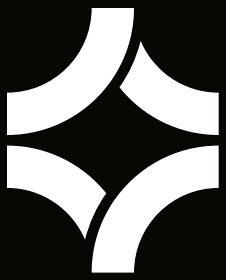


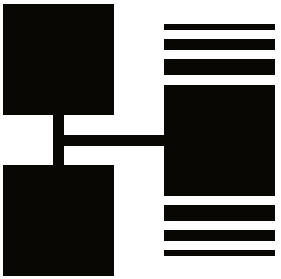
Pivot

Pivot is an FM synthesizer with three operators built to be as straightforward and joyous to use as possible.

Years of fascination, research, code and love of FM synthesis has gone into picking just the right balance of flexibility and ease of use. It's the continuation of our journey of making FM synthesizers that do not adhere to the established norm set in the 1980s.

Pivot does not seek to replicate or succeed anything, it's a diversion and voice of its own, exploring what a 3OP FM synth without algorithms can be.

We think it's a lot of fun.



Pivot is a plugin instrument and requires a host to run.

It's available in the CLAP, VST3 and AUv2 formats and is compatible with any host (such as a DAW) that supports any of these formats.

Pivot is compatible with macOS (Universal), Windows and Linux.

Minimum supported OS versions are

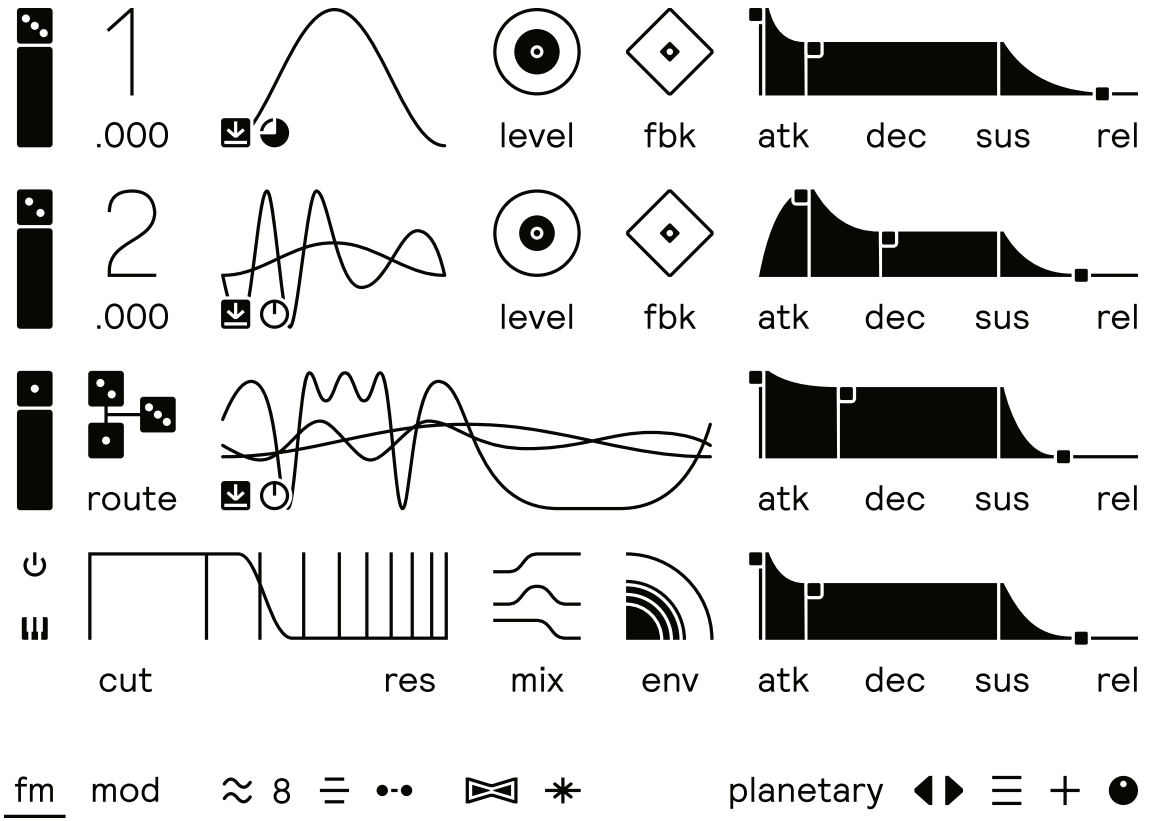
macOS 10.13 (High Sierra)
Windows 10
Ubuntu 22

The parameters in Pivot can be adjusted with your cursor, scrolling and via direct keyboard input.

