ableton

live

Reference Manual

version 6

Live Version 6.0 for Windows and Mac OS

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Reference Manual by Kevin Haywood, Rose Knudsen, Gerhard Behles, Jakob Rang, Robert Henke, Torsten Slama.

Essential Instrument Collection created by SONiVOX.
Web: www.sonivoxrocks.com

Drum samples provided by Big Fish Audio.

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Chapter 1

Welcome to Live

1.1   The Ableton Team Says: Thank You

Live is the result of musicians wanting a better way to create, produce and perform music using a computer. A great deal of effort has been put into making Live easy and fun to use, yet at the same time capable of helping you create music with unlimited depth and sophistication. This effort continues even as you read these lines... in fact, a new, improved Live version might already be available for download! Please check on our website now[1], or choose the Check for Updates command from the Help menu.

We hope you enjoy using Live and that it enhances your creative process. Should you have suggestions about how we can improve Live, please let us know[2].

Your Ableton Team.

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[1]http://www.ableton.com/downloads
[2]contact@ableton.com

1.2   What's New in Live 6?

1.2.1   Movie Import

- Improvise, compose and warp music to picture

1.2.2   Live Effects and Instruments

- Sampler optional add-on instrument
- Dynamic Tube effect
- EQ Four upgrades to EQ Eight
- Note Length MIDI effect
- Enhancements for Operator, Saturator and Utility
- Instrument and Effect Racks enable custom groupings of devices along with a simplified set of controls for tweaking the sound

1.2.3   Mixing and Routing

- Pro Session Mixer features
- Pre-effects, post-effects and post-mixer routing options for more flexible mix setups

1.2.4   Warping

- Tempo Master setting for warped audio and video clips in the Arrangement
- Multi-clip warping

1.2.5   ReWire and Remote Control

- ReWire master access to Live's instruments
- Instant mappings for many popular control surfaces
- Improved MIDI and key mapping

1.2.6   File Management and Browsing

- New file management tools
- Better browsing

1.2.7   Processor Maximization

- Multiplied audio processing power with multicore and multiprocessor support
- Deep Freeze keeps most editing functions available while tracks are frozen

Chapter 2

First Steps

When you install Live and run it for the first time, you will be presented with a dialog asking for your Live serial number. Please see the chapter on unlocking Live should you have questions or concerns during the authorization process.

If you do not (yet) own Live, you can close the dialog and proceed, as Live will run in Demo Mode by default. In Demo Mode, you will be able to work with all of Live's features with the exception of saving and exporting.

2.1   Learn About Live

Live comes with a set of interactive *lessons* to take you step by step through the key features of the program. The lessons are organized in a table of contents, which can be opened directly in the program via the Help menu. We highly recommend following the lessons. Many users have told us that the lessons helped them become familiar with the program very quickly.

We also recommend that you read the Live Concepts chapter, which encapsulates everything that Live is and can do, and is therefore a worthwhile read for both beginners and

experienced users. The remaining chapters of this manual serve as in-depth reference for the material introduced in Live Concepts.

2.1.1   Using the Info View and Index

Live's Info View tells you the name and function of whatever you place the mouse over.
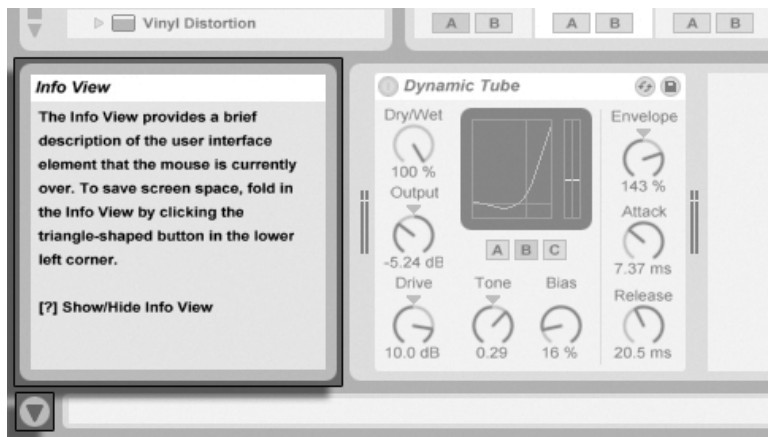
The Info View and its Show/Hide Button.

If you require more information on a specific user interface element or topic, please consult this reference manual. The index, found at the end of the manual, contains the names of all user interface elements and will lead you to the relevant section.

2.2   Setting up Preferences

Live's Preferences window is where you can find various settings that determine how Live looks, behaves and interfaces with the outside world. This window is accessed from the Options menu's (Windows)/Live menu's (Mac OS X) Preferences command, or with the `Ctrl` `,` (PC) / ⌘ `,` (Mac) shortcut.

Live's Preferences are distributed over several tabs:

- In the Look/Feel tab, you can make various settings, including the language used for text display and the color scheme, or "skin," for the Live user interface.

- The Audio Preferences are used to set up Live's audio connections with the outside world via an audio interface. Please take the time to follow the program's built-in "Setting up Audio I/O" lesson, which will walk you through all the steps required to set up and optimize the settings for any given system. To access the lesson, use the Lessons Table of Contents command from the Help menu.

- The MIDI/Sync Preferences are used to help Live recognize MIDI devices for three separate and distinct purposes:

  - *Playing MIDI notes.* To learn how to route an external device into Live for MIDI input, or how to send MIDI to an external device, please see the Routing and I/O chapter.

  - *Controlling parts of the interface remotely.* This subject is covered in detail in the MIDI and Key Remote Control chapter.

  - *Syncing the program* with an external sequencer or drum machine, either as a master or a slave. Please see the Synchronizing via MIDI chapter for details.

- The File/Folder Preferences pertain to Live's file management and the location of plug-in devices.

- The Record/Warp/Launch Preferences allow customizing the default state for new Live Sets and their components, as well as selecting options for new recordings.

- The CPU Preferences include options for managing the processing load, including multicore/multiprocessor support.

- The Products Preferences are used to manage licensing and installation of the Live platform, and add-on components like the Operator instrument and Live Packs.

2.3 The Main Live Screen

Most of your work in Live happens in the main Live screen. This screen consists of a number of views, and each view manages a specific aspect of your Live Set. Since screen space is

usually limited, the Live views can't all be displayed at the same time.

