



MM2044

SSM2044 Filter

User Manual

MM Soundworks

www.mmsoundworks.com

For MM2044 1.0 · VST3 · Audio Unit · CLAP · macOS · Windows

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This manual is written for musicians and producers. You do not need to know anything about electronics or signal processing to use MM2044 — where something technical comes up it is explained in plain language first, and the numbers come afterwards for anyone who wants them.

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1. Welcome

MM2044 is a filter. You put a sound through it, turn the **CUTOFF** knob, and part of the sound goes away — that is the whole idea, and you already know how it works from every synth you have ever touched.

What makes this one worth having is *which* filter it is. MM2044 is a component-level model of the **SSM2044**, a chip made in the early 1980s that ended up inside a remarkable number of the instruments people still chase today. It does not sound like a generic digital filter, and chapter 4 explains exactly why not.

What an SSM2044 was

In the late 1970s a company called Solid State Micro Technology started making chips that put a complete analogue filter — the part of a synthesiser that shapes the tone — onto a single component. The SSM2044, which arrived at the turn of the decade, was its four-pole lowpass filter, with voltage control over both cutoff and resonance, and it became the filter in a generation of instruments:

- **E-mu SP-1200, SP-12** and the **Drumulator** — the filter under an enormous amount of sampled hip-hop.
- **E-mu Emulator I** — the first sampler most people ever heard, with four SSM2044s doing the smoothing.
- **Korg Polysix, Mono/Poly** and **Trident** — three of the definitive early-80s Korgs.
- **PPG Wave 2.2 / 2.3** — the digital wavetables that needed an analogue filter to sound musical, and a long list of others.

Those machines do not sound alike, but they share a certain quality in how the filter behaves — the way it thickens when driven, the way the resonance eases off instead of screaming when you feed it something loud. That behaviour is the chip, and it is what MM2044 reproduces.

Why it sounds like the real thing

There are two ways to make a digital filter sound vintage. The common one is to take an ordinary digital filter and add distortion until it sounds dirty. The other is to model the circuit itself. MM2044 does the second.

The SSM2044 is four cascaded one-pole stages whose resistors are transistor current mirrors, with the output of the fourth stage fed back into the input pair to produce resonance. MM2044 reproduces that topology directly, working from the circuit as its patent and datasheet describe it — the same four stages, the same feedback loop, and the exponential saturation that every transistor junction along that path contributes.

That is why the character is not an effect sitting on top of a filter. The way the sound thickens under drive, the way the resonant peak flattens as you feed it something loud, and the self-oscillation at the very top of the **RESO** knob are not features that were added — they are what the circuit does, and the model does them because it is shaped like the circuit.

The model was then checked against the hardware rather than against an opinion. A real SSM2044 was measured on the bench — its frequency response across the cutoff and resonance range, how far the resonant peak collapses as the input level rises, and the point at which it begins to oscillate — and the model was corrected until it agreed.

What you can do with it

- Shape any sound with a genuinely analogue-behaving lowpass or highpass filter.
- Drive the filter hard for saturation, weight and harmonics — not as a separate distortion, but the way the chip itself distorts.
- Make the filter follow the signal, for auto-wah, envelope-swept bass and pumping filter ducks.
- Sweep the cutoff with an LFO, free-running or locked to your project tempo.
- Duck or open one track from another using the external sidechain input.
- Blend the filtered sound back against the dry with the **MIX** control, for parallel filtering.

Formats and requirements

Item	Detail
Plug-in formats	macOS: VST3, Audio Unit (AU), CLAP — Windows: VST3, CLAP (Audio Unit is a macOS-only format and does not exist on Windows)
macOS	10.13 or later, Intel and Apple Silicon (one Universal binary covers both)
Windows	Windows 10 or later, 64-bit
Channels	Mono and stereo, plus an optional stereo sidechain input
Price	MM2044 is free. No licence code, no activation, no time limit — see chapter 12
This manual	Installed as a PDF beside your presets — see the table in chapter 2

2. Installation and first sound

Installing

On macOS

1. Open the disk image (.dmg) you downloaded and double-click the installer package inside it.
2. The installer shows an introduction, the licence agreement, a read-me and a summary.
3. On the component screen, tick what you want: **VST3**, **Audio Unit**, **CLAP** and the **User Manual**. All are ticked by default.
4. Finish, then restart your DAW.

