

M1K

A six-voice analogue rack synth that plays two patches at once, layered: 100 patches, a full editor and a built-in effects rack.

A Lab plug-in. The Lab is where new GFX plug-ins are built in the open: they may change sound or controls between versions.



Overview

M1K is a six-voice analogue synth module in the spirit of the late-80s matrix-modulation rack synths: a single rack unit full of patches, with a full editor behind the EDITOR key. Each voice has two DCOs, a 24 dB low-pass VCF, two envelopes and two LFOs.

It comes with 100 factory patches in seven banks - KEYBOARD, STRINGS, WIND+PERC, SYNTH, BASS, LEAD and EFFECTS. Every patch also carries its own Mod Rack setting: chorus, tremolo, vibe and delay built into the unit.

This Lab version plays **two patches at once**. Patch A and patch B are each any of the 100 patches, edited as you like, and both sound on every note you play: a piano with strings behind it, brass over a pad, a bass with a pluck on top. BALANCE mixes the two, and LAYER B switches patch B in and out. With LAYER B out, M1K sounds exactly as the original.

It is an instrument: it has no audio input and plays from MIDI. It responds to pitch bend, the mod wheel (CC1), channel aftertouch, the sustain pedal (CC64) and all-notes-off (CC120 / CC123).

Reach for it for

- Layered sounds: piano and strings, brass and pad, bass and pluck
- Classic late-80s analogue pads, strings and brass
- Punchy synth basses and mono leads with glide
- Quick patch browsing - 100 sounds a click away
- Building your own patches in the editor
- Wide stereo sounds with the built-in Mod Rack

Loading and playing it

1. Insert M1K on a track (it is an instrument, so it needs no audio on the track).
2. Arm the track for recording and set its input to your MIDI keyboard (or draw MIDI notes into an item on the track).
3. Click the patch name window and choose a patch, or step through them with the < and > keys. The MIDI light flashes when notes arrive.
4. A new M1K starts with RACK PIANO as patch A and RACK STRINGS layered as patch B. Click B in the LAYER strip to choose another patch B, or switch LAYER B off to play patch A alone.
5. If you play on a particular MIDI channel, set CH in the PLAY strip; OMNI listens to all 16.

Controls

The rack unit

Patch number

The red three-digit display shows the number of the patch chosen in the LAYER strip (A or B), 000 to 099.

Patch name window	Shows A or B, the bank and the patch name. While you turn a control it shows that control's name and value for a moment instead. Click it for every patch, listed by bank; the patch you pick goes into the slot chosen in the LAYER strip.
< / >	Step to the previous or next patch in the chosen slot (wrapping round from 099 to 000).
EDITOR	Switches the lower half of the panel between the patch list and the editor.
BLACK / CREAM	Swaps the faceplate between the black early boxes and the cream 90s boxes. Looks only - the sound does not change.
COMBI	Click for the list of combis: ready-made pairs of patch A and patch B (see Combis below). Shows the combi loaded, or a dash once you change A or B.
MIDI	Lights when a note arrives.
VOLUME	The overall level, -24 to +6 dB.

LAYER

The strip under the rack unit holds the two patches. Both play on every note: six voices for patch A and six for patch B.

A / B	Choose which patch the display, the patch list and the editor show and change. The window beside each key shows that patch's number and name; click a window to choose a patch for it from the list.
LAYER B	Switches patch B in (lit, the default) and out. It fades in or out over 20 ms, so it never clicks, even with notes held. While it is out, patch B's name is greyed and M1K plays patch A alone, exactly as the original.
BALANCE	The mix of the two patches. In the centre (the default) both play at full level; turn it left to bring patch B down until only A is left, right to bring patch A down until only B is left. Each patch also keeps its own LEVEL (in the PLAY strip), so you can set the blend there too.