Click and drag the icon above the parameter name to change the value. Hold Shift to increase the sensitivity.

Click on the parameter name to enter a value by typing.

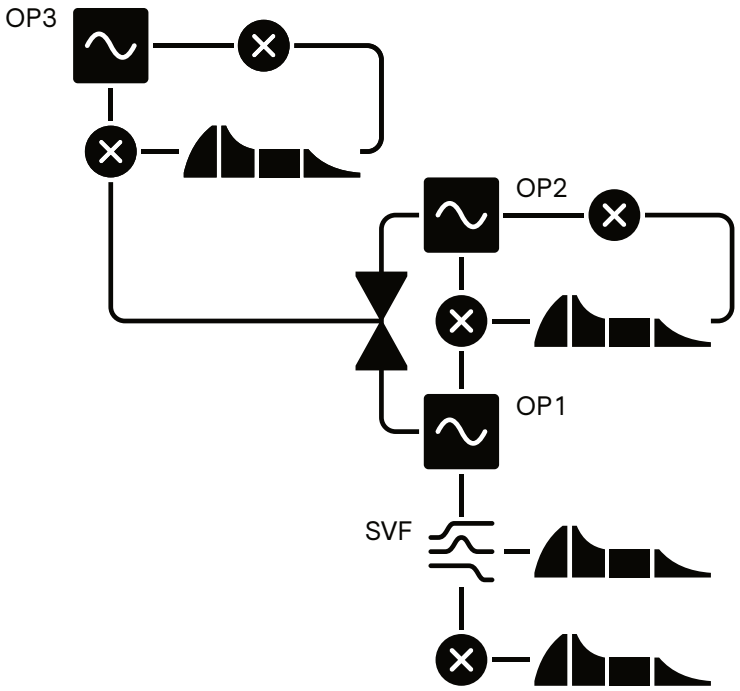
Double-click on a parameter icon to reset the value.



The synth part of Pivot is centered on a single screen, with an overview of all three FM operators stacked vertically.

The bottom edge of the screen contains global voice controls as well as settings and presets.

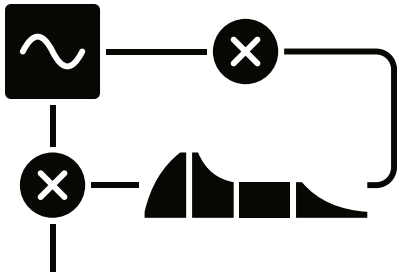
Signal flow



Pivot is based around 3OP FM, with one continuous control for the routing of the top operator (OP3) which can modulate either the second modulator (OP2) or the carrier (OP1)

At the end of the signal chain is a 4-pole resonant filter that can morph from lowpass to bandpass to highpass.

Operators

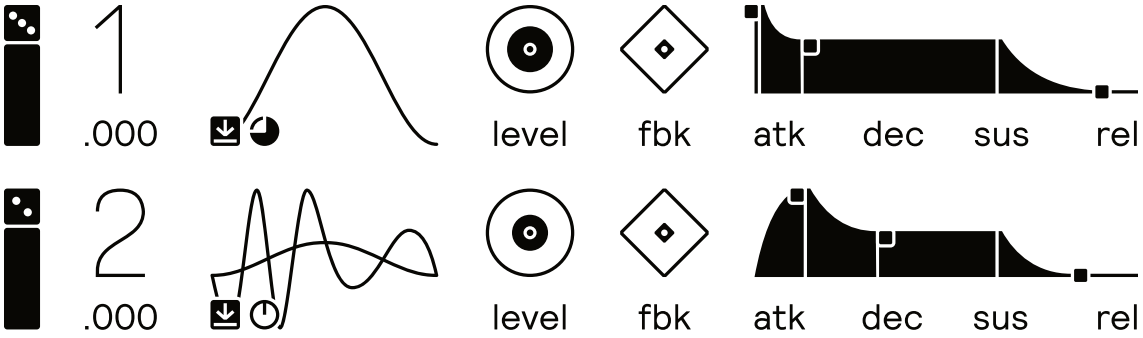


FM Operators are basically oscillators with an integrated amplitude envelope and internal feedback path. When they connect together, they introduce timbral complexity in the oscillator that receives the signal.

