KXtra User Manual

Nov 6, 2026 · @Ian

Introduction

KXtra is a 16-voice FM synthesizer where you build the sound by placing operators on an 8 × 8 grid and drawing wires between them. Every operator that reaches an output feeds one of four coloured output paths, A to D. Each path has its own filter, envelopes, LFOs and effects. A morph pad blends the four paths, by hand or along a stored path that moves on every note or in time with the song.

KXtra comes in three formats:

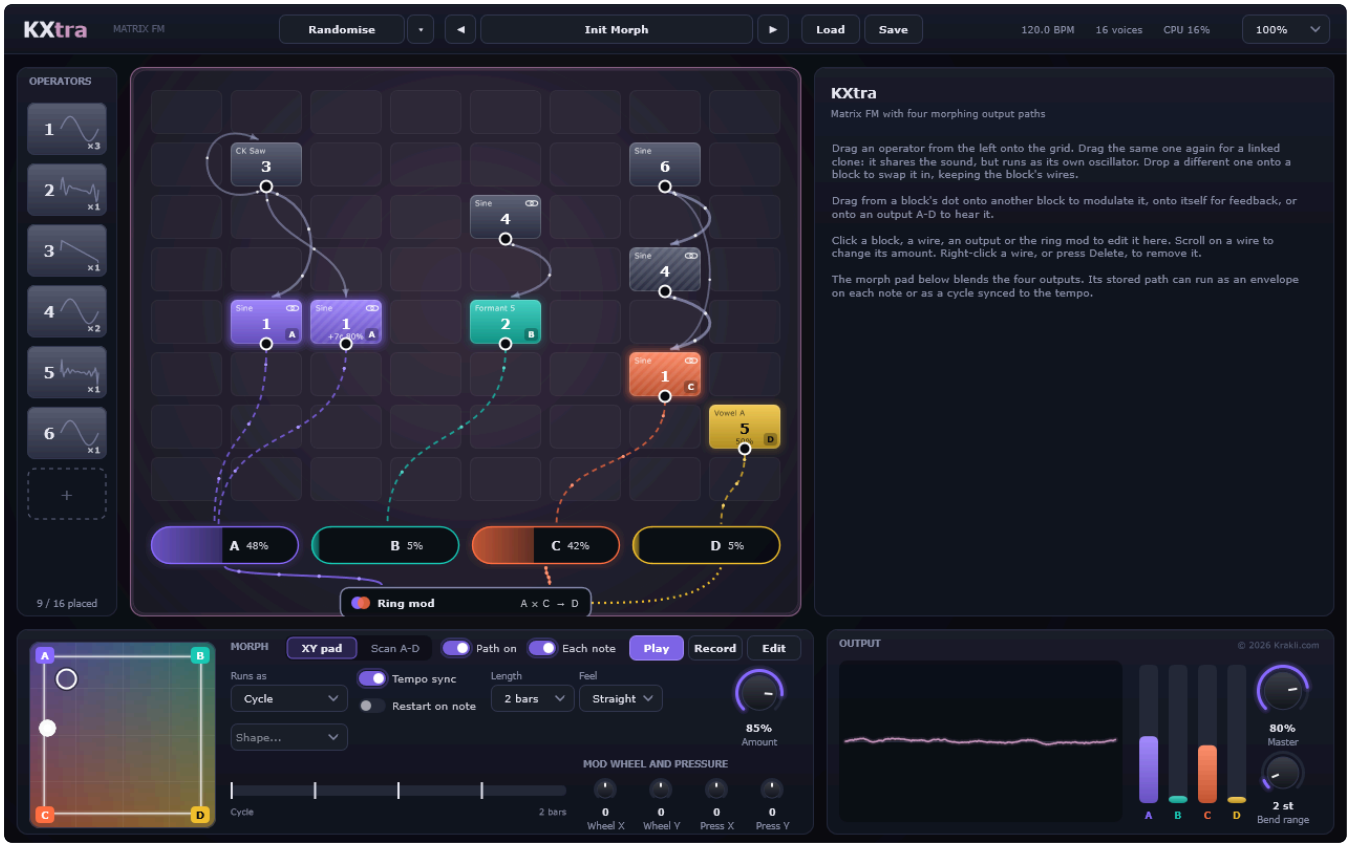
Format	System	Install location
VST3	Windows	`C:\Program Files\Common Files\VST3\KXtra.vst3`
VST3	macOS	`~/Library/Audio/Plug-Ins/VST3/KXtra.vst3`
AU	macOS	`~/Library/Audio/Plug-Ins/Components/KXtra.component`
Standalone	Windows, macOS	Anywhere; run it like any app

