

PCM 12

A 12-bit PCM drum machine with a PAD SYNTH page: build each pad's own sound, then store it at the rate and bits you choose and play it through the same 12-bit converter as the ROM.

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

PCM 12 is a drum machine in the spirit of the big mid-80s digital rhythm programmers. Its sound ROM holds 24 drums, built when the plug-in loads and stored as 12-bit PCM at 40 kHz - no sample files to install. There are 12 pad channels, each playing one sound at a time with the classic voice edit (pitch, level, pan, a four-part envelope, bend, reverse and its MIDI note). Each pad is tuned by its own playback clock, which holds every stored value until the next tick, so tuning a sound down makes it darker and grainier, as on the hardware.

This Lab version adds a **PAD SYNTH** page. Every pad has its own synth sound: an oscillator with a pitch sweep, filtered noise, a metal voice made of six square waves, a stick click, drive, a short room and an 80s gated reverb. When you change it, the

sound is built at the RATE you choose (40 kHz down to 8 kHz), normalised, stored at 12, 10, 8 or 6 bits, and then played exactly like a ROM sound - through the pad's clock, the voice edit, the converter and its output filter. So a synth kick tuned down grows the same converter grain as a ROM kick, and a 12 kHz, 8-bit snare sounds like a cheap early sampler.

The sequencer now follows the house drum-machine rules: 16 patterns, a bank of 15 ready-made patterns, RUN and FOLLOW, an ACCENT knob, and the kits laid out in the house pad order with colours by family.

Reach for it for

- Gritty 80s digital drum tracks
- Your own kicks, snares, zaps and blips, crushed to 12 bits or less
- Lo-fi kits: everything built at 12 or 8 kHz
- Gated snares and big toms
- Programming quick patterns without leaving the plug-in

Getting started

1. Insert PCM 12 on a track (it is an instrument: it has no audio input).
2. Play it from MIDI: each pad answers to the note printed on it. The kits use General MIDI drum notes (kick 36, snare 38, rim 37, clap 39, closed hat 42, open hat 46, toms 48 / 45 / 41, ride 51, crash 49).
3. Or press RUN in the PATTERN section: pattern 1 plays at the project tempo. Light FOLLOW to have the sequencer start and stop with REAPER's transport instead.
4. Click a pad to hear it and select it. Press EDIT in the top bar to build the selected pad's own sound on the PAD SYNTH page; press EDIT again to come back.

Controls

Knobs: drag up or down (Shift for fine steps), use the mouse wheel, or double-click to reset; a knob shows its value while you touch it.

The header

LCD

Line 1: the selected pad, its sound (SYN in front of a synth sound) and the kit. Line 2: the pattern and the sequencer

	state (STOPPED, RUNNING or FOLLOWS REAPER); while it runs it shows the step and the tempo.
KITS	Choose a kit (see Kits). A kit sets all 12 pads: sounds, voice edits, notes and the synth sounds. It never changes the patterns. The kits are also in REAPER's parameter list, as the last parameter (Preset), for screen readers.
EDIT	Opens the PAD SYNTH page for the selected pad, and closes it again. Its light is lit while the page is open.
MIDI light	Flashes when a note arrives.
12-BIT LIN / 8-BIT COMP	The converter era (a drop-down), for the ROM and the synth sounds alike. 12-BIT LIN: the 12-bit linear converter, with a tiny touch of the real part's non-linearity. 8-BIT COMP: the earlier 8-bit companded converter, whose steps grow with the level, so a gritty layer rides about 38 dB under the sound all the way down its tail. The change applies from the next hit.
S / M / L	Panel size: small, medium or large. The panel also scales to fit the plug-in window.
?	Opens a pop-up with the design credit, the GFX website address and the address of this manual. Click anywhere to close it.

PADS

Twelve rubber pads, four by three, each with its number, its sound, its MIDI note (SYNTH and the note when the pad plays its synth sound) and a colour bar for the sound's family: kick brown, snare and rim red, clap orange, hats yellow, toms green (darker for lower), ride and crash blue, percussion violet.

