

Daichi

A virtual-analogue polysynth: two oscillators with sync, FM and ring, a multimode filter, three deep LFOs, unison, an arpeggiator and an effects strip.

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

Daichi is a virtual-analogue polysynth in the spirit of the much-loved early-2000s freeware VA synths, themselves modelled on the classic virtual-analogue lead synths of the 90s. It is quick to program: everything is on one panel, one knob per job.

Two oscillators feed the sound. OSC 1 has a sub-oscillator an octave down and can be frequency-modulated by OSC 2; OSC 2 can be detuned, hard-synced to OSC 1, ring-modulated with it or taken off the keyboard altogether. A simple MOD ENV sweeps OSC 2's pitch, the FM amount or the pulse width - the classic sync-sweep lead and FM-bell tricks. The mix runs through a FILTER (12 dB or self-oscillating 24 dB low-pass, high-pass or band-pass) with its own envelope and saturation, then the AMP envelope.

Three LFOs, each with two destinations, eight shapes (including a 16-step pattern you draw), per-voice or global running and a fade-in, up to 16 voices with up to 8 unison voices per note, portamento, a tempo-locked arpeggiator and an EFFECTS strip

(distortion or bit crush, phaser, chorus or flanger, and a stereo tempo-synced delay) finish it off. DRIFT gives it a gently unstable, analogue feel.

Reach for it for

- Fat saw basses, acid lines and sub basses
- Sync-sweep, square and wide unison leads
- PWM strings, warm and sweeping pads
- FM electric pianos, bells and plucks
- Tempo-locked arpeggios and chip-tune sounds
- Noise sweeps, risers and laser effects

Loading and playing it

1. Insert Daichi on a new track. It is an instrument: it makes its own sound and needs no audio input.
2. Arm the track with a MIDI input and record monitoring on, or put a MIDI item on the track, and play. The MIDI light in the header blinks on each note.
3. Pick a patch with PRESETS or the ◀ / ▶ keys, then shape it with the panel.
4. For arpeggios, switch ARP on and press play in REAPER: the arpeggiator runs in time with the project tempo.

Controls

Drag the knobs up and down (hold Shift for fine moves); double-click or Ctrl-click to reset one. A knob shows its value while you hover over it. Keys light orange when they are on.

The header

PRESETS	Opens the patch list (or click the display).
◀ / ▶	Step through the patches.
Preset display	Shows the patch number and name. Click it for the list.
Voice display	POLY, MONO or LEGATO (with ARP when the arpeggiator is on), and VOICES: how many voices are sounding out of the VOICES setting.

MIDI	Blinks on each note.
OMNI / CH	The MIDI channel. Click it for a list: Omni (the default, every channel) or Channel 1 - 16.
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.

OSC 1

WAVE	Five keys with wave glyphs: sine, triangle, saw (the default), square (a pulse, see PW) or noise.
SUB	The level of the sub-oscillator, one octave below OSC 1, 0 - 100% (0% by default).
FM	How much OSC 2 modulates OSC 1's frequency, 0 - 100% (0% by default). On the sine and triangle it is phase modulation (clean FM bells and tines); on the saw and square it bends the pitch through the waveform for a harder, grittier edge. Set OSC 2's PITCH to choose the overtones.
PW	The pulse width of the square waves (on both oscillators), 5 - 95% (50% = a true square). Narrow settings sound thin and nasal.
SUB WAVE	The sub-oscillator's wave: sine or square.

OSC 2

WAVE	The same five waves as OSC 1 (saw by default).
SYNC	Hard-syncs OSC 2 to OSC 1: OSC 2 restarts every cycle of OSC 1, so changing OSC 2's pitch changes its tone rather than its pitch. Sweep PITCH (or use the MOD ENV) for the classic tearing sync lead.

PITCH	OSC 2's tuning, -24 to +24 semitones (0 by default). The display under the knobs shows PITCH and FINE together.
FINE	Fine tuning, -50 to +50 cents (+8 cents by default, for a gentle beating against OSC 1).
RING	Ring modulation (OSC 1 times OSC 2), 0 - 100%. It replaces the plain oscillators as it comes up: clangorous, bell-like tones that change with PITCH.
MIX	The balance between OSC 1 (left, 1) and OSC 2 (right, 2); 50% by default.
TRACK	KEYBOARD tracking, on by default. Off, OSC 2 stays at a fixed pitch whatever you play - useful with SYNC, RING and FM for effects.