Component	Installed to
VST3	/Library/Audio/Plug-Ins/VST3/
Audio Unit	/Library/Audio/Plug-Ins/Components/
CLAP	/Library/Audio/Plug-Ins/CLAP/
User Manual (PDF)	~/Documents/Music/MM-Soundworks/MM2044/

On Windows

1. Unzip the download. Inside you will find the installer, the user manual, and VST3 and CLAP folders for installing by hand.
2. Double-click **MM2044-<version>-windows-installer.exe**. Windows asks for permission to make changes — the plug-in goes into a shared system folder, so this is expected.
3. Finish, then restart your DAW.

Component	Installed to
VST3	C:\Program Files\Common Files\VST3\
CLAP	copy MM2044.clap from the download into C:\Program Files\Common Files\CLAP\
User Manual (PDF)	Documents\Music\MM-Soundworks\MM2044\

"WINDOWS PROTECTED YOUR PC"

A blue warning may appear when you start the Windows installer. It appears because the installer does not yet carry a paid Windows signature — not because anything is wrong with the file. Click **More info**, then **Run anyway**.

VST3 ON WINDOWS IS A FOLDER

MM2044.vst3 is a folder, not a single file. That is how the VST3 standard works on Windows and it is perfectly normal. If you install by hand, copy the **whole folder**, not the file inside it.

NO LICENCE CODE, EVER

MM2044 is **free**, in full. There is no code to enter, no activation, no account, no registration screen, no demo restrictions and no time limit — it simply works, on as many machines as you like. Chapter 12 has the details, and there is nothing unpleasant in it.

IF YOUR DAW DOES NOT SEE IT

Most hosts only scan for new plug-ins at startup, so quit and reopen the DAW. On macOS, Logic and GarageBand additionally validate Audio Units on first launch, which can take a moment, and they need the **Audio Unit**; most other hosts use **VST3** or **CLAP**. On Windows there is no Audio Unit — your host will be using **VST3** or **CLAP**, and some hosts need you to add the plug-in folder to their scan paths before they find it.

Your first sound in one minute

1. Put MM2044 on a track with something busy on it — a drum loop, a pad, a bass line. Something with content across the whole spectrum works best.
2. Turn **CUTOFF** down slowly. The top of the sound disappears; you are hearing a four-pole lowpass filter close.
3. Now turn **RESO** up to about 60 % and sweep **CUTOFF** again. There is a peak riding at the cutoff point, and it sings.
4. Turn **DRIVE** up to about 9 dB. The sound thickens — and notice the resonant peak gets *less* pointed as it does. That is not a bug; it is the whole point of this chip. Chapter 5 explains it.
5. Click **MODE** to switch from **LP** to **HP** and sweep again: now the bottom disappears instead of the top.
6. Set **CUTOFF** to about 400 Hz, **RESO** to 70 %, and turn **AMOUNT** in the ENV section up to +60 %. The filter now opens on every hit. That is an auto-wah, and it took ten seconds.

3. The window, area by area

MM2044 has one window with everything on it — no pages, no tabs, no hidden menus.

The display

The large panel across the middle is the most useful thing in the window, and it shows two things at once:

- **The filter curve** — the shape the filter is applying right now. Move CUTOFF or RESO and it redraws. This is the filter, drawn.
- **The live spectrum** — the actual frequency content of the audio passing through, behind the curve, so you can see what the filter is doing *to your material* rather than in the abstract.

The cutoff position on the curve moves in real time as the envelope follower and the LFO modulate it. When you set up a wobble or an auto-wah, you can watch it work — which makes dialling in **AMOUNT**, **ATTACK** and **RELEASE** far quicker than doing it by ear alone.

