Shaper Manual

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Autumn Rock software Development

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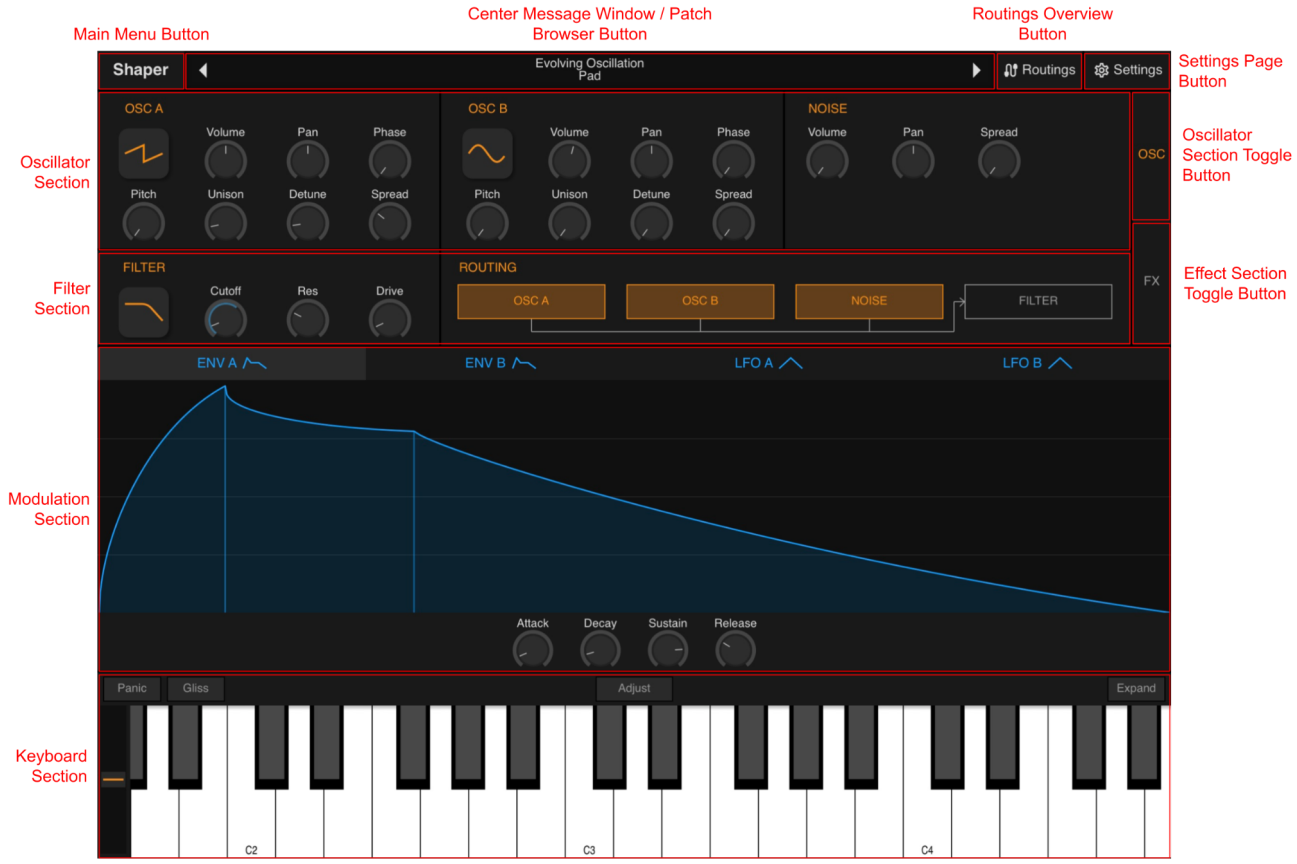
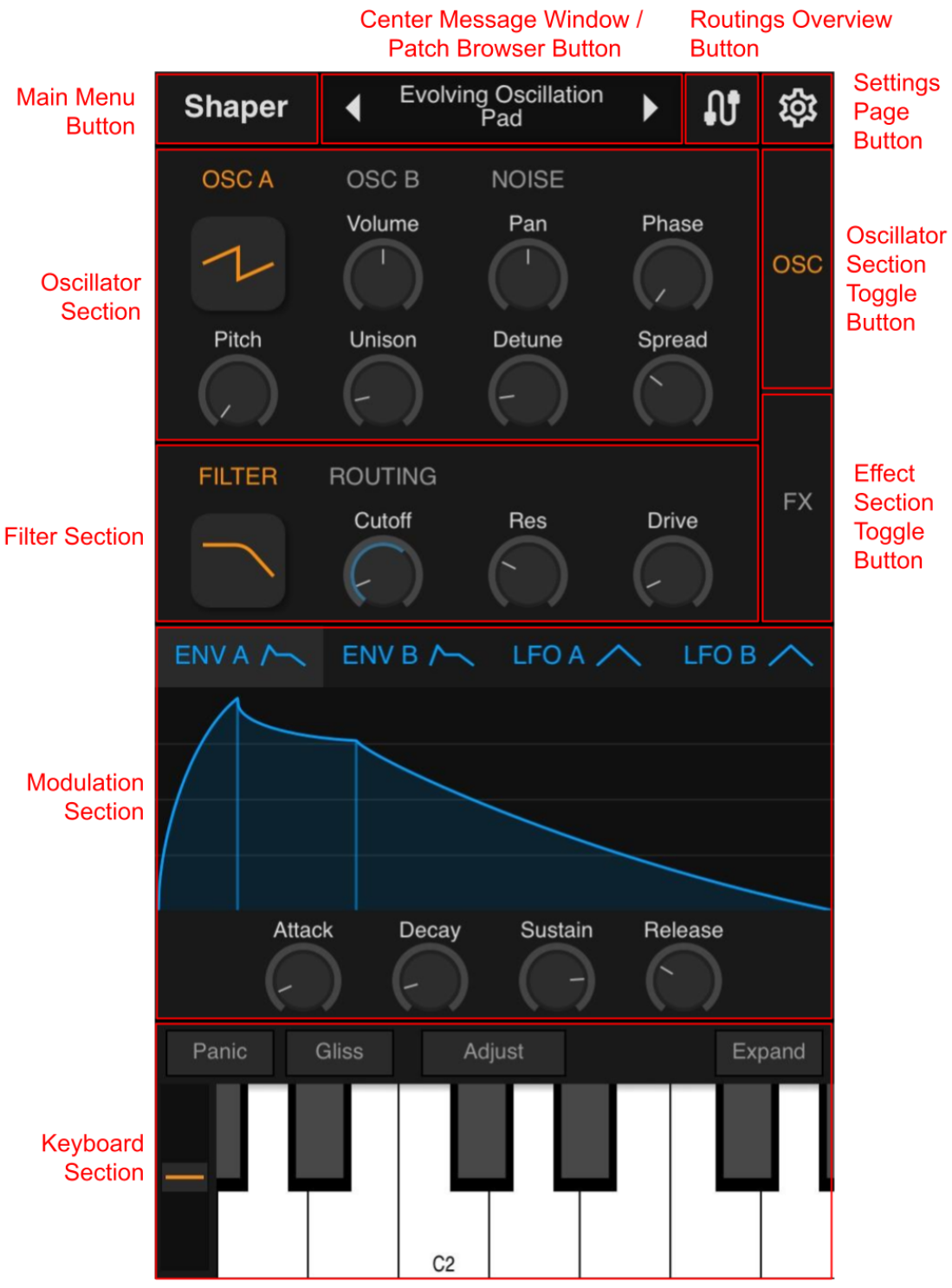
Overview

Thank you for using Shaper! Shaper is a subtractive synthesizer designed for the mobile platform. In this section, we will provide a general overview of the Shaper's UI and its signal flow.

