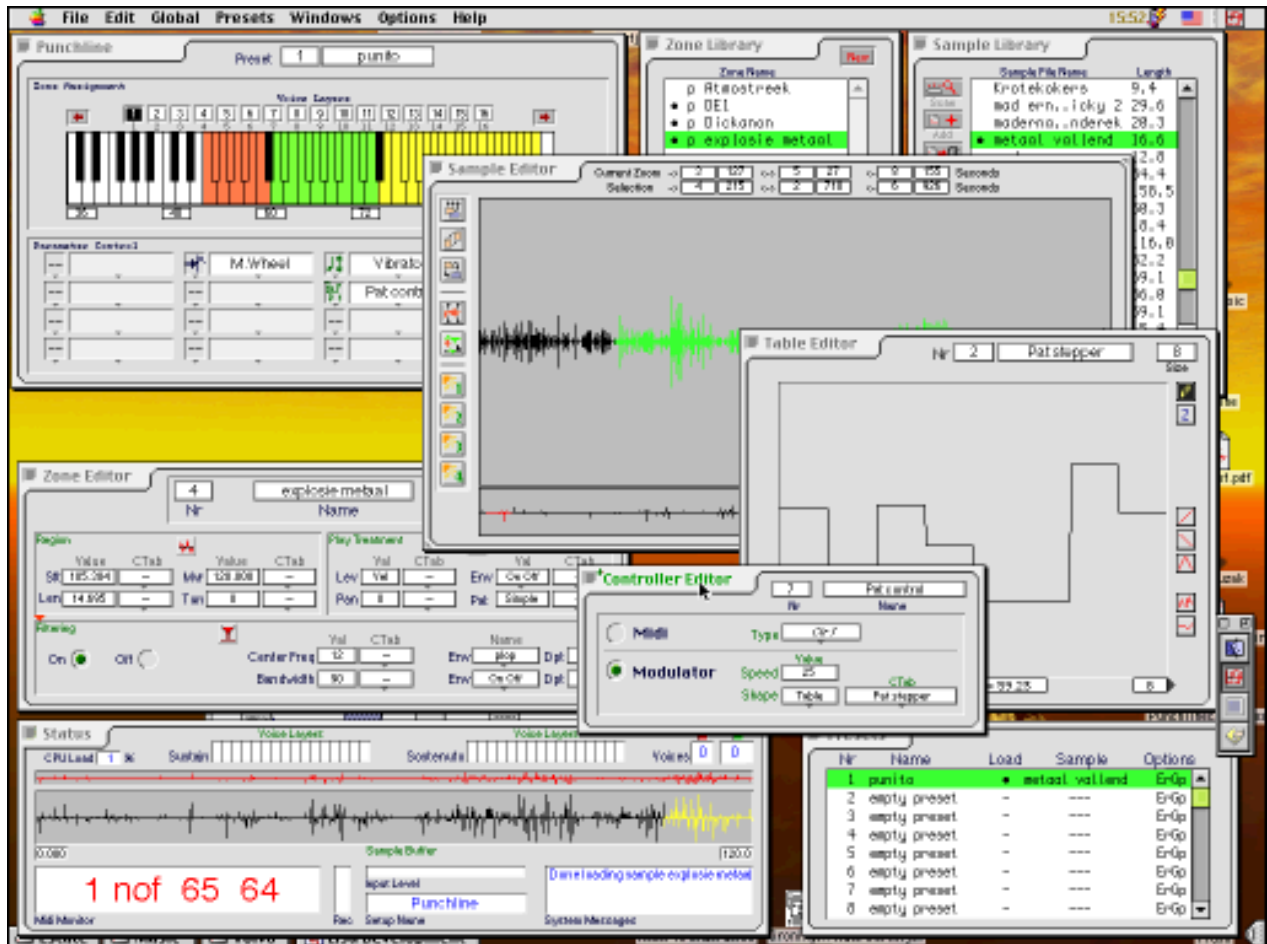


LiSa v2



By Michel Waisvisz and Frank Baldé
DSP Programming advice: Tom Demeyer

Manual: Matthew Ostrowski

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Introduction to LiSa

What is LiSa?

LiSa (Live Sampling) is a real-time audio manipulation environment that runs on any Macintosh or Mac OS-Compatible computer with a Power PC Processor. The program uses the 16-bit AD/DA converters of these platforms and the computing power of the PPC RISC Processor. This combination turns the Mac into a versatile audio sampling machine. Complete program control is possible via MIDI, allowing the user to work with this system in performance.

LiSa was designed to fulfill the needs of musicians who work with sampled and manipulated sounds and need more flexibility than is generally available in a traditional sampler. Not only can sounds be recorded and played back quickly and easily in a performance situation, LiSa's architecture gives you direct access to the samples in memory, allowing much more sophisticated manipulation of samples than is possible in traditional samplers, both hardware- and software-based. In addition, LiSa offers a variety of algorithms for processing sampled sounds, and is very well suited for a broad variety of delay applications.

Version 2.0

The 2.0 release of LiSa contains many improvements and changes over the 1.x releases, some visible, and some not. They include:

- **Improved Sound Quality.** The internal sound playback algorithms have been improved, giving better sound quality overall, especially at lower transpositions.
- **Sample Editor.** The Sample Editor window allows for better and more accurate placement of sounds in the Sample Buffer.
- **Filters.** Playback Zones now all have an optional MIDI-controllable bandpass filter.
- **Internal Modulators.** In addition to external MIDI control, LiSa now has built-in modulators for parameter control.
- **Improved GUI.** The user interface has had many improvements, including improved drag-and-drop, more

consistent window management, and better access to parameters via popup menus.

- Balloon help. Most of LiSa's interface is now provided with Balloon help, accessible from the Help menu.

New in Version 2.0:

New features of particular interest to version 1.x users are flagged with the notification to the left.

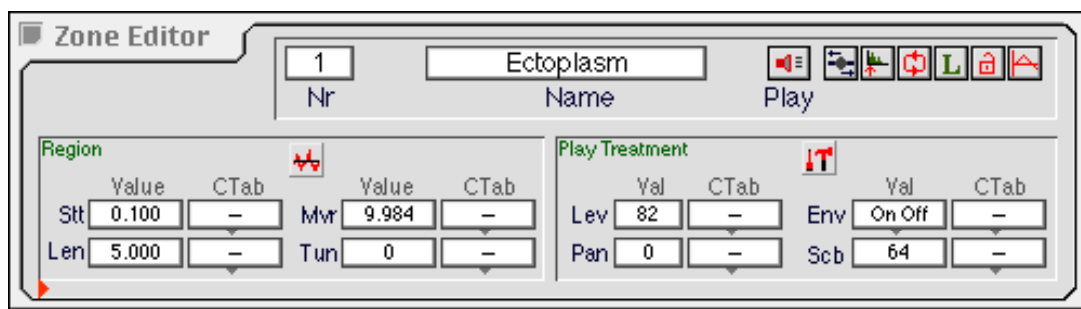
Manual Conventions

In this manual, certain conventions will be followed for clarity:

- All menu items, from either the main menu bar or popup menus, will be printed in **9-point Charcoal**.
- All names of numericals or other words appearing in LiSa's windows will be in **Helvetica Bold**.
- All illustrations will show time values in seconds and milliseconds.

The LiSa Interface

WINDOWS



The windows in LiSa look different from but are almost exactly the same as traditional Macintosh windows. The main difference is that all windows are active at all times – you can use any window without having to bring it to the front, even if it is partially covered by another window. A small green diamond in the upper left-hand corner and the green title color indicates the 'top' window (i.e., the one to which all cut, copy, and paste operations are directed).

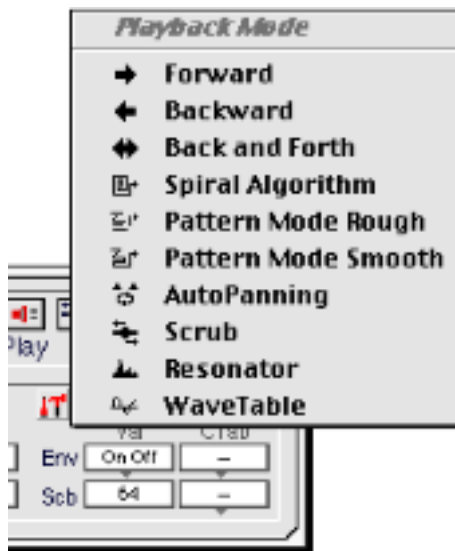
Don't Forget: the window you're staring at is not necessarily the top window! If you're having trouble cutting, copying, or pasting, you probably don't have the right window on top

To bring a window to the top:

- Select it's name from the **Windows** menu

- Use the corresponding Cmd-key equivalent (visible in the Windows menu)
- Click anywhere in the window drag area, around the border of the window
- Click anywhere in the window while depressing the Control key.
- To move a window:
- Click and drag anywhere in the window drag area, around the border of the window
- Click and drag anywhere in the window while depressing the Control key.

Subdivisions of windows usually have a set of related data input controls in them, or some set of related information. They are called *panes*. With the exception of the Sample Editor, windows cannot be resized.



POPUP MENUS AND NUMERICALS

Most of the data that you enter into LiSa's windows will be via either popup menus or numericals. In general, numericals appear as simple rectangular boxes, and popup menus appear either as icons or as boxes with a triangle on their bottom edge.

USING NUMERICALS

A numerical is a box containing a number or text that can be changed from either the mouse or the keyboard. Values in a numerical can be changed three different ways:

- **Scrolling:** Position the cursor in the box and hold down the mouse button. If the cursor is in the top half of the box, the displayed values will increase; if in the bottom half, they will decrease. The cursor will change to an arrow to indicate the direction of movement, and the numerical will continue to change as long as the mouse button is held down.
- **Dragging:** Click anywhere in the box, hold the mouse button down, and move the mouse forward or backward to increase or decrease the value. This is somewhat faster than scrolling.
- **Typing:** Click once in the box, which will select it, type, and hit Return or Enter.

New in Version 2.0: All numericals which formerly contained controller names or any other non-numerical data are now popup menus.

Note that once a numerical is selected, you have to deselect it in order to change it's aspect with the shift key.

NUMERICALS AND TIME DESCRIPTIONS

Time can be displayed in two ways in LiSa: either by seconds and milliseconds, or by number of samples. You can toggle between these two options by using the **Show Length in Seconds/Samples** option in the **Options** menu. When viewing in seconds, you can set time values with a precision of one millisecond. If you need to be 100% accurate, you can set time in samples, down to the individual sample. A numerical can't hold the often gigantic numbers required for counting through a large buffer in samples, so when displaying time in samples, they have two modes:

Counting by *kilobytes* (kB) of samples (that's 1024 samples, or about .02 of a second), or by individual samples (a very tiny bit of a second). When you have **Show Size in Samples** selected, you will normally see time displayed in kB of samples.

If the number is in normal type, that means the time selected is an even number of kB of samples; that is to say that the total number of samples in the numerical is evenly divisible by 1024.

If it is in **bold**, that means that there are samples left over – the total number of samples in the numerical is not divisible by 1024.

To fine-tune this number, press the shift key, and the number of samples left over in the numerical will appear. This is the fine-tune aspect of the numerical. To change this number select the numerical while the Shift key is depressed. You can release the Shift key at this point, and the numerical will remain selected. Scroll or type as usual.

DUAL NUMERICALS

In some cases, a numerical may be used to set more than one parameter. In these cases, mentioned in the manual as they appear, holding down the Shift key will reveal the second parameter. These dual numericals are never related to precise time values, and do not relate to the situation described above.

EDITING FUNCTIONS

New in Version 2.0:
Extended editing functions

The standard Macintosh editing functions (**Cut**, **Copy**, **Paste**, and **Undo**) are implemented in different ways in different windows. All numericals and text boxes in Editor windows, if selected, can be copied and pasted into any other numerical for any other Editor. Undo will also work normally in a selected text box.

If no numericals in an editor window are selected, selecting **Copy** will copy the entire data structure (Envelope, Zone, whatever) to the clipboard. This can then be pasted into a

new structure of the same type. All parameters, including the name, will be copied over.

All editing commands are always directed to the topmost window eee

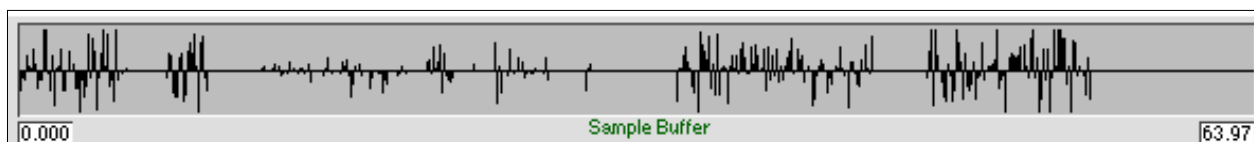
Fundamentals of LiSa

OVERALL STRUCTURE

LiSa's overall architecture is divided into *Setups*, *Presets*, and *Zones*. Data that LiSa uses is stored in *Libraries*. The file you load when you start up a program is a Setup. Each Setup is comprised of up to 128 Presets, which are the immediate sound and control environments you are working in when editing or performing with LiSa. A Preset is comprised of up to 2048 Zones, which contain all the actual information regarding sample performance and manipulation, plus a set of MIDI controller and keyboard connections to direct how MIDI will effect your sounds.

SOUND IN THE COMPUTER

LiSa, like all samplers, works by loading sounds into a contiguous chunk of RAM, known as a *buffer*. The key difference between LiSa and traditional samplers is that you have direct access to all parts of the Sample Buffer via MIDI. All sounds loaded into LiSa are stored in one large buffer; one sound lined up after the other.



You access this buffer by creating Zones. A Zone is comprised of three aspects: A *keyrange* (or range), a *function*, and a *sample region*, or region. Zones are activated (played) by MIDI 'note on' messages.

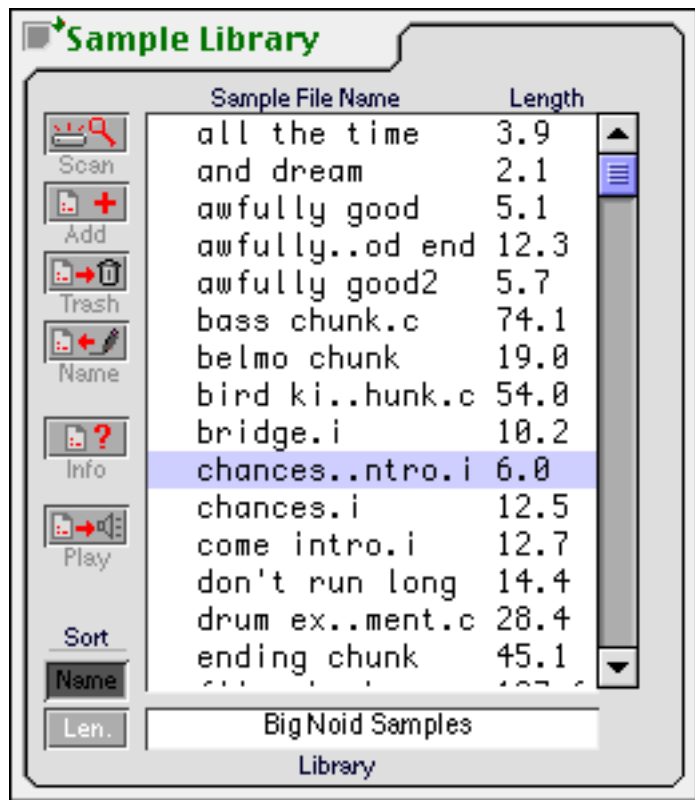
- The range is the key or keys (MIDI notes) that activate the Zone. These are specified in the Assignment Window. The same Zone can be assigned to different keyranges in different MIDI channels.
- The sample region is the physical area of the Sample Buffer on which the Zone operates. It can be all or part of the buffer, and its exact size and location can be either set permanently or controlled via MIDI. These initial parameters are set in the Zone Editor window.

- A function is what the Zone does to the Zone's region.
Playing back, recording, and loading sounds from disk are all examples of functions.

When a Zone receives a note on message in its keyrange, it does its thing, whatever that may be. A typical Preset would be comprised of some number of Zones for playback, recording sounds live, and loading samples from disk.

LIBRARIES

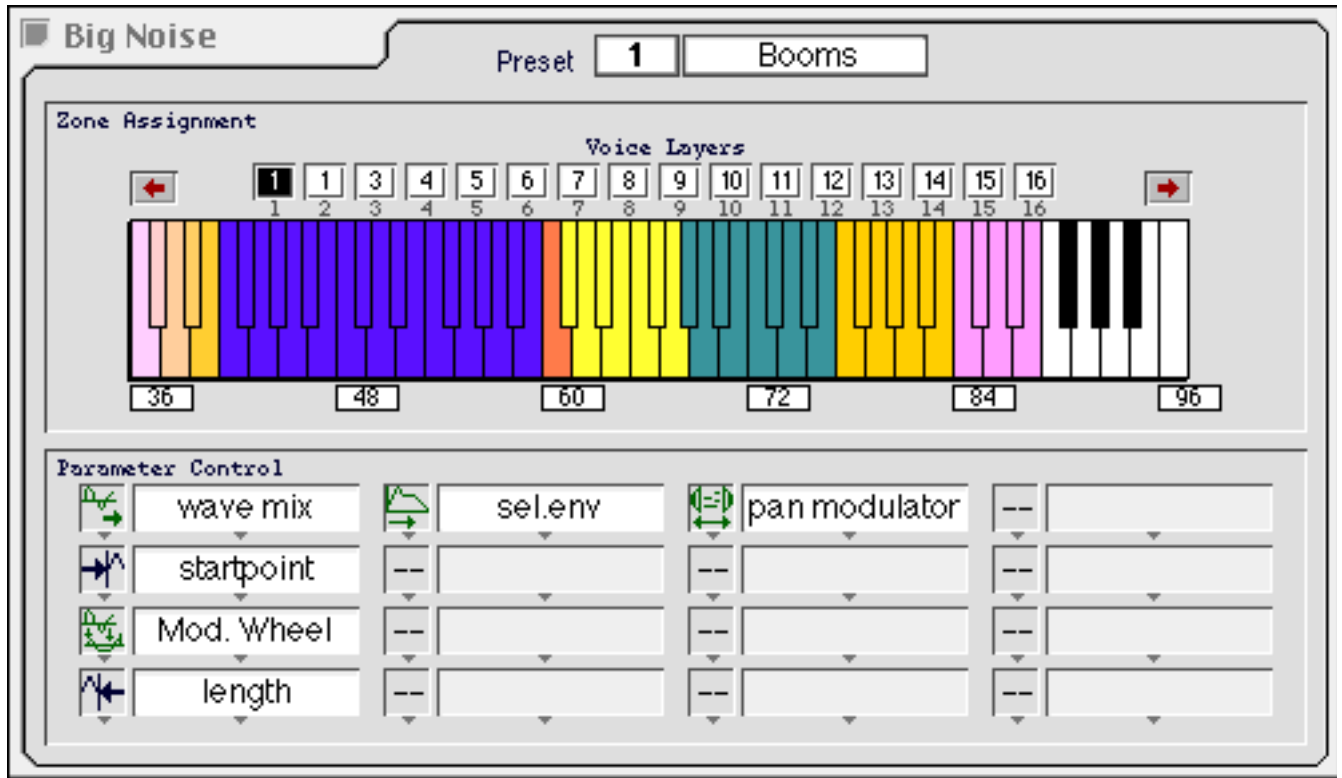
All of the data LiSa uses in a Setup – Zones, samples, tables, and so on, are stored in a set of *Libraries*. They are independent data banks, and can be shared between Setups.



A Quick Tour

These are the main windows used when programming and performing with LiSa, with brief descriptions of their general functions.

THE ASSIGNMENT WINDOW



The Assignment window provides you with the basic information about your Preset, the actual 'instrument' you are working with at any given moment.

In the upper left-hand corner, you can see the name of the currently loaded Setup – this is your open file. To the right is the name and number of your currently loaded Preset. Every Preset has both a name and a number, which is the number of the Program Change Message that loads it.

A Setup can contain up to 128 Presets.

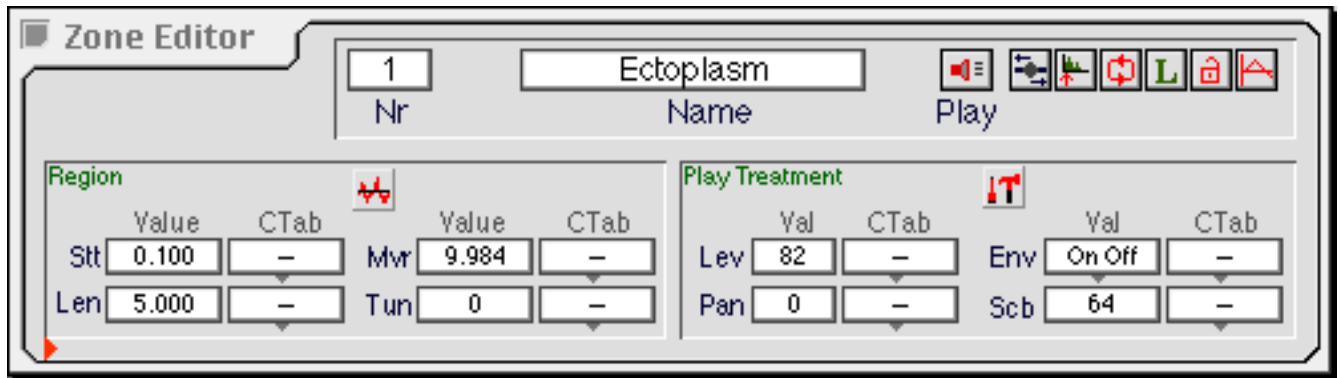
Below, with the keyboard inside, is the Zone Assignment pane. Here is where you assign Zones to a keyrange for activation, and assign MIDI channels.

At the bottom of the window is the Parameter Control pane. This is your 'patchbay' for MIDI and internal modulation control.

Each Preset is comprised of up to 16 Voice Layers (see p.88), indicated by the row of numbered buttons above the

keyboard. Each Voice Layer can respond to a different MIDI channel, and have a different set of key assignments and Parameter Control options. When nothing is selected in the Assignment Window, selecting **Copy** from the **Edit** menu will copy the entire Voice Layer to the clipboard, from which it can be pasted into a Voice Layer in the same, or another, Preset.

THE ZONE EDITOR



The Zone Editor is one of the most important parts of LiSa. It is the window in which you determine both the function and the sample region of a Zone. Its exact appearance will vary depending on the kind of Zone that you are editing.

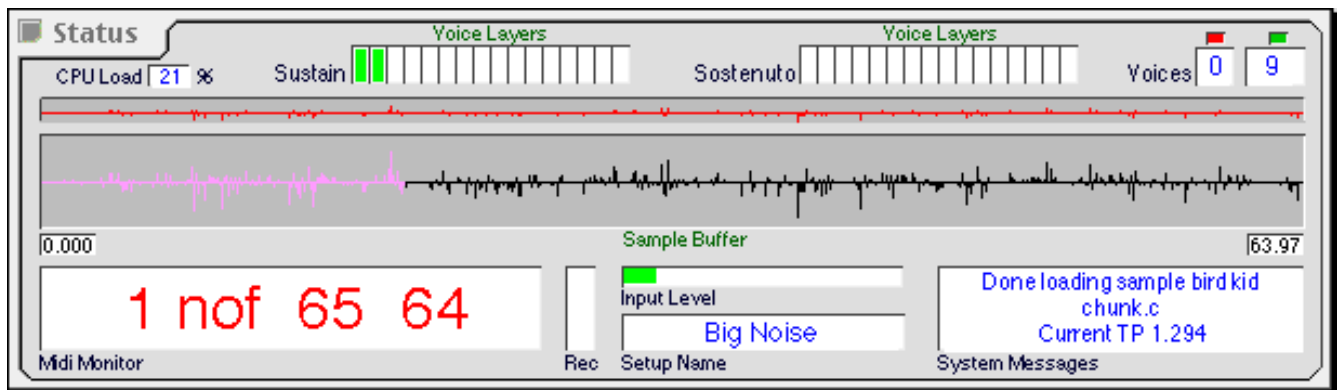
As in the assignment window, you can see the name and number of the Zone on top. Unlike Presets, these numbers have no particular meaning – they are LiSa's catalog numbers.

To the right of the Zone name are a row of icons. When clicked, they reveal a series of popup menus, which determine the function of the Zone (record, playback, etc.) and the *modes* of that function. A Zone that plays a sample backwards has the same function (Playback) as one that plays it forwards, but with a different mode.

The Region pane is where the sample region of the Zone is set. In some functions this pane will include other options such as tuning. These parameters are usually MIDI controllable.

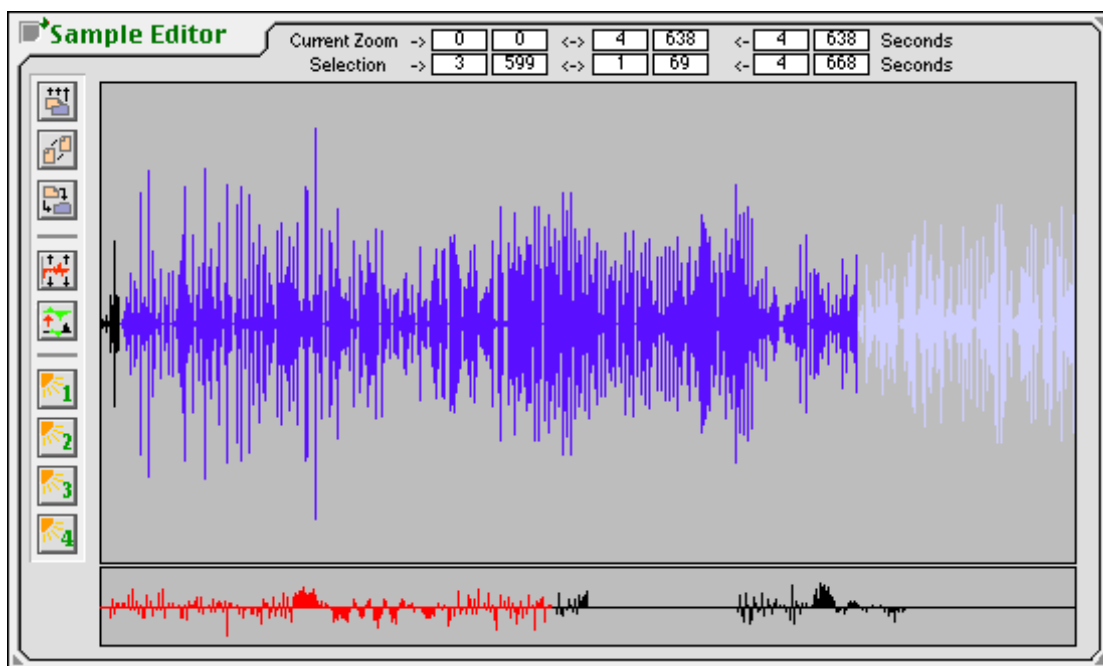
The Treatment pane contains parameters specific to the Zone's function, and the parameters available can change a great deal depending on the function of the Zone. It can contain such things as input and output levels, processing parameters such as distortion, or the name of a file to be loaded.

THE STATUS WINDOW



This is the main window for performance and real-time information. It is dominated by the Sample Buffer pane, which shows the sounds you are working with. It also contains information on current MIDI input, processor load, and other miscellaneous information.

