Filterscape

with Filterscape VA and Filterscape Q6

User Guide

version 1.4

Introduction

Filterscape is our bundle of filter-based sound mangling tools, the ultimate in versatility and control. A parametric EQ with morphable snapshots, a dual multi-mode filter, a sophisticated delay unit, a synthesizer... you can use Filterscape to spice up your music in a myriad of ways. Whichever flavour you choose, Filterscape is always a fun environment – the GUI invites you to discover new and radical ways to process your tracks.

If you have any questions about Filterscape and/or would like to discuss any u-he product, you are very welcome to post a message in our forum at KVR!

install / uninstall

Go to the Filterscape page, download the appropriate installer and unzip the compressed file. Open the *Filterscape14* folder, double-click on the installer app and follow further instructions.

Filterscape is fully functional in demo mode except for an intermittent crackling sound which disappears as soon as the product is registered (by right-clicking on the data display in any of the Filterscape plug-ins and selecting the first entry).

To uninstall Filterscape, delete all 3 plugins and the associated files from the following directories (these locations depend on the paths you chose during installation):

Windows presets   *...\VstPlugins\u-he\Filterscape.data\Presets\Filterscape(Q6, VA)*
Windows preferences*...\VstPlugins\u-he\Filterscape.data\Support* (*.txt files)

Mac presets   Mac HD*/Library/Audio/Presets/u-he/Filterscape(Q6, VA)/*
Mac presets (User)   *[you]/Library/Audio/Presets/u-he/Filterscape(Q6, VA)/*
Mac preferences   *[you]/Library/Application Support/u-he/com.u-he.Filterscape...* (*.* files)
Mac resources   *Mac HD/Library/Application Support/u-he/Filterscape(Q6,VA)/*

online resources

For information, downloads and support, go to the u-he website
For a lively discussion about u-he products, go to our KVR forum
We also have a u-he youtube channel and an online patch library

_____

the u-he team (2015)

- Urs Heckmann (code, concept, strategy, discipline)
- Sascha Eversmeier (more code, but different)
- Howard Scarr (synth presets, manuals, grump)
- Rob Clifton-Harvey (support, databases, tenacity)
- Michael Dühr (QA, demo tracks, beer)
- Sebastian Greger (GUI design, 3D graphics)
- Jan Storm (yet more code, framework)
- Michael Pettit (videos, marketing)
- Viktor Weimer (more support, the voice)
- Oddvar Manlig (everything else!)

     with special thanks to...

- Hans Hafner and John Adair for help with the original manual
- Brian Rzycki for keeping PatchLib up and running

Filterscape

Although this chapter mainly deals with just one of the plugins in the bundle (the one simply called *Filterscape*), it contains information that applies to all three – especially details of the EQ.

Key Features

two state-variable filters
- multi-mode – simultaneous mixable lowpass, bandpass, highpass and notch
- extensive modulation options (see 'modulation sources' below)

parametric morphing EQ
- 8 snapshots, individually editable
- snapshots can be automated / morphed in a variety of ways
- 4 basic modes – equalizer, filter, peak, bandpass x 2

flexible routing
- 5 routing algorithms – different patches for different applications
- 2 mixers – with pan, balance, inverse stereo
- host tempo synchronized delay with cross feedback

modulation sources
- 2 step-sequencers for rhythmic modulation / patterns
- 2 host tempo synchronized LFOs
- 4 envelope followers with pre-filtering and attack-hold-release mode

GUI Elements

Filterscape's user interface includes quite a lot of controls. Although they have been optimized for easy usage and readability, it might take several hours to know your way around with confidence. The knobs and selectors often have extra functions that aren't immediately obvious...
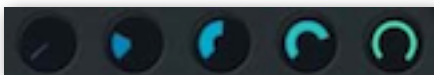
Knobs

Knobs are typically used for continuous control over parameters. As you would expect, clicking on a knob and dragging the mouse up and down adjusts the value. There are also special functions via double-click, right-click or modifier key:

- Double-click resets the parameter to a default value, in most cases zero.
- Shift + drag gives you fine (high resolution) control.
- Right-click accesses the *MidiLearn* function as described on the next page.

The knobs in Filterscape aren't simple pointers – values appear as 'pie slices' of variable colour, width and brightness, indicating values more clearly. There are actually two distinct kinds of knob, unipolar and bipolar:

Unipolar knobs are used for parameters that only take positive values, often with a range of 0% to 100%. Note that the pie slices thin out and become brighter/greener as you increase values – a bit like a rubber band (this is an attempt to illustrate 'tension' of extreme settings):

Bipolar knobs are used for parameters that also take negative values, often with a range of -100% to +100%. Negative values become a more vibrant blue, positive values become a brighter red:

Selectors

Selectors (switches) are used for all parameters that can only have discrete values, such as the modulation source for a filter's cutoff, or the basic options in a step sequencer:

Left-click on a selector to open a list of options, or right-click to access the *MidiLearn* functions.

If your mouse has a scroll wheel, you don't need to open the pop-up menu to set a value – simply hover over any selector (without clicking) and roll the wheel.
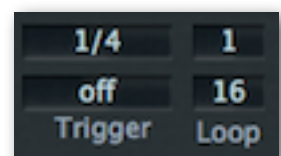
Data Display

All three Filterscape plugins include a large data display which, apart from showing the name of the preset, will also show the values of parameters as you adjust them:
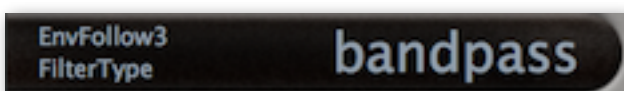
The name of the module (in this case Envelope Follower 3) as well as the parameter ('Filter type' here) appear to the left of the display, and the current value (much larger) appears to the right.

Main Context Menu

Right-click in the background to open a menu containing options that affect the appearance:

GUI Size

Filterscape's window is scalable in 10% steps. The range is 70% to 200

Text Antialiasing

This switches the smoothing of labels and values on or off (normally left on)

Gamma

Select one of the options to adjust the brightness
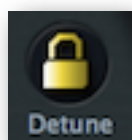
Control Context Menu

Right-click on any control for the following options:

Lock

To guarantee that the value of a parameter doesn't change when you switch presets, use the Lock function. You are still free to adjust the value of a locked parameter!

MIDI Learn / Unlearn

Filterscape's *MidiLearn* function lets you remote-control parameters from a hardware device without having to reach for the mouse. Most contemporary MIDI keyboards offer a set of knobs or faders that can send 'MIDI Continuous Control' messages (often abbreviated to 'MIDI CC'). There are also dedicated MIDI control boxes with 8, 16 or more knobs.

Most of Filterscape's parameters can be controlled by MIDI CC. However, as the maximum number of MIDI CCs is only 128 while Filterscape has over 600 (!) parameters, these connections are not fixed – you decide which parameters you want to control, whether just for the current project or as part of a more permanent 'template' setup you will be needing often...

All the standard controls (knobs, selectors) can be remote-controlled:

Right-click on any knob or selector to open the menu, choose *MidiLearn* then move a physical control on your MIDI hardware. That knob/slider will be assigned to the chosen parameter. To remove the connection again, select *MidiUnLearn* from the same menu.

Important: For FilterscapeVA you can use MidiLearn with most applications that can host virtual instruments. For Filterscape and FilterscapeQ6, MidiLearn only works when host applications route MIDI signals to effect plug-ins. To find out how to set up MIDI for effect plug-ins, please refer to the manual of your audio software. In Apple 'Logic', for example, you can only send MIDI to effects if they are inserted into 'Instrument Tracks'.

Mouse Wheel is Rastered

If you can feel your mouse wheel 'clicking' slightly as you roll it, activate this option – each little click will then increment / decrement the value in 'sensible' steps.

Presets

Three functions are called by clicking on buttons at the left and right borders of Filterscape's window: *load*, *store* and *randomize*. They are included in all 3 plug-ins, and work exactly the same.

Load

To browse through the available patches in any Filterscape plug-in, click on the *Load* button **(1)** at the top left of the window. The regular controls are greyed out, and the browser window appears with its two columns: preset folders **(5)** and preset names **(6)**. After having clicked on a preset, you should be able to use the up/down cursor keys on your computer to step through all the others. To close the preset browser, click on the *Load* button again.

Instead of opening the browser, you can step through presets using the pair of triangular buttons **(3)**. To select from all presets in the current folder, simply click on the data display **(4)**.

Store

In the preset browser (see load above), make sure that the folder where you want to put your sounds is currently selected. Click on the *Store* button **(2)**. A dialog window opens in which you can name your sound and enter any details you would like to add (patch description, playing tips etc.). Confirm by clicking on *Apply*.

Whenever you need to create a new folder or refresh the list (e.g. if folders or patches have been added from Explorer / Finder), right-click in the left pane of the browser. Note: Simply clicking on a folder should also refresh the list.

Favourite or Junk?

Right-clicking on a patch in the browser will open a context menu in which you can classify patches as *Favourite* or *Junk*. Junked files normally disappear, but can be made visible again by selecting *show Junk* from the same context menu.