UI Overview



Shaper Running on Tablets

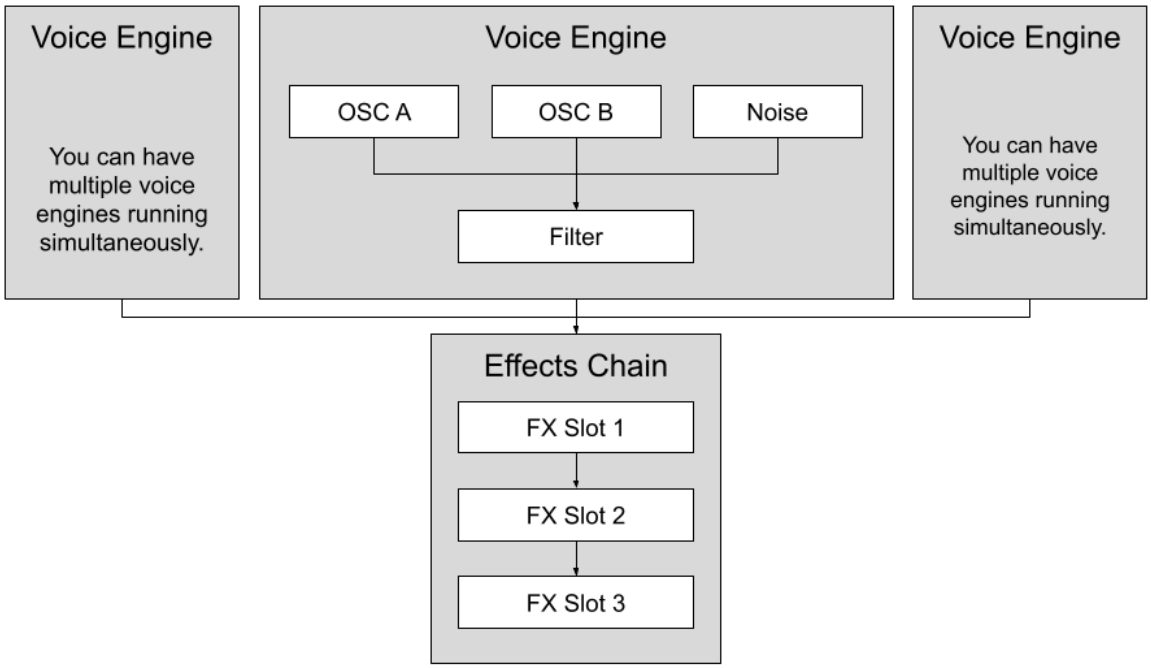


Shaper Running on Phones

The UI can be divided into several main sections: oscillator, filter, effect, modulation, and keyboard. They are responsible for different aspects of the sound creation process. In the following chapters, we will explain each of them in detail. (Note, the effect section is not shown in the screenshot above. It can be accessed through the effect section toggle button.)

Some sections can also have smaller subsections. For example, the oscillator section can be further divided into three subsections. They are oscillator A, oscillator B, and the noise oscillator. On smaller devices, those subsections are stacked together to save space, and you can toggle between them by using the tab buttons “OSC A”, “OSC B” and “Noise”. This space-saving mechanism is also used throughout the application and can be seen in the filter section and the effects section.

Signal Flow Overview



A Simplified View of Shaper's Audio Signal Flow

The signal flow can be divided into two main parts: voice engines and the effects chain. Voice engines are the source of your sound. A voice engine includes a set of three oscillators (2 waveform OSCs and 1 noise OSC) and a filter. Since Shaper is a polyphonic synthesizer, you can have multiple voice engines running at the same time. The exact number is determined by the "max voice count" you set on the settings page. The effects chain is where you can apply various sound effects to your sound. There are three slots inside the effects chain, and the audio signal flows through the chain from slot 1 to slot 3. After that, the audio signal is sent to the final output.

This is only a quick overview. More information about voice engines and the effects chain will be given in the later chapters.

Voice Engine

The voice engine sits at the heart of most software synthesizers. It is where the sound originates from and it is also where most tone shaping happens. Every time a note is triggered, Shaper turns on one of its voice engines. The voice engine is kept running until the key is lifted and the sound has faded away. There can be multiple voice engines running at the same time, and the maximum number of simultaneously running voice engines is determined by the “max voice count” found on the settings page.

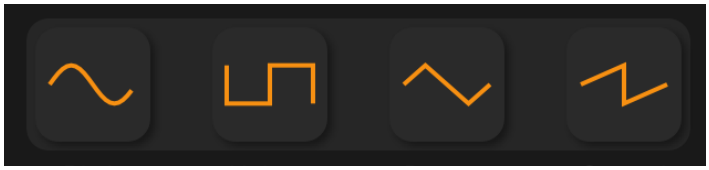
The Shaper’s voice engine has two main components. They are the oscillator section and the filter section. Let’s take a closer look at both of them.

Oscillator Section

There are three oscillators in a voice engine, two waveform oscillators (OSC A and OSC B) and one noise oscillator. Depending on the sound you are trying to create, you may only need a subset of those three oscillators at one time.

OSC A & B (Waveform Oscillators)

OSC A (waveform oscillator)



Four Basic Waveforms

Waveform oscillators are used to create pitched sounds. There are four basic waveforms for you to choose: “**sin**”, “**square**”, “**triangle**”, and “**saw**”. The idea behind waveform oscillators is very simple. Whenever you play a sound, the oscillator will loop through the waveform you have selected to produce a sustained pitch. The pitch of the sound is determined by how fast the oscillator loops around the waveform. The faster it does, the higher the pitch will be.

Besides the waveform dropdown, there are seven additional knobs that control different aspects of the oscillator:

Volume: Controls the amplitude of the waveform. This determines how loud a particular oscillator will sound in the mix. When the volume of an oscillator is set to 0, the oscillator will be turned off to save system resources.

Pan: Controls the oscillator’s stereo position in the mix. 0 means left, and 1 means right.

Phase: Determines the starting point of the waveform. The value ranges from 0 degrees to 360 degrees. This knob is commonly used to create the “phasing effect” between multiple oscillators. If you only have a single oscillator running, it would be very difficult to hear the effect of this knob.

