



# ZEBRAHZ

AND

# THE DARK ZEBRA



VERSION 2.9.4

18. SEP 2024

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# Introduction

Just a few sections of the main Zebra2 user guide are missing in this version: There is no 'Quick Start Tutorial', as it is assumed that you already know the absolute basics. Neither the Zebrify nor the Zrev chapters are repeated here, as there are no special versions of those effects for ZebraHZ. However, all important reference information is included, so you shouldn't have to refer to the regular Zebra2 user guide very often, if at all.

## The Dark Zebra

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The Dark Zebra is a bank of 400 presets, a collaboration between Hollywood composer Hans Zimmer and u-he's own Howard Scarr. Practically all Zebra sounds used in the movies *The Dark Knight* and *The Dark Knight Rises* are included, plus a few extras that were made at the same time but didn't quite fit in the scores.

### New in version 2.9...

All presets now include XY pad control and are NKS compatible. Especially the 'simpler' presets benefit greatly from the extra controls.

## ZebraHZ

---

ZebraHZ is Hans Zimmer's custom version of Zebra2. Many of the following extensions are required by The Dark Zebra:

- 8 extra filters (4 x highpass and 4 x lowpass) based on Diva models
- 4 comb filter modules instead of 2
- 8 MSEGs instead of 4
- 24 modulation matrix slots instead of 12
- X/Y pads also appear as regular modulation sources
- 4 polyphonic compressors, one for each lane of the main grid
- 3 Polymoog™-style resonators with additional full-range band

Note: For even more powerful physical modelling capabilities, version 2.9 has twice as many comb filters as version 2.8, and three Resonators instead of just one.

## Online resources

For downloads, news and support, go to our [website](#)

For heated debates about u-he products, go to our [forum](#)

For friendship and informal news updates, go to our [facebook page](#)

For u-he presets (paid or free), go to our [patch library](#) (PatchLib)

For video tutorials and more, go to our [youtube channel](#)

For personal pics and a few videos, go to our [instagram page](#)

For audio demos of soundsets, go to our [soundcloud](#)

## Installation

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Double-click the installer (Mac or PC) and follow instructions.

**Important:** If you are updating an existing ZebraHZ installation, please either use the same paths as the original and select the **same set of plug-in formats**, or remove the old version before installing the new one. To avoid crashes or other “strange behaviour” while loading presets, please do not mix old and new versions.

**Serial Number:** ZebraHZ uses the same serial number as Zebra2. Load ZebraHZ, right-click on the data display then select *enter serial number*. If you can’t find your Zebra serial number, go to [u-he.com/my-licenses/](http://u-he.com/my-licenses/) and follow the “request” instructions.

## Default Paths

### macOS

Presets (local) *MacHD/Library/Audio/Presets/u-he/ZebraHZ/*  
 Presets (user) *MacHD/Users/\*YOU\*/Library/Audio/Presets/u-he/ZebraHZ/*  
 Preferences *MacHD/Users/\*YOU\*/Library/AppSupport/u-he/com.u-he.ZebraHZ...*  
 MSEG/OSC *MacHD/Library/Application Support/u-he/ZebraHZ/Modules/*  
 Microtuning *MacHD/Library/Application Support/u-he/Tunefiles/*

### Windows

Presets (local) *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\Presets\ZebraHZ\*  
 Presets (user) *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\UserPresets\ZebraHZ\*  
 Preferences *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\Support\ (\*.txt files)*  
 MSEG/OSC *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\Modules\*  
 Microtuning *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\Tunefiles\*

## Support

- ZebraHZ supports AU, VST2 / VST3 and AAX. You can run Zebra2 and ZebraHZ in parallel, as they are now separate plug-ins.
- ZebraHZ and Zebra2 both require a serial number issued after mid-2009. If your Zebra2 serial is older, go to [u-he support](http://u-he support) and request a new one. If your email address has changed since then, please let us know. If you can’t remember when you purchased Zebra2, please retrieve your original serial number before installing ZebraHZ. If you start Zebra2 with an obsolete code, it will ask you to contact [support@u-he.com](mailto:support@u-he.com) so we can send you a new one. No worries, you really can’t break anything!

## Updates

As a combination of soundset and plug-in, The Dark Zebra cannot be directly downloaded from its product page. In general, u-he soundset updates can only be downloaded after you have requested a license email: If you ever need an update, go to the [My Licenses](http://My Licenses) page at u-he.com and enter the e-mail address you originally used to purchase The Dark Zebra. Our system will reply with an e-mail containing all your u-he plug-in serial numbers (including the one for Zebra2) plus temporary download links for any u-he soundsets you currently own, including the latest **Dark Zebra / ZebraHZ** installer.

## Terms of Use

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1. Before using this soundset, you must have purchased a legitimate license for **Zebra2** as well as for **The Dark Zebra** soundset.
2. The Dark Zebra may not be distributed without the written consent of the copyright holder, Heckmann Audio GmbH.
3. You may not distribute resampled or otherwise replicated parts of **The Dark Zebra** in any product, commercial, free or otherwise. This includes, but is not limited to, sample libraries and sample-based synthesizers. You may, however, create such derivatives for your own musical works as long as these derivatives are only distributed in the context of the musical work.
4. **The Dark Zebra / ZebraHZ** can only be resold together with your **Zebra2** license.

Heckmann Audio GmbH, Berlin

[Imprint / Impressum](#)

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Special thanks Brian Rzycki for maintaining [PatchLib](#).

# User Interface

## Basic Operation

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Although operating ZebraHZ is fairly intuitive, there are a few points worth mentioning...

### Standard controls

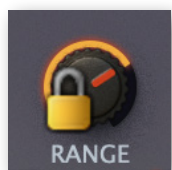
Values are adjusted via click-and-drag, with fine control by holding down a SHIFT key. The knobs are either **bipolar** like *Pan* in this image, or **unipolar** like *Volume*.

Double-click resets a knob to its default value. If your mouse has a scroll wheel, hover over any control then roll the wheel. For finer control, hold SHIFT.

### Assignable controls

Most of Zebra's modules include freely assignable controls that directly modulate important parameters. Select a source by clicking the label (or the knob if unassigned).

### Parameter locking



Right-click on a control and select 'Lock'. The lock only prevents the value from changing **when you switch presets**, it does not prevent you from adjusting the value directly. To unlock, right-click again and untick 'Locked' in the menu. Example: Lock both Microtuning options to audition various presets, all with the same non-standard tuning.

Note: Right-clicking a knob also lets you assign XY control – a quick alternative to the more flexible method described in the section about [programming the XY pads](#).

### Switches and the mouse wheel

Most of the rectangular buttons open drop-down menus. However, most of them will also react to the mouse wheel – which is particularly useful in the ARP CTRL panel.

If your mouse wheel is rastered i.e. it has noticeable 'ticks', you should check that the *Mouse Wheel Raster* preference is switched **on** (see [Preferences](#)). This ensures that each tick will correspond to a sensible step, usually an integer.

### Key Control



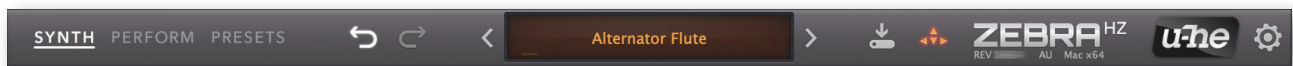
Experimental feature, work in progress! For various reasons we recommend using a numeric keypad a.k.a. **numpad**. You will find this button in the upper bar. Activate, then either click on any knob or navigate using the cursor keys. Type a value and confirm via Return or Enter. For negative values, type minus (-) at any time before confirming.

Hit backspace to recall the default. Increment / decrement integer values via (+) and (-) on the numpad; Hold shift for fine control, or option (Mac) / ctrl (Win) key for steps of 10. The system copy/paste and undo/redo shortcuts should work as expected.

Video and discussion: <https://www.kvraudio.com/forum/viewtopic.php?t=611856>.



## Upper Bar



### SYNTH, PERFORM, PRESETS

The buttons on the left select the 3 main windows.

### DATA DISPLAY

The central display has three main jobs: Firstly, it shows the preset name. You can step through the presets by clicking on the triangles to the left and right. Clicking on the name opens a list of all presets in the current directory – a convenient way to load a preset without having to open the PRESETS window. Since version 2.9.1 you can even load a preset by dragging it from your desktop (or any system window) onto the data display.

Secondly, it shows the value of the parameter being edited. Watch the display whenever you need to set specific values. After about 2 seconds, it reverts to the preset name.

Thirdly, right-clicking on the display toggles between compatibility mode 2.3 (a faint '2.3' appears on the right) and the regular 2.5+. While editing 2.3 presets, remember that this mode does not support some more recent features and improvements. Also, the sound can change when you switch from 2.3 to 2.5, mainly due to the improved [XME](#) module.

A small indicator at the bottom left lights up whenever **MIDI data** is being received.

### INITIALIZE (*init*)

At the top of the context menu (right-click on the display) is a simple template called *init* you can load whenever you want to program from scratch. The main grid contains an oscillator and the effects grid has an inactive Chorus/Phaser (ModFX1).

**UNDO / REDO:** The curved arrows to the right of the data display can be used to fix recent 'mistakes'. The number of steps in the undo buffer is limited to 30, but as you can undo a change of preset, switching presets before saving doesn't mean losing any work.

### SAVE



Stores the preset into the currently selected folder or the 'User' folder, depending on the [Save Presets To](#) setting. To select a different folder, click on PRESETS and navigate in the directory. Click on [SAVE], give your creation a name and any details you would like to appear in the [PRESET INFO](#). Please avoid using the following characters: \ / ? % \* : " > < =

Right-clicking on [SAVE] opens a menu with a choice of file formats. The recommended *h2p* option is our normal cross-platform format (editable text), while *h2p extended* includes extra readable information. The *native* option is the standard format of your system (.fxp for VST and AAX, .aupreset for Audio Units). If you have loaded the VST2 version you will also see the option *nksf*. See the [NKS](#) chapter towards the end of this document.

**Key Control:** See previous page.

### BADGE



Clicking on the **u-he** badge opens a popup menu containing links to this user guide, to the documents folder, to our company homepage, to our KVR support forum as well as to our presence in various social networks.

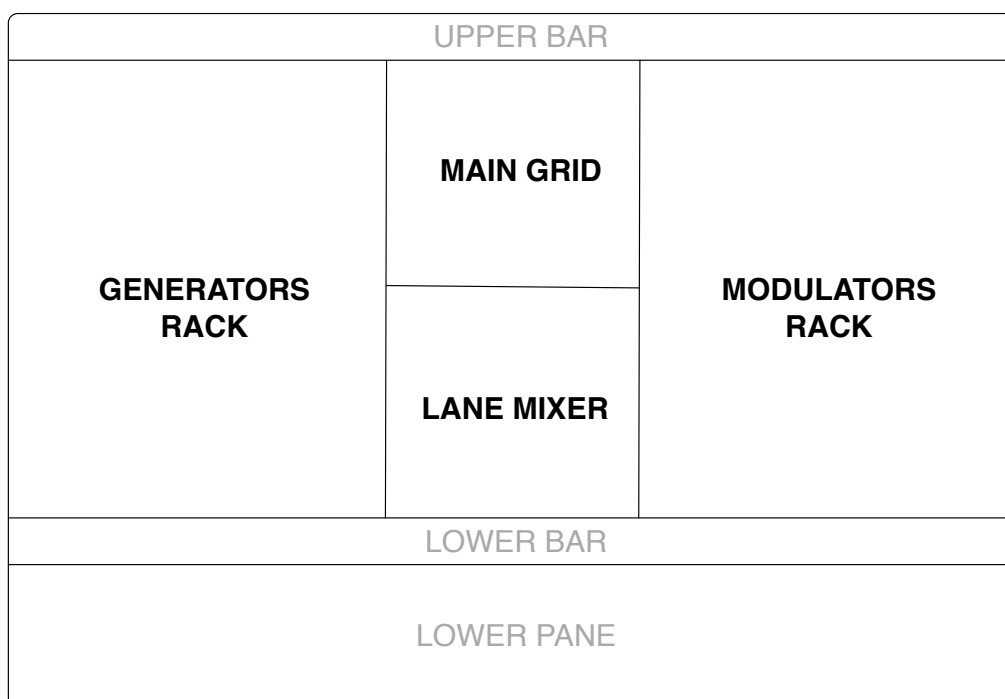
## GUI size

Right-clicking anywhere in the background of the control bar or lower pane opens a menu with options for **GUI sizes** (as percentages and as width x height in pixels). Sizes larger than the current screen will appear disabled (greyed-out).

A more permanent GUI size setting is available in the [Preferences](#).

## Synthesis Window

Click on the **SYNTH** button in the upper bar...



*areas of the SYNTH window*

### Generators rack

The area to the left contains control panels for each active module in the main grid (see the next page).

### Modulators rack

The area to the right contains panels for all control signals (envelopes, LFOs etc.) currently in use. Modulators automatically appear as soon as they are used anywhere.

If the rack isn't tall enough to show all active panels, a scroll bar will appear. Right-click in an empty area of each rack to choose **auto scroll** – the rack scrolls (if necessary) to reveal the panel belonging to the module selected in the grid, or **selected on top** – the module selected in the grid moves to the top of the rack.

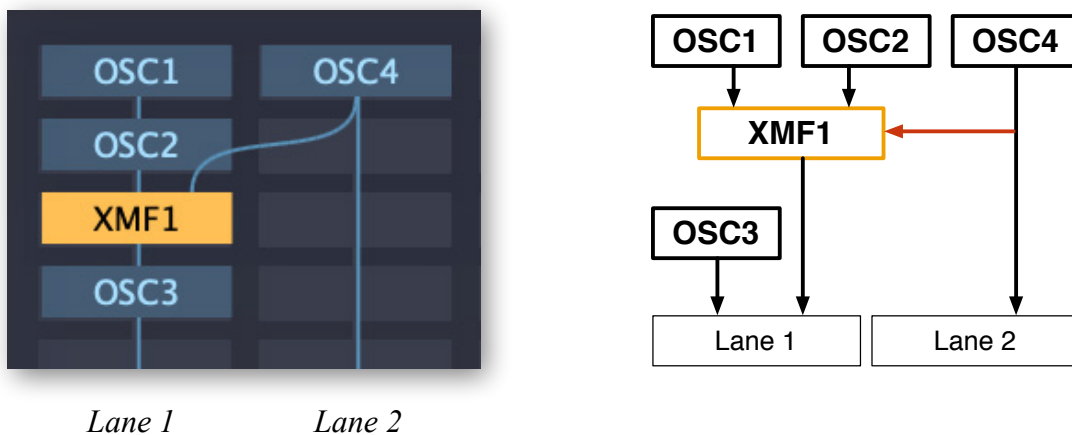
Note that the order of panels in the generators rack will seldom reflect the patch structure as it is defined in the grid. However, you can swap the positions of adjacent panels by clicking in the narrow space between them.

## Main grid

The center of the Synthesis window is a grid consisting of four vertical **lanes**. This area is used for connecting generators together, whereby the signal flow is **top to bottom**.

To add a module, click on an empty cell and select from the list. Drag modules around the grid, deactivate via **double-click** (or Mac: **cmd+click**, Win: **alt+click**), specify input routing or remove the module via right-click. Clicking on a module will highlight the corresponding control panel in the generators pane.

**IMPORTANT:** Oscillators and noise generators (as well as FMOs in certain modes) do not process audio, so when placed on top of one another in the same lane, the signals are simply mixed together.



In the above example, both OSC1 and OSC2 flow into XMF1 (cross mod filter). The XMF1 output is then mixed with (**not** processed by!) OSC3, and the mixture flows down lane 1. OSC4 flows down lane 2 as well as modulating XMF1 cutoff (the red arrow).

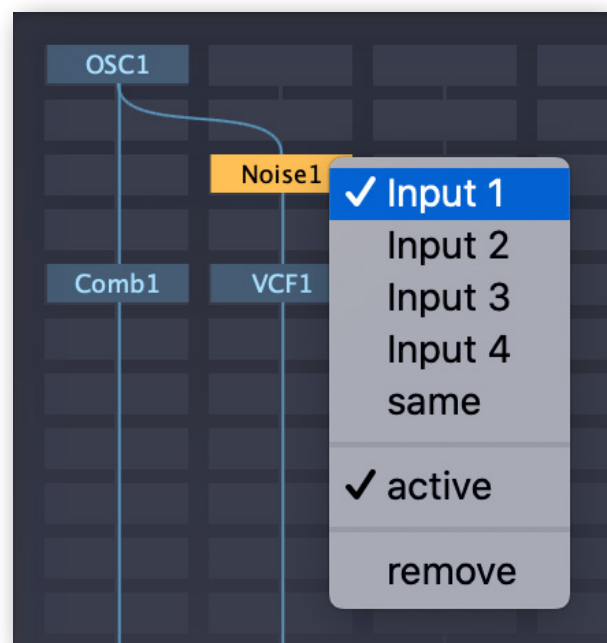
### Routing between lanes

Any module can route signals between the lanes. Right-click on a module to select the source ('Input') lane.

In this example, OSC1 is processed by the Comb module in lane 1. Both OSC1 and Noise1 are filtered by VCF1 in lane 2.

Note that the vertical position can matter when routing between lanes: If Noise1 is moved to where VCF1 is now, it will take its input from Comb1 instead.

*Note: For the sake of simplicity and brevity, the names of modules as they appear in the grid, which often differ from the panel titles, are used throughout this manual.*



## Lane Mixer

Below the main grid is what looks like a 4-channel mixer. This is where you adjust the pans/volumes and select envelopes as well as route signals to the [FX grid](#).



### MUTE

A handy mute button for each lane. In the image above, lane 2 is muted.

### FX Bus Select

Selects an output for each lane:

*main*.....route to the lefthand lane of the FX grid (MASTER)

*bus1*.....route to the center lane of the FX grid (R1)

*bus2*.....route to the righthand lane of the FX grid (R2)

### PAN / MOD

Pan position knob plus assignable modulation knob. Right-click on a PAN knob to toggle between *Pan* and *Bal* (balance) modes. Remember that **balancing** to the left means fading out the righthand channel of your stereo signal, while **panning** to the left means moving it over to the left.

### Amp Envelope

Selects an envelope for each lane's amplifier.

*Gate*.....a simple on/off envelope, but with enough release to avoid clicks

*Env(n)*.....envelopes 1 to 4

### VOL / MOD

Lane volume knob and assignable modulation knob. Modulation here *scales* the volume from 0% through 100% (centre) to 200%. In the example above, the modulation wheel fades lane 1 down to silence, irrespective of the VOL value (which is about 70 here).

Note: If you want a unipolar modulation source to fade a lane in from zero it's best to use the modulation matrix instead.

## Lane Compressors

Each lane in the [main grid](#) has its own **polyphonic** (per voice) compressor. All controls appear in the lower area, like the [Diva VCF](#) modules.

Click **COMP1-4** in the lower bar...



### On/Off

To save CPU, lane compressors can be switched off.

### GR

Gain reduction indicator

### Mode (the vertical 3-way switch)

ECO .....original lo-fi version, with low CPU-hit.

SMOOTH.....smooth compression, the best choice for most situations.

STRONG .....very powerful compression, best for bold percussive sounds.

### ATTACK

The time it takes for the compressor to fully work after the threshold has been reached. Attack can affect the brightness: very fast values cause the compressor to reduce gain immediately, which can dull the attack of the original sound. When ATTACK is set to zero, it is only one sample long.

### RELEASE

This adjusts the recovery time i.e. the time the compressor takes to return to unity gain after the input signal has fallen below the threshold. Very short release can distort low-frequency input, overly long release can 'clamp' the sound down and not release enough before the next 'attack' arrives. When RELEASE is set to zero, the release is only one sample long.

### INPUT

The input level before the signal reaches the compressor.

### THRESHOLD

The level above which compression is applied and below which it is released. Lower THRESHOLD values result in more compression than higher values.

### COMP

The amount of compression – think of this as a dry / wet crossfade.

### OUTPUT

Compensates for any loss or gain resulting from the compression.

## Performance Window

Click on the **PERFORM** button in the upper bar to open the *Performance Window*. The four X/Y pads can simultaneously control up to 16 parameters each...



*Performance window, with a different 'XY' panel selected below*

- Click to jump to a new position – find different variations of the sound
- Click and drag to move smoothly – for realtime morphing
- Double-click to reset to the center

Next to each pad is a large field where you can add a functional description (double-click).

Note: [NKS](#) hardware owners might generally prefer to use the 8 knobs instead of the pads, as the X and Y dimensions are independent. The Dark Zebra presets, however, are geared towards 2D control.



Clicking on the [+≡] icon at the top right of each pad toggles between the the pad and a list of X/Y assignments. You can also make assignments here without having to open the XY panel in the lower area. Drag & drop assignment also works (as in the above image), but as the generator and modulation racks are not currently visible, this is mainly useful for assigning XY to the lane mixer and effect parameters.

For details, see the section about programming [XY Pads](#) in the PERFORMANCE chapter.

## Lower Bar and Lower Pane

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The lower bar switches the contents of the *lower pane*:



### **GLOBAL**

Output levels, the FX grid and FX panel, miscellaneous preset settings. [Go there](#)

### **OSC1 to OSC4**

Wave Editor, oscillator load/save, miscellaneous oscillator settings. [Go there](#)

### **FMO1-4**

Additional settings for all 4 FMOs in a single panel. [Go there](#)



### **MSEG1-8**

The 8 Multi-Stage Envelope Generators. [Go there](#)

### **XY1**

For programming the X/Y pads. [Go there](#)

### **ARP CTRL**

For programming the arpeggiator / sequencer. [Go there](#)

### **MM1-12 / MM13-24**

Two pages of modulation matrix slots (1 to 12 and 13 to 24). [Go there](#)

### **DIVA VCF**

The Diva filters. [Go there](#)

### **COMP1-4**

The 4 lane compressors. [Go there](#)



# Preset Browser

## Overview

You can load a preset in the current folder by clicking on the data display, or step through them by clicking on the arrow symbols either side of the data display...or even drag a preset file from a system window or your desktop and drop it onto the data display. But of course Zebra also has a powerful preset browser – click **PRESETS** in the upper bar:



### Layout

Folders are on the left, presets in the centre and information about the currently active preset on the right. If there is no PRESET INFO panel on the right, click on the [≡] button in the top righthand corner and tick *Show Preset Info*. The same menu also offers *Show Tags in Preset Info* – untick if you prefer not to see any tags there.

### Default, init

When ZebraH2 starts it checks whether *Local* contains a preset called *default*. If so, this is loaded instead of *Batcave Syncing Down*. If you want a simple template every time you start a new instance, right-click on the data display and select *init*. Then select the *Local* folder and save it under the name *default* (which does not appear in the browser). If a fresh instance doesn't load your new *default*, it probably landed in *User*, in which case you should change *Save Presets To* in the [Preferences](#) and repeat the above.

### PATCH FORMAT

At the bottom right of the browser you can specify the format in which your patches will be saved. The default is *.h2p* (recommended). To save in the plugin version's own format, select *native*. The *.h2p extended* format can include comments for each line.

### SAVE ONLY ACTIVE MODULES

Unused modules will not be saved with the preset. Activating this option causes newly created modules to adopt settings from previously loaded presets.



## BYPASS EFFECTS

Mirrors FX BYPASS in the GLOB/FX panel. Click to temporarily deactivate all effects in the grid. This switch is **truly global** – you won't hear any effects until you deactivate it!

## Directory Panel (folders)

### Local and User Folders

Dark Zebra patches are sorted into 9 folders, and there's an untagged 'best of' selection in the 'Local' root. At the bottom of 'Local' is the entire Zebra2 factory library. After selecting a preset you can step through the others using the cursor keys.

'Local' is meant primarily for factory content, so you should save all your own creations into the 'User' folder (see the *Save Presets To* [preference](#)).

### MIDI Programs

'Local' also contains a special folder called 'MIDI Programs'. When the first instance of ZebraHZ starts, all presets in that folder (up to 128) are loaded into memory so they can be selected via *MIDI Program Change* message. **Important:** To ensure a fixed order it is important to rename them e.g. '000 rest-of-name' to '127 rest-of-name'.

'MIDI Programs' can contain up to 127 sub-folders, switchable via *MIDI Bank Select* messages (CC#0). Send Bank Select first, then Program Change. 'MIDI Programs' itself is bank 0, while sub-folders are addressed in alphabetical order starting with bank 1. **Important:** The content of 'MIDI Programs' cannot be changed on the fly. Any changes there will only be updated when the host application is restarted.

### Smart Folders

These are not regular folders, but the results of querying a database of all presets. The content is therefore dynamic; it will change whenever the underlying data changes.

*Search History* is a list of past searches. To make them more permanent, right-click and select *Save Search...* To empty the list, right-click on 'Search History' and select *Clear*.