Randomize

The *Randomize* button **(7)** assigns random values to most of the parameters in Filterscape. The vertical slider below sets the degree of randomization.

Caution: Randomization can result in very loud sounds, so to protect your monitors and ears, it's always a good idea to turn down the volume beforehand!

Reveal in...

As the functionality of Filterscape's browser is limited, the context menus let you open a window of your operating system and highlight the current folder or file: Right-click and select *Reveal in Finder / Explorer.*

MIDI Programs Folder

Local also contains a special folder called *MIDI Programs*, which is initially empty. If you put a bunch of patches (up to 128) in there, they are **all** loaded into a cache (for performance reasons) when the first instance of Filterscape starts. Important: changes will only take affect after restarting the host software – *MIDI Program* patches cannot be added, removed or renamed on the fly.

Individual patches are selected via MIDI program change messages. As they are accessed in alphabetical order, it is a good idea to put a number at the beginning of each name e.g. '000 rest-of-name' to '127 rest-of-name' or similar.

Banks: The MIDI Programs folder can contain up to 127 sub-folders (of 128 patches each), switchable via MIDI bank select messages 1-127. The MIDI bank select message is CC#0 (Filterscape only interprets the MSB) – send this value, then a Program Change message.

Routing, Mixers and Delay

Routing Selector

Filterscape is based on a modular plug-in engine, which means you can use the filters, the EQ and the delay in series, in parallel, or a mixture of both. For more complex effects, some of the routing algorithms place modules within the delay's feedback path.

To select a routing algorithm in Filterscape, click on the large image at the bottom left:

filters - delay - EQ

EQ - filters in delay

all parallel + delay

filters in delay - EQ

EQ in feedback

EF 12 = Envelope Followers 1 and 2

EF 34 = Envelope Followers 3 and 4

Mixers

The two mixers give you extra control over the signal flow. They determine the dry/wet mix of parallel stages as well as pan position of the return signal.

The *Mix* knobs **(2)** control the ratio of levels between the main signal and the signal returning from a parallel path (indicated by arrows in those images), with a range of 0% (dry) to 100% (wet). This gives you complete control over how much any module in the signal path contributes to the overall effect.

The wet signal can be panned **(4)** in various ways, as determined by the selector **(3):**

- **Bal L-R**: adjusts relative volumes of the stereo signal while preserving the stereo image.
- **Pan L-R**: negative values pan the right channel to the left, positive values pan the left channel to the right. None of the signal is lost, but the stereo image will be affected.
- **Bal R-L**: same as Bal L-R, but with an inverted stereo image
- **Pan R-L**: same as Pan L-R, but with an inverted stereo image
- **Pan mono**: pans the mono sum of the input signal

Of course those pan positions can be modulated. Use *Pan Mod* **(5)** to set the amount and click on the selector **(6)** to choose a modulation source.

Delay

In the lower right corner of the editor window are controls for the tempo-synced delay effect. At first glance, Filterscape's delay appears to be a very basic 'digital' unit. Although straightforward to use, however, it is more powerful than it seems...

You can select a delay time independently for each channel via the selectors **(8),** from 1/64 to 1/1, including dotted and triplet values. The two knobs for *Feedback* **(9)** and *Cross* **(10)** control the amount of delayed signal fed back into the same stereo channel (Feedback) and the amount fed back into the 'other' channel (Cross).

The *Mix* knob **(7)** controls the ratio of dry/wet signal.

Remember that there are routing algorithms where (for example) the EQ is placed within the delay's feedback path. You can create many different flavours of delay, from filtered spectra to wildly evolving feedback. Experiment!

As feedback can cause the delay to overload, it includes a built-in limiter that keeps the overall level within a reasonable range. Or at least it tries to – you can still do things that no limiter on earth could possibly correct...

Filters

Filterscape features a pair of classic analogue SVF (State Variable Filters). The SVF is common in vintage gear as well as software synthesizers. The version in Filterscape provides simultaneous output for **lowpass**, **bandpass**, **highpass** and **notch**, but unlike most other plug-ins, Filterscape doesn't simply switch between the different types, it lets you mix them dynamically...

Main SVF panels
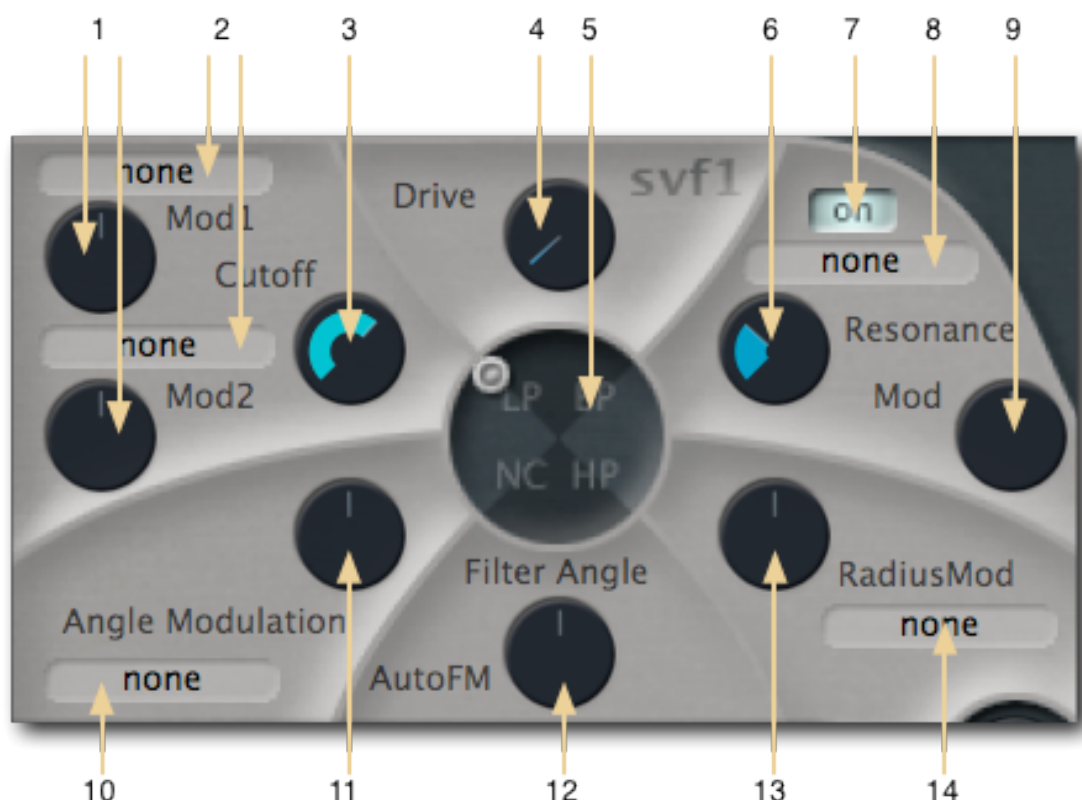
1	2 x cutoff modulation depths
2	2 x cutoff modulation source selectors
3	Cutoff frequency
4	Filter drive (distortion)
5	Filter angle (mixture of lowpass, bandpass, highpass and notch)
6	Resonance
7	Filter on/off switch
8	Resonance modulation source selector
9	Resonance modulation depth
10	Angle modulation source selector
11	Angle modulation depth
12	Auto FM amount (cutoff modulation from the input signal)
13	Radius modulation depth
14	Radius modulation source selector

Filter Type / Angle (5) controls the mixture of the four filter outputs. The small ring can be dragged freely using your mouse. The little ball (which can lag behind if you move the ring very quickly) shows the currently audible mixture. So you can create filter sounds that blend seamlessly between e.g. lowpass and bandpass.

On/Off (7) activates or deactivates the entire filter.

Cutoff (3) sets the common cutoff frequency. Each of these four filters is audible if the ball is in center position. Note: The gain and pan position are adjusted in the extra SVF panels (see below)**.**

Cutoff modulation (1, 2): The cutoff frequency can be modulated from two selectable sources **(2)**, and the amount of modulation is controlled by the associated knobs **(1)**.

Resonance (6): This knob controls the amount of resonance (internal feedback) for the entire filter. Resonance can be modulated from a source chosen in the selector **(8),** at a depth controlled by the knob **(9)**. Use the Drive parameter **(4)** to add filter-typical distortion to the resonance.

Angle modulation (10, 11): The knob **(11)** controls the amount of angle modulation from a source chosen in the selector **(10)**. Note that angle modulation will only have an audible effect if the Radius is away from the center. When the knob is turned all the way up (i.e. to 4) the inner ball will complete two full cycles. For a better idea of what's going on here, load the presets "Doc Angle Modulation", "Doc Radius Modulation" and "Doc Angle + Radius Modulation".

AutoFM (12) modulates the cutoff frequency *from the input signal itself*, often resulting in complex distorted timbres. Note that negative AutoFM sounds different from positive AutoFM.