Operators are usually referred to as Modulators and Carriers. Modulators send signals and Carriers receive.

While FM stands for Frequency Modulation, Pivot implements Phase Modulation just like almost all classic and modern FM synths. The term FM is widely accepted as the categorization of PM-based synthesizers.

In a digital system, the difference is minute, but Phase Modulation has the benefit of being able to feed its signal back into itself without affecting the pitch of the oscillator.



The modulators in Pivot have identical controls, each with a waveform preview which gives you a visual indication of how the modulation looks like at each stage. The indicators are shown with pre-envelope attenuation.

The sidebars to the left of each row denotes which operator number it is, starting at three top to bottom.

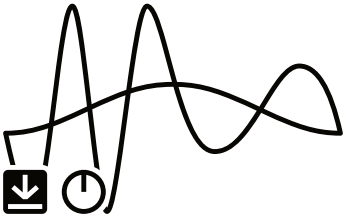
Ratio controls the frequency multiplication of each operator. This multiplies the base frequency and results in different overtone patterns when introduced as modulation.

The base frequency of the operators is simply the MIDI note that is being sent to Pivot.

The top number is the Coarse control which multiplies the base frequency by whole numbers while the bottom Fine control lets you adjust in smaller increments.

Typically, whole numbers will result in a stable and harmonic timbre while non-integers will sound more inharmonic and fluctuating.

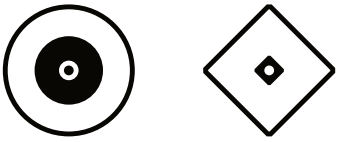
The waveform display of each operator will show the resulting waveform of is row including the modulating operator if there is any.



The arrow button controls whether the phase of the operator should be reset per note-on. This is useful to maintain a more consistent timbre while turning it off can sound a bit more organic.

The circular dial controls the phase offset of the operator and is only relevant when the phase sync is on. This is useful for intricate waveshapes or to improve transient response.

Level and Feedback (fbk) controls the amplitude of the operator’s output being sent out and back into itself respectively.



Level controls the amount of modulation the operator outputs and is “where the FM happens” as you say.

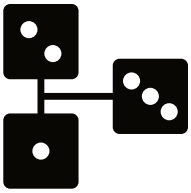
Feedback controls the amount of modulation the operator is sending back into itself. This results in a sharper waveform at lower values devolving into noise-like patterns at higher values.

Each operator has an ADSR envelope which controls its dynamics, meaning the amplitude over time.

Attack (atk) controls the fade-in time of the envelope. Decay (dec) controls the time it takes from where the attack stops to settle into the Sustain (sus) level. Release (rel) controls the final fade-out time.

Turning up release to its max will let the envelope be infinitely open, maintaining the sustain level until a new note is received.

How do the operators connect?



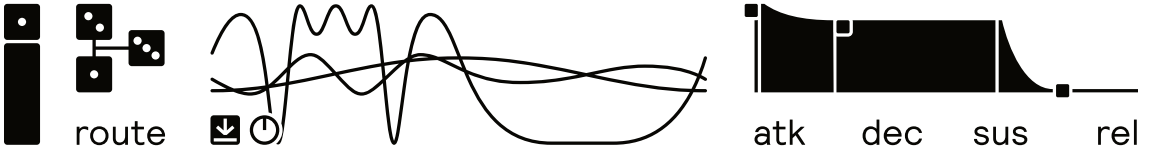
In most conventional FM synthesizers there is a concept called “algorithms” which change the order and routing of the operators. This lets you shape the sound in different ways depending on how the operators are interconnected.

Algorithms, while useful, can be hard to use since they aren’t a continuous part of sound design. In many cases you need to make a choice for the direction of the sound before you start making it.

With 3OP FM we recognized that there is a possibility to not use algorithms at all.

Instead, Pivot let’s you continuously mix between two destinations for one of the operators. This is essentially equivalent to having two different algorithms, but with a mix between. Operator 3 (top modulator) can be routed to both OP1 (carrier) and OP2 simultaneously and continuously which let’s you intuitively control the timbre.

