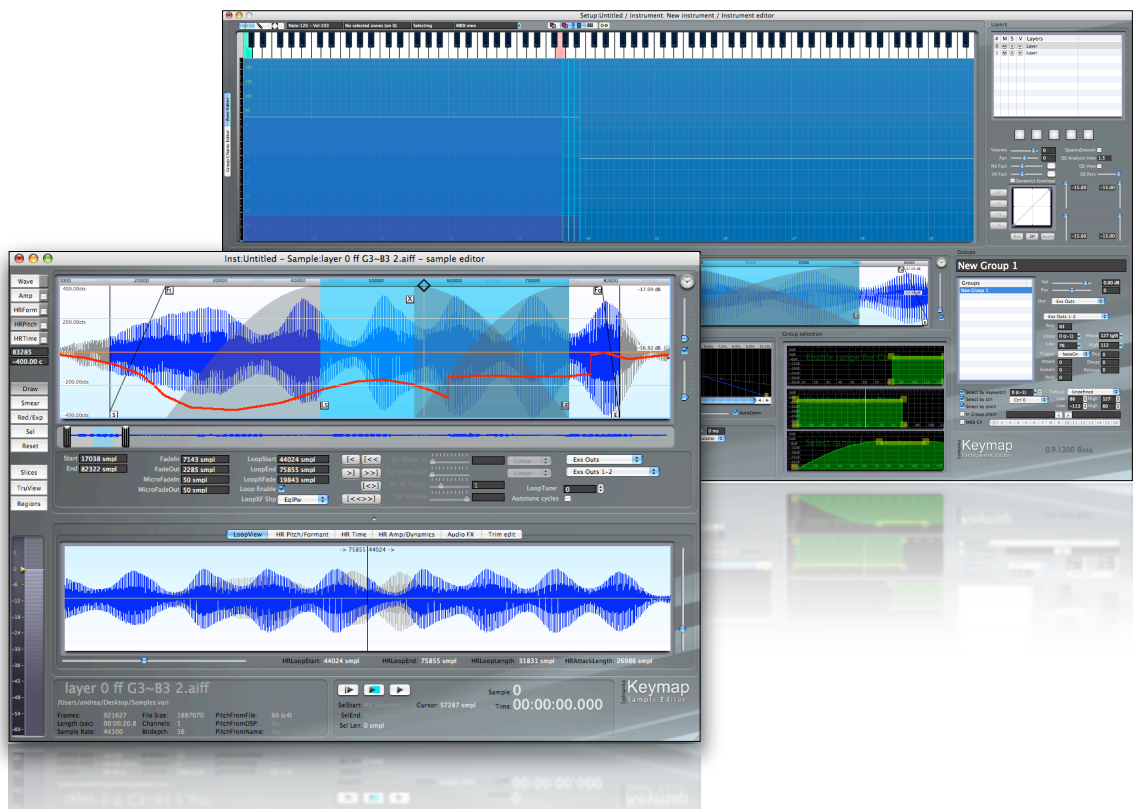


Keymap

Advanced Sampled Instruments Editor

User's Guide



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Rev 2-AG-OM
02/2007

Forget all you know about editing sampled instruments.

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Welcome to Keymap

Keymap is a powerful tool for editing, looping, arranging, and organizing samples into complete sampled instruments. Keymap makes it easy and fun to create any kind of sampled instrument, from loop collections to acoustic instruments to special effects libraries. This preface provides an overview of the features of Keymap.

Keymap makes it easy to create and edit sampled instruments on your computer. With the Keymap tools and functions you can easily combine individual samples into great sounding sampled instruments. Import your EXS24 instruments, loop your samples, use Harmonic Resynthesis to reshape sounds and use a variety of mapping tools for getting to your desired result very quickly, without leaving the Keymap environment. Keymap offers a unique environment where you can import your instruments and samples and tweak, edit, loop, re-synthesize, spatialize and much much more...

When you are ready to use your instruments in your music, you can export them as industry-standard Logic/Logic Express EXS24 instrument files and samples. Each sample file created by Keymap always contains complete sample mapping details so that it can be imported into any sampler application, on any platform.

What Keymap is not:

Keymap is not a performance instrument (meaning: it's not a plug-in, you don't insert it into a host DAW's audio channel strips) and it is not a replacement for the EXS24 or EXS24P. Keymap is a standalone application which doesn't need Logic to run, but natively handles the EXS24 instrument format, and is a natural companion to Logic. Keymap does contain its own playback engine so you can hear the edits in realtime; however we do not emulate the EXS24's filter section or the modulation matrix. You'll typically use Keymap to create or edit instruments which you will subsequently load into the EXS24.

Keymap focuses on the editing and creation of cohesive, excellent sounding, and exceptionally playable sampled instruments from your raw samples or instruments, using sophisticated yet intuitive tools. Keymap does not force a specific workflow on you: flexibility is intrinsic in our design. We firmly believe in offering you a variety of tools and functions, and letting you determine your own preferred way to use them.

Note: This guide expects you to already know the basics of sampling and of the EXS24 (or EXS24P) software instrument. If you are a Logic user but you are not familiar with your version's sampler instrument, please read its description in the Logic Plug-ins Reference Guide.

Hybrid virtual memory audio engine

Keymap uses a hybrid virtual memory engine so that samples do not have to be loaded completely in RAM before you can start using them. This means that even when working with huge instruments, load time is always reasonably short, depending on your Mac's hard disk performance. Keymap automatically loads from disk the required audio as needed, and ignores audio not currently needed for playback. The audio engine also lets you use samples in compressed audio formats, as MP3 and AAC with no limitations. The decoding is performed in realtime, with no need to decompress sounds before editing them. This might add an extra CPU load on your computer, but the hybrid virtual memory engine takes care of reusing the decoded data when appropriate. For all intents and purposes the original sample format is simply irrelevant to you as a user.

Multichannel sample support

Keymap has been designed to support up to 8 output channels per sample. Through channel maps you can remap channels to a different configuration, for each single Zone. On output you can assign up to 16 Keymap audio channels to your audio device, remapping each Keymap out to any audio device out for maximum monitoring flexibility.

Open formats

Keymap is all about using open or standard formats and allowing free information exchange. Keymap imports WAVE, AIFF, MP3 and AAC format audio, and exports audio in WAVE and AIFF formats. All the sample files created by Keymap contains information about the placement of the sample in an instrument map, and the position of loop points, so that those samples can immediately be loaded and used in any audio application.

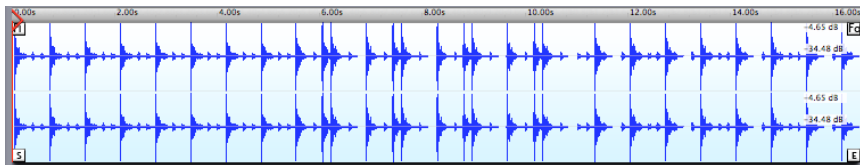
We choose to support directly the Apple EXS24 instrument format because:

- The EXS format is one of the oldest and most supported instruments formats available
- You can convert almost any other instrument format from/to the EXS format
- The EXS format is arguably Apple's "official" format for the Mac platform, being the sample format used in GarageBand, Logic Pro and Logic Express.

When exporting projects to the EXS24 format, samples using complex Keymap-only features are rendered and/or split in order to be compatible with the EXS24 audio engine or other traditional two channel sample engines.

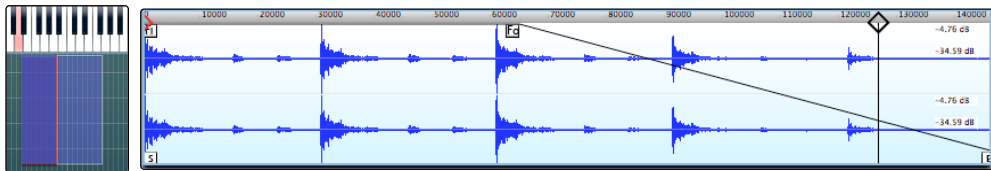
Virtual samples

Instead of playing samples directly, Keymap plays non-destructively edited samples (Virtual samples), that you can cut, copy, paste, slice, shift, fade, loop at your pleasure. The fact that that you can manipulate sounds without touching the files on disk means that you do not have to worry about undoing changes and sharing samples among instruments, you have more freedom to experiment, and edits are always very quick.



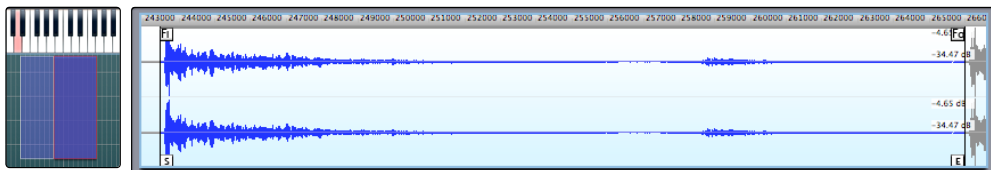
The actual sample on disk referenced by both zone 1 and zone 2

Zone 1



In this zone we cut a portion and added a fade out

Zone 2



In this other zone we cut a different portion and did not add any fade out

Each single Zone appears to have an independently editable sample file, even if they are using the same sample file on disk. All this is realtime, non destructive and does not create additional sample files until you export to EXS24 format.

Harmonic resynthesis

One of the main problems you'll find with sampling, past the initial excitement, is that you often want to build a coherent /cohesive sound out of many different samples but the samples cannot be modified as fluidly as you'd like, and not in the context of an instrument. While you can use the traditional resampling to adjust the pitch of a sound, after that the timing of the sample will also be changed. Or imagine you have two wonderful vibrato flute samples, but the vibrato speeds don't really match...or you have a piano sample which you think sounds a little too much like a harpsichord and you'd like it to sound more like a grand piano. Sometimes you also have the inverse problem: samples are too similar and you need to differentiate them in order to create a sense of more breath, variety and dynamics.

Previously, applications have allowed you to change some properties of sounds, as pitch and time, but only one sample at a time. Traditionally you have to use time-stretching algorithms and/or plugins to do this destructively for each sample file, and then reassemble the whole instrument and hope that it plays they way you imagined. This approach is inefficient and can kill creativity and experimentation.

Harmonic Resynthesis (HR) is a proprietary technology we have introduced to the field of sampled instruments editors for manipulating pitch, time, formant and amplitude of samples in the context of entire sampler instruments in a simple and intuitive way. The same way movies use computer graphics to create realistic scenes that would be otherwise impossible to shoot, Harmonic Resynthesis works by analyzing your samples, and creating in realtime new sounding samples using the original as a basis.

For maximum flexibility, each Zone has an individual HR engine and set of parameters that you can tweak in realtime. You can also edit multiple Zones at once and immediately hear the results, in the direct context of your instrument.

For each of the four main Harmonic Synthesis sound property parameters, you can directly draw and edit envelopes to achieve the exact result you want. When you change the Time envelope, you will not actually be seeing a change in the length of the sample on screen, but you will see that the playback cursor will smoothly change its speed to follow the envelope. As another example, the amplitude envelope is not a volume-change control, but the real, final, volume of the sample for each point. You are not limited to changing the whole sample length, but you can speed up or down an attack in a subtle way, smooth a vibrato or correct the sample amplitude only where you need it, directly draw the shape of your drum loops on screen, or freeze the decay in a sample, or.... do you get the idea? Harmonic Resynthesis offers an immense range of applications!

Editing of HR envelopes is done either by drawing with the mouse or by using tools that allow you to expand or reduce the effect, grab and smear the envelope, or smoothly reset the envelope to its original shape. While this is extremely flexible, we also added parameters to let you perform common tasks as

pitch correction or normalization in realtime through sliders, without having to edit the envelopes directly.

You can use Harmonic Resynthesis to polyphonate a sample. In other words you can load a sample and build re-synthesized versions of it for the two surrounding octaves. The polyphonated Zones will play for the same exact amount of time, so that you can very easily use this to create harmonies of spoken words, or other similar applications where you are stuck with very few samples and you want intermediate samples too.

While at this point the “Resynthesis” part of “Harmonic Resynthesis” should be clear, we still have to explain the meaning of “Harmonic”. By “Harmonic” we mean that this kind of resynthesis is targeted to sounds with a clearly defined and possibly tuned set of fundamentals and harmonics (also called harmonic sounds). Most acoustic instruments, voices and synth sounds are harmonic sounds. Drums are not harmonic sounds, and neither are drum loops or effected sounds. The amplitude control is an exception to the “harmonic sounds only” rule, as it will also work with inharmonic or non tuned material, and actually will give fantastic results with drum loops as you can directly draw the drums shape.

HR is available in three different algorithms, HR-A , HR-B and HR-C. The HR-B version differs from HR-A in that you can’t change formants, but you have higher quality on complex harmonic audio material. HR-C is for pitch only and is of very high quality. Each algorithm can be selected independently for each Zone.

Audio Effects

Each Keymap Zone offers a set of individually configurable Low Pass and High Pass filters with settable frequency and resonance. Keymap also includes a couple of saturators and a stereo width reducer/expander. These simple effects allow you to mix and match and fine tune different samples so that they fit together better, and these effects can be also used to combine several layers of sounds harmonically so that, for example, one layer plays the low frequency portion of the sound over the whole keyboard range, while another layer just adds the top frequencies (imagine a low pass filtered grand piano layered to an high pass filtered rhodes). As always, the settings are editable individually Zone by Zone, or by selecting and editing multiple Zones at once.

Multiple objects editing in inspectors

In most of the Keymap editors, whenever you select multiple objects (i.e. Zones, or Groups), you can edit a value in the inspector and all selected objects will be edited at once. This makes it extremely easy to assign a Group to multiple Zones, or edit all Zones to have a certain top velocity range.

Smart edit

In the Instrument editor, dragging a border common to adjacent Zones will edit both Zones at once. You can also split Zones and drag and drop Zones across layers and instruments.

Tessellation engine

“Tessellation” refers to the creation of repeated shapes that do not overlap or have any gaps, which very often is exactly how you want to create sample Zones. The Instrument editor uses a tessellation engine which will automatically cut Zones in order to make space for others, and allows you to add Zones or delete map areas without having to edit all affected Zones directly. Slide Over and Slide Under modes let you protect either the edited Zones, or the unedited Zones when dragging Zones.

Display guides

You can add visual alignment guides to help you place Zones on the map, with and without snap.

Dynamic velocity remapping

You can remap whole layers over velocity through a real-time velocity envelope. This is like the inverse of having a velocity curve, in that you are keeping the incoming velocity as it is, but you are changing the placement of Zones over the velocity range.

Quadrasmooth

Very often, the multiple samples you’ll place in an instrument will have slight volume differences. Quadrasmooth lets you visualize these differences over the sample map as variation of a color, and then easily identifies and corrects these differences. You simply set the desired volume for the four corners of a layer, and Quadrasmooth will automatically change all Zones volume in that layer, based on the amount of correction desired.

Zone crossfades

Sometimes you will notice small “jumps” in sound between adjacent sounds due to the fact that the samples are different. Keymap lets you set a crossfade area individually for each Zone in order to have a constantly mixed transition between different samples. You can also create optimized Zone crossfades automatically for multiple Zones at once, and then simply tweak the crossfade scale to minimize or maximize the effect. Zone crossfades are individually settable for both notes and velocities ranges.

Sample editor in Instrument editor window

Instrument editors and resources windows contain a smaller sized, but fully featured sample editor, so you can edit samples while looking at the instrument, with no need to switch windows back and forth.

Single cycle loops

Keymap offers great tools for creating and editing single cycle loops. You can create a single cycle loop by simply selecting a point of the sample and pressing a key. Keymap will also automatically set the loop tune so that the single cycle plays at the right pitch, and can also retune short loops of arbitrary length, letting you to explore different formants for that cycle, a bit like a sync oscillator does in a synth.

Single Cycle Explorer

Sometimes you might be working on long evolving samples and you might want to experiment with the single cycle loop at various points over the samples length. The Single Cycle Explorer lets you move the single cycle around the sample by dragging a slider. You can also use this for multiple Zones.

MIDI Learn

MIDI Learn allows you to set note and velocity parameters by using a keyboard controller.

Pitch and Time correction in Instrument editor

Keymap offers non-destructive, undoable HR Pitch correction and HR Time change directly from the instrument window. If you are working with looped samples, you can time stretch the loop duration separately from the attack duration.

Samples Drag and Drop

Keymap offers extensive drag and drop support of WAV, AIFF, MP3 and AAC samples into the Instrument editor. You can also drag whole folders, and each folder will be placed in a separate layer that is automatically named after the folder. When you drag and drop samples, you can also use modifier keys in order to automatically create a Group for those samples, or to map each sample to octave intervals. You can also substitute a sample in an existing Zone, simply by dragging and dropping a new sample over an existing sample.

Advanced selection methods

Keymap offers an extensive number of ways to select Zones. You can select Zones directly with your mouse or you can select the currently playing Zones. You can select Zone Templates (empty Zones) or Zone Placeholders (Zones with missing samples). If you wish to work with a MIDI controller, Keymap also let you select Zones between the last two played notes. Once a selection is made, you can move, or extend it using cursor keys.

Audition mode

With only a few key presses, you can define an area to play repeatedly, even across the end of a loop. When you adjust the sample start or loop position, the playback area will move with the parameter, allowing you to continuously preview the change without waiting for a complete playback cycle around the loop (which is very desirable when editing loop points, for example).

Autosplit

Keymap can split long recordings into individual virtual samples automatically. The split Regions can also be trimmed automatically to user settable attack and release levels.

Autophase

With the Autophase function, you can move sample start, end and loop to zero crossings automatically, also for multiple Zones.

Interactive attack and release trim

With Keymap you can select a portion of a sample, or a Zone, or even multiple Zones, and tweak a slider for trimming the attack to a desired dB level. The same can be done for the release. This let you select your Zones containing raw samples, set the two values, and...you're done! When you are doing this on a single Zone or single Sample, the trim points are visualized in realtime.

Autolooping

Finding an optimal loop in a sample is often a difficult, boring and time consuming task. Keymap offers a series of extremely powerful autolooping tools that enables you to find loops in your sample material very easily. While a lot of complex DSP is required for this to happen, we designed the simplest possible user interface for it. You basically select a sample area (up to the entire sample), and you "Autoloop" it, and that's all. You can also search for loops parametrically, by limiting the search Zone only to a certain range over the sample. Autolooping can be performed for multiple Zones at once.

Automapping

When creating instruments from scratch, another arduous task is to load each sample, assign the proper root notes and adjusting the Zone borders. Keymap offers several Automapping functions that let you place samples over the Keyboard automatically by using pitch detection, or mapping data from the sample files, or the root name embedded in the sample filenames. You can also select if you want the note ranges built so that the root note is placed on high note, on low note or in the middle of the note range. And obviously you can just set the root notes, leaving the existing note and velocity ranges as it is.

Magic Pads

In each Instrument editor you have a set of Magic Pads, which are drag and drop destinations for sample files. Each Magic Pad performs a series of actions over the dropped samples. Among the various available functions, with Magic Pads you can autosplit and autotrim samples, then automap them, and finally autoloop them. This lets you go from the raw recording to a playable instruments in seconds, so that you can concentrate on fine tuning the results.

Remapping

Sometimes you might need to rearrange Zones for a specific use. Keymap offers an extensive selection of remapping functions. You can remap to white or black keys only, or you can compact Zones toward low notes or high notes, or remap them from a certain note with a certain interval, etc...

You can swap the latest two played Zones, or expand Zones to fill the whole map. You can also simplify existing complex instruments by setting how much you want to reduce the number of Zones. Once Zones are set to the proper root note, you can also have Keymap build the Zone ranges for you.

Keep and Remove

Instead of just relying on the usual Zone selection, Keymap offers two dedicated markers (“Keep” and “Remove”) for each Zones. In this way you can mark Zones (using selection, or by playing notes, etc), and at the end only keep the ones marked “Keep”, or remove the ones marked “Remove”. Used together with the available remapping functions, this makes for very flexible and intuitive construction of instruments from a MIDI Controller.

Group chain editor

A Group chain is a sequence of Groups that will repeat in a “round robin” fashion. Keymap offers a dedicated and intuitive graphical editor for creating Group chains. You can connect Groups through graphical connections so that it’s very easy to visualize the chains at any time.

Dedicated Group Select editors

Keymap also offers dedicated graphical Group editors for setting velocity range, select-by-pitch and select-by-controller ranges. Group Keyswitches are visualized on the Virtual Keyboard, and you can set a specific MIDI Channel for each Group.

Graphical Amp Envelope editor with Group offsets editing

The Amplitude Envelope has its own graphical editor, where you can grab and drag envelope points. When a Group is selected, you can still edit the envelope, but instead of editing the actual envelope parameters, you are actually editing the envelope offsets for the selected Group. In this way you can build an arbitrary number of different envelopes for use in your instruments, without having to deal directly with the complexity of the Group offset parameters.

Cursor navigation and editing

You can freely navigate across Zones and Layers using the cursor keys, and using key modifiers you can also merge layers, move Zones across layers, and change/extend selection. This allows for a very efficient editing experience.

High performance sample overviews

Keymap uses a heavily multithreaded sample overview engine that has been designed for speed and flexibility. Overview generation is very quick, and performed in the background, so you do not have to wait for overviews to be created when opening a new sample file. At any time you can view from any sample position to any sample position, with no limitation on the zoom factor. This let you use your screen space for displaying only the portion of sound you are interested to. An optional "TruView" mode let you see on screen the actual result of your fade and crossfade operations on the sample, and not just a superimposed envelope. This is extremely useful for visualizing any unwanted phasing in crossfades.

Full support for mouse scroll wheel / Mighty Mouse

Keymap uses the Mighty Mouse trackball and scroll wheel features for navigation in most of its windows. In the Instrument editor you can pan using the trackball, while in the sample editor you can zoom in/out and pan in a way you have never seen before.

Horizontal Sample Autozoom

Many times you may find yourself working with a zoomed out sample display, and need to set a cursor to a sample accurate position. Keymap has an automatic (horizontal) autozoom feature, where you can grab

and hold a cursor or marker with the mouse, and Keymap will start zooming in around the cursor until you start moving the mouse again, or just release the mouse button. In this way you can go from a completely zoomed out sample to your sample accurate view without having to mess with scroll bars and zoom settings at all. When you are finished, you are back to your original sample view. Simple and effective.

Vertical Sample Autozoom

In some situations, especially with decaying samples, you may find that the sample view shows you very little information. You'll see a huge peak at beginning, and then the waveform oscillates near zero with a long tail. This happens because your samples have a lot of resolution (and possible dynamics) but you only have a few hundred pixels on screen to display that data. In Keymap you can enable a Vertical Autozoom function that will automatically zoom in and out in order to fill the display with a useful sample waveform, not empty space. At any time, the visualized dynamic range is displayed on screen. This function lets you, for example, select a small portion of a decaying sample, and when moving the view toward the decaying end you'll keep seeing the waveform displayed for the full vertical pixel resolution of the sample view.

Advanced sample naming and renaming

When rendering new samples, or simply renaming existing samples, Keymap offers an highly sophisticated parameter-based naming system, where you can combine more than 20 different parameters (as Zone name, project name, low and high notes, velocities, root note, date, time, etc) into the new sample name. It becomes very simple to create samples with the name structure that best suits your needs. When you create new samples you can use the parameters also for creating subfolders.

Slicing, slice mapping and loop remix

You can slice a sample manually, at regular points or at transient points, and then shift the content of individual slices around. Slices can be played back with a continuous crossfade system allowing glitch-free playback. Through cursor keys commands you can navigate across slices and shift their content in real time and very intuitively, effectively remixing the content. This is especially interesting with rhythmic loops. You can also select slices and map them to individual notes on the Keyboard.

Regions

For each Zone you can create Regions, each containing its own set of basic parameters (start, end, loop, etc). Regions can be created by manual selection or by auto-splitting long samples containing multiple sounds, and can also be used for working with alternative settings, as loop points, for each Zone.

LiveDB sample database

Keymap contains Redmatica next-generation scanning database engine (LiveDB). This system has been designed to couple the advantages of database systems (no need to scan every time) with the advantages of scan (data always in sync with what is on disk). When you add a new folder/drive, it will be scanned just once at roughly three times the speed of ExsManager 2.9 . After this first scan, a full database update usually takes a few tenths of second even for databases containing many hundreds thousands files. The small-footprint database file is automatically loaded/saved from disk. Basically, once you set the paths where to search for samples, searching samples is not a problem anymore.

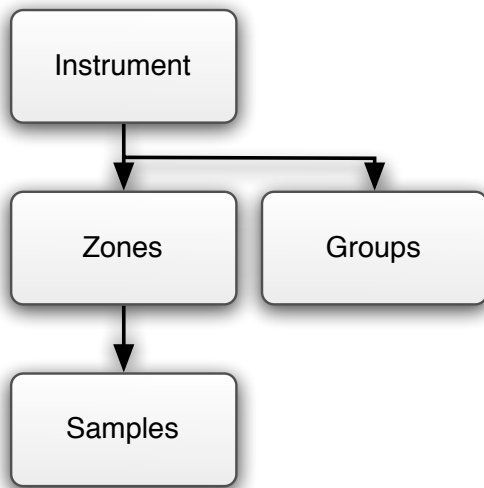
Statistics

Keymap can display and update in realtime statistics about the currently active project. A dedicated Statistics window shows more than 40 statistics, while the most important ones, i.e. the number of Zones and the total sample size, are permanently displayed in your Mac system menu at the top of the screen.

Chapter 1: Keymap project structure

Before we start: how things are organized inside the EXS24

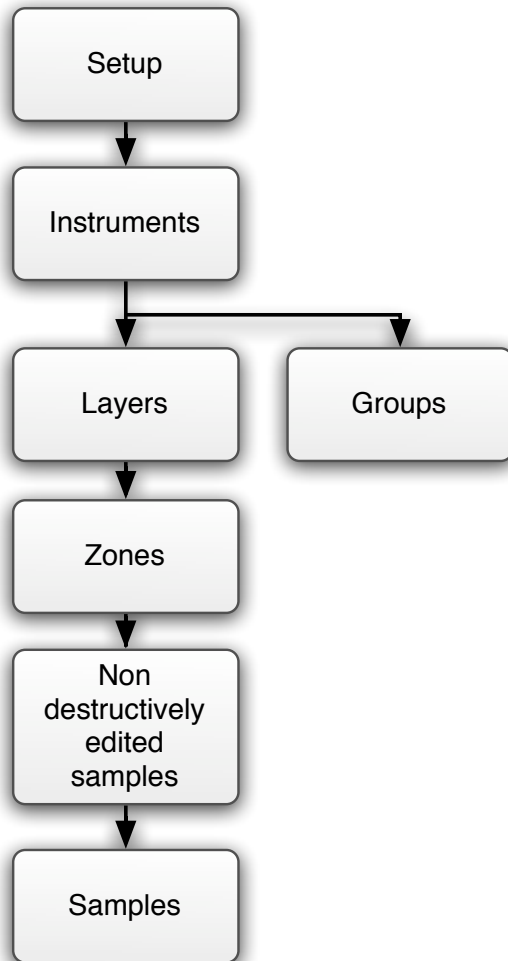
A good editor should always show you the data in an organized fashion in order to make it easy for you to see what you want to edit, and then edit it. This is especially needed with sampled instruments because of the enormous number of parameters and settings they can potentially contain. For example, in the EXS24 editor, the organization of elements in an instrument is as shown in the following diagram:



An instrument is built out of a number of Zones and Groups. The Zones reference the samples and contain the mapping parameters (note range, velocity range, loop, etc). The Groups are used to Group edits the Zones and to control their playback conditions (controller, note off triggering , keyswitch, etc). As you can see, the Zones are all in the same “basket”, and this can be a really big and potentially confusing basket if you have many Zones. Every time you need to change something in the sample (example: normalization), you also need to destructively edit the samples. Combining two instruments in one is done by copying all Zones and Groups from one of the instruments and pasting those Zones and Groups into the other instrument, but in doing so you lose the ability to quickly edit one instrument or the other individually.

How things are organized inside a Keymap project

Keymap extends the EXS24 organization by introducing new organizational elements such as Setups, Layers and also introducing non destructive editing to samples:



In order to avoid potential confusion, a single Keymap instrument file is called a “Keymap Project”, or KMP file. A project consists of one (and only one) Setup element in which you can create or load Instruments (as many as you want). Think of the Setup as sort of like a “Combi” of Instruments. Each Instrument contains Groups as in EXS24. However the Instruments do not contain Zones directly, and at this level we instead have Layers.

Setups

In each keymap project you always have one and one only Setup. The Setup lets you load and map multiple instruments over the keyboard so that it's very easy to build layered or stacked sounds out of existing instruments. A bit like "Combi" or "Setup" mode in hardware synths, you can transpose each instrument, limit its playing range, add a velocity offset, and temporarily mute it. Working at the Setup level makes a lot of sense if you want to rearrange instruments over the keyboard without going into the detail of what exactly each instrument contains. The Setup level also contains the Amplitude Envelope, which is common to all instruments in each project. As we'll see in the Groups chapter, this is not that big of a limitation as you can get individual envelopes through Groups.

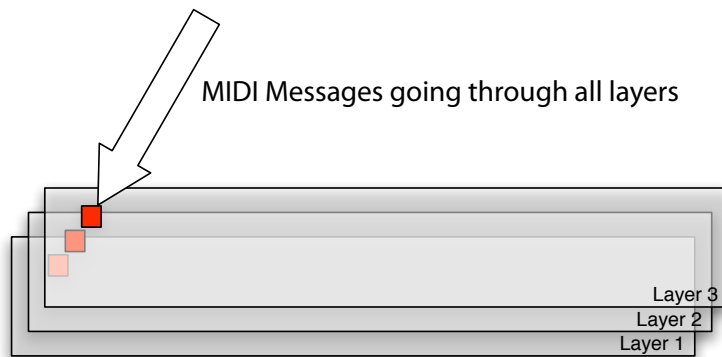
Instruments

Going down in the organizational hierarchy, the Instruments element in Keymap resemble their EXS24 counterpart as they are the main holders of all the sounding things.

Layers

Layers are one of the most important concepts in Keymap. Each Layer contains a matrix in which sounds (Zones) are mapped over notes and velocities, and you can have as many layers as you want for each single Instrument.

From the Instrument point of view, Layers are overlapping workspaces which respond all to the incoming MIDI messages for that Instrument. When a certain note is pressed on the MIDI keyboard with a certain velocity, all the layers will play at the same time if they have a sound assigned for that note and velocity.



A peculiarity of Layers is that each single Layer cannot contain overlapping Zones. If you want to overlap Zones you will simply place them in separate Layers. This paradigm makes for a much clearer visualization

of things, and allows the introduction of many useful editing and remapping functions, which would not really make sense with overlapped Zones. Each individual Layer also has a set of parameters which allow you to quickly change parameters at the Layer level: volume, pan, Zone crossfades and much more. Each Layer can also be muted, soloed and you can assign a Layer name.

Layers are also very useful as workspaces in which you can work on sounds/samples which you then copy or move to their destination layer. We'll explore all of this in detail later in the Layer chapter.

Zones

Inside each Layer we find one or more Zone elements. A Zone is a placeholder for a sample reference, but also contains important parameters, as the note and velocity ranges over which the sample should play, the root note, the transposition and tuning, the start and end sample point, the loop points, and all other parameters that affect how the sample will be played in the context of the layer.

A Zone can also be created without a reference to a sample file. In this case the Zone is referenced as a **Zone Template**, which can be later "filled" with a sample. Zone Templates are very useful if you have a map model that you just want to fill of samples each time you build an instrument.

Groups

Groups in Keymap are very similar to their EXS24 counterparts. The fact that in Keymap you can edit and set parameters for multiple Zones at once directly makes the note and velocity ranges settings in Groups less important, but Groups still remain the holders of the Zone selection logic, and through Groups you can set a number of conditions for the Zones to play. The conditions might be a certain controller range, a pitch bend range, a keyswitch or the use of a specific MIDI Channel. Group chains can also be defined so that you can have round-robin style playback of properly assigned Zones, and much more. Through the use of Group Amplitude Envelope offsets you can also define and use more than one Amplitude Envelope in each project.

Virtual Samples

The term "virtual" is notoriously abused, but you will see how in the Keymap context it makes perfect sense. While usually samplers play sample files, **Keymap plays non destructively edited samples**. This might appear a small difference but it's not. Each virtual sample is conceptually similar to an audio track in the Logic Arrange, in which you can cut/paste/shift, change volume, add envelopes to the samples, and so on, while your actual files are left untouched on disk. When a Zone is played in Keymap it's like triggering an audio track in Logic, and any change or edit over the virtual sample is computed in real-time. This completely non-destructive approach lets you normalize samples, change their dynamics, pitch correct, time stretch as simple parameter/envelope changes that you can change and tweak at any time

over the life of a Keymap project. When saving in EXS24 file format, all the edits that cannot be translated to the EXS24 capabilities are rendered in new standard-format sample files that Keymap creates and assigns automatically to the EXS24 Zones so that you can hear the same exact sound/edits inside the EXS24.

This approach has the advantage of being quick and fully undoable. As only the kmp file content changes over the life of a Keymap project (samples are never modified!), features like the Keymap built-in “autobackup kmp files” makes perfect sense to keep track of all changes and being able to go back at any moment.

Each individual Zone has its own Virtual Sample, which is totally independent of all other Zones, even in the case that the actual Sample on your hard drive is used by more than one Zone. In other words, when you edit a specific Virtual Sample, you can be sure that no other Zone will be modified by mistake. Of course, when you need it, there’s a number of functions in Keymap allowing you to edit multiple Zones at once.

Sample references are saved with a project only if the sample is being used by a Zone. Keymap lets you temporarily add samples without Zones to a project with the **File > Add Samples to the current Project** menu, but that’s intended only as a way to open a sample editor for a sample in your current session, before referencing that sample in any Zone. If you want your project to maintain a reference to a sample, even if you are not really using it in your project, you can always create a Zone for that sample in a muted layer which you’ll use as a workspace for editing tasks.

Basic handling of loop points, crossfades, start and end points does not require a new sample to be rendered for the EXS24, however you can render your samples in order to get individual samples out of a long recording sample, or if you want looped samples without any unused audio data past the loop end. For simplicity, we’ll refer to Virtual Samples as “Samples”. Just keep in mind that these are very special samples!

Real Samples

Real samples are the actual sample files on disk, and they are never modified or overwritten by Keymap. Each time you render samples, a new set will be created so that, you can always revert to previous project versions. In normal use, rendering is something that is done rarely: typically just once you are satisfied with the project and want to export your instrument to the EXS24 for creating music in Logic.

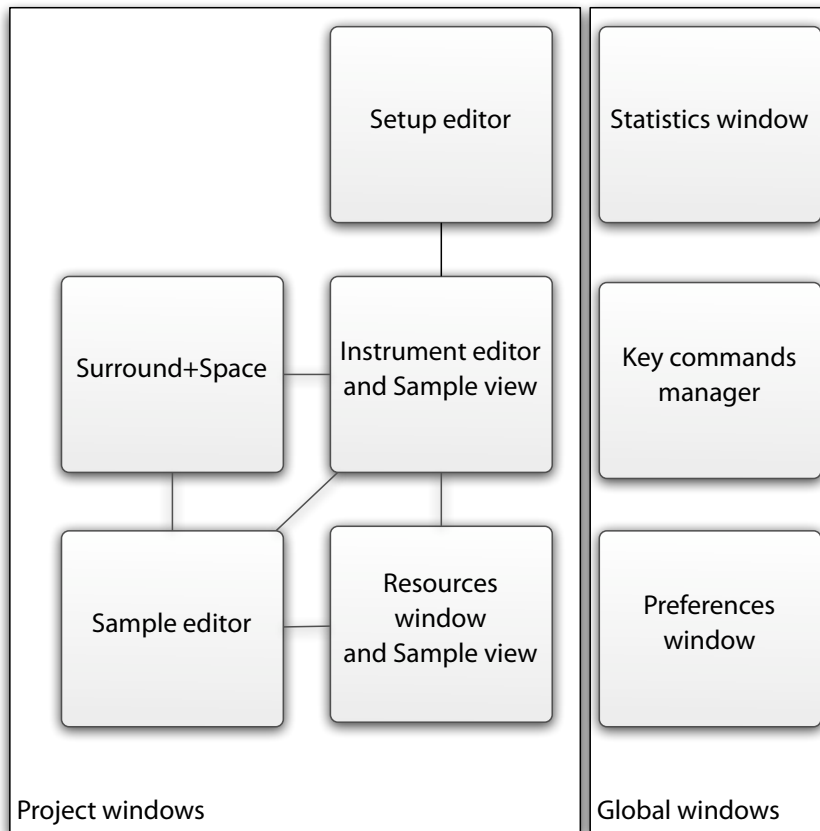
Note: Keymap allows you to use standard WAVE and AIFF formats for samples, but also compressed formats as MP3 or AAC, with no special limitations.

Keymap will also put full mapping and looping data inside each rendered sample file, so that it's easy to import those samples in any other application. An advanced naming panel allows you to render samples with very intuitive or complex names built, among other things, out of more than 20 different dynamic parameters.

The only exceptions to the "real samples are never modified" are when you choose to rename samples from within Keymap, or add mapping and loop data chunks into the original sample files.

The structure of Keymap windows and editors

Keymap offers several interconnected project editors. Each editor focuses on a specific project element or task.

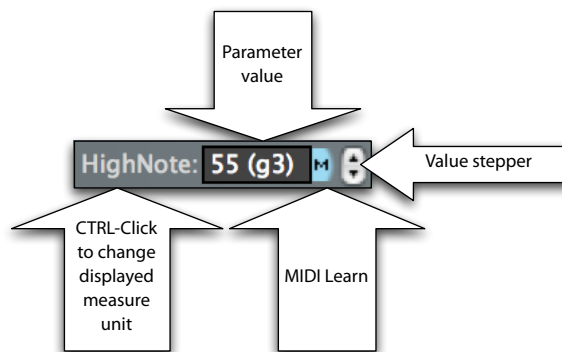


Keymap also has one preferences window and one statistics window, which are not strictly part of the currently open project, and will not close when you close the project. The statistics window however will show you statistics for the currently loaded/active project. The key commands manager let you display and edit the assignment of commands to keys.

All of the project editors typically offer one or more graphic views in which you can directly edit objects using the mouse, and then one or more inspector sections where you can directly set or tweak parameters. One common inspector feature is that wherever it makes sense you are able to select multiple items of the same type in the workspace and set parameters in the inspector directly for all of them at once. At the same time when you select multiple items of the same type you can see the common values they share in the inspector boxes. Another Keymap feature is that for most editing tasks you will not need to open the full sample editor window that Keymap provides, since smaller but still fully functional sample views (also called “auxiliary sample editors”) are embedded in other editors wherever a sample is involved. This lets you work in a single editor for most of the time without the hassle of switching back and forth between different windows.

Special attention has been given to visualization—in other words, in making sure that the editors give you clear and precise visual information at all times. We also focused on workflow efficiency through the extensive use of key-commands, key modifiers, context menus and scroll-wheel/trackball navigation. In order to offer a better editing experience tailored to your system, Keymap offers three different layouts for the main two editors (Setup editor and Instrument editor). You can select the one better suited to you in the preferences.

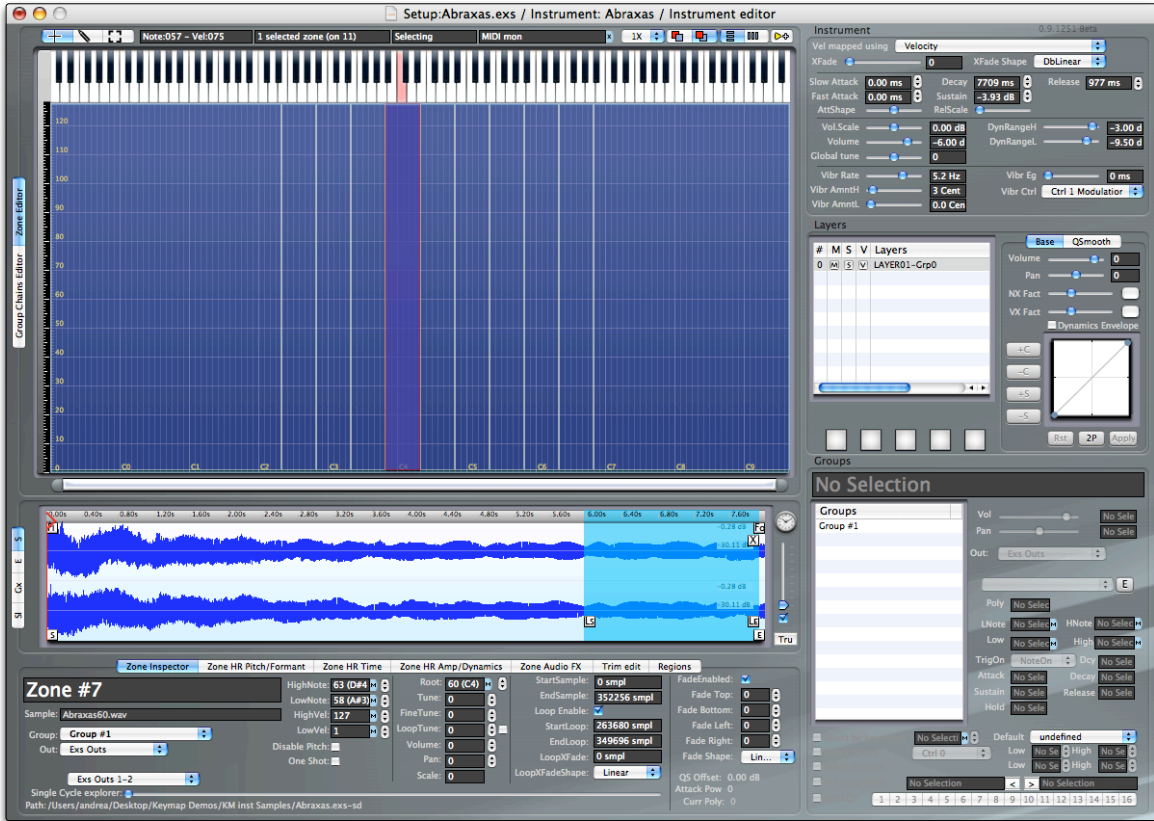
Wherever it makes sense, MIDI learn (represented by a blue M button) is also available for parameters, and real-world units (Hertz, Cents, Note names, dB, etc) are used. For some parameters it’s also possible to switch between different measure units by opening the context menu over the parameter description.



We'll now have a very quick tour of the various editors and windows.

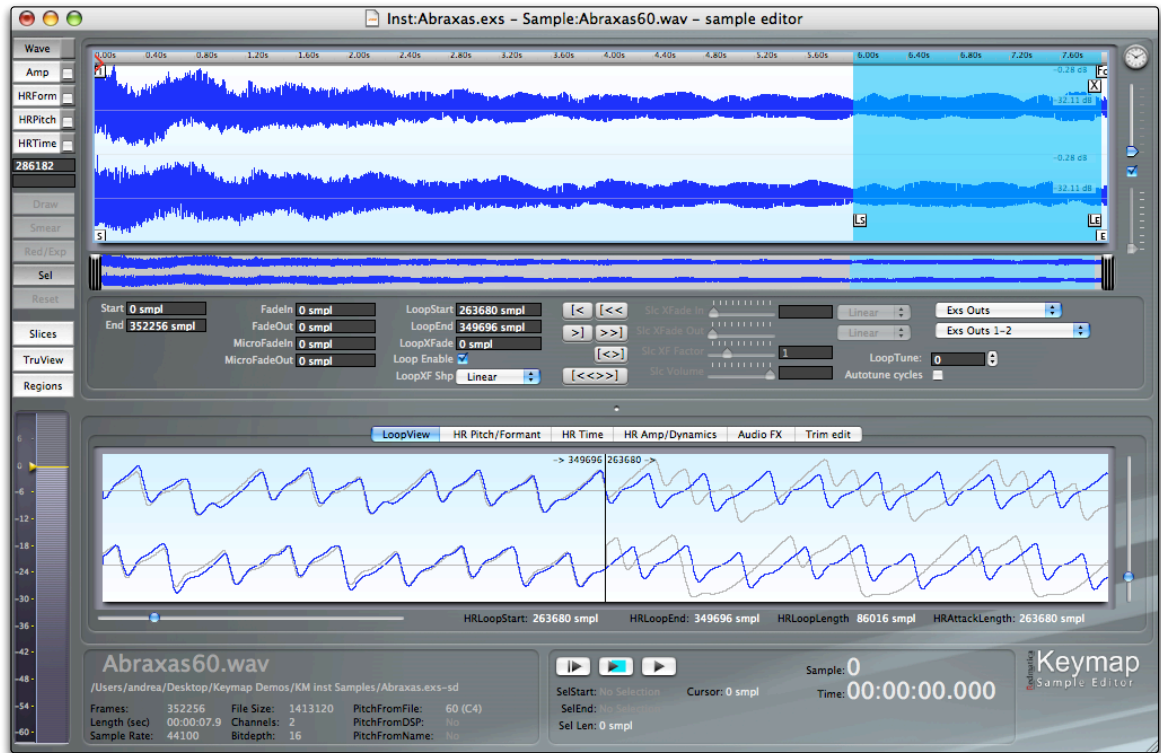
Instrument editor

This is the most important editor in Keymap. Thanks to the multiple auxiliary editors available in the window, you can edit Zones, layers, Groups, samples, Regions, amp envelope and instruments with no need to switch windows.



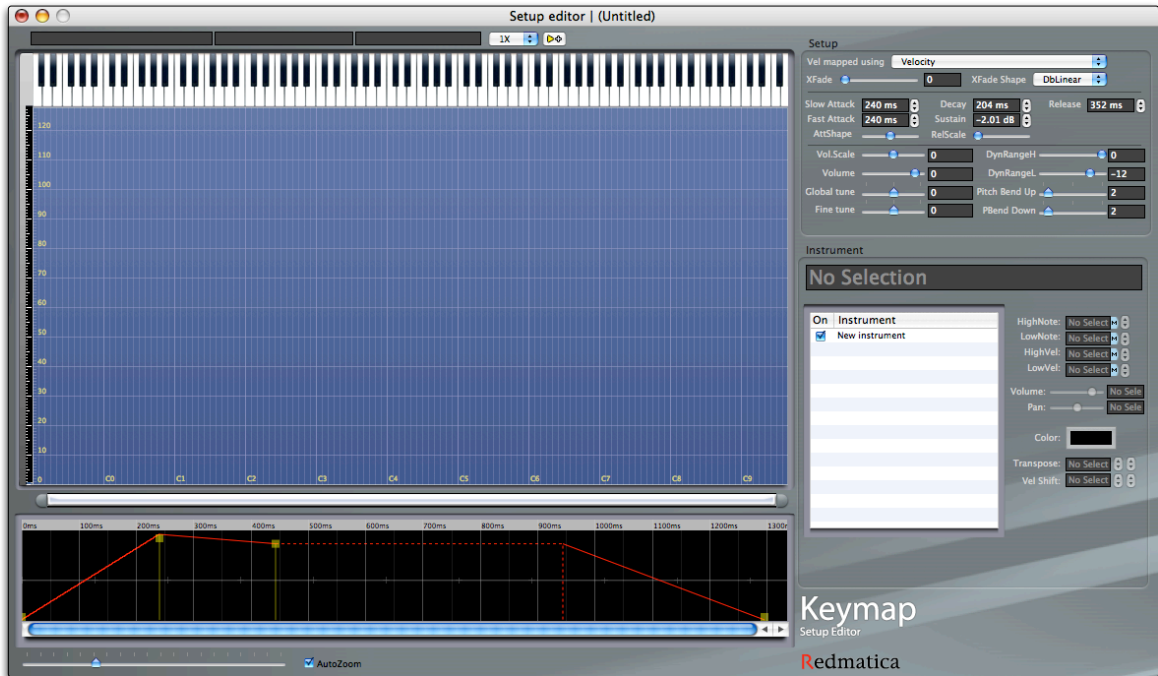
Sample editor

This window lets you access the full set of sample tools, and lets you edit samples, loops, slices, Regions and Harmonic Resynthesis envelopes.



Setup editor

In this window you combine multiple instruments into a Setup, and can edit properties for each instrument and for the setup, including the amp envelope.



Resources window

This window let you see in tabular form the samples, Zones, layers, instruments for your current project. An auxiliary sample editor let you also visualize and edit samples.

Resources window | (more moog.kmp)

1 selected zones

Zone	Layer	Instrument	Group	LowN	HighNo	Root	LVel	HV	L
osc mixer 2 R	osc mixer 2 R	alpha Moog	alpha	24 (C1)	72 (C5)	60 (C4)	1	127	
osc mixer 2 L	osc mixer 2 L	alpha Moog	alpha	24 (C1)	72 (C5)	60 (C4)	1	127	
flange moog	flange moog R	backwardMoog	backward	24 (C1)	79 (G5)	57 (A3)	1	127	
flange moog	flange moog L	backwardMoog	backward	24 (C1)	79 (G5)	57 (A3)	1	127	
big fly	big fly R	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127	
big fly	big fly L	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127	
noise 1	noise 1	buzzy Moog	buzzy	24 (C1)	67 (G4)	60 (C4)	1	127	
prodigy A1	prodigy A1	buzzy Moog	buzzy	24 (C1)	67 (G4)	45 (A2)	1	127	
osc mixer 1	osc mixer 1	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	
moog tune	moog tune	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	
osc mixer 2	osc mixer 2	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	
detune	detune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127	
moog tune	moog tune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127	
light sync 1	fat+sync Moog	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	41 (F2)	1	127	
light sync 2	light sync 2	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	48 (C3)	1	127	
moog filter	moog filter L	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127	
moog filter	moog filter R	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127	
light sync 2	light sync 2	livin Moog	livin Moog	24 (C1)	60 (C4)	48 (C3)	1	127	
moog sweep	moog sweep	livin Moog	livin Moog	24 (C1)	60 (C4)	41 (F2)	1	127	
moog square	mono Moog	mono Moog	mono	24 (C1)	67 (G4)	53 (F3)	1	127	
flange moog	flange moog L	moog deep 1	moog	24 (C1)	72 (C5)	57 (A3)	1	127	
flange moog	flange moog R	moog deep 1	moog	24 (C1)	72 (C5)	57 (A3)	1	127	
flange moog	flange moog L	moog lo-echo	moog lo-	24 (C1)	67 (G4)	57 (A3)	1	127	
flange moog	flange moog R	moog lo-echo	moog lo-	24 (C1)	67 (G4)	57 (A3)	1	127	
flange moog	flange moog L	movie bass	movie	24 (C1)	72 (C5)	57 (A3)	1	127	
flange moog	flange moog R	movie bass	movie	24 (C1)	72 (C5)	57 (A3)	1	127	
flange moog	flange moog L	movie bass	movie	24 (C1)	72 (C5)	57 (A3)	1	127	

Sample editor for moog tune.aif

Sample	Frames	Rate	Form	Modified	Created on	Path
moog tune.aif	274176	48000	AIFF	Jan 04,2007	Jan 03,2007	/Users/

1 selected samples

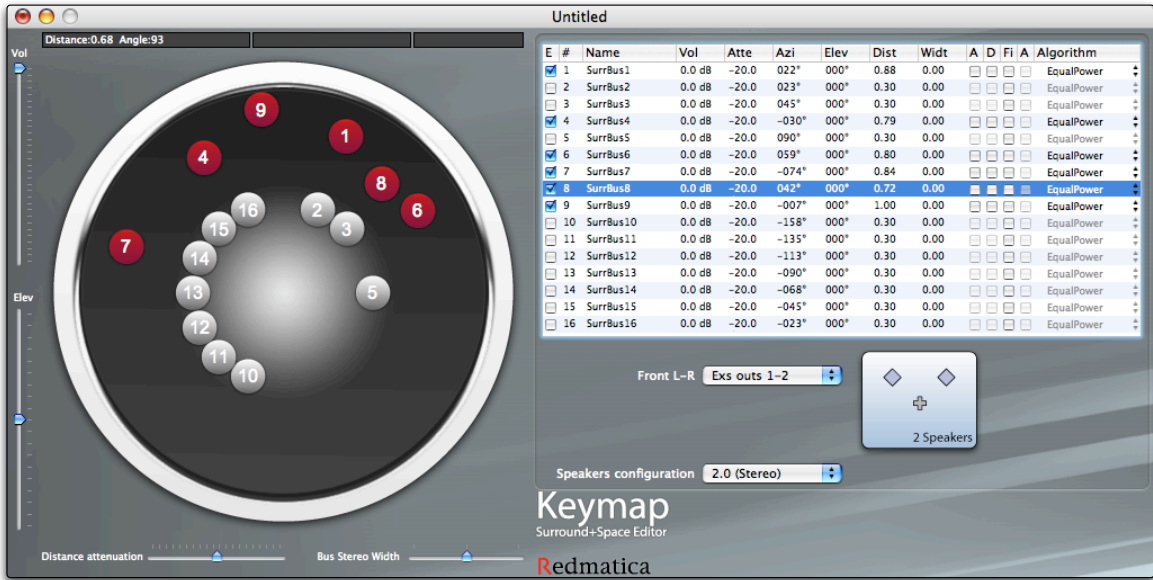
moog tune.aif
/Users/andrea/Desktop/untitled folder

Frames: 274176 Channels: 1 High Note In File: 127 (G9) Root Note: 60 (C4)
Time: 5.71 sec Bitdepth: 16 Low Note In File: 0 (C-1)
Sample Rate: 48000 Loop start: 38289 High Vel in File: 127
File Size: 548864 Loop End: 268896 Low Vel in File: 0

Keymap
Resources Window
Redmatica

Surround+Space mixer

In this window you place and mix each of Keymap's sixteen stereo surround busses into the soundfield with a selection of algorithms and multiple output configurations.



Statistics window

In this window you can see statistics about your current project.

Setup Statistics

Abraxas

Responding to MIDI channels: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 ALL

Instruments

1 Instruments

Avg number of layers per instrument: **1.0**
Min number of layers per instrument: **1**
Max number of layers per instrument: **1**

Layers

1 Layers

Avg number of zones per layer: **11.0**
Min number of zones per layer: **11**
Max number of zones per layer: **11**

Groups

1 Groups

Using keyswitches: **0** Avg number of zones per group: **11.0**
Using ctrl switches: **0** Min number of zones per group: **11**
In Group chains: **0** Using pitch switches: **0** Max number of zones per group: **11**
Total Group chains: **0** Using MIDI channel: **0** Unused groups: **0**

Zones

11 Zones

Using Groups: **11** Avg note range width: **11.6**
Using Harmonic Resynthesis: **0** Avg velocity range height: **127.0**
Using AudioFX: **0** Avg max distance from root note: **9.5**
Looped: **11** Using loop XFades: **0**
Unlooped: **0** Avg loop XFade length: **0**

Samples

11 Samples

Current size: **14.61 MB** Avg sample length: **332026**
Truncated 16bit size: **14.61 MB** Min sample length: **243712**
Truncated 24bit size: **21.91 MB** Max sample length: **425984**

Updates automatically [Update now](#)

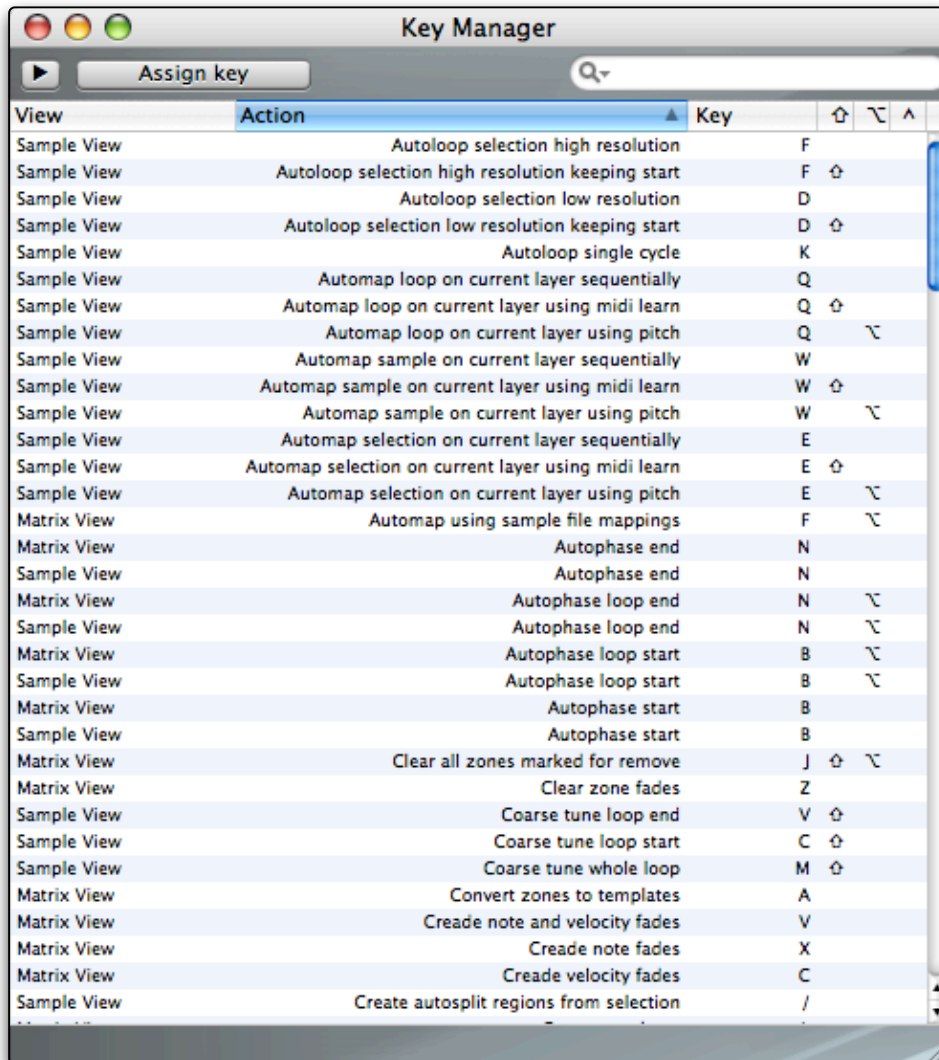
At all times, the information regarding the number of Zones and project sample size is also displayed in the system menu bar on the top of your screen.



Key Manager

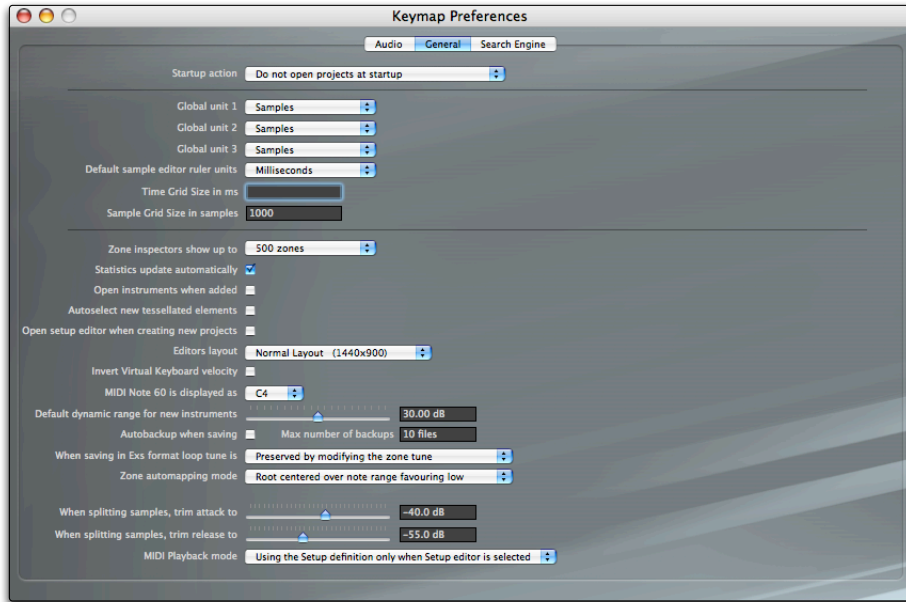
In Keymap each function or command can usually be performed either as a menu command, or by using key commands. As the key commands are user-definable we won't mention them explicitly every time in the guide, but using key commands is the recommended way to access functions.

This Key Manager window lets you see the key commands, and change key assignments.



Preferences

The preferences page let you set the audio device, the search engine, and other parameters used to personalize your Keymap experience



Menu Conventions

In the guide we'll often refer to menu commands. A hierarchical menu command will be written as follows: **Menu > Menu Entry > Function**. When using menus, remember that menus are disabled when an operation can't be performed, as in the case of copying a selection of objects if a selection is not available.

Blank areas in the guide

This guide has been written using a large number of snapshots and graphical illustrations. In order to Group paragraphs and images in a logical way, some guide pages might not be completely filled with text and images. This is intentional.

Key commands

Almost all menu functions have equivalent key commands. Sometimes this guide will mention key commands explicitly: we'll refer to the default key assignment. Be aware that key commands assignments

are user definable and can be changed as you prefer. You can search for the assignments from the Key Manager window.

The vast majority of key commands also are also tied to specific editors, and so the same key can have different functions depending if you are in the sample editor, or in the Instrument editor. Again, you can see this from the Key Manager.

Key modifiers

Keymap makes extensive use of key modifiers, namely the **shift**, the **option**, the **control** and the **Command keys**, which you press in conjunction to other keys or to the mouse. In this guide we'll both explicitly mention them as modifier keys (“... pressing the Shift key modifier and the W key will perform...”) and also describe them in a synthetic way (“...shift+W will perform...”). The two expressions are equivalent.

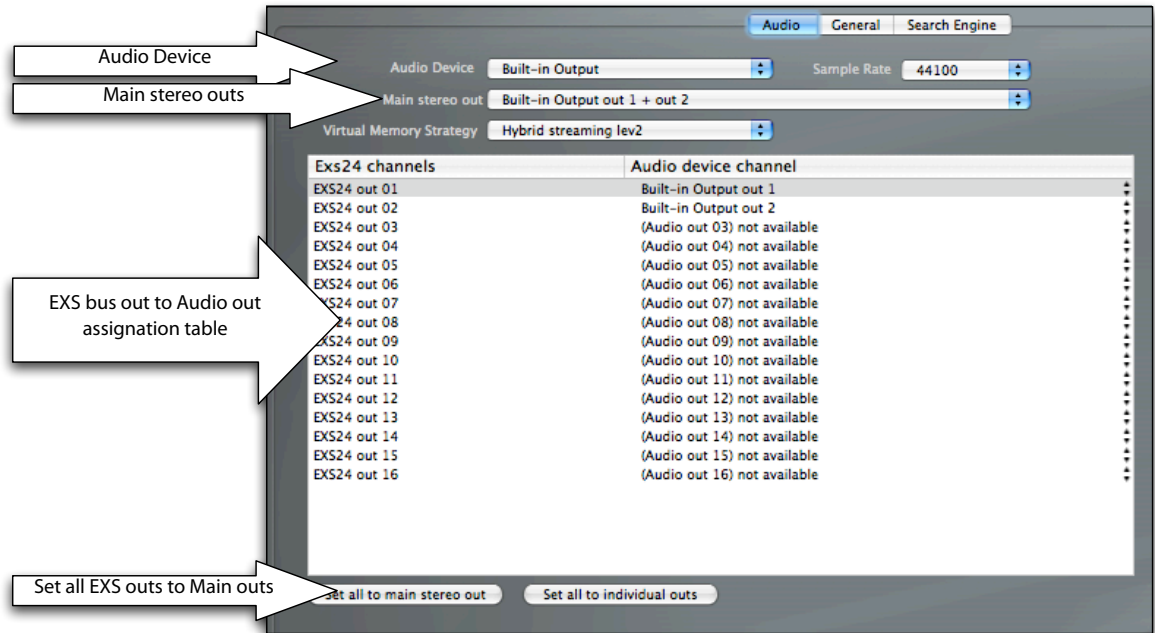
It's all interconnected! Please read the guide twice.

Keymap is an application where all the functions and editors are heavily interconnected. For this reason we'll inevitably have to make references in this guide to things that are explained “later”. We suggest reading this guide **twice**, since it is our experience that during the second reading everything will “click” to its place.

Chapter 2: Setting up Keymap

The first time you launch Keymap, you will need to configure the application for your system. This is done from the preferences panel. The things that you'll need to configure are:

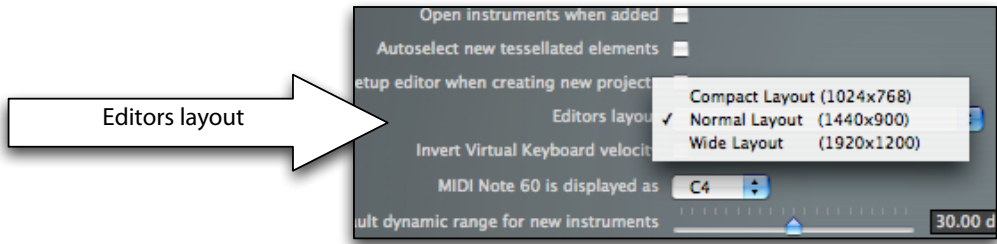
1) The Audio Device in the "Audio" preferences tab.



If your audio device has multiple outs, you will also need to set which set of outputs Keymap will use as main outs. The **Main stereo out** pop-up menu lets you select which stereo audio output you want to use as main Keymap stereo. Setting this menu is not the only step to reconfigure audio outputs. For the new main outputs to be used you will also to click the **Set all to main stereo outs** button. Then Keymap will route all the EXS/Keymap outputs to the selected main stereo outs.

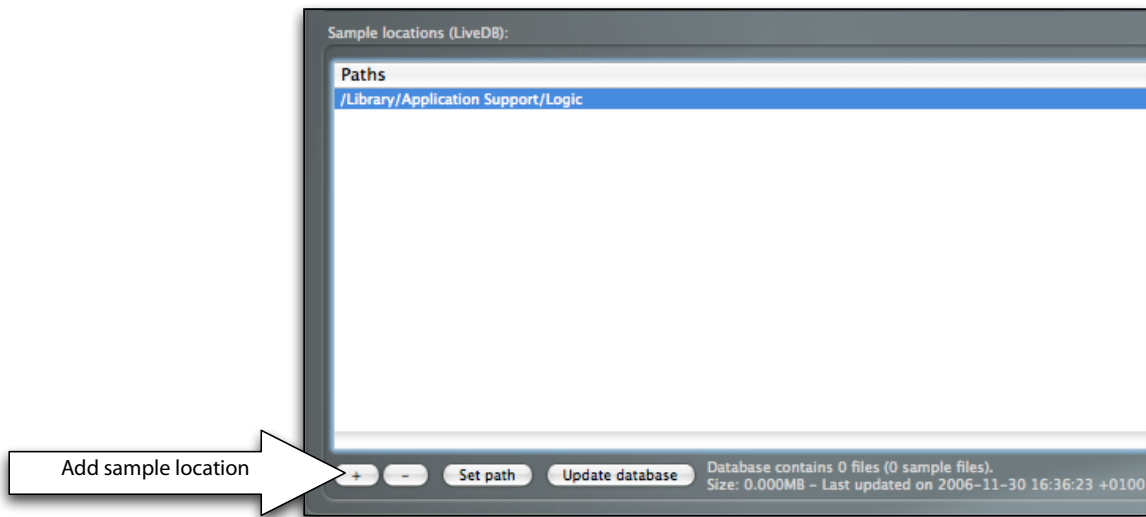
You do not have to set MIDI devices, as Keymap always responds to all attached MIDI controllers.

2) The preferred layout to be used for the editors in the “General” preferences tab:



Keymap offers different sizes for several of its editor windows in order to better match your screen size. The default layout will be the most suited for your current screen size, but you might want to use a different one. This setting is relevant only for the new editors you are going to open: currently opened editors won't change layout.

3) You also need to set the locations where you store your sample files folders/drives in the “Search Engine” preferences tab, so that the Keymap integrated sample database (LiveDB) will know where to search for samples when needed.



You can click on the “+” button to add paths or folders, and click on “-” to remove them. Once a path has been added, you can change it by clicking the “Set Path” button.

LiveDB will automatically self-update every time this is needed, but the very first time it will have to scan the newly added drives and folders and it takes some more time, so you might want to do it now by clicking "Update database". LiveDB has been designed to work in a "set-and-forget" way, and will automatically load/save and update with no need for you to do anything.

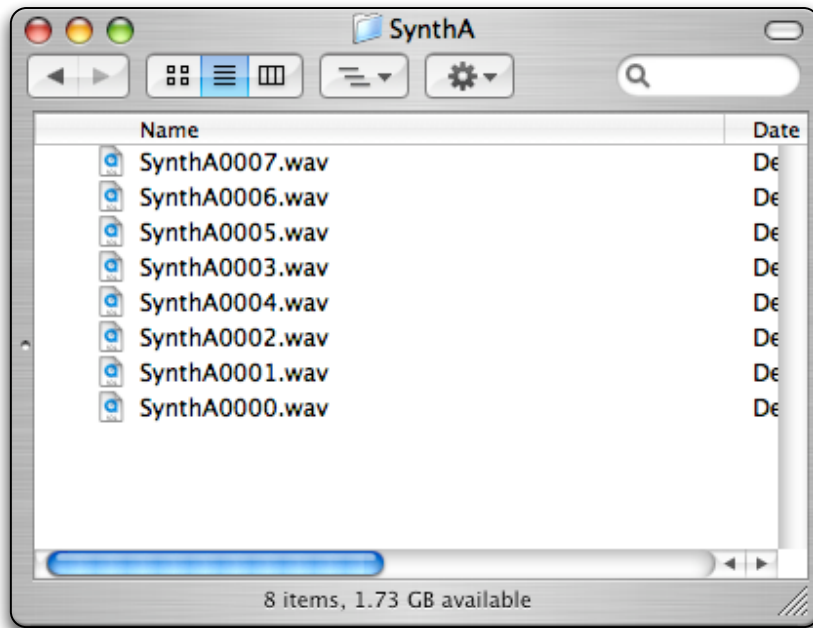
Chapter 3: Let's build an instrument

Before explaining the various Keymap editors and functions one by one, let's dirty our hands a little bit by building an instrument from scratch using some of the demo samples available on the Keymap CD or as a download from the Redmatica site. We'll assume you already set up the audio device correctly as described in the previous chapter.

Let's build the SynthA instrument.

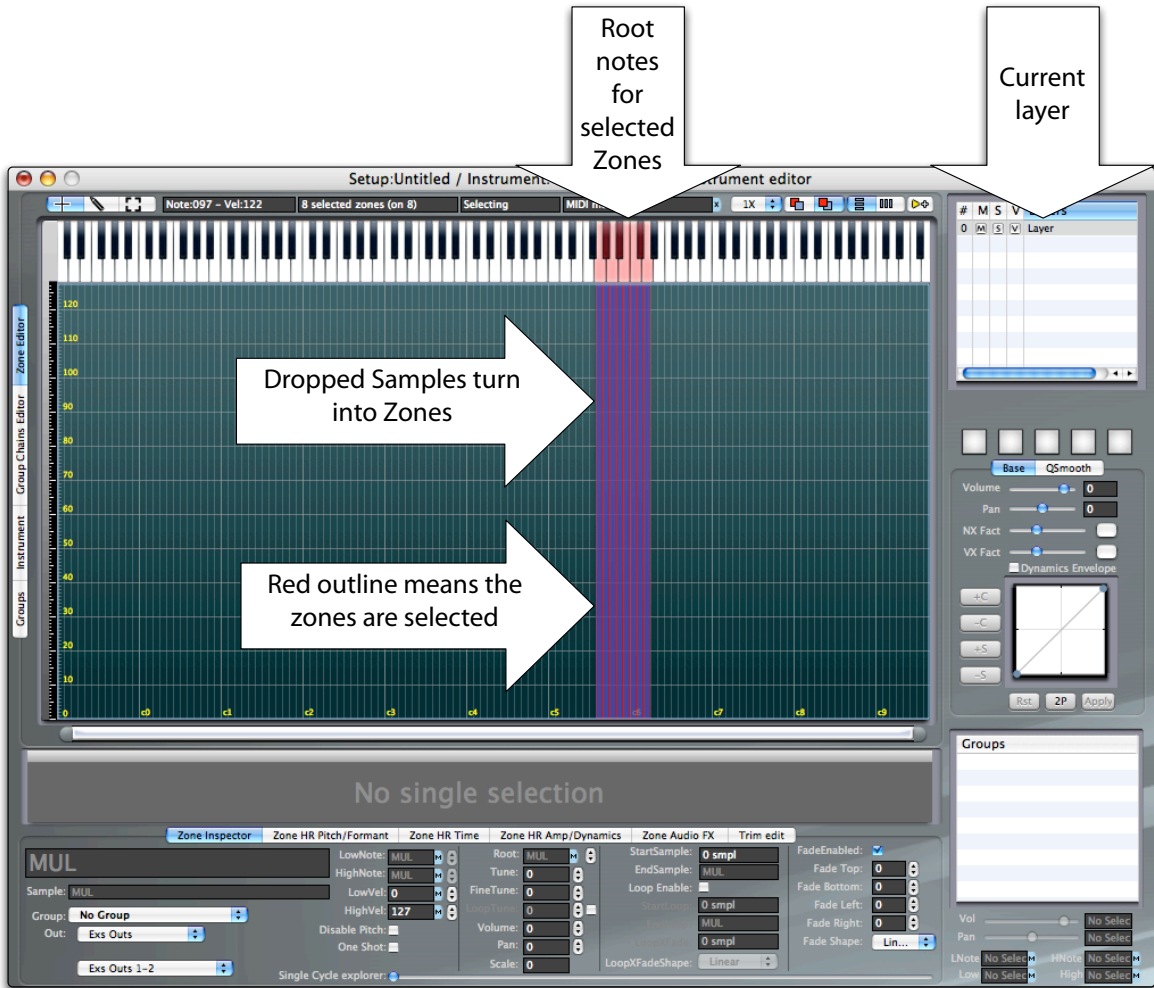
After installation, Keymap will create a new instrument by default when launched. You can later disable this in the preferences if you wish. For now, ignore or close the Setup editor, as we'll only use the Instrument editor.

Open the folder containing the SynthA samples



Notice how the samples have quite anonymous names, and no trace of a root note name.

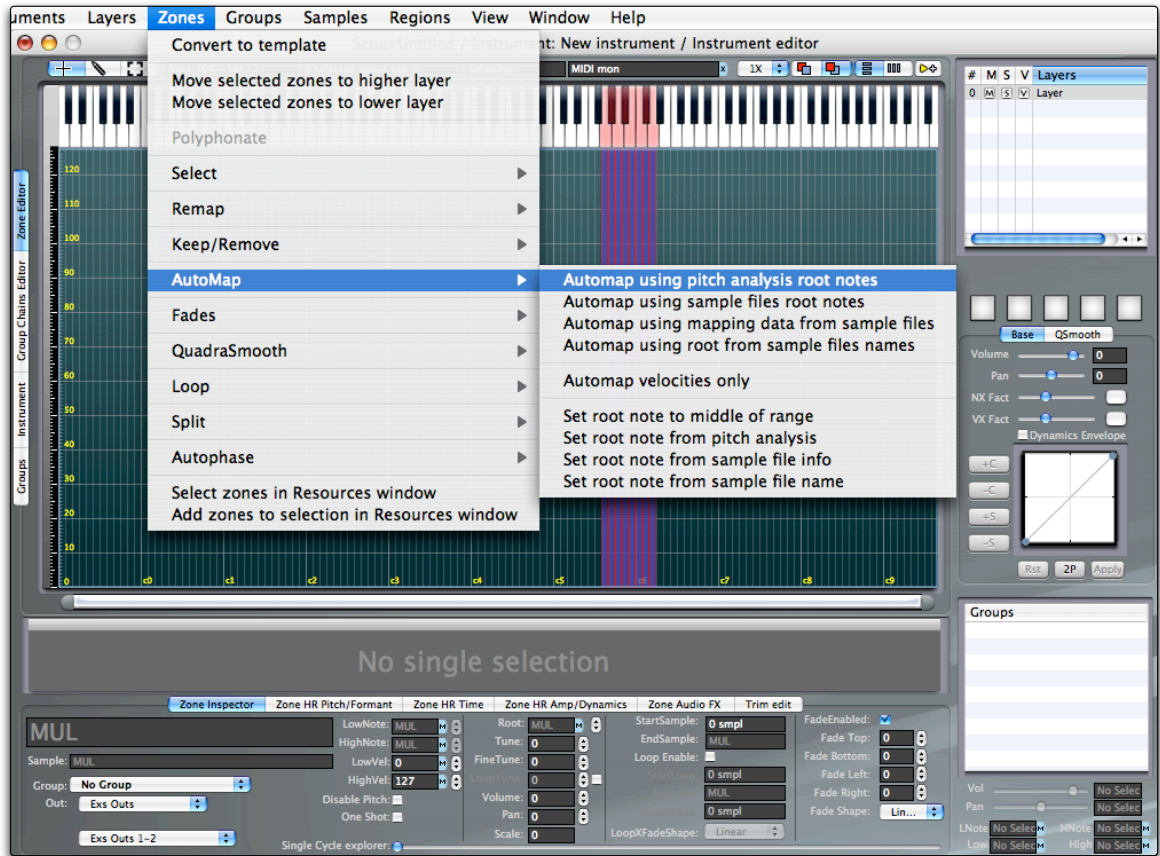
Select the sample files and drag them into the Instrument editor, roughly in the middle of the layer matrix. In these pictures you will see the a compact layout Instrument editor, but of course you can use other layouts as well.



Note how new Zones (blue rectangles) have been created in the current layer matrix for the samples you dropped. The Zones are one note wide, with the root note set to that note. The red outline means that the

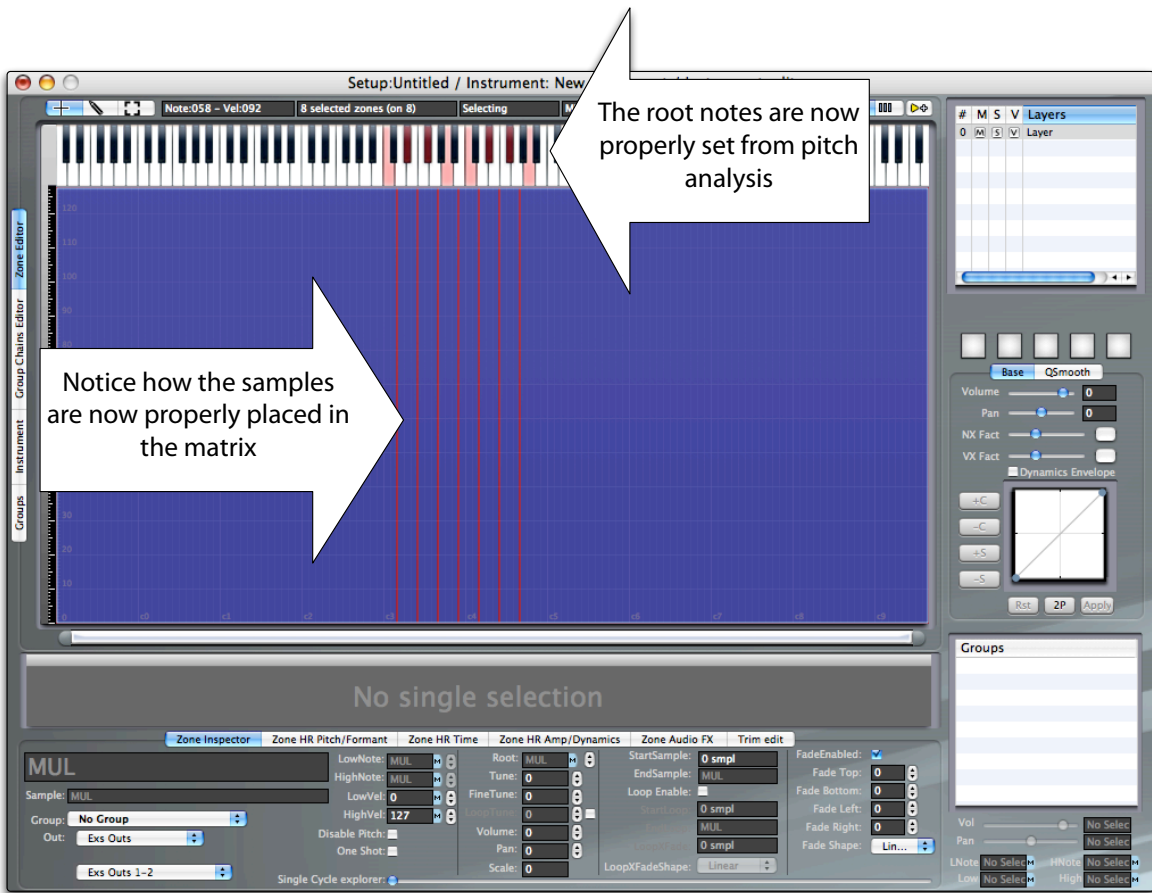
Zones are selected. Whenever Zones are selected, you can see their root notes highlighted in red over the virtual keyboard. Notice also how Zones have been placed over notes in alphabetical order based on their sample names.

With the Zones still selected, use the **Zones > Automap > Automap using pitch analysis root notes** menu.



Keymap analyzes the samples and places them at the appropriate position in the map, with the root note set properly.

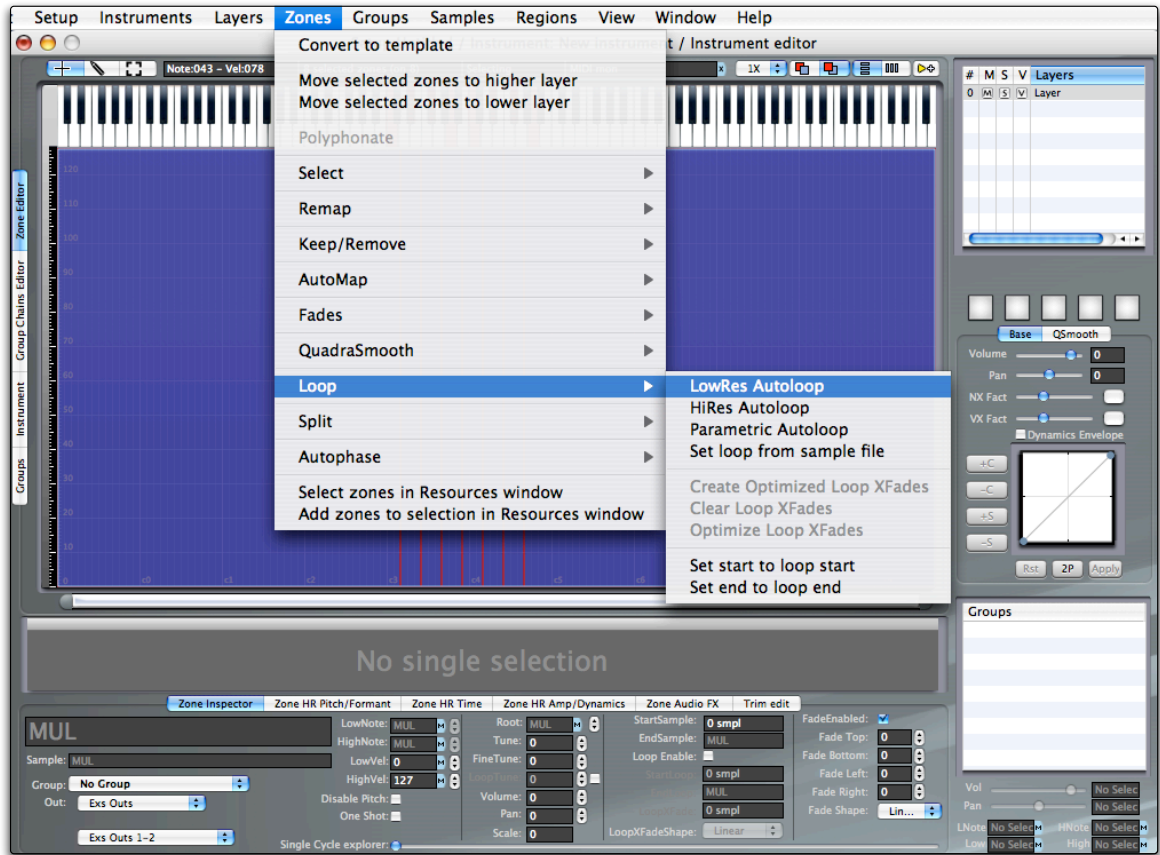
And here are the results of automapping:



If you try to play the instrument it now sounds perfectly mapped.