What belongs to each patch: every DCO, VCF, envelope and LFO setting, plus its own LEVEL and GLIDE. What is shared, set by patch A: the Mod Rack (on both layers together), the voice mode (POLY / MONO / UNI), VELOCITY and BEND. The mod wheel and aftertouch add vibrato to both patches through each one's own LFO 1.

The patch list

With EDITOR off, the lower half lists all 100 patches under their bank headings. Click a name to load it into the slot chosen in the LAYER strip; the current patch is highlighted. Choosing a patch stops any notes still sounding.

The editor below shows the patch chosen in the LAYER strip, A or B.

DCO 1

WAVE	Switches the saw / triangle wave on or off.
PULSE	Switches the pulse wave on or off. WAVE and PULSE can both be on at once.
FREQ	Tuning in semitones, -24 to +24.
SHAPE	Morphs the wave from SAW (fully left) to TRI (fully right).
PW	Pulse width, 5 to 95% (50% is a square).

DCO 2

WAVE / PULSE / SHAPE / PW	As on DCO 1.
NOISE	Replaces DCO 2's waves with white noise.
SYNC	Hard-syncs DCO 2 to DCO 1. Tune DCO 2 up with FREQ (or sweep it with the pitch envelope) for the classic tearing sync sound.
FREQ	Tuning in semitones, -24 to +24.
DETUNE	Fine tuning against DCO 1, -50 to +50 cents (+7 by default) - the beating that makes two oscillators sound thick.

MIX

1 / 2	The balance between the two DCOs, from DCO 1 only to DCO 2 only.
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VCF

A 24 dB per octave low-pass filter.

CUTOFF	The filter frequency, 20 Hz to 18 kHz.
RES	Resonance: a peak at the cutoff, for a sharper, more vocal or squelchy tone.
ENV 1	How far ENV 1 moves the cutoff, -100 to +100% (up to six octaves either way). Negative values close the filter as the envelope rises.
KEY	Keyboard tracking: how much the cutoff follows the notes you play (at 100% it moves one octave per octave), so high notes stay as bright as low ones.
FM	DCO 1 sweeps the cutoff at audio rate, for a clangorous, metallic edge.
VEL	Velocity opens the filter: harder notes are brighter (up to +5

octaves).

ENV 1 - VCF and ENV 2 - VCA

Two envelopes with the same controls. ENV 1 moves the filter (and, if you like, the pitch); ENV 2 shapes the volume of each note. The attack rises in a straight line; the decay and release fall away naturally.

DLY	A delay before the envelope starts, 0 to 3 s.
ATK	Attack time, 0.5 ms to 8 s.
DEC	Decay time to the sustain level, 5 ms to 10 s.
SUS	The level held while the key is down, 0 to 100%.
REL	Release time after the key is let go, 5 ms to 10 s.
PITCH (ENV 1 only)	ENV 1 bends the pitch, -24 to +24 semitones - for sync sweeps, zaps and drum-like drops.
DCO 2 / BOTH	Click to choose whether PITCH moves DCO 2 only or both DCOs.

LFO 1 - VIBRATO

SPEED	0.05 to 30 Hz.
DEPTH	Vibrato depth, 0 to 100 cents.
DELAY	The vibrato fades in over this time after each note, 0 to 5 s.
Wave box	Click to choose the shape: TRIANGLE, SAW UP, SAW DOWN, SQUARE, RANDOM (stepped) or NOISE (smooth random).

The mod wheel and channel aftertouch add more vibrato through LFO 1 (up to 50 cents), whichever is higher.

LFO 2

SPEED	0.05 to 30 Hz.
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DEPTH	How much LFO 2 moves its destination, 0 to 100%.
Wave box	The shape, as on LFO 1.
TO PW / TO CUT / TO PITCH	The destination: the pulse width of both DCOs (PWM), the filter cutoff (up to +/-5 octaves) or the pitch (up to +/-12 semitones).