SVF extras

The **SVF1** and **SVF2** panels below the EQ provide individual gain and pan positions for each filter type (there are four identical blocks here):

15	Filter pan
16	Filter pan modulation source selector
17	Filter pan modulation depth
18	Filter pan mode selector
19	Filter gain

First, the gains **(19)** are individually adjustable. The filter outputs can be panned **(15)** according to one of five panning modes **(18)** – see the section about the Mixers for details about pan modes. Finally, the pan position can be modulated **(17)** from a source specified in the selector **(16).**

Equalizer (EQ)
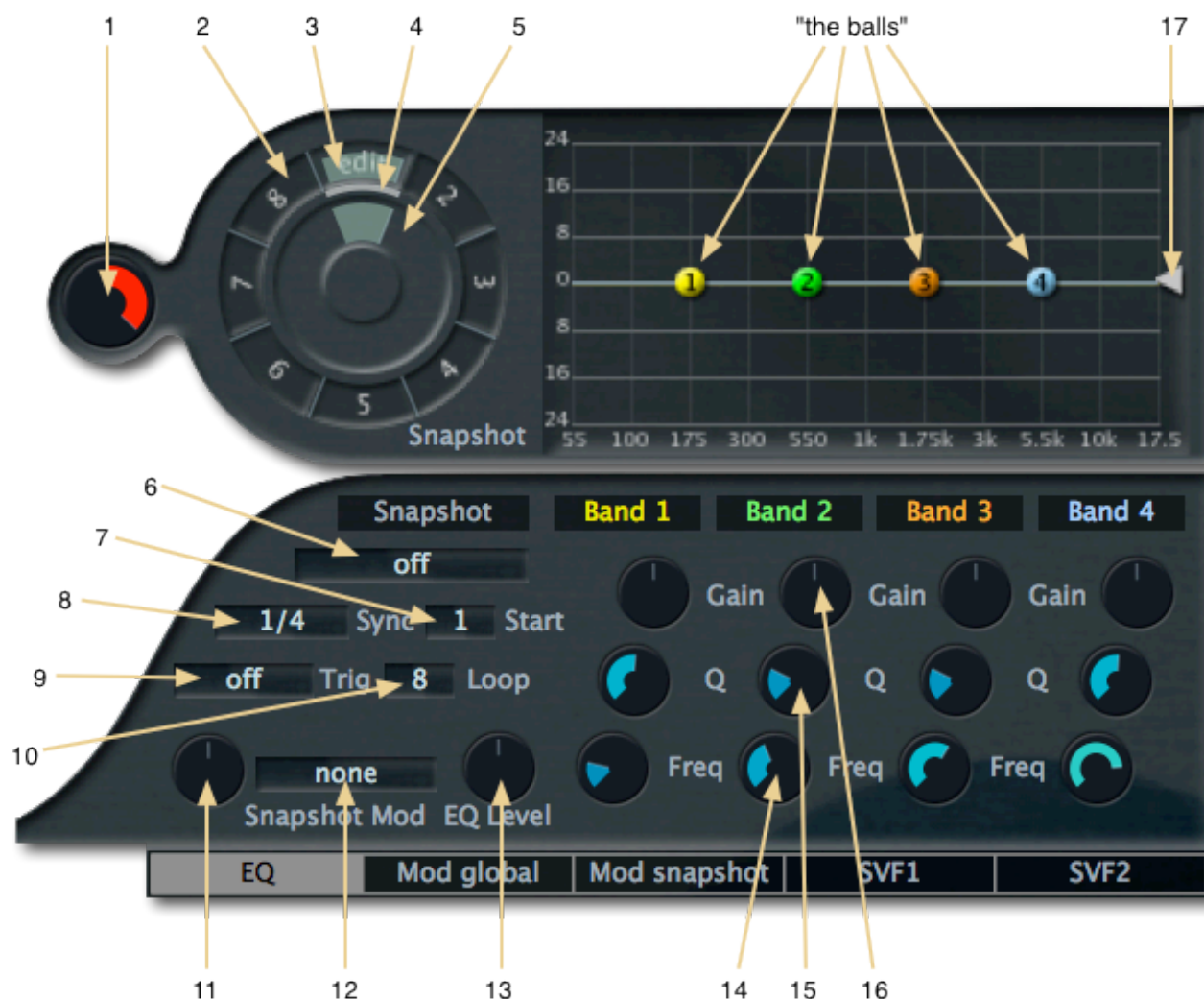
With its 8 morphable snapshots and extensive modulation options, the *Equalizer* is the true heart of the *Filterscape* effects plugin:

1   Gain scale (bipolar, per snapshot)
2   Snapshot select (1 to 8), "edit" = snapshot 1
3   The currently selected (i.e. editable) snapshot is highlighted
4   Currently audible snapshot (morph position)
5   Blend control (moves the audible snapshot)
6   Snapshot loop mode (off, loop -->, loop <->)
7   Starting point for the loop
8   Loop speed (sync value)
9   Trigger (restart after 1 bar, 2 bars etc..)
10   Loop width (number of snapshots included)
11   Snapshot modulation amount
12   Snapshot modulation source selector
13   Overall EQ level (per snapshot, alternative to 17)
14   EQ band frequency
15   EQ band width, 'Q'
16   EQ band gain
17   Overall EQ level (per snapshot, alternative to 13)

Graphic Editor

Move the coloured balls in the graphic editor to define each band**:** Left-click and drag to adjust the frequency **(14)** and gain **(16)**, right-click and drag to adjust the **Q** (steepness / width) **(15)**. (The numbers in the above sentence refer to the knobs with the same functions).

The resulting static curve is shown as a grey line. A blue line, updated in realtime, shows the current 'morph curve' between snapshots.

The EQ has an overall level (per snapshot) controlled by the triangle **(17)** or the knob **(13).** You can adjust either one, whichever is easier.

The Gain Scale knob **(1)** to the left adjusts the EQ 'strength' between -100% and +100%. Use this to seamlessly fade the EQ in and out, or invert the curves by setting Gain Scale to -100%.

Ctrl-click (Mac: cmd-click) anywhere in the background sets 'freezes' the values corresponding to the blue line. You can use this feature to create smooth transitions between snapshots etc..

Context Menu / Modes

Right-clicking the background of the graphic editor opens a context menu with *Copy*, *Paste* and *Clear* functions as well as the following basic mode options:

EQ .... Low shelf + Peak + Peak + High shelf
Peaks .... 4 x Peak
Filter .... Lowpass + Bandpass + Bandpass + Highpass
Bandpasses .... 4 x Bandpass

EQ dial

In the center is an area **(5)** used for blending smoothly between snapshots (note that you can click anywhere within the larger circle, not just on the central knob). The outer segments **(2)** are snapshot selectors – the currently editable one is highlighted **(3)**. A thin grey arc **(4)** represents the current position between snapshots. Tip: Load the preset *Doc Snapshot loop* (you will find this in the Documentation folder) to see how the EQ curve moves in realtime.

Note that the EQ dial is the ideal target for automation in Filterscape. The individual parameters it controls (Gain, Q, Freq, Level) cannot be automated directly, as this would be redundant.

Loop Modes

An 'auto-proceed' function makes automating EQ snapshots easier than setting up an LFO. The loop has adjustable boundaries and direction, and is synchronized to the host tempo. Try it – switch on the loop mode **(6)** i.e. set it to one of the following values:

Loop ->   after reaching the *Loop* **(10)** position, it jumps back to the *Start* **(7)** snapshot.
Loop <->   after reaching the *Loop* **(10)** position, it reverses direction.

The Sync selector **(8)** determines the speed of the loop within a range of 1/64th note to 8 bars (including triplets and dotted values). The trigger selector **(9)** is used for specifying the number of bars (measures) after which the loop will be automatically reset.