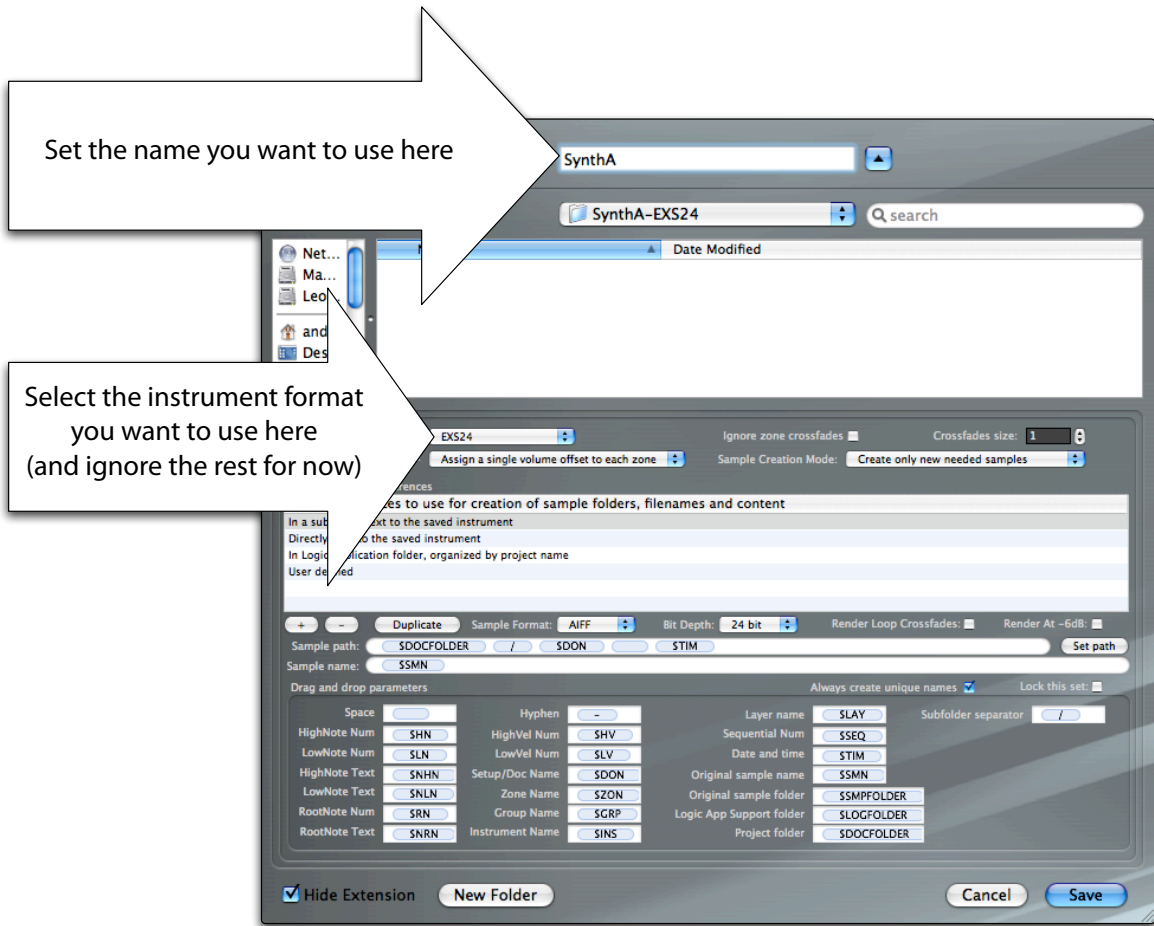
However, after playing a note for a while, the sound stops. This happens because the samples are not looped yet.

So what we are going to do now is autoloop the Zones. Make sure the Zones are still all selected, and then select the **Zones > Loop > LowRes Autoloop** command.



In a few seconds the samples will be non destructively looped. Once autolooping ends, try playing notes again, and you will notice how the sounds play indefinitely.

You can now save the project as an EXS24 instrument by using the **File > Save** menu. By default you are saving in Keymap format, but you can select EXS24 format in the popup menu found in the save panel.



Do not be intimidated by all those parameters. For now we won't use them, and you will learn all about them later.

Click "Save" and that's all.

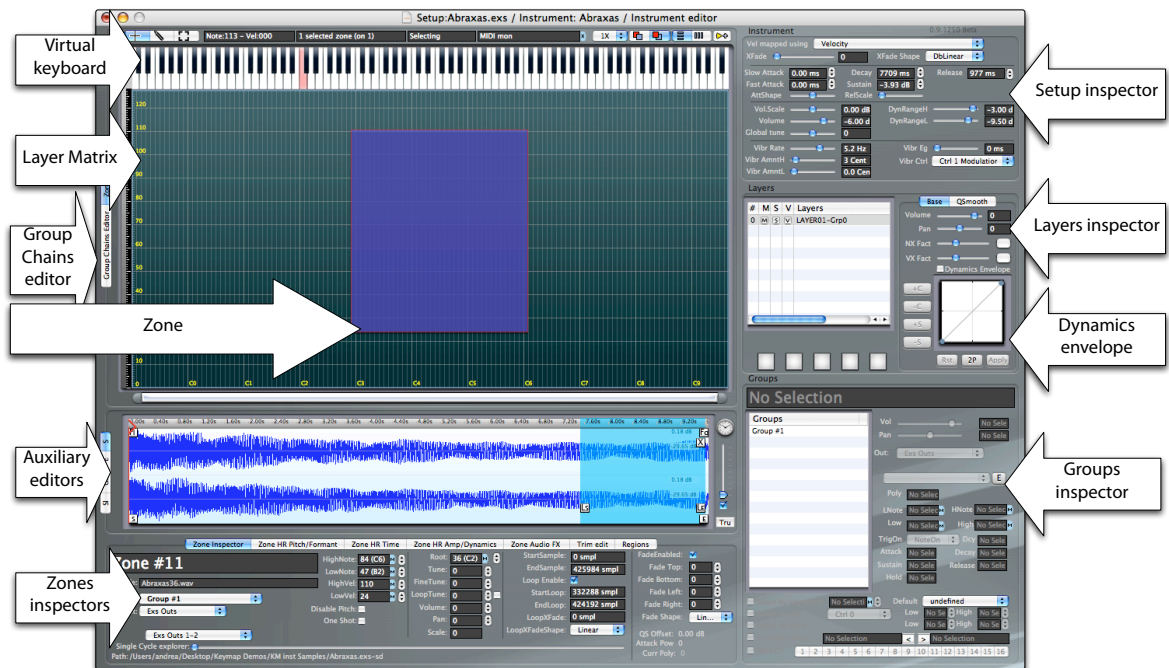
Congratulations! You have just built your first instrument with Keymap from scratch, complete with autolooping, and without having to edit anything. The whole process could probably have been done in a couple minutes.

Welcome to the world of Keymap!

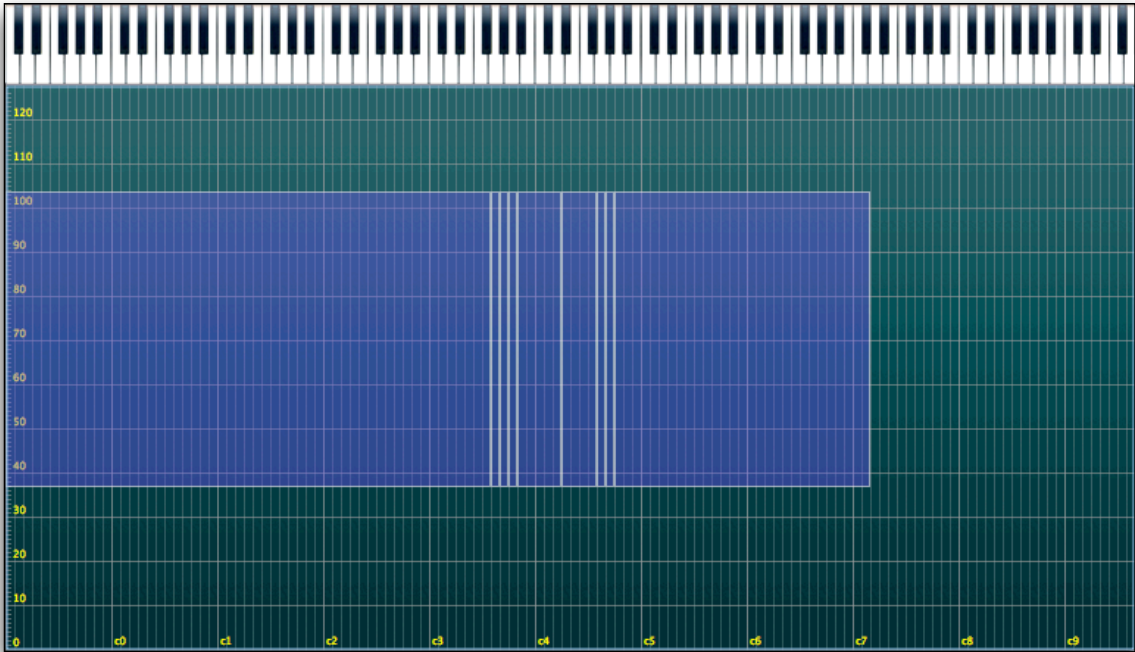
Chapter 4: Instrument Editor Overview

The Instrument editor is the most important Keymap window and has been designed for an efficient workflow with most of the functions just one mouse click away. The editor makes extensive use of context menus which you access by clicking the right mouse button (or ctrl+single mouse button) over the main window elements.

In the Instrument editor you typically edit Zones, layers, Groups and the instrument parameters, but through the built-in auxiliary sample editor editor you can also edit samples form here., You can drag and drop samples into the matrix to create Zones automatically, or to assign samples to existing Zones.



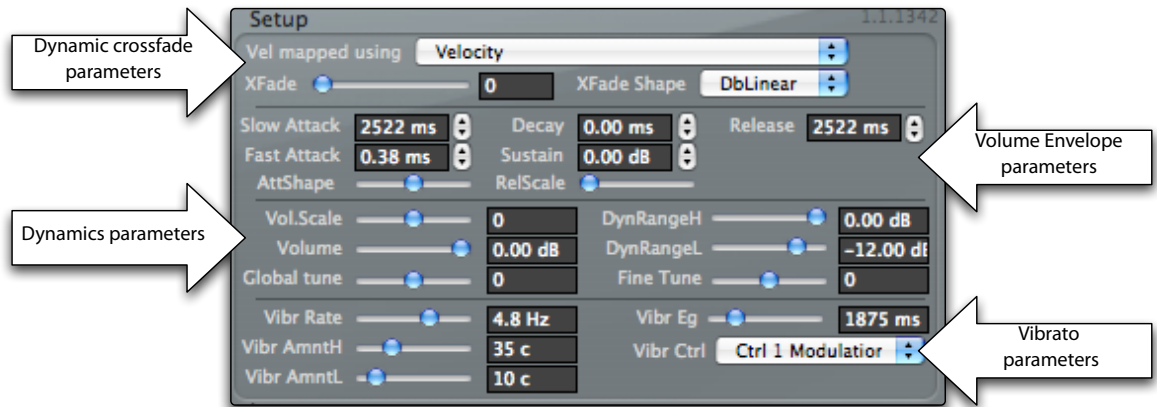
The Instrument editor window contains several elements. The largest element is the layer matrix, in which Zones can be created and placed graphically over note and velocity ranges.



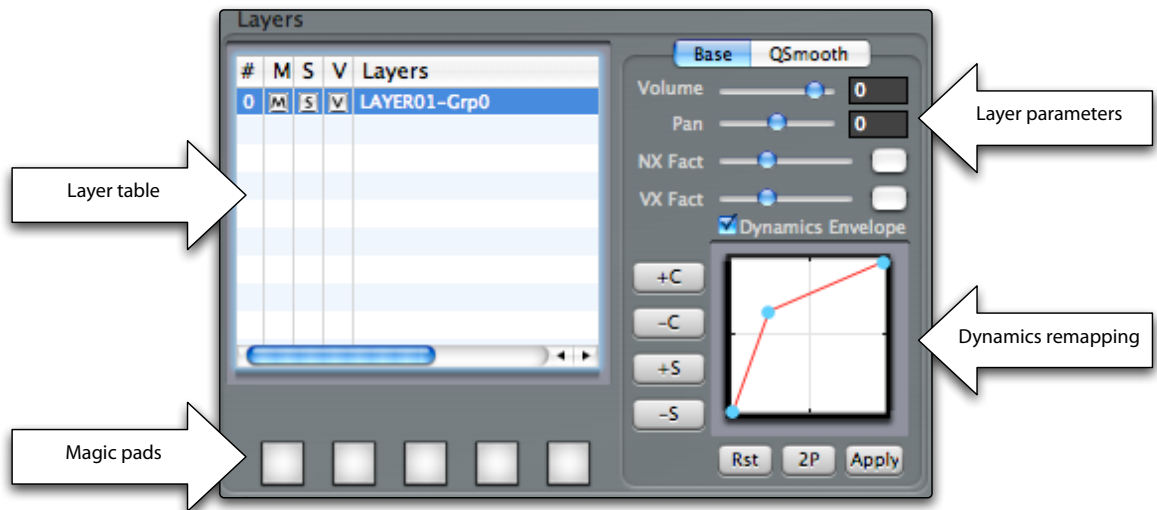
At the top we have an integrated Virtual Keyboard with full velocity range control, which is used to play notes using the mouse, to see which note is being played from MIDI, and to visualize Zone root notes and other useful data.



The Setup inspector resides in the upper-right, with parameters for crossfades, envelopes, dynamics and vibrato. These parameters are shared with the whole project (actually with the setup in the project), not just the edited instrument.

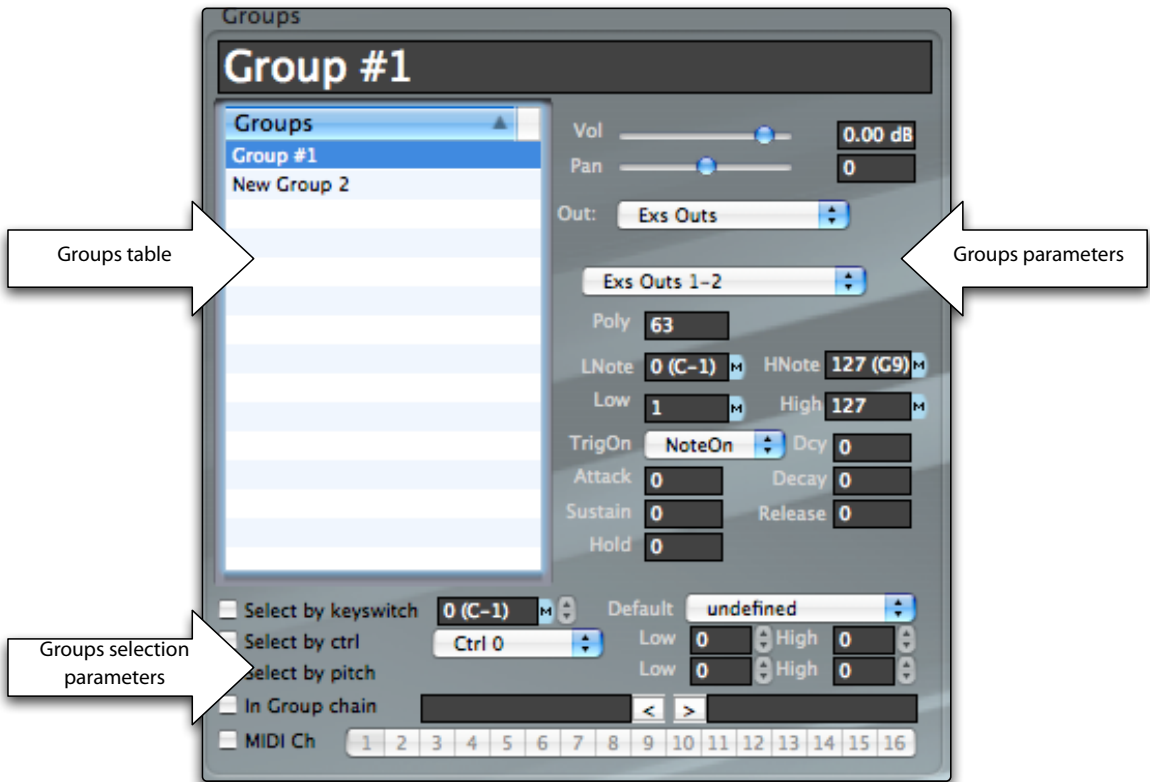


Continuing down the right we see the Layers inspector.

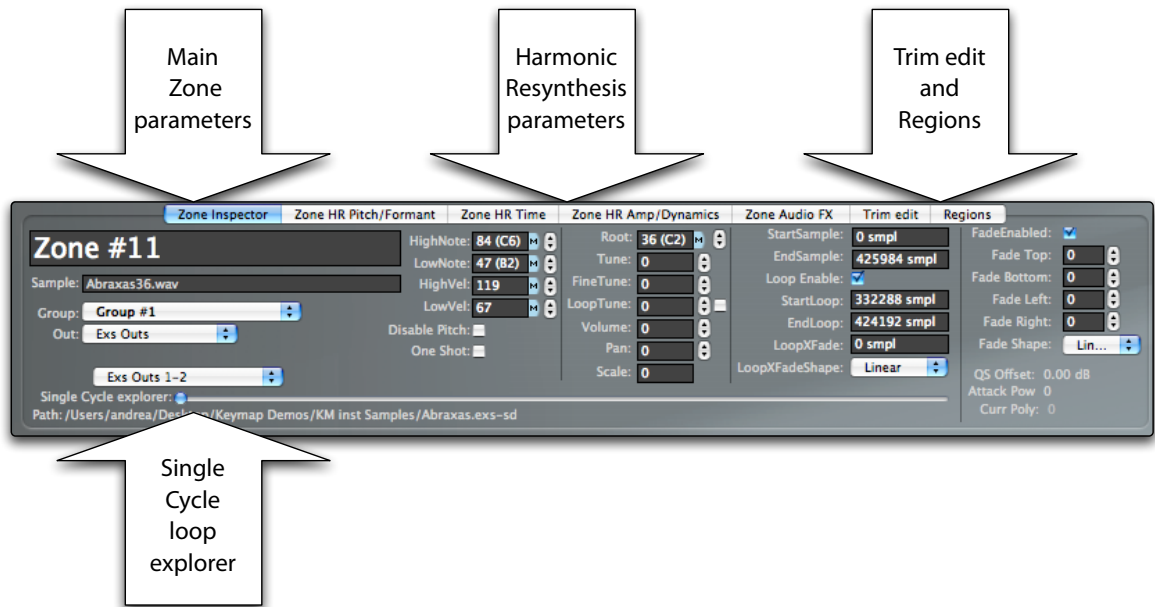


At any point, the layer displayed in the Layer matrix is the one selected in the Layer table. Each layer has an independent dynamics remapping envelope, which is useful for changing the velocity mapping and/or restricting the dynamic range of the each layer. At the bottom of the layer inspector box you see five Magic pads, each of which can apply a different set of functions to samples dragged and dropped over them. These pads are very useful for quickly performing some preset common tasks.

On the right bottom we see the Groups inspector, containing the Group table, with the associated parameters. An important section at the bottom handles the selection parameters for Groups, determining when a Group should become active or not. As we'll see, the selection mechanisms are very important for creating complex, dynamical playing instrument.

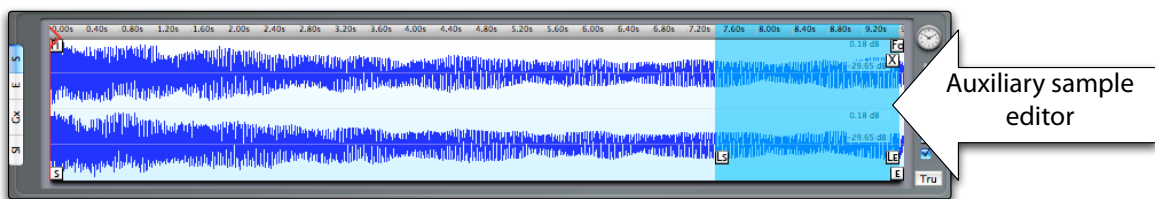


At the bottom-left, we see the Zone inspectors. We use the plural because each Zone has a huge number of individual parameters, which are presented in seven distinct tabs, subdivided by area of pertinence. If you select multiple Zones, the inspectors will display the common values and will still let you edit the other ones, so that it's very easy, as example, to set all Zones low velocity with a single edit action from the inspector.



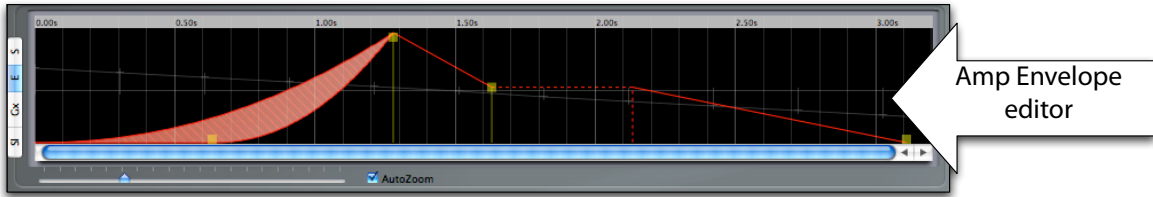
At the bottom of the main Zone inspector tab you also find the Single cycle loop explorer. This long slider let you automatically navigate through single cycle loops for harmonic samples, just by moving it to the desired relative position.

Above the screen area of the Zone inspectors we see the Auxiliary (aux) editors. These small but fully functional editors let you visualize and edit important data in the context of the Instrument editor so that you will rarely need to switch to other windows. The most important aux editor is the **Aux Sample Editor** (also named **sample view** to distinguish it from the full-featured sample editor).

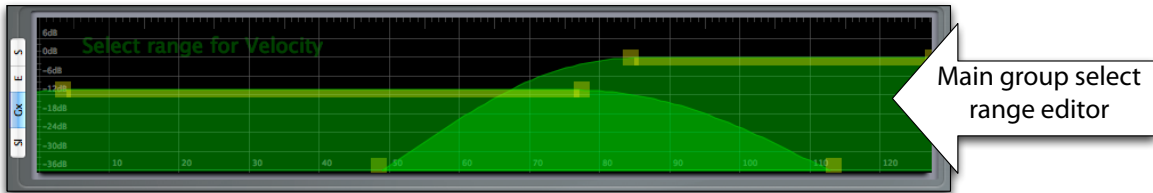


This editor shows you the sample assigned to the currently selected (single) Zone. The sample view becomes inactive when you select multiple Zones, or when no Zone is selected.

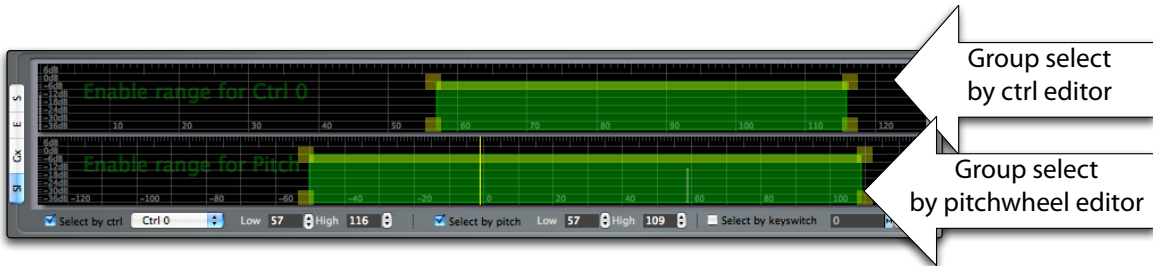
Another auxiliary editor is the Amp Envelope editor, showing at all times the amp envelope for the current project. Note that even if we have a single amp envelope for each project, you can actually have many different variations by using the Groups offset feature. More about this later.



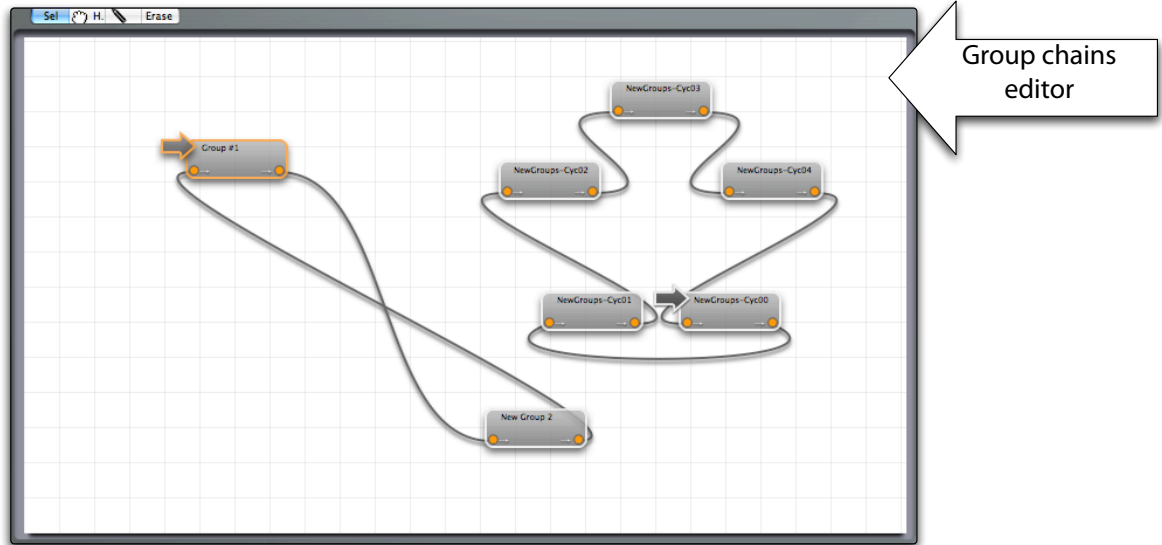
Among the aux editors we also find the main **Group velocity/xfade range editor**, which lets you select the velocity range for which the Group(s) will become active and will play linked Zones.



And we also can see the smaller editors for the **Group selection** respectively **by controller** and **by pitchbend**.



We have one last editor in the Instrument editor window and it's the **Group chains editor**, accessible through a tab on the left of the layer matrix.

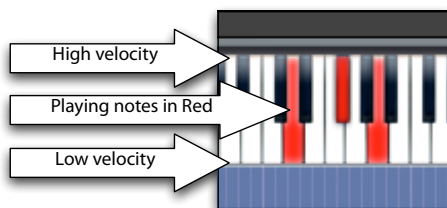


With the Group chains editor it becomes very simple to visualize and edit even the most complex round robin Group structures.

Virtual keyboard

The virtual keyboard in Keymap is used both for displaying information and for playing notes using the mouse. This latter operation is quite straightforward, as you just have to click over the representation of the keyboard keys. The note velocity for the played Zones depends on the vertical position of the mouse cursor over the keyboard when clicking. Click a note at the bottom and you will get a low velocity note. Click at the top and you will get full velocity. If you prefer, a setting in preferences lets you reverse this behavior, so that you get low velocity at top and high velocity at bottom.

The virtual keyboard also displays note-related informations by highlighting the virtual keys with colors.



At any moment:

red notes are the currently playing notes, both from mouse or from MIDI.

light red notes are the root notes for the selected Zones. The root notes will be displayed only if the **View > Extra** and the **View > Show > Root Notes** menus are enabled. This let you have a less visually crowded virtual keyboard in case you do not want to work with root note parameters.

green notes are keyswitch notes set in Groups.

blue notes are the range of the currently dragged Zones (and they will appear only when dragging around Zones).

light blue notes are the original note range of the currently dragged Zones

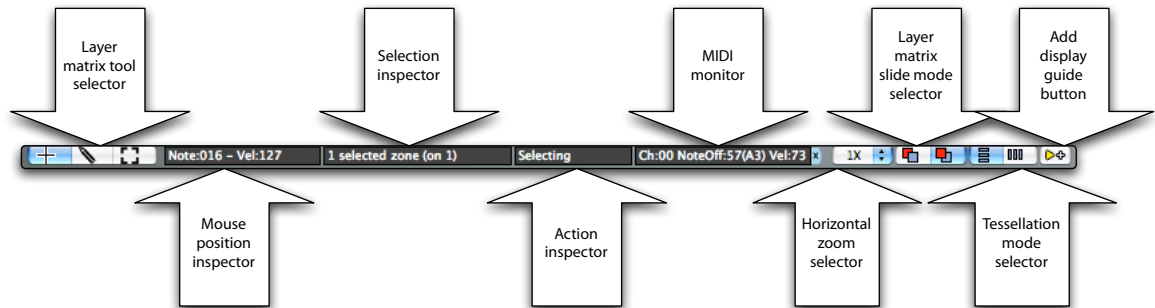
yellow notes show the note range in between the last two played notes (Keymap always remember the latest two played notes and can use that information for selecting Zones).

The virtual keyboard can also be used to edit the root notes for the selected Zones: select the Zones in the layer matrix, and then drag the light red notes on the virtual keyboard with the mouse by holding the **option+Command key modifiers** and then clicking and dragging the root notes around on the virtual keyboard. This kind of edit is also possible for multiple Zones.

You can also select the currently playing Zone by holding the **Control key modifier** while clicking notes on the virtual keyboard, or from he MIDI Keyboard. Using this functions, you can inspect very quickly the Zone parameters for the note you hear.

Cursor inspector, MIDI Monitor, Zoom and Guides

Above the virtual keyboard we have various small inspectors and buttons.



Starting from left, the **layer matrix tool selector** lets you select the current tool for the layer matrix.

The cross represents the **selection tool**. This is used for selecting, resizing and moving Zones around the layer matrix.

The pen represents the **pen tool**, which is used for drawing Zones in the layer matrix

The square represents the **erase tool**, which is used for deleting Zones or create arbitrary empty spaces in the layer matrix

Another tool, the **scissors tool**, is always available from the layer matrix by pressing the **Command key modifier** (vertical scissors tool), or the **shift+Command key modifiers** (horizontal scissors tool).

The **mouse position inspector** shows you the current note and velocity position of the mouse cursor inside the layer matrix. This is useful when you want to do precise edits.

The **selection inspector** displays the current number of selected Zones.

The **action inspector** displays in detail the current action being performed with the mouse.

The **MIDI monitor** displays both the notes being played by any external MIDI source connected to your computer, and the notes that you play on the virtual keyboard. The small blue "x" button at the right of the MIDI monitor is an "**all notes off**" panic button.

The **horizontal zoom selector** let you select the zoom level for the layer matrix. The available zoom levels are typically 1X and 2X, but some editor layouts (as the wide setup editor) are fixed at 2X and in that layout you won't actually see the zoom selector.

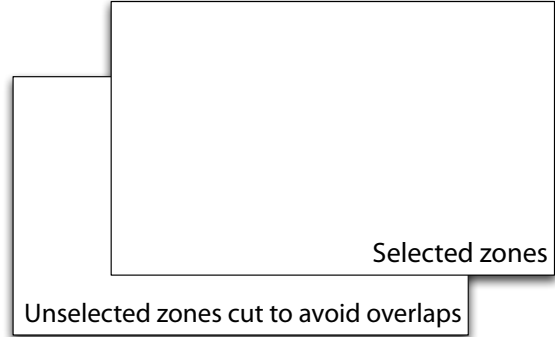
Next, to the right, is the **slide mode selector**. Slide mode is a very important concept in Keymap, and it lets you select how Keymap handles overlapping Zones in a layer. We need to remember that in Keymap, **Zone overlaps in a layer are not allowed**. However, while moving selected Zones around with the mouse, you can overlap them as long as you hold the mouse button pressed. The slide mode selector essentially lets you select what happens when you release the mouse button.

Slide-over mode

While dragging selected zones around



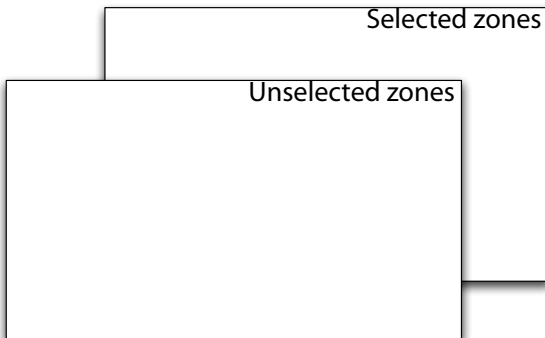
... and after releasing the mouse button



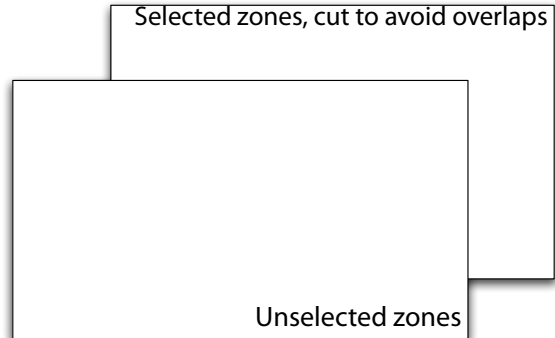
In **slide-over mode**, the selected Zones are considered to be placed **over** the unselected Zones. When you drag selected Zones and release the mouse button, Keymap will cut the unselected Zones in order to make space for the selected Zones you are dropping over them.

Slide-under mode

While dragging selected zones around



... and after releasing the mouse button



In **slide-under mode**, the selected Zones are considered to be placed **under** the unselected Zones. When you drag selected Zones and release the mouse button, Keymap will cut the selected Zones in order not to overlap the pre-existing unselected Zones at that position.

What actually happens in both modes is slightly more complex. As you might imagine, Zones are graphically visualized as rectangles, and so Keymap can't simply cut a part of a Zone, as it wouldn't be a rectangle anymore! Here is where the **tessellation engine** steps in and solves the problem.

For a start, what does "tessellation" mean? From the dictionary:

tessellate |ˈtesəˌlæt| (also **tesselate**)

verb [trans.]

cover (a plane surface) by repeated use of a single shape, without gaps or overlapping.

DERIVATIVES

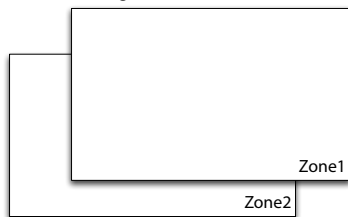
tessellation |ˌtesəˈlā sh ən| (also **tesselation**) noun

The tessellation engine automatically recognizes situations where cutting a Zone would result in an irregular, non-rectangular shape, and splits this shape in a number of rectangular Zones, each a copy of the original one.

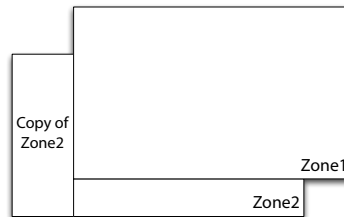
The **tessellation mode selector** let you select if you prefer the irregular shape to be split horizontally or vertically. Once the slide mode and the tessellation mode are selected, this is what Keymap actually does through its tessellation engine:

Tessellation engine in slide-over mode

Before releasing the mouse button



With vertical tessellation

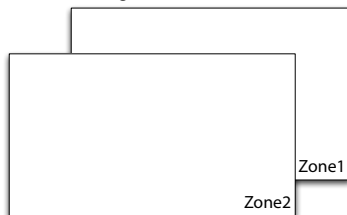


With horizontal tessellation

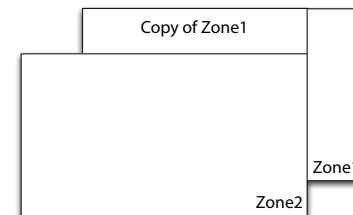


Tessellation engine in slide-under mode

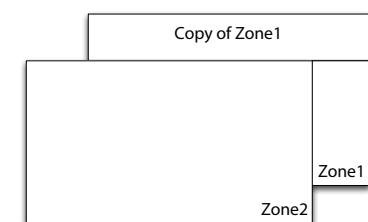
Before releasing the mouse button



With vertical tessellation

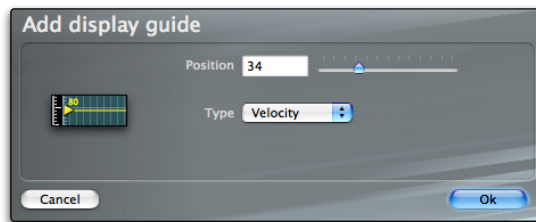


With horizontal tessellation



And of course, while this example shows just two Zones for the sake of simplicity, Keymap can handle multiple Zones at once. After all this talk about overlapping Zones not being allowed, we need to remember that while Zone overlaps are not allowed **in a single layer**, you can certainly overlap as many Zones (and relative samples) as you wish **by using multiple layers**.

Back to our screen controls, at the right we find the **add display guides** button. **Display guides** are vertical and horizontal lines that serve as handy visual elements which you can place on the layer matrix as a visual reference. This is especially useful when moving Zones around. As previously mentioned, Guides can be vertical (over a single note) or horizontal (over a single velocity level). Once you click the guides button, a panel will let you select the guide type and value.

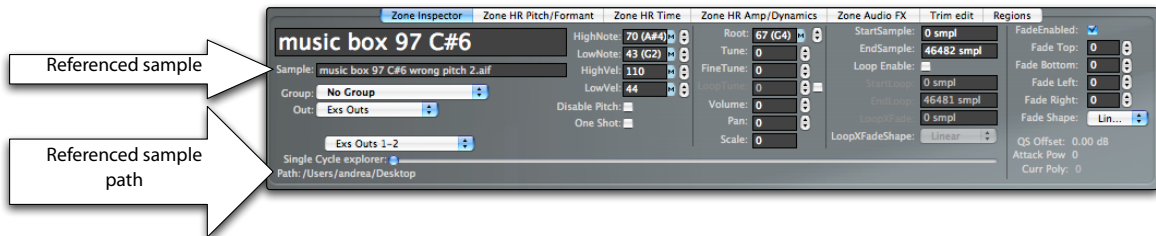


Guides are especially useful when the **View > Snap to guides** menu function is enabled. Once created, guides can be moved by dragging around the corresponding small yellow triangle, and can be deleted by dragging the guide triangle to velocity zero, or note zero.

Independent Virtual Sample

As we have seen already, instead of referencing a sample directly, each Zone has its own virtual sample. The advantage of this is that you can edit the samples in each Zone without interfering with other ones. Each single virtual sample only references audio data from a single real sample file, so it's not possible to cut and paste between different sample files.

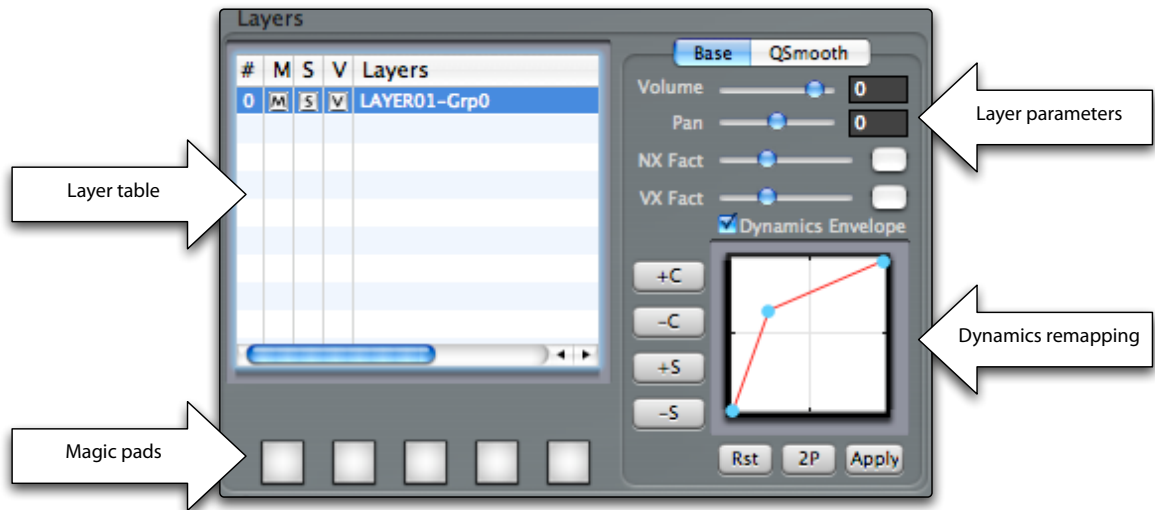
At all times you can see the referenced real sample file name and path from the Zone Inspector as shown in this illustration.



A more comprehensive and detailed view of the samples used in your Zones can be seen in the resources window.

Chapter 5: Layers in the Instrument Editor

The **Layer matrix** shows the Zones contained in the currently selected Layer, and you can see and select Layers in the **Layer table**. The order of layers is not strictly important as they will all respond to incoming MIDI messages in the same way. You can't select more than one layer at once.



Create a layer

When you create a new project using the **File > New** menu command, the default instrument contains one single empty layer. You can create new empty layers using the **Layers > Create** menu command.

Duplicate a layer

You duplicate an existing layer including all of its Zones by first selecting a layer and then using the **Layers > Duplicate** menu command.

Delete a layer

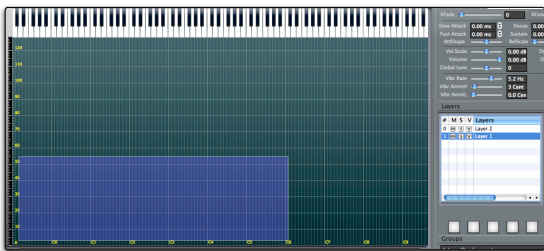
You can delete the selected layer by using the **Layer > Delete** menu, or by using the backspace or delete keys in the Layer table.

Layer mute, solo and viewable checkboxes

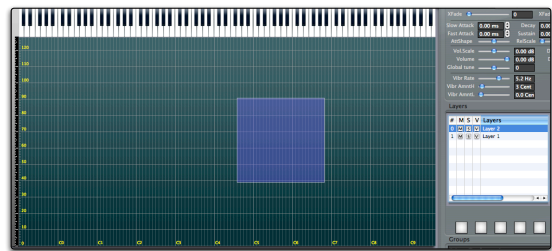
Each layer can be **muted** and **solod** in the layer table through the [M] and [S] checkboxes. Regarding layer muting, note that when exporting to the EXS24 file format only the non-muted and non solo-muted layers will be saved, with the muted layers discarded.

When your instrument has more than one layer, sometimes you may want to edit the Zones in one layer with respect to the position of Zones of other layers. This would seem to pose a problem, since you can select and display only one layer at a time. The "viewable" checkbox ("[V]") solves this problem by letting you select which layers you want to always display in the matrix background.

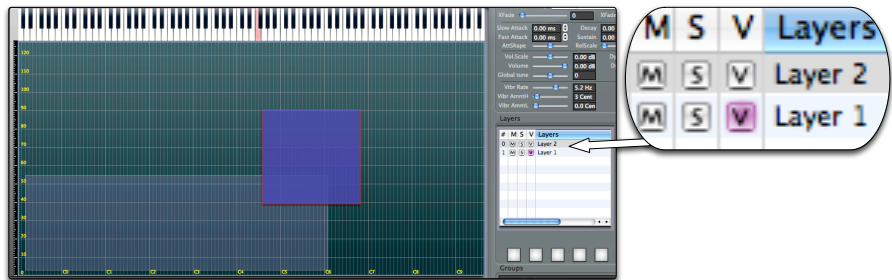
How the "Viewable" layer checkbox works



Layer 1 selected and displayed in the matrix



Layer 2 selected and displayed in the matrix



By clicking the "viewable" [V] checkbox for Layer1, you can now select, see and edit Layer2 while Layer 1 is still displayed in the background

Layer volume and pan

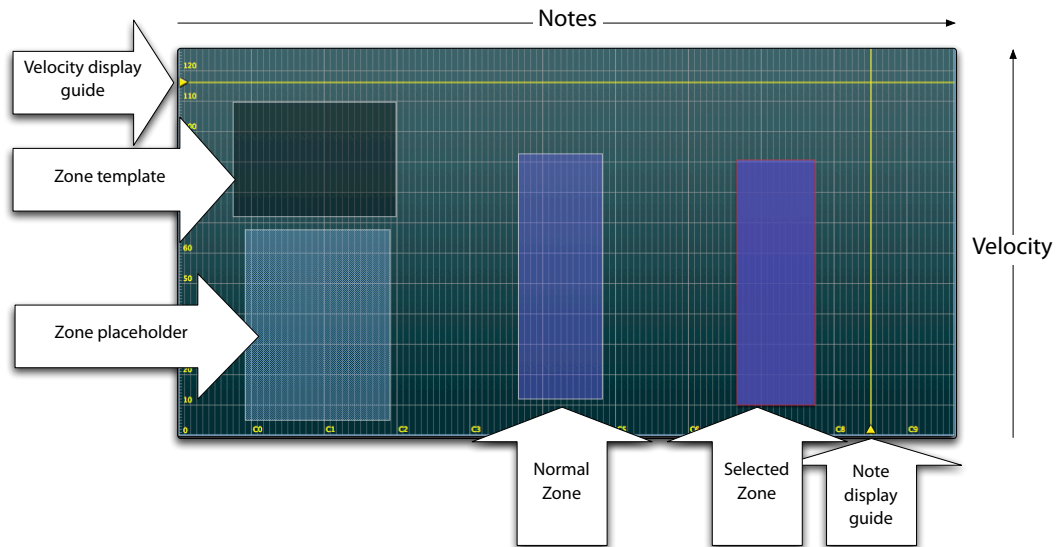
Each layer has independent volume and pan settings, so that you can easily adjust the volume for the whole layer, instead of having to edit Zone by Zone. When exporting to EXS24 format, the volume and pan are factored to the individual Zone parameters.

Layer crossfade factors

Each layer has two independent settings (**NX Fact** and **VX Fact**) for adjusting any static Zone fades that you might have defined. The **NX Fact** slider will increase or decrease the note crossfade for all layer Zones with defined note fades. Similarly, the **VX Fact** slider will tweak the velocity fades.

Chapter 6: Zones in the Instrument Editor

In the Layer matrix, Zones are visualized as rectangles over a certain note range and velocity range. When a note within both the note and velocity ranges for a certain Zone is played on the MIDI Keyboard or virtual keyboard, that specific Zone will be played. The Layer matrix makes this process very evident, as any incoming played note will be displayed as a small red dot in the matrix, at the crossing of the played note and its respective velocity, so that you can see at any moment which Zone in the layer is being played. For a Zone to emit sound, it must reference an existing sample, and the layer must not be muted or solo-muted.



Zone types

In Keymap there are three different types of Zones which are displayed differently:

Blue Zones are **normal Zones**, referencing a sample.

Dark Zones are **Zone templates**, i.e. they occupy a space in the layer matrix but they don't actually contain any reference to a sample yet, so they are mute. You normally use Zone templates to create maps that you will later fill with samples. You can convert a normal Zone to a template using the **Zones > Convert to Template** command, and you can convert a template to a normal Zone by dropping a sample over it.

Light patterned Zones are **Zone placeholders**. These already reference a sample, but the sample file was not found when Keymap opened the project. These Zones too are muted until you re-load the project with the samples available.

When these three Zone varieties are selected, the Zone borders appear drawn in red color. **Unselected Zones** have a light gray color border.

Create Zones

You can create Zones in Keymap using several different methods. Each Zone gets its own independent set of parameters, and creating or modifying a Zone doesn't affect other Zones, even if they are referencing the same sample file.

Create Zones when you have one sound for sample file

CREATE BY DRAG AND DROP FROM FINDER

This is probably the simplest way to create Zones from existing samples. When you drag samples from the finder and drop them into the layer matrix, Keymap will create a sequential series of Zones in the matrix, each spanning one single note, at the drop point. You can create wider one-octave Zones by pressing and holding the Shift key modifier while dropping the samples. If a layer is not selected in the Layer table when you drop the samples, then a new layer will be created for you, and samples placed there.

Not only you can drag and drop multiple samples, but you can also drag and drop multiple sample folders. For each folder a new layer will be created, appropriately named, and the samples from each folder will be placed in Zones into the respective layers.

If you drop samples while pressing the **Option key**, a new Group will be created and automatically assigned to the new Zones.

When dragging and dropping samples, Zones will be created sequentially in alphabetical order of the referenced samples, with special consideration for any note name that might be embedded in sample file names. This means that the proper musical order of note names is respected (as example: "Flute-C#4.wav" is placed after "Flute-D2.wav" even if alphabetically it would come before). Note that the notes in the sample names will not be used automatically for mapping the Zones on the layer. You can do that later, using the **Zones > Automap > Automap** command using root from sample files name menu.

You can also drop samples, one at a time, over existing Zones or Zone templates. In this case, the existing Zone content will be discarded and replaced with the new sample. This feature is very useful if you want to replace a few Zones without the hassle of deleting and creating new ones, or if you simply want to fill a

layer comprised of Zone templates already placed at the right map position. When performing this operation normally all Zone parameters are reset, but if you press and hold the **Command key** while dropping a sample over an existing Zone, you will replace the sample but keep the existing main Zone parameters as tuning, pan, volume.

CREATE BY DRAWING ZONES

You can directly draw Zones using the pen tool from the layer matrix tool selector. The pen tool intuitively let you draw Zones anywhere in the layer matrix, and any existing Zone will be tessellated to make place for the newly drawn Zone.

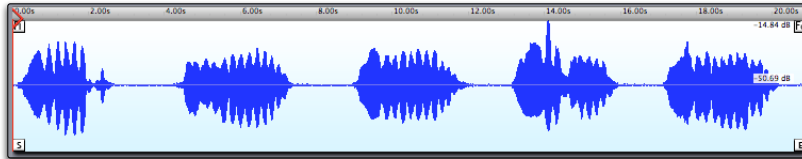
Normally the pen tool draws Zone templates with no reference to a sample, but if you press and hold the **Option key** when drawing Zones, you will be asked to select a sample file for each newly drawn Zone. Using the same key modifier, if you click with the pen tool over an existing Zone, you will be able to select and assign/reassign a sample file for that Zone.

TRICK: CREATE BY SPLITTING EXISTING ZONES: when you need to work with duplicates of existing Zones, it's often very convenient to enlarge the Zone and then split it using the scissors tool.

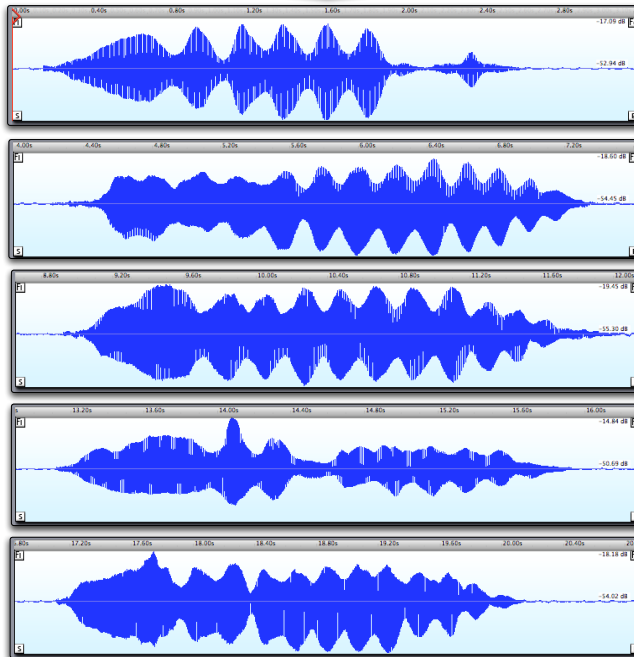
Creating Zones using multiple sounds imbedded in one sample file

When creating instruments from scratch, very often you do not have already split and trimmed samples, but instead a few long recordings of multiple sounds, recorded one after the other, with silence used as separator.

The typical multiple-sounds single-recording situation



From a single long recording we want to split individual sounds and define a new zone for each sound



Keymap offers an extensive variety of methods for mapping these recordings, some involving the sample editor. Normally Keymap lets you open the sample editor from Zones. In this case we do not yet have Zones, so we will open the sample in the sample editor by using the **Files > Add samples to current project** command.

CREATE ZONES BY MANUAL SELECTION IN THE SAMPLE EDITOR

The basic idea with this method is to add the sample recording to an open project and then manually select the desired sections of the recording from the sample editor and map them as Zones using the **Samples > Map > Map selection** set of menu functions. The note position at which the Zone will be created depends on which variation of the “Map selection” menu you use.

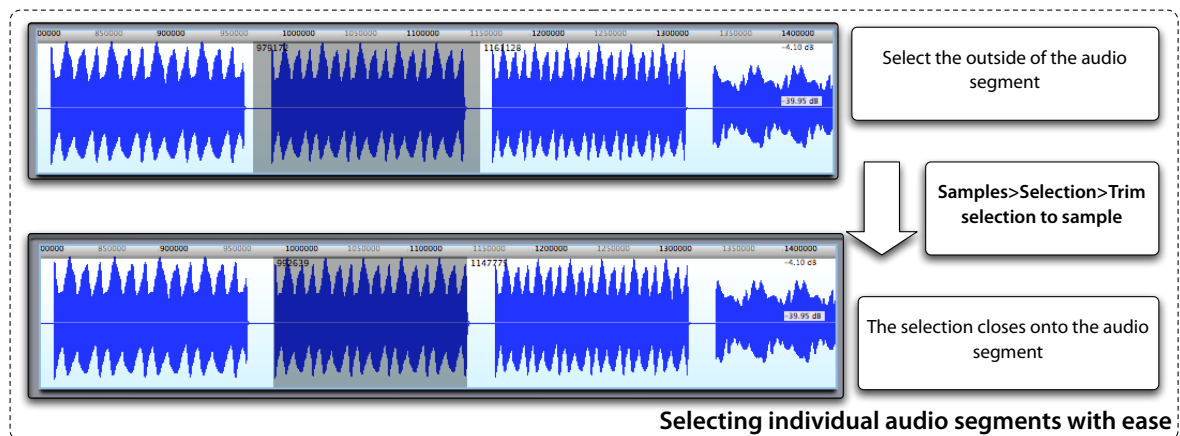
Samples > Map > Map selection sequentially to current layer will map each selection sequentially (useful for drums, or phrases, for example).

Samples > Map > Map selection with MIDI learn to current layer will ask you to press a note on the MIDI keyboard to select on which note to create the Zone.

Samples > Map > Map selection with pitch detection to current layer will analyze the pitch of the sample selection and map the Zone at that note.

These three manual methods will create Zones one note wide. This is the recommended way to build layers in Keymap, as you can always expand each Zone to fill empty layer space using the **Zones > Remap > Expand** menu function. Conversely, once the layer is completely filled by Zones, you can shrink each Zone again to one single note (its root note) by using the **Zones > Remap > Remap to root note** menu function.

Tip: it's very useful to use the **Samples > Selection > Trim selection to sample** menu command (H key command) when selecting single segments, as the selection will be automatically resized to the start and end positions of the audio segment in the recording.



CREATE ZONES BY AUTOMAPPING A SELECTION IN THE SAMPLE EDITOR

Keymap lets you automate the splitting and the sequential/pitch detection process described above with the automap functions available from the sample editor. Just select the desired section of the sample containing all the sounds you want to map, and use the **Samples > Automap > Autosplit and Automap selection sequentially to new layer** menu function if you want to create Zones in sequential fashion. Alternatively, the **Samples > Automap > Autosplit and Automap selection by pitch to new layer** menu function will create Zones mapped using pitch detection.

Note: each split segment is automatically trimmed using the levels set in the preferences panel. If you do not get the expected results, you might have set those values too high or too low.

CREATE ZONES BY DRAG AND DROP OF THE RECORDING FILE OVER MAGIC PAD #1 IN Instrument editor: the Magic pad #1 (the leftmost one) performs the splitting and mapping task automatically and creates Zones sequentially in a new layer. This method is useful when dealing with recordings of drums, effects or sound phrases.

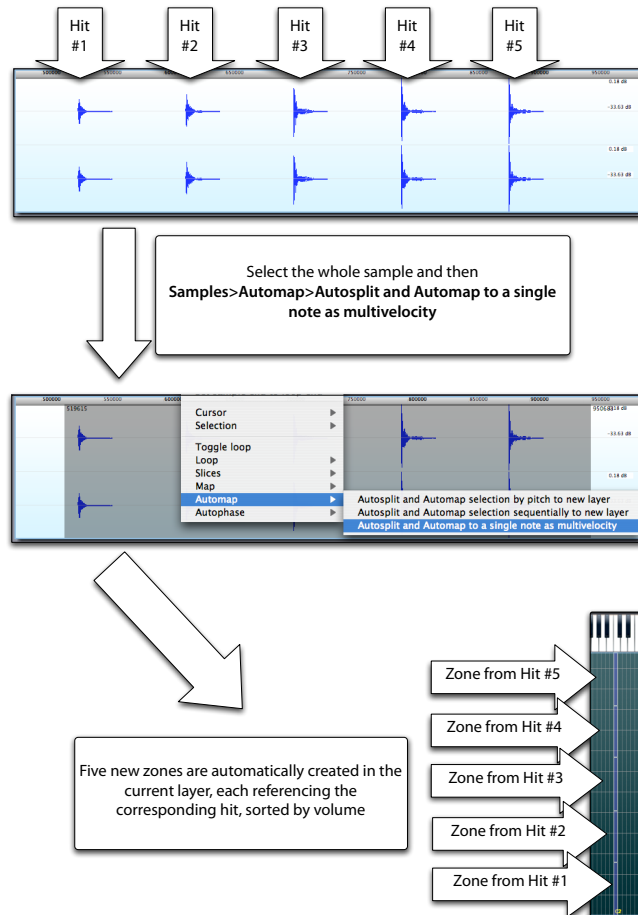
CREATE ZONES BY DRAG AND DROP OF THE RECORDING FILE OVER MAGIC PAD #3 IN Instrument editor: the Magic pad #3 (the third from left) performs the splitting and mapping task automatically, analyzing the pitch for each sound, and creating Zones mapped at the detected pitch notes, in a new layer. This method is optimal when dealing with tuned harmonic sounds belonging to the same instrument. This magic pad also automatically deals with multiple samples for each detected pitch by sorting them by volume over velocity. This way you can create multi-note multi-velocity layers directly from a recording.

Special Zone creation methods

Keymap also includes two specialized creation methods, well suited for creating complex instruments.

CREATE MULTIVELOCITY ZONES FOR A SINGLE NOTE FROM SELECTION IN SAMPLE EDITOR

With this function you select a section of your recording containing an arbitrary number of sounds sampled at different velocities (for example a snare, or a guitar, or a piano), then use the **Samples > Automap > Autosplit and Automap to a single as multiveLOCITY** menu function to automatically split those sounds and create the respective Zones into the layer, at the same single note. The Zones are mapped over the velocity axis based on their relative volume.

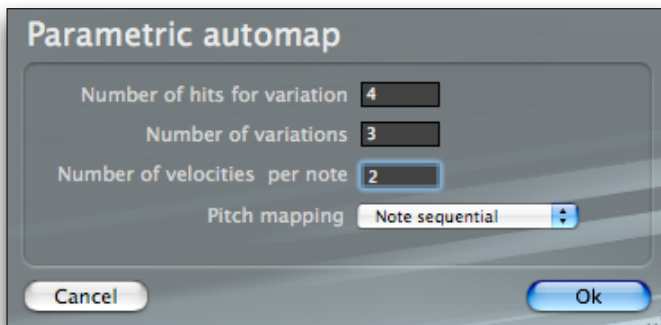


Note: each split segment is automatically trimmed using the levels set in the preferences panel. If you do not get the expected results, you might have set those values too high or too low.

CREATE A COMPLETE INSTRUMENT BY DRAG AND DROP OF THE RECORDING FILE OVER MAGIC PAD #2 IN Instrument editor (AKA PARAMETRIC AUTOMAPPING)

This method is the most complex method available in Keymap and allows automatic construction of multi-velocity instruments with keyswitched variations and pseudo-randomization features. The recording you are going to drop over Magic Pad #2 must be well structured for this function to work properly, and you must plan how you want the instrument configured in advance.

As an example, let's say that for each of the three variations of your hihat (closed, mid, open) and for each of the two velocities you'll want to record, you also want four equivalent samples to be played in round robin fashion so that the instrument sounds natural.



You just have to record the hihat in this "hits by variation by velocity" sequence:

hit1-closed-lovel
hit2-closed-lovel
hit3-closed-lovel
hit4-closed-lovel

hit1-mid-lovel
hit2-mid-lovel
hit3-mid-lovel
hit4-mid-lovel

hit1-open-lovel
hit2-open-lovel

hit3-open-lovvel
hit4-open-lovvel

hit1-closed-hivel
hit2-closed-hivel
hit3-closed-hivel
hit4-closed-hivel

hit1-mid-hivel
hit2-mid-hivel
hit3-mid-hivel
hit4-mid-hivel

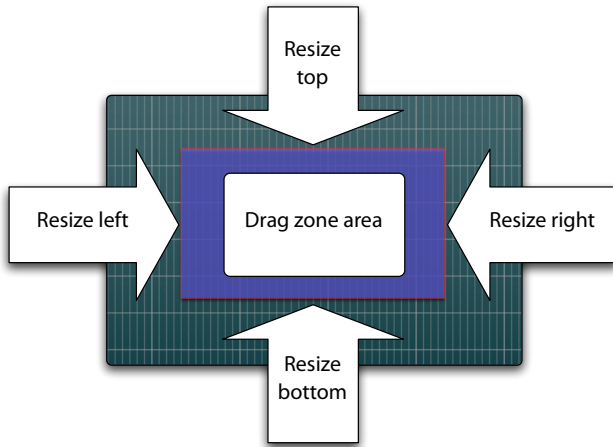
hit1-open-hivel
hit2-open-hivel
hit3-open-hivel
hit4-open-hivel

When you drop this recording on the Magic Pad #2, Keymap will ask you the parameters for number of hits, variations and velocities, and if you either want to map samples sequentially (drums) or by pitch detection (harmonic sounds). Keymap will then automatically create an instrument in which keyswitches will change the playing Group from "closed" to "mid" to "open", and then each of these 3 variations will play in round robin fashion the correct 4 hits, and the velocity will also select the right velocity set. In situations where there is only one variation, or only one "hit" per variation, the corresponding keyswitch or cyclic Group chain selection will not be enabled/created. With this function you can really create very complex instruments with minimal effort.

Note: each split segment is automatically trimmed using the levels set in the preferences panel. If you do not get the expected results, you might have set those values too high or too low.

Editing Zones with the mouse

Once Zones are created, you can edit them in the layer matrix using the mouse, when the **selection tool** is active. There are five sensible areas in a Zone as shown in the following illustration.



Note that the corners are not active, so that you always resize the note width, or the velocity height, but not both at the same time.

When resizing multiple Zones over a border, Keymap automatically recognizes which of the selected Zones have the resized border in common and will edit all the Zones at the same time. This is very useful when you want to quickly change the note width of a multi-velocity set of Zones, or want to alter a velocity subdivision for the whole layer with a single edit action.

Needless to say, every time you resize or move Zones around, the tessellation engine is always ready to take care of any Zone overlap when you release the mouse button.

Moving Zones and the root note

Normally, moving a Zone across notes changes both the low note and high note parameters for the Zone, however sometimes you might also want to move the root note. For example, when you move around drum Zones you usually want to move the root note too so that the drums don't sound transposed. On the other hand, when moving an acoustic instrument Zone you might want the root note to stay where it is, otherwise you'd get the wrong tuning.

Keymap lets you move Zones across notes in both fashions. By default the root note is not moved. If you however press the **option+Command keys** while moving Zones, the root note will remain "attached" to the Zone, and will be moved along with the Zone.

You can use the **scissors tool** to manually split Zones. By pressing the **Command key** you activate the **vertical scissors tool**, while using the **shift+Command keys** you activate the **horizontal scissors tool**. With both of these tools, only the selected Zones will be split at the scissors line, and this lets you split multiple non-contiguous Zones with a single action. When Zones are split, each resulting Zone gets its own independent set of parameters and a separate virtual sample, so that extending a Zone range and then splitting it, is a quick and efficient way to duplicate Zones.

The **pen tool** lets you draw new Zone templates or, by pressing the **Option key**, to create a new Zone in an empty section of the matrix from a specific sample. If you click with the **Option key** over an existing Zone, you will be asked to select a new sample for that Zone.

The **eraser tool** allows you to erase rectangular areas of arbitrary size in the matrix and uses the tessellation engine to split partially erased Zones. Just select the area you want to clear, and Keymap will do the rest.

Selecting Zones

The Zone selection mechanism in Keymap is very important, because once you select Zones you can view and edit their parameters in the Zone inspectors, transform them using Keymap functions, and operate with them in the matrix using the matrix tools.

Keymap offers several methods for selecting Zones in the Layer matrix. The straightforward method is select Zones with the mouse. A single click inside a Zone selects it, and you can extend the selection to other Zones by clicking the **Shift key** while clicking Zones.

It's also possible to select Zones in a certain Layer matrix area by pressing the **Shift key** and dragging the mouse over that area.

Another method is to use the computer keyboard cursor keys. If no Zone is currently selected, pressing the left or right cursor keys will select the leftmost or rightmost Zone in the matrix, and then you can navigate through the other Zones using the cursor keys. Pressing the **Shift key** while using cursor keys extends the current selection.

Keymap also lets you select the last played Zone. This is done by holding the **Control key** while playing on the MIDI or virtual keyboard. With this method you will only be able to select one single Zone (the last played) at once.

If you want to select all the Zones in the current layer being played, you can use the **Zones > Select > Select Playing Zones** command. You must hold the played notes while you activate this function, as Zones still playing but in the release phase will be ignored.

Sometimes you might also want to select Zones in a note range from the MIDI Keyboard. Keymap always remembers the latest two played notes, and can select Zones in that range by using the **Zones > Select > Select range between last two played notes** command. As a visual aid, you can enable the visualization of that range on the virtual keyboard by enabling the **View > Show > Last MIDI selection** menu function.

You can also select among the different classes of Zones (normal, template, placeholder), using the **Zones > Select > Select placeholders** and **Zones > Select > Select templates** menu commands.

Other selection menu commands

Zones > Select > Select All

All Zones are selected.

Zones > Select > Deselect All

All Zones are deselected.

Zones > Select > Invert selection

The selection is inverted, i.e. selected Zones become unselected, and unselected become selected.

Zones > Select > Deselect playing Zones

The currently playing Zones are deselected. The note keys must actually be held while performing this function. Zones still playing but in the release phase will be ignored and not deselected.

Zones > Select > Deselect templates

All the templates in the layer will be deselected

Zones > Select > Deselect placeholders

All the placeholders in the layer will be deselected

Zones > Select > Deselect range between last two played Zones

The Zones in the note range between the last two played notes will be deselected. The notes can be played both from the MIDI or from the virtual keyboard.

Zones > Select > Select Zones at higher notes

If you already have Zones selected, this function will select the nearest Zones along the notes axis toward the right.

Zones > Select > Select Zones at lower notes

If you already have Zones selected, this function will select the nearest Zones along the notes axis toward the left.

Zones > Select > Select Zones at higher velocity

If you already have Zones selected, this function will select the nearest Zones toward the top, along the velocity axis.

Zones > Select > Select Zones at lower velocity

If you already have Zones selected, this function will select the nearest Zones toward the bottom, along the velocity axis.

Zones > Select > Extend select Zones at higher notes

If you already have Zones selected, this function will extend the selection to the nearest Zones toward the right along the notes axis.

Zones > Select > Extend select Zones at lower notes

If you already have Zones selected, this function will extend the selection to the nearest Zones toward the left along the notes axis.

Zones > Select > Extend select Zones at higher velocity

If you already have Zones selected, this function will extend the selection to the nearest Zones toward the top, along the velocity axis.

Zones > Select > Extend select Zones at lower velocity

If you already have Zones selected, this function will extend the selection to the nearest Zones toward the bottom, along the velocity axis.

Zones > Select > Extend select playing Zones

This function will extend the selection to the currently playing Zones. Note that the note keys must actually be held while performing this function. Zones still playing but in the release phase will be ignored.

Keep/remove system

The nature of sampling, coupled with the fact that you'll often want to integrate a MIDI Keyboard into your workflow convinced us to develop a new mechanism whereby you can not only select Zones, but you can mark them as "keepers" or as "to be removed". We call this mechanism the **Keep/remove system**.

Typically you will use this mechanism when you drop samples in the Layer matrix, and subsequently audition them using MIDI or the virtual keyboard. When you hear a sample that you want to keep in the layer, you'll mark the playing notes as **Keep**. If you hear samples you don't like, just mark them as **Remove**. The Keep Zones will change color and be displayed in a lighter blue, while the Remove Zones will change to brown color.

There are two ways to mark Zones for Keep, one by selecting them and then using the **Zones > Keep/Remove > Mark selected Zones for Keep** command and the other by marking the currently playing notes with **Zones > Keep/Remove > Mark playing Zones for Keep** command. The equivalent menus also exist for Remove.

At any moment, you can perform the Keep function, using the **Zones > Keep/Remove > Keep** menu command and all Zones in the layer will be removed except for the ones marked as "Keep". Similarly the **Zones > Keep/Remove > Remove** menu command will remove all Zones marked as "Remove". Notice how the two functions are slightly different, in that one lets you concentrate on the Zones you like, while the others is focused on the Zones you don't like.

Note also how the Keep and Remove functions are independent from the selection mechanism. In other words, when you Keep or Remove your Zones you do not need them to be selected. This is done so that you can mark playing notes from a MIDI Keyboard and perform an action through key commands without having to touch the mouse.

As a suggestion, the most practical way for approaching the Keep/remove system is probably through key commands and not menus. You can check the Key Manager chapter for an explanation of how to find key commands for each function, and appendix E with the list of all the default key commands.

Other Keep/remove menu functions

Zones > Keep/remove > Clear marks for Keep

This function unmarks for "Keep" the selected Zones.

Zones > Keep/remove > Clear marks for Remove

This function unmarks for "Remove" the selected Zones.

Other Zone menu commands

Zones > Convert to Template

This command will remove any sample reference from selected Zones, transforming them into templates.

Zones > Move selected Zones to Higher layer

This command moves selected Zones to the layer “above” the current one, as seen in the Layer table. Moved Zones will keep their note and velocity positions and all other parameters. If the moved Zones collide with pre-existing Zones in the destination layer, then a hole will be cut in the destination layer to make space.

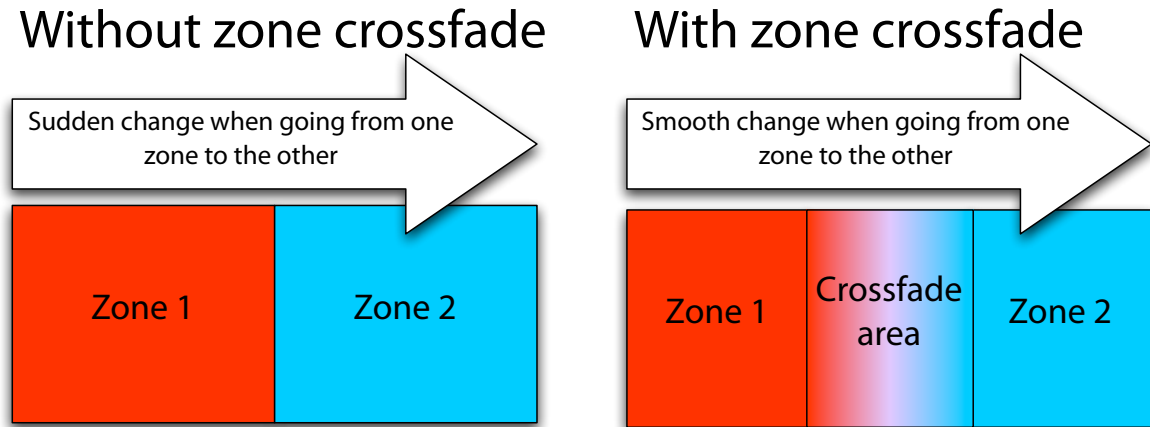
Zones > Move selected Zones to Lower layer

This command moves selected Zones to the layer “under” the current one, as seen in the Layer table. Moved Zones will keep their note and velocity positions and all other parameters. If the moved Zones collide with pre-existing Zones in the destination layer, then a hole will be cut in the destination layer to make space.

Static Zone crossfades

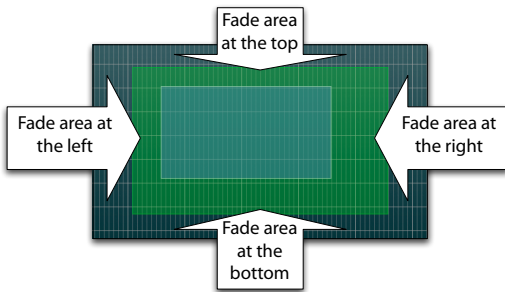
As we have seen, in Keymap no Zone overlaps are allowed in a single layer, but you can use multiple layers for stacking Zones and sounds. There are, however, situations where some kind of overlap in a single layer would be desirable, especially when you have adjacent Zones and you'd like to somehow blend the Zones to smooth a crude transition from one Zone to the other. Keymap offers a way for doing this through Zone crossfades.

As shown in the following illustration, a Zone crossfade between two adjacent Zones is essentially an area where the second Zone sound is progressively mixed louder, while the first Zone sound is mixed progressively softer. When done properly, and when the adjacent Zones contain relatively homogeneous material, the transition jump can't be heard anymore.



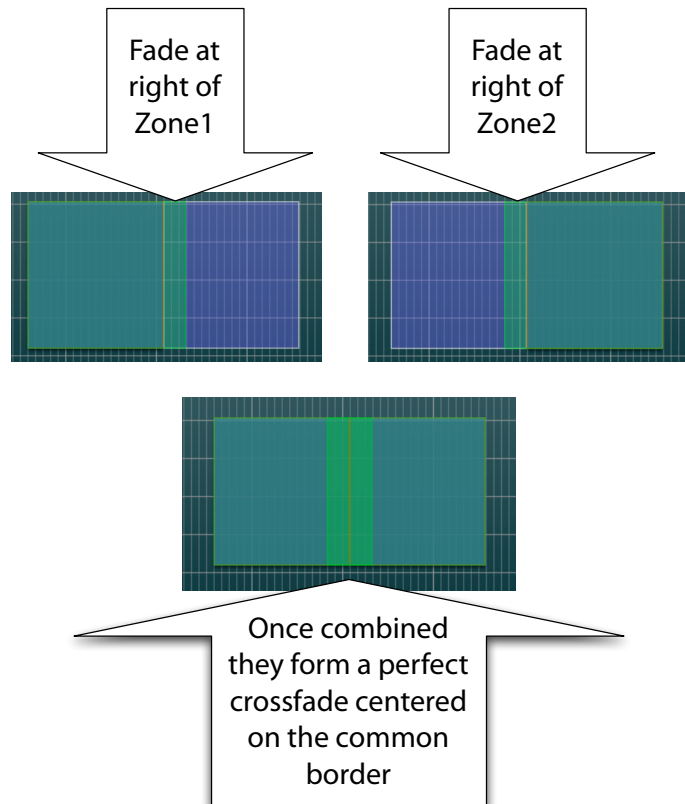
In order to offer maximum flexibility, Keymap doesn't implement Zone crossfades exactly as shown in the illustration, as that simplistic approach would stop working correctly when multiple Zones contribute to the sound in a complex multi-sample multi-velocity instrument.

What Keymap actually offers are individually configurable fade areas around each single Zone through four parameters which let you set the fade range at the left, right, top, and bottom of the Zone. This approach lets you blend multiple Zones in any way, as you can extend each fade area over any portion of the Layer matrix area. As you can see in the illustration, the fade area is shown as a green aura around each Zone.



By using the **View > Show > Crossfades** command, you can choose to always display the fade area, while the **View > Show > Crossfades when selected** will visualize fade areas only when the Zones are selected.

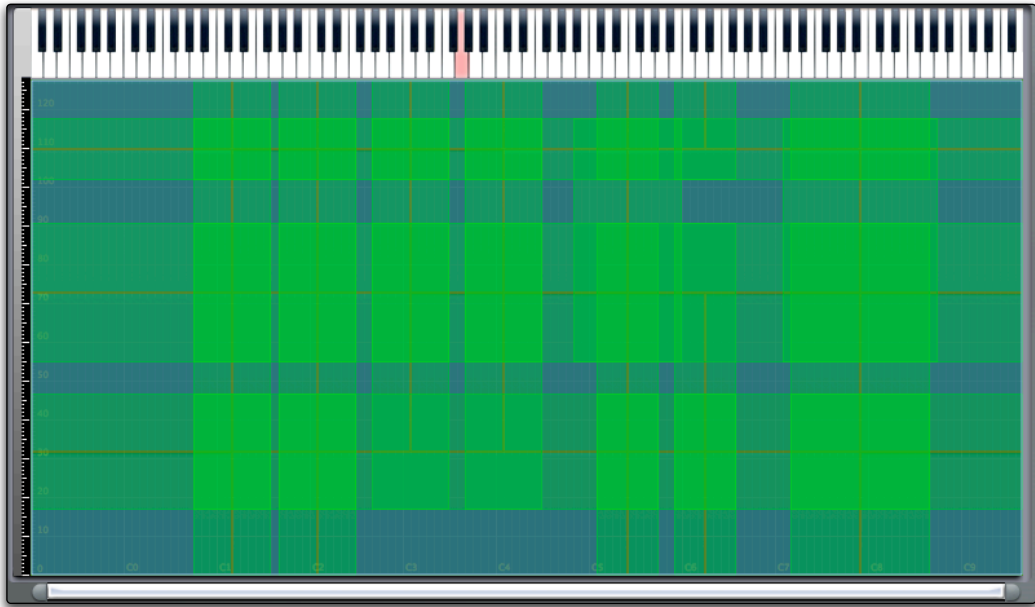
The canonical crossfade can be achieved by having two adjacent Zones extend their fade Zone by the same amount in the opposite directions as shown in the following illustration.



You can edit the fade area for each Zone in the Layer matrix by moving the mouse cursor over the Zone borders, pressing the **Option key** and then dragging the border. You will not actually edit the Zone borders, but a green (fade) area around the Zone. When Zones are adjacent, you can select them and drag the common border using the **shift+Option key**. In this mode you will automatically create both fades at the same time, effectively creating a crossfade with minimum effort.

As we will see later in this chapter, Keymap also offers some automatic functions that analyze the selected Zones and create fades of the right size around each Zone. Some further controls in the Layer inspector allows you to tweak and scale all fades for each layer with a simple couple of sliders.

Here's an example of complex crossfaded map built using the automatic Keymap functions.



It's very important to note that creating Zone crossfades does not involve the creation of new samples, or the creation or use of other time and space consuming resources. When you save a project using Zone crossfades in EXS24 format, Keymap will simply create additional Zones around each Zone, referencing the same sample and with the same parameters, but with a Zone volume correspondent to the fade volume.

This however also means that if you try to reload such an EXS24 instrument, you will see a very different instrument respect to the one you saved, even if it will sound the same. For this reason, we recommend that you always save such projects in Keymap format before saving in EXS24 format.

Zone fade menu functions

Zones > Fades > Create full note xfade

This function analyzes the selected Zones and sets the proper fade left and fade right values for smoothing Zone transitions along the note axis.

Zones > Fades > Create full velocity xfade

This function analyzes the selected Zones and sets the proper fade top and fade bottom values for smoothing Zone transitions along the velocity axis.

Zones > Fades > Create full velocity xfade

This function analyzes the selected Zones and sets the all the proper fade values for smoothing Zone transitions both along along the note axis and the velocity axis.

Zones > Fades > Clear fades

This function clears all the fade parameters for selected Zones.

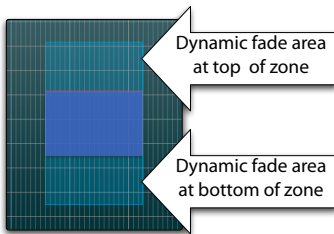
Dynamic crossfade

As we have seen, the fade functions are very flexible in what you can do, but they are static, as they are tied to note and velocity information only. Once you press a note the correct blend of Zones will be played but you can't change it dynamically using a modulation wheel while the note is being held.

For this reason, Keymap also supports a different kind of crossfade, called **dynamic crossfade**.

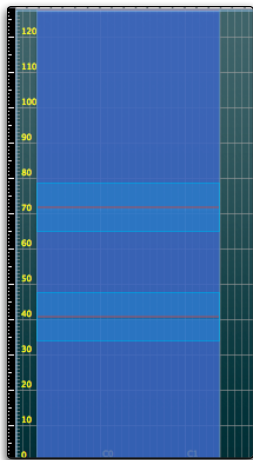
The two crossfade modes can't coexist in Keymap in a single project, but you can switch from one mode to another without losing the individual Zone fade settings.

Dynamic crossfade mode is enabled as soon as the XFade parameter in the instrument inspector is set to a value other than zero, or you select a MIDI controller to be used instead of velocity with the "Vel mapped using" menu in the instrument inspector. After that, the green area around your Zones disappears, but all Zones display a light blue area extension along the velocity axis.



Those areas represent the fade area for the Zones. The length of the fade is the same for all Zones in your whole project, and is set using the XFade parameter. As you might already have imagined, the dynamic crossfade can only be applied along the velocity axis.

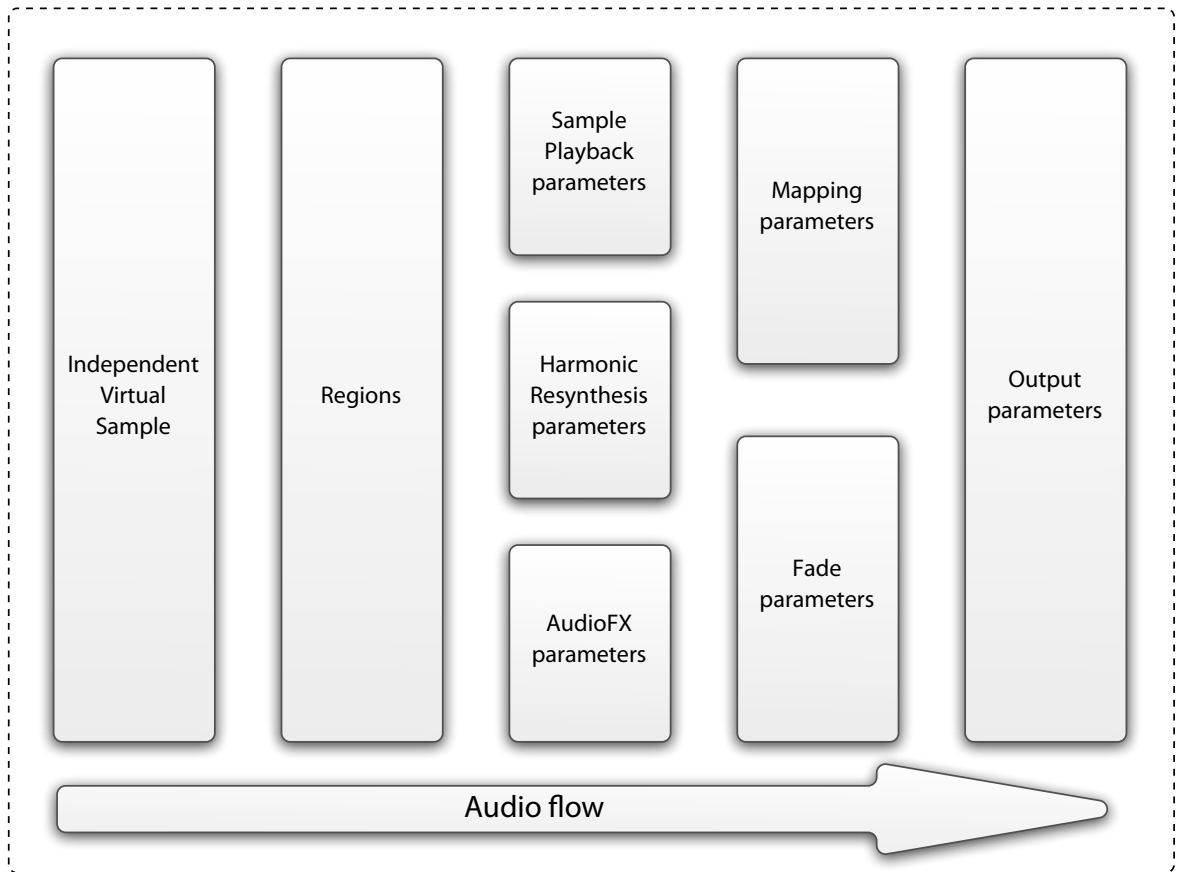
When you play notes, the mechanism is similar to what we saw for static crossfades in that the Zone sounds are blended, with the important difference that if you are using a dynamic MIDI controller for velocity you can now tweak it in realtime, and the sound will smoothly change depending on where the controller value maps along the velocity axis, as in the following illustration.



With dynamic crossfades, once you assign a MIDI Controller to the matrix velocity axis, instead of the usual note-on velocity, you can dynamically change position along the axis by changing the controller value, and hear a dynamically blended sound from zones

Zone parameters in the Zone inspector

Zones are the most complex elements in Keymap, being repositories both for virtual samples and Regions, and offering more than one hundred independent parameters each. The parameters and elements can be subdivided into several logical categories as shown in the following illustration, and together determine when and how the sample will be played back.