Pad	Click to hear it and select it: VOICE EDIT, the STEP keys and the PAD SYNTH page follow the selected pad, which has a red bar under it and its LED lit. A pad flashes red when it plays.
Arrow	Opens the list of sounds for that pad: the 24 ROM sounds (BD 1, BD 2, BD GATED, SD 1, SD GATED, SD TIGHT, RIM,

CLAP, TOM 1 - 4, HH CLOSED, HH OPEN, HH PEDAL, RIDE, CRASH, COWBELL, SHAKER, TAMBOURINE, CONGA, TIMBALE, ELEC TOM, SNAP), then PAD SYNTH, the pad's own synth sound.

LEVEL

A bank of 12 channel faders, one per pad, 0 to 100 (80 by default), with the value under each and the pad's colour under its number. Drag a cap (Shift for fine moves) or double-click it for 80; click a fader's number to select its pad.

VOICE EDIT (the selected pad)

SOUND	The pad's sound (the same list as the pad's arrow).
NOTE	The MIDI note that plays the pad, 24 to 96. If two pads share a note, the lower-numbered pad plays.
REVERSE	Plays the sound backwards.
PITCH	-24 to +24 semitones. Pitching changes the pad's playback clock, as on the hardware, so higher is also shorter and brighter, and lower is longer, darker and grainier.
PAN	-100 (left) to +100 (right).
BEND	-100 to +100: the pitch sweeps DOWN or UP while the sound plays (up to 4 octaves per second at full); OFF at the centre.
LEVEL	The pad's level, as its fader.
ATTACK, DECAY 1, D.POINT, DECAY 2	The envelope over the stored sound: a fade-in (0 to 200 ms), DECAY 1 towards the decay point, then DECAY 2 to silence. Decay times are the time to fall by 40 dB; FULL (fully up) leaves the sound's own decay untouched. A short DECAY 2 after a high D.POINT gives a gated, chopped tail.

PATTERN

RUN	Starts and stops the sequencer; it never starts by itself. While REAPER plays, the steps follow the timeline (bar 1 =
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	step 1); while REAPER is stopped, RUN starts at step 1 and runs on its own at the project tempo. With FOLLOW lit, RUN only shows whether the sequencer is running.
FOLLOW	Lit: the sequencer starts and stops with REAPER's transport. Off by default.
1 - 16	Choose the pattern. The pattern playing is lit. While it runs, a new pattern takes over at the next bar: its key flashes until then. When stopped it changes at once. Patterns 1 - 15 of a new instance hold the bank (see Patterns); 16 is empty.
SWING	0 to 75%: delays every second 16th.
ACCENT	How far apart accents and plain hits are, 0 to 100% (50% by default, about 6 dB). As it goes up, plain hits sit back and accents jump out. It works on sequencer accents and on the top MIDI velocity step.
BARS 1 / 2 / 4 / 8	How many bars EXPORT writes (the pattern is repeated).
EXPORT	Hands the current pattern to the export script (see below). It reads SCRIPT if the script did not pick the pattern up.
COPY TO	Copies the current pattern to another pattern (1 - 16).
CLEAR	Empties the current pattern.
BANK	Loads one of the 15 bank patterns into the current pattern.

STEPS

Step keys 1 - 16	The selected pad's steps in the current pattern. Click to cycle off, hit, accent: the left LED is a hit, both LEDs an accent. The green light under the keys runs with the sequencer.
Overview	Above the keys, all 12 rows at once as LEDs (accents brighter), each with its pad's colour on the left, the selected pad's row highlighted. Click a row to select its pad.

Plain sequencer hits play at 70% velocity, accents at full. An accent also changes the sound: a harder attack (the level briefly overshoots), a little longer decay and a hair

higher in pitch. The patterns, the pads and their synth sounds are saved with the project.

MASTER

VOL	Output level, -24 to +12 dB.
VELO	How much MIDI velocity (and accents) changes the level, 0 to 100% (60% by default). Velocity is read in 10 steps, as on the machines of the era; the top step (velocity 121 and over) is the accent.
DAC	The converter's 4-pole output filter, 4 to 20 kHz (14 kHz by default; about -3 dB there, with a slight lift an octave below). Lower it for a duller, older sound.
CH	The MIDI channel the pads listen to: OMNI (all) or 1 to 16.
DRIFT	See Drift below.
Meters	Output level, left and right. Click to reset the peak hold.