Mod Global / Mod Snapshot

These two panels contain modulation options for each band of the EQ:
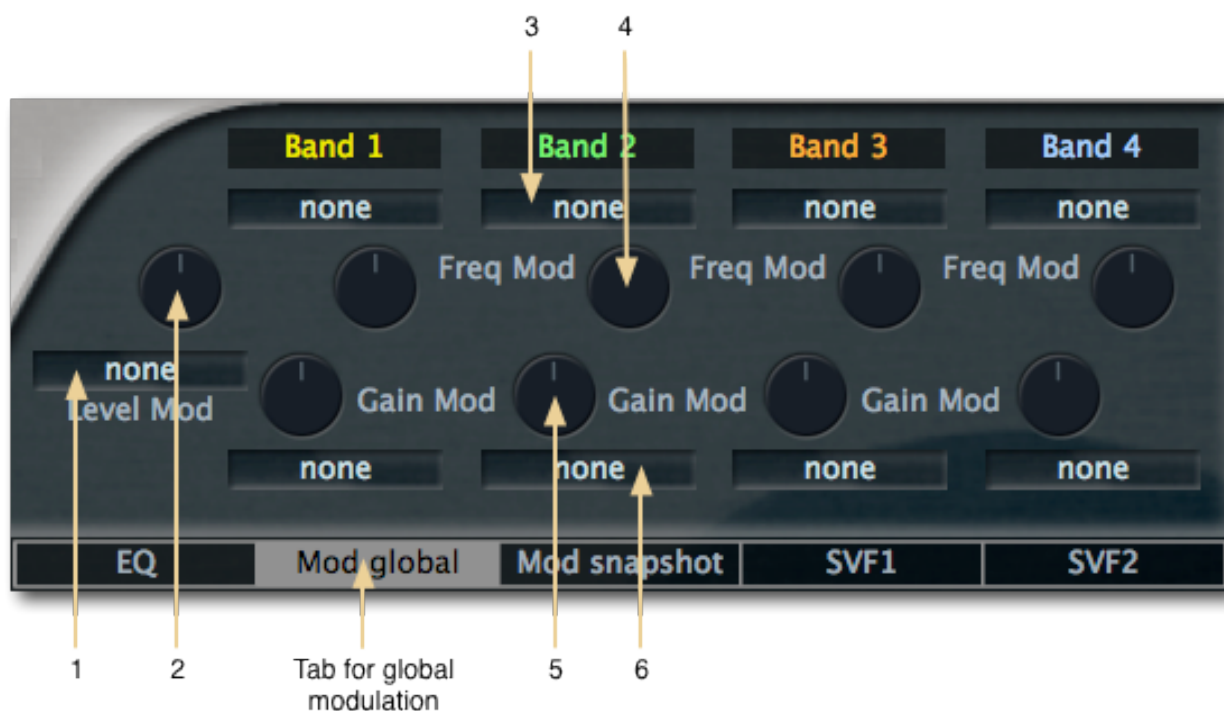
1 Overall level modulation source selector
2 Overall level modulation depth
3 Frequency modulation depth
4 Frequency modulation source selector
5 Per-band gain modulation depth
6 Per-band gain modulation source selector

The total level of the EQ can be modulated by specifying a modulation source **(1)** and adjusting the modulation amount **(2).** If each band is set to zero gain (i.e. the EQ is completely flat) then level modulation will sound like a tremolo. See the preset 'Doc tremolo'.

The Freq Mod knob **(4)** controls frequency modulation globally. Choose a modulation source with the selector **(3).** The band's frequency will be modulated for every snapshot (see preset "Doc Freq mod global"). In the preset "Doc Freq mod global 2", snapshot 5 has a different setting than the others – give it a listen!

Similarly, knobs **(5)** and selectors **(6)** let you modulate the gain of each EQ band.

Mod snapshot

While Mod global is independent of the current snapshot, Mod snapshot provides the same options *for each snapshot* independently! This means that the 8 snapshots can have completely different modulation settings, which can then be blended via the snapshot position. Use the dial to switch snapshots, then adjust the modulation settings.

See the preset 'Doc Freq mod snapshot' for an example – this preset cycles between the first and fourth snapshot.

Modulators

Step Sequencers

Filterscape includes 2 step sequencers for any kind of pattern-based modulation. The *Blend* knob belonging to sequencer 2 appears at the far right of the panel, otherwise the two are identical:
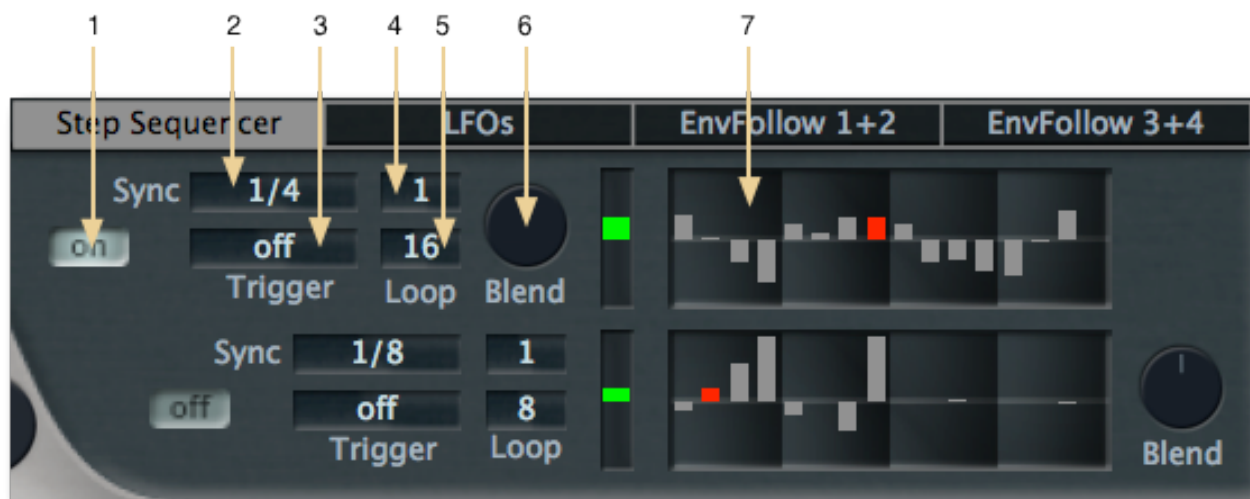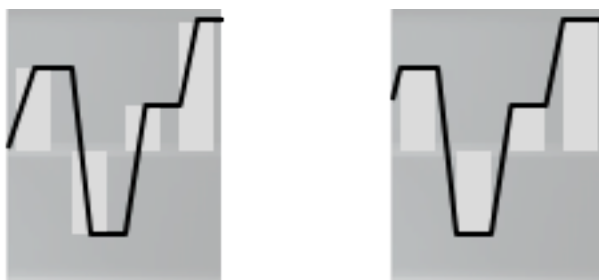

1   On/off switch
2   Speed
3   Retrigger
4   First step
5   Number of steps (i.e. loop length)
6   Blend
7   Graphic editor for the steps

Button **(1)** switches the step sequencer on or off. The *Sync* selector **(2)** lets you select the speed – it is always synced to the host tempo, within a range of 1/64th notes to 8 bars/measures.

The Trigger selector **(3)** specifies an optional number of bars after which the step sequencer will be retriggered. In the off position, the step sequencer simply loops continually.

With the first step **(4)** and loop length **(5)** selectors you can define the loop: The first step specifies the step at which the sequencer will start, the loop length specifies how many steps will be used.

Blend **(6)** controls how the steps glide into one another. At the center, they will jump immediately from one value to the next (see preset 'Doc step seq example 1'). For positive Blend values (1% to 100%), the glide will start with each step (see preset 'Doc step seq example 2'.). For negative values (-1% to -100%), the glide will start **beforehand** so that the value is already 'there' when the next step arrives, as in the righthand image here (see 'Doc step seq example 3').

LFOs

Filterscape has two general purpose LFOs. Both work in exactly the same way, so for simplicity's sake we will only deal with LFO 1 here.

1   Waveform selector
2   Speed
3   Restart trigger selector
4   On/off switch
5   Phase control

The waveform selector **(1)** lets you choose one of the following LFO waveforms:

> *Sine*
> *Triangle*
> *Sawtooth*
> *Square hi-lo*
> *Square lo-hi*
> *Random hold*
> *Random glide*

The first three are self-explanatory. *Square hi-lo* is a square wave starting at the upper level, while *Square lo-hi* starts at the lower level. *Random hold* generates random values**,** and *Random glide* is the same in 'smooth'.

The Sync selector **(3)** lets you specify the LFO speed. Note: LFO speed is always synced to the host's tempo, with a range of 1/64th to 8 bars.

Restart **(4)** specifies a number of bars after which the LFO will be restarted. In the off position, the LFO will cycle continuously i.e. it will not be restarted.

The phase knob **(5)** shifts the phase of the LFO wave backwards (negative) or forwards (positive).