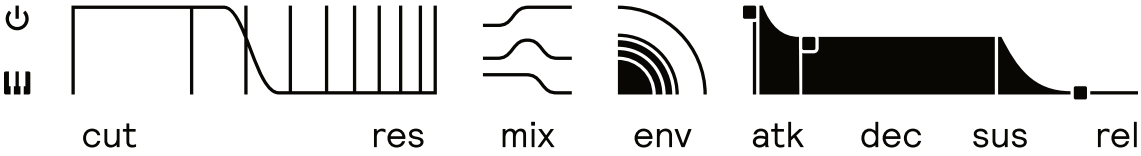
The Carrier Operator



The last operator row, the carrier, lets you use Route to control the routing of the 3rd operator along the other familiar controls. This is a powerful way to change the timbre of the sound.

Note that the ADSR envelope for the carrier controls the dynamics of the final output of the synth voice.

Morphing Filter



The filter in Pivot is a 4-pole resonant State Variable Filter which can mix between each stage– Lowpass, Bandpass and Highpass.

The filter can be completely bypassed by pressing the power button (top left) and can be keytracked by turning the piano keys button on or off.

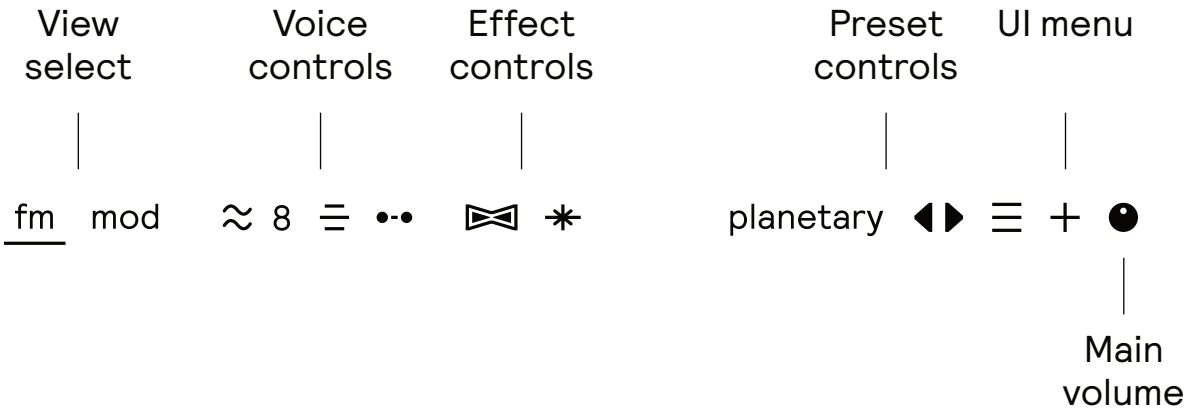
It has an ADSR envelope which can be used to modulate the cutoff frequency, this is controlled with the Env (depth) parameter.

Among complex FM spectras, a classic subtractive filter is a powerful tool that can be used to radically change the tonality of a sound. It’s the best of both worlds.

Random

The values of each row of controls on the FM screen can be randomized by clicking on the dice icon in each sidebar. The last row randomizes both OP1 and the filter.

Global Controls

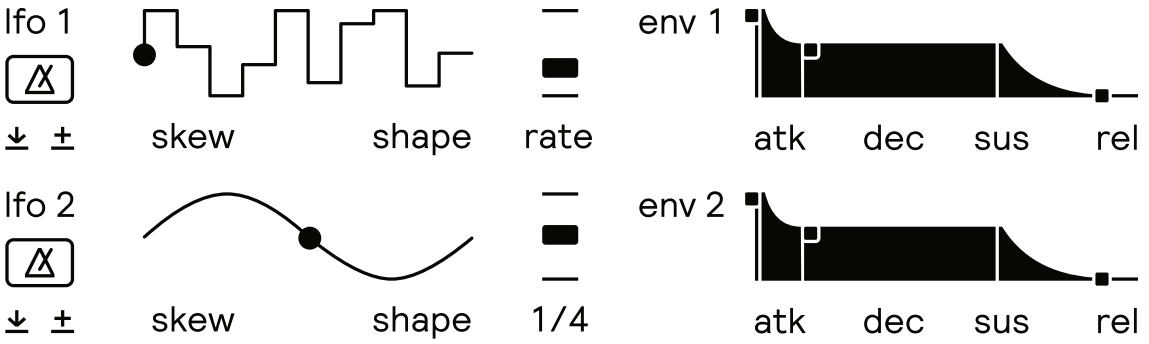


Underneath the main rows of operators lies the global controls. These control things that affect the whole patch, such as the voice count, main volume, effects and preset switching.