*Saved Searches* contains any 'Search History' entries that have been saved. To remove entries here, right-click and *Delete*. Items dragged from 'Saved Searches' and dropped into the 'Local' or 'User' root will create a folder containing real copies of all the listed presets. This is quite a powerful tool for reorganizing your presets, but requires care!

*Bank* smart folders reference metadata about preset origin – the version of the factory library or the name of the soundsset with which the preset was installed. See [Preset Info](#) a few pages down. You can create your own custom banks: Drag & drop one or more presets onto the 'Bank' folder then enter a suitable bank name into the dialogue box.

To remove Bank attributes from selected presets, either drag & drop them onto the 'no Bank' folder you will see at the bottom of the Bank list, or right-click on the Bank and select *Remove Presets from Bank*. Empty Banks will disappear. Presets according to origin, as also shown in PRESET INFO (3rd line down).

*Favourites:* 8 smart folders, one for each colour (1-8). See the [Presets context menu](#) a few pages down. Only one Favourite can be set per preset. Presets dropped onto one of the 'Favourites' folders will be marked as such. Favourite status can be removed from all presets of one particular colour / index by right-clicking on the 'Favourite' folder and selecting *Remove All Favourite (n) Marks*.

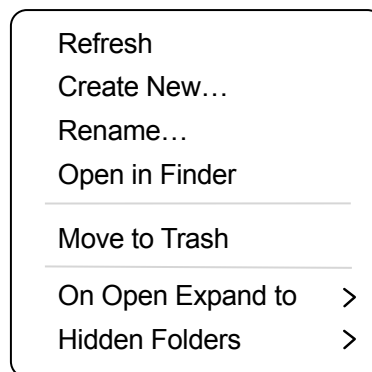
*Junk* shows all 'junked' presets (see [Presets context menu](#) below). Presets dropped on this folder will disappear from the browser unless you make them visible via *show Junk*. The context menu (right-click) includes a function which lets you clear the *Junk* status from all presets at once (*Remove Junk from Presets*).

*Tags* contains smart folders for each Categories, Features and Character tag. Presets dropped onto these folders will adopt the corresponding tag. Presets dropped onto the 'Untagged' folder will have **all** Categories, Features and Character tags removed.

*Author* contains a folder for each *author name* as defined when presets are saved. Presets dropped onto these folders will adopt the new name. Tip: Instead of signing each of your creations, you could sign just one of them, then select them all and drag onto 'Author/(You)'. As the process cannot be undone, use this feature with caution! See the section [Internal Drag & Drop](#) a few pages down.

### Directory context menu

Right-clicking on any folder within Local or User will open this menu:



*Refresh*: Updates the browser. Windows users might need to call this function whenever files have been moved, added, deleted or renamed in Explorer. Refresh is seldom necessary on the Mac.

*Create New...* Insert an fresh, empty subfolder.

*Rename...* Edit the folder name.

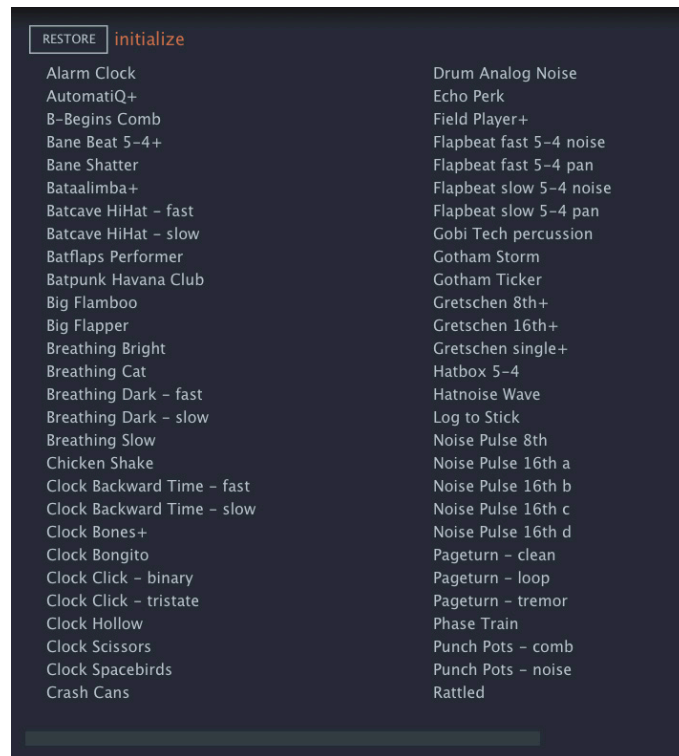
*Open in Finder / Explorer* opens a system window for the currently selected folder. If you hold down the option key (Mac) or ctrl key (Windows), this entry will change to *Show in Finder / Explorer* and the folder will be highlighted instead of opened.

*On Open Expand to*: Determines which nested directories will appear in the directory whenever the GUI is loaded. The first option (none) collapses all folders, while the final option (all levels) reveals all nested folders.

*Hidden Folders*: Select the smart folders you don't want to see.

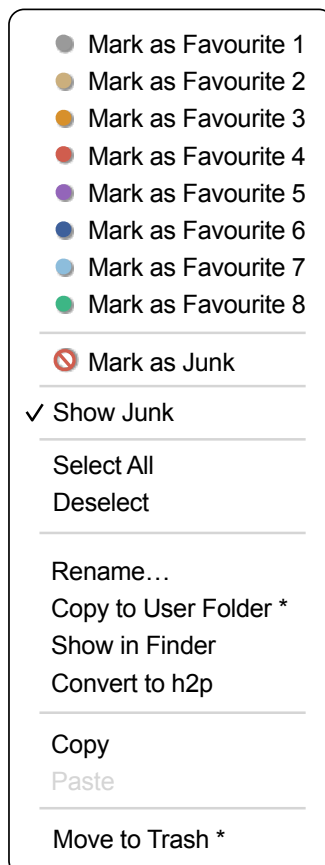
## Presets Panel (files)

The central area of the browser shows all presets in the current directory. Click to load.



### Presets context menu

Right-clicking on a preset opens a menu containing the following options:



*Mark as Favourite:* Choose one of eight ‘favourite’ marks. The selected entry will be replaced with *unmark as favourite*.

*Mark as Junk:* Instead of deleting presets you can mark them ‘Junk’ so they disappear from the browser. Activate *Show Junk* to display junked files and mark them with a STOP symbol.

*Show Junk:* Junk appears, but is marked with a STOP symbol.

*Select All, Deselect:* See ‘Multiple Selection’ below.

*Rename:* Rename the most recently selected preset.

*Copy to User Folder / Duplicate:* The entry here depends on the status of the *Save Presets To [preference](#)* as well as on the location of the source preset(s) i.e. whether they are in the Local or the User folder. Selected presets are copied with a number appended to the name, which increments (just like the *Auto Versioning* option) so that no preset can be overwritten by mistake.

*Show in Finder / Explorer:* Opens a system window for the right-clicked file. In smart folders only, holding down an option (Mac) or ctrl key (Windows) replaces this entry with *Show in Browser*, which shows the selected file in its original location.

*Convert to native / h2p / h2p extended / nksf:* Selected presets are converted to the format specified in the [SAVE] button context menu or in the PATCH FORMAT field.

*Copy/Paste:* Clipboard functions. Individual or multiple presets can be copied then pasted elsewhere, even between the browser and system windows (Finder, Explorer).

*Move to Trash / Recycle Bin:* Send selected presets to the system ‘trash’.

## RESTORE

At the top left of the Presets panel is a [RESTORE] button which lets you audition presets to your heart’s content without losing track of the one that was loaded before you opened the browser: Clicking on [RESTORE] navigates to that preset and reloads it.

## Scan / Ready

Progress indicator for *Refresh* (see *Directory context menu* above). It is best not to close the plug-in (or the host) while a scan is in progress.

## Multiple selection

A block of adjacent presets can be selected via shift+click, and individual presets can be added to the selection via cmd-click (Mac) / alt+click (Win). Presets can be moved to a different folder via drag & drop (see the next paragraph). To deselect, either click on an unselected preset or choose *Deselect* from the context menu.

## Drag & Drop

### Internal

You can drag and drop single or multiple files from the preset panel onto any folders in the directory panel. Files dragged onto regular folders will be moved unless you hold down *option* (Mac) or *ctrl* (Windows), in which case they will be copied instead. Files dropped onto smart folders will adopt the attribute of that folder: For instance, you can set e.g. the Author or Favourite status of several presets at once.

### External

To manage your preset library more comfortably you can drag presets and folders between ZebraHZ's browser and your desktop (or any system window).

On the Mac most Finder operations will automatically update the browser. Updating might not be immediate when using multiple formats or multiple host applications, but all it usually takes is a click on the GUI or in the directory tree (which sets the focus to the clicked instance of Zebra).

On Windows systems, a manual *Refresh* (see [Directory Context Menu](#)) will be required before changes to the contents of the browser appear.

### Exporting smart folders

Drag a smart folder onto e.g. your desktop to create a folder containing those presets. For instance, an entry in the Search History, one of the Favourites, the 'Drums' category (includes sub-folders), all presets with the 'Duo' feature, or an Author...

### Exporting favourite / Junk status

You can export Favourites, either all at once or individually. Shift+click and drag the 'Favourites' folder onto the desktop to create a file called *Favourites.uhe-fav*. Similar for sub-folders: If you shift+click and drag e.g. 'Favourites 5', this will create a file called *Favourite 5.uhe-fav*. Such files can be imported into Zebra's browser on a different computer (for instance), via drag & drop onto or anywhere within the Favourites folder.

Note: Importing *.uhe-fav* files from another computer will only work 100% correctly if all preset names and locations are identical on both computers!

### Note for Windows users

According to Microsoft, drag & drop will only work between applications with the same rights (i.e. both admin or both normal) for security reasons. If the host was started using the "run as admin" option, drag & drop functionality will be limited: You can still drag objects between plug-ins, or from the plugin into system windows e.g. your desktop. However, attempts to drag & drop anything into the plug-in from outside the host will fail. This applies to presets, folders, favourites, *.uhe-soundset* files or indeed anything that can be dropped onto the plug-in GUI.

## Preset Info Panel

The panel to the right shows information about the selected preset. If you can't see this panel, click on the triple bar [≡] button in the top right corner and tick *Show Preset Info*:

- ✓ Show Preset Info
  - ✓ Show Tags in Preset Info

Below the preset name you should see its path (from /Local or /User), the Bank and the Author. DESCRIPTION and USAGE text is entered immediately before saving a preset. CATEGORIES, FEATURES and CHARACTER are the tags for the currently selected preset. You can remove or add tags directly here (see [Tagging via Preset Info](#) below)...

## Installing More Soundsets

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All Zebra2 soundsets we distribute ourselves now have the extension *.uhe-soundset*, and third parties are encouraged to use this format for their own commercial soundsets.

Note: You can install any Zebra2 soundset in ZebraHZ.

### Standard Method

To install, simply drag & drop the *.uhe-soundset* file into ZebraHZ – anywhere will do. The soundset folder will appear within the 'User' folder. If a folder with the same name already exists there, the older versions of any modified files will be backed up and the location of the backup will be displayed.

### Alternative Method

Soundsets in *.uhe-soundset* format can also be installed by clicking on the u-he badge, selecting *Install Soundset...* and navigating to the desired file.

### Regular Folders

Folders containing ZebraHZ presets can be manually copied or moved into the 'User' folder. You might have to refresh the browser (see [Directory context menu](#)) before they appear there. A refresh is generally necessary in Windows but not in macOS.

As *.uhe-soundset* files are basically ZIP-compressed folders, you can rename them i.e. replace the long file extension with 'zip', then extract the presets and documentation.

## Preset Tagging

Tags are elements of metadata, information that you can add to presets so that they can be found more easily.

Tags are updated automatically – clicking on the [SAVE] button isn't required! The main advantage is that presets don't have to be saved every time you edit a tag. The main caveat is that you should only edit tags after saving your preset.

For instance, if you decide to edit tags while creating a 2nd version of an existing one, please remember that you are actually changing the tags in the original preset!

## The Tagging Window

Right-click on the [SAVE] button and select *Tag this Patch*:

### CATEGORY

Bass	Acoustic
Pads	Analogue
Leads	Digital
Keys	Dist+LoFi
FX	E-Bass
Drums	FX Bass
Seq+Arp	Plucks
Other	Rhythmic
	Sub
	Sync
	Synth
	Vocal

### FEATURES

Mono	Dry
Poly	Modulated
Duo	Percussive
Chord	Soft Attack
BPM	Slow Release
Comb	Glide
OscSync	
RingMod	
FM	

### CHARACTER

Bright	Dark
Constant	Moving
Clean	Dirty
Soft	Aggressive
Phat	Thin
Natural	Synthetic

CATEGORY describes a preset by analogy to instrument types or typical usage, and each has a more or less appropriate set of subcategories. FEATURES are technical classifications, and CHARACTER tags are pairs of opposites from which you can choose just one. When you are finished, click on the [CLOSE] button at the top right of the window.

## Tagging via Preset Info

In the PRESET INFO panel, right-click on CATEGORY, FEATURES or CHARACTER labels and select / unselect tags in the context menu. If you right-click on an individual tag, the first option in the menu becomes *Remove Tag...*

The function *Create Search from Tags* finds all presets with the exact same set of tags. Tip: This function can be used to locate differently named duplicates.

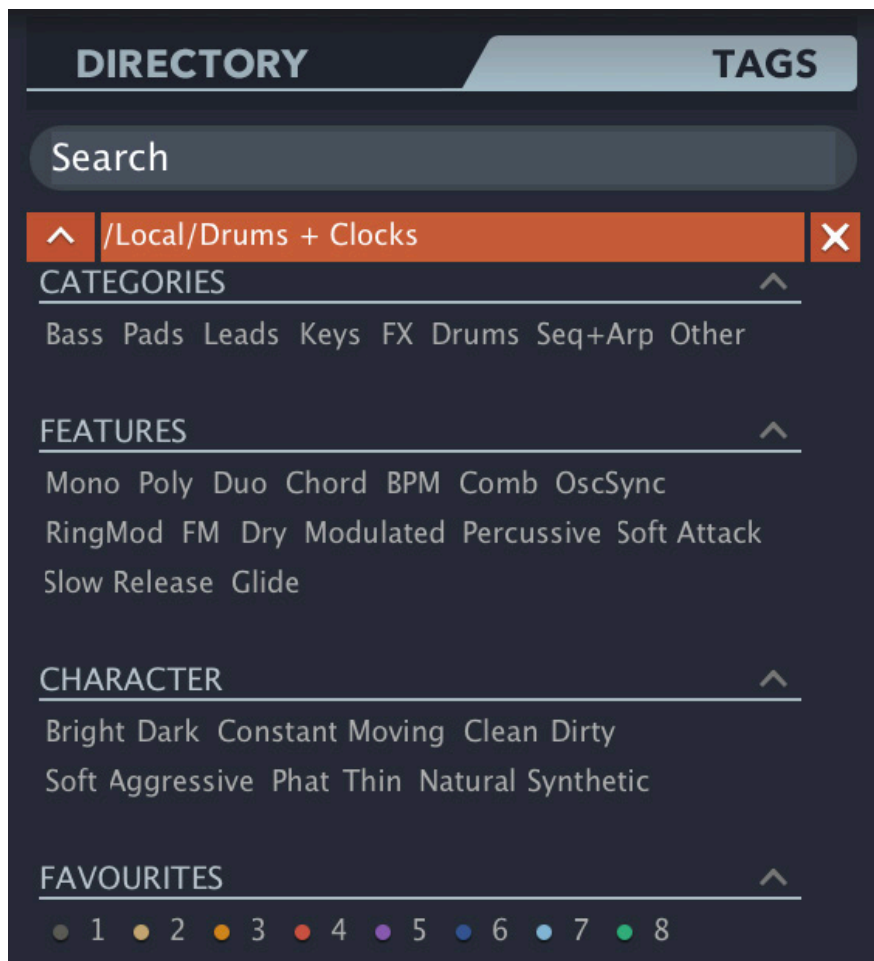
## Tagging via Smart Folder

You can tag presets by dragging them onto any of the *Tags* subfolders in the directory. To remove all tags from presets, drag and drop them onto the *[no Tags]* subfolder.



## Search by Tags

Click on the TAGS tab to open this view. The buttons here let you specify search criteria with just a few mouse clicks:



Below the Search field are 4 sets of buttons (CATEGORIES, FEATURES, CHARACTER and FAVOURITES). The first 3 correspond to the tags in the tagging window (see the previous page), while the bottom row lets you find presets you have marked as *Favourites*. Clicking on the [^] icon to the right of each heading hides the options for that set of tags.

### Categories and Subcategories

Here are a few bullet points to get you started. Especially for CATEGORY tags, following a step-by-step tutorial is much easier than studying a complete technical description.

Each category has its own set of subcategories. Not selecting a subcategory here means “show me presets tagged with **any** subcategory”.

You can select multiple categories without specifying a subcategory if you hold **cmd** (Mac) or **alt** (Windows) while clicking. The number of hits can increase dramatically!

Selecting a subcategory with the same name as the main category means “show me all presets in the category that do not have any subcategories defined”.

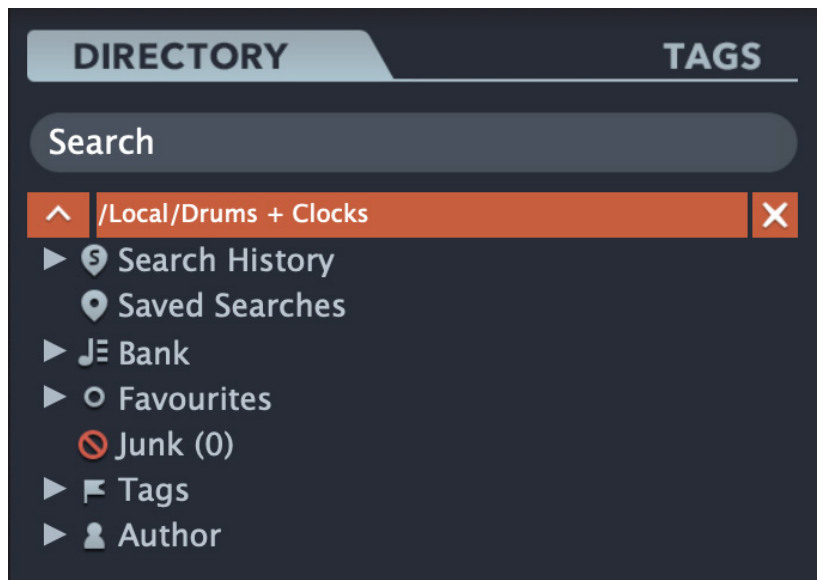
Complete category+subcategory tags appear below the subcategories as buttons so that you can add other main categories by simply clicking on them. Click the [X] to remove.

For a more detailed walkthrough, please refer to the standard Zebra2 user guide.



## Search by Text

The **Search** field lets you find presets according to a string of characters i.e. text. If you remember that the preset you're looking for has the word "*clock*" in either its name or its description, simply enter *clock* into the Search field and hit Return...



Search normally looks into the preset name, author, DESCRIPTION and USAGE (see the PRESET INFO panel). Searches are not case-sensitive and quotes are not required unless you want to include spaces between words.

If you want to restrict the search to a particular path e.g. *Local/Drums + Clocks*, double click on the *Drums + Clocks* folder. This path appears below the Search field instead of the preset folders. You will only see smart folders plus any subfolders within the specified path:

The [^] button to the left moves the search path up one level (in this case to */Local*). The [X] button to the right sets the search path to include all presets (i.e. *Local* and *User*), and the regular preset folders reappear.

Try it: Enter three or four letters then hit *Return*. For instance, *star* would find all files containing the text string *star* (e.g. *mustard* or *starters*). Entering "*star wars*" (with the quotes!) would find e.g. *Battlestar Warsaw* if such a preset existed.

## Syntax

### Scope

You can limit the search to just the preset name or parts of PRESET INFO by using *name*, *author*, *desc* (*description*) or *use* (*usage*) followed by a colon. For instance, *author:the* finds all presets by authors whose names include 'the'. Similarly, *desc:space* will find all presets with the word *space* in the description.

An alternative syntax lets you use ? (a single letter) and \* (any number of letters), but the scope *name*, *author*, *desc* or *use* must be specified, followed by '=', and logical operators are not allowed.

### Logic

The AND operator specifies that presets contain both words surrounding it. AND is implicit, but can be written explicitly if you prefer: For example, *star AND wars* (or simply *star wars*) will find presets that contain both *star* and *wars*.

OR only requires that presets contain one of the words surrounding it. For example, *star OR wars* will find presets that contain *star* as well as presets that contain *wars*. Or both.

NOT excludes presets containing the following word. To find all presets that contain *star* but do not contain *wars*, enter *star NOT wars*.

### Examples using regular syntax

<i>brass OR string</i>	'brass' or 'string' appear in the Name, Author, Description or Usage
<i>brass string</i>	both 'brass' AND 'string' appear somewhere in the preset
<i>use:vibrato</i>	'vibrato' appears in the Usage
<i>"at ="</i>	aftertouch usage is mentioned in the Author, Description or Usage field (Note: '=' is not a valid character for preset names)
<i>"hs s" ctrl #Mono</i>	All monophonic factory presets starting with an 's' that use at least one of the A / B performance controls

### Examples using alternative syntax

<i>desc=*trin*</i>	e.g. 'string' or 'Patrington' appear in the Description
<i>author=*ow?e</i>	would find "Howie", "That old Howie", but not "Howie S"

# Global Settings

To open this panel, click on the GLOB/FX tab in the lower bar.



*The global parameters*

## PITCH

### TRANSPOSE

Shifts incoming MIDI notes within a range of +/- 24 semitones.

### FINE TUNE

Shifts all oscillator and filter pitches by +/- 100 cents (relative to 100% keyfollow).

### - BEND +

Sets pitch bend ranges independently from 0 to +/- 48 semitones.

## GLIDE

### MODE

*time* .....The duration of the glide is constant, irrespective of the note interval.

*rate* .....The duration of the glide is proportional to the note interval.

### RANGE

Lower values shift the beginning of the slur closer to the target note.

### GLIDE, GLIDE 2

A smooth pitch transition between consecutive notes. Glide affects the Key Follow modulator, so it is applied to all modules that include this parameter (OSCs, FMOs, Combs, VCFs and XMFs). Glide2 is a bipolar offset for the even-numbered modules. The modulation source KeyFol2 is the same as KeyFol, but includes the Glide2 offset.

## VOICE

### MODE

Remember that here is where you activate the [arpeggiator](#)!

*poly*.....Normal polyphonic.

*retrigger*.....Monophonic – each new note triggers the envelopes.

*legato* .....Monophonic – envelopes are retriggered after spaces between notes.  
Allows for more interesting musical phrasing.

*arpeggiator* .....Polyphonic – triggers, pitches etc. are defined in the [ARP CTRL](#) panel.

*duophonic* .....Both low note AND high note priority. Odd-numbered OSC, FMO, Comb, VCF, D-VCF and XMF pitches and cutoffs follow the lowest note, while those of even-numbered modules follow the highest note.

### VOICES

You can reduce the maximum number of notes that Zebra2 will try to play at once:

*few* = 4 notes, *medium* = 8 notes, *many* = 16 notes. Due to intelligent voice allocation, these are all approximate values.

### SMOOTH ATTACKS

Instantaneous attack times can mean audible clicks at the start of each note. Switching this on removes all such clicks. Tip: If you do want clicks (consistent ones), leave this option off, activate RESET in the oscillator panel(s) and adjust PHASE/PW.

### VOICE DRIFT

This causes each new note to be slightly detuned, emulating the imprecise pitch of classic analogue oscillators. Switch off for more precision.

## MICROTUNING

ZebraHZ supports standard .TUN microtuning tables. Literally thousands of these are available online, and most of them are free. Click the **ON** button, then the selector (likely to be 'default scale') to open a floating directory where you can choose a table. Note: This window works like the main browser, including the drag & drop functionality.

Alternatively, right-click on the selector and choose a table from the current folder. Near the top of the same menu is *Show in Finder / Explorer*, which opens a system window for the location of microtuning files... you can put more .*tun* files in there.

### MTS-ESP

ZebraHZ supports [Oddsound](#) MTS-ESP, a system for microtuning multiple plug-ins within a DAW environment. The freeware 'Mini' version is all you need to get started.

Note: MTS-ESP can be overridden by activating Zebra's own microtuning, for instance with the .*tun* file *Default Scale*.

## SWING

In most synthesizers, 'swing' is only applied to the arpeggiator and/or mini-sequencer. In Zebra2 and ZebraHZ this parameter also affects synchronized LFOs.

### BASE / PERCENT

Click on the BASE selector, choose a bar division, then adjust the swing factor using the PERCENT knob. Note that the indicator will stop flashing if PERCENT is set to zero.

# Generators

## OSC main panel

In ZebraHZ, the oscillator module looks like this:



*Oscillator panel with the MIXER sub-panel selected*

The button next to the module label is for loading oscillator presets (see [Oscillator Preset](#)).