Each one of the *selector buttons* at the screen borders calls up a specific view; clicking this one, for instance, accesses the Live devices:


The Device Browser Selector.

To hide one of Live's views and free up screen space, click on the triangle-shaped button next to it. To restore the view, click the button again.

A View Show/Hide Button.

You can run Live in Full Screen Mode by selecting the Full Screen command from the View menu. To leave Full Screen Mode, click the button that appears in the lower right corner of the screen. Full Screen Mode can also be toggled by pressing [F11]. (*Note:* On Mac OS X, this key is assigned by default to Exposé, and will not toggle Full Screen Mode unless Exposé has been deactivated or assigned to a different key in OS X's System Preferences.)

You can adjust the main window's horizontal split by dragging.
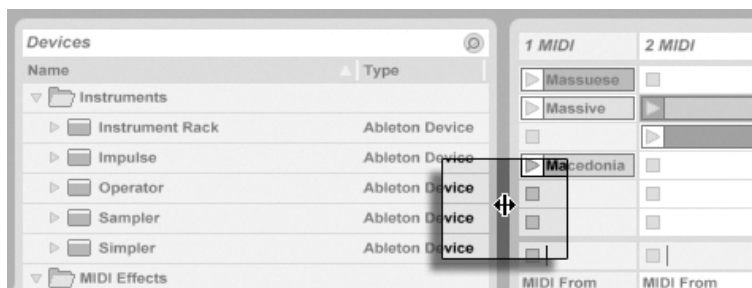

Adjusting the Main Window Split.

Chapter 3

Unlocking Live

Live is protected against illegal use by a copy protection scheme. This scheme has been designed to meet the highest security standards while avoiding hassles for our customers. If you find this procedure to be an inconvenience, please understand that the copy protection secures your investment: It allows Ableton to provide you with support and to continue developing Live.

Authorization of Ableton products takes place in the Preferences' Products tab, which will appear when you start Live for the first time.

Here you can choose to authorize ("unlock") or purchase any Ableton products available to you, for example the Operator instrument.

Please note that products such as Operator are sold separately from Live but are unlocked using the same procedure described in the following sections. They can also be individually set to Demo Mode in the Products tab so that you can try them out.

Product	Status
Live 6	Unlocked
Operator	Hidden
Sampler	Demo Mode
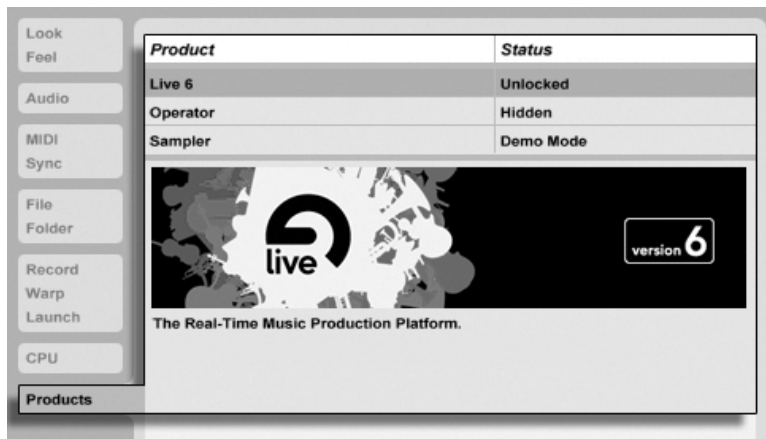
The Products Tab in the Preferences.

Clicking on any product listed in the Products tab will give you the option of unlocking or buying that product. Please click the Unlock button here to complete the unlocking process in two steps. If you have not yet purchased the product, you can do so online by clicking the Buy button. You can always return to the Products Preferences tab later or visit the Ableton webshop[1] to make a purchase. Live's Preferences are available via the Options menu (or the Live menu in Mac OS X).
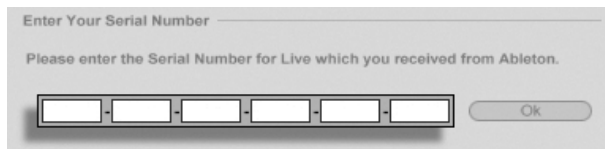
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[1]http://www.ableton.com/shop

Selecting the Unlock Button in the Products Tab.

3.1   Step 1: Entering Your Serial Number

As an owner of Live, you have received a *serial number* from Ableton, either via e-mail (if you ordered Live directly from Ableton), or on a card as part of the Live package.

The Fields for Entering Your Serial Number.

After clicking the Unlock button in the Products tab, you will be presented with six fields for typing in your serial number. Each field holds four characters. The serial number is composed of numbers 0..9 and letters A..F. If you accidentally type the wrong string into a field, the field will turn red. When you have successfully entered the serial number, click the Ok button to proceed.

The serial number identifies your ownership of Live. Because your serial number is a valuable good, you should keep it in a safe place and out of reach of unauthorized hands. Please be aware that sharing your serial number will render it unusable. The only way for Ableton

technical support to help you get back your serial number if you lose it is via your registration data. Therefore, please register your product[2], as otherwise you might lose your property!

3.2   Step 2: Unlocking Live

The second step of authorizing Live is called "unlocking." Unlocking means associating your serial number with a specific computer. Please be aware that the standard Live license grants you the right to use Live on *only one computer at a time*. You can, however, unlock Live with your serial number more than once under the legal and technical conditions described later.

3.2.1   The Unlock Key

For unlocking, you require an *unlock key* that can only be created by the Ableton server. Unlocking therefore requires access to the Internet. The computer from which you connect to the Internet does not have to be the same computer for which you wish to unlock Live, but it does make things easier.
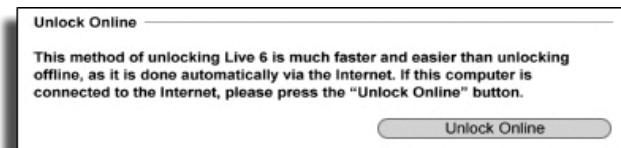
3.2.2   The Challenge Code

The Ableton server creates the unlock key from your serial number and a so-called *challenge code*. The challenge code is a "fingerprint" that Live takes of your computer's components. For details, please see the corresponding section.