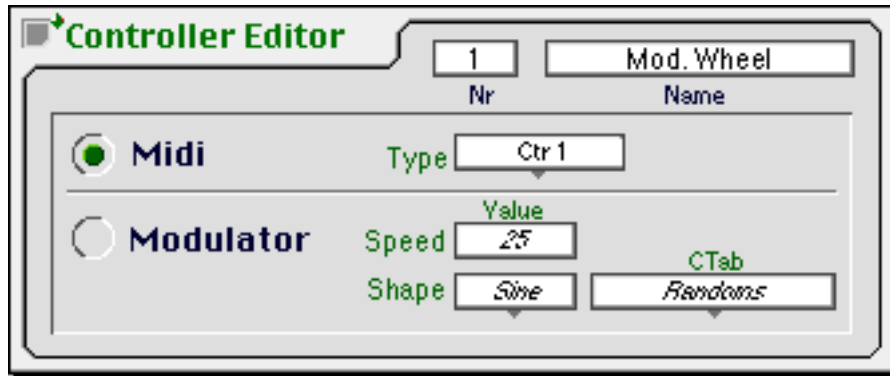
THE SAMPLE EDITOR



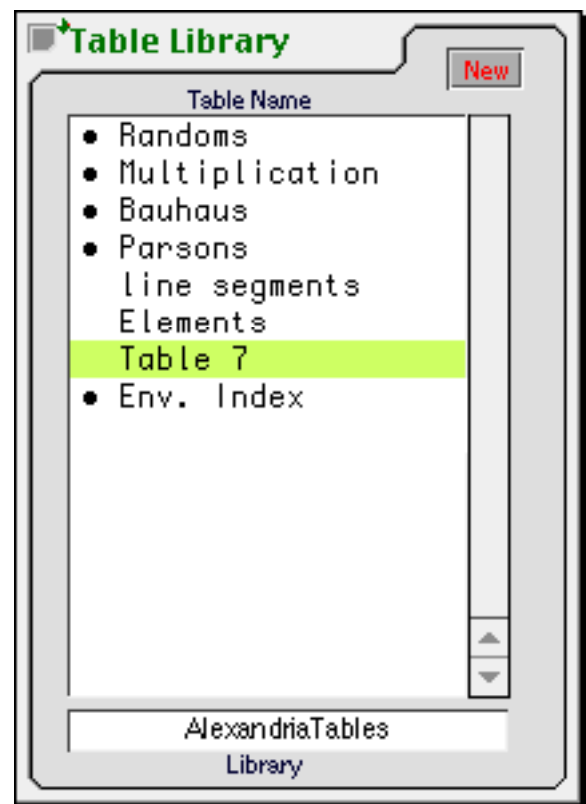
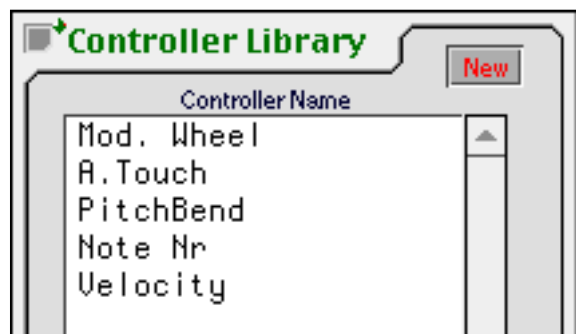
New in Version 2.0

The Sample Editor window is an environment in which more detailed manipulation of samples is possible than in the Status window. Samples can be dragged to the Editor from the Sample Library, edited, and resaved to your hard drive as new samples.

LIBRARIES AND EDITORS



All of the data used in LiSa is stored in Libraries: Zones, Envelopes, Tables, Controllers, Patterns, and Samples. We have already encountered the Zone and Sample editors, and the others will be explained in future chapters. Double-clicking on an item in a Library will open up the associated editor, or you can open the editors from the **Windows** menu.



Setting up LiSa

Hardware

Problems have been discovered running LiSa on the PPC 7500 with system version 7.5.2. If you have such a Setup and are having problems running LiSa, upgrade your system to 7.5.3 or higher.

LiSa will run on all desktop and laptop Macintosh and MacOS compatible PowerPC computers. Although you can use any monitor it is strongly advised to use a color monitor, preferably a multi-scan so that you can use the highest resolution possible. An external MIDI interface is also required for connection to your keyboard or other MIDI controller. This can be connected to either the modem or the printer port of your computer.

To take full advantage of LiSa, it is also necessary to have some kind of MIDI instrument. In this manual we will assume you have a velocity-sensitive keyboard with pitchbend, a modulation wheel, and aftertouch.

Memory

LiSa requires at least 10 MB of RAM to operate, so a total of at least 32 MB of RAM is recommended for your computer. The sounds used by LiSa are stored in RAM, so the more RAM you have available above and beyond that, the longer your Sample Buffer can be.

Recommended memory assignment (in the Information panel for LiSa) is 20638 kB. Memory you assign to LiSa's buffers will also be included in this number, so it needs to be fairly large. For every additional MB of RAM you assign to LiSa, you will increase your buffer space by approximately 12 seconds. If you have assigned more memory to LiSa than your machine has available, you will probably get a dialog at startup indicating that OMS is not installed. This is because LiSa eats the memory that OMS would normally take, and once LiSa has opened, OMS can't find the memory it needs. If you get this warning and know you've installed OMS, quit LiSa. Select it in the finder, and choose **Get Info...** from the **Special** Menu in the Finder. From there, you can resize the memory to a lower value in the Information panel, and open it up again. If that does not help, open the Preferences folder in your computer's System folder and throw away the file 'LiSa Prefs'.

System settings and Sound Manager

LiSa is compatible with all versions of the Mac OS for Power PC; however, make sure that Sound Manager version 3.3 is installed regardless of your hardware or system version.

Check your 'Memory' control panel. LiSa will not run properly unless memory settings are correct.

- Virtual memory should be off. LiSa will run with Virtual Memory on, but it will slow down the program immensely.
- Modern Memory Manager must be on.

Sound control Panel Settings

Depending on what version of the Macintosh OS you are running, you will have a slightly different version of the 'Sound' or 'Monitors and Sound' control panel, so all the options described below may not be available here. Whatever the layout is, you should set it to the following:

SOUND IN

- If you have a Macintosh with RCA (Cinch) audio inputs, (which operate at standard -10 dB line level) you should select External Audio.
- If you have only a mini-jack microphone in, select Microphone. (On some more recent versions of the Mac OS, this is called Sound Input)
- If you wish to record samples from your computer's internal CD-ROM, select Internal CD.

SOUND OUT

- Sample Rate can be set to anything. LiSa uses 44.1 kHz internally, and it is not connected to this control panel.
- Size set to 16 bit.
- Use set to stereo.

A note on audio cards:
As of this writing, LiSa is only compatible with the Korg 1012 Audio Card. Only the first two inputs and outputs will be available

Audio Setup

INPUT

LiSa accepts signals directly from the audio inputs in the back of your Macintosh. The Sample Buffer itself is mono, but it is possible to record stereo samples. (See Appendix 3: Stereo Recording, p. 109.) Whatever your sound source is, it is important to run your input through some kind of a preamp or mixer in order to be able to set your levels properly. You can set an overall level for recording input in the System Settings dialog, see (System Settings, p. 17).



When you have audio input, you should see some activity in the input level meter at the bottom center of the Status window. The recording input bar is split for the left and right channels.

If you are sure your lines into the computer are good, but still aren't seeing any input, quit LiSa, go to the 'Monitors and Sound' (or 'Sound', depending on your OS version) control panel in the Finder, and make sure the sound input is set correctly. If you use the Control Strip, make sure the Sound Input module is in agreement with the Control Panel setting. Set your mixer levels so that the input level meter is as high as possible without going into the red.

OUTPUT

LiSa outputs in stereo, so you should take both of the outputs from the back of your Mac and send them to a mixer. This signal will need some kind of amplification before you send it to your speakers.

MIDI Setup

CONNECTING MIDI

A current version of the Apple Sound Manager is available at <http://www.apple.com>. The latest version of OMS can be downloaded at <http://www.opcode.com>

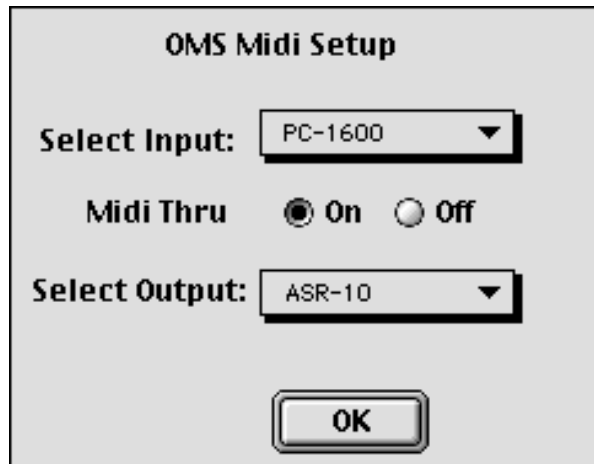
LiSa needs some kind of MIDI input to take full advantage of its capabilities. (Some MIDI may also be generated from the computer keyboard and the mouse – see Controlling LiSa from the Computer, p. 102.) You will need a MIDI interface, and OMS, preferably at least version 2.2. Plug your interface into either the modem or the printer port of your computer,

and the MIDI out from your controller into the MIDI in plug of the interface.

CONFIGURING MIDI

In order for your MIDI instrument to properly communicate with LiSa, you need to specify which ports are in use for MIDI. This is done in the **MIDI Setup...** dialog in the **Global** menu.

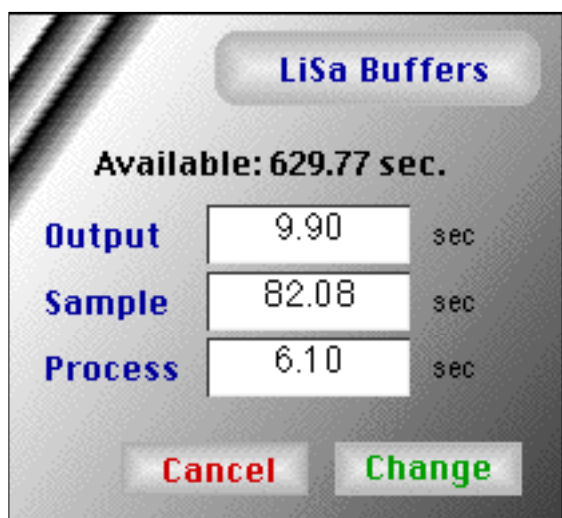
New in Version 2.0:
MIDI Received by LiSa
can be passed through
to other applications or
instruments.



Preferences

Preference settings for LiSa (found in the **Global** menu) are stored in its Setup files. This means that for each LiSa Setup you have, you can have completely different set of preferences. A new Setup will start with the preferences from the last Setup opened. Aside from the **Midi Setup...** menu item, there are three others:

SIZE OF BUFFERS



The Sample Buffer is the part of your computer's RAM that is assigned to storing the samples you play in LiSa. It can be as large as your computer's memory allows, but you must assign the memory space in the **Get Info...** dialog in the Finder. (see Memory on p. 11) There are actually 3 buffers in LiSa, and each of them can be set individually through the **Size of Buffers...** dialog in the Global menu. The size of these buffers can be set either in seconds or kilobytes of memory, depending on whether the **View Size in Samples** option is selected in the **Options** menu.

You will also notice (if you are using the **View Length in Samples** option) that the Process Buffer is measured in kilowords, rather than kilobytes. (A kiloword is twice the size of a kilobyte). That is because it saves stereo samples, which will take up twice as much space per second in your RAM. If you resample from this buffer, however, it will be automatically mixed and converted to a mono sample. This also means that if you are viewing the buffer size in seconds, the Process Buffer will take up twice as much memory per second of length than the other buffers.

Sample. This is the buffer that actually holds the samples you work with, and is represented in the Status window. This is LiSa's main workspace, and the most important of the three buffers.

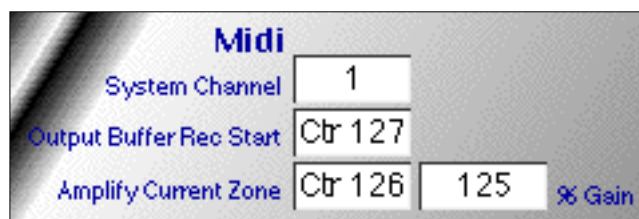
Output. The Output Buffer records whatever you have played most recently, including your silences. You can save this buffer to a soundfile in order to listen back to what you have just played, or for further processing later. It does not automatically record; it has to be activated via MIDI.

Process. The Process Buffer holds the last piece of sound you produced. If you play for a minute, and then don't play for ten, that minute (or however long, depending on your buffer size) will still be in the buffer. This buffer is specifically designed for resampling something you have already played in a live situation (for more on these two buffers and their functions, see Copying Buffers on p. 84). It's best to think of the Output Buffer for saving or editing sounds at a later time, and the Process Buffer as a tool for live performance.

GLOBAL SETTINGS

Global settings may be found in the **System Settings...** item in the **Global** menu. It is divided into three sections:

MIDI SETTINGS



In this section, you can set MIDI for commands to LiSa's system.

System Channel. This is the channel on which you make commands to LiSa's system, independent of Zone activation and other performance-related commands.

Output Buffer Rec. Start. Any value sent on the selected controller number on the System Channel will initiate Output Buffer recording.

To find out what this means, see Copying Buffers, p. 84.

Amplify Current Zone. Any value sent on the selected controller number on the System Channel will amplify the Region of the currently active Zone by the value specified in the **%Gain** numerical. This is described further under the heading Amplify Current Zone, page 100.

SYSTEM SETTINGS

System		
MaxVoices CPU Load	75	%
Recording Input Gain	88	% Gain
Sound Thru	0	(0-7)

Max Voices CPU Load. LiSa will tend to demand as much of your computer's processor time as it needs to do whatever it has to do. This can be a problem if you are attempting to run LiSa in tandem with other applications on your computer, as LiSa can easily freeze them out. (The Status Window provides you with a running display of how much of your computer's CPU time is being used by LiSa.) It is best to keep this as high as possible while remaining compatible with other applications, because the lower the CPU load maximum, the fewer voices you will have available in performance. It is also possible that when running with too many voices that some of them are 'hiccuping.' This is a sign that your CPU is overextended. Reducing this value will decrease your absolute number of voices, but they will play smoothly.

When using any of the new blue and white Macs (iMac, B&W G3/4, etc.) if your **Input Gain** is set to 50%, the computer will interpret this as an input mute, and no sound will come into your machine.

Input Gain. Overall attenuation of your input signal to the Macintosh's analog/digital converters can also be set here. This numerical has a range of 50% - 150% of the original input level. If your computer is an AV model with RCA (Cinch) type audio inputs, setting this numerical to 50% guarantees that virtually nothing you put into the computer will be clipped. If your input source is weak, however, you can raise it as needed. For models with a miniplug audio input, it is less sure that you will be distortion-free, but it's not easy to overdrive it. We recommend that you keep this at about 60%, and only increase if needed.

Sound Thru. This sets whether input sound will go directly through to LiSa's outputs. If 0 is selected, no external sound will pass. Any

other number enables input sounds to pass directly out. The number chosen has no effect on volume.

ENVELOPE FOLLOWERS

Envelope Followers		Left	Right
EF channel		1	1
EF note nr		36	37
EF threshold		12	12
EF contr. nr		16	16

One of LiSa's new features is the ability to translate its audio input into MIDI, which can be used as controls for Zone parameters. (See Envelope Followers on p. 101 for more on this topic).

EF Channel. The MIDI channel on which the Envelope Followers will send data.

EF Note Number. The MIDI note number that will be activated when the Threshold is exceeded.

EF Threshold. The relative amplitude value at which a MIDI note on will be triggered.

EF Contr. Nr. The Controller number that will follow the amplitude envelope of the incoming signal.

**New in Version 2.0:
Envelope Followers
convert audio input to
MIDI**

Zones

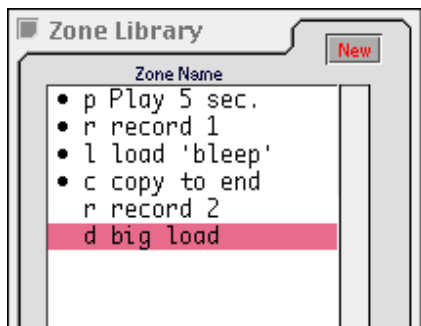
Zones are the primary link between the performer and the sound material. All actions in LiSa are initiated through Zones. It is important to familiarize yourself with some basic ideas about Zones and procedures for editing them, or you will quickly get lost further on.

Structure of a Zone

A Zone can be thought of as the link between the keyboard (or other MIDI input) and the Sample Buffer. Playing notes on the keyboard can initiate all the basic activities of recording and playback, loading and saving soundfiles, and most other real-time actions LiSa performs. There are 3 basic elements to a Zone:

- **Keyrange, or range.** This is the key or keys that activate the Zone, i.e., tell it when to start or stop. Zones may respond to any MIDI note in the range 0 - 120 (c-3 to c10), on all 16 MIDI channels. Any one Zone can be activated by any number of keyranges on different MIDI channels.
- **Function.** A function is what the Zone actually does -- record a sample, play it back, or load or save from disk. Each function has further sets of options called *modes*.
- **Sample Region, or region.** This is the segment of the Sample Buffer on which the Zone operates. It can be any size within the limits of the buffer, and can be resized and moved via MIDI.

Zone Libraries



Zones, like all other data in LiSa, exist independently of any individual Setup, and are saved in Library files. Different Setups can use the same Zones by using the same Zone Library. When you save a new Setup, the Library will automatically be named with the Setup, but it is now a separate file, and can be loaded into any Setup you wish. For more on loading and saving Libraries, see Libraries, page 31.

All the Zones for a Setup are stored in the same Library. Each Library can hold a maximum of 2048 Zones. Double-clicking on a Zone in the Library makes it appear in the Zone

Each Zone listed in the Zone Library has a one-letter prefix indicating it's type:

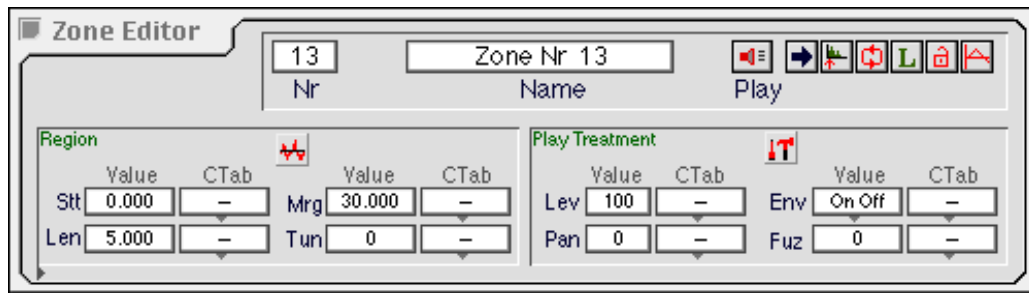
p: Play
r: Record
I: Static Load
d: Dynamic Load
c: Copy Buffer
Σ: Load Session

Editor window. Zones can be cut, copied, pasted or duplicated in the Zone Library. If you want to make a duplicate of a Zone (for example to create a Zone that is a slight variation of another Zone) you can select a Zone in the Library, and select **Duplicate** from the **Edit** menu. A new Zone will appear with the old Zone's name plus a star (*). If a Zone is assigned to a key somewhere in your Setup, a bullet will appear in front of the Zone's name in the Library window, so you can immediately see which Zones in the Library are in use. The bullet marks will only be updated when you store the current Preset.

Creating a Zone

All Zones are created in the same way, regardless of their function. In the upper-right-hand corner of the Zone Library window is a button marked **New**. Click on this button, and a new Zone will appear listed in the Library. It will also appear in the Zone Editor with some sexy name like 'Zone Nr 13.' All Zones begin life as Playback Zones, and it is in the Zone Editor that you can change its function, set it's parameters, and rename it.

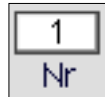
The Zone Editor



The illustration above shows the Zone Editor, as it appears when a Fresh Zone is created. This is the window for a Playback Zone. Both the function icon and the title below it display the Zone's function. If you change the function of a Zone, changes will appear in the window layout. These will be discussed in greater detail in their respective sections.

THE ZONE INFORMATION PANE

The top pane of the window contains the most basic information about the Zone:



Number. This numerical shows the catalog number of the Zone. Zones are numbered sequentially in the order of their creation. This number is LiSa's internal reference to the Zone, and cannot be changed. In order to edit a Zone, you may use the Zone Number numerical to select the Zone of your choice, or double-click on the Zone's name in the Zone Library. You can cycle through available Zones in the Zone editor by using the left and right arrow keys.



Name. In this box (which is not a numerical) you can rename the Zone. Clicking in it once selects the whole box, and you type the name in. Zone names may be up to 15 characters long. To move the cursor in the **Name** box hold the mouse button down for a second when you click in it, and the cursor will appear. You can then move it around with the arrow keys. Hitting Enter will make the new name appear in the Zone Library.

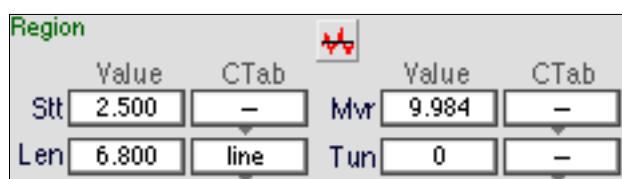


Function Button. This button, just left of the name, above the label **Play** in the picture above, determines the function of the Zone. Clicking on this button brings up a popup menu, from which you can select a function. Once this is selected, the name of the function will appear below the icon, and the window will be reconfigured for that particular type of Zone.



Mode Buttons. The buttons to the right of the Function button vary in number depending on the Zone's function, and control various parameters relating to the Zone -- we'll look at these in more detail in the chapters on the specific Zone functions.

THE REGION PANE

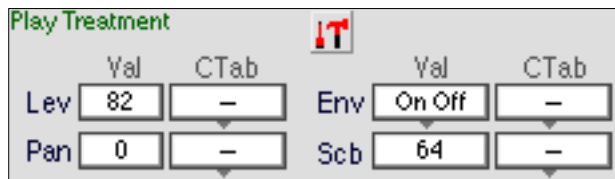


In this section, the bottom left part of the editor, the sample region, movement range,

and tuning for the Zone are set. See Defining Sample Regions, page 24 for more details.

THE FUNCTION PANE

This pane contains information specific to the function of the Zone being edited, and varies the most from one function and mode to another. As this image is taken from a Playback Zone, it is in here called the Play Treatment pane.

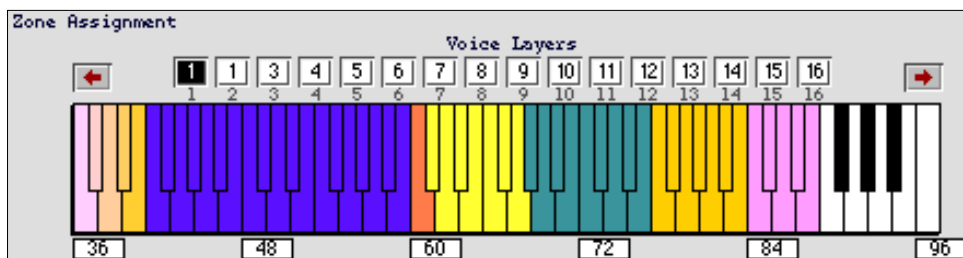


Setting Keyranges

BASIC INFO

To assign Zones to MIDI note events, you need to open the Assignment window from the **Windows** menu. This window has the current Setup's name as the window title, so initially its title will be 'Untitled Setup'.

The Assignment window is divided into three parts. Here we will be primarily discussing its relationship to creating and applying Zones. For its other functions, see the chapters Presets, Setups, and Libraries on p. 27, and Parameter Control on p. 86.



Keep in mind that the keyrange of your Zone indicates your access to it only, and is in no way connected to how much of the buffer it reads. Keyrange assignments & sample region assignments are wholly unrelated.

No two Zones can occupy the same key on the same Voice Layer at one time. Whichever Zone is dragged over a key last will be the ONLY Zone that will be activated by that key in that Voice Layer.

The Zone Assignment pane of the Assignment window has two parts to it, a row of buttons (actually popup menus) labeled **Voice Layers**, and a representation of a keyboard. The Voice Layer buttons indicate which Voice Layer is currently being shown in the keyboard below. Each Voice Layer responds to a particular MIDI channel. (For a full explanation of Voice Layers and MIDI channels, see Voice Layers and MIDI Channels, page 88.) In a new Setup each of the 16 Voice Layers is assigned to MIDI channels 1-16.

The keyboard itself represents MIDI note on events, from 0 to 120. The numbers below the keyboard indicate the MIDI note numbers of the keys. As most keyboards cover the range of MIDI notes from 36 to 96 (c1-c6), that is the default for the visible range. You can see lower or higher notes on the keyboard by clicking on the arrow buttons above the keyboard on the right- and left-hand sides, which will move the visible section of the keyboard an octave at a time. It is on the keyboard that you assign Zones to virtual keys. This determines which MIDI note on events will activate which Zones. A Zone can occupy as much or as little of the keyboard as you like, although it is usually unnecessary for Record or Load Zones to occupy more than one key. The one exception to this is Load Session Zones, p. 82.

CREATING A KEYRANGE

Select the Voice Layer of the Setup you want the Zone to be activated from, by clicking on the appropriate Voice Layer button above the keyboard.

In the Zone Library, click on the Zone you want to assign to the keyboard, and drag it over to the keyboard. Hold it over the key you want to assign the Zone to, and release. The key will now change color. Each Zone is arbitrarily assigned its own color, and the sample region it occupies in the buffer will appear in the same color in the Status window. One Zone may have 2 or more non-contiguous ranges on the keyboard. (You may also drag samples from the Sample Library directly to the keyboard to create new Playback Zones, see Quick Zone Creation, p. 52)

To extend the range of the Zone, click-drag from the starting key over the keys you want to have the Zone play on. You can resize the Zone this way at any time.

DELETING A KEYRANGE

To remove a keyrange entirely from the virtual keyboard, click-drag an unassigned (uncolored) key over the keyrange. Assigning a new Zone to the lowest key of a keyrange will also delete that entire range from the keyboard. If the keyrange is trapped between two other ranges you don't want to change, you can clear an individual key by Cmd-clicking on

any key in the unwanted Zone. From there you can drag the unassigned keys over the rest of the unwanted Zone.

FINDING ZONES

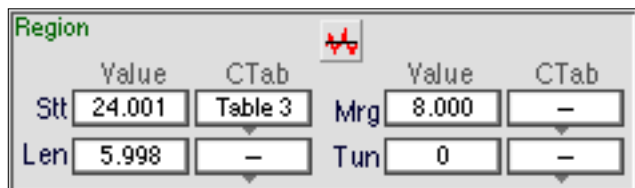
Once you have created a large number of Zones in a Setup, it's not hard to lose track of them. To find out if a Zone is used in your Setup, check in the Zone Library window. If there is a bullet in front of its name, it is in use in the Setup. (These will only be updated when the Preset is stored). To find out where a Zone is in your Setup, select the Zone you are looking for in the Zone Library, and choose **Find Selected Zone** from the **Edit** menu, or press Cmd-F. LiSa will then locate the Zone, load the Preset that it is in, and flash the lowest key of the Zone in the virtual keyboard. If it is loaded into more than one place, **Find Zone Again** (Cmd-G) will locate its next appearance.

Warning: When Finding a Zone, LiSa will load the entire Preset, including a new sample into the buffer if there is one, so make sure you've saved all changes to the Preset you're working on before you Find a Zone.

Defining Sample Regions

There are two ways to define a sample region: either using the numerals in the Region pane of the Zone Editor, or by directly applying values from the Sample Editor. The sample region you define will be visible in the Sample Buffer pane as a segment the same color as the keyrange in the Assignment window.