Envelope Followers

Filterscape has four general purpose envelope followers / generators:
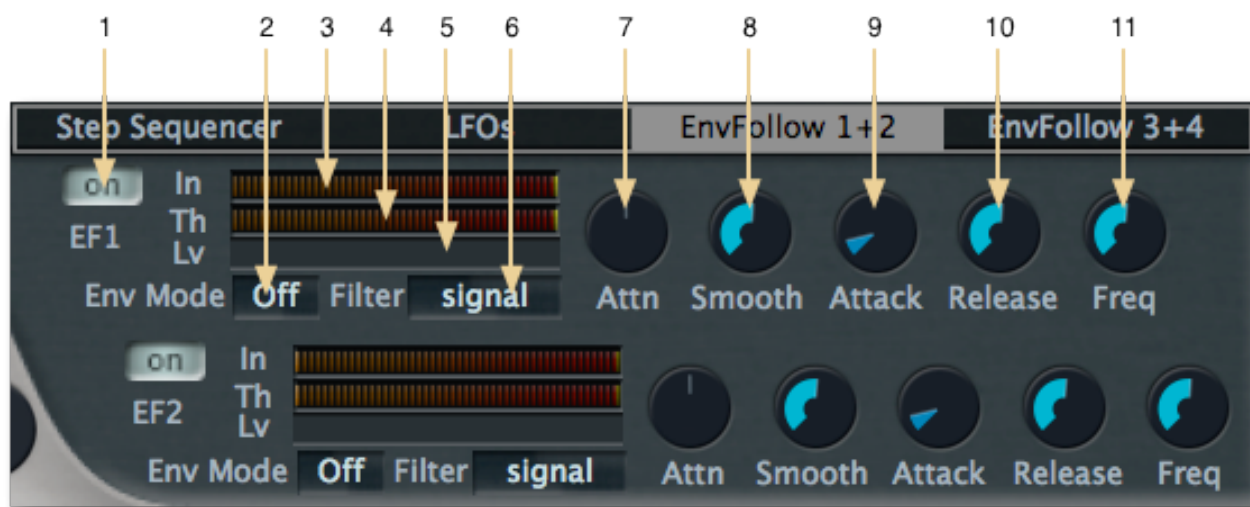
1   On/off switch
2   Envelope mode on/off
3   In – input level display
4   Threshold slider
5   Modulation level display
6   Analysis mode selector
7   Attenuation
8   Smooth
9   Attack
10   Release
11   Frequency

The on/off switch **(1)** turns the envelope follower on or off. The Input level meter **(3)** shows the signal amplitude on the input, and the *Attn* (attenuation) knob **(7)** controls the controls the gain of the signal input.

The *Th* (threshold) slider **(4)** sets a level at which the envelope follower becomes active. There is no handle, simply drag across the threshold display to adjust the value.

The *Lv* (level) display **(5)** shows the modulation signal's output in realtime. Tip: Adjust the other parameters to ensure maximum movement here.

The *Filter* (analysis mode) selector **(6)** can be set to lowpass, bandpass or highpass, and is used to narrow the analyzed spectrum down to a certain frequency band, as set by the Freq **(11)** knob. This makes it possible to trigger the two envelope followers from different frequency ranges of the same signal (e.g. bass drum and hi-hat).

The *Attack* **(9)** and *Release* **(10)** parameters control the rate at which the envelope actually follows the input signal (between 1ms and 650ms). The *Smooth* parameter **(8)** adds some inertia to the analyzer stage, making it more sluggish – which can be very handy for overly dynamic material. Note: *Smooth* also affects the perceived attack and release.

If *Env Mode* **(2)** is activated, the envelope follower works as a triggered Attack-Hold-Release type envelope instead. Whenever the input level crosses the threshold **(4)**, the AHR envelope will be triggered. The envelope is sustained ('hold') until the input level falls below the threshold.

FilterscapeVA

FilterscapeVA is the polyphonic synthesizer member of the Filterscape bundle. The image below is a simple overview of the various panels. As the equalizer section is exactly the same as in the Filterscape effect plug-in, please refer to the previous chapter for EQ details.
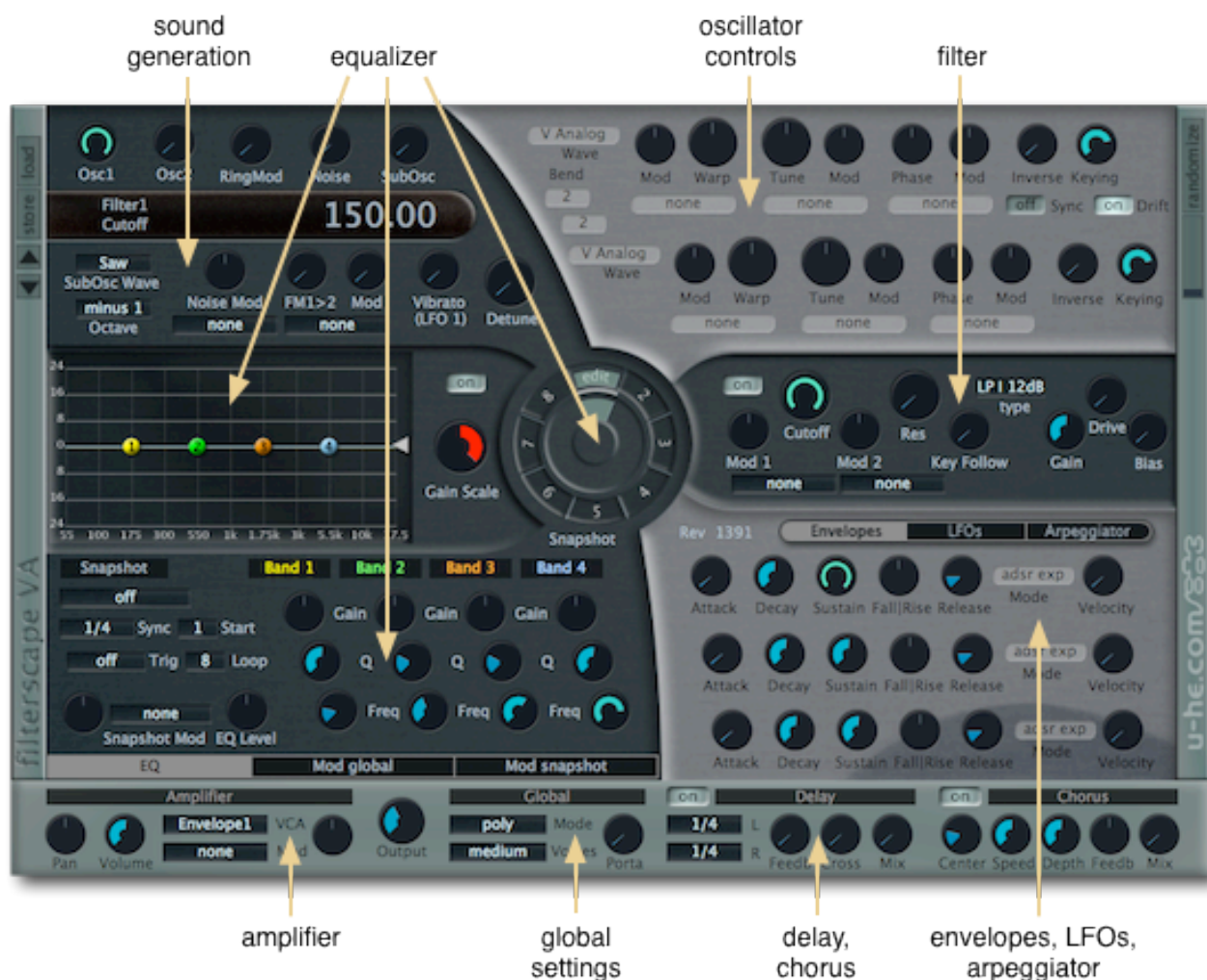
Extra features / differences from the regular *Filterscape* described in the previous chapter:

- It's an instrument plug-in, not an effect!
- 2 oscillators + sub-oscillator, noise
- 3 LFOs (1 global, 2 per-voice) instead of 2
- 3 envelope generators
- 4 different lowpass filter modes
- Arpeggiator / sequencer
- Chorus effect

The rich sound and flexibility of the oscillators, the FM feature, pulse width modulation, hard sync and ring modulation combined with the 12/24/36 dB resonant lowpass filter and Filterscape's morphing EQ make FilterscapeVA capable of a broad range of sounds – from fat vintage basses, warm or digital pads to heavily distorted leads. Despite the apparent complexity,

FilterscapeVA is based on a familiar signal flow: ***2 oscillators + sub-oscillator + noise ⇨ filter***

But then comes the fun part: Each voice has its own instance of Filterscape's morphing EQ – just one reason why FilterscapeVA can make such amazingly 'fluid' sounds. Remember that you can have have 8 snapshots of 4 peak (or notch) filters controlled by different envelopes or LFOs...

Lower bar

Amp & Voice (global) Settings

The left half of the lower bar looks like this:
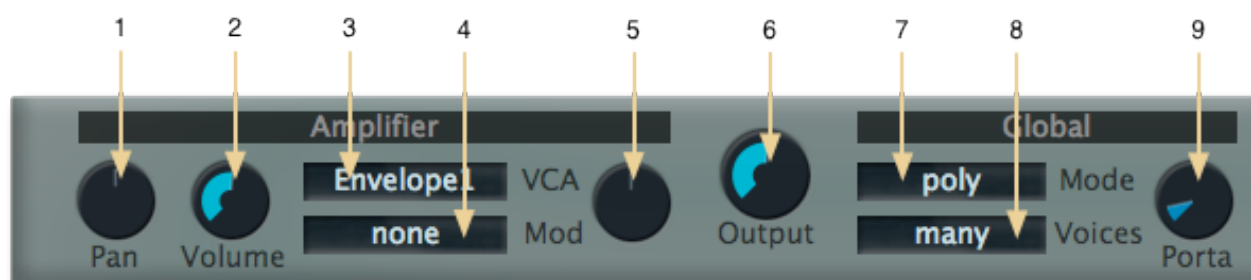
Knob **(1)** sets the overall pan position, knob **(2)** is an initial volume control**.** With the selector **(3)** you can choose which envelope you would like to be used to modulate the volume. Selector **(4)** specifies an extra volume modulation source, and knob **(5)** sets the amount of that modulation.

