

ROLI

Equator Quick Start Guide

Beta v.0.9.4

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Contents

About	3
Support and feedback	3
1. Getting Started	4
1.1 Installation	4
1.2 Layout	4
1.3 Top Panel	5
1.4 Interacting with Equator	6
2. Synth Panel	7
2.1 Oscillators	7
2.2 Frequency Modulation	8
2.3 Sample Playback	8
2.4 Noise Generator	8
2.5 Filter Section	9
2.6 Effects Section	9
2.6.1 EQ	9
2.6.2 Chorus	10
2.6.3 Delay	10
2.6.4 Reverb	10
3. Mixer	11
3.1. Sends	11
3.2 Filter Configuration	11
3.3 Output Gains	11
4. Modulation	12
4.1. Expressive Gestures from the Seaboard GRAND	12
4.2 Envelopes 1 - 5	13
4.3 LFO 1-2	14
4.4 Keywave Display (Key-tracking)	14
4.5 Modulation List View	15
5. Equator Sidebar	16
6. SoundDial Manager	18

About

This user manual is a guide for using Equator, the bespoke synth engine that has been designed from the ground up to enable multidimensional sound design. With a mixture of subtractive and FM synthesis, sample playback and a strong focus on the modulation and flexibility of parameters, Equator is an expressive and flexible synthesiser working as a standalone OS X application, as a plug-in for a suite of industry-standard DAWs, and also on-board the Seaboard GRAND.

For instructions on setting up and using the Seaboard GRAND, please refer to the Seaboard GRAND User Guide found at: my.roli.com

Support and feedback

We want you to have the best experience possible with Equator but also would love to hear your thoughts and feedback regarding it. If you have any questions, are experiencing any problems or have any feedback for us, please don't hesitate to get in touch with our team.

The easiest way to reach us is to send us a support enquiry at: my.roli.com/en/issues/new

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1. Getting started

1.1 Installation

To install Equator please follow the instructions in the Seaboard GRAND installer. After installation, by default, Equator will be installed in the Applications folder, as well as a plug-in in the following folders:

- Macintosh HD/Library/Audio/Plug-ins/VST
- Macintosh HD/Library/Audio/Plug-ins/Components
- Presets, SoundDial Banks and a copy of this guide will be saved in the following folder: ~/Documents/ROLI/Equator

Gatekeeper

Before running the installer, please make sure that Gatekeeper is disabled so that our installer can run. To do this, go to System Preferences, 'Security & Privacy' and make sure that 'Allow apps downloaded from: Anywhere' is selected.

1.2 Layout

Below is the main view of Equator, showing the Synth and Modulation Panel.

The top section shows the available settings, including the Preset Browser, SoundDial Manager and Audio/MIDI Settings. More details on the this top panel can be found in Section 5 and 6.

In the top half of Equator lie both the Synth and Mixer view (switching on the top tabs changes the view). The synth panel gives access to the parameters of the modules in the signal chain, whereas the Mixer panel can be used to route, configure and mix these modules. More details on these views can be found in Section 2 and 3.

In the lower half lie the two modulation views. The Modulation Panel gives access to the multiple modulation sources and their parameters and also allows modulation paths to be quickly created. All these paths can then be viewed and edited in the Modulation List. More information of these views can be found in Section 4.



1.3 Top panel

The following icons are located in the top right corner:



Compare: Any new changes to a preset can easily be previewed and compared to the original by clicking and holding this icon.



SoundDial Manager: Clicking on this icon opens up the SoundDial Manager, where presets can be assigned to the different segments of the Seaboard GRAND SoundDial and to also transfer presets to the Seaboard. More details regarding this section can be found in Section 7.



Master Volume: When using the standalone application of Equator, this slider can be used to adjust the overall output level of the instrument. This parameter is not saved in the presets.



MIDI Panic: Clicking this button will clear the MIDI buffer and remove all active notes. This is useful to reset any stuck notes or strange MIDI messages.



Equator Sidebar: Clicking on this icon gives access to various Equator functions including New, Save As, Undo/Redo and Audio/MIDI Settings etc. Please see Section 5 for more details.

The top panel also displays the current preset and arrows either side to quickly change between presets. Clicking on the name of the current preset also brings up the Preset Browser window, which is explained in Section 5.

1.4 Interacting with Equator

Changing Parameters

Navigate to the parameter and click and drag the dial to adjust the base value.