SIZING REGIONS FROM THE ZONE EDITOR



The Region pane of the Zone Editor, regardless of the function of the region, will always contain the two numerals below:

Stt. Start of region. This sets how far into the buffer the Zone begins.

Len. Length. This determines the length of the region, how broad an area within the buffer the Zone uses when activated.

To the right of each of these numerals is a box labeled CTab. These are part of the Parameter Control implementation, and will be described in full in Mapping MIDI Controllers – CTab on p. 97.

New in Version 2.0:
regions are now sized
from the Sample
editor, and no longer
from the Status
Window

SIZING REGIONS FROM THE SAMPLE EDITOR

Instead of defining the start and length of your Zone's view by changing the **Stt** and **Len** numericals, you can also do it directly in the buffer, by selecting parts of the buffer and then applying them to the Zone currently being edited. In version 2.0, these operations are performed in the Sample Editor window.

To apply a selection in the Sample Editor to the current Zone:

Click-drag through the portion of the buffer you wish to select. The start and length values will appear in the numericals labeled section at the top of the window, and the selected region will be highlighted. Select **Enter Selection in Zone** from the **Edit** menu, or press Cmd-E. The selected region will then become the Zone's sample region.


The key commands will only change the region size if there is no selected area in the sample editor. If part of the sample editor is highlighted, then they will change the size of the selected area, not the region.

You can nudge the start point and length of the region by holding down the Option key and pressing the arrow keys on your computer keyboard. It nudges in increments of 1 kB of samples.

- Option-Arrow left will move the start point earlier in the Sample Buffer (i.e., to the left).
- Option-Arrow right will move the start point later in the buffer (to the right).
- Option-Arrow up will increase the length of the region.
- Option-Arrow down will decrease the length of the region.

Zone Functions

Each Zone has a function, which can be changed using the Function button in the Zone Editor window, the first of the row of icons in the top-right of the Zone Editor. Here the general function options of Zones are described. Specific modes for each of these functions are discussed in the following chapters.

Playback. Activating  Playback Zone will play back all or some part of the Sample Buffer. Each Playback Zone can be individually tuned as far as which area of the buffer it will play, and how it will play it.

Record. Activating this Zone will cause some part of the Sample Buffer to be overwritten with new



sounds from a live source, and optionally saved to disk.



Load Sample. Static and Dynamic Load Sample Zones load soundfiles from disk into the Sample Buffer, which can then be used by Playback Zones.



Copy Buffer. This Zone resamples your own output from LiSa after it has gone through some kind of transformation, and puts it back into the Sample Buffer to be played again.



Load Session. A Load Session Zone is a special bank of Load Sample Zones, designed especially for retrieving live recorded samples created during a performance.

All Zones have certain parameters in common, and others that are unique to their function. These parameters are initially defined when the Zone is created in the Zone Editor. Most of them are also controllable in real time via MIDI or internal modulators. Connections between MIDI control and Zone parameters are made in the Assignment window, described in Parameter Control, p. 86.

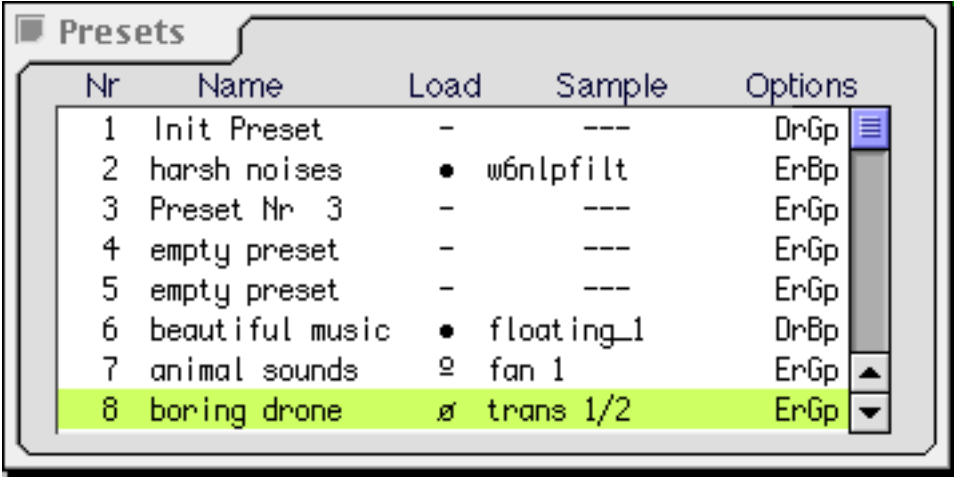
Presets, Setups, and Libraries

Above Zones in LiSa's overall architecture are Presets and Setups. The file you load when you start up the program is called a Setup. Every Setup is comprised of up to 128 Presets, which you can switch between in performance using MIDI Program Change messages. A Preset is what you are actually working with at any one time when programming or performing with LiSa.

Presets

A Preset is the basic performance unit of LiSa. When performing or editing, you work with only one Preset at a time. A Preset is comprised of two parts: Up to 1920 Zones, organized into a maximum of 16 Voice Layers (see p. 88), and an optional sample to be loaded into the Sample Buffer with the Preset. You access Presets through the Preset Window, where you can also set parameters for initial sample loading and playback quality.

THE PRESET WINDOW



Nr	Name	Load	Sample	Options
1	Init Preset	-	---	DrGp
2	harsh noises	•	w6nlpfilt	ErBp
3	Preset Nr 3	-	---	ErGp
4	empty preset	-	---	ErGp
5	empty preset	-	---	ErGp
6	beautiful music	•	floating_1	DrBp
7	animal sounds	g	fan 1	ErGp
8	boring drone	x	trans 1/2	ErGp

The Preset window is where you can find basic information about the Presets in your Setup. It resembles, but is not identical to, the Library windows we have encountered so far. It is available in the **Windows** menu, or by pressing Cmd-9.

Unlike Library windows, there are already 128 Presets in the Preset window. A new Setup will have one Preset already made, called **Init Preset**. The other Presets, although visible, are empty, and have not yet been initialized.

Note that unlike Libraries, there is no particular need to create Presets in numerical order. Since Presets are accessed via MIDI program change messages in performance, you can 'fill' any empty Preset you wish to match any program change numbers you choose.

CREATING AND COPYING PRESETS

To create a new Preset:

Double-click on an empty Preset in the Preset window. You will get a dialog asking you if you want to create a new Preset. Clicking 'OK' will automatically create and load it.

Select an empty Preset and then select **Load Preset** in the **Presets** menu. The same dialog box will appear.

To copy a Preset:

Select Store Current Preset As.... From the **Preset** menu. You will then be given the option of which position you want to store the copied Preset into.

Once the new Preset is created, you can rename it in the Assignment window. This new name will not be reflected in the Preset window until you store the Preset using either the menu item **Store Current Preset** or **Store Current Preset As...** Using the former will store it in its current position, and the latter will allow you to set its number, and thus the number of the Program Change message that will load it.

DELETING AND CLEARING PRESETS

An 'Empty Preset' as seen in the Preset window takes up no space on your hard disk. If you decide you don't need a Preset or want to start from scratch, there are two menu options available, both in the **Preset** menu:

Presets and Memory:

It is important to note that every time you create a new Preset, your Setup file will increase in size by 34 Kbytes, even if there is nothing in it. A Setup containing the maximum possible number of Presets will thus be almost 4 MB. Thus it is advisable to use the minimum possible number of Presets, and to make sure that any created Presets are actually being used.

Clear Current Preset. Whatever Preset is currently visible in the Assignment window will be cleared. All Zones will be removed, and all MIDI connections broken. Libraries will be left untouched -- any Zones, Envelopes or Patterns you have created, even if they're not used anywhere else, will not be deleted. Memory allocation will not change, and the 34K of memory the Preset occupies will still be occupied.

Delete Selected Preset. Selecting this item will completely delete the Preset selected in the Preset window. Libraries will still remain, but the memory the selected Preset occupies will be cleared. It is not possible to delete the

currently active Preset. To delete a Preset, you must open another one and then delete the unwanted Preset.

VIEWING AND EDITING PRESETS

To load a Preset into the Assignment window:

When the Preset number appears in Bold in the Assignment window, that means it has unstored changes.

Click on the Preset Number numerical at the top of the Assignment window. This works identically to the Zone Number numerical in the Zone editor. You can scroll to or type in the number of the desired Preset.

Press the up or down arrow keys. (This will scroll between created Presets only.). The up arrow key will give you the next higher numbered Preset, and the down arrow key the next lower one. The selected Preset will change only in the Assignment window -- you will not see the selected Preset change in the Preset Window.

Click on a Preset in the Preset window, and select **Load Selected Preset** from the Preset menu.

Double-click on a Preset in the Preset window.

PRESET OPTIONS

LOADING SAMPLES WITH A PRESET

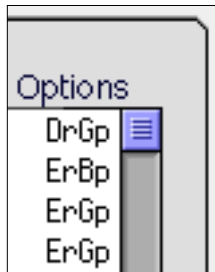
Presets			
Nr	Name	Load	Sample
1	Init Preset	-	---
2	harsh noises	•	w6nlpfilt

When you load a new Preset, you have the option to load a sample with it. To choose a sample from disk to load, select the sample from the Sample Library and drag it to the **Sample** column of the desired Preset in the Preset window. It need not be the currently active or selected Preset. The selected sample will always load from the beginning of the Sample Buffer.

There are five loading options for Preset Images; each represented by a different symbol in the **Load** column in the Preset window. Clicking on one of these will bring up a pop-up menu with the options below. In all of them except **Clear Buffer**, the effected area is limited to the region of the buffer into which the new sample is loaded

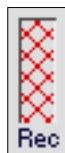
- **No Load.** No sample will be loaded.
- **Replace.** In this mode, the new sample will completely replace whatever was in the region. Parts of the Sample Buffer beyond the original sample will remain untouched.
- Ø **Insert.** Any silences currently in the effected region will be filled with sound from the loaded sample. The new sample is layered directly on top of the old buffer. For example, if samples 500-800 of the buffer are empty when a sample in this Mode is loaded, samples 500-800 of the new sample will go into the empty space. If some or all of that is silence in the new sample, that will be loaded as well.
- **Mask.** This is the inverse of Insert. The entire new sample will be loaded, but any silences that may be in the sample will not erase what was already in the buffer. New samples will replace old samples, but silences will leave old samples untouched.
- X **Clear buffer.** All samples in the entire Sample Buffer will be cleared.

PLAYBACK QUALITY



To the far right of the Preset window is the Preset Options column. This will effect the quality of playback of the Preset. It is possible to select between two different sample rates for playback, Good and Best. Presets assigned to Good will play back their samples at a rate of 22.05 kHz, and Best at 44.1 kHz. It is also possible to enable or disable sample recording. When sample recording is disabled, more voices will be available, especially on slower machines. If a Preset is record-disabled, the Record indicator in the Status window will have red cross-hatching in it.

Clicking on the four-letter code of a Preset will reveal a popup menu with 4 options:



ErGp Enabled Record, Good Playback

ErBp Enabled Record, Best Playback

DrGp Disabled Record, Good Playback

DrBp Disabled Record, Best Playback

Changing your current Preset via MIDI (since it is primarily designed for performance) will not give you the option of storing any changes in your Preset. When editing, it is thus advisable to switch Presets from the user interface.

CHANGING PRESETS VIA MIDI

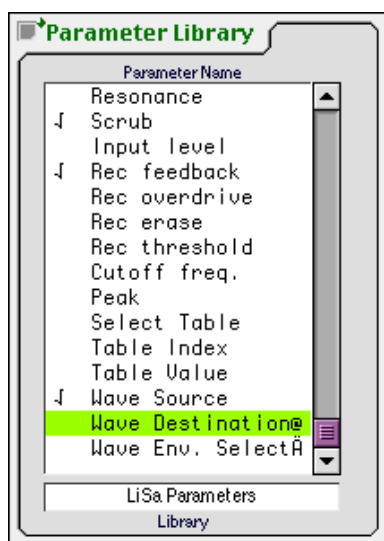
To change a Preset via MIDI, you must send LiSa a Program Change message on the channel you have selected as LiSa's System Channel in the System Settings Dialog (see p. 16). The program change number +1 will be the Preset you call up (pgc 0 = Preset 1, etc.).

Stop Notes on Preset Change Option: When this is checked (in the **Options** menu), all currently active notes will be silenced, and all Control values that you have changed while using the Preset will be set back to their original values. If it is not selected, all active Zones will remain active until turned off, and returning to that Preset, you will find all of the controllers in their last position before you changed Presets. If you are switching between Good and Best playback quality, all notes will always be stopped.

Setups

A Setup is the actual file you save when you select **Save** in the File menu, and is the file you load or open from the **New Setup...** or **Open Setup...** File menu items. It is comprised of:

- All the Presets you have written for that Setup.
- The preferences you have set in the **Global** menu. Each Setup can have its own System Settings, buffer sizes, and pitch bend range.
- All selected Options in the **Options** menu, except for **Show Current Sample Pointer**, which always reverts to on.
- Pointers to Libraries. All data structures such as Zones and Tables, which are stored in Libraries, are stored in separate files, and the Setup remembers which Libraries to open up with the Setup.



Libraries

All data structures in LiSa are created and stored in a Library. Seven Libraries contain all of the data structures used in LiSa: Zones, Patterns, Envelopes, Tables, Controllers, Samples, and Parameters. These are separate files from your Setup file -- any number of Setups can share Libraries. They are saved in the same folder as your Setup file, and are automatically named with the name of your Setup plus the type of Library. (For example, if your Setup is called Foo, upon saving it LiSa will create Library files named 'Foo

Envelopes', 'Foo Controllers', etc.) Once created, Libraries may be saved in any location on your hard drive – they need not be in the same folder as their original Setup. LiSa will remember their access path as long as they remain on the volume on which they were created. All standard Macintosh edit functions work in Libraries – Items in Libraries can be duplicated, cleared, etc. via the **Edit** menu. Some Libraries exhibit slightly differing behaviors, which are mentioned in their specific sections. The explanations below apply to all Libraries, whatever their type. The one exception is the Parameter Library, which is not changeable, and simply provides a list of the control parameters available. For use of the Parameter Library, see Parameters and Controllers on p. 89.

LIBRARY FUNCTIONS

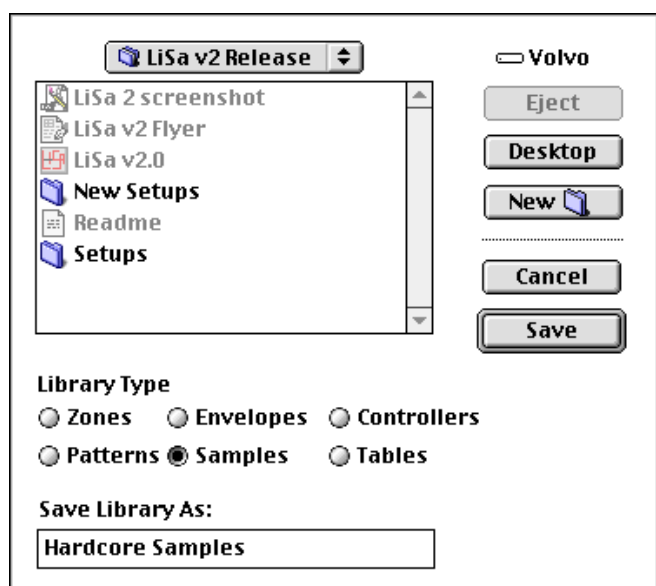
- Creating new data structures. All Zones, Controllers, etc. are created by using the **New** button in the library window of that type. Some of these structures may also be created in other ways as well, but they can all be created from Libraries.
- Managing data so it can be used by multiple Setups. As mentioned above, multiple Setups may share Libraries.
- Reference for what structures have been created, and whether they are used in a Setup. (The exception to this is the Parameter Library, which indicates the used Parameters in each Voice Layer, not Setup.)
- Drag-and-drop of data into a Preset. An item from any Library can be dragged to an appropriate numerical or menu item. For example, any table may be dragged to a CTab numerical in a Zone Editor Window, and samples in the Sample Library may be dragged directly into the Sample Buffer or the Sample Editor.

LOADING LIBRARIES

When loading a set of old Libraries into a new Setup, it is best to load the Zone Library last. If the Zones have pointers to patterns or envelopes in a Library that isn't loaded yet, those pointers will be lost.

To load an existing Library into an open Setup, select **Load Library...** from the **File** menu. This will bring up the standard Open File dialog box. Once you have selected a file to load, you will be presented with a dialog box asking if you want to replace the current Library, or append the Library you are loading to it. Selecting **Append** will add the Tables, Envelopes, or whatever, to the end of the current Library of that type. Selecting **Replace** will delete whatever was in there previously. When you select Append, the current Library will keep its original name. Selecting Replace loads in the new Library, name and all, into your Preset. All of these operations can be performed while the Library windows are open or closed. If you Load items into or Save As... a closed Library you will see the results when you open it.

SAVING LIBRARIES

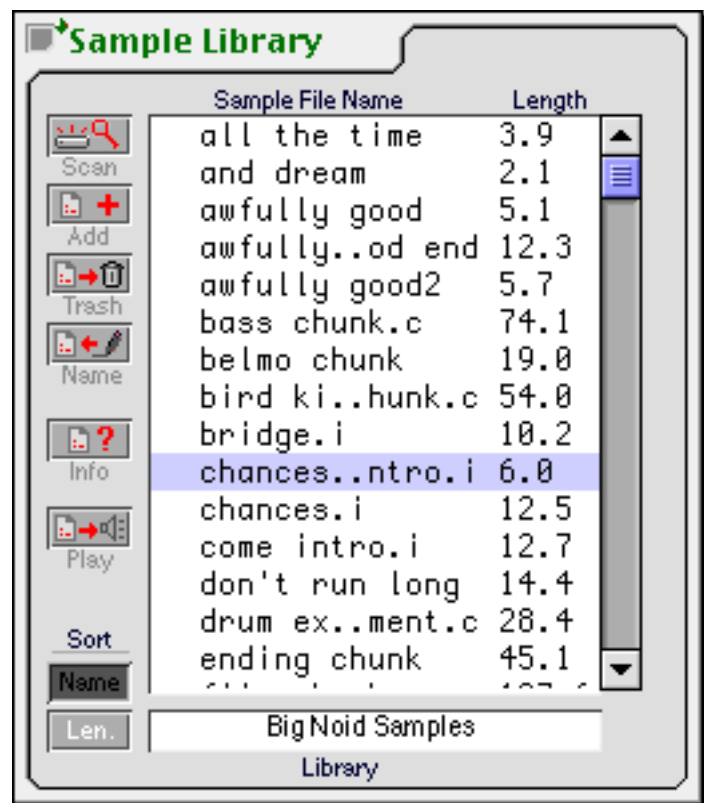


You can save a Library independent of the Setup at any time by selecting **Save Library as...** from the **File** menu. You will see a slightly modified dialog box, like the one at left. When saving, you should select the radio button with the correct type of Library, or LiSa will not be able to load it properly.

Sound Management

This chapter describes how to handle samples that are already on disk or in LiSa's buffers. For information about how to record samples directly into LiSa live, see the chapter Recording a Sample on p. 69.

LiSa can load samples recorded in either Sound Designer II or AIFF format, 16-bit, with a sample rate of 44.1 kHz. It saves recorded samples as SDII mono files. It can open stereo files, but it will force them to mono, possibly causing unwanted phase interference, so we recommend that if you are using files you've previously edited or processed, use mono files.



The Sample Library

The Sample Library does not actually contain any samples. Rather, it is a list of pointers to a set of the soundfiles on your hard drive. These samples do not need to be in any particular location on your drive, or even on the same volume. Once in a Library, as long as the sample remains on the same volume, LiSa will be able to find it.

BUILDING A SAMPLE LIBRARY

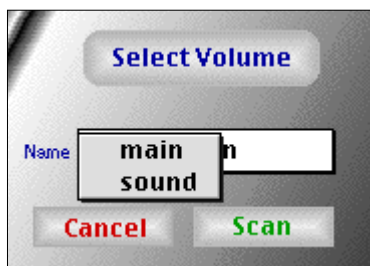
There are two ways to build a sample Library:



Click on the Add button. It will bring up a dialog in from you can add soundfiles to the Library, either individually or by the folderful.



Click on the Scan button. If you have multiple drives on your system, it will present a popup menu from which you can choose a drive. Once the drive is selected, LiSa will scan the drive for all readable soundfiles and add them to the Library.



Drag selections from the Sample Editor over to the Sample Library, which will automatically save them to disk.

EDITING THE SAMPLE LIBRARY

Once there are samples in the Library, the list can be sorted either alphabetically or by length, depending which option is selected in the lower left corner. A sample used in a Preset, either in the currently active Zone Library, or as a Preset Sample Load, will have a bullet next to its name.

Other commands:



Info. Clicking on this button will present a box showing the filepath of the selected sample. The box will remain visible only as long as the mouse button is held down.



Play. Activating this button will play the selected soundfile. Clicking it again will stop playing. Double-clicking on any sample name will also play the sample.



Name. Clicking on this will bring up a dialog in which you can rename the sample. This is identical to changing the name in the Finder.



Trash. Puts the selected soundfile in the Trash. It is not an immediate delete – the Trash must be emptied for the soundfile to be permanently thrown out.

Clear (from Edit menu). Selected samples will be cleared from the Library, but remain untouched on your hard drive. The Sample Library must

be the topmost window for this command to work.

OTHER SOUNDFILE OPTIONS

You cannot use any of these methods to move soundfiles from one hard disk or partition to another.

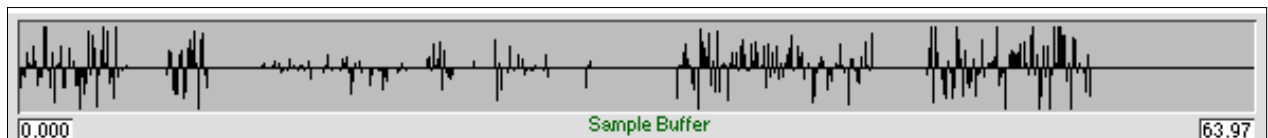
Samples can be moved around on your hard drive directly from LiSa. There are two ways to do this:

The **Load Sample...** dialog box (available from the **File** Menu) presents other sample management options:

Rename. Obviously enough, you can rename a selected sample. Click on this button and another dialog will appear prompting you to enter a new name.

Move. Selecting **Move** will put the selected soundfile in a new folder inside the same folder as your setup entitled Moved Samples. You can then move these samples where you will in the Finder. (If you move these samples onto another disk or partition, the Sample Library will lose track of them.)

Delete. This should be fairly clear. You will get a dialog box asking for confirmation that you want to delete the soundfile. Don't try getting it back.



The Sample Buffer

The Sample Buffer is the section of RAM allotted to LiSa in which playable sounds actually live. (For the basics of this, see *Sound in the Computer*, page 5). When editing a Setup, there are two access points into the Sample Buffer: the Sample Buffer pane of the Status window, and the Sample Editor.

To Zoom your view of the sample Buffer in the Status window, highlight part of the zoom pane directly above the Sample Buffer window.

LOADING SAMPLES INTO THE SAMPLE BUFFER

There are several ways of loading samples into the Sample Buffer. All of these methods are pastes, not inserts, and will overwrite any previously loaded samples in the chosen location:

Select **Load Sample...** from the File Menu. This will load a sample into the Sample Buffer, starting from the beginning of the buffer. Note that this is the one method you can use to load samples that are not in the Sample Library.

Dragging a sample name from the Sample Library to other windows will also load samples into the buffer, in several different ways:

To a Playback Zone in the Zone Editor: As much of the sample as will fit into the Zone's region will be loaded, wherever it is in the buffer.

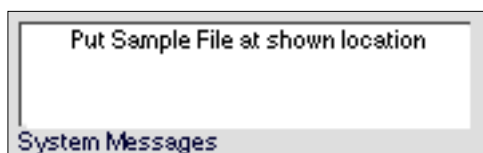
To the virtual keyboard: The sample will be loaded into the buffer immediately to the right of the rightmost loaded sample, or at the beginning of the buffer if empty. In addition, a new Playback Zone, with the same name as the sample, will automatically be created.

When dragged to either the Sample Buffer pane of the Status window, or into the Sample Editor, modifier keys control the exact way you can locate the sample:

With **no modifiers**, the sample will automatically start from the beginning of the buffer.

Option-drag will automatically place the sample after the last sample in the buffer.

Cmd-drag allows you to place the sample in a specific location in the buffer. Once you drag the sample over the Sample Buffer pane, a number box will appear which will show you the exact location of the sample in the buffer. In the Sample Editor, you can place your sample visually.



When dragging samples to the buffer, a message will appear in the System Messages pane of the Status window to remind you of your current dragging mode.

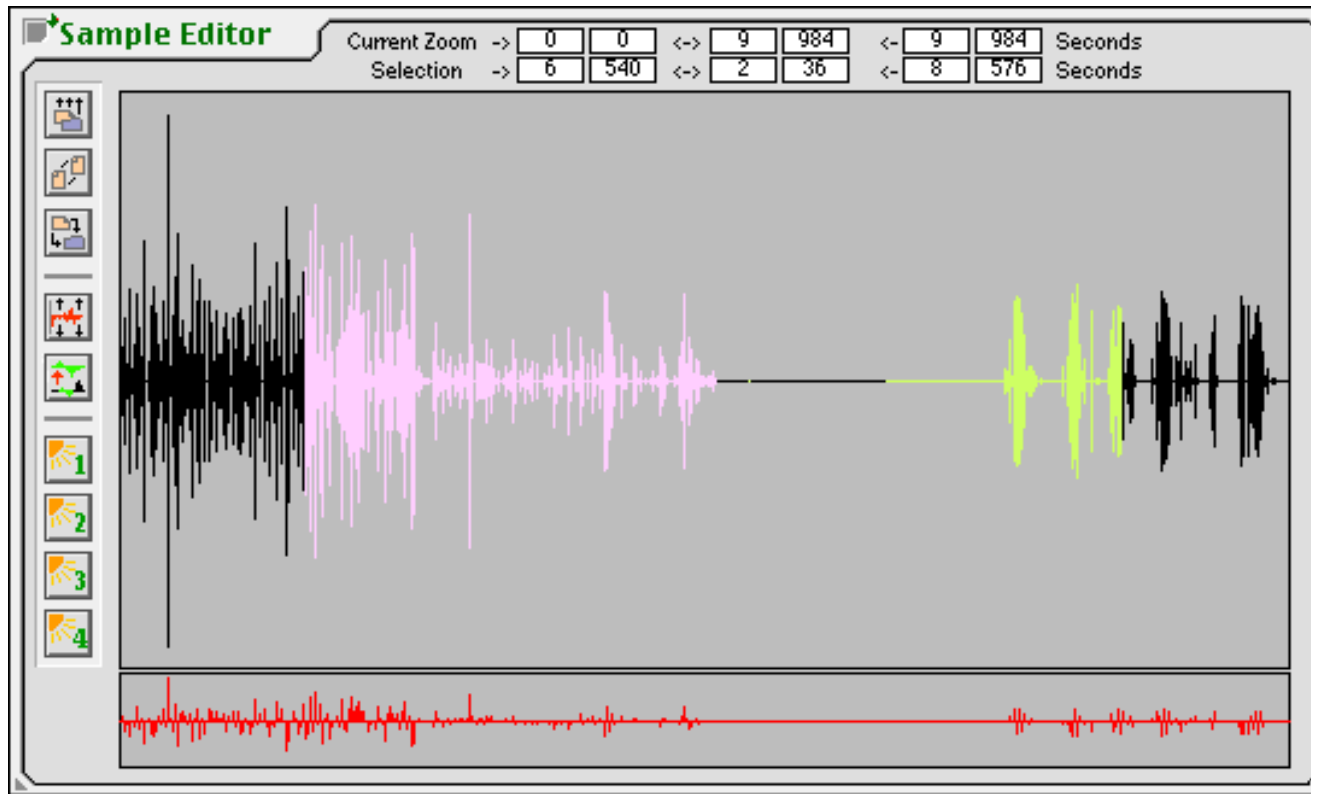
SAVING SAMPLES FROM THE SAMPLE BUFFER

There are two ways of saving all or part of the Sample Buffer to your hard disk as a new sample. Both of these methods will automatically add the new sample to the Sample Library:

Select the **Save Sample Buffer...** item from the File menu. This will give you the option of saving either the entire Sample Buffer or only the current visible zoom as a SDII file. Current visible Zoom refers to the visible area of the Sample Buffer as shown in the Sample Buffer pane of the Status window, and not to the Sample Editor window. You set the Zoom in the Status window by click-dragging over the desired section of the buffer in the Overview Pane of the Status Window.