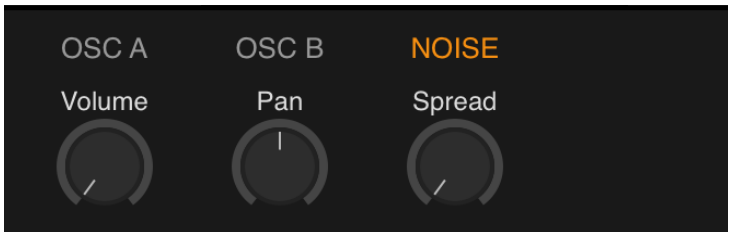
Pitch: Determines the pitch offset of an oscillator. The value ranges from -12 semitones to 12 semitones.

Unison: Sets the number of unison voices. Waveform oscillators in Shaper can be “duplicated” up to 8 times. By itself, this knob has no audible effect. You need to use it in combination with the detune knob to hear the duplication effect.

Detune: This knob can be used to achieve a chorus effect when unison is greater than 1. The value of the detune knob ranges from 0 semitones to 1 semitone. This value determines the max deviation in pitch a unison voice could have from the oscillator's original pitch. For example, with a value of 1, the pitch of all unison voices will be spread between +/-1 semitone from the oscillator’s original pitch.

Spread: This knob determines the width of the stereo image created by all the unison voices. You can think of it as a control on the position of a group of singers on a stage. With a low spread, the singers will all stand in the center, and with the maximum spread, they will be evenly spread out from one end of the stage to the other.

Noise Oscillator



Noise Oscillator

Besides the two waveform oscillators, Shaper also has an oscillator specifically designed to generate white noise which is commonly used in electronic music. The noise oscillator has three knobs, they are:

Volume: Controls the amplitude of the white noise. This determines how loud the white noise will sound in the mix. When the volume is set to 0, the noise oscillator will be turned off to save system resources.

Pan: Controls the oscillator's stereo position in the mix. 0 means left, and 1 means right.

Spread: This knob determines the width of the stereo image created by the white noise.

Filter Section

Filter Knobs

Filter Types: Low-pass, High-pass, Band-pass

A filter can be used to remove certain frequencies from the audio data created by the oscillators. This is one of the most common tools musicians use to shape their synth sounds. There are three types of filters available in Shaper. They are:

Low-pass: A filter that reduces frequency above the cutoff by -24db.

High-pass: A filter that reduces frequency below the cutoff by -24db.

Band-pass: Leaving only a small band of frequency around the cutoff untouched, and reducing everything else by -24db.

There are three knobs inside the filter section:

Cutoff: Determines the cutoff frequency. This knob ranges from 20Hz to 20000Hz and increases exponentially.

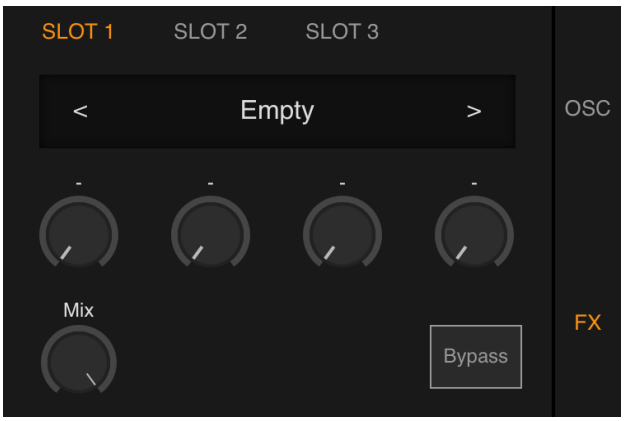
Res: Controls the resonance of the filter. A high resonance value will make the cutoff point “sharper” and more “pronounced”. On the other hand, a low resonance value will result in a more gradual cutoff.

Drive: Controls the gain into the filter, and can be used to create a slightly distorted sound.

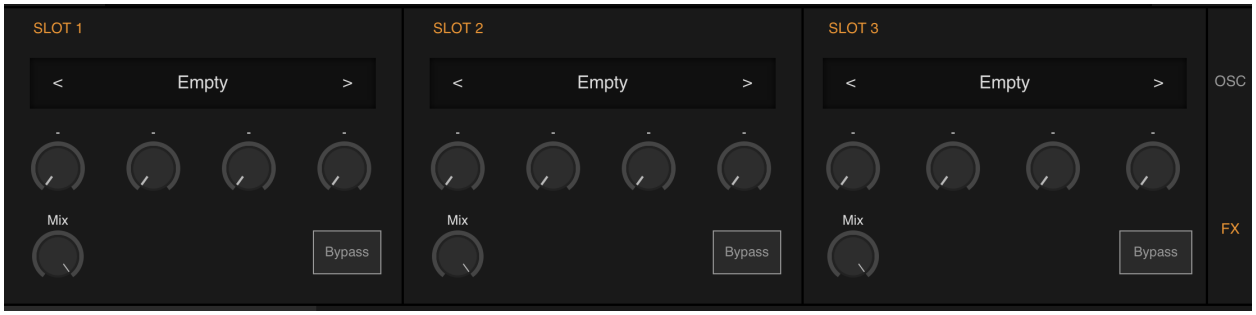
Filter Routing

Shaper also gives you the ability to control which oscillators should be sent into the filter. You can modify this by toggling the buttons (OSC A, OSC B, and NOISE) found under the routing panel. Any oscillators that are not turned on inside the routing panel will not be affected by the filter.

Effect Section



Effect Section on Phones



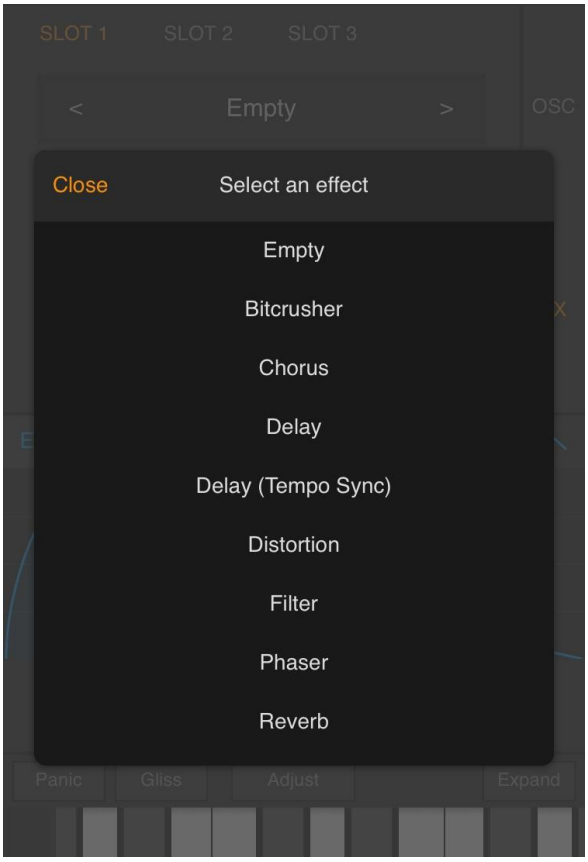
Effect Section on Tablets

Shaper has an effect section that contains three effect slots chained together from slot 1 to slot 3. Each effect slot has one “Mix” knob, one “Bypass” button, and four other knobs that change their names depending on the effect currently selected.