MOD ENV

A simple attack / decay envelope that starts with every note.

OSC 2 / FM / PW	Where it goes: OSC 2's pitch (up to 4 octaves at full AMOUNT), the FM amount, or the pulse width.
ATTACK	0.5 ms - 5 s (1 ms by default).
DECAY	5 ms - 5 s (300 ms by default).
AMOUNT	-100 to +100% (0, off, by default). Negative values sweep the other way.

FILTER

LP 12 / LP 24 / HP 12 / BP 12	The filter type: a 12 dB per octave low-pass, a 24 dB low-pass (the default, a ladder that self-oscillates at full RESO), a 12 dB high-pass or a 12 dB band-pass. The window above draws the filter envelope.
CUTOFF	20 Hz - 20 kHz (6 kHz by default).
RESO	Resonance, 0 - 100% (10% by default). LP 24 whistles and sings

	at the top; the 12 dB types stay tamer.
SAT	Drive into the filter, 0 - 100%: warmth at low settings, a thick, compressed growl higher up.
KEY	Keyboard tracking of the cutoff, 0 - 100% (50% by default). At 100% the cutoff follows the notes exactly.
VELO	How much key velocity opens the filter and deepens the filter envelope, 0 - 100%.
ENV	The filter envelope's amount, -100 to +100% (0 by default); up to 7 octaves at full.
ATT, DEC, SUS, REL	The filter envelope: attack 0.5 ms - 5 s, decay 5 ms - 8 s (400 ms), sustain 0 - 100% (50%), release 5 ms - 8 s (300 ms).

AMP

Envelope window	Draws the amp envelope.
GAIN	The patch level, -24 to +12 dB.
VELO	How much velocity changes the level, 0 - 100% (50% by default).
ATT, DEC, SUS, REL	The amp envelope: attack 0.5 ms - 5 s, decay 5 ms - 8 s (300 ms), sustain 0 - 100% (100%), release 5 ms - 8 s (200 ms).

LFO

Three LFOs share one section: the 1 / 2 / 3 keys choose which one the section shows. The light on each key is lit while that LFO is doing something (a DEPTH turned up); the orange dot in the window follows the LFO as it runs. LFO 1 starts on the filter, LFO 2 on pitch, LFO 3 on the filter, all with their depths at 0. This is what is new against the Stable Daichi: a third LFO, a second destination per LFO, more shapes, per-voice LFOs, a fade-in and FLOW timing.

1 / 2 / 3	Show LFO 1, 2 or 3.
GLOBAL / VOICE	GLOBAL (the default): one LFO for the whole synth, so every note moves together. VOICE: each note gets its own LFO,

	started with the note - chords shimmer instead of moving as one, and FADE starts afresh on every note.
KEY	In GLOBAL: restarts the LFO with each new note. (A VOICE LFO always starts with its note.)
FREE / SYNC / FLOW	FREE: the rate in Hz. SYNC: locked to the project tempo in note values, following the beat while REAPER plays. FLOW: tempo-locked note values too, but free-running, so it keeps its own phase and drifts gently against the beat.
Shape	Eight keys: sine, triangle, saw up, saw down, square, S&H (random steps), smooth random (a gliding random wander) and STEP. Jumping shapes are rounded off by 2 ms so they never click.
Window	Draws the chosen shape. With STEP chosen it shows 16 bars: click or drag across them to draw the pattern, each step from -100 to +100%.
RATE	FREE: 0.02 - 30 Hz. SYNC / FLOW: 4/1, 2/1, 1/1, 1/2, 1/2T, 1/4, 1/4T, 1/8, 1/8T, 1/16, 1/16T or 1/32. With STEP, the rate is one step.
FADE	How long the LFO takes to come in after a note starts (when no other key is held, in GLOBAL), 0 - 5 s: delayed vibrato, slowly blooming movement.
DEPTH A / DEPTH B	Two depths, -100 to +100%, each with its own destination menu, so one LFO can move two things at once - in the same or opposite directions. Depths glide, so turning them never steps.
Destinations	PITCH (up to an octave), OSC 2 PITCH (up to 2 octaves), FILTER (up to 4 octaves), AMP (tremolo), PAN, FM, PULSE WIDTH, RESONANCE, OSC MIX, RING, SUB, UNISON DETUNE, CHORUS DEPTH, DELAY MIX, and the RATE or DEPTH of any LFO - one LFO can speed up or swell another.