Highlight the region you want to save in the Sample Editor window. A grabbing hand icon will appear when the cursor is over the highlighted area. You can then drag it to the Sample Library, where you will get a standard Save File dialog box. Dragging it to the Preset window will also save the sample, which will be loaded together with the Preset.

The Sample Editor



New in Version 2.0

Version 2.0 of LiSa has added a Sample Editor window to simplify working in the Sample Buffer. Some of the features formerly included in the Sample Buffer pane of the Status Window have been moved to the Sample Editor, and many new features have been added.

OVERVIEW

The Sample Editor window contains an exact reflection of the sounds in the Sample Buffer. Changes made in one window are immediately reflected in the other. As the editor is only reflecting what is in RAM, any edits made in the Sample Editor have no effect on any soundfiles on disk. The entire buffer, or any part of it, may be added to the Sample Library and saved to disk. Unlike LiSa's other windows, it can be resized, by click-dragging any of the three shaded corners.

NAVIGATION

The Sample Editor provides two views of the buffer: The Edit pane, and a smaller overview below. The Edit pane can be zoomed in and out from the overview, which always shows the entire contents of the Sample Buffer. The part of the

buffer visible in the Edit window is always shown in the Overview pane in red. In addition, the top row of numbers, labeled Current Zoom, will show the exact start point, end point, and duration of the area visible in the Edit window. To change the view in the Edit window, click-drag on the overview:

Vertical dragging up or down will zoom in or out of a specific section of the buffer. Note that when you zoom in or out, expansion or contraction of the visible area is from a fixed start point on the left.

Horizontal dragging will move the visible area to the left or right in the buffer. The red area in the Overview will move with the cursor. To fine-tune a location, shift-dragging will move the view at a much slower rate. Clicking in the overview will immediately move the area visible in the Edit window to that location.

There are also two types of buttons to aid changing views:



Expand Selection. Clicking on this button will cause the selected area to completely fill the Editor window.



Snapshots. The four numbered buttons on the Sample Editor, called Snapshot buttons, serve as view memories. Shift-Clicking on one of these buttons will remember the location and zoom view of that portion of the Sample Buffer, and a normal click will return the Edit window to that view. Snapshots are not remembered after you quit LiSa.

APPEARANCE

The waveform in the Edit window will also appear in as many as three colors:

- Black, for unselected areas.
- The sample region of the current Zone will appear in that Zone's color. This will also be visible in the Status window.
- The selected area will appear in your computer's 'highlight' color.

PLAYBACK

For playback and editing functions to work, the Sample Editor must be the **topmost** window.

To start or stop playing in the Sample Buffer, press the spacebar. You will hear the sound beginning at the current cursor location. If you have selected part of the buffer, the highlighted area will automatically be looped. If nothing is selected, the area currently visible in the Edit window will be looped. (The selected area will take priority over visibility, so if a selected area is partially or entirely invisible, you will still hear it.)

EDITING

SELECTING

To select a portion of the buffer, click-drag with the mouse. Shift-clicking will extend the selection. The highlighted area can also be fine-tuned with the Arrow keys:

Option-left arrow and Option-right arrow will nudge the left-hand edge of the selected area.

Option-up arrow and Option-down arrow will nudge the right-hand edge to the right and left, respectively.

The nudge size is 1 kB of samples (1024 samples, or about .023 of a second). Once a selection is made, its exact start point, end point, and duration will be displayed at the tip of the window, in the row labeled **Selection**.

EDIT FUNCTIONS

Some of the standard **Edit** menu items are also available from icons in the Sample Editor:



Cut will remove the selection, put it on the clipboard, and move all samples to the right of the selection to fill in the empty space.



Copy copies the selection to the clipboard, leaving the original untouched.



Paste will insert the sound on the clipboard at the insertion point, moving all sounds to the right. If paste is used when a region of the Sample

Buffer is selected, it will replace whatever is in that region.

Clear (Available in the **Edit** menu only) will replace the selection with silence.

Undo is not available In the Sample Editor.

SPECIAL FUNCTIONS



Normalize. This normalizes the selected area of the Sample Buffer. This effects only the buffer, and samples on disk are left untouched. This is also available in the **Edit** menu, or by pressing Cmd-M. This is a non-real time option, so it's not recommended for live use. Normalization will take your sound's loudest sample and make it equal to 0 dB, thus utilizing the full 16-bit audio range available.

Save Sample to Disk. You can drag any selected area of the Sample Editor to either the Sample Library or the Preset Window. If dragged to a Preset, that sample will be automatically loaded when that Preset is called up.

Enter Selection in Zone. This item, available in the **Edit** menu, will automatically set the Start and Length parameters of the Zone currently in the Zone Editor to that of the current Selection.

Enter Region in Zone. If you change the size of the current Zone via MIDI, selecting this from the **Edit** menu will automatically resize the default sample region to the current one.

Tables and Envelopes

There are two data structures in LiSa which serve multiple functions in different contexts: Tables and Envelopes. This chapter contains basic information on both of these structures, and will briefly mention their applications in different aspects of LiSa. Their use in particular contexts is explained in full in the relevant chapters.

Tables

This section covers general editing and handling of tables.

- For tables used to modify parameter controls, see Mapping MIDI Controllers – CTab on p. 97.
- For tables used to generate sound, see Wavetable Zones on p. 58.
- For editing tables in real time, see Real-time Control of Tables on p. 98.

CREATING A NEW TABLE

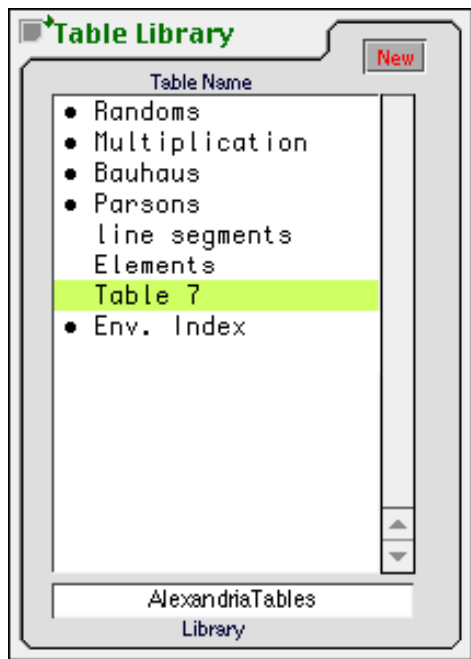
Like all other data, tables are stored in a Library. The Table Library window works identically to all other Libraries.

There are two ways to create a new table:

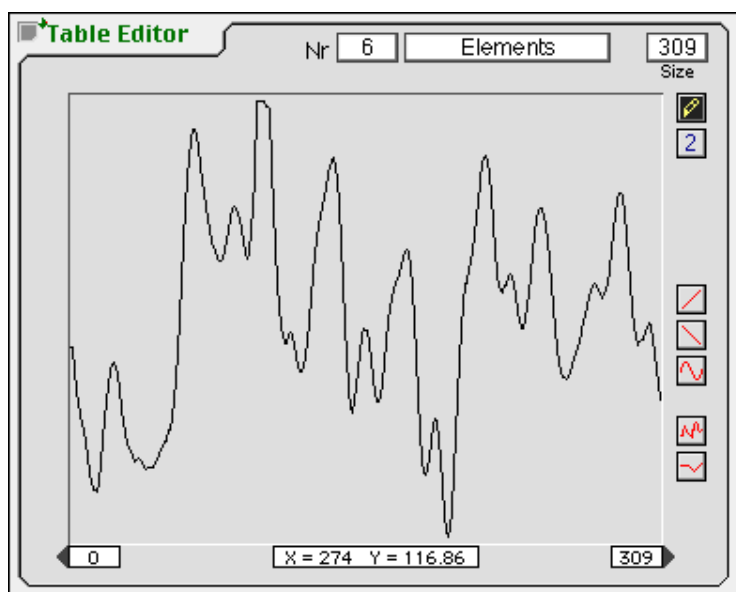
Click on New in the Table Library window.

Select the **New Table** menu item from any of the popup menus labeled **CTab** in the Zone Editor.

This will immediately open the Table Editor window, with a new table full of random values. A single Library can hold up to 256 tables. Each new table's name will appear in both the Table Library and the CTab popup menus in the Zone Editor.



THE TABLE EDITOR



The top row of the Table Editor has the usual LiSa identification number (you can change the table you are editing by scrolling through this numerical or using the right and left arrow keys when this window is topmost) and name field. There is also a third numerical to control the table's size (domain). Default (and maximum) is 512. Note that the Y values are stored in the table as floating-point numbers, which are truncated for MIDI.

The Table Editor window can be viewed in two ways: graphically (the default) and numerically. You can toggle between these two views by clicking on the radio buttons marked with a pencil or the numeral 2 on the right-hand side of the window. These two views reflect the same information, but each view has slightly different editing capacities. Tables can be drawn, edited number-by-number, generated using the Function buttons, or copied directly from the Sample Editor.

GRAPHICS VIEW

In this view, one can simply draw the desired curve into the Editor window. The X and Y values of the cursor are shown in the location box at the bottom center of the editor.

NUMERICAL VIEW

In this view, the table is represented as one or more pages of 128 numerals. Each numerical shows the Y value for an X value that corresponds to its position in the table, ranging from zero to the domain of the table. Putting the cursor over

**New in Version 2.0:
graphical Table
editing**

Floating-point table values will appear in **Bold** in the numerical view. There are no dual numericals in the numerical view – you must set floating-point values from the graphics view.

a numerical will show its X and Y values in the location box at the bottom center of the table. You can only see 128 values at a time in this view – to go to higher or lower ranges, click on the boxes with the triangles on the lower left and right of the Editor window.

To edit in numerical view, scroll the numerical corresponding to the X value you want to change to its desired value, or type the value in. Only integer values may be entered from the numericals. (It is handy to have your highlighting color set to something other than black -- it makes it much easier to see what is happening in the tables.)

FUNCTION BUTTONS

LiSa has two types of function buttons. Some put in a standard set of values, and some allow you to set certain parameters and apply a function to them.

SET FUNCTIONS

These buttons will always exhibit the same behavior, adjusting to the size of the table. Minimum and maximum values cannot be scaled, and are always from 0 to 127.



Linear. This button creates a linear table, with Y values beginning at 0, and reaching 127 at the maximum X value of the table.



Reverse Linear. This loads the exact inverse of the above table, with the lowest value of X being equal to 127, and the highest 0.



Triangle. Maps a triangle wave beginning and ending with zero to the full domain of the table.

VARIABLE FUNCTIONS

You can create several line segments or random ranges using the Variable Function buttons. These work only in numerical view, where you can set as many breakpoints as you like.



Line Segment. In Numerical view, you can make any number of breakpoint line segments. Shift-clicking on a numerical in the Table Editor will select it. You can select any number of numericals by shift-clicking. When you set the selected numericals to values of your choice and click on this button, LiSa will automatically interpolate a line segment between pairs of the selected numericals, as seen below.

If no numerals are selected, and you click on Line Segment, it will automatically interpolate a line from the first to the last value in the visible page of the table. To create a table with more breakpoint line segments, you have to have at least two numerals selected.

Table Editor Nr: 5 line segments 128 Size

106	106	106	106	106	106	106	106	50	50
50	50	50	50	50	50	50	50	50	50
50	50	50	50	8	8	8	8	8	8
8	8	8	8	8	8	19	19	19	19
19	19	19	19	19	19	19	19	19	19
19	19	19	19	19	19	62	62	62	62
62	62	62	62	62	62	62	62	62	62
62	62	62	62	87	87	87	87	87	87
90	90	90	90	90	90	90	90	90	90
90	90	90	90	90	90	90	90	90	90
90	90	90	90	90	90	90	90	19	18
17	16	15	14	13	12	11	10	9	8
7	6	5	4	3	2	1	0		

0 127

Note in the example that the region from the last selected numerical (containing 90) to the end of the table is not a line segment from 90 to 0. This is because the last numerical was not selected. If you only select a segment inside the boundaries of the table, as in this case, the portion of the table from the selected numerical closest to the boundary of the table will remain untouched. What you see in this case is what remained from a previous table – a triangle wave. You can use this to combine line segments with other kinds of functions. Although all of the line segments in this table are of linear values, you can interpolate between any two numbers using this system.

Random. This function works very similarly to the Line Segment function. Clicking on this button with no numerals selected will create a flat random distribution in the range 0-127. By selecting pairs of numerals the same way as line segments, and clicking on this button, you can create a random distribution within the limits set by the selected numerals. When creating these 'segments' of limited random distribution, the numerals that start and end the region may change when you click the button, as they are included as part of the random distribution. As with line segments, you can create as many regions of different distributions within one table as you wish.



Although line segments often appear to hold the same value (note the repeated numbers in the first segment on the previous page), they are stored in LiSa as floating point numbers, not integers. This means that although there may be no visible difference between two adjacent numbers in the Table Editor, these two values may well sound different when used to control playback. If a number is stored as a floating point number, it will appear in the Table Editor in **bold**. If you want a table to have a consistent value for a certain number of steps, your line segments must begin and end on the exact same value.

USING VARIABLE FUNCTIONS WITH LARGE TABLES

When using a table in numerical view, you can see only one 128-number page of it at a time. If you want to make a longer series of line segments, you can repeat the procedure on each page of the table. Only the visible page of the table changes when you use a Variable Function button.

COPYING FROM THE SAMPLE EDITOR

You can copy data directly from the Sample Editor and paste it into a table. (Only the first 512 samples of your selection will be used.) Particularly useful when using a table as a Wavetable (see Wavetable Zones on p. 58), this technique will work if the table is in either graphic or numerical view. There are two ways to do this:

Copy and Paste. Bring the Sample editor window to the front. Make your selection, and copy it to the clipboard. Bring the Table Editor to the front. Select **Paste** from the **Edit** menu, or type Cmd-v. The selected portion of the waveform will appear in the table.

Select and Drag. You can click-drag any highlighted area from the Sample Editor directly into the Table editor.

Envelopes

Only general handling of envelopes is covered here. Specific applications of envelopes are covered in their respective sections:

- For Amplitude control, see Amplitude Envelopes on p. 61.
- For Filter control, see

Filters on p. 62.

- For Wavetable mixing, see Wavetable Zones on p. 58.

ENVELOPES IN SETUPS

Envelopes are stored in and accessed from an Envelope Library. You can change the amplitude envelope of a Zone by sending it MIDI, using the Envelope Select parameter (p. 94). Default is to envelope No. 1.

CREATING AND EDITING ENVELOPES

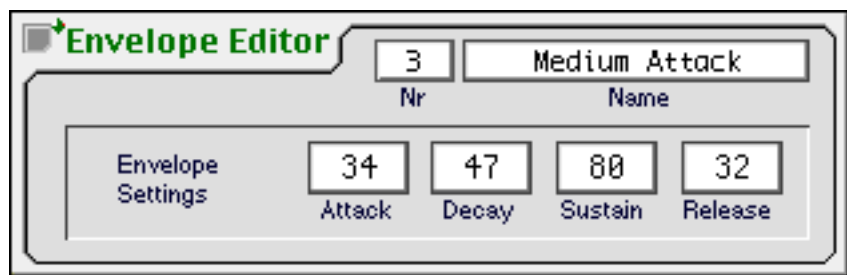
To make a new envelope, you can either:



Click on the New button in the Envelope Library window (available in the **Windows** menu, or by typing Cmd-4.).

Click on the Val numerical next to the **Env** parameter in the Zone Editor. A popup menu of all available Envelopes will appear, together with options for creating a new Envelope or editing the current one.

They are edited in the Envelope Editor, which is also available in the Windows menu, or by double-clicking on an envelope in the Envelope Library. You can cycle through available Envelopes in the Envelopes editor by using the left and right arrow keys.



Envelopes in LiSa are basic ADSR envelopes. They contain 4 stages; each scaled from 0 to 99, except Sustain, which is scaled from 0-100. Lower values mean shorter time durations.

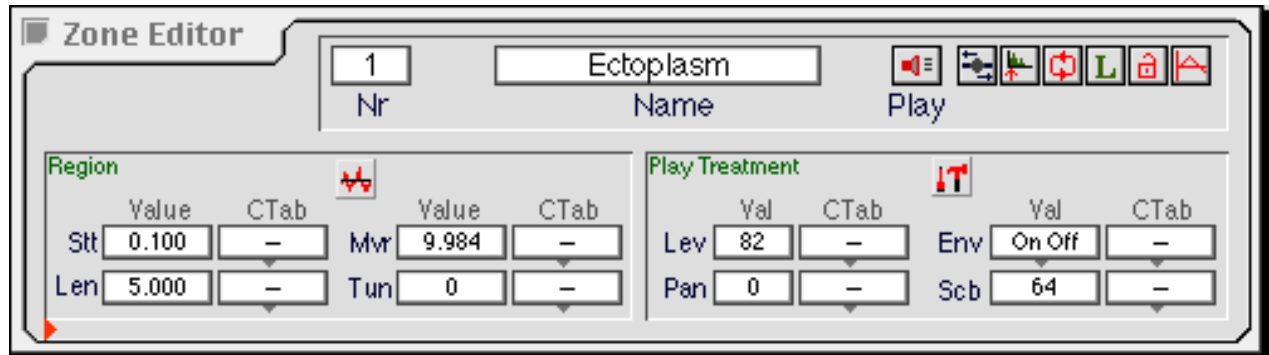
Attack. The time it takes the envelope to reach its maximum value.

Decay. The time it takes to go from full value to the sustain level.

Sustain. The value of the envelope after it has passed the decay stage. It will remain at this value as long as the Zone is active. Note that this is not a duration.

Release. The time it takes after the Zone is deactivated (your finger is off the key) for the envelope to return to zero from the **Sustain** value.

Playing Back a Sample



Once you have sound in the buffer, there are a great variety of playback methods for sampled sounds. All of these are done with Playback Zones. The exact way in which the playback works is determined by the *mode* of the Zone. In this section we will look at these possibilities in detail.

Defining a Zone

The process for defining a Playback Zone, like all Zones, is comprised of 5 parts:

- Creating a new Zone in the Zone Library window.
- Assigning the Zone to an activation key or keyrange in the Assignment window.
- Assigning a sample region to the Zone, in the Zone Editor or the Sample Editor.
- Defining the Zone's functions in the Zone Editor.
- Creating Parameter Control variables for the Zone, if desired. This happens in both the Zone Editor and the Assignment window, and will be discussed in full in the chapter Parameter Control on p. 86.

The order you do these in is of no particular importance (though it helps to create the Zone first), and you can freely readjust any parameter at any time.

Creating the Zone

The first step is to create a Playback Zone and assign it to a keyrange on the virtual keyboard in the Assignment window. Click on **New** in the Zone Library window, and a new Zone will appear. Assign it to a keyrange by clicking on the Zone name and dragging it to the virtual keyboard. When defining the range for your playback Zone, remember that it is in Playback Zones (and in Playback Zones only) that the location of the Zone on the keyboard is related to the pitch of the sound you hear.



Value		CTab	Value		CTab
Stt	2.500	—	Mvr	9.984	—
Len	6.800	line	Tun	0	—

Defining the Sample Region

The numerals in the Region pane of the Zone Editor define the sample region of the Zone (the part of the sample buffer it acts on) and set the Zone's playback pitch. Please note that all of these parameters can be controlled via MIDI, and are amongst those most often used in LiSa.

When setting these two parameters, **Len** takes precedence over **Stt**. That is to say in a 10-second buffer, if Len is set to 3 seconds, Stt will automatically not go past 7 seconds. However, when controlling the location of the Record Zone via MIDI, You may wind up playing past the section or RAM allotted to LiSa.

Stt (absolute region start). Sets the absolute start time of the Zone's region – the segment of the Sample Buffer from which the Zone will access sample data. This numerical will always have a minimum of 0. The maximum depends on the amount of memory you have allotted to the Sample Buffer. This is an absolute offset -- MIDI controls can only make the region go above (to the right in the buffer) this position, not below.

Len (length). Sets the length of the Zone's sample region. Minimum is 1 kB of samples (± 0.023 seconds) and maximum is from the start time to the end of the buffer. Default is 5.00 seconds.

Mvr (movement range). This numerical is used to define the effects of MIDI data sent to the above parameters. When this value is set to 0, MIDI sent to the **Stt** parameter will have no effect. Set to maximum (again, automatically the length of the buffer), the full range of a MIDI controller (0-127) will cover the full range of the buffer. If set to half the length of the buffer, it will cover half the length. Default is the entire length of the buffer.

You will notice that we are ignoring the CTab popup menus. These are related to how their variables interpret MIDI information, and will be discussed at length in Mapping MIDI Controllers – CTags on p. 97.

QUICK ZONE CREATION

In many cases, you will want a Playback Zone to simply correspond to one sample in the buffer. There is a fast system for creating such Zones, combining keyboard assignment, buffer region, and transposition in one simple gesture.

Drag a sample from the Sample Library directly to the Virtual Keyboard in the Assignment Window, and assign a keyrange. This will automatically:

- Create a new Playback Zone, with the same name as the sample.
- Load the soundfile into the Sample Buffer, immediately after the last sample in the buffer.
- Set the sample region to the exact size and location of the sample.
- Set the **Tun** parameter so that the leftmost key in the keyrange selected will play back the original pitch of the sample (tuned for a chromatic keyboard).

It is possible, by dragging samples larger than your buffer, to actually create Zones larger than your buffer size. This can cause problems, and after saving and restarting such a Setup, you may receive a warning dialog when loading. You should check out your Zone sizes or resize your buffer (p. 15) before proceeding.



Due to insufficient Buffer sizes, the following settings have been changed in some Zones:
Wrong Zone Settings: LENGTH
Adjust the Buffers and check your Zones.

Understood

Pitch

Pitch transposition of sampled sounds is one of the most common uses of samplers. LiSa gives you full control over your playback pitch, including the ability to implement non-equal tempered scales. The pitch of a Playback Zone can be altered in two ways:

- By changing the **Tun** value in the Region pane of the Zone Editor.
- By playing it back on different MIDI notes in its keyrange.

INITIAL PITCH

To change the note number that will play the sample back at initial pitch, you adjust the **Tun** numerical in the Region pane of the Zone Editor. When you record a sample, LiSa will default to playing it back at its initial pitch at note 60(c3) (We call this the initial pitch of a note, regardless of what its pitch is in the real world, or even if it has no pitch at all). Thus, in a Playback Zone that begins at note 72(c4), the lowest it will be able to play a sample will be one octave above the sample's initial pitch.

This numerical has a range of -60 to 60, measured in half-steps, which allows you to adjust the initial pitch of the Zone over a 10-octave range, centered on note 60 (c3). This is a dual numerical: by pressing the shift key, you can fine-tune the initial by plus or minus 99 cents (1/100 of a half-step). If the tuning in cents is anything other than zero, the coarse-tuning value will appear in **bold**.

When tuning a sample from this numerical, you will only hear the new pitch when you trigger the sample again. (This is not true, by the way, when you alter **Tun** via MIDI).

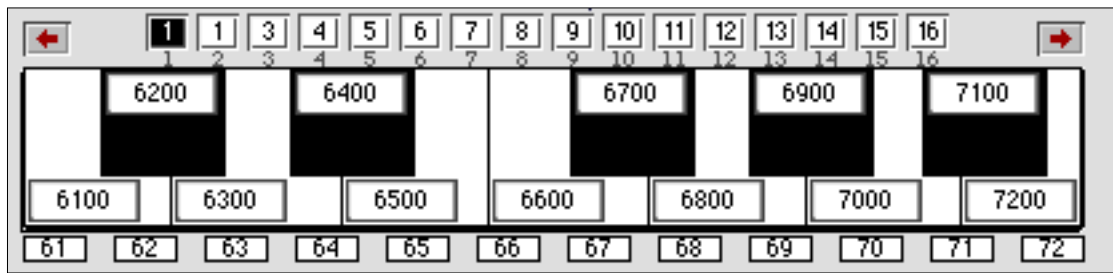
Remember, **Tun** sets the initial pitch of the Zone, not the sample itself. It is possible to have any number of Zones with the same region (i.e., playing back the same sample), each with a different **Tun** setting).

KEYBOARD TRANSPOSING

The playback pitch of the Zone will be relative to the initial pitch you have set in Tun. A Zone with a **Tun** value of -12 will play back a sample on key 60(c3) at a pitch one octave lower than its original pitch -- the effective playback pitch will be 48(c2). With a combination of **Tun** and your keyrange, you can play back the sample in any transposition or possible sets of transpositions you desire.

SCALE RETUNING

Default tuning for the virtual keyboard is 12-tone equal tempered. It is possible that you may want to use a different scale. You may want to implement just or microtonal tunings, or have the keyboard tuned in some completely nonscalar way. This can be easily implemented in LiSa. Look at the Assignment window and press the Caps Lock key. The virtual keyboard will change into this:



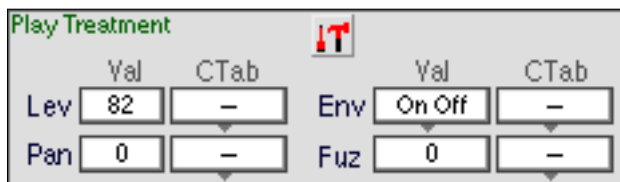
The keyboard will not switch back into normal mode (keyrange setting mode) if the cursor is in one of the tuning numericals.

This is a representation of one octave of the virtual keyboard (notes 61-72, d3-c4). The note numbers are shown on the lowest row. As with the normal keyboard, you can view above or below this octave by clicking on the arrow buttons to the right and left. Above the note numbers are a set of numericals representing the pitch value of each note, expressed in cents. Each of these numericals has a range of 0-12000, thus making it possible for each MIDI note to play at any pitch within LiSa's entire range. The virtual keyboard for each Voice Layer can be tuned separately. These pitch tables are stored at the Preset level, meaning that each Preset can hold 16 pitch tables, one for each Voice Layer.

PRESET TUNINGS

There are a few keyboard shortcuts for the most common tunings. Hitting these keys at any time will tune the virtual keyboard for the currently selected MIDI channel. These are not Cmd-key combinations. A dialog will appear asking for confirmation that you in fact want to retune the keyboard. The available shortcuts are:

- N = normal; 12-tone equal tempered.
- K = quarter-tone equal tempered scale; two MIDI notes to the half-step.
- U = unison; all notes play back at note 60(c3).



The Play Treatment Pane

The variables appearing in this pane control the basics of playback. All of these parameters are MIDI-controllable.