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[2]http://www.ableton.com/register

3.2.3 Unlocking Online

Unlock Online

This method of unlocking Live 6 is much faster and easier than unlocking offline, as it is done automatically via the Internet. If this computer is connected to the Internet, please press the "Unlock Online" button.
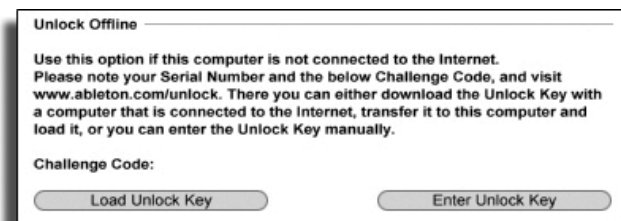
Unlock Online

Unlocking Live Online.

If the computer you want to unlock Live for is connected to the Internet, the only thing you need to do is press the Unlock Online button. Live will then create a connection to the Ableton server, send your serial number and challenge code, and receive the unlock key from the server. No information other than this is exchanged between your computer and the Ableton server.

3.2.4 Unlocking Offline

Unlock Offline

Use this option if this computer is not connected to the Internet. Please note your Serial Number and the below Challenge Code, and visit www.ableton.com/unlock. There you can either download the Unlock Key with a computer that is connected to the Internet, transfer it to this computer and load it, or you can enter the Unlock Key manually.

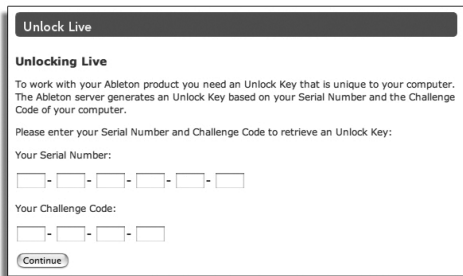Challenge Code:

Load Unlock Key   Enter Unlock Key

Unlocking Live Offline.

If the computer you want to unlock Live for is not connected to the Internet, you can use any other computer to access the Ableton server's web interface[3]. This is a website with fields for entering your serial number and the challenge code, which you can copy from Live's Unlock dialog.

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[3]http://www.ableton.com/unlock

The Live Unlocking Web Site.

If you have entered your serial number and challenge code correctly, another website will appear to provide you with the unlock key. There now are two options for transferring the unlock key to the computer that is to be unlocked:

Follow the weblink to download the unlock key as a file. Transfer the file to the target computer via a diskette or CD-ROM. Then, press the Unlock dialog's Load Unlock Key button to load the unlock key file.
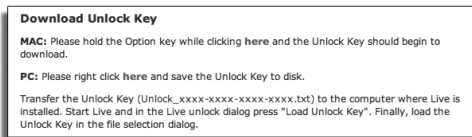
The Unlock Key Can Be Downloaded as a Text File.

OR it might be more convenient to print the webpage with the unlock key on it. On the target computer, press the Enter Unlock Key button to open a dialog with fields for typing in the unlock key. Typing it in is easier than it first appears, because the fields will turn red if you type the wrong string.
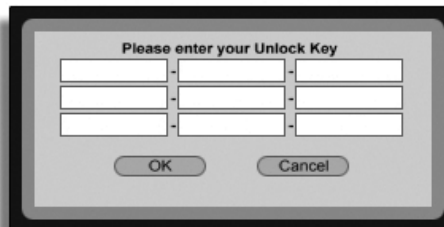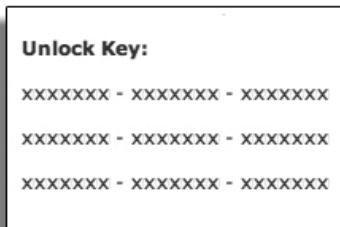
Manually Enter Your Unlock Key.

3.3   Copy Protection FAQs

3.3.1   Can I Use Live or Other Ableton Products Without a Serial Number?

If you do not (yet) own Live, you can work with Live in *Demo Mode*. Demo Mode offers Live's complete functionality, but saving and exporting are disabled.

Live will run in Demo Mode by default if it has not been authorized. You can try out other Ableton products, such as the Operator instrument, by individually switching them to Demo Mode in the Products tab of the Preferences.

Demo Mode can also be deactivated on a product-by-product basis in the Product Preferences.

If running Live or another product in Demo Mode raises your interest in purchasing it, please select it from the Products Preferences tab and then click the Buy button, or visit the Ableton webshop[4]. This site contains information about Ableton's distributor and dealer network. It also offers you the opportunity to buy Ableton products online. Live's Preferences are available via the Options menu (or the Live menu in Mac OS X).
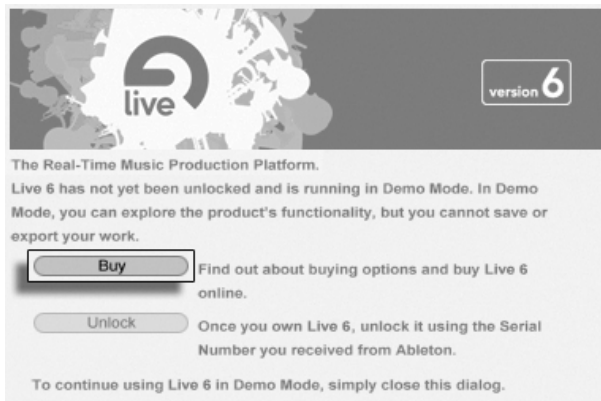
Click Here if You Are Interested in Buying Live.

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[4]http://www.ableton.com/shop

3.3.2 What if I Change My Computer's Components?

If the challenge code of your computer changes for some reason, Live will indeed ask you to unlock the software another time. The challenge code does not change, however, when computer peripherals are replaced (audio or MIDI hardware, printers, modems). The challenge code may change if the motherboard, processor or network card is replaced. On some computers, reformatting a hard drive also changes the challenge code.

3.3.3 Can I Unlock Live More than Once?

The standard Live license allows you to use Live on *only one computer at a time*. However, if you have registered your product[5], the Ableton server will provide you with two unlock keys in good faith that you will use Live on only one machine at a time. Just proceed as described in the corresponding section.

You can therefore run Live on both a studio desktop computer and a tour laptop, but not at the same time.

Should the Ableton server reject your demand for another unlock key, please contact Ableton's technical support.