VOICE

POLY / MONO / LEGATO	Polyphonic; monophonic (every note restarts the envelopes); or legato (overlapping notes glide without a new attack).
VOICES	How many voices, 1 - 16 (8 by default). The unison voices come out of this pool.
UNISON	Voices per note, 1 - 8 (1, off, by default).
DETUNE	The spread of tuning across the unison voices, 0 - 50 cents (15 by default).
SPREAD	The stereo spread of the unison voices, 0 - 100% (60% by default).
PORTA	Portamento: the glide from the last note, 0 (off) to 2 s.
BEND	Pitch-bend range, 0 - 24 semitones (2 by default).
WHEEL	What the mod wheel (CC1) does: OFF, VIBRATO (the default, its own 5.5 Hz vibrato), LFO 1 (brings LFO 1's DEPTH A up to full), CUTOFF (opens the filter up to 3 octaves) or FM.

ARPEGGIATOR

The arpeggiator plays the held notes in time with the project tempo while REAPER plays.

ARP	Switches the arpeggiator on.
MODE	UP, DOWN, UP-DOWN, DOWN-UP, PLAYED (in the order you played them), RANDOM or CHORD (all the held notes together).
RATE	1/4, 1/4T, 1/8, 1/8T, 1/16 (the default), 1/16T or 1/32.
RANGE	1 - 4 octaves.
GATE	The length of each note, 10 - 200% of a step (60% by default). Over 100% the notes overlap.

EFFECTS

DIST	Switches the distortion on. DRV is a warm overdrive; BIT is a bit and sample-rate crusher.
AMOUNT	How hard it drives or crushes, 0 - 100% (30% by default).
PHASER	A stereo four-stage phaser. RATE 0.05 - 10 Hz (0.4 Hz), DEPTH 0 - 100% (60%).
CHORUS	CHO is a stereo chorus, FLA a flanger with feedback. RATE 0.05 - 10 Hz (0.6 Hz), DEPTH 0 - 100% (50%).
DELAY	A stereo delay locked to the project tempo, its repeats darker each time round.
PING-PONG	Bounces the repeats from side to side (on by default).
TIME	1/2, 1/4D, 1/4, 1/4T, 1/8D (the default), 1/8, 1/8T or 1/16.
FDBK	Feedback, 0 - 90% (35% by default).
MIX	The level of the repeats, 0 - 100% (25% by default).

MASTER

VOLUME	Output level, -24 to +6 dB.
DRIFT	0 - 100% (25% by default). See Drift below.
SAT	The GFX 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. 0% by default.
OUTPUT CLIP	A soft clipper on the output (always on) catches overs at the ceiling.
Meter	The output level.

Drift

DRIFT makes Daichi behave a little like an analogue synth: the tuning wanders slowly, OSC 2 wanders against OSC 1, the filter cutoff moves, the speed of the phaser and chorus breathes, and every note lands slightly differently in tune. The LFOs drift too: a

FREE or FLOW LFO's speed wanders by about 4% at the standard setting, and each VOICE LFO starts a little faster or slower than the last (about 3%), so a chord never quite moves in lockstep. SYNC LFOs stay locked to the tempo. At 0% everything is steady.

MIDI

Notes	Played across the whole keyboard, with velocity.
Pitch bend	Over the BEND range.
CC1 (mod wheel)	The WHEEL destination.
CC64	Sustain pedal.
CC120 / CC123	All sound off / all notes off.
MIDI through	All MIDI is passed on to the next plug-in.

Presets

Presets set the whole synth apart from the MASTER section (DRIFT, VOLUME, SAT and the output stage) and the MIDI channel. Every preset is levelled to the GFX house level (held sounds about -23 dBFS RMS, arpeggios a little lower), so stepping through them doesn't jump in volume.

Init	Two saws, OSC 2 8 cents up, through the open LP 24 filter.
Fat Saw Bass	Two saws an octave apart with a sub, a closed, saturated LP 24 with a punchy envelope, two unison voices, legato.
Acid Line	A single saw through a nearly closed, very resonant LP 24 with a snappy envelope and a short glide.
FM Bass	Sine FM with the MOD ENV on the FM amount: a woody pluck that softens as it decays.
Sub Bass	A sine with a sine sub and a little triangle on top, LP 12, legato.
Sync Lead	OSC 2 synced and swept by the MOD ENV, with a little vibrato.