Lev (level). This numerical controls the overall level of the Zone's output. This parameter is always linked to the velocity of the played note, so that a velocity of 127 will output the value shown in this numerical. (For more on this, see Velocity Mapping, p. 100.) Maximum is 100 (100% of the original level of the sample), and minimum is 0. Default is 100.

Pan (panning). This controls the location of the sounds in a stereo field. The range is from -100 (hard left) to 100 (hard right). 0 is center. The exact behavior of Pan when used with live MIDI is dependent on the type of controller used. For more information, see Channel and Voice MIDI Control, p. 91.

Env (envelope) A popup menu which selects between available amplitude envelopes. It is possible to change the envelope via MIDI control – see the Output Parameters section of the Parameter menu, p. 94.

In addition, in the lower-right corner of this pane are the special parameters, unique to each mode, and will be described below with the playback modes.

Defining the Zone's



Function

The Zone you have just created should be visible in the Zone Editor window. The Zone's function is defined from Function icon, the leftmost one in the Editor window. (For more, see Zone Functions, p. 25.) The default function for new Zones is Playback, so you are ready to start setting its modes. Different modes will also change the parameters available in the Play Treatment pane, so we'll be jumping back and forth a bit between the two. The bottom right numerical in the Play Treatment pane is the one which changes the most depending on the playback mode; this is called the special

parameter numerical, and all references to special parameters below refer to this numerical.

Defining the Zone's Modes

The Playback Mode menu, the leftmost of the Function buttons, determines the basic ways the Zone reads the information in its sample region. It covers things like the direction (or directions) the Sample Buffer is read, and also includes some secondary processing (effects) options. Generally, listening to them will make their function more clear to you than the descriptions below, so we encourage you to experiment with the program as you read.



Forward (default). This simply plays the sample region from beginning to end, with no secondary processing.

Backward. As above, but playing from the end of the region towards the beginning.

Back and Forth. In this mode, the Zone's region is read first forwards and then backwards upon reaching the end. A Zone in this mode and in Once or Trigger mode (see below) will play the region once forwards and once backwards before coming to a stop.

The Fuz Parameter. In the Play Treatment pane, these three modes all have the special parameter **Fuz**, which is a distortion algorithm. When set to 0, there is no distortion. As the value of this parameter increases, so does the distortion. The louder the initial sample, the faster distortion will occur. This, like all distortions in the Sample Buffer, is an analog-type distortion, and will not create nasty digital clipping.

Spiral Algorithm. The exact operation of this algorithm is a trade secret -- you just have to listen to it and see what it sounds like. Its special parameter is called Spiralness, or **Spl** in the Play Treatment pane. It's a non-linear parameter -- you just have to try it out! Range: 1-256, default 64.

Pattern Mode Rough.

Pattern Mode Smooth. The Pattern modes are one of LiSa's most powerful playback options, and are complex enough to merit a chapter of their own. To learn more, see

When you are playing in Step mode (see below) your pan position will take up from where you left off the last time you activated the Zone. In Restart mode, it always starts from the left and heads to the right.

The Scrub mode will only work well in conjunction with the Looping mode (see the Activate Mode menu below)

Autopan. In this mode, the **Pan** control numerical is disabled, and there is no special parameter. Zones in this mode play a sample forwards, and automatically pan it from left to right, starting left and going to the right once every time it reads through the region, and then back again from right to left. This means that the pan rate is dependent on the pitch and length of the region: the higher the pitch and the shorter the sample, the faster it will pan.

Scrub. This is LiSa's attempt at commercial success with the hiphop crowd. It uses the **Scb** parameter. With an initial value of 64, you will hear no sound. This is because the sample is not 'moving.' As you increase the values above 64, you will hear the sample looping in a forward direction, starting very low, and increasing in pitch as the control value goes up. As you go below 64, the same thing will happen, except the sample will go backwards. At a value of 72 (forwards and default) or 56 (backwards) the sample plays at its original pitch. It responds to MIDI values exactly the same way. The total pitch range covered is from as slow as possible to 4 octaves above unbent pitch. This is most useful when connected to the Pitchbend parameter of your keyboard -- it's already centered at a control value of 64.

Resonator. The Resonator uses a combination of delay and feedback to emphasize the upper harmonics of a sound. By adding the sample to itself with a slight delay, resonances are created. Playing with it is also the best way to get the hang of what happens when you change the special parameters. This mode has two special parameters, which may be toggled by holding down the shift key.

Res (resonance frequency). This controls the emphasized frequencies. Range is from 0-127, default is 64.

Dpt (resonance depth). This controls the amount of the sample that is fed back. The resonance value can be either positive or negative, but as it is mapped to MIDI, 64 is equal to 0. At 64, no resonance will occur. As you increase the resonance depth in either direction, you will increase the strength of the upper harmonics, but with different timbral results depending

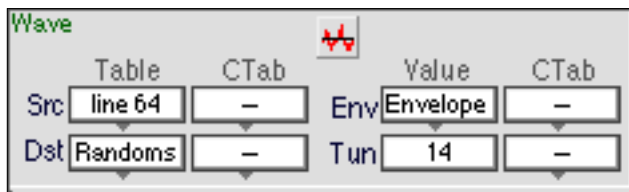
on whether your value is above or below 64. Range is 0-127, default is 64.

WAVETABLE ZONES

New in Version 2.0

Although this mode appears with the playback modes, it differs from them in that it does not read samples from the Sample Buffer. Instead, it reads from tables. (For a general discussion of tables, see Tables on p. 43). Wavetable Synthesis is a technique that uses a set of numbers stored in a table as if it were one cycle of a repeating waveform, turning the table into a lookup oscillator. By reading the tables at different rates, one changes the pitch of the oscillator. The exact timbre of the sound produced will depend on the shape of the wave inside the table. Wavetable Zones in LiSa use two tables, which can be modulated together. The only special parameter in the Play Treatment pane is **Fuz** (see above), and the Region pane changes entirely, becoming the Wave pane.

THE WAVE PANE



As you can see, all the numericals, except for **Tun**, now have different names. Since Wavetable Zones don't read from the Sample Buffer, **Stt** and **Len** are no longer needed. In the Wave pane, you choose two waveforms to use, and select an envelope that will determine their relative balance.

Src (source). Clicking on this numerical will present a popup menu of the available tables, or give you an option to make a new one. The table you select here will be the first waveform heard when you activate the Zone, or the Source wave.

Dst (destination). This works identically to the Src parameter. The table chosen here, the Destination wave, will be averaged with the Source wave, in a proportion determined by the selected **Env**.

Env In this numerical, you select an envelope which will determine the timing and ratio of the two wavetables. In a Wavetable Zone, an envelope functions somewhat differently than it does when used to control amplitude. When the Zone is first activated, you will hear 100% of the Source wave. Over a period of time determined by the attack length of the envelope, the Destination wave will be added

Since Release is triggered by the deactivation of the Zone, you will only hear the complete return of the Zone to 100% source if the release on the amplitude envelope is at least as long as the release on the envelope chosen in the **Env** menu. Conversely, if you want it to end with all or part of the destination wave still audible, make sure the amplitude release time is shorter.

to the source, until at the end of the attack, you will hear 100% of the destination wave. The Decay time will determine the period it takes to reach the Sustain level. This is not a volume level, but a ratio setting between the two waves. When Sustain is set to 0, you will hear only the Source wave. At 100, only the Destination. Values in between will give you a mixture of the two waves. Release time will determine the rate at which you return to hearing 100% of the Source wave.

USING CTABS AS WAVETABLES

When using a Playback Zone in Wavetable mode, LiSa is treating the chosen tables as lookup oscillators. This means that the tables used are treated like very small sample buffers, and the shape of the table is effectively a waveform. The shape of the table thus changes the timbre and amplitude of the Playback Zone. Some things to remember about using CTables as wavetables:

- **The full table size is always used, even if you can't see it.** If you try using a table with a domain smaller than 512, the Wavetable Zone will read the entire table anyway.
- **The flatter your table is, the less amplitude you will get.** The difference between the minimum and maximum values of your table will have more of an effect on volume than timbre. If you make 2 sawtooth waveforms, both with a minimum value of zero, and one with a maximum of 127 and the other with a maximum of 64, you will notice a relatively small difference in timbre, but a significant one in volume.

Once you have chosen one of the Playback modes described above, which determines the basic nature of how the sample will be treated as it is played, you use the menus available from the other Function Mode buttons to determine details of Zone behavior and MIDI response.

ADVANCE MODE

Sets the start point for each activation of the sample.



Restart Mode (default). Every time the Zone is activated in this mode, it begins playing at the absolute start point of the Zone's sample region. If the sample region is changed via MIDI while a Zone in this mode is active, it will automatically retrigger from the beginning of the sample.

Step Mode. In this mode, the sample will begin playing back at the place it left off the last time

it was activated. If its region is moved via MIDI, it will not retrigger.

<i>Activate Mode</i>	
♻	Looping
⚡	Once
🔑	Trigger

ACTIVATE MODE

determines the repeat pattern of the Zone (beginning at the start point determined by the Advance Mode option):

Looping (default). As long as the Zone is active, it will continue playing over and over through its region.

Once. In this mode, the sample will play as long as the Zone is active, up to the end of the region.

Trigger. A Zone in Trigger mode will play the entire region, regardless of how long it is activated. Note that this is pointless to use in conjunction with Step mode, as you will always find your 'step' ending at the end of the sample region.

<i>Voice Allocation</i>	
L	Free Allocation
H	Never Replace
8	8 Voice Max.
16	16 Voice Max.
32	32 Voice Max.

VOICE ALLOCATION

Determines the priority of the voices assigned to the Zone. For more details see Appendix 2: Voice Allocation on p. 107.

Free Allocation (default). When LiSa runs out of voices, i.e., when there are more MIDI commands for activating Zones than the computer's processor can handle, Low priority Zones will drop their longest-playing voice in order to free up a voice for the new note on. LiSa looks for the longest-playing voice in all active low-priority zones to turn off.

Never Replace. High priority Zones never give up their voices for anything, including other high-priority Zones and Record Zones. Beware of overusing this setting, especially in conjunction with any kind of sustain. Once a high Priority Zone has received a note on, it will never give it up, even if that means that no new notes can be produced or recorded.

8/16/32 Voice Max. These three settings limit the number of voices for that Zone. New Note On messages will drop the oldest voice for that Zone.

ZONE PARAMETER CONTROL

Enables or disables the connection between the Zone and the MIDI parameter controls as set in the Assignment window. This is useful when editing Zones, to avoid sending



unnecessary MIDI to a Zone, and when selecting Zones that you do not want to be effected by MIDI in performance.

Enabled (default). MIDI input can effect Zone parameters.

Disabled. MIDI cannot effect Zone parameters. The Zone can still be activated through the keyboard, and velocity will still effect volume, but no controllers or modulators will effect the Zone.

MODULATOR RUNNING MODE



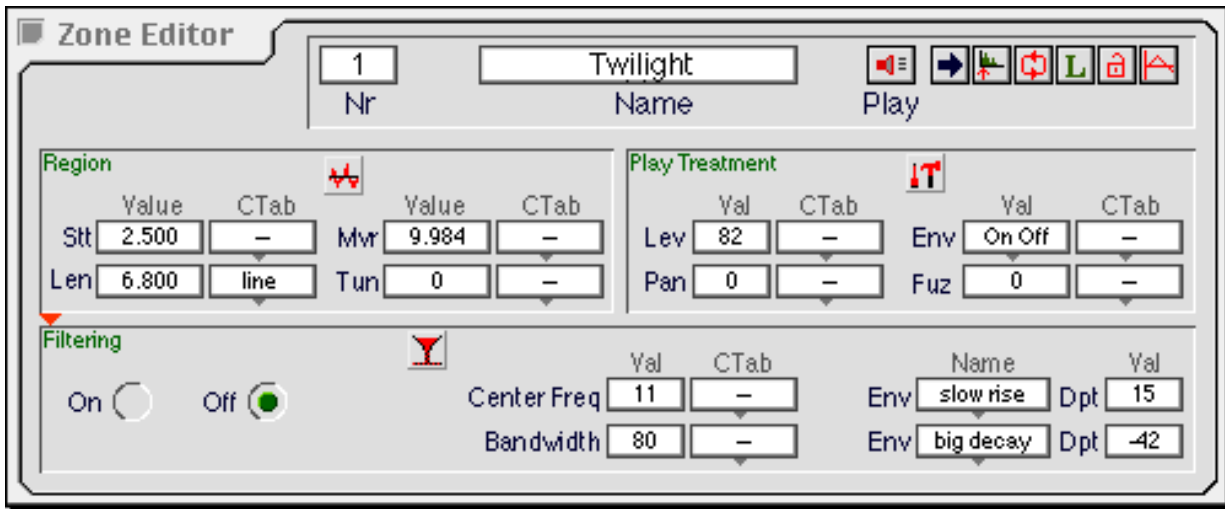
Determines the start point for LiSa's internal modulation functions (see Parameter Control p. 86 for more on modulators). In Restart mode, the waveshape or table that determines the shape of the modulation will start from the beginning each time the sample is triggered. In Free Run mode, the start location in the table is unpredictable.

Amplitude Envelopes

When Listening to samples from the Sample Library, LiSa uses envelope Nr. 1 by default for amplitude, so it is wise to not put long attacks or decays on this envelope if you want to audition your sample properly.

All Playback Zones have an amplitude envelope -- a controller for the amplifier that determines how quickly each sound reaches its maximum volume, and how long it takes to die out after you stop playing the note. When a Playback Zone is created, it comes with one ready-made envelope, called 'On Off,' which immediately turns the sample to full volume when you activate the Zone, and immediately turns it off when you deactivate it.

Filters



All playback zones have an optional MIDI-controllable band-pass filter, which can be viewed by clicking the red menu triangle in the lower-left corner of the Zone Editor.

When a new playback Zone is created, the filter is off by default. To activate it, click on the **On** radio button. Filters have two parameters:

Center Freq. This parameter controls the center frequency of the filter. Scaled 0-100.

Bandwidth. Controls steepness of the filter cutoff. Scaled 0-99, higher values increase steepness, decreasing the bandwidth, and thus the resonant qualities of the filter.

These parameters can be controlled both by MIDI (parameters available, like all others, in the Assignment window) and by envelopes, which can be selected from any envelopes in the Envelope Library. The depth of the effect of the envelopes can be adjusted from the numerals labeled **Dep**. Note that unlike the amplitude envelopes for playback Zones, these envelopes may not be switched via MIDI. The effect of the envelopes and the other parameter controls are additive.

When using filters, keep in mind two things:

- 1: They are computationally expensive, and the more filtered zones you have activated, the fewer overall voices you will be able to sound simultaneously.
- 2: To get the best results from your filter, always use Best Playback quality in Presets with filtered Zones.

Pattern Mode

The Pattern modes are one of LiSa's most powerful playback options. A Zone in Pattern mode uses custom templates of playback pointer movement through the Sample Buffer, which can be controlled via MIDI.

Except for their sound quality the two types of Pattern modes function identically. Patterns function in Zones in a way analogous to envelopes: you design a set of patterns in the Pattern editor, store them in a Pattern Library, and call them up via the special parameter numerical or MIDI.

A pattern is comprised of one to ten elements, each comprised of a set of instructions to the play pointer, the thing in the computer that points to the exact location in the Sample Buffer one is hearing at any given moment. When a Pattern Zone is active, it will execute the elements one by one, in an order determined by the **Jump to:** parameter.

Pattern Editor Nr

	Offset	Length						Jump to:
1	0.000	0.364	3	-2	100	95	->	Elem. 2
2	2.496	1.128	0	0	100	-91	<-	Elem. 4
3	-0.510	0.168	0	4	100	38	->	Elem. 2
4	0.251	0.010	31	3	100	11	<-	Elem. 5
5	1.458	0.990	5	-40	100	0	->	Elem. 1
6	0.000	0.000	0	0	0	0	->	-
7	0.000	0.000	0	0	0	0	->	-
8	0.000	0.000	0	0	0	0	->	-
9	0.000	0.000	0	0	0	0	->	-
10	0.000	0.000	0	0	0	0	->	-

Midi Controllable Parameters

	Param	Elem.	Min	Max	Param	Elem.	Min	Max	
1	Offset	1	0.107	1.355	—	0	0	0	2
3	Repeats	5	33	5	—	0	0	0	4

The Pattern Editor

To create a new pattern, select **Pattern Library** from the **Windows** menu, (or type Cmd-3) and click on **New**. The Pattern Editor window can be opened by selecting the **Pattern Window** item in the **Windows** menu or by double-clicking on a Pattern in the Pattern Library. Creating a new Pattern will also automatically open the Editor. In this window you can specify the precise movements of the play pointer through the Pattern's Region. Before discussing the Pattern mode parameters in detail, a few general points:

- When in 'show length in samples' mode, the Pattern editor counts in absolute number of samples. Remember that when you have selected Show Size in Samples, you normally see time represented in the Coarse aspect of a numerical in kilobytes (kB), or groups of 1024 samples in the Zone Editor. The pattern editor, on the other hand, shows you the absolute number of samples -- there is no coarse setting. 400 means 400 samples (circa .009 of a second) not 400 kB of samples (9.287 seconds). Thus when viewing your Zone Editor in Show Size in Samples, it will not directly relate to what you see in the pattern editor.
- Any movement of the play pointer you specify will always be limited to the size of the Zone's sample region. This will become clearer as you read on, but for now understand that any movement you specify that would push the play pointer out of the Zone's region will be wrapped around to the beginning of the sample region. A pattern will never go outside of its Sample Region, however you describe its movements.
- A pattern retriggers when moved based on its Advance mode. Like playback regions, when a Pattern Zone's sample region is moved via MIDI, it will start again from the beginning of the pattern if it is in Restart mode. In Step mode, it will simply continue the pattern from whatever point it left off at the last time it was activated.

Pattern Parameters

It is possible to change parameters in the Pattern Editor while listening to your sample. You cannot, however, make a pattern shorter while a voice is activated.

The offset starts from the beginning of the Zone if it is in Restart mode. In Step mode, it will naturally continue from where it left off last.

Offset. This parameter determines how many samples the pointer skips over at the beginning of each pass of the element. Every time the element plays, it takes the offset and adds it to

the current pointer location before starting to play.

Offset values can also be negative. When **Offset** is negative, that means that the play pointer goes backwards in the sample every pass -- the **Offset** value is subtracted from the last location of the pointer, effectively moving the pointer to the left in the Sample Buffer window. In this case, the pattern will be wrapped to the end of the Zone, by the way -- if the first Element of a Pattern has a negative offset, the first thing you hear is the end of the sample.

Offset's range (in either direction) can be as large as the entire Sample Buffer, although as mentioned above, it will always wrap around within the size of the Sample Region. Default is 0.

A good rule of thumb to keep in mind when designing patterns is the thousand-sample rule. As long as your **Offset** and **Samples** parameters are under 1000 or so, (about .02 seconds) the transformations you put into your pattern will be perceived basically as pitch and timbral changes. Above this threshold you start to hear more rhythmic chunks of sound. The exact behavior will depend on the sample and the relationship between these two parameters.

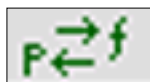
Length. This determines the actual number of samples that the pointer plays when executing the element. Whatever your other processes within the element are, this is what you will actually hear. Default is 0.1 seconds.

Repeats. This determines the number of times the area defined by **Length** will be repeated in each pass. Minimum is 0 (default), meaning it plays through only once, maximum is 9999.



Pitch Shift. This numerical alters the frequency of the samples being played, above and beyond any other pitch alterations that may be taking place. It is a frequency-based parameter, not pitch, and is thus logarithmic rather than linear. When this parameter is set to zero, it is heard at the pitch as established by the keyboard and the **Tun** numerical. When set to it's maximum value (100) it is played back at just under twice the frequency of its original pitch, which is to say (just shy of) one octave higher. On the other hand, when you go below zero, the pitch drops much faster. At -50, you are playing it back at half the frequency, or one octave lower, and at -75, an octave below that. At it's lowest setting, -99, you're playing very low, about 6 octaves below your original pitch. Default is 0.





Amplitude. This sets the amplitude of the element, relative to the overall amplitude of the Zone as set in **Lev**. Maximum is 100 (unity with Lev); minimum is 0 (no sound). Default is 100.



Panning. Controls location of the sound in the stereo field. -100 is hard left, 100 hard right. 0 (center) is the default.



Play Direction. Clicking on this numerical toggles between a forward (-->) and backward (<--) direction of play. Play direction has no effect on the Offset parameter. Default is forward.

Jump To:. The Jump To: box functions as a gateway from one element to the next. Clicking on it reveals a popup menu with the following options:

- **New Element.** Adds a new element to the bottom of the list.
- **Delete Element.** Deletes current element from the list. You cannot delete element number 1.
- **Element <number>.** Selecting one of these assigns the next element the pattern will jump to. Any active element may be chosen, including itself.

Due to the nature of pattern Zones, all parameter control is treated as Channel Controllers. For an explanation of the distinction between voice and channel controls, see Channel and Voice MIDI Control, p. 80.

Controlling Patterns with MIDI

LINKING CONTROLLERS TO PATTERNS

To assign a pattern element to MIDI, select any of the four Pattern Control options in the Parameter menu in the MIDI pane of the Assignment window, and connect it to a controller. This procedure is explained in full in Assigning Controllers to Parameters on p. 88.

LINKING CONTROLLERS TO PATTERN ELEMENTS

Midi Controllable Parameters									
	Parm	Elem.	Min	Max		Parm	Elem.	Min	Max
1	Offset	1	0.107	1.355		—	0	0	0
3	Repeats	5	33	5		—	0	0	0

The exact function of MIDI control patterns is set at the bottom of the Parameter Editor, in the MIDI Controllable Parameters pane. Each of the red numbers at the side indicates one of the Pattern Parameter Controls available in the parameter menu. Thus, if you link Pattern Parameter Control 2 to Aftertouch, you would set exactly what effect aftertouch has in the top-right set of numerals. There are four columns for settings:

Parm. Clicking on this numerical will reveal a popup menu with the seven pattern parameters on it. Select the one you want to use.

Elem. This numerical selects which of the pattern elements will be effected. You cannot change one parameter for all elements in a pattern, only one element per controller.

Min and **Max.** For most parameters, the **Min** and **Max** have the same meaning they would in the numerals for setting the given parameter. The MIDI control range of 0-127 is interpolated between the Min and Max values. (The exception to this is the Play Direction parameter, which can only be set to 0 or 1. Zero (which is the result of any MIDI control value less than 64) makes the element play backwards, and one (for any MIDI value 64 or over) plays forwards. **Min** may be a larger value than **Max**.

Smooth Versus Rough Patterns

There are two different types of Pattern Mode: Smooth and Rough. All of the functions described above work identically

in both. The difference is that the Smooth Pattern mode has special algorithms built in to eliminate clicks and pops often heard while jumping around in a sample, and the Rough does not. Depending on the particular Pattern and sample you are using, one may sound better than another, or they could sound more or less the same. Rough mode often gives an extra kick to the upper harmonics that gives the sample a bit more presence. Another difference between the two is that the Rough mode is one of the fastest playback algorithms in LiSa, whereas Smooth, because of the time it spends doing corrections, is one of the slowest, and puts more stress on your voice allocation. So if you have a slower machine, and you're concerned about your number of available voices, use Rough mode when you can.

Pattern Modes are one of LiSa's most unique abilities, and the kinds of results you can achieve are almost infinite. These modes in particular will profit from a great deal of experimenting and playing with – endless surprising results are possible.

Recording a Sample

Although there is a great deal one can do with LiSa only playing back sampled sounds from disk, it was primarily designed for live situations in which one can sample another instrument live, process the sample, and play it back. This chapter covers techniques for recording samples into the Sample Buffer in real time, which are done with Record Zones. Many of the modes used in the Record function are identical to those in Playback. There are some small variations, however, and at the risk of being repetitive, they will all be described in full.

A Few Things About Recording Samples in LiSa

CLIPPING AND OVERDRIVE

Digital clipping is particularly ugly, and there are possibilities within LiSa to create certain distortion and overdrive effects, as we shall see. We advise that you record your samples as cleanly as you can, and create any distortion you want within LiSa, using the **Fuz** playback parameter described in the previous chapter.

MONO AND STEREO

LiSa accepts mono signals for sampling. You can use either input on your Macintosh for LiSa, or both, but if you send signals to both channels it will be converted to mono.

LiSa can now record independently from its left and right inputs. Although the Sample Buffer remains mono, it is now possible to record samples in stereo, or from 2 independent sources. To see how to select the left or right input, see The Record Treatment Pane on p. 75. For recording and playback of stereo samples, see Appendix 3: Stereo Recording, on p. 109.

RECORDING FROM CD

It is possible also to record from your computer's built-in CD-ROM player. By selecting CD as the audio input in the Sound (or Monitors and Sound) control panel, LiSa will record directly from the CD player.

**New in Version 2.0:
Independent left and
right channel recording**

Creating a Record Zone

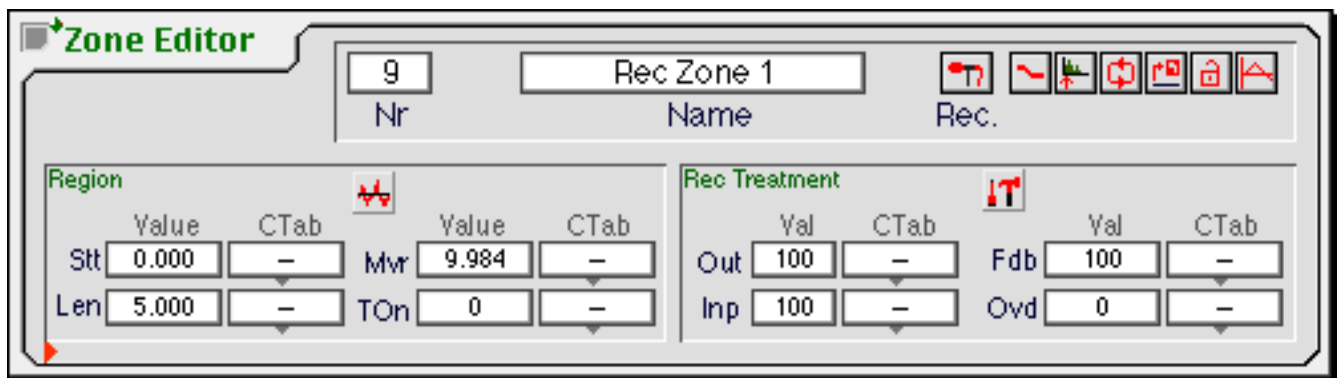
There is no particular reason to assign a Record Zone to more than one key

-- The key number you record from will have no effect on playback pitch.

We assume that at this point you are clear on the basic procedures for creating a Zone and assigning its keyboard range. If you aren't, see Creating a Zone on p. 20.

Defining the Zone's Function

The Zone you have just created should be visible in the Zone Editor window. The default function for new Zones is Playback, so the first step is to make it a Record Zone. Go to the Zone Function button (the leftmost icon in the top pane) in the Zone Editor, click on it and select **Record Zone** from the pop-up menu. The Zone Editor looks slightly different from a Playback Zone, but most of the settings are similar.



Defining the sample region

THE REGION PANE

Record Zones will self-limit. That is to say that they will not go past the end of the Sample Buffer -- recording into some random spot in your computer's memory would crash your machine. (This does not apply to all Zone functions).

The numerals in this section of the Zone Editor define the sample region of the Zone, and set an activation threshold for recording. The first three function exactly as they do in Playback Zones.

Stt (absolute start time). Sets the absolute start time of the Zone's region.

Len (length). Sets the length of the Zone's sample region.

Mvr (movement range). Sets the area within the Sample Buffer that the Zone can move in when controlled by MIDI.