The slightly larger global output knob **(6)** controls the final output level sent to the host.

Use selector **(7)** to specify a polyphony mode**:** poly, retrigger, legato or arpeggiator / sequencer. The Voices selector **(8)** determines the maximum number of voices generated before note-stealing occurs (select *medium* or *few* here to save CPU cycles). Finally, there is the control for portamento i.e. glide rate **(9)**.

Delay & Chorus Settings

The right half of the lower bar looks like this:
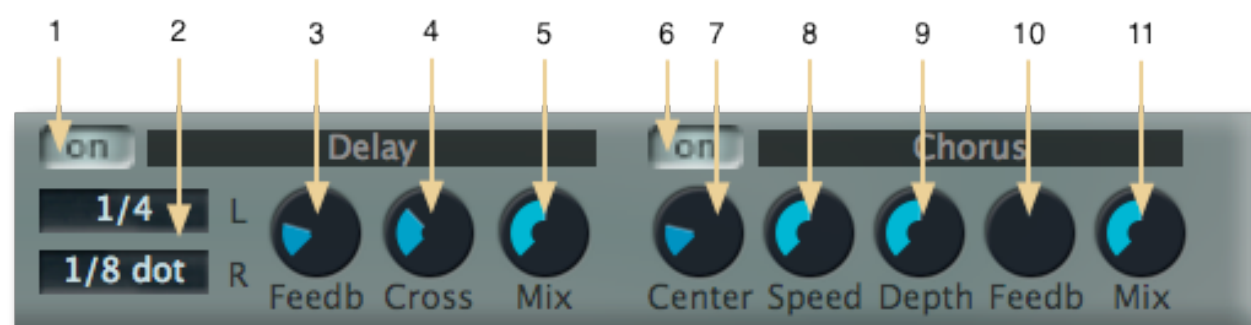
Delay is activated by clicking on the switch **(1).** This appears highlighted while the Chorus is on. Select a delay time (1/64 to 1/1 including dotted and triplet values) independently for each channel via the selectors **(2)**. The two knobs for *Feedback* **(3)** and *Cross* **(4)** control the amount of delayed signal fed back into the same stereo channel (Feedback) and the amount fed back into the 'other' channel (Cross). The *Mix* knob **(5)** controls how much of the delayed signal you will actually hear.

Chorus also has its own on/off switch **(6).** The *Center* knob **(7)** controls the nominal amount of phase shift (i.e. before modulation via a dedicated LFO), the *Speed* knob **(8)** controls the rate of the LFO while *Depth* **(9)** determines how much this modulates the phase shift either side of the Center. The *Feedb* knob **(10)** controls the amount of feedback, either positively or negatively. Finally, you can blend the chorus signal with the original 'dry' signal via the Mix knob **(11).**

Sound Generation

Filterscape VA has two main oscillators, an independent sub-oscillator and a white noise generator. The panel surrounding the data display contains an audio source mixer (1 – 5) plus a few other sound generation parameters. The two oscillators are defined in a separate panel (next page).

The *Osc1* **(1)** and *Osc2* **(2)** knobs control the levels of the main oscillators. *RingMod* **(3)** adds the result of ring-modulation between them, and *Noise* **(4)** controls the amount of white noise added to the mix.

SubOsc **(5)** adjusts the level of what is actually an extra oscillator: The *SubOsc Wave* selector **(6)** offers saw, pulse or sine wave. Below this is the *Octave* **(7)** transposition selector, which offers the same octave as the oscillators when *Tune* (see the next page) is neutral, or one or two octaves below that. The sub-oscillator's pitch does not follow that of e.g. oscillator 1, and the only types of modulation are pitchbend and vibrato.

Tip: the sub-oscillator 'saw' wave is the inverse of the main oscillators' saw, so it can be used for e.g. a certain classic PWM effect (mix it 50:50 with a saw wave from one of the main oscillators, and detune) while freeing up the other main oscillator.

*Noise Mod* **(8)** controls noise level modulation from a source chosen in the selector **(9)**.

FM1>2 **(10)** controls the level of FM (frequency modulation of oscillator 2 by oscillator 1). This can also be modulated: choose a modulation source with the selector **(11)** and adjust the *Mod* knob **(12)**. Tip: experiment with relatively pure waveforms and high oscillator frequencies first.

The *Vibrato* control **(13)** adds pitch modulation from LFO1 to all oscillators, with a maximum range of +/- 50 cents.

Detune **(14)** fine tunes oscillator 1 upwards, and oscillator 2 downwards, by a maximum of 100 cents each (turning this knob all the way up will result in a whole-tone interval).

Oscillators

The oscillator settings (waveforms, pitches etc.) are in a separate panel. Here is an image of the upper half of that panel containing the parameters for oscillator 1, as well as a few settings that apply to both oscillators (pitchbend ranges, the sync and drift switches):
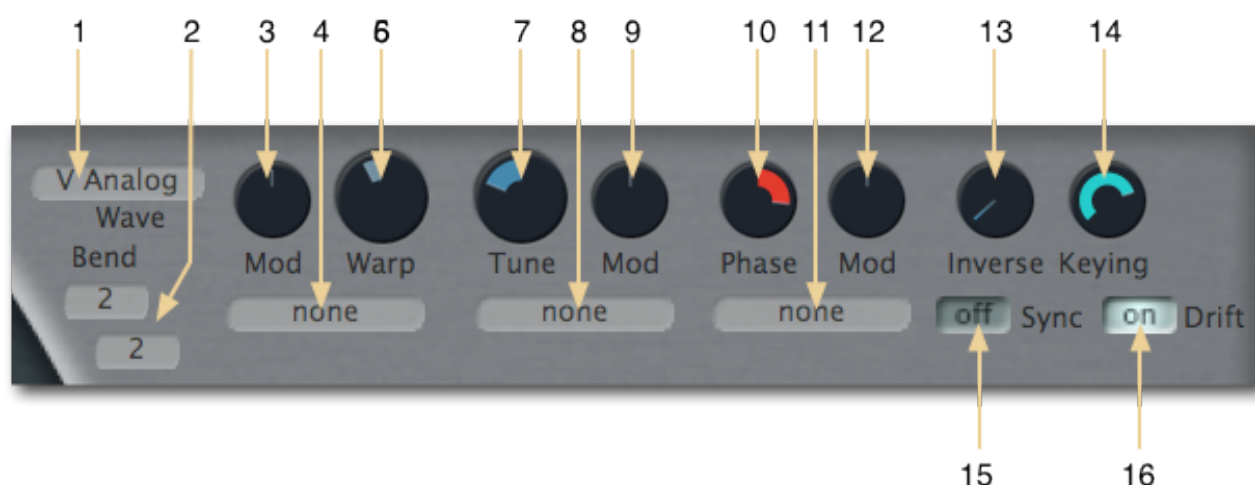
The *Wave* selector **(1)** lets you choose a basic wavetable from the 9 available (have a look!), and the *Warp* parameter **(6)** blends smoothly between all waves in that table. Tip: It's worth inspecting the wavetables using an oscilloscope plug-in e.g. the freeware 's(m)exoscope'.

Warp can be modulated by selecting a source **(4)** and adjusting the amount **(3).**

Tune **(7)** offsets the pitch of the oscillator by +/- two octaves. Tune can be modulated by selecting a source **(8)** and adjusting the amount **(9).**

Phase **(10)** shifts the phase (horizontal position) of the waveform by +/- 180°. Again, this can be modulated by selecting a modulation source **(11)** and adjusting the amount **(12).** Cyclic phase modulation from an LFO is an interesting alternative/addition to pitch modulation.

Inverse **(13)** cross-fades the waveform with a copy that has been inverted and phase-shifted by 180°. This can be used to create a variety of effects, notably PWM aka pulse width modulation: (you will find this example as part of the preset *'Template PWM'*)

> Make a sawtooth (Wave = 'V Analog', Warp = 50.00)
> Set *Inverse* to 0.00 for an equal mixture of the saw and the copy
> Modulate *Phase* from an LFO

Sync **(15)** enables the familiar (at least in vintage analogue synthesizers) hard sync effect: each time oscillator 1 completes a cycle, it forces oscillator 2 to restart as well. Tip: to create the typical 'biting' sync sound you would typically modulate oscillator 2 frequency.

Keying **(14)** adjusts the spread of pitches across the keyboard. Despite appearances, it is bipolar. At +100 the notes generated are the notes played and chords are perfectly in tune. At -100 the pitches are inverted, so if you play a scale upwards on the keyboard it will sound as if it was played downwards.

The pair of *Bend* selectors **(2)** determine the pitchbend ranges (up and down) for all oscillators.