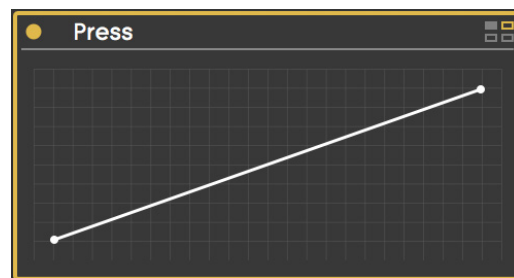


- Holding down the cmd key whilst clicking and dragging the inner circle will allow for a more precise value to be set
- The base value of the parameter can also be set by double clicking on the value and typing in the desired amount
- Double clicking will reset the parameter to its default value

Modulating Parameters

In the main view of Equator a modulation source can be quickly set to modulate a parameter by the following steps:

- Activate the modulation source by clicking on the title bar section of the source, this will highlight the panel with an orange border.



- Click and drag in the outer circle of the dial to set the modulation depth for that parameter. The amount of modulation will be shown by the orange arc that will appear in the dial.



- Holding down the cmd key whilst clicking and dragging the outer circle will allow for a more precise modulation depth to be set
- When a modulation source is highlighted, the value of a parameter can be changed by clicking and dragging in the inner circle of the dial
- Modulation can be both positive and negative
- Double clicking in the outer circle will reset the modulation amount

2. Synth panel

The Synth Panel below shows Equator's main sound generation and shaping tools. These include three Oscillators, an FM module, two Stereo Sample Playback modules, a Noise Generator, Filters and Effects. Each of these can be easily enabled or disabled by clicking on its title bar area.

The following sections provide further details about these modules.



2.1 Oscillators

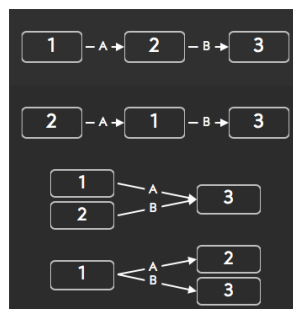
The three wavetable Oscillators can be set to various waveforms including classic analogue waves (pulse, sine, square, triangle and sawtooth) and multiple complex waveforms.

The following parameters are available for each Oscillator:

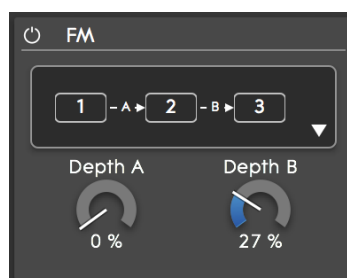
- Level: $-\infty$ to 0dB
- Pan: Full Left to Full Right
- Fine Pitch: -99 to +99 Cents
- Coarse Pitch: -48 to +48 Semitones
- Width: 0% to 100% (can be used to change the pulse width of the pulse waveform)

2.2 Frequency Modulation (FM)

In the FM section of Equator, the frequency of one oscillator can be set to modulate the frequency of another, thus changing the timbre. The four available FM configurations are shown below:



For each configuration, the modulation depth of each modulator can be controlled by the Depth A and B dials.



2.3 Sample Playback

The two Sample Playback modules contain a wide selection of preinstalled samples, from acoustic instruments to synthesised and layered sounds.

The following parameters are available for each Sample Playback module:

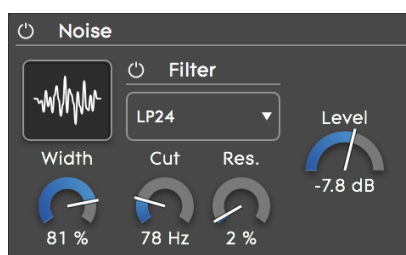
- Level: $-\infty$ to 0dB
- Pan: Full Left to Full Right
- Fine Pitch: -99 to +99 cents:
- Coarse Pitch: -48 to +48 semitones
- Filter parameters (see Section 2.5)



2.4 Noise Generator

The Noise Generator outputs stereo pink noise with adjustable stereo width and a dedicated filter section. The following parameters are available:

- Level: $-\infty$ to 0dB
- Stereo Width: 0% (Mono) to 100% (Stereo)
- Filter parameters (see Section 2.5)

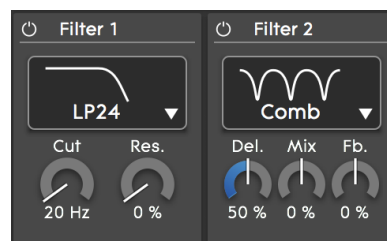


2.5 Filter Section

There are five identical Filter modules in Equator, one for each Sample Playback module, one for the Noise module and two for general routing. The routing of the latter two can be set in the Mixer Panel (see Section 3.2).