Output parameters

The output parameters category includes volume, pan, and the routing of the audio from Zones. Each Zone transmits audio on a number of channels, always numbered starting from channel one. So if a sample has two channels, its Zone will transmit audio on two channels (channel 1 and 2). If the sample

has 8 channels then its Zone will emit audio on 8 channels (channels 1 to 8). Each Zone can route its audio output to four alternative destinations:

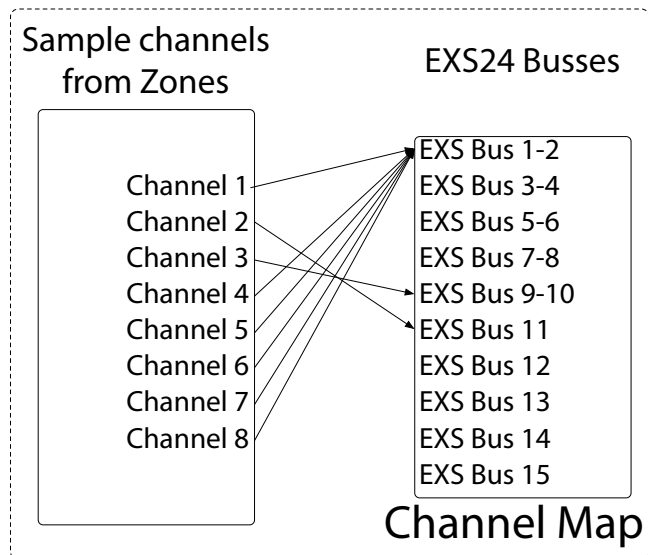
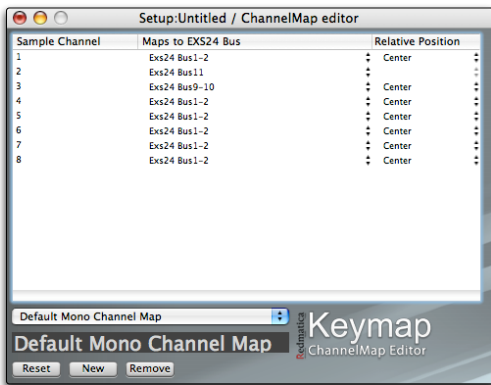
- **To a direct EXS24 bus:** the sound is directly sent to one of the EXS24 output buses.
- **To a Channel Map:** the sound is sent to a Channel Map which let you swap channels, and reroute them to any EXS24 output bus.
- **To a Surround+Space mixer bus:** the sound is sent to one of the 16 busses in the Surround+Space mixer, where it can be spatialized or placed in a surround mix.
- **To the destination selected by its Group** (if the Zone is linked to a Group)

Routing to a direct EXS24 bus

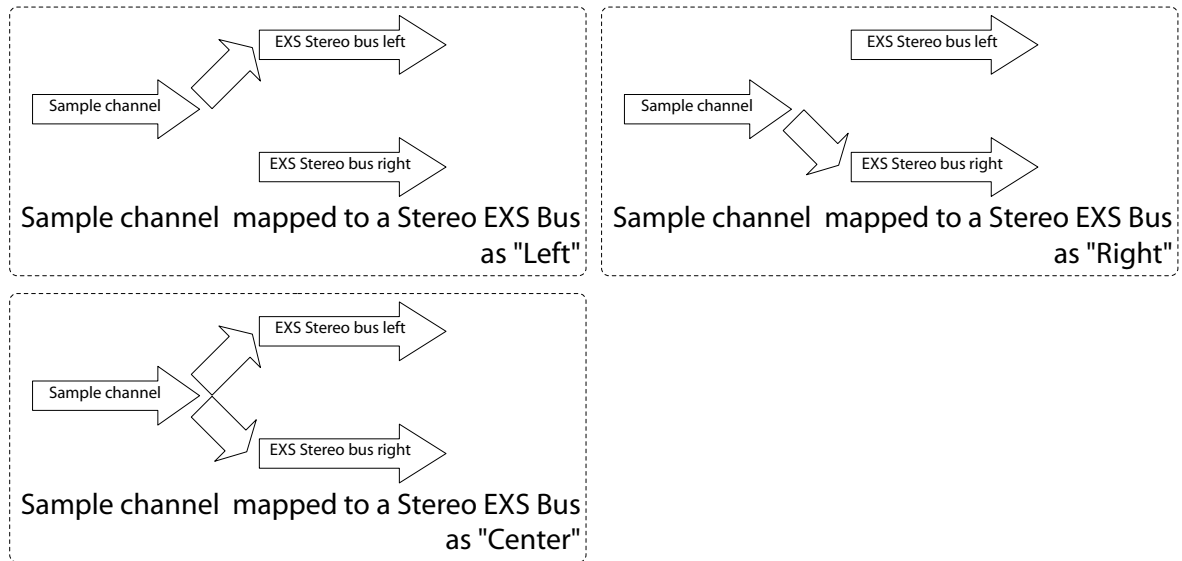
This routing sends your audio channels directly to one of the EXS busses.

Routing to a Channel Map

Channel Maps route each individual sample channel from the Zone to the available EXS24 busses. This let you swap channels, or remap multichannel samples to your designated busses. When routing a sample channel to stereo EXS busses you can also select if this channel is to be intended as a monophonic channel or as part of a couple of stereo channels.



Since each sample channel is intrinsically mono but can be part of a stereo pair when routed to a stereo EXS bus, you can select whether the sample channel should be considered mono (so it will be sent equally to both channels of the EXS stereo bus), or the left channel of a stereo pair (sent only to left channel of the EXS bus stereo channels), or the right channel of a stereo pair (sent only to the right channel of the EXS bus stereo channels).



Once defined, channel maps can be shared by several Zones, so that you can change the routing for multiple Zones, provided they are all using the same map. Note that a Zone routed to a channel map does not respond to Pan.

Saving Zones using channel map routing to EXS24 format

Channel Maps are not directly supported by the EXS24. For this reason, when saving a project which uses channel map routings in the EXS24 instrument format, Keymap renders a new set of samples and creates the appropriate number of additional Zones so that the resulting instrument conforms to the limitations of the EXS24. We recommend saving the instrument in Keymap format before creating the EXS24 instrument, so that you can keep working in Keymap with Channels Maps instead of multiple raw Zones.

Creating a new Channel Map

You create a new channel map by clicking the **New** button in the channel map editor

Deleting a new Channel Map

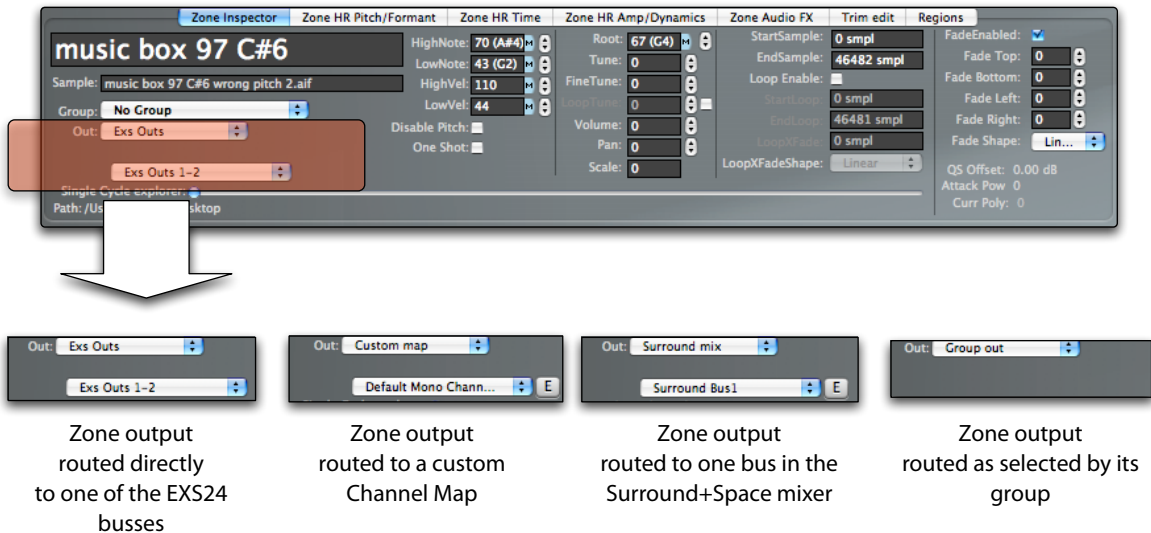
You delete an existing channel map by clicking the Remove button in the channel map editor.

Routing to a Surround bus

This is the routing to use when you want to spatialize your samples in the sound field. The complete description of how the sound is processed can be found in the dedicated Surround+Space chapter. For now know that there are 16 separate stereo buses going to the surround mixer for independent mixing and spatialization, so that you can position Zones in specific places around the soundfield.

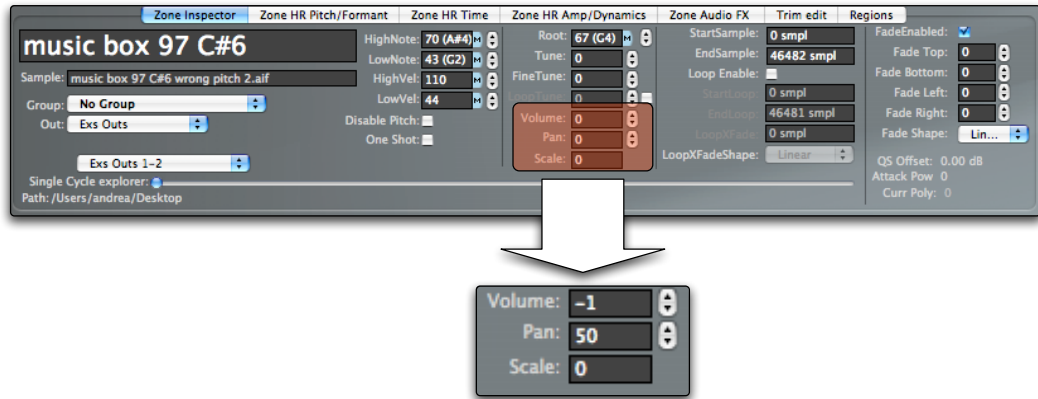
How to set the routing from the Zone Inspector

You can use one of the possible routings by selecting your Zones and then setting the desired routing in the **Out:** pop-up menu of the Zone Inspector. When switching routing modes, a second pop-up menu lets you select respectively the bus, the Channel Map, or the Surround bus to be used. A button marked “E” lets you open and edit the Channel Map or Surround+Space editors directly from the Zone inspector, for an improved workflow.



Volume and Pan

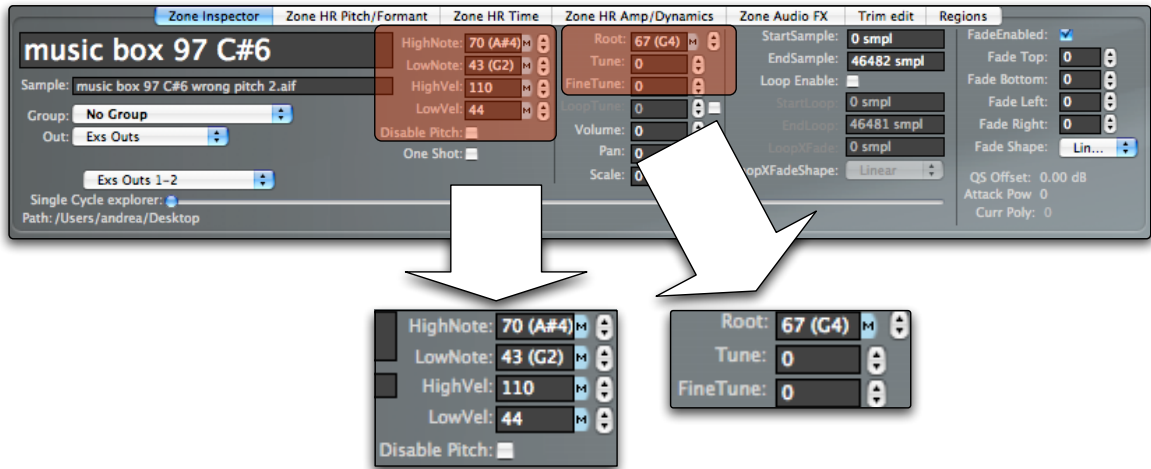
You can change Volume and Pan for a Zone directly from the Zone inspector. The Volume is expressed in decibels, while Pan ranges from -100 (full left) to +100 (full right). The panning value will affect the sound only when the Zone is routed directly to an EXS bus: when using Channel Maps or going into the Surround+Space mixer, the pan value is ignored.



The Scale value let you change the Volume in function of the distance of the Zone from MIDI note 60, and is expressed in dB by octave.

Mapping parameters

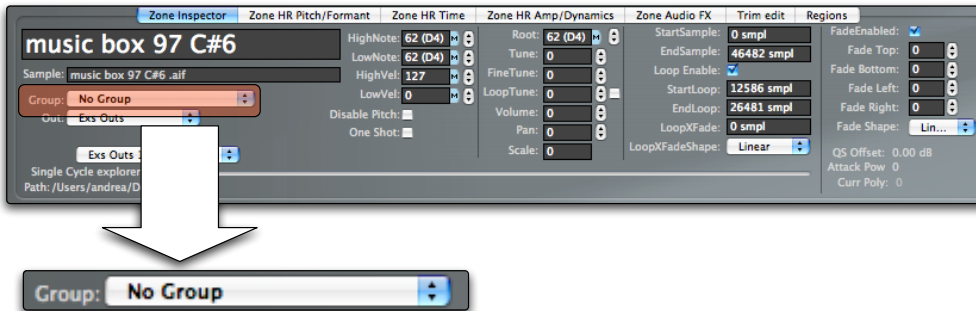
The mapping parameters are the core of a Zone definition, and express the note and velocity ranges over which the Zone will play, the playback pitch, and the playback mode. The note range is defined by a **low note** and a **high note**, and the velocity range by a **low velocity** and **high velocity**. When a played note (with its associated velocity) hits both ranges simultaneously, then the Zone will be played.



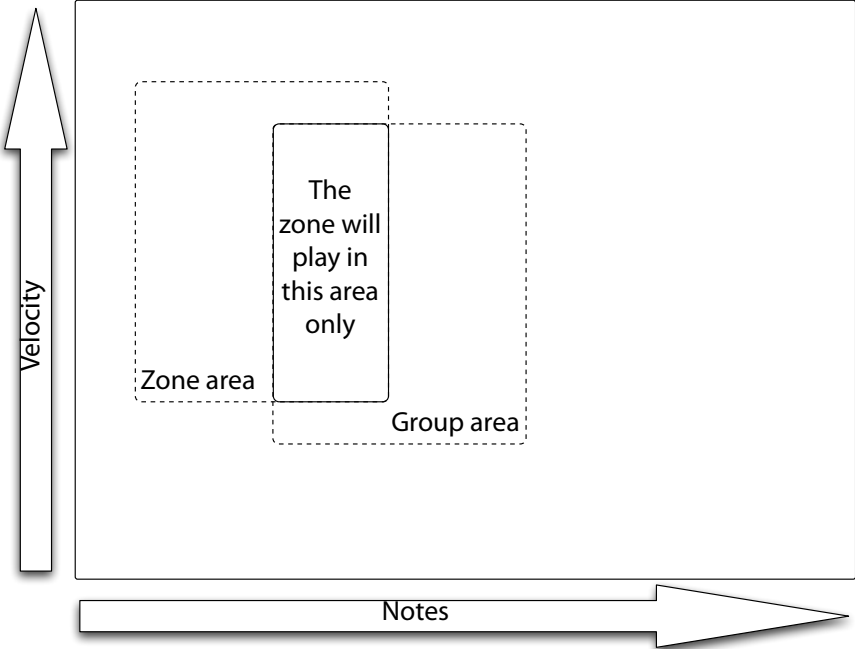
Normally the played sample is being resampled at varying pitches over each note of the the note range, and the **Root Note** represents the note for which the the sample will be played with no resampling. If the **Disable Pitch** checkbox is enabled then no resampling will happen, and all notes of the Zone note range will play at the same pitch as the root note. You can change the pitch played at the root note using the **Tune** and **FineTune** parameters.

Groups restrict note and velocity mapping area

We'll talk in depth about Groups in a later chapter, but for now keep in mind that Zones can belong to a Group. When this happens, the mapping area of the Zone gets intersected with the Group

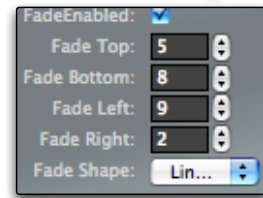
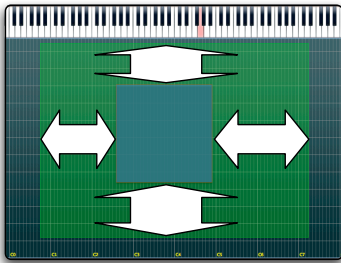
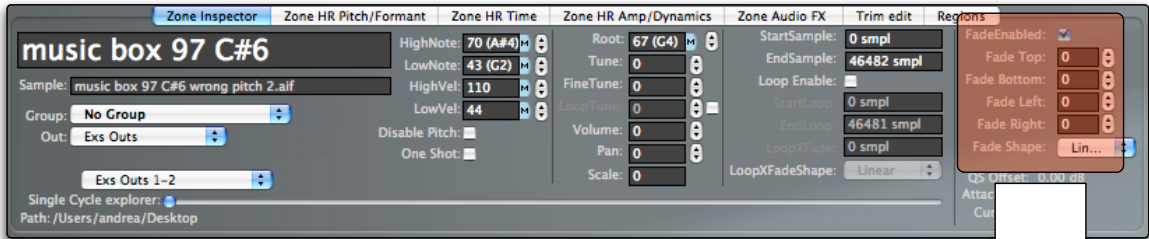


and the Zone will respond only to incoming note messages for the common area, as shown in the following illustration of the layer matrix.



Fade parameters

Fade parameters define the fade area around the mapped Zone in which the sound will progressively smoothly increase in volume and then fade to silence. The fade area is defined relative to the Zone mapping parameters, so that when you modify a Zone mapping, the fade area will still be linked to the new Zone borders. The fade parameters are **Fade Top**, **Fade Bottom**, **Fade Left** and **Fade Right**.



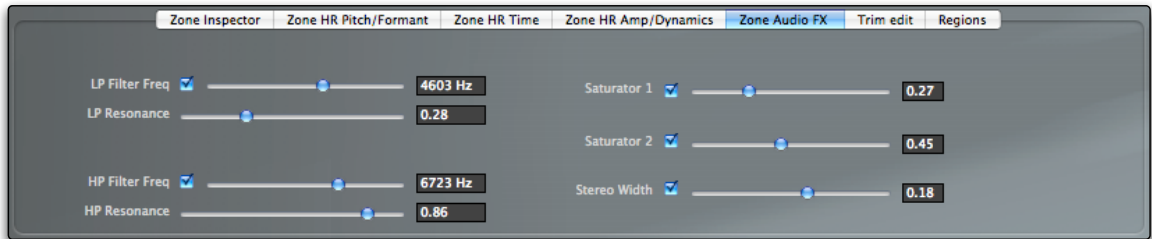
You can also enable or disable fade areas using the **Fade Enabled** checkbox, and change the fade shape between linear/EQPower/S-Curve using the **Fade Shape** parameter.

Saving Zone crossfades to the EXS24 format

Zone crossfades are not directly supported by the EXS24. When saving to the EXS24 format, for each Zone, Keymap fills the fade area with many small copies of the Zone, each set at the appropriate decreasing volume in order to simulate the fade. We recommend saving the instrument in Keymap format before creating the EXS24 instrument, so that you can keep working in Keymap with fade areas instead of multiple raw Zones.

AudioFX Parameters

AudioFX parameters are a series of audio effects available and independently adjustable for each Zone. We have a **Low Pass filter** with configurable **frequency** and **resonance**, a **HighPass filter** with adjustable **frequency** and **resonance**, two **satulators** and a **stereo width** control. The effects are chained serially.



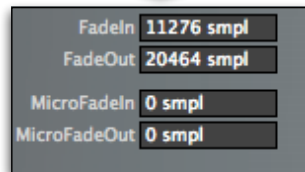
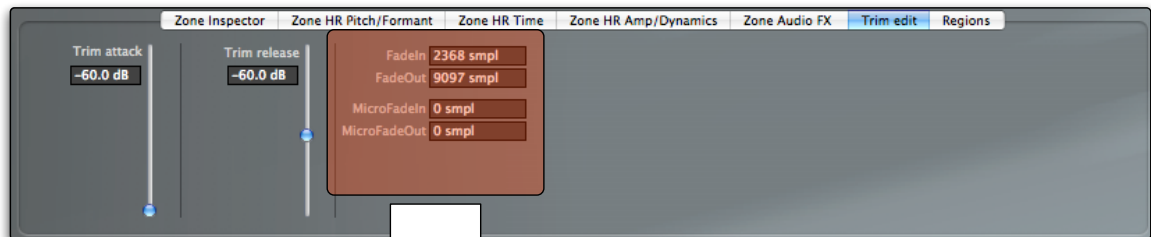
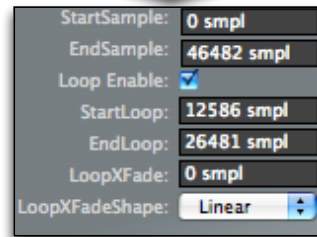
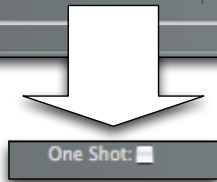
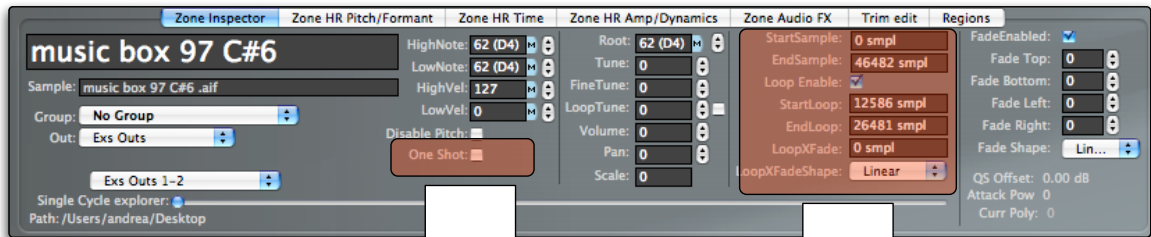
The stereo width control is active only with stereo samples, while the other effects can be applied on all kind of samples. When talking of filters in a sampler you are probably thinking to the EXS24 filter section. AudioFXs have nothing to do with that and have been designed to spice up individual samples (in drumsets for example) or for spectrally combining different layers (imagine a composite sound created by a low pass filtered layer with a sound combined with a high pass filtered layer with a different sound). The stereo width parameter is effective as a simple soundfield enhancer without going through the full-featured surround+space mixer.

AudioFX and EXS24

The EXS24 doesn't have support for Keymap's AudioFX. For this reason, when saving to EXS24 format, all samples using AudioFX will need to be rendered to new files. We recommend saving the instrument in Keymap format before creating the EXS24 instrument, so that you can keep working in Keymap with AudioFXs non destructively.

Sample playback parameters

At the heart of each Zone we have a reference to a sample, which is played back for generating sound. The sample playback parameters let you set where the playback should start, where it should end and optionally where the playback should be looped or if some fade in or fade out should be applied.



The **SampleStart** and **SampleEnd** parameters let you set the segment of the sample that will be played by the Zone (we will also call them **start** and **end** in this guide when no confusion might arise). The

FadeIn and **FadeOut** let you non-destructively apply some fading. The **FadeIn** length is relative to the **SampleStart** position and the **FadeOut** length is relative to the **SampleEnd** position, so that adjusting the start and end positions will not alter the fade lengths. **MicroFadeIn** and **MicroFadeOut** are specially shaped fades, applied similarly to **FadeIn** and **FadeOut**, that should be used in the 2-to-100 samples range for removing clicks from sample start and end. The two fades (**Fades** and **Microfades**) coexists and can be applied at the same time.

Normally the sample will play as long as you hold the note that triggered it. Activating the **One Shot** checkbox causes the **Zone** to ignore the length of notes used to trigger the sample and the sample is always played to the end. This option is useful with percussion and drums where you often don't want the MIDI note length to affect sample playback.

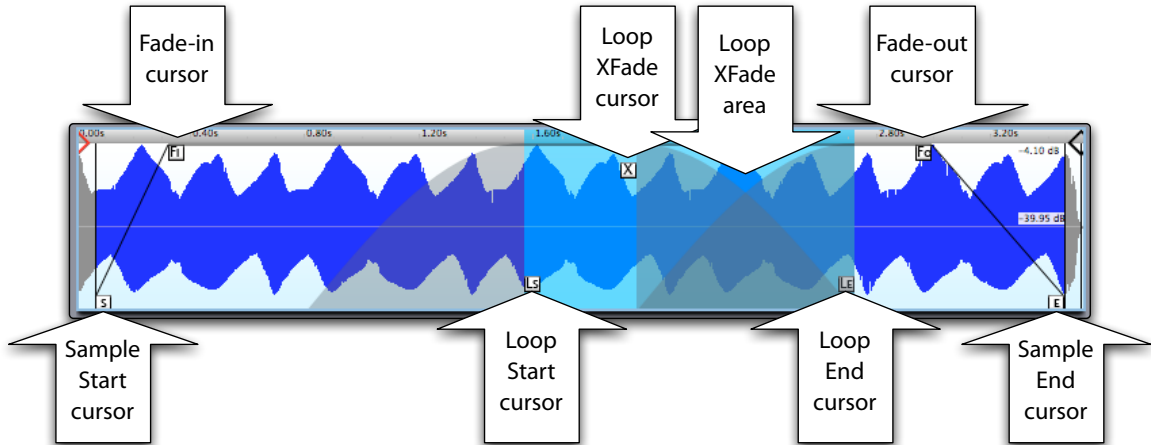
The sample can also have one loop defined and enabled. In **Keymap** a sample loop is defined by a **LoopStart** and a **LoopEnd** position. Once you enable the loop using the **LoopEnable** checkbox, when playback reaches the **LoopEnd** position, it will jump back to **LoopStart**.

As you can imagine only perfect loops will sound without glitches at the "join" point. For this reason **Keymap** let you set a non destructive loop crossfade, where a portion of the sample before the loop start gets mixed at the end of the loop in order to smooth the transition. You set the length of this segment using the **Loop XFade** parameter. You can also select a mix shape for the crossfade between **linear**, **Equal Power** and **S-Shaped**, with the **LoopXFadeShape** pop-up menu. As a suggestion, for simple waveforms the linear crossfade is probably the best choice, while complex audio will probably be better served with **Equal Power**. Needless to say, **Keymap** offers a variety of looping functions both at the sample and at the **Zone** levels. We'll also see how the full fledged **Sample Editor** contains a dedicated loop editor.

Note: the **S-Shaped** crossfade is not directly supported by the **EXS24** and requires new samples to be rendered.

Editing sample parameters in the sample editor

While the Zone inspector shows and let you edit these values in numerical form, you can also view and edit them in the **Auxiliary sample editor**. The sample editor contains several screen elements, called **cursors**, which let you change the respective parameters.



Without going into describing in detail how the sample editor works now, know that you can select one Zone at a time and edit using the Aux Sample Editor cursors instead of the numeric parameters.

Tip: When editing sample parameters, a very handy key command is the "Play" command, which is assigned by default to the space bar. This command will play the sample and let you hear the changes you made.

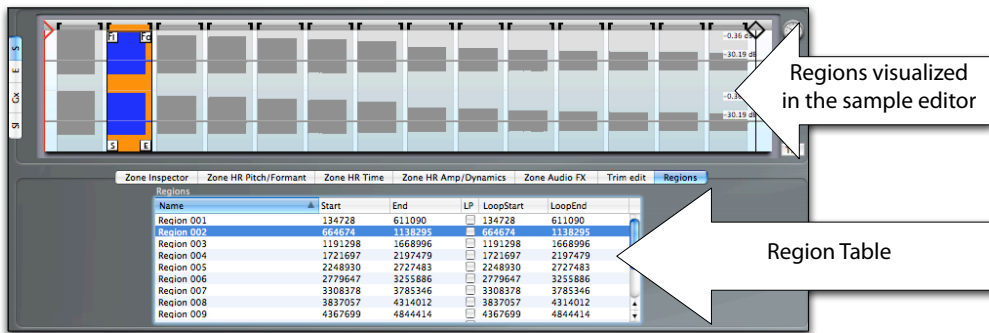
Chapter 7: Regions

Sometimes you might find it useful to have alternate sets of sample parameters for the same sample, or to define audio segments from a sample that you will later map to individual Zones. Regions are Keymap elements designed exactly for these tasks.

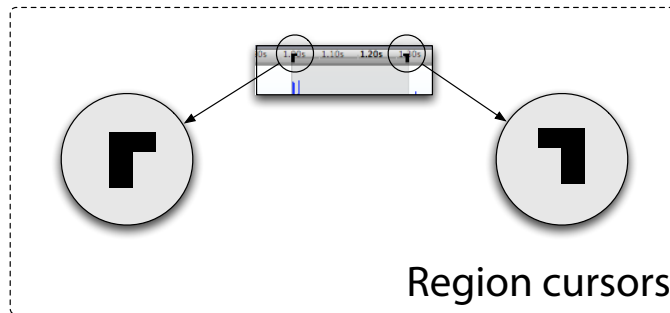
Each Region is basically an independent set of the following parameters: SampleStart, SampleEnd, FadeIn, FadeOut, LoopStart, LoopEnd, LoopXFade, LoopXFadeShape, and LoopEnabled

Regions can be defined manually or by autosplitting samples.

There are no special limitations to keep in mind with Regions: for each Zone an arbitrary number of Regions can be created, and they can overlap. Regions are visualized both in a **Region table**, and graphically in the auxiliary sample editor as colored areas delimited in the ruler by **Region cursors**.



Normally a Zone has no Regions defined and it uses the **main set** of sample parameters. Once you create Regions, you can switch between the **main set** and each **Region set** by selecting a Region in the **Region Table**. When one single Region is selected, it will become the **active Region**, and the Zone will play its sample according to the active Region. Also, all edits of the Zone parameters listed above will actually be editing the Region set, and not the main set, which is left untouched.

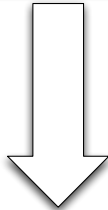
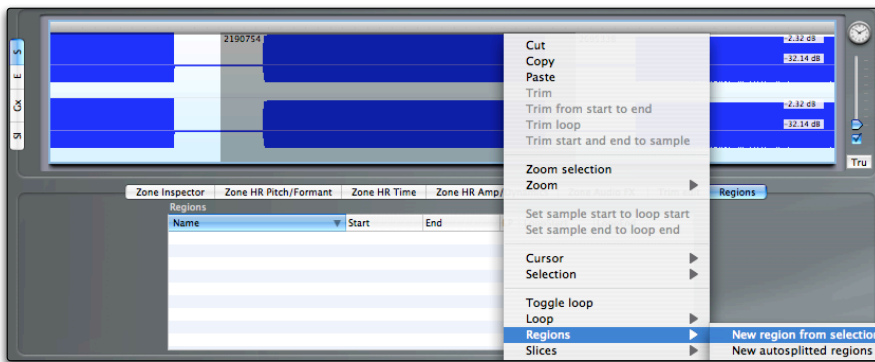


Moving the active Region cursors in the sample editor is equivalent to moving the SampleStart and SampleEnd parameters for that Region.

In the sample editor, **Unselected Regions** are displayed in light grey color, while the single selected Region (the active Region) is displayed in orange color. You can also **select multiple Regions**: in this case the Zone will revert to using the main set, and the selected Regions will be displayed in light orange color.

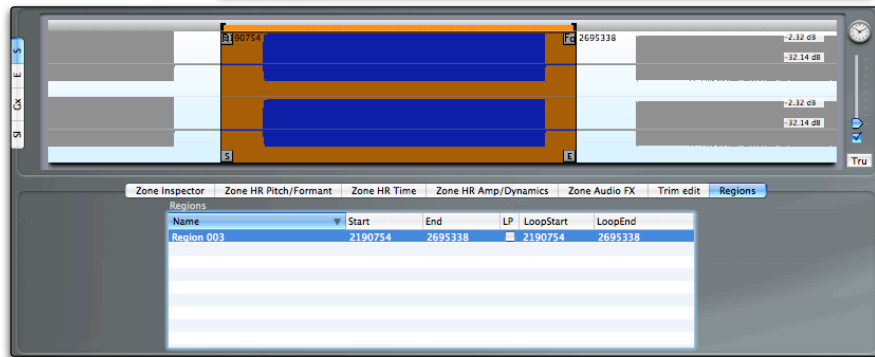
How to create a Region manually

Creating a Region is as simple as selecting a portion of the sample in the Aux Sample Editor and using the **Regions > New Region from selection** menu function. The newly defined Region will appear in the Region table, where you can now select it.



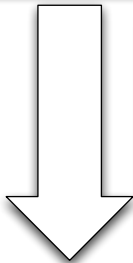
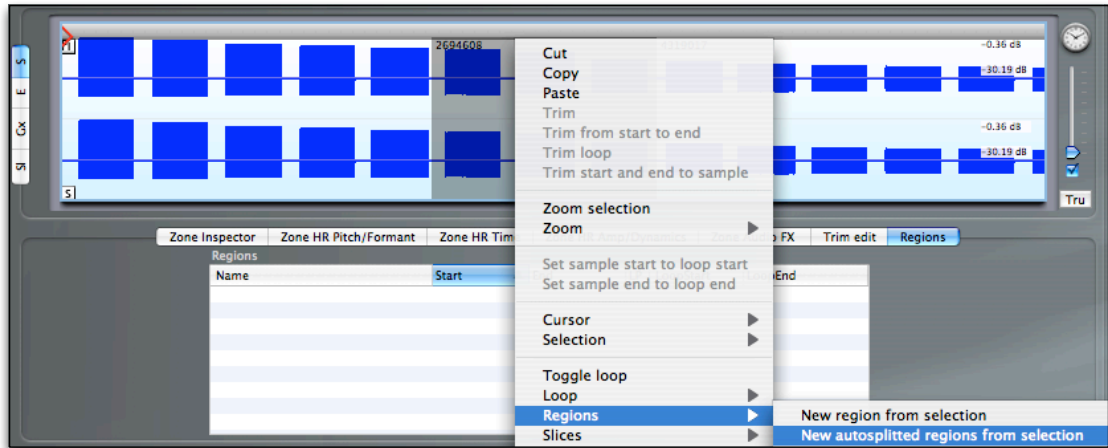
Select a segment in your sample and use the **Regions>New region from selection** menu function.

A new region will be created and displayed in the Regions table. If you then select it in the table, it will become active



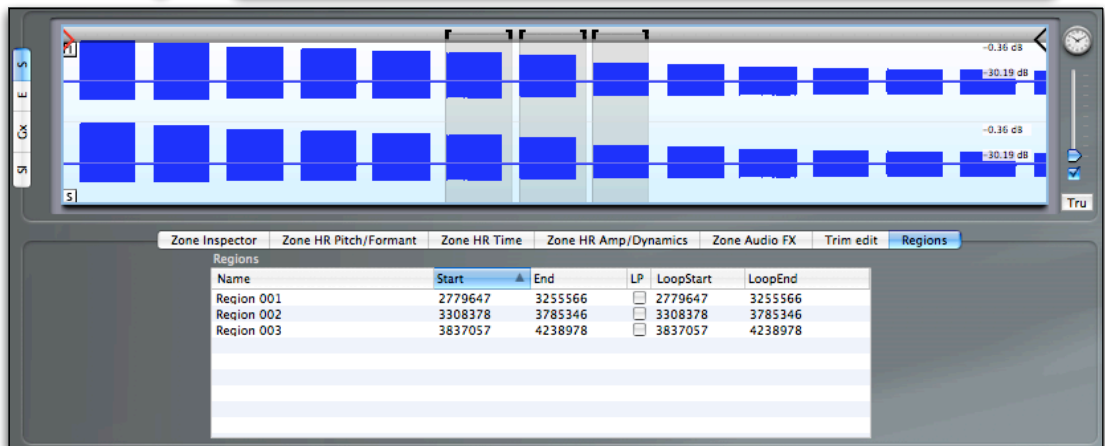
How to create a Region by autosplitting a sample selection

Keymap can split the audio segments for you and create the corresponding Regions. You just have to select a section in the sample editor and use the **Regions > New Autosplit Regions from selection** menu function as shown in the following illustration:



Select a section in your sample and use the **Regions>New autosplit regions from selection** menu function.

The audio segments will be split and new regions created.



How to create Regions at transients from a sample selection

Keymap can also detect transients in your samples, and create the corresponding Regions. You have to select a section in the sample editor and use the **Regions > New Regions at transients from selection** menu function, as illustrated here:

The first screenshot shows the 'Regions' menu with the following options: Cut, Copy, Paste, Trim, Trim from start to end, Trim loop, Trim start and end to sample, Zoom selection, Zoom, Set sample start to loop start, Set sample end to loop end, Cursor Selection, Toggle loop, Loop, **Regions** (highlighted), Slices, and Map. The 'Regions' submenu is open, showing: New region from selection, New auto splitted regions from selection, and **New regions at transients from selection**.

The second screenshot shows the 'Create regions from transients' dialog box with 'Transient Threshold' set to -10.00 dB and 'Gate time' set to 100 ms. There are 'Cancel' and 'Ok' buttons.

The third screenshot shows the sample editor with red vertical lines indicating detected transient points.

The fourth screenshot shows the 'Regions' table with the following data:

Name	Start	End	LP	LoopStart	LoopEnd
Region 016	96	7519	<input type="checkbox"/>	96	7519
Region 017	7520	19986	<input type="checkbox"/>	7520	19986
Region 018	19987	25693	<input type="checkbox"/>	19987	25693
Region 019	25694	38635	<input type="checkbox"/>	25694	38635
Region 020	38636	45335	<input type="checkbox"/>	38636	45335
Region 021	45336	58630	<input type="checkbox"/>	45336	58630
Region 022	58631	64120	<input type="checkbox"/>	58631	64120
Region 023	64121	77224	<input type="checkbox"/>	64121	77224
Region 024	77225	102856	<input type="checkbox"/>	77225	102856

Select the sample and use the **Regions>New regions at transients from selection** menu function

The transients sheet opens

You are now able to tweak parameters watching the detected transients

Once you are happy with the detected transient points, click "OK" on the transients panel and new regions will be created, each spanning from one transient position to another

How to delete Regions

Deleting Regions is as simple as selecting them in the Region table and pressing the backspace or delete key on your Mac keyboard, or using the Clear menu item.

Region functions

Once Regions have been defined and selected, you have a few selected functions you can perform directly on them in the Region table. These functions let you copy parameters to and from the main set, autoloop Regions, and also map Regions to newly created Zones.

Note: if you need to use other functions, remember that when you activate one Region you can use the full set of Keymap functions on that Region.

Copy Region sample parameters to the main set

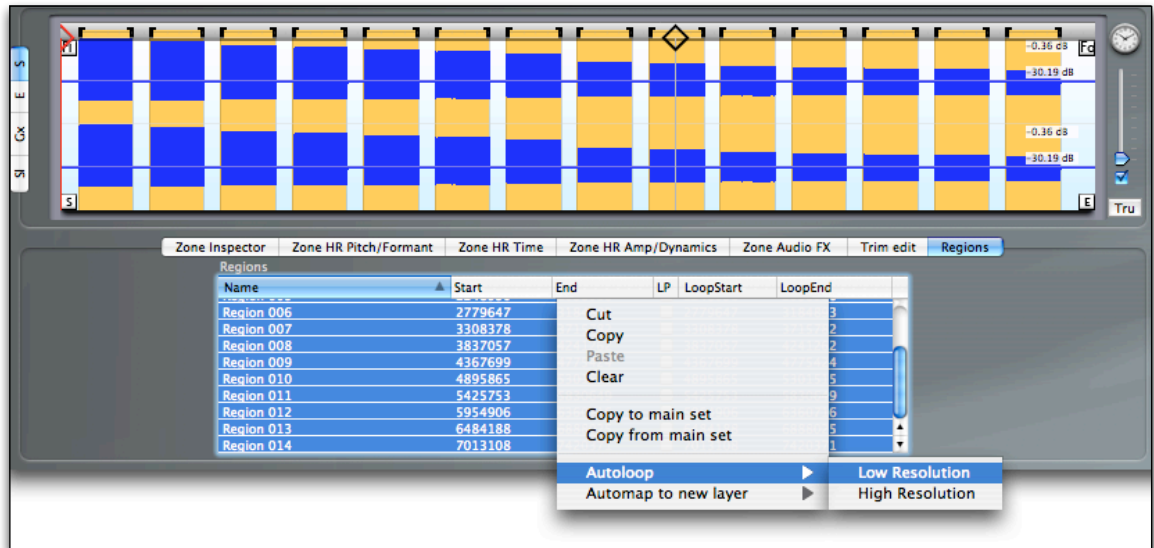
The **Regions > Autoloop > Copy to main set** menu function copies the Region parameters to the main set.

Copy the main set sample parameters to Regions

The **Regions > Autoloop > Copy from main set** menu function copies the main set sample parameters to the selected Zones.

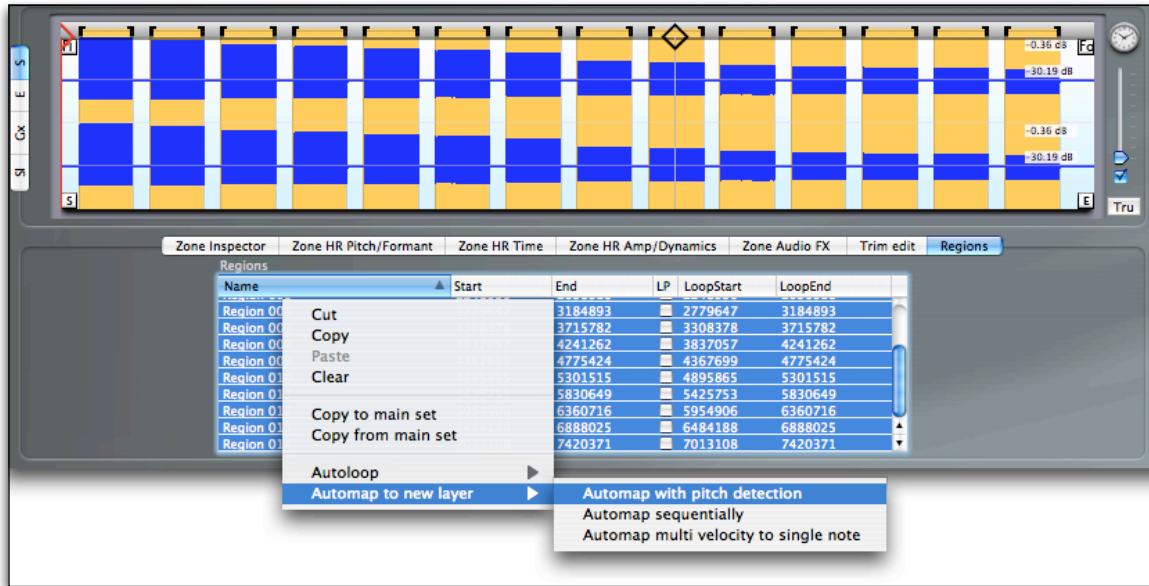
Autolooping Regions

Autolooping Regions is as simple as selecting them and using the **Regions > Autoloop > Low Resolution** or **Regions > Autoloop > High Resolution** menu functions. For each Region, the best loop will be searched for and set in its loop parameters. The main set is unaffected.



Automapping Regions

With the Region automapping functions you create new Zones from selected Regions.



You have three distinct functions available for this:

Regions > Automap to new layer > Automap with pitch detection will pitch detect each Region and create a Zone at the detected note using the Region sample parameters.

Regions > Automap to new layer > Automap sequentially will create Zones sequentially using the Region sample parameters.

Regions > Automap to new layer > Automap multivelocity to single note will map all Regions to Zones on a single note, with Zones sorted along the velocity axis by the volume level of the sample comprised between each Region start and end parameters.

Chapter 8: Harmonic Resynthesis

Each Zone has an independent Harmonic Resynthesis engine and relative set of parameters and envelopes for controlling it. As we have explained at the beginning of this guide, with Harmonic Resynthesis you can reshape harmonic samples over four important properties: pitch, formant, time and amplitude. By default, Harmonic Resynthesis is not active for Zones until you explicitly enable it in one of the three HR Zone inspector tabs. In this chapter we won't focus on the fact that you can draw graphical envelopes for each of these sonic properties, and we'll instead describe the Harmonic parameters available from the Zone inspector. The best way to see how these these parameters are affecting your sound is to looking at the auxiliary sample editor for results.

Note: HR is a resynthesis method, and not a pitchshift/timestretch function, and it will work correctly only with monotonic harmonic samples, with the exception of HR Amplitude, which can be applied to any kind of sample.

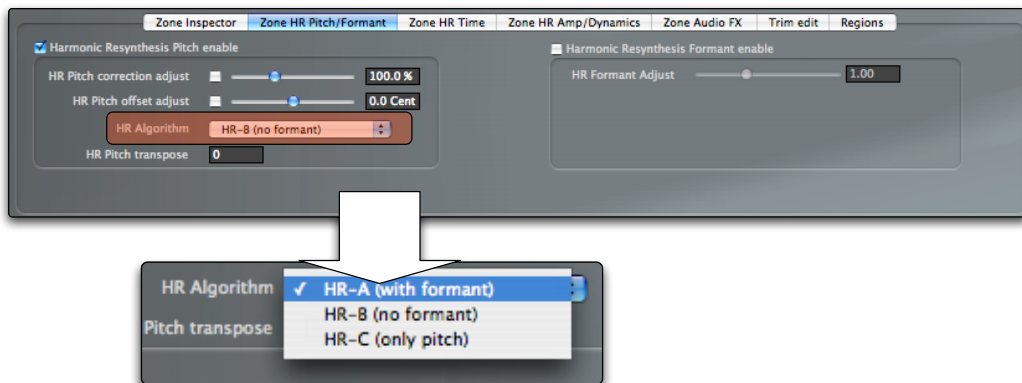
Harmonic Resynthesis algorithms

Keymap offers three alternative Harmonic Resynthesis algorithms: **HR-A** , **HR-B** and **HR-C**.

HR-A allows manipulation of pitch, formant, time and amplitude. **HR-B** instead allows manipulation of pitch, time and amplitude (you lose formant control), but it's better sounding with complex, high pitched harmonic sounds and for polyphonation. **HR-C** only handles pitch but at very high quality. For maximum flexibility, the algorithm can be selected individually Zone by Zone.

How to set the Harmonic Resynthesis algorithm

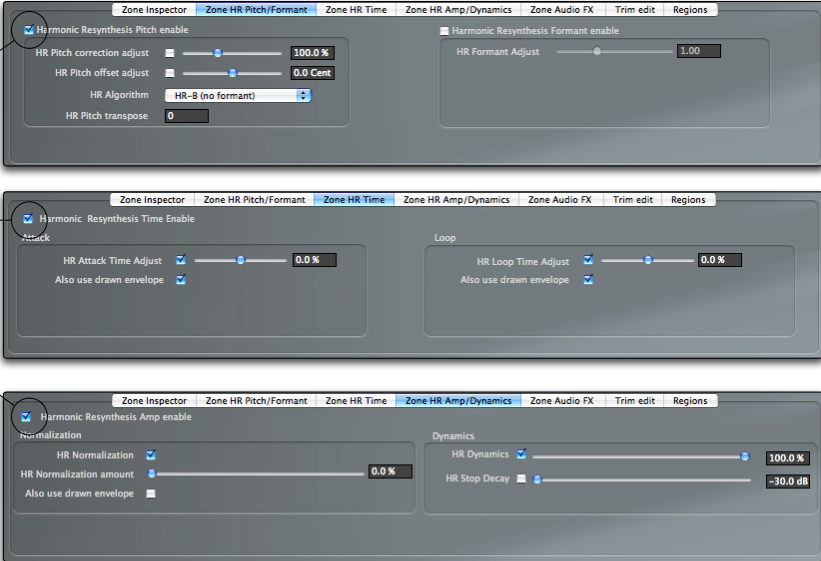
Once you select one or more Zones in the layer matrix, you can change the Harmonic Resynthesis algorithm by setting the "HR Algorithm" pop-up menu as shown here:



Note that changing the algorithm by itself doesn't mean that HR will be turned on for those Zones.

How to enable Harmonic Resynthesis for the selected Zones

Once you select one or more Zones in the layer matrix, you can enable the Harmonic Resynthesis engine for those Zones by enabling at least one of the three master **HR enable** checkboxes.



The image shows three screenshots of the Zone Inspector interface, each with a callout arrow pointing to a specific checkbox. A central circular icon with a blue checkmark is also present. The first screenshot shows the 'Zone HR Pitch/Formant' tab with 'Harmonic Resynthesis Pitch enable' checked. The second screenshot shows the 'Zone HR Time' tab with 'Harmonic Resynthesis Time Enable' checked. The third screenshot shows the 'Zone HR Amp/Dynamics' tab with 'Harmonic Resynthesis Amp enable' checked. A text box on the left states: 'At least one of the master HR enable checkboxes must be enabled for the Harmonic Resynthesis engine to be active'.

The first time Harmonic Resynthesis is enabled for a Zone, an analysis of the pitch and amplitude envelopes will be made, and this operation might take a few seconds for each Zone.

Harmonic Resynthesis and loops

As Harmonic Resynthesis creates a new sound starting from the original sample, and as looping is performed in the audio chain after the HR Engine, you might need to adjust your loop points, or apply some crossfade after editing the HR Parameters.

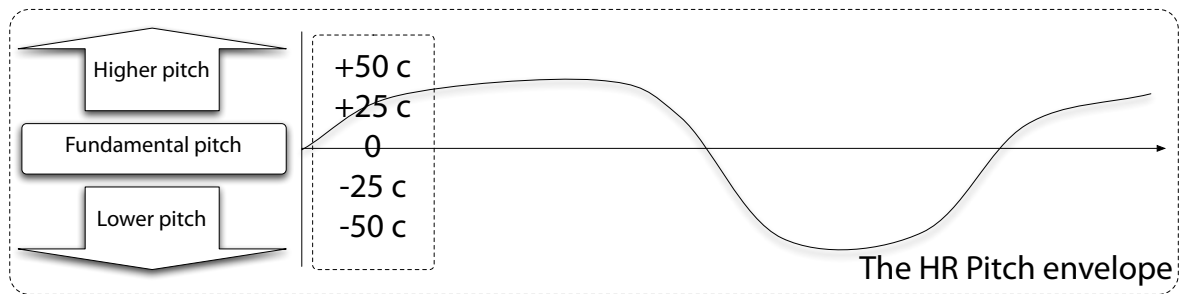
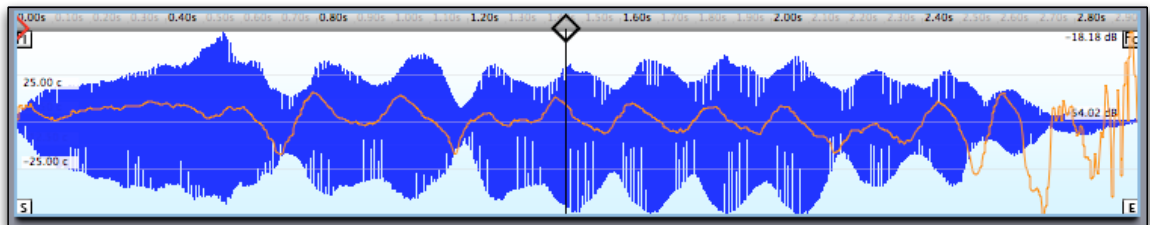
Saving to EXS24

As the Harmonic Resynthesis features are not directly supported by the EXS24, new samples need to be rendered when saving the project to EXS24 format. The rendered samples are normal sample files, containing the re-synthesized sample, and the positions (start, end, loop, etc) in the EXS24 Zones will incorporate all the changes necessary to have them play the sound exactly as heard in Keymap. We recommend keeping a Keymap format copy around before saving to EXS24 format so that you can go back and tweak the HR settings, that would otherwise be lost in the EXS24 format instrument.

The HR Pitch envelope

If you select a single Zone, and enable the **Harmonic Resynthesis Pitch enable** checkbox, you will see the pitch envelope displayed as a thin orange line in the auxiliary sample editor. That envelope represents the envelope that will be used by Keymap to synthesize the pitch for the sound.

Immediately after analysis the envelope line is a precise representation of the detected sample pitch at any point. Notice how the envelope is represented as a deviation from the detected fundamental note pitch, which is in turn always represented as a horizontal line in the center of the sample editor, regardless of the fundamental pitch value, or the fact that the sample is mono or stereo.

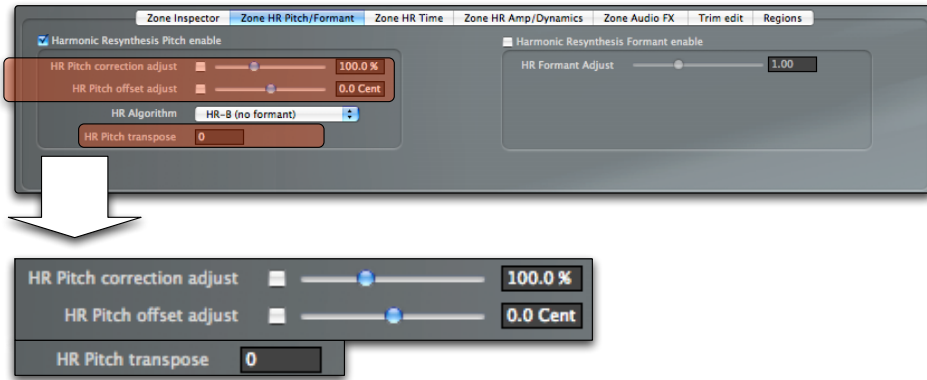


At the left of the sample editor you can see the **HR Pitch ruler** values, displaying the deviation in cents from the fundamental. If you have a mighty mouse, you can press and hold the **Option key** and spin the mouse trackball vertically to **change the vertical HR Pitch zoom factor**.

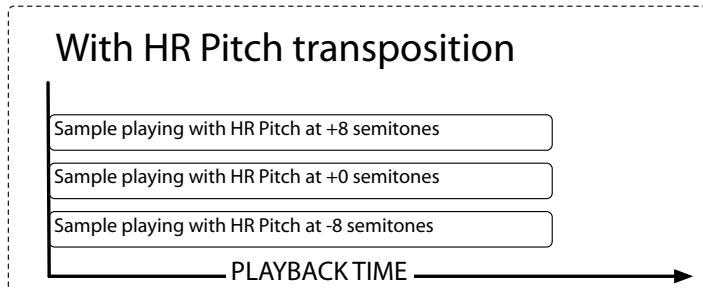
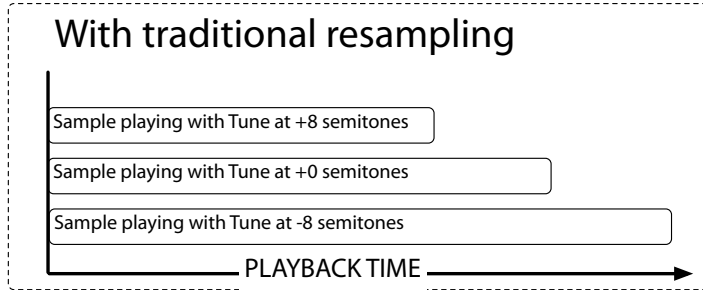
From the auxiliary sample editor in the Instrument editor window it's not possible to draw and edit directly the pitch envelope, but you can use the HR Pitch parameters to quickly modify it in useful ways.

Harmonic Resynthesis parameters for Pitch

Each Zone has three pitch parameters for transforming the HR pitch envelope. These parameters deal with pitch transposition and pitch correction.



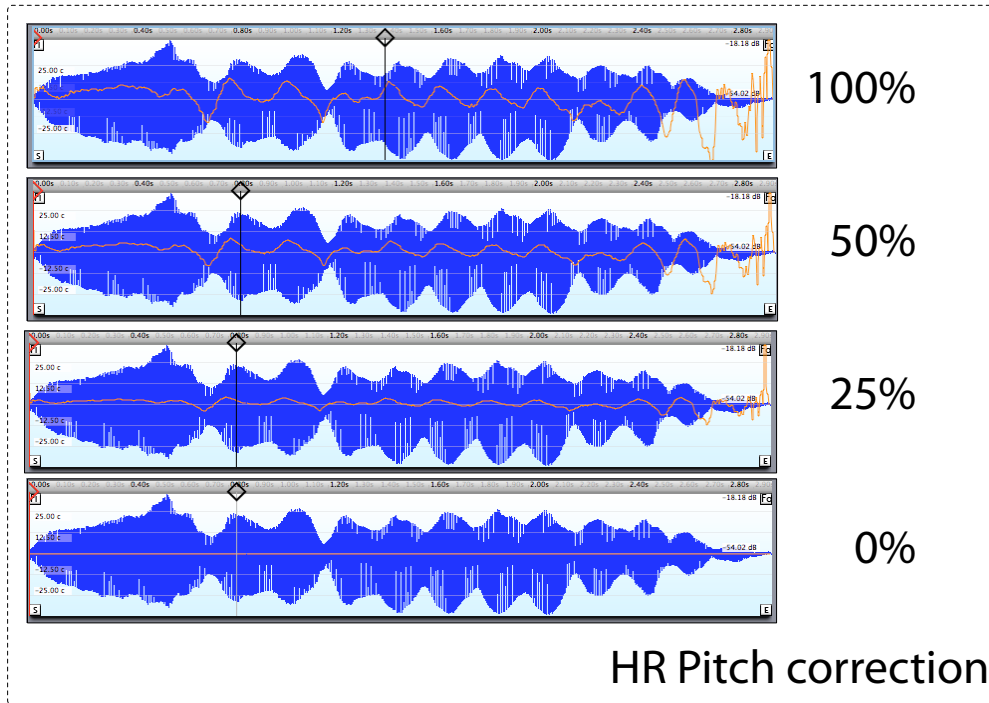
HR Pitch Transpose let you change the pitch of the sample in semitone steps. The major difference between this parameter and the normal **Tune** Zone parameter is that HR Pitch transpose doesn't modify the original sample playback length, while the Tune parameter will instead change the playback resampling rate and higher pitches will result in shorter playback times as shown in the following illustration.



The HR Pitch Transpose parameter is used by Keymap as the basis for the Zone **polyphonate** function.

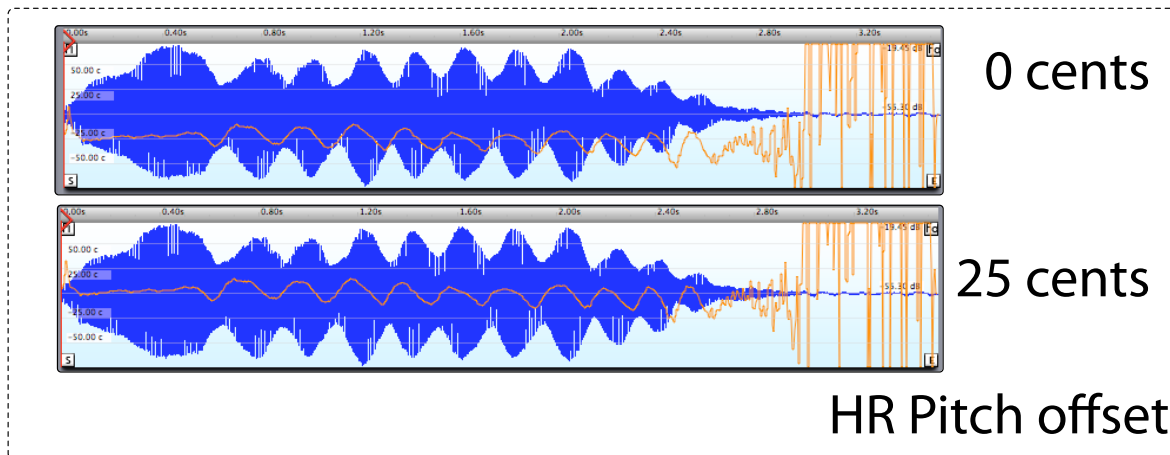
HR Pitch correction

The **HR Pitch Correction adjust** parameter lets you correct the pitch envelope by gently warping it toward the fundamental pitch by the desired amount. This parameter is expressed in percentile of the analyzed deviation, where 100% means the original untouched envelope, 0% means full correction. You can also reinforce the pitch deviation from the fundamental by using values greater than 100%. In this case, the pitch deviation will be accentuated. You can enable and disable pitch correction by using the **checkbox** near the pitch correction slider. When you edit and release the pitch correction slider, **the pitch envelope will be updated** to reflect the changes you made, as shown in this illustration:



For your consideration: some amount of pitch correction is very useful when building sampled acoustic instruments as it is often difficult to sample some of them at the perfect pitch. When playing a solo part a slight de-tuning might sound very human and wonderful, but if you play multiple instruments you definitely want them in tune.

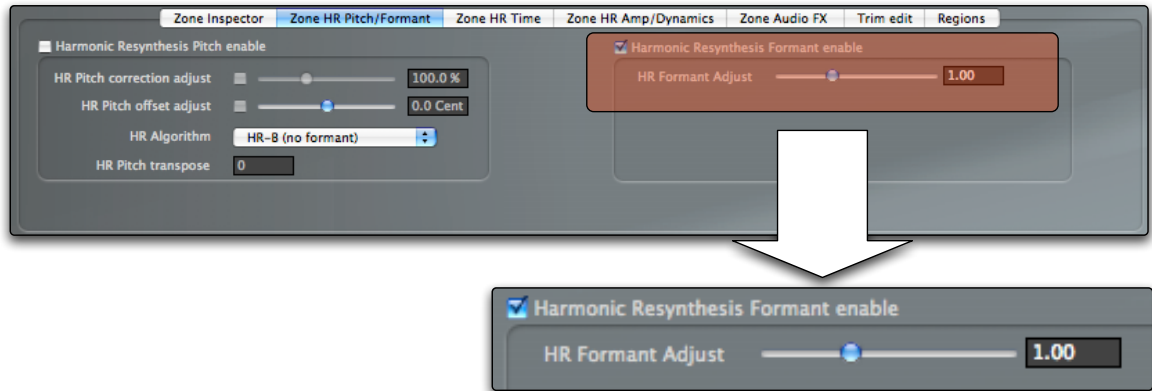
The **HR Pitch Offset adjust** parameter is complementary to the HR Pitch Correction adjust, and lets you add an offset to a pitch. This is useful when you have an out of tune vibrato, and you do not want to change the vibrato, but just center it onto the fundamental, as seen in the following illustration:



You can enable and disable HR Pitch shaping using the **Harmonic Resynthesis Pitch enable** checkbox.

Harmonic Resynthesis formant control

The Harmonic Resynthesis engine can also be used, with the HR-A algorithm, to modify the formant of the played sample. This lets you change the spectral distribution of the sound without changing the pitch, which is useful if you want to create a subtle variation of the same sample, or you want to simulate a larger or smaller resonant body for a sampled acoustic instrument.



The **HR Formant adjust** parameter lets you modify the formant of selected Zones. A value of 1.0 means no formant change, while a value of 0.5 means that the formant will be shifted toward high frequencies, and 2.0 means that the formant is shifted toward the low frequencies.

You can enable and disable HR Formant shaping for the selected Zones using the **Harmonic Resynthesis Formant enable** checkbox.

Harmonic Resynthesis time control

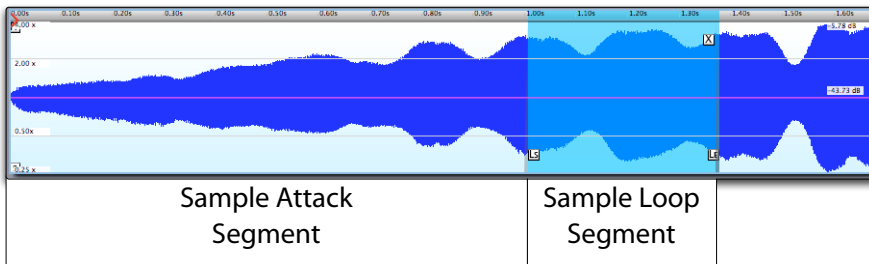
How many times have you wished you could have fine control over the timing of your sampled instrument? The Harmonic Resynthesis engine allows you to control the playback timing, so that it becomes easy to slow down a sample at some points or accelerate it in others. In other words, you have continuous control of the timing aspects of your harmonic sample through an HR Time envelope.

Perceived time vs displayed time

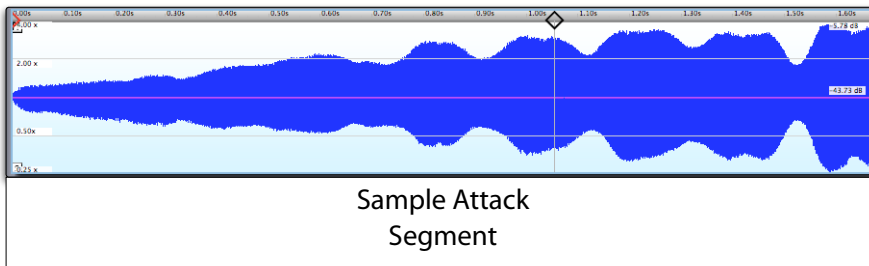
Keymap displays the timing changes as a time envelope overlaid on the sample; you will not see a change in the length of the displayed waveform in the sample editor. What you will instead see is the playback cursor slowing down or accelerating to reflect the current time envelope value. All sample position parameters **displayed** on screen (start, end, loop points, etc) will **not** change when you adjust the time envelope, and will keep referencing the original sample positions, but of course the **perceived** length (i.e. the length of the sound you'll hear) will change. This allows you to have a continuous time envelope (i.e. the envelope can smoothly change sample by sample), and lets you edit and adjust envelopes with precision, without the waveform constantly updating. After the initial sample analysis, the time envelope is a flat horizontal line centered over the sample waveform, meaning that no timing change will be done.

Harmonic Resynthesis time parameters

As for HR Pitch, it's not possible to draw the envelope directly from the Auxiliary sample editor in the instrument window, but we have two parameters for controlling the sample attack and sample loop segments as defined in the following illustration:



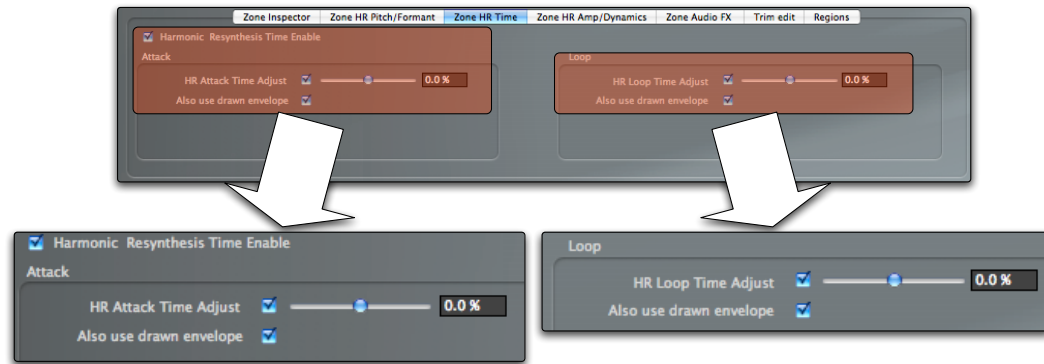
When a loop is enabled, we have both an attack and a loop segment



When the loop is disabled or not defined, we have only an attack segment

Note that when a loop is not defined, or disabled, there is no sample loop segment and so the whole sample is considered to be part of the sample attack segment.

The HR time parameters are found in the **Zone HR Time inspector**.



The **HR Attack Time Adjust** lets you change the perceived length of the attack phase. The parameter is expressed as a percentage of the displayed length and you set the parameter go from 50% (half of the original length) to 200% (double of the original length).

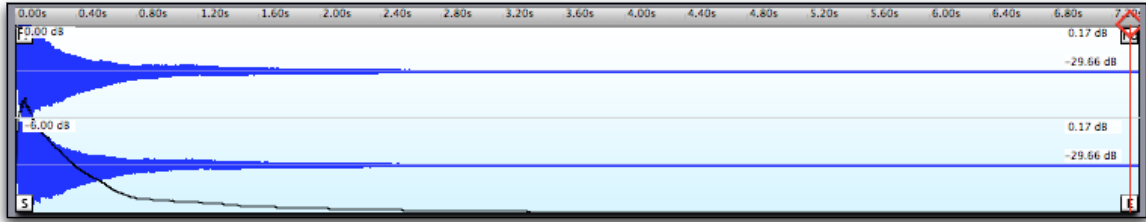
Similarly, with the **HR Loop Time Adjust** you can change the perceived loop length. The parameter is expressed as a percentage of the displayed length and you adjust it from 50% (half of the original loop length) to 200% (double of the original loop length).

The **Also use drawn envelope** checkboxes let you enable/disable the hand-drawn envelopes you might have created from the full fledged sample editor.

You can enable and disable HR Time shaping for the selected Zones using the **Harmonic Resynthesis Time enable** checkbox.

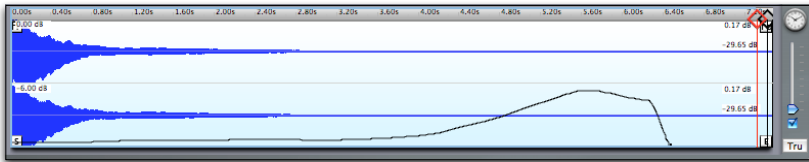
Harmonic Resynthesis amplitude control

The last of the four properties that you can reshape with Harmonic Resynthesis is amplitude. When a Zone is first analyzed, an amplitude envelope is created, representing the original sample amplitude characteristics. The amplitude envelope appears as a black line in the sample editor, as shown in the following illustration.

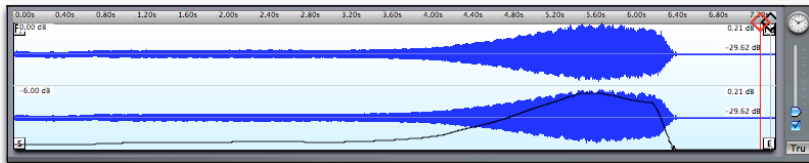


Tru-view display mode: visualizing HR Amp processing

When editing the HR Amp envelope or parameters, only the HR amp envelope is visually modified and the displayed sample waveform still represents the original sample. You can however see the actual HR Amp processed waveform by clicking the **Tru** button and entering the **Tru-view sample editor mode** Tru-view button.



With the Tru-view mode disabled, the original sample waveform is displayed



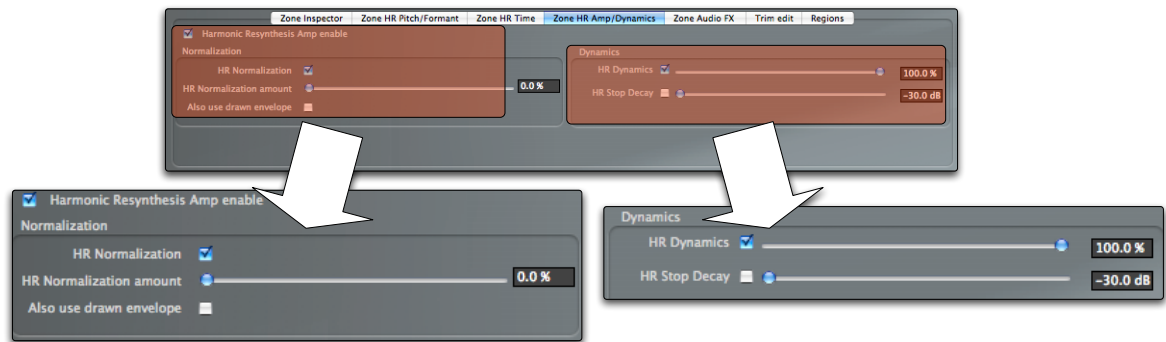
With the Tru-view mode enabled, the processed sample waveform is displayed

Note: Tru-view mode also displays the actual results of fade-ins, fade-outs and loop crossfades. In Tru-view mode, the audio outside the Zone SampleStart and SampleEnd positions is visualized as silence.

Tru-view display mode is slower and requires more CPU power than the normal mode, which is why it's not enabled by default.

HR Amp Zone parameters

Keymap offers full control over this amplitude envelope from the full sample editor, but some useful HR Amp parameters are also available from the **Zone HR Amp inspector**.

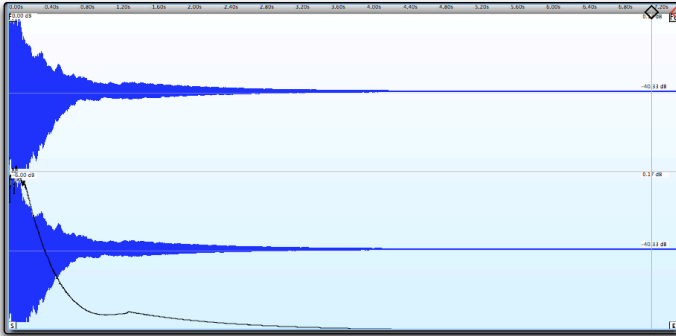


How to normalize samples using HR Amplitude

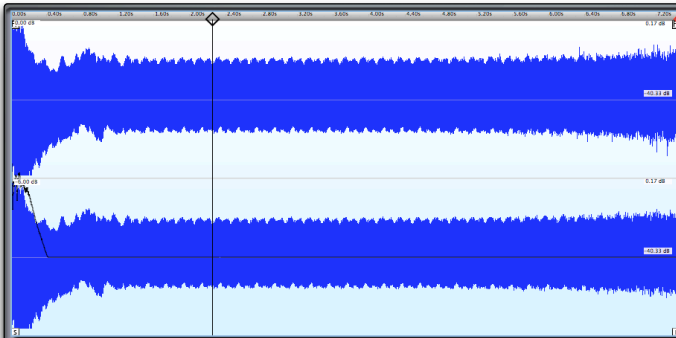
One of the most common actions in the sampling world is normalizing samples. Unfortunately this is usually implemented in a destructive way. This means that the original samples files are modified, which both takes a significant amount of time and is very difficult to undo once you have committed to the change. In Keymap, using Harmonic Resynthesis, you can perform this operation non-destructively in realtime simply by setting the amount of normalization you want to achieve. The **HR Normalization amount** parameter goes from 0% (meaning no amplitude change), to 100% (meaning the amplitude is stretched to fully normalize the sample).

Freezing the decay of decaying samples

A problem with sampled instruments is that decaying samples often can't be effectively looped, as the energy difference between the loop start and the loop end usually creates a sudden jump in the sound at the loop "join" point. In these situations, a loop crossfade will be helpful, but might not solve the problem. In Keymap, thanks to our Harmonic Resynthesis engine, you can freeze the decay just by setting the **HR Freeze Decay** parameter to the desired decay level expressed in decibel. When the sample tail reaches that level, its level will freeze and remain constant until the end of the sample, making looping a much simpler task (and there are often hidden sonic gems in those long tails).



The original decaying piano sample



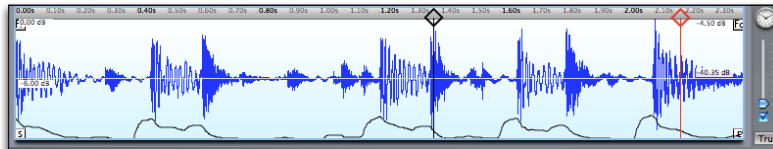
The same piano sample with decay frozen at -12dB



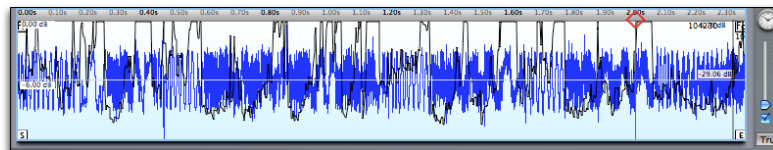
Like all Zone inspector parameters, this parameter can be set for all selected Zones, making this kind of edit very simple for whole layers.

Removing dynamics out of samples

Another function in Keymap lets you remove to various degrees the dynamics from a sample so that it becomes a sonically uniform. The **HR Dynamics** parameter goes from 0% (no dynamics) to 100% (original dynamic). This function gives very interesting results with drum loops and with samples of constantly varying amplitude. Once sounds have their dynamics removed, you can sculpt them again at you liking using the EXS24's envelopes and filters.



The original drum loop



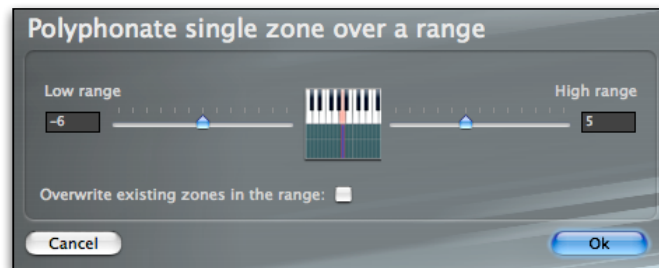
The same drum loop with all dynamics removed

HR Dynamics 0.0%

Zone polyphonation

Zones > Polyphonate menu command

Polyphonation is the process by which a single tuned harmonic sample is used to generate multiple samples, each shifted in pitch and mapped to a different note. This might seem similar to what happens when you play Zones in a sampler, but polyphonation has the important distinction of maintaining the sample length for all notes so that, for example, the vibrato in a sample will play at the same speed on all the polyphonated notes, or playing a polyphonated voice sample over the keyboard will result in a nicely synched choir. The Polyphonate function in Keymap uses Harmonic Resynthesis for doing this and doesn't actually create additional samples until the moment you export to EXS format.



Once you select a single Zone and polyphonate it, a panel will ask you the range for the polyphonation at

the left and at the right of the selected Zone root note, and if you want to overwrite any existing Zones in that range. Keymap will then create a new set of Zones, each referencing the same sample, with the same parameters, except for the **HR Pitch transpose** parameter, set to match the transposition needed.

Chapter 9: Zone functions

Zone remap functions

The **Zones > Remap** sub-menu commands Group all Zone remapping functions. With a couple of exceptions, each remap function works on the currently selected layer.

Zones > Remap > Remap down by one octave

This functions remaps Zones down by one octave, also moving the root note. Velocities are not modified.

Zones > Remap > Remap up by one octave

This functions remaps Zones up by one octave, also moving the root note. Velocities are not modified.

Zones > Remap > Remap down by one octave no root

This functions remaps Zones down by one octave, without moving the root note. Velocities are not modified.

Zones > Remap > Remap up by one octave no root

This functions remaps Zones up by one octave, without moving the root note. Velocities are not modified.

Zones > Remap > Remap instrument down by one octave

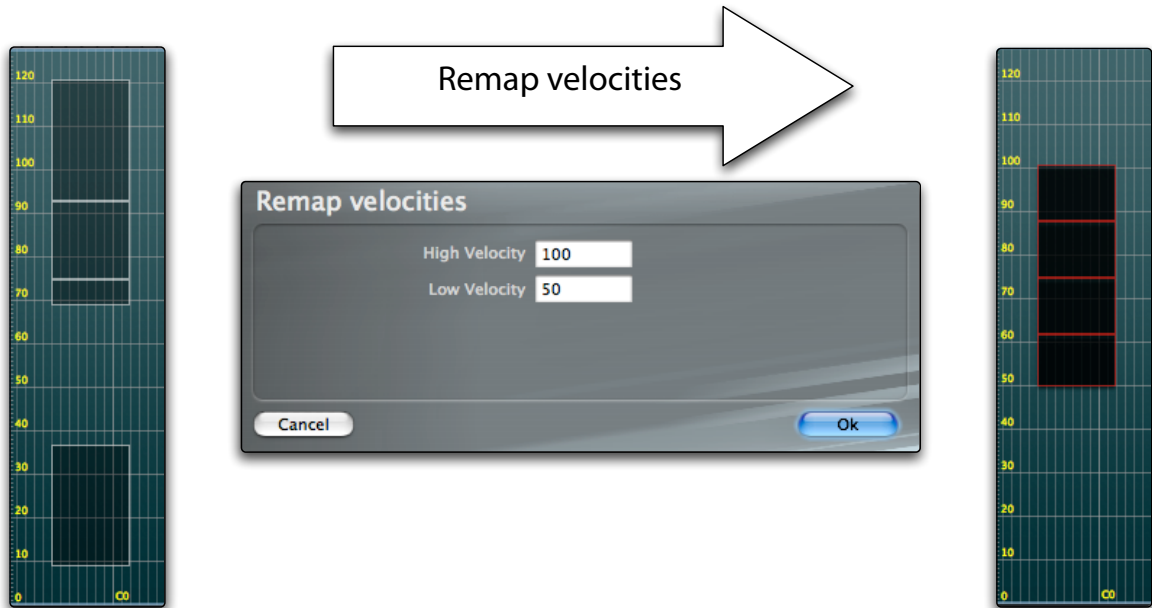
This functions remaps Zones down by one octave for the whole instrument (i.e. all layers), also moving the root notes. Velocities are not modified.

Zones > Remap > Remap instrument up by one octave

This functions remaps Zones up by one octave for the whole instrument (i.e. all layers), also moving the root notes. Velocities are not modified.

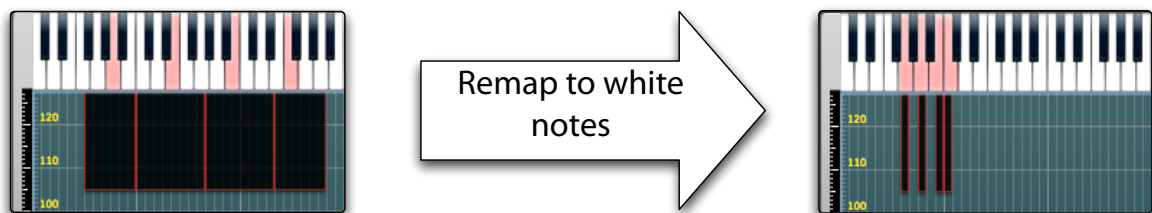
Zones > Remap > Remap velocity

This function remaps the velocity ranges for selected Zones. A panel asks you the desired minimum and maximum velocity and will then remap the selected Zones so they fill the desired velocity range in equal amounts.



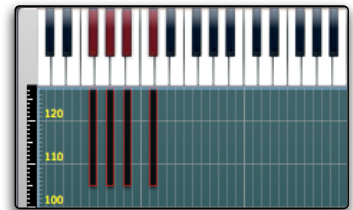
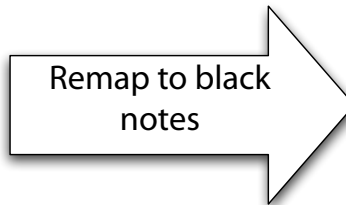
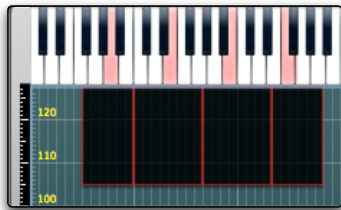
Zones > Remap > Remap to white notes

This function remaps the note range for the selected Zones, so that each Zone becomes one single note wide, is positioned over white notes only, and is mapped sequentially starting from the leftmost Zone. The root note for each Zone is also moved. This function is useful with percussion and effects sounds for which you want to have different sets mapped on the white and (see the next menu function) the black keys, possibly on separate layers.



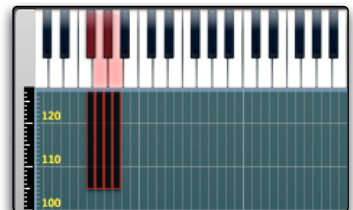
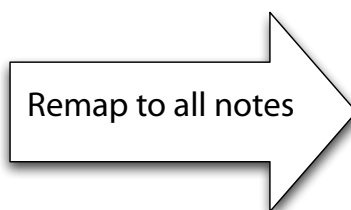
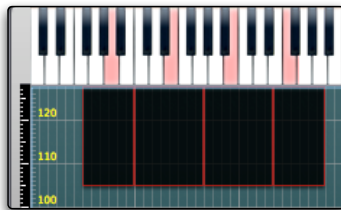
Zones > Remap > Remap to black notes

This function is the counterpart of the previous one. It remaps the note range for the selected Zones so that each Zone becomes one single note wide, is positioned over black notes only and is mapped sequentially starting from the leftmost Zone. The root note for each Zone is also moved. This function is useful with percussion and sound effects for which you want to have different sets mapped on the black and (see the previous menu function) the white keys, possibly on separate layers.



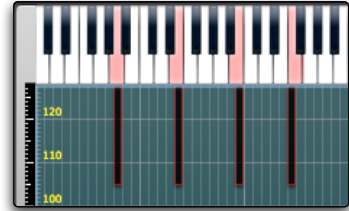
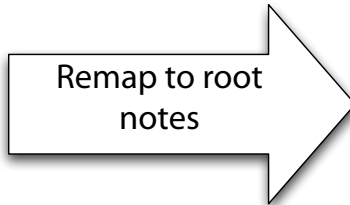
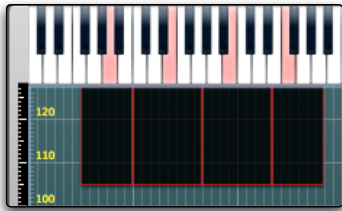
Zones > Remap > Remap to all notes

This function remaps the note range for the selected Zones, so that each Zone becomes one single note wide and is mapped sequentially starting from the leftmost Zone. The root note for each Zone is also moved. This function is useful with percussion and sound effects for which you want to compact Zones in the layer, especially after dropping several Zones in the layer and deleting the uninteresting ones.