They can be reached by:

- E-mail[6];
- Telephone: +49 (0)30 - 288 763 151 (available Monday to Friday 11 to 15hrs CET);
- Fax: +49 (0)30 - 288 763 11.

To speed up the process, please:

- Register your copy of Live[7];
- Include a brief explanation of the circumstances.

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[5]http://www.ableton.com/register
[6]support@ableton.com
[7]http://www.ableton.com/register

To use Live on more than one computer at a time, you require a *secondary license* or a *site license*. Ableton offers these licenses at special rates. Please contact the sales team[8] for details.

3.3.4   Can I Play my Set from a Computer That Is Not Unlocked?

In Demo Mode, you can load and perform a Live Set with no time limitation. You cannot, however, save or export your work. When you go on tour, consider taking along your Live program CD and a CD with the last state of your Live Set(s). In case of an emergency, you can install and run Live on any computer available and play your backup Live Set(s).

3.3.5   How Can I Turn Demo Mode Off?

If Live is unlocked but other products are set to Demo Mode, Live will also run in Demo Mode, and you will not be allowed to save or export your work. To turn Demo Mode off in this case, activate the Hide option for each additional product in its respective Product Preference page.
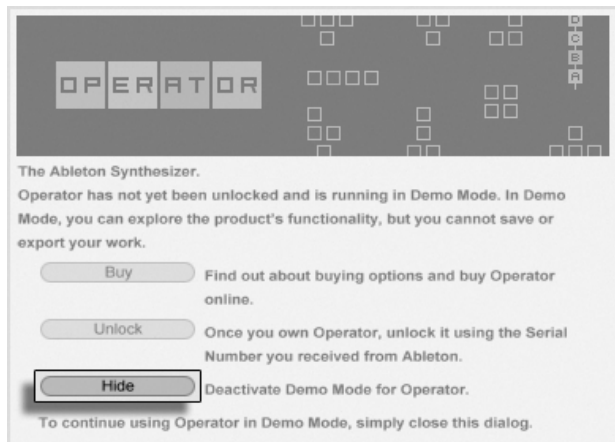
Click Here to Hide a Product's Features.

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[8]orders@ableton.com

You can always choose to show a product again later, and then try out its features by using them in Demo Mode.

3.3.6   What Do I Do About Problems or Questions Regarding Copy Protection?

Please contact technical support[9]. They are happy to help!

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[9]support@ableton.com

Chapter 4

Live Concepts

This chapter introduces the essential concepts of Live. We advise you to read this chapter early in your Live career, as a solid understanding of the program's basic principles will help you fully exploit Live's potential for your music-making.

4.1 Live Sets

The type of document that you create and work on in Live is called a *Live Set*. Live Sets reside in a Live Project – a folder that collects related materials – and can be opened either through the File menu's Open command or via the built-in *File Browsers*.
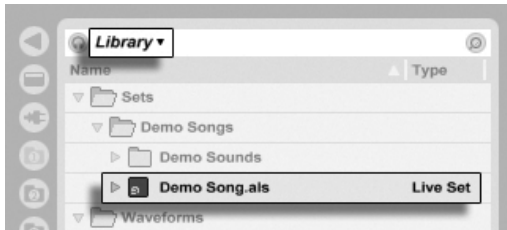

A Live Set in the File Browser.

Selecting the Library bookmark in Live's File Browser will take you to the Live Library of creative tools. There are a number of Demo Sets here, and double-clicking a Live Set's name in the Browser will open that Live Set.

4.2   Arrangement and Session

The basic musical building blocks of Live are called *clips*. A clip is a piece of musical material: a melody, a drum pattern, a bass line or a complete song. Live allows you to record and alter clips, and to create larger musical structures from them: songs, scores, remixes, DJ sets or stage shows.

A Live Set consists of two environments that can hold clips: The *Arrangement* is a layout of clips along a musical timeline; the *Session* is a real-time-oriented "launching base" for clips. Every Session clip has its own play button that allows launching the clip at any time and in any order. Each clip's behavior upon launch can be precisely specified through a number of settings.
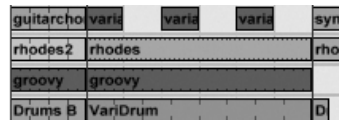
Clips in the Session View (Left) and in the Arrangement View (Right).

The Arrangement is accessed via the *Arrangement View* and the Session via the *Session View*; you can toggle between the two views using the computer's Tab key or their respective selectors. Because the two views have distinct applications, they each hold individual collections of clips. However, it is important to understand that flipping the views simply changes the appearance of the Live Set and does not switch modes, alter what you hear or change what is stored.


The Arrangement and Session View Selectors.

The Arrangement View and the Session View interact in useful (though potentially confusing) ways. One can, for instance, improvise with Session clips and record a log of the improvisation into the Arrangement for further refinement. This works because Arrangement and Session are connected via *tracks*.

4.3   Tracks

Tracks host clips and also manage the flow of signals, as well as the creation of new clips through recording, sound synthesis, effects processing and mixing.
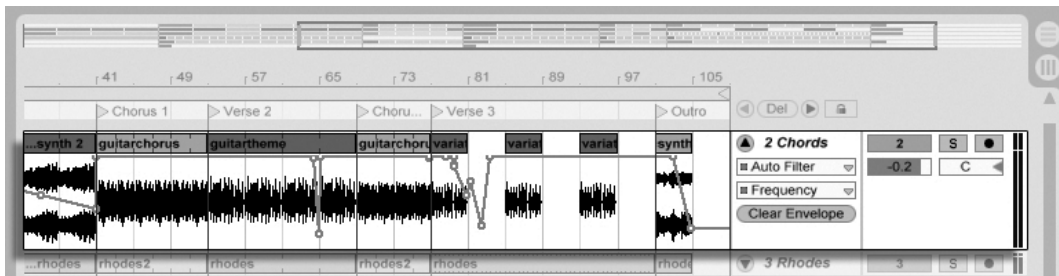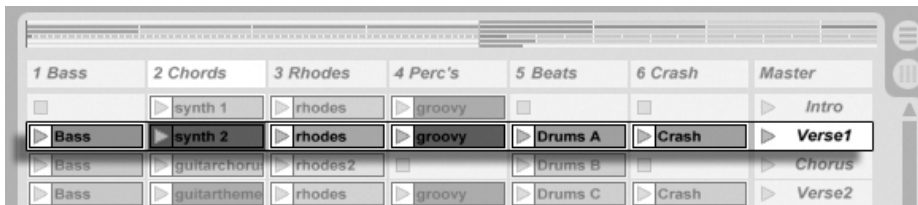

A Track in the Arrangement View.