For all five filters, the following filter types are available:

- Low-pass 12dB/octave
- Low-pass 24dB/octave
- Band-pass
- Notch
- Hi-pass 12dB/octave
- Hi-pass 24dB/octave
- Comb Filter



The low-pass, high-pass, band-pass and notch filters have the following parameters:

- Cut-off or Centre Frequency of the chosen filter: 20Hz to 15kHz
- Resonance: 0% to 100%

The Comb Filter has a different set of parameters:

- Delay: the length of the delay line (0.2ms to 20ms)
- Mix: the amount of delayed (wet) signal added to the (dry) input signal (can be positive or negative)
- Feedback: the amount of delayed signal fed back to the input of the delay line (can be positive or negative)

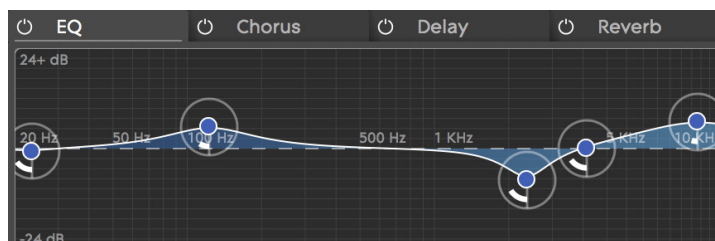
2.6 Effects Section

The Effects Section of Equator contains four stereo effects in series. These are:

- EQ
- Chorus
- Delay
- Reverb

The Effects Section comes at the end of the signal chain and is global for all voices. The configuration of all effects is explained in Section 3

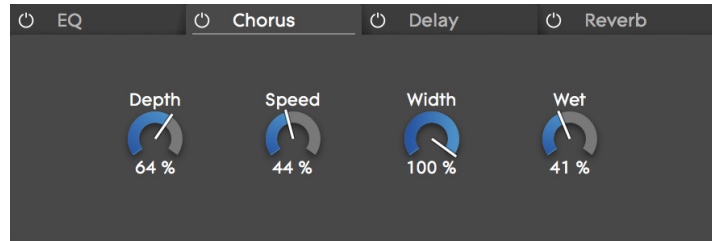
2.6.1 EQ



The EQ section is a five band parametric equaliser with the following parameters for each band:

- Gain: -24dB to +24dB
- Centre Frequency: 20Hz to 15kHz
- Q factor: this parameter can be used to adjust the bandwidth of the bell-shape

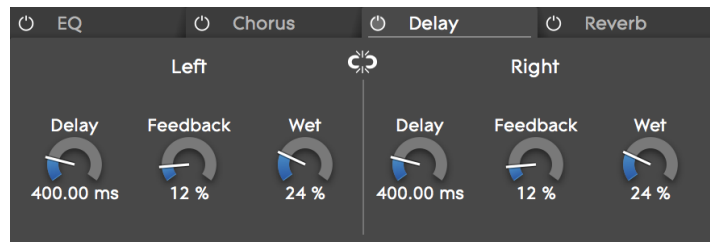
2.6.2 Chorus



The stereo Chorus has the following parameters available:

- Depth: 0% to 100%
- Speed: 0.2Hz to 50Hz
- Stereo Width: 0% (Mono) to 100% (Stereo)
- Wet: 0% to 100%

2.6.3 Delay

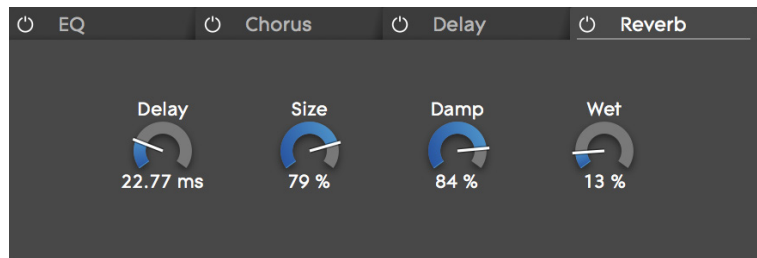


The Delay consists of two independent delay lines (left and right). The following parameters are available for each channel:

- Delay Time: 0 to 2000ms
- Feedback: 0% to 100%
- Wet: 0% to 100%

The parameters of the two channels can be linked by clicking on the middle icon. When linked, parameter changes made on one side will also be applied to the other.