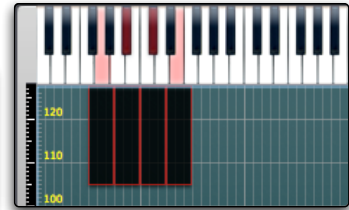
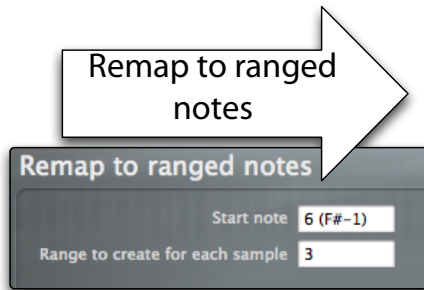
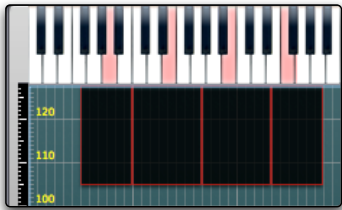
Zones > Remap > Remap to root notes

This function remaps the note range for the selected Zones, so that each Zone becomes one single note wide and is mapped on its root Zone. The root note for each Zone is not moved. This function is useful when you want to insert Zones between existing ones and want to have some free layer matrix space, or when you want to map samples manually. Once you are satisfied, you can use the "Expand Zones" function (see later) to fill up any empty layer matrix space.



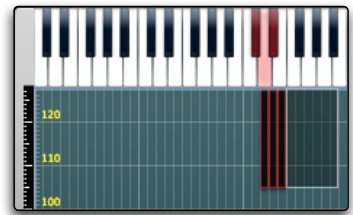
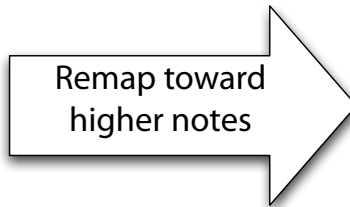
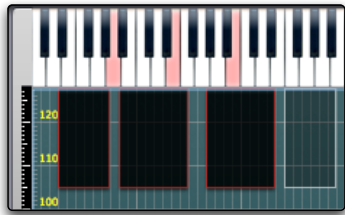
Zones > Remap > Remap to ranged notes

This function asks for a starting note and a width, and then remaps the note range for the selected Zones, so that Zones are mapped sequentially starting from the starting note, with the selected width for each Zone. The root note for each Zone is moved to the center of each Zone note range. This function is useful when you have some samples and want to create a playable range around each of them to experiment playing at various pitches.



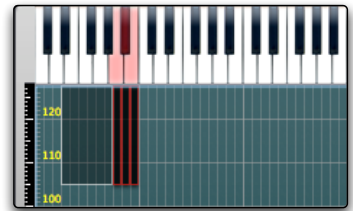
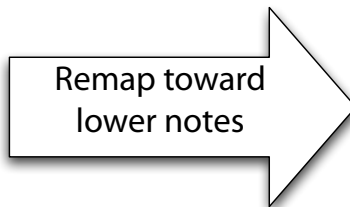
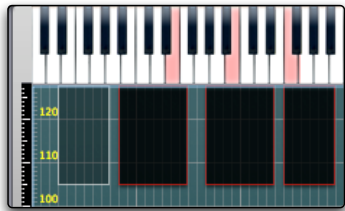
Zones > Remap > Remap toward high notes

This function changes the selected Zones note width to a single note, and moves them toward high notes (i.e. toward the right in the matrix) until an unselected Zone is found. The root note for each Zone is changed to the new Zone note position. This function is useful if you want to compact Zones in the matrix.



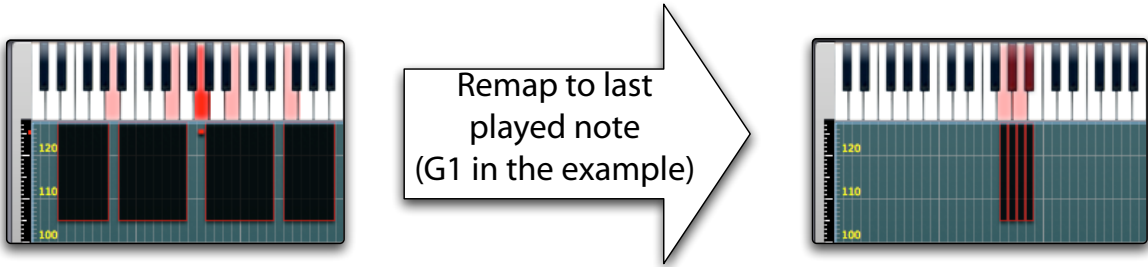
Zones > Remap > Remap toward low notes

This function changes the selected Zones note width to a single note, and moves them toward low notes (i.e. toward the left in the matrix) until an unselected Zone is found. The root note for each Zone is changed to the new Zone note position. This function is useful if you want to compact Zones in the matrix.



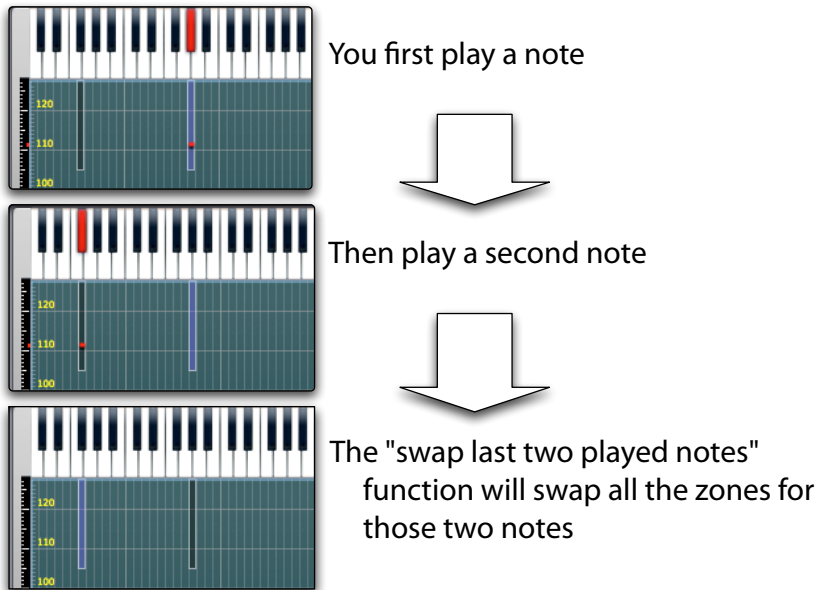
Zones > Remap > Remap to last played note

This function changes the selected Zones width to a single note, and remaps them sequentially starting from the last played note. The root note for each Zone changes to the new Zone note position. This function is useful if you want to remap sparse percussion and effects Zones, using the MIDI or virtual keyboard.



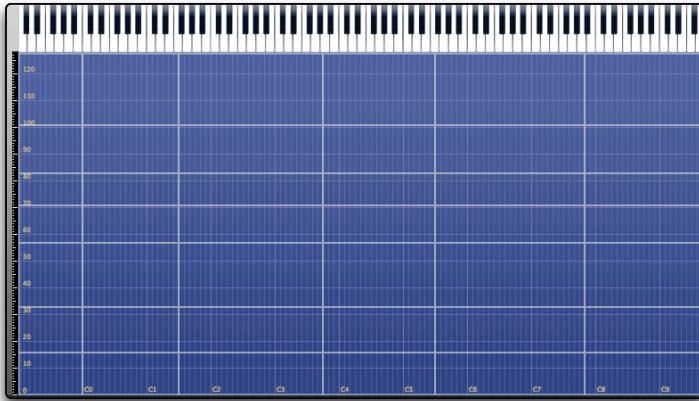
Zones > Remap > Swap last two played notes

This function let you swap the Zones assigned to two different notes. You simply play one note and the other on the MIDI or virtual keyboard (and you can do this until you find the right notes), and then activate this function. All the Zones assigned to those two notes will be swapped.



Zones > Remap > Simplify mapping

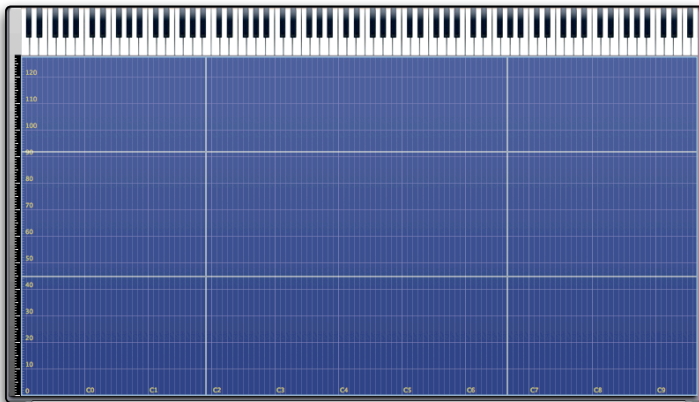
This function transforms the current Zone selection in the map into a simpler map with less Zones. Keymap asks for your desired maximum number of splits over note and velocity ranges, analyzes the placement of Zones, discards the necessary Zones and fills empty layer space with the remaining Zones. This function is useful for creating a lighter version of an instrument. Zone crossfades can be used to smooth transitions. For this function to work properly, the initial map should be filled over its entire area, or at least within the lowest and highest used note.



Simplify

Maximum number of note splits

Maximum number of vel splits

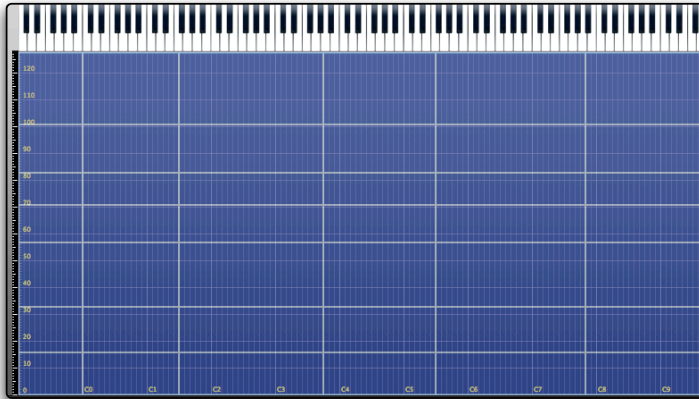


Simplify
mapping

The current
map is
simplified to
match the
desired
maximum
number of
splits

Zones > Remap > Simplify mapping no expand

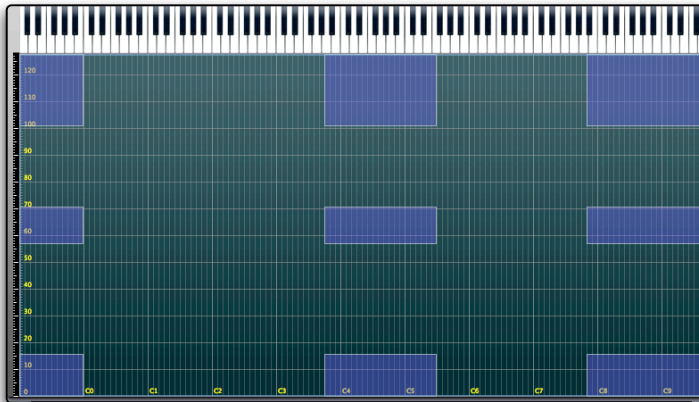
This function is similar to the previous one, with the difference that the redundant Zones are removed, but the remaining Zones aren't expanded to fill the empty matrix space. For this function to work properly, the initial map should be filled over its entire area, or at least within the lowest and highest used note.



Simplify

Maximum number of note splits

Maximum number of vel splits

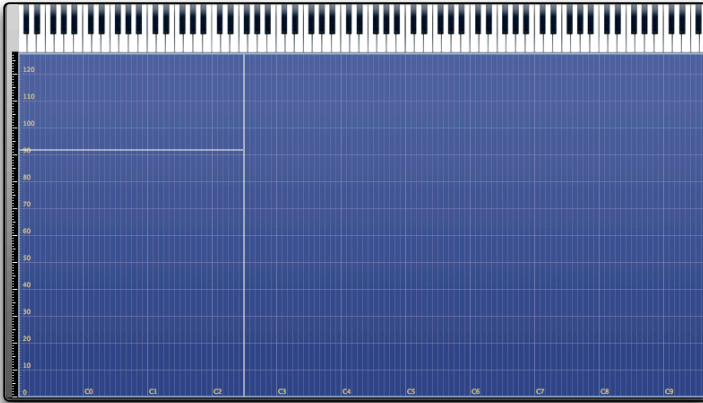
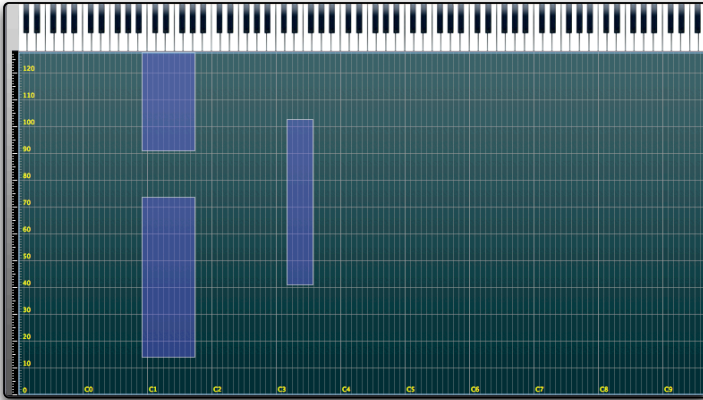


Simplify
mapping
no expand

Zones are
removed in
order to
simplify the
map
as desired

Zones > Remap > Expand Zones

This function expands both the notes and velocity ranges for the selected Zones in order to fill as much empty matrix space as possible. It's very handy when your samples are placed in the matrix and you want to fill empty spaces between them. Root notes are not modified.

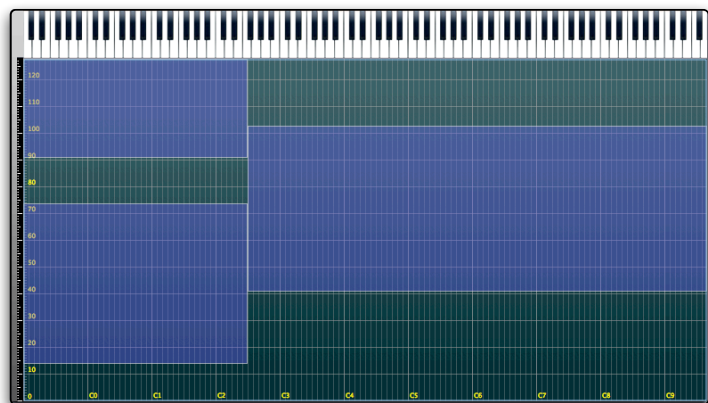
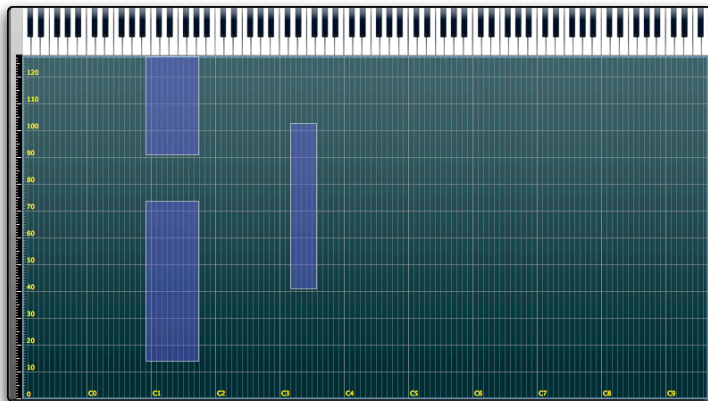


Expand zones

Zones are expanded along the note and velocity axis in order to fill empty matrix space

Zones > Remap > Expand Zones notes

This function expands the note ranges for the selected Zones in order to fill as much empty horizontal matrix space as possible. Velocities and root notes are not modified.



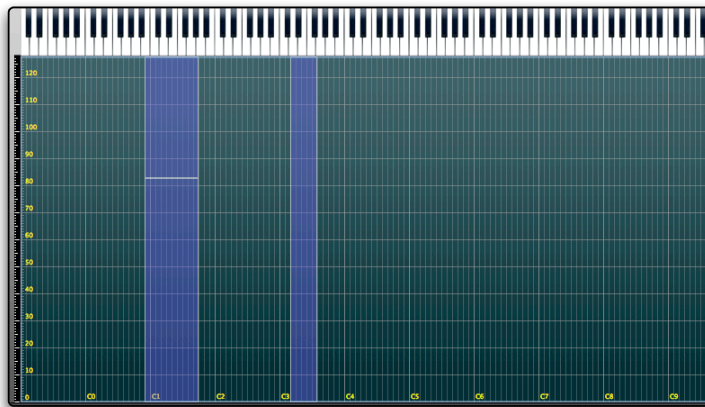
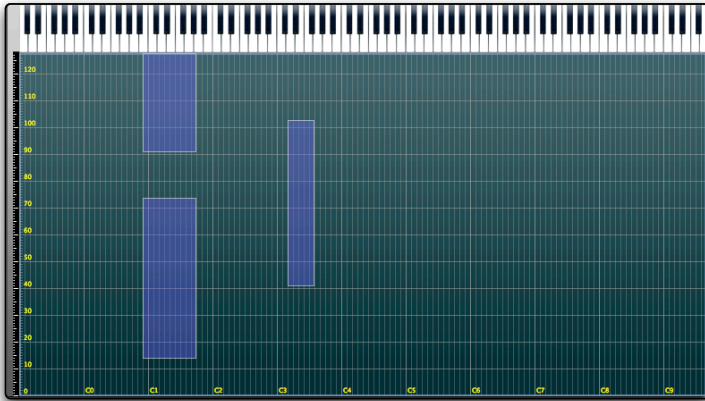
Expand
zones
notes

Zones are
expanded
along the note
axis
in order to fill
empty matrix
space.

Velocity is not
modified

Zones > Remap > Expand Zones velocities

This function expands the velocity ranges for the selected Zones in order to fill as much empty vertical matrix space as possible. Notes and root notes are not modified.

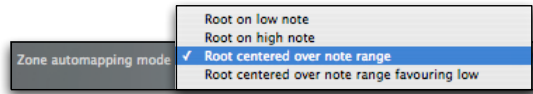


Expand zones vel

Zones are expanded along the velocity axis in order to fill empty matrix space. Notes are not modified

Zones > Remap > Optimize mapping based on root notes

This function analyzes the selected Zones and remaps them in the Layer matrix based on the defined root notes. Velocities are not modified. This remapping function uses one preference parameter, **Zone automapping mode** to determine how you want to remap Zones.



The possible choices are:

Root on low note means that the remapped Zones will have the low note set to the root note.

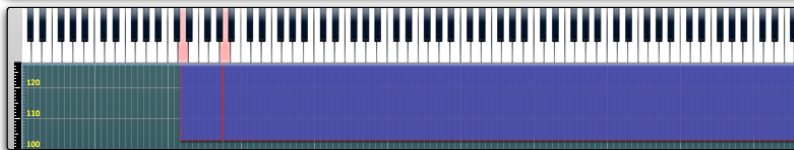
Root on high note means that the remapped Zones will have the high note set to the root note.

Root centered over note range means that the Zones will be remapped so that the root note is centered respect the low and high notes (with an exception for the leftmost and rightmost Zones). In Zones two notes wide, the low note is set to the root note.

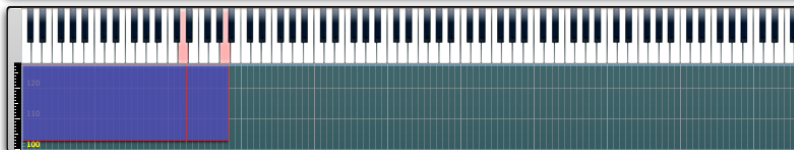
Root centered over note range favoring low is like "Root centered over note range" but with a different rounding so that in Zones two notes wide, the high note is set to the root note.



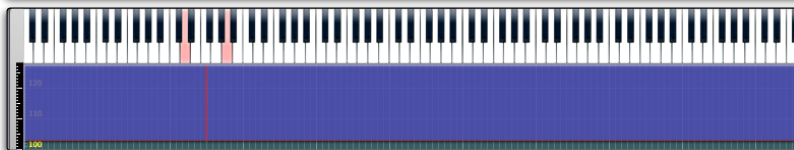
Original map



Optimized map with "Root on low note"



Optimized map with "Root on high note"



Optimized map with "Root centered over note range"

Zones > Remap > Intersect Zone ranges with Group ranges

This function analyzes the selected Zones, checks if any of them are assigned to a Group, and if any Zones are, reduces the Zone note and velocity ranges within the note and velocity specified by its Group. This change has no consequences on how the instrument plays, as the Zone ranges are always clipped to the Group ranges anyway when you play notes, but it makes for a much clearer visualization of Zones in the layer.

Zone automap functions

Zones > Automap > Automap using pitch analysis root notes

This function analyzes the pitch and volume of the samples for selected Zones and uses this analysis to map them in the matrix. The detected pitch is also assigned to the root note for each Zone.

Zones > Automap > Automap using sample files root notes

This function uses the root note information from the sample files, analyzes the volume of the samples for selected Zones and uses this combined data to map them in the matrix. The pitch from the sample file is also assigned to the root note for each Zone. Note that only WAVE and AIFF file formats support the embedded root note data information. All samples rendered by Keymap contain this information.

Zones > Automap > Automap using mapping data from sample files

This function uses the mapping data information (low note, high note, low velocity, high velocity, root note) from the sample files and sets the respective Zones to those values. The root note information from the sample file is also assigned to the root note for each Zone. Note that only WAVE and AIFF file formats support the embedded mapping data information. All samples rendered by Keymap contain the whole set of mapping data.

Zones > Automap > Automap using root from sample files name

This function checks the presence of a note name (examples: C1, F4, D#2 etc..) in the selected Zones' samples and analyzes the sample volume. This data is then used to map the Zones over the layer matrix. Keymap will only use the first valid note name found in the sample name, and the note name must be separated by previous and successive characters by some separator character as space, underscore or similar characters.

Zones > Automap > Automap velocity only

This function analyzes the sample volume for the selected Zones and will remap them over the velocity axis based on the analysis results. The note ranges are not modified.

Zones > Automap > Set root note to middle of range

This function sets the root note for selected Zones, at the middle of the note range. This is mostly useful with drums and effects, as > you can readily have playable Zones over a range regardless of how you mapped them.

Zones > Automap > Set root note from pitch analysis

This function analyzes the pitch of selected Zones' samples, and sets the root notes to the analysis results.

Zones > Automap > Set root note from sample file info

This function checks the presence of root note information inside the selected Zones' sample files and sets the root notes to those values.

Zones > Automap > Set root note from sample file name

This function checks the presence of a valid note name in the selected Zones' sample file names, and sets the root notes to those values.

Zone loop functions

Zones > Loop > LowRes Autoloop

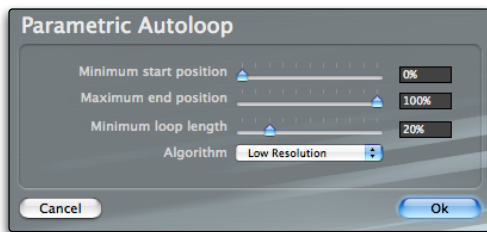
This function searches and sets the best loop points in the samples of the selected Zones using Keymap's Low Resolution autolooping algorithm. The loops are also enabled.

Zones > Loop > HiRes Autoloop

This function searches and sets the best loop points in the samples of the selected Zones using Keymap's High Resolution autolooping algorithm. The loops are also enabled.

Zones > Loop > Parametric Autoloop

This function first asks you the relative positions in the selected Zones' samples where Keymap should search for a loop, the minimum loop length to search for, and the algorithm to be used. After that, Keymap will autoloop the selected Zones and enable the loops.



Note that the positions and start/end positions are all expressed in percentage of each sample's length, in order to be meaningful for all selected Zones regardless of their length in samples.

Zones > Loop > Set loop from sample file

This function checks the presence of loop data (start and end points) inside the sample files of the selected Zones, and if this information is available sets the Zone loop points accordingly. Note that only WAVE and AIFF file formats support embedded looping data information. All samples rendered by Keymap contain the looping data (if a loop has been defined and is enabled).

Zones > Loop > Add optimized XFade to loop

This function automatically adds some crossfades (XFade) to your existing loops, and also tweaks the loop end position in order to get a better sounding loop, for the selected Zones. Note that this function needs and expects loops to be set and enabled already.

Zones > Loop > Clear Loop XFades

This function clears any crossfade (XFade) in the existing loops, for the selected Zones.

Zones > Loop > Optimize Loop XFades

This function analyzes your loops and optimizes the loop end position for crossfaded loops. It also clears any crossfades (XFade) in the existing loops, for the selected Zones.

Zones > Loop > Set start to loop start

This function sets the Zone sample start position to the loop start for the selected Zones.

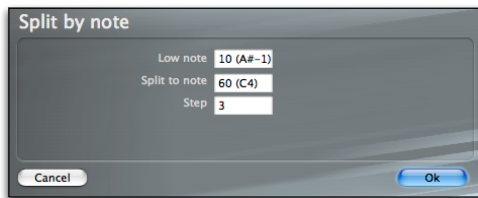
Zones > Loop > Set start to loop end

This function sets the Zone sample end position to the loop start for the selected Zones.

Zone split functions

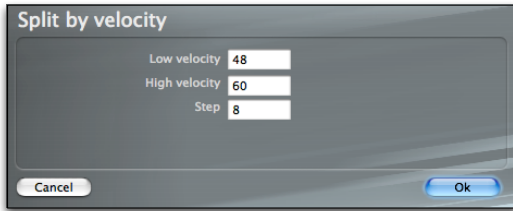
Zones > Split > Split by Notes

This function splits the selected Zones along the note axis. Keymap asks you to select a start note, an end note, and the note width of each split



Zones > Split > Split by Velocities

This function splits the selected Zones along the velocity axis. Keymap asks you to select a start velocity, an end velocity, and the velocity step of each split .



Zone autophase functions

Zones > Autophase > Autophase sample start

This function moves the sample start position to the nearest rising zero crossing.

Zones > Autophase > Autophase sample end

This function moves the sample end position to the nearest rising zero crossing.

Zones > Autophase > Autophase loop start

This function moves the loop start to the nearest rising zero crossing. The loop length is preserved. In other words, the loop end position will be moved of the same amount so that the total loop length doesn't change.

Zones > Autophase > Autophase loop end

This function moves the loop end to the nearest rising zero crossing. The loop length is **not** preserved. In other words, the loop start position will **not** be moved.

Resources window selection commands

Zones > Select Zones in Resources window

This command selects the Zones in the Resources window. Any other previously selected Zone in Resources will be deselected.

Zones > Add Zones to selection in Resources window

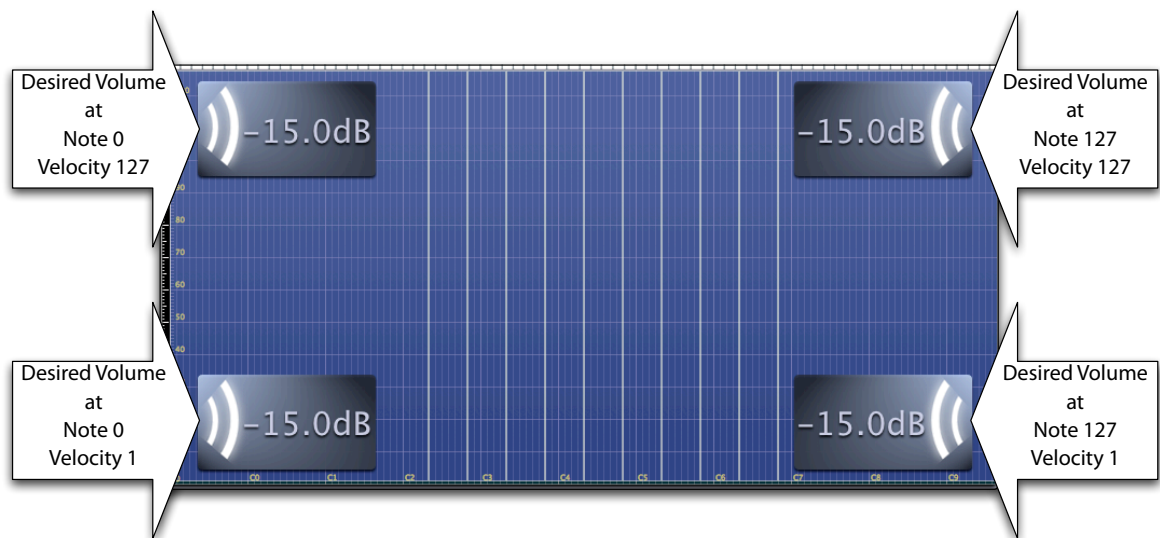
This command selects the Zones in the Resources window, maintaining any existing selection there.

Chapter 10: QuadraSmooth

Oftentimes when you create an instrument out of multiple samples, you want a smooth audio level from your samples even if the the volume of their waveforms differ, and possibly without having to alter your samples by normalization or by applying a gain change of the actual sample data.

This can be especially important when two adjacent Zones play samples with a noticeable volume difference. This can be somewhat improved using Zone crossfades, but the difference in volume still remains.

The QuadraSmooth function in Keymap solves this problem. As the name implies, this function let you set the four desired volume levels at the corners of your layer matrix, and then Keymap automatically changes the volume of Zones in order to match the desired volume profile across the layer matrix. Each single layer has its own set of independent QuadraSmooth parameters.



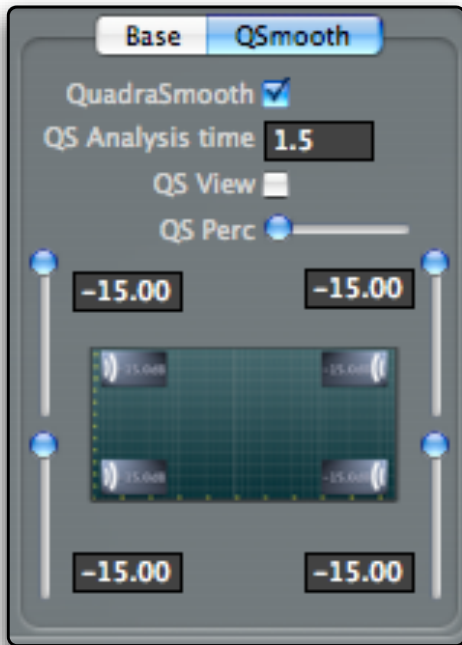
Keymap first analyzes each sample in order to get the actual sample volume, and then applies a gain change to the Zone (not to the sample data) to bring it to the desired level. For example, if the sample volume level, expressed as RMS power, was at -22dB, and you set QuadraSmooth to have the Zones at -15dB, then the Zone will be played with a 7 dB volume gain. The QuadraSmooth gain parameter for each Zone is separate and independent from the Zone volume, so you can still use the normal Zone volume as you wish, as **QuadraSmooth always refers to the volume level of samples before applying any processing or further volume change to samples/Zones.** If you set all samples to the same exact volume

level through QuadraSmooth, and then change the volume for one Zone, then Keymap will first smooth the volumes using QS, and then will also apply the volume change as from the Volume parameter.

The results obtained with QuadraSmooth are perfectly equivalent to applying a gain change to the samples, but we have the great advantage of being able to tweak values in realtime, with no destructive process taking place. The volume correction that you apply is also not just an on/off thing, but you can set the amount of correction you like.

QuadraSmooth parameters

You enable or disable the function through a **QuadraSmooth** checkbox in the Layer Inspector box.



The **QS Analysis Time** parameter lets you set how much of the audio signal should be analyzed to calculate its audio level. For percussive signals, or signal with a quick attack you might want to use values in the range of 1 or 2 seconds. Long attack samples might need longer values, as 5 or 6 seconds.

The **QS Perc** slider lets you set the amount of desired volume correction, from no correction (full left) to correction (full right).

The four corner level sliders and relative parameter entries let you set the desired RMS volume value for the four layer matrix corners.

When tweaking sliders, the corresponding values are also momentarily displayed in the layer matrix.

QuadraSmooth view

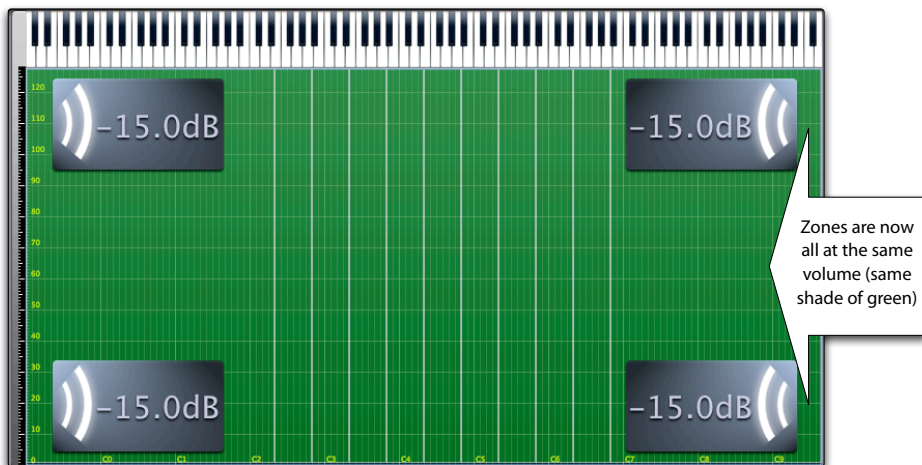
QuadraSmooth is not merely a way to correct volume differences, but also to display them.

When you turn on the **QuadraSmooth view mode** by enabling the **QS View checkbox**, Zones will be displayed in various shades of green color, with the brightest green being the Zone with the sample of highest volume, and the darkest green being the Zone with the sample of lowest volume. When you change the correction amount, the Zone shading will be update to reflect the new situation, as in the following illustration.

QuadraSmooth view mode with no QuadraSmooth correction



QuadraSmooth view mode with full QuadraSmooth correction



QuadraSmooth menu commands

Zones > QuadraSmooth > Refresh layer

This command refreshes the QuadraSmooth analysis for the selected Zones.

Saving a project using QuadraSmooth in EXS24 format

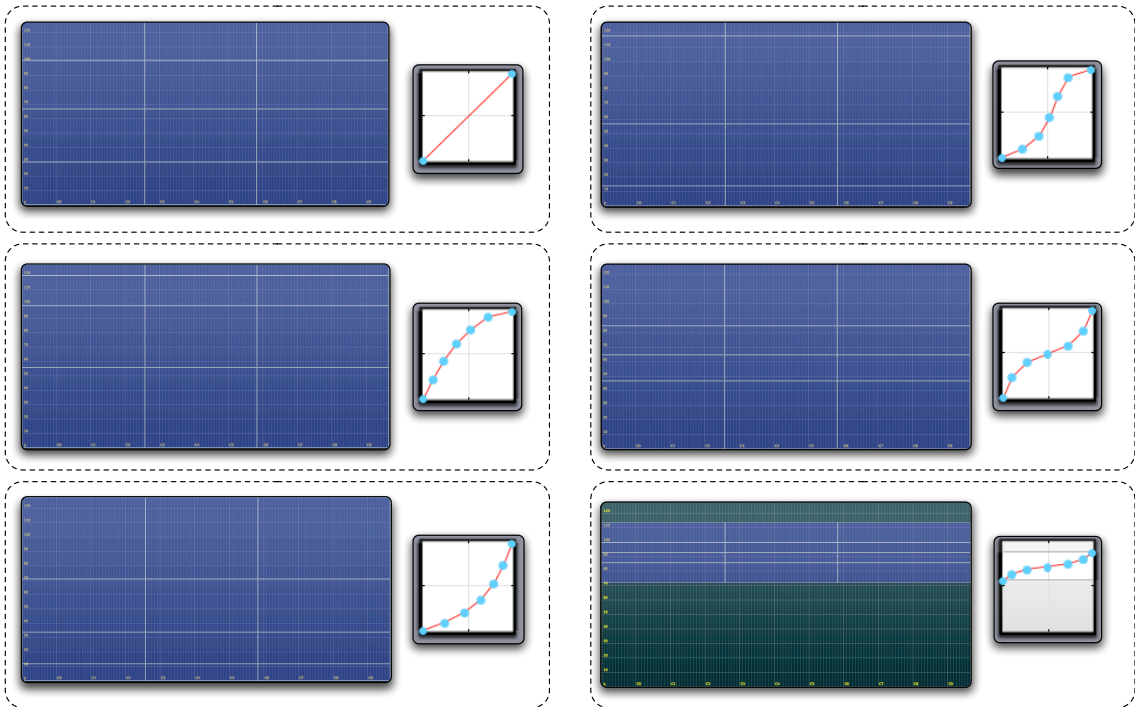
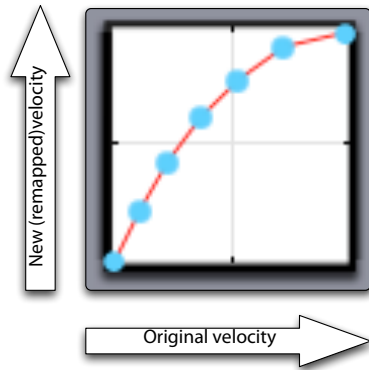
When saving a Keymap project which uses QuadraSmooth, in EXS24 file format, the volume changes necessary for the correction are added to the Zones volume, so that EXS24 can play Zones at the correct, QS corrected, volume.

No rendering of new samples is necessary with QuadraSmooth.

Chapter 11: Dynamics remap envelope

Most probably, you already are familiar with the concept of velocity curves on MIDI Keyboards. With velocity curves you essentially reshape the velocity response of the Keyboard to better match your

playing style, or to play an instrument in a more expressive way. The Dynamics remap envelope in Keymap uses the same concept but this time not to the velocity data from the MIDI keyboard, but instead to the velocity values of your mapped Zones for each single layer. In this way you can adjust the velocity mapping of a whole layer just by drawing an envelope, and all Zones velocity parameters in that layer will be modified accordingly, as shown in the following illustration.

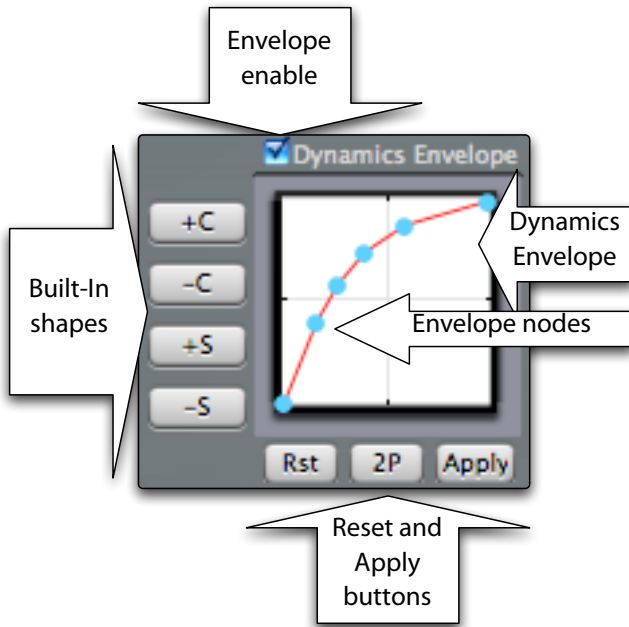


As you can see this is a very efficient method for reshaping layers along the velocity axis, especially because at all times you see the Zones moving while you edit the envelope, and you can play directly the transformed map in realtime from a MIDI Keyboard.

When you enable the dynamics remap envelope for a layer, you will not be able to perform manual editing of Zones and other remap functions in that layer, until the envelope is disabled or applied in a permanent way to the Zones.

The Envelope in detail

The dynamics envelope section can be found in the Layer inspector box, and it's effectively a layer function, always processing the whole layer. Being a layer function, it means that each layer has an independent envelope.

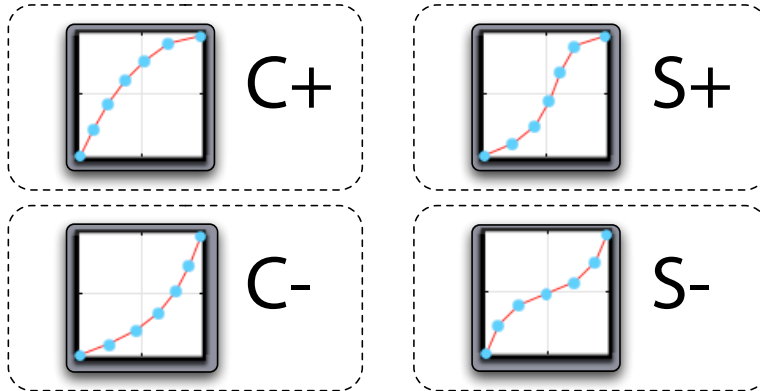


The envelope shape is displayed as a series of blue **nodes** connected by a red line.

The envelope is turned on for the layer through the **Dynamics Envelope** checkbox, and can be reset using the **Rst** button, or applied in a definitive way to the Zones by clicking the **Apply** button. The **2P** button acts as the Rst button, with the difference that the first and last nodes in the envelope are not modified. These nodes have some important properties as we'll see in the next page.

Built-in envelope shapes

On the left of the envelope view you have four buttons (C+, C-, S+, S-) representing four different basic shapes: "C+" stands for positive C-shaped curve, "C-" for negative C-shaped curve, "S+" for positive S-shaped curve and "S-" for negative S-shaped curve.



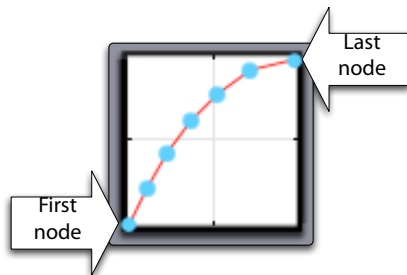
For each click of these four buttons, the current envelope will be imparted a tiny amount of the corresponding shape, so that you can tweak envelopes without having to edit the envelope directly.

Creating an envelope manually

Of course, you can edit the envelope directly! The envelope is defined by a series of **nodes** which you **create** simply by double clicking over the envelope line, and drag around until you get the desired shape.

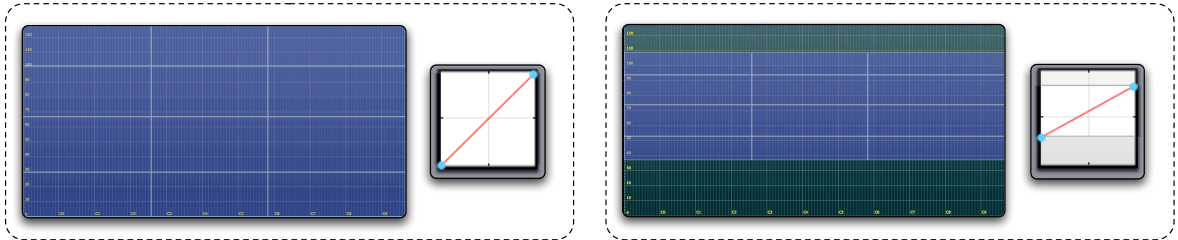
In a similar way you **delete** nodes by double clicking over them.

An envelope has always at least two nodes, the **first node** and the **last node**.



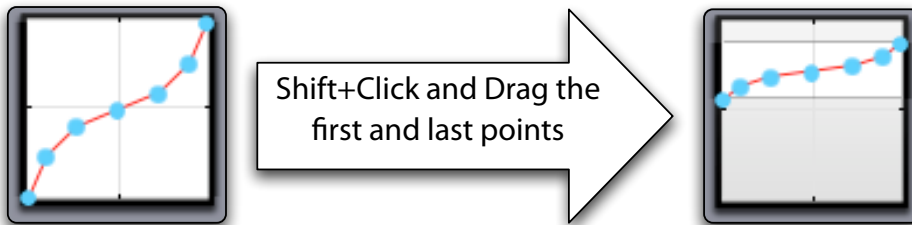
These two nodes are special in that they represent velocity 127 and velocity 0 of the original Zones, in other words the original top and the bottom velocity range. If you have a straight default two-nodes

envelope, and you edit these nodes along the vertical direction (the only allowed for them), the net result will be to squeeze all Zones to a restricted velocity range or, from a different perspective, to set the velocity range for each layer.

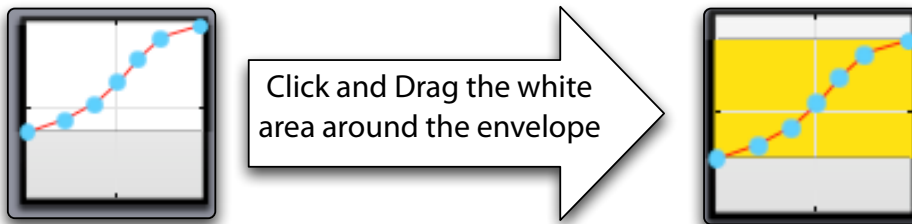


This is very useful for stacking different audio material in different layers and tweaking their velocity ranges as a whole.

If you have a non-linear envelope defined (i.e. more than two nodes defined), and you hold down the **Shift** key while dragging the first or last node, all nodes in between will also be squeezed, so that you can restrict the velocity range but still keeping the desired envelope shape.



Once the layer dynamic range is restricted, i.e. the first or last nodes have been moved, then you can drag the envelope curve simply by clicking in the white area, which will become yellow, and then drag it around vertically.

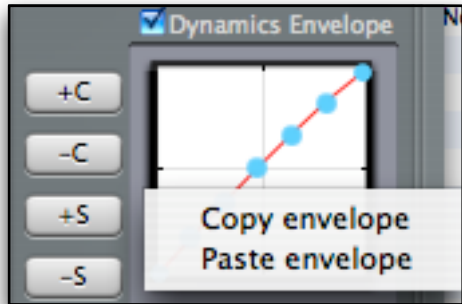


Applying the envelope

Once you are satisfied with the envelope, you can apply it in a permanent way to the Zones by clicking the **Apply** button.

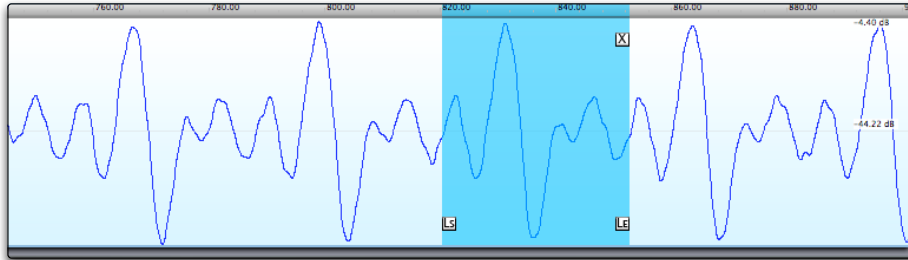
Copying the envelope across layers

The dynamics envelope context menu lets you copy and paste envelopes across layers.



Chapter 12: Single cycle loops

Several kinds of sounds can be effectively looped using a single waveform cycle, in other words, as a single repetition of the basic waveform being played. This technique works, often surprisingly well, with wind instruments, synths, voices, and basses.



One of the problems you find with single cycle loops is that there is a correlation between the loop length and the perceived pitch. If you have a perfect single cycle loop, and you make it longer of a few samples, you will not only get some clicks caused by the wrong loop points, but you will also hear a lower pitch. Why this? You are essentially playing repeatedly the looped segment: regardless of what is in the looped audio segment, the perceived pitch fundamental frequency will be equal to the number of times you play that segment in a second.

Another related problem is that while loop start and end positions and so the loop length, can be expressed only as integer numbers, almost in every case you'd need loops of fractional length.

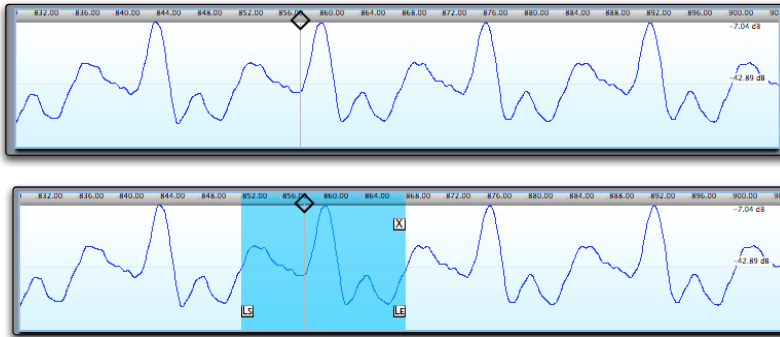
For example, the fundamental frequency for note C4 is 261.60 Hertz, and this needs a single cycle loop of 168.57 samples (at 44.1Khz sample rate) to play at the right pitch. This looks an impossible problem, as you can only build loops of 168 or 169 samples. The clever solution introduced many years ago by sampler manufacturers is to have a fine tune control for the loop segment. With this capability you can set a loop of 168 samples, which will play sharper than wanted, and then tune it down using the loop tune parameter. But you see, this complicates things, as now not only you have to find the right loop points, but also set another parameter to have the correct pitch.

Well, we are pleased to tell you that Keymap does all this (loop search and retuning) for you, with a single key command.

Keymap single cycle loop functions have been designed to work on harmonic samples, and will not work correctly with other kinds of material.

Autolooping a single cycle

Creating a single cycle loop in an harmonic sample is as simple as placing the sample cursor in the sample editor, and using the **Samples > Loop > Autoloop Single Cycle** menu function. A loop of the right length will be created, with the loop start aligned to a positive-phase zero crossing, and the loop tuning parameter set at the proper value in order to have a perfect pitch.



Just place the cursor at a sample position, and then use the **Samples>Loop>Autoloop Single Cycle** menu function



Keymap will create a single cycle loop, and tune it to get perfect pitch

In some cases, you might want to add a small loop crossfade in order to smooth the transition.

Autotuning a near-cycle to match the right pitch

Near-cycle loops are intended for loops less than two waveform cycles long. These short loops are a goldmine of sonic potential, but experimenting with them has always been a problem because the pitch changes drastically as you change the loop length. Keymap offers an autotuning function that automatically does that for you with harmonic samples.

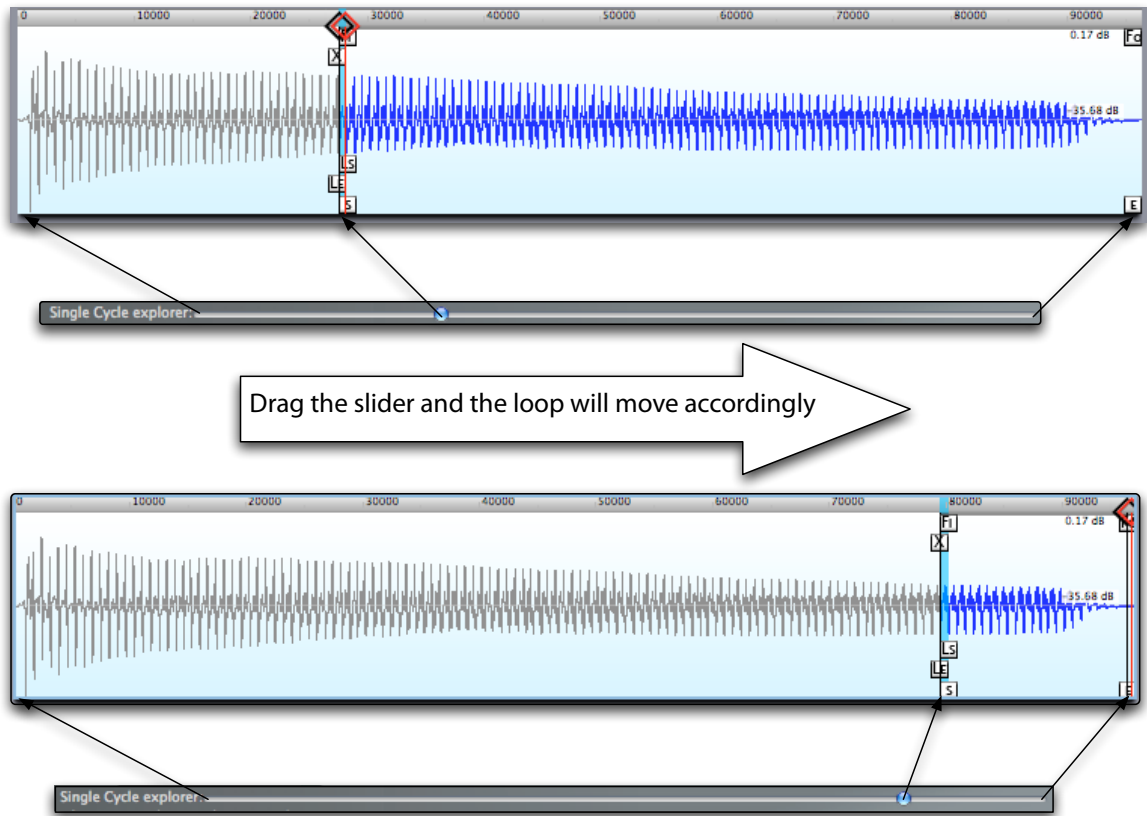


Just enable the checkbox near LoopTune, in the Zone Inspector, and your short loops will be retuned. If you edit the loop points while playing the sample, you will hear how the pitch will remain stable, but the spectral shape of the sound will smoothly change.

When experimenting with near-cycle loops, we recommend using some loop crossfade in order to always get a smooth loop.

The Single Cycle Loop Explorer

If you experiment a little with single cycle loops in harmonic samples, you will notice how often the spectral content of the loop changes depending on the position of the loop in the sample: a single cycle loop at attack might sound brighter than a single cycle loop at the end. The Single Cycle Loop Explorer in the Zone inspector lets you explore the changing spectral properties of your single cycle loops at the various sample positions simply by moving a slider, as shown in the following illustration.

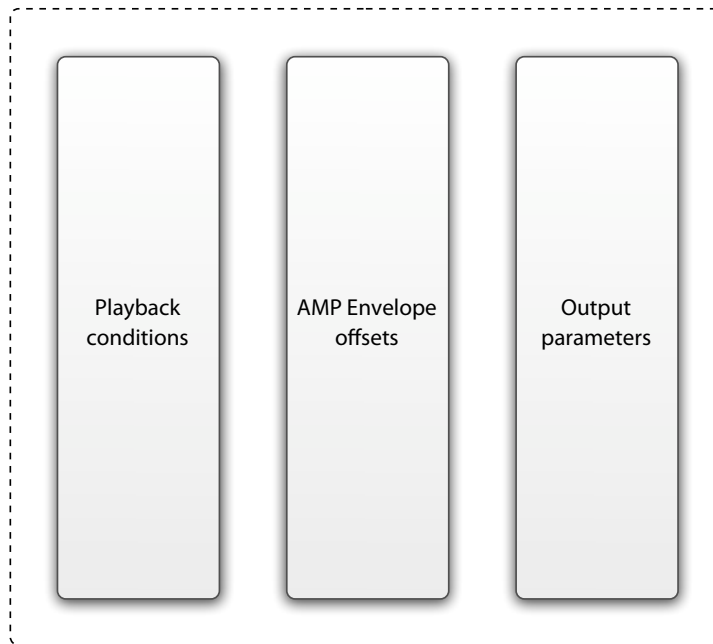


When you drag the Single Cycle Loop Explorer knob, a phase aligned, autotuned single cycle loop will be created at the corresponding relative position for the selected Zones. The explorer will also set the start position to the loop start position, so that on playback starts directly at the loop beginning.

Chapter 13: Groups

Groups in Keymap are very interesting elements as they bring a lot of functionality to the instruments . As you might imagine, Groups by themselves are not really useful (with the due exceptions as we'll see), but are normally used in conjunction with Zones. Once you assign a Zone to a Group, the Zone will inherit the Groups properties, and will play samples when both the Zone and Group parameters, together, agree.

The Group parameters can be subdivided in three main categories as we see in the following illustration.



We have:

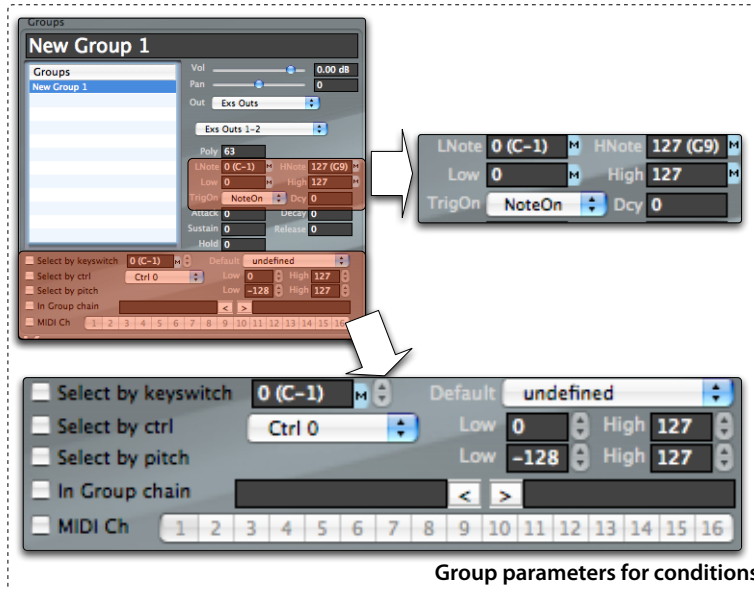
Playback conditions (a.k.a. selections): this set of Group parameters together decide **when** the Group should play (example: on note-on, or on note-off, only in a small map area, etc..)

AMP Envelope offsets: Keymap, as the EXS24, has a single AMP Envelope. However, each Group contains a set of parameters that let you customize the envelope for the assigned Zones.

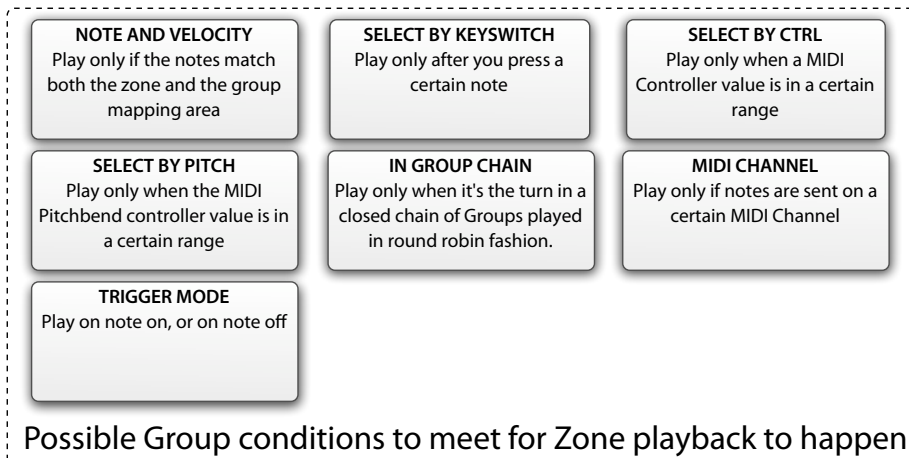
Output parameters: you can set an audio routing, and tweak volume and pan for the Group as a whole.

Playback conditions (a.k.a. selections)

As we have seen, most of the Zone parameters are related to **how** the sample should play, and you have only the note and velocity ranges parameters to set **when** it should play. Now, this will suffice for a lot of applications, but when you need something more complex, you use Groups.

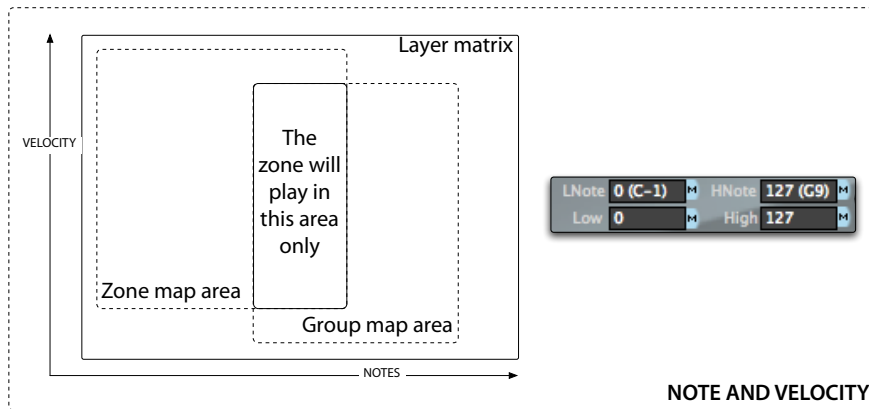


Basically, Groups let you set a number of conditions for the assigned Zones to play. Only when all conditions are met and the played MIDI note and velocity hit the Zone map area in the layer matrix will the Zone play. It's important to note that this set of conditions **always limit Zone playback**, and **never extend it**.



NOTE AND VELOCITY

If you set the Group **LowNote/HighNote/LowVel/HighVel** to less than the full map area, you will limit the Zone playback to when the note, and its velocity, will match both the Zone map area **and** the Group map area.



This Group map area condition is always active, but you can of course make it irrelevant by setting the Group map area to the whole layer matrix, i.e. LowNote set to zero, HighNote set to 127, LowVel set to 1 and HighVel set to 127. In this way the Group map area condition will always be satisfied.

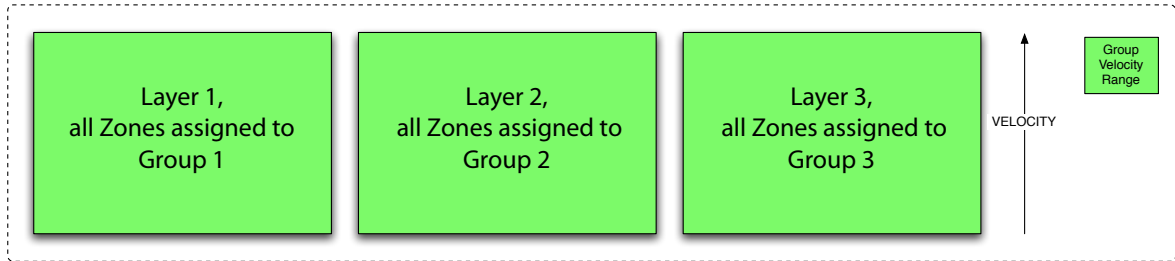
Similarly, if you set the Group map area so that it doesn't intersect the Zone map area, then the Zone will never play.

Tip: Keymap has a remapping menu function, **Zones > Remap > Intersect Zone ranges with Group ranges**, which will remap the Zone(s) to the common (intersection) area with the Group. The result will be smaller Zones, set to the real relevant areas. If the Group and the Zone do not intersect, then the Zone will be deleted. This function will help you a lot in "fixing" messy instruments where the sound designer used unnecessarily large Zone map areas, and small Group map areas.

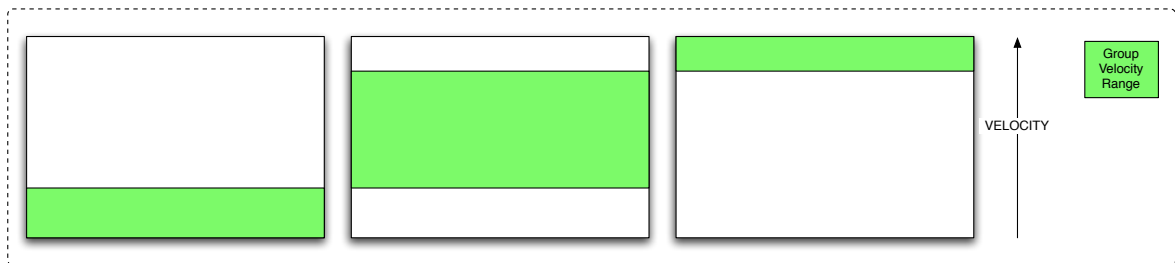
How to use Group velocity range for creating dynamic sounds

Group velocity ranges, when used with layers, are very important tools for creating dynamic layered sounds in Keymap. Here's a simple step by step construction of an instrument using three different sounds, dynamically crossfading as you move the modulation wheel while playing.

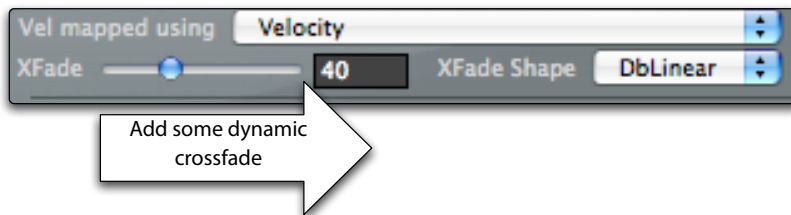
As first thing let's create three layers, one for each sound, place your Zones there and assign one Group to each layer content. The Groups velocity range is displayed in green here.



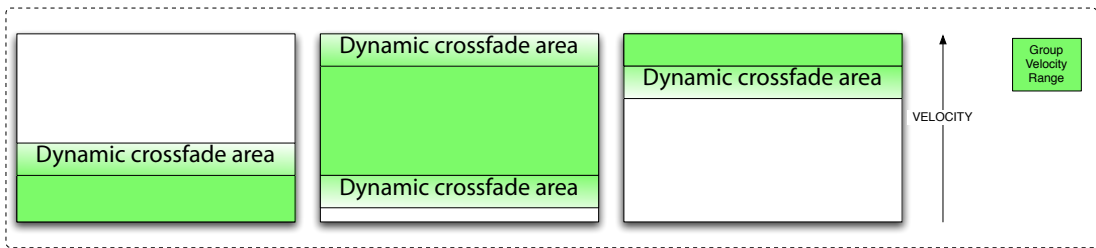
Now, for each Group, restrict the Group velocity range so that the Group is active only for a small section of the map. Set the three ranges so they are tied one to the other, with no holes along the velocity axis



If you now play on the keyboard, you will see how you will play one sound or another depending on the velocity. However, you are still "jumping" from one sound to the other, with no smooth transition. We now add some dynamic crossfade:



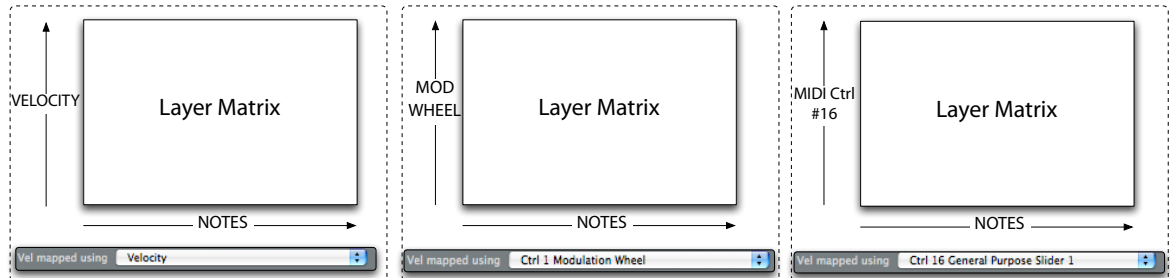
Adding dynamic crossfade means that the Group (and Zone) low and high velocities will be extended by the XFade amount, and the resulting two new areas, one at the top, the other at the bottom are fade areas, as shown in the following illustration.



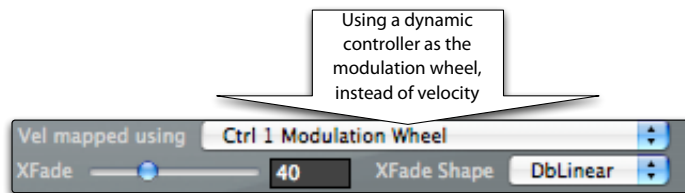
If you now try playing again, you will notice how the sounds do crossfade, and we now have blended the three sounds. However, very often you will want dynamic control over the blending **while you are holding** notes, and you can't do that using velocity, because it's a single value received at the beginning of a note.

Using a MIDI Controller instead of MIDI Velocity in the layer matrix

To reach that goal, you can set Keymap to use a MIDI Controller instead of MIDI velocity, for all the parameters that normally reference velocity. In other words, while we are used to think to the layer matrix as a matrix of the note and velocity values, you can actually also use a MIDI Controller instead of velocity.



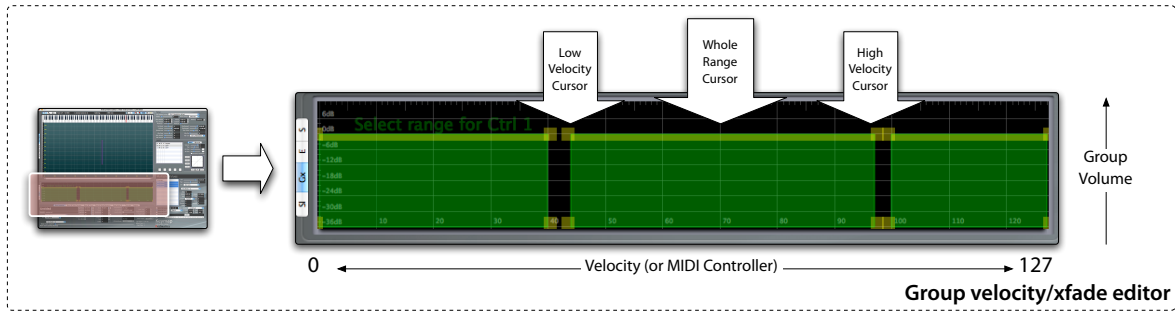
The parameter which controls this, is the “**Vel mapped using**” found in the Setup inspector.



To continue in our example, set the “**Vel mapped using**” parameter to the modulation wheel, and play again on the keyboard. This time you will be able to change the blend of played sounds, just by moving the mod wheel, even while you are holding notes on the MIDI Keyboard.

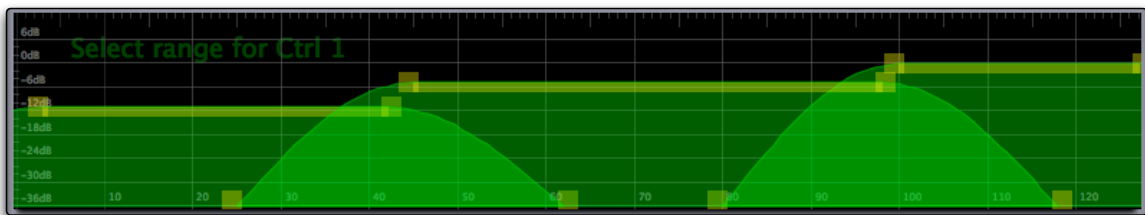
Graphical Group velocity/xfade editor

We have seen how it's technically simple to create dynamically blending sounds in Keymap. However, the method we have just described is not really intuitive or real-time oriented. For this reason, Keymap provides a dedicated graphical Group velocity/xfade editor, where you can set velocity ranges and Group volume level graphically, and see the interaction of crossfade shapes across Groups.



At any moment, the selected Groups are drawn in green color, and you can edit the velocity range just by dragging the low or high velocity cursor around with the mouse. If you drag the cursor on top of the displayed Group, you can move the whole range, without changing its length. At all times you can hear the results just by playing the MIDI Keyboard.

If you add some amount of dynamic crossfade to the project, and select one of the possible dynamic crossfade shapes, the editor will show you these areas and the interaction of their fade curves.

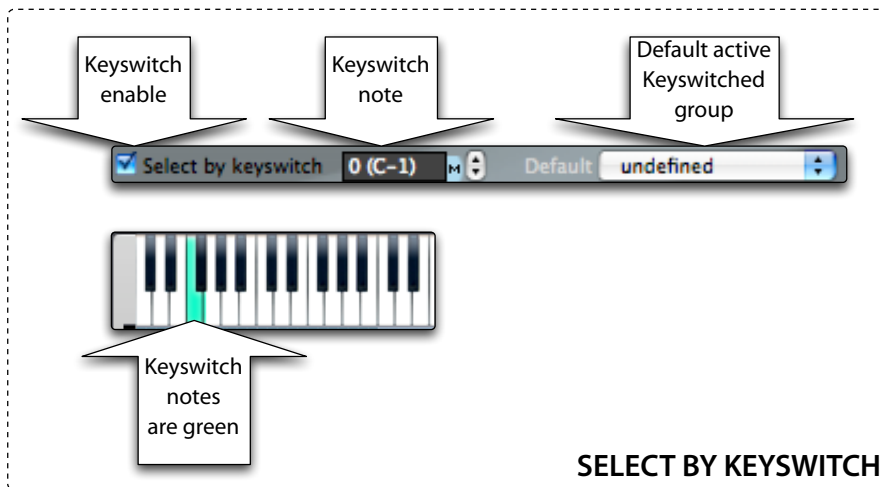


If you press and hold the **Option** key and then drag around the whole-range cursor, you will also be able to set both the velocity range and the volume for the Group. In this way the experience of creating and editing Group crossfades is very musical, as you have immediate control, and feedback, about the blend of sounds from Groups.

SELECT BY KEYSWITCH

Sometimes it is useful to have different sets of Zones, playing different sounds, or variations of sounds, and switch set while playing. For example, you might have one set of Zones playing guitar notes, and another set playing strummed guitar chords. This can be done by assigning one set of Zones (or even a whole layer) to a Group, and the other set to a second Group. If this is all you did, both sets would still play at the same time, but you can actually tie Groups to MIDI Keyboard notes, so that Groups play only after you press a note on the MIDI Keyboard. We call this method “**select by keyswitch**”, and the note you have to press to activate one Group is, as you guessed, the **Keyswitch**.

One important thing to keep in mind is that only one keyswitch can be active at any moment, and so Groups using different keyswitches (notes) are mutually exclusive: if you play one set then the other will get muted, and vice versa.



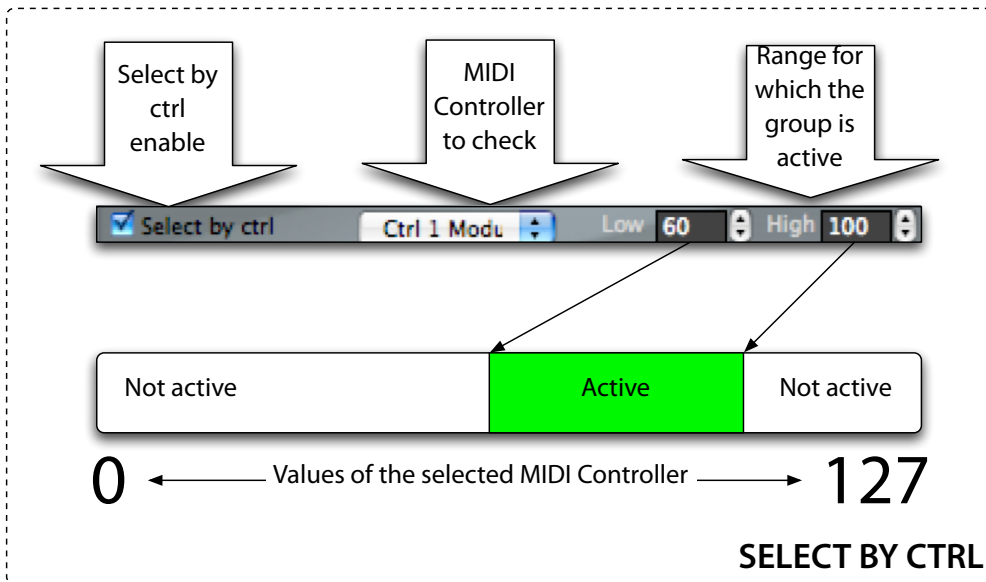
Keyswitches are also latched, so once you press a Keyswitch note, the relative Group will become active until you press another, different, Keyswitch.

Given the hierarchical, non overlapping organization of Zones in Keymap, you will use two layers for the two sets. And of course you can actually have as many Keyswitched sets as you want—until you run out of Keyswitch notes!

Notes assigned as Keyswitches are exclusively reserved for that task, and will not emit any sound. For this reason, the choice of a note usually goes for very low keyboard notes that you might not use often for producing actual music.

SELECT BY MIDI Controller

Another possible way to make a Group active is through a MIDI Controller: you select a MIDI Controller (modulation wheel, pedals, knobs, etc) and you set the range of values that will make the Group active, as shown in the following illustration.



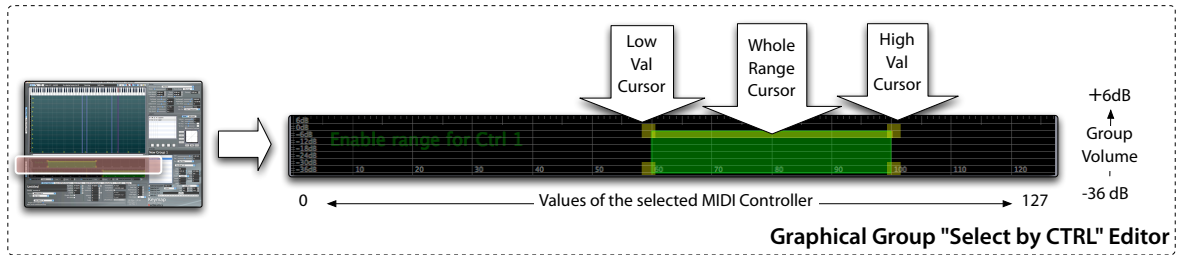
Only when the value from the MIDI Controller is inside the set range will the Group become active (and of course only if all the other conditions you might have set are met as well).

Unlike Keyswitches, these MIDI Controller conditions are not mutually exclusive. You might have one Group enabled when the sustain pedal is held down, and another Group enabled when you turn one knob full left, and these Groups can become active at the same time provided that each meets its set conditions.

You would normally use this function to select between different sets depending on knobs, or for limiting playback of the Group Zones only to some special MIDI event (i.e. when you press down a pedal, or put a finger on a trackpad, or press one MIDI Controller switch, etc).

Graphic "Select by Ctrl" editor

In Keymap, the SELECT BY CTRL feature has a corresponding graphic aux editor where you can visualize the range graphically against ranges in other Groups, making the construction of multiple Groups selection ranges very intuitive.

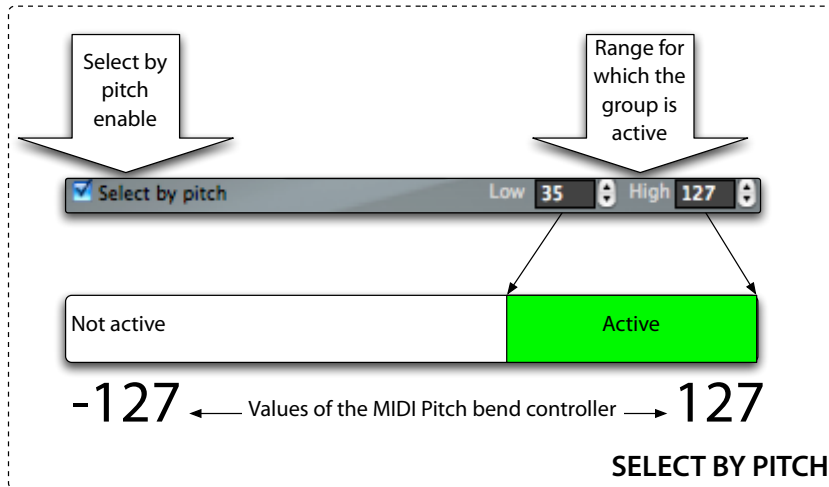


You can click and drag the editor cursors with the mouse, and the Group controller range will be updated accordingly.

If you press the **Option** key while dragging around the whole-range cursor, you can set both the controller range and the volume for the Group. This allows you to create and edit Group conditional selections in a very musical way, as you have immediate control and visual feedback regarding when and at what volume the Group will play.

SELECT BY MIDI Pitchbend

Another possible way to make a Group active is via the MIDI Pitchbend controller: once this function is enabled, you set the range of pitchbend values that will make the Group active, as shown in the following illustration.

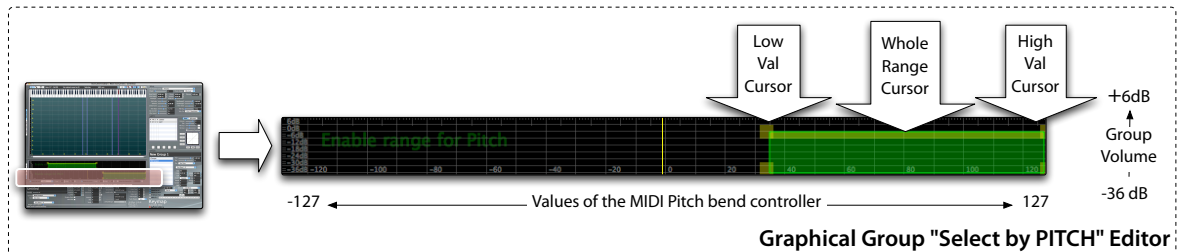


Only when the value from the MIDI Pitchbend controller is inside the set range will the Group become active (and of course only if all the other conditions you might have set are met too).

As with MIDI Controllers, these MIDI Pitchbend controller conditions are not mutually exclusive. You can have overlapping pitchbend ranges, and the Groups will become active accordingly, regardless if another Group is active or not.

Graphic "Select by Pitch" editor

In Keymap, the SELECT BY PITCH feature has a corresponding graphic aux editor in which you can see the bend range graphically, against ranges in other Groups, making the construction of multiple Groups selection ranges very intuitive.



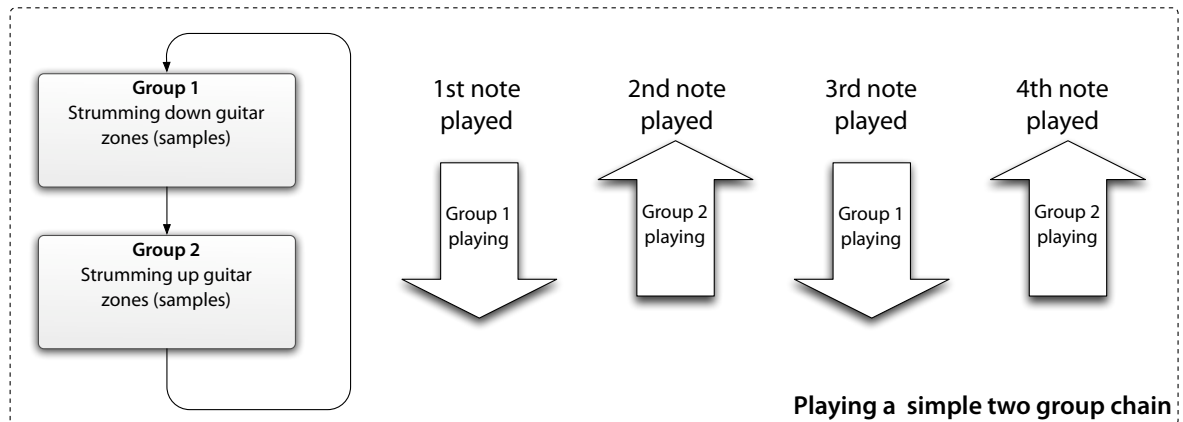
You can click and drag the editor cursors with the mouse, and the Group pitchbend range will be updated accordingly.

If you press the **Option key** while dragging around the whole-range cursor, you can set both the pitchbend range and the volume for the Group. In this way the experience of creating and editing Group conditional selections is very musical, as you have immediate control, and visual feedback, about when and at what volume the Group will play.

Group Chains

Keymap and the EXS24 support the creation and playback of Group chains in which each Group in a chain takes its turn at being active, and each played note advances the active Group in the chain.

For example, imagine you want to create a strummed guitar simulating the up and down strokes, and you want the sampler to handle automatically the change of direction for each note you play. For doing this, you create two layers, one containing the strum up Zones, and the other the strum down Zones. You then assign the Zones in the two layers to two Groups, one for the strumming up Zones, and the other for the strumming down Zones. If you create a chain with the two Groups, then each Group will take its turn at becoming active, playing back as shown in the following illustration.



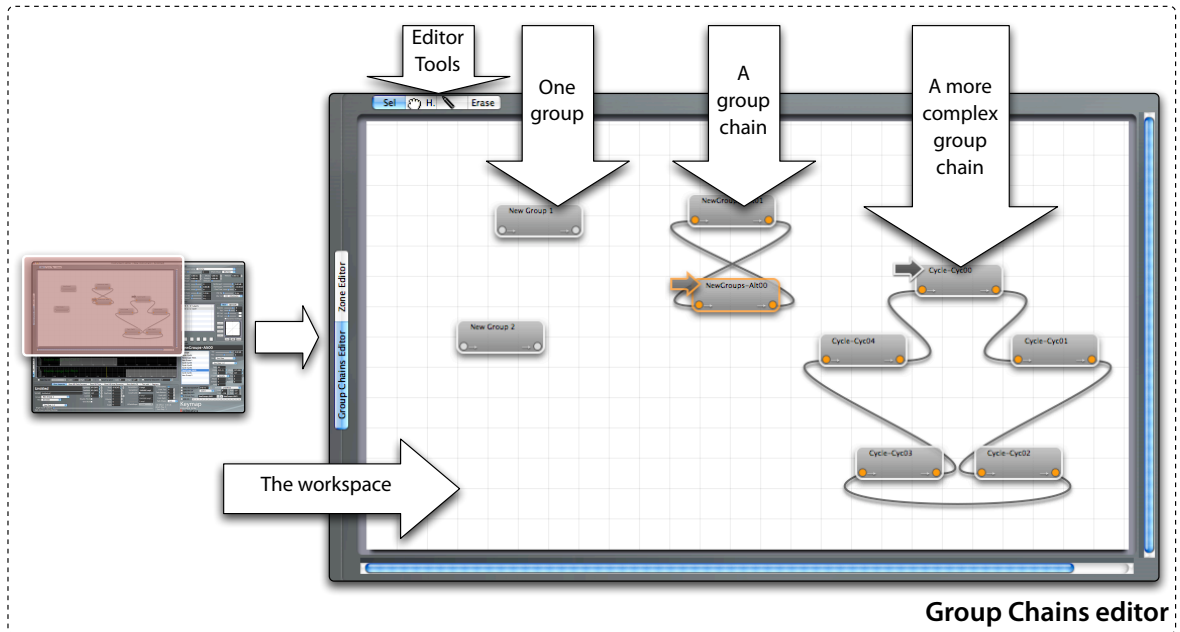
By definition all Group chains are closed, i.e. once the chain arrives at its last Group, it starts again from start, and the chain advances to the next Group as you keep playing notes.

