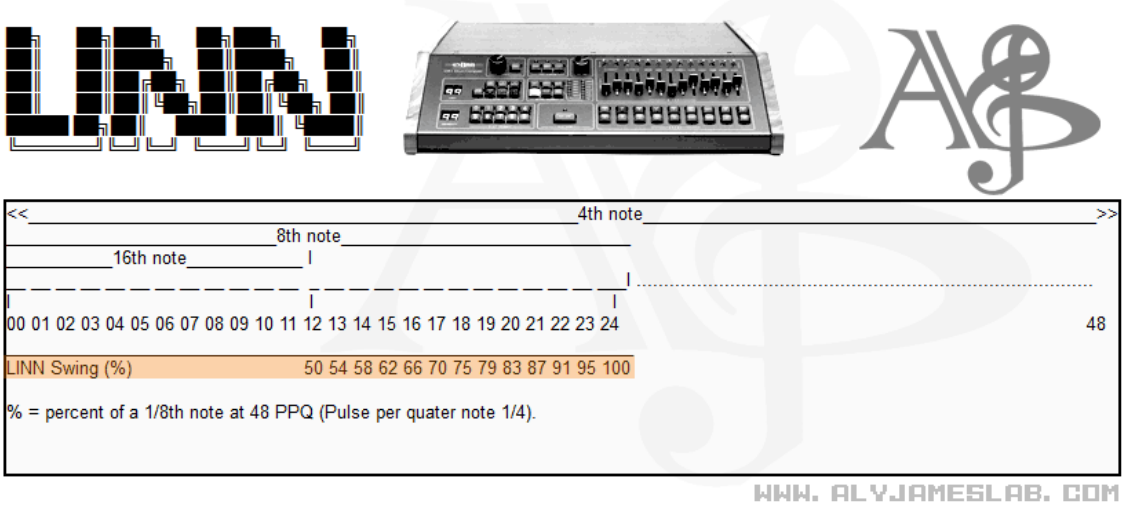
The LM-1's sequencer operated on a **1/192 grid**, meaning that even when **quantization was turned off**, notes were still recorded within a **48 PPQN framework**. The CPU used a **clock signal** to measure the length of each **1/192 note**, maintaining a structured but slightly imperfect groove.

When using **Auto-Correct (Quantization)** on the LM-1, the following values were available:

- **1/8 (Eighth Notes)**
- **1/8T (Eighth-Note Triplets)**
- **1/16 (Sixteenth Notes)**
- **1/16T (Sixteenth-Note Triplets)**
- **1/32 (Thirty-Second Notes)**
- **1/32T (Thirty-Second-Note Triplets)**

This structured quantization, combined with the **48 PPQN limitation**, is what created the LM-1's **unique feel** when swing was applied.

Look at this table and notice why Roger Linn sticks to those values of swing on the LM-1.



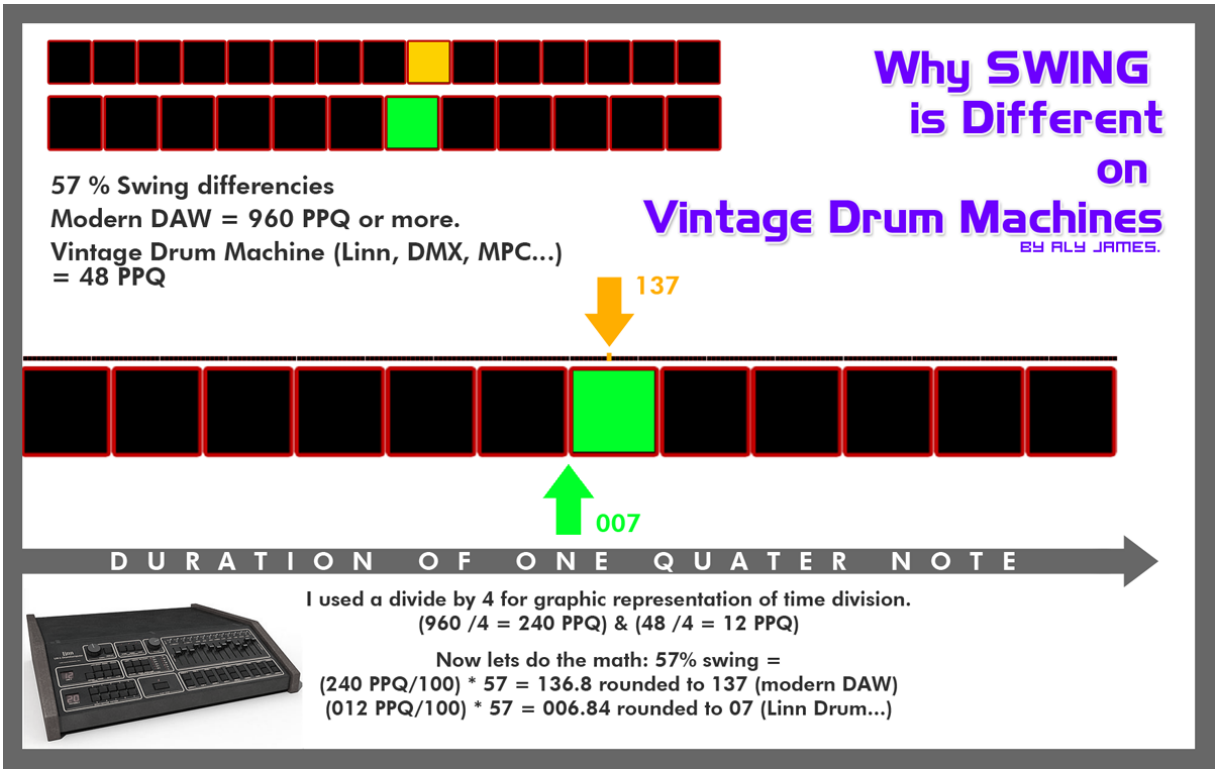
The Key Difference Between 48 PPQN & 960 PPQN

If you compare a sequence recorded at **960 PPQN** with one recorded at **48 PPQN**, the difference is immediately noticeable.