After copying the plugin, rescan plugins in your DAW. KXtra shows up as an instrument by Krakli. It has a stereo output and responds to MIDI notes, pitch bend, the mod wheel and pressure (aftertouch).

New to FM? Read **Operators and clones** and **Wiring** first. Those two sections explain how KXtra makes sound; the rest shapes it.

The screen

KXtra has one fixed screen of six areas, with nothing hidden in scrolling panels. Click anything on the grid and its controls appear in the details panel on the right.



Area	Where	What it does
Top bar	Across the top	Randomise, patch browser, Load and Save, tempo, voice count, CPU and window size
Operators	Left column	The operator palette: up to 8 operators to drag onto the grid, and a count of blocks placed (up to 16)
Matrix	Centre	The 8 × 8 grid of blocks and wires, the four output chips A to D, and the Ring mod chip
Details	Right	The controls for whatever you last clicked. With nothing selected it shows a short guide.
Morph	Bottom left	The XY pad, the stored morph path and its timing, and the mod wheel and pressure amounts
Output	Bottom right	Oscilloscope, a level bar per output showing its share of the mix, Master volume and pitch bend range

The interface takes on the colours of the outputs you are hearing. The KXtra logo, the matrix background and the scope all blend the four output colours by their current morph weights. Each output chip also shows its weight as a percentage, so you never have to judge it by colour alone.

Top bar

- **Randomise** makes a new patch. The small arrow beside it opens the randomiser menu (see **Patches and the randomiser**).
- **◀ and ▶** step through the factory patches. Click the patch name to choose from a list of factory patches and your own saved patches.
- **Load** and **Save** open and save `.kxtra` patch files. They default to a `KXtra` folder in your Documents folder.
- The tempo, active voices and CPU load are shown for reference.
- **Window size** scales the whole interface to 75%, 100%, 125%, 150% or 200%. You can also drag the window's corner; the layout keeps its shape.

Selecting things

Clicking a block, a wire, an output chip or the Ring mod chip opens its page in the details panel. Click an empty part of the grid to go back to the guide. Pages with tabs, such as the output pages, remember the last tab you used.

Operators and clones

An operator is an oscillator with its own envelope. Each one sits in the palette as a numbered tile, and you place it on the grid as a block. A patch can have up to 8 operators and up to 16 blocks.

Placing blocks

1. Click the **+** tile at the bottom of the palette to add a new operator (up to 8).
2. Drag a tile from the palette onto an empty grid cell to place a block.
3. Drag the same tile again to place a **clone**: a second block that shares the operator's sound settings but runs as its own oscillator.
4. Drag a block to move it to another empty cell.

Each palette tile shows how many blocks use it (for example ×2). Clones are marked with a link symbol on the grid.

To swap a block for a different operator, drop that operator's tile onto it. The block keeps its wires and its output, and its per-block settings go back to their defaults. The grid shows "Replace with op N" while you hover.

Shared settings

Click a block or a palette tile to edit its operator. These settings belong to the operator, so changing them changes every block that uses it.

Control	Range	What it does
Waveform	57 waves	The shape the oscillator plays (see **Quick reference**)
Ratio	0.25 to 16	Frequency as a multiple of the played note
Level	0 to 100%	Output level. On a modulator this also scales how hard it modulates.
Velocity	0 to 100%	How much key velocity changes the level. At 0% velocity has no effect.
Attack	1 ms to 8 s	Envelope rise time
Decay	10 ms to 10 s	Fall time to the sustain level
Sustain	0 to 100%	Level held while the key is down
Release	10 ms to 10 s	Fall time after the key is released

Ratio steps through 0.25, 0.5, 0.75, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5 and then whole numbers up to 16.