The Mod Rack

Four effects in parallel on the whole sound, both layers together. They are patch A's, saved with each patch, and the editor shows them whichever slot is chosen. Each module has a SYNC key (click to step through off, SYNC straight, SYNC D dotted and SYNC T triplet): when synced, RATE or TIME becomes a note value from 4 BARS to 1/32, locked to the project tempo. The L, C and R keys pick which outputs the module feeds: left, a mono centre, and right. With C plus L or R, the outputs are offset from one another for a wider spread.

TREMOLO	RATE (0.1 - 15 Hz), DEPTH, and CHOP, which squares the wave off for a choppy, on-off tremolo.
CHORUS	RATE (0.05 - 8 Hz), DEPTH, MIX, and STRETCH, which lengthens the chorus delay and lowers its clock for a darker, grainier, warbling chorus.
VIBE	RATE (0.1 - 12 Hz), DEPTH, and LAMP, which makes the sweep lopsided and adds the throb of the old lamp-driven units.
DELAY	TIME (20 - 1500 ms), FDBK (0 - 95%), MIX, and RUNAWAY, which adds tape-like wow and flutter to the repeats and pushes the feedback harder.

PLAY strip

POLY / MONO / UNI	POLY: six voices. MONO: one voice, last-note priority and legato - a note played while another is held glides to the new pitch without restarting the envelopes, and letting go returns to the note still held. UNI (unison): all six voices on one note, detuned and spread across the stereo field, for a huge mono sound.
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GLIDE	Portamento time, 0 to 1 s: the pitch slides from the previous note. Each patch has its own; the dial shows the chosen slot's.
VELOCITY	How much velocity changes the volume, 0 to 100% (50% by default).
BEND	Pitch-bend range, 0 to 12 semitones.
DRIFT	See Drift below.
LEVEL	The patch level, -12 to +6 dB, saved with each patch to even out loud and quiet patches. Each patch has its own; the dial shows the chosen slot's.
CH	MIDI channel: OMNI or 1 to 16.
SAT	Band saturation on the way out: only the lows and highs are saturated (the mids stay clean), with a soft curve that loosens as the level rises.
OUTPUT CLIP	A soft clipper on the output (always on) catches overs at the ceiling.
S / M / L	Panel size: small, medium or large. The panel also scales to fit the plugin window.
?	Opens a pop-up with the design credit, the GFX website address and the address of this manual. Click anywhere to close it.

Drift

DRIFT (0 - 100%, 25% by default) moves the tuning only, as on real analogue hardware: the overall tuning wanders slowly, each voice's two DCOs drift apart in fine pitch, and every note lands slightly differently in tune. Both layers drift, each voice on its own, so patch A and patch B never sit quite in lockstep. The filter, pulse width and Mod Rack stay steady. At 0 the tuning is perfectly steady.

Combis

A combi is a ready-made layer: one click on the COMBI window (in the rack unit, under the name) loads a patch into A and a partner into B together, each at a matched LEVEL so the pair plays at about the same loudness as patch A alone, with B sitting behind it. LAYER B goes in and BALANCE is set for you. Change A or B afterwards and the COMBI window shows a dash: the layer is then your own. In REAPER's parameter list the combis are the Combi parameter.

KEYS

PIANO + STRINGS	A: 000 RACK PIANO · B: 016 RACK STRINGS
EP + PAD	A: 008 SOFT EP · B: 045 WARM PAD
WURLY + STRINGS	A: 011 WURLY · B: 017 SLOW STRINGS
BELL + SOFT PAD	A: 006 BELL PIANO · B: 044 SOFT PAD
VIBES + CHOIR	A: 007 VIBRAPHONE · B: 054 CHOIR PAD
ORGAN + STRINGS	A: 003 HOLLOW ORGAN · B: 029 STRING MACHINE
HARPSI + CHAMBER	A: 005 HARPSICHORD · B: 019 CHAMBER
MUSIC BOX + SPACE	A: 015 MUSIC BOX · B: 058 SPACE PAD