With a **lower resolution**, the number of possible note placements is **limited**, meaning that when swing or quantization is applied, notes **snap to a coarser timing grid**. This restriction contributes to the **slightly loose but musical feel** of classic drum machines.

At **960 PPQN**, the swing effect can be extremely **fine-tuned**, but this doesn’t always feel as "good" as the **chunkier** placement in a **48 PPQN** grid.

Look at this picture, this is the same thing recorded at 960 and at 48 PPQN.
You will notice that the final placement is not the same! This is because as the resolution is limited, possible places for a note also are.



Recreating the Vintage Groove in a Modern DAW

The good news is that you can easily **replicate this feel** in your DAW.

1. **Create a sequence you like** in your DAW.
2. **Export it as a MIDI file**, but set the MIDI resolution to **48 PPQN** (some DAWs allow you to choose this setting).
3. **Re-import the MIDI file** into your DAW and compare it to the original.
4. F..k this and simply activate VProm’s 48 PPQN Clock!

This won’t necessarily sound **better or worse**, but it **will sound different**—closer to the **LM-1 groove**. Interestingly, many people tend to prefer the **feel of 48 PPQN**, which naturally introduces more **quantization and groove characteristics**.

Of course, if you apply this technique to a **straight 1/16 quantized beat**, you probably won’t hear any difference—but on **swung or loosely played patterns**, the change is quite noticeable.

Note that on the LM-1 specifically the samples themselves were part of the groove, notably the LM-1 snare which got a bit of air in front, makes it already a bit behind the beat!

HIDDEN SECRETS

LM-1 Experiments

The **LM-1** was often processed through external gear in the studio, adding character and depth to its iconic drum sounds. Many engineers and producers experimented with **guitar pedals, outboard effects, and tape tricks**, taking the machine beyond its stock sounds.

Classic Processing Techniques

- **Reverbs** – The **AMS RMX16** was widely used, especially the **NonLin2 and Reverse** presets.
- **Pitch Effects** – The **Eventide Harmonizer** was often applied for unique pitch-shifting textures.
- **Modulation Effects** – Stereo **flangers** like the **Roland SBF-325** and **choruses** like the **Roland Dimension-D** were popular choices.
- **EQ Shaping** – **Pultec and API equalizers** helped shape the LM-1's sound in mixes.
- **Tape Speed Manipulation** – Some producers used the **variable pitch control on tape recorders** to **drastically alter** the LM-1's drum sounds, creating unique effects.

The **LM-1's simplicity invites experimentation**, so have fun trying new techniques!

Modern Techniques & DAW Automation

One major advantage of **modern DAWs** is **automation**. In the past, engineers had to manually adjust pitch for LM-1 samples, while today, this can be done easily with **DAW automation curves**.

- **Fast Retriggering** – Try using an **arpeggiator** or other fast-triggering method on a **TOM sample**.
    - When retriggered at high speeds, the sample starts to **generate a pitched tone**.
    - **Modulating the tuning** while retriggering can lead to **interesting rhythmic textures**.

Additional Tricks & Layering Ideas

- **Dual Snare Panning** – Load **two snare samples**, use the **EXTRA voice slot**, and **pan them hard left and right** for a **wide, powerful snare sound**.
- **Blending with Analog Drum Synths** –
    - Layer **VProm** with an **analog drum synth** for added **depth and sizzle**.
    - My **VSDSX** (which emulates **Simmons SDS-V, SDS1, and SDS3** drum brains) or **SY-4X** (**Pearl Syncussion**) can be used for this purpose.
    - Alternatively, hardware units such as **Pearl Drum-X, Simmons SDS-V, Tama Techstar, and Synare** can add a distinctive analog character.

A Note on High-Frequency Loss & EQ

As a **design choice**, I **removed** the slight **high-frequency loss** caused by the **hardware op-amp bandwidth limitations** found in the original LM-1. This was done because, in real-world use, an LM-1 was **always plugged into a mixing console**, where engineers typically **boosted the highs** using onboard EQs.

However, if you want a **closer-to-hardware sound**, simply slightly **roll off some highs above 12 kHz** to replicate the **natural limitations of the original circuitry**.

By the way here is a quick tip if you don’t want to be tricked by your ears when judging **hardware vs software** in general.
A sound that **lacks high-frequency content** can often **appear fatter or warmer** simply because the **highs are rolled off**, making the **low and mid frequencies seem more prominent**.

To make a **fair comparison**, always:

- **Match volume levels precisely**—perceived warmth can be influenced by loudness differences.
- **Check the frequency balance**—if one version has fewer highs, it may **seem** fuller but isn't necessarily more powerful.
- **Apply a gentle high-frequency roll-off** on the software version if needed to **simulate analog bandwidth limitations**.

This principle applies to **any hardware vs. software comparison**—perception can be deceiving, so always analyze the **actual frequency response** rather than relying on first impressions.

LINKS

Official Website https://www.alyjameslab.com/

HOPE YOU HAVE FUN WITH THE VProm!

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