From here you can also switch between viewing the synth (fm) page and the mod matrix (mod) page.

Switching between the FM Synth view and the Mod Matrix view is as simple as pressing fm or mod.

The Mod Matrix contains 2 LFOs and 2 ADSR envelopes that can be routed to different destinations. This lets you craft deeper sound design and breathe life into things.

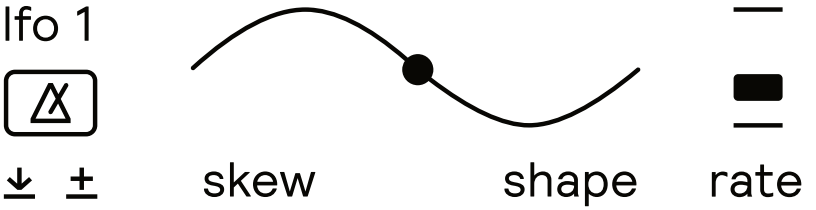


source		level	pitch	volume	cutoff	route	lvl 3	lvl 2
vel			-	100.0	-	-	-	-
lfo	1		-	20.00	50.00	15.00	-	-
env	1		8.00	-	-	-	-	-
lfo	2		-	-	-	-	-	-
env	2		-	-	-	-	-	-

The Mod Matrix screen lets you change the values of the two pairs of LFO and envelope mod sources, which can then be routed to different destinations at the bottom of the screen. There are six available destinations which can be set to the parameters from the fm screen.

MIDI velocity can also be routed to any of the destinations.

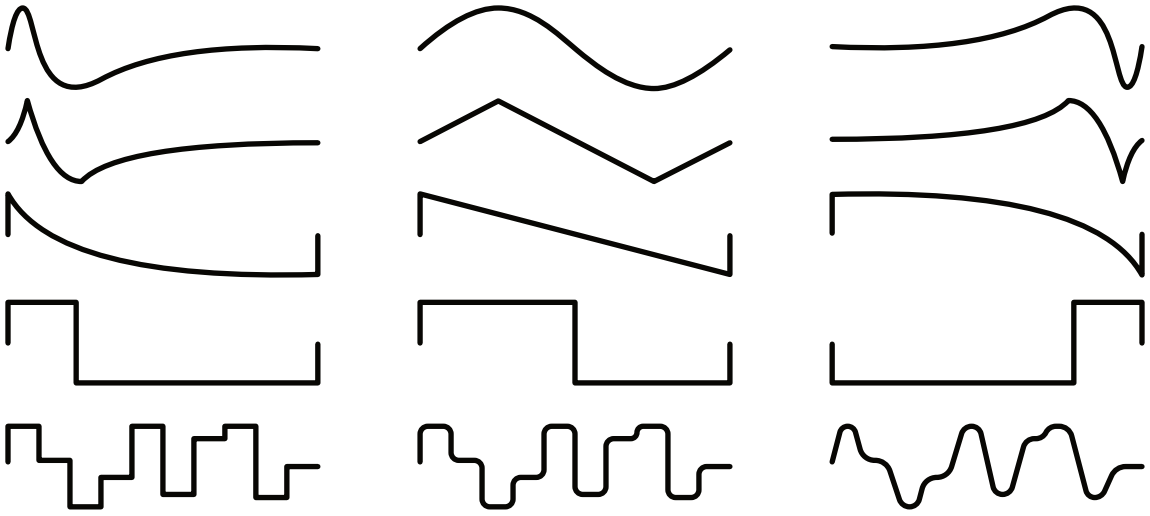
The LFOs in Pivot are simple but effective.



Toggling the metronome button will enable or disable tempo-sync, which lets you set the LFO rate in note values like 1/16, 1/8 note etc.

The down-arrow button selects whether the oscillator should reset its phase per note-on.

The plus/minus button toggles between unipolar or bipolar modulation.