## Switches

### POLYWAVE

Selects single or multiple (2, 4 or 11) stacked oscillators. The *eleven* option here is much more than a “supersaw”, as stacking can be applied to any waveform.

### PWM

Adds an inverted copy of the waveform. Applied to a sawtooth, phase modulation (see PHASE below) creates an effect very similar to classic PWM, hence the name.

### SYNC

Activates oscillator-internal hard sync. See PHASE below.

### RESET

Causes the oscillator to start at the same phase position each time.

## Knobs

### WAVE

The position (index 1–16) within the waveset. Unlike the row of selectors below the wave editor, this knob lets you set intermediate values.

The knob below Wave is for wave index modulation (+/-16) – click on the label to select a source. How smoothly and precisely waves are interpolated depends on the oscillator’s [Resolution](#) setting (in the lower panel).

Note: The center of the waveset is actually 8.5, so a modulation amount of 7.5 from a bipolar source is enough to span the entire waveset. To reach Wave 16 from Wave 1 using a unipolar source (such as the mod wheel), set the amount to +15.

## TUNE

Oscillator pitch offset (+/- 48 semitones). You can hold down SHIFT for finer control, but there is also a Detune knob to the right. The knob beneath it is for Tune modulation (+/- 48 semitones). Click on the label to select a source, then turn up the amount.

## DETUNE

Detune has two different meanings, depending on the POLYWAVE setting: In *single* mode it is simply fine tuning (+/- 50 cents). In *dual*, *quad* or *eleven* modes it does not affect the overall pitch of the oscillator, but spreads the detuning equally between the multiple waves. Of course you can still fine tune the oscillator using SHIFT+Tune!

## VIBRATO

The amount of pitch modulation from LFO1, with a range of +/- 50 cent.

The oscillators may appear harmless, but there is a lot more here than meets the eye. Apart from extra parameters in the [lower panel](#), oscillators have 3 switchable sub-panels, *Phase/Sync*, *Osc FX* and *Mixer*, selected via the buttons at the top right...

## PHA/SNC (Phase/Sync)

Click on the left tab to reveal this panel:



### PHASE/PW

Adjusts the oscillator phase from 0° to 180° (but you can modulate it up to 360°). Rapid phase modulation normally affects pitch, but if the PWM switch (see above) is on, the effect is similar to **pulse width modulation**.

### SYNC

Pitch offset for the oscillator's integrated hard-sync. This classic 'analogue' sync adds a lot of upper harmonics.

## OSC FX

Click on the middle tab to reveal this panel:



The waveform can be subtly or radically altered by two **spectral effects** routed in series.

To select a spectral effect, click on the **label** of an upper knob. Adjust the value and/or modulate to taste using the assignable control. Here, the *Scrambler* effect is set to zero, but is modulated by the pitch bender.

Note: While modulated, the speed and smoothness of most spectral effects depend on the [Resolution](#) setting.

See the list of spectral effects on the **next page**.

## MIXER

Click on the right tab to reveal this panel:



### PAN

Panorama shifts the stereo position to the left or right.

### VOLUME

Oscillator output level.

### WIDTH

If POLYWAVE is *dual*, *quad* or *eleven*, this knob controls the stereo separation of the polywave. It has no effect if POLYWAVE is set to *single*.

## List of Spectral Effects

<i>Fundamental</i>	Adjusts the level of the fundamental. Range = -200% (inverted) to +200%. At the central position, the fundamental is inaudible.
<i>Odd for Even</i>	Even-numbered harmonics are cross-faded into odd harmonics. This results in a more 'squarish' waveform (square waves contain only odd harmonics). With negative values, the opposite applies – odd harmonics become even harmonics.
<i>Brilliance</i>	Boosts (positive) or attenuates (negative) higher harmonics, resulting in brighter or darker waveforms.
<i>Filter</i>	A combination of lowpass (negative values) and highpass (positive values) filters. Because in reality the 'filter' code only manipulates amplitudes, its slope is more than 100dB/octave.
<i>Bandworks</i>	A combined bandpass (positive) and notch filter (negative).
<i>Registerizer</i>	Boosts any octaves of the fundamental while attenuating all other harmonics, often resulting in an organ-like sound.
<i>Scrambler</i>	Similar to operator feedback in FM synthesizers: the phase of the waveform is modulated by the wave itself, creating many new overtones. If you need dirty-sounding digital oscillators, this is the one.
<i>Turbulence</i>	Periodically shuffles the harmonics at random. Even if it is not being modulated, the speed is dependent on the oscillator <a href="#">Resolution</a> . Useful in SpectroBlend mode with only a few harmonics.
<i>Expander</i>	Expands (or contracts when negative) the spectrum. Similar to brilliance if the harmonics are distributed evenly.
<i>Symmetry</i>	Contracts the waveform towards the beginning or end of its cycle. Often sounds like pulse width modulation – and for a square wave, that's precisely what it is!
<i>Phase Xfer</i>	A variant of PD (phase distortion). The original waveform is not output directly, but is used as the phase response of an extra sine wave – which you can hear when the value is zero.
<i>Phase Root</i>	The original wave multiplies the phase response of the sine wave.
<i>Trajector</i>	The original wave adds to the phase response of the sine wave. Like phase modulation in 'FM' synthesizers – try Trajector on a pure sine.
<i>Ripples</i>	Multiplies the waveform with a variable harmonic, resulting in quasi-resonant sounds.



<i>Formanzilla</i>	Multiplies the spectrum of the waveform with a variable harmonic, resulting in formant-like spectra with several strong peaks and troughs.
<i>Sync Mojo</i>	Simulates hard sync by contracting the time axis then writing the waveform back into wave memory.
<i>Fractalz</i>	Like Sync Mojo, except that the already contracted wave is contracted again etc.. This results in a fractal waveform with even more harmonics than Sync Mojo. Fractal structures can be found in nature.
<i>Exophase</i>	A classic 7-stage phaser is applied to the original wave. This effect is equally useful for static coloration or resonant sweeps.
<i>Scale</i>	The relative amplitudes of harmonics are scaled, either to the power of 2 (negative, softer) or 3 (positive, brighter). Results in finer resolution of quiet harmonics, so more precise control over the overtone structure.
<i>Scatter</i>	Similar to Scrambler (see above), but here the phase is modulated by itself squared (i.e. to the power of 2). An FM triangle or square from a pure sine, or absolute chaos from a sawtooth – Scatter is flexible.
<i>ChopLift</i>	Negative values raise an amplitude threshold below which all harmonics are faded out (Chop). Positive values raise the levels of fainter harmonics (Lift).
<i>HyperComb</i>	Adds 3 copies of the original wave to the wavetable. For positive values (only), the phases are randomly shifted, resulting in a subtle to dramatic effect similar to chorus. Even when not modulated, positive HyperComb is dependent on the value of oscillator <a href="#">Resolution</a> .
<i>PhaseDist</i>	Phase distortion, as in the '80s Casio CZ series of synthesizers. The wave acts as a function for the phase of an inverse cosine. The 'amount' knob crossfades between no effect and full effect, so the most dramatic uses of this effect involve modulating Wave index.
<i>Wrap</i>	Inverts parts of the wave that extend above or below a threshold. The limits for multiple wrapping are greater with negative values.
<i>DX</i>	Same as <i>Trajector</i> (see above), but approximately 10 times stronger.
<i>Smear</i>	Blurs the spectrum in one direction (negative = down, positive = up).

## OSC Lower Panel

Center-stage in the oscillator's lower panel is its [Wave Editor](#). On the far left is a sub-panel containing the following elements...



### OSC MODULE PRESET

Use this to load or save complete oscillators, including all settings. Left-click to select a preset from a floating window or right-click to open a menu containing *Copy/Paste*, *Save Oscillator(n) Settings* and *Show in Finder / Explorer*.

*Copy/Paste* can be used to transfer all settings of an oscillator to another oscillator, even in a different instance of ZebraHZ or Zebra2. *Show in Finder / Explorer* opens a system window for the oscillator presets (including any you saved here).

Note that all modulation assignments (e.g. Wave modulated by LFO2) ARE oscillator settings, while the settings in the modulation sources themselves are NOT. This means that an oscillator preset might not sound the same as when you saved it.

### WAVEFORM

Selects the basic mode for the current oscillator: *Geomorph*, *SpectroMorph*, *GeoBlend* or *SpectroBlend*. All will become clear in the next few pages...

### Renderer (unlabelled)

Oscillator 'sharpness', either *soft* or *crisp*. We recommend only switching to *crisp* if you really need those extra 'spikes' and are not too concerned about aliasing.

### NORM (normalization)

The output level of the generated wave is analyzed (RMS), then low-level waves are boosted so that the final level would be 0dB if Normalize were set to 100%.

High normalization values are fine for boosting most low-level waves, but please keep NORM low on very spiky waves.

**RES** (resolution)

Controls the time between successive waveform calculations, ensuring that Zebra2 is still very CPU-efficient compared with other synthesizers that calculate their waveforms in realtime. The range is from 4 seconds (at 1.00) to below one millisecond (at 9.00).

High values lead to more precise transitions at the cost of higher CPU load. Low resolution can actually make transitions smoother, as intermediates are smoothly interpolated, but can introduce other unwanted effects e.g. during rapid pitch-modulation. For most purposes, the default value of 5.00 is best.

**KEY S** (key scale)

MIDI note to oscillator pitch, centred around the note E2. A bipolar *KeyFol* (key follow) for the oscillators. for perfect semitones, set this to 100.00.

## Gain Scaling

To the right is a sub-panel containing graphic controls for scaling the oscillator gain...

**KEY SCALE / GAIN**

MIDI note to OSC gain scaling. It can be used to balance oscillator volumes across the keyboard or even create 'keyboard splits' between oscillators. The horizontal axis is MIDI note (8 octaves) and the vertical axis is oscillator gain, independent of Volume.

**VELOCITY SCALE**

Velocity to OSC gain scaling: The horizontal axis is MIDI velocity and the vertical axis is oscillator gain. Again, this feature is independent of the oscillator's Volume control. Can be used for velocity cross-fades or even 'velocity switching' between oscillators.

## OSC Wave Editor

The Wave Editor is where you can create your own waveforms. As the editor manages up to 16 waves per **Waveset**, it includes a **Wave Selector** bar below the editing area...

### Wave Selector



The wave selector has almost the same function as the Wave knob in the oscillator's main panel – if you adjust one, the other will move accordingly. Unlike the *Wave* knob, however, the selector doesn't let you set intermediate values (e.g. Wave = 1.5).

### Mouse operations in the Wave Selector

Some extra functions for multiple waves...

#### *Rearrange*

(Mac) opt + drag

(Win) ctrl + drag

#### *Morph or Blend*

(Mac) cmd + click on the desired target wave

(Win) alt + click on the desired target wave

#### *Duplicate*

(Mac) opt + cmd + click on the desired target wave

(Win) ctrl + alt + click on the desired target wave

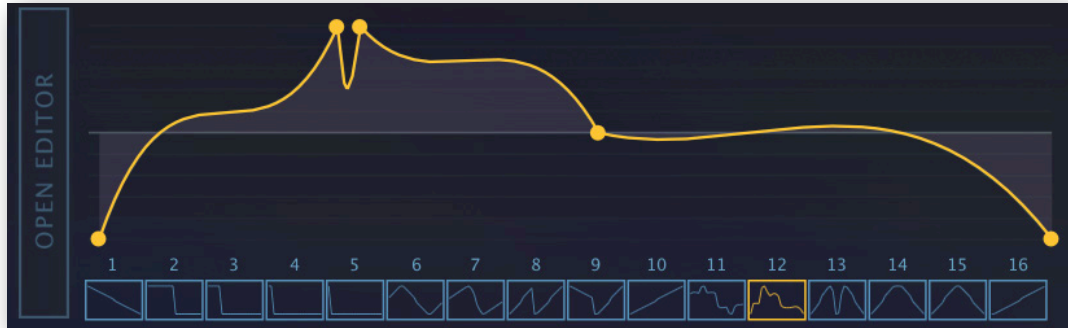
#### *Context menu (right-click)*

Morph / Blend, Duplicate or Exchange this wave with the currently highlighted one

## GeoMorph & SpectroMorph

Although there are four oscillator modes, only two editing methods are required. This section describes the ‘Morph’ waveform modes and how to edit them.

### GeoMorph



*A typical GeoMorph wave*

GeoMorph mode lets you draw waveforms by positioning up to 32 points, and adjusting the curvature of the lines between them. Note that the first and last points cannot be deleted or moved horizontally – they define the level at 0° phase. The minimum number of points is 4, and all waves in the waveset adopt the same total number.

### SpectroMorph



*A typical SpectroMorph wave*

Although it looks and feels like GeoMorph, SpectroMorph is very different. It does not represent a waveform directly, but rather its spectrum. 1023 harmonics in the horizontal axis are scaled logarithmically for a total range of about 10 octaves. In this mode, a horizontal line spanning the width of the editor so that all harmonics have equal levels creates a very bright saw wave. By the way, the example above is a bright saw (the upper line) with two wide troughs – practically a “dual notch-filtered saw”.

## Mouse operations, GeoMorph and SpectroMorph modes

### Create or remove a point

(Mac) cmd + right-click  
(Win) alt + right-click

### Multiple selection

Click in the background and drag over one or more points  
Shift + click on a point to add or remove it from the selection  
To move all selected points, click and drag one of them

### Adjust curvature (left, right)

(Mac) opt + drag, cmd + drag  
(Win) ctrl + drag, alt + drag

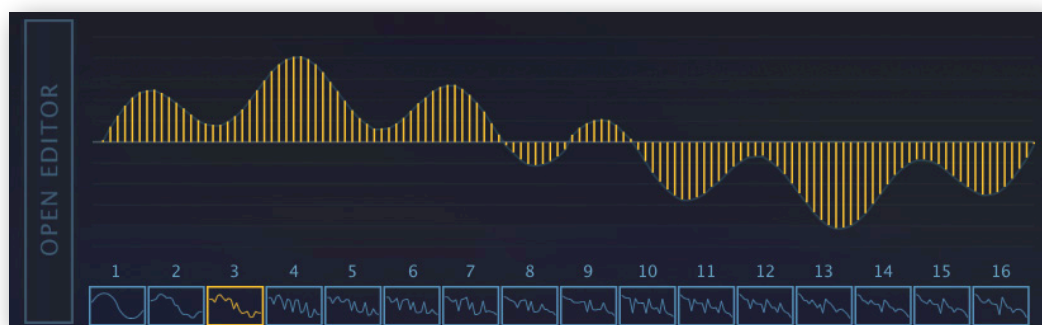
### Context menu (right-click)

*insert point* .....creates a new point (appears in all waves in the waveset)  
*smooth* .....adjusts all curves in the selection for minimum spikes.  
*linear* .....straightens all curves in the selection  
*peaks* .....adjusts all curves in the selection for maximum spikes  
*distribute all* .....adjusts the horizontal positions of all points for equal spacing  
*line up selected* .....line up all points with the leftmost / rightmost in the selection  
*clear* .....resets all points to minimum level  
*copy / paste* .....transfers wavesets between oscillators (also between presets)

## GeoBlend & SpectroBlend

This section describes the two 'Blend' waveform modes, and how to edit them.

### GeoBlend



*A typical GeoBlend wave*

A single cycle is defined by 128 columns. GeoBlend is similar to GeoMorph in that it reflects the actual shape of the wave. However, when the morph function is used or the wave index is modulated, waveforms are not morphed, they are *blended*. The main advantage of GeoBlend over GeoMorph is that waveforms can be drawn freehand.

GeoMorph wavesets can be extracted from audio sources. A few third-party utilities are available for this purpose (try googling 'Wav2Zebra' and 'Blueberry Thing'), but they do require some dedication.

## SpectroBlend



*A typical SpectroBlend wave*

The spectrum is represented by 128 bipolar columns. Similar to SpectroMorph except that it has fewer harmonics, and these are scaled linearly for a total range of six octaves.

The lower half is 'anti-phase', so the same harmonic in adjacent waves (e.g. 1 and 2), but with opposite phases, can cancel each other out (at exactly 1.50 in this example). This cancellation effect can be put to good use – see the oscillator preset 'Bells Flipper'.

The main advantage of SpectroBlend over SpectroMorph is the total control over individual harmonics, including polarity. Waves are not morphed in this mode, they are *blended*.

### Mouse operations in GeoBlend and SpectroBlend modes

#### *Draw freehand*

click + drag

#### *Draw a straight line*

(Mac) opt + drag

(Win) ctrl + drag

#### *Reset sections to zero*

(Mac) cmd + drag

(Win) alt + drag

#### *Context menu (right-click)*

blur.....softens transitions between columns

sharpen.....accentuates transitions between columns

maximize.....sets the highest column to maximum, scales the rest accordingly

copy/paste.....transfers wavesets between oscillators (even between presets)

## Expand

A much larger version of the wave editor opens when you click on the vertical EDITOR button to the left of the data area. To exit, click on the same vertical button, which has been conveniently renamed CLOSE. While the wave editor is expanded, the lower pane contains a copy of the oscillator panel.



## FMO main panel

FMO stands for Frequency Modulation Oscillator, and this module is indeed closely related to the famous Yamaha DX7. Compare the Zebra2 preset *HS DY7 Add Pad* with the typical DX7 e-piano sounds of the 1980s, which were often layered with analogue pads.



*the FMO module panel*

### TYPE (input mode)

**FM by Input:** The FMO is modulated by its input, and the FM knob controls input level.

**FM self (+):** The FMO modulates itself, resulting in a brighter waveform approaching a sawtooth. Values above 50% can produce some interesting digital noise!

**RM Input:** No FM here, the FMO is actually ring-modulation with its input.

**Filtered FM:** Like FM by Input except that the FM knob opens a lowpass filter instead of setting the input level (which is fixed at 100%). This results in a warmer tone.

**FM self2 (+):** Like FM Self (+) except that the input is the output squared (multiplied by itself). Great for triangular / squarish tones, including a wonderful 'shark-fin' triangle when the FM depth is between 25 and 30.

### MONO / STEREO

Like the OSC module, the FMO can also run in stereo mode. This is hardly noticeable unless the FMO is detuned and Width is turned up because, unlike OSC modules, the phase of an FMO is always reset to zero when a note is played.

### TUNE

FMO pitch offset (+/- 48 semitones).

### WIDTH

Stereo spread. This parameter has no effect if the FMO is in MONO mode (see above).

### DETUNE

If the FMO is in MONO mode, this lowers or raises the pitch by +/- 50 cents. In stereo mode, it is a detune **spread**, simultaneously sharpening the left channel and flattening the right channel. Of course you can still fine tune the FMO via SHIFT + Tune!

### VIBRATO

The amount of pitch modulation from LFO1, with a range of +/- 50 cent.



**PAN**

Shifts the stereo position to the left or right. Works for mono or stereo (see above).

**VOLUME**

Output level.

**FM**

Generally FM depth / input level – see *TYPE* on the previous page for details.

## FMO lower panel

---

Like the standard oscillators, the FMOs use the lower panel for some extra parameters. Unlike the standard oscillators, all four FMOs share the same panel...



*part of the FMO pane in the lower panel*

**Generator Mode** (the square waveform graphic)

Click to select an alternative waveform. The name appears to the left of the graphic – for the FMO1 here it is *pure sine*, for FMO2 it is *quadric shift*.

**Key Scale Pitch** (the unlabelled horizontal slider -200 to 200)

MIDI note to FMO pitch, centred around E2. A bipolar 'KeyFol' for the FMO modules. Double-click to set the default 100 (perfect semitones).

**KEY SCALE / GAIN**

MIDI note to FMO gain scaling. The horizontal axis is the full 8 octaves of MIDI notes and the vertical axis is the volume of the FMO from 0 to 100%, independent of the FMO's regular Volume setting.

**VELOCITY SCALE**

Velocity to FMO gain scaling. The horizontal axis is MIDI velocity and the vertical axis is FMO gain from 0 to 100%, independent of the FMO's regular VOLUME setting.

## Noise

Noise has traditionally been used for percussive sounds, wind effects, explosions etc..



*the Noise module*

### TYPE (unlabelled)

*White* is a random signal with equal power across the spectrum.

*Pink* is darker – high frequencies are attenuated by 3dB / octave.

*Digital* is a square wave with random polarity, like a very lo-fi oscillator. It can be played in tune if LP Cutoff is modulated by KeyFol with the amount set to 64.00.

*Crackles* produces random impulses, like a Geiger counter or a worn-out vinyl record.

### MONO / STEREO

Even noise can be stereo! See WIDTH below.

### LP / HP

Lowpass and highpass filter cutoff frequencies. In both *White* and *Pink* modes, these are 6dB/octave. In *Digital* mode, the LP is pitch, and the HP adds more irregularity. In *Crackles* mode, the HP reduces the probability of an impulse.

### PAN

Shifts the stereo position towards the left or right channels.

### VOLUME

Noise output level.

### WIDTH

Controls stereo spread if STEREO is switched on.

## VCF

Although there are no high voltages in ZebraHZ pushing and pulling on electrons, the VCF models sound almost as ‘alive’ as their analogue forbears, so the name stuck. These models are less CPU-hungry than XMF (see 2 pages down).



*VCF module panel*

## Filter Types

<i>LP Xcite</i>	24dB lowpass, with a frequency-dependent exciter as Drive, adding high frequencies.
<i>LP Allround</i>	CPU-friendly 24dB lowpass, with a strong resonance and smooth coloration via Drive.
<i>LP MidDrive</i>	Boosts mid-range frequencies via Drive, good for leads that can cut through the mix.
<i>LP OldDrive</i>	Adds even-numbered harmonics, for a vintage sound bordering on ‘cheesy’!
<i>LP Formant</i>	Vocal filter type. Combines a non-resonant 12dB/octave lowpass with a resonant formant stage. The Formant parameter replaces resonance, and the vowel parameter morphs through <b>A–E–I–O–U</b> . Great for ‘singing’ voices and vocoder-like pads. Note: The modulation target of the righthand assignable knob is the <i>Vowel</i> parameter here!
<i>LP Vintage</i>	CPU-cheap analogue-modeled transistor ladder with 24dB rolloff.
<i>LP 12dB</i>	A 12dB version of LP Allround
<i>LP 6dB</i>	A simple lowpass with a very shallow rolloff, non-resonant
<i>BP RezBand</i>	A resonant 12dB bandpass model
<i>BP QBand</i>	Another resonant bandpass, with a different character
<i>HP 24dB</i>	Resonant 24dB highpass
<i>HP 12dB</i>	12dB version of the above
<i>BR Notch</i>	24dB band reject

<i>EQ Peaking</i>	Peak / reject filter, like parametric ‘mid’ on a mixing desk. Res controls the slope of the peak. Gain has a range of -20dB (deep notch) to +24dB (strong peak). This type has little or no effect if Gain is zero.
<i>EQ LoShelf</i> <i>EQ HiShelf</i>	Two shelving models, to complete the trio of ‘parametric EQ’ filters. Like in EQ Peaking, Gain attenuates or boosts the frequency range (low or high), and the Res parameter controls the slope.
<i>AP Phaser4</i> <i>AP Phaser8</i>	The two phasing models use 4 or 8 stage all-pass (AP) filters to generate typical phasing effects. Cutoff controls the center frequency, and Res controls intensity. In the Phaser8 model, the Split parameter de-tunes the 8 stages.
<i>LP Vintage2</i>	More CPU-intensive version of LP Vintage, capable of self-oscillation.
<i>SR Decimate</i>	Not really a filter, this is a sample-rate reduction processor. The Cutoff parameter controls rate, meaning it can be tuned harmonically (set KeyF to 100). Neither Res nor Drive are used.
<i>LP TN6SVF*</i>	<a href="#">TyrellN6</a> ’s state variable lowpass. An octave higher than other types!
<i>LP MS2035*</i>	Early version of <a href="#">Diva</a> ’s rev1 BITE lowpass
<i>LP S20SK*</i>	Early version of Diva’s rev2 BITE lowpass

\* The last 3 were included by mistake in a certain version of Zebra2, and reintroduced for compatibility reasons. Note: the CPU hit is significantly higher than the other types.

## Controls

### CUTOFF

The *Cutoff* determines a filter’s edge-frequency. Like all frequency parameters in Zebra2, the scale is in semitones, as tuning cutoff in musical terms makes more sense than the very scientific ‘Hertz’. With KeyF (key follow) turned down, the cutoff values of most filter types correspond to MIDI note numbers minus 12 (one octave). For instance, with cutoff set to 81.00 a filter would resonate at 440Hz (middle A).

### RES

Resonance is an internal feedback loop that emphasizes the cutoff frequency. In some filter types (e.g. EQ Peaking), this parameter is actually a Q-factor, the slope of a band centred around the cutoff frequency.

### KEY F

The ‘key follow’ parameter adjusts how strongly the cutoff follows MIDI notes (the higher the note, the higher the cutoff). At 100%, it follows semitones precisely.