The controls

Section	Controls
Gain in	INPUT — level into the filter, with the IN meter beside it
Filter	CUTOFF , RESO , DRIVE , and the MODE button reading LP or HP
ENV	AMOUNT , ATTACK , RELEASE , and the SC button reading Int or Ext
LFO	SHAPE , RATE , DIV , DEPTH , PHASE , and the Sync and Retrig toggles
Gain out	OUTPUT and MIX , with the OUT meter, plus the HQ and CLIP toggles

RESIZING

Drag the bottom-right corner. MM2044 scales from **70 % to 200 %** of its design size and keeps its proportions. Only that corner resizes, so you cannot distort the layout by grabbing an edge while reaching for a knob.

EVERY KNOB IS AUTOMATABLE

All controls are host parameters, so you can automate or MIDI-map any of them from your DAW in the usual way. Cutoff sweeps drawn as automation are a completely legitimate alternative to the LFO, and often more musical for a one-off.

4. The filter: CUTOFF, RESO and MODE

This is the chapter that matters. Everything else in MM2044 exists to feed this filter or to move its cutoff around.

What a filter actually does

Sound is made of frequencies — low ones you feel as weight, high ones you hear as air and detail. A **lowpass** filter lets the low frequencies through and removes the high ones. A **highpass** filter does the opposite. **CUTOFF** sets where the dividing line sits, and **MODE** chooses which side survives.

Four poles, and why that matters

Filters are described by how steeply they cut. A gentle one rolls off at 6 dB per octave — one 'pole'. The SSM2044 is a **four-pole** filter: **24 dB per octave**. That is steep. An octave above the cutoff, a sound is not softened, it is gone.

This steepness is why four-pole filters became the sound of synthesis. A gentle filter sounds like a tone control. A four-pole filter sounds like an *instrument* — you can hear the cutoff point moving, and closing it feels like a physical action rather than an EQ adjustment.

CUTOFF

20 Hz to 20 kHz, which is the entire audible range. The knob is scaled so that the musically useful region has most of the travel, rather than the top octave hogging half the knob.

- Fully **clockwise** (20 kHz): the filter is effectively open and out of the way.
- **Mid-range** (200 Hz – 2 kHz): where filtering is most obviously musical — this is where sweeps live.
- Fully **anticlockwise** (20 Hz): almost everything is gone. Useful as a destination for a sweep, or as a starting point that the envelope opens up from.

RESO — resonance

Resonance is feedback around the filter. A little of it lifts the frequencies right at the cutoff point into a gentle peak, which makes the cutoff audible as a *pitch* rather than just an absence. A lot of it turns that peak into a whistle that dominates the sound.

On MM2044 the knob reads **0 % to 100 %**, and it is worth knowing the landmarks:

Setting	What you get
0 %	No peak at all. A clean, flat four-pole roll-off — the right setting when you just want less top end.
20 – 50 %	A gentle emphasis. Adds focus and character to a sweep without drawing attention to itself. Most factory presets live here.
60 – 85 %	An obvious, singing peak. This is 'synth filter' territory — sweeps become the main event.
90 – 94 %	On the edge. The peak is very loud and very narrow, and it rings after transients.
above ~95 %	Self-oscillation. The filter feeds back enough to generate its own tone at the cutoff frequency, even with no input. CUTOFF now plays it like a pitch knob.

SELF-OSCILLATION IS LOUD

Above about 95 % the filter produces a sine tone of its own that does not stop when the music does. It is a real, musical effect — sweep it for a lead line, or add a touch under a kick for weight — but bring **OUTPUT** down before you go there, and keep the **CLIP** toggle on (chapter 8), which is exactly the situation it exists for.

There is no makeup gain, on purpose

On many digital filters, turning resonance up leaves the rest of the sound where it was. On a real SSM2044 it does not: as resonance rises, **the low end drops away**. The energy goes into the peak, and it has to come from somewhere.