2.6.4 Reverb



The stereo Reverb has the following parameters:

- Pre-delay: the delay between the direct signal and the reverberant signal (0 to 100ms)
- Size: the reverb time of the reverberant signal
- Damp: the amount of low-pass filtering (absorption) applied
- Wet: the amount of reverberant (wet) signal added to the (dry) input signal

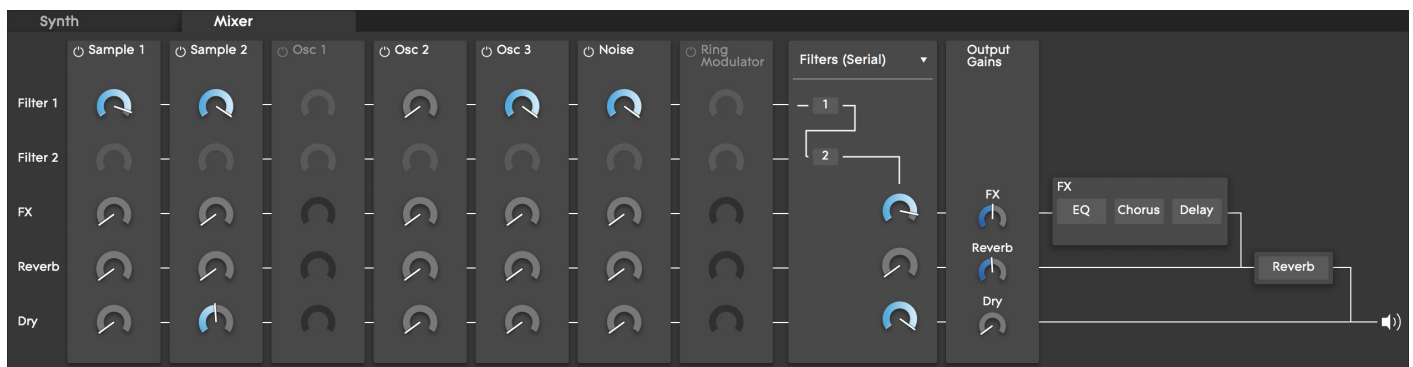
3. Mixer

3.1. Sends

The Mixer Panel can be used to route the output of each audio source (Oscillators, Sample Modules, Noise Generator, Ring Modulator*) independently to any of the following destinations:

- Filter 1
- Filter 2
- Effects Section (EQ, Chorus and Delay)
- Reverb
- Main Output

*The Ring Modulator multiplies the outputs of Oscillator 1 and 2.



3.2 Filter Configuration

The routing of Filter 1 and 2 can be configured in the following ways:

- Serial*: Filter 1 feeds into Filter 2
- Parallel: The signal flow of Filter 1 and 2 are separate and their outputs can be mixed separately.
- Summed: Filter 1 and 2 are in parallel but their outputs are summed together
- Mixed: Filter 1 has its own output but is also fed into Filter 2

*In this configuration the sends to Filter 2 are disabled.

The dials below each filter output determine the output level feeding into the effects, reverb and main output.

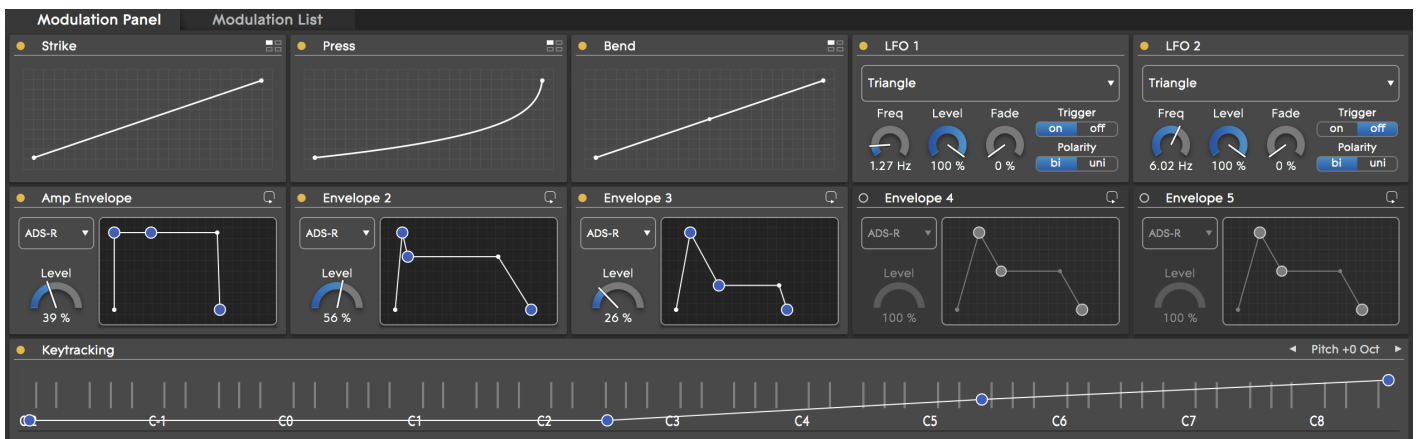
3.3 Output Gains

The overall gain going to the effects, reverb and main output can also be varied with the final dials in the signal chain..