### DRIVE / GAIN

The Drive or Gain parameter of a filter usually adds some kind of distortion. In Zebra’s VCF this is more of a generic ‘flavour’ parameter – see the remarks in the above list.

## XMF

The XMF (cross-modulation filter) module is an extremely flexible multimode filter featuring self-oscillation, input-dependent distortion and audio-rate FM via the extra input. The XMF is more CPU-intensive than any of the VCF models.



*XMF module panel*

There are 15 filter types / combinations, but you actually have **two of these** in stereo, with differential cutoff. So if you ever need a 3-pole allpass in parallel (or series) with a 2-pole bandreject / lowpass combination... no problem!

Distortion in the XMF is highly dependent on the level of the input signals – they affect the sound as much as Overload does. You should try e.g. oscillator volumes as low as 2%!

## Switches

### ROUTING

Each XMF module has two stereo filters, which can be routed in four different ways:

- single* .....Standard mode. Actually two filters with stereo-splittable cutoff values for spectacular panning effects – try modulating Offset with an LFO.
- serial* .....Type1 filter is fed into the Type2 filter.
- parallel* .....Type1 and Type2 filters are output separately.
- diff'ed* .....The difference signal (Type1 minus Type2). Note that if the two types are the same and there is zero offset, the result is total cancellation.

For more details, see the flow diagrams towards the end of this document.

### DRIVER

Five options for the resonance / overload character. Note that output volumes can vary depending on the Resonance and Overload values (see below).

- XMF* .....Standard high-quality – plenty of bite.
- analogue* .....Classic ladder filter overload – warm / dark.
- biased* .....Diode-like asymmetrical distortion, for more even-numbered harmonics.
- eco* .....CPU-friendly version of *analogue*, lower quality overload.
- folded* .....Positive peaks that would otherwise clip are folded back down.

**TYPE 1** (unlabelled)

*LP4, LP3, LP2, LP1* .....Lowpass: 24, 18, 12 or 6 dB per octave – all resonant!

*HP3, HP2, HP1* .....Highpass: three different slopes

*BP4, BP2* .....Bandpass: two different slopes.

*BR2* .....Bandreject: 2-pole only

*AP3* .....Allpass: 3-pole only

*HP3LP, HP2LP* .....Combination of 3-pole or 2-pole highpass + 2-pole lowpass

*BR2LP* .....Combination of 2-pole bandreject + 2-pole lowpass

*AP3LP* .....Combination of 3-pole allpass + 2-pole lowpass.

**TYPE 2** (unlabelled)

*Same* .....Type 2 adopts the Type 1 setting.

For all other options, see the Type 1 list above.

## Controls

**CUTOFF**

Cutoff determines the filter's edge-frequency. Like all frequency parameters in Zebra2, the scale is in semitones – tuning cutoff in musical terms makes more sense than the more scientific 'Hertz'. Cutoff values correspond to standard MIDI note numbers minus 12 (one octave), so 81.00 means a middle A (440Hz) before any modulation.

**RES** (resonance)

Resonance is an internal feedback loop that emphasizes the cutoff frequencies. High resonance is very interesting in combination with Overload. Set Resonance to maximum, and the filter will self-oscillate (see *Click* below).

**KEY F**

KeyFollow, the depth of cutoff modulation from MIDI note / keyboard. At 100%, it follows semitones perfectly. Note that the breakpoint (the key that doesn't change) here is E2.

**OFFSET**

Splits the cutoff values of the two channels, in semitones (+/-48). Great for panning effects with the standard *single* routing, or for multiple resonances in *serial*, *parallel* or *diff'ed* mode (see the previous page). *Offset* has a assignable modulation knob.

**FM**

For audio-rate cutoff modulation ('Filter FM') from the XMF's second input. By default, the FM source is the same as the input signal, but using a different FM source can be highly rewarding: right-click on the [XMF] cell to change the sidechain input to another lane – and put something in that lane! *FM* also has a assignable modulation knob.

**OVER** (overload)

Pushes the filter 'too far'! For interesting distortion effects and general oomph. Note that high overload can amplify the signal a lot.

**CLICK**

Injects a short impulse into the filter at the start of each note. Turn up for harder attacks or more instantaneous self-oscillation.

## Diva VCF

### Where are the panels?

ZebraHZ is a bit of a Frankenstein's monster. Under the circumstances, the Diva filters are integrated in the best way possible. Not in the generator rack like the other filters, but as tabbed panels in the lower area, like the MSEGs.

*Note: These filters are very CPU-intensive, and are therefore **monaural** i.e. not stereo.*



Altogether, ZebraHZ has 8 Diva-style analogue filters: 4 highpass and 4 lowpass / multimode filters. To access all controls, click on the **DIVA VCF** button in the lower bar, second from the right.

### General settings

#### ACCURACY

This is an important global parameter, as it trades CPU-hit for realtime audio quality (especially resonance). If your computer stutters while playing presets that use D-filters, switch the accuracy to *fast* or even *draft*. You will soon learn which one your system can handle. Mono presets should be no problem, even on older computers.

#### OFFLINE ACC

The accuracy used for offline audio rendering. You should generally render tracks to audio in the highest quality – to do this, set *OfflineAcc* to *best*. If you find that your sound works best in Draft mode (e.g. because it is meant to be gritty), feel free to switch this to *Same*.

#### CUTOFF SLOP

Scales the amount of randomisation applied to all D-filter cutoffs.

#### RND

The **Random** button generates new random values for CUTOFF SLOP.



*The Diva general settings (left) and highpass filter (right) panels*

### HPF settings

The 4 Diva highpass filters share a single panel to the right of the general settings (see the screenshot above), and are tabbed like the MSEGs. To switch between them, click on the *D-HPF1* to *D-HPF4* buttons.



## MODEL

There are two basic highpass types: **HPF PRE** is a simple, CPU-friendly highpass with only a cutoff control. Note: Although *Resonance* and *FreqModDepth* appear as a targets in the matrix, these have no effect. **HPF BITE** is a much more characterful model with a resonance control. Two REVISIONs with different characteristics are available.

## LPF settings

On the right are the main Diva filters, in pairs that are switched via the buttons at the bottom, **D-VCF1+2** | **D-VCF3+4**. The upper definable ('none') knobs are modulation depths for Cutoff while the lower one is for resonance.



## MODEL / MODE

The **Ladder** model is a classic 24dB or 12dB per octave filter with key-follow and resonance. Click on the MODE selector to switch between the two.

**Cascade** is cleaner than *Ladder* but has an extra COLOR switch for selecting revisions of this famous filter. MODE switches between 24dB and 12dB per octave.

**Multimode** is based on the filter in yet another classic polyphonic synthesizer (or two). MODE offers the following options:

*LP 24db* .....4-pole lowpass

*LP 12db* .....2-pole lowpass

*HP* .....highpass

*BP* .....bandpass



**BITE** sounds very different – it's a real character! The tone is highly dependent on the input signal levels, on the selected REVISION as well as on the resonance. BITE can deliver anything from solid 2-pole to screaming mayhem.

**Uhbie** is a classic state variable 2-pole with a silky sound. You can crossfade smoothly between 3 different modes via the modulatable SHAPE MIX: Lowpass through notch or bandpass (switchable via the BANDPASS on/off button) to highpass.

## COMB

Comb ‘filters’ are based on ultra-short delay lines with feedback. Even if the input is a very short impulse, feedback can turn it into a slowly decaying (or even sustaining) tone. The frequency response curve resembles a regular row of spikes, hence the name.



*Comb module panel*

You can create envelope-driven polyphonic flangers, realistic plucked and bowed strings, flutes, mallet and other percussion instruments. Note: Most uses need some FEEDB!

## Switches

### MODE

This could be called a ‘multi-mode’ comb, as its four delay lines can be connected in various ways, often with dramatically different results. The options are:

**Comb**.....A simple stereo delay tuned to the played note. Neither the TONE nor the FLAVOUR parameter have any effect in this mode.

**Split Comb** ....Any input is summed to mono and fed to the first of two delays, which then cross-feed each other. TONE is the ratio between the delay times, while FLAVOUR controls the amount of input signal fed directly into the second delay. The left channel is delay 1 and the right channel is delay 2.

**Split Dual** .....The same as *Split Comb* except that input signal is not summed to mono.

**Diff Comb**.....The same as *Split Dual* except that the second ‘delay’ is actually an all-pass filter. This is especially good for strange, complex sounds. FLAVOUR is the feedback of the allpass filter. As inharmonic frequencies can dominate the sound, you sometimes have to tune this one rather carefully.

**Dissonant**.....A 4x4 feedback delay network which always sounds metallic. Both TONE and FLAVOUR affect the delay ratios (i.e. pitches), but DIST is unused.

**Cluster**.....Only included for compatibility reasons – use at your own risk!

**Blown**.....This mode uses a bandpass filter in the feedback path to accentuate harmonics rather than the fundamental. Modulating the Flavour parameter is especially interesting. You can get very realistic flutes and trumpets etc., but this does require careful tuning.

## FILL

The comb has an impulse generator so it can generate sound without requiring an input signal. The impulse can be one of three different waveforms:

*Noise*.....short burst of white noise – bright, different characteristics per note

*Saw*.....single cycle sawtooth – full / warm

*Square*.....single cycle square wave – hollow / nasal

## Main controls



*Comb panel, main controls*

### PRE FILL

The level of the internal impulse signal selected in FILL (see above).

### INPUT

Input level. Negative values invert the signal to be processed, so you can even use the Comb module as an audio signal inverter.

### DAMP

A 6dB lowpass filter in the feedback path simulates how a plucked string is naturally dampened by various physical constraints.

### FEEDB

Bipolar feedback level control. Negative values lower the pitch by an octave, and the timbre is more hollow.

### TUNE

Nominal pitch. The range is +/-24 semitones.

### DETUNE

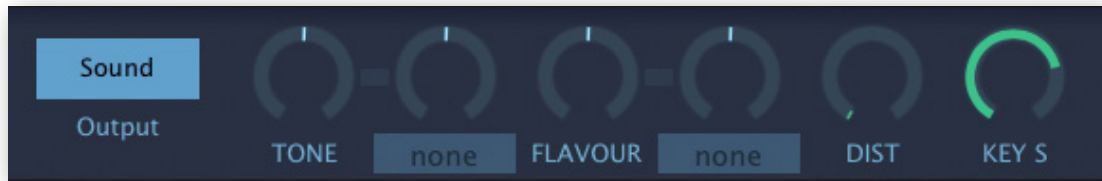
For *Split Comb* this is normal fine tuning. In other modes it detunes in both directions.

### VIBRATO

Amount of pitch modulation directly from LFO1 (0 – 100), with a range of +/- 50 cents.

## Sound controls

Click on the **Sound** button...



*Comb panel, SOUND sub-panel*

### TONE

The function of this parameter changes from mode to mode. Usually a ratio between delay times. For details, see [MODE](#) above.

### FLAVOUR

The function of this parameter changes from mode to mode. Usually a level within one or more feedback paths. For details, see [MODE](#) above.

### DIST

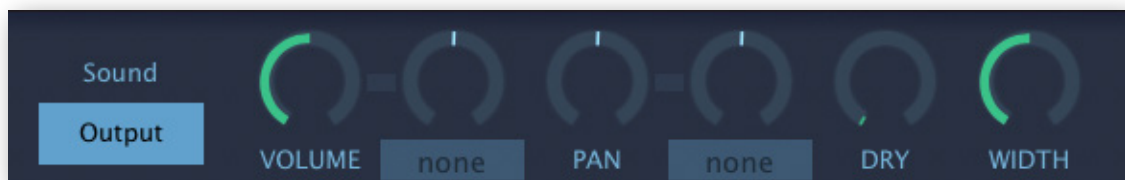
Distortion adds harmonics into the feedback. Use with caution!

### KEY S (Key Scale Pitch)

MIDI note to pitch, centred around the note E2. Effectively a bipolar 'KeyFol' for the Comb. Leave at 100 for semitone steps (a double-click takes you straight there). For flanging and resonance effects, set KEY S to 0.00 and take the Tune value down.

## Output controls

Click on the **Output** button



*Comb panel, OUTPUT sub-panel*

### VOLUME

Comb output level. Careful! If this reaches zero either through modulation or simply by turning down the VOLUME knob, the Dry signal suddenly shoots up to 100%. Whether this is a feature or a bug, it can make some very interesting rhythms – try modulating VOLUME from an LFO, and adjusting the VOLUME knob.

### PAN

Panorama shifts the stereo position of the processed signal towards the left or right. Pan does not affect the position(s) of the Dry signal.

### DRY

Unprocessed “throughput” from whatever is fed into the Comb.

### WIDTH

Stereo separation of the processed signal. Does not affect the dry signal.

## SIDEBAND

The SIDEBAND module is a stereo frequency shifter, the origins of which go back to the early days of radio. Related to ring modulation in which two signals are multiplied, resulting in two sidebands. It can deliver anything from mild stereo phasing to complex metallic sounds, as frequencies are shifted by a constant (e.g. 100Hz) instead of a factor (e.g. 2.00 times). While the ‘beating’ between two detuned oscillators can become irritatingly fast when you play higher up the keyboard, frequency shifting remains constant.



*SideBand module panel*

### RANGE

The SB offers 3 bipolar frequency range options, each with 0Hz at the centre.

*10Hz*.....for relatively slow-moving cyclical effects e.g. stereo phasing.

*200Hz* .....for low-frequency effects: deep bells, rumbles... or even old dial-tones!

*4kHz* .....for high-frequency or very wide range effects

### FREQ

Bipolar frequency shift.

### OFFSET

Bipolar offset between left and right channels. Offset can be used for a special kind of phasing that continually rises in the left channel, while continually falling in the right channel. Check this out in headphones: Set the range to 10Hz, Freq to zero, Offset to 2.00, Mix to 50 – and feed it a medium dose of pink noise.

### MIX

Bipolar cross-fade between the dry signal and the frequency-shifted signal. Negative values invert the processed part. For maximum phasing, set to exactly +/- 50.

## SHAPER

Input level dependent distortion unit with a choice of 4 algorithms.



*Shaper module panel*

### TYPE

**Shape** ..... Classic waveshaper. The DEPTH parameter adds DC bias before the shaper, making it positively asymmetrical (for even-numbered harmonics similar to tube distortion). Note that the DC bias can seriously reduce signal level.

**T-Drive** ..... Frequency-dependent waveshaper, like a transformer. Can boost 'presence'.

**Crush** ..... Bit-reduction via DEPTH. Neither INPUT nor HI OUT are used in this mode.

**Wedge** ..... A high-order waveshaper with foldback function (loud signals can become silent or even phase-inverted). The DEPTH knob boosts the input signal, controlling the distortion amount. Placed after a resonant filter this type can emulate typical acid bassline sounds.

### DEPTH

Distortion threshold, effectively a distortion amount control. Like a guitar amplifier, every control in this module affects the amount of distortion in some way or other!

### EDGE

The main tone control.

### INPUT / OUTPUT

Attenuate / boost the input and output signals. Also affects tone...

### HI OUT

Attenuates / amplifies high frequencies – the final tone control in this module.



## Distortion

The Distortion module creates traditional analogue-type saturation. If used in the FX Grid, it can mimic a complete guitar amplifier and speaker cabinet.

**input amp → pre tilt filter → distortion → post tilt filter → post filter → output amp**



*Distortion module panel*

### TYPE

**Tube Class A**.....Simulates a complete tube preamplifier. Class-A is the 'traditional' type of tube distortion, creating both odd and even harmonics by using a single tube and applying DC bias. Due to the asymmetry of the operational curve, Class A distortion sounds relatively warm.

**Tube Class AB**.....Simulates a preamplifier with two tubes in a 'push-pull' arrangement, which leads to symmetrical distortion with no even-harmonic partials.

**Tube 2 Stages**.....Mimics a tube amplifier with two class-A stages in series. Like class A, this also creates odd and even harmonics, but the results are richer and more dynamic. This mode applies additional internal filtering and feedback for more sonic complexity. At high gain settings you should hear more pronounced treble roll-off and more bass lift.

**Hard Clip**.....This mode simply chops off the top and bottom of the waveform.

**Rectify**.....Full-wave rectification. The negative half-wave becomes positive and the resulting waveform is fed through a DC-blocking filter. Interesting note: A pure triangle wave will be simply doubled in frequency, without altering the waveform.

**Foldback**.....Also known as 'fold-over distortion'. *Foldback* is similar to soft clipping, except that increasing the gain does not slam the signal against the ceiling (it reduces the gain instead). Listen out for strange inter-modulation artifacts!



**INPUT**

Sets the gain (in decibels) at the input

**OUTPUT**

Sets the final output gain. Note that this stage includes soft clipping, which can create even more distortion when turned up 'too high'

**PRE TILT**

A tilt filter i.e. combined low and high shelving EQ applied to the input signal before the distortion. At zero the response is flat. Negative values strengthen the bass and reduce the treble, while positive values strengthen the treble and reduce the bass.

**CENTER**

Combined low and high shelf frequency control.

**POST TILT**

Balance the tone *after* the distortion.

**POST FILTER**

*Dual-Band Shelf*.....A simple corrective EQ: a low shelf at 100Hz and a high shelf at 10kHz. See *Low and High* below.

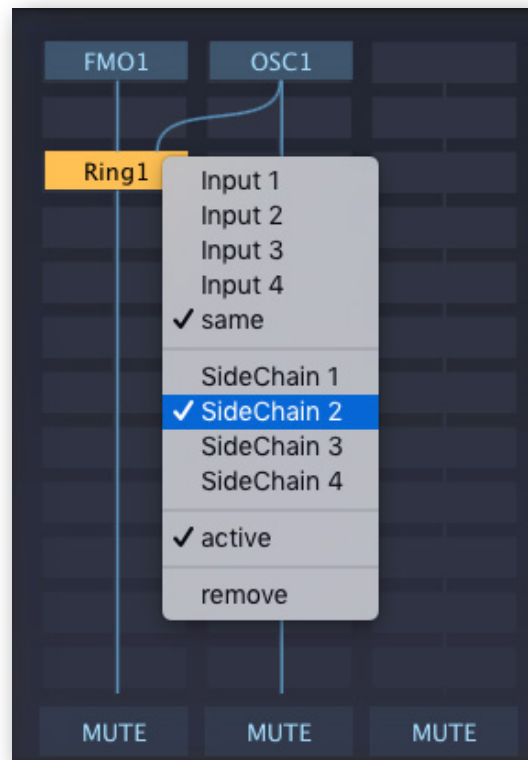
*Guitar Cab 4x12*.....Mimics the frequency response of a very popular vintage speaker cabinet, producing its typical mid-range focused sound, including peaks and dips caused by resonance within the cabinet as well as the effects of close-miking.

**LOW and HIGH**

In *Dual-Band Shelf* mode these are the gains of the two shelving filters (see POST FILTER above). In *Guitar Cab 4x12* mode they control the amount of 'cabinet resonance' i.e. bass and speaker 'edge'.

## RING

Ring modulation is a variant of amplitude modulation (AM): Two input signals are balanced so that they disappear completely, leaving only the sum and difference frequencies. These frequencies are seldom harmonically related, so ring modulation is often used for bell-type sounds. For the purest results, use sine waves – FMOs and/or *SpectroBlend* OSCs.



Although the ring modulators in Zebra don't require a panel, they do need 2 input signals. The above screenshot shows the context menu of a right-click on 'Ring1'.

## MIX

These modules can be used for simply mixing two signals, for cross-fading ('Mix' is a modulation target) or for reducing the stereo width of a signal: Select 'Pan Mono' mode and set MIX to 100 – you will only hear the sidechain signal now, at dead centre.



*Mix module panel*

### PAN MODE

*Bal L-R, Pan L-R, Bal R-L, Pan R-L or Pan Mono.* With the Pan knob set to the centre, the *Bal L-R* and *Bal R-L* options have 0dB of gain for both channels: only one channel is attenuated as the control is moved away from the centre. The *Pan L-R* and *Pan R-L* modes, however, mix one channel onto the other while adhering to the 'pan law'.

### PAN, MIX

The stereo position and relative levels of the two inputs.

## FOLD

A ‘Wavefolder’ is a kind of waveshaper that maps the signal onto a sine wave, folding it back on itself multiple times. Like hardware units, Zebra’s *FOLD* module sounds best when applied to signals with very little high frequency content – try a pure FMO sine first!



*6 ripples, 22% folds, 30% bias and maximum slope*

### RIPPLES

The total number of cycles, from 1 to 7.

### LIVE VIEW

This button activates realtime animation of *FOLDS* and *BIAS* modulation. If you need to save CPU, leave it disabled.

### CLIP ANGLE

The horizontal slider adjusts the smoothness of the two ‘knees’ to the left and right.

### FOLDS

The percentage of Ripples used. Note: As it is effectively an input level control, setting *Folds* to zero without any modulation will result in silence.

### BIAS

This parameter shifts the used section of the curve to the left or right. Bias modulation is applied in opposite directions per stereo channel, resulting in a unique stereo effect.

### RATIO

The relative level of the ripples, effectively an output boost control.

### SLOPE

Tilts the curve downwards or upwards.

# Modulators

Modulation is what we use to turn static tones into interesting instruments or soundscapes. Zebra2 lets you modulate practically any 'target' parameter in the synth. As well as LFOs and envelopes, the list of modulators include some standard MIDI messages for external control: pitchbend, mod-wheel (CC#01), polyphonic or channel aftertouch, expression (CC#11), velocity and Gate.

Notes: Practically all the controls can be automated. Using the X/Y performance pads is the best way to control a lot of parameters at once, and they can also be automated.

## List of Modulation Sources

ModWhl	modulation wheel (CC#01)
PitchW	pitch wheel / pitch bender
CtrlA	MIDI control A, default = Breath (CC#02)
Ctrl B	MIDI control B, default = Expression (CC#11)
LfoG1, LfoG2	global LFOs
X1 to Y4	the x/y pads
Gate	note on/off
KeyFol, KeyFol2	key follow (center = E2) + glide. (2) includes glide offset
Velocity	MIDI note velocity
ATouch	channel or key (polyphonic) aftertouch, smoothened.
ArpMod1, ArpMd2	arpeggiator modulation
Env1 to Env4	standard envelopes
MSEG1 to MSEG8	Multi-Stage Envelope Generators
Lfo1 to Lfo4	voice LFOs
MMap1 to MMap4	modulation mappers
MMix1 to MMix4	modulation mixers

For a complete list of all modulation **targets**, go [here](#).

## Modulation Matrix

All generator panels include assignable knobs (unused ones appear with an ellipsis ... as label) for setting up local modulation. The **mod matrix** is where you can set up any kind of modulation – the image below shows just three of the 24 modulation slots...

### Depth (unlabelled)

The lefthand knob sets the (bipolar) amount. of modulation from a source selected in the label below it.

### Via (unlabelled)

The righthand knob sets the amount that a secondary modulator controls how much of the primary modulator reaches its target. Odd behaviour: When the Via source is at minimum, negative amounts of Via scale the modulation depth from 100% to 200%!

### Target (unlabelled)

The parameter to be modulated. Because drag & drop(see below) uses left-click, opening the list of modulation targets requires a right-click.

**Two examples:** In slot 22, Env2 decay is being negatively modulated by Aftertouch: The harder you press, the shorter the decay.

In slot 23, Env2 is 100% modulating oscillator detuning. However, this amount is partially *scaled* by the mod wheel – the amount of Env2 reaching its target will be less than maximum unless the wheel is at maximum. If Via is set to +100% instead, none of the Env2 signal will reach the oscillator unless the wheel is pushed.



### Drag & Drop

A quick alternative to selecting a target from the menu. Left-click on a Target selector, drag the crosshair onto any control in the SYNTH page then release the mouse button.

Of course you don't have drag & drop access to any of the controls in the lower pane (Global, Osc 1, Osc 2 etc.), but these are still available in the target's context menu.

### Pitch modulation

Setting precise pitch intervals in the modulation matrix requires a bit of arithmetic, as the 96 semitone range (+/- 4 octaves) is mapped onto 100 steps. Try these:

12 semitones (octave)	$100 / 96 \times 12 =$	<b>12.50</b>	(absolutely precise)
7 semitones (a fifth)	$100 / 96 \times 7 =$	<b>07.29</b>	(also try 07.30 and 07.31)
1 semitone	$100 / 96 =$	<b>1.04</b>	(more precisely 1.0416666667)

Note: If the modulation source is bipolar e.g. an LFO, you should halve the modulation amount, as the 96 semitone range is mapped onto 200 steps instead (-100 to +100)..

## ENV

When you load *init*, envelope 1 is already visible in the modulators pane because in this preset it is designated as the audio envelope for all 4 lanes of the main grid.



*an ENV module in v-slope mode*

Although it looks like a regular ADSR with just a few extras, the ENV module has several tricks up its sleeve: It is syncable, loopable, and offers 2-stage attack or release...