MM2044 reproduces that. Turn RESO up and the sound gets thinner as well as more focused. If that is not what you want, the fix is the one an engineer in 1982 would have used: bring some of the dry signal back with **MIX** (chapter 8), or lift **OUTPUT**. What we have not done is quietly correct it for you, because that loss of weight *is* part of why the chip sounds the way it does.

MODE — LP and HP

The **MODE** button switches between the two:

Mode	What it does	Use it for
LP (lowpass)	Keeps the lows, removes the highs above the cutoff. This is the SSM2044 as it was actually built — the chip is a lowpass filter and nothing else.	The classic move. Darkening, sweeping, taming brightness, making something sit further back.
HP (highpass)	Keeps the highs, removes the lows. The real chip could not do this; MM2044 derives it the way multimode synths of the era did, by mixing the filter's internal stages. The resonance behaves identically.	Thinning a sound out, clearing space under a mix, rising build-ups, and making a bass part sit above a kick.

5. DRIVE, and why resonance collapses

DRIVE pushes the signal harder into the filter, from 0 to **+18 dB**. It is not a distortion effect bolted on in front — it is the amount of level going into the filter itself, and the filter is what distorts.

What you hear

- **At 0 dB** the filter is clean and the resonance is at its sharpest.
- **Around 6 dB** the sound thickens. Harmonics appear, and the whole thing feels a little louder and more solid even though the level has barely changed — MM2044 compensates the output automatically as you drive.
- **Around 12 dB** it is clearly saturated. Transients round off and the sound gets its own character.
- **At 18 dB** it is fully cooked: dense, compressed, aggressive.

The important part: resonance collapses with level

This is the SSM2044's signature, and the single behaviour that separates it from a digital filter with a distortion in front of it.

Every stage inside the chip saturates. When you feed it a loud signal, those stages compress — and the resonance feedback path runs *through* them. So the louder the signal, **the less resonance the filter actually has**. Hit it with a kick drum and the peak momentarily flattens; let the sound decay and the peak comes back.

What that means in practice:

- **The filter breathes with the music.** A resonant setting that screams on a quiet passage behaves itself on a loud one, all by itself.
- **You can use far more resonance than you would expect.** Settings that would be unusable on a clean digital filter are perfectly musical here, because the loud moments self-limit.
- **DRIVE and RESO interact.** They are not independent controls. Turn one and the other changes character. Dial them together, not one after the other.

WHY DRIVE IS ALWAYS BEFORE THE FILTER

MM2044 briefly had a Pre/Post switch for the drive. It was removed, deliberately: putting the drive after the filter gives you an ordinary saturated filter, which any plug-in can do. Putting it *before* is what produces the level-dependent resonance above — the effect people actually want from this chip. There is only one position because only one of them is the SSM2044.

A GOOD STARTING POINT

RESO 70 %, **DRIVE 9 dB**, **CUTOFF** wherever the sound needs it. That is far more resonance than you would normally reach for, and it works precisely because the drive is holding it in check. Now sweep the cutoff and listen to how the peak moves with the dynamics.

6. The envelope follower

An envelope follower watches how loud the incoming signal is, moment to moment, and uses that to move the cutoff. Loud passage, filter moves; quiet passage, filter returns. It is how you get a filter that plays itself.

The four controls

Control	Range	What it does
AMOUNT	-100 % ... +100 %	How far the cutoff moves, and in which direction. Positive opens the filter on loud signals — the auto-wah, the funk sound. Negative closes it on loud signals — ducking, pumping, the filter getting out of the way. At 0 % the follower does nothing. Full travel is four octaves either way.
ATTACK	0.1 ms ... 500 ms	How quickly the filter reacts to a sound getting louder. Short values snap onto transients; longer ones let the initial hit through before the filter moves, which keeps a drum's click intact.
RELEASE	5 ms ... 2 s	How quickly it returns once the sound dies away. This is the control that sets the <i>groove</i> of the effect — too short and it chatters, too long and it never resets between notes.
SC	Int / Ext	Where the follower listens. Int watches the signal on this track. Ext watches the external sidechain input instead — see chapter 9.