The Session and Arrangement share the same set of tracks. In the Session View, the tracks are laid out vertically from left to right, while in the Arrangement View they are horizontal from top to bottom. A simple rule governs the cohabitation of clips in a track:

A track can only play one clip at a time.

Therefore, one usually puts clips that should play alternatively in the same Session View column, and spreads out clips that should play together across tracks in rows, or what we call *scenes*.

A Scene in the Session View.

The exclusivity of clips in a track also implies that, at any on time, a track will either play a Session clip or an Arrangement clip, but never both. So, who wins? When a Session clip is launched, the respective track stops whatever it is doing to play that clip. In particular, if the track was playing an Arrangement clip, it will stop it in favor of the Session clip – even as the other tracks continue to play what is in the Arrangement. The track will not resume Arrangement playback until explicitly told to do so.

The Back to Arrangement Button.

This is what the *Back to Arrangement* button, found in the *Control Bar* at the top of the Live screen, is for. This button lights up to indicate that one or more tracks are currently *not* playing the Arrangement, but are playing a clip from the Session instead.

We can click this button to make all tracks go back to the Arrangement. Or, if we like what we hear, we can capture the current state into the Arrangement by activating the *Record* button. Disengaging Record Mode or stopping Live using the *Stop* button leaves us with an altered Arrangement.

4.4 Audio and MIDI

Clips represent recorded signals. Live deals with two types of signals: audio and MIDI. In the digital world, an audio signal is a series of numbers that approximates a continuous signal as generated by a microphone or delivered to a loudspeaker. A MIDI signal is a sequence of commands, such as "now play a C4 at mezzo piano." MIDI is a symbolic representation of musical material, one that is closer to a written score than to an audio recording. MIDI signals are generated by input devices such as MIDI or USB keyboards[1].

It takes an *instrument* to convert MIDI signals into audio signals that can actually be heard. Some instruments, such as Live's *Simpler*, are for chromatic playing of one sound via the keyboard. Other instruments, such as Live's *Impulse*, have a different percussion sound assigned to each keyboard key.

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[1]For an introduction to digital audio and MIDI, please see http://img.uoregon.edu/emi/emi.php and http://www.midi.org/

Audio signals are recorded and played back using *audio tracks*, and MIDI signals are recorded and played back using *MIDI tracks*. The two track types have their own corresponding clip types. Audio clips cannot live on MIDI tracks and vice versa.

Information about inserting, reordering and deleting audio and MIDI tracks is found here.

4.5   Audio Clips and Samples

An audio clip contains a reference to a *sample* (also known as a "sound file" or "audio file") or a *compressed sample* (such as an MP3 file). The clip tells Live where on the computer's drives to find the sample, what part of the sample to play and *how* to play it.

When a sample is dragged in from one of Live's built-in *File Browsers*, Live automatically creates a clip to play that sample. Prior to dragging in a sample, one can audition or *preview* it directly in the Browser; the switch in the Browser with the headphone icon activates previewing.

Name	Type
🎧 Current Project: Library ▾	
Tenor Hard B5 1.aif	Aiff
Tenor Hard B5 2.aif	Aiff
Tenor Hard B5 3.aif	Aiff
Tenor Hard B5 4.aif	Aiff
Tenor Hard C#4.aif	Aiff
Tenor Hard C#5.aif	Aiff
Tenor Hard C3 1.aif	Aiff

Samples Are Dragged in from Live's File Browsers.

Live offers many options for playing samples in exciting new ways, allowing you to create an abundance of new sounds without actually changing the original sample – all the changes are computed in real time, while the sample is played. The respective settings are made in the *Clip View*, which appears on screen when a clip is double-clicked.
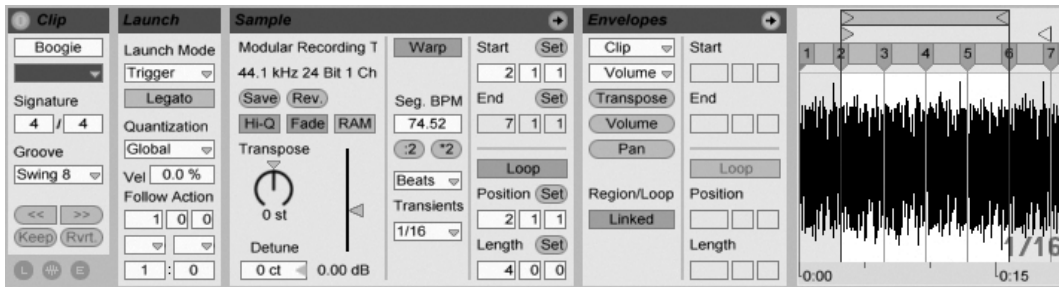
An Audio Clip's Properties as Displayed in the Clip View.

Many powerful manipulations arise from Live's *warping* capabilities. Warping means changing the speed of sample playback independently from the pitch so as to match the song tempo. The tempo can be adjusted on the fly in the Control Bar's Tempo field.

The Control Bar's Tempo Field.

The most elementary use of this technique, and one that usually requires no manual setup, is synchronizing sample loops to the chosen tempo. Live's Auto-Warp algorithm actually makes it easy to line up *any* sample with the song tempo, such as a recording of a drunken jazz band's performance. It is also possible to radically change the sonic signature of a sound using extreme warp settings.

4.6   MIDI Clips and MIDI Files

A MIDI clip contains musical material in the form of MIDI notes and controller envelopes. When MIDI is imported from a *MIDI file*, the data gets incorporated into the Live Set, and the original file is not referenced thereafter. In the Live File Browsers, a MIDI file appears as a folder that can be opened to reveal its individual component tracks, which can be selectively dragged into the Live Set.

*MIDI Files Are Dragged in from Live's File Browsers.*

As you'd expect, a MIDI clip's contents can be accessed and edited via the *Clip View*, for instance to change a melody or "paint" a drum pattern.