### Switches

#### Time Base (unlabelled)

**8sX:** Up to eight seconds. The knob scale is exponential (mid-position is 1 second)

**16sX:** Up to sixteen seconds. The knob scale is exponential (mid-position is 2 seconds)

**10s:** Up to ten seconds. The knob scale is linear, so 20.00 means 2 seconds etc.

**1/4, 1/1, 4/1:** Times are relative to song tempo (beat, bar, 4 bars). Knob scale is linear.

#### Mode (unlabelled)

The curvature of all time-based envelope stages:

**quadric:** Exponential curves. Attack is convex, Decay and Release are concave.

**linear:** Straight lines. Linear envelopes can sound unnatural.

**v-slope:** Exponential curvature via a slider: the far left position is extremely concave, -50 is close to quadric, the center is linear, the far right is extremely convex.

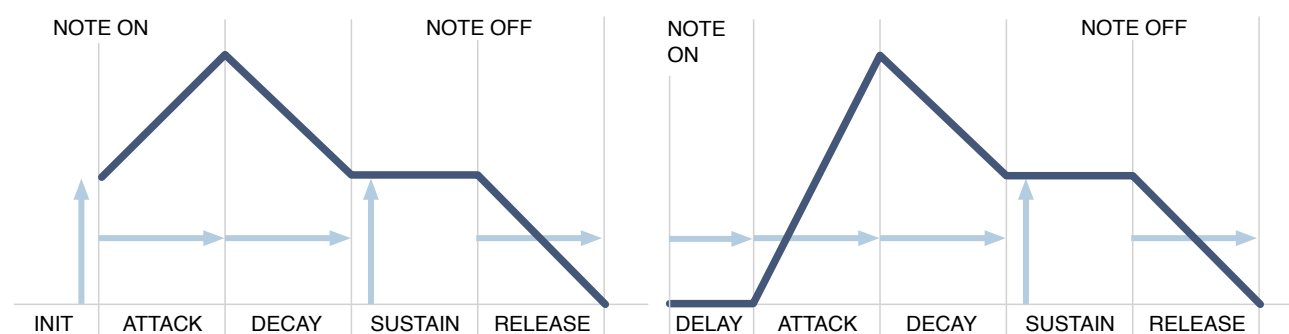
### Controls

#### Pre-Attack (unlabelled)

Although it resembles assignable modulation, the top lefthand knob actually controls one of two parameters at the beginning of the envelope.

**Init:** Attack stage starts at a level other than zero (see the lefthand image)

**Delay:** The Attack stage is delayed (see righthand image)





**ATTACK**

The time it takes for the envelope to rise from zero (or the *Init* value) to maximum

**DECAY**

The time it takes to drop from maximum to the Sustain level

**SUSTAIN**

The level after Decay. Normally remains at that position until the note is released

The extra envelope stages below can be tricky. If you prefer regular ADSRs, simply ignore the following options...

**F/R** (Fall / Rise time)

Centre: infinite fall/rise time i.e. no effect

Negative values: either fall to 0, or fall/rise to the Sust2 level (see Post-Sustain)

Positive values: either rise to 100, or fall/rise to the Sust2 level

As F/R is not updated in real time you may have play a note repeatedly to adjust it.

**Post-Sustain** (unlabelled)

Select one of the following options by clicking on the label.

*Sust2*.....Extra Sustain level after F/R

*LoopA*.....Time to loop back to Attack

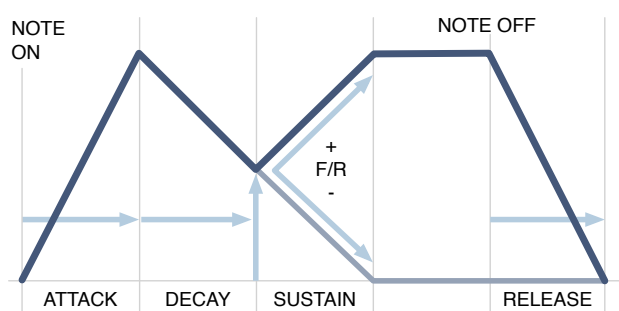
*LoopD*.....Time to loop back to Decay

*LoopS*.....Time to loop back to Sustain

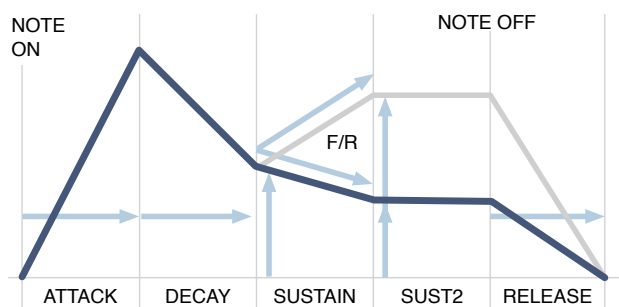
*Rel(nn)*.....Time of extra release stage (nn = target levels 25, 50, 75 or 100)

As F/R is always included in the loop, the 3 *Loop* options require a non-infinite F/R time i.e. you will need to move F/R away from the centre.

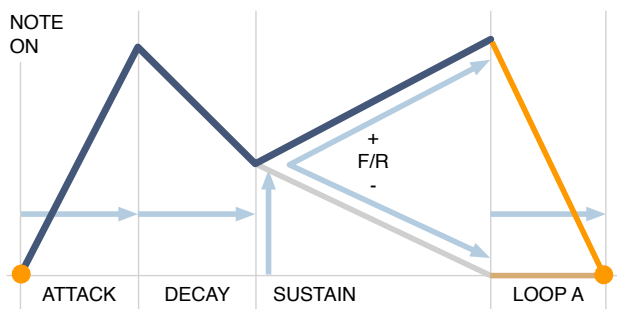
The diagrams below are simplifications. For example, Release (or Rel25/50/75/100) can start at any point within the envelope, as it is initiated by a MIDI Note Off message.



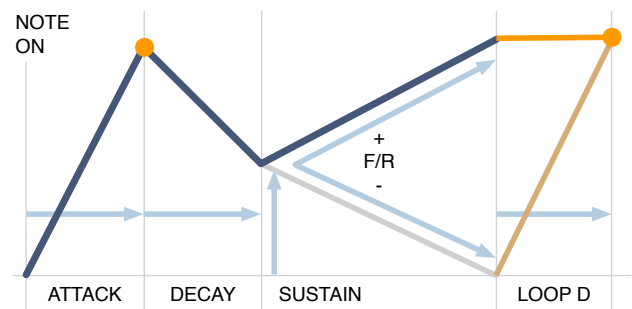
Normal F/R behaviour, no Sust2 stage



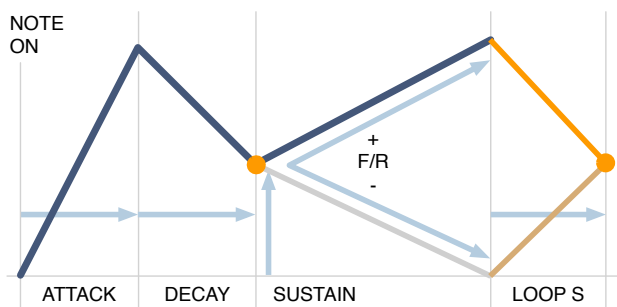
F/R behaviour with a Sust2 stage  
(2 possible Sust2 values shown here)



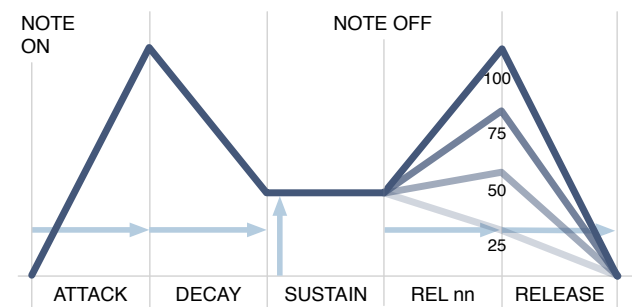
*LoopA: Time to return from end of F/R (100 or zero) to zero (start of Attack).*



*LoopD: Time to return from end of F/R (100 or zero) to 100 (start of Decay)*



*LoopS: Time to return from end of F/R (100 or zero) to Sustain level.*



*Rel25/50/75/100: Time to rise or fall from Sustain to 25/50/75/100%, followed by the normal Release stage.*

## RELEASE

The time it takes to drop to zero after a note is released. See also [Rel\(nn\)](#) above.

## VEL (velocity)

For dynamic envelopes – keyboard velocity scales the envelope's output level.

## VEL SCALE and KEY SCALE

To see these controls, click on the **[+]** icon in the top righthand corner of the panel.



*ENV module, with scaling sub-panel open*

All these knobs correspond to the parameters in the upper sub-panel. For instance, positive Velocity Scale for Decay will lengthen the decay times as you play harder, and negative Key Scale for Release will shorten the release times of higher notes, etc..

## MSEG

The Multi Stage Envelope Generator is a complex modulation source offering total shape control as well as continuous rate control. Click on the MSEG 1 button in the lower bar...



Many different uses can be found in the Zebra2 factory presets. A few examples:

Rhythms ..... *6 Lupins / Twangle*  
 Pitches ..... *6 Lupins / Seven of Eight* (MSEG 3)  
 Multiple attacks ..... *8 Perklers / Drums of Mordor+* (MSEG 1 and 2)  
 Combinations ..... *2 Leaders / I am Zebra* (All 4 MSEGs)  
 Snappy envelopes ..... *6 Lupins / How Money More Times*  
 Twisted regularity ..... *7 Noises / Combotor* (MSEG 2, MATRIX slot 02)

## Controls

### TIME UNIT

Selects the unit that will correspond to integer steps in the editor's time-line. Note that the timing can always be shifted by setting non-zero Attack, Loop or Release values.

*Sixteenth / Quarters / Notes:* These are note lengths, synchronized to song tempo.

*Seconds:* Units are 4 seconds long. For seconds, set Attack / Loop / Release to 2.00.

### TRIGGER

*poly* ..... standard polyphonic

*single* ..... only retriggers after all notes are released (like organ "percussion" register)

*mono* ..... standard monophonic

### A (attack)

Slows down / speeds up everything before the loop. -1.00 is half speed, 1.00 is double speed, 2.00 is quadruple speed etc..

### LOOP

Loop speed: -1.00 is half speed, 1.00 is double speed, 2.00 is quadruple speed etc..

### R (release)

Slows down / speeds up everything after the loop. -1.00 is half speed, 1.00 is double speed, 2.00 is quadruple speed etc..

### VEL (velocity)

For dynamic envelopes – velocity scales the MSEG output level.

## PRESET

Like the oscillators, MSEGs can be loaded and saved. Click on the long button to load from the floating browser, or right-click to copy, save (to the current folder), or open the current MSEG folder in Finder / Explorer.

## Editor functions

### OPEN EDITOR

For a larger editor, click on the vertical label to the left of the editing area. To exit again you can click on the same button (conveniently renamed CLOSE EDITOR).

While an MSEG is expanded the lower pane becomes an editable list of all its uses, either as assignable knobs in the panels or in the modulation matrix. Modulation depths can be adjusted here, either by moving the slider left-right or the VALUE vertically.

Source assignments can even be added by clicking on the *Add* button. To remove an assignment, click on the [x] button to the right.

### Edit Mode Switches



Bottom right of the editing area are three small icons. From left to right, these are:

*Single*.....moves individual points, the other points remain fixed

*Shift*.....moves individual points, all following points also move

*Draw*.....moves multiple points vertically – click on a point and ‘draw’

Note that points will jump to the nearest *unit snap* and *value snap* positions if these are defined (see *Background Context Menu* on the next page).

### Create New Point (max. = 33)

Mac cmd + click on the background

Win alt + click on the background

### Curvature

Click on a line and drag it in any direction to adjust the curvature. S-curves are also possible: Hands-on experience is better than a detailed explanation here. To straighten a curve, left-click on it and release immediately.

### Zoom & Scroll

To zoom in or out, click on the background and drag up or down. For optimum zoom, double-click in the background. To scroll to invisible sections of the envelope, click and drag left / right.

**Background Context Menu** (right-click in the background)

*Copy / Paste* .....clipboard functions  
*Half Size* .....shortens the envelope  
*Double Size* .....lengthens the envelope  
*Upside Down* .....inverts the envelope  
*Unit Snap* .....horizontally restricts new input to 3, 4, 6 or 8 steps per unit  
*Value Snap* .....vertically restricts new input to 12, 24, 36, 48 or 15 levels  
*Quantise to Snap* .....quantizes all points to the nearest step (see *unit snap*)  
*Unit Spacing* .....distributes all points to successive units  
*Even Spacing* .....evenly distributes all points  
*Pointer off* .....to save CPU, hide the position indicator  
*Pointer coarse* .....default resolution of the position indicator  
*Pointer fine* .....higher resolution of the position indicator

**Point Context Menu** (right-click on a point)

*Remove Point* .....delete the clicked point (note: the minimum number of points is 2)  
*Loop Start* .....set the start of the loop to the clicked point  
*Loop End* .....set the end of the loop to the clicked point

Loop Tip1: To create a loop of zero length, delete the 'loop end' point.

Loop Tip2: If the loop end is the very last point, the MSEG will continue looping after the note is released.

## LFO

---

Alongside envelopes, **low frequency oscillators** represent THE classic modulators – for vibrato or any cyclic movement e.g. a slowly drifting tonal change:



*The frequency is host-synchronized here, but the RESTART phase is random*

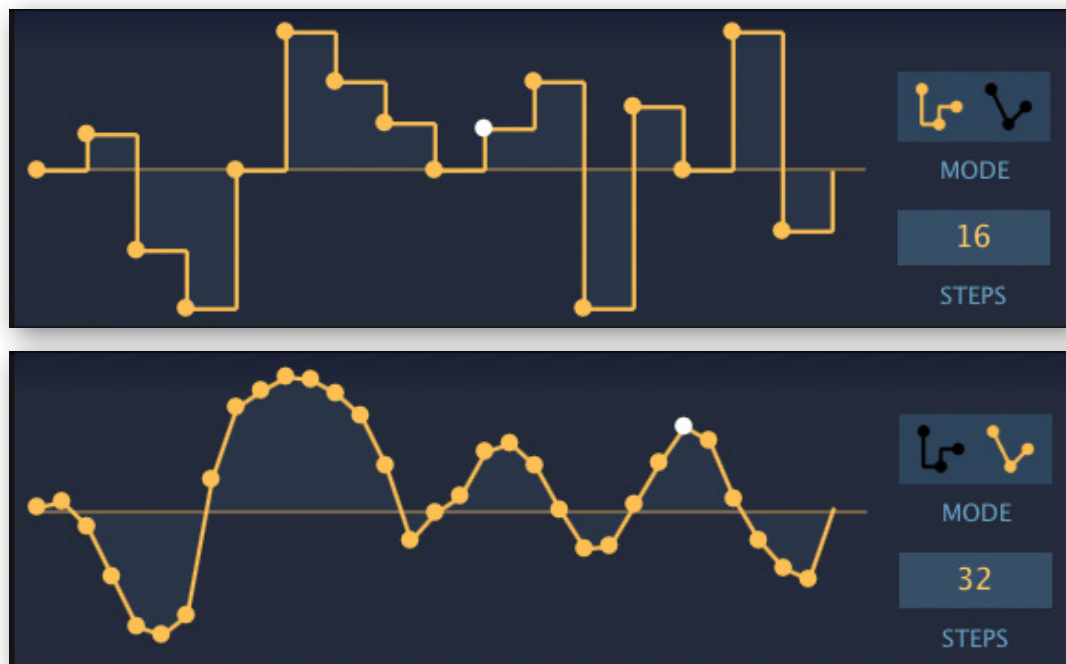
This is called a 'voice' (or polyphonic) LFO because, unlike the LFOG modules, it is instantiated per voice – each note you play gets its own LFO.

The main advantage of polyphonic LFOs over the global ones is that each note in a chord can have a different amplitude, phase and rate. Also, they can be restarted per note (see RESTART on the next page).

In all OSC, FM and Comb modules, **VIBRATO** uses **LFO 1**, which is why the LFO 1 panel always appears with OSC1 when you initialize a preset. To set up classic vibrato control via modulation wheel, click on the label of the knob to the right of AMP, select *ModWhl* and turn the amount up to maximum. Also turn up VIBRATO in the oscillator, of course.

## WAVEFORM

*sine*.....pure sine wave  
*triangle*.....pure triangle wave  
*saw up*.....rising saw ('ramp')  
*saw down*.....falling saw  
*sqr lo-hi*.....square wave, restarted at the lower level  
*sqr hi-lo*.....square wave, restarted at the higher level  
*rand hold*.....random steps  
*rand glide*.....random curves  
*user*.....up to 32 steps, user-drawn:



SYNC (see below) specifies the length of each step, which means that a complete cycle in the upper example would be  $16 * 1/16 = 1$  bar in 4/4 time.

Note: A right-click on the LFO's edit window in *user* mode opens the same context menu as in the [modulation mapper](#), with the same set of useful [drawing tools](#).

## SYNC

0.1s, 1s, 10s .....absolute times in seconds, three ranges  
 1/64 – 8/1 .....synced to song tempo (includes dotted and triplets, maximum 8 bars)

## RESTART

*free* .....the LFO starts with a random PHASE each time a note is played  
*gate* .....the LFO starts at the same PHASE each time a note is played

## SLEW

*off* can produce clicks, while *fast* and *slow* smooth out any sharp transitions.

## AMP

Amplitude i.e. LFO output level. For typical “vibrato via modulation wheel”, click on the label of the assignable knob and select *ModWhl* as source. Note that AMP modulation does not add to the LFO output level, but **scales** it.

**RATE**

LFO rate. This bipolar control scales the SYNC value.

**PHASE**

Sets the phase at which the LFO will be restarted every time a note is played. Ignored if RESTART is set to *free*.

**DELAY**

Fade-in time. Typically used for so-called ‘delayed vibrato’.

## LFOG

---

The “LFO Global” module is simpler than the normal LFO: The assignable knobs and the Delay are missing, and the LFOG doesn’t restart per voice – it is practically ‘monophonic’.



*LFOG module, triangle wave, synced to ‘beats’ and retriggered every 3 bars*

**WAVEFORM**

The LFOG offers the same waveform options as the LFO (see the list above).

**SYNC**

The LFOG offers the same synchronization options as the LFO (see the list above)

**RESTART**

Automatic restart after the specified number of bars (off i.e. no restart, or 1 to 32).

**SLEW**

*off* can produce clicks, while *fast* and *slow* smooth out any sharp transitions.

**AMP**

Output level.

**RATE**

LFOG speed. This bipolar control *scales* the basic rate set by the SYNC switch.

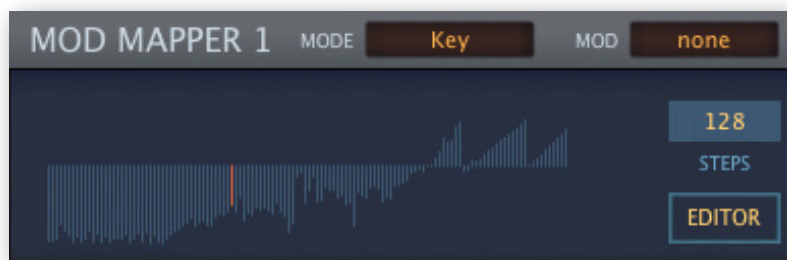
**PHASE**

Sets the position (within its cycle) at which the LFOG restarts.



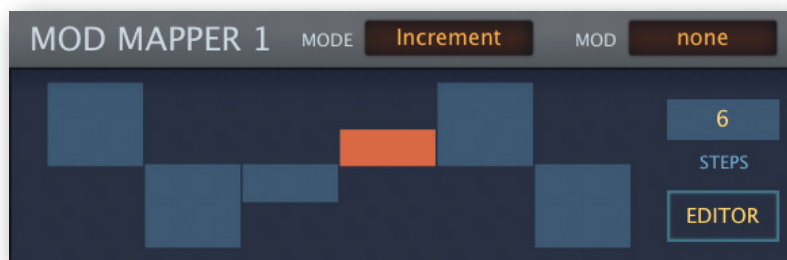
## MOD MAPPER

The 4 **Modulation Mappers** are general purpose tables which can hold up to 128 user-defined values. Maps have a wide variety of uses, e.g. meticulously adjusting the *tone* of each note on the keyboard, as in this example...



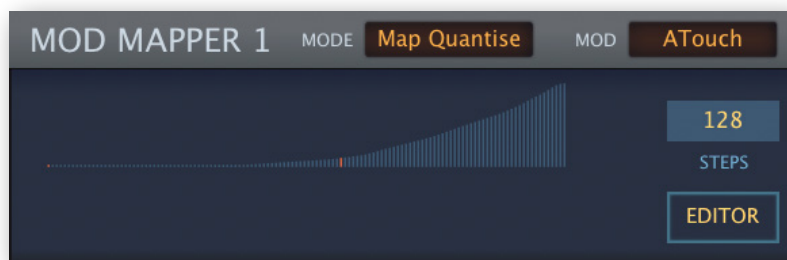
*The map used in HS Ligetimat*

...or for 'round-robin' effects. Old polysynths had a limited number of voice circuits, and the tuning of e.g. pitch and cutoff was also fixed (via trimmers) for each one. This example simulates six of those trimmers...



*One of the maps used in HS Poppington*

...or for remapping a modulation source. In the example here, the aftertouch response is altered: Aftertouch has zero effect until you press the keys hard enough to reach the point where the curve starts to rise.



*The map used in e.g. HS Seed*

### MODE

Specifies how the map is controlled. The two *Map* modes won't do anything unless you define a Modulator.

*Key*.....the 128 MIDI notes (although nobody owns a keyboard that long)

*Map Smooth*.....the 128 modulator values, interpolated for smooth transitions

*Map Quantize*.....the 128 modulator values, not smoothed

*Increment*.....played notes step through the map

### MOD (modulator)

This button selects a modulation source (LFO, envelope, whatever) to be mapped in either of the *Map* modes. Ignored in *Key* or *Increment* mode.

### EDITOR

Click to expand the map editor. While a map is expanded, the lower pane becomes a list of all its uses. Modulation depths can be adjusted here, and source assignments can even be added by clicking on the *Add* button. To remove an assignment, click on its [x] button.

## Selection / Drawing Tools

To edit a map, draw in the windows by clicking and dragging. To highlight a selection, hold down the SHIFT key while dragging: The functions are restricted to the selection, if one exists. To deselect everything, either click in the background (away from the selection) or right-click and choose 'deselect' from the *Selection* sub-menu.

Right-clicking on the modulation mapper's edit window opens a long list of editing tools. **Shift** is used for selection, and **alt** (Win) or **cmd** (Mac) is used for applying the selected *draw* option. Note: All these options also apply to LFO and LFOG in user mode!

<i>Copy / Paste</i> .....	Clipboard functions for the map data. You can use these to transfer maps between presets.
<i>Shapes</i> .....	Draw <i>Ramp</i> , <i>Triangle</i> , <i>Sine</i> , <i>Cosine</i> , <i>Root</i> , <i>Quadric</i> or <i>Spectralize</i> . The latter interprets the map as amplitudes of harmonics in the harmonic series, then replaces the map with the calculated waveform (see <a href="#">Spectralize</a> in Tips & Tricks). If you set fewer values than 128 (see 2-128 below) it will be repeated to fill all positions.
<i>Alt/Cmd-Draw</i> ....	Modify the shape by dragging in the editor while holding <b>alt</b> (Win) or <b>cmd</b> (Mac). The options are <i>erase</i> (zero), <i>scale</i> (multiply), <i>shift</i> (2D move) or <i>warp</i> (2D bend).
<i>Selection</i> .....	Applies functions to the selection: <i>invert</i> , <i>shift left</i> , <i>shift right</i> , <i>every 2nd/3rd/4th</i> . If nothing is selected, only the 'every' options will appear.
<i>Reverse</i> .....	Flips the current selection horizontally
<i>Invert</i> .....	Flips the current selection vertically
<i>Randomize</i> .....	Adds random offsets to the selection
<i>Soften</i> .....	Interpolates between values
<i>Normalize</i> .....	Expands vertically to minimum / maximum
<i>Make Unipolar</i> ....	Shifts all values to positive, rescaling if necessary
<i>Straighten</i> .....	Draws a straight line for the selection / window
<i>Reset</i> .....	Sets all values in the map to zero
<i>Quantize (n)</i> .....	Adjusts values to an equally-spaced grid. Tip: Select '12' here and use the map for pitch modulation (set the modulation depth in the osc to 12).
<i>2-128</i> .....	Map size i.e. number of values shown/used

Copy
Shapes ▶
Cmd-Draw ▶
Selection ▶
Reverse
Invert
Randomize
Soften
Normalize
Make Unipolar
Straighten
Reset
Quantise 4
Quantise 6
Quantise 8
Quantise 12
Quantise 16
Quantise 24
2
3
4
5
6
7
8
9
10
11
12
16
24
32
48
64
96
128
Lock

## MMix

Zebra's **Modulation Mixer** processes up to 3 modulation sources in one of three ways...