Getting it right

The usual mistake is to set AMOUNT first. Do it the other way round:

1. Set **AMOUNT** to about **+50 %** so you can clearly hear the effect.
2. Set **CUTOFF** low — say 300 Hz. This is where the filter sits *between* hits, and it is the sound you keep coming back to.
3. Adjust **RELEASE** until the movement locks to the tempo of the part. This matters more than any other setting: get it grooving first.
4. Adjust **ATTACK**. Short for a sharp quack; longer if the transients are being swallowed.
5. Now go back to **AMOUNT** and set how dramatic it should be.

WATCH THE DISPLAY

The cutoff marker on the filter curve moves with the envelope in real time. If the effect sounds wrong but you cannot say why, watch it for a few bars — you will usually see the problem (not returning between notes, not reaching far enough, moving on the wrong beats) faster than you can hear it.

Positive and negative

AMOUNT	The effect	Classic use
Positive	Loud → filter opens	Auto-wah on guitar or clavinet, funk bass, opening a pad on its attack, adding brightness to hits without EQ
Negative	Loud → filter closes	Ducking a bass under a kick, pumping pads, making a busy part retreat whenever the lead plays

7. The LFO

The LFO sweeps the cutoff on its own, in a repeating cycle, whether or not anything is playing. Where the envelope follower reacts to the music, the LFO *imposes* movement on it.

Control	What it does
SHAPE	Sine — smooth, the default wobble. Triangle — a straighter, more even sweep. Saw Down — falls steadily then jumps back, for a repeating downward sweep. Square — jumps between two cutoffs with no in-between (edges are smoothed slightly so it does not click). S&H — a new random cutoff every cycle, the classic stepped, burbling sound.
RATE	How fast, from 0.02 Hz (one cycle every fifty seconds — a slow drift over a whole section) to 20 Hz (a fast tremolo-like flutter). Used when Sync is off.
Sync	Locks the LFO to your project tempo. When it is on, DIV replaces RATE .
DIV	The tempo division: 1/1 down to 1/32 , including dotted (1/4. , 1/8.) and triplet (1/4T , 1/8T , 1/16T) values. 1/4 is one cycle per beat.
DEPTH	How far the cutoff moves, in semitones , from -48 to +48 — four octaves in either direction. Negative simply inverts the shape. At 0 the LFO does nothing.
PHASE	0° to 180° of offset between the left and right channels. Above zero the two sides sweep at different times, which turns a mono wobble into a wide stereo movement. This is the control that makes a pad sound enormous.
Retrig	Restarts the LFO from the beginning of its cycle when the host transport starts, so the movement lands in the same place every time you play the section. On by default.

SYNC IT, THEN SET DEPTH LAST

Switch **Sync** on and pick a **DIV** before touching anything else — a wobble that is not locked to the grid rarely sounds intentional. Then set **DEPTH**. Start smaller than you think: ± 12 semitones (one octave) is already a strong effect.

STEREO WIDTH FOR FREE

Set **PHASE** to 90°, a slow **DIV** (1/1 or 1/2) and a modest **DEPTH**, and a mono synth or pad becomes a wide, slowly moving stereo texture — without a chorus, a reverb or any phase trickery that collapses in mono.

The LFO and the envelope follower **add together**. You can have a track-wide tempo wobble from the LFO *and* a per-hit response from the follower at the same time — they are summed before the cutoff is set, so both effects survive.

8. The output stage

MIX — the parallel filter

MIX blends the filtered sound against the original, from **0 %** (dry only, the plug-in does nothing) to **100 %** (filtered only, the default).

Anything in between is *parallel filtering*, and it is more useful than it sounds. A heavily resonant, heavily driven setting at 100 % may be too much; the same setting at 40 % adds its character and its harmonics while the original sound keeps its weight and its transients underneath. This is also the neatest answer to the low end that resonance takes away (chapter 4) — the dry signal still has it.