Skew and Shape controls the waveshape of the LFO. The Shape control switches between different basic waveforms – from top to bottom: Sine, Triangle, Saw, Pulse and Random.

The Skew control is bipolar and will squeeze the waveshape forwards or backwards. If the Random shape is selected Skew will control the amount of smoothing of the random steps.

The graph above shows Skew at -100 on the left and +100 on the right, with Skew 0 in the middle.

source		level	pitch	volume
vel			-	100.0
lfo	1		-	20.00
env	1		8.00	-
lfo	2		-	-
env	2		-	-

The matrix itself shows the Sources on the left, each with a global level control which can be useful for adjusting all destinations depths at once.

The destination columns show the selected destination at the top, for example “pitch”, which you can click on to change to a different parameter.

Underneath each destination selector is the control for how much modulation the destination receives from each source. The depth is bipolar (-100 to 100)

The Vel source corresponds to MIDI Note Velocity and is applied as an attenuator which is useful for velocity mapping.

Voice Controls

From left to right, the two waves denote Voice Count which lets you choose how many voices of polyphony are available, with a max of 16 voices. If this is set to 1 voice Pivot will operate in Mono mode, which allows legato play.

The three lines denote the Unison control, increasing this will add two stacks of the FM operators above and below the fundamental pitch.

The two dots with a line in between represents the Note Glide control, which will introduce a portamento / glide between each note being played.

In Mono mode, the voice will only glide when two notes are overlapping, behaving much like a classic monosynth.

Effect Controls

Width (left) controls the level of a stereo widening effect which acts like a very neutral chorus-like sound that simulates a wide stereo signal.

Distortion (right) controls the amount of distortion applied, from a subtle soft clip to absolute destruction.

Both effects are stereo effects and are applied in a chain and they process the final output of all voices.

Preset Controls

Presets can be browsed by pressing the arrows next to the preset name, or you can open up the menu (lines) to select a preset manually.

In the preset menu you can also initialize the current sound, or save it as a new preset in the User folder.

To name your sound, simply click on the preset name and enter a new name for it.

Presets that have been created with the Lite version of Pivot will show up in a sub-menu (Lite) and are fully compatible with the full version of Pivot.

Presets are stored in a common XML format in these locations:

macOS:

```
~/Library/Application Support/Pivot/Presets
```

Windows:

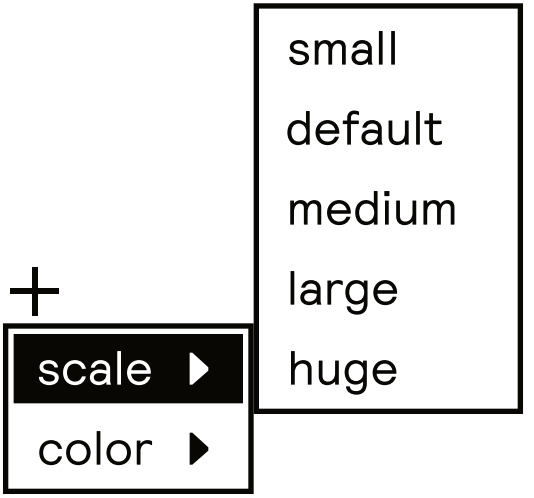
```
C:\Users\[name]\AppData\Roaming\Fors\Pivot\Presets
```

Linux:

```
~/.config/Fors/Pivot/Presets
```

For Pivot-Lite the location is the same, but of course in a folder called Pivot-Lite instead.

UI Menu



Note that you can resize the window by dragging any corner out, but if this is not available in your host you can change the size from this menu.

The Color sub-menu lets you change the color theme used by Pivot. It comes with a handful of factory themes, but it’s also possible to make your own.

The color themes in Pivot are stored in a simple XML format using hex color codes, e.g #000000 for black. Please see the factory theme files for reference.

Color themes are installed in these locations:

macOS:

```
~/Library/Application Support/Pivot/Themes
```

Windows:

```
C:\Users\[name]\AppData\Roaming\Fors\Pivot\Themes
```

Linux:

```
~/.config/Fors/Pivot/Themes
```

You can of course manually make a custom theme, but we suggest using our Pivot Theme Creator on our website:

```
https://fors.fm/pivot-themes
```

Ok, that’s all!

We hope you enjoy Pivot.

Fors

100% Digital Synthesis

Made in Sweden