This feature is very useful for creating complex realistic instruments because it allows you to use multiple variations of a sample to add extra realism (think of multiple hi-hats and snares samples, and acoustic instruments in which two notes played in sequence are never exactly the same).

While the Group chain mechanism is intuitively simple, managing it can be a nightmare, and as you start adding multiple long Group chains to your instrument, keeping track of all these chains can be a nightmare. For this reason Keymap doesn't let you create and edit chains directly from the Group Inspector, but offers you a dedicated Group Chains editor.

Group Chains Editor

To access the Group chains editor, click on the vertical tabs on the left of the Layer matrix. We based this editor around a user interface metaphor of a workspace containing boxes connected through virtual cables. The boxes represent the Groups, and the workspace is simply a place where you can create, move, re-cable and delete your Groups.



A chain is a set of Groups connected by cables. Editing chains is a highly intuitive process as you simply drag the wires extremities around. Keymap always takes care of closing the chains for you when you delete Groups or move cables.

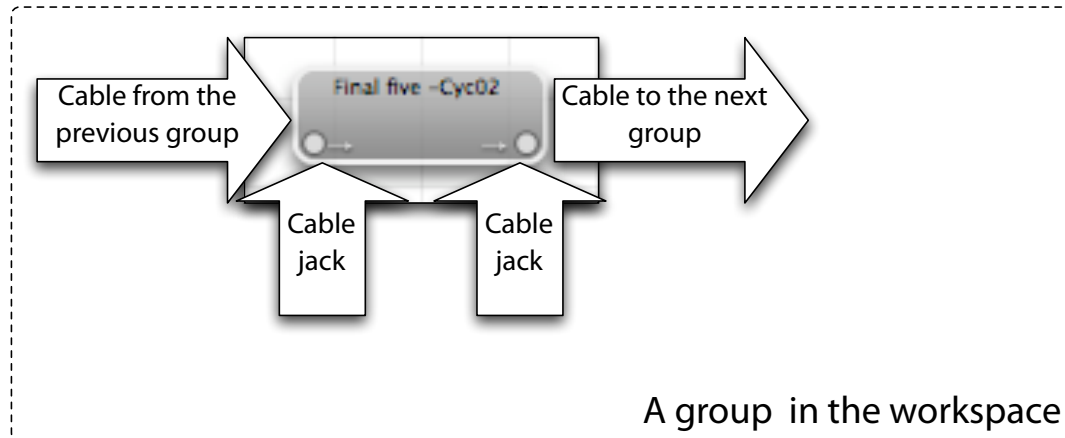
Selected Groups are displayed with an orange border. Groups can be selected by clicking on them, and if you press the **Shift** key while clicking on Groups you will add the Groups to the current selection. Using

the same key modifier you can also select Groups in an area of the workspace simply by dragging the mouse.

A series of functions let you create not only single Groups, but also pre-cabled Group chains.

How to edit a chain in the editor

Each Group is represented in the workspace as a box with two jacks for cables. The jacks are displayed as two small circles as shown in the following illustration.



The jack on the left accepts cables from the right side of the previous Group in chain, and the jack on the right is used to cable the Group to the left side of the next one. Connected jacks are displayed in orange color, while unconnected jacks are in gray color.

Cabling Groups together is as simple as positioning the mouse cursor over a jack, and then dragging the mouse to a jack in another Group. In the same way, if a cable is already connected, you can unplug it and connect it to another Group in the same way: click on the jack and drag the cable to the new Group.

Note that you can only create cables going from a Group left jack to a Group right jack, or from a Group right jack to a Group left jack, as it wouldn't make sense otherwise.

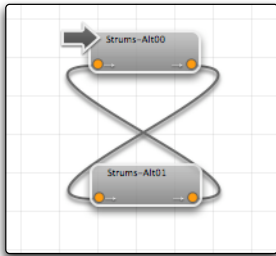
When you release the mouse button after cabling, Keymap will validate the chains and close any open chain. Group chains consisting only of one Group, while technically still a chain, will be demoted to single Groups.

Adding single Groups

As the Group chains editor is connected in realtime with the Group table, you can add Groups normally from the Group menu using the **Groups > Create new Group** menu function, and they will appear in the workspace. Alternatively you can select the pen tool from the toolbar at the top, and simply click in the workspace: a new Group will be created under the mouse cursor. You can also use the **Create new Group** function in the context menu. Newly added single Groups are not wired to a chain already.

Adding alternate Group chains (two-Groups chains)

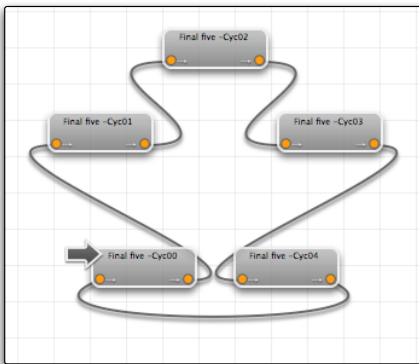
You can add a pre-cabled chains containing two alternating Groups by using the **Groups > Create alternate Group chain** menu function, or the **Create alternate Group chain** function from the context menu.



A new chain of two new Groups will be created, already cabled for you. You can later edit the chain to add more Groups at will.

Adding longer Group chains

You can add a pre-cabled chains containing an arbitrary number of Groups by using the **Groups > Create cyclic Group chain** menu function, or the **Create cyclic Group chain** function from the context menu.



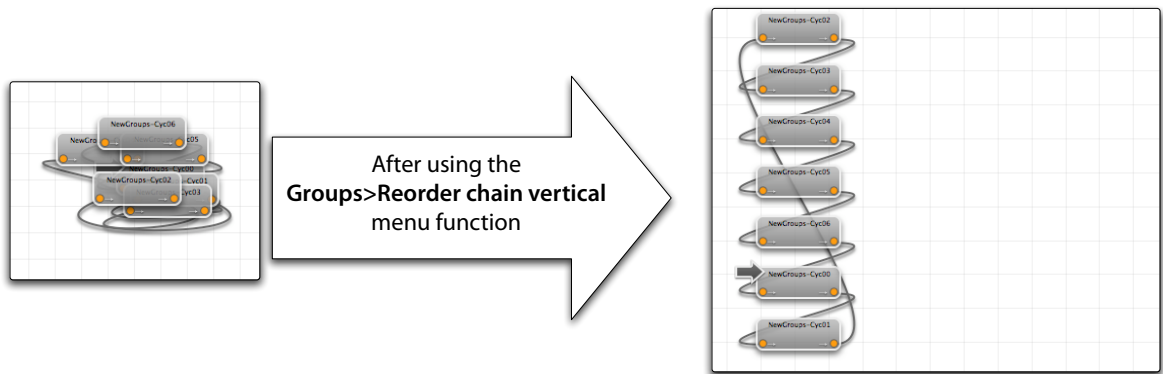
You will be asked through a panel the number of the desired Groups (the length of the chain), and a new chain of new Groups will be created, already cabled for you. You can later edit the chain to add or remove Groups at will.

Removing Groups from an existing chain

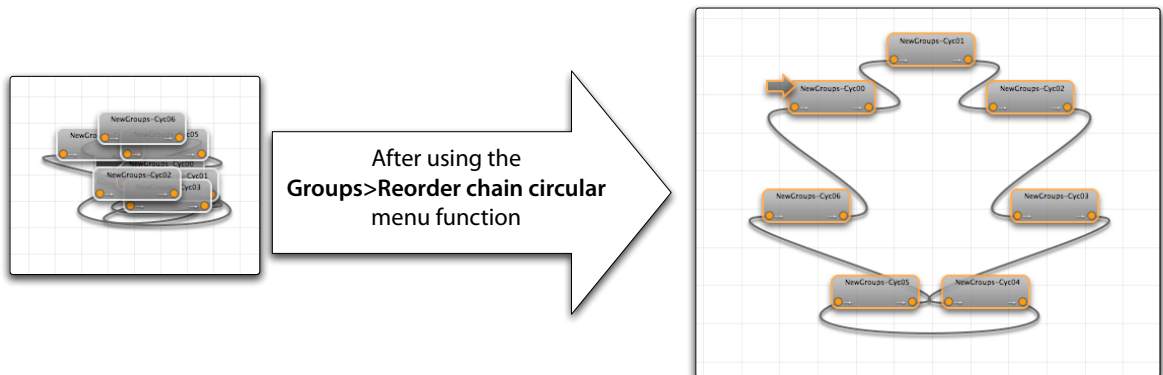
Sometimes you might want to remove a series of Groups from a chain, without deleting the Groups themselves. You can do that either manually, by changing all cabling, or automatically, by selecting the Groups and then using the **Groups > Detach Groups from chain** menu function, or the **Detach Groups from chain** function in the context menu.

Reordering Groups in the workspace

As you create chains, you might need to reorder the chains in the workspace to visualize things more clearly. Once you select one of the Groups in the chain, Keymap offers two functions for reordering. The **Groups > Reorder chain vertical** menu functions will reorganize the chain as a vertical column of Groups.



The **Groups > Reorder chain circular** menu functions will reorganize the chain Groups in a circle.



These functions only have a cosmetic purpose, and they do not modify the chain or the Groups in any way.

Deleting Groups

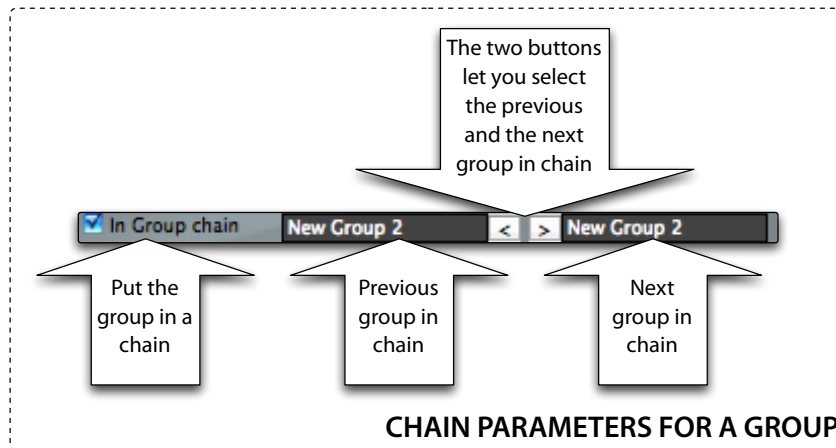
Groups can be deleted from the Group table using the **Edit > Delete** menu function, or its equivalent in the context menu. You can also select the eraser tool and click with the mouse over Groups.

Navigating the workspace

You can pan through the workspace using the mighty mouse trackball, or by using the Hand tool and dragging the workspace around. You can zoom in and zoom out pressing the Option key modifier and turning the scroll wheel/trackball.

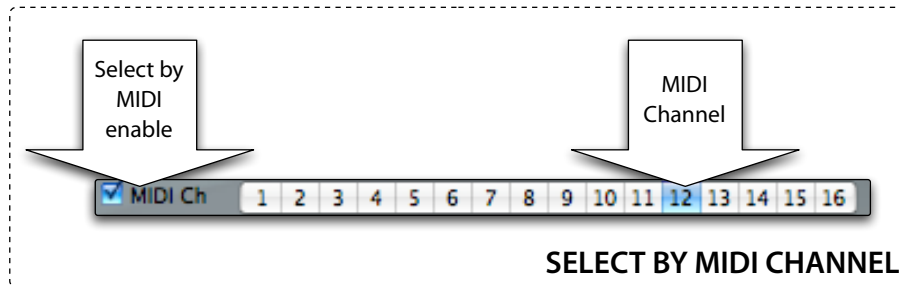
The chain functions in the Group inspector

As we have seen, the chain editor is the place where to create and edit chains. Still, in the Group inspector we have a few functions available about chains. The **In Group Chain** checkbox will show you if the selected Group is in a chain. In that case, you can detach it from the chain by unchecking the checkbox. On the right you can see the previous and next Groups in the chain, and you can switch selection to one of them by clicking the appropriate button on the side, as shown in this illustration.



MIDI Channel

Normally Groups respond to incoming notes on any midi channel. By enabling the **MIDI Ch** checkbox in the Group inspector, and selecting a midi channel you can force the Group to respond only to that single MIDI Channel.



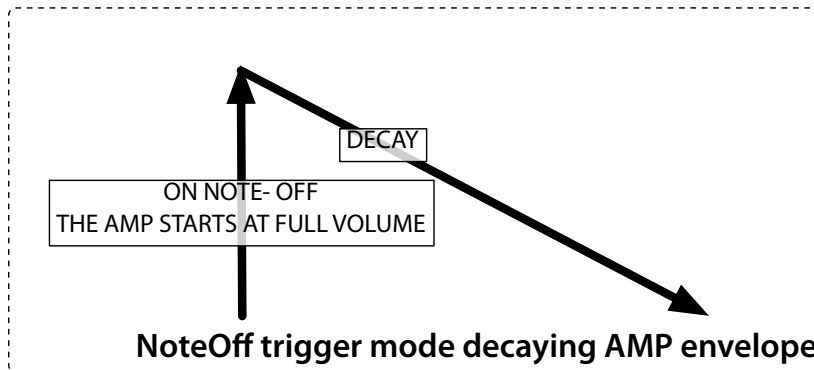
This function is the key to creating multi-timbral instruments in Keymap and EXS24, as you can create separate layers, each with its own Group responding to a different MIDI Channel.

Trigger Mode

Normally a Group, once active, will trigger Zones when receiving note-on messages. However, you can have Groups respond to note-off messages instead. This is useful when you want to add release samples to an instrument, i.e. when you want a certain sample to be played when you release a note on the keyboard. The parameter responsible for this is called **trigger mode**, is found in the Group inspector, and can be set to **NoteOn** or to **NoteOff**.

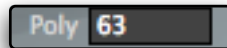


When you set the trigger mode to NoteOff, the Group will stop using the AMP Envelope, and will instead play Zones with a simple decaying envelope, whose time is set by the **Dcy** parameter.



Polyphony

The Group **Poly** parameter let you set the maximum number of Zones, assigned to the Group, that should be playing at once. When you trigger a note and you exceed the set limit, the oldest playing Zone in that Group will be stopped, and the new one will start playing instead.



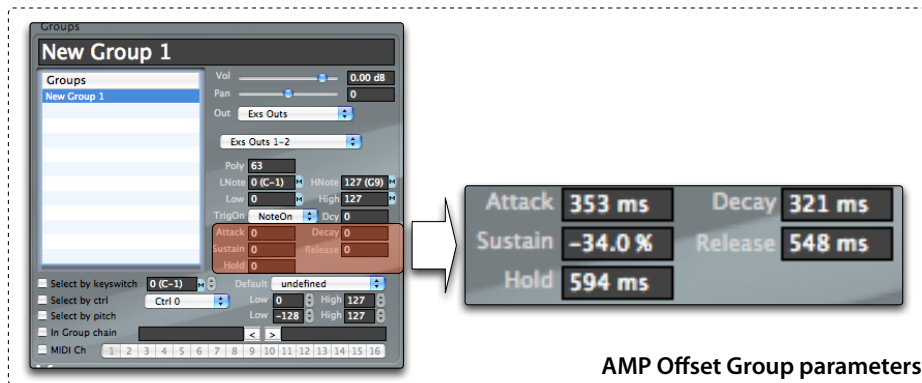
This parameter is useful for emulating some kinds of instruments where the sound is inherently monophonic.

AMP Envelope Group offsets

The EXS24 and Keymap only have one single AMP Envelope generator. This may seem to be a serious limitation, in that you can't have more than one envelope shape for each one of your instruments. We wrote "seem" because this is not the case.

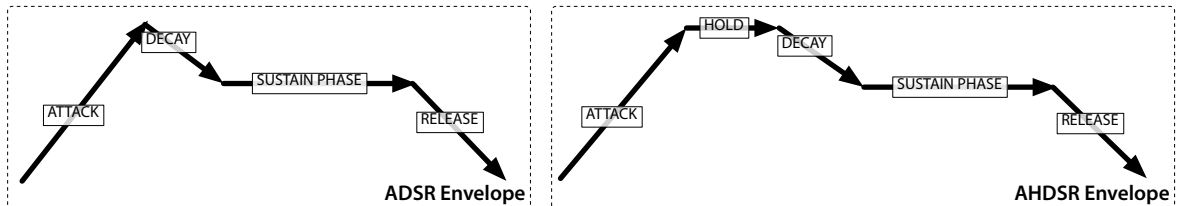
Each Group contains a set of time and level offsets respect to parameters of the main AMP Envelope. When a Zone is assigned to a Group, and you play the Zone, the Group offsets will modify the AMP envelope for that specific played Zone, without changing all other playing AMP envelopes. In other words, through this mechanism you can define many different envelope for your sounds, in a single instrument. To avoid making confusion between the original AMP shape and the modified AMP envelope, we'll call the original envelope the "main envelope".

The offsets available in each Group are relative to the **attack**, **decay**, **release** times, expressed in milliseconds. The **sustain** level can be tweaked as a percentage of the level defined in the main envelope.



Hold time

Through the Group AMP offset mechanism, you can also transform the normal ADSR AMP Envelope available in Keymap and EXS24 into an AHDSR envelope, by setting the **hold** time parameter to a value different than 0ms. This parameter is only available from Groups.



Editing the offsets and hold time from the AMP Envelope editor

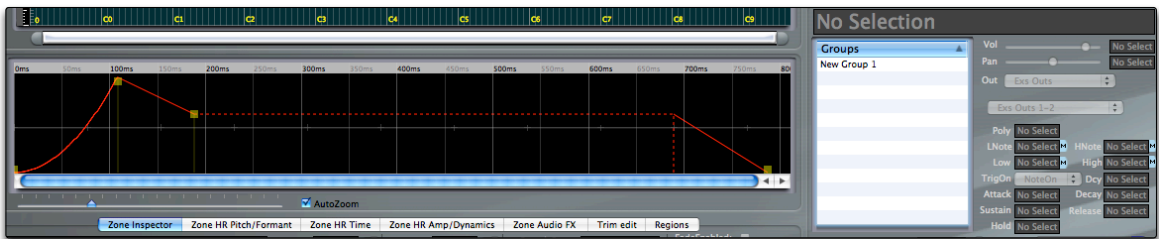
It's great to have the capability to use a different envelope for each Group, but not if you need a pocket calculator, some paper and a pencil to keep track of all those offsets (and all the time what you really want to do is to play music!). Keymap solves this problem by letting you edit the envelope shape directly in the graphic AMP envelope editor. When a Group is selected in the Group table, instead of modifying the main AMP Envelope parameters you will actually change the offsets in the selected Group.

When no Group is selected and you are editing the main AMP envelope parameters, then the envelope shape will be displayed in red color. When instead a **single** Group is selected, the envelope will turn in blue color, and by moving around the envelope nodes you will actually edit the Group offsets.

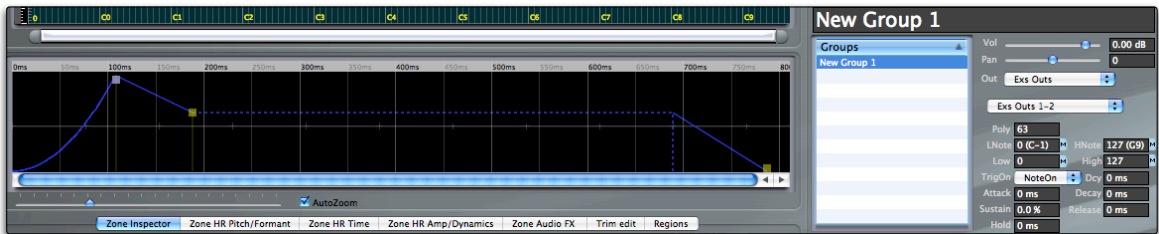
While you are editing the Group offsets, the main AMP envelope is still drawn as a reference, in a dark gray color.

Example of AMP envelope editing

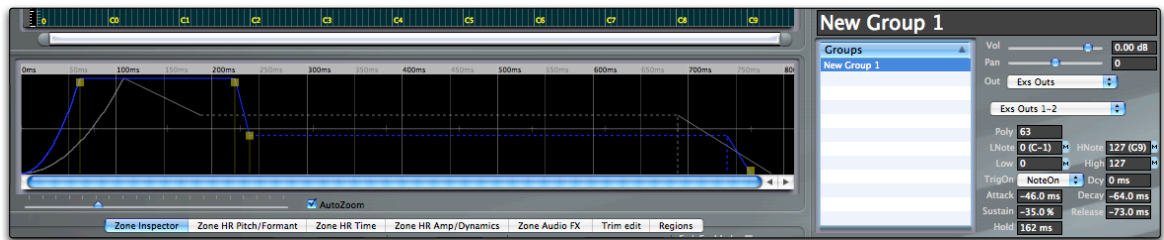
Deselect all Groups, and switch to the AMP Envelope editor. The envelope will be displayed in red



Now select a single Group. The envelope will become blue. You are now editing the Group offsets. Notice how the offsets are still at their default values.



If you now click and drag the envelope nodes with the mouse, the main envelope is not modified, and can still be seen in dark grey inside the editor. You are just changing the Group offsets, so that the Group will play the blue envelope.

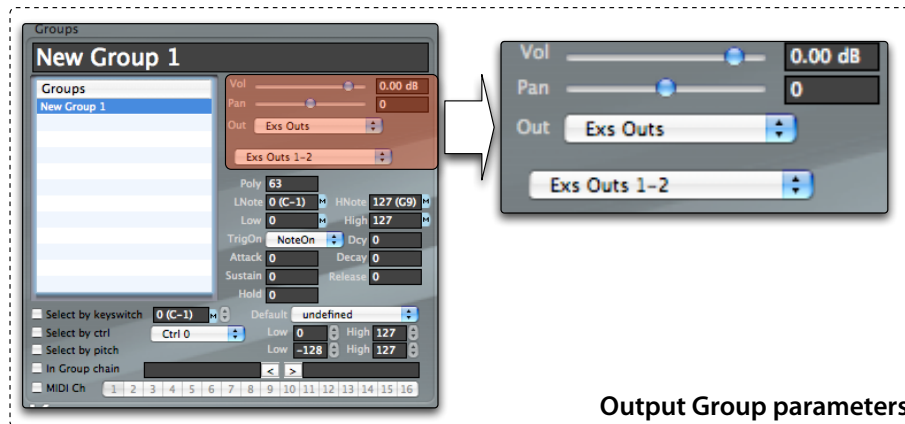


Resetting the AMP Envelope offsets

The **Groups > Reset AMP Offsets** menu function resets all offsets and hold parameters to zero in the selected Groups.

Output parameters

Each Group has a set of parameters dedicated to routing and modifying the audio output of assigned Zones.



Output Group parameters

Output routing

Once you assign Zones to a Group, their audio output will be routed as selected by the Group **out** pop-up menu. The possible routings are to an **Exs bus**, to a **Channel Map**, or to a **Surround bus**. As the Group out parameter mimics exactly the Zone out parameter, we'll spare you a duplicate explanation.

Volume and Pan

The Volume and Pan are adjustable for each Group. These settings will combine with all other volume parameters in the hierarchical structure of your instrument, and so are good choices for tweaking the volume of a Group against another.

As we have already seen, the Group volume is also settable through the various Group Ctrl, Pitch and Velocity aux editors by clicking the **Option key** while editing the full range cursors.

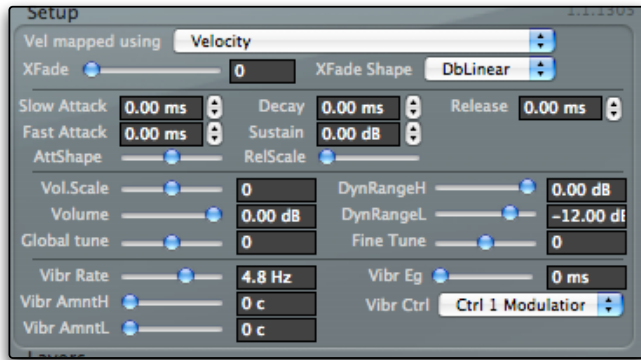
Other group functions

The **Select linked zones in curr layer** contextual menu command selects all zones in the current layer, that belong to the selected group(s).

The **Select next linked layer** contextual menu command selects the next layer containing zones that belong to the selected group(s). This is useful if you want to search for zones belonging to a group.

Chapter 14: Setup inspector

The setup inspector let you change project wide parameters that affect both all instruments. Most of these parameters are also available from the Setup editor.



Vel mapped using

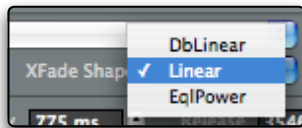
This pop-up menu lets you substitute the normal note velocity with a the value of a MIDI Controller. Once set to a MIDI Controller different than "Velocity", each time Keymap (and the EXS24) receives a note-on message, it will get the "velocity" value not from the velocity of the note, but from the current value of the selected controller. Selecting a controller different than Velocity enables the Dynamic crossfade mode, and disables all defined Static crossfades for all instruments in the setup.

XFade

This value determines the size of the extended velocity area used for dynamic crossfades in Zones and Groups. If you set it to a value different than zero, the Dynamic crossfade mode will be enabled, and any Static crossfade in all instruments in the setup will be disabled.

XFade Shape

This pop-up menu let you select the volume shape to be used in the dynamic crossfades areas.



Possible values are:

DbLinear : the volume, expressed as decibel, will linearly fade to/from zero

Linear : the volume will linearly fade to/from zero

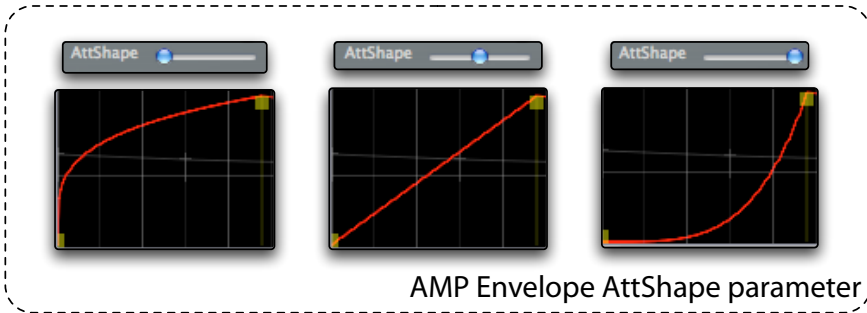
EqIPower : the volume will fade to/from zero using an equal power shape

Slow Attack, Fast Attack, Decay, Sustain, Release

These parameters control the shape of the AMP Envelope

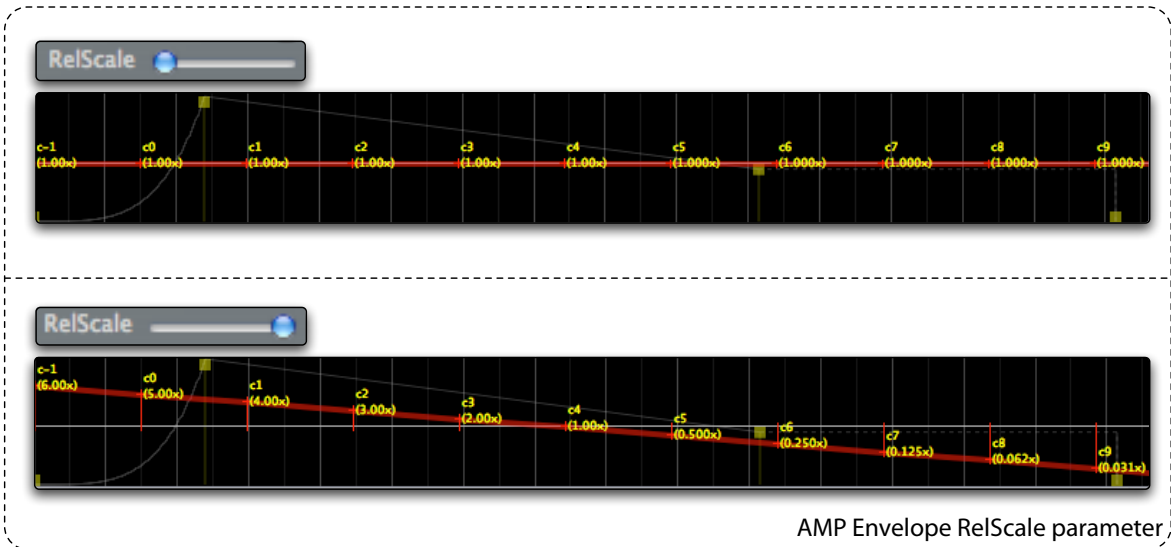
AttShape

This parameter controls the shape of the attack phase in the AMP Envelope, as shown in the following illustration.



RelScale

This parameter changes the release time for the AMP Envelope depending on the position of the played note respect to MIDI note 60. When edited, the envelope editor will briefly show the factors that will be used for the release time across the whole note range, as shown in the following illustration:

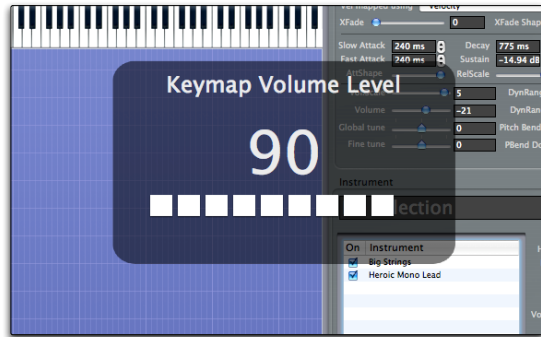


Volume Scale

This parameter lets you scale the volume across the keyboard with respect to note 60, and is measured in decibels per octave. Positive values will lead to higher volume on high notes, while negative values will do the opposite.

Volume

This is the general volume control for the whole setup.



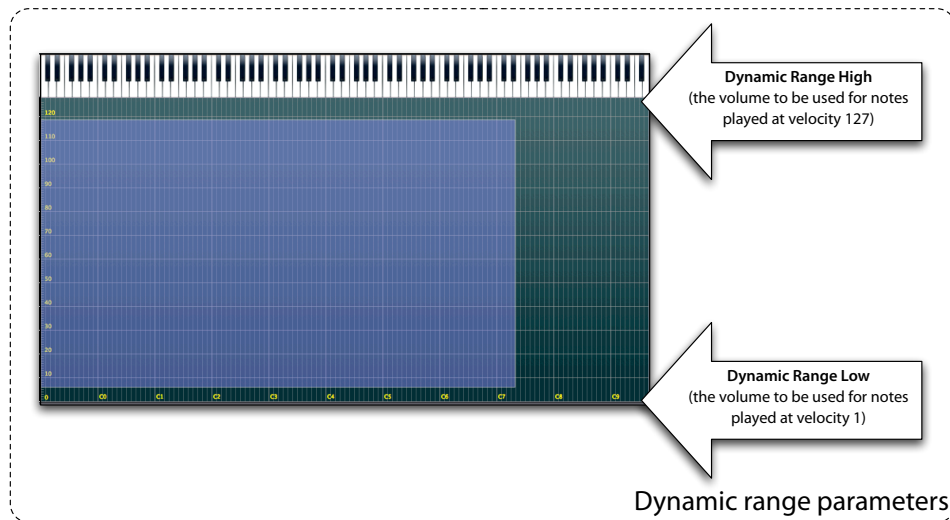
Tip: if you just want to change the monitoring level, you can use Keymap built-in independent monitoring volume, assigned by default to the F1 and F2 keys on your Mac keyboard. This volume controls the volume on all Keymap audio outs, and doesn't change the volume for other audio applications that might be running at the same time.

Global tune, Fine tune

These two parameters control the tuning of the whole setup.

Dynamic Range High, Dynamic Range Low

These two parameters controls the dynamic range for played notes, over the whole velocity range.



Dynamic Range High is the volume to be used when notes are played at full velocity (velocity 127), and Dynamic Range Low is the volume to be used when notes are played at the lowest velocity (velocity 1). The dynamic range for the setup is given by the difference between the two values.

When creating a new project, the dynamic range is set accordingly to the **Default dynamic range for new projects value** in the preferences panel.



Vibrato section

The vibrato section is available only if the use of LFO1 by Keymap for this task doesn't interfere with an existing routing or use of it in the original EXS24 instrument synthesis parameters, and the LFO1 rate and EG values in the EXS instrument are within the values range supported by Keymap.

if the instrument is built from scratch in Keymap, then the vibrato section is always available.



Vibrato rate

This parameter controls the rate of the vibrato LFO. When saving to EXS24 format, this is mapped to LFO1 Rate.

Vibrato Amount High

With this parameter you set the amount of vibrato, expressed in cents of a semitone, when the MIDI Controller tied to the vibrato is at full value.

Vibrato Amount Low

With this parameter you set the amount of vibrato, expressed in cents of semitone, when the MIDI Controller tied to the vibrato is at minimum value.

Vibrato EG

The parameter controls a simple envelope generator modeling the vibrato LFO waveform shape. Setting it to a value different than zero, means that the vibrato LFO shape will fade-in for the set amount of time.

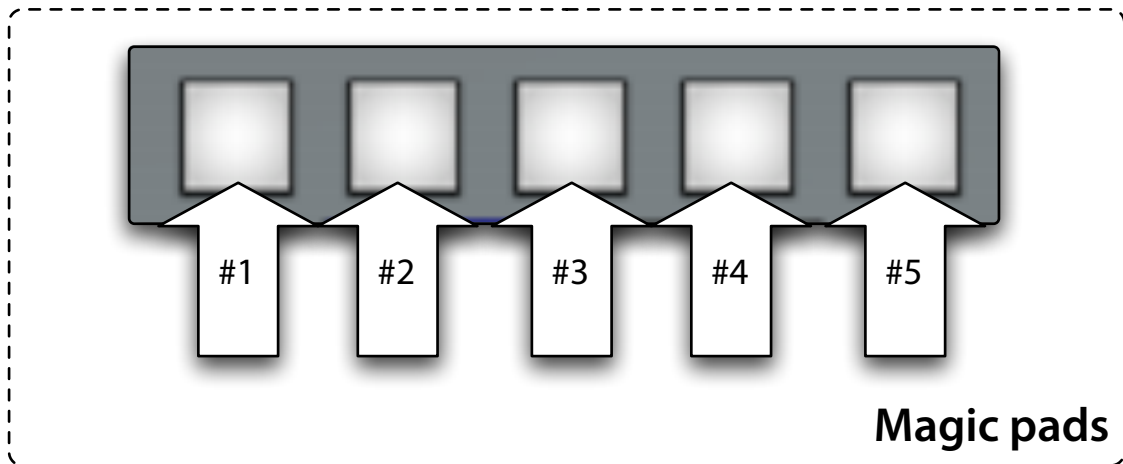
Vibrato Controller

With this pop-up menu you set the MIDI Controller ties to vibrato control. A common controller used for this task is the Modulation Wheel, a.k.a. MIDI Controller #1

Chapter 15: Instrument Editor Magic Pads

When building sampled instruments, some tasks are intrinsically repetitive. Loading recordings, splitting them in individual audio segments, mapping those segments in the instrument, etc..

Magic pads are drag and drop destinations for samples which automatically perform predefined sets of action chains on the dropped samples. They appear onscreen as small square pads, and are available in all Instrument editors next to the layer table. While the action chains for Magic pads are not user modifiable, they represent the most common tasks involving repetitive editing.



Magic pads do not have specific name, and they are referenced through their position. As Keymap currently includes five Magic pads, we reference them as Magic pad #1 up to Magic pad #5.

When you drag some samples from the Finder, and you move the mouse cursor over the pads, a short text message informs you of the functionality tied to that specific pad.

Let's examine each single pad in detail.

Magic Pad #1

This pad adds dragged samples to the current layer and autoloops them. The created Zones are mapped sequentially starting from MIDI note 20, and are 1 note wide. This pad is useful if you have many rhythmic segments already cut but not looped, and you want them mapped and looped on the keyboard. Autoloop by its nature needs a larger audio segment than just the loop, so you will not get the expected results if the segments are already perfect loops—in that case you can simply drag the samples into the Layer matrix.

Magic Pad #2

This pad allows automatic construction of multi-velocity instruments with keyswitched variations and pseudo-randomization features. The recording you are going to drop over Magic Pad must be well structured for this function to work properly, and you must plan how you want the instrument in advance.

For example, let's say that for three variations of your hihat (closed, mid, open) and for each of the two velocities per variation you'll want to record, you also want four equivalent samples to will be played in round robin fashion so that the instrument sounds natural.

You just have to record the hihat in this "hits by variation by velocity" sequence:

hit1-closed-lovvel
hit2-closed-lovvel
hit3-closed-lovvel
hit4-closed-lovvel

hit1-mid-lovvel
hit2-mid-lovvel
hit3-mid-lovvel
hit4-mid-lovvel

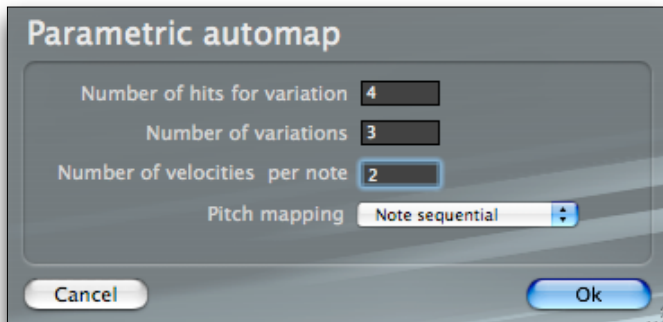
hit1-open-lovvel
hit2-open-lovvel
hit3-open-lovvel
hit4-open-lovvel

hit1-closed-hivel
hit2-closed-hivel
hit3-closed-hivel
hit4-closed-hivel

hit1-mid-hivel
hit2-mid-hivel
hit3-mid-hivel
hit4-mid-hivel

hit1-open-hivel
hit2-open-hivel
hit3-open-hivel
hit4-open-hivel

When you drop this single recording on Magic Pad #2, Keymap will open a panel and ask you the number of hits, variations and velocities, and if you either want to map samples sequentially (drums) or by pitch detection (harmonic sounds).



Keymap will then automatically create an instrument in which keyswitches will change the playing Group from "closed " to " mid " to " open ", and then each of these three variations will play the correct 4 hits in round robin fashion, and the velocity will also select the right velocity set. In situations in which there is only one variation, or only one "hit" per variation, the corresponding keyswitch or cyclic Group chain selection will not be enabled/created. With this function you can really create very complex instruments with minimal effort.

Note: each split segment is automatically trimmed using the levels set in the preferences panel. If you do not get the expected results, you might have set those values too high or too low.

Magic Pad #3

This pad expects to receive recordings each containing multiple tuned audio segments. Each of these recordings will be automatically split and trimmed in its individual segments, and then each segment will be pitch detected and mapped on the layer accordingly. The trim values for attack and release are set in the preferences panel. A new layer will be created for each recording (sample file). No autolooping is performed.

This pad is very useful for quickly creating instruments out of recordings.

Magic Pad #4

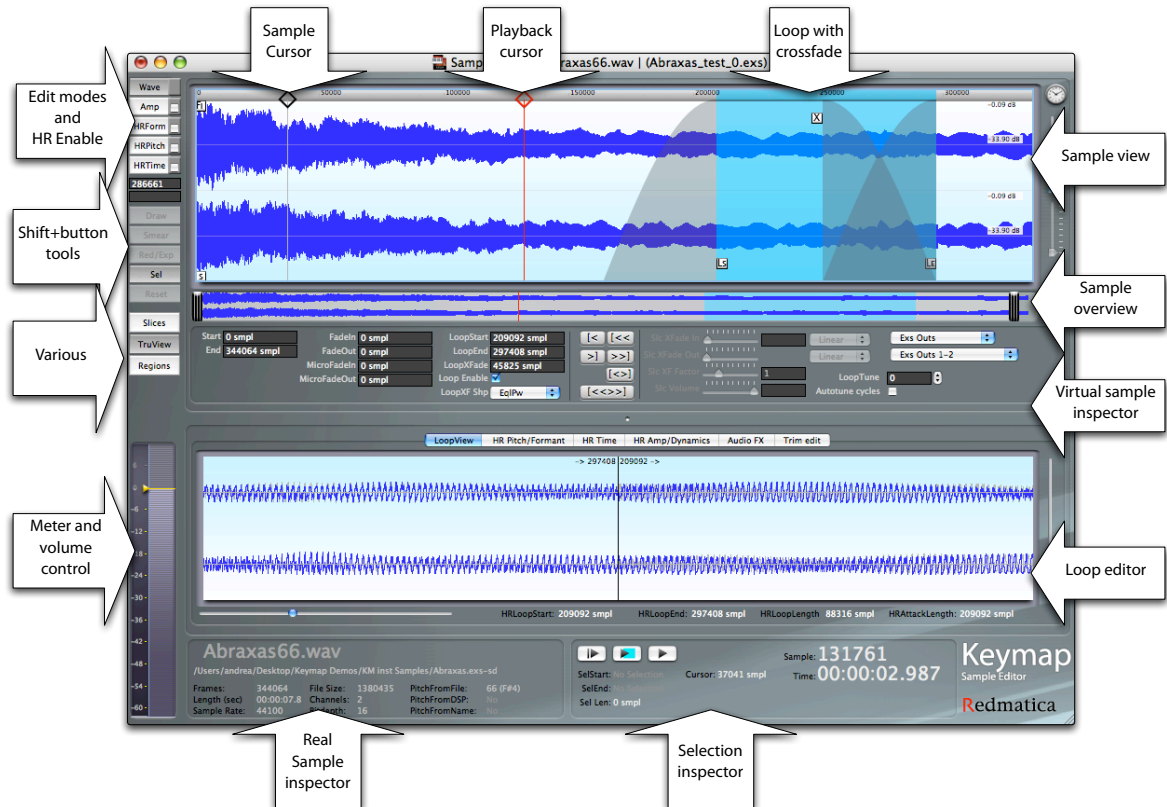
This Magic pad works as magic pad #3, but also autoloops samples.

Magic Pad #5

This Magic pad works as magic pad #4, but also adds crossfading to the loop and then optimizes it. It might be a good solution for exotic audio material.

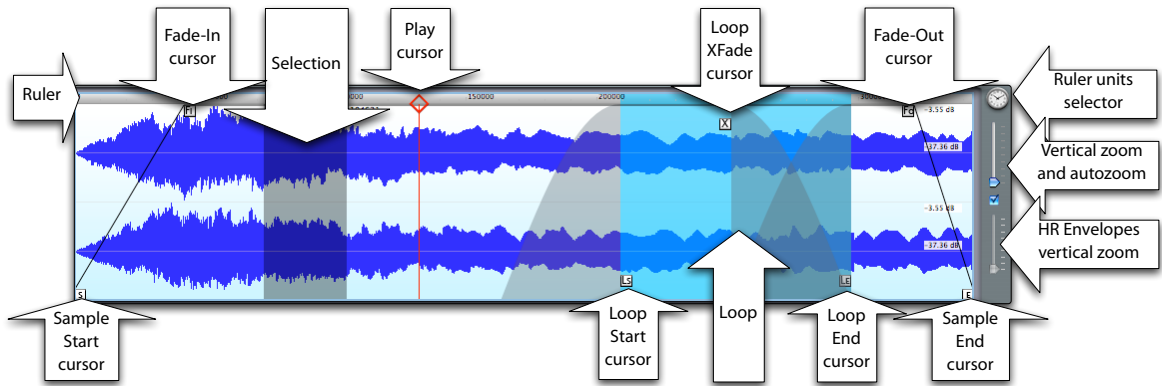
Chapter 16: Sample editor

The sample editor is where you perform edits on virtual samples and have full access to all the Keymap functions for creating loops, Regions, applying Harmonic Resynthesis, creating slices and much more. While the focus of the sample editor is on a single virtual sample at a time, the same features and functions of the sample editor are also available in the Aux Sample Editor found in the Instrument editor and resources window, which is for all intents and purposes as functional as the full sample editor only stripped of some of the full sample editor's surrounding elements.



It is important to understand that **the sample editor is always about virtual samples**, and not the real sample files on disk. All the cut and paste operations you do here **never** modify the real samples: the editor, and all of its functions, are totally non destructive.

The main element in the sample editor is the sample view, where the sample waveform is displayed, and where you can set cursors, define loops, make selections, and perform functions.



In each sample view you always have a number of cursors tied to the basic set of virtual sample parameters:

The **Sample Start cursor** represents the starting point for playback of the virtual sample. When the sample is going to be played with the MIDI keyboard, playback will start from there.

The **Sample End cursor** represents the ending point of playback of the virtual sample. When the sample is being played with the MIDI keyboard, playback will stop there, unless there's a loop defined, in which case the playback never goes beyond the loop end, as it jumps back to the loop start.

The **Fade-In Cursor** represents the length of the initial fade-in (if any), and is tied to the Sample Start cursor (when you move the start sample cursor, the fade-in cursor will move too).

The **Fade-Out Cursor** represents the length of the final fade-out (if any), and is tied to the Sample End cursor (when you move the end sample cursor, the fade-out cursor will move too).

When a loop is active you'll also see the loop highlighted in light blue color, with some loop-specific extra cursors:

The **Loop Start cursor** sets the start position of the loop. This cursor is always after the fade-in cursor.

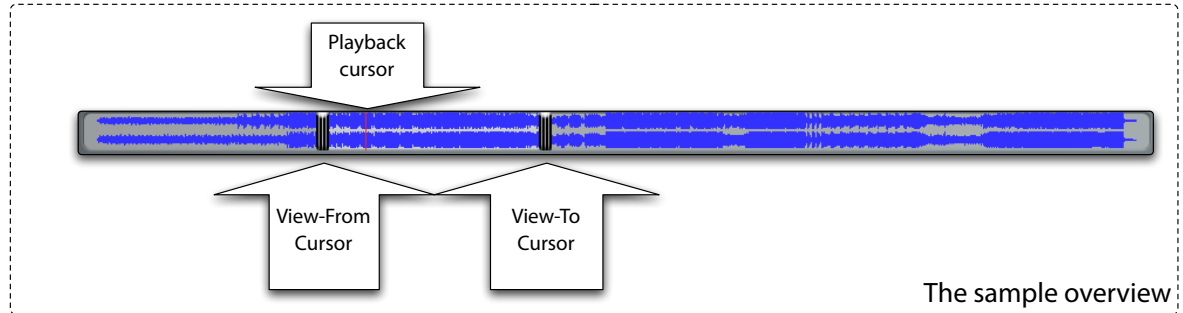
The **Loop End cursor** sets the end position of the loop. This cursor is always before the fade-out cursor.

The **Loop XFade (crossfade) cursor** sets the amount of crossfade that will be used with the loop.

When the sample is being played, the playback position is being shown in realtime by the red color **playback cursor**.

If you click with the mouse over the waveform, you will set the black-color **sample cursor**.

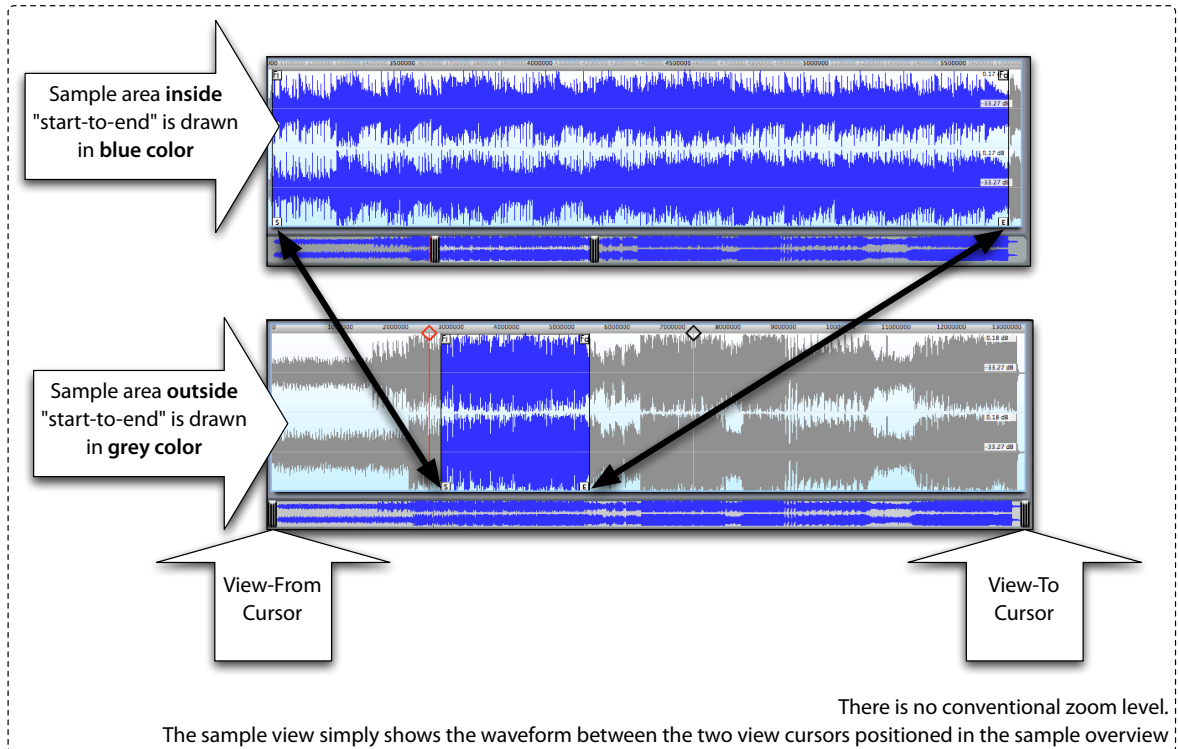
Under the sample view we find the sample overview, which shows the whole sample extension.



In the sample overview we have the **View-From** and the **View-To cursors**, which at all times let you set the portion of the whole sample being displayed in the sample view. The playback cursor is seen (but not edited) in the sample overview too, as a vertical red line.

How the sample is displayed

The sample is displayed in a familiar way, with some important differences.



Waveform color

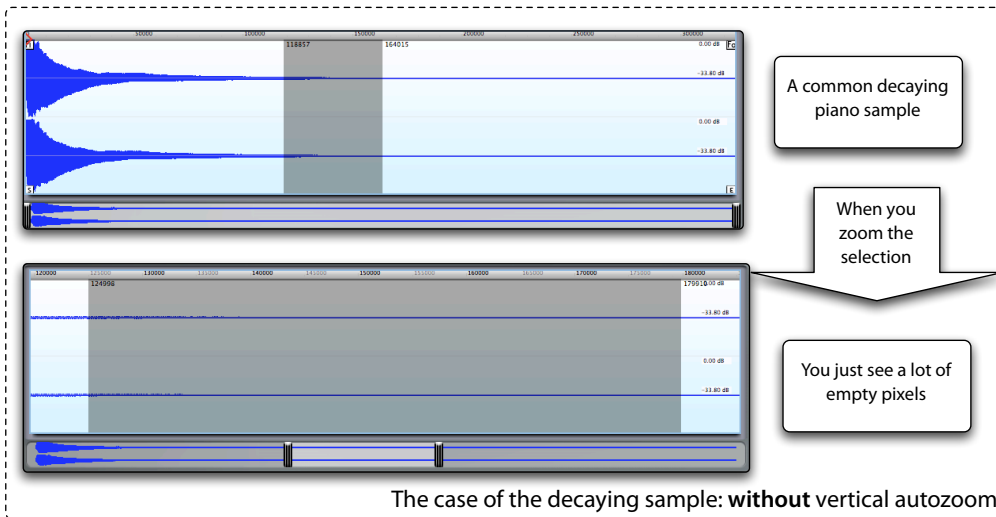
The waveform color indicates whether it is within the sample-start to sample-end area (in blue), or outside (in grey).

No horizontal zoom

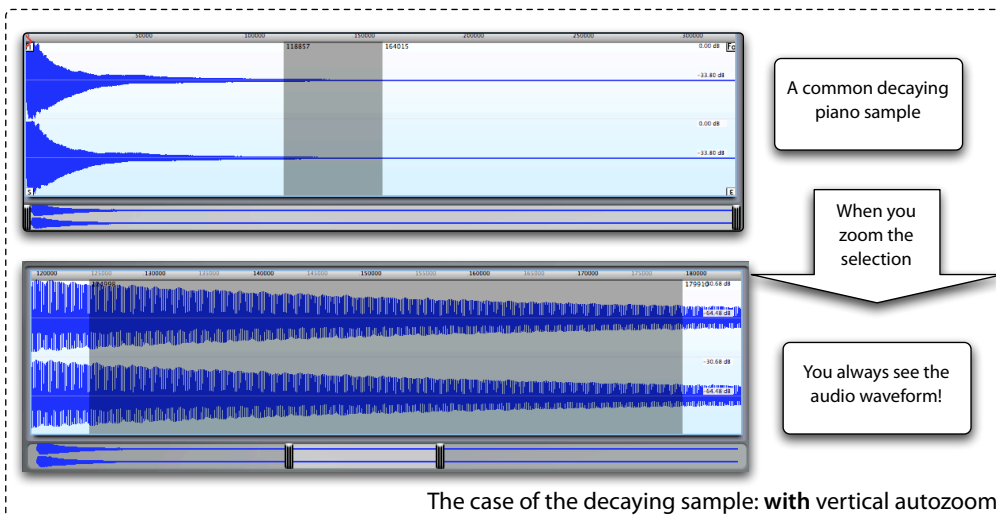
There is no conventional horizontal zoom factor: at any moment the sample view shows the sample section within the two **View-From** and **View-To** cursor in the Sample Overview. The high-performance Keymap graphic subsystem can visualize the sample from any position to any position, and is smoothly updated in realtime as you move the view cursors. An extensive set of zooming functions accessed through menus and key commands let you zoom out completely, zoom just the start-to-end section, zoom the loop, zoom the selection.

Vertical autozoom

A typical problem with decaying samples is that very often the display only shows you a huge peak and then a flat line as in this following illustration:



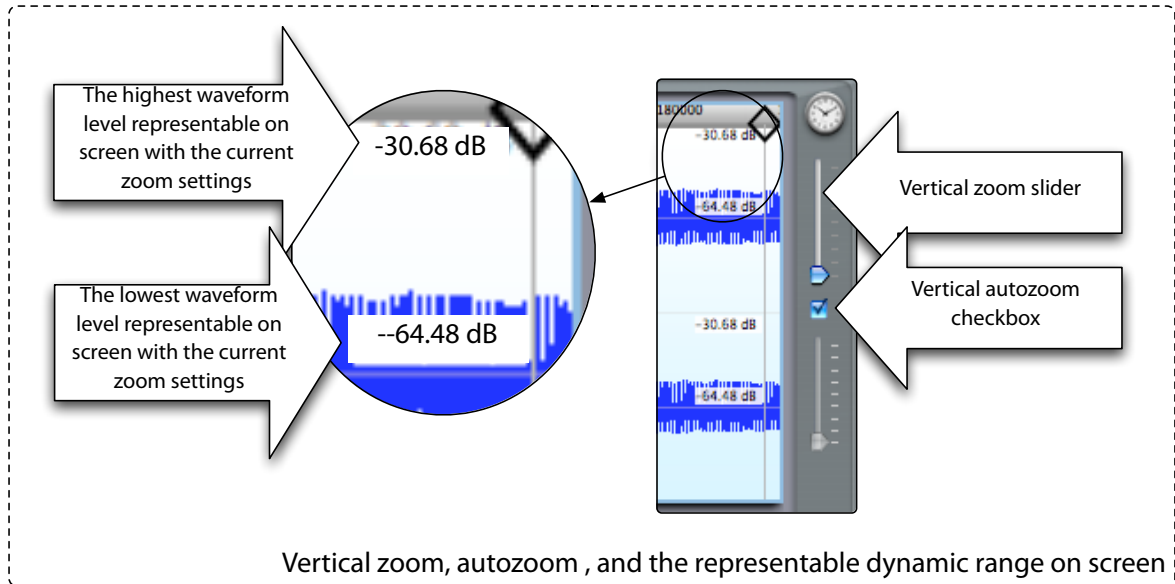
If you zoom on the center section of that sample, you'd normally see.... nothing, and you would have to constantly tweak the vertical zoom. The vertical autozoom function in Keymap, when enabled, constantly changes the vertical zoom in order to show you the maximum amount of useful waveform:



The autozoom function is independent from the vertical zoom slider, so that you can have the autozoom function enabled and still zoom on something with the slider.

The representable dynamic range

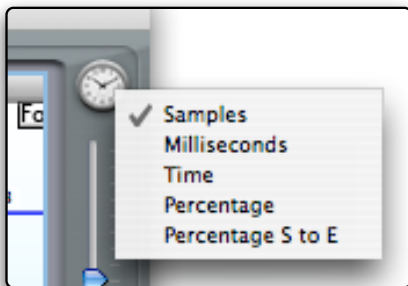
The problem with visualizing waveforms on a computer display is that waveforms can have an enormous dynamic range. Each 24 bit sample can be at more than 16 million possible distinct levels(!), while displays have typically just a few hundreds pixels for representing a sample. Keymap constantly calculates and updates the maximum and minimum audio level representable on screen, considering the available number of pixels and the zoom and autozoom factors.



This is especially useful when the vertical autozoom is enabled, so you have at all times two reference levels to the waveform you see.

Ruler and ruler units

The ruler in Keymap sample view can be set to use several different units of measure. You change the unit of measure by clicking over the clock icon , and selecting from the context menu:



- **Samples** shows positions in samples from the beginning
- **Milliseconds** shows positions expressed in milliseconds, or for long samples in seconds, from the beginning
- **Time** shows positions as absolute time from beginning
- **Percentage** shows positions as percentage of the total sample length
- **Percentage S to E** shows positions as percentage starting from the Start position (0%) to the End position (100%)

Horizontal autozoom for cursors

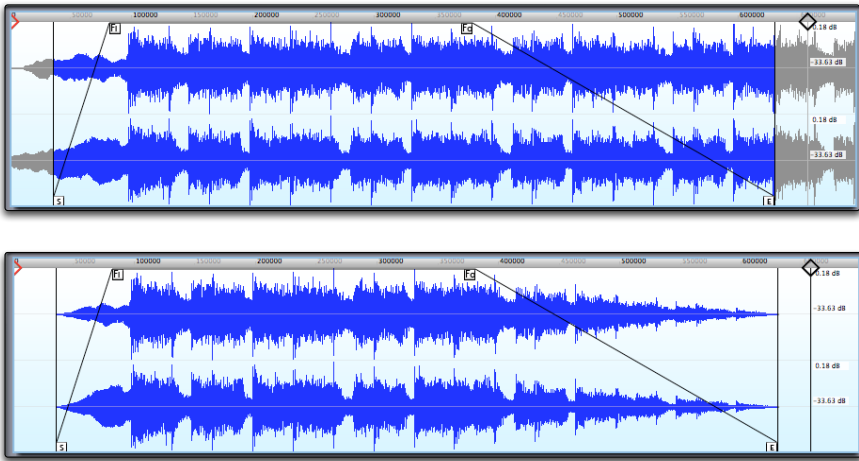
When editing cursors, it's very common look at the whole sample, as this way you get a good idea of the relative cursor positions. However, this makes precise graphic editing almost impossible, since moving the cursor with the mouse by just one pixel could mean changing the value of several thousands samples at once!

Keymap solves this problem by progressively zooming in horizontally when, during a click-and-drag cursor session, you continue holding down the mouse button but stop moving the mouse for a couple seconds. Once you reach the optimal zoom level you need, move the mouse again, and the zoom-in will stop momentarily. If you stop again, zoom-in will continue from the current zoom level.

Once you set the right cursor position and release the button the original starting zoom level will be restored. Setting a cursor has never been so simple and ergonomic!

TruView display mode

Keymap by default shows you the audio waveform before processing. If you add a fade out, the displayed waveform will not change to reflect that. However, looking at the result of your edits can sometimes be very useful, especially when setting crossfades. For this reason Keymap offers the TruView display mode: once enabled, the waveform will show you the outcome of your edits, as in the following illustration.



TruView

With TruView disabled, you do not see the actual result of your fades and crossfades

TruView

With TruView enabled, you do see the outcome of your fades and crossfades

TruView display mode

The TruView display mode uses more CPU resources than the standard mode, so you might want to enable it only in the situations of effective use.

How to open the sample editor for a virtual sample already assigned to a Zone.

You can open the sample editor in several ways.

- by double clicking over Zones selected in the Instrument editor
- by double clicking the Aux editor in the Instrument editor, when it displays a sample
- by selecting the Zones in the instrument window and using the **Windows > Show sample editor for selected Zones** menu command
- by selecting the Zones in the resources window and using the **Windows > Show sample editor for selected Zones** menu command
- by double clicking over the non editable section of the Zone table in the resources window

How to open the sample editor for a sample file not already assigned to a Zone.

You can also open the sample editor for a sample file which has not yet been assigned to a Zone through the **File > Add samples to current project** menu function. This is useful when you want to load a sample and split it in segments, each mapped to a different Zone.

How to save edits done in the sample editor

Every edit you perform updates the project in memory immediately; for this reason there's no "save" function specific to the sample editor. All the virtual sample edits you make, affect the project only (never the sample files!) and are saved together with the project when you perform the **File > Save** menu command.

The exception is the case of a sample opened with the **File > Add samples to current project**. The edits you do for that sample will **never** be saved, but all the Zones you create out of that editing session, and all the relative virtual samples associated to the new Zones of course will be saved with the project.

In other words: Keymap saves virtual samples edits with the project, only if/when these virtual samples are associated to Zones.

How to set the sample cursor

If you click the mouse inside the sample view, the black colored **sample cursor** will move to the mouse position.

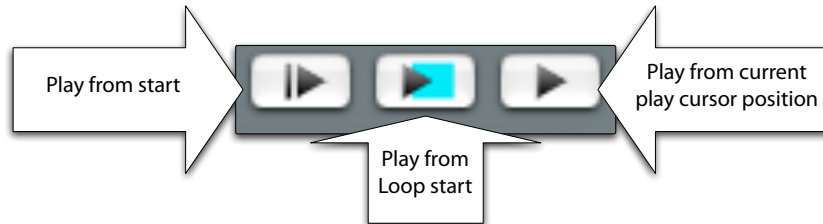
How to select a segment of a sample

If you click the mouse in the sample view and then you drag the mouse holding down the mouse button, you define a selection. The selection start and end positions, and the selection length, are visible from the

selection inspector. The selection mechanism is important, as many sample editor functions work on selections.

Playing the sample

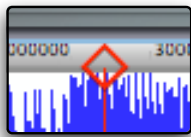
You can always play the sample using the transport controls at the bottom of the sample editor:



or by using the *Play* key commands. By default, the **spacebar** key plays from the sample cursor, **shift +spacebar** plays from the sample start, and **option+spacebar** plays from the current playback cursor position.

Dragging the playback cursor to a position

While the sample is playing, it is possible to drag the playback cursor, and jump playback to any position within the sample and end positions, either by dragging the diamond shape at the top of the red playback cursor:

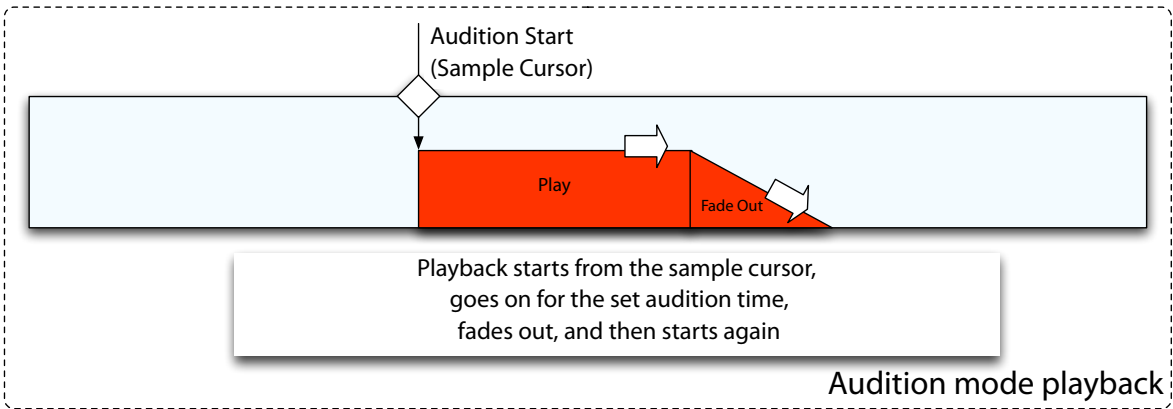


or by holding down the **Option key** and clicking directly in the ruler area: the playback cursor will jump to that position and continue playing from there. If you press the **Option key** and then drag the mouse over the ruler, you will be able to scrub to any point in the sample within the sample and end positions.

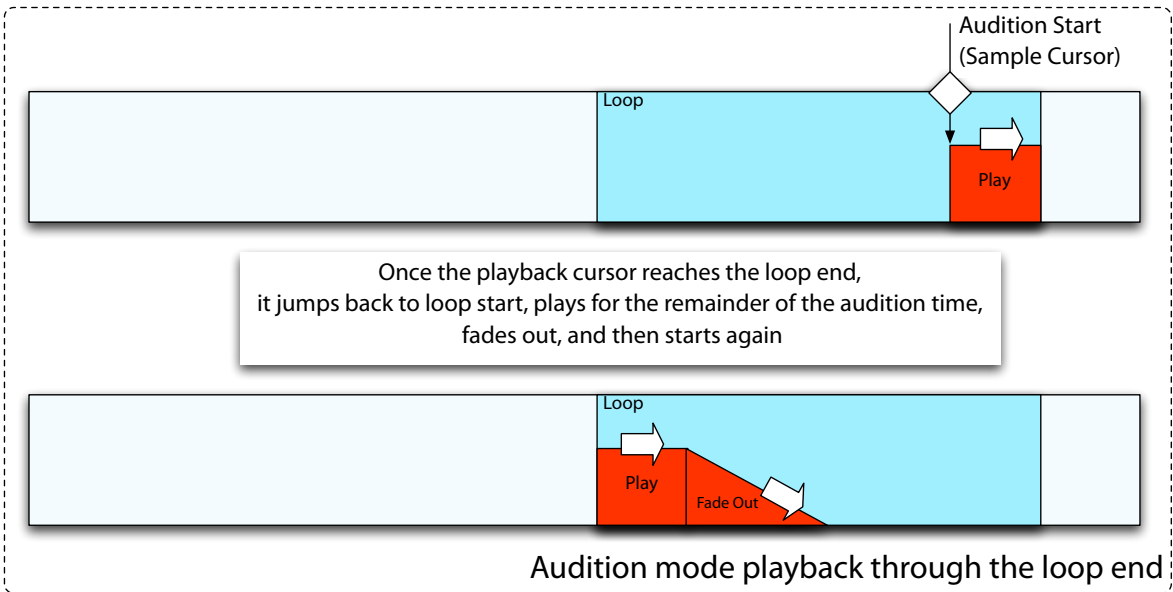
Audition mode

Sometimes you want to repeatedly play back a small section of the sample so that you can adjust parameters or (loop) positions. In other audio applications you are probably used to selecting a segment of the waveform and then enabling a mode for repeat playback. The problem with that approach is that you can't use it across the sample loop end boundary and back to loop start, which is probably the single most important transition. Also, that approach makes it difficult to hear the attack of your selection, since the attack plays immediately following the end of the selection. To solve both these problems, Keymap provides a playback **Audition mode**: you set the audition time, enable Audition mode and start playback.

The playback will start and continue normally for the set audition time, then fade out to silence, and start again at full volume from the initial point. You can change the initial point simply by setting the sample cursor (clicking with the mouse in the sample view).



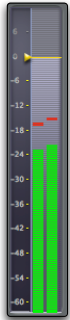
Audition mode never interferes with the normal path of the playback cursors. If you start playback near the end of a loop, the playback cursor will follow its normal path and when it reaches the loop end, it will jump back to the loop start position, continuing from there. When the audition time expires, the fade out will happen and then it will start again from the original start position..



The audition time is not set as a numeric value, but by holding down for the desired amount of time the **Learn audition time** key (normally it's **shift+A**). Audition mode is enabled/disabled using the **Toggle audition mode** key command (by default the A key). When in audition mode, a small flashing red warning will appear next to the sample view to remind you that the Sample Editor is in audition mode.

Meters, monitoring volume and muting

The meters at the bottom left of the sample editor window show the RMS levels (in green) and the Peak levels (in Red) of the played sample. You can also change the monitoring volume for the editor by clicking over the small yellow triangle, and dragging it vertically to the desired level.

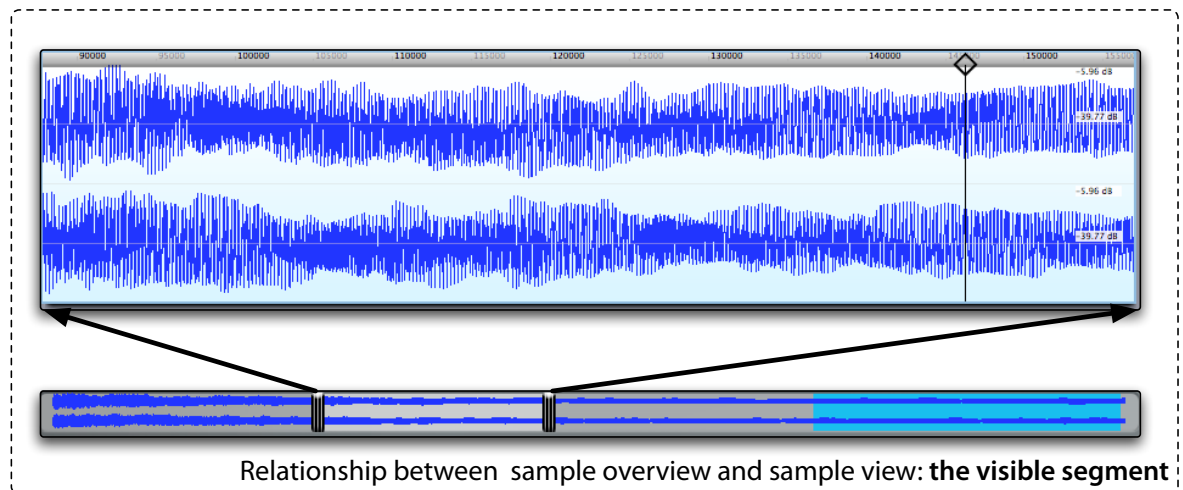


This volume level only affects the volume for the current editor. If you want to modify the overall Keymap monitoring volume, you can use at any time the **F1** and **F2** function keys.

You can also mute the sample editor temporarily by holding the Option key modifier and clicking over the meters. If you click again, the volume will be reset at 0dB.

Zoom and pan using the sample overview, and the visible segment

As we have seen, in Keymap you can set the sample view to show any sample segment, from every position to any other position simply by moving the view cursors in the sample overview to the desired position. The sample segment visible at any time in the sample view is called **the visible segment**.



If you want to pan the visible segment, click in the sample overview between the two view cursors, and drag the (yellow) highlighted visible segment around. If you want to zoom in or zoom out of the current visible segment, press and hold the **Shift key** then click again with the mouse in the sample overview, between the two view cursors, and drag the mouse up and down.

Zoom and pan using the Mighty Mouse

The small trackball available in the Apple Mighty Mouse device makes for an excellent controller in pan and zoom applications. Keymap supports this device in multiple ways:

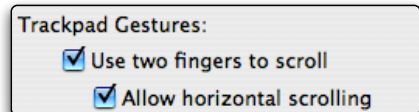
- you can pan the visible segment by placing the mouse cursor over the sample overview or the sample view and scrolling left or right
- you can zoom in/out by placing the mouse cursor inside the visible segment in the sample overview, and scrolling up and down
- you can zoom in/out by placing the mouse cursor over the sample view and scrolling up and down

Notice how zooming is always made relative to the mouse cursor position. This is extremely ergonomic, as you can place the mouse cursor over a waveform peak, scroll the trackball up/down, and you will zoom in/out exactly around that peak.

If you first select a section of the sample, and then quickly scroll down the trackball, you will zoom the selection.

Zoom and pan using the Trackpad

If your Mac laptop supports trackpad gestures (all recent ones do), and you enabled them as shown in the picture on the right, Keymap will let you use it similarly to the Mighty Mouse trackball. When you place two fingers on the trackpad at the same time, and the mouse cursor is over the sample view, you can zoom by moving fingers forward and backward, and pan moving fingers left or right.



Zoom and pan using the cursor keys

You can also use the cursor keys for zoom and pan. The **Cursor Left** and **Cursor Right** keys pan the visible segment. **Option+Cursor Left** and **Option+Cursor Right** will instead change the current zoom level.

Zoom functions

A number of functions, accessible through both menu commands and key commands, let you zoom to specific sample segments instantly:

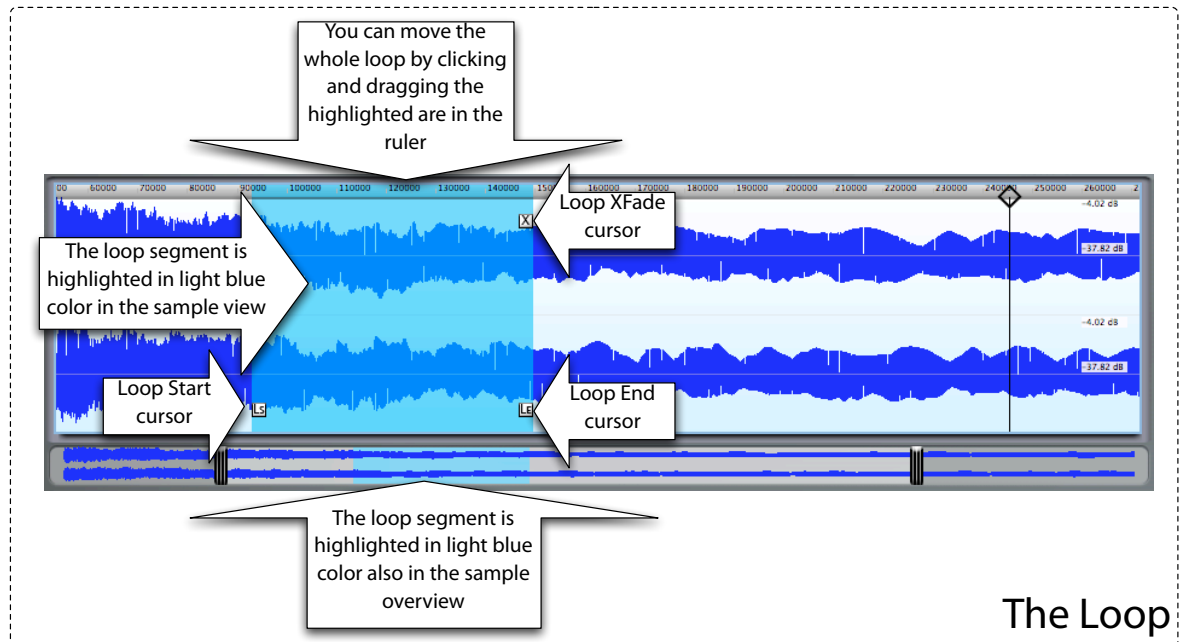
- the **View > Zoom all** menu command (**Option+Up Arrow**) will display the whole sample
- the **View > Zoom selection** menu command (**S**) will zoom to the selection
- the **View > More Zoom > Zoom loop** menu command (**Down Arrow**) will zoom to the loop
- the **View > More Zoom > Zoom to the Zone** menu command (**Up Arrow**) will show the start to end segment
- the **View > More Zoom > Zoom cursor** menu command centers the sample view around the sample cursor

Note that most of these functions do not **exactly** zoom to the respective segment, but will also display some additional space at left and right so you can readily adjust the cursors without having to zoom out or pan immediately.

Chapter 17: Loops

Creating a loop

You can define the loop segment by making a selection in the sample view, and then using the **Samples > Loop > Set loop from selection** menu command (**Option+L**). The loop segment will be displayed as a highlighted light blue color area, and the **Loop Start**, **Loop End** and **Loop XFade** cursors will appear.

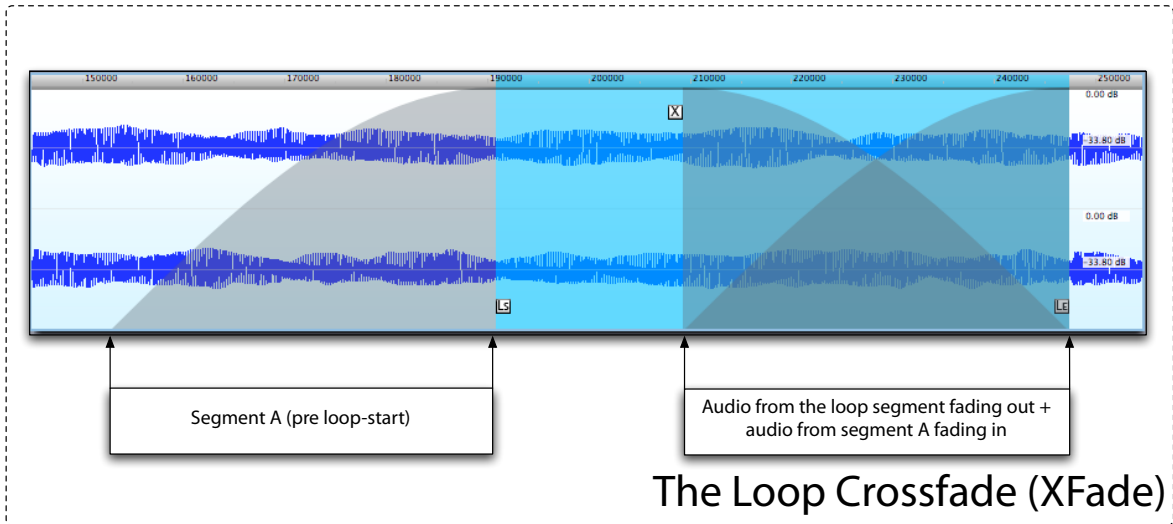


The EXS24, and Keymap, support a single loop for each Zone/virtual sample. In a looped sample, playback never goes beyond the loop end position.

Crossfade loops

The EXS24, and Keymap offer realtime loop crossfades which is very useful for smoothing out the “join” point of the loop, i.e. when the playback cursor jumps from the loop end back to the loop start. This function does not require the sample files to be modified, and is performed in realtime by the EXS24 and Keymap while playing notes.

Once you set the crossfade length, the function works by smoothly fading-out the end of the loop segment, and at the same time mixing-in the audio segment from the corresponding relative position immediately before the loop start.



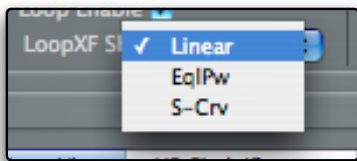
The Loop Crossfade (XFade)

This way, (at least ideally) the audio at the end of the loop should blend seamlessly with the audio at the start of the loop in order to avoid glitches: the crossfade function spreads any possible glitch or sonic difference over the length of the crossfade (mix) before loop end.

Note: adding a crossfade to a loop does not ensure that the loop will be smooth, due to the other factors involved (such as: the audio waveform phase, the spectral content, and so on). Keymap however provides functions that greatly help you in finding good loop points and crossfades.

Loop crossfade shapes

When the loop is enabled, the crossfade shape for the loop can be selected among three different curves from the **LoopXF Shape pop-up menu**.



- linear: this shape is recommended for simple waveforms
- equal power: this shape is suggested for complex audio material
- s-curve: this special shape is an hybrid between linear and equal power and might be useful in certain situations

Enabling/disabling a loop

Loops are enabled and disabled in the sample editor with the **Samples > Toggle loop** menu function (L). When a loop is disabled, the loop cursors are not shown in the sample view.

Autolooping

Keymap offers several functions for creating optimal loops in your samples. Before we start describing these functions, we need to discuss the nature of loops.

What is a good loop?

“What is a good loop” is a simple question, but as we’ll see the answer is very complex. Let’s look at a typical single snare sample. The sound is intrinsically percussive and starts with a “bang”, quickly fading into silence. Can we loop the snare so that the body of the sound can be played for an indefinite amount of time, as long as we hold down the key on the MIDI Keyboard? The answer is no: the sample itself is a big transient, and nothing in the overall structure of the sound has a steady sonic state that can be played over and over.

But you can certainly define a 300 sample-long segment of it to loop randomly, and get a buzzy sound that might be nice to play. We can also loop the whole sample, and it will be **for sure** a good rhythmic loop. As you can see, what is a “good loop” has not a single clear answer.

Another example: let’s take a “good” drum loop of 1 bar at 120bpm 4/4.

That loop will be perfect **to me** (a Vienna musician, playing walzer), if I cut out one quarter of it and it becomes 1 bar of 120bpm ar 3/4.

The same original loop is perfect **to my friend** (a progressive rock musician) when he cuts out one eighth of its length, and it becomes 1 bar at 120 bpm 7/8.

The musician from Vienna will be probably horrified at the 7/8 loop, and the prog rock player will consider the 3/4 loop to be decadent.

If you are an avant-garde musician, you could probably pick two random sample positions for the loop, and get great results (even if probably to your ears only!).

All this is to point out how the term “loop” not only has multiple meanings, but also that sometimes the loop *you* consider perfect could be simply *terrible* for another user, regardless of its technical characteristics. This is because you are applying your artistic background to your definition of “good loop”.

So, back to Keymap, how can a software application find the loops for you if it’s not possible to define exactly what a “good loop” is? The Keymap answer is that the “good loop” is the most “natural loop” which makes musical sense as a single segment from a larger segment of material. Once that natural loop is found, it’s up to you and to your artistic choices to modify it at your will.

This means that for Keymap to search for and offer you a good loop, you have to give it a larger audio segment to search. Trying to search for a good loop inside a sample already defined by a loop, will *never* give you the original loop as a result, but probably something 1/4 or 1/2 the length, as Keymap needs to have some musical context around loops in order to find them.

It’s also important to understand that, depending on the material, the best rhythmic loops in a sample are not necessarily the ones starting at the position you’d normally try to use as a start (as example, at the beginning of a bar), because for example there might be a tail from some other transitory sound (cymbals?) creating a glitch at the join point.

Similarly, with harmonic sounds (instrument samples), historically loop points are searched for at zero-crossing points, but the truth is that zero-crossing points are not much more than a trick used by human beings in order to simplify the search, and not necessarily the best places to search for loops.

The Keymap Autoloop functions will look for the best natural loop in your samples, regardless of where the found loop will start. You can change the start point later, to zero crossings or to beat 1, using other Keymap functions.

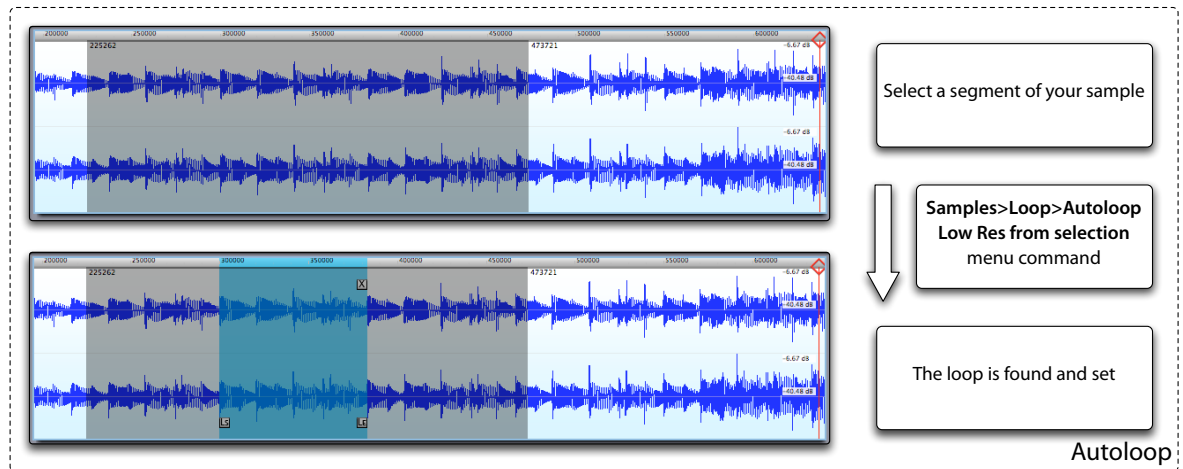
Beyond searching for good loops, Keymap also offers specialized tools for optimizing existing loops, and for looping single cycle loops in harmonic samples.

Note that Keymap autoloop functions will **not** modify or process your samples, but will simply pick the “right points” for you.