Settings for one block

When you click a block on the grid, a second group of controls applies to that block only. This is how clones differ from each other.

Control	Range	What it does
Ratio ×	×0.5, ×1, ×2, ×3, ×4	Multiplies the operator's ratio for this block
Detune	−50 to +50 cents	Fine pitch offset. A few cents on a clone gives a chorused, beating sound.
Level trim	0 to 150%	Scales this block's level
Output	None, A, B, C, D	Which output this block plays through. None makes it a modulator only.

The page title tells you which block you are editing, for example "Instance 2 of 3 (clone)".

Clone, Unlink and Remove

- **Clone** places another block of the same operator in the nearest free cell.

- **Unlink** turns a clone into a new operator with a copy of the same settings, so you can change it on its own. It needs a free operator slot (fewer than 8 in use).
- **Remove** deletes the block and its wires. You can also select a block and press Delete or Backspace.

Wiring

Wires decide what you hear. A block wired to another block modulates it, and a block wired to an output chip is heard. Every block has a dot on its lower edge; drag from that dot to make a wire.

Drag from a block's dot onto…	Result
Another block	**Modulation**: the first block bends the phase of the second, adding harmonics
The same block	**Feedback**: the block modulates itself, from brighter to noisy
An output chip A to D	The block becomes a **carrier** and is heard through that output

A patch can have up to 32 modulation and feedback wires. Each block goes to at most one output; dragging it onto a different chip moves it. Wires into outputs are dashed and take the output's colour. Blocks that only modulate stay grey.

Changing and removing wires

- **Scroll** over a wire to change its amount.
- **Click** a wire to open its page, with one large knob: **Mod index** for modulation or **Feedback** for a self-wire. Both run from 0 to 1. New wires start at 0.40, and new feedback at 0.25.
- **Right-click** a wire, or select it and press Delete, to remove it.
- Clicking a wire into an output opens a page with a **Disconnect** button. The block stays on the grid with its other wires; it just stops being heard.