Envelopes

FilterscapeVA includes 3 identical envelope generators:
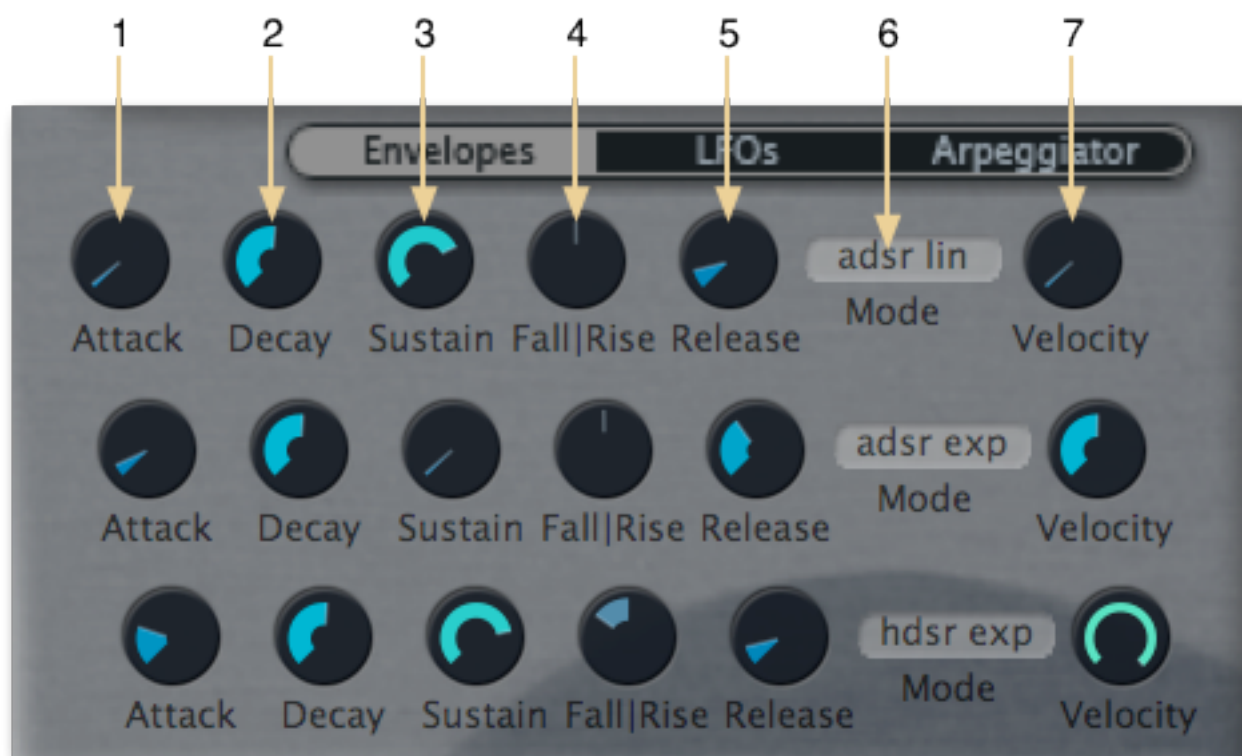
The *Attack* **(1),** *Decay* **(2),** *Sustain* **(3)** and *Release* **(5)** parameters work the same as in practically any other synthesizer (OK, there are a few exceptions).

Filterscape's envelopes have an additional *Fall/Rise* parameter **(4)** which can cause the *Sustain* stage to either fall to zero (negative values) or rise to maximum (positive values) instead of remaining flat. Values of +/- 100 are almost instantaneous, values close to the centre are slow.

The *Mode* selector **(6)** offers four different types of envelope: either the normal ADSR type or an HDSR (Hold-Decay-Sustain-Release) type, each available in exponential or linear flavours. In the HDSR modes, the *Attack* knob controls how long the envelope remains at maximum before the decay stage kicks in.

Velocity **(7)** sets how much MIDI key velocity will affect the level of the envelope signal.

Filter

FilterscapeVA has a single multi-mode filter:
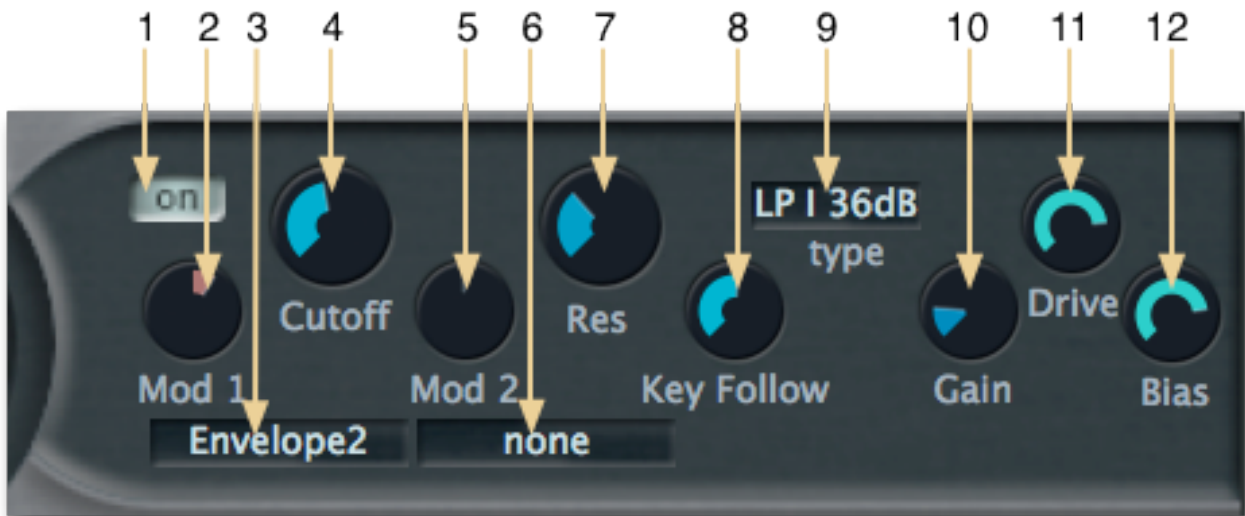
The switch **(1)** activates or bypasses the filter section. The *Cutoff* **(4)** knob controls the corner frequency and *Resonance* **(7)** controls how much this frequency is accentuated.

The *type* selector **(9)** offers 12, 24 or 36dB per octave lowpass models. The 36db option is actually the same as the 24dB but with an extra 12dB filter after the *Drive* circuit. The remaining options are explained below.

Cutoff can be modulated by two different sources at the same time – choose modulation sources with the selectors **(3** and **6)**, then adjust the modulation depths via the *Mod* knobs **(2** and **5).**

Key Follow **(8)** modulates cutoff from the MIDI note i.e. it opens up the filter for higher notes.

Drive **(11)** crossfades between the clean signal and an 'overdriven' signal. *Gain* **(10)** controls the depth of that 'drive', adding harmonics while losing some of the bass. *Bias* **(12)** adds a DC offset (fixed current) to the input, thus overdriving more of the positive transients than the negative ones.

The **LP II**, **BP II** and **HP II** filter models were added in later FilterscapeVA versions. Although they are based on the same 4-pole circuit, they are 'wired' differently to create **lowpass**, **bandpass** as well as **highpass** flavours. The *Gain* and *Bias* parameters are replaced with *Click* and *Osc1FM* – and of course they have different functions:

Click does precisely that. It injects a click into the filter each time a note is played. Try this: Set both *Resonance* and *Key Follow* to maximum, turn all oscillators etc. down (in the other panel) and play e.g. 'Popcorn' with the resonating filter...

Osc1FM modulates the cutoff from the oscillator 1 signal. Setting negative values will often result in a different sound than positive values.

Equalizer (EQ)

The EQ section in *FilterscapeVA* is the same as in the *Filterscape* effect plug-in. Please refer to the previous chapter for details.

LFO

FilterscapeVA includes 3 LFOs (low frequency oscillators):

One of the LFOs is **global** (like in the main *Filterscape* effect plugin) while the other two are 'per-voice'. Note: the global LFO is the one on the left, LFO1 is in the centre.

All LFOs have the same choice of waveforms **(2** and **7)** as in the main effect plugin – *sine*, *triangle*, *saw up*, *saw down*, *square hi-lo*, *square lo-hi*, *random hold* and *random glide*. The first three are self-explanatory, but the others may need more explaining: *Square hi-lo* is a square wave starting at the top, while *Square lo-hi* starts at the bottom. *Random hold* generates random values**,** and *Random glide* is the same but smooth.

The *Sync* selector **(3** and **8)** lets you specify the LFO speed. LFO speed is always synced to the host's tempo, with a range of 1/64th to 8 bars.

The global LFO can *Restart* **(4)** after a certain number of bars/measures. The parameter with the same name **(9)** in LFO1 and LFO2 has a related but different function – here are the options:

> *sync* ....never restarts, LFOs for all notes have the same phase
> *gate*................restarts to the value of *Phase* **(13)** whenever a new note is played
> *single* ....like *sync*, but restarts whenever a non-legato note is played
> *random*...........restarts at a random phase whenever a new note is played

Both LFO 1 and LFO 2 include a *Delay* parameter **(12)** which adjusts the LFO's fade-in time. Also, the LFO amplitudes can be modulated **(11)** from a source chosen in the selector **(10)** to the left.