*A MIDI Clip's Properties as Displayed in the Clip View.*

4.7   Devices and the Mixer

A track can have not only clips but also a chain of *devices* for processing signals. Double-clicking a track's title bar brings up the *Track View*, which shows the track's device chain.
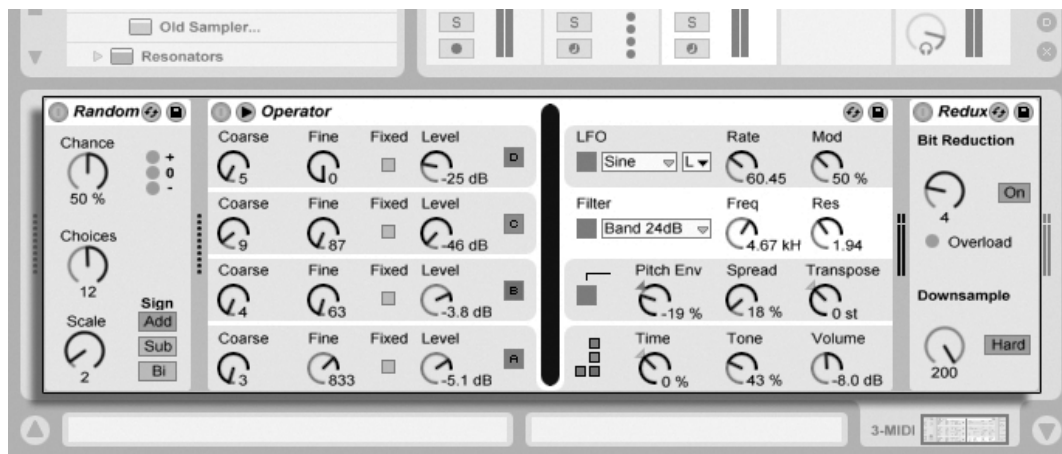
*The Track View
Displaying a MIDI Track's
Device Chain.*

Live's built-in audio effects, MIDI effects and instruments are available from the *Device Browser* and can be added to tracks by dragging them from there into the Track View, or into a Session or Arrangement track.
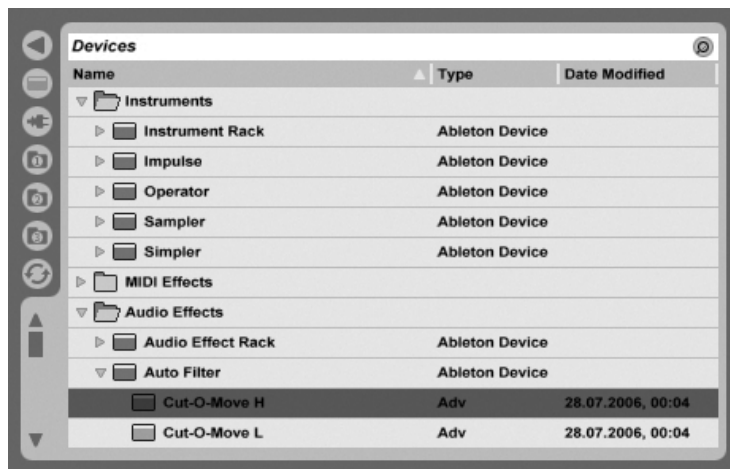
*Live's Built-in Devices
Are Available from the
Device Browser.*

You can also use plug-in devices in Live. VST and Audio Units (Mac OS X only) Plug-ins are available from the Plug-In Device Browser.
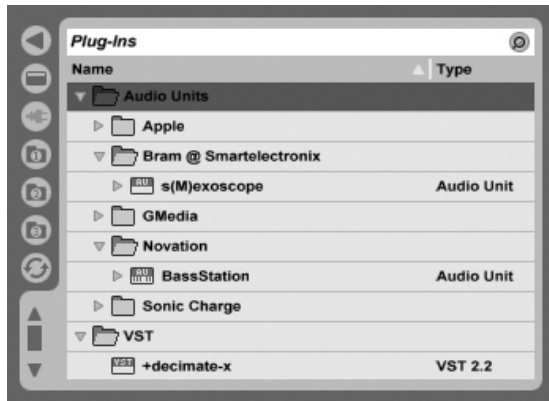
Plug-In Devices Are Available from the Plug-In Device Browser.

Consider an audio clip playing in an audio track. The audio signal from the clip reaches the leftmost device in the chain. This device processes (changes) the signal and feeds the result into the next device, and so on. The number of devices per track is theoretically unlimited. In practice, the computer's processor speed does impose a limit on the number of devices you can use at the same time, a topic that deserves separate discussion. Note that the signal connections between audio devices are always stereo, but the software's inputs and outputs can be configured to be mono in the Audio Preferences.

When the signal has passed through the device chain, it ends up in Live's *mixer*. As the Session and Arrangement share the same set of tracks, they also share the mixer. The mixer can be shown in both views for convenience. To optimize the screen layout, the individual mixer sections can be shown or hidden using the View menu's entries.
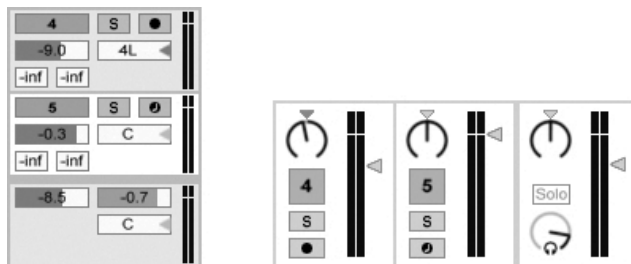

The Live Mixer in the Arrangement View (Left) and Session View (Right).

The mixer has controls for volume, pan position and *sends*, which adjust the contribution

each track makes to the input of any *return tracks*. Return tracks only host effects, and not clips. Via their sends, all tracks can feed a part of their signal into a return track and share its effects.

The mixer also includes a crossfader, which can create smooth transitions between clips playing on different tracks. Live's crossfader works like a typical DJ mixer crossfader, except that it allows crossfading not only two but any number of tracks – including the returns.
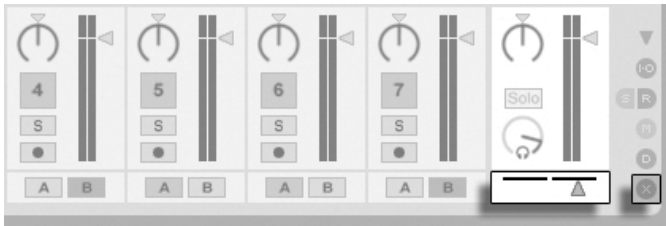

Live's Crossfader.