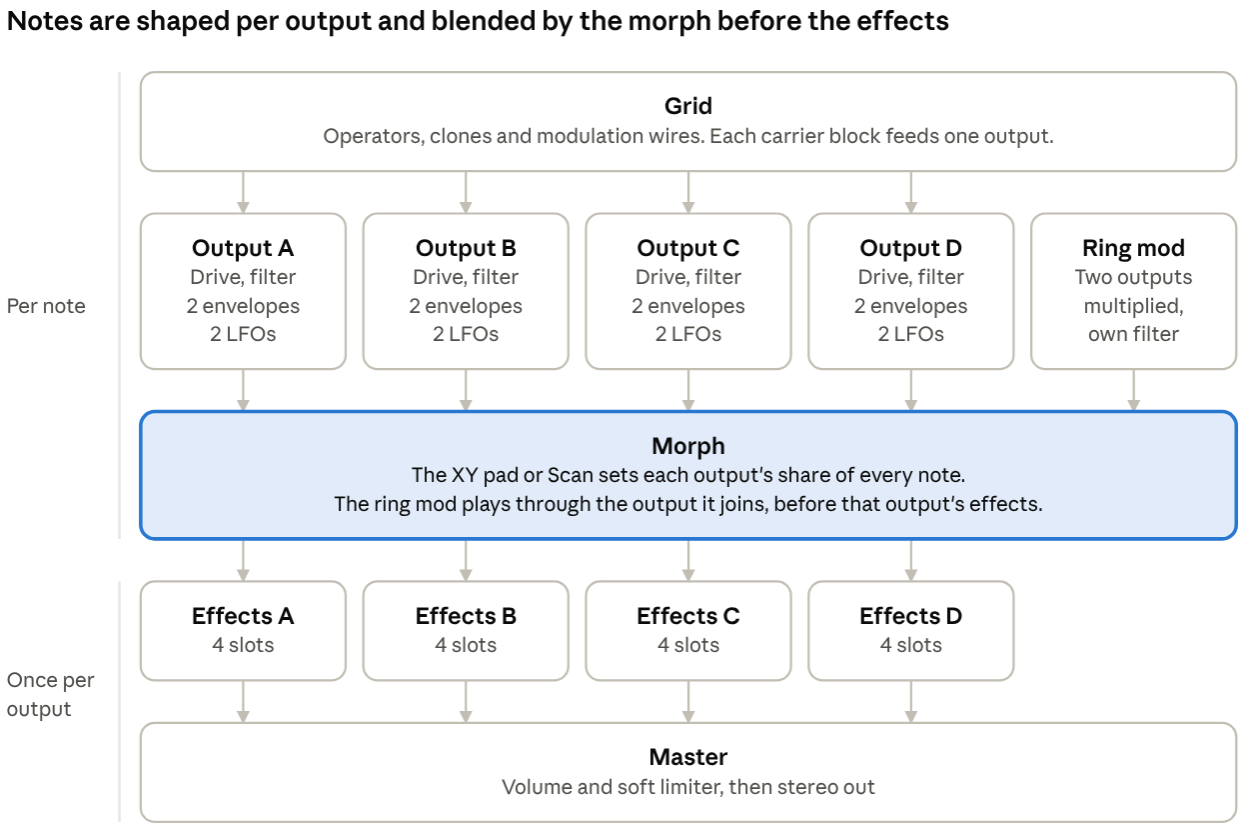
Order and loops

KXtra sorts the blocks so that modulators always run before the blocks they modulate. You can wire blocks into loops, such as 1 → 2 → 1. The wire that closes a loop is delayed by one sample, which keeps the loop stable.

FM tips:

- A modulator at ratio 1 or 2 adds even, warm harmonics. Odd or fractional ratios such as 3.5 give bell and metallic tones.
- Give a modulator a short decay to make a bright attack that softens, the classic FM piano and pluck sound.
- Clones of one modulator wired to several carriers keep their timbres in step: edit one operator and they all follow.

Signal flow



KXtra signal flow · grid to stereo out

Everything above the morph runs separately for each note, so every note in a chord has its own filter sweep and morph position. The effects and master run once, on the combined sound.

Output paths A to D

Each output is a complete synth voice path: drive, a filter, two envelopes, two LFOs and four effect slots. Click an output chip under the grid to edit it. The page subtitle lists the operators that feed it, such as "Fed by operators 1, 3 (×2)".

The filter, envelopes and LFOs run separately for every note, so chords and overlapping notes each get their own sweep. The effects run once on the output's combined sound.

Top of the page

Control	Range	What it does
Level	0 to 100%	Output volume before the morph
Pan	−100 to +100	Stereo position
Drive	1 to 10	Soft saturation before the filter. 1 is clean.
Colour	Any	Opens a colour picker for this output. The grid, chips and morph pad all use it.

Filter tab

Control	Range	What it does
Type	Off, Low-pass, Band-pass, High-pass, Notch, Comb, Vowel	The filter shape
Cutoff	40 Hz to 14 kHz	Filter frequency
Resonance	0 to 97%	Emphasis at the cutoff
Key track	0 to 100%	How far the cutoff follows the keyboard. At 100% it moves with the note pitch, measured from middle C.
Env amount	−48 to +48 semitones	How far the filter envelope moves the cutoff

Vowel sweeps through the vowels A, E, I, O and U as you turn Cutoff. **Comb** tunes a short delay to the Cutoff frequency, and Resonance sets its feedback, which gives metallic and plucked-string tones.

Envelopes tab

Two ADSR envelopes, each with a graph: the **filter envelope** (moved by Env amount on the Filter tab) and the **amp envelope**, which shapes the output's volume for each note. Attack runs from 1 ms to 8 s; Decay and Release from 10 ms to 10 s.

The amp envelope runs on top of each operator's own envelope. For a quick start, leave the amp envelope open and shape the sound with the operator envelopes, then use the amp envelope for the overall fade.