*The three MMIX modes*

### MODE

*sum modulations* ..... All 3 modulation sources plus the value of CONST (constant) are added together – which saves work and Matrix slots if (for instance) you want to modulate several parameters at the same time from the same bunch of modulators!

*scale sum by const* ..... The same as *sum* except that the result is multiplied by CONST.

*fade 1/2 by 3xC* ..... The constant determines how much of the Mod3 signal cross-fades between Mod1 and Mod2.

### MOD1, MOD2, MOD3

Selectors for the 3 modulators.

### CONST (constant)

The constant is added to the output in *sum modulations* mode, it scales the output in *scale sum by constant* mode, or scales the amount of Mod3 in *fade 1/2 by 3xC* mode. Note that the CONST value can be modulated, as it is a target in the modulation matrix.

# Outputs and Effects

## The FX Grid

Whenever you select GLOB/FX in the lower bar, you will see the FX Grid in the middle of the lower pane. The principle is the same as the main grid except that it is not per-voice. For how to route signals from the main grid into the FX grid, see the [Lane Mixer](#) section.

To add a new module, click on an empty cell. Double-click a module to switch it on/off. Right-click to select input(s) or remove the module.

Seven of the FX module types are the same as ‘processing’ generators available in the main grid, but of course not per voice: *Shape*, *Mix*, *Ring*, *VCF*, *SB*, *XMF* and *Dist*. All other types, *ModFX*, *Delay*, *Rev*, *Comp*, *EQ*, *Res* and *NuRev*, are described below.



*FX Grid with example routing*

## Output controls

### SEND 1 and SEND 2

These two knobs route the unprocessed input of the MASTER lane to the R1 and R2 lanes (otherwise known as *bus1* and *bus2*). In the image above, Send2 is feeding the SB3 module, and pushing the modulation wheel turns the amount down to zero. See the [flow diagram](#) on page 111.

### FX-BYPASS

Click on this button (it turns green) to temporarily deactivate all effects in the grid. The BYPASS status is truly global – you won’t hear any effects in any of your presets on any day of the week until you deactivate this!

### MASTER, R1 and R2

Volume controls for the left, center and righthand lanes of the FX grid.

### OUTPUT

The final volume control, this scales the sum of MASTER, R1 and R2. Normally set to 100%, but a preset’s volume can be boosted up to 200% if necessary.

## A note about modulating effect parameters

ZebraHZ lets you use any modulation source in the Matrix to modulate global parameters such as reverb size or delay feedback. However, many of the available modulators are instantiated per voice (e.g. envelopes and LFOs). To avoid conflicting values the effects only use the modulation provided by the most recently played voice. Depending on the source, target and depth, this can still result in audible glitches. We recommend using global sources such as the wheels, LfoG or MSEGs (in *single* or *mono* mode) wherever possible.

## MODULATION FX

Analogue purists may shudder at the mention of built-in **chorus** (which suggests a lack of ‘beef’ in other departments), but we believe no synthesizer should be without one:



*ModFX panel, Chorus mode, equalizer On*

### MODE

*Chorus* .....chorus / flanger using short delay lines

*Phorus*.....chorus / flanger using allpass filters

*Phaser*.....classic phaser unit

### FEEDB

Bipolar feedback control for ‘flanger’ type resonances.

### CENTER

Nominal delay time / allpass cutoff.

### DEPTH

Amount of *Center* modulation from the integrated LFO. See SPEED below.

### STEREO

LFO phase offset between the two stereo channels.  
Note that 50% often delivers the widest effect.

### MIX

Balance between the dry and wet signals.

### SPEED

The rate of the ModFX module’s own LFO (0.1Hz to 1Hz).

**QUAD**

The volume of an additional chorus circuit, with independent LFO.

**Q-PHASE**

Modulation LFO phase offset (see *Stereo* above) for the Quad effect.

**EQUALIZER**

A pair of low and high filters between the dry and chorused signal. These can be used to preserve the stereo position of bass frequencies while softening the chorus.

**ON/OFF**

Switches ModFX equalization on or off

**LO FREQ / LO BOOST**

Low crossover frequency and gain for the dry signal.

**HI FREQ / HI BOOST**

High crossover frequency and gain for the dry signal.

**DELAY**

The **Delay** in Zebra2 is (as you should already have begun to suspect) very flexible. It has four delay lines, each with time scaling and pan controls. Two flavours of feedback with inserted low and highpass filters can run at the same time, feeding each other...



*Delay module in 'stereo 2' mode (ping-pong regeneration via x-back)*

**MODE**

*stereo 2* .....stereo delay, uses delay 1 and 2 only

*multitap 4* .....all four delays in parallel

*dubby 2+2* .....like two instances of stereo 2 in series

*serial 2* .....ping-pong delay, uses delay 1 and 2 only

For more details, see the flow diagrams towards the end of this document.

**FEEDB and X-BACK**

Normal regeneration and cross-regeneration amounts. In multitap mode, the X-back routing is 1 - 2 - 3 - 4 - 1 etc..



## LOWPASS and HIGHPASS

Simple filters in the feedback paths which affect the tonal quality of successive repeats.

## MIX

Cross-fade between the dry and wet signal.

## Sync (unlabelled)

The button above each RATIO knob sets either a synchronized value (1/64th to 1/1 triplet) or absolute time (1 second)...

## RATIO

The Ratio knob scales the Sync from 0% (4 samples long) to 200%. Tip: Try using a tiny amount of random LFOG to modulate one or two of the delay ratios.

## PAN

The stereo position of each delay line.

# REVERB

The original **Rev1** Zebra2 reverb unit. See also [NuRev](#).



*Reverb panel, 'Reverb' mode*

The upper row is the usual set of reverb parameters, and the lower row has a similar set of controls for the DIFFUSOR (diffusion adds more reflections, increasing reverb density).

## MODE

*Reverb* is the standard model while *Metalverb* sounds more artificial and wider.

## PRE DELAY

A delay before the reverb starts. Useful for retaining the presence of the dry signal while using lots of reverb. Or for slap-back effects with short Decay and small Size.

## RANGE, D-RANGE

Reverb/Diffusion length i.e. delay times, from 'very short' to 'rather long'. Together, the RANGE and FEEDB parameters (see below) shape the impression of room size.



**FEEDB, D-FEEDB**

How much of the reverb signal is fed back into the reverb input. If *Range* and *Feedback* are set to maximum and *Damp* is at zero, the reverb will carry on almost indefinitely.

Together, the RANGE and FEEDB parameters shape the impression of room size.

**DAMP**

A simple low pass filter in the feedback loop causes higher frequencies to fade faster than low frequencies, imitating the 'warming' effect of carpets, curtains etc. in a room, or the audience in a concert hall.

**D-MIX**

The amount of diffusion.

**SPEED, D-SPEED**

The rates of the LFOs modulating Range and Feedback / D-Range and D-Feedb.

**MOD, D-MOD**

The levels of the LFOs modulating Range and Feedback / D-Range and D-Feedb.

**DRY, WET**

Separate controls for unprocessed and processed signal levels – modulating individual levels is more flexible than cross-fading dry/wet.

## COMPRESSOR

---

The original Zebra2 global compressor:



*The compressor in smooth mode*

**TYPE**

*eco*..... original lo-fi version, with very low CPU-hit

*smooth*..... smooth compression, the best choice for most sounds

*strong*..... very powerful compression, best for bold percussive sounds

**INPUT**

Adjusts the input level before the signal is compressed.

## OUTPUT

Adjusts the output level to compensate for gain differences caused by the compression.

## THRESH (threshold)

The level above which compression will be applied, and below which compression will be released – so lower values will result in more compression than higher values.

## COMP (compression)

Sets the amount of compression.

## GR

Gain reduction indicator.

## ATTACK

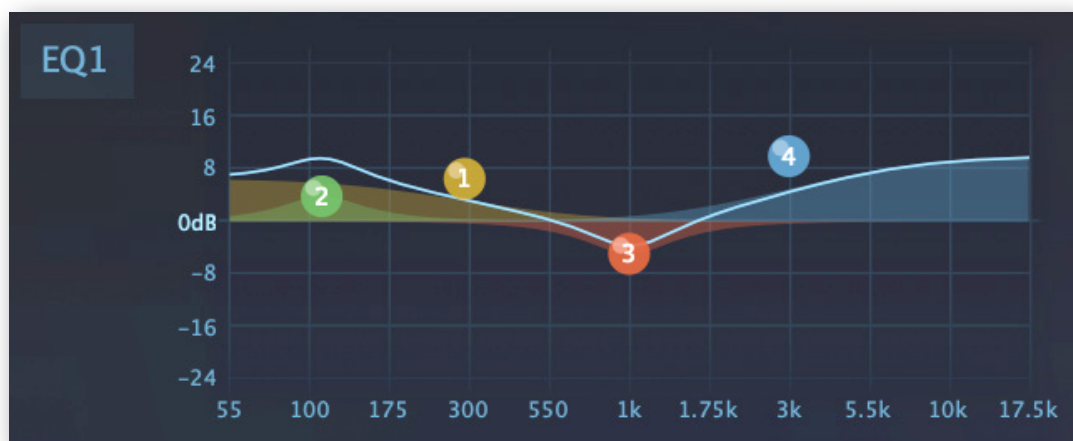
The time it takes to reach maximum compression after the threshold has been crossed. Attack can affect brightness: very fast values cause the compressor to reduce the gain immediately, which can dull the attack of the original sound. Note: When set to zero, the Attack is only one sample in length.

## RELEASE

Recovery time i.e. the time the compressor takes to return to unity gain after the input signal has fallen below the threshold. Very short Release can distort low-frequency input, overly long Release can ‘clamp’ the sound down and not release enough before the next ‘attack’ arrives. When set to zero, Release is only one sample in length.

## EQ

A 4-band parametric equalizer. Drag the points to set frequency and gain. Right-click on a point and drag vertically to adjust the Q (width/slope) of the band. Right-click in the background for basic editing functions: copy, paste, clear (flatten).



*Equalizer module, bass+treble boost, dip around 1 kHz*

Apart from compression, equalization is the audio engineer’s important “Swiss-army knife” used to ensure that tracks work well together in the context of the song.

In ZebraHZ, equalizers are very useful for tweaking the final tonal character of a preset – make it generally brighter or duller, boost or cut certain frequencies...

Freq LowShelf
Q LowShelf
Gain LowShelf
<b>Freq Mid1</b>
Q Mid1
Gain Mid1
Freq Mid2
Q Mid2
Gain Mid2
Freq HiShelf
Q HiShelf
Gain HiShelf

All 12 parameters (frequency, gain, slope) of the EQ are targets in the modulation matrix. The highlighted entry in this image is actually the horizontal position of point 2:

*Point 1 = LowShelf*

*Point 2 = Mid1*

*Point 3 = Mid2*

*Point 4 = HiShelf*

Example: To use the EQ shown on the previous page as a swept band reject filter (sounds a bit like phasing), you will need to modulate point 3 to the left and right. The modulation target is Freq Mid2.

## NU REV

A smooth plate reverb with pre-delay. See also the original [REVERB](#).



*The NuRev module*

### PRE DELAY

A delay before the reverb starts. Useful for retaining the presence of the dry signal while using lots of reverb. Or for slap-back effects with short Decay and small SIZE.

### DAMP

A low pass filter in the feedback loop causes higher frequencies to fade faster than low frequencies, imitating the 'warming' effect of carpets, curtains etc. in a room,.

### SIZE

Room dimensions, from "sardine can" to infinity and beyond. Balance this with *Decay*...

### TONE

Strong 'tilt' equalizer. Bipolar. Use in combination with *Damp* to "colourize" the reverb.

### DECAY

Reflectivity of the room. Effectively how long it takes for the reverb tail to fade to silence.

### WIDTH

Stereo spread of the reverb signal.

### Dry/Wet

Balance between the dry and processed signals.

## RESONATOR

One of the very first polyphonic synthesizers ever made included a 3-band peaking filter that could dramatically colourize a sound.

The ZebraHZ version **Res** is similar, but is fully modulatable and includes an extra full-range band on the right of the panel.

Click on a cell in the effects grid and select a **Res** module from the menu...



*The Resonator module*

### MODE

Swaps out the filter type used: **LP** = lowpass, **BP** = bandpass, **BPi** = bandpass with the second filter (300Hz to 1.5kHz) inverted, and **HP** = highpass.

### INPUT

The signal level at the resonator's input.

### COLOUR

Selects one of 3 different analogue filter models (in the order of CPU hunger).

**F** = Frequency

The yellow sliders set cutoff frequencies within the ranges indicated by the labels. Note that the filter on the right is full-range (60 Hz to 7.5 kHz).

**E** = Emphasis

The blue sliders adjust the emphasis a.k.a. resonance for each filter.

**G** = Gain

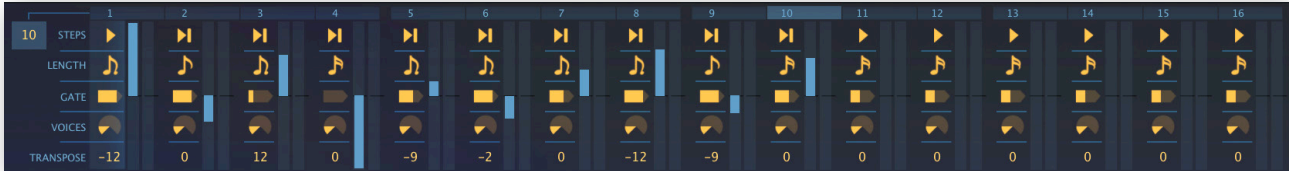
The orange sliders set the output level for each filter.

*Tip: ZebraHZ's resonator is worth studying in depth. It can help you train your ears to recognize natural formants in the environment or in acoustic musical instruments, which is very useful knowledge for synth sound design!*

# Performance

## Arpeggiator / Sequencer

If you would like to experiment with an existing arpeggio, load *How Money More Times* from the Zebra2 'Lupins' folder and play with **all** settings...



*Arpeggiator settings used in the Zebra2 preset 'How Money More Times'*

...or you can follow these steps:

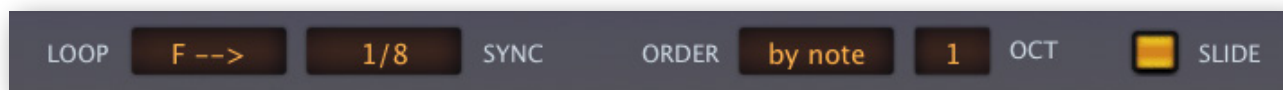
### Hands-on tutorial

1. Right-click on the data display and select *init*.
2. Click below the OSC1 cell and add VCF1.
3. Set CUTOFF to minimum, click on an assignable knob in the VCF and select Env1
4. Set the amount of 'Env1' cutoff modulation in the VCF to about 110, ENV 1 SUSTAIN to minimum, and RELEASE to 50.
5. Click on the GLOB/FX tab in the lower bar and select VOICE MODE *arpeggiator*.
6. Play a low note...
7. Change OSC1 mode to 'quad', and DETUNE it a little.
8. Play that low note again and adjust VCF 1 RESONANCE to 10 or a little higher.
9. We should now have a simple slow bass arpeggio. Click on the ARP CTRL tab in the lower bar to open the arpeggiator...
10. Change STEPS to 4 and SYNC to 1/8. Set TRANSPOSE of the 3rd step to 1 and the 4th step to 7. Play a note...
11. Change the leftmost triangle to a different icon... why is it an 8-note sequence now? Experiment! Listen to what happens if you change one or two of the other triangles.
12. Play a chord... Change the first four VOICES to 6 (roll your mouse wheel to do this)
13. Play a chord. If it distorts, turn down the volume in Lane 1.
14. Click on the remaining assignable knob in the VCF, select 'ArpMod' and set the amount to +20. To the right of each step you will see two unlabelled columns. Drag the leftmost of these up or down for each of the 4 steps.

Try adjusting all LENGTH, GATE settings. And don't forget to add '1/8 dot' delay, of course!

## General Settings

The row of options along the bottom affect the entire arpeggio / sequence:



### LOOP

The direction in which the **note buffer** (see ORDER below) is played back:

*f* ==> forwards  
*b* <== backwards  
*fb* <=> forwards / backwards  
*bf* >=< backwards / forwards

The names of these options may be a source of confusion: LOOP does **not** affect the direction in which the arpeggiator runs!

### SYNC

1/64 – 1/1 trip: The duration of the default ‘semiquaver’ step. See LENGTH below.

### ORDER

Incoming notes are ordered within a **note buffer** in one of two ways. The buffer is then played back in the direction set by the *Loop* parameter (see below).

*by note* .....notes are reordered according to MIDI note number  
*as played* .....the original order in which notes were played is retained

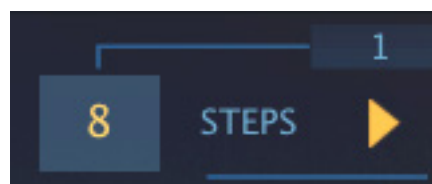
### OCT (octaves)

0, 1 or 2 times: This switch sets how often the octave is shifted up after all notes in the buffer have been played back.

### SLIDE

When this switch is active i.e. orange, any Glide/Glide2 set in the GLOB/FX panel will only be applied to connected notes (see GATE below).

### STEPS (1)

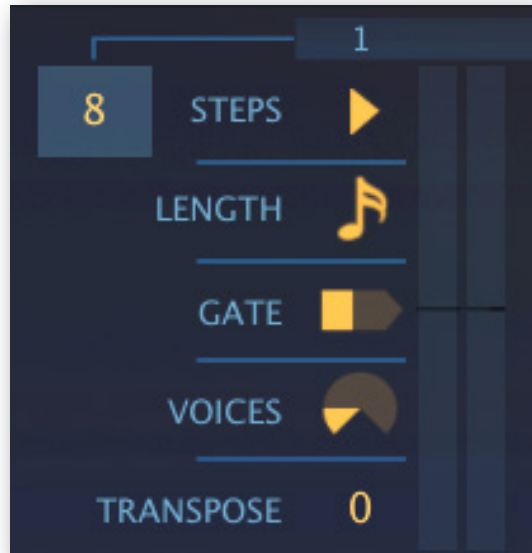


This label is used for two different parameters: 1) the number of steps in the arpeggio / sequence and 2) which note is retrieved from the buffer (see [STEPS \(2\)](#) below).

For the former i.e. to change the number of steps there are 3 methods: Either click and drag the box at the top left ('8' in this image), or hover over it and roll the mouse wheel, or click on one of the numbers along the top of the arpeggiator panel.

## Per Step Settings

The parameters described below appear 16 times, once for each step. Use them to make your arpeggios more lively...



### STEPS (2)

The symbol immediately below the step index (1 in this image) shows which note is retrieved from the buffer. Either click to open a menu, or hover over the symbol and roll your mouse wheel for the following options:

- ▶ the **next** note
- || the **same** note
- ◀ the **first** note
- ▶ the **last** note

Tip: For typical monophonic arpeggios, set all used steps to 'last'.

### LENGTH

Step lengths are defined as multiples of the *Arp Sync* value. Click to open the menu or roll the mouse wheel for the following:

- ♪ = 1 x
- ♪ = 2 x
- ♪ = 3 x
- ♪ = 4 x



**GATE** (gate length)

As arpeggiators automatically play / release notes, the gate times need to be defined.



0 to 4.....From very short to almost the value of [SYNC](#) (see 2 pages up).

5.....**Tie** i.e. connect this step to the next one. See [SLIDE](#) 2 pages up.

Note that a tie only connects to the **first** voice of the following step. If the following step plays multiple VOICES, these will be triggered.

**VOICES**

0 to 6. The maximum number of notes that can be played simultaneously for the step. A value of 0 here means *skip this step*.

**TRANSCOPE**

The pitches may be already animated, but the steps can also be transposed by up to +/- 12 semitones. This feature can be used to create regular sequences, but is particularly interesting combined with arpeggiation i.e. when you play more than one note at a time.

**Arpeggiator Modulators** (unlabelled)

The two rather faint columns are bipolar sliders used for modulating any targets you like (e.g. VCF cutoff and Glide rate) in parallel with the arpeggiator. The corresponding modulation sources are called *ArpMod* and *ArpMod2*.

**Tip**

Even a simple 3-step arpeggio can create a 15-note sequence (or even 24 in FB or BF loop mode!) if you set [OCT](#) to 2 and play a 5 note chord.

## XY Pad programming

Click on the XY1 tab in the lower bar...



*X/Y programming panel #1 in 'Batflaps Performer'*

### Hands-on tutorial

Don't enter the PERFORM page just yet, but stay in the SYNTH page for now.

1. Load *init* by right-clicking on the data display and selecting the first entry.
2. Right-click on OSC1's Tune knob and select *assign to / X1*. Move the top left knob (X1)
3. Click on XY in the lower bar, then on 1 to see the new assignment.
4. Click below OSC1 in the grid and select VCF1. Leave the Cutoff at maximum.
5. In the righthand 'Y' area of the X/Y panel, right-click on the topmost 'none' and select Filter1 / Cutoff. Double-click **3 times** on that grey segmented bar to set the limit markers appropriately: Y1 will now span the entire cutoff range, with low values at the bottom and high values at the top.
6. While watching that bar, move Cutoff up and down in the filter panel. You will see the bar moving in the opposite direction from Cutoff. Leave Cutoff at maximum.
7. Click on PERFORM in the control bar, then move the **handle** (the dot) around the XY1 pad while playing. Watch the movement in the lower area until you understand what's happening there. Note that only the lower half of the Y axis affects cutoff...
8. ...so grab the righthand (Y1) bar and move it to dead center. The data display should read "Filter1 Cutoff, 75.00". If necessary, hold down SHIFT for fine control. Double-click on the bar 3 times to reposition the limit markers.
9. Play a note and use the XY1 pad again. Positive Y values will now affect the cutoff because **you have turned the cutoff knob down** to 75 by moving the bar to the right. Open the SYNTH window and check that, then go back to the PERFORM window.
10. Double-click in the empty field above the pad, enter the text "PITCH & CUTOFF" and click on the Apply button. Next, double-click in the large empty field to the right and enter "x=pitch" and "y=cutoff" on separate lines. Apply.
11. Try assigning XY2 to other targets e.g. filter resonance and oscillator vibrato. Adjust the triangular limit markers manually instead of double-clicking on the bars this time. You can assign up to 8 targets per axis. You will only see targets for modules that are used in the preset... add more modules and look again!

## Controls

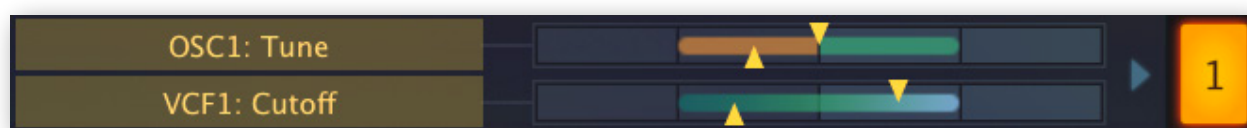
### X and Y knobs

The 8 knobs in the centre mirror the X/Y controls pads in the PERFORM page: Moving a knob will also move the handle in the corresponding pad, and vice versa. Use them to MIDI-learn the X/Y pads for remote control, or for X/Y automation. See [MIDI Learn](#).

### Target Selectors and Range Controls

The main area of the XY assignment panel is divided into two blocks: The left half is for the X-axis and the right half is for the Y-axis.

The 16 *Target Selectors* (all set to 'none' by default) open a nested menu containing everything that can be modulated in the current preset. As more modules are added to the grids, more targets will appear. Note that you can use [drag & drop](#) assignment here – simply click on a target selector and drag into the SYNTH window...



*target selectors*

*bipolar (top) and unipolar (bottom) range bars  
with limit markers (the triangles)*

Targets can also be selected from the SYNTHESIS window or effects panels by right-clicking on a knob and choosing 'assign to / (X1...Y4)' from the context menu.

As soon as a target is selected, a **range bar** appears to the right, representing the full range of the target parameter, plus a pair of **limit markers**.

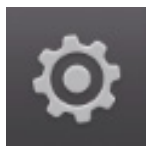
**Important:** In the centre of this area is a vertical line which represents the current value, and moving the range bar adjusts that value. Go to the SYNTH window and watch the target parameter move *in the opposite direction* as you slide the range bar left and right. Or vice versa – adjust that knob and watch the range bar move.

The two triangular **limit markers** set the minimum and maximum values. You can invert the control by setting the upper marker to the left and the lower one to the right.

Double-clicking on a range bar switches between three preset ranges: normal full range, inverted full range and zero range from the centre (current value).

Note: Although X1 to Y4 appear as modulation sources in the ZebraHZ matrix, these are fully independent of the X/Y programming panel.