Devices that receive and deliver audio signals are called *audio effects*. Audio effects are the only type of device that fit in an audio track or a return track. However, two more types of devices are available for use in MIDI tracks: *MIDI effects* and *instruments*.

Consider a MIDI track playing a clip. The MIDI signal from the clip is fed into the track's device chain. There, it is first processed by any number of MIDI effects. A MIDI effect receives and delivers MIDI signals. One example is the Scale effect, which maps the incoming notes onto a user-defined musical scale. The last MIDI effect in the chain is followed by an instrument. Instruments, for instance Live's *Simpler* and *Impulse*, receive MIDI and deliver audio. Following the instrument, there can be any number of audio effects – as in an audio track.
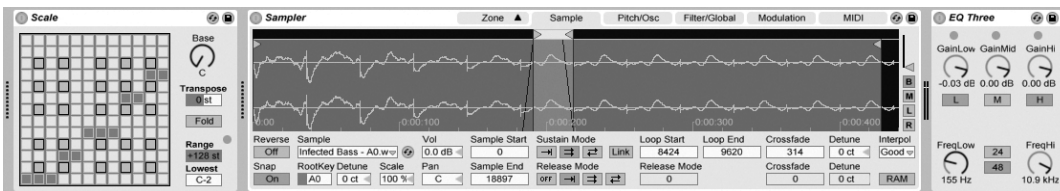
A MIDI Effect, an Instrument and an Audio Effect in a MIDI Track.

If a MIDI track has no instrument (and no audio effects), then the track's output is a plain MIDI signal, which has to be sent somewhere else to be converted into audio. In this case, the track's mix and Send controls disappear from the mixer.
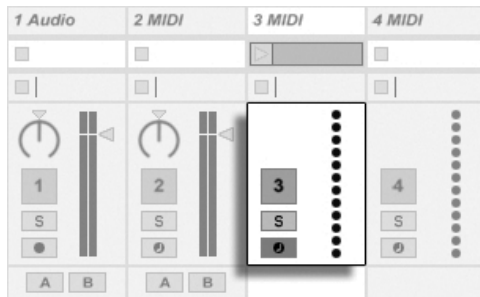
The Mixer for a MIDI Track without an Instrument.

4.8 Presets and Racks

Every Live device can store and retrieve particular sets of parameter values as *presets*. As presets are stored independently from Live Sets, new presets become part of a library that any project can draw from.

Live's *Instrument and Effect Racks* allow saving combinations of devices and their settings as a single preset. This feature allows for the creation of powerful multi-device creations and effectively adds all the capabilities of Live's MIDI and audio effects to the built-in instruments.

4.9 Routing

As we have seen, all tracks deliver signals, either audio or MIDI. Where do these signals go? This is set up in the mixer's *In/Out section*, which offers, for every track, choosers to select a signal source and destination. The In/Out section, accessible through the View menu's In/Out option, is Live's "patchbay." Its routing options enable valuable creative and technical methods such as resampling, submixing, layering of synths, complex effects setups and more.

Track Routing Is Set up Using the In/Out Section in the Arrangement (Left) or Session View (Right).

Signals from the tracks can be sent to the outside world via the computer's audio and MIDI interfaces, to other programs that are connected to Live via *ReWire* or to other tracks or devices within Live.

Likewise, a track can be set up to receive an input signal to be played through the track's devices. Again, tracks can receive their input from the outside, from a ReWire program or from another track or device in Live. The *Monitor* controls regulate the conditions under which the input signal is heard through the track.

4.10   Recording New Clips

Audio tracks and MIDI tracks can record their input signal and thereby create new clips. Recording is enabled on a track by pressing its *Arm button* (Hold down the Ctrl (PC) / ⌃ ⌘ (Mac) modifier to arm several tracks at once). When the Control Bar's Record button is on, every armed track records its input signal into the Arrangement. Every take yields a new clip per track.
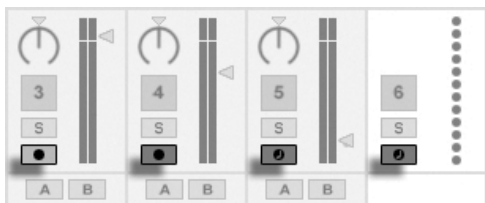
Track Arm Buttons, as They Appear in the Session View.

It is also possible to record into Session View slots on the fly. This technique is very useful for the jamming musician, as Session recording does not require stopping the music. When a track is armed, its Session slots exhibit Clip Record buttons, and clicking one of

these commences recording. Clicking the Clip Record button again defines the end of the recording and launches the new clip. As these actions are subject to real-time *launch quantization*, the resulting clips can be automatically cut to the beat.


The Control Bar's Quantization Chooser.

Session recording in conjunction with the *Overdub* option and *Record Quantization* is the method of choice for creating drum patterns, which are built up by successively adding notes to the pattern while it plays in a loop. It only takes a MIDI keyboard (or the computer keyboard) and a MIDI track with Live's Impulse percussion instrument to do this.

4.11   Automation Envelopes

Often, when working with Live's mixer and effects, you will want the controls' movements to become part of the Arrangement. The movement of a control across the Arrangement timeline is called *automation*; a control whose value changes in the course of this timeline is *automated*. Automation is represented in the Arrangement View by *breakpoint envelopes*, which can be edited and drawn.
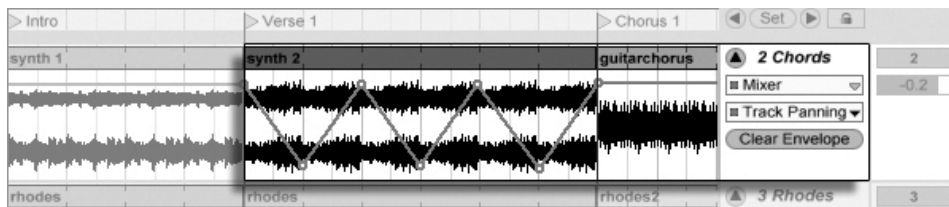

The Automated Pan Control and its Envelope.