The *Phase* knobs **(5** and **13)** shift the LFO waveform backwards (negative) or forwards (positive).

Arpeggiator-Sequencer

Click on the Arpeggiator tab to open these panels:
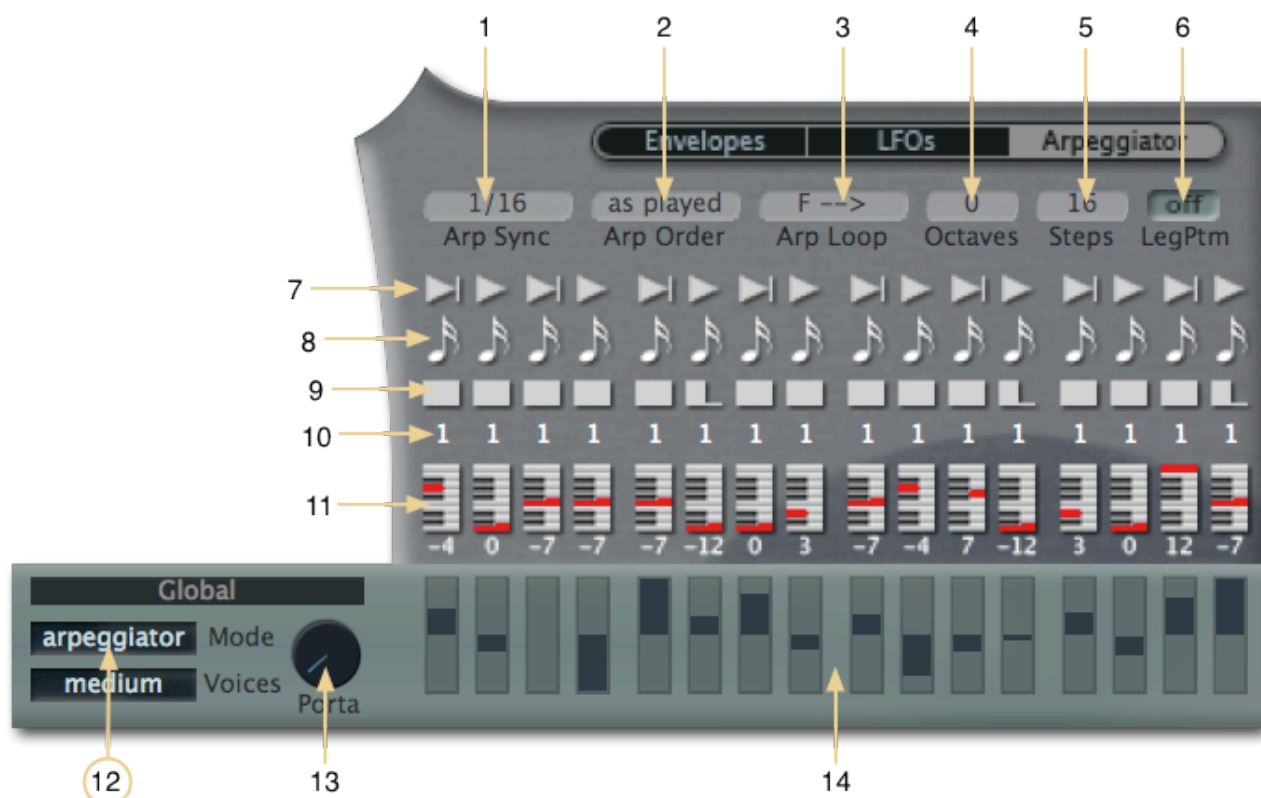
To activate the arpeggiator, switch the global *Mode* selector in the lower bar to *arpeggiator* **(12)**.

- The *Arp Sync* selector **(1)** specifies the duration of the default 'semiquaver' step, which can then be multiplied (up to 4 times) for each step by clicking on 'note' icons **(8)**.

- The *Arp order* selector **(2)** affects how played notes are ordered within a **note buffer** (which is then played back in the direction specified by the *Arp Loop* parameter – see below).
  *by note ......*notes in the buffer are sorted from lowest note to highest note
  *as played...*no sorting i.e. the original order is retained

- Whatever the *Arp order* setting, the position within the note buffer can be modified at each step by clicking on the upper row of icons **(7)**. The options are:

SYMBOL	TEXT	ACTION
>	*next*	jump to the next note in the buffer – this is the normal setting
||	*same*	repeat the previous note in the buffer
|<	*first*	jump to the first note played
>|	*last*	jump to the last note played

  Tip: Set all steps to 'last' for typical 'monophonic' arpeggios.

- The *Arp loop* selector **(3)** determines the direction of playback from the note buffer:
  F -->   forwards
  B -->   backwards
  FB <->   forwards then backwards
  BF >-<   backwards then forwards

  Note: don't expect this function to reverse the direction of playback through steps!

- The *Octaves* selector **(4)** specifies how often the octave is shifted upwards during playback (0, 1 or 2). The *Steps* selector **(5)** sets the number of steps (1 to 16) the arpeggiator will play before jumping back to the beginning.

- When the *LegPtm* (legato portamento) switch **(6)** is on, portamento will only be applied to legato notes (*gate length* = 5, see below). Adjust the *Porta* knob **(13)** to set the portamento rate.

- As arpeggiators automatically play and release notes, *gate lengths* need to be defined per step – the job of the centre row of icons **(9)**:

    0, 1 ,2, 3, 4   from very short to almost the value of *ArpSync*
    5 (arrow)   legato i.e. connected to the next step (see also *LegPtm* above)

    The step following a '5' will not be retriggered unless it uses more than one voice.

- Up to 6 notes can be triggered per step **(10)**.

- Pitches may already be jumping about, but on top of all this movement, individual steps can be transposed +/-12 semitones using the small 'keyboard' buttons **(11)**. Unpredictable as is may appear at first, with practice you can create some very clever patterns.

- The right half of the lower bar is a row of bipolar sliders **(14)** that resemble Filterscape's pair of step sequencers. This can be used to modulate any available target (e.g. filter cutoff or an EQ band's frequency) in step with the arpeggiator. The modulation source is called *ArpModulator*.

FilterscapeQ6

The **dynamic EQ** specialist of the family, Q6 is essentially a simplified version of Filterscape, but with two extra EQ bands (low shelving and high shelving filters):

4 frequency-dependent envelope followers, 6-band morphing EQ.

Envelope Followers

The *EF* switch **(1)** turns the envelope follower on / off. The Input level meter **(7)** shows the signal amplitude on the input, and the *Attn* (attenuation) knob **(3)** controls the signal input gain. The overall output level is controlled by the knob **(11)** to the left of the graphic editor.

If *Env Mode* **(2)** is activated, the envelope follower works as a triggered Attack-Hold-Release type envelope instead. Whenever the input level crosses the threshold **(8)**, the AHR envelope will be triggered. The envelope is sustained ('hold') until the input level falls below the threshold.

Th (threshold) **(8)** sets the level at which the envelope follower becomes active. It may look more like a level display, but is actually a slider control.

The *Lv* (level) display **(9)** shows the modulation signal's output in realtime. Tip: Adjust the other parameters to ensure maximum movement here.

The *Filter* selector **(10)** can be set to lowpass, bandpass or highpass. Specifying a narrow range of frequencies makes it possible to trigger the envelope followers from different parts of the same signal. In Q6, the analysis frequencies are adjusted using the sliders **(12)**, whereby the upper slider belongs to envelope follower 1, the second slider to envelope follower 2 etc..

The *Attack* **(5)** and *Release* **(6)** knobs adjust the rate at which the envelope will follow the input signal (the range of both parameters is 1ms to 650ms). The *Smooth* knob **(4)** adds inertia to the analyzer stage, making it more sluggish – which can be very handy for overly dynamic material!

The *Gain Scale* knob **(13)** to the right of the graphic editor adjusts the EQ 'strength' between -100% and +100%. Use this parameter to seamlessly fade the EQ in and out, or completely invert the curve by setting it to -100%.

Equalizer (EQ)

The EQ in FilterscapeQ6 is a 6-band affair with a low shelf, four parametric bands and a high shelf. Like in Filterscape and Filterscape VA, you have eight snapshots that can be modulated via MIDI controllers or the envelopes. As it is all about dynamics, FilterscapeQ6 has no LFOs.

For in-depth descriptions of all these elements, please refer to the section about Filterscape's EQ.

EQ

This panel contains basic settings for the selected snapshot. It shows the gain, frequency and Q of each band, as well as the snapshot dial and its modulation controls. Please refer to the equalizer section in the *Filterscape* documentation.

Mod global

This panel is used for globally modulating the EQ. Please refer to the equalizer section in the *Filterscape* documentation, specifically mod global.

Mod snapshot

This panel is used for modulating the EQ for each snapshot individually. Please refer to the equalizer section in the *Filterscape* documentation, specifically mod snapshot.

The End