Mix: Controls wet/dry amount for the effect.

Bypass: Controls whether an effect is bypassed in the signal chain.

Available Effects



List of Effects in Shaper

There are eight different effects available in Shaper.

Bitcrusher

Bitcrusher is a type of distortion effect that decreases the sample rate and bit depth of the incoming audio signal. The effect has two knobs:

Rate Crush: Controls how much distortion will be applied to the sample rate.

Bit Crush: Controls how much distortion will be applied to the bit depth.

Chorus

A chorus effect modulates the delay of a delay line to create sweeping notches in the magnitude frequency response. The effect has four knobs:

Rate: Sets the rate (in Hz) of the LFO modulating the chorus delay line.

Depth: Sets the volume of the LFO modulating the chorus delay line (between 0 and 1).

Delay: Sets the center delay in milliseconds of the chorus delay line modulation.

Feedback: Sets the feedback volume (between -1 and 1) of the chorus delay line.

Delay

A stereo delay effect. The effect has three knobs:

Delay L: Sets the delay time on the left channel.

Delay R: Sets the delay time on the right channel.

Feedback: Sets the feedback volume (between -1 and 1) of the delay line.

Delay (Tempo Synced)

A stereo delay effect that syncs to the BPM found on the settings page. The effect has three knobs:

Delay L: Sets the delay time on the left channel.

Delay R: Sets the delay time on the right channel.

Feedback: Sets the feedback volume (between -1 and 1) of the delay line.

Distortion

A simple distortion effect for creating a grittier sound. The effect has two knobs:

Pre-Gain: Controls the gain of the input signal before the clipping process. A higher Pre-Gain value will result in a more distorted sound.

Post-Gain: Controls the volume of the output signal.

Filter

A filter can be used to remove a certain frequency from the input signal. The effect has four knobs:

Type: Selects the type of filter that is used. The knob ranges from low-pass to band-pass to high-pass.

Cutoff: Determines the cutoff frequency. This knob ranges from 20Hz to 20000Hz and increases exponentially.

Res: Controls the resonance of the filter. A high resonance value will make the cutoff point “sharper” and more “pronounced”. On the other hand, a low resonance value will result in a more gradual cutoff.

Drive: Controls the gain into the filter and can be used to create a slightly distorted sound.

Phaser

A 6 stage phaser that modulates first-order all-pass filters to create sweeping notches in the magnitude frequency response.

Rate: Sets the rate (in Hz) of the LFO modulating the phaser all-pass filters.

Depth: Sets the volume (between 0 and 1) of the LFO modulating the phaser all-pass filters.

Freq: Sets the center frequency (in Hz) of the phaser all-pass filters modulation.

Feedback: Sets the feedback volume (between -1 and 1) of the phaser.

Reverb

Simulates the effects of placing the sound in a physical room.

Size: Sets the size of the room.

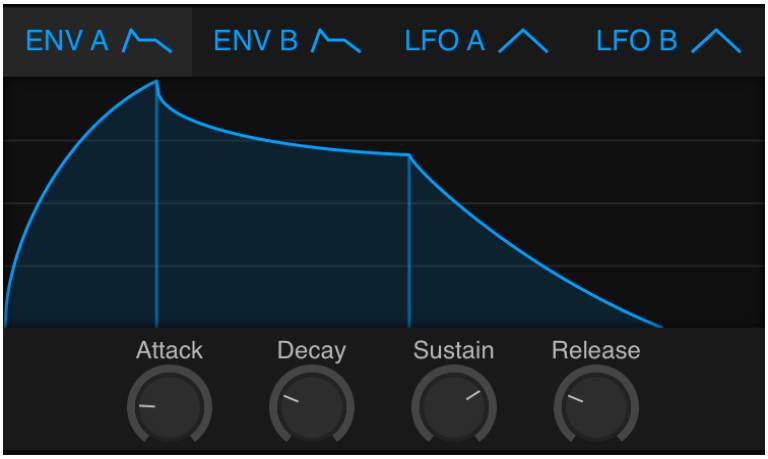
Damping: Sets damping factor. The sound will die down faster with a high damping factor.

Width: Controls the width in the stereo image.

Freeze: Put the reverb into a continuous feedback loop when the knob is turned past the halfway point.

Modulation Section

Modulation is the process of changing various properties of sound over time. You can think of it as having additional imaginary hands controlling different knobs while you play. Here, the “imaginary hands” are the “modulation sources”, and the knobs are the “modulation destinations”. In Shaper, there are two different types of modulation sources, they are Envelope (ENV) and Low-Frequency Oscillator (LFO).

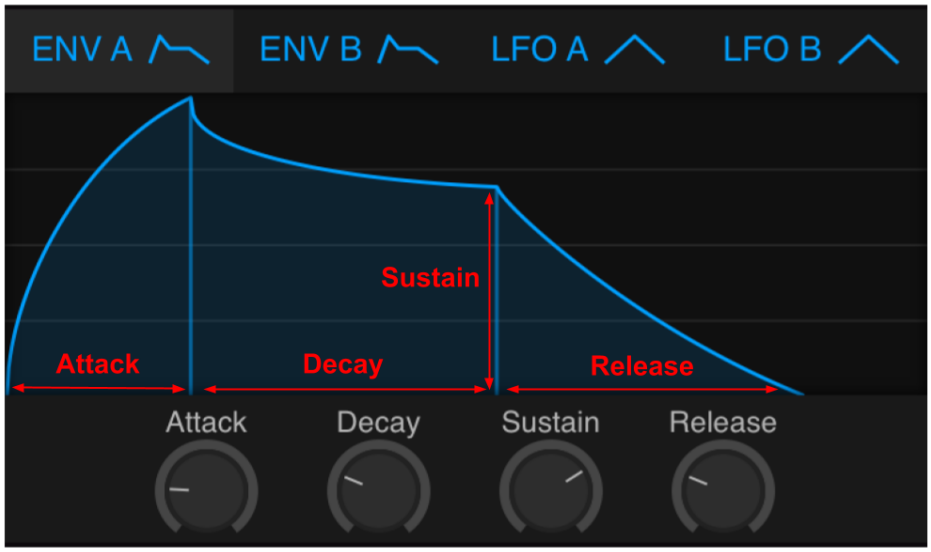


Envelope Section (ENV)

Low-Frequency Oscillator Section (LFO)

Envelope (ENV)

The envelope is a type of modulation source that changes its value based on keypress. The values generated by envelopes range from 0 to 1 and they can act as control signals for various knobs. To understand envelopes, there are four important concepts you need to know. Those are attack, decay, sustain and release, commonly known as ADSR.