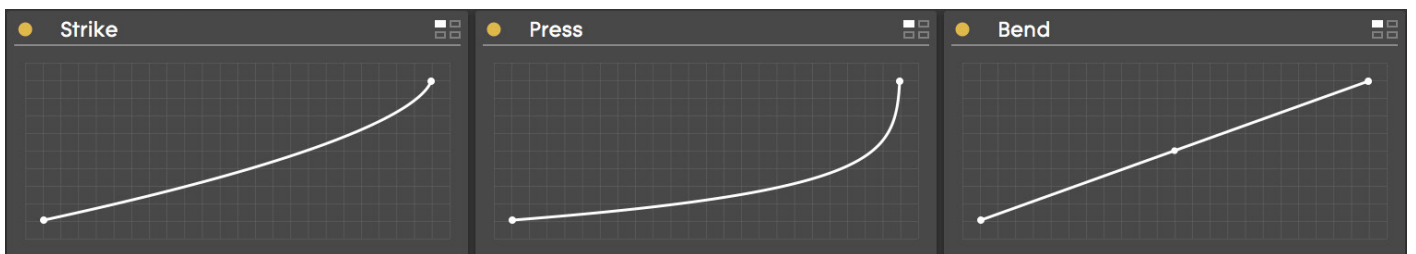
4. Modulation

The Modulation section in the lower half of Equator plays an important role in shaping the sound and making it very quick and easy to apply modulation to different parameters. There are four main types of modulation sources:

- Expressive Gestures from the Seaboard GRAND
- Envelopes
- Low-frequency Oscillators (LFOs)
- Keytracking

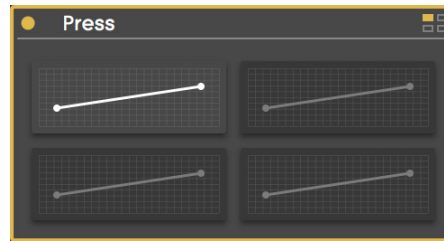


4.1. Expressive Gestures from the Seaboard GRAND



The three expressive gestures that can be performed on the Seaboard GRAND are:

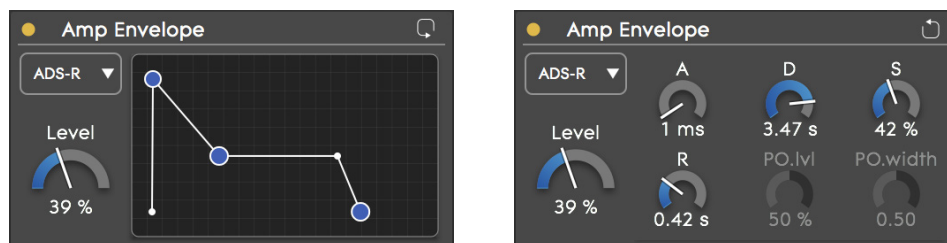
- **Strike:** The initial force applied to a key wave when it is first struck (Velocity)
- **Press:** The continuous pressure applied when a key wave is pressed down (Poly Aftertouch or Channel Pressure)
- **Bend:** The bending of the key wave between notes, or sliding on the top and bottom glissando ribbons (14-bit Pitch Bend)



The response each gesture has as a modulation source can be fine-tuned with the corresponding transfer curves. Each gesture has four independent transfer curves that can be assigned to different modulation destinations. To select one of the four curves, click on the four box icon in the top right hand corner of the gesture box and then click on the curve you wish to use.

4.2 Envelopes 1 - 5

Equator has five independent envelopes that can be viewed in Curve or Dial view. To switch between the two views, click on the switch button in the top right of each of the envelope panel.



The following envelope types are available:

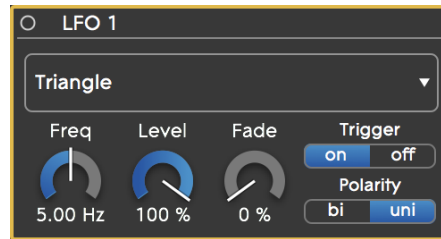
- **ADS-R:** This mode works as a typical ADSR envelope. Hitting a note triggers the Attack-Decay-Sustain section, releasing the note will trigger the Release section.
- **ADR (one-shot):** The Attack-Decay-Release section is played once without pause, even if the note has not been released.
- **ADADR (looped):** The Attack-Decay section is repeated until the note is released, when the Release section will be triggered.
- **ADS-PR (pluck-off):** Acts like an ADSR envelope, however, when a note is released the envelope will peak with a set level and width before the release section. This can be used to emulate such gestures as the fret noise produced on plucked instruments.