Autoloop within a selection

The main autoloop functions search inside the sample selection boundaries. While the algorithm is internally *very* complex, the interface is extremely simple: just select a segment, then use the **Samples > Loop > Autoloop LowRes from selection** menu command.

That's it.



There are actually four different variations of that menu command, depending on which algorithm and search mode you want to use:

Samples > Loop > Autoloop **LowRes** from selection

Samples > Loop > Autoloop **HighRes** from selection

Samples > Loop > Autoloop **LowRes** from selection (**Keep Start**)

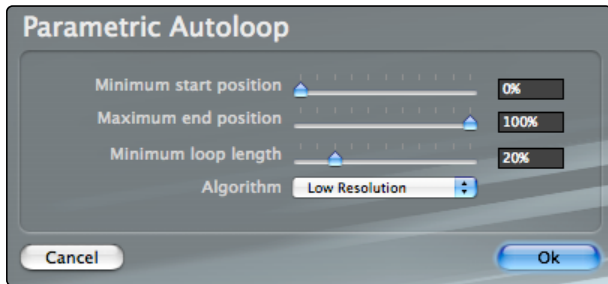
Samples > Loop > Autoloop **HighRes** from selection (**Keep Start**)

LowRes and **HighRes** are the two possible algorithms you use. They differ in the accuracy of the loop search, and in the time needed to perform it. LowRes can handle most applications and it is fast. HighRes should be used only when LowRes doesn't give you satisfactory results, and is far slower.

Normally the loop search will be performed inside the selection with no special regard to where the loop should start. However, the loop search can also be anchored to the start of the selection. The "**Keep Start**" variation will force Keymap to look for loops starting within a few hundreds samples from the selection start. Adding that small tolerance of "a few hundreds samples" will greatly improve the chance of finding a good loop, as not every loop start position has a correspondingly good loop end position.

Parametric autoloop

Sometimes you might want a little more control over where the loop should be searched. The **Samples > Loop > Parametric autoloop** menu function let you set a few parameters that will guide Keymap in its search.



The numeric values are expressed as a percentage, which that is more useful than absolute lengths because you'll frequently deal with with samples of varying length. The **minimum start position** and **maximum end position** parameters let you set the segment of the sample where the loop search will occur. In that segment, Keymap will search a loop of length equal or bigger than the **minimum loop length** parameter value.

The Algorithm pop-up menu lets you select which of the two algorithms you want to use.

Once all parameters are set, you click Ok, and then Keymap will find you the best loop.

Setting the loop from the loop data in the sample file

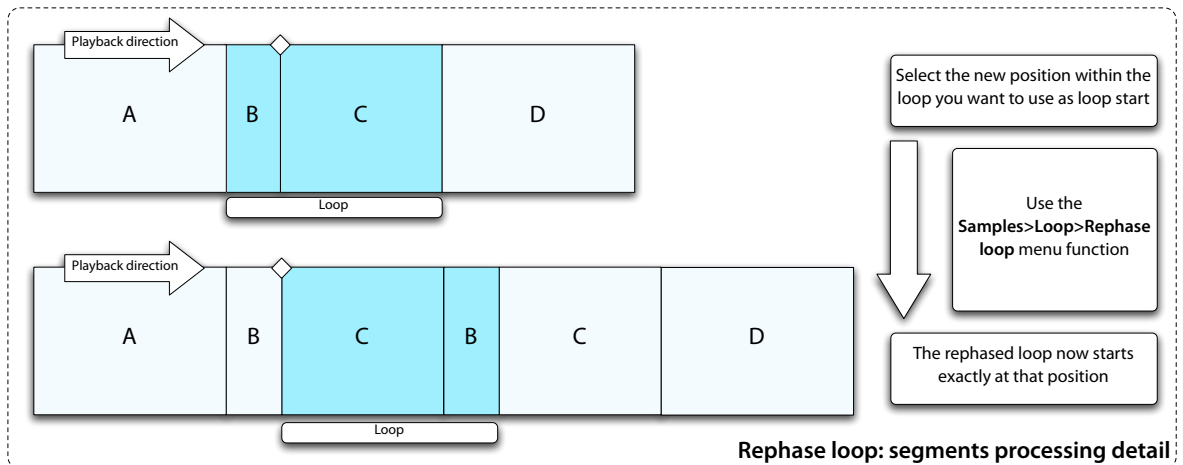
AIFF and WAV samples can contain loop information such as the loop start and loop end positions. The **Samples > Loop > Set loop from sample file** looks in the sample file for that information, and if found, it sets the loop in the sample editor to those positions.

Autolooping a single cycle in an harmonic sample

If you are editing an harmonic sample, you can create single cycle loops very easily by setting the sample cursor in the sample view, and using the **Samples > Loop > Autoloop single cycle** menu command (K).

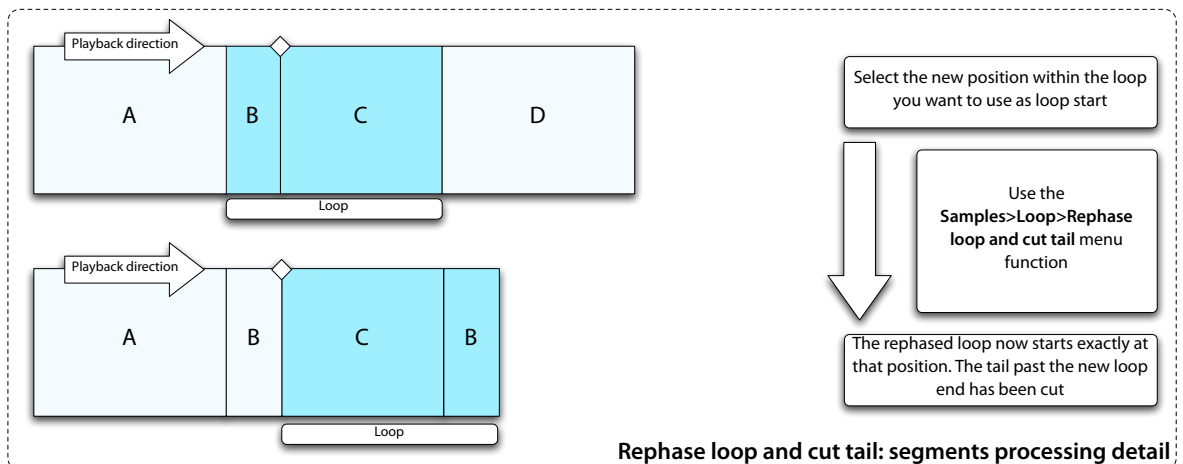
Rephasing a loop (setting a new loop start inside the loop)

Once you have a good loop with no perceptible glitches at the join point, you might want it to start at a different position. The **rephase loop** function does all the needed editing for you, automatically. You just have to set the cursor at the desired starting point, which must be inside the loop, and use the **Samples > Loop > Rephase loop** menu function. The sample will be sliced and recombined as shown in the following illustration.



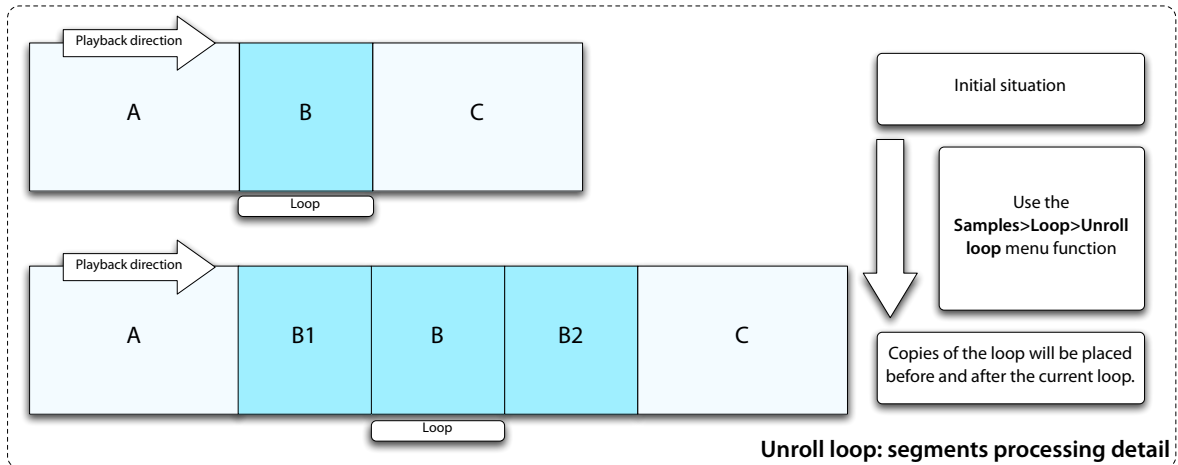
Note how the total sample length will increase by exactly one loop length.

You can also completely cut the tail of the sample past the loop end position using the **Samples > Loop > Rephase loop and cut tail** menu function.

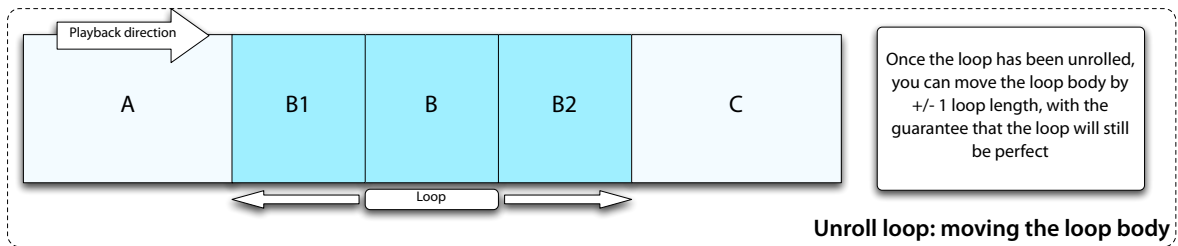


Unroll loop

Another useful loop function is **unroll loop**. This function, accessed through the **Samples > Loop > Unroll loop** menu command, slices the loop and adds additional loop copies before and after it, as shown in the following illustration.

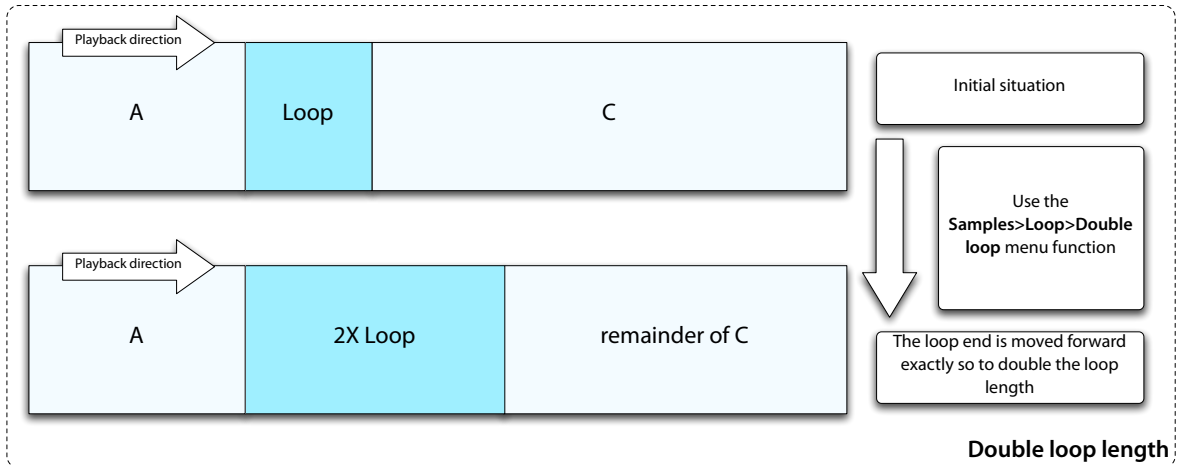


The net result is that once the loop has been unrolled, you can move the loop body by ± 1 loop length, with the guarantee that the loop will still sound perfect. This is a more interactive process than **rephase loop**, as you can tweak the loop starting point interactively by moving the loop body.



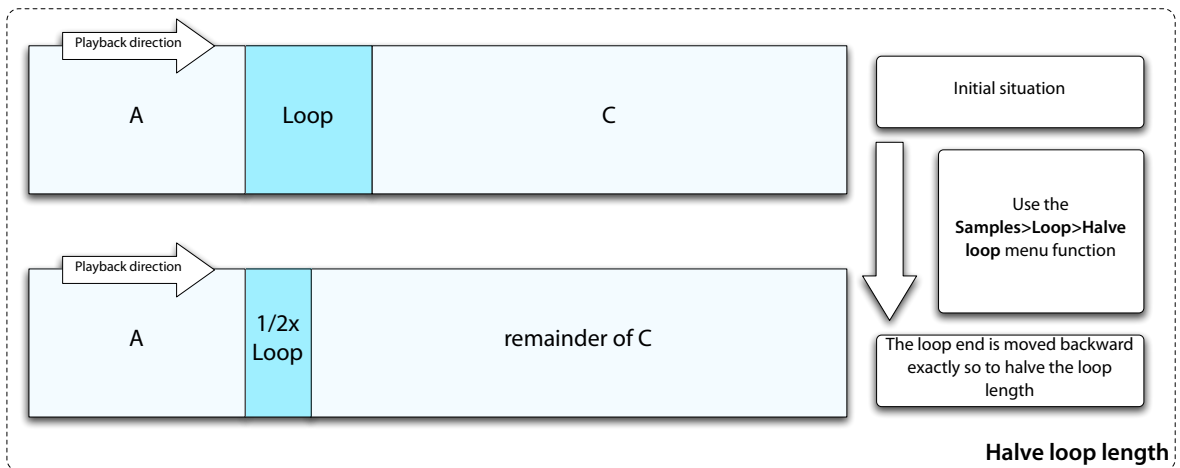
Double the loop length

The **Samples > Loop > Double loop length** menu command doubles the loop length, by moving the loop end position. If the audio material maintains a reasonably steady timing, the loop will still play in a musically interesting way.



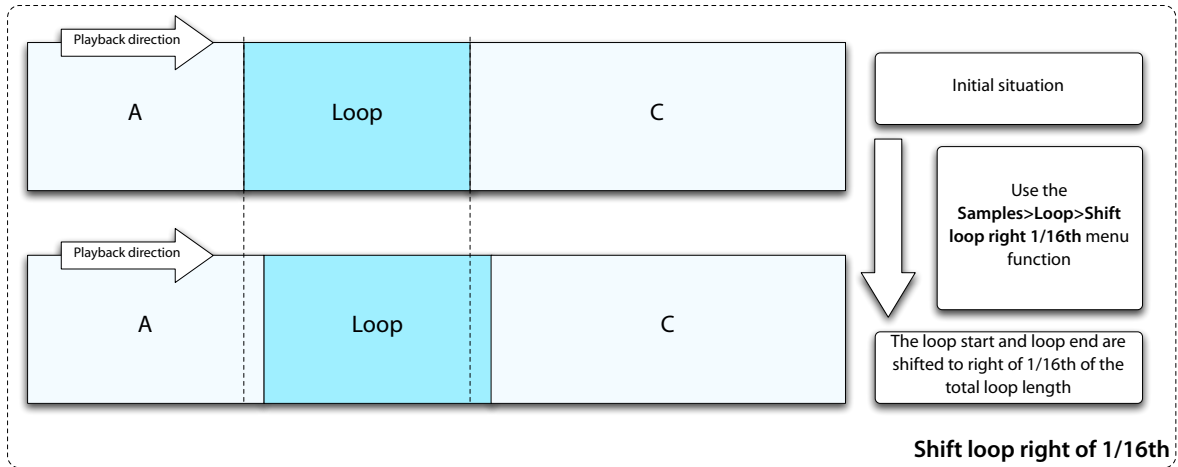
Halve the loop length

The **Samples > Loop > Halve loop length** menu command halves the loop length, by moving the loop end position. If the audio material is playing with a reasonably steady timing, the loop will still play in a musically interesting way.



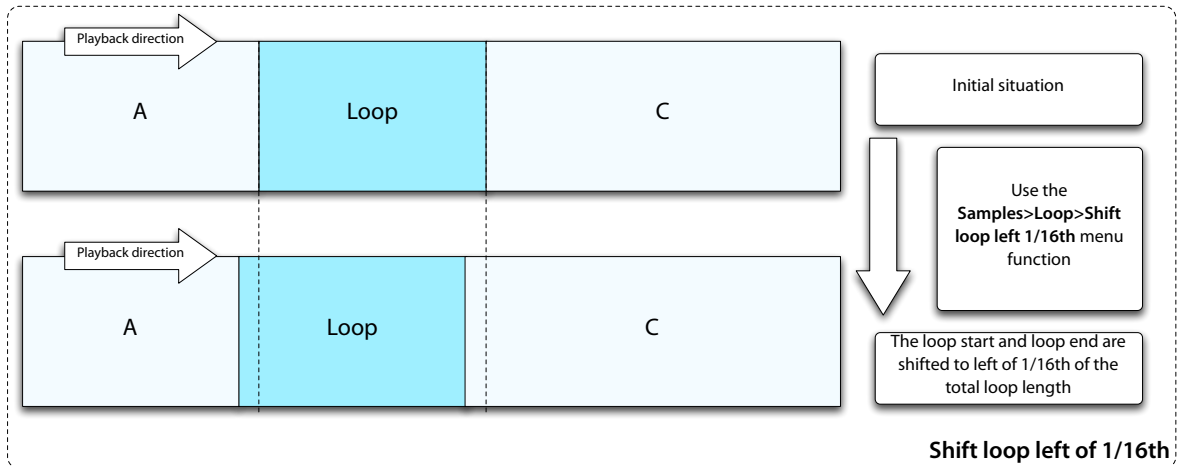
Shift loop to right (push ahead) of 1/16th

You can shift the loop to the right (push ahead) by 1/16th of its loop length. If the audio material is 4/4 and you are dealing with a certain number of bars (1, 2, 4, 8), and the audio is played at a steady tempo, this shift has a musical meaning.



Shift loop to left (push back) of 1/16th

You can shift the loop to the left (push back) by 1/16th of its loop length. If the audio material is 4/4 and you are dealing with a certain number of bars (1, 2, 4, 8), and the audio is played at a steady tempo, this shift has a musical meaning.



Improving loop points

Keymap offers a few functions designed to improve loops, by moving the loop start and/or the loop end to nearby positions that might have some better qualities. This set of functions is distinct from autoloop, as they use a totally different approach, and will only search for a potential position near the existing one. Most of these functions are available both as menu commands, as key commands, and as dedicated buttons in the sample editor.



In this section, we'll use the terms *tune* and *tuning* to refer to "improving" loop positions, not to changing pitch.

Fine tune loop start

This function is available from **Samples > Loop > Fine tune loop start**, and will search for a better starting loop point within a few hundred samples from the current position. This function changes the loop length.

Fine tune loop end

This function is available from **Samples > Loop > Fine tune loop end**, and will search for a better ending loop point within a few hundred samples from the current position. This function changes the loop length.

Fine tune whole loop

This function is available from **Samples > Loop > Fine tune whole loop**, and will search for better starting and ending loop points within a few hundred samples from their current positions. This function changes the loop length.

Coarse tune loop start

This function is available from **Samples > Loop > Coarse tune loop start**, and will search for a better starting loop point within a few thousand samples from the current position. This function changes the loop length.

Coarse tune loop end

This function is available from **Samples > Loop > Coarse tune loop end**, and will search for a better ending loop point within a few thousand samples from the current position. This function changes the loop length.

Coarse tune whole loop

This function is available from **Samples > Loop > Coarse tune whole loop**, and will search for better starting and ending loop points within a few thousands samples from their current positions. This function changes the loop length.

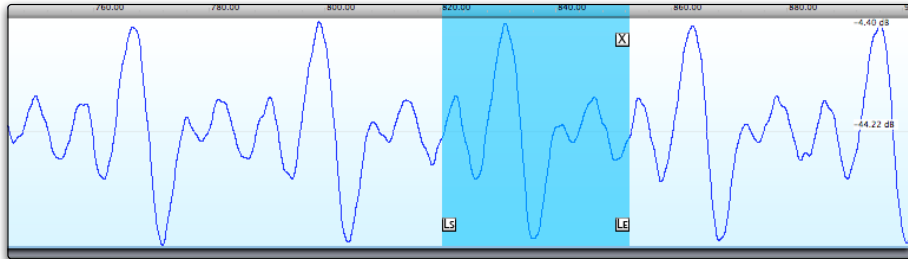
Optimizing a crossfade loop

When you create crossfade loops you are mixing two different segments of the same audio material. This can cause a number of sonic problems if the two segments are not coherent. The **Samples > Loop > Optimize loop crossfade** menu function will move the loop end position in order to give you a better crossfade loop.

As the new position is searched only near the current position, you might need to perform this command more than once before finding the right position. The length of the crossfade loop also plays a factor in the search, and longer crossfades will lead to better loop optimizations.

Single cycle loops

Several kinds of sounds can be effectively looped using a single waveform cycle, i.e. as a single repetition of the basic waveform being played. This technique works, often surprisingly well, with wind instruments, synths, voices, and basses.



One of the problems you find with single cycle loops is that there is an identity between the loop length and the perceived pitch. If you have a perfect single cycle loop, and you make it longer by a few samples, you will not only get some clicks caused by using non-ideal loop points, but you will also hear a lower pitch. Why this? Because you are essentially repeatedly playing the looped segment: regardless of what is in the looped audio segment, the perceived pitch fundamental frequency will be equal to the number of times you play that segment in a second.

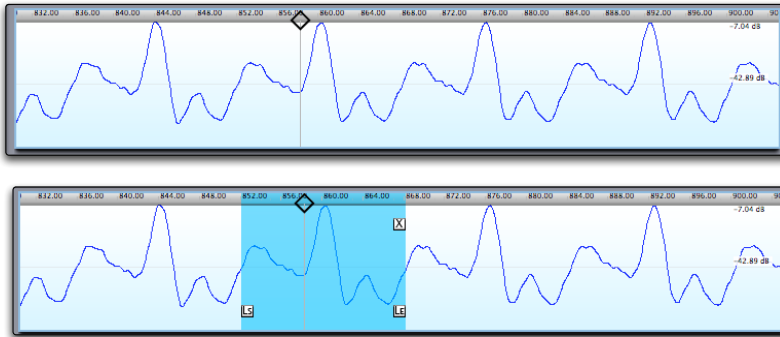
Another related problem is that while loop start and end positions (and therefore the loop length) can be expressed only as integer numbers, almost in every case you'd need loops of fractional length. For example, the fundamental frequency for note C4 is 261.60 Hertz, and this needs a single cycle loop of 168.57 samples (at 44.1Khz sample rate) to play at the right pitch. This looks like an impossible problem, as you can only build loops of 168 or 169 samples. The clever solution introduced many years ago by sampler manufacturers is to have a fine tune control for the loop segment. With this control you can set a loop of 168 samples, which will play sharper than wanted, and then tune it down using the loop tune parameter. But you see, this complicates things, as now not only you have to find the right loop points, but also set another parameter correct the pitch.

Keymap does all this (loop search and re-tuning) for you, with a single key command.

Keymap single cycle loop functions have been designed to work on harmonic samples, and will not work correctly with other kinds of material.

Autolooping a single cycle

Creating a single cycle loop in a harmonic sample is as simple as placing the sample cursor in the sample editor, and using the **Samples > Loop > Autoloop Single Cycle** menu function. A loop of the proper length will be created, with the loop start aligned to a positive-phase zero crossing, and the loop tuning parameter set at the proper value in order to have a perfect pitch.



Just place the cursor at a sample position, and then use the **Samples>Loop>Autoloop Single Cycle** menu function

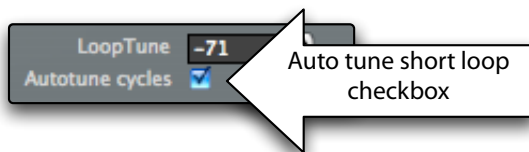


Keymap will create a single cycle loop, and tune it to get perfect pitch

In some cases, you might want to add a small amount loop crossfade in order to smooth the transition.

Autotuning a near-cycle to match the right pitch

Near-cycle loops are intended for loops less than two waveform cycles long. These short loops are an authentic gold-mine of sonic potential, but experimenting with them has always been a problem because the pitch changes drastically as you change the loop length. Keymap offers an autotuning function that automatically does that for you with harmonic samples.



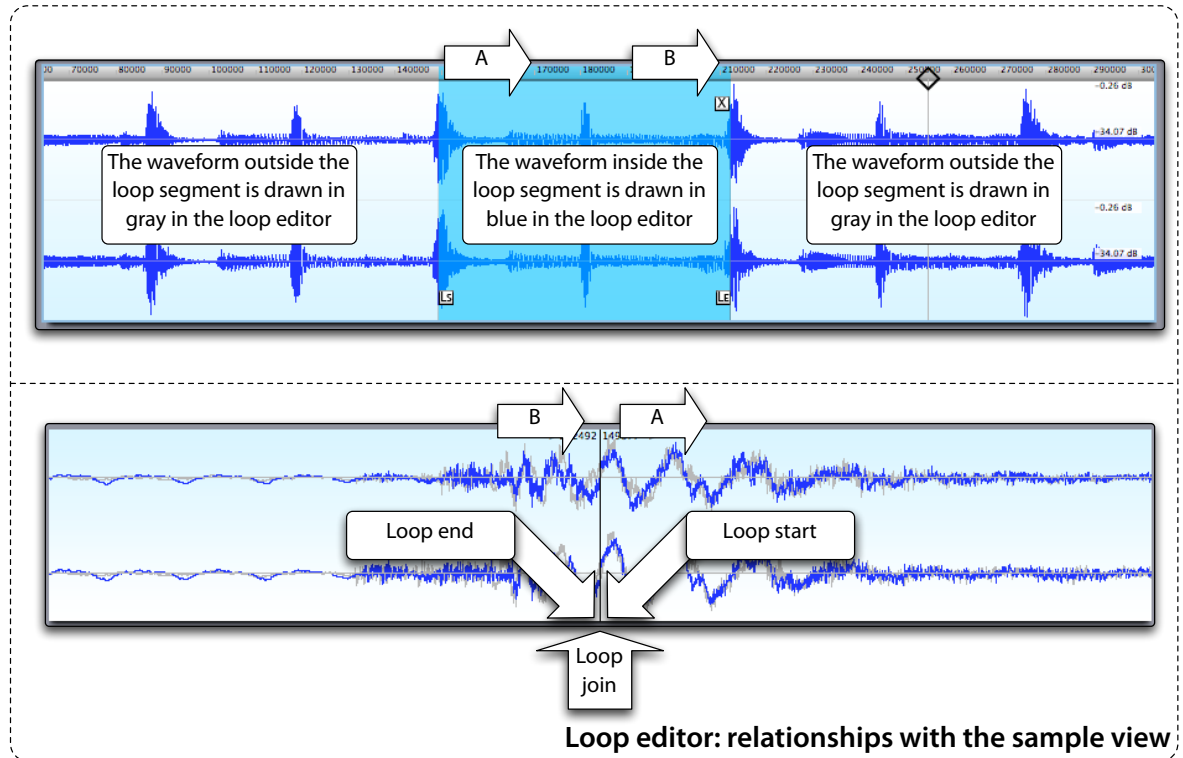
Just enable the **Autotune cycles** checkbox and your short loops will be re-tuned.

If you edit the loop points while playing the sample, you will hear how the pitch will remain stable, but the spectral shape of the sound will smoothly change.

When experimenting with near-cycle loops, we recommend using loop crossfades in order to always get a smooth loop.

The Loop editor

The loop editor specializes in displaying the loop at its most important point: the join point. The loop editor is indeed always centered on the loop join point, with the waveform on its left being the one at the end of the loop, and the waveform on its right the one at the beginning of the loop.



The loop editor always shows two overlapped waveforms: the one around the loop start, and the one around the loop end. The waveform sections inside the loop are drawn in blue, while the audio not in the loop is drawn in gray.

The underlying concept is that the audio around the end of the loop should ideally be very similar to the audio around the start of the loop. When this happens, you won't hear glitches when the loop wraps back to the start. Whenever you change the loop points in the sample editor, the loop editor will show you the situation at the join points.

TruView display mode

The loop editor also can switch to TruView display mode, and in this mode will effectively display the resulting waveform after adding a crossfade to the loop.

Changing the Horizontal and Vertical zoom using the sliders

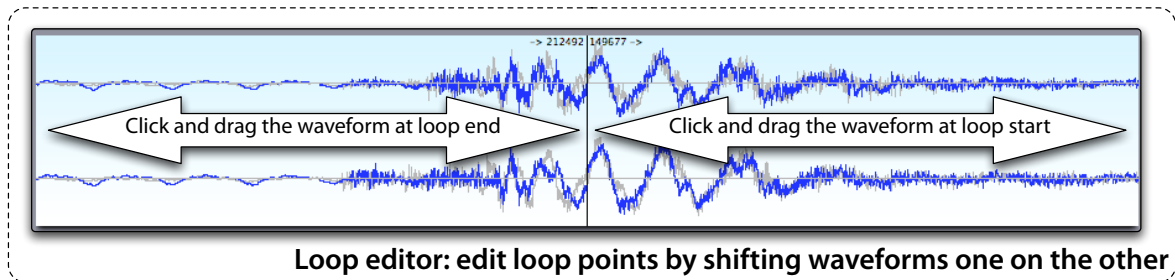
You can change the zoom levels for the loop editor by moving the respective faders on the bottom and on the right of the loop editor.

Changing the Horizontal zoom using the Mighty Mouse trackball

You can change the horizontal zoom level for the loop editor by rotating the Mighty Mouse trackball forward and backward.

Changing the loop start and loop end with the loop editor

The loop start position can be modified from the loop editor, by clicking over the right half of the view and dragging the waveform. As you can see in the sample view and in the sample inspector, this is equivalent to setting the loop start, with the added benefit that you can interactively see how the waveforms overlap. The loop end point is similarly edited by dragging the waveform in the left half of the view.



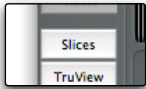
Chapter 18: Slices

The virtual sample is built out of slices

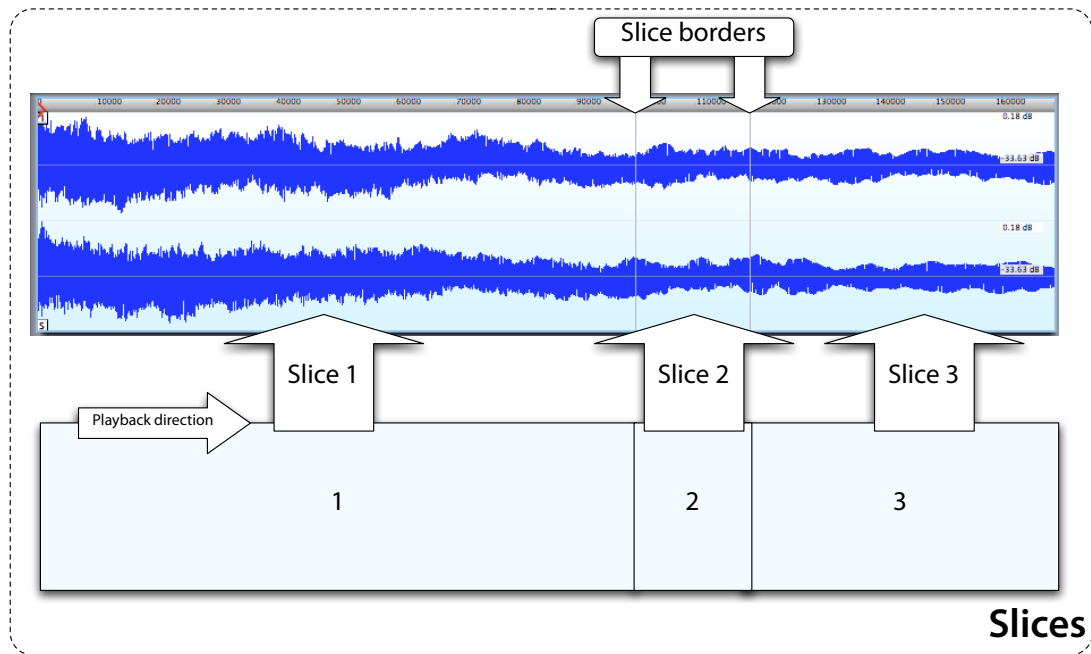
We previously made an analogy between the sample editor in Keymap and the arrange window in Logic, as they both are non destructive respect to sample files. Well, continuing in that analogy, exactly as Logic has audio Regions in a track, Keymap has **slices** in a **virtual sample**. This analogy should give you a good idea of what you can do. Some things are a bit different, and for example all slices in a virtual samples must always be tied one to the other, with no “empty space” allowed in between.

Looking at slices

Slices are normally not shown in the sample view. By clicking on the Slice button, however, you enable the **slice view mode** and can see the slice borders as light gray vertical lines. Each segment subdivided by slice borders is a slice.



Slices are always segments from the same sample (you can't copy and paste across different samples), placed one tied to the other, as shown in the following illustration.



Cut and paste using slices

Once you enable the **slice view mode**, and you copy, cut or paste inside a virtual sample, you will notice how slice borders will appear around copied or cut segments. This is consistent with the “audio Regions in a Logic track” analogy we made earlier.

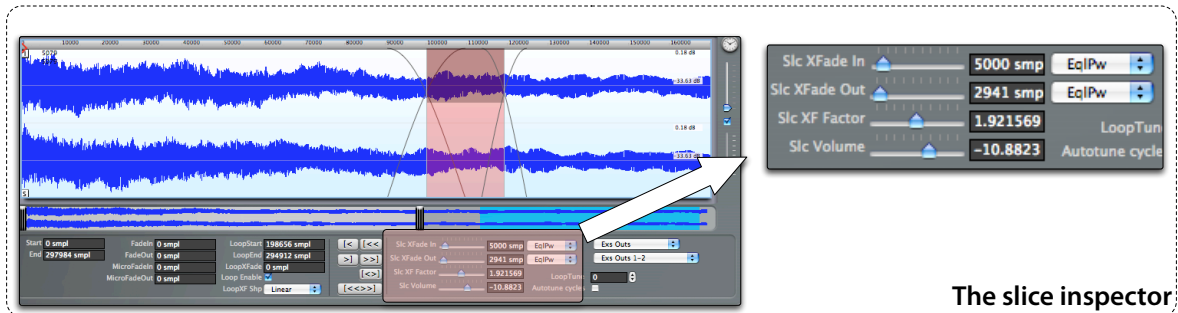
The continuous slice crossfade mechanism

Each slice in Keymap has an independent volume and is always smoothly crossfaded with the next slice via a selection of several crossfade shapes and variable crossfade length. This continuous crossfade system is totally non destructive, and performed in realtime. As slice crossfades are always computed before looping (and loop crossfade) in the Keymap audio chain, the two crossfades do not interfere.

The reason for having slice crossfades is that you can do a lot of interesting edits if you do not have to worry about clicks at slice boundaries.

The slice inspector

All the slice parameters can be set in the slice inspector, under the sample view, as shown in the following illustrations. The slice inspector always shows the parameter values for the currently selected slice.



Available parameters are the **Slice XFade In** and **Slice XFade Out**, which set the length of the crossfade segments at beginning and at end of the currently selected slice. You can also select the respective fade shapes to **linear**, **eqpower** or **s-shape** using the pop-up menus on their right.

The **Slice Volume** changes the volume for the selected slice, and is visualized in the sample editor as a colored bar imposed on the slice. The **Slice XF Factor** parameter is **global** to all slices in the virtual sample, and is an overall crossfade length factor, so that you can tweak crossfades in the whole sample with one single edit.

Using the TruView mode with slices

We recommend using the Truview display mode when editing slices, so you will be able to see in realtime the actual results of your edits.

How to select a slice

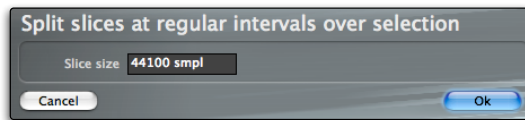
In each virtual sample, there can only be one selected slice at a time. You select a slice by holding the **Option key** and clicking with the mouse over it in the sample view. If you enabled the slice view mode, the selected slice will be highlighted in light red color.

How to slice/split a sample

Slicing a sample is done by splitting an existing slice at the desired position, and it's very simple: just place the sample cursor at the desired split position and use the **Samples > Slices > Slice split at cursor position** menu command (**Y** key command). A split line will appear.

Slicing a sample at regular positions

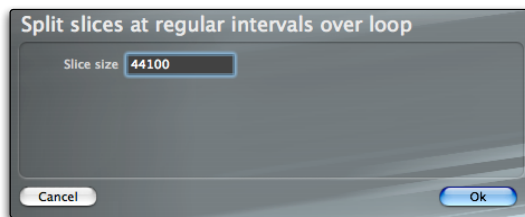
Sometimes you may want to slice the sample at regular intervals. You can do that by selecting a portion of the sample, and using the **Samples > Slices > Slice selection at regular positions** menu command.



You will be asked to enter a size in samples, and then Keymap will split the selection in slices of the requested size.

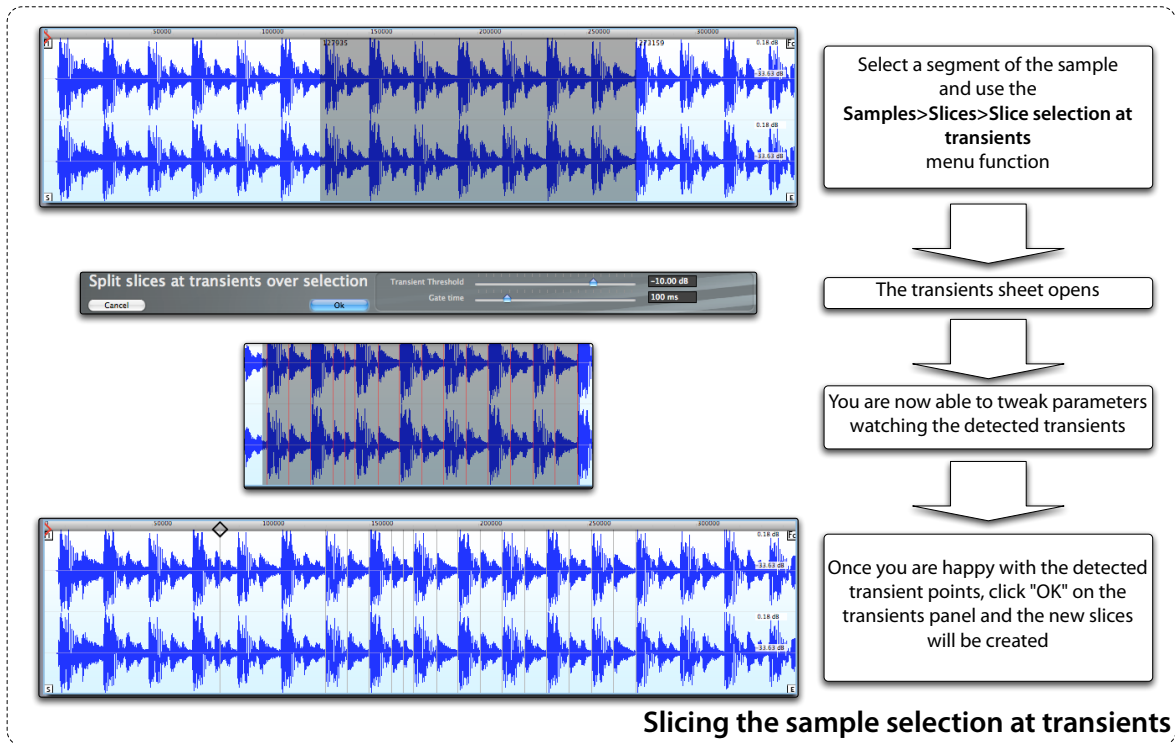
Slicing the loop at regular positions

Similarly, you may want to slice the loop at regular intervals. The **Samples > Slices > Slice loop at regular positions** menu command does exactly that.



Slicing the selection at transients

As we'll later see, slicing the sample at transients lends itself to many interesting creative possibilities. The slicing is done by first selecting a segment of the sample, and then using the **Samples > Slices > Slice selection at transients** menu command, as shown in the following illustration.



Slicing the loop at transients

The same process we have just seen can also be performed directly on the loop segment, using the **Samples > Slices > Slice loop at transients** menu command.

Slicing the loop in a musical number of slices

Keymap also lets you slice the loop into a specific number of slices. The **Samples > Slices > Split loop in 4** menu command will slice the loop in four regular segments. Other similar menus let you slice the loop in 6, 8, 12, 16, 24 and 32 regular segments. These functions are very useful as a basis for the Loop Remix functions we'll see later.

Removing all slices

From time to time you might want to reset all slices and edits and start from scratch again. The **Samples > Slices > Restore to unsliced** menu command removes all slices and restores the virtual sample to a copy of the real sample file on disk.

Manual slice editing: drag-shifting the slice content

The sample view lets you manually edit slices in many interesting ways. The **content** of a slice can be **shifted** by pressing and holding the **Command key** and **dragging the content** of the slice with the mouse. The slice borders and position will not change, but the audio content in the slice will shift. Of course, for this to be possible, the slice must have some extra audio material at the left or right of the currently displayed segment (for example: you can't shift a single slice as long as a sample file). The total length of the sample is not affected by this edit.

Manual slice editing: drag-shifting the slice borders

If you press and hold the **Option+Command key modifiers**, you will be able to click and **drag the slice borders**, without changing the position of the played audio for that slice. In other words, you are really shifting the boundaries. The total length of the sample is not affected by this edit.

Swapping the audio content of two adjacent slices

You can swap the audio content of the selected slice with the content of an adjacent slice by using the **Samples > Slices > Swap slice content from left** or **Samples > Slices > Swap slice content from right** menu functions. The swap will occur only if both slices length can be expanded or reduced to fit the other's length.

Swap remix beat functions

Once the loop has been split in a number of slices, you can randomly swap certain relative "beat" positions of these loop slices. The available slice remix functions found in the **Samples > Slices > Swap remix....** menus, let you remix the 1st beat, the 2nd beat, the 3rd beat or the 4th beat, all the beats indifferently, or just the selected slice in the loop.

Divide a slice exactly in two

The **Samples > Slices > Slice divide in half** menu command splits the selected slice exactly in the middle. This is useful, as example, if you have a loop divided in fourths, but need also some 8ths.

Divide a slice exactly in two with stuttering

The **Samples > Slices > Slice stutter** menu command splits the selected slice exactly in the middle. However the 2nd slice will also be shifted so to be an exact repetition of the 1st one. This command is useful for stuttering effects, but also for other creative edits.

Duplicate a slice

The **Samples > Slices > Slice insert duplicate** menu command adds a copy of the selected slice next to it. This function increases the total sample length.

Remove a slice

Sometimes you might want to delete a slice without affecting the total sample length. The **Samples > Slices > Slice remove** menu command first deletes the selected slice, then fills the empty space with the tail of the preceding slice.

Delete a slice

You delete a slice by first selecting it and then using the **Samples > Slices > Slice delete** menu command. The total length of the sample will decrease of the length of the deleted slice.

Creating Zones from slices

Once you have created some slices, you might want to map those slices into the instrument as individual Zones. The **Samples > Slices > Map slices under selection to layer** menu command does exactly that by creating new Zones, each playing a slice. As Keymap does not allow you to select multiple slices, you select the slices to be mapped using the normal sample selection system. Only slices **completely covered** by the sample selection will be mapped to the layer. Also, for this function to work, the sample you are slicing must have been opened from the Instrument editor. The new Zones will be created sequentially on the notes at right of the Zone containing the sample.

Creating Zones from sliced loop

The **Samples > Slices > Map loop slices to layer** is very similar to the above function, with the difference that you do not have to make a selection. The new Zones will be generated from the slices created in the loop.

Chapter 19: Mapping functions

The overall goal of Keymap is to let you create instruments out of samples. If your samples each contain a single sound, then you can create Zones by dragging those samples directly to the Layer matrix. When instead a single sample contains multiple audio segments, each representing a different note, or a different sound/loop, then you need a way to map each of these segments into Zones. Keymap offers several automated ways to do this, but it also lets you do it manually through a series of **mapping functions**. All these functions requires that you have at least one Instrument editor open, with a layer selected. The nine mapping functions are combinations of three possible ways to define a segment, and three ways to map that segment into a layer. The new Zones will be created in the selected layer in the Instrument editor. That layer is called the **current layer**. Each of the created Zones is one note wide: you can later fill the empty areas of the matrix using the **Expand** remapping function.

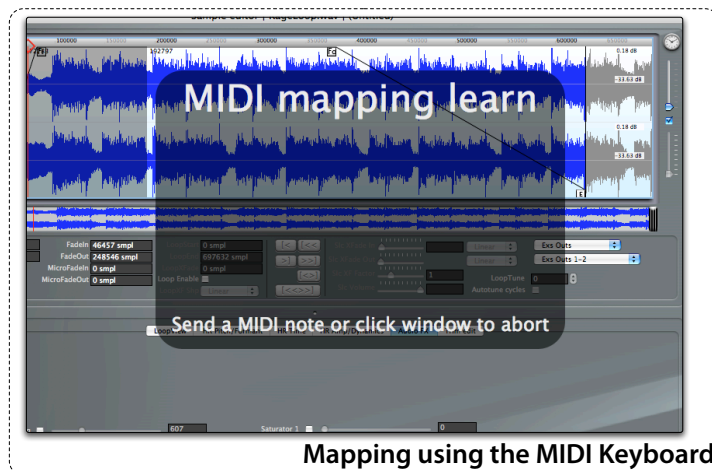
Mapping the start-to-end sample segment

Creating a new Zone from the start-to-end segment, placed sequentially in the layer

The **Samples > Map > Map sample sequentially to current Layer** menu function creates a new Zone from the start-to-end sample segment. The Zone and its root note are mapped sequentially over the matrix.

Creating a new Zone from the start-to-end segment, placed in the layer through MIDI Keyboard

The **Samples > Map > Map sample with MIDI Learn to current Layer** menu function creates a new Zone from the start-to-end sample segment. Immediately after selecting this menu, you are asked to press a note on your MIDI Keyboard to choose which note the Zone will be mapped to.



Mapping using the MIDI Keyboard

The Zone root note is set to that note too.

Creating a new Zone from the start-to-end segment, placed in the layer using pitch detection

The **Samples > Map > Map sample with pitch detection to current Layer** menu function creates a new Zone from the start-to-end sample segment. The segment will be analyzed for pitch, and the Zone and its root note set at the detected note.

Mapping the loop segment

These functions require a loop to be defined and enabled

Creating a new Zone from the loop segment, placed sequentially in the layer

The **Samples > Map > Map loop sequentially to current Layer** menu function creates a new Zone from the loop sample segment. The Zone and its root note are mapped sequentially over the matrix.

Creating a new Zone from the loop segment, placed in the layer through MIDI Keyboard

The **Samples > Map > Map loop with MIDI Learn to current Layer** menu function creates a new Zone from the loop sample segment. Immediately after selecting this menu, you are asked to press a note on your MIDI Keyboard to choose which note the Zone will be mapped to. The Zone root note is set to that note too.

Creating a new Zone from the loop segment, placed in the layer using pitch detection

The **Samples > Map > Map loop with pitch detection to current Layer** menu function creates a new Zone from the loop sample segment. The segment will be analyzed for pitch, and the Zone and its root note set at the detected note.

Mapping the selection

These functions require a selection to be defined

Creating a new Zone from the current selection, placed sequentially in the layer

The **Samples > Map > Map selection sequentially to current Layer** menu function creates a new Zone from the current sample selection. The Zone and its root note are mapped sequentially over the matrix.

Creating a new Zone from the current selection, placed in the layer through MIDI Keyboard

The **Samples > Map > Map selection with MIDI Learn to current Layer** menu function creates a new Zone from the current sample selection. Immediately after selecting this menu, you are asked to press a note on your MIDI Keyboard to choose which note the Zone will be mapped to. The Zone root note is set to that note too.

Creating a new Zone from the current selection, placed in the layer using pitch detection

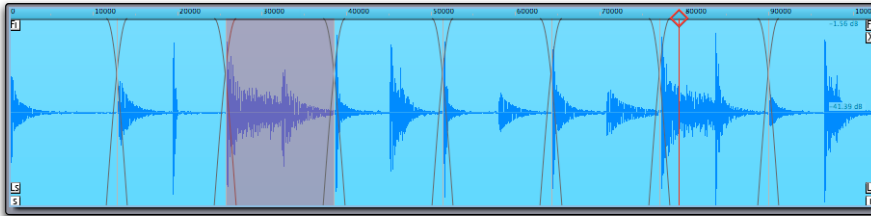
The **Samples > Map > Map loop with pitch detection to current Layer** menu function creates a new Zone from the current sample selection. The selection will be analyzed for pitch, and the Zone and its root note set at the detected note.

Loop remix

Using slices, the continuous crossfade system and a few selected key commands, you can easily take an existing rhythmic loop and create dozens of variations out of it. We call this “**Loop remix**”. The trick is to subdivide your aligned rhythmic loop in a “musical” number of slices. As example, in a 2 bar 4/4 loop, we could use 8 slices, so that each slice is a single beat. By swapping individual slices you can recombine the loop in many different variations, which you can then map to keyboard with just a key command. Imagine doing all this while the loop is playing in realtime!

Activate slice view mode

Then split your loop in 8 or 16 slices using the **Samples>Slices>Slice loop in 8 (or 16)** menu



Play the loop, select one slice with option+click, then holding shift+control pressed, use the cursor keys to navigate and remix slices

shift

control

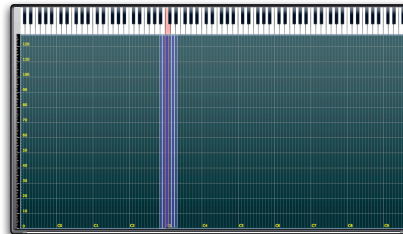
↑
↓
Shift slice
content from
left

←
→
Select slice at
left

↑
↓
Shift slice
content from
right

←
→
Select slice at
right

Every time you like the loop, press Q
(**Samples>Map>Map loop sequentially to layer**)
and you will map it as a new zone



Loop remix how-to

Tip: slice crossfade/volume parameters let you smooth or enhance specific beats, you can alter timing by shifting the slice content, you can add extra slices or tweak slices borders.

Chapter 20: Automap

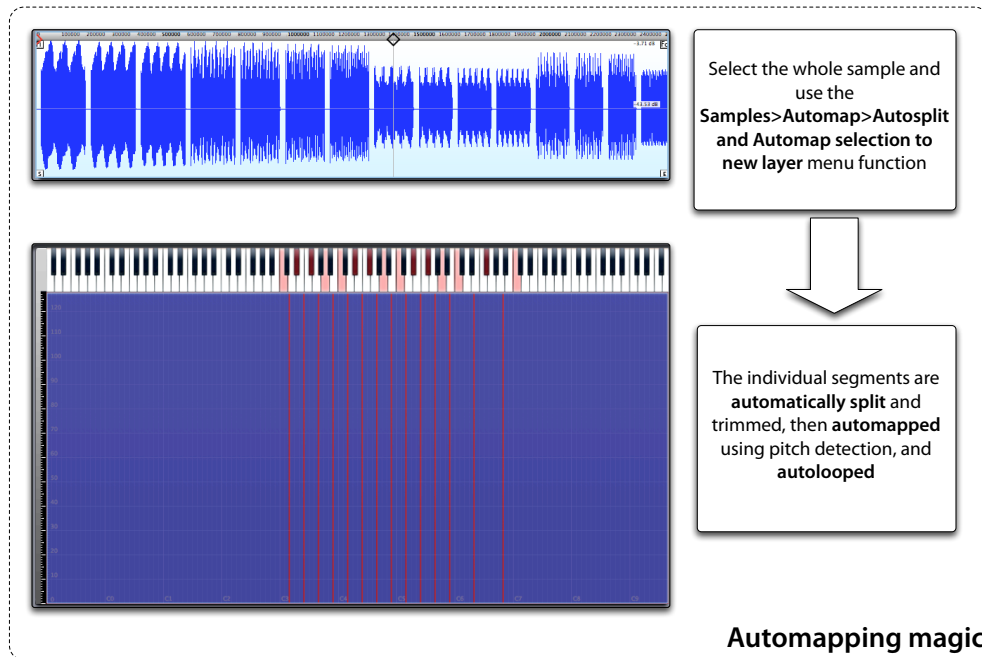
Keymap lets you automate the split-and-map process from the sample editor with the automap functions.

Autosplitting and Automapping a sample sequentially

If you select the desired section of the sample which contains all the sounds you want to map to Zones, and use the **Samples > Automap > Autosplit and Automap selection sequentially to new layer** menu function, Keymap will split the selection in the individual segments, trim them according to your trim level preferences, and will create Zones sequentially in a new layer. The resulting Zones are also autolooped.

Autosplitting and Automapping a sample using pitch detection

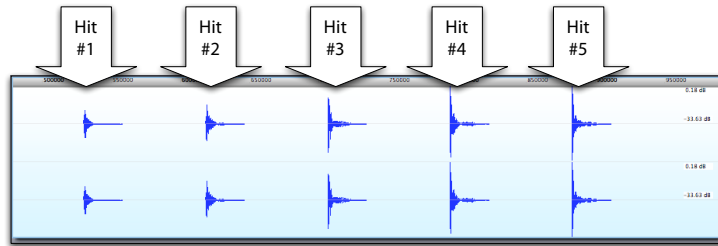
The **Samples > Automap > Autosplit and Automap selection by pitch to new layer** menu function works similarly to the previous function, but will use pitch detection to map Zones to the appropriate notes. The resulting Zones are also autolooped.



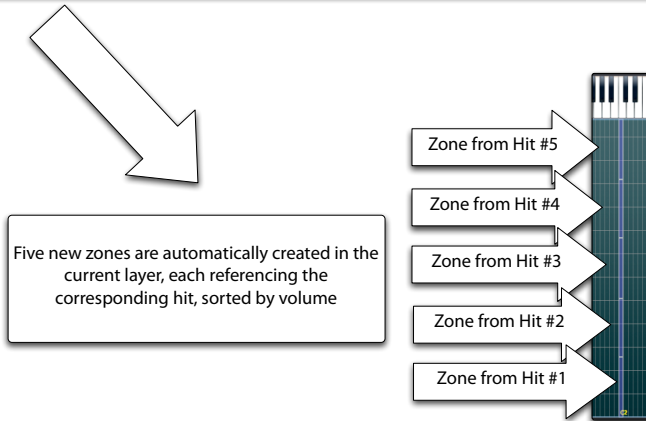
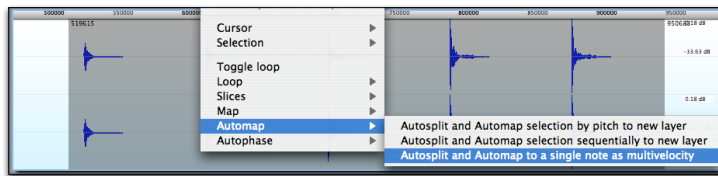
Create multi-velocity Zones for a single note, from selection

With this function you select a section of your sample recording containing an arbitrary number of sounds sampled at different velocities (for example a snare, or a guitar, or a piano), then use the **Samples**

> **Automap > Autosplit and Automap to a single as multivelocity** menu function to split automatically those sounds and create the respective Zones into the layer, at the same single note. The Zones are mapped over the velocity axis based on their relative volume.



Select the whole sample and then
Samples>Automap>Autosplit and Automap to a single note as multivelocity



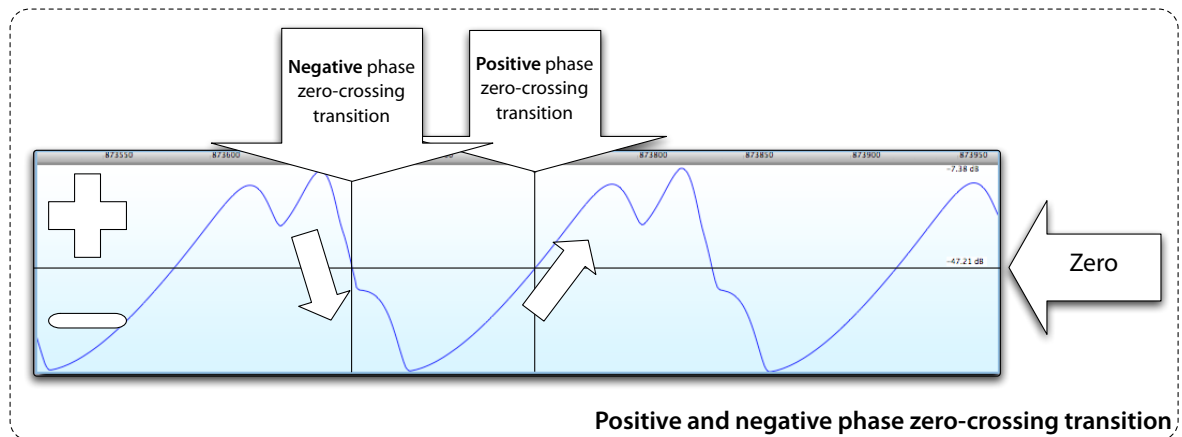
Note: each split segment is automatically trimmed using the trim level preferences. If you do not get the expected results, you might have set those values too high or too low.

Chapter 21: Autophase

You often might want to set the sample start, the sample end, or the loop points to a positive phase zero-crossing transition. The autophase family of functions searches for the nearest zero-crossing transition and set parameters to that position.

What is a positive phase zero-crossing transition?

The audio signal is physically emitted from your audio outputs as a voltage fluctuating cyclically from positive values to negative values and then back to positive values. A zero-crossing transition is when the audio voltage crosses the zero voltage level. The waveform represents this continuous voltage change by drawing its level over time, around a “Zero level” line.



As you see, you can have two types of zero-crossings: when the wave level decreases and goes from positive to negative, and it’s called **negative phase**, or when the wave level increases and goes from negative to positive, and it’s called **positive phase**.

Autophasing the start position

The **Samples > Autophase > Sample Start** menu command sets the sample start to the nearest positive phase zero crossing.

Autophasing the end position

The **Samples > Autophase > Sample End** menu command sets the sample end to the nearest positive phase zero crossing.

Autophasing the loop start position

The **Samples > Autophase > Loop start** menu command sets the loop start to the nearest positive phase zero crossing. The loop end position is changed too, so that the loop length doesn't change.

Autophasing the loop end position

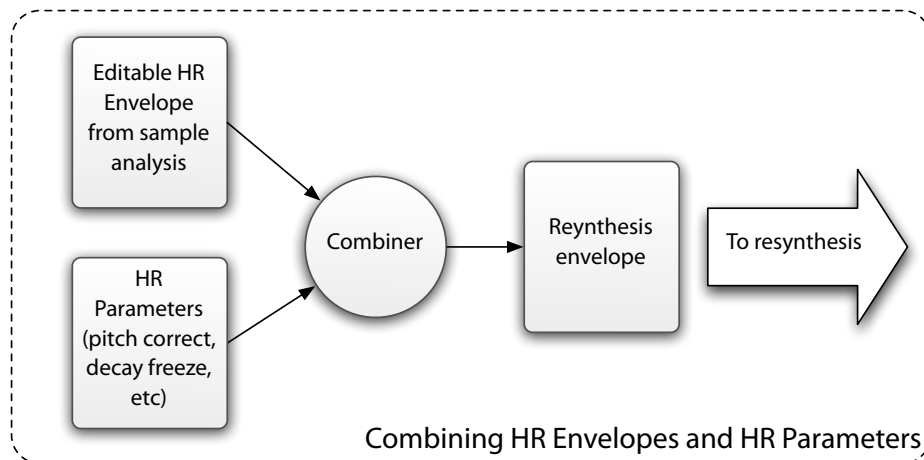
The **Samples > Autophase > Loop end** menu command sets the loop end to the nearest positive phase zero crossing. The loop start position is **not** changed, and so that the loop length will change.

Chapter 22: Harmonic Resynthesis in the sample editor

Each virtual sample can be controlled by a relative set of parameters and envelopes, and has its own independent Harmonic Resynthesis engine. If the sample has been already mapped to a Zone, the HR setting of the Zone and of its sample are coincident (i.e. it's a single set). With Harmonic Resynthesis you can reshape harmonic samples over four important properties: pitch, formant, time and amplitude. By default, Harmonic Resynthesis is not active until you explicitly enable it. HR is a resynthesis method, and not a pitchshift or timestretch function, and it will work correctly only with single pitch harmonic samples, with the exception of HR Amplitude, which can be applied to any kind of sample.

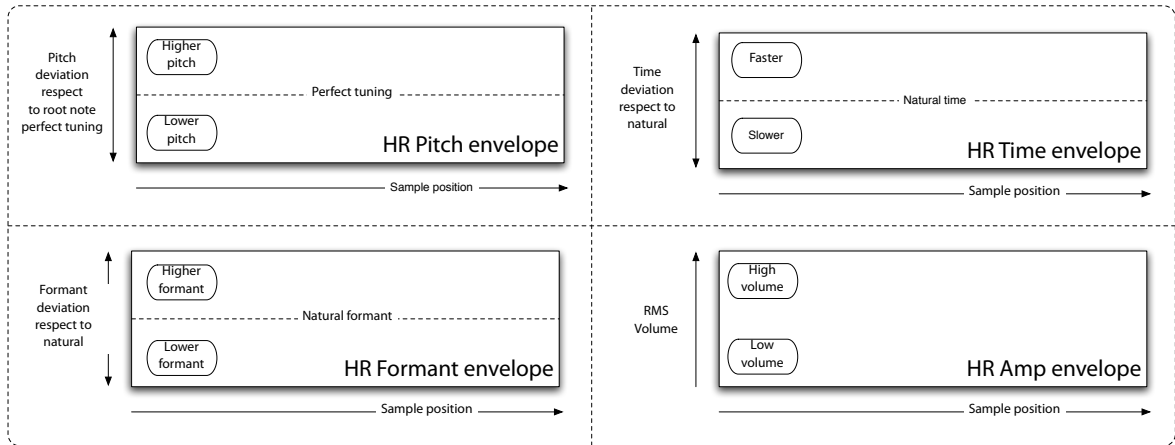
HR Envelopes and parameters are combined into the resynthesis envelope

The first time that Harmonic Resynthesis is enabled for a sample, it makes an analysis of the sound. This operation might take a few seconds or more depending on the complexity, the length and the format of the sample. The resulting envelopes (one for each property) can at this point be manually edited using several available tools. Keymap then combines these envelopes with a series of HR parameters, and as a result creates a new envelope called the **resynthesis envelope**, which ultimately is used by Keymap as the basis for re-creating the desired sound.



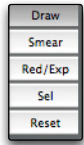
How HR Envelopes are displayed

All of the HR envelopes are displayed as envelopes overlaid to the sample waveform. There is a single envelope for each sonic property regardless of the number of audio channels in the sample. While the envelope and the sample share the use of the horizontal axis for sample position, the vertical axis representation changes depending on the type of HR Envelope, as shown in the following illustration.



How HR Envelopes are edited

Keymap provides a number of tools for editing the HR Envelopes. The tools are selected from the HR tools section in the sample editor, and are used by holding the **Shift key** while clicking and dragging the mouse in the sample view over the envelope. For the tools to become selectable, you must first select which HR envelope you want to edit. As soon as you select one envelope, this will become highlighted in red color.

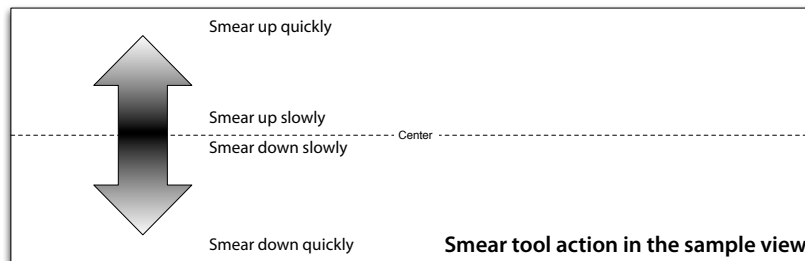


Draw tool

The draw tool let you directly draw the envelope. As simple as that!

Smear tool

The smear tool smoothly bends the envelope in the vertical direction. The bend speed is proportional to the distance of the mouse cursor from the mid of the sample view. This tool is very useful for editing/warping the envelope, maintaining its natural characteristics (as opposed to drawing).



Reduce/Expand tool

The smear tool smoothly reduces or expands the envelope in the vertical direction with respect to its neutral value (usually the center position). The speed of the action is proportional to the distance of the mouse cursor from the mid of the sample view. This tool is very useful for reducing or enhancing pitch vibratos manually.

Reset tool

The reset tool, when applied, smoothly and progressively restores the envelope to its original shape. It's useful when you draw things manually, and you want to impart a little bit of natural feeling, or when you want to smoothly add the natural vibrato from a hand-drawn pitch correction.

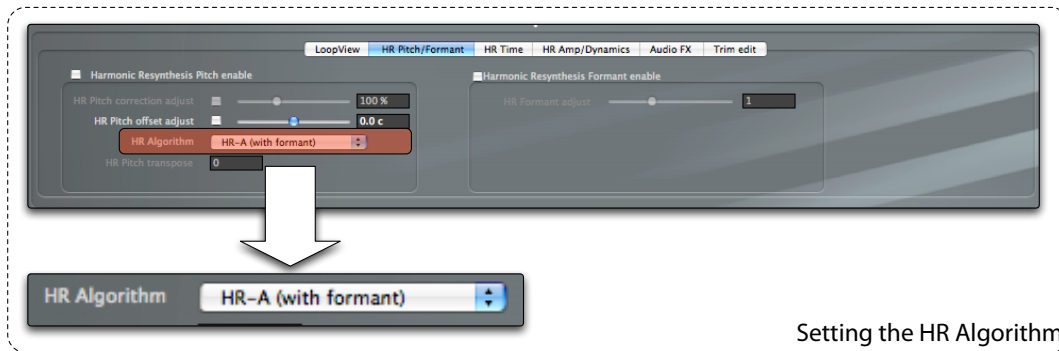
Harmonic Resynthesis algorithms

Keymap offers two alternative Harmonic Resynthesis algorithms: **HR-A** and **HR-B**.

HR-A allows manipulation of pitch, formant, time and amplitude. **HR-B** allows manipulation of pitch, time and amplitude (you lose formant control), but HR-B sounds better with complex, high pitched harmonic sounds and for polyphonation in the Instrument editor. For maximum flexibility, the algorithm can be selected individually sample by sample, Zone by Zone.

How to set the Harmonic Resynthesis algorithm

You can change the Harmonic Resynthesis algorithm by setting the **HR Algorithm** pop-up menu in the HR Pitch/Formant inspector, as shown here:

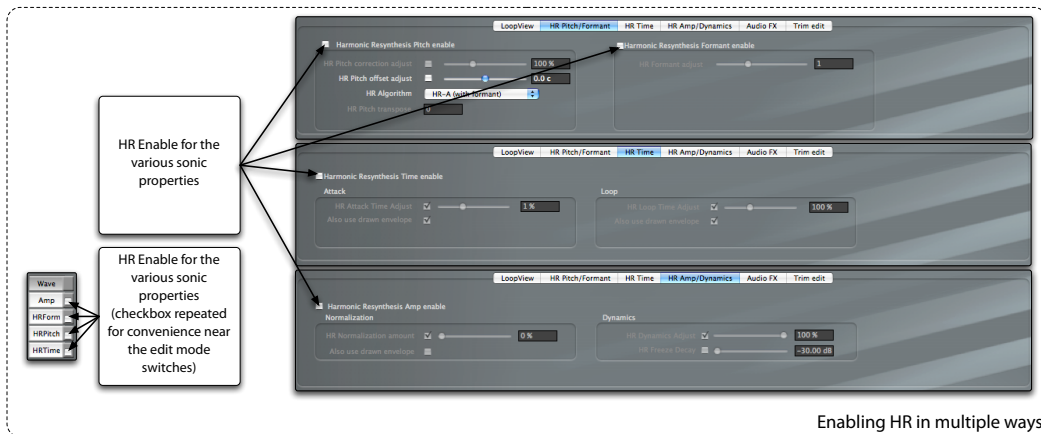


Setting the HR Algorithm

Note that changing the algorithm by itself doesn't mean that HR will be turned on for the sample.

How to enable Harmonic Resynthesis for the sample

You can enable the Harmonic Resynthesis engine for the sample by enabling at least one of the four master **HR enable** checkboxes, available both from the edit mode selection and in the various HR inspectors.



Enabling HR in multiple ways

The first time that Harmonic Resynthesis is enabled for a sample, an analysis of the sound will be made, and this operation might take a few seconds or more depending on the complexity, length, and the format of the sample.

Harmonic Resynthesis and loops

As Harmonic Resynthesis creates a new sound using the original sample only as basis, and as looping is performed in the audio chain after the HR Engine, you might need to tweak your loop points, or apply some crossfade after editing the HR Parameters.

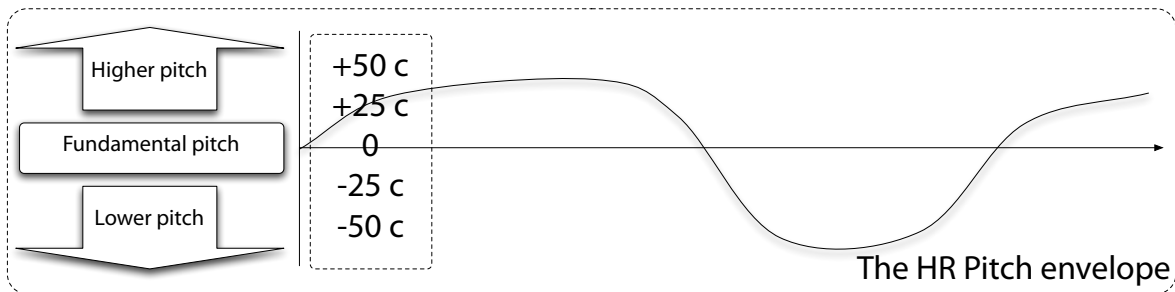
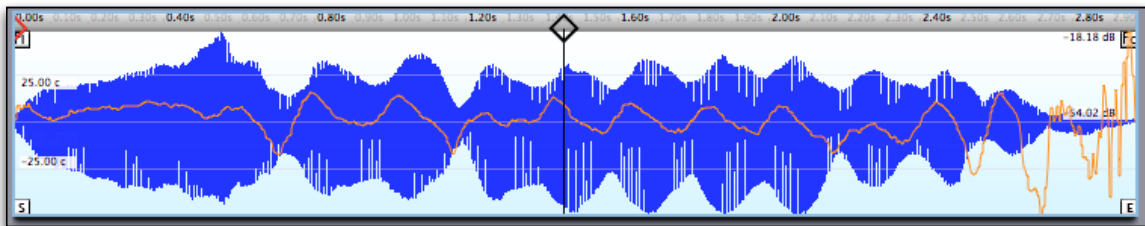
Saving to EXS24

As the Harmonic Resynthesis features are not directly supported by the EXS24, the sample needs to be rendered when saving the project to EXS24 format. The rendered sample is a normal sample file, containing the re-synthesized sample. We recommend keeping a Keymap format copy around before saving to EXS24 format so that you can go back and adjust the HR settings.

The HR Pitch envelope

If you enable the **Harmonic Resynthesis Pitch enable** checkbox, you will see the pitch envelope displayed as a thin line in orange in the auxiliary sample editor. That envelope represents the resynthesis envelope that will be used by Keymap to reconstruct the sound.

Immediately after analysis, the envelope is a precise representation of the detected sample pitch at any point. Notice how the envelope is represented as a deviation from the detected fundamental note pitch, which is in turn always represented as a horizontal line in the center of the sample editor, regardless of the fundamental pitch value, or the fact that the sample is mono or stereo.

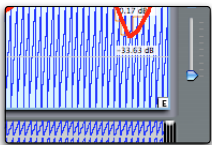


HR Pitch envelope ruler

At the left of the sample editor you can see the **HR Pitch ruler** values, displaying the deviation from the fundamental in cents.

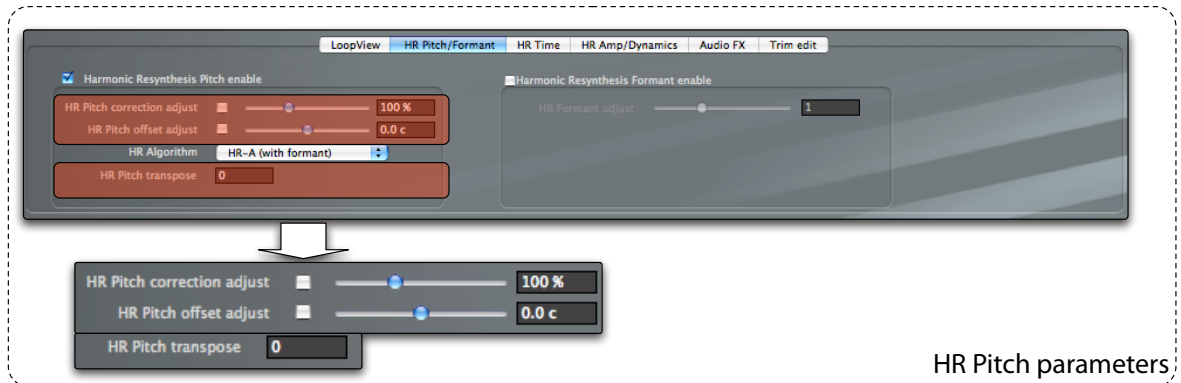
HR Pitch envelope zoom

The **HR Zoom** slider, at the right of the sample view, changes the zoom factor used for displaying the HR ruler and envelope. If you have a mighty mouse, you can press and hold the **Option** key and spin the mouse trackball vertically to change the vertical HR Pitch zoom factor.



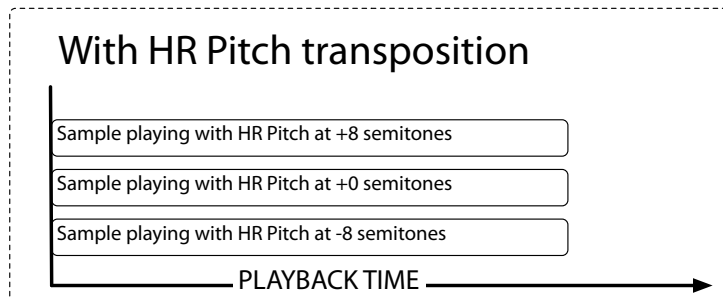
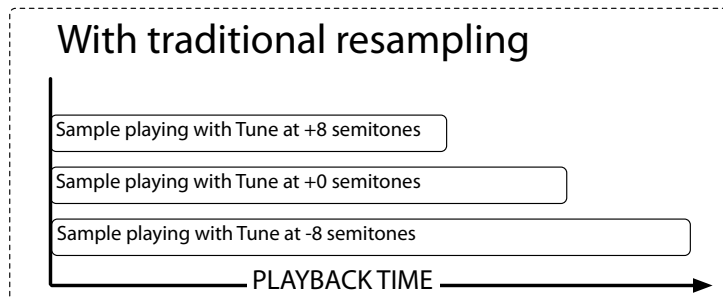
Harmonic Resynthesis parameters for Pitch

Each Zone has three pitch parameters for transforming the HR pitch envelope. These parameters deal with pitch transposition and pitch correction.



HR Pitch parameters

HR Pitch Transpose lets you change the pitch of the sample in semitone steps. The major difference between this parameter and the normal **Tune** Zone parameter is that HR Pitch transpose doesn't modify the original sample playback length, while the Tune parameter will instead change the playback resampling rate and higher pitches will result in shorter playback times as shown in the following illustration.

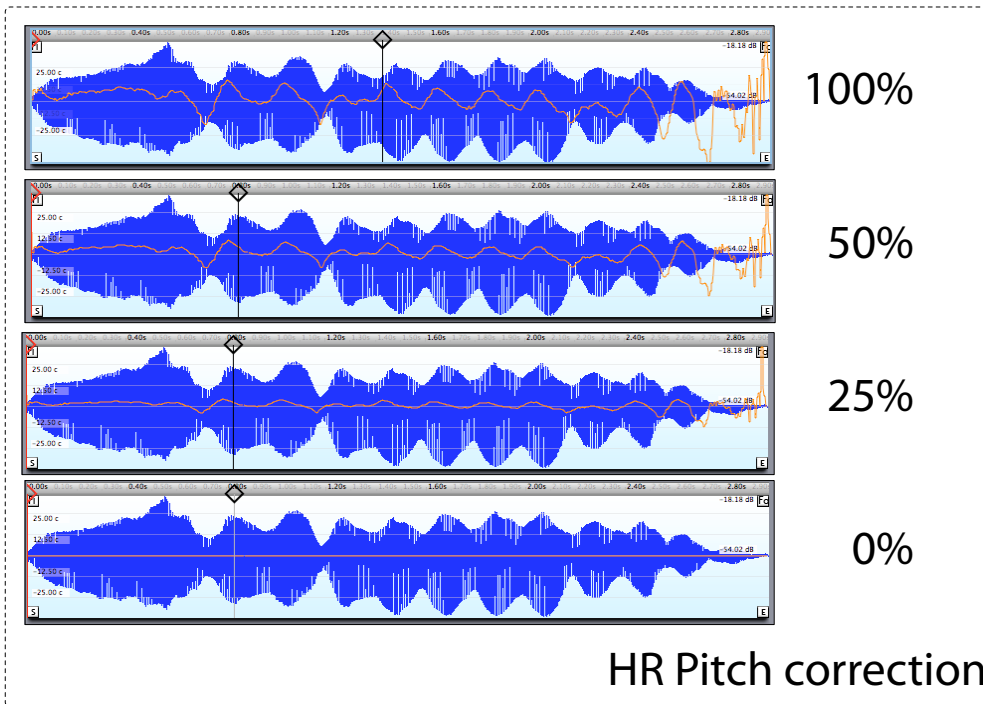


The HR Pitch Transpose parameter is used by Keymap as the basis for the Zone **polyphonate** function.

HR Pitch correction

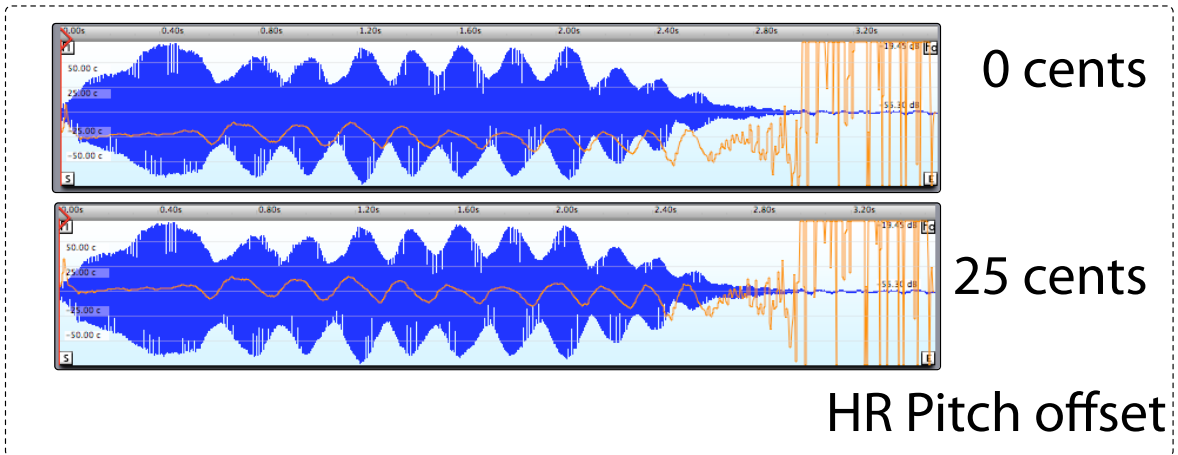
The **HR Pitch Correction adjust** parameter lets you correct the pitch envelope, by gently warping it toward the fundamental pitch by the desired amount. This parameter is expressed as percentage of the analyzed deviation, in which 100% represents the original untouched envelope and 0% represents full correction. You can also reinforce the pitch deviation from the fundamental by using values greater than 100%. In this case, the pitch deviation will be accentuated.

You can enable and disable pitch correction by using the **checkbox** near the pitch correction slider. When you edit and release the pitch correction slider, **the pitch envelope will be updated** to reflect the changes you made, as shown in this illustration:



Note: some amount of pitch correction is very useful when building sampled acoustic instruments especially considering how it's often difficult to sample some of them at perfect pitch. When playing a solo part a slight de-tuning might sound very human and wonderful, but if you play multiple instruments you definitely want them in tune.

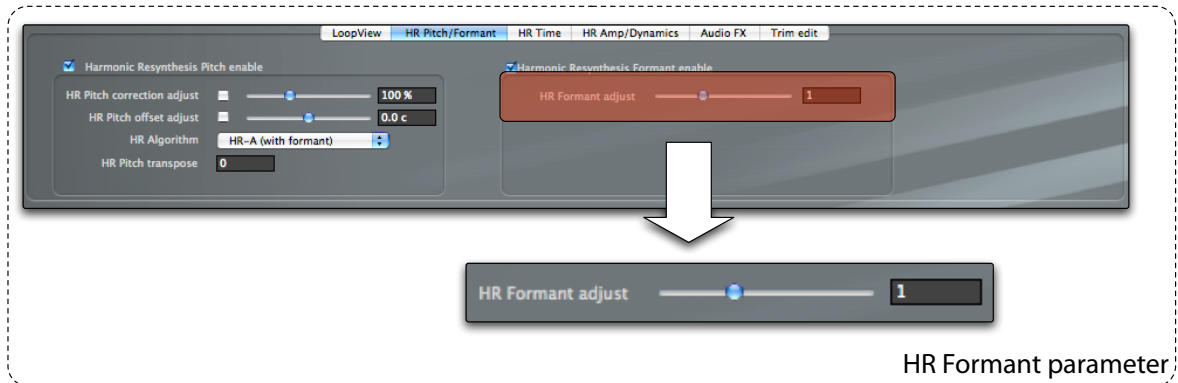
The **HR Pitch Offset adjust** parameter lets you add an offset to a pitch. This is useful when you have an out of tune vibrato, and you do not want to change the vibrato, but just center it onto the fundamental, as seen in the following illustration:



You can enable and disable HR Pitch shaping using the **Harmonic Resynthesis Pitch enable** checkbox.

Harmonic Resynthesis formant control

The HR-A algorithm of the Harmonic Resynthesis engine can be used to modify the formant of the played sample. This lets you change the spectral distribution of the sound without changing the pitch, and is useful if you want to create subtle variation of the same sample, or you just want to simulate a larger or smaller resonant body for a sampled acoustic instrument.



The **HR Formant adjust** parameter let you modify the formant of the sample. A value of 1.0 means no formant change, while a value of 0.5 means that the formant will be shifted toward high frequencies, and 2.0 means that the formant is shifted toward the low frequencies.

You can enable and disable HR Formant shaping for the sample using the **Harmonic Resynthesis Formant enable** checkbox.

Harmonic Resynthesis time control

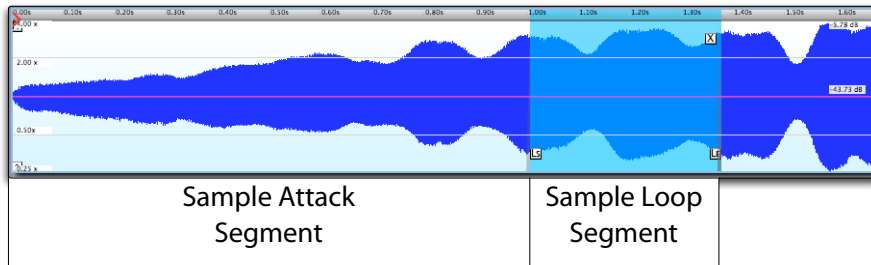
How many times have you wished you could have fine control over the timing of your sampled instrument? The Harmonic Resynthesis engine allows you to control the playback timing, so that you can easily slow down playback at some points or accelerate it in others. In other words you get continuous control of the timing aspects of your harmonic sample through the HR Time envelope.

Perceived time vs displayed time

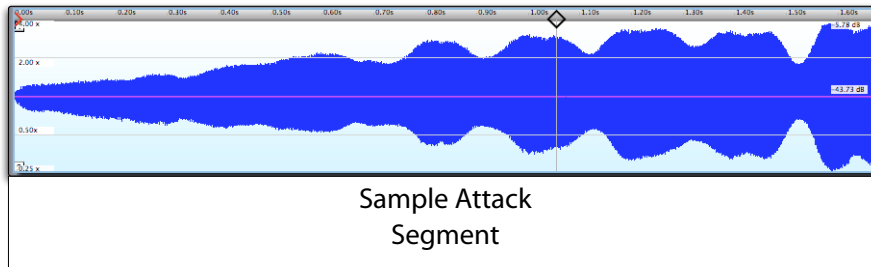
Keymap displays timing changes as a time envelope overlaid on the sample, but you will not see a change in the length of the displayed waveform in the sample editor. Instead, you will see the playback cursor slowing down or accelerating to reflect the current time envelope value. All sample position parameters **displayed** on screen (start, end, loop points, etc) will **not** change when you tweak the time envelope, and will keep referencing the original sample positions, but of course the **perceived** length (i.e. the length of the sound you'll hear) will change. The reason for this is so you can have a continuous time envelope that lets you edit and adjust envelopes with precision, without the screen constantly updating. After the initial sample analysis, the time envelope is a flat horizontal line centered over the sample waveform, meaning that no timing change occurs.