Envelope Graphic UI

Attack: Defines the time it takes for the initial run-up of the control signal from 0 to 1 right after a key is pressed.

Decay: Defines the time it takes for the subsequent run-down from 1 to a designated sustain level.

Sustain: Defines the level of the control signal that will be maintained after the run-down and before the key is released.

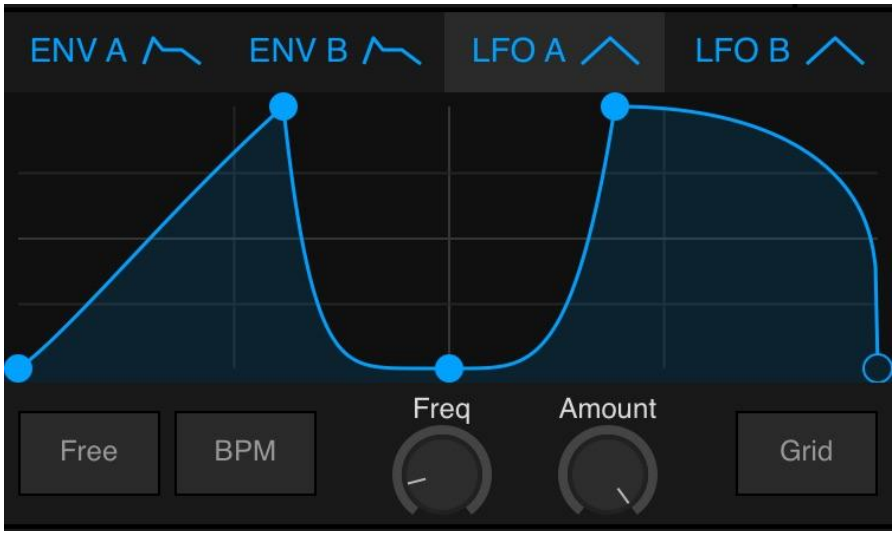
Release: Defines the time it takes for the level of the control signal to decay from the sustain level to 0 after the key is released.

Curvature: Besides the values of ADSR, you can also change the curvatures of attack, decay, and release by dragging on different parts of the envelope's graphic UI.

Envelope has traditionally been used to control the amplitude of a synthesizer. In Shaper, the ENV A is hardwired to the amplitude of each voice engine by default. That said, you can also use ENVs to modulate any other knobs that you want to change based on keypresses.

Low-Frequency Oscillator (LFO)

Low-Frequency Oscillator (LFO) is an oscillator that generates a frequency below 20Hz. Unlike oscillators found in voice engines, LFOs do not create audible sounds. Instead, their outputs are used as control signals for other knobs.



LFO Graphic UI

Shaper allows you to create customized waveforms for your LFOs. You can double-tap on the LFO's graphic UI to add/remove control points, drag on an existing point to change its position, and drag on any line between two points to change its curvature. Besides the waveform window, there are several knobs and toggle buttons associated with each LFO. They are:

Freq: Controls the frequency of LFO. Ranges from 0.1Hz to 20Hz.

Amount: A scalar value ranges from 0 to 1 that scales the control signal generated by the LFO.

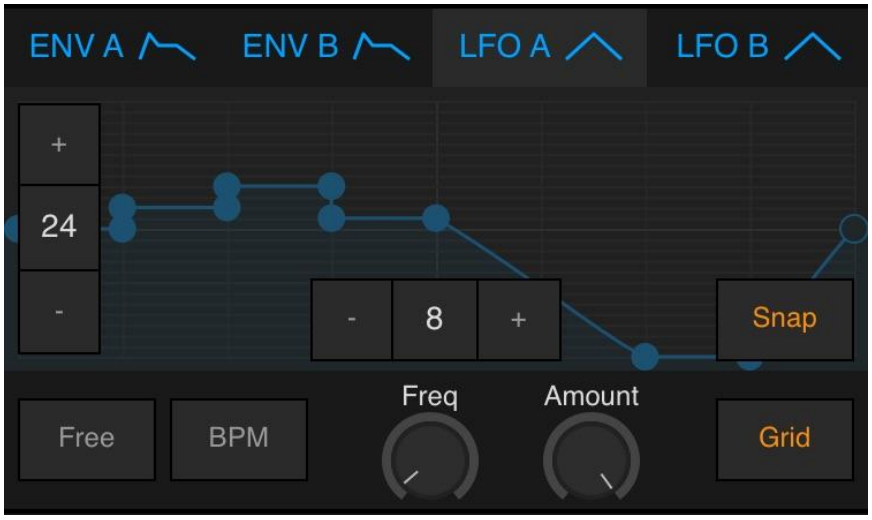
Free: When "Free" is turned on, the LFO position will no longer reset to the beginning after every keypress. This can be used to create less predictable and more free-flowing patches.

BPM Button On

BPM: A toggle button that decides whether the LFO is synced to the global BPM. When BPM is on, the frequency of the LFO will be calculated based on the global BPM and the values set by the length knob and the rhythm knob.

Length: Defines the length of each cycle. The value ranges from 8 bars to 1/128 bar.

Rhythm: Decides whether to apply any rhythmic alternation on the value set by the length knob. The rhythm knob can be set to regular (no alternation), triplet (divide the length by 3) or dotted (multiple the length by 1.5).



Grid Button On

Grid: A toggle button that shows additional settings for controlling the grid of the waveform editor.

Snap: A toggle button that turns on the snap to grid feature. This can be very useful if you need to create precise rhythmic patterns using the LFO's waveform.

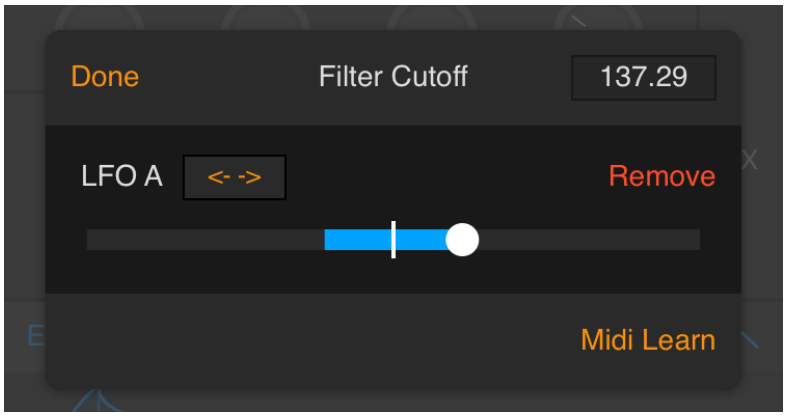
Assigning Modulation to Knobs

So far, we have discussed Envelope (ENV) and the Low-Frequency Oscillator (LFO), two types of modulation sources found in Shaper. In this section, we will show you how to link them to various knobs (modulation destinations).