STRINGS

STRINGS + BRASS	A: 016 RACK STRINGS · B: 043 POLY BRASS
CELLOS + VIOLINS	A: 021 CELLO SECTION · B: 020 BRIGHT VIOLINS
STRINGS + CHOIR	A: 025 SWELL STRINGS · B: 054 CHOIR PAD
PWM WASH	A: 018 PWM ENSEMBLE · B: 048 PWM PAD
PIZZ + STRINGS	A: 026 PIZZICATO · B: 017 SLOW STRINGS

SYNTH

BRASS + PAD	A: 042 RACK BRASS · B: 044 SOFT PAD
STAB SECTION	A: 052 STAB SYNTH · B: 009 STAB KEYS

PLUCK + PAD	A: 051 PLUCK POLY · B: 045 WARM PAD
SYNC + WARM PAD	A: 050 SYNC SWEEP · B: 045 WARM PAD
FAT FIFTHS	A: 056 FAT POLY · B: 049 FIFTHS PAD

BASS

RESO + SUB	A: 066 RESO BASS · B: 065 SUB BASS
BASS + SLAP	A: 062 RACK BASS · B: 074 SLAP SYNTH
SYNC + SUB	A: 068 SYNC BASS · B: 065 SUB BASS

LEAD

SAW + SQUARE	A: 079 SOLO SAW · B: 078 SQUARE LEAD
FLUTE + SINE	A: 030 BREATHY FLUTE · B: 084 SINE LEAD
BRASSY SYNC	A: 081 BRASSY LEAD · B: 077 SYNC LEAD

MALLETS + FX

MARIMBA + PAD	A: 035 MARIMBA · B: 044 SOFT PAD
KALIMBA + CHOIR	A: 036 KALIMBA · B: 054 CHOIR PAD
WIND + DRONE	A: 088 WIND · B: 097 DRONE CLUSTER

Patches

Choosing a patch for slot A sets every DCO, VCF, envelope, LFO and Mod Rack setting, plus the voice mode (POLY / MONO / UNISON), GLIDE and the patch LEVEL. Choosing one for slot B sets its own DCO, VCF, envelope and LFO settings, GLIDE and LEVEL (its Mod Rack and voice mode are not used). VOLUME, VELOCITY, BEND, DRIFT and the MIDI channel are left as they are.

KEYBOARD (000 - 015)

000 RACK PIANO	Pulse and saw through a plucky filter envelope, with stereo chorus.
001 DYNO KEYS	Narrow pulses an octave apart, velocity-bright, with chorus and a gentle tremolo.
002 CLAV KEYS	Thin pulses with a resonant, fast filter snap.
003 HOLLOW ORGAN	Square waves an octave apart, steady organ envelope, light vibrato and the VIBE.
004 PERC ORGAN	Triangles with a second partial an octave and a fifth up, an organ envelope and the VIBE.
005 HARPSICHORD	Saw plus an octave-up narrow pulse, bright and decaying.
006 BELL PIANO	Synced DCO 2 two octaves up with a small pitch sweep, for a bell-like attack.
007 VIBRAPHONE	Triangles two octaves apart with a long ring and a 5.5 Hz tremolo.
008 SOFT EP	Mellow pulse and triangle, slow decay, chorus and soft tremolo.
009 STAB KEYS	Two detuned saws with a short, punchy envelope.
010 TOY PIANO	Pulses with an off-key 31-semitone partial for a tinny toy sound.
011 WURLY	Pulse and saw-triangle, velocity-driven filter, chorus and tremolo.
012 CHURCH KEYS	Triangles a fifth apart, a soft attack and long release, light vibrato and the VIBE.
013 GLASS PIANO	Synced saws with a falling pitch sweep on DCO 2 for a glassy attack.
014 FUNKY CLAV	Very narrow pulses with a resonant, fast filter pluck.
015 MUSIC BOX	Triangles two octaves apart, fast tremolo and a synced delay.