LFO 1 and LFO 2 tabs

Control	Options	What it does
Shape	Sine, Triangle, Saw, Square, Sample & hold, Smooth random	The wave the LFO follows
Target	Cutoff, Resonance, Level, Pan	What it moves. At full amount, Cutoff moves by up to 3 octaves each way.
Amount	−100 to +100%	Depth. Negative values invert the wave.
Rate	0.02 to 20 Hz	Speed, when Tempo sync is off
Tempo sync	On or off	Locks the LFO to the song tempo
Length and Feel	1/64 to 16 bars; straight, dotted, triplet	One cycle's length, when Tempo sync is on
Restart on note	On or off	Starts the LFO from the beginning on each note

Effects tab

Four slots, run top to bottom. Choose a type from each slot's menu, and use the ▲ and ▼ buttons to move a slot up or down. Every effect has a **Mix** knob from dry (0%) to fully wet (100%).

Effect	Controls
Drive	Drive, Tone
Chorus	Rate, Depth, Spread
Phaser	Rate, Depth, Feedback
Delay	Time, Feedback, Ping-pong, Sync
Reverb	Size, Damp, Width
Bit crusher	Bits, Rate
Tilt EQ	Tilt (below 50% darker, above 50% brighter)

Delay time is free (10 ms to 1.5 s) or, with **Sync** on, a note length from 1/32 to 1 bar, straight, dotted or triplet.

The effects come after the morph. When the morph moves away from an output, its delay and reverb tails still ring out rather than stopping dead.

Ring modulator

The ring modulator multiplies two outputs together, note by note, and plays the result through one of the outputs. This produces sum and difference tones that neither output makes on its own: clangorous bells, robotic voices and hollow, inharmonic pads.

Click the **Ring mod** chip below the output chips to edit it. The chip shows its routing, for example **A × C → D**. It needs two different outputs that each have at least one carrier; otherwise the page says so and the ring mod stays silent. Use the **On** switch at the top of the page to turn it off.

Because it runs inside each note, playing a chord does not multiply different notes together, which would turn to mush.

Inputs tab

Control	Options	What it does
Input 1, Input 2	A, B, C, D	The two outputs to multiply
Tap (for each input)	Before filter, After filter	Take the raw FM sound, or the sound after that output's filter and amp envelope
Ring / AM	0 to 100%	0% is true ring modulation; 100% is amplitude modulation, which keeps more of input 1's own pitch
Offset 2	−100 to +100	Adds a constant to input 2, moving the sound toward amplitude modulation
Dry inputs	0 to 100%	Blends the two unmultiplied inputs back in
Gain	0 to 200%	Level into the ring mod's own filter
Into output	A, B, C, D	Which output the ring mod plays through. It joins before that output's effects.
Amount	0 to 150%	Ring mod level into that output
FM / Ring	FM only, Both, Ring only	The balance between the destination output's own FM sound and the ring mod
Level, Drive	as on the outputs	Volume and saturation of the ring mod's own path

The **FM / Ring** knob has three useful positions:

- **FM only** (left): the ring mod is silent.
- **Both** (centre): the ring mod follows the morph exactly like its destination output.
- **Ring only** (right): only the ring mod is heard from that output, and it plays at full level wherever the morph is.

Filter, Envelopes, LFO 1 and LFO 2 tabs

The ring mod has its own filter, filter and amp envelopes, and two LFOs. They work exactly like the ones on the output paths.

Tip: route the ring mod into an output with no carriers of its own. That corner of the morph pad then plays pure ring mod.

Morph

The morph section blends the four outputs. You can set the blend by hand, play it from the mod wheel or pressure, or let a stored path move it on every note or in time with the song. The morph is what makes KXtra sound alive: one note can travel from a soft pad on A to a ring-mod clang on D.

XY pad and Scan

Choose the mode with the tabs at the top of the section.

- **XY pad**: A, B, C and D sit at the four corners (A top left, B top right, C bottom left, D bottom right). The centre plays all four equally. The blend uses equal-power curves, so the volume stays steady as you cross the middle.
- **Scan A-D**: one **Scan** knob sweeps A → B → C → D, blending only two neighbours at a time. In Scan mode the stored path and the mod wheel and pressure amounts have no effect.

The pad's background shows the four output colours blended across it. While notes play, each sounding note shows as a white dot at its own morph position.

Play, Record and Edit

Three buttons set what the mouse does on the pad.