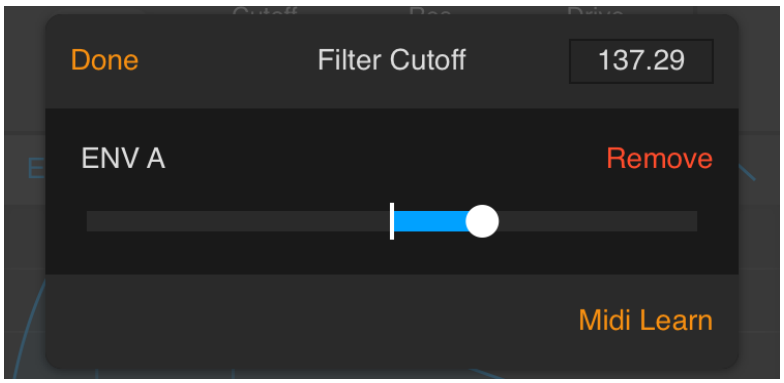
In Shaper, modulation assignment is done by dragging one of the ENVs or LFOs onto the knob you want to control.

Assigning Modulation Source to Knob

After releasing the LFO / ENV icon onto a knob, a modulation dialogue will appear. Here you can set the amount of modulation that you wished to apply to the knob.



Modulation Settings Page (LFO)



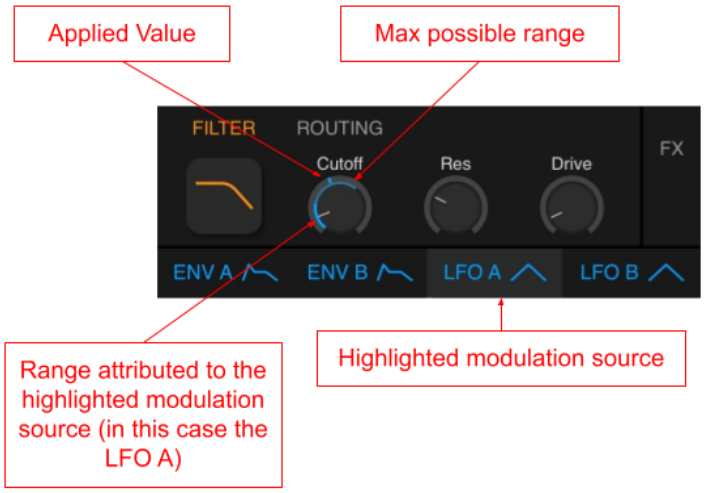
Modulation Settings Page (ENV)

In the case of assigning LFO, you also have the “bidirectional” toggle button “**<- ->**”. This button is used to decide whether the modulation should be “bidirectional” or “unidirectional”.

After you are finished with the assignment you can click on the “Done” button to close the window. If you later need to update the modulation settings, you can double-click on a knob to open its modulation settings.

Visual Indicators Around Knobs

Once you have assigned one or more modulation sources to a knob, several visual indicators will show up around the knob’s UI.



Visual Indicators

Applied value: The applied value is represented by a moving cursor around the knob. This is the value that actually gets applied to the voice engine. The cursor only appears when at least one voice engine is active.

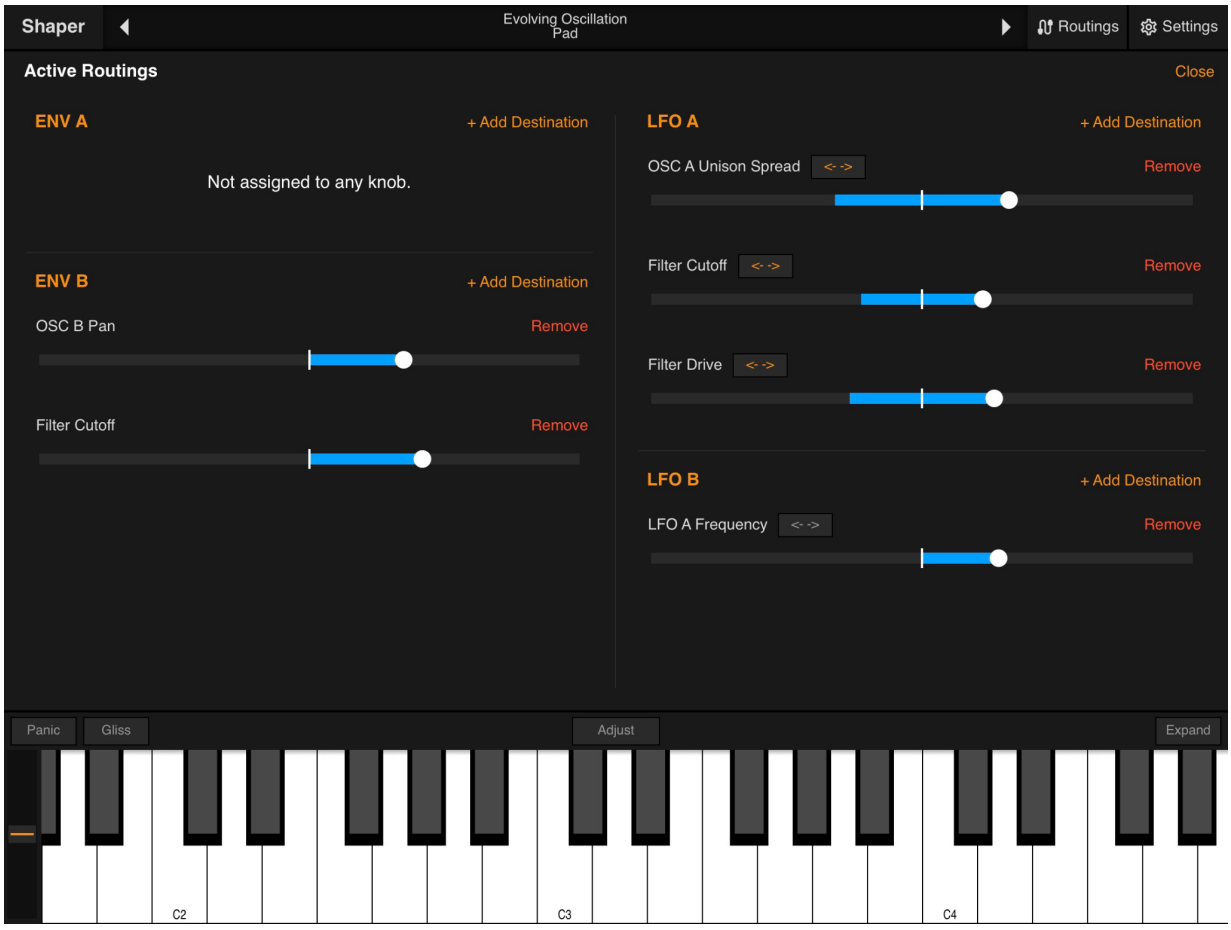
Max possible range: This is the maximum range of the applied value resulting from the sum of all modulation sources. It is represented by the dark blue curve around the knob.