STRINGS (016 - 029)

016 RACK STRINGS	Two detuned saws with slow attack, light pulse-width movement, vibrato and chorus.
017 SLOW STRINGS	As RACK STRINGS with a much slower attack and release.
018 PWM ENSEMBLE	Two pulses with deep LFO 2 pulse-width modulation and chorus.
019 CHAMBER	A darker, quicker string section.
020 BRIGHT VIOLINS	Saws an octave apart with a brighter filter and more vibrato.
021 CELLO SECTION	Saws an octave down, darker and quicker.
022 OCTAVE STRINGS	Saws an octave apart with chorus.
023 ENSEMBLE DREAM	Square plus saw an octave up, with LFO 2 adding pitch shimmer and chorus: the string-machine sound.
024 TREMOLO STRINGS	String pad with a deep 7 Hz tremolo.
025 SWELL STRINGS	Very slow attack and filter swell.
026 PIZZICATO	Short, plucked strings with no chorus.
027 DARK HALL	Low filter, long release, a dark string wash.
028 SYNTH VIOLA	More detuned, more resonant string.
029 STRING MACHINE	Squares an octave apart with pulse-width shimmer and chorus.

WIND+PERC (030 - 041)

030 BREATHY FLUTE	Triangle with a little noise, delayed vibrato and a soft echo.
031 PAN PIPES	Triangle and noise with wide, wavering vibrato and echo.
032 OBOE	Narrow pulses with a resonant filter and delayed vibrato.
033 CLARINET	Hollow square waves through a darker filter.

034 BASSOON	Pulse and saw an octave down, reedy and dark.
035 MARIMBA	Triangle with a quiet two-octave pulse partial and a short decay.
036 KALIMBA	Triangle with a high partial, a tiny pitch blip and echo.
037 STEEL DRUM	Triangle with a 19-semitone pulse partial and a ringing decay.
038 TIMPANI	Low triangle and noise with a slight pitch dip on the strike.
039 TOM TOM	Triangle and noise; the pitch dips on the strike and bends back up.
040 WOODBLOCK	Very short, resonant knock.
041 HARMONICA	Pulse and saw with a reedy, resonant filter.

SYNTH (042 - 061)

042 RACK BRASS	Two detuned saws with a filter-envelope brass swell.
043 POLY BRASS	Slower, darker brass with a strong filter envelope.
044 SOFT PAD	Pulse and saw, slow attack, pulse-width movement and chorus.
045 WARM PAD	Saw-triangle blend, long attack and release, chorus.
046 GLASS PAD	Synced saws with a pitch sweep, LFO 2 pitch shimmer, chorus and a synced delay.
047 SWEEP PAD	A dark, resonant pad with a strong filter envelope, a slow attack and chorus.
048 PWM PAD	Two squares with deep pulse-width modulation and chorus.
049 FIFTHS PAD	Saws a fifth apart with chorus.
050 SYNC SWEEP	Hard-sync lead-pad with a big pitch sweep on DCO 2.
051 PLUCK POLY	Short, resonant filter pluck with a synced delay.

052 STAB SYNTH	Wide-detuned saw stab with a synced delay.
053 HOOVER-ISH	UNISON with glide, saw-plus-pulse and a heavily detuned lower saw, pitch dip on attack.
054 CHOIR PAD	Pulse and saw through a resonant filter for a vocal 'ah', with chorus.
055 VOX SYNTH	Very resonant filter wobbled by LFO 2 for a talking tone.
056 FAT POLY	Saw plus pulse on both DCOs, detuned, with chorus.
057 SLOW RISE	Very slow filter opening from a low cutoff.
058 SPACE PAD	Saws a fifth apart, LFO 2 on the cutoff, chorus and delay.
059 BRASS SWELL	Slow-attack brass with a strong filter envelope.
060 ARP PLUCK	Short, resonant pluck for arpeggios, synced delay.
061 DIGI WAVE	Synced triangles with fast, full LFO 1 vibrato for a digital warble, synced delay.