Harmonic Resynthesis time parameters

You cannot draw the HR Pitch envelope directly in the auxiliary sample editor in the instrument window, but two parameters control the sample attack and sample loop segments as defined in the following illustration:



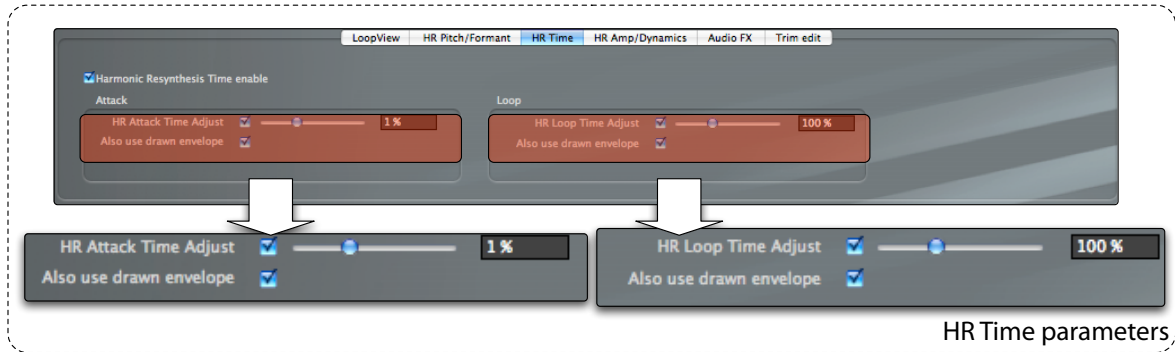
When a loop is enabled, we have both an attack and a loop segment



When the loop is disabled or not defined, we have only an attack segment

Note that when a loop is not defined, or disabled, there is no sample loop segment and so the whole sample is considered to be part of the sample attack segment.

The HR time parameters are found in the **HR Time inspector**.



The **HR Attack Time Adjust** lets you change the perceived length of the attack phase. The parameter is expressed as a percentage of the displayed length with a range of 50% (half of the original length) to 200% (double of the original length).

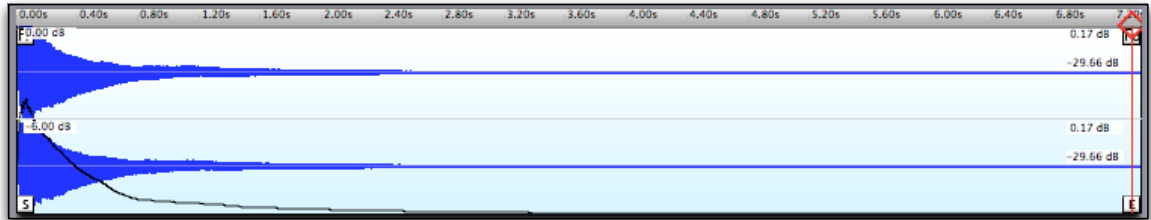
Similarly, you can change the perceived loop length using **HR Loop Time Adjust**. The parameter is expressed as a percentage of the displayed length with a range of 50% (half of the original loop length) to 200% (double of the original loop length).

The **Also use drawn envelope** checkboxes let you enable/disable the hand-drawn envelopes you might have created in the sample view.

You can enable and disable HR Time shaping for the sample using the **Harmonic Resynthesis Time enable** checkbox.

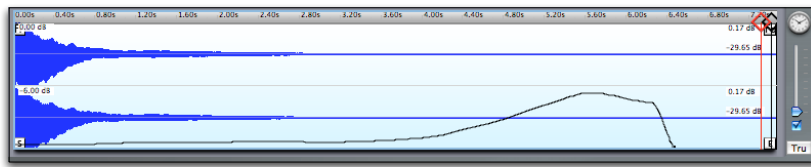
Harmonic Resynthesis amplitude control

The last of the four sonic properties that you can reshape with Harmonic Resynthesis is amplitude. When a sample is first analyzed, an amplitude envelope is created, representing the original sample amplitude characteristics. The amplitude envelope is displayed as a black line in the sample view, as shown in the following illustration.

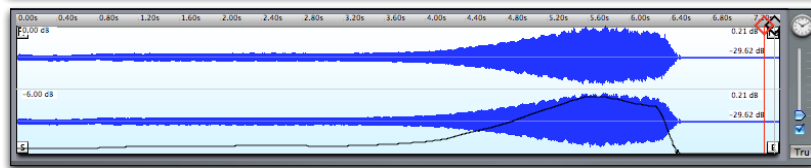


TruView display mode: visualizing HR Amp processing

When editing the HR Amp envelope or parameters, normally only the HR amp envelope is visually modified and the displayed sample waveform still represent the original sample. You can however visualize the actual, HR Amp processed, waveform by clicking the **TruView** button and entering the **TruView display mode**.



With the Tru-view mode disabled, the original sample waveform is displayed



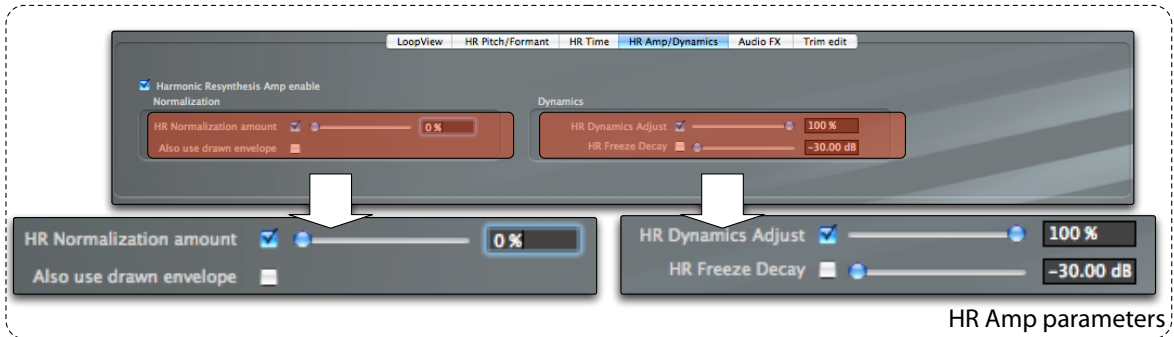
With the Tru-view mode enabled, the processed sample waveform is displayed

Note: TruView mode also displays the actual results of fade-ins, fade-outs and loop crossfades. In Tru-view mode, the audio outside the start and end positions is visualized as silence.

TruView display mode is slower and requires more CPU power than the normal mode, which is why it is not enabled by default.

HR Amp parameters

The HR Amp parameters are available from the **HR Amp inspector**.

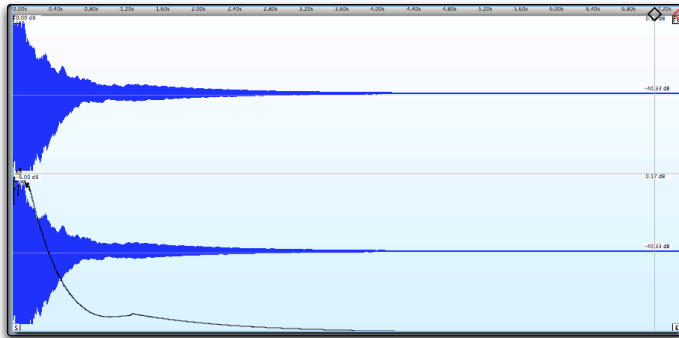


How to normalize samples using HR Amplitude

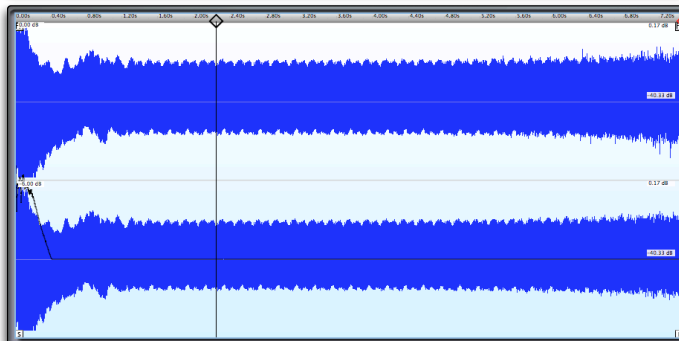
One of the most (over)used functions with regards to samples is normalization. Unfortunately this is usually implemented in a destructive way, which means the actual sample files are modified, which is difficult to undo. In Keymap, using Harmonic Resynthesis, you can perform this operation non destructively in realtime simply by setting the amount of normalization you want to achieve. The **HR Normalization amount** parameter goes from 0% (meaning no amplitude change), to 100% (meaning the amplitude is stretched to fully normalize the sample).

Freezing the decay of a decaying sample

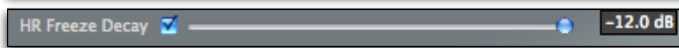
Another huge problem with sampled instruments is that decaying samples often can't be effectively looped, as the energy difference between the loop start and the loop end usually creates a sudden jump in the sound at the loop "join" point. In such situations, a loop crossfade will be helpful, but might not solve the problem. In Keymap, thanks to Harmonic Resynthesis engine, you can freeze the decay just by setting the **HR Freeze Decay** parameter to the desired decay level expressed in decibel. When the sample tail reaches that level, its level will freeze and remain constant until the end of the sample, making looping a much simpler task (and there are often hidden sonic gems in those long tails).



The original decaying piano sample

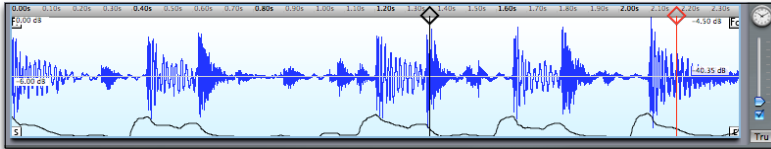


The same piano sample with decay frozen at -12dB

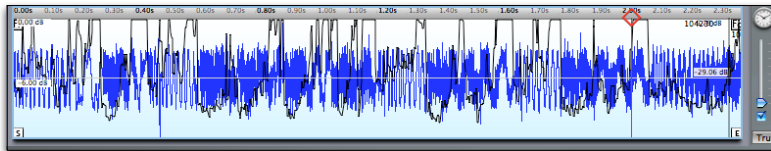


Removing dynamics out of the sample

Another function in Keymap lets you remove a variable amount of the dynamics from a sample so that it becomes an uniform sonic blob. The **HR Dynamics** parameter goes from 0% (no dynamics) to 100% (original dynamic). This function can be very interesting with drum loops and with samples of constantly varying amplitude. Once sounds have their dynamics removed, you can sculpt them again to your liking using the EXS24 envelopes and filters.



The original drum loop



The same drum loop with all dynamics removed

HR Dynamics 0.0%

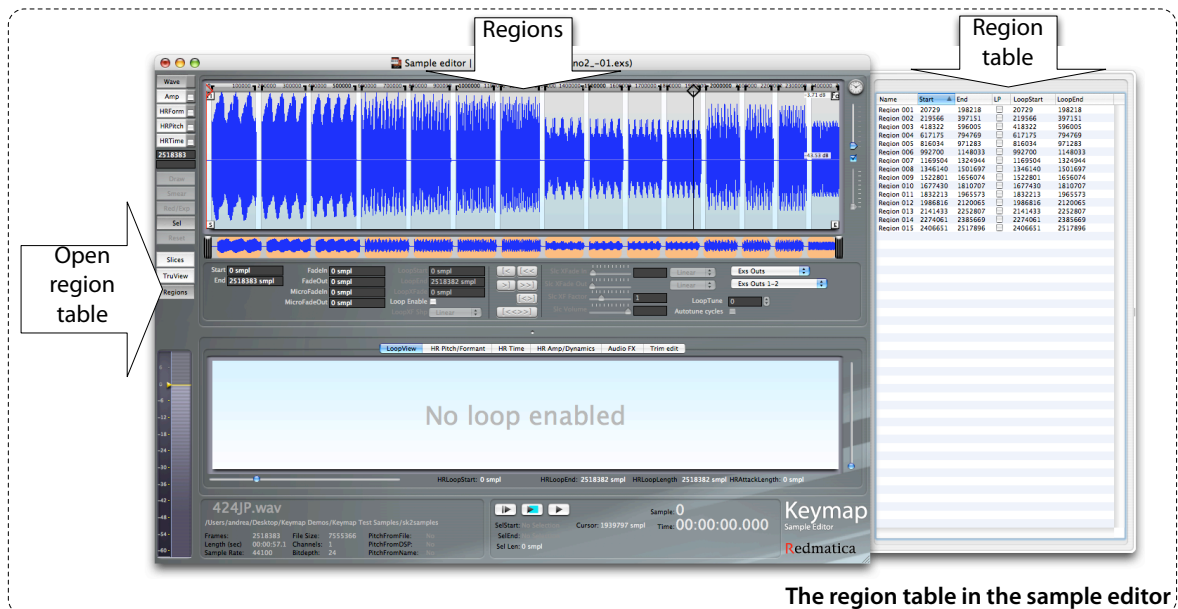
Chapter 23: Regions in the sample editor

Sometimes you might find it useful to have alternate sets of sample parameters for the same sample, or perhaps you would like to define audio segments from a sample that you will later map to individual Zones. Regions are Keymap elements designed specifically for these tasks. Each Region is basically an independent set of the following parameters:

- SampleStart
- SampleEnd
- FadeIn
- FadeOut
- LoopStart
- LoopEnd
- LoopXFade
- LoopXFadeShape
- LoopEnabled

Regions can be defined manually or by autosplitting samples.

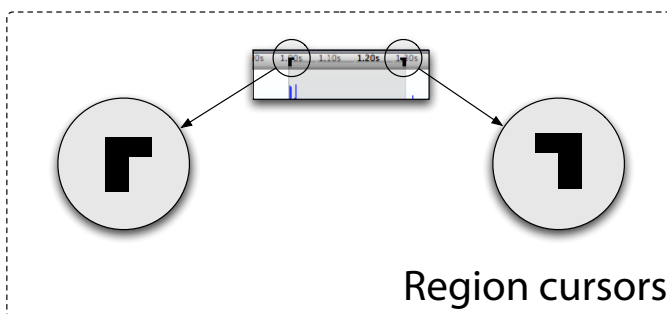
There are no special limitations to keep in mind with Regions: for each sample an arbitrary number of Regions can be created, and they can overlap. Regions are visualized both in a **Region table**, and graphically in the sample view as colored areas delimited in the ruler by **Region cursors**.



The region table in the sample editor

Normally a sample has no Regions defined and uses the **main set** of sample parameters. Once you create Regions, you can switch between the **main set** and each **Region set** by selecting a Region in the **Region**

table. When one single Region is selected, it will become the **active Region**, and the sample will play according to the active Region. Also, all edits of the Zone parameters listed above will change the Region set, and not the main set, which is left untouched.



Moving the active Region cursors in the sample editor is equivalent to moving the start and end position parameters for that Region.

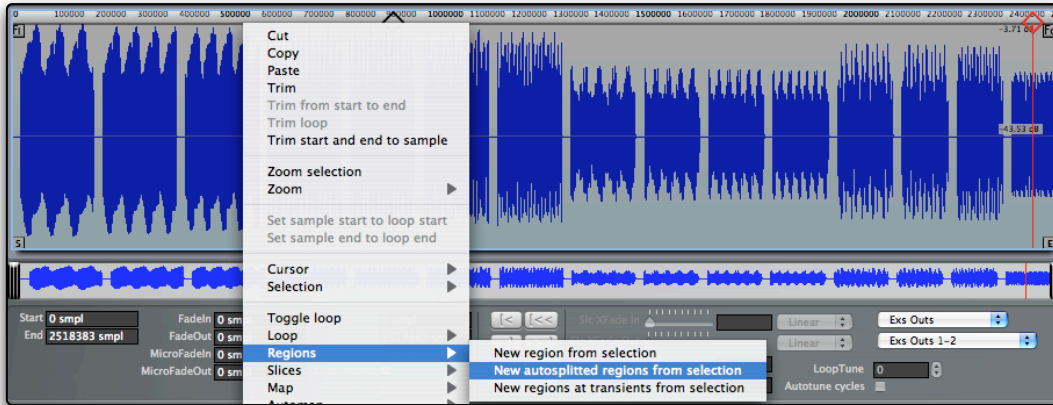
In the sample editor, **Unselected Regions** are displayed in light grey, while the single selected Region (the active Region) is displayed in orange. You can also **select multiple Regions**: in this case the Zone will revert to using the main set, and the selected Regions will be displayed in light orange color.

How to create a Region manually

Creating a Region is as simple as selecting a portion of the sample in the sample view and using the **Samples > Regions > New Region from selection** command. The newly defined Region will appear in the Region table, where you can now select it.

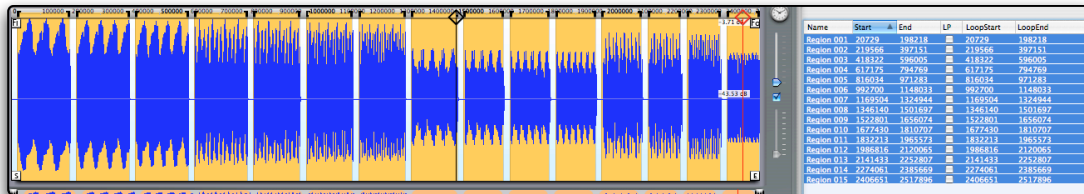
How to create a Region by autosplitting a sample selection

Keymap can also split the audio segments for you and create the corresponding Regions. Select a section of the waveform in the sample editor and use the **Regions > New Autosplit Regions from selection** menu function as shown in the following illustration:



Select a section in your sample and use the **Samples>Regions>New autosplit regions from selection** menu function.

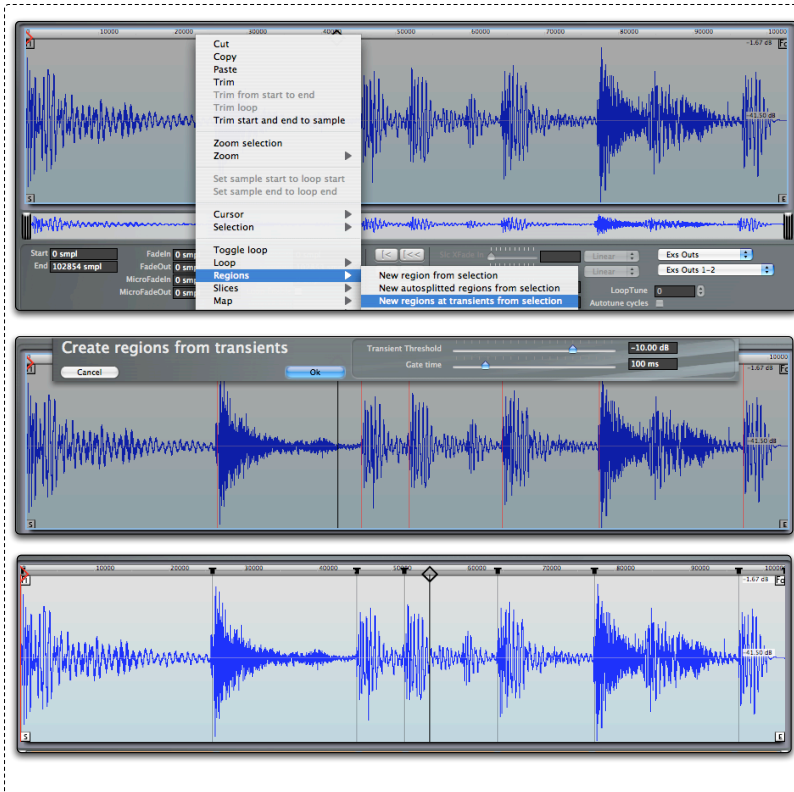
The audio segments will be split and new regions created.



Autosplitting into regions

How to create Regions at transients from a sample selection

Keymap can also detect transients in your samples, and create the corresponding Regions. Select a section of the waveform in the sample editor and use the **Regions > New Regions at transients from selection** menu function, as illustrated here:



Select the sample and use the **Samples>Regions>New regions at transients** menu function

The transients sheet opens. You are now able to tweak parameters watching the detected transients

Once you are happy with the detected transient points, click "OK" on the transients panel and new regions will be created, each spanning from one transient position to another

Region from transients

How to delete Regions

Deleting Regions by selecting them in the Region table and pressing the backspace or delete key on your Mac keyboard, or using the Clear menu item.

Region functions

Once Regions have been defined and selected, you have a few selected functions you can perform directly on them in the Region table. These functions let you copy parameters from/to the main set, autoloop Regions, and also map Regions to newly created Zones.

Note: if you need to use other functions, remember that when you activate one Region you can use the full set of Keymap functions with it.

Copy Region sample parameters to the main set

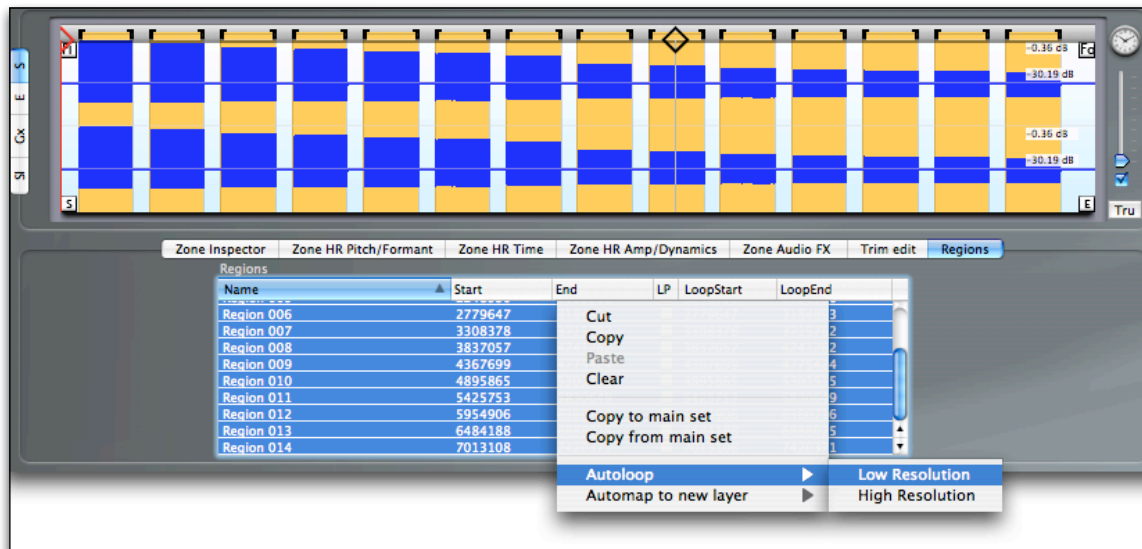
The **Regions > Autoloop > Copy to main set** menu function copies the Region parameters to the main set.

Copy the main set sample parameters to Regions

The **Regions > Autoloop > Copy from main set** menu function copies the main set sample parameters to the selected Zones.

Autolooping Regions

Autolooping Regions is as simple as selecting them and using the **Regions > Autoloop > Low Resolution** or **Regions > Autoloop > High Resolution** commands. For each Region, the best loop will be found and set in its loop parameters. The main set is unaffected.



Automapping Regions

With the Region automapping functions you create new Zones from the selected Regions.

You have three distinct functions available for this:

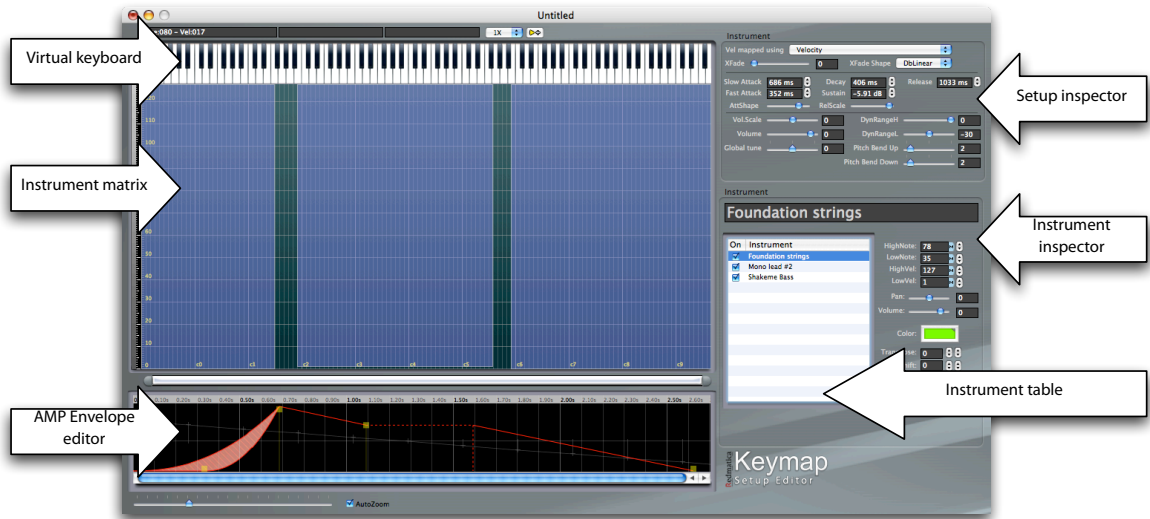
Regions > Automap to new layer > Automap with pitch detection will pitch detect each Region and create a Zone at the detected note using the Region sample parameters.

Regions > Automap to new layer > Automap sequentially will create Zones sequentially using the Region sample parameters.

Regions > Automap to new layer > Automap multivelocity to single note will map all Regions to Zones on a single note, with Zones sorted along the velocity axis by the volume level of the sample comprised between each Region start and end parameters.

Chapter 24: Setup editor

The setup editor allows you to add and combine multiple instruments in a single Keymap project, and edit parameters which are common to the whole project. Each project always contains one single setup, and by default each time you create a new project using the **File > New** menu command, the setup editor will open, with the layout and window size as specified in the preferences **Editors layout** parameter. The setup editor contains a number of elements, as shown below:



If you close the setup editor, you can re-open it at any time using the **Window > Show Setup** menu command, or its equivalent key command. It is not possible to delete or add a setup.

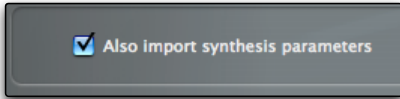
Creating a new empty instrument in a setup

You can add a new empty instrument to the setup by using the **Setup > Add new empty instrument to current Setup** menu command, or the **New** context menu command in the instrument table. Once you use either command, a new instrument containing one empty layer will be created, added to the setup, and appears in the instrument table.

Adding an existing EXS instrument to a setup

You can add an existing EXS instrument to your setup by dragging and dropping the EXS instruments from the finder directly into the instrument matrix. Another way is through the **File > Add Instruments to current project** or **Setup > Add Instruments into selected Setup** menu functions. In this latter case, you will be asked through a panel to select the instrument to add. If you enable the **Also import synthesis**

parameters in the panel, you will also import synthesis parameters from the instrument, overwriting the current ones.



The synthesis parameters are **never** imported when you drag and drop the instrument into the editor. Note that you can only add instruments in EXS format to a setup. It is not currently possible to do this for with Keymap (KMP) format files.

IMPORTANT: do not confuse the **Add Instruments** function with the **File > Open** menu command. The File > Open command actually opens a new project, with its own setup. This is completely different than adding instruments to an existing project/setup.

Opening the Instrument editor for an instrument

If you want to open the Instrument editor for a certain instrument, double click it in the instrument table, or select it and use the **Window > Show instrument** menu command.

Enabling/disabling instruments

Each instrument can be disabled by unchecking the **On** checkbox in the instrument table. Once disabled, the instrument will stop responding to MIDI/Virtual keyboard events.

Implications of a disabled instrument when saving the project in EXS format

As the EXS format doesn't directly support setups, and you can't really save "disabled" sections of your project, disabled instruments and their relative Zones and Groups will not be saved in EXS format at all.

Tip: this feature let you handle easily situations where you have a complex Keymap project and want to save individual instruments to individual EXS files, as you just have to enable the wanted instruments, save to EXS, then go back, enable some other instruments and save again, etc.

How to avoid opening the setup window when creating new instruments or opening projects

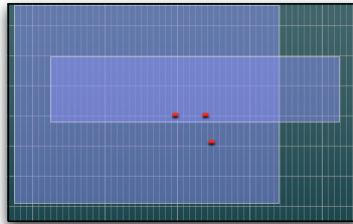
There might be times where your focus is on a single instrument, and you are not interested in the setup environment at all. In this case you can keep the setup editor from automatically opening by unchecking the **Open setup editor when creating new projects** checkbox in the preferences panel.

Open setup editor when creating new projects

The setup is still being created, and you can open the setup editor at anytime using the **Windows > Show Setup editor** menu or its equivalent key command.

Instrument matrix

The main component of the setup window is the Instrument matrix. Similarly to the Layer matrix, the instrument matrix represents the note range horizontally, and the velocity range vertically. An instrument is represented by a blue rectangle displayed over its note and velocity map area, and will only play if the incoming MIDI note and velocity intersect the instrument rectangle. This is displayed as red dots, representing played notes, over the matrix so that you can easily see which instrument is being played at any moment, and in which matrix position.



Differently than in the Layer matrix, in the instrument matrix the elements (the instruments) can overlap at will, and graphical editing with the mouse is allowed only when a single instrument is selected.

Selecting an instrument from the instrument table

Instruments can be selected directly in the instrument table. You can select multiple instruments at once, which is very useful for editing multiple instruments at the same time in the instrument inspector. However to edit a single instrument in the Instrument matrix you need to select it in the instrument inspector. When you select a single instrument, it will be shown in the matrix with its individual color, as set in the instrument inspector.

Selecting an instrument from the layer matrix

Alternatively, you can select an instrument from the instrument matrix by clicking it. If there are ambiguities, i.e. if more than one instrument is under the mouse cursor when you click, no instrument will be selected directly. You can however get to select the desired instrument by pressing and holding the **Shift key** and clicking repeatedly with the mouse: the selection will cycle among the instruments under the mouse cursor, and you can stop when you are satisfied with the selected instrument.

Editing the instrument in the matrix

You can graphically edit an instrument mapping by dragging one of its four borders, or the center of the rectangle. Corners are not active. As you will notice the note and velocity ranges parameter for that instrument in the inspector will update accordingly. There is no particular limitation regarding the placement of instruments, and they can overlap so to play together at the same time.

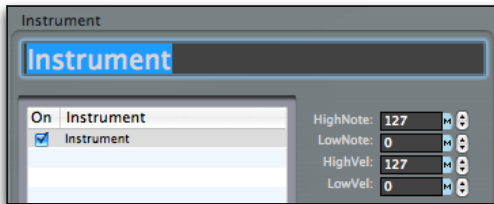
Note that resizing or moving the instrument note and velocity range will only change which part of the instrument is exposed in the setup (and to incoming MIDI Events), but doesn't actually move the instrument content across the instrument matrix.

The parameters responsible for moving (shifting) the actual content, and not just the exposed part of the instruments, are the **transpose** and the **velocity offset** parameters, and they are respectively responsible for shifting across notes, and velocity.

If you press and hold the **Option key** while moving an instrument (not just the borders!) with the mouse, the transpose parameter will be automatically updated so that the net combined effect is that you are moving the current content of the instrument across the setup. Note that the velocity offset value is not modified by this key modifier, as for most purposes you will not want to do that.

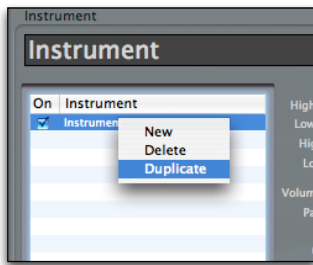
Renaming an instrument

You can rename an instrument by directly editing the instrument name above the instrument table.



Duplicating an instrument

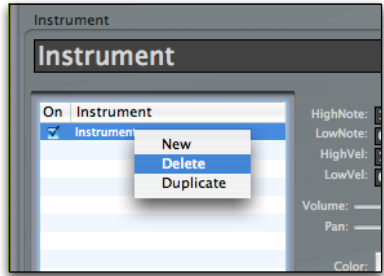
You can duplicate an instrument by first selecting it, and then using the **Duplicate** menu function in the context instrument table menu.



IMPORTANT: when you duplicate an instrument, you are at all effects creating a separate, independent copy of the instrument and of all its elements (layers, Zones, virtual samples, Groups). If you edit a Zone in one of the instruments, you will **not** affect its duplicate.

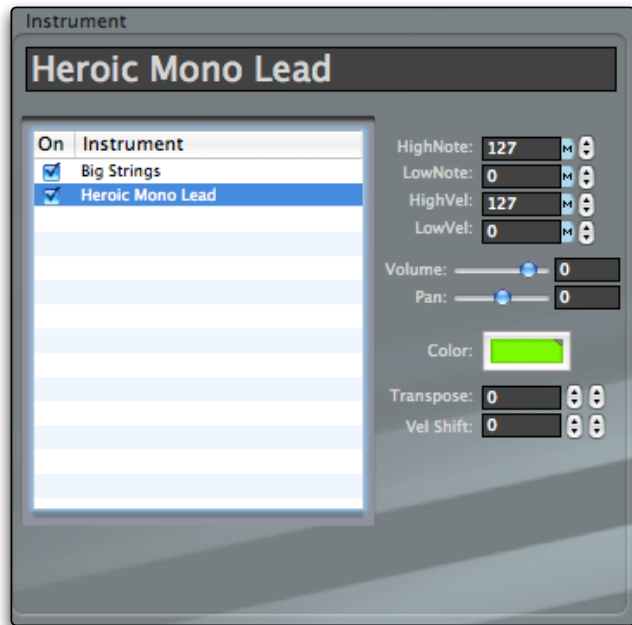
Deleting an instrument

You can delete an instrument by selecting it, and then using the **Delete** command in the context instrument table menu. All layers, Zones, virtual samples and Groups in that instrument will be deleted from memory as well, but **nothing will be done to sample files, or EXS instrument files** you have imported from disk. In other words, this function is merely deleting the data structures in memory.



Instrument inspector

At the right of the instrument matrix you see the instruments inspector. Here you can view and edit instrument level parameters in an analytical way.



HighNote, LowNote, HighVel, LowVel

These four parameters define the area of the instrument in the setup; in other words, they determine the ranges for which the instrument will be played.

Volume and Pan

You can change volume and pan for each instrument independently, which makes it easy to balance volume for the individual sounds in splits or stacks. These values are composited with all the others in the audio chain in order to define the real final volume of the sound.

Color

Assigning a color will make each instrument stand out with respect to the others when selected. When editing overlapped instruments, assigning a color helps you identify the instrument you are editing.

Transpose and Velocity offset

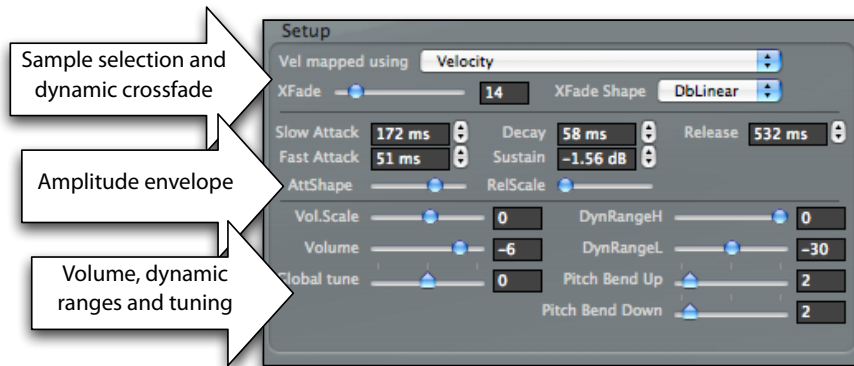
These two parameters are very important as they allow you to shift the instrument **content** respectively along the note and velocity offsets, within the note and velocity ranges defined by HighNote, LowNote, HighVel, LowVel.

The Instrument table

The instrument table lets you enable or disable instruments and through its context menu you can create new empty instruments, delete an instrument from the setup, or duplicate an existing instrument.

Setup inspector

The setup inspector lets you change project-wide parameters which affect all instruments. For convenience, most of these parameters are also shown, and editable, in the Instrument editor. A few parameters, like the dynamic-crossfade-related parameters, are actually more relevant in the Instrument editor than here.



Vel mapped using

This pop-up menu lets you substitute the normal note velocity with the value of a MIDI Controller. Once set to a MIDI Controller different than "Velocity", each time Keymap (and the EXS24) receives a note-on message, it will get the "velocity" value not from the velocity of the note, but from the current value of the selected controller. Selecting a controller different than Velocity enables the Dynamic crossfade mode, and disables all defined Static crossfades for all instruments in the setup.

XFade

This value determines the size of the extended velocity area used for dynamic crossfades in Zones and Groups. If you set it to a value different than zero, the Dynamic crossfade mode will be enabled, and any Static crossfade in all instruments in the setup will be disabled.

XFade Shape

This pop-up menu let you select the volume shape to be used in the dynamic crossfades areas. Possible values are:

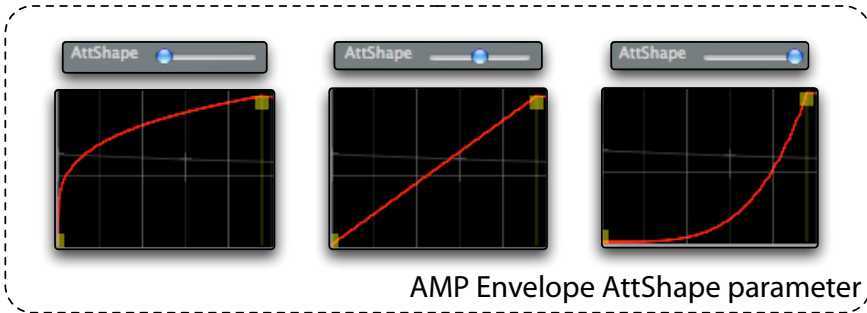
- DbLinear : the volume, expressed as decibel, will linearly fade to/from zero
- Linear : the volume will linearly fade to/from zero
- EqIPower : the volume will fade to/from zero using an equal power shape

Slow Attack, Fast Attack, Decay, Sustain, Release

These parameters control the shape of the AMP Envelope.

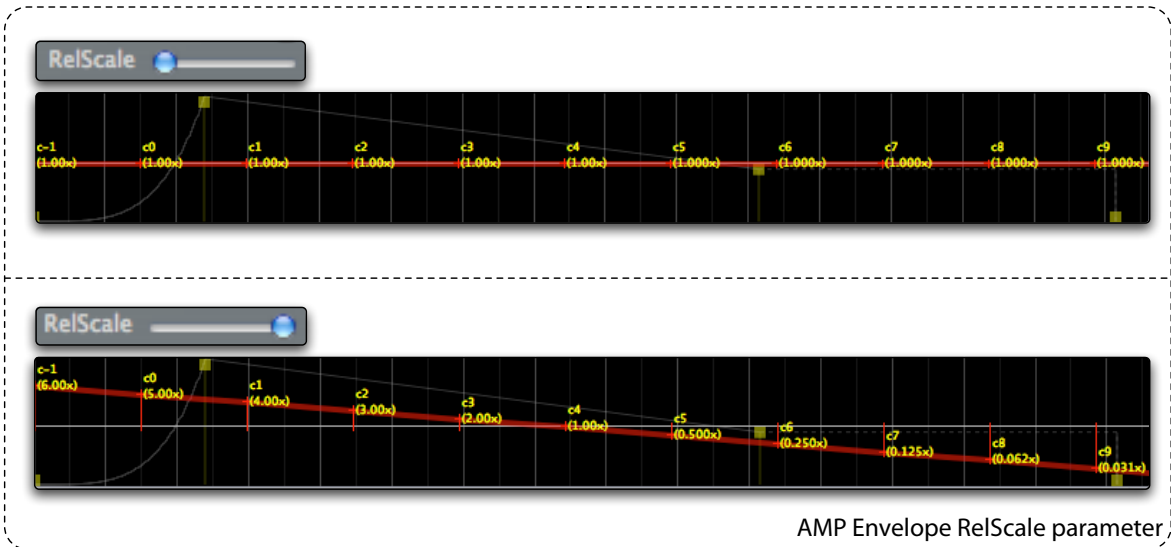
AttShape

This parameter controls the shape of the attack phase in the AMP Envelope, as shown in the following illustration:



RelScale

This parameter changes the release time for the AMP Envelope depending on the position of the played note with respect to MIDI note 60. When edited, the envelope editor will briefly show the factors that will be used for the release time across the whole note range, as shown in the following illustration:



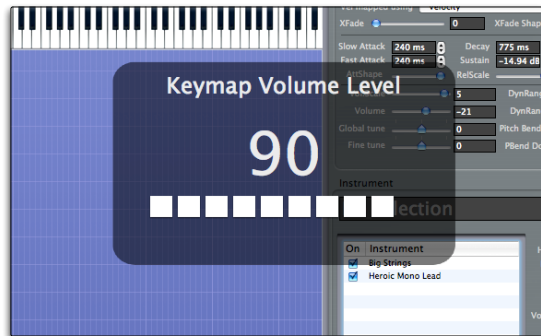
Volume Scale

This parameter lets you scale the volume across the keyboard, respect to note 60, and is measured in decibels per octave. Positive values will lead to higher volume on high notes, while negative values will do the opposite.

Volume

This is the general volume control for the whole setup.

Tip: if you just want to change the monitoring level, you can use Keymap built-in independent monitoring volume, assigned by default to the F1 and F2 keys on your Mac keyboard. This volume controls the volume on all Keymap audio outs, and doesn't change the volume for other audio applications that might be running at the same time.

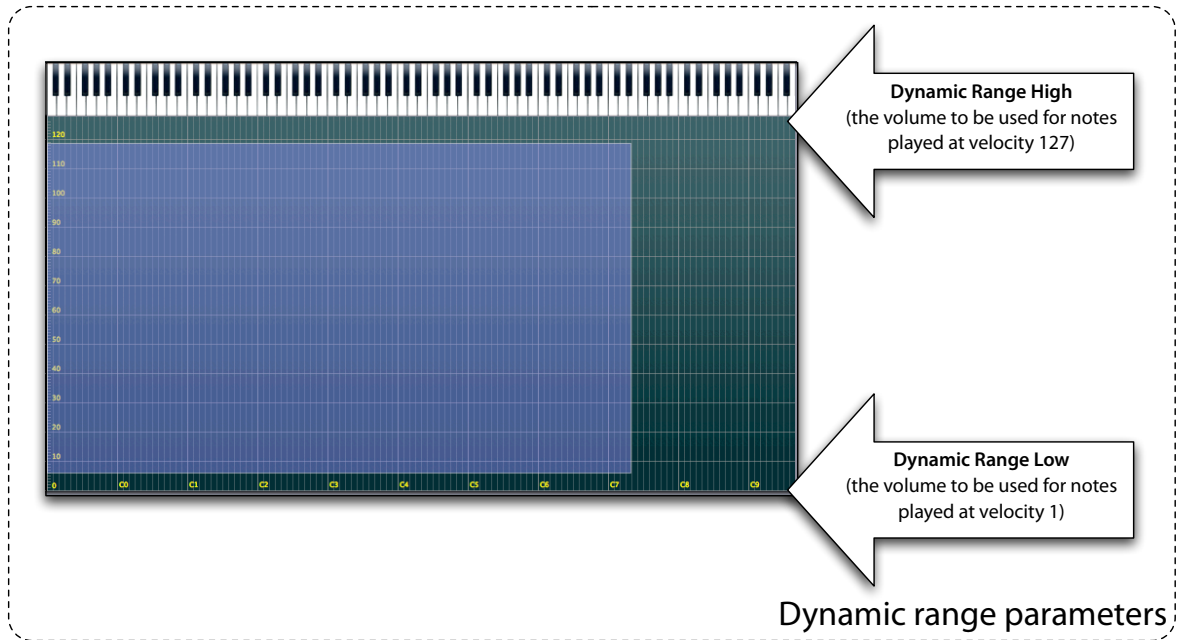


Global tune, Fine tune

These two parameters control the tuning of the whole setup.

Dynamic Range High, Dynamic Range Low

These two parameters controls the dynamic range for played notes, over the whole velocity range.



Dynamic Range High determines the volume to be used when notes are played at full velocity (velocity 127), and Dynamic Range Low determines the volume to be used when notes are played at the lowest velocity (velocity 1).

The dynamic range for the setup is given by the difference between the two values.

When creating a new project, the dynamic range determined by the **Default dynamic range for new projects value** set in the preferences panel.

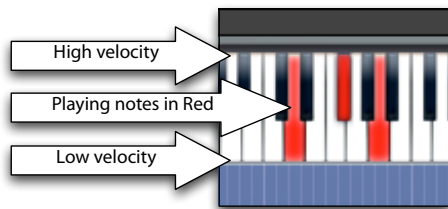


Pitch Bend Up, Pitch Bend Down

These two parameters control the amount of pitch bending for the two directions of the pitch wheel controller.

Virtual keyboard

The **virtual keyboard** resides at the top of the setup editor window. You can use it to play notes using the mouse. It also displays the notes currently being played at any moment through MIDI.



The virtual keyboard lets you play notes at any velocity depending if you click on the higher part of a the virtual key, or on the lower position.

If you prefer, the **Invert Virtual Keyboard velocity** preferences setting allows you to invert this behavior so that at top you have low velocity and at bottom you have high velocity.

Invert Virtual Keyboard velocity

Note keys pressed on the MIDI Keyboard or on the virtual keyboard are displayed in red. Note that this doesn't necessarily means that a sound will be played, since which notes sound depends on how your instruments are mapped.

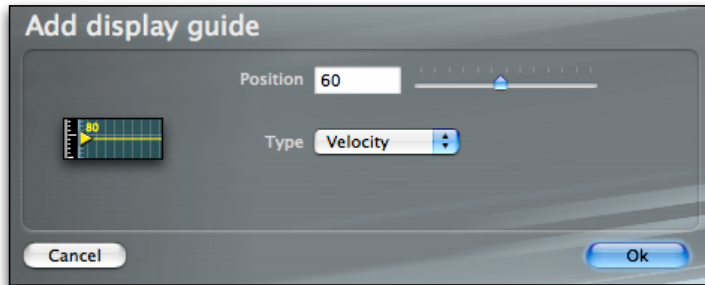
Cursor inspector, Zoom and Guides

Above the virtual keyboard is the cursor inspector, showing the current mouse cursor position, the zoom control for the editor and a a button for creating display guides.



The available **zoom levels** are typically 1X and 2X, but some editor layouts (such as the wide setup editor) are always at 2X and for this reason there is no zoom selector in those layouts.

Display guides are handy visual elements which you create to be references when moving elements around. Guides can be vertical (over a single note) or horizontal (over a single velocity level). Once you click the guides button, a panel will let you select the guide type and value.



Guides are especially useful when the **View > Snap to > Guides** menu functions are enabled. Guides can be moved by dragging around the corresponding small yellow triangle, and can be deleted by dragging the triangle to velocity zero, or note zero.

The guides you'll create in the setup editor will only be visible in the setup editor. In the same way, guides created in Instrument editors will not be visible in the setup editor.

Understanding the process of adding EXS instruments

Adding EXS instruments in a setup is subject to some limitations due to the nature of the EXS24. The EXS24, (and therefore Keymap) can only handle one set of synthesis parameters (Envelopes, LFOs, Filters, Matrix modulation, Volume, Dynamic range, Dynamic Crossfade, etc) for each EXS instrument. For this reason, all instruments in a Keymap setup must share the same set of synthesis parameters. This is not an issue if you are working on a single instrument, but when merging multiple EXS instruments you will have to make the choice of which instrument Keymap should get the synthesis parameters from.

The global tune and fine tune parameters in EXS instruments are handled differently, and Zones always play at the intended tuning with the following mechanism. When you add an instrument to a project **without** also importing its synthesis parameters (i.e. also the global tuning for the EXS instrument), the Zones of the **imported** instrument will be retuned so as to play at the intended absolute pitch.

In the same way, when you add an instrument **and also import** its synthesis parameters (i.e. also global tuning), the **existing** Zones in the Keymap project will be retuned so that they will keep playing at the intended absolute pitch even if the global tune has changed.

In other words, whatever you do, adding instruments to a project never leads to pitch conflicts for the Zones, or better said, the conflicts are solved by Keymap automatically.

Chapter 25: Opening and saving projects

The **Open** and **Save** commands are essential parts of the Keymap workflow. This chapter deals with all the subtle and not-so-subtle things you should know about those two functions.

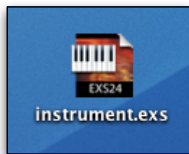
Opening KMP projects

You open KMP projects through the **File > Open** command. The opened project is considered to be an independent project respect to any other project you might have already opened.



Opening EXS instruments

You open EXS instruments through the **File > Open** command. The opened instrument is considered to be an independent project respect to any other project you might have already opened.



One of the problems with loading EXS Instruments is that Keymap works with non-overlapping Zones and has layers, while the EXS format instrument is a single element containing everything and has no concept of layers.

For this reason, when you open an EXS instrument, Keymap creates separate layers where it then places homogeneous Groups of Zones based on the associated Group, the one shot parameter, the disable pitch parameter, and the output bus parameter. Keymap also checks if overlaps occur between Zones in each layer, and moves Zones to new layers in order to resolve this conflict.

Once the EXS instrument is open, we refer to it as a “project” to avoid any possible confusion with Keymap instruments.

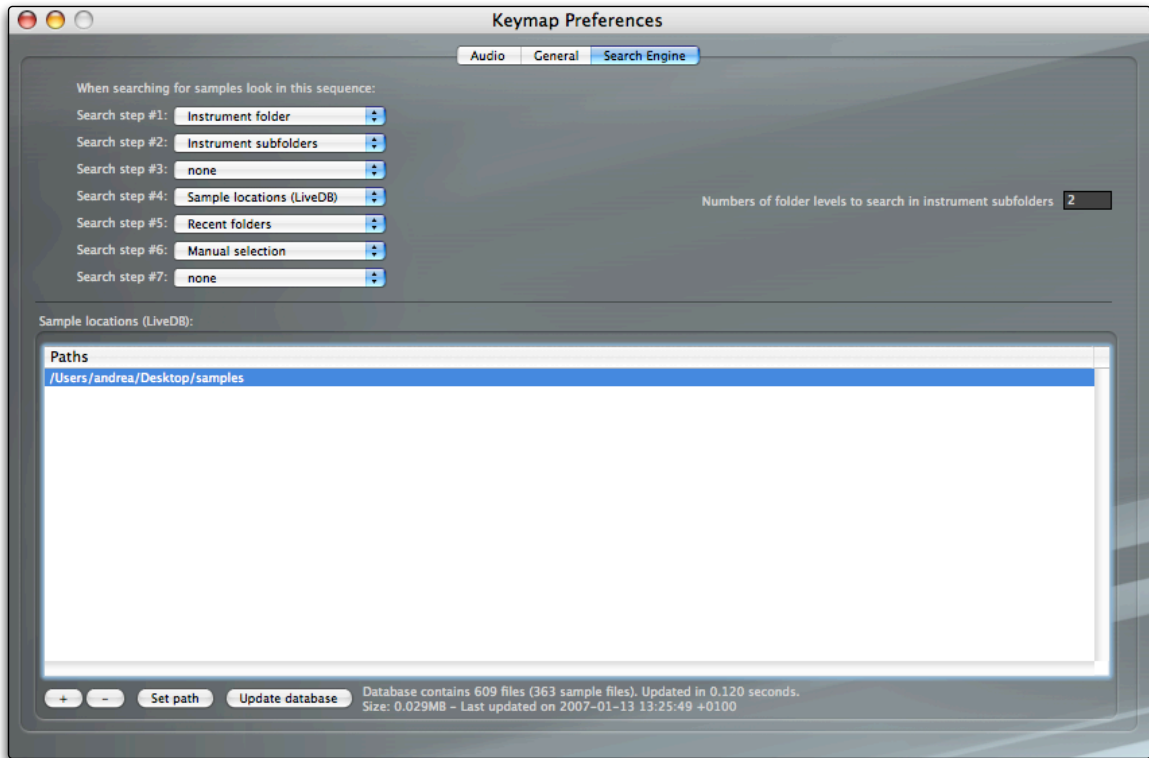
If the EXS instrument file was originally created by Keymap, then the file also contains the layer list. In this case Keymap reconstructs the layers and places Zones exactly how they were saved within Keymap.

Sample files

When a project/instrument is opened, Keymap looks for the referenced sample files in the exact disk location described in the opened file. If the sample is not found there, then Keymap will use its built-in **search engine** to search for the appropriate file in a number of locations.

The search engine

The search engine settings and location are found in the preferences panel, under the **search engine** tab.



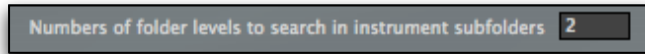
Keymap has 5 different methods for searching samples, and you can configure the sequence in which these methods are applied by setting the “search step” sequence of pop-up menus. Our suggestion is to not change the default sequence unless you have a very specific need, and you know what you are doing.

Search methods: instrument folder

The “**instrument folder**” method searches for the missing sample in the folder where you loaded the project file. It will not look in subfolders.

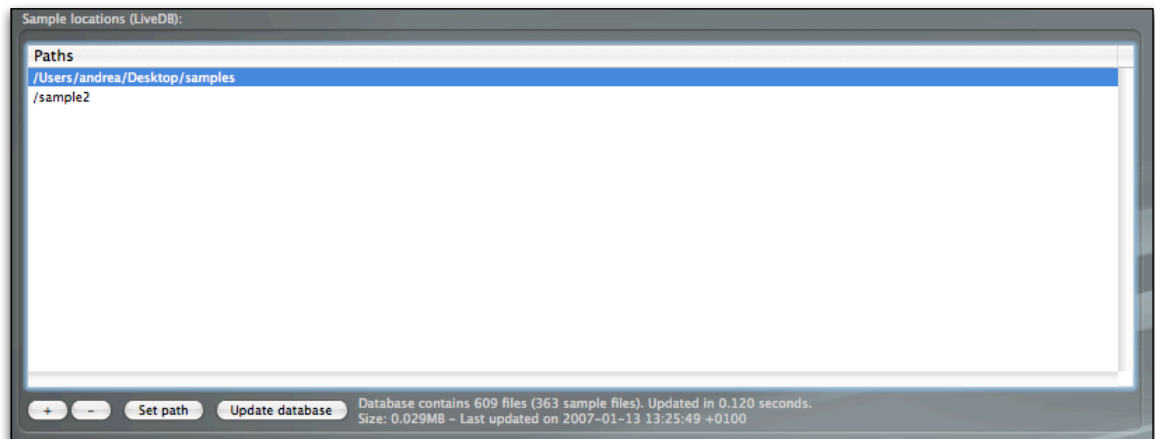
Search methods: instrument subfolders

The “**instrument subfolders**” search method searches for the missing sample in any subfolders of the folder where you loaded the project file. You can set how many subfolders levels should be searched in a dedicated parameter text field.



Search methods: sample locations (Live DB)

The “**sample locations**” method will search for the missing sample in one or more locations that you set in the **locations table**.



The **location table** is quite straightforward in that you can add or remove locations using the “+” and “-” buttons, and can change the path for the selected location by using the “Set path” button. This functionality is powered by Redmatica’s next-generation scan and database engine, **LiveDB**. This system has been designed to couple the advantages of database systems (no need to scan every time) with the advantages of scan (data always in sync with what is on disk). When you add a new location to the table, it will be scanned just once at very high speed. After this first scan, a full database update usually takes a few tenths of second also for databases containing many hundreds thousands files. The database is stored in the Keymap application support folder, is automatically updated and managed, and takes very little disk space.

As the first scan after adding locations can take some time, you have the option of performing it immediately by clicking the “Update database” button. The status of the LiveDB engine is permanently displayed as text, with information about the number of files and samples found, the size of the database and the date and time of the last update.

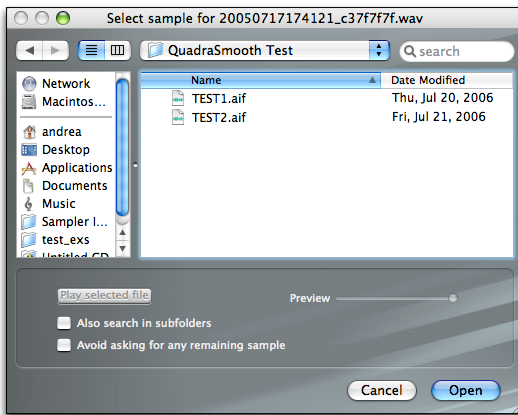
In order to minimize search time, the locations should point directly to sample folders and/or sample drives. We strongly recommend against adding the system drive, the home folder or the desktop as locations.

Search methods: recent folders

The “**recent folders**” search method searches for the missing sample in the folders where other missing samples were recently found. This ensures that once you locate a sample, any other sample in that folder will be searched for other missing samples too.

Search methods: manual selection

When everything else fails, “**manual selection**” lets you locate the sample file yourself using a standard file dialog. With this method you can also select a sample with a different name than the one searched, and you can preview the sample content using the **Play selected file** button. The dialog will also let you select an entire folder: in this case Keymap will search for the sample file in that folder, and if you enable **Also search in subfolders**, also in subfolders.



If you click “Cancel”, the manual search method will fail and pass the task to the next method defined in the search list.

If you enable **Avoid asking for any remaining sample** then you won’t be asked anymore to locate manually samples for the current session. This is very handy

when you want to examine an instrument without having samples.

Tip: if you never want to be asked about samples, just remove the “manual selection” method from the search steps.

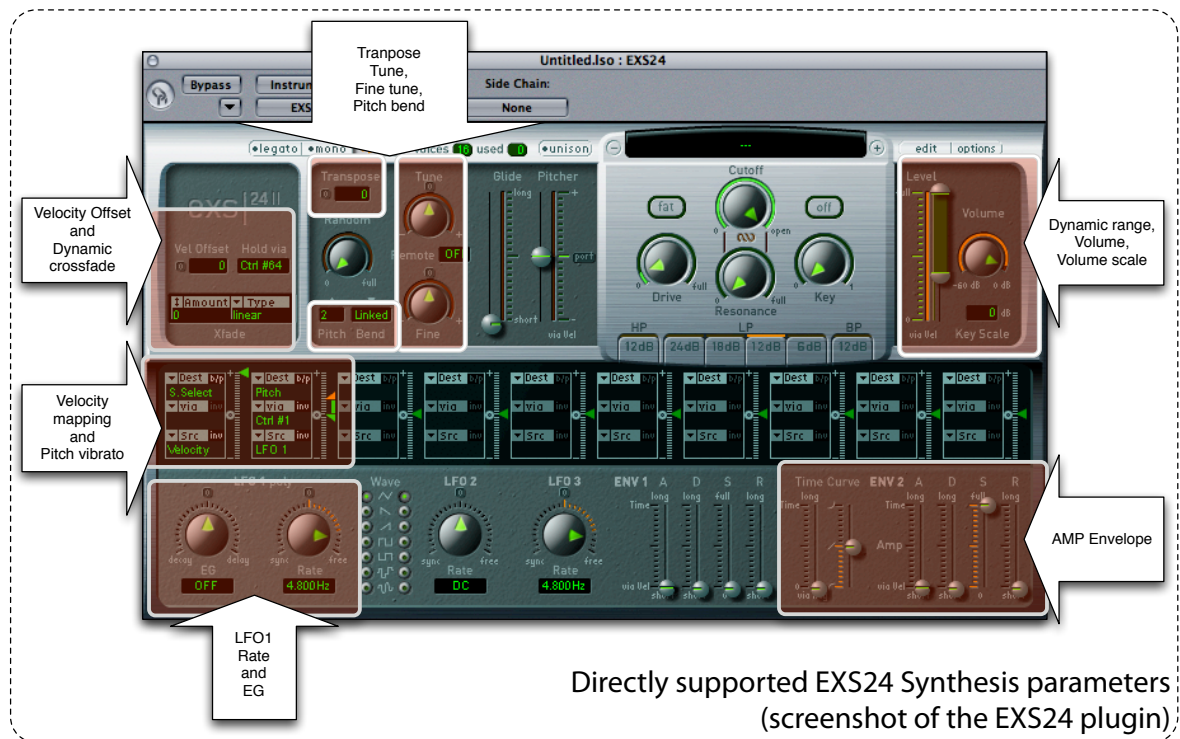
Tip: in some cases the searched sample file might not have the correct file suffix or creator code, and so might be not selectable from the panel. In this cases, just select its folder.

What happens when samples are not found

In the case some samples are not found, the respective Zones will be displayed in the Instrument editor as **placeholders**. If you save the project, either in Keymap or EXS format, the references to missing samples will be preserved, so that they can still be searched, and possibly found, next time.

Supported and unsupported EXS Synthesis Parameters

Keymap has **not** been designed to replace or clone the EXS24 editor. For this reason the **synthesis** section in Keymap does not cover all the EXS24 features, and only a subset is directly supported and editable. All the unsupported parameters (filters, complex modulation matrix routings, etc), are however still read and preserved when you open an EXS instrument, and written back to the file when you save the project in EXS format.



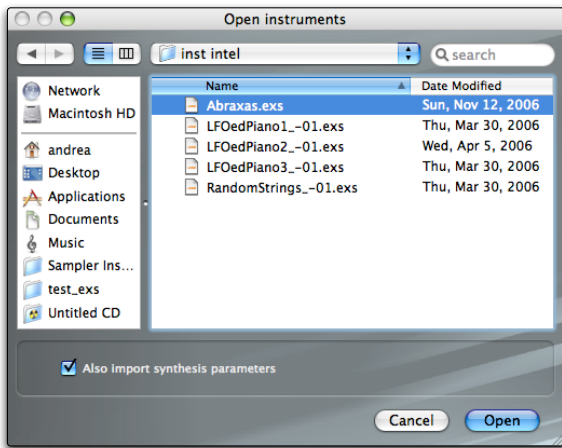
In particular, we need to mention the pitch vibrato section in Keymap: while the default EXS settings use LFO1 for pitch vibrato through modulation wheel, this is not necessarily always true. Also, LFO1 rate can also be set to rhythmic figures, which aren't supported in Keymap as there's no metronome.

When loading, Keymap will check if LFO1 is used for vibrato, and if the LFO1 rate is in the hertz range. The Vibrato section in Keymap will become available and editable only when both conditions are satisfied. In the other cases, the LFO parameters won't be editable and will be preserved as they are.

Combining multiple EXS instruments in a setup: implications regarding the synthesis parameters

In Keymap, you can combine multiple EXS instruments in a single Keymap setup, and then save it as a single EXS instrument. As the EXS24 has a single synthesis section for all the Zones, you understand how it's not possible to have multiple filter types, settings, modulation matrixes, and all the rest for each instrument at the same time when you save a setup back to EXS format.

For this reason, when adding EXS instruments to a project, you can replace the current synthesis parameters of the project with the ones from the loaded EXS instrument by enabling the **Also import synthesis parameters** checkbox.



All the synthesis parameters (vibrato, volume, AMP envelope, dynamic range, tuning, etc) will be replaced with the values from the added instrument.

Notable exceptions are the tuning parameters, which are handled differently. When you add an EXS instrument and change synthesis parameters, the tuning for already defined Zones will be modified to preserve the absolute tuning, regardless of the new project tuning values.

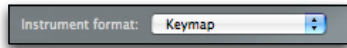
For example, if you add an instrument which is tuned six semitones down, the tune of current Zones will be increased by six semitones so that in the end they will keep playing at the current (right) pitch. Similarly, if your project is at +9 semitones and you add an instrument without importing its synthesis parameters, then the new Zones added to the project will be tuned to -9 semitones so as to play at the intended pitch.

Note that you are never asked to replace synthesis parameters (they are never imported), when you just drag the EXS instrument into the setup editor. The tuning parameters will still be handled anyway.

Tip: if you just want to replace synthesis parameters from an instrument without really adding it to the setup, add the instrument and import its synthesis parameters, and then delete it from the

Saving the project in Keymap format

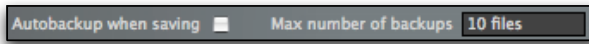
The project can be saved in Keymap format with the **File > Save** or **File > SaveAs** command and setting the Keymap instrument format in the save panel instrument format pop-up menu.



When you save in Keymap format, there is never need to render new sample files—the operation only consists of updating or writing a .kmp file.

Autobackup

Keymap provides an autobackup function that preserves previously saved versions of a project. The function is activated from the preferences panel by enabling the “Autobackup when saving” checkbox. You can also set the maximum number of older versions you want to preserve.

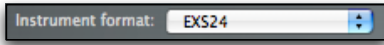


The next time you save the project, a folder with the project name and the .back suffix will be created next to it. At each save, the old version is moved in that folder, and all versions renamed by appending a sequential number, so that at any time version “1” always identifies the newest backup and the others are progressively older as the number increases.

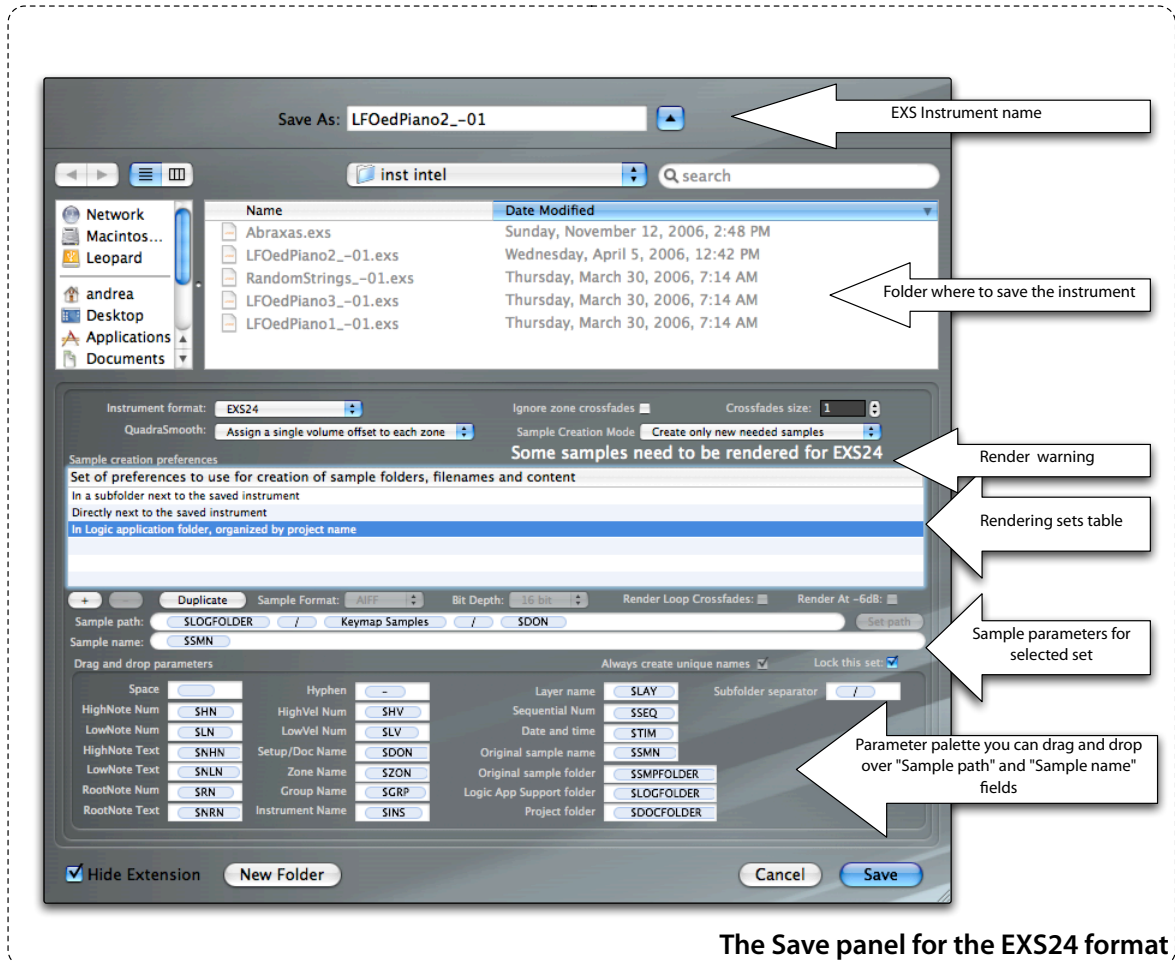
Tip: autobackup, when used with .kmp files, lets you go back in versions at will, as keymap projects never require changes to samples, and all sample functions/edits are performed in realtime, and so all the changes over time are effectively stored in the backup files.

Saving the project in EXS24 format

The project can be saved in EXS24 format by using the **File > Save** or **File > SaveAs** command and setting the EXS24 instrument format in the save panel instrument format pop-up menu.



And this is the save panel for the EXS24 format (don't panic!).



In the save panel you control not just the location for the saved instrument, but also how things will be translated from Keymap to EXS24 format.

Saving the project in EXS24 format: instrument parameters in the save panel

Static crossfades for a Zone are recreated by Keymap in the EXS24 as multiple small copies mapped around the Zone they refer to, with decreasing volume level in order to simulate the fade area.

The **Ignore Zone crossfades** checkbox excludes any static Zone crossfade from being created. In the case crossfades are instead saved, the **Crossfades size** parameter let you choose the size of the Zones to create for simulating the fade area.

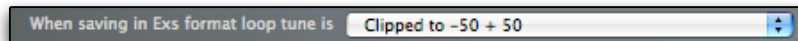
Similarly, the **Quadrasmooth** pop-up menu lets you apply the Quadrasmooth volume correction to each Zone as it is, or alternatively split Zones in smaller chunk to get more homogeneous volume transitions between Zones.

Zone tuning rebalancing

Keymap let you set the fine tuning pitch parameters for Zones and loops within a very large range of values, while EXS24 does not. For this reasons, the tuning parameter values might need to be rebalanced when saving to EXS24 format. The fine tune parameter is always rebalanced to within the EXS24 limits by changing the tune parameters, and this doesn't pose problems. However, the EXS24 does not allow the loop tune parameter to be out of the ± 50 cents range, and this *is* a problem, as this parameter can be very easily out of that range in Keymap if you use single cycle autotuning. The application gives you three ways to handle the problem:

- by clipping the loop tune parameter to ± 120 cents, which is not officially supported by EXS24 but will work
- by clipping the loop tune parameter to ± 50 cents, which is the official supported EXS24 range
- by keeping the loop tuning using the trick of changing the tune and fine tune Zone values of the needed values to reach that goal. This approach is probably useful only when the sample starts playback exactly on loop start, or anyway very near

You select the method to use in the preferences panel



Saving the project in EXS24 format: sample rendering

If the project uses any of the Keymap sample functions not directly available in the EXS24, then these samples are automatically rendered to new sample files incorporating all the edits and the processing required for them to sound in the EXS24 exactly as in Keymap. Functions requiring rendering to new files include using the surround+space mixer, channel maps, harmonic resynthesis, s-shaped crossfades, fade in and fade outs, cut and paste edits...you get the idea...

You can see in advance the need to render new files by looking at the **Render warning** message in the panel. If no warning message is displayed, then there's no need to render any new file.

Some samples need to be rendered for EXS24

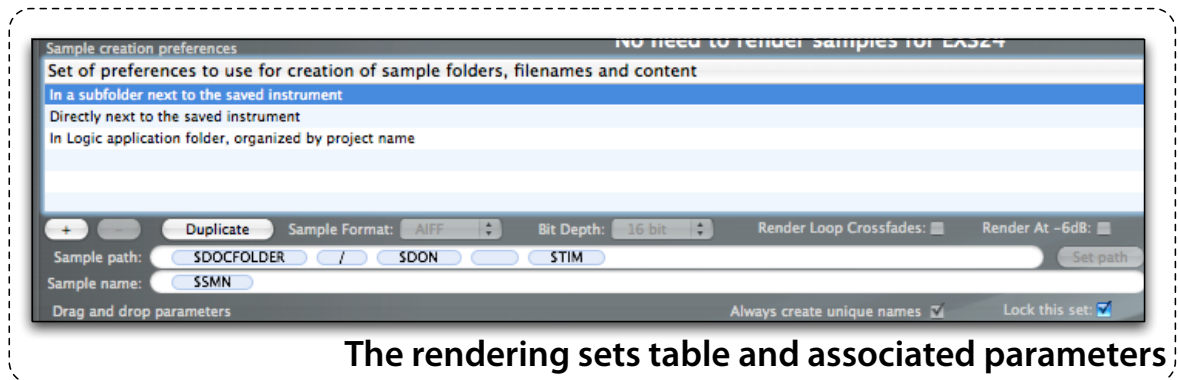
By default, Keymap will render only the samples where used features can't translate directly to EXS format, and the saved EXS instrument will reference the newly rendered files plus the rest of the samples which did not require a render.

You can however **force all samples to be rendered anyway** to new files, using the **Sample creation** mode pop-up menu and selecting **Recreate entire sample set**. In this case all samples will be rendered and the saved EXS instrument will only reference the new samples.

Rendering parameters sets

Rendering samples involves making a number of choices: format, bitdepth, rendering mode, name of sample files, location for the new samples, etc. Instead of setting all these parameters every time, Keymap lets you create sets of parameters that you can then select as a whole. Also, you can build sample names and path locations parametrically out of more than 20 parameters, so that, for example, samples are saved in folders named after the velocity range, or samples are named after their root note.

The sets are selectable in the **Rendering sets table**, and you can add , remove and duplicate sets using respectively the “+”, “-” and “Duplicate” buttons.



Each set can be locked from modifications using the **Lock this set** checkbox. Once the set is unlocked, you can set the desired **sample format** (AIFF or WAVE) and **bitdepth** (16 or 24) from the respective pop-up menus.

You can also choose to render the crossfades in the loop by enabling the **Render loop crossfades** checkbox. Doing so will make impossible to later edit the crossfade in Keymap or EXS24, but will make the sample playable with the crossfade by any sample player.

The **Render at -6dB** checkbox let you attenuate the rendered samples by 6dB in order to cope with peaks without distorting or limiting the sample. When this setting is enabled, the Zones referencing the newly rendered sample will have the volume increased by 6dB in order to compensate for the sample attenuation.

The sample name can be typed directly in the **Sample name** field, but can also be built using tokens that you can drag and drop from the **Parameter palette** or type directly. Keymap will replace these tokens with the actual values taken from the currently processed sample, and its Zone.

The available tokens are:

Token	Converts to
Space	A single space . Normally all redundant spaces are removed
\$HN	The High Note Zone parameter expressed as MIDI Note number
\$LN	The Low Note Zone parameter, expressed as MIDI Note number
\$NHN	The High Note Zone parameter expressed as note name
\$NLN	The Low Note Zone parameter, expressed as note name
\$RN	The Root Note Zone parameter expressed as MIDI Note number
\$NRN	The Root Note Zone parameter expressed as note name
Hyphen	A single hyphen ("-")
\$HV	The High Vel Zone parameter
\$LV	The Low Vel Zone parameter
\$DON	The project name (which is also the setup name)
\$ZON	The Zone name before find+replace processing
\$GRP	The Group name (if the Zone is not assigned to a Group, this translates to nothing)
\$INS	The instrument name for the Zone
\$LAY	The layer name for the Zone
\$SEQ	A sequential number , always starting from 1 for each save session, and progressively incremented for each sample being rendered
\$TIM	The current date and time
\$SMN	The name of the original sample file referenced by the Zone

The **sample path** is built similarly, either by setting a path using the **Set path** button, or by adding tokens as for the name. When using tokens for the path, Keymap will create a different subfolder for each value of the token. When you combine things, you can obtain very interesting results. As example you could use a sample path definition of

```
/Volumes/ExternalDrive/KeymapSamples/$DON/$NRN/$HV
```

And then all your samples would always be rendered in common and well organized folders subdivided by project name, root note and top velocity.

As another example, let's say that you set a sample folder defines as

```
/Volumes/samples/$GRP/velocity $HV
```

and a name structure defined as

```
newsample-$LN-$HN
```

Keymap would render a sample with this complete name (picking random values and Group names, it's just an example)

```
/Volumes/samples/Group one/velocity 100/newsample-A5-B5.wav (or .aiff)
```

Simple and powerful!

The sample folder field can use additional tokens (parameters) respect to the name. Here's the complete list:

Token	Converts to
Space	A single space . Normally all redundant spaces are removed
\$HN	The High Note Zone parameter expressed as MIDI Note number
\$LN	The Low Note Zone parameter, expressed as MIDI Note number
\$NHN	The High Note Zone parameter expressed as note name
\$NLN	The Low Note Zone parameter, expressed as note name

Token	Converts to
\$RN	The Root Note Zone parameter expressed as MIDI Note number
\$NRN	The Root Note Zone parameter expressed as note name
Hyphen	A single hyphen ("-")
\$HV	The High Vel Zone parameter
\$LV	The Low Vel Zone parameter
\$DON	The project name (which is also the setup name)
\$ZON	The Zone name
\$GRP	The Group name (if the Zone is not assigned to a Group, this translates to nothing)
\$INS	The instrument name for the Zone
\$LAY	The layer name for the Zone
\$SEQ	A sequential number , always starting from 1 for each save session, and progressively incremented for each sample being rendered
\$TIM	The current date and time
\$SMN	The name of the original sample file referenced by the Zone
\$SMPFOLDER	The folder of the original sample file referenced by the Zone
\$LOGFOLDER	The logic application support folder
\$DOCFOLDER	The folder where the project is being saved

Unique names

The **Always create unique names** checkbox, when enabled, will append a specially composed pseudo-random string of 4 chars to the name in order to make it unique. This is *extremely* important if you are going to render the same samples multiple times, as you will get multiple copies of samples, and Logic can't reliably distinguish one sample from the other if they have the same exact name. Enabling this checkbox, and so appending the random string, will eliminate this problem.

Names for split surround samples

When rendering multi-out or surround samples, Keymap might need to render multiple stereo files with the same name: in order to avoid overwritings and potential confusion, a short suffix is appended to the name, indicating the output bus. "A" is bus 1+2, "B" is bus 3+4, "C" is bus "5+6" and so on. For the sake of convenience, since BUS 1+2 is the most used, the A character is not appended to the sample name.

Limitation on length of sample names

Currently Logic has a limit of 32 chars in the sample name. Even though Keymap manages the use of longer sample names in EXS instruments, the recommendation is to use short names.

If the sample path is not an absolute path...

If the folder structure you set does not start with a " / " or one of the folder tokens (Logic folder, or document folder), then Keymap will create the folders next to the instrument file. Some characters are considered illegal and are removed when processing. These include " : " both for the folders and for the names. The default location saves next to the instrument.

Logic caches instruments!

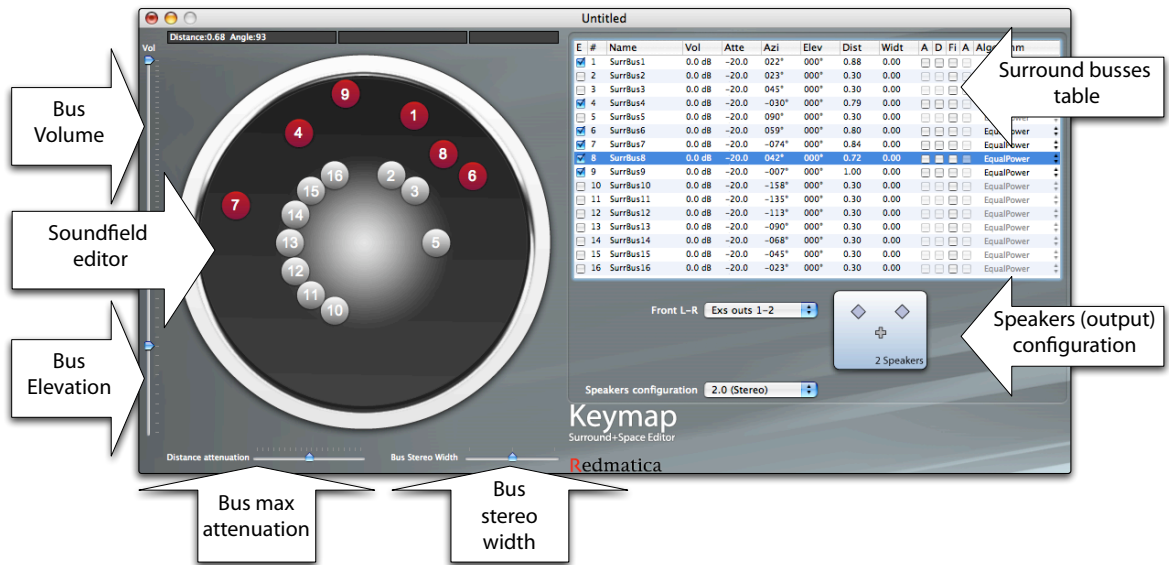
As of Logic 7.2, once Logic loads an EXS instrument, it caches it in its memory, with the net result that regardless of the fact that you load it again from the EXS menu, Logic will keep using the version in memory, and ignores any updated file on disk.

In the same way, Logic sometimes will silently overwrite the EXS files with the version it keeps in memory, and in this way it can potentially overwrite an edit you just made with Keymap.

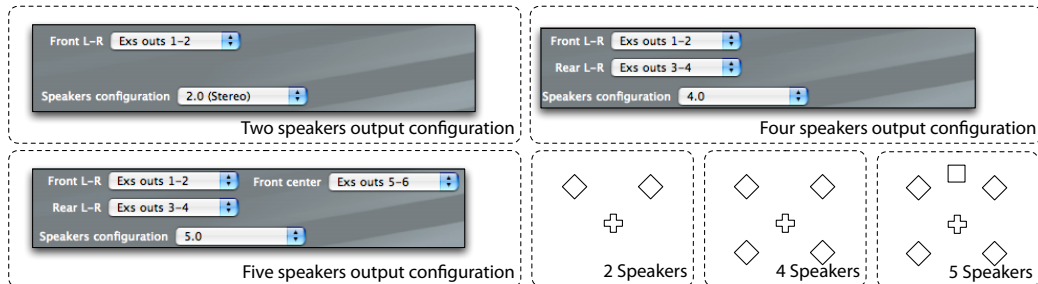
Keep these things in mind if you see strange results, such as instruments apparently not being updated, or files reverting back to old versions, while running Logic and Keymap at the same time.

Chapter 26: The Surround+Space Mixer

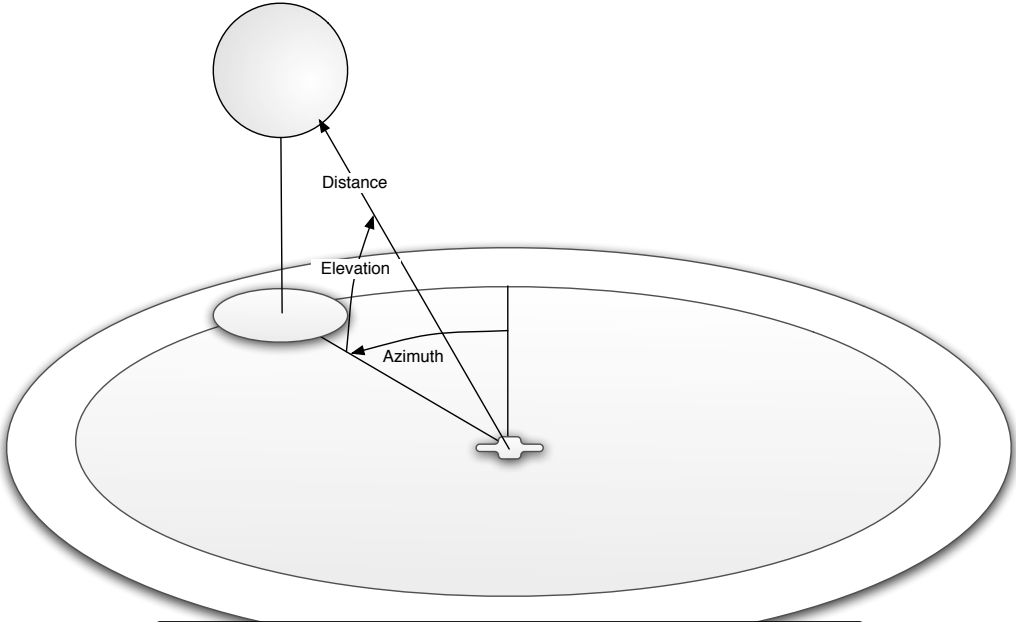
When creating sample instruments, it can be very helpful to already pre-mix the individual Zones or layers, so that the instrument can be used immediately in a musical context. While adjusting volume and pan already makes for interesting results, sometimes you need more realistic spatial control over placement of sounds in the sound field. These days it's also increasingly important to be able to spatialize sounds not just in the 2.0/stereo domain, but also in more complex speakers configurations as 4.0 or 5.0. Moreover, Keymap should be able to print these spatial qualities to the samples so that the EXS24 or any other sampler can play the samples as we mixed and heard them in Keymap. The realtime Surround +Space mixer in Keymap is the answer to these needs.