The PAD SYNTH page



The page builds the selected pad's own synth sound. Turn any knob and the pad switches to its synth sound (USE SYNTH lights); the new sound is built in a fraction of a second and plays once when you let go of the mouse. Until it is ready the pad keeps playing its previous sound, so a running pattern never clicks while you edit. The four parts - TONE, NOISE, METAL and the CLICK - are mixed, then DRIVE, ROOM and GATE work on the mix.

The pad keys and SOUND

Pad keys 1 - 12	Click one to hear that pad and build its sound. Each key shows the pad's starting point and colour; its light is lit when the pad plays its synth sound.
START FROM	Loads one of 16 starting points into the pad: KICK, SNARE, RIM, CLAP, CL HAT, OP HAT, HI TOM, MID TOM, LO TOM, RIDE, CRASH, COWBELL, ZAP, CLAVE, NOISE, BLIP. The starting point also sets the pad's colour family.
USE SYNTH	Lit: the pad plays its synth sound. Click to switch back to the ROM sound it had before (and on again).
HEAR	Plays the pad.

TONE

WAVE	The oscillator's shape: sine (fully left), triangle (centre), square (fully right), and every blend between.
PITCH	The pitch the sound settles to, 20 Hz to 2 kHz.
SWEEP	How far above PITCH the sound starts, 0 to 48 semitones. A kick starts two or three octaves up and falls fast; a zap falls four octaves slowly.
TIME	How quickly the sweep falls, 1 to 300 ms.
DECAY	How long the tone rings, 10 ms to 2 s.
LEVEL	The tone's level in the mix (0 = no tone, for hats, claps and cymbals).

RATIO	The overtone's pitch against the tone, x 1.00 to x 4.00 (x 1.59 is a drum head's second mode; x 1.51 a cowbell's).
OVERTONE	The overtone's level. It uses the same WAVE and sweep, and dies away twice as fast as the tone.

NOISE

FILTER	LOW-PASS, BAND-PASS or HIGH-PASS (a drop-down).
COLOUR	The filter's frequency, 200 Hz to 16 kHz.
RES	The filter's resonance: a ringing peak at COLOUR as it goes up.
BURSTS	1 to 4: the noise restarts this many times, 9 ms apart, before its decay - four bursts make a hand clap.
DECAY	How long the noise lasts, 5 ms to 2 s.
LEVEL	The noise's level in the mix.

METAL

PITCH	Six square waves at clashing ratios, 50 to 200% of their standard pitches: the hats and cymbals of the early machines.
COLOUR	A band-pass over the metal, 1 to 16 kHz.
DECAY	How long it rings, 5 ms to 2 s (short for a closed hat, long for an open hat or ride).
LEVEL	The metal's level in the mix.

CHARACTER

CLICK	The stick or beater: a short burst at the very start.
DRIVE	Soft saturation over the mix: rounder and louder at first, then thick and square.

ROOM	A few short reflections, darkened, as if the drum was recorded in a small studio.
GATE	An 80s gated reverb: a dense room held for 220 ms, then cut.

CRUSH

RATE	The rate the sound is built and stored at: 40, 32, 24, 20, 16, 12 or 8 kHz (a drop-down). Lower rates lose the top and, played through the pad's clock, add the converter's images: the sound of the cheaper early samplers. A synth sound's top is limited to just under half its rate.
BITS	12-BIT, 10-BIT, 8-BIT or 6-BIT (a drop-down): the stored word size. 8 bits is gritty, 6 bits is crunchy. The converter era (12-BIT LIN / 8-BIT COMP in the header) still applies on top.
LENGTH	The longest the sound is stored, 30 ms to 1.3 s. The sound is stored until it has died away or LENGTH is reached, and its last 15% fades out.

STORED SOUND

A picture of the pad's synth sound as it is stored, with its bits, rate and length. It reads BUILDING while a new sound is being made.

Drift

DRIFT (in MASTER, 50% by default) is the machine's supply and clocks. Each pad's clock sits a few cents off, the master clock wanders very slightly, and no two hits are quite the same level. Busy, accented playing sags the power supply: every clock dips (by up to 10 cents) and the level by up to 0.4 dB, recovering over about 300 ms. 0% is exact and repeatable; 100% is twice the standard amount.