Tool	What the mouse does
Play	Drag to set the manual position, the morph's starting point
Record	Hold the mouse down and move it. Releasing stores the movement as the path, with its timing.
Edit	Click to add a point, drag to move one, double-click to delete one

A recorded movement is simplified to at most 32 points. Recording also sets the path's length (or, for a free-running cycle, its rate) to the time you took, turns the path on, and switches back to Play. A path needs at least 2 points.

The **Shape…** menu replaces the path with a ready-made one: Square, Circle, Figure 8, Zigzag, or A to D (a straight line between those corners).

The line under the controls is the path's timeline. Each point is a tick on it, and a loop section shows in red.

Path controls

Control	Options	What it does
Path on	On or off	Turns the stored path on
Each note	On or off	On: every note runs its own copy of the path. Off: all notes share one.
Runs as	Envelope, Cycle	Once per note, or repeating like an LFO
Amount	0 to 100%	How far the path pulls the morph away from the manual position. At 100% the path alone sets the position.

Envelope mode plays the path once, starting on each note:

- **Length** (0.1 to 30 s) is how long the whole path takes.
- **Loop from** and **Loop to** pick two points. While the key is held, the path repeats between them. When you release the key, it continues from the loop to the end of the path.
- With Each note off, the shared path starts again when you play after releasing every key.

Cycle mode repeats the path:

- With **Tempo sync** on, **Length** (1/64 to 16 bars) and **Feel** (straight, dotted, triplet) set one cycle. With it off, **Rate** sets the speed from 0.01 to 20 Hz.
- **Restart on note** starts the cycle from the beginning on each note. With it off, the cycle runs freely and every note shares it; when synced and the song is playing, it locks to the song position, so it stays in time with the bar.

Mod wheel and pressure

Four knobs, each from −100 to +100, let your controller push the morph: **Wheel X** and **Wheel Y** for the mod wheel (MIDI CC 1), and **Press X** and **Press Y** for pressure (channel or polyphonic aftertouch). They move the manual position, so with a path running at less than 100% amount you can steer against it.

For example, set Wheel Y to +100 with the pad at the top: the mod wheel then moves the sound from the A–B edge down to the C–D edge.

Patches and the randomiser

A patch stores everything: the grid, the wires, the morph path, the output colours and every control. KXtra comes with 5 factory patches, saves your own as files, and can make new ones with the randomiser.

Factory patches

Patch	What it shows
Init Morph	The default: all four outputs and the ring mod, with a 2-bar synced cycle around the corners of the pad
Init	A plain starting point: one modulator into one carrier on output A, with the path off
Glass Ring	Bell tones with the ring mod into B, and a 3-second envelope path that loops while you hold the key
Vowel Drift	Vowel filters on A, B and C, blended by a slow figure-of-eight cycle shared by every note
Pulse Steps	Short plucked tones, a comb filter on B, and a 1-bar synced path that jumps between the corners

Step through them with ◀ and ▶, or click the patch name for the list. They also appear as programs in your DAW's preset menu.

Saving and loading

- **Save** writes a `.kxtra` file. It suggests the `KXtra` folder in your Documents folder, and the file name becomes the patch name.
- **Load** opens a `.kxtra` file from anywhere.
- Patches saved in `Documents\KXtra` (`~/Documents/KXtra` on a Mac) also appear under **Your patches** in the patch list.

Your DAW project also stores KXtra's full state, so you don't need to save a patch file just to keep a song's sound.

The randomiser

Click **Randomise** for a new patch. The randomiser builds an FM structure on the grid that suits the chosen character, plays it offline before you hear it, rejects results that are silent, harsh or unstable, and sets the level. Each result gets a name, such as "Copper Reed".

The arrow beside the button opens its menu. Whatever you pick there becomes what the Randomise button does next.

Menu section	Choices	What it does
New patch	Any, Keys, Pad, Pluck, Bass, Bell, Lead, Texture	A whole new patch of that character
Vary this patch	Subtle, Medium, Wild	Changes the current patch by a small, medium or large amount
New … parts only	Operators and routing, Output paths, Effects, Ring mod, Morph path	Replaces only that part, using the current character, and keeps the rest
Undo		Goes back to the patch before the last Randomise. It remembers up to 30 steps.

Undo covers the randomiser only. To keep a result you like, save it as a patch.

Playing, MIDI and automation

KXtra plays up to 16 notes at once and listens on every MIDI channel.