BASS (062 - 075)

062 RACK BASS	Two saws an octave down with a punchy filter envelope.
063 FAT SAW BASS	Wider-detuned, brighter saw bass.
064 PULSE BASS	Pulse-wave version of the matrix bass.
065 SUB BASS	Triangles one and two octaves down, almost no filter movement.
066 RESO BASS	Very resonant, fast filter pluck.
067 PICK BASS	Narrow pulse and saw with a short pick-like attack.
068 SYNC BASS	DCO 2 synced to a lower DCO 1 with a pitch sweep.
069 WOW BASS	Slow resonant filter 'wow' on each note.

070 FRETLESS	Saw-triangle blend with delayed vibrato.
071 HOUSE BASS	Squares one and two octaves down, resonant pluck.
072 ACID-ISH	Single saw, very resonant, strong envelope and velocity on the filter.
073 SOFT ROUND	Mellow triangle bass with a low filter.
074 SLAP SYNTH	Narrow pulse and saw with a sharp, velocity-sensitive snap.
075 DEEP DRONE	Wide-detuned low saws with a slow LFO 2 filter movement.

LEAD (076 - 087)

076 RACK LEAD	MONO saw lead with glide, delayed vibrato and a synced delay.
077 SYNC LEAD	Hard-sync lead with a pitch sweep on DCO 2.
078 SQUARE LEAD	Squares an octave apart.
079 SOLO SAW	Wide-detuned saws with chorus and delay.
080 WHISTLE	Triangle an octave up with a breath of noise.
081 BRASSY LEAD	Saw lead with a brass-like filter swell.
082 NASAL LEAD	Very narrow pulses through a resonant filter.
083 FIFTH LEAD	Saws a fifth apart.
084 SINE LEAD	Soft triangles an octave apart.
085 SCREAMER	Saws through a very resonant filter.
086 PORTA LEAD	Saw lead with a long 160 ms glide.
087 WAH LEAD	Resonant filter swept by LFO 2 for an auto-wah.

EFFECTS (088 - 099)

088 WIND	Noise through a resonant filter swept slowly by LFO 2, with slow chorus.
089 SURF	Noise with a very slow filter and tremolo swell, like waves.
090 S&H COMPUTER	Random sample-and-hold LFO 2 on a resonant filter, with delay.
091 LASER	Synced saws with a big falling pitch sweep on both DCOs.
092 SIREN	Triangle with LFO 2 swinging the pitch, and a delay with RUNAWAY wobble.
093 ZAP DROP	A strong falling pitch envelope on both DCOs for zaps.
094 BUBBLES	Resonant triangle with random LFO 2 pitch jumps and delay.
095 METAL CLANG	Synced saws with VCF FM for a clangorous ring.
096 RISER	Very slow attack with a rising filter and a slight pitch rise, for builds.
097 DRONE CLUSTER	Saws a semitone apart with slow filter movement and chorus.
098 HELICOPTER	Low noise chopped by a fast square tremolo.
099 FM BELLTREE	Triangles at an inharmonic 31-semitone interval with strong VCF FM and a long ring.

Tips

- Start from a COMBI, then change patch B to taste: the levels stay where the combi set them.
- Two layers together play louder than one: bring the LEVEL of each patch down a few dB if a layered sound is too hot.
- Your edits stay until you choose another patch. To keep an edited patch, save it as a REAPER preset (the + button at the top of the plugin window).
- Use LEVEL rather than VOLUME to balance one patch against another - LEVEL is saved with the patch.

- For a thick lead, try a MONO patch and switch to UNI: all six voices stack on one note.
- Raise DETUNE on DCO 2 and add the CHORUS module for wide, classic pads.
- If a patch's echo clashes with your song, switch the DELAY module's SYNC on so its time follows the project tempo.

File: gfx-lab-g-m1k.jsfx