For each envelope the following parameters are controllable and can also be modulated:

- Level: 0% to 100%
- Attack Time: 0 - 5 seconds
- Decay Time: 0 - 5 seconds
- Sustain Level: 0% to 100%
- Release Time: 0 - 5 seconds
- "Pluck Off" Level: 0% to 100%*
- "Pluck Off" Width: 0 - 2 seconds*

* These parameter will only take effect when using the ADS-PR envelope type is selected

4.3 LFO 1 - 2



The two independent Low-Frequency Oscillators (LFOs) have the the following waveforms available:

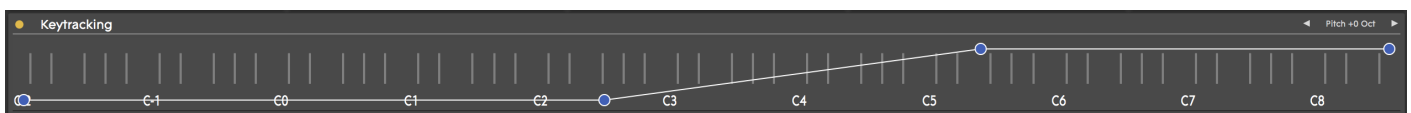
- Square
- Rising sawtooth
- Falling sawtooth
- Sine
- Triangle
- Random
- Random (Sample and Hold)

Each LFO has the following parameters:

- Frequency: 0 to 10 Hz
- Level: 0% to 100%
- Fade In: 0 - 5 secs (this determines the time it takes for the level of the LFO to rise from zero to the desired level)
- Trigger:
 - On: the LFO for each voice is triggered when the voice becomes active
 - Off: the LFO is free running, meaning the LFOs across all voices are in phase
- Polarity:
 - Bi: the output of the LFO is bipolar
 - Uni: the output of the LFO is unipolar

4.4 Keywave Display (Key-tracking)

As well as displaying the current notes being played, the Keywave Display can be selected and used as a modulation source to perform keytracking on a parameter. The level and behaviour of the keytracking can be set using the 4 point curve found overlaying the Keywave display.



4.5 Modulation List View

The Modulation List shows all modulation paths of the current preset. As well as being able to view all paths, each one can also be edited and new ones can be created. The general structure of the Modulation List is shown below:

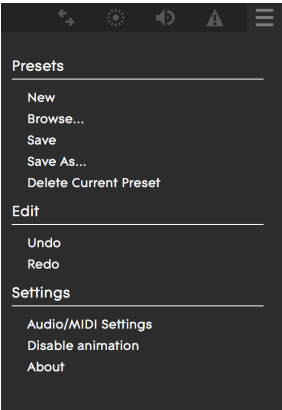
Modulation Panel		Modulation List			
Source		Transfer function	Destination	Modulation amount	
Amp Envelope		edit	Oscillator Level 1	100	Remove
		edit	Oscillator Level 3	92	Remove
		edit	Sampler Level 1	100	Remove
		edit	Sampler Level 2	100	Remove
Bend 1		edit	Oscillator Coarse 1	100	Remove
		edit	Oscillator Coarse 2	100	Remove
		edit	Oscillator Coarse 3	100	Remove
		edit	Sampler Coarse 1	100	Remove
		edit	Sampler Coarse 2	100	Remove
		edit			

- **Source:** lists all modulation sources used in the current preset. The modulation source for a group of paths can be changed by opening up the drop-down menu for each source and choosing from the list. The order of the modulation paths can be sorted by source by clicking on the section header.
- **Transfer function:** by clicking on the Edit icon, the transfer function between a modulation source and a destination can be adjusted to have a non-linear response.
- **Destination:** lists all modulation destinations used in the current preset. The destination for each modulation path can be changed by clicking on the drop-down menu and selecting from the list. The order of the list of modulation paths can be sorted by destination by clicking on the section header.
- **Modulation amount:** determines the modulation depth of the corresponding path. To edit the depth, either double-click and type in the new value or click and drag up or down in the box.
- **Remove Button:** modulation paths can also be deleted by clicking on the Remove icon on the far right of each row.

New Modulation Paths can be added by scrolling to the bottom of the list and clicking on the 'Select New Source' or 'Select New Destination' box.