# Configuration



Click on the cogwheel icon at the top righthand corner to open the global configuration pages where you can adjust the UI size and brightness as well as connect Zebra parameters to MIDI continuous controllers. A row of 4 buttons appears:



These are **MIDI Learn** (L), **MIDI Table** (≡), **Preferences** (“tools”) and **Close** (cogwheel).

Tip: Right-click anywhere within the row of buttons to **Set as Default View**. That particular page will appear whenever you load a new instance and click on the cogwheel.

## About MIDI CC

**CC**, which now officially stands for *Control Change* (and no longer *Continuous Controller*!) is a multi-purpose message format used for editing and performing presets.

CC isn't the only kind of MIDI performance data. For instance, there are different messages for note on/off (including velocity), pitch bend and two kinds of aftertouch.

Although the MIDI Manufacturers Association (MMA) was kind enough to leave most of the 128 CC numbers undefined, two of them have specific meanings recognized by ZebraHZ:

01 = modulation wheel  
64 = sustain pedal

Previous versions of Zebra2 and ZebraHZ also offered the CC controls *Breath* (CC 02) and *Expression* (CC 11). These have been replaced by user-definable Control A and B. See the [Preferences](#).

Note that you don't actually need a breath controller (for instance) or an expression pedal to make use of CC messages. Most of the names are purely convention these days – you can use anything that can send a definable CC e.g. some knobs or sliders on your MIDI keyboard, or a controller lane in your MIDI sequencer.

Later MMA revisions to the MIDI spec even included a bunch of esoteric CC definitions such as ‘Celeste Detune Depth’, probably at the request of a home organ manufacturer or two. We can safely ignore all such definitions.

## MIDI Learn



ZebraHZ can be remote-controlled / automated via MIDI messages from a hardware controller unit or from your sequencer program. Click on the cogwheel then on the MIDI Learn symbol (L) to open this view...



The overlay shows all MIDI-learnable elements as selectable outlines. Controls that are already assigned appear filled, like the OSC 1 'Wave', 'Tune' and 'Detune' controls in the above image. The currently active element i.e. the one waiting to be learned is highlighted – like OSC 2 'Wave' here.

Try it: Click on the OSC 1 'Tune' knob and send some MIDI CC data (move a knob or slider on your MIDI controller). The 'Tune' knob becomes opaque and remote-controllable.

The GUI switches (e.g. all those in the lower bar) remain active so you can MIDI-learn all parameters without having to exit and switch panels.

Tip: If you ever have problems with parameters magically resetting themselves, the usual reason is an *accidental MIDI learn*. Open the **MIDI Table** and see if there's anything there!

## MIDI Table



Click on the cogwheel and select the MIDI Table [≡] icon to open an editable list of all current MIDI CC assignments:

MIDI table					
	Parameter	Channel	Controller	Mode	Type
1	Oscillator1:WaveWarp	1	8	normal	Continuous7bit
2	Oscillator1:Tune	1	7	normal	Continuous7bit
3	Oscillator1:Detune	1	6	normal	Continuous7bit
4	-not assigned-	1	1	normal	Continuous7bit

### Parameter

The first field displays/selects one of ZebraHZ's many parameters, which are sorted into sub-menus. Click on the 'Add' button at the bottom and experiment with this option.

### Channel / Controller

The next two fields are for MIDI channel and CC number (see [About MIDI CC](#) above).

### Mode

Specifies the range and/or resolution of values:

*Normal*.....full range, continuous

*Integer*.....full range, whole numbers only

*Fine*.....0.01 steps between the two integers closest to the current value

### Type

Specifies the data output from knobs / sliders on your hardware controller. *Continuous 7bit* is the most common by far, but you should check your hardware specifications:

*Encoder 127*.....'relative mode' endless knobs that repeatedly send the CC value 1 when turned up, or 127 (interpreted as -1) when turned down

*Encoder 64*.....'relative mode' endless knobs that repeatedly send the CC value 65 when turned up, or 63 when turned down

*Continuous 7bit*.....7-bit MIDI CC (normal resolution, most common)

*Continuous 14bit*.....14-bit MIDI CC (high resolution, less common)

### Removing Assignments

To remove an individual assignment, click on the [X] to the right of the line. To remove all assignments at once, click on the *Delete All* button at the bottom and confirm.

### Last Clicked (experimental feature)

Click on the 'Add' button. At the very bottom of the Parameter menu you will see two options called *Last Clicked Control* and *Last Clicked Control Fine*. Select *Last Clicked Control*, enter a suitable controller (MIDI CC) and exit the configuration pages. Which-ever knobs or switches you click on now, the most recent one will respond to that CC! The *Fine* option is similar, but has a very narrow range so you can program a pair of knobs to remote-control anything "coarse" as well as "fine". Work in progress.



## Per Instance Control

### Control A and Control B

These are local versions of the settings *Control A Default* and *Control B Default* in the Preference page (see below)., and override those global settings.

## Preferences



Clicking on the cogwheel then the [TOOLS] icon will open the Preferences window, where you can specify various global settings...

## Control

### Mouse Wheel Raster

If your mouse wheel is rastered (you can feel slight clicks as you roll it), switch this on..

### Scroll Horizontal

Folders with more files than can be displayed in the window (e.g. 'Drums & Clocks') can be scrolled page-wise via mouse wheel. Opinions differed about which direction the wheel should be moved, so we made this optional.

## Appearance

### Default Size

Sets the UI size for each new instance. Note that you can temporarily change the size by right-clicking in the background.

### Gamma

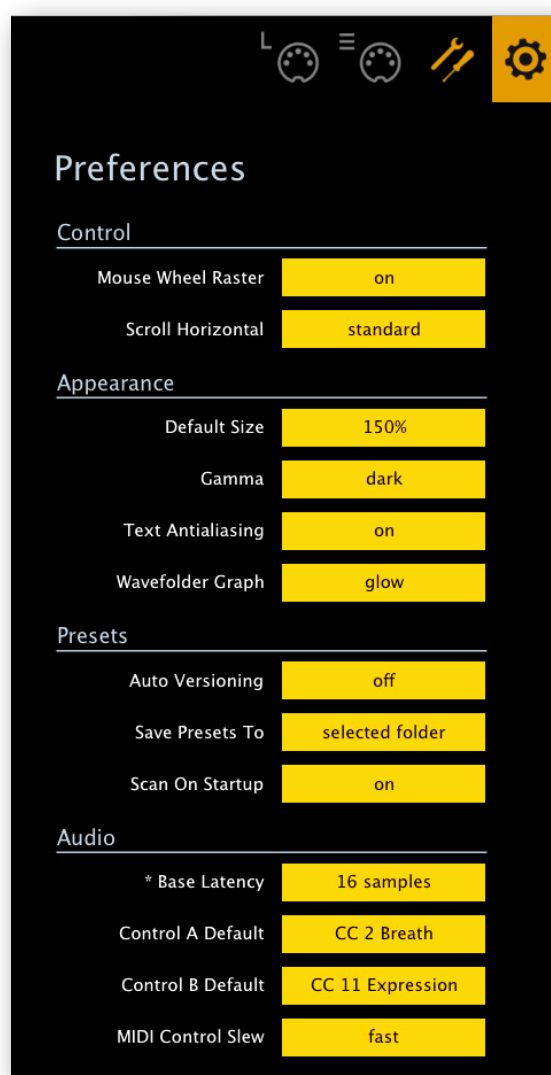
The default brightness.

### Text Antialiasing

Smoothing of all labels and values. Usually left on, in rare cases switching this option off can improve readability.

### Wavefolder Graph

Appearance of the FOLD module's little graph. 'eco', 'fast' or 'glow', in order of CPU usage.



## Presets

### Auto Versioning

If this option is switched on, an index is appended to the preset name and automatically incremented each time you save. For instance, saving 'Space' three times in a row would give you three files: 'Space', 'Space 2' and 'Space 3'.



### Save Presets To

Choosing 'user folder' here causes all saved presets to land in the *User* folder instead of the currently selected one.

### Scan On Startup

Whether the preset library should be scanned and the database recreated when the first instance of Zebra2 is started, e.g. when you reopen a project.

## Audio

### Base Latency

Only disable this option if you are 100% sure that your audio system – hardware as well as software – uses buffers that are a multiple of 16 samples. Otherwise you should leave it at '16 samples' to prevent crackles.

Note that a new Base Latency setting will only take effect when the host allows e.g. on playback or after switching the sample rate. Reloading ZebraHZ will always work.

#### ABOUT THOSE BUFFERS

Internally, Zebra processes audio in chunks of  $n \times 16$  samples. This so-called 'block processing' method significantly reduces CPU load and memory usage.

For instance, if the number of samples to be processed is 41, Zebra will process the first 32 and keeps the remaining 9 in a small buffer (16 samples is enough). Those 9 samples are then processed at the start of the next call.

Note: The extra buffer is only necessary if either the host or the audio driver is processing "unusual" buffer sizes. In the many host applications that process buffers of 64, 128, 256 or 512 samples (all multiples of 16), try switching it off so that Zebra can process latency-free.

### Control A/B Default

The list of modulation sources in earlier versions of included the fixed MIDI CC *Breath* (CC#02) and *Xpress* (expression pedal, CC#11). Since version 2.8 we have replaced these with the user-definable CC sources **Control A** and **Control B**, retaining *Breath* (CC2) and *Expression* (CC11) as the defaults to ensure compatibility with older presets.

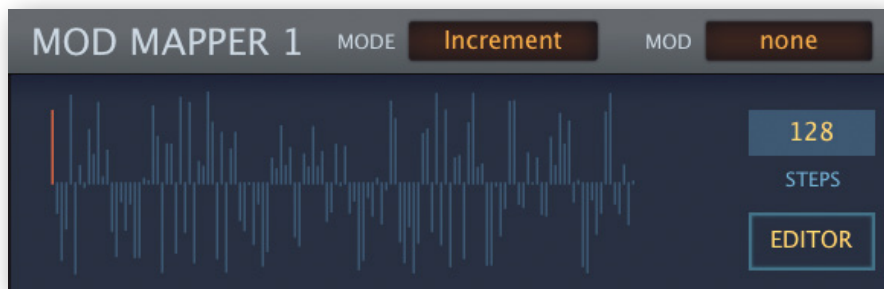
### MIDI Control Slew

The strength of parameter smoothing for all performance control sources: *PitchW* (pitch wheel), *ModWhl* (modulation wheel), *CtrlA*, *CtrlB* as well as *ATouch* (aftertouch i.e. channel pressure or poly pressure). The default setting is 'fast'.

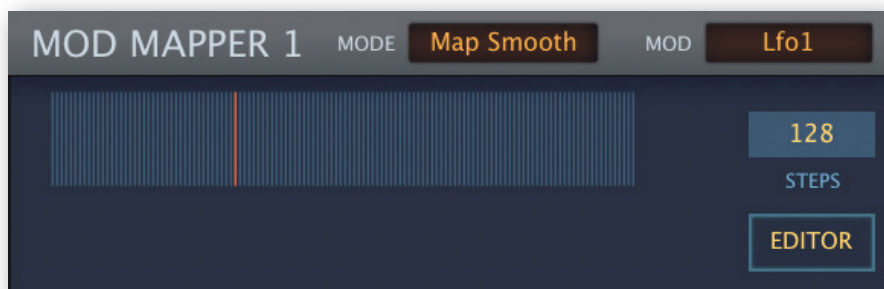
# Tips & Tricks

## Motion viewer for modulators

Thanks to Brian Rzycki for this tip. Load *init* then assign MMap1 as modulation source for something, e.g. Lane 1 Pan (the target doesn't actually matter for this experiment). A ModMapper will appear in the modulators pane:

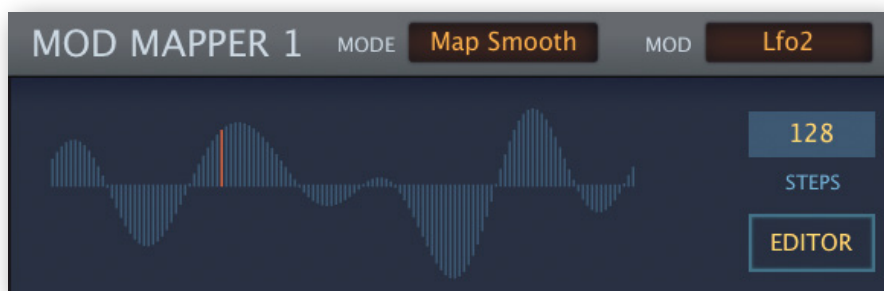


Change the MODE to *Map Smooth*. Select LFO1 as MOD source. Click on [EDITOR] to expand the map, set the extreme left and right values to maximum, right-click in the background and select *Straighten*. CLOSE the expanded editor. It should now look like this:



Play a note and turn down the LFO rate (this trick only works well if the modulator is relatively slow). Also works fine with envelopes or MIDI input such as aftertouch.

## Spectralize



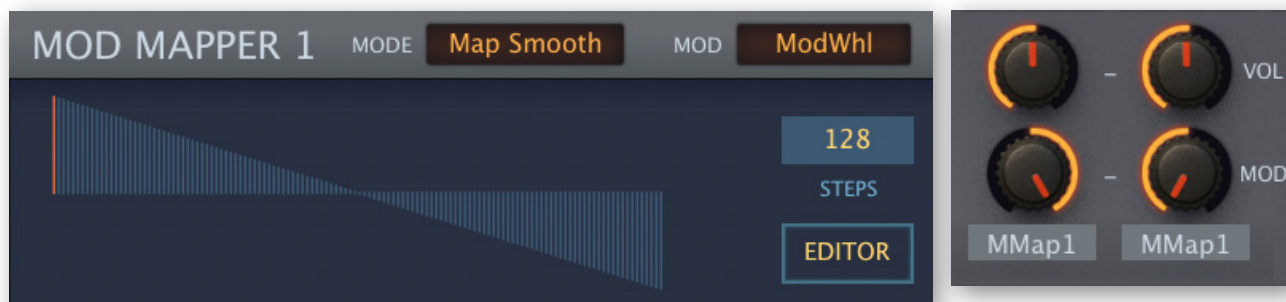
The context menu of the modulation mappers include a special function adopted from u-he synths that can use maps as audio waveforms (ACE and Bazille): Spectralize interprets the map as the first 128 partials of the harmonic series, and converts the data into the actual waveform. In Zebra, this is the easiest way to create a smooth, complex curve.

Try this: Load *init*, click on the OSC1's Tune modulation knob and select *MMap1*. Right-click in MMap1 and select *Reset*. Right-click again and restrict the size of the map to 5. Move those 5 values up or down, right-click once more and select *Shapes / Spectralize...*

To scan in one direction only, set the waveform of the MOD (LFO2 here) to *saw up*.

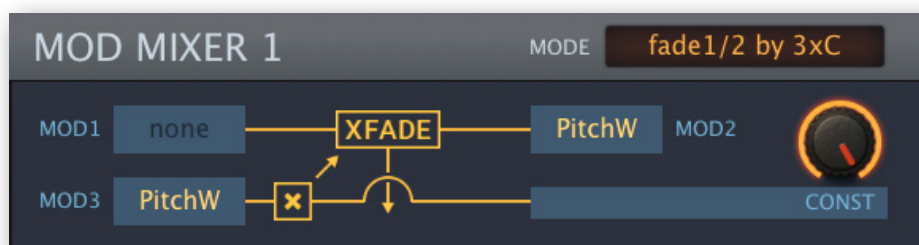
## Modulation inverter

It is sometimes necessary to invert unipolar modulation sources, for instance if you want to cross-fade between two lanes of the main grid. Here's how to do that:



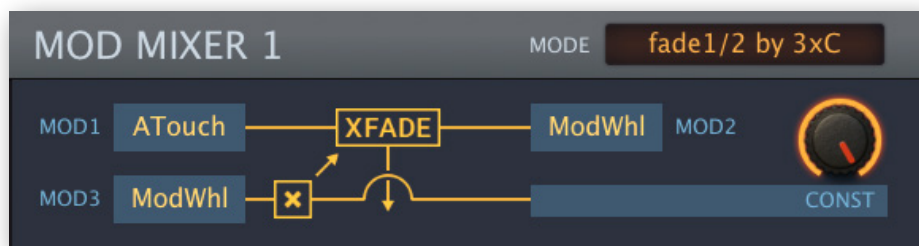
A Mix module can crossfade between signals **at source** e.g. 2 oscillator volumes, but the solution here does unipolar to bipolar conversion and can create non-linear curves.

## Absolute value



This example always outputs positive pitch wheel values – minus times minus is plus!

## Vibrato under control



When the mod-wheel is at minimum, output is all *ATouch*, and when at maximum, output is all *ModWhl* – so the sum of the sources always adds up to 100%.

Especially 'Prog-Rock' keyboard wizards will understand the reason for this one. It lets you add vibrato using either mod-wheel or aftertouch or any mixture of the two in the same preset, without letting vibrato get too deep. So you can take a solo using the mod-wheel, then get back to playing two keyboards at once using aftertouch instead.

## More MSEG points

If you really need more points than the 33 available in each MSEG, try using a couple of MSEGs in series. Here's how: Extend the very last segment of the first MSEG to the total length of the second MSEG, then extend the first segment of that MSEG to the length of the first MSEG minus that long segment. Add them together using a modulation mixer.

# Modulation Target Lists

## Generators

Target names are in alphabetical order. Knob names are in **bold**. “Modulation amount” means the degree to which another modulator affects its target.

OSC	
Detune	<b>DETUNE</b>
key scale	<b>KEY SCALE / GAIN</b> (lower panel)
Normalize	<b>NORM</b> (lower panel)
Pan	<b>PAN</b>
PanModDepth	(assignable) Pan modulation amount
Phase	<b>PHASE/PW</b>
PhaseModDepth	(assignable) Phase modulation amount
Poly Width	Stereo <b>WIDTH</b> (for dual, quad, eleven)
SFX1ModDepth	(assignable) spectral effect 1 modulation amount
SFX2ModDepth	(assignable) spectral effect 2 modulation amount
SpectraFX1 Val	spectral effect 1 value
SpectraFX2 Val	spectral effect 2 value
SyncModDepth	(assignable) Sync modulation amount
SyncTune	<b>SYNC</b> effect
Tune	<b>TUNE</b> in semitones
TuneModDepth	(assignable) Tune modulation amount
Vibrato	<b>VIBRATO</b>
Volume	<b>VOLUME</b>
VolumeModDepth	(assignable) Volume modulation amount
WarpModDepth	(assignable) Wave modulation amount
WaveWarp	<b>WAVE</b> index

Noise	
F1 ModDepth	(assignable) Lowpass modulation amount
F2 ModDepth	(assignable) Highpass modulation amount
Filter1	<b>LP</b> (Lowpass)
Filter2	<b>HP</b> (Highpass)
Pan	<b>PAN</b>
PanModDepth	(assignable) Pan modulation amount
Volume	<b>VOLUME</b>
VolumeModDepth	(assignable) Volume modulation amount
Width	Stereo <b>WIDTH</b>

VCF	
Cutoff	<b>CUTOFF</b>
Drive	<b>DRIVE / VOWEL / SPLIT</b>
Gain	<b>GAIN</b>
KeyFollow	<b>KEY F</b>
ModDepth1	(assignable) Cutoff modulation amount 1
ModDepth2	(assignable) Cutoff modulation amount 2
Resonance	<b>RES</b>

D-HPF	
Frequency	<b>CUTOFF</b>
Resonance	<b>RES</b>
FreqModDepth	(assignable) Cutoff modulation amount

D-VCF	
Frequency	<b>CUTOFF</b>
Resonance	<b>RES</b>
FreqModDepth	(assignable) Cutoff modulation amount
FreqMod2Depth	(assignable) Cutoff modulation amount 2
KeyFollow	<b>KEY F</b>
ResModDepth	(assignable) Resonance modulation amount
ShapeModDepth	(assignable) SHAPE MIX modulation amount (for Uhbie mode)

FMO	
Detune	<b>DETUNE</b>
FM Depth	<b>FM</b> input
FM ModDepth	(assignable) FM modulation amount
Key Scale Pitch	Key Follow (lower panel, unlabelled horizontal slider)
Pan	<b>PAN</b>
PanModDepth	(assignable) Pan modulation amount
Tune	<b>TUNE</b> in semitones
TuneModDepth	(assignable) Tune modulation amount
Vibrato	<b>VIBRATO</b>
Volume	<b>VOLUME</b>
VolumeModDepth	(assignable) Volume modulation amount
Width	<b>WIDTH</b>

Comb	
Damp	<b>DAMP</b>
DampModDepth	(assignable) Damp modulation amount
Detune	<b>Detune</b>
Distortion	<b>Distortion</b>
Dry	<b>Dry</b>
FBModDepth	(assignable) Feedback modulation amount
Feedback	<b>Feedbk</b>
Flavour	<b>Flavour</b>
FlavourMod	(assignable) Flavour modulation amount
Input	<b>Input</b>
InputMod	(assignable) Input modulation amount
Key Scale Pitch	<b>KEY S</b>
Pan	<b>PAN</b>
PanModDepth	(assignable) Pan modulation amount
PreFill	<b>PRE FILL</b>
Tone	<b>TONE</b>
ToneMod	(assignable) Tone modulation amount
Tune	<b>TUNE</b> (semitones)
TuneModDepth	(assignable) Tune modulation amount
Vibrato	<b>VIBRATO</b>
Volume	<b>VOLUME</b>
VolumeModDepth	(assignable) Volume modulation amount
Width	<b>WIDTH</b>



Shape	
D_ModDepth	(assignable) Depth modulation amount
Depth	<b>DEPTH</b>
Edge	<b>EDGE</b>
Edge ModDepth	(assignable) Edge modulation amount
HiOut	<b>HI OUT</b>
Input	<b>INPUT</b>
Output	<b>OUTPUT</b>

Mix (ChannelMix)	
Mix	<b>MIX</b>
Pan	<b>PAN</b>
PanMod Depth	(assignable) Pan modulation amount

XMF	
Bias	(visible but not implemented)
Click	<b>CLICK</b>
Cutoff	<b>CUTOFF</b>
FilterFM	Cutoff <b>FM</b>
Freq mod1	(assignable) Cutoff modulation amount 1
Freq mod2	(assignable) Cutoff modulation amount 2
FreqOffMod	(assignable) Offset modulation amount
FreqOffset	<b>OFFSET</b>
KeyFollow	<b>KEY F</b>
Overload	<b>OVER</b>
Resonance	<b>RES</b>
XFMmod	(assignable) Filter FM modulation amount

SB	
FModDepth	(assignable) Freq modulation amount
Frequency	<b>FREQ</b>
Mix	<b>MIX</b>
MModDepth	(assignable) Mix modulation amount
Offset	<b>OFFSET</b>
OModDepth	(assignable) Offset modulation amount

Distortion	
Input	<b>INPUT</b>
Output	<b>OUTPUT</b>
Pre Tilt	<b>PRE TILT</b>
Post Tilt	<b>POST TILT</b>
Center Freq	<b>CENTER</b>
Low	<b>LOW</b>
High	<b>HIGH</b>

Fold	
Folds	<b>FOLDS</b>
Fold Mod	(assignable) Fold modulation amount
Bias	<b>BIAS</b>
Bias Mod	(assignable) Bias modulation amount
FoldRatio	<b>RATIO</b>
FoldSlope	<b>SLOPE</b>
Clip Angle	<b>CLIP ANGLE</b>

Voice Circuit (GLOB)	
Portamento	<b>GLIDE</b>
Portamento2	<b>GLIDE 2</b>

## Modulators

Envelopes	
Init	(assignable) Initial level before the Attack stage
Attack	<b>ATTACK</b>
Decay	<b>DECAY</b>
Sustain	<b>SUSTAIN</b> level
Fall/Rise	<b>F/R</b>
Sustain2	(assignable) Sust2 level (if Sust2 is active)
Release	<b>RELEASE</b>
Velocity	<b>VEL</b>
Vel2I	<b>VEL SCALE</b> initial level amount (if Init is active)
Vel2A	<b>VEL SCALE</b> to Attack amount
Vel2D	<b>VEL SCALE</b> to Decay amount
Vel2S	<b>VEL SCALE</b> to Sustain amount
Vel2FR	<b>VEL SCALE</b> to F/R amount
Vel2S2	<b>VEL SCALE</b> to Sust2 amount (if Sust2 is active)
Vel2R	<b>VEL SCALE</b> to Release amount
Key2I	<b>KEY SCALE</b> to initial level amount (if Init is active)
Key2A	<b>KEY SCALE</b> to Attack amount
Key2D	<b>KEY SCALE</b> to Decay amount
Key2S	<b>KEY SCALE</b> to Sustain amount
Key2FR	<b>KEY SCALE</b> to F/R amount
KeyS2	<b>KEY SCALE</b> to Sust2 amount (if Sust2 is active)
Key2R	<b>KEY SCALE</b> to release amount
Slope	Slope (unlabelled, for v-slope mode)

MSEGs	
Velocity	<b>VEL</b>
Attack	<b>A</b> (attack time)
Loop	<b>LOOP</b> time
Release	<b>R</b> (release time)