Range attributed to the highlighted source: The lighter blue curve shows the range attributed to the modulation source that is currently highlighted by the user.

Active Routings Overview

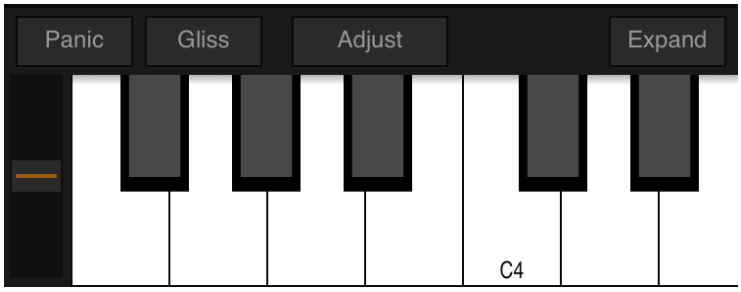
When working on complex sound patches, it can be helpful to have an overview of all the active routings. You can access this information by clicking on the “Routings” button found on the top right corner of the screen.

Inside the “Active Routings” page, you can add or remove a routing assignment, or modify an existing one.



Active Routings Page

Keyboard Section



Keyboard Section

Besides the main keyboard, you can find:

Pitch wheel: A standard pitch wheel that can bend notes up/down one semitone.

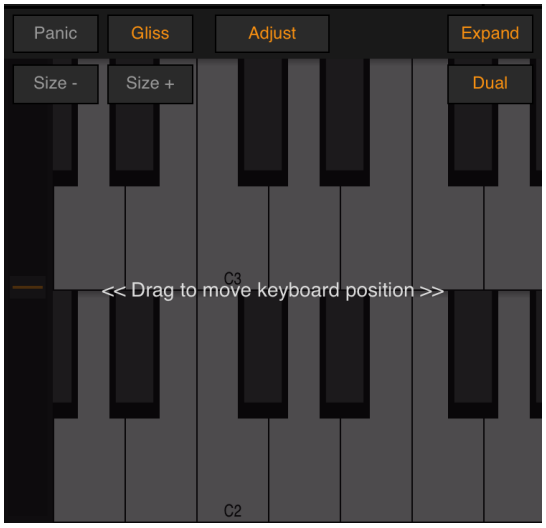
Panic: A button that can be used to turn off any stuck notes.

Gliss: Enables glissando mode.

Adjust: Opens keyboard adjustment panel.

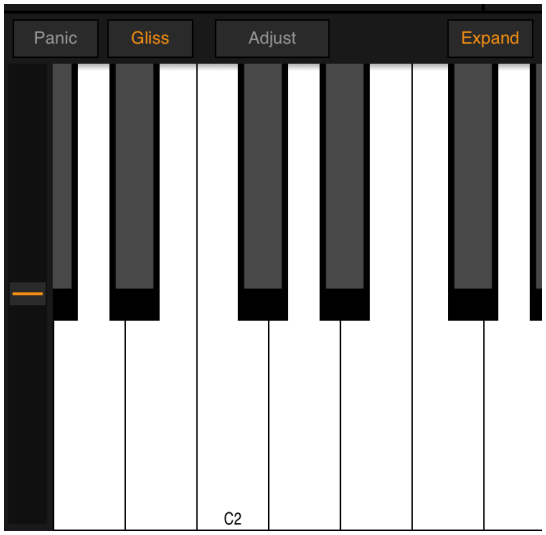
Keyboard Adjustment Panel

Dual: Enables double keyboard.



Dual-mode

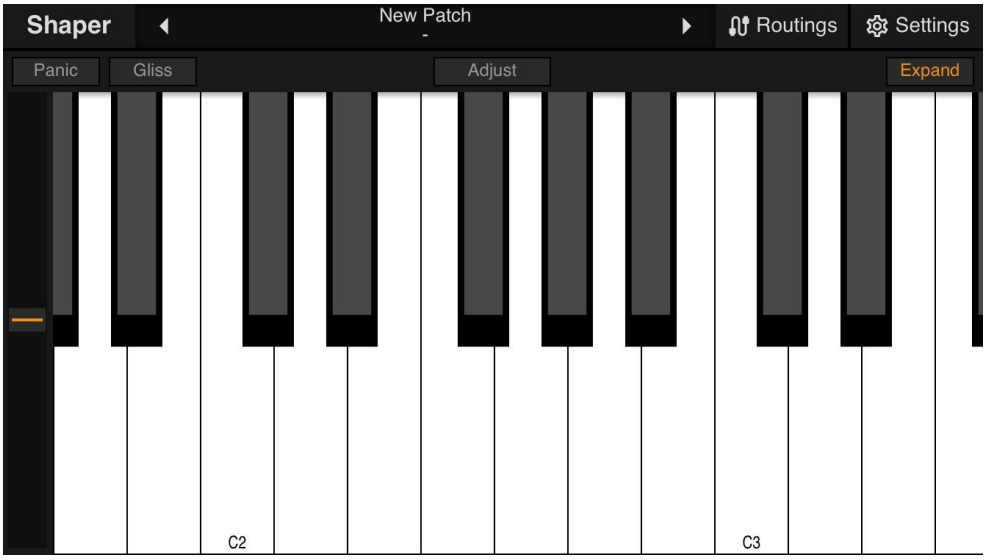
Expand: Expands the keyboard section.



Expanded mode

On phones, you can also rotate your device to landscape mode if you need a bigger keyboard.

Landscape Mode

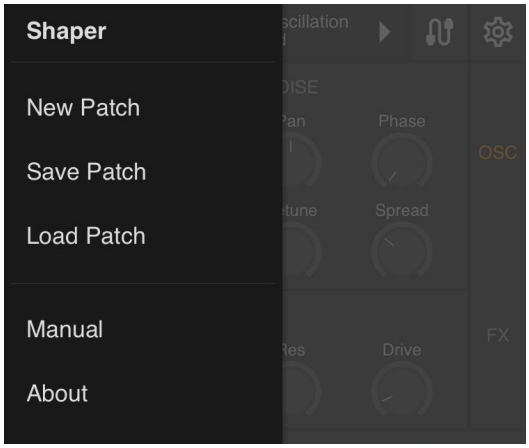


Landscape Mode with an Expanded Keyboard

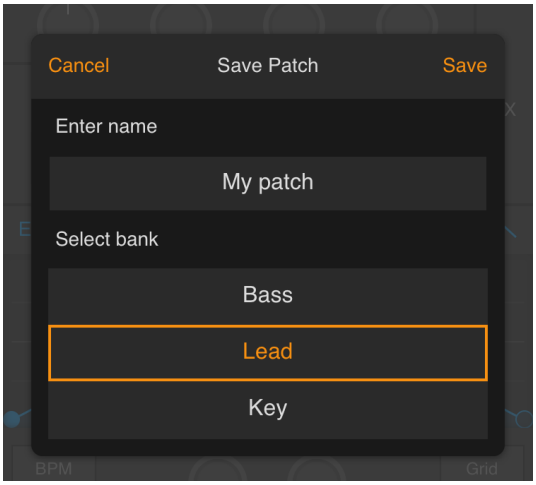
Patch Management

Save Patch

Once you have finished working on your patch, you can save it by clicking on the Save Patch button found in the app's side menu.