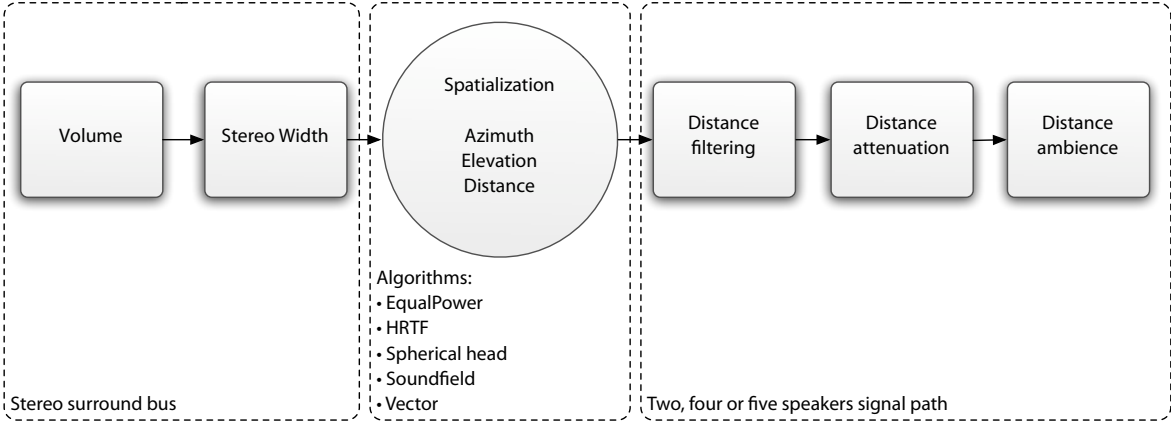
This mixer has 16 stereo input busses coming from Zones, and the output can be configured for two, four or five speakers. The output configuration and the EXS24 busses to use for speakers are selected through the **Speakers Configuration** and the related **Front, Rear and Front Center** pop-up menus.



Each stereo bus input has an individual input **Volume** control, a **Stereo Width** control and can be processed using the spatialization engine. Here, the **Azimuth**, **Elevation** and **Distance** parameters drive one of the five available spatialization algorithms.



Azimuth, Elevation and Distance define the position of the audio from the busses, in the soundfield



Spatialization Algorithms

These are the available algorithms:

EqualPower: this algorithm is intended for 2.0 output and implements an simple equal power panner driven by the azimuth parameter. The elevation parameter is ignored by this algorithm.

- **HRTF** (Head-related transfer function): this algorithm uses convolution to model the human head, and filters the audio to simulate the diffraction and reflection properties of the head, pinna, and torso, before the sound reaches the eardrum and the inner ear. Biologically, the source-location-specific pre-filtering effects of these external structures aid in the determination of source location, particularly the determination of source elevation. Thus, the HRTF is used to create the impression of surround sound without multiple speakers.

- **Spherical Head:** this algorithm is similar to HRTF, but uses a mathematical model instead of convolution.

- **Soundfield:** this algorithm takes the audio from the bus and distributes it amongst all the output channels with a weighting toward the location in which the sound derives. It is very effective for ambient sounds, which may derive from a specific location in space, yet should be heard through the listener's entire space.

- **Vector:** this algorithm is similar to Soundfield, but the sound is more focused to the output channels near the location in space of the sound source.

Distance-related additional effects

Some algorithms let you also enable distance-related spatialization effects:

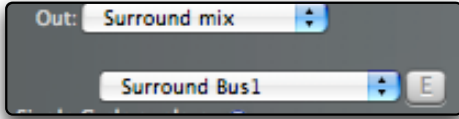
- **Distance Filtering** progressively dampens the sound as the distance increases to emulate the attenuation of high frequencies as happens in real, open spaces. You enable and disable it through the **Fi** checkbox in the **surround bus table**.

- **Distance Attenuation** progressively dampens the sound as the distance increases to emulate the attenuation of high frequencies happening in real, open spaces. Each bus has an independent **Distance Attenuation** parameter, which sets the volume attenuation at the maximum distance, and can be enabled and disabled through the **A** checkbox in the surround bus table

- **Distance Ambience** progressively adds ambience to the sound as the distance increases to emulate sound field ambience reflections. This is enabled and disabled through the **R** checkbox in the surround bus table

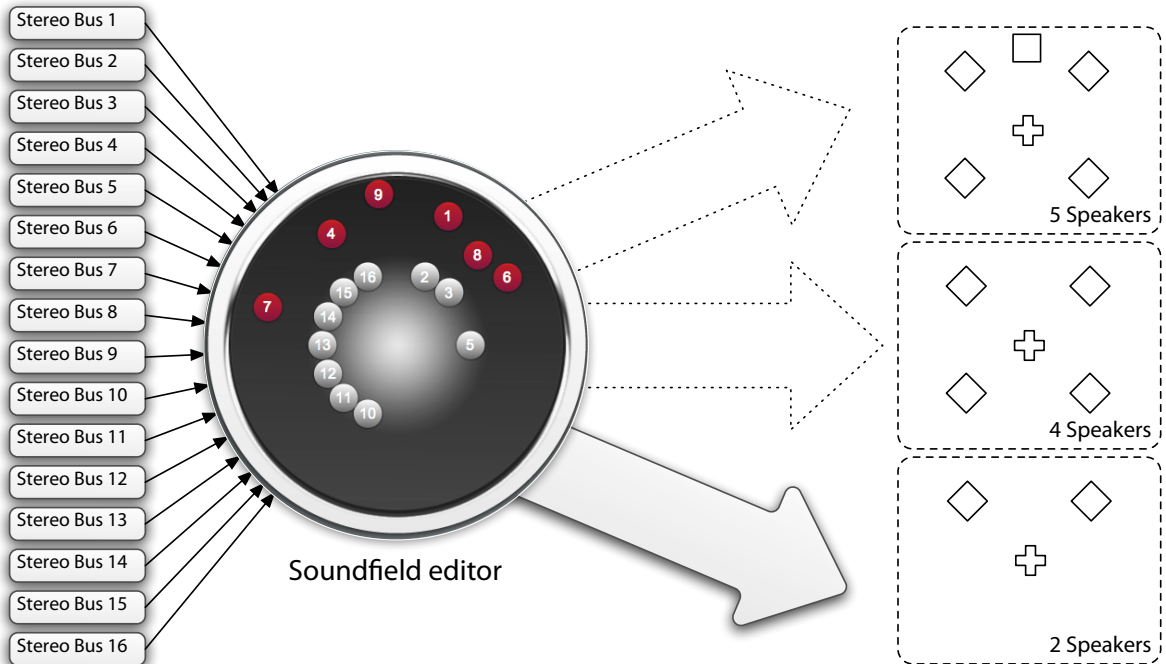
How to route Zones to a Surround bus

For routing the audio out from some Zones into one of the surround buses, select the Zones, set “Surround Mix” in the Out pop-up menu inside the Zone inspector, and then set the desired surround bus destination.



How to place and position the buses in the sound field

The 16 stereo buses are always visualized as numbered circles in the Soundfield editor. Disabled buses are displayed in grey, while enabled buses are displayed in red. You set azimuth and distance simply by dragging around enabled buses in the soundfield, with the center of the soundfield being the listener point. The elevation parameter is set through the **elevation slider** at the left of the soundfield editor.



While dragging the buses around, the highlight of buses serves as a visual cue that the buses are at the same distance. This let you set up buses at the same distance in a very simple and intuitive way.

Saving projects using the Surround+Space mixer to the EXS24 format

The EXS24 has no built-in support for the surround+space mixer. When a project using these features is saved to the EXS24 format, Keymap will recognize the samples which use spatialization and will process them and save the result as new sample files.

If the mixer is configured for 4.0 or 5.0 output format, then Keymap will render the busses to 4 or 5 channel samples. As EXS24 has no support for multichannel samples, Keymap saves this complex rendered multichannel sample as a series of stereo and mono sample files, with new Zones created and properly assigned, in order to recreate the same sonic result of Keymap inside the EXS24.

As you can imagine this is a very complex process, which is not reversible. For this reason we strongly suggest to save the project in Keymap format before saving it in EXS24 format.

Chapter 27: Resources window

The resources window has been designed to give you an overview in tabular form of your current project elements, including the referenced real sample files.

The screenshot shows the 'Resources window | (more moog.kmp)' interface. It features a main table with columns for Zone, Layer, Instrument, Group, LowN, HighNo, Root, LVel, and HV. Below this is a 'Sample table for selected zones' with columns for Sample, Frames, Rate, Form, Modified, Created on, and Path. At the bottom, there is an 'Aux sample editor' showing a waveform for 'moog tune.aif' and a 'Sample file inspector' displaying file metadata.

Annotations with arrows point to the following features:

- Zone table menu
- Search field
- Zone table
- Sample table for selected zones
- Sample table menu
- Aux sample editor
- Aux sample overview
- Sample file inspector

Zone	Layer	Instrument	Group	LowN	HighNo	Root	LVel	HV
osc mixer 2 R	osc mixer 2 R	alpha Moog	alpha	24 (C1)	72 (C3)	60 (C4)	1	127
osc mixer 2 L	osc mixer 2 L	alpha Moog	alpha	24 (C1)	72 (C3)	60 (C4)	1	127
flange moog	flange moog R	backwardMoog	backward	24 (C1)	79 (G3)	57 (A3)	1	127
flange moog	flange moog L	backwardMoog	backward	24 (C1)	79 (G3)	57 (A3)	1	127
big fly	big fly R	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127
big fly	big fly L	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127
noise 1		buzzy Moog	buzzy	24 (C1)	67 (G4)	60 (C4)	1	127
prodigy A1	prodigy A1	buzzy Moog	buzzy	24 (C1)	67 (G4)	45 (A2)	1	127
osc mixer 1	osc mixer 1	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127
moog tune	moog tune	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127
osc mixer 2	osc mixer 2	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127
detune	detune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127
moog tune	moog tune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127
light sync 1	fat+sync Moog	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	41 (F2)	1	127
light sync 2	light sync 2	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	48 (C3)	1	127
moog filter	moog filter L	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127
moog filter	moog filter R	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127
light sync 2	light sync 2	livin Moog	livin Moog	24 (C1)	60 (C4)	48 (C3)	1	127
moog sweep	moog sweep	livin Moog	livin Moog	24 (C1)	60 (C4)	41 (F2)	1	127
moog square	mono Moog	mono Moog	mono	24 (C1)	67 (G4)	53 (F3)	1	127
flange moog	flange moog L	moog deep 1	moog	24 (C1)	72 (C3)	57 (A3)	1	127
flange moog	flange moog R	moog deep 1	moog	24 (C1)	72 (C3)	57 (A3)	1	127
flange moog	flange moog R	moog lo-echo	moog lo-	24 (C1)	67 (G4)	57 (A3)	1	127
flange moog	flange moog L	moog lo-echo	moog lo-	24 (C1)	67 (G4)	57 (A3)	1	127
flange moog	flange moog R	movie bass	movie	24 (C1)	72 (C3)	57 (A3)	1	127
flange moog	flange moog L	movie bass	movie	24 (C1)	72 (C3)	57 (A3)	1	127

Sample	Frames	Rate	Form	Modified	Created on	Path
moog tune.aif	274176	48000	AIFF	Jan 04, 2007	Jan 03, 2007	/Users/

File Inspector for 'moog tune.aif':

- Frames: 274176
- Time: 5.71 sec
- Sample Rate: 48000
- File Size: 548864
- Channels: 1
- Bitdepth: 16
- Loop start: 33289
- Loop End: 268896
- High Note In File: 127 (C3)
- Low Note In File: 0 (C-1)
- High Vel In File: 127
- Low Vel In File: 0
- Root Note: 60 (C4)

From this window you can also perform advanced renaming of Zones and sample files, view and save mapping and loop data to sample files, edit the Zones virtual samples through the auxiliary sample editor, open the instrument or sample editor for selected resources and search for specific names in your elements.

The Zone table

This table lists all Zones in your project, and their relationship with layers, instruments and Groups. We also see the basic Zone properties: **note** and **velocity** ranges, **root note**, **start** and **end** playback position, **loop** points.

Zone	Layer	Instrument	Group	LowN	HighNo	Root	Lvel	HV	Lp	Start	End	Loop Start	Loop End
osc mixer 2 L	osc mixer 2 L	alpha Moog	alpha	24 (C1)	72 (C5)	60 (C4)	1	127	<input type="checkbox"/>	32	86267	32	86267
osc mixer 2 R	osc mixer 2 R	alpha Moog	alpha	24 (C1)	72 (C5)	60 (C4)	1	127	<input type="checkbox"/>	32	86267	32	86267
flange moog	flange moog L	backwardMoog	backward	24 (C1)	79 (G5)	57 (A3)	1	127	<input checked="" type="checkbox"/>	122	415551	80634	415184
flange moog	flange moog R	backwardMoog	backward	24 (C1)	79 (G5)	57 (A3)	1	127	<input checked="" type="checkbox"/>	122	415551	80634	415184
big fly	big fly L	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127	<input checked="" type="checkbox"/>	32	289879	201342	282220
big fly	big fly R	big insect	big insect	36 (C2)	69 (A4)	41 (F2)	1	127	<input checked="" type="checkbox"/>	32	289879	201342	282220
noise 1	noise 1	buzzy Moog	buzzy	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	3	1155	237	1155
prodigy A1	prodigy A1	buzzy Moog	buzzy	24 (C1)	67 (G4)	45 (A2)	1	127	<input checked="" type="checkbox"/>	48	199923	40547	195376
moog tune	moog tune	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	32	152115	15559	152115
osc mixer 2	osc mixer 2	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	<input type="checkbox"/>	32	86267	32	86267
osc mixer 1	osc mixer 1	China Moog	china	24 (C1)	67 (G4)	60 (C4)	1	127	<input type="checkbox"/>	32	89167	32	89167
moog tune	moog tune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	32	152115	15559	152115
detune	detune	Eno Moog	eno	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	32	210647	168316	210647
light sync 2	light sync 2	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	48 (C3)	1	127	<input checked="" type="checkbox"/>	102	216787	55804	216520
light sync 1	fat+sync Moog	fat+sync Moog	fat+sync	24 (C1)	64 (E4)	41 (F2)	1	127	<input checked="" type="checkbox"/>	102	172687	31667	171520
moog filter	moog filter R	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	0	399134	40032	389344
moog filter	moog filter L	filter flow	filter flow	24 (C1)	67 (G4)	60 (C4)	1	127	<input checked="" type="checkbox"/>	0	399134	67684	347194
light sync 2	light sync 2	livin Moog	livin Moog	24 (C1)	60 (C4)	48 (C3)	1	127	<input checked="" type="checkbox"/>	102	120069	14846	120069
moog sweep	moog sweep	livin Moog	livin Moog	24 (C1)	60 (C4)	41 (F2)	1	127	<input checked="" type="checkbox"/>	56	177184	41644	177074
moog square	mono Moog	mono Moog	mono	24 (C1)	67 (G4)	53 (F3)	1	127	<input checked="" type="checkbox"/>	122	56879	19655	50632
flange moog	flange moog L	moog deep 1	moog	24 (C1)	72 (C5)	57 (A3)	1	127	<input checked="" type="checkbox"/>	122	415551	80634	415184
flange moog	flange moog R	moog deep 1	moog	24 (C1)	72 (C5)	57 (A3)	1	127	<input checked="" type="checkbox"/>	122	415551	80634	415184

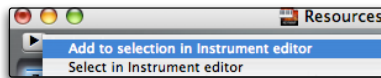
Only some parameters are editable from the table: the Zone, layer, instrument, Group names, the root note and the loop enabled/disabled checkbox. If you double click with the mouse over one of the non editable parameters you will actually open the full sample editor for that Zone virtual sample. You can also sort the table by clicking on the columns titles. This is very useful if you want to look at the the Zone list organized in various ways, by Group, by instrument, or by layer.

Using the Zone table as a browser

The Zone table editor can also be used to browse the Zones/samples you dropped into the Instrument editor, as you can move from one Zone to the other using the cursor keys, and play the sample using the space bar. You can also select Zones and later keep or remove them from the Instrument editor.

Selecting Zones in the Instrument editor from the Zone table

Since all editors in Keymap are integrated, you can use the Resources Window next to your Instrument editor and select Zones in the Instrument editor from the Resources Window using one of two menu functions you find in the Zone table menu.



The **Add to selection in Instrument editor** function adds the currently selected Zones in the Zone table to the Instrument editor selection without deselecting any Zone that might have been already selected there.

The **Select in Instrument editor** menu function will instead first clear any selection in the Instrument editor and then select the Zones as from the Zone table.

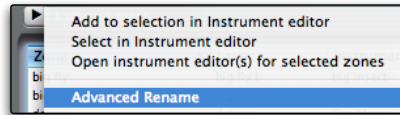
Opening the Instrument editor(s) for selected Zones

Once you select some Zones in the Zone table, you can open the Instrument editors for those Zones using the **Open instrument editor(s) for selected zones** menu function.

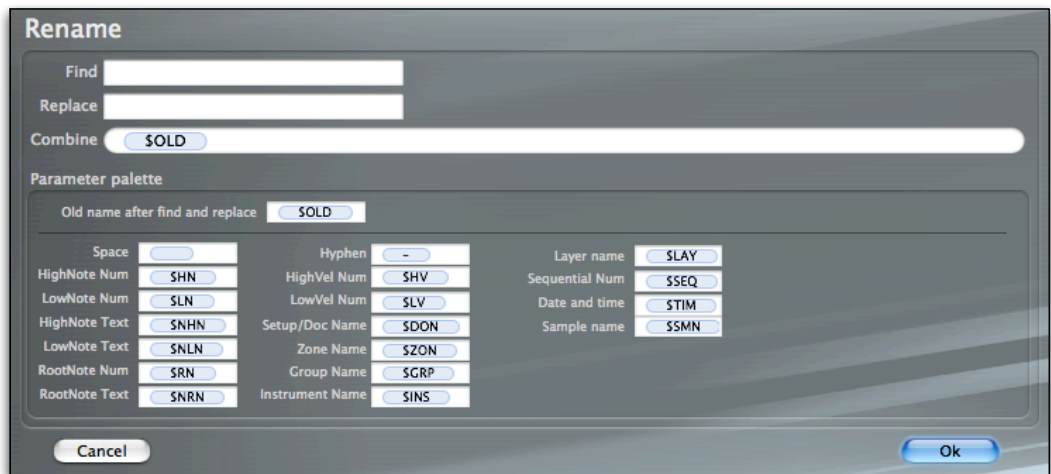


Advanced rename

Once you select Zone Zones in the Zone table, Keymap lets you rename them with a sophisticated, yet simple, token based system which we call **advanced rename**. You open the advanced rename panel using the Advanced rename menu function.



The panel consists of four sections: the **Find** text field, the **Replace** text field, the **Combine** text field and the **Parameter palette**.



The renaming is done in two phases for each Zone: **Find and Replace** and then **Combine**. In the first phase the name is searched for using the **Find** text, and any instance is replaced with the **Replace** text. After that you can **Combine** the result with names taken from some of the Zone properties. The concatenation is defined by simply placing a series of token in sequence in the Combine field. Keymap will replace these tokens with the actual values taken from the currently processed Zones. You are not limited to using tokens: you can type text directly in the Combine field, and that text will be used to rename your Zones. Of course it doesn't really make sense to name all Zones with the same text , so you might want to at least add a sequential number using the \$SEQ token.

Parameters palette

The parameter shows the available tokens for renaming. Here's an explanation of each of them:

Token	Converts to
\$OLD	The Zone name after find+replace processing
Space	A single space . Normally all redundant spaces are removed
\$HN	The High Note Zone parameter expressed as MIDI Note number
\$LN	The Low Note Zone parameter, expressed as MIDI Note number
\$NHN	The High Note Zone parameter expressed as note name
\$NLN	The Low Note Zone parameter, expressed as note name
\$RN	The Root Note Zone parameter expressed as MIDI Note number
\$NRN	The Root Note Zone parameter expressed as note name
Hyphen	A single hyphen ("-")
\$HV	The High Vel Zone parameter
\$LV	The Low Vel Zone parameter
\$DON	The project name (which is also the setup name)
\$ZON	The Zone name before find+replace processing
\$GRP	The Group name (if the Zone is not assigned to a Group, this translates to nothing)
\$INS	The instrument name for the Zone

Token	Converts to
\$LAY	The layer name for the Zone
\$SEQ	A sequential number , always starting from 1 for each rename session, and progressively incremented for each Zone being renamed
\$TIM	The current date and time
\$SMN	The name of the real sample file referenced by the Zone

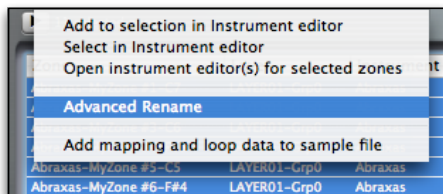
You really have no more excuses for creating instruments with cryptic Zone names!

A step-by-step example

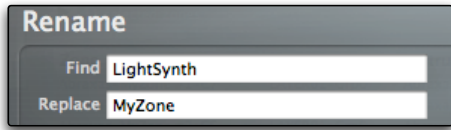
We first select these Zones in the Zone table. Notice how the Zone name is a bit anonymous: we want to spice up the Zone names by adding the instrument name, changing the LightSynth text to something else, and adding the name of the root note too.

Zone	Layer	Instrument	Group	LowN	HighNo	Root	LVel	HV	Lp
LightSynth #1	LAYER01-Grp0	Abraxas	Group #1	94 (A#6)	127 (G9)	96 (C7)	1	127	✓
LightSynth #2	LAYER01-Grp0	Abraxas	Group #1	88 (E6)	93 (A6)	90 (F#6)	1	127	✓
LightSynth #3	LAYER01-Grp0	Abraxas	Group #1	82 (A#5)	87 (D#6)	84 (C6)	1	127	✓
LightSynth #4	LAYER01-Grp0	Abraxas	Group #1	76 (E5)	81 (A5)	78 (F#5)	1	127	✓
LightSynth #5	LAYER01-Grp0	Abraxas	Group #1	70 (A#4)	75 (D#5)	72 (C5)	1	127	✓
LightSynth #6	LAYER01-Grp0	Abraxas	Group #1	64 (E4)	69 (A4)	66 (F#4)	1	127	✓
LightSynth #7	LAYER01-Grp0	Abraxas	Group #1	58 (A#3)	63 (D#4)	60 (C4)	1	127	✓
LightSynth #8	LAYER01-Grp0	Abraxas	Group #1	52 (E3)	57 (A3)	54 (F#3)	1	127	✓
LightSynth #9	LAYER01-Grp0	Abraxas	Group #1	46 (A#2)	51 (D#3)	48 (C3)	1	127	✓
LightSynth #10	LAYER01-Grp0	Abraxas	Group #1	40 (E2)	45 (A2)	42 (F#2)	1	127	✓
LightSynth #11	LAYER01-Grp0	Abraxas	Group #1	0 (C-1)	39 (D#2)	36 (C2)	1	127	✓

We open the Advanced rename panel using the Zone table menu.



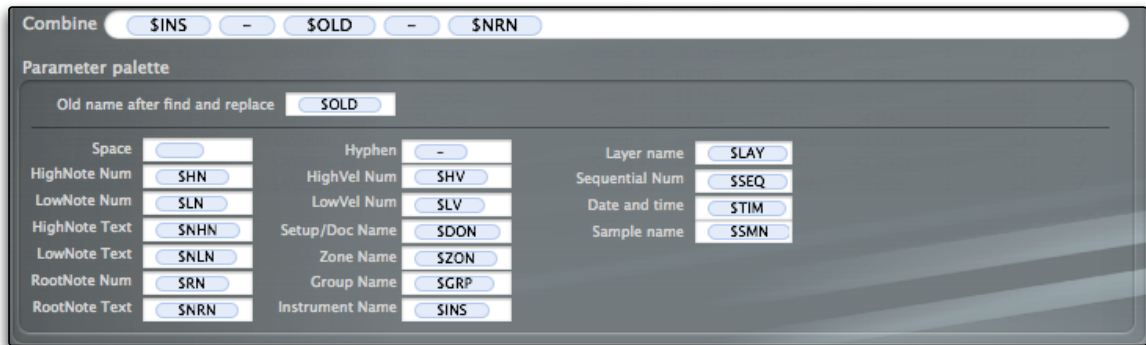
And then we set the panel to find and replace the "LightSynth" string with "MyZone" by filling the appropriate **Find** and **Replace** fields.



A dialog box titled "Rename" with two input fields. The "Find" field contains the text "LightSynth" and the "Replace" field contains the text "MyZone".

We can combine the resulting name with other parameters by dragging and dropping the tokens from the palette into the **Combine** field. The **\$OLD** token represent the Zone name after the find and replace process. If we just leave the \$OLD token in the Combine field, then we are simply going to find and replace and no further combination (concatenation) of names or values will happen. Let's start from scratch by selecting the combine field and using the backspace key to clear it: as you will see the Combine field it works in many ways as a normal text field.

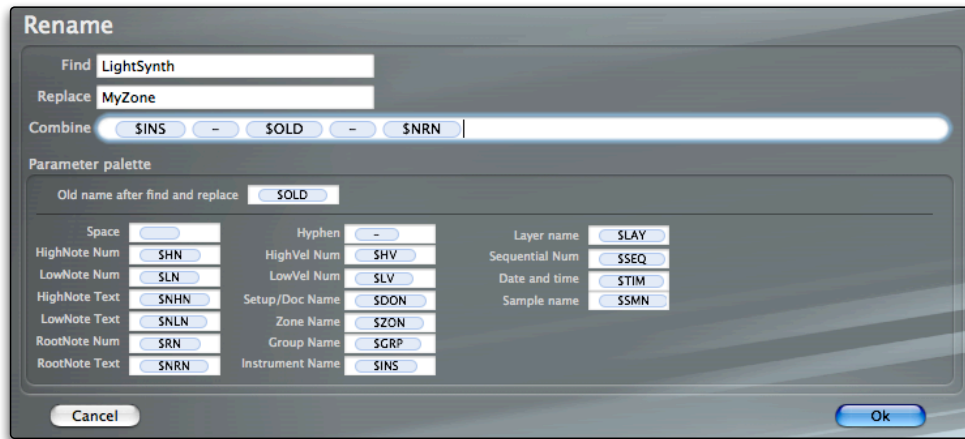
In our case we want the Zones to start with the instrument name, so we drag and drop the **\$INST** token from the palette into the combine field , then we drag and drop an hyphen token that we'll use as separator. We then drag and drop the **\$OLD** token, representing our Zone name after find+replace , then we add another hyphen and also the root note as text (i.e. expressed as **C4** and not **60**).



A dialog box titled "Combine" showing a sequence of tokens: \$INS, -, \$OLD, -, \$NRN. Below this is a "Parameter palette" section. At the top of the palette, "Old name after find and replace" is set to \$OLD. The palette contains several categories of tokens:

Space	[]	Hyphen	-	Layer name	SLAY
HighNote Num	SHN	HighVel Num	SHV	Sequential Num	SSEQ
LowNote Num	SLN	LowVel Num	SLV	Date and time	STIM
HighNote Text	SNHN	Setup/Doc Name	SDON	Sample name	SSMN
LowNote Text	SNLN	Zone Name	SZON		
RootNote Num	SRN	Group Name	SGRP		
RootNote Text	SNRN	Instrument Name	SINS		

This is what you should see



We can now click OK, and Keymap will rename all selected Zonesm , and this is the result:

Zone	Layer	Instrument	Group	LowN	HighNo	Root	LVel	HV	Lp
Abraxas-MyZone #1-C7	LAYER01-Grp0	Abraxas	Group #1	94 (A#6)	127 (G9)	96 (C7)	1	127	✓
Abraxas-MyZone #2-F#6	LAYER01-Grp0	Abraxas	Group #1	88 (E6)	93 (A6)	90 (F#6)	1	127	✓
Abraxas-MyZone #3-C6	LAYER01-Grp0	Abraxas	Group #1	82 (A#5)	87 (D#6)	84 (C6)	1	127	✓
Abraxas-MyZone #4-F#5	LAYER01-Grp0	Abraxas	Group #1	76 (E5)	81 (A5)	78 (F#5)	1	127	✓
Abraxas-MyZone #5-C5	LAYER01-Grp0	Abraxas	Group #1	70 (A#4)	75 (D#5)	72 (C5)	1	127	✓
Abraxas-MyZone #6-F#4	LAYER01-Grp0	Abraxas	Group #1	64 (E4)	69 (A4)	66 (F#4)	1	127	✓
Abraxas-MyZone #7-C4	LAYER01-Grp0	Abraxas	Group #1	58 (A#3)	63 (D#4)	60 (C4)	1	127	✓
Abraxas-MyZone #8-F#3	LAYER01-Grp0	Abraxas	Group #1	52 (E3)	57 (A3)	54 (F#3)	1	127	✓
Abraxas-MyZone #9-C3	LAYER01-Grp0	Abraxas	Group #1	46 (A#2)	51 (D#3)	48 (C3)	1	127	✓
Abraxas-MyZone #10-F#2	LAYER01-Grp0	Abraxas	Group #1	40 (E2)	45 (A2)	42 (F#2)	1	127	✓
Abraxas-MyZone #11-C2	LAYER01-Grp0	Abraxas	Group #1	0 (C-1)	39 (D#2)	36 (C2)	1	127	✓

As you can see each Zone name now starts with the instrument name, then the found+replaced text and then the root note (as you can check by comparing with the root note column on the right).

Another example

Let's say that we are not satisfied with the results above, and we want to go back to a simple name with a sequential number. We open again the Advanced rename panel, and this time we don't do any find and replace, but we type directly the new name we want in the Combine field, followed by a space token and a \$SEQ token, so that each Zone name is followed by a unique number.

The screenshot shows the 'Rename' dialog box with the following configuration:

- Find:** (empty)
- Replace:** (empty)
- Combine:** ThisIsWhatIWant \$SEQ
- Parameter palette:**
 - Old name after find and replace: SOLD
 - Space: (checked)
 - Hyphen: -
 - Layer name: SLAY
 - HighNote Num: SHN
 - HighVel Num: SHV
 - Sequential Num: SSEQ
 - LowNote Num: SLN
 - LowVel Num: SLV
 - Date and time: STIM
 - HighNote Text: SNHN
 - Setup/Doc Name: SDON
 - Sample name: SSMN
 - LowNote Text: SNLN
 - Zone Name: SZON
 - RootNote Num: SRN
 - Group Name: SGRP
 - RootNote Text: SNRN
 - Instrument Name: SINS

We click ok, and this is what we get:

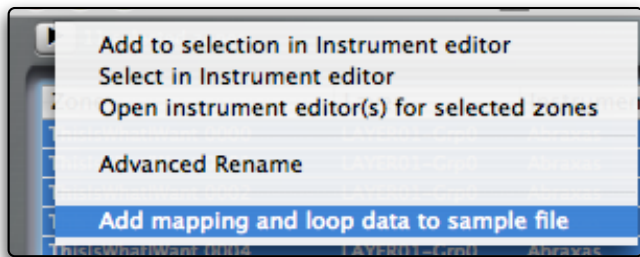
Zone	Layer	Instrument	Group	LowN	HighNo	Root	LVel	HV	Lp
ThisIsWhatIWant 0000	LAYER01-Grp0	Abraxas	Group #1	94 (A#6)	127 (G9)	96 (C7)	1	127	✓
ThisIsWhatIWant 0001	LAYER01-Grp0	Abraxas	Group #1	88 (E6)	93 (A6)	90 (F#6)	1	127	✓
ThisIsWhatIWant 0002	LAYER01-Grp0	Abraxas	Group #1	82 (A#5)	87 (D#6)	84 (C6)	1	127	✓
ThisIsWhatIWant 0003	LAYER01-Grp0	Abraxas	Group #1	76 (E5)	81 (A5)	78 (F#5)	1	127	✓
ThisIsWhatIWant 0004	LAYER01-Grp0	Abraxas	Group #1	70 (A#4)	75 (D#5)	72 (C5)	1	127	✓
ThisIsWhatIWant 0005	LAYER01-Grp0	Abraxas	Group #1	64 (E4)	69 (A4)	66 (F#4)	1	127	✓
ThisIsWhatIWant 0006	LAYER01-Grp0	Abraxas	Group #1	58 (A#3)	63 (D#4)	60 (C4)	1	127	✓
ThisIsWhatIWant 0007	LAYER01-Grp0	Abraxas	Group #1	52 (E3)	57 (A3)	54 (F#3)	1	127	✓
ThisIsWhatIWant 0008	LAYER01-Grp0	Abraxas	Group #1	46 (A#2)	51 (D#3)	48 (C3)	1	127	✓
ThisIsWhatIWant 0009	LAYER01-Grp0	Abraxas	Group #1	40 (E2)	45 (A2)	42 (F#2)	1	127	✓
ThisIsWhatIWant 0010	LAYER01-Grp0	Abraxas	Group #1	0 (C-1)	39 (D#2)	36 (C2)	1	127	✓

Adding loop and mapping data to sample files

While the EXS instrument format is supported by all the most popular software samplers, sometimes you might want to use the samples in a different context, or with an application which can't read EXS format. Luckily, both the WAV and AIFF file format specifications allow applications to write and read for each sample file the expected position in a note+velocity matrix, the root note, the volume and the loop points. In many situations this is really all what you need.

When rendering new sample files, Keymap always embeds this information in the created files. The problem however remains for samples not rendered by Keymap, or when you modify the mapping and looping parameters and need to update the sample files.

The **Add mapping and loop data to sample file** menu function in the Zone table menu let you add, or update, the mapping information contained in AIFF and WAV samples referenced by the selected Zones.



This function will not add or update data if a sample is used by more than one single Zone in your instrument. This happens because in that case the Zones would have conflicting values, and would not be possible to establish the right set to use.

Applications that support the mapping and loop data in sample files will be able to import the samples and place them directly in the proper map area.

Keymap supports the mapping data in sample files, and uses this data as the basis for a few automap functions available in the Instrument editor.

The search field

If you type some text in the search field and press Return or Enter, the Zone table will only show you Zones for which the search text matches any part of the names of either the Zone, instrument, layer and Group. Needless to say, the search field is an efficient way to quickly focus on a limited set of Zones.

The aux sample editor

Each time you select a **single** Zone in the Zone table, you will be able to view and edit its virtual sample in the resources window aux sample editor. This editor has all the functionalities of the aux sample editor seen in the Instrument editor.

It's important to understand that the sample editor will show you the virtual sample for the Zone, and not the content of the real sample file. In simple projects the two samples might coincide, but that's not the rule.

The sample table

The sample table shows the sample files referenced by the Zones selected in the Zone table, and their most important properties, as number of frames, sample rate, format, modification date, creation date and path.

Sample	Frames	Rate	Form	Modified	Created on	Path
Abraxas84.wav	253440	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas42.wav	409280	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas36.wav	425984	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas60.wav	352256	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas72.wav	297984	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas66.wav	344064	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas48.wav	423936	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas54.wav	363520	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd
Abraxas78.wav	288768	44100	WAV	Jan 07, 2007	Mar 27, 2004	/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd

If you select a single sample file, you can see more information in the sample file inspector, including the mapping and loop data eventually available in the sample file.

Abraxas84.wav
/Users/andrea/Desktop/Keymap Demos/KM inst Samples/Abraxas.exs--sd

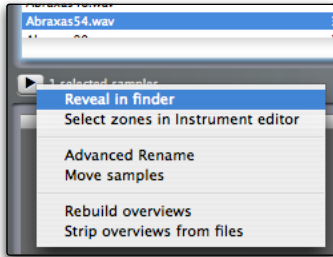
Frames: 253440	Channels: 2	High Note in File: 87 (D#6)	Root Note: 84 (C6)
Time: 5.75 sec	Bitdepth: 16	Low Note in File: 82 (A#5)	
Sample Rate: 44100	Loop start: 157696	High Vel in File: 127	
File Size: 1017939	Loop End: 251904	Low Vel in File: 1	

It's important to note that while the loop points data is automatically used by Keymap when adding samples to the project, the mapping data (note, velocity ranges and root note) is never used

automatically by Keymap, not even if you drag and drop samples in the Instrument editor, and you have to make explicit use of it through the automap functions in the Instrument editor.

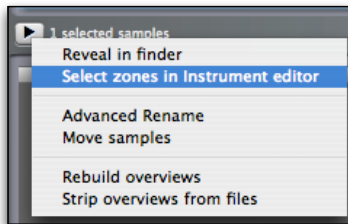
Reveal samples in finder

If you select one or more samples in the sample table, you can go to their disk folders using the **Reveal in finder** sample table menu function.



Select Zones in Instrument editor

If you select one or more samples in the sample table, you can select all Zones referencing these samples, in their instruments editors, by using the **Select Zones in Instrument editor** menu function.



Renaming sample files

You can rename sample files. The method and the rename panel are exactly the same as used for the Zones, so we won't repeat the explanation here. Note however that when we talk about sample names, we always mean sample names **without** the format extension (.aiff, .wav). Keymap will always add the format extension itself.

In the specific case of renaming sample files, you have to be careful as there might be other projects or instruments using those samples, and if you rename samples, those other projects won't be able to find those renamed samples anymore.

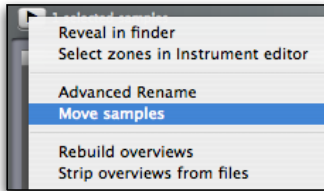
Another thing to keep in mind is that the Keymap undo system will also undo a rename of sample files, but only if you do not change or modify them in any way through the finder or other applications in the meantime. If you do so, and then undo a rename session, you might break the project, and Keymap might have trouble finding the samples again next time you'll load the project.

In the case your Combine parameters leads to already existing sample names, Keymap automatically appends a sequential number to names so that the files do not overwrite or collide with each other.

Remember: be prudent when you rename sample files, as this is one of the very few destructive operations you can do in Keymap.

Moving sample files

You can move sample files by selecting them in the sample table and using the **Move samples** function.



You will be asked for a destination folder: if you are moving samples across drives, be sure that there is enough space available. If a potential overwrite of files is detected, Keymap will solve the situation by appending sequential numbers to your sample names, in order to make the name unique.

Rebuilding sample overviews

Keymap creates and saves sample overview data as a resource of the sample files. You normally should never have to rebuild overviews manually, as Keymap will automatically recognize when the overview needs to be updated. However, certain archival utilities and audio applications may corrupt this data. By selecting the samples in the sample table, and using the **Rebuild overviews** menu command, you can force Keymap to rebuild the overview data.

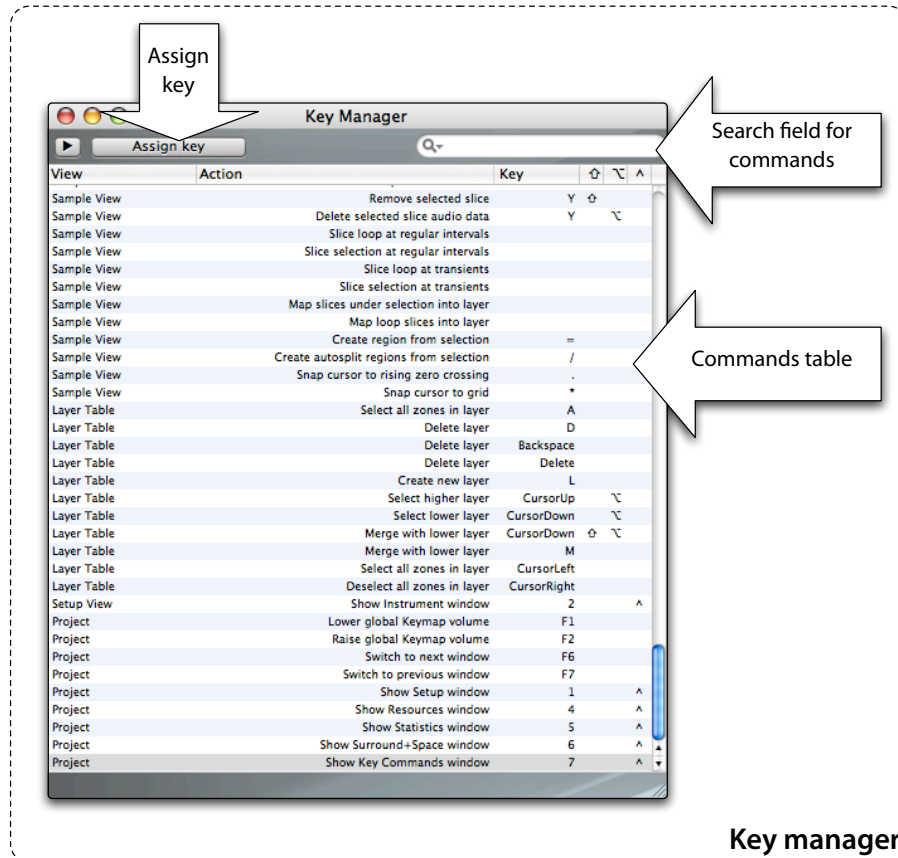
Stripping sample overviews from sample files

If you want to remove the Keymap sample overview data from your sample files, just select the samples in the sample table and use the **Strip overviews from files** menu command. If you open this sample again in Keymap, the overview will be regenerated automatically.

Chapter 28: Key manager

Keymap lets you use key commands as alternative to menu commands. Once you take the time to learn all the various functions, this is the quickest and most efficient way to use the application. The **Key manager** window lets you see which keys are assigned to functions, which functions are assigned to specific keys, and of course you can customize the key assignments to better suit your workflow.

The Key manager is opened using the **Windows > Show Key manager** command.

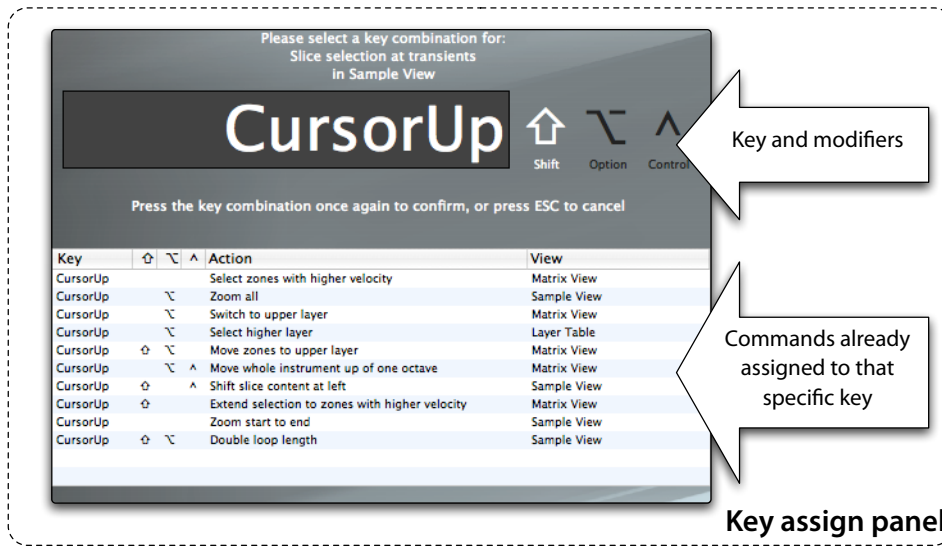


The **commands table** shows all key commands available, and the **search field** lets you narrow the visible commands to the ones you are looking for. Each assignment also takes key modifiers in account. The supported key modifiers for commands are the **Shift**, the **Option** and the **Control** keys. The **Command**

key is not supported by Keymap for user-definable commands. Note also how key commands are for the most part specific to the currently selected view or table, and will operate only there.

Assigning a new key combination to a command

Keys are assigned in the **Key assign panel**, which you can open by double-clicking on the selected function in the commands table, or by selecting the function in the table and then clicking the **Assign key** button. In the **Key assign panel** you can both browse and assign keys.

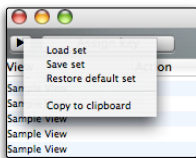


Once the Key assign panel is open, you can assign a new key combination (a combination of a key and its modifiers) by pressing the same key combination twice in a row. Pressing a key combination just once will simply browse keys and see the commands already assigned on that key, regardless of the modifiers.

Some functions are available more than once in the table, as this allows multiple key combinations for those functions. Pressing the ESC key will cancel the Key assign panel and no key assignment will occur.

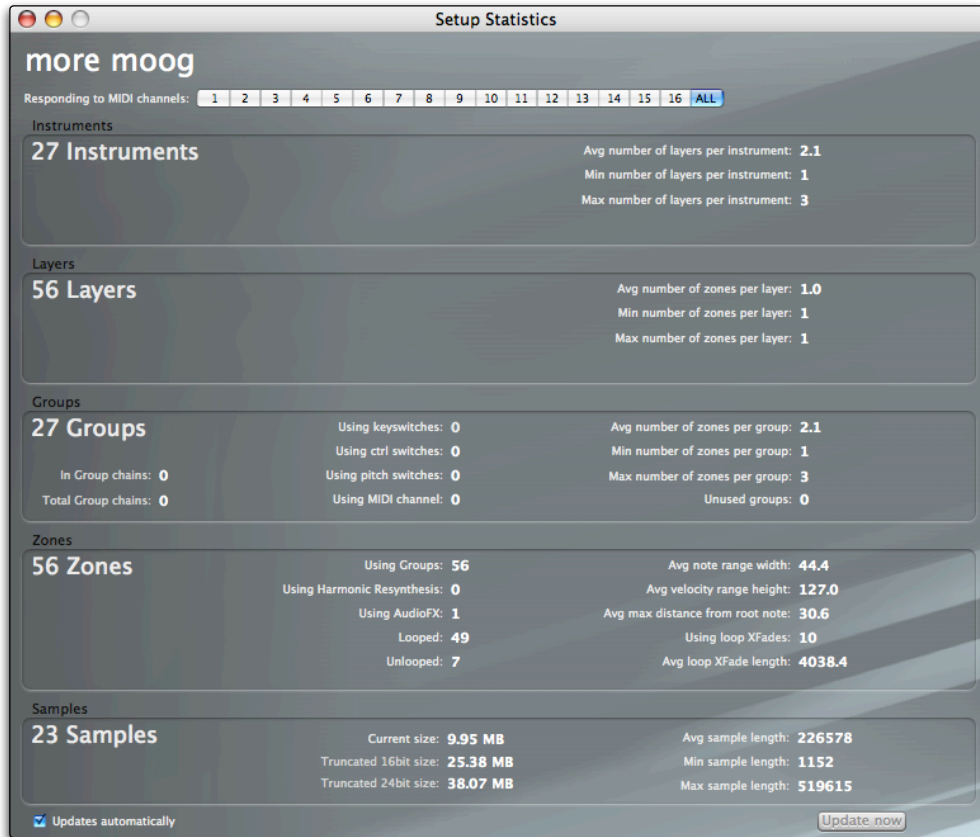
Loading and saving key commands set

The customized key commands set can be saved and loaded using the **Load set** and **Save set** functions available from the context menu. The **Restore default set** menu command restores the key assignments to the defaults. The **Copy to clipboard** command copies the key assignments as a text list to the clipboard, from where you can copy it in a text editor. You will need to use a fixed width font, as Courier or Monaco, for it to be displayed correctly.

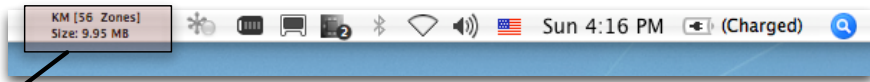


Chapter 29: Statistics window

While building instruments, it's often useful to keep track of how many samples are used, and how much disk space the project is going to take. Keymap statistics subsystem keeps track of these and many more things for you, and displays the current statistics in a dedicated window.

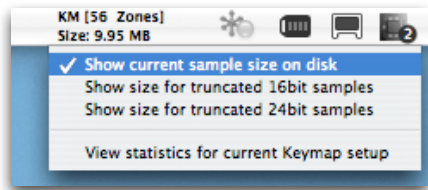


The most important information is also displayed in a small status Zone in the OSX system menu so that it always remains visible.

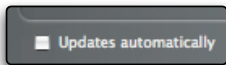


KM [56 Zones]
Size: 9.95 MB

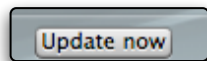
Clicking on the KM status will open a small menu allowing you to select which sample size you want to actually see in the system menu bar (current size, saved at 16 bit, saved at 24 bit).



The statistics are usually updated automatically after each editing action, but you can change this behavior by disabling the **Updates automatically** checkbox at the bottom of the window.



Once disabled, you can update statistics whenever you want by clicking the **Update now** button on the right.



Most of the values seen in the statistics window are logically subdivided and quite self-explanatory, but three of them deserve a comment.

The **Current size** value for samples is the total size of the samples referenced by the current project.

The **Truncated 16bit size** is the predicted sample size if you are going to render all samples for the project at 16 bit.

The **Truncated 24bit size** is the predicted sample size if you are going to render all samples for the project at 24 bit.

Apart from the size difference due to the different bit depths, it's important to remember that when you render new samples, Keymap by design will always create an independent sample for each Zone, regardless of the fact that they might have been originally pointing to the same file. This is the reason for why you might see a difference between the Current sizes and the Truncated sizes.

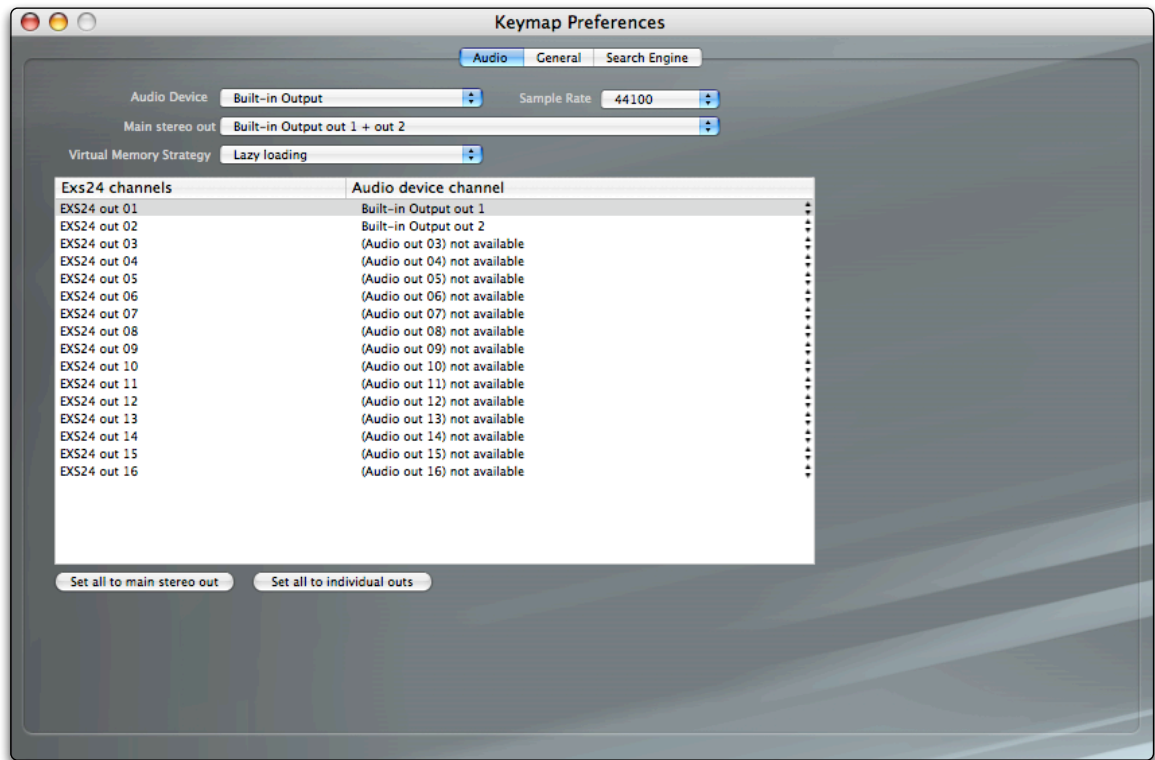
While this design rule can lead instruments generated by Keymap to use potentially more disk space, in this way each Zone can be independently processed with third-party audio applications later.

Chapter 30: Preferences

The preferences window, accessible using the **Keymap>Preferences** menu command, lets you personalize the software to your preferences and to your computer hardware.

Audio preferences

In the audio preferences page you set the audio device you want to use for Keymap, and the routing of Keymap outs to your audio device individual outputs. Note that Keymap does **not** use the Mac OS X system preferences for sound output.



The **Audio Device** and **Sample Rate** pop-up menus let you select the audio device for Keymap, and the desired sample rate. Most of the multi-channel devices have a “main” set of stereo outs. The **Main stereo out** menu lets you view and change this “main” stereo couple, but is not directly changing the routing of the audio from Keymap to the audio outs, and you will have to change the routings directly in the audio routing table. At the end of Keymap audio engine we have 16 virtual audio outputs, exactly as in EXS24,

that you can see at the left of the audio routing table. For each one of them you can select an audio device output to be used, on the right column.

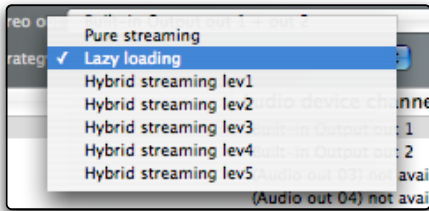
If all you want is to send each individual channel to individual outs, you can click the “Set all to individual outs” button.

If instead you want to send all outs to a certain stereo set, you should first choose the main stereo out set you want to use in the “Main stereo out” menu, and then click the “Set all to main stereo out” button.

Virtual memory

Keymap is based on a streaming audio engine, which avoids loading sample data into the computer RAM memory, if not strictly necessary.

Without going into needless technical details, you can change the audio engine behaviour using the **Virtual memory Strategy** menu. This menu is provided mostly as a way to troubleshoot systems, rather than something you should worry/think about, and we recommend leaving it at the default setting.



Pure streaming will force the audio engine to keep as less audio data as possible in RAM.

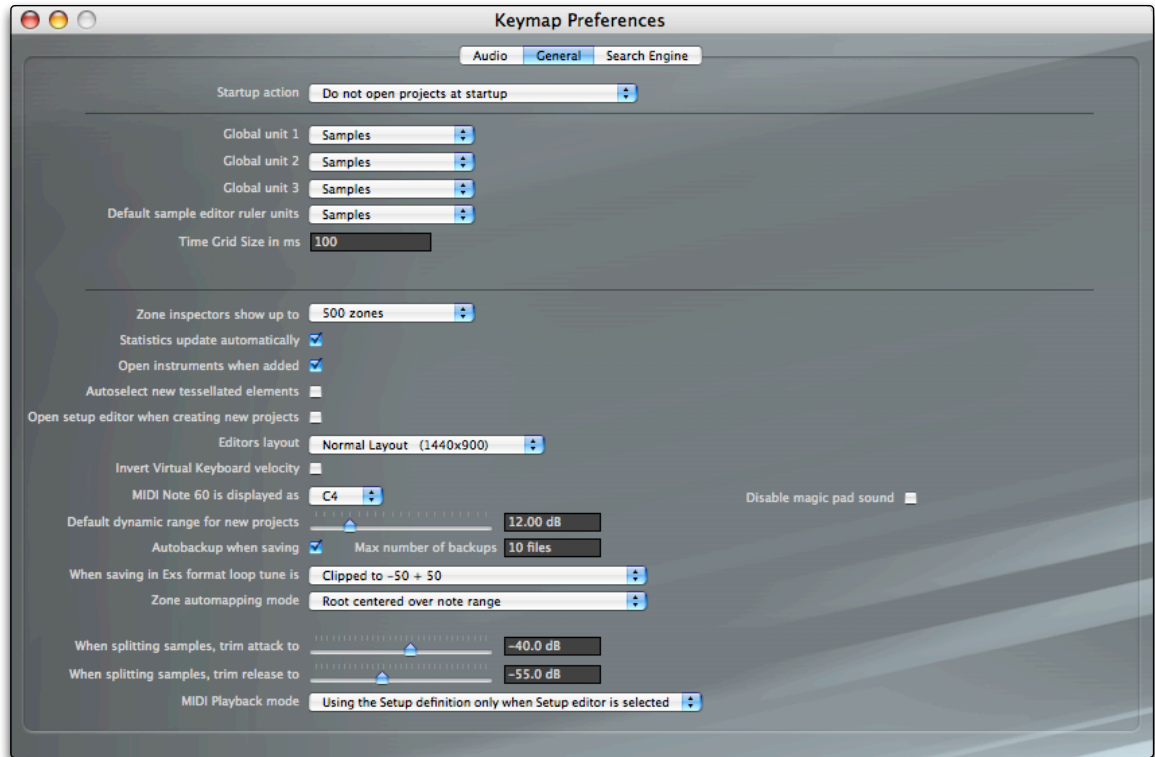
Lazy loading on the contrary will not stream but will load samples in RAM only when strictly necessary.

Hybrid streaming settings switch the audio engine to a mode which is “in between” of streaming and loading, and gives most of the advantages of both approaches.

You might need to restart Keymap before changes to this setting become effective.

General preferences

These preferences affect the general behavior of Keymap.



The **Startup action** menu is used to force Keymap to reload the last saved project, or to create a new project (or nothing), at startup.

With the **Global unit 1, 2 and 3** menus, you define unit of measures that can be used in the sample editor for the various parameters inspectors.

Default sample editor ruler units is for the sample editor ruler.

Time grid in ms lets you define the sample editor grid size (when enabled) expressed in milliseconds.

The **Zone inspectors show up to** menu lets you set the maximum number of zones for which the zone inspectors in the instrument editor will work. This setting has an important performance impact, because

each time you select multiple zones, Keymap has to check which parameters from all zones are at the same value and which not, so that it can display correctly the values in the zone inspectors. Considering that each zone has hundreds of parameters, and that instruments can easily contain hundreds of zones, this can take quite a hit on your CPU. With this parameter you can set the “maximum number of zones” which will be handled by the inspectors.

Statistics update automatically, when enabled, will automatically update the statistics window at each edit action.

Open instruments when added, when enabled, will automatically open the instrument editor when you add instruments to a setup.

Autoselect new tessellated elements, when enabled, will automatically maintain the selection even if a zone gets tessellated because of some editing action.

Open setup editor when creating new projects, lets you automatically open the setup editor when creating a new project.

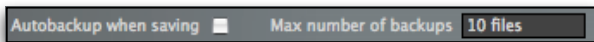
The **Editors layout** menu lets you choose one of three possible layouts available for the main editors windows. Each layout is targeted toward a certain screen size, and we have a **Compact** layout (1024x768), a **Normal** layout (1440x900), and a **Wide** layout (1920x1200).

Invert virtual keyboard velocity, when enabled, makes the virtual keyboard send low velocity notes when clicked at the top, and high velocity notes when clicked at the bottom.

MIDI note 60 is displayed as , lets you define the note name to use for MIDI note 60. Possible choices are C3, C4 and C5).

Default dynamic range for new projects lets you set the desired dynamic range when creating a new project.

The **Autobackup when saving** checkbox activates an autobackup function that preserves previously saved versions of a project. You can also set the maximum number of older versions you want to preserve with the **Max number of backups** preference.



The next time you save the project, a folder with the project name and the .back suffix will be created next to it. At each save, the old version is moved in that folder, and all versions renamed by appending a

sequential number, so that at any time version "1" always identifies the newest backup and the others are progressively older as the number increases.

The "When saving in EXS format the loop tune is" menu lets you choose how the loop tune should be rebalanced when saving to EXS24 format. Please check the **Single cycle loops** section for more information about this.

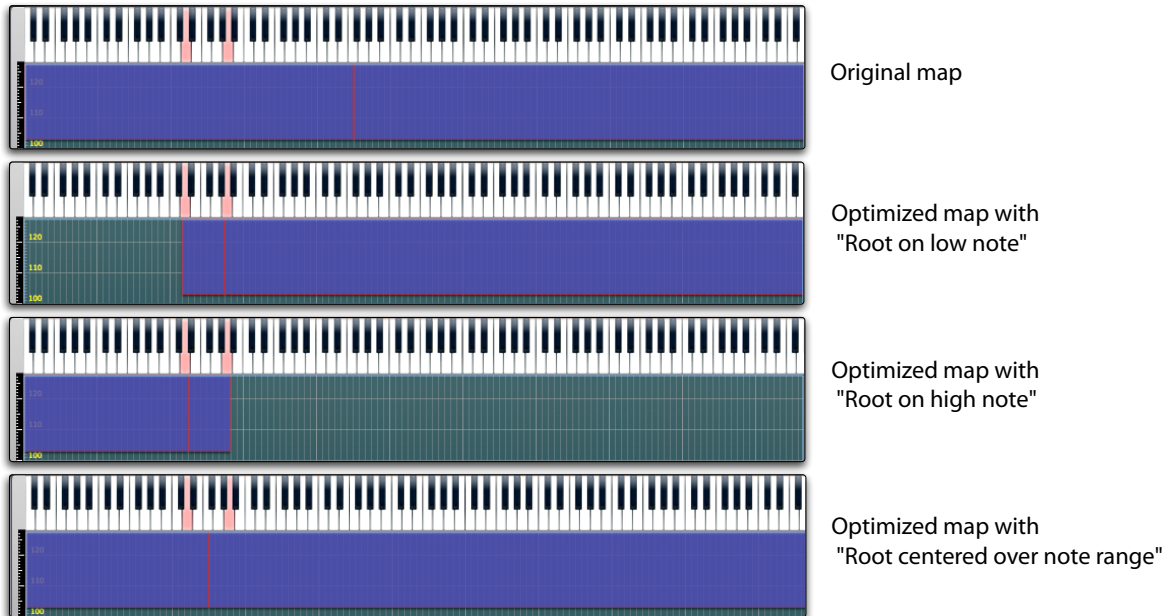
The **Zone automapping mode** determine how you want to remap Zones. The possible choices are:

Root on low note means that the remapped Zones will have the low note set to the root note.

Root on high note means that the remapped Zones will have the high note set to the root note.

Root centered over note range means that the Zones will be remapped so that the root note is centered respect the low and high notes (with an exception for the leftmost and rightmost Zones). In Zones two notes wide, the low note is set to the root note.

Root centered over note range favoring low is like "Root centered over note range" but with a different rounding so that in Zones two notes wide, the high note is set to the root note.



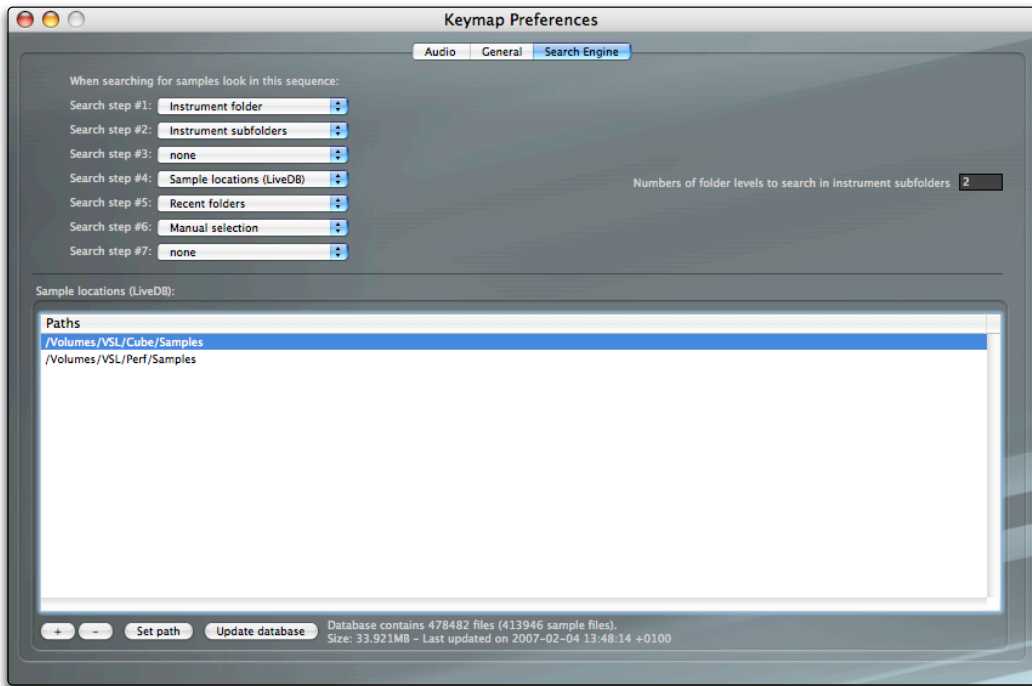
The **When splitting samples trim attack to** and **When splitting samples trim release to** preferences, let you set at which level samples should be trimmed after having been split from a longer audio file. These values do not change how the split algorithm works, and are used on each sample segment only after the splitting is done.

The **MIDI playback mode** determines how MIDI playback works when an instrument editor is selected as main window. When the **“Always use setup definition”** setting is selected, the instrument will play transposed and velocity offset as set from setup. When instead the **“Only use Setup definition when setup is selected”** setting is used, instrument transposition and velocity offset will be ignored when playing from the instrument editors.

Disable magic pad sound lets you disable the sound emitted by magic pads when dragging some files over them.

Search engine preferences

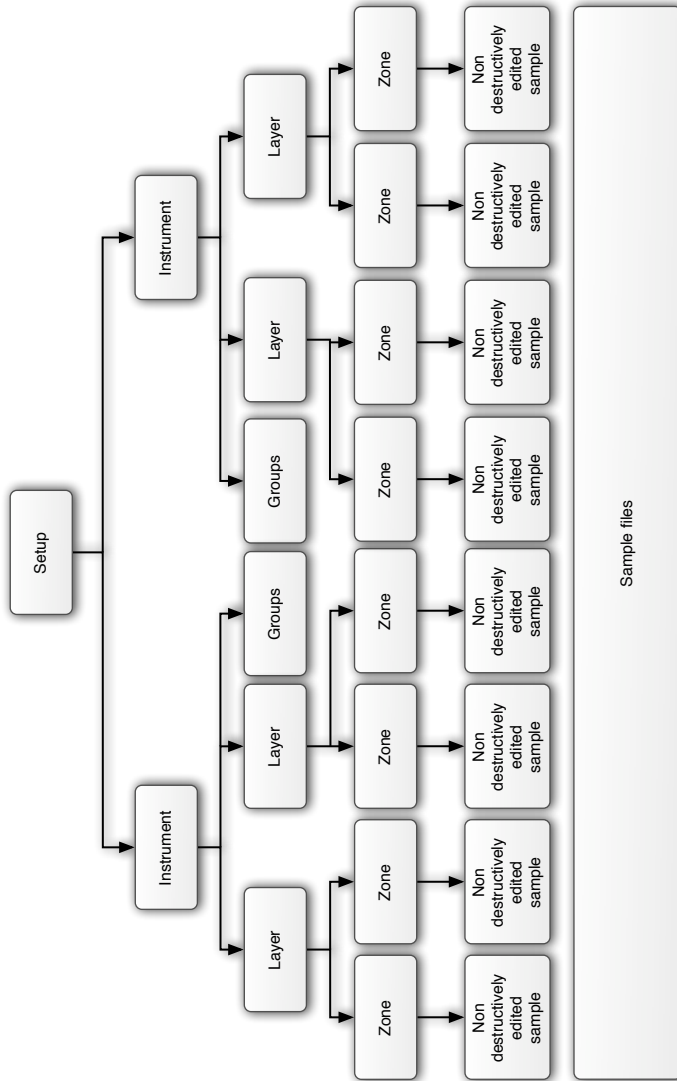
These preferences deal with how and where Keymap searches for samples when loading instruments.



Keymap uses many different search methods, and you can set the order in which these methods are used. from this preferences page, even if normally all you need to do is add the paths to the folders and drives where you keep sample files.

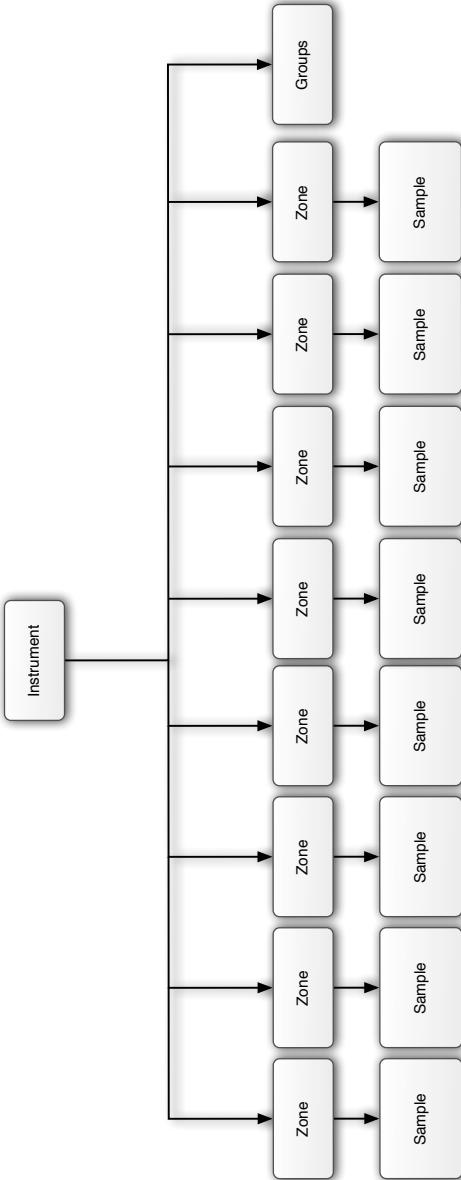
APPENDIX A

Structure of a Keymap Project file (.kmp)



APPENDIX B

Structure of an EXS24 instrument file (.exs)



APPENDIX C

Table of MIDI notes, frequencies and single cycle periods at 44.1Khz

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
0	C-2	8.18	5393.97
1	C#-2	8.66	5091.23
2	D-2	9.18	4805.48
3	D#-2	9.72	4535.77
4	E-2	10.30	4281.19
5	F-2	10.91	4040.91
6	F#-2	11.56	3814.11
7	G-2	12.25	3600.04
8	G#-2	12.98	3397.99
9	A-2	13.75	3207.27
10	A#-2	14.57	3027.26
11	B-2	15.43	2857.35
12	C-1	16.35	2696.98
13	C#-1	17.32	2545.61
14	D-1	18.35	2402.74
15	D#-1	19.45	2267.88
16	E-1	20.60	2140.60
17	F-1	21.83	2020.45

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
18	F#-1	23.12	1907.06
19	G-1	24.50	1800.02
20	G#-1	25.96	1698.99
21	A-1	27.50	1603.64
22	A#-1	29.14	1513.63
23	B-1	30.87	1428.68
24	C0	32.70	1348.49
25	C#0	34.65	1272.81
26	D0	36.71	1201.37
27	D#0	38.89	1133.94
28	E0	41.20	1070.30
29	F0	43.65	1010.23
30	F#0	46.25	953.53
31	G0	49.00	900.01
32	G#0	51.91	849.50
33	A0	55.00	801.82
34	A#0	58.27	756.82
35	B0	61.74	714.34
36	C1	65.41	674.25
37	C#1	69.30	636.40

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
38	D1	73.42	600.68
39	D#1	77.78	566.97
40	E1	82.41	535.15
41	F1	87.31	505.11
42	F#1	92.50	476.76
43	G1	98.00	450.01
44	G#1	103.83	424.75
45	A1	110.00	400.91
46	A#1	116.54	378.41
47	B1	123.47	357.17
48	C2	130.81	337.12
49	C#2	138.59	318.20
50	D2	146.83	300.34
51	D#2	155.56	283.49
52	E2	164.81	267.57
53	F2	174.61	252.56
54	F#2	185.00	238.38
55	G2	196.00	225.00
56	G#2	207.65	212.37
57	A2	220.00	200.45

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
58	A#2	233.08	189.20
59	B2	246.94	178.58
60	C3	261.63	168.56
61	C#3	277.18	159.10
62	D3	293.66	150.17
63	D#3	311.13	141.74
64	E3	329.63	133.79
65	F3	349.23	126.28
66	F#3	369.99	119.19
67	G3	392.00	112.50
68	G#3	415.30	106.19
69	A3	440.00	100.23
70	A#3	466.16	94.60
71	B3	493.88	89.29
72	C4	523.25	84.28
73	C#4	554.37	79.55
74	D4	587.33	75.09
75	D#4	622.25	70.87
76	E4	659.26	66.89
77	F4	698.46	63.14

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
78	F#4	739.99	59.60
79	G4	783.99	56.25
80	G#4	830.61	53.09
81	A4	880.00	50.11
82	A#4	932.33	47.30
83	B4	987.77	44.65
84	C5	1046.50	42.14
85	C#5	1108.73	39.78
86	D5	1174.66	37.54
87	D#5	1244.51	35.44
88	E5	1318.51	33.45
89	F5	1396.91	31.57
90	F#5	1479.98	29.80
91	G5	1567.98	28.13
92	G#5	1661.22	26.55
93	A5	1760.00	25.06
94	A#5	1864.66	23.65
95	B5	1975.53	22.32
96	C6	2093.00	21.07
97	C#6	2217.46	19.89

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
98	D6	2349.32	18.77
99	D#6	2489.02	17.72
100	E6	2637.02	16.72
101	F6	2793.83	15.78
102	F#6	2959.96	14.90
103	G6	3135.96	14.06
104	G#6	3322.44	13.27
105	A6	3520.00	12.53
106	A#6	3729.31	11.83
107	B6	3951.07	11.16
108	C7	4186.01	10.54
109	C#7	4434.92	9.94
110	D7	4698.64	9.39
111	D#7	4978.03	8.86
112	E7	5274.04	8.36
113	F7	5587.65	7.89
114	F#7	5919.91	7.45
115	G7	6271.93	7.03
116	G#7	6644.88	6.64
117	A7	7040.00	6.26

MIDI Note	Note Name	Frequency (Hz)	Period in samples at 44.1Khz
118	A#7	7458.62	5.91
119	B7	7902.13	5.58
120	C8	8372.02	5.27
121	C#8	8869.85	4.97
122	D8	9397.27	4.69
123	D#8	9956.06	4.43
124	E8	10548.08	4.18
125	F8	11175.30	3.95
126	F#8	11839.82	3.72
127	G8	12543.86	3.52

APPENDIX D

Definitions for terminology used in this guide

Sample segment: a section of a sample, delimited by a start and an end position. Often used for referring to an individual sound within a longer sample.

Harmonic samples: samples containing a single sound, with a clearly defined and reasonably steady fundamental, and little inharmonic or noise content. Rhythmic loops, audio effects, song snippets, drums are **not** harmonic samples.

APPENDIX E

Default key commands

View	Command	Key			
Matrix View	Swap last two played notes	*			
Matrix View	Swap sample to the left	<			
Matrix View	Swap sample to the right	>			
Matrix View	Select Zones at left	CursorLeft			
Matrix View	Extend selection to Zones at left	CursorLeft	⇧		
Matrix View	Move Zones left one octave	CursorLeft		⌘	
Matrix View	Move Zones of 1 semitone to left	CursorLeft	⇧	⌘	
Matrix View	Move layer left one octave	CursorLeft		⌘	^
Matrix View	Move left of 1 semitone (no root)	CursorLeft	⇧	⌘	^
Matrix View	Select Zones at right	CursorRight			
Matrix View	Extend selection to Zones at right	CursorRight	⇧		
Matrix View	Move Zones right one octave	CursorRight		⌘	
Matrix View	Move Zones of 1 semitone to right	CursorRight	⇧	⌘	
Matrix View	Move layer right one octave	CursorRight		⌘	^
Matrix View	Move right of 1 semitone (no root)	CursorRight	⇧	⌘	^
Matrix View	Select Zones with higher velocity	CursorUp			
Matrix View	Extend selection to Zones with higher velocity	CursorUp	⇧		
Matrix View	Switch to upper layer	CursorUp		⌘	
Matrix View	Move Zones to upper layer	CursorUp	⇧	⌘	
Matrix View	Move whole instrument up of one octave	CursorUp		⌘	^
Matrix View	Select Zones with lower velocity	CursorDown			

View	Command	Key			
Matrix View	Extend selection to Zones with lower velocity	CursorDown	⇧		
Matrix View	Switch to lower layer	CursorDown		⌘	
Matrix View	Move Zones to lower layer	CursorDown	⇧	⌘	
Matrix View	Move whole instrument down of one octave	CursorDown		⌘	^
Matrix View	Delete selected Zones	Backspace			
Matrix View	Delete selected Zones	Delete			
Matrix View	Convert Zones to templates	A			
Matrix View	Simplify mapping	Y			
Matrix View	Simplify mapping without expanding	Y	⇧		
Matrix View	Expand Zones	U			
Matrix View	Set loop start and end from sample file data	I			
Matrix View	Remap optimized to minimize maximum transposition	O			
Matrix View	Parametric loop search	P			
Matrix View	Mark playing Zones for remove	J			
Matrix View	Mark selected Zones for remove	J	⇧		
Matrix View	Remove	J		⌘	
Matrix View	Clear all Zones marked for remove	J	⇧	⌘	
Matrix View	Mark playing Zones for keep	K			
Matrix View	Mark selected Zones for keep	K	⇧		
Matrix View	Keep	K		⌘	
Matrix View	Keep	K	⇧	⌘	
Matrix View	Create new layer	L			
Matrix View	Duplicate layer	D			
Matrix View	Delete layer	D		⌘	

View	Command	Key			
Matrix View	Automap using sample file mappings	F		⌘	
Matrix View	Remap to single root notes	G			
Matrix View	Remap to white keys	Q			
Matrix View	Remap to black keys	W			
Matrix View	Remap to all keys	E			
Matrix View	Remap with range	R			
Matrix View	Remap velocities	T			
Matrix View	Clear Zone fades	Z			
Matrix View	Creade note fades	X			
Matrix View	Creade velocity fades	C			
Matrix View	Creade note and velocity fades	V			
Matrix View	Open in sample editor	S			
Matrix View	Autophase start	B			
Matrix View	Autophase loop start	B		⌘	
Matrix View	Set start to loop start	B	⇧	⌘	
Matrix View	Merge with lower layer	M			
Matrix View	Autophase end	N			
Matrix View	Autophase loop end	N		⌘	
Matrix View	Set end to loop end	N	⇧	⌘	
Matrix View	Play Zone	SpaceBar			
Matrix View	Play Zone from start	SpaceBar	⇧		
Matrix View	Play Zone from last played position	SpaceBar		⌘	
Matrix View	Toggle mute for selected layer	F3			
Matrix View	Toggle mute for all layers	F3		⌘	

View	Command	Key			
Matrix View	Toggle single solo for current layer	F4			
Matrix View	Toggle solo for selected layer	F4	⇧		
Matrix View	Toggle solo for all layers	F4		⌘	
Matrix View	Toggle background view for selected layer	F5			
Matrix View	Toggle background view for all layers	F5		⌘	
Matrix View	Show Resources window	3			^
Sample View	Play	SpaceBar			
Sample View	Play from start	SpaceBar	⇧		
Sample View	Play from last position	SpaceBar		⌘	
Sample View	Toggle audition mode	A			
Sample View	Learn audition time	A	⇧		
Sample View	Scramble remix selected slices	U			
Sample View	Set loop start and end from sample file	I			
Sample View	Rephase loop start	R			
Sample View	Rephase loop start and cut tail	R	⇧		
Sample View	Trim selection	T			
Sample View	Trim loop	T		⌘	
Sample View	Trim from start to end	T	⇧		
Sample View	Scroll left	CursorLeft			
Sample View	Zoom out	CursorLeft		⌘	
Sample View	Shift loop by 1/16th to the left	CursorLeft	⇧	⌘	
Sample View	Select slice at left	CursorLeft	⇧		^
Sample View	Scroll right	CursorRight			
Sample View	Zoom in	CursorRight		⌘	

View	Command	Key			
Sample View	Shift loop by 1/16th to the right	CursorRight	⇧	⌘	
Sample View	Select slice at right	CursorRight	⇧		^
Sample View	Zoom start to end	CursorUp			
Sample View	Zoom all	CursorUp		⌘	
Sample View	Double loop length	CursorUp	⇧	⌘	
Sample View	Shift slice content at left	CursorUp	⇧		^
Sample View	Zoom loop	CursorDown			
Sample View	Zoom selection	CursorDown		⌘	
Sample View	Halve loop length	CursorDown	⇧	⌘	
Sample View	Shift slice content at right	CursorDown	⇧		^
Sample View	Zoom selection	S			
Sample View	Autoloop selection low resolution	D			
Sample View	Autoloop selection low resolution keeping start	D	⇧		
Sample View	Autoloop selection high resolution	F			
Sample View	Autoloop selection high resolution keeping start	F	⇧		
Sample View	Loop crossfade optimization	G			
Sample View	Trim selection to sample	H			
Sample View	Trim start and end to sample	J			
Sample View	Autoloop single cycle	K			
Sample View	Move cursor to start	Z			
Sample View	Move cursor to frame zero	Z		⌘	
Sample View	Move cursor to loop start	Z	⇧		
Sample View	Move cursor to end	X			
Sample View	Move cursor to last frame	X		⌘	

View	Command	Key			
Sample View	Move cursor to loop end	X	⇧		
Sample View	Fine tune loop start	C			
Sample View	Coarse tune loop start	C	⇧		
Sample View	Fine tune loop end	V			
Sample View	Coarse tune loop end	V	⇧		
Sample View	Autophase start	B			
Sample View	Autophase loop start	B		⌘	
Sample View	Set start to loop start	B	⇧	⌘	
Sample View	Autophase end	N			
Sample View	Autophase loop end	N		⌘	
Sample View	Set end to loop end	N	⇧	⌘	
Sample View	Fine tune whole loop	M			
Sample View	Coarse tune whole loop	M	⇧		
Sample View	Toggle loop	L			
Sample View	Set loop from selection	L		⌘	
Sample View	Optimize slices phases	O			
Sample View	Parametric Autoloop	P			
Sample View	Split loop in 4	1		⌘	
Sample View	Split loop in 8	2		⌘	
Sample View	Split loop in 16	3		⌘	
Sample View	Split loop in 32	4		⌘	
Sample View	Split loop by transients	5		⌘	
Sample View	Automap loop on current layer sequentially	Q			
Sample View	Automap loop on current layer using pitch detection	Q		⌘	

View	Command	Key			
Sample View	Automap loop on current layer using midi learn	Q	⇧		
Sample View	Automap sample on current layer sequentially	W			
Sample View	Automap sample on current layer using pitch detection	W		⌘	
Sample View	Automap sample on current layer using midi learn	W	⇧		
Sample View	Automap selection on current layer sequentially	E			
Sample View	Automap selection on current layer using pitch detection	E		⌘	
Sample View	Automap selection on current layer using midi learn	E	⇧		
Sample View	Split slice at cursor	Y			
Sample View	Remove selected slice	Y	⇧		
Sample View	Delete selected slice audio data	Y		⌘	
Sample View	Slice loop at regular intervals				
Sample View	Slice selection at regular intervals				
Sample View	Slice loop at transients				
Sample View	Slice selection at transients				
Sample View	Map slices under selection into layer				
Sample View	Map loop slices into layer				
Sample View	Create Region from selection	=			
Sample View	Create autosplit Regions from selection	/			
Sample View	Snap cursor to rising zero crossing	.			
Sample View	Snap cursor to grid	*			
Layer Table	Select all Zones in layer	A			
Layer Table	Delete layer	D			
Layer Table	Delete layer	Backspace			
Layer Table	Delete layer	Delete			

View	Command	Key			
Layer Table	Create new layer	L			
Layer Table	Select higher layer	CursorUp		↶	
Layer Table	Select lower layer	CursorDown		↷	
Layer Table	Merge with lower layer	CursorDown	⇧	↷	
Layer Table	Merge with lower layer	M			
Layer Table	Select all Zones in layer	CursorLeft			
Layer Table	Deselect all Zones in layer	CursorRight			
Setup View	Show Instrument window	2			^
Project	Lower global Keymap volume	F1			
Project	Raise global Keymap volume	F2			
Project	Switch to next window	F6			
Project	Switch to previous window	F7			
Project	Show Setup window	1			^
Project	Show Resources window	4			^
Project	Show Statistics window	5			^
Project	Show Surround+Space window	6			^
Project	Show Key Commands window	7			^

Credits

Manual written by **Andrea Gozzi**.

Manual edited by **Orren Merton**.

Thanks to....

We would like to thank: **Jay Asher, Jason Fernandez, Antongiulio Frulio, Kirk Hunter, Panos Koliass, Heiner Kruse, Roberto Lanzo, Paul Linford, Matteo Orlandi** and **Orren Merton**.

Special thanks go to.... **you know who you are**, there in the L.A. area.

A thank you goes to **Fabio, Rosanna, Carlo** and **Stefania** for the moral support and all the rest.

A big hi to **Roberto, Michele** and **Claudia** for the chats in front of the coffee machine.

A thank you goes to **Sascha Kujawa** for showing how hesitation can be a good thing when selecting things.

A standing ovation with fireworks and epic symphonic music goes to **Jym Feat**, for his *titanic* amount of competent, detailed, invaluable, humorous, quality, constant, persistent, incessant, relentless, unremitting, nonstop (got the idea?) feedback. Chapeau!

And finally to Emagic, Apple and to **Clemens Homburg** for developing the EXS24.

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