LFO	
Amplitude	<b>AMP</b>
Delay	<b>DELAY</b>
DepthMod Dpt1	(assignable) Amp modulation amount
FreqMod Dpt	(assignable) Rate modulation amount
Phase	<b>PHASE</b>
Rate	<b>RATE</b>

MMix	
Constant	<b>CONST</b>

Voice Mix	
Mod Depth(1-4)	(assignable) 'Mod' modulation depth (Vol) – lane mixer
Pan Mod Dpt(1-4)	(assignable) 'Mod' modulation depth (Pan) – lane mixer
Pan(1-4)	<b>PAN</b> – lane mixer
Send1	<b>SEND1</b> – FX mixer
Send2	<b>SEND2</b> – FX mixer
SendDepth1	(assignable) SEND1 modulation amount – FX mixer
SendDepth2	(assignable) SEND2 modulation amount – FX mixer
Volume(1-4)	<b>VOL</b> – lane mixer

Lane Compressors (AmpComp)	
Compression	<b>COMP</b> – compression amount
Threshold	<b>THRESHOLD</b>
Attack	<b>ATTACK</b> rate
Release	<b>RELEASE</b> time
Input	<b>INPUT</b> level
Output	<b>OUTPUT</b> level

## Global

---

LFOG (LfoG)	
Amplitude	<b>AMP</b>
Phase	<b>PHASE</b>
Rate	<b>RATE</b>

Master	
Master	<b>MASTER</b>
Return1	<b>R1</b>
Return2	<b>R2</b>

## Effects

ModFX	
Center	<b>CENTER</b>
Depth	<b>DEPTH</b>
Feedback	<b>FEEDB</b>
HiCut Freq	<b>HI FREQ</b>
High Boost dB	<b>HI BOOST</b>
Low Boost dB	<b>LO BOOST</b>
LowCut Freq	<b>LO FREQ</b>
Mix	<b>MIX</b>
Quad	<b>QUAD</b>
QuadPhase	<b>Q-PHASE</b>
Speed	<b>SPEED</b>
Stereo	<b>STEREO</b>

Delay	
Drive	(unused)
Feedback	<b>FEEDB</b>
Hipass	<b>HIPASS</b>
Lowpass	<b>LOWPASS</b>
Mix	<b>MIX</b>
Pan1 ... Pan4	<b>PAN1 ... PAN4</b>
Ratio1 ... Ratio4	<b>RATIO1 ... RATIO4</b>
X-Back	<b>X-BACK</b>

Shape	
D_ModDepth	(assignable) Depth modulation amount
Depth	<b>DEPTH</b>
Edge	<b>EDGE</b>
Edge ModDepth	(assignable) Edge modulation amount
HiOut	<b>HI OUT</b>
Input	<b>INPUT</b>
Output	<b>OUTPUT</b>

Mix (ChannelMix)	
Mix	<b>MIX</b>
Pan	<b>PAN</b>
PanMod Depth	(assignable) Pan modulation amount

Reverb	
Damp	<b>DAMP</b>
Diff Feedback	<b>FEEDB</b> (in DIFFUSOR)
Diff Mix	<b>MIX</b> (in DIFFUSOR)
Diff Mod	<b>MOD</b> (in DIFFUSOR)
Diff Range	<b>RANGE</b> (in DIFFUSOR)
Diff Speed	<b>SPEED</b> (in DIFFUSOR)
Dry	<b>DRY</b>
Feedback	<b>FEEDB</b>
Modulation	<b>MOD</b>
PreDelay	<b>PRE DELAY</b>
Range	<b>RANGE</b>
Speed	<b>SPEED</b>
Wet	<b>WET</b>



Comp	
Attack	<b>ATTACK</b>
Compression	<b>COMP</b>
Input	<b>INPUT</b>
Output	<b>OUTPUT</b>
Release	<b>RELEASE</b>
Threshold	<b>THRESH</b>

EQ	
Freq HiShelf	<b>(4)</b> horizontal position
Freq LowShelf	<b>(1)</b> horizontal position
Freq Mid1	<b>(2)</b> horizontal position
Freq Mid2	<b>(3)</b> horizontal position
Gain HiShelf	<b>(4)</b> vertical position
Gain LowShelf	<b>(1)</b> vertical position
Gain Mid1	<b>(2)</b> vertical position
Gain Mid2	<b>(3)</b> vertical position
Q HiShelf	<b>(4)</b> slope
Q LowShelf	<b>(1)</b> slope
Q Mid1	<b>(2)</b> slope
Q Mid2	<b>(3)</b> slope

VCF	
Cutoff	<b>CUTOFF</b>
Drive	<b>DRIVE / VOWEL / SPLIT</b>
Gain	<b>GAIN</b>
KeyFollow	<b>KEY F</b>
ModDepth1	(assignable) Cutoff modulation amount 1
ModDepth2	(assignable) Cutoff modulation amount 2
Resonance	<b>RES</b>

SB	
FModDepth	(assignable) Freq modulation amount
Frequency	<b>FREQ</b>
Mix	<b>MIX</b>
MModDepth	(assignable) Mix modulation amount
Offset	<b>OFFSET</b>
OModDepth	(assignable) Offset modulation amount

XMF	
Bias	(visible but not implemented)
Click	<b>CLICK</b>
Cutoff	<b>CUTOFF</b>
FilterFM	Cutoff <b>FM</b>
Freq mod1	(assignable) Cutoff modulation amount 1
Freq mod2	(assignable) Cutoff modulation amount 2
FreqOffMod	(assignable) Offset modulation amount
FreqOffset	<b>OFFSET</b>
KeyFollow	<b>KEY F</b>
Overload	<b>OVER</b>
Resonance	<b>RES</b>
XFMmod	(assignable) Filter FM modulation amount

Resonator	
InputGain	<b>INPUT</b>
Frequency(1-4)	Yellow sliders
Emphasize(1-4)	Blue sliders
Gain(1-4)	Red sliders

Distortion	
Input	INPUT
Output	OUTPUT
Pre Tilt	PRE TILT
Post Tilt	POST TILT
Center Freq	CENTER FREQ
Low	LOW
High	HIGH

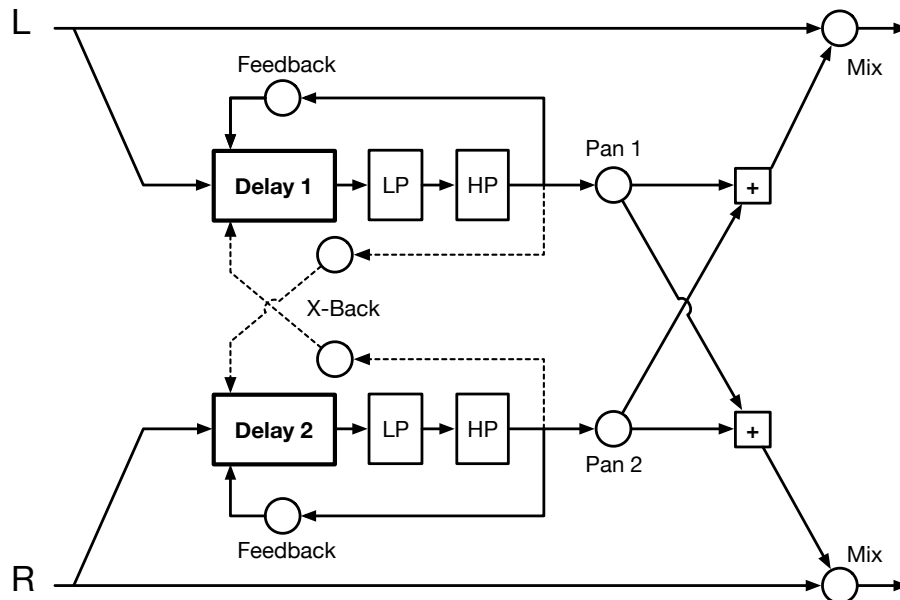
NuRev	
Pre-Delay	PreDelay
Damp	Damp
Decay	Decay
Size	Size
Tone	Tone
Width	Width
Dry/Wet Mix	Dry/Wet

# Flow Diagrams

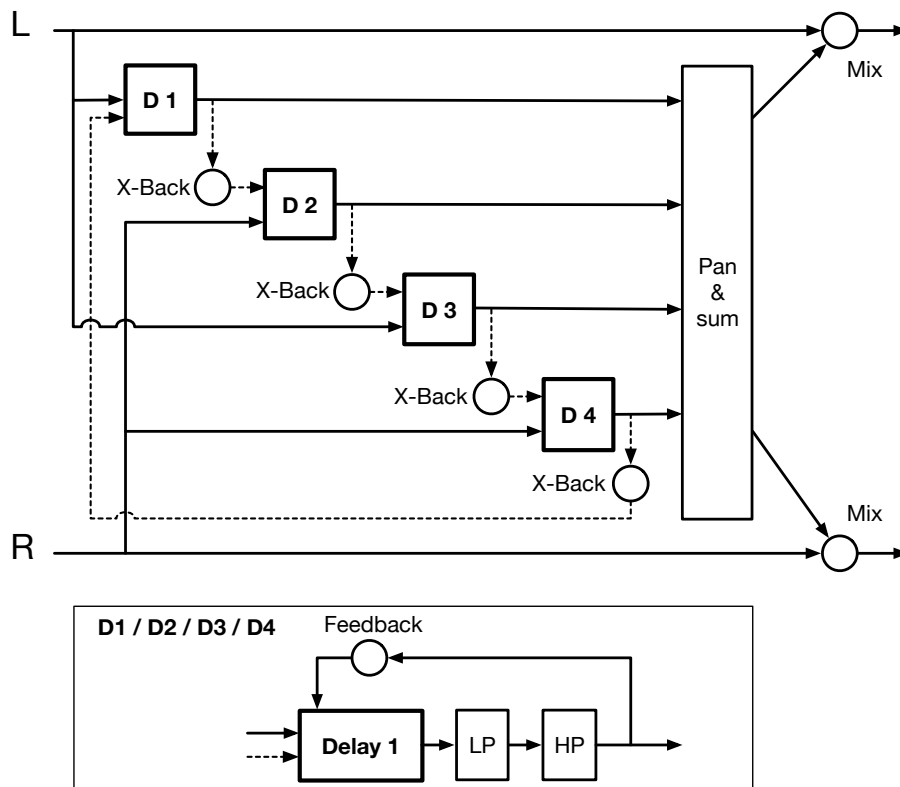
## Delay Modes

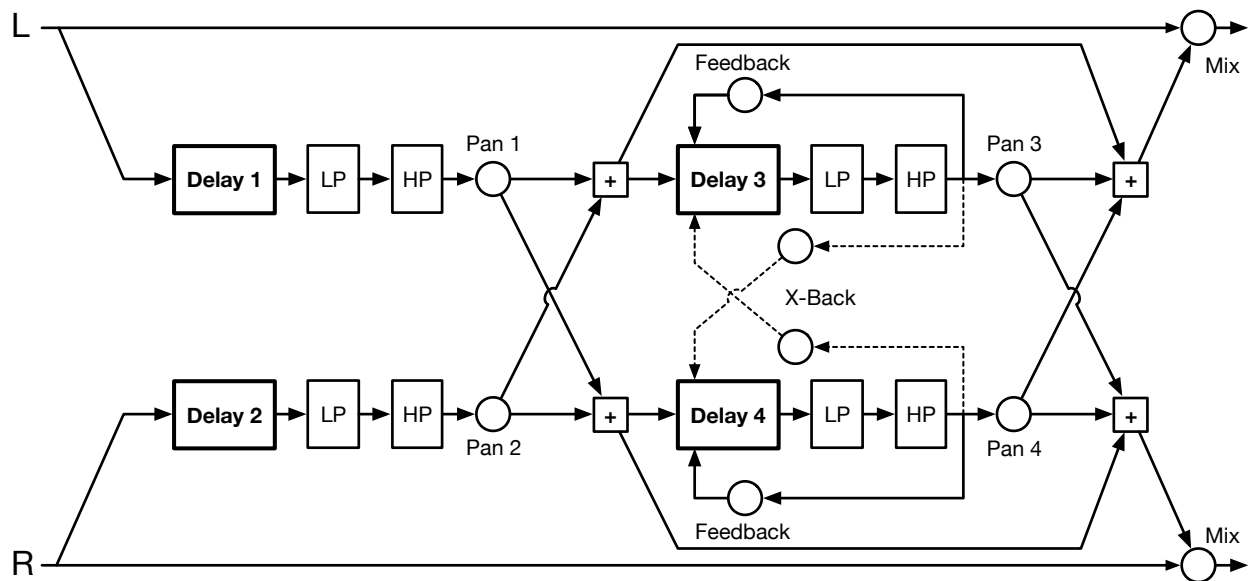
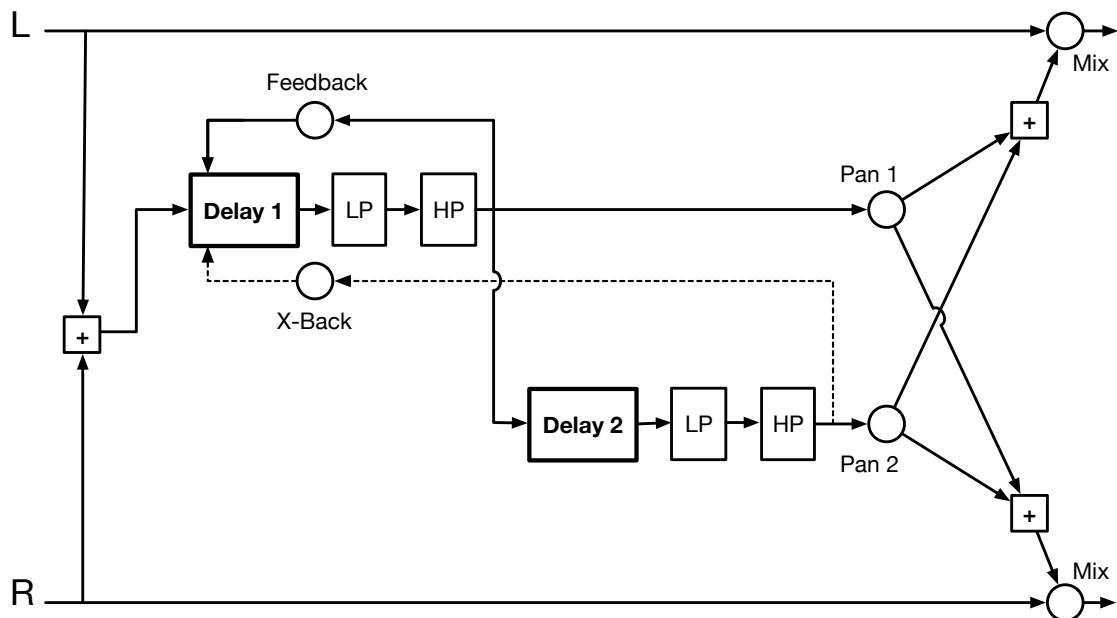
See [DELAY](#) on page 75. Thanks to Ed Harvey for the originals of these diagrams!

### stereo 2



### multitap 4

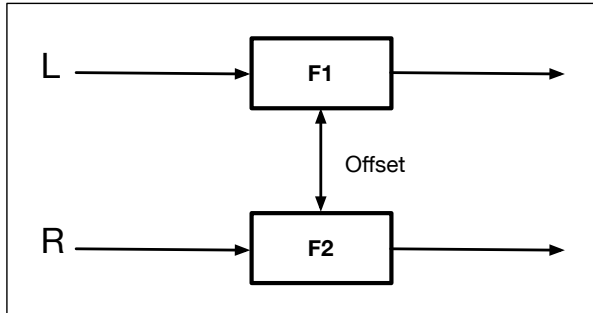


**dubby 2+2****serial 2**

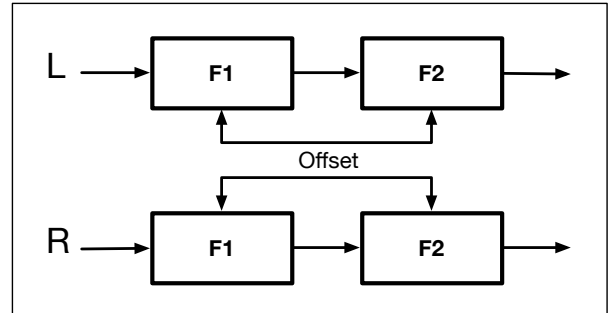
## XMF Modes

See [XMF](#) on page 46.

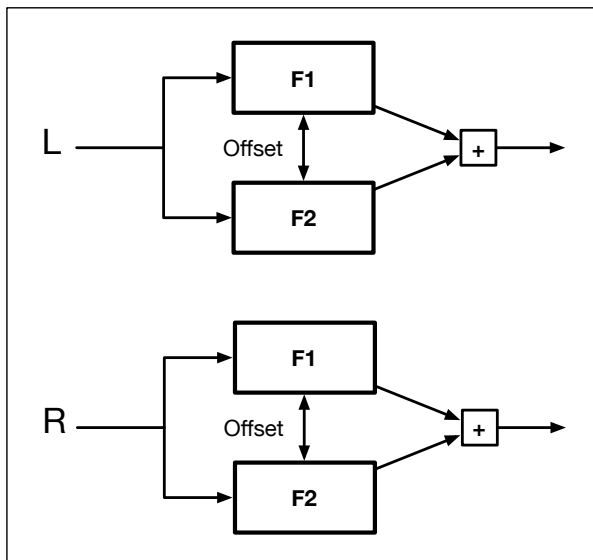
### single



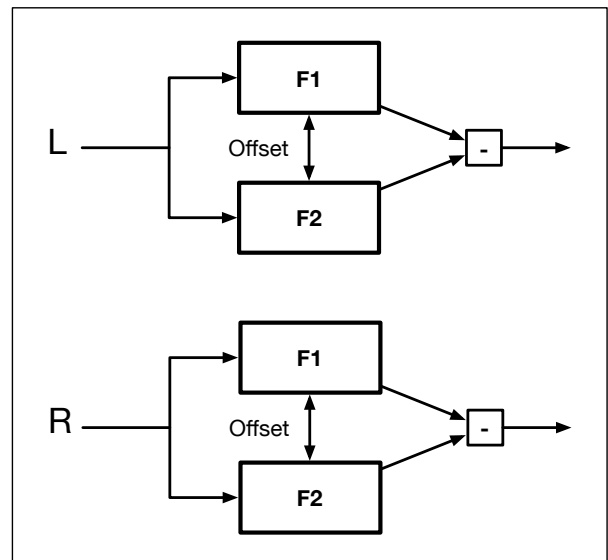
### serial



### parallel



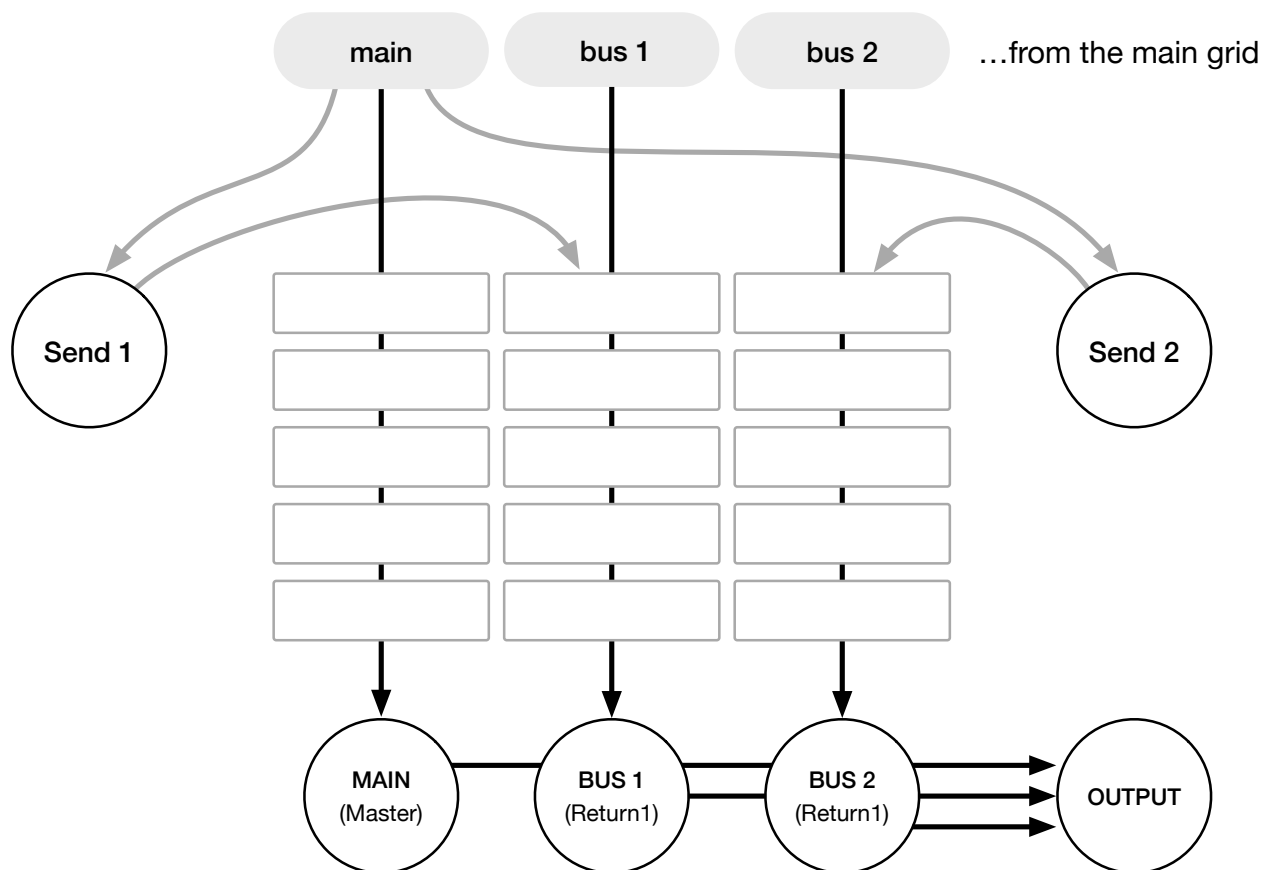
### diff'd



The only difference between the *parallel* and *diff'd* modes is that in *diff'd*, the F2 signal is subtracted from F1 instead of added to it.

## FX Grid

See [The FX Grid](#) on page 73.





# NKS

This version supports Native Instruments **NKS** format so that ZebraHZ can be integrated into the Komplete Kontrol or Maschine environments. The factory presets are (optionally) also installed as tagged *.nks* files.

## **Saving as .nks is only possible in the VST2 version**

Mac owners can use (temporarily) if necessary – any host that supports VST2

## **Saving in NKS format**

While the native, h2p and h2p extended options cause ZebraHZ to save presets into the currently selected preset directory, *.nks* files go directly into the preset location used for Komplete Kontrol or Maschine, so they do not appear in ZebraHZ's preset browser. To make them visible in Komplete Kontrol, open its preferences and rescan the locations.

## **Batch conversion**

Right-click the [SAVE] button and set the target format to *nks*. Via cmd-click (Mac) or alt-click (Win), select all presets in the current folder you want to convert, then right-click any of the selected presets and choose *convert to nks*. The original files are not affected.

## **What to do if ZebraHZ doesn't appear in Komplete Kontrol / Maschine.**

First, make sure your NKS software is up to date: Komplete Kontrol V1.5+ or Maschine V2.4 are the minimum requirements for u-he. In Windows, Komplete Kontrol must know the *Vstplugins* folder containing ZebraHZ: Open the Komplete Kontrol preferences, go to Locations and add your *Vstplugins* directory if necessary, hit Rescan and check whether ZebraHZ appears. Maybe the NKS preset folder is empty? If so, please reinstall ZebraHZ with the correct VST path and the NKS-option checked.

Here are the preset folder locations:

**Mac**    *Macintosh HD/Library/Application Support/u-he/ZebraHZ/NKS/ZebraHZ/*  
**Win**    *C:\Users\\*YOU\*\Documents\u-he\ZebraHZ.data\NKS\ZebraHZ\*

Perhaps the XML-File is missing from this location:

**Mac**    *Macintosh HD/Library/Application Support/Native Instruments/Service Center/u-he-ZebraHZ.xml*  
**Win**    *C:\Program Files\Common Files\Native Instruments\Service Center\u-he-ZebraHZ.xml*

A re-install with the NKS-option checked should also remedy this issue.

## **What to do if Komplete Kontrol / Maschine is unable to load ZebraHZ**

Either the VST2 version of ZebraHZ wasn't installed, or the path wasn't correct.

**Mac**    *Macintosh HD/Library/Audio/Plug-Ins/VST/u-he/*  
**Win**    *<User VST Folder> / (path as set for the VST plug-in during installation)*

If ZebraHZ's VST plug-in cannot be found in these locations you should run the installer again, making sure that you set the correct path and activate 'VST' during installation.