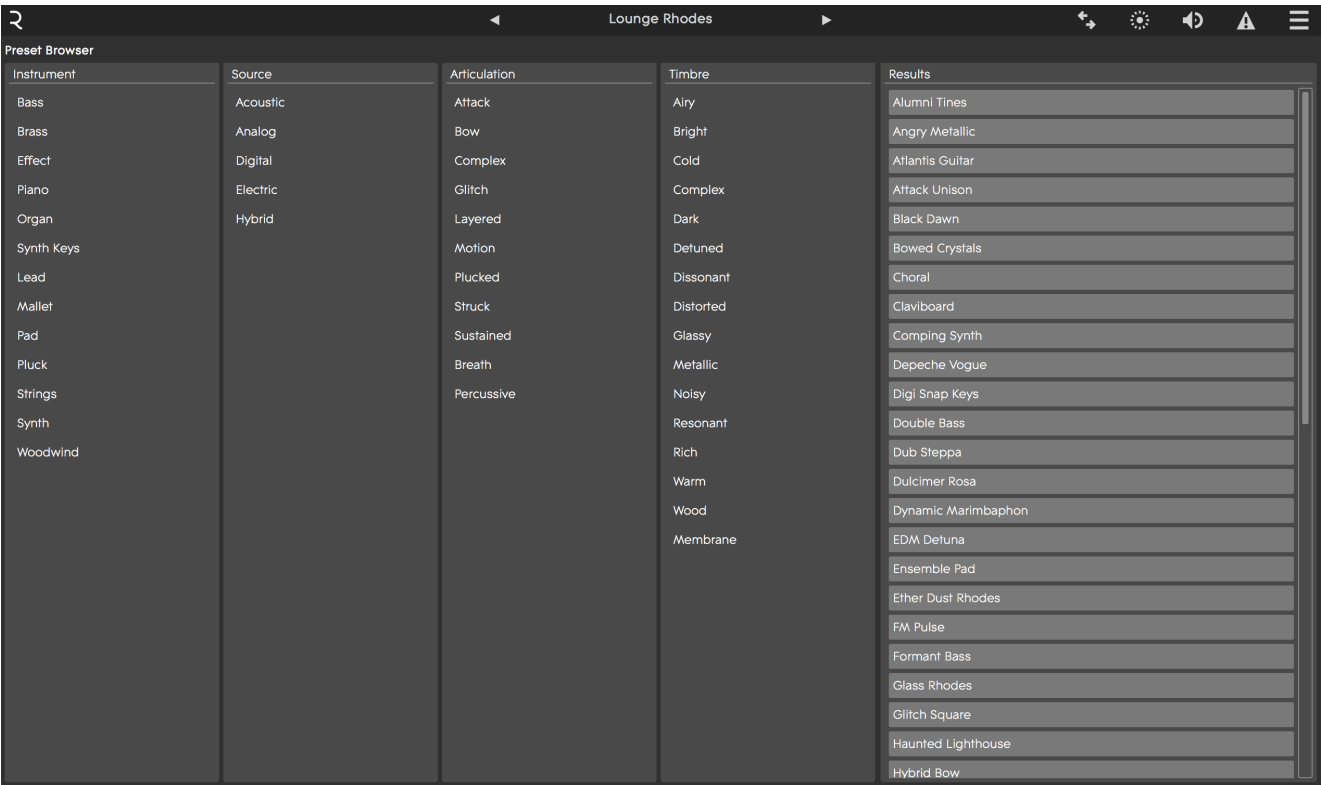
5. Equator Sidebar

Clicking the far right icon in the top panel opens up the Equator Menu, giving access to the preset management, editing and Audio/MIDI settings of Equator.



Presets

- **New:** reverts the Synth to the Init (Initial) preset to build a patch from scratch.
- **Browse:** opens up the Browser window, where all presets can be searched for by specifying tags. The Browser window and the available tags, can be seen below:



- **Save (cmd+s):** saves the changes to the current preset.
- **Save As:** opens up a window similar to the Browser window, allowing presets to be named and tagged.
- **Delete Current Preset:** deletes the currently selected preset.