Square Lead	Two squares an octave apart, slow PWM from LFO 2, vibrato and glide.
Unison Lead	Seven detuned saws spread wide, legato, with chorus and delay.
Soft Lead	Triangle and sine, a gentle attack, vibrato, glide and delay.
PWM Strings	Two squares with both LFOs on the pulse width, a slow attack and chorus.
Warm Pad	Saws with a slow filter and amp, the filter breathing on LFO 1, chorus and delay.
Sweep Pad	Saw and square a fifth apart, a slow resonant filter sweep, phaser and delay.
Glass Pad	Sine and square an octave and a fifth apart with ring modulation through the band-pass, chorus and delay.
FM E-Piano	Sine FM with a decaying FM amount, velocity, phaser and chorus.
Bell Tines	Sine FM at a high, non-harmonic ratio with a long decay and delay.
Clav Pluck	A narrow pulse and saw through a resonant band-pass with a short envelope and phaser.
Organ	Sines at 8', 4' and a sub, with a fast chorus and a little vibrato.
Poly Brass	Saws with a slow-opening LP 24, velocity on the filter, vibrato and chorus.
Brass Stab	Saw and pulse with a quick filter envelope and two unison voices.
Arp Pulse	A resonant square pluck arpeggiated up over two octaves at 1/16, with delay.
Arp Glass	An FM-tinged sine arpeggiated up and down over three octaves, with chorus and delay.

Chip Square	A thin square, mono and unfiltered; the mod wheel brings in a fast square trill.
Chip Arp	A square arpeggiated up and down at 1/32 over three octaves.
Noise Sweep	Noise through a slowly sweeping resonant band-pass, auto-panned, with phaser and delay.
Wind Riser	Noise with a long rising filter and amp, random filter steps and phaser.
Laser Zap	OSC 2 diving fast on a negative MOD ENV, with FM and a triplet delay.
Reso Pluck	A short, very resonant LP 12 pluck with delay.
Hoover	Four detuned, gliding square-and-saw unison voices with PWM, saturation and chorus.
Bit Bass	Square bass with a square sub, crushed by the BIT distortion.
Phase Keys	Saw and triangle keys through a deep, slow phaser.
Fifth Lead	Two saws a fifth apart, legato with glide, vibrato and delay.
Dark Drone	Saws an octave down with a sub, a dark resonant filter breathing very slowly, long envelopes, phaser and delay.
Shimmer Pad	Detuned saws with a VOICE LFO on the filter and pan, so every note of a chord shimmers on its own; LFO 2 slowly swells the chorus, and delay.
Late Vibrato	A singing lead whose vibrato fades in over the first part of each note, as a player would add it, with slow PWM.
Step Bass	A resonant bass with a drawn 1/16 STEP pattern on the filter and resonance, locked to the tempo.
Gate Pad	A pad chopped in time by a STEP pattern on the amp, with delay.
Drunk Strings	PWM strings whose pulse-width LFO speeds up and slows down on LFO 3, with a smooth-random VOICE LFO on pitch and

	filter: loose and wandering.
Tremolo Keys	Electric-piano keys with a tremolo and an auto-pan from one VOICE LFO's two depths, fading in on each note.
Random Ripple	S&H steps on the filter and ring modulation in FLOW timing, with a smooth-random auto-pan.
Wobble Bass	A sub-heavy bass with a 1/8 FLOW LFO on the filter, its speed swung by a second LFO locked to the bar.

Tips

- For the classic sync lead, switch SYNC on, set MOD ENV to OSC 2 with a positive AMOUNT and a decay of half a second or so.
- FM sounds clearest with both oscillators on sine; set PITCH to 12, 19 or 24 for bright, harmonic tones, and odd values for bells.
- Turn UNISON up and DETUNE to 15 - 25 cents for supersaw-style leads; raise VOICES too if you want to play chords.
- A little filter SAT goes a long way on basses; push it with LP 24 and high RESO for squelch.
- Set DRIFT to 0 when you want an exact, repeatable sound - for tight unison or layered parts.

File: gfx-lab-g-daichi.jsfx