MIDI it responds to

Message	Effect
Note on and off	Plays notes. Velocity changes the overall loudness and, through each operator's Velocity control, its level.
Pitch bend	Bends every note by up to the **Bend range** (0 to 24 semitones, default 2)
Mod wheel (CC 1)	Moves the morph, by the Wheel X and Wheel Y amounts
Channel pressure and polyphonic aftertouch	Moves the morph, by the Press X and Press Y amounts. Aftertouch on any key moves it for all notes.
All notes off, all sound off	Stops every note at once

The sustain pedal (CC 64) and other controllers are not used yet.

When all 16 voices are busy, a new note takes the voice of the oldest released note, or the oldest held note if none are released. Playing a note that is already sounding reuses its voice.

Output section

- **Master** (0 to 100%, default 80%) sets the final volume. A soft limiter on the output rounds off peaks rather than clipping them.
- **Bend range** sets the pitch bend range.
- The scope shows the output waveform, and the bars A to D show each output's share of the current morph.

KXtra works on stereo or mono tracks; on a mono track the two channels are mixed together.

Automation

KXtra has 464 automatable parameters with readable names, such as "Op 1 ratio", "Inst 3 detune", "Out A cutoff", "Ring mod amount" and "Morph X". Wire amounts appear as "Link 1" to "Link 32".

The grid itself is part of the patch, not a parameter: block positions, which wires exist and which output each block feeds can't be automated. Draw them on the grid and automate the amounts instead.

CPU

The top bar shows KXtra's CPU load. As a guide, 16 notes of Init Morph use about 16% of one core on a recent desktop PC. Each block runs for every note, so the number of blocks on the grid is the biggest factor. Setting an unused output's filter to Off saves a little too.

Quick reference

Mouse and keyboard

Action	Where	Result
Click the + tile	Palette	Adds an operator
Drag a tile	Palette to grid	Places a block, or a clone if the operator is already placed
Drop a tile on a block	Grid	Swaps the block's operator, keeping its wires

Action	Where	Result
Drag a block	Grid	Moves it to an empty cell
Drag from a block's dot	Grid	Wires it to another block, itself or an output
Scroll over a wire	Grid	Changes its amount
Right-click a wire	Grid	Removes it
Delete or Backspace	Grid	Removes the selected block or wire
Click, drag, double-click	Morph pad in Edit	Adds, moves, deletes a path point
Drag the window corner	Window	Resizes the interface

Limits

Item	Limit
Operators	8
Blocks on the grid	16, on an 8 × 8 grid
Modulation and feedback wires	32
Outputs	4, plus the ring mod
Effect slots	4 per output
Morph path points	2 to 32
Voices	16

Waveforms

Group	Waveforms
Shaped sines	Sine, Peaked sine, Half sine, Half peaked, Double sine, Double peaked, Double rectified, Double rect. pk
CK waves, 8 harmonics	CK8 Saw, CK8 Ramp, CK8 Soft Ramp, CK8 Peak Ramp, CK8 Square, CK8 Triangle, CK8 Peak, CK8 Octava, CK8 Cluster 1, CK8 Cluster 2

Group	Waveforms
CK waves, full	CK Saw, CK Ramp, CK Soft Ramp, CK Peak Ramp, CK Square, CK Triangle, CK Peak, CK Octava, CK Cluster 1, CK Cluster 2
Harmonic series	All bright, All 1/n, All soft, All flat 16, Odd bright, Odd 1/n, Odd soft, Odd flat 9, Even, Organ 8′ 4′ 2′, Organ full
Formants	Formant 2, 3, 4, 5, 6, 8, 11, 15 and 20; Resonant 4, 8, 16 and 32; Vowel A, E, I, O and U

The shaped sines are the classic FM choices and give the cleanest modulation. The CK8 waves hold 8 harmonics and stay smooth when modulated; the full CK waves are brighter. The formant and resonant waves boost one harmonic (the number in the name), and the vowel waves imitate sung vowels; all give a nasal, voice-like colour. For vowels that stay put as you play up the keyboard, use the Vowel filter on an output with Key track at 0%. Every wave is band-limited, so high notes don't alias.