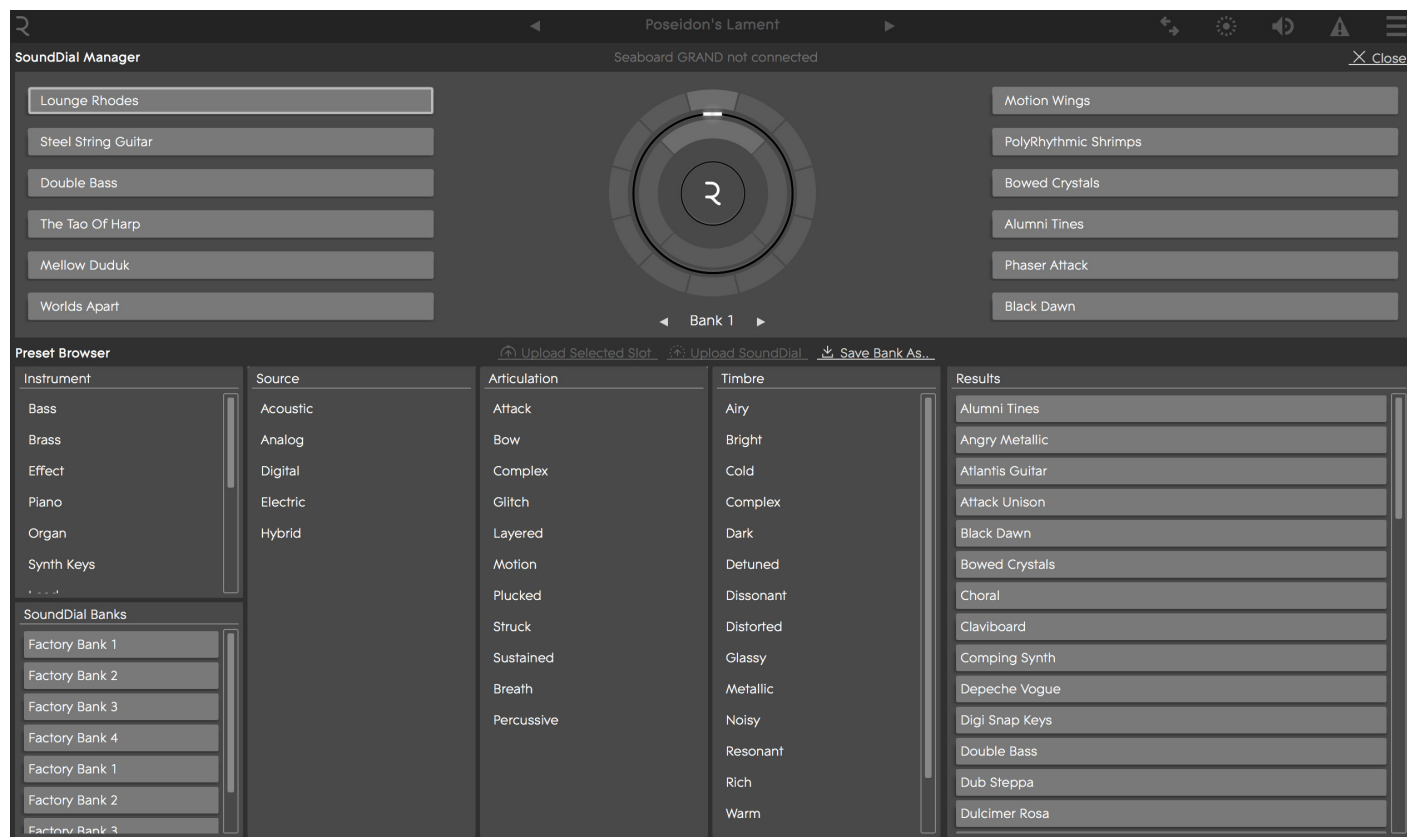
Edit

- **Undo (cmd+z):** will undo the last change made to a preset.
- **Redo (cmd+y):** will redo the last change made to a preset.

Settings

- **Audio/MIDI Settings:** gives access to the the audio output device, the sample rate, buffer size and the available MIDI inputs. Make sure 'Seaboard' is selected from the list of MIDI devices to use Equator with Seaboard GRAND. This menu is not available in the plug-in version as MIDI devices are managed by the host.
- **Disable/Enable Animation:** Equator contains many animations to show how parameters are modulated. These animations are optional and can be disabled here.
- **About:** Clicking on the About section shows the version number of Equator and a link to directly contact ROLI Support.

6. SoundDial Manager



The SoundDial Manager is used for both arranging saved presets on the SoundDial when using Equator as a software instrument and also managing and uploading presets to the Seaboard GRAND to be used as a standalone instrument.

The SoundDial on the Seaboard GRAND has four banks of twelve presets. To assign a preset to a SoundDial segment, select a preset from the Preset Browser and drag it onto the virtual SoundDial. To change bank, either use the left and right bank arrows, click one of the inner bank segments, or use the physical Seaboard GRAND SoundDial.

Once the SoundDial has been arranged or modified, the following actions can be performed:

- **Upload Selected Slot:** If a specific position on the SoundDial is selected, other presets can be previewed in the browser, clicking on this function will quickly swap the currently selected preset into the selected SoundDial position.
- **Upload SoundDial:** This function will transfer the chosen presets in the current bank to the Seaboard GRAND, ready for it to be used as a standalone instrument. The presets will then stay on the Seaboard GRAND in the same order until the SoundDial is uploaded again. Any presets on the Seaboard GRAND will be overwritten by the new bank.
- **Save Bank As:** The position of presets for each bank can be saved locally and then quickly reloaded. User SoundDial Banks are shown in the bottom left corner of the SoundDial manger. The saved banks can be dragged and dropped on to the SoundDial. The location of the SoundDial Banks folder is: `~/Documents/ROLI/Equator/SoundDial Banks`



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