Side Menu

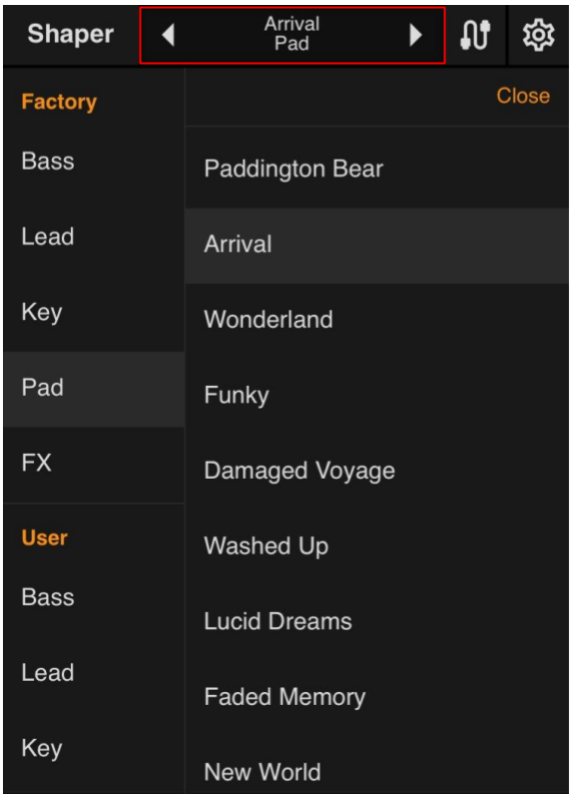


Save Patch Window

After clicking on the “Save Patch” button, a popup window will appear. Here you can enter the name of your patch and set the bank it belongs to.

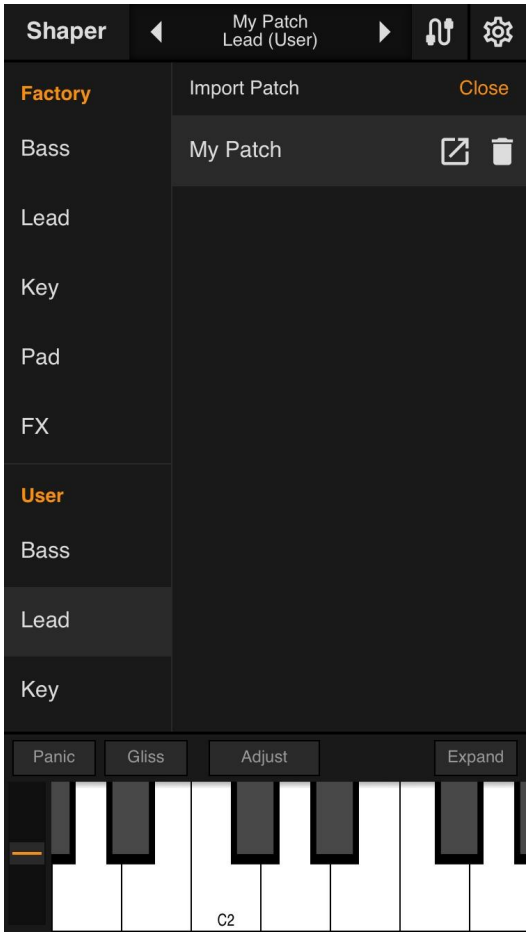
Load Patch

To load a patch, click on the center message panel on the top of the window.



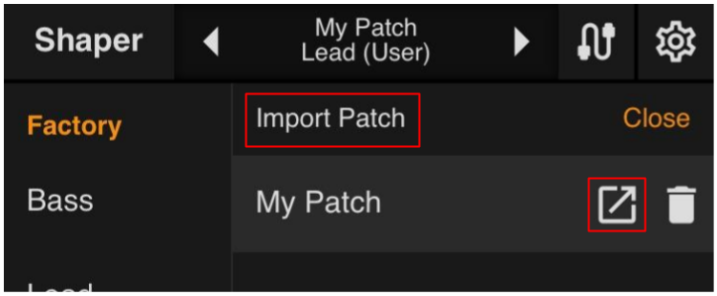
Patch Management Window

Here you can load factory patches and any patch that you have saved previously. All user patches will show up within the banks under the “User” label.



User Bank

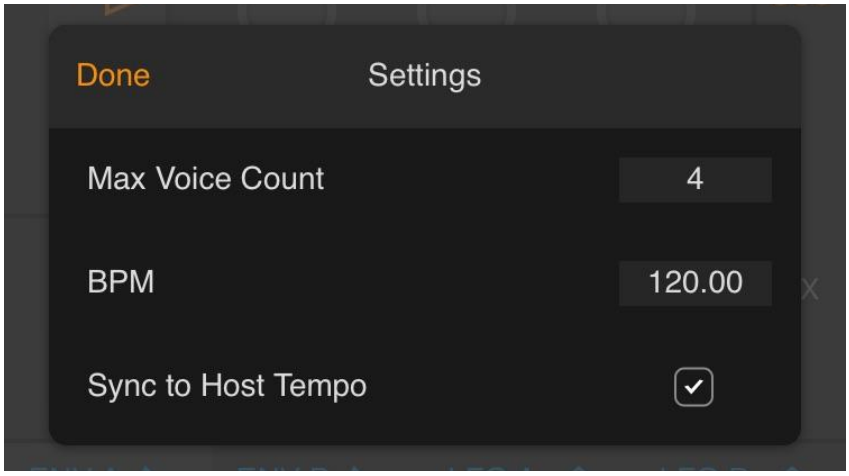
Inside user banks, you can also import and export patches that you have made.



Importing and Exporting User Patches

Settings Page

Settings Window Button



Settings Window

You can access the settings page by clicking on the settings button found on the top right corner of the screen. Here, you can set a few important values used across the program.

Max Voice Count: This value defines the maximum number of voices that the synthesizer can play at the same time. (A higher max voice count will require additional computing power. If you start to hear popping noises when playing, it is an indication that you may need to lower your max voice count.)

BPM: This defines the global BPM used by components such as the LFOs and the tempo-synced delay effect.

Sync to Host Tempo: When enabled, the global BPM value will be synced to the BPM of the host program. (This checkbox is hidden on the Android version. This is because the Android operating system currently does not have proper support for audio plugins.)

Contact Info (Supports)

If you have any questions that are not covered in this manual feel free to contact us at:

autumnrockdev@gmail.com

We also have a Discord Server setup where we answer any questions you may have regarding Shaper:

https://discord.com/invite/xsSAjFA