Kits

All kits lay the pads out in the house order: 1 kick, 2 snare, 3 rim, 4 clap, 5 closed hat, 6 open hat, 7 high tom, 8 mid tom, 9 low tom, 10 ride, 11 crash, 12 percussion. The bank patterns are written for this order, so they work with every kit.

TIGHT FUNK	Short, dry and snappy (the default), with a cowbell on pad 12.
ELECTRO	Electronic toms raised and shortened with a gentle downward bend, a bent kick, a snap on the rim pad.
GATED 80S	BD GATED and SD GATED, big toms that fall a little in pitch, a pedal hat on pad 12.
LATIN	Congas and a timbale on the tom pads (GM notes 62, 64, 66), a deep kick, tight snare, side stick and cowbell.
HIP HOP	Everything tuned down: a booming kick that bends down, a dark snare and toms, a reversed crash, a snap on pad 12.
HOUSE	A round kick, a tight snare and clap, a short open hat, an electronic tom, a conga and a tambourine.
SYNTH 80S	Every pad built on the PAD SYNTH page at 40 kHz and 12 bits: a driven kick, a gated snare, toms with room and gate.
CRUSHED	Synth kick, snare, rim, clap and hats at 20 kHz and 8 bits, driven; ROM toms and cymbals tuned down; a crushed zap on pad 12.
LO-FI 12K	Every pad on the synth at 12 kHz and 10 bits: dark, grainy and soft-edged.
ZAP ELECTRO	A long sweeping synth kick, zaps on the three toms, a clave on the rim pad, a blip on pad 12, ROM ride and crash.

Patterns

The bank: a new instance has these in patterns 1 - 15; BANK loads any of them into the current pattern.

1 80S ROCK	Kick, backbeat snare, eighth hats and a crash on the one.
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2 FUNK	Syncopated kick and snare with ghost notes, busy 16th hats, an open hat.
3 ELECTRO	Electro kick with claps, eighth hats and percussion.
4 DISCO	Four on the floor, backbeat and off-beat open hats.
5 GATED BALLAD	A slow backbeat with eighth hats and a rim.
6 TOM FILL	A fill down through the three toms into a crash.
7 CLAPS + BELL	Four on the floor with claps, a cowbell line and off-beat hats.
8 HIP HOP	A lazy kick, backbeat and eighth hats with a rim.
9 HOUSE	Four on the floor, claps, off-beat open hats and percussion.
10 NEW JACK	A swung, syncopated kick and snare with busy hats (add SWING).
11 SHUFFLE	A shuffled hat pattern over kick and backbeat.
12 ONE DROP	Kick and rim on the three, eighth hats.
13 SYNTH POP	Four on the floor, snare and clap together, 16th hats with accents.
14 BREAKBEAT	A broken kick and snare with eighth hats.
15 LATIN	A clave rhythm on the rim, congas and timbale, cowbell eighths.

Exporting patterns as MIDI

JSFX plug-ins cannot write files, so EXPORT works with a companion ReaScript, 'GFX G-PCM 12 - export MIDI.lua' in the Scripts folder.

1. In REAPER, open Actions > Show action list, choose New action > Load ReaScript, and pick 'GFX G-PCM 12 - export MIDI.lua'. Select it and press Run.

2. The script keeps running in the background and exports every time you press EXPORT. Run it again to stop it.
3. Select the track you want the MIDI on and place the edit cursor where the pattern should start.
4. Choose BARS (1, 2, 4 or 8) and press EXPORT. A MIDI item named 'G-PCM 12 pattern' appears at the edit cursor.

Each pad's row is written on that pad's MIDI note, on MIDI channel 10; hits have velocity 100 and accents 127, and the swing is kept.

Tips

- Start a sound from KICK and raise SWEEP and TIME for an electro kick; drop DECAY and add DRIVE for a hard techno one.
- Build a snare at 16 or 12 kHz and 8 bits, then tune it down with PITCH in VOICE EDIT: the grain grows the lower it goes.
- For a clap, start from CLAP and try 3 BURSTS for a tighter hand, or add ROOM for a bigger one.
- GATE on a tom or snare gives the 80s gated sound; a short LENGTH chops it even harder.
- Use COPY TO to make variations of a pattern, then switch between them while playing - the change waits for the bar line.

File: gfx-lab-g-pcm12.jsfx