TOn/TOf (threshold on/off) This is a dual numerical.

TOn is normally visible – to view and edit **TOf**, press the Shift key. These parameters (range 0-127) set the relative input level at which the recording process will be initiated and ended. At 0, it will record all input, at 64 it will record only signals that are more than half of the maximum input, and at 127 it will record hardly anything. If it is set to any non-zero value, the Record Zone will only record if it is both activated from MIDI and is receiving a signal above the threshold. When the input drops below the level set in **TOf**, it will pause the recording process.

There are two things to keep in mind about using a threshold. Firstly, attack and decay times are very short. One sample with an amplitude above **TOn** will initiate recording, and 20 milliseconds or so of sound below the level of **TOf** will deactivate it, depending on your machine. Secondly, the threshold value takes priority over all mode settings. As long as the signal is below **TOn**, the record pointer does not move. This applies to all modes, including Trigger mode. In order to record a whole Zone in Trigger mode, it is necessary to set **TOf** to 0. In a Zone in Loop mode, for example, you might hear the sample playing, but you will not record exactly onto what you hear -- you will record beginning at where it last stopped. You can check the activity of the record pointer in the Status window by selecting the **Show Current Sample Pointer** option in the **Options** menu. The current location of the sample pointer will be displayed in the System Messages pane of the Status Window.



Defining Record Modes

THE RECORD MODE ICONS

Clicking on each of the 5 mode buttons will reveal pop-up menus showing the possible record options:



THE RECORDING MODE POP-UP MENU

This covers what happens to the old sound (if any) in the sample region at the moment of recording.

Replace. (default). When the Zone is in this mode, whatever sound was in the Sample Buffer prior to the recording will be overwritten.

Overdub. In this mode, the newly recorded sound is added to whatever sounds were present in that location in the buffer. The original sound will remain. Please note that this is purely additive and there is no limiting, so repeated overdubs will eventually lead to distortion. This is not necessarily a bad thing, but something to be kept in mind. The amount of the original material you will hear depends on the Feedback setting in the Record Treatment pane.

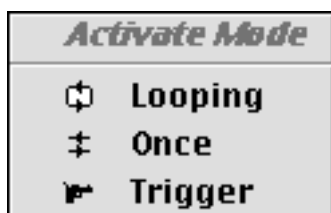


THE ADVANCE MODE POP-UP MENU

Sets the record start point for each activation of the Zone. These work on the same principle as the Advance Mode items in Playback Zones.

Restart Mode (default). Every time the Record Zone is activated in this mode, it begins recording at the absolute start point of the Zone.

Step Mode. In this mode, the sample will begin recording at the place it left off the last time it was activated. For example, if a Record Zone has a sample region 5 seconds long, and you record in 3 seconds of sound, the next time you activate the Zone, it will begin at 3 seconds plus 1 sample, leaving your first 3 seconds of samples untouched. Depending on the Activate Mode (see The Record Treatment Pane, p. 75), it will either continue cycling through its portion of the buffer, or step through until the end of the sample region.



THE ACTIVATE MODE POP-UP MENU

Determines how the record pointer will move through the Sample Buffer when it is activated (beginning at the start point determined by the Advance mode option).

Looping (default). As long as the Zone is active, it will continue recording over and over through its allotted area in the Sample Buffer.

Regardless of the Recording Mode, a Zone in loop mode will overdub material from that particular activation, in an amount determined by the **Fdb** parameter (see above).

Once. In this mode, the sample will record as long as the Zone is active, up to the maximum length of the Zone.

Trigger. A Zone in Trigger mode will record the entire sample region, regardless of how long it is activated. Thus, a short keystroke can initiate the recording of a very long sample.

THE AUTO SAVE SESSION POP-UP MENU



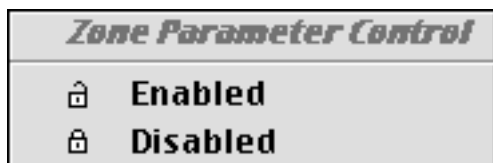
Handles direct saving of samples to disk. This is discussed in more detail in Load Session Zones, p. 82.

Disabled (default). The Zone will not auto-save.

Enabled. For samples to be auto-saved, this must be enabled and the **Auto Save Recording Sessions** item in the **Options** menu must be enabled (checked). If only one or the other is on, no auto-saving will occur. (This is in order to make it easy to disable all auto-recording zones when editing your Setup.) When both of these are enabled, it means that every time a new recording is made into the Zone, it will be saved immediately to disk. Make sure you know when you are using this, or you can fill up your disk awfully fast! Recorded samples are immediately available for reloading into LiSa using Load Session Zones. (p. 82.) When you quit LiSa, it will create a folder in the same folder that contains your Setup file. This folder will be named with the format '<date> Sessions <time>'. Saved soundfiles are in Sound Designer II mono format, 44.1 kHz. For more on this, see Managing Sessions on p. 83.

Recording while editing: If you activate a Record Sample Zone by option-clicking on the virtual keyboard, instead of via MIDI, it will not save the recording as a session. Once the recording is finished, LiSa will prompt you to name and save the soundfile as one would any other file.

THE ZONE PARAMETER CONTROL POP-UP MENU



Enables or disables the connection between the Zone and the parameter controls as set in the Assignment window.

Enabled (default). MIDI input can effect Zone parameters.

Disabled. MIDI cannot effect Zone parameters.

The Record Treatment Pane



The variables in this pane control input, output and feedback levels for the sample as it is being recorded. All of these are also controllable via MIDI from the Assignment window.

When you record a sample in Looping and Overdub mode, you will hear the old material every time through before it is recorded over. If you do not want to hear it, set **Out** to 0.

Out/Pan (output level/panning) This is a dual numerical. Out controls the overall level of the Zone. Range is 0-100, with 0 meaning no output, and 100 meaning full sample volume level. This value does not effect the sample itself, only it's output level. Default is 100%. Pressing the Shift key will change it to the Pan parameter. Range is -100 to 100, from 100% left to 100% right.



Inp (input level/channel). This dual numerical sets both the attenuation of the signal input as it is recorded, and the channel which the Zone will record from. Note that this value does not effect the level of the incoming signal to the Macintosh's analog-digital converters -- it cannot be used to control clipping, you need to do that at your sound source. This parameter, being MIDI-controllable, is best used when attenuating input in live situations. Default is 100%. Holding down the Shift key will turn this numerical into a channel select, with the options of Left, Right, or Both.

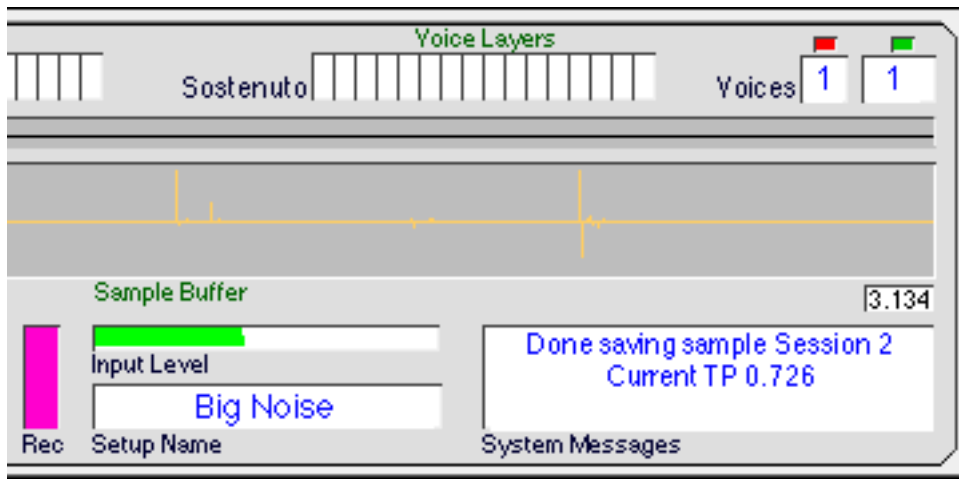
Fdb (feedback). If the Zone is in Loop mode, this parameter will effect how much of the previous sample you hear. If this value is anything higher than 0, some amount of the previous signal will be mixed in with the new signal as the buffer is re-recorded, with the amount depending on this setting. Range is 0-100% of the original signal. Default is 100%

Ovd (overdrive). Overdrive is an extension of the feedback control -- rather than attenuating the previous signal, it amplifies it. After repeated looping, you can get some rather interesting distortion effects with Overdrive. You can think

of it as Feedback values of more than 100%. In order for **Ovd** to take effect, **Fdb** must be set to 100. Default is 0.

Recording

Once you have defined your Zone, you're ready to record something into it. Information about the recording process may be found in the Status window.



The **Input Level** monitor shows the input level to LiSa through your computer's analog-digital converters. This should not go into the red -- that means annoying digital clipping is occurring, and you will have to readjust your levels either from your mixer or in the System Settings dialog box (p. 17). The Input level display monitors in stereo. The top half of the bar monitors the left channel, the bottom half the right.

The **Rec** monitor turns magenta if a Record Zone is currently active. Remember that this does not necessarily indicate if recording is actually taking place. When **TOn** is above 0, it will only record when the level of your input exceeds the threshold values. Selecting the Show Current Sample Pointer option will allow you to see if recording is actually taking place.

The Sample Buffer pane will show a graphic representation of the samples currently in RAM. When you record, you should see your sample appear in the buffer after recording is completed, or if you are in Looping mode, after each loop.

The **Voices** monitor indicates how many voices are currently active. The number below the red button indicates the number of voices recording, below the green button, the number of voices playing back.

You will never hear your recorded sound directly as you record it, unless you have the **Sound Thru** option selected to a non-zero number in the **System Settings** Dialog. In Overdub mode you will hear the original sample, and if you are looping and overdubbing, you will hear the last recorded version. In Once or Trigger mode, you will hear nothing as you record. Note that if you do have a non-zero Sound Thru setting, you will hear all input into LiSa, if it is being recorded or not.

Activating your Record Zone

To initiate recording, simply press the key on your keyboard that is assigned to your recording Zone's keyrange. Assuming you are not using a threshold, recording will commence immediately, in whatever fashion you have set in the Zone Editor. Once you have recorded, you can play the sounds using Playback Zones.

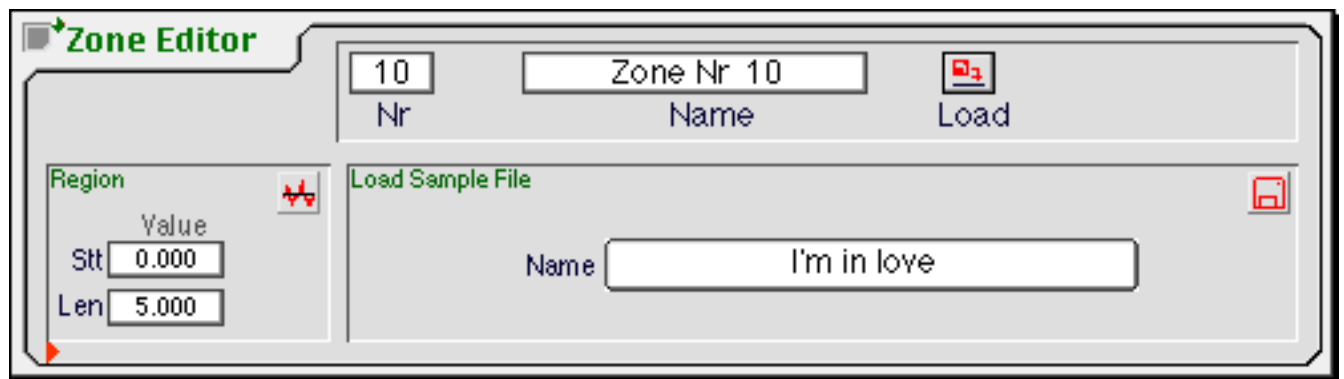
File management

Zones

There are three special kinds of Zones devoted to dealing with soundfiles: Static and Dynamic Load Sample Zones, and Load Session Zones. A Load Sample Zone is designed for loading samples that have been previously recorded. Load Session Zones are for loading samples which have been recorded live.

Load Sample Zones

There are two varieties of Load Sample zones, Static and Dynamic. They both serve the same basic function of loading soundfiles from disk into the Sample Buffer, but with different modes of operation. Like all Zones, Load Sample Zones are spawned by creating a new Zone in the Zone Library and selecting Static Sample Load from the Function Icon menu in the Zone Editor. Once you've done this, you'll notice that it looks rather different from the Zone Editor windows we've seen so far.



STATIC ZONES



Firstly, you will notice that no Mode Icons remain, and there are no CTags next to the **Stt** and **Len** numericals. This is because that except for keyboard activation, Static Load Sample Zones are not MIDI-controllable. The Load Sample File pane on the bottom right is where you select the sample to be loaded.

SELECTING A SAMPLE TO LOAD

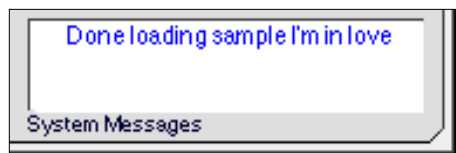
To select a sample to load, drag the name of the desired soundfile from the Sample Library window into the **Name** box in the Load Sample File pane. The name of the selected file will appear in the **Name** box in the Zone Editor Window.

LOADING A SAMPLE

When you activate a Load Sample Zone, it will load the soundfile from disk into the sample region specified by the **Stt** and **Len** numericals in the Region pane. Some things to keep in mind about loading samples from a Static Zone:

- **Sample Loads are Destructive.** That is, whatever material is in the Sample Buffer already in the region of the load Zone will be overwritten. It is not possible to mix a statically loaded sample with sound previously existing in the buffer.
- **Region Size.** The amount of time you assign to your sample region in the buffer need not be the same size as the sample. If the region is larger than the sample to be loaded, it will load the entire sample, and leave any other material inside that region untouched. If the region is smaller, it will load as much as will fit in the region, starting from the beginning of the soundfile.

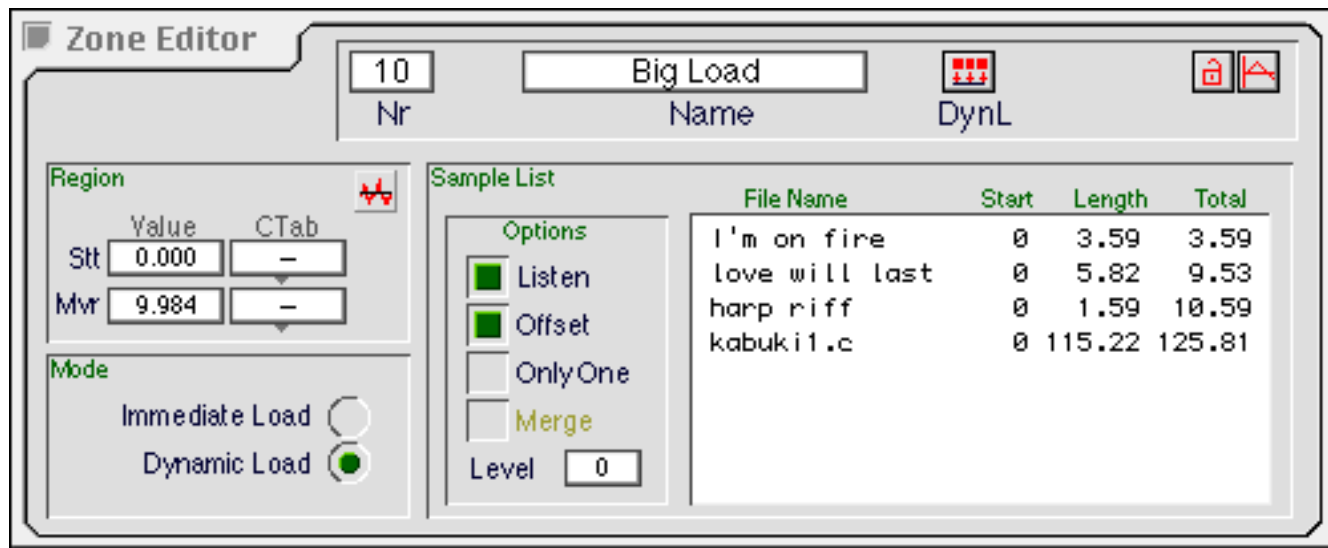
When you attempt to load a sample you will get a notification (in the System Messages pane in your Status window) indicating if the sample was successfully loaded.





DYNAMIC ZONES

Dynamic Load Sample Zones work on a similar principle, but have more options available.



New in Version 2.0:
Load multiple Samples
from a single Zone.

MOVEMENT

Dynamic Load Zones can be moved via MIDI, like a Playback or Record Zone, with a corresponding CTab. The **Mvr** parameter will set the movement range. Length may not be altered, or even set – the size of the Zone automatically adjusts to that of the sample being loaded.

MULTIPLE SAMPLES

Like a Static Load Sample Zone, samples are added by dragging them from the Sample Library. Up to eight samples may be dragged into the Zone. Moving them up and down in the window will change their load order. To see why you might want to do this, see below. Each Mode has one or more available options, which may be selected in the Options pane.

LOADING MODES

IMMEDIATE LOAD.

When the immediate load radio button is selected, all samples in the Sample List pane are loaded in top-to-bottom order. An activation of any length will load the entire sample collection. (Like the Static Zones, you can think of this as being in Trigger mode.) When in this mode, there is one option:



Merge. When this is selected, the samples to be loaded will be mixed with the samples already present at that location in the buffer, like a record Zone in Overdub mode. The **Level** numerical controls the amount of the new sample to be added to the old. Continued adding of samples on top of each other will create the same kind of distortion made by the **Fuz** playback parameter, not digital clipping.

DYNAMIC LOAD.

In Dynamic Load mode, the sample is loaded only as long as the Zone is active. If you have two 10-second samples, and hold the key controlling the Zone down for 5 seconds, only the first 5 seconds of the first sample in the collection will be loaded. The options for this Mode are rather complicated, and build on one another:

Listen. In Dynamic mode, you will probably always want to have this button checked. This plays the sample as it being loaded into the buffer.

Offset. When **Offset** is selected, the velocity of the note on event that activated the Zone is used as an index to select which sample is to be loaded first. The full range of the velocity is divided among the number of samples in the collection. In the example above, a gentle press on the keyboard will load the collection starting with the sample 'I'm on fire', a light medium one 'love will last', a more determined one "harp riff" and a hard strike 'kabuki1.c'. The samples will always be loaded from the beginning of the soundfile, and will stop loading when the Zone receives a note off. Once one sample is finished, it will start loading the next.

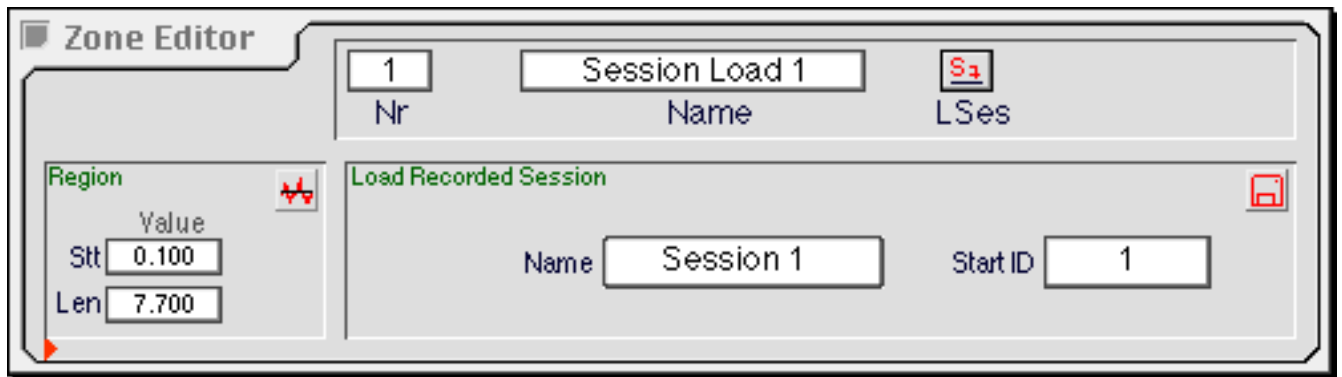
Only One. Only available when **Offset** is selected. When Only One is selected, the Zone will only load one of the samples in the collection. In the above case, with Only One selected, a low-velocity note on would load 'I'm in love' alone, no matter how long the key was held down.



Due to the nature of mouse clicks and keypresses, and the way the Macintosh prioritizes tasks, Dynamic Load Sample Zones will not properly load samples when activated from the computer.

An external MIDI source must be used.

Load Session Zones



There is another way to record and play back live samples, using Sessions. When using a Record Zone and then playing it back you are only dumping sound into the buffer. Using Load Session Zones, you can save any number of samples when recording live, and then load them at a later time during your performance. To use Sessions in a live performance:

- Enable Auto Save Recording for one or more recording zones. This will automatically save whatever your Record Zone records to disk.
- Once you have recorded some live sounds, you reload the saved recordings into the Sample Buffer with a Load Session Zone.
- Play the sessions back with a Playback Zone.

RECORDING SESSIONS

Every time you activate a Record Zone that has Auto Save Recording enabled, you create a new Session. Regardless of which Record Zone you activate on which MIDI channel, it is simply saved as the next consecutively numbered Session.

Record Zones have the option of being set to save recorded samples to disk or not, via the **Auto Save Recording** function. (For a full explanation on how to auto save Recordings, see The Auto Save Session pop-up Menu on p. 73.) You can record as many sessions as your hard disk can hold. They will be saved into the same folder as your Setup, and automatically named 'Session 1,' 'Session 2,' etc. Sessions start numbering themselves anew every time you start up LiSa.

LOADING SESSIONS

A load Session Zone, unlike a Load Sample Zone, is best used over a large keyrange. When you activate a key in this Zone's range, it will load a Session file based on the relative number of that key in the Zone's keyrange. The first key in the range will load session 1, the second will load session 2, and so on, depending on the number of sessions you have. If

The note values of the keyrange you assign to your Load Session Zone will not effect their playback pitch! This Zone only loads, it does not play.

you attempt to load a session that does not yet exist, you will get an error message in the System Message pane.

There is a numerical in the Load Recorded Session pane called **Start ID**. (The box next to the label **Name** in this pane is display-only -- it is connected to the **Start ID** numerical.) This allows you to choose the session numbers that your keyrange will load into the Sample Buffer.

For example, you might want to have multiple Load Session zones on different MIDI channels. If your Zone on channel 1 has 10 keys assigned to it, they will default to playing back Sessions 1-10. You can create a second Load Session Zone on channel 2 as well, and have it play Sessions starting with number 11 by changing the Start ID numerical to 11. The number shown in **Start ID** will always be the Session number played by the 'lowest' key in the keyrange.

The effective number of sessions that can be loaded is 1144. The highest possible Start ID number is 1024, and if you have a Load Session Zone covering all 120 MIDI notes, 1144 is your maximum. Also note that the Sample Regions of these Zones cannot be moved or resized via MIDI.

Session loads work just like Static Load Sample loads in other respects. Loading a Session will only fill the Sample Buffer up to the size of it's Sample Region, regardless of the size of the Session file it is loading, always starting from the beginning. You will not hear a Session when it loads -- you need a Playback Zone in order to be able to hear the Session.

Managing Sessions

SAVED SESSION FOLDERS

If you are planning to save sessions, it is very important to save your Setup BEFORE recording any sessions. Sessions recorded by an unsaved Setup will appear in the folder containing the LiSa application, not in a sessions folder. One will be created if you save your Setup before quitting, but it will be empty. Should you find your Sessions folder empty, check in the folder containing the application.

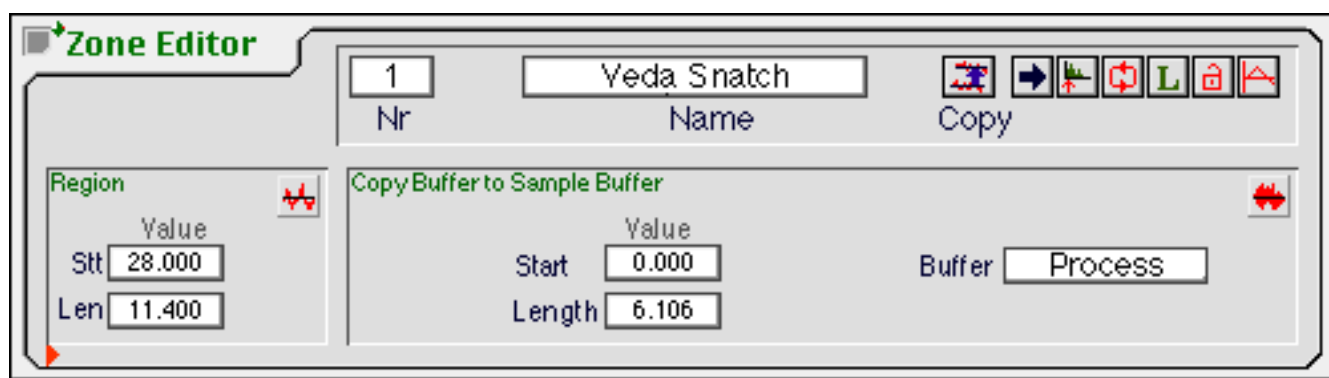
If you have recorded Sessions, they will be automatically reorganized every time you shut down LiSa. When you quit, it will create a folder in the folder that contains your Setup file. This folder will be named with the format '<date> Sessions <time>'. They are saved with the names 'Session 1', 'Session 2', etc. These can then be renamed as samples for later use, or reloaded as Sessions in another performance.

When loading Sessions, LiSa looks in the folder containing your Setup, and loads whatever it finds there with the name 'Session' followed by a number. This means that any samples can be loaded as Sessions by naming them 'Session <number>' and putting them in this folder. They could be previously recorded sessions or any old samples that you've named in this format. (This has no particular advantage over simply making a bunch of Load Sample

Zones with old session samples, but you can do it.) If you choose to use those Sessions again, as Sessions, you have to take them out of the folder they were saved into. LiSa will not look in folders *inside* the folder containing your Setup. During a performance, Sessions must be directly in the folder containing your setup. After quitting, LiSa automatically moves them as described above.

Warning: If you have moved old sessions back into your Setup's folder and record any new sessions, LiSa will write over the old ones. If you have old Sessions numbered 1-20 in that folder, and record a new Session, LiSa will not record it as session 21, but will rather write a new file entitled 'Session 1', deleting your old 'Session 1' in the process.

Copying Buffers



These Zones only copy from one buffer to another. In order to save any of this information to disk, you have to save it from the Sample Buffer with a Save Sample Zone.

Another one of LiSa's live performance abilities is the capacity to resample something that has already been played and return it to the Sample Buffer. This is done with Copy Buffer Zones. (For basic information about LiSa's buffers and how to resize them, see Size of Buffers on p. 15). Copy Buffer Zones can be set to copy either the Output Buffer or the Process Buffer. You toggle between these two choices by clicking on the **Buffer** numerical on the right-hand side of the Zone Editor. The **Region** pane contains numerals for determining the size and location of the Zone's region. As in Static Load Zones, the sample region cannot be changed via MIDI. The numerals in the **Copy Buffer to Sample Buffer** Pane set the region of the Process or Output Buffer that is copied to the Sample Buffer.

THE OUTPUT BUFFER

The Output Buffer is normally empty. To copy it to the Sample Buffer, it must first be filled. Recording is initiated by a MIDI control message. It accepts any value from a

controller to trigger recording -- the controller number you set yourself, in the **System Settings...** dialog from the **Global** menu (p. 16).