INPUT and OUTPUT

INPUT (± 24 dB) sets the level going in. It matters more here than on most plug-ins, because how hard you hit the filter changes how it behaves — see chapter 5. Think of it as a second drive control with a gentler grip.

OUTPUT (± 24 dB) sets the level coming out. Use it to match levels so you can judge the effect fairly, and to pull things back after driving hard or going near self-oscillation.

The **IN** and **OUT** meters beside them show peak level, so you can see at a glance whether you are feeding the filter sensibly.

CLIP — the safety net

CLIP is a gentle soft clipper on the output, and it is **on by default**. Below about -3 dBFS it does nothing at all. Above that it rounds peaks off instead of letting them hit digital full scale and crack.

It exists because this filter can produce very loud, very sudden peaks — a resonant sweep crossing a bass note will do it, and self-oscillation certainly will. The small lamp beside the toggle lights when the clipper is actually working so you know it engaged.

Leave it on unless you have a specific reason not to. If the lamp is lit constantly, that is a sign to bring **OUTPUT** down rather than to switch the clipper off.

HQ — high quality mode

HQ runs the drive and the filter at **twice the sample rate** internally.

Any non-linear process — and this filter is thoroughly non-linear — can generate harmonics above what the sample rate can represent, which fold back down as a faint metallic edge. Running at double rate pushes that fold-back out of the way.

	HQ off	HQ on
CPU	Lower	Roughly double for this plug-in
Latency	None at all	A small delay, which the plug-in reports so your DAW compensates automatically
When	Tracking, and while you are dialling settings in	Mixing and bouncing, and any time DRIVE or RESO is high

At low drive settings the difference is subtle. At high drive, high resonance, or with fast modulation, it is clearly audible. A reasonable habit: work with it off, switch it on before you bounce.

9. Sidechain — filtering one track from another

Set the **SC** button to **Ext** and the envelope follower stops listening to the track MM2044 is on, and listens to a *different* track instead. The filter still processes its own track — only the control signal comes from elsewhere.

That is how you get the effects everybody wants:

- A **bass line that ducks out of the way of the kick**, using negative AMOUNT with the kick as the sidechain source.
- A **pad that opens on every snare**, using positive AMOUNT.
- A **rhythmic filter pattern on a sustained sound**, driven from a drum loop that is muted in the mix and exists only to control this.

Setting it up in your DAW

Host	Roughly how
Logic Pro	Use the Side Chain menu in the top-right of the plug-in header and pick the source track
Ableton Live	Open the plug-in's configure/sidechain routing and choose the source track as the sidechain input
Reaper	Route the source track to MM2044's track as channels 3/4, then set the plug-in's pin connections so those feed the sidechain input
Cubase / Studio One	Activate the plug-in's sidechain input, then add a send from the source track to it

NOTHING HAPPENING?

An unconnected sidechain reads **silence** — MM2044 does not quietly fall back to the track's own signal, because a silent sidechain that pretends to work is far more confusing than one that plainly does nothing. If **Ext** produces no movement, the routing is not connected yet. Switch to **Int** to confirm the follower itself is set up correctly, then go back and fix the routing.

10. Presets

The preset menu in the header is split into **FACTORY** presets, which are read-only, and **MY PRESETS**, which are yours. The arrow buttons step through them without opening the menu, which is the quickest way to audition.

The factory presets

Preset	What it is for
Init	A clean starting point: filter wide open, no resonance, no modulation. Start here when you want to build something rather than adjust something.
SP-1200 Lo-Fi	The filter as it sat in an SP-1200 — the classic sampled-drum treatment.
Auto-Wah Bass	Envelope follower opening the filter on every note. The funk sound; try it on clavinet and guitar too.
Sidechain Duck	Negative envelope amount set up for external sidechain — connect a kick and the track ducks out of its way. See chapter 9.
Dub Wobble	Tempo-synced LFO with real depth. Bass, chords, or anything you want moving.
HP Tighten	Highpass mode, cleaning the bottom out of a sound so it sits above the low end of a mix.
Resonant Sweep	High resonance built for automating the cutoff — draw a sweep across a section and it does the rest.
Slow Sine Wobble	A very slow, gentle movement. Put it on a pad and leave it; the effect is felt more than heard.