The **Output Buffer Rec Start** numerical is where you set the controller number. Any number, including zero, which you send from this controller to Lisa on the channel you have designated as the System channel (see MIDI Settings p. 16), will enable recording. Recording will not commence until some sound is produced. Once that happens, the indicator above the rightmost of the two **Voices** monitors in the Status window will turn from green to red.

This indicates that the Output Buffer is being filled. It will turn back to green once the buffer is full. There is no way to stop the recording process once it begins -- it is always in Trigger mode. Once the buffer is recorded, it can be copied into the Sample Buffer any time by activating a Copy Output Buffer Zone. This process can be repeated at any time -- the old buffer will be overwritten by the new sounds.

The Output Buffer records everything that happens while it is being recorded -- including nothing, so if there are silences in your performance, there will also be silences in your Output Buffer, and thus also in your Sample Buffer when you copy the Output Buffer to it.

THE PROCESS BUFFER

Unlike the Output Buffer, the Process Buffer continually records LiSa's output. It is a circular buffer, meaning that as new information is added, the oldest information is dropped to make room for the new. When LiSa is not producing any sound, the Process Buffer is inactive -- it does not fill up with silence.

When you copy the Process Buffer, you are copying some portion of the last few seconds of sound (depending on the size of the Process Buffer and sample region) into your Sample Buffer. This makes it possible to record something live (in a record Zone), load it (Load session Zone), play it back through some process (Playback Zone) load it again after it was processed by the last Playback Zone (Copy Process Buffer Zone), and process it again through the same or another Playback Zone.

Activating this Zone simply takes a part of the Process Buffer and copies it into the Zone's sample region, exactly like a load from disk. You can also set the Start and Length of the portion of the Process Buffer you copy, but since this is a circular buffer, you cannot predict with much accuracy exactly what sounds you will get.

Parameter Control

Setup

For the basics of connecting and configuring MIDI in LiSa, and for setting MIDI preferences, please see MIDI Setup, page 13.

Parameter Control Types

MIDI

MIDI is LiSa's primary interface to the outside world, and in a performance situation all of your manipulations of LiSa will be done via some sort of MIDI instrument. LiSa gives you maximum flexibility in assigning controllers to different parameters of the program. There are six primary functions of MIDI:

- Activating Zones. This is done using note on and note off MIDI commands, much like MIDI on a standard sampler.
- Moving and resizing the sample region of a Zone in the Sample Buffer.
- Changing Zone parameters such as panning or distortion.
- Controlling input and output levels of samples.
- Amplifying the current Zone.
- Initiating an Output Buffer recording.

MODULATORS

Zone Parameters can also now be controlled using internal table-driven modulators. Their operation is explained in full below. In all respects regarding Setup and connections to Parameters, they are treated no differently from MIDI controllers.

**New in Version 2.0:
Internal Modulators**

Architecture

Parameter Controls are connected to Zones in the Parameter Control pane of the Assignment window. This will always mean first selecting a Parameter to control, and then assigning it to a Controller, which can be created in the

**New in Version 2.0:
Control and Parameter
Libraries**

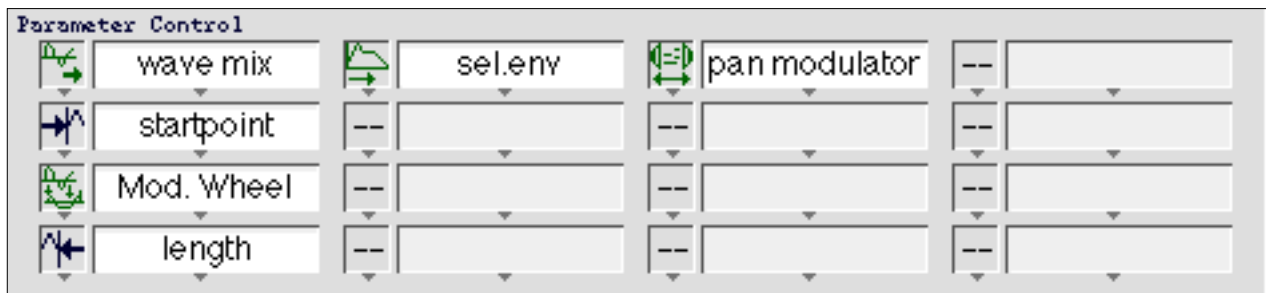
Controller editor. There is a Parameter Library, but you cannot create new Parameters in it. The number of Parameters in LiSa is fixed, and the Library is there primarily for reference and drag-and-drop convenience.

Controllers, whether they be MIDI or Internal Modulators, are stored like all other data in a Library, created in an Editor, and named with a name of your choice.

MIDI in LiSa is assigned to Voice Layers, and MIDI sent to a Voice Layer can effect all of the Zones whose keyranges are in that layer. It is possible to vary the way MIDI effects the various Zones on a channel, or not have a Zone be effected by MIDI at all. A MIDI input, typically a 7-bit value (0-127), is assigned to a variable. This could be sample region length, a degree of effects processing, or almost any of the numbers appearing in numerals in the Zone Editor. Before this number is applied to the variable it can be passed through a special table called a Control Table, or CTab. These tables can be custom-designed to map the normally linear values of a MIDI controller. (See Tables, p. 43.)

You can see the MIDI input from your instrument in the MIDI Monitor pane of the Status window.

The Parameter Control



Pane

The Control Pane in the Assignment window contains 16 pairs of popup menus, in which MIDI inputs or LiSa's internal modulators can be assigned to various Parameters. Assigning MIDI inputs to either effects Parameters or sample region Parameters involves the same process, all of which is done in the Assignment window:

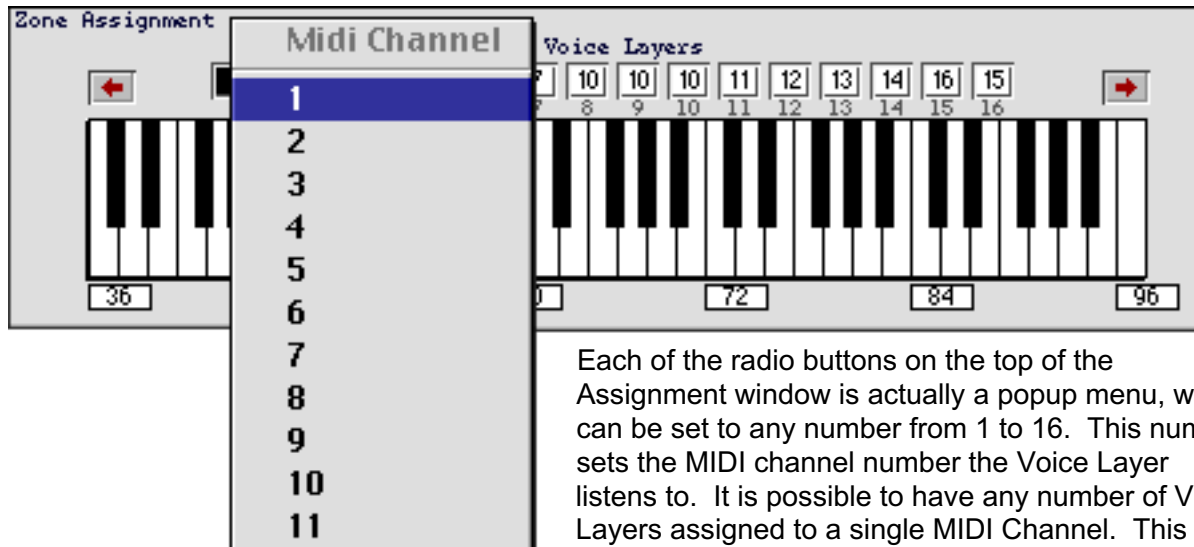
Selecting the Voice Layer in the Zone Assignment pane (see Assigning Controllers to Parameters below).

Selecting a Parameter to be controlled in the Parameter Control pane.

Assigning Controllers from the Controller Library to sample region or effects Parameters in the Parameter Control pane.

Creating and assigning CTags, if desired, to the various Parameters. This is done in the Zone Editor.

VOICE LAYERS AND MIDI CHANNELS



Each of the radio buttons on the top of the Assignment window is actually a popup menu, which can be set to any number from 1 to 16. This number sets the MIDI channel number the Voice Layer listens to. It is possible to have any number of Voice Layers assigned to a single MIDI Channel. This has two main consequences:

- You can activate more than one Zone from a single key. This is done by assigning the Zones to the same key in different Voice Layers responding to the same MIDI channel.
- Controllers can effect more than one Voice Layer. By assigning a Controller to a MIDI Channel that effects more than one Voice Layer, one Controller can effect parameters in multiple Voice Layers.

If nothing is selected in the Assignment Window, selecting Copy from the Edit menu will copy the entire Voice Layer to the clipboard, from where you can paste it into another Voice layer in the same, or another, Preset.

ASSIGNING CONTROLLERS TO PARAMETERS

The Parameter Control pane of the Assignment Window can be thought of as the patchbay where you can connect Parameters to specific Controllers (either external MIDI or the internal modulators see below). The pane is comprised of 16

pairs of popup menus. There are two ways to assign a Parameter to a Controller:

Click on the left-hand menu. This is the Parameter Select menu. A popup menu of all Parameters will appear. Select the Parameter you want to control. From the right-hand menu, the Controller Select menu, select a Controller, or create a new one.

Drag Parameters and Controllers from their respective Libraries to the appropriate menu spots in the Parameter Control pane.

A Parameter must always be selected before a Controller. A Controller Select menu will not respond to a click unless it has a Parameter assigned to it. A Parameter may only be connected to one Controller per Voice Layer. Used Parameters will be greyed out in the Parameter Select menu, and bulleted in the Parameter Library.

Parameters and Controllers

PARAMETER LIBRARY

The Parameter Library is fixed – you can use it to drag Parameters to the Assignment window, and use it as a reference to see which Parameters have been assigned to the current Voice Layer. Assigned Parameters are marked with a bullet in the Parameter Library window. A Parameter may only be assigned once in a given Voice Layer. Unlike other Libraries, the bulleted Parameters indicate which are used in each Voice Layer, not each Setup.

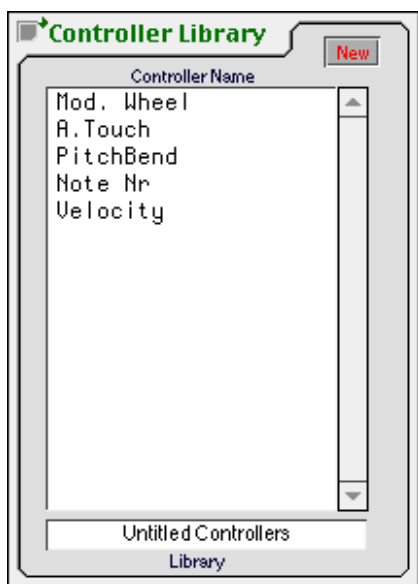
CONTROLLER LIBRARY

The Control Library will always appear at first with a limited set of the standard MIDI controls.

You can add your own custom controls, which may be either MIDI inputs or modulators, to the Controller Library. You can drag Controllers into the Assignment Window, or access them from the popup menus in the Control pane.

CREATING CONTROLLERS

Controllers may be created from either the Controller Library or the Parameter Control pane of the Assignment window. The Control Editor window will automatically open when you create a new Controller.

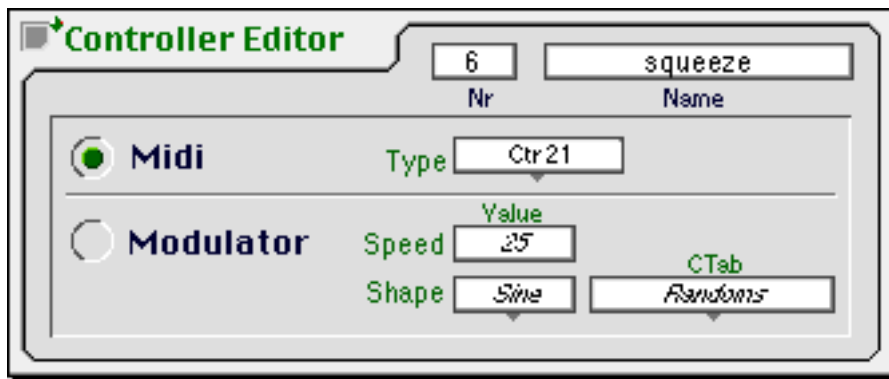


To create a new Controller from the Library: click on **New**.

To create a new Controller from the Assignment Window, select **New Controller...** from one of the Controller Select menus in the Parameter Control pane.

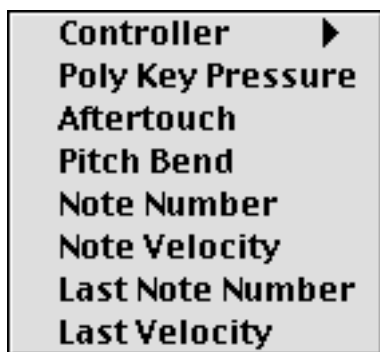
Once you have created a new Controller, the Controller Editor will automatically appear, and it will be able to be edited.

EDITING CONTROLLERS



At the top of the Controller Editor are numericals for the number and name of the Controller. Like Zone numbers, these are for internal reference only and may not be changed. Scrolling through it will bring up the Controllers in the Controller Library for editing. The second numerical is a name field, which can be edited the same way as Zone names. The two radio buttons select between external MIDI control and internal modulators. You can scroll through available Controllers in the Controller Editor using the left and right arrow keys.

MIDI CONTROLLERS



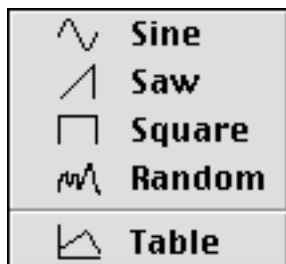
Clicking on the **Type** numerical will bring up the MIDI Controller Menu. This shows the MIDI input options available. The **Controller** item has a submenu showing all 128 MIDI controller numbers. Select the menu item, rename the Controller, and you're done. If your MIDI is plugged in, it is also possible to select your MIDI input by selecting the Type numerical and activating the controller you want to use. LiSa will automatically detect which controller you are using and show it in the numerical. This works for all MIDI except note number and velocity. (Hitting a key will enter Aftertouch or Poly Key Pressure, depending on which your keyboard is using)

CHANNEL AND VOICE MIDI CONTROL

There are two different types of MIDI input in LiSa: Those that effect the entire Voice Layer, and those that only effect the current sounding voice. Poly Key Pressure, Note Number, and Note Velocity will effect every voice separately – if Velocity, for example, is connected to **Tun**, the pitch of each voice will depend on the velocity of the key that activated it. The other Controllers, including Last Note Number, and Last Velocity, will effect all active Zones in the Voice Layer. If Last Velocity is connected to **Tun**, all active Zones will change their pitch when a new note is struck. Likewise with panning – A Channel Controller will move all voices on that Voice layer to the new panning position. (This can be varied from Zone to Zone with CTab, of course) All of LiSa's internal modulators are Voice Controllers

MODULATORS

In addition to external MIDI, you can create any number of internal modulators to control Parameters. These work by automatically reading tables at a preset speed. LiSa has some tables built in, but it is also possible for the modulators to read from custom tables. The Modulator section of the Controller Editor has three variables:



Shape. This popup menu determines the wave shape of the modulator. There are four permanent tables built into LiSa, with sine, sawtooth, and square waves, and a final, which has a random distribution. To use a custom table, select Table from this menu.

CTab. If you have selected **Table** from the Shape menu, this menu will become available. You can select a table from ones you have already created, or make a new one by selecting **New Table...** from the menu, which will open up the Table Editor.

Speed. Sets the speed at which the modulator will be read. The maximum and minimum speeds will vary depending on the size of the table.

When LiSa processes sound, it does so in groups of 256 samples. This is known as the *audio vector size*. When you set the Modulation Rate to it's maximum speed (99) what that means is that the Parameter you are modulating is changed once every 256 samples, or once per audio vector. Thus, tables are non-interpolating between their X values. This has several effects to keep in mind when designing tables for modulators:

The smaller the table, the faster the modulation rate. If you want to maximize the modulation rate, use the smallest table possible. For example, if you want to modulate pitch with a square wave, use a table with a domain of two, with the first value set to 0, and the second to 127. If you use a table with a domein of 128, with each value repeated 64 times, LiSa will calculate 64 vectors at the first value before switching to the next. At a modulation speed of 99 this would mean that the small table would change values 172 times per second, and the large would change only 2.6 times per second.

High speeds, big tables for smoothness. If you are trying to get a smooth curve at a relatively slow rate, use a large table at a high speed. This minimizes the number of audio vectors calculated at one value, and minimizes staircasing.

Modulation rate changes geometrically. Every increment in the Speed numerical of the Controller Edit window adds one to the number of audio vectors that are calculated before moving on to the next value. At a rate of 99, it is one vector. At 98, it is two, making it twice as slow, at 97 it is three, and so on. All pre-built modulator tables contain 16 values.

Controller Behaviors

Some Zone Parameters behave slightly differently under MIDI control than when they are changed by hand in the Zone Edit window. All Controller behaviors are described in detail below. Note that 'Controller' here means any kind of input that can be assigned in the Parameter Control pane of the Assignment window; i.e., velocity, pitchbend, etc. plus internal modulators.

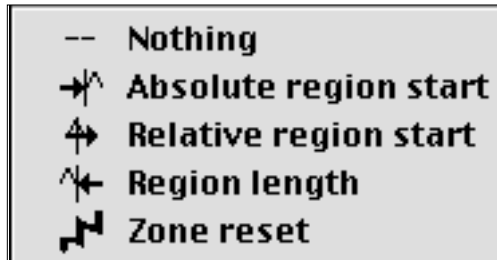
For Parameters that only refer to specific Zone functions or modes, Controllers will only effect Zones of the appropriate type; e.g. changing the Spiralness Parameter will only effect Playback Zones in Spiral mode.

Also keep in mind that although MIDI control is assigned to an entire Voice Layer, individual Zone responses will depend on what (if any) CTab is assigned to the individual Zone's MIDI input and the settings in the Region pane of the Zone Editor window.

SAMPLE MOVEMENT PARAMETERS

Nothing. No Parameter is available, and no Controllers may be assigned in the corresponding Controller Select menu.

Absolute Region Start. This Parameter controls the start position of the sample region of the Zone. This Parameter is always additive, e.g., the higher the value, the further ahead of the original sample region start point (as set in **Stt** in the Zone Editor) the start of the sample region will move. The maximum range covered by this Parameter will depend on the size of the **Mvr** (movement range) numerical. The CTab connected to the **Abs. Start** value is the one to the right of the **Mvr** numerical in the Region pane of the Zone editor.



New in Version 2.0: Region/Pointer Option Switch



If you set your **Mvr** high enough to move your sample region out of the buffer, LiSa will loop the region around back to the beginning of the buffer.

Special Feature: The icon in the center of the Region Pane in Playback Zones is actually a button which toggles between two slightly different playback modes. When this button is selected, the behavior of **Absolute Region Start** changes. Instead of moving the start point of the Zone, it moves the *sample pointer itself* within the sample region. The Zone's region does not change, and the **Mvr** Parameter has no effect. Every time your Controller moves the pointer, the sample will start to play again from that point, and will continue to the end. Once it reaches the end of the sample, it will either loop or stop, depending on the Advance mode of the Zone (p. 59).

Relative Region Start. If the **Mvr** of a sample is very large, it is possible that the jumps between Controller values will skip more samples than you would like. Rel. Start acts as a fine tuner for your sample region start point. The entire offset range of **Rel Start** is always 8% of **Mvr**. This means that if you also have **Abs. Start** enabled, controller values 1-10 of **Abs. Start** cover the same range as values 0-127 of **Rel. Start**. It is not necessary to have **Abs. Start** enabled for **Rel. Start** to work. The CTab connected to the **Rel. Start** value is the one to the right of the **Stt** numerical in the Region pane of the Zone editor.

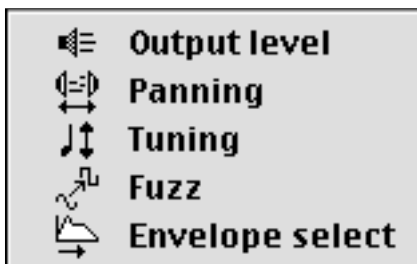
Region Length. This Parameter changes your total sample region length in relation to the original length set in **Len** in the Zone Editor. A control value of 0 will shrink the sample region to 1.5%

of its original length, and a control value of 127 will double it.

Zone Reset. When this is sent a 0, and only a 0, all Zones on the channel, active or not, will automatically revert to their original settings as described in the Zone editor. This includes start and length of the sample region and effects settings.

OUTPUT PARAMETERS

Output Level. Sets output level for playback Zones in all modes. Equivalent to the Lev numerical in the Zone Editor.



Panning. Controls the pan position of a Zone. 0 = 100% right, 127 = 100% left. Has no effect on Autopan Zones. The exact behavior of this input depends upon whether the MIDI control is a voice or channel control. (see Channel and Voice MIDI Control, p. 91.) If it is voice-specific, pan for each instance of a Zone will vary depending on its MIDI control. If channel-specific, all voices in the Voice Layer will move together.

Tuning. Works the same way as the **Tun** numerical found in all Playback Zones. You can set the range of pitch change in the **Pitch Bend Range...** dialog in the **Global** menu.






Fuzz. Amplifies previously recorded sample. Works exactly the same way as the **Fuz** numerical in the Playback Treatment pane of the Zone Editor.

Envelope Select. Sending a Controller value to this Parameter will change the envelopes in all Zones in the Voice Layer to the envelope of the corresponding number in the Envelope Library. This index works like program change messages, i.e. the Controller value will always be one less than the index number of the envelope. Control value 0 brings up envelope 1, etc. To avoid changing all envelopes in a layer identically, use CTags or voice-specific Controllers with this Parameter.

you can get different Envelopes (or patterns) in different Zones by giving each Zone a different CTab for this variable.

PATTERN CONTROLS

Pattern Select. Sending a Controller value to this Parameter will change the pattern in all pattern Zones in the Voice Layer to the pattern of the corresponding number in the Pattern Library. If you have 10 patterns, control value 0 or 1 will load pattern number 1, 2 will load pattern 2, etc. Note that this is different from how Tables and Envelopes are selected. To avoid changing all patterns in a layer identically, use CTabS or voice-specific Controllers with this Parameter.

	Pattern select
	Pattern Parameter 1
	Pattern Parameter 2
	Pattern Parameter 3
	Pattern Parameter 4

In Pattern Select and Envelope Select, sending control values which do not have a pattern or envelope connected to them will automatically select the highest-numbered pattern or envelope. Thus if you have less than 128 patterns or envelopes, a CTab is more or less required to map your various patterns across your control range.






Pattern Parameters 1–4. These are assigned to different aspects of a Pattern Zone. The operation of these Controllers is discussed in full in Pattern Mode , p. 63.

PLAYBACK ZONE PARAMETERS

These items control depth or degree of output effect on Playback Zones in various modes. Full control range covers the full range of the Parameter, (scaled to seven bits of resolution) however its range is expressed numerically in the Zone Editor.

Spiralness. Changes the mystery Parameter (**Spl**) for Zones in Spiral mode.

Playback Direction. This control only works for Playback Zones in Back and Forth mode. Any control value below 64 will force the playback pointer to a forward direction, no matter what direction the Zone was originally playing in. At 64 or above it will force the playback pointer to move backwards until it reaches the start of the region.

	Spiralness
	Playback direction
	Resonance Frequency
	Resonance Depth
	Scrub

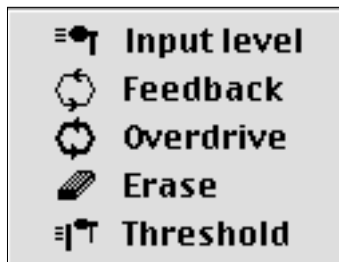
Resonance Frequency and Resonance Depth. Controls these two values for Zones in Resonator mode (**Res** and **Dpt**).

Scrub. Changing this control value ‘scrubs’ the sample backwards and forwards. Due to the design of this mode, pitchbend is the most suitable controller. As you increase the values above 64, you will hear the sample looping in a forward direction, increasing in pitch as the control value goes up. As you go below 64, the same thing will happen, except the sample will go backwards. At a value of 72 (forwards)

or 56 (backwards) the sample plays at its original pitch.

RECORD PARAMETERS

The next five MIDI inputs control record Parameters, and function exactly as they do in the Zone Editor for Record Zones. For details see Recording a Sample, on p. 69.



Input Level. Controls the input level of sounds as they are recorded. Identical to the **Inp** numerical in the Record Treatment pane.

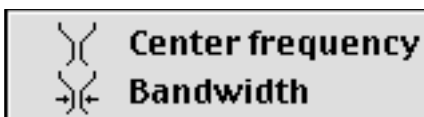
Feedback. Controls the amount of old sound that is retained when loop recording. Identical to the **Fdb** numerical in the Record Treatment pane of the Zone Editor.

Overdrive . Overdrive is an extension of the feedback control -- rather than attenuating the previous signal, it amplifies it. You can think of it as Feedback values of more than 100%. In order for **Ovd** to take effect, set **Fdb** to 100. Identical to the **Ovd** numerical in the Record Treatment pane of the Zone Editor.

Erase. This Parameter is most useful when using LiSa as a delay system. Increasing this value when loop-recording sound will decrease the amplitude of whatever you record into the Sample Buffer at that time, and a value of 127 will erase it entirely. This can be very useful for 'punching holes' in repeatedly delayed material. The Erase function cannot be connected to a CTab.

Threshold. Identical to the **TOn** numerical in the Region pane of the Zone Editor. Sets volume threshold for recording.

FILTER PARAMETERS



Center Frequency. This controls the center of the bandwidth of the filters used in Playback Zones. 0 is lowest, 127 highest.

Bandwidth. Sets the width of the bandpass. 0 is widest, 127 narrowest.

TABLE EDITING PARAMETERS

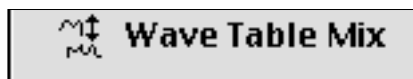


For changing table values in real time. See Real-time Control of Tables on p. 98 for details. Note that it is not possible to connect a CTab to any of these Parameters.

Edit Table Select. This is an indexing Parameter, like Envelope select. The Controller value will select the number of the table edited by the other two MIDI controls. Since CTables cannot be used, you can only access the first 128 tables for real-time editing

Selected Table Index. Midi values sent here will set the index number (X value) of the table to be altered by Selected Table Value.

Selected Table Value. Sets the Y value of the index selected above.

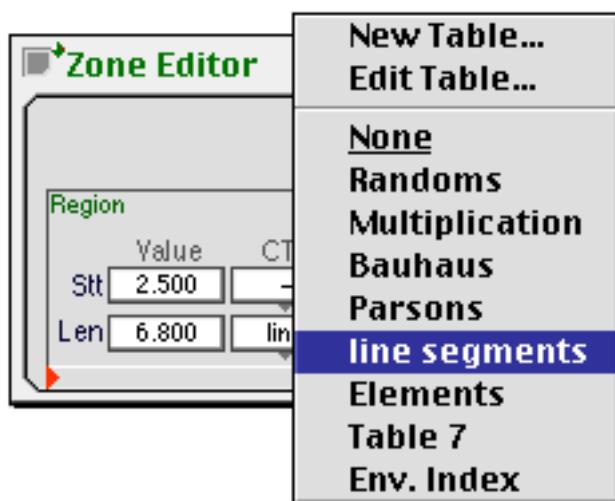


WAVE TABLE PARAMETER

Used in Wavetable Playback Zones.

Wave Table Mix. Controls the relative volume of the Source and Destination waveshapes. 0 is 100% Source, 127 is 100% destination.

Mapping MIDI Controllers – CTables



Tables (CTabs) can be used to map linear Controller signals to other sets of values. For a general description of creating and editing tables, see Tables and Envelopes, p. 43.