Your own presets

Save, **Save as...** and **Rename** are in the same menu. Your presets are stored as files in:

macOS ~/Documents/Music/MM-Soundworks/MM2044/

Windows Documents\Music\MM-Soundworks\MM2044\

which is the same folder the installer put this manual in. They are ordinary files, so backing them up means copying that one folder, and sharing a preset means sending someone a file.

11. Troubleshooting and FAQ

The sound gets thin when I turn resonance up

That is correct behaviour, not a fault — the real chip does exactly this, and chapter 4 explains why. Bring the weight back with **MIX** below 100 %, or lift **OUTPUT**.

Turning **DRIVE** up makes the resonance weaker

Also correct, and it is the single most characteristic thing this filter does. Chapter 5 covers it. If you want a sharper peak, use less drive; if you want more resonance *and* more drive, turn **RESO** up further than feels sensible — the drive will hold it in check.

The external sidechain does nothing

The routing is almost certainly not connected — an unconnected sidechain input reads silence, deliberately. Switch **SC** to **Int** to check the follower is set up properly, then fix the routing in your DAW using chapter 9.

Something is distorting and I did not ask it to

Check the **IN** meter first: **INPUT** may simply be too hot. Remember that **DRIVE** is meant to distort — that is its job. If the **CLIP** lamp is lit constantly, turn **OUTPUT** down rather than switching **CLIP** off.

A loud peak jumped out during a sweep

A resonant peak crossing a strong note will do that. Keep **CLIP** on, and consider a little less **RESO** or a lower **OUTPUT**. This is exactly what the soft clipper is for.

Should I leave **HQ** on all the time?

You can, if your machine can afford it. The usual habit is off while writing and tracking, on for mixing and bouncing. The difference is small at gentle settings and obvious at high drive or high resonance.

Does **MM2044** work in mono?

Yes, mono and stereo both. In stereo, the LFO **PHASE** control can offset the two channels; in mono it has nothing to offset and does nothing.

Is it really free? What is the catch?

There is none. No code, no account, no time limit, no nagging, no restricted features. See chapter 12.

12. Licence and trademarks

MM2044 is free

MM2044 is given away, complete and unrestricted:

- **No licence code**, no activation and no account. Nothing to enter, nothing to lose.
- **No time limit**, no expiry, and no feature held back for a paid version. What you have installed is the whole plug-in.
- **Install it on as many computers as you like**, at home or at work.
- **Use it commercially**. Music you make with MM2044 is yours, with no restrictions and no attribution required.

What you may not do is sell MM2044 itself, or pass it off as your own work. If you want to point someone at it, please send them to **www.mmsoundworks.com** rather than re-hosting the installer — that way they get the current version, correctly signed.

The full terms are the End User Licence Agreement shown during installation, also published at **www.mmsoundworks.com**. Where this summary and that document differ, the agreement is the one that counts.

IF YOU LIKE IT

MM2044 costs nothing and always will. If it earns a place in your sessions, the best thanks is to have a look at what else we make — there is a link in the plug-in's footer, and the paid plug-ins are what pay for the free ones.

Trademarks

All product names, trademarks and registered trademarks are the property of their respective owners. They are used in this manual and in the plug-in for identification and description only.

In particular:

- **SSM** and **SSM2044** are trademarks of their respective owner.
- **E-mu**, **SP-1200**, **SP-12**, **Drumulator** and **Emulator** are trademarks of their respective owner.
- **Korg** and **Polysix**, **Mono/Poly** and **Trident** are trademarks of their respective owner.
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MM2044's filter is an original implementation, written from the published patent and datasheet behaviour of the circuit. It contains no code, firmware, ROM content or samples from any hardware instrument.

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