CONTROLLERS

Although MIDI input effects all enabled Zones assigned to that Control Layer, the response of each Zone to that MIDI input does not have to be identical. You can map the input to any output you desire with CTables. To the right of all the MIDI-controllable Parameters in the Zone Editor is a numerical labeled **CTab**. Clicking on this will reveal a popup menu with all available CTables. From here you can choose the Control Table to which incoming

MIDI is mapped.

MIDI input is mapped to the X value, and MIDI output to the Y value of the CTab. Tables of any size can be used – LiSa will interpolate the values to the 0-128 of MIDI controllers.

If you want a Zone to respond to some MIDI inputs but not to others, linking a parameter to a CTab that contains one fixed value (for example, 64 for the tuning parameter) will effectively disable it.

INDEXES

Some Zone Editor Parameters (notably envelope select and the pattern modes) use MIDI controllers to select between options rather than control variables. CTab's also come in handy for this – you can map out the full range of a Controller to select all or a selection of items out of the Envelope or Pattern Libraries.

REAL-TIME CONTROL OF TABLES

You can use MIDI to change table values in real time. Tables being used for any purpose can be changed, although it is most powerful when used to change tables being read as waveforms. To do this requires at least two control sources. Settings for real-time control of tables are made in the Control pane of the Assignment window.



To edit a table via MIDI:

Edit Table Select. If the Parameter is connected to a Controller, that Controller's value +1 will select the table number to be edited. (It works like Program Change messages – an index value of 0 will edit table 1, etc.) If no Controller or modulator is connected to this Parameter, all MIDI sent to the other Table Edit Parameters will automatically be applied to table number 1. Note that there is no way to control this Parameter with a CTab, so you may have to think carefully about what order and where those tables are in your Table Library. In addition, this means that only the first 127 tables in your Table Library can be edited in this manner.

Real-time editing of tables will only work when a voice is active. The table you are editing may or may not be in the active Zone, but at least one voice must be playing for this to work.

Selected Table Index. The value this Parameter receives will set the index number (X value) of the table to be edited. If it receives a value of 16, whatever value comes into the **Selected Table Value** Parameter will change index number 16. This Parameter by itself changes nothing in the table. It is often useful to connect a modulator attached to a sawtooth wave the same size as the table to be edited to

this Parameter, to be able to change values sequentially.

Selected Table Value. Sending a value to this Parameter will immediately change the value (Y value) of the table at the index specified in **Selected Table Index**.

Miscellaneous MIDI Controls



SUSTAIN AND SOSTENUTO

LiSa also supports MIDI Sustain and Sostenuto commands, both directly from the Status window and via MIDI. Enabling Sustain on a MIDI channel will keep all record or playback Zones in the effected Voice Layers active until Sustain is turned off for that channel, at which point all sustained notes receive note off messages. Enabling Sostenuto acts like sustain as long as it is on. When Sostenuto is turned off, all held notes will continue to hold until the key that activated them is pressed again.

Each of the 16 buttons next to the words **Sustain** and **Sostenuto** will enable sustain or sostenuto on Voice Layers 1-16. Clicking with the cursor in these buttons will toggle them on and off. If more than one Voice Layer is assigned to a particular MIDI Channel, enabling Sustain for that Layer will enable it for all other Layers sharing that MIDI Channel as well.

You can also activate Sustain and Sostenuto from MIDI messages:

- A value of 127 from Controller No. 64 will turn on sustain for all Voice Layers connected to that MIDI Channel, and a value of 0 will turn it off.
- A value of 127 from Controller No. 66 will turn on sostenuto for all Voice Layers connected to that MIDI Channel, and a value of 0 will turn it off.

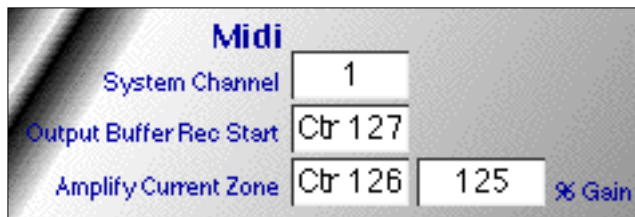
Sustain and sostenuto can be enabled from the keyboard for the active Voice Layer. '+' will toggle sustain on and off, and '-' will do likewise for sostenuto.

VELOCITY MAPPING



It is important to note that velocity is always connected to the amplitude of a Zone in the traditional MIDI manner – the harder you hit, the louder the sound is, reaching the volume set in the **Lev** numerical when a key is struck with a velocity of 127. It is possible to change the relationship between velocity and volume response by using a CTab, however. If you look at the Play Treatment pane in the Zone Editor, pressing Shift will turn the value of the **Lev** numerical into the word **Vel**. The CTab to the right of the numerical is connected to velocity. By adding a new table here, you can change the relationship between velocity and volume. In the example, a table titled Inverse, which goes from 127 to 0 has been inserted, so a soft touch will be loud, and a loud one soft.

AMPLIFY CURRENT ZONE



It is possible that you will record a sound at a volume that is unsuitably low in volume when played back. It is possible to amplify the sample region of your current Zone (that is, the last Zone played, or the one visible when you have **Show Current Zone** selected) by sending it a MIDI control value. This is set from the **System Settings...** menu item in the **Global** menu. (See p. 16)

In **Amplify Current Zone**, there are two variables. The first is the controller number. Sending any value on this Controller on any channel will cause the sample region of the selected Zone to be amplified by the percentage specified in the numerical labeled **%Gain**. (This works best with a controller you can send from a button rather than a slider -- every time you change the slider value, you will 'bump up' the amplitude of the signal.) This numerical has a range of 0 - 200% amplitude of the original signal.

Using this will permanently change the sound in the Sample Buffer, although not in your original soundfile, if the sample comes from one. Repeated amplifying will cause distortion akin to analog distortion, not digital clipping. It also is slightly slower than real-time. If your region is fairly short, it is fast enough to use in performance, but not instantaneous. The speed of your computer will also effect this -- it's best to experiment a bit before trying it out on stage.

ENVELOPE FOLLOWERS

Envelope Followers		Left	Right
EF channel		1	1
EF note nr		36	37
EF threshold		12	12
EF contr. nr		16	16

The audio input into LiSa can be converted to MIDI. Audio can generate note on and off messages, and be attached to MIDI controllers. LiSa uses the amplitude of the incoming signal to generate these MIDI values. Settings for the Envelope Followers are made in the **System Settings** item in the **Global** menu. This MIDI is treated exactly as MIDI coming from an external device. Settings can be different for Left and Right inputs.

Note that these settings have nothing to do with recording audio as it comes in. These settings are only for MIDI.

EF Channel. All MIDI from the Envelope Followers is sent on the channel set here.

EF Note Nr. When the Envelope Follower detects input above the threshold level, it will send a note on message for this note on the MIDI channel specified above. When the signal goes below the threshold, LiSa will send a note off.

EF Threshold. Here you can set the threshold level for note on and off messages. Amplitude above the threshold will generate a note on, and when it falls below the threshold, a note off. Setting this numerical to zero will cause a note on when any audio is received, and at 127 the envelopes will never be triggered.

EF contr. Nr. Here you set the Controller number for the Envelope Follower. To disable EF control, set these numerals to 0, which does not send MIDI to controller 0, but turns off the envelope generators. (Controller 0 is thus unavailable for use with the Envelope Followers.)

To use MIDI from the envelope followers, treat it like any other MIDI input:

For **Note on** messages, just drag a Zone to the key specified, and it will be activated once the EF passes the threshold.

For **Controllers**, create a new Controller in the Controller Library with the number of the MIDI controller you have assigned in the dialog box, and treat it as any other external Controller.

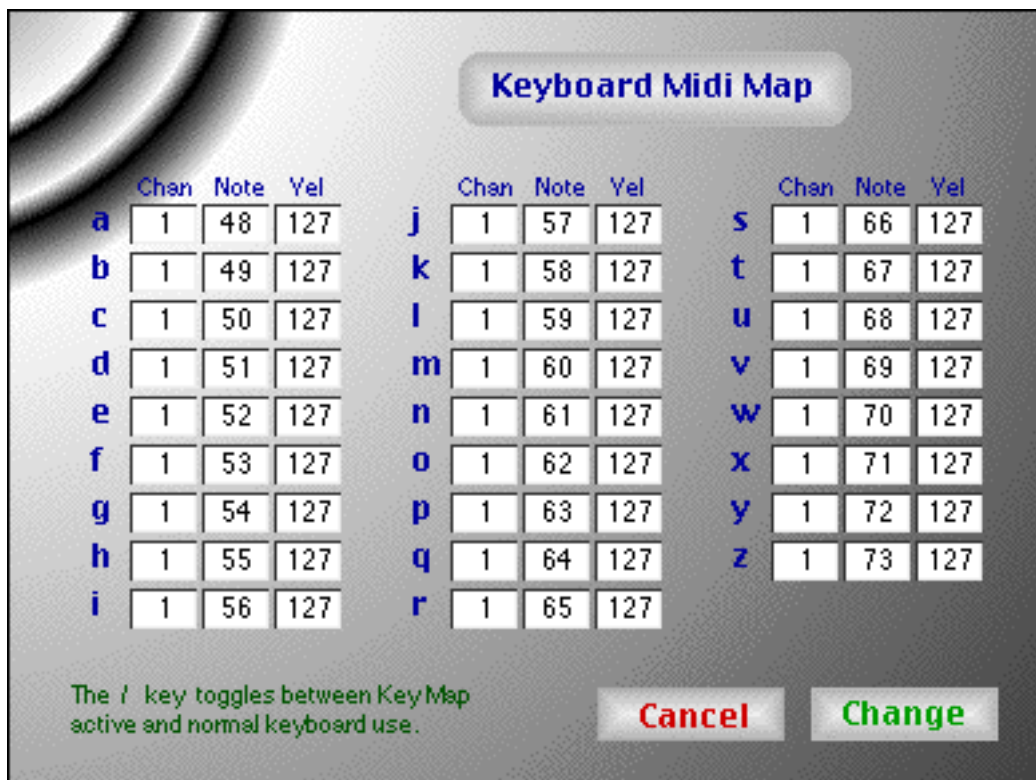
Controlling LiSa from the Computer

When editing a Setup, it is sometimes convenient to be able to test it without having to use an external MIDI device. This can be done in two ways: Notes can be activated directly from the computer keyboard, or you can use the Mouse Control window.

PLAYING NOTES FROM THE KEYBOARD

SETUP

In the **Global** menu is the item **Keyboard MIDI Map...** Selecting this will present a window with a set of numericals, three for



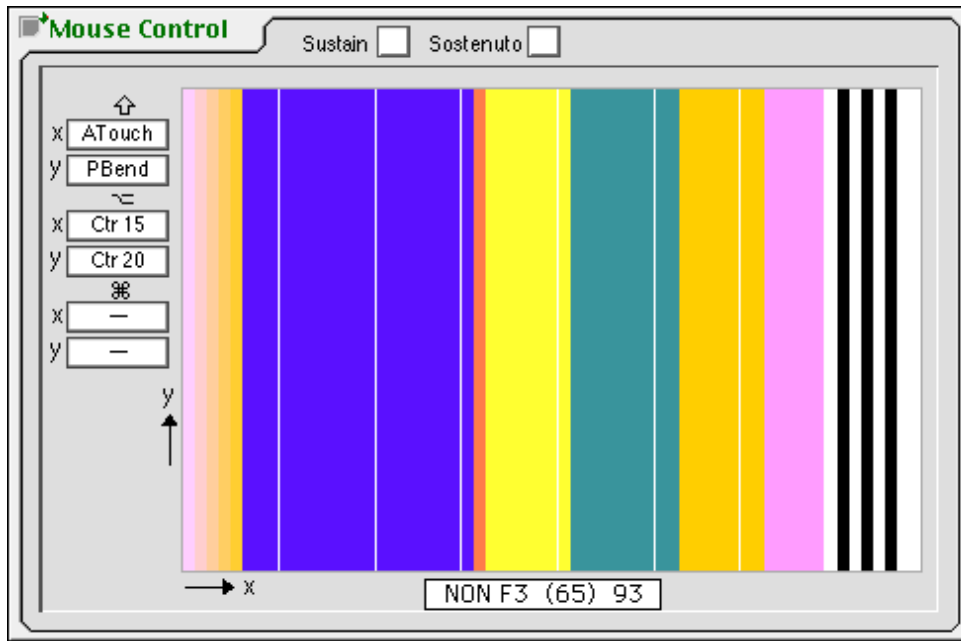
each of the alphabetical keys of the keyboard.

Using these numericals, you can set a channel value, note number, and velocity for the alphabetical keys. The note assignments are saved with your Setup.

BEHAVIOR

To activate computer keyboard MIDI, press the forward slash (/) key. This will toggle keyboard MIDI on. Pressing slash again will deactivate it. While keyboard MIDI is active, none of the alphabetical Cmd-key menu shortcuts will work, although the items will still work from the menu bar. Numerical Cmd-key shortcuts, and the arrow keys, will continue to function normally.

The number of notes you can play from the keyboard at a time varies from computer to computer. You can, of course, enable Sustain for the MIDI Channel you are using. Both Sustain and Sostenuto work normally.



THE MOUSE CONTROL WINDOW

The Mouse Control Window is available from the Windows menu, and allows you to both activate notes and use up to 2 Controllers simultaneously.

PLAYING NOTES

The main pane of the Mouse Control Window is an elongated representation of the current Voice Layer keyboard. Clicking

in this area of the window will activate the note. The higher up in the window you click, the greater the velocity. The note will remain on as long as the mouse button is held down. Click-dragging will play notes as you move the mouse around. The most recent note played is displayed at the bottom of the window. Sustain and Sostnuto for the current Voice Layer can be activated using the buttons at the top of the window.

USING CONTROLLERS

You can imitate the behavior of 2 simultaneous Controllers using the mouse and the modifier keys. In the numericals on the left, you can assign 2 Controllers to the X and Y axes of the cursor's movements. By pressing the Shift, Option, or Command keys, click-dragging the mouse will stop playing notes and send Controller information instead. (You can use the sustain or Sostenuto buttons to keep a note playing while you use the Controllers.) Only one modifier key may be used at a time. Current Controllers and their values are displayed in the bottom of the window when a modifier key is down.

Appendix 1: Basic Order of Operations

This section is intended to give you a quick idea of the basic procedure involved in creating a LiSa Setup – with so many details it is sometimes hard to figure out where to start. We assume that you are familiar with all of LiSa's windows and functions, but whether you are just trying to get started and make some music, or if you have read the manual, this should clarify the order of events involved in getting something happening.

- Open LiSa. A new Setup, called Untitled Setup, will appear. (The window arrangement will depend on what was open the last time you started the program, and we will assume that you will be able to locate or open whatever windows may be called for.) You are now in an open Preset entitled 'Init Preset', and one Zone, called 'Play 5 sec.' has been created and is visible in the Zone Editor. Check your incoming MIDI – if it is working, you will see the input displayed in the Status Window.
- Get a list of available samples from your hard disk, so you can decide which ones to load into the Sample Buffer. Bring the Sample Library to the front. If you already know what samples you want to load, you can select them individually by using the **Add** button, or to see all available soundfiles on your disk, use the **Scan** function.
- Put a sample into the Sample Buffer. Click-drag the selected sample to the Sample Buffer pane of the Status window or to the Sample Editor window. The sample will appear in the window.
- Create a new Zone (You could use the pre-made Zone if you felt like it, we're just running through the procedure) by clicking on **New** in the Zone Library. You will see the new Zone listed in the Library, and appear in the Zone Editor. Rename it by typing in the **Name** box in the Zone Editor.
- Adjust the size of your Zone to the current sample in the buffer. This can be done using the numericals in the Zone Editor window, or if you have the Sample Editor open, you can highlight the area of the sample and select **Enter Section in Zone** from the **Edit** menu.
- Assign a keyrange to the Zone. Click-drag the Zone from the Zone Library to the virtual keyboard in the Status window, and assign it to a key or range of keys.

- Select a MIDI Parameter to control. Drag **Tuning** from the Parameter Library to one of the small rectangles in the Parameter Control pane of the Assignment window. You could also do this by clicking on the rectangle, which will present a pop-up menu with the same options). To control it with the modulation wheel, select **Modwheel** from the pop-up menu directly to the right of the rectangle with the Tuning icon in it.
- Play one of the notes on your keyboard within the Zone's keyrange, and move the modwheel up and down. You should hear the pitch bending both above and below the original pitch of the sample.
- To have the modwheel only transpose the sample up, click on the **CTab** box next to the **Tun** numerical in the Zone Editor. Select **New Table...** from the pop-up menu. The Table editor will open with a new table full of random values.
- Rename the table something useful like 'trans up,' and adjust the size to 128 by typing in the **Size** numerical in the top right-hand corner.
- Change the table view to Numerical by clicking on the Numerical View icon. Shift-click on the first numerical, and change its value to 64. Do the same with the last numerical, and change its value to 127. Click on the Line Segment button, and the table will now have linear values from 64 to 127.
- Close the Table editor, and you will see the name of your new table in the **CTab** box next to the **Tun** numerical.
- Play the note again, play with the modwheel, and you will hear the pitch only transpose up.
- If you want the sample to be automatically be loaded with this Preset, drag the sample name to the Sample Column in the Preset window.

The above steps represent the basic order of operations while designing a Setup in LiSa. You create a new Zone and assign it a region and keyrange, and change its function and modes in the Zone editor if you wish. You can then set its Parameter control behavior in the Assignment window, and tweak it using CTables and envelopes.

Appendix 2: Voice Allocation

Polyphony and Voice Allocation

NUMBER OF VOICES

LiSa is designed to be able to play a maximum of 128 voices (sounded notes) simultaneously. The actual number of voices you will be able to get depends on several factors:

- The speed of your machine.
- The kinds of Zones you are using, as some are more computationally expensive than others.
- Number of Filters you are using. Filters slow LiSa down considerably.
- Playback Quality of your samples. If you are using Good playback quality, you will get more voices than if you use Best.

Sounding voices is naturally the most time-consuming task on the part of your computer's processor, so the faster the computer is, the more voices it can sound. LiSa can make very big demands on your computer's CPU, and will even 'steal' processor time from other programs in order to produce all the voices that are being demanded of it. In a case when you are using LiSa on a computer simultaneously running other programs (for MIDI control, for example) problems could obviously develop.

It is possible to limit the amount of processor load that LiSa will occupy (see System Settings, p. 17). You may need to experiment with your particular set of applications to determine how many voices you can assign without slowing down your other programs.

VOICE PRIORITY

It is not unusual (particularly when generating MIDI from a computer) to wind up in a situation where more voices are being called for (in the form of active record or playback Zones) than LiSa has available. In that case, LiSa follows a strict order in deciding which voices will be sacrificed first to

perform other tasks. They are given priority in the order below, with the ones sacrificed first at the bottom of the list. The number of voices being played does not effect loading and saving soundfiles.

- **Playback Zones (High Priority).** Playback Zones can have their voice allocation prioritized into high or low priority. A high priority Zone will always take precedence over any other Zone, and if any record tasks are called for, a low priority Zone will be dropped first. Note that this means that if all voices that are playing are set to high priority, you will not be able to record.
- **Record Zones.** If you are using all available voices for playing and try to record a new sample, low-priority playback voices will always be sacrificed to perform the record. Also, to record a sample requires two voices, so if your maximum number of voices is 12 and you're using them all, when you activate a Record Zone, you will have 10 still playing.
- **Playback Zones (other than High Priority)** All other playback zones will always be dropped first, starting from the one that has been playing the longest.

Appendix 3: Stereo Recording

To record a stereo sample in LiSa, it is necessary to use two Record Zones of identical length with different sample regions. Each of the Zones must be in a different Voice Layer, and assigned to the same MIDI note to guarantee simultaneous activation. They can then be played back in stereo using two similarly arranged Playback Zones.

- Create a record Zone. Title it 'Rec Left', or something similarly handy. Holding down the Shift key, set **Pan** to -100 and **Inp** to Left.
- Duplicate the Zone in the Zone Library, using the Duplicate command in the Edit menu (Make sure the Zone Library is on top!). In the Zone Editor, rename the new Zone 'Rec Right'. Change the **Stt** numerical to a point beyond the end of 'Rec Left', and once again holding down Shift, set **Pan** to -100, and **Inp** to Right. You now have 2 identically sized zones recording in different parts of the Sample Buffer.
- Assign the Left Zone to a virtual key. Check the Assignment Window, and make sure you are on Voice Channel 1. Drag 'Rec Left' from the Zone Library to a key, say number 60. MIDI note C3 on channel 1 will now activate this Zone.
- Assign the right Zone to the same key in another Voice Layer. Bring up Voice Layer 2 by clicking on its button in the Assignment Window. Drag 'Rec Right' to virtual key 60.
- Change the MIDI Channel of Voice Layer 2. Click and hold on the selection button for Voice Layer 2, and a popup menu will appear allowing you to set the MIDI channel on which this Layer will respond. Select Channel 1. Both Zones will now be activated when LiSa receives a MIDI note on for C3 on MIDI Channel 1.

To play back a sample recorded in this manner, duplicate both Record Zones, and in the Zone Editor change their function to Playback. This guarantees identical Sample Regions. Set the **Pan** Parameter of the 'Rec Left' copy to -100, and of the copy of 'Rec Right' to 100. Assign these to identical keys or keyranges on Voice Channels 1 and 2 respectively, and you will be able to play back your recorded stereo samples.

Appendix 4:

Reference

File

New Setup	⌘N
Open Setup...	⌘O
Load Sample...	⌘L
Load Library...	
Close Window	⌘W
Save Setup	⌘S
Save Setup As...	
Save Sample Buffer...	
Save Library As...	
Quit	⌘Q

File Menu

- **New Setup...** Creates new Setup, closes currently open Setup, including Libraries.
- **Open Setup...** Opens Setup, loads it's Libraries.
- **Load Sample...** Loads a sample into the Sample Buffer starting from the beginning of the buffer. Overwrites old material. Only way to access samples not in the Sample Library.
- **Load Library...** Opens a dialog allowing you to load a Library from another Setup into your open Setup, with the option to replace or append the current Library.
- **Close Window.** Closes topmost window
- **Save Setup...** Saves current Setup, including preferences and Libraries.
- **Save Setup as...** Save current Setup under a new name, which will resave Libraries under the new name as well.
- **Save Sample Buffer...** Saves Sample Buffer contents as new soundfile, either the entire buffer or the current view available in the Sample Editor.
- **Save Library As...** Saves a Library under a new name.
- **Quit.** Quits LiSa.

Edit Menu

Edit	
Undo	⌘Z
Cut	⌘X
Copy	⌘C
Paste	⌘V
Clear	
Duplicate	⌘D
Clear Sample Buffer	
Enter Selection in Zone	⌘E
Enter Current Region in Zone	⌘U
Normalize Current Sample Region	⌘M
Find Selected Zone	⌘F
Find Zone Again	⌘G

- **Undo**
- **Cut**
- **Copy**
- **Paste**
- **Clear**
- **Duplicate.** Standard Mac edit commands. Note that not all edits are available in all windows, and that edits only apply to the topmost window, identifiable by the green diamond in the upper-left corner.

- **Clear Sample Buffer.** Completely clears all samples in the Sample Buffer. Output and Process buffers remain untouched.
- **Enter Selection in Zone.** When the Zone Editor is topmost, the start points and length of the highlighted area will be applied to the current Zone (the one visible in the Zone Editor).
- **Enter Current Region in Zone.** Enters the current sample region in the current Zone. Useful if changing a Zone's region via MIDI, and wanting to make it the Zone's initial state.
- **Normalize Current Sample Region.** Normalizes the Sample region of the current Zone. Cannot be undone.
- **Find Selected Zone**
- **Find Zone Again.** Will flash the Zone selected in the Zone Library in the virtual keyboard. Will look through all Presets in a Setup, so store your Preset before using.

Global Menu

Global
System Settings... Size of Buffers...
Midi Setup... Pitch Bend Range...
Keyboard Map...

The preferences stored in the dialogs available from this menu are saved with the Setup, so each setup may have different values for all of these options.

- **System Settings...** Opens System Settings dialog, where you can set basic preferences for LiSa's system.
- **Size of Buffers...** Opens a dialog in which you can resize all three of LiSa's audio buffers.
- **MIDI Setup...** Set OMS MIDI input and Thru.
- **Pitch Bend Range...** Sets Pitch bend range. Min=1 semitone, max=60 semitones.
- **Keyboard Map...** Opens a dialog in which you can make MIDI channel, note number, and velocity for the alphabetical keys on your computer keyboard.

Presets Menu

Presets
Load selected Preset
Store current Preset ⌘P Store current Preset As...
Clear Current Preset Delete Selected Preset

- **Load Selected Preset.** Loads Preset selected in the Preset window into LiSa.
- **Store Current Preset.** Stores current Preset in it's current location
- **Store Current Preset As...** Stores current Preset in any location in Preset window, with a new name.
- **Clear Current Preset.** Removes all Zones, Controller assignments and samples from current Preset. Keeps memory reserved.
- **Delete Selected Preset.** As above, but also releases memory assigned to the Preset. Cannot be done on currently loaded Preset.

Windows

Assignment	⌘1
Zone Editor	
Pattern Editor	
Envelope Editor	
Table Editor	
Controller Editor	
Sample Editor	
Zone Library	⌘2
Pattern Library	⌘3
Envelope Library	⌘4
Table Library	⌘5
Controller Library	⌘6
Sample Library	⌘7
Parameter Library	⌘8
Presets	⌘9
Status	⌘0
Mouse Control	

Windows Menu

Opens the various windows available in LiSa. Self-explanatory.

Options

✓ Show Current Zone
Stop Notes on Preset Change
✓ Auto Save Recording Sessions
✓ Show Current Sample Pointer
Show Length in kSamples

Options Menu

- **Show Current Zone.** When checked, the Zone Editor will display the Zone last played, either via MIDI or from the Mouse Control Window.
- **Stop Notes on Preset Change** When checked, all notes will be silenced and Zones reset to their original Sample Regions when changing Presets.

- **Auto Save Recording Sessions.** When enabled, all record Zones with Auto Save Session enabled will save their recordings to disk.
- **Show Current Sample Pointer.** Displays numerical location of the sample pointer of the last Zone activated in the System Messages pane of the Status Window.
- **Show Length in kSamples/Show Length in Seconds.** Toggles between these two modes of time display.



Help Menu

- **Show Balloons/Hide Balloons.** Toggles Balloon Help.

Keyboard Shortcuts

GENERAL

- Shift: reveals second aspect of dual numericals or shows second special parameter.
- Up Arrow: jump to next available Preset
- Down Arrow: jump to previous available Preset.
- Left Arrow: show previous available structure in the topmost Editor Window.
- Right Arrow: show previous available structure in the topmost Editor Window.
- +: Toggles Sustain for the MIDI channel used by the current Voice Layer.
- -: Toggles Sostenuto for the MIDI channel used by the current Voice Layer.
- /: Toggles Computer Keyboard MIDI for alphabetical keys.
- A-Z keys. When Computer Keyboard MIDI is enabled, plays notes as chosen in the **Keyboard Map...** dialog.

SAMPLE EDITOR

- Option-Left Arrow and Option-Right Arrow will nudge the left-hand edge 1 kB of samples of the selected area.
- Option-Up Arrow and Option-Down Arrow will nudge the right-hand edge to the right and left, respectively.

TUNINGS

- Caps lock: reveals custom scaling keyboard.
- K: quarter-tone tuning.
- N: 12-tone equal tempered tuning.
- U: unison, all notes to play at MIDI note 60.

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