Practically all mixer and effect controls in Live can be automated, even the song tempo. Creating automation is straightforward: All changes of a control that occur while the Control Bar's Record switch is on become automation.

Changing an automated control's value while *not* in Record Mode is similar to launching a Session clip while the Arrangement is playing: It deactivates the control's automation (in favor of the new control setting). The control will stop tracking its automation and rest with the new value until the Back to Arrangement button is pressed, which will resume Arrangement playback.

4.12   Clip Envelopes

Envelopes are found not only in tracks but also in clips. *Clip envelopes* are used to *modulate* device and mixer controls. Audio clips have, in addition, clip envelopes to influence the clip's pitch, volume and more; these can be used to change the melody and rhythm of recorded audio. MIDI clips have additional clip envelopes to represent MIDI controller data. Clip envelopes can be *unlinked* from the clip to give them independent loop settings, so that larger movements (like fade-outs) or smaller gestures (like an arpeggio) can be superimposed onto the clip's material.
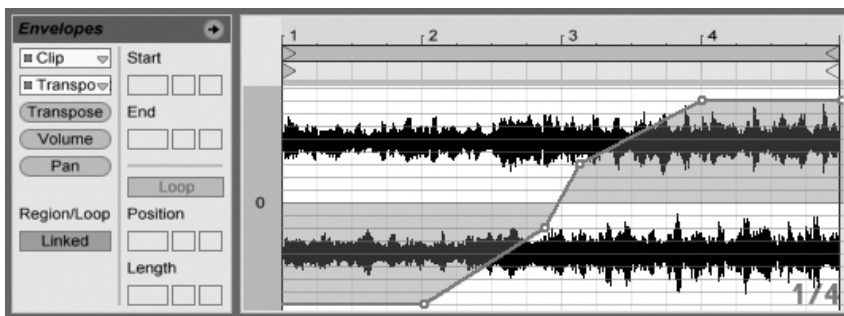
An Envelope for Clip Transposition.

4.13   MIDI and Key Remote

To liberate the musician from the mouse, most of Live's controls can be "remote-controlled" via an external MIDI controller. Remote mappings are established in *MIDI Map Mode*, which is engaged by pressing the MIDI switch in the Control Bar.

In this mode, you can click on any mixer or effect control, and then assign it to a controller simply by sending the desired MIDI message (for example, by turning a knob on your MIDI control box). Your assignments take effect immediately after you leave MIDI Map Mode. Session clips can be mapped to a MIDI key or even a keyboard range for chromatic playing.

MIDI keys and controllers that have been mapped to Live's controls are not available for recording via MIDI tracks. These messages are filtered out before the incoming MIDI is passed on to the MIDI tracks.

Session clips, switches, buttons and radio buttons can be mapped to computer keyboard keys as well. This happens in *Key Map Mode*, which works just like MIDI Map Mode.

Live offers, in addition to this general purpose mapping technique, dedicated support for *Mackie Control*-compatible mixer surfaces, which allows for mouse-free operation of the program.

4.14   Saving and Exporting

Saving a Live Set saves everything it contains, including all clips, their positions and settings, and settings for devices and controls. An audio clip can, however, lose the reference to its corresponding sample if it is moved or deleted from disk. The links between samples and their clips can be preserved with a special command, Collect and Save, which makes a copy of each sample and stores it in a project folder along with the Live Set.

A separate Save button in the Clip View saves a set of default clip settings along with the sample, so that each time the sample is dragged into the program, it will automatically appear with these settings. This is especially useful if you have made warp settings for a clip and want to use it in multiple Live Sets.

Exporting audio from Live can be done from both the Session and Arrangement Views. Live will export the audio coming through on the Master output as an audio file of your specifications via Render to Disk.

Live can also export individual MIDI clips as MIDI files.

Exporting and saving material for later use in Live can be done very conveniently with the Live Clip format. Session View clips can be dragged back out of a Live Set to the File Browsers, and thereby exported to disk as Live Clips.
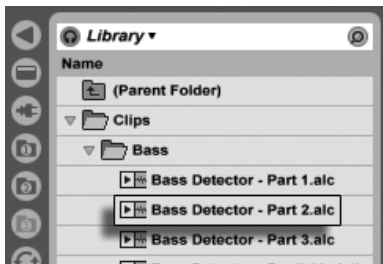
A Live Clip in the File Browser.

Live Clips are a very powerful way of storing ideas, as they save not only the clip's Clip View settings, but also the corresponding track's instruments and effects chain. Live Clips in the Browser can be previewed and added to any open Live Set just like sample files. In the Live Set, they restore the original clip's creative options.

Using Live Clips, you can build your own personalized library of:

- MIDI sequences with matching instruments and effects, e.g., a MIDI drum pattern with the associated Impulse and effects settings;

- Different regions or loops referencing the same source file;

- Variations of a sample loop created by applying Warp Markers, clip envelopes and effects;

- Ideas that may not fit your current project but could be useful in the future.

4.15   The Library

The Live Library acts as a repository of sounds that are available to all projects. In Live's File Browsers, the Library is accessible through a bookmark. Bookmarks can be selected by clicking the Browser's title bar to open the Bookmark menu:
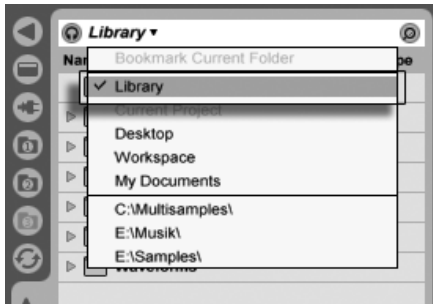
Choosing the Library Bookmark.

After installation the Library will already contain a few sound ideas, courtesy of Ableton. We encourage you to remove, change, augment or replace this content as you like.

Ableton provides additional Library content in the form of *Live Packs* which are available from installation CDs, DVDs or the Ableton website[2]. Owners of a boxed version of Live can enjoy the Essential Instrument Collection, a multi-gigabyte library of meticulously sampled and selected instruments.

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[2]http://www.ableton.com/downloads

Chapter 5

Managing Files and Sets

Various types of files are used in making music with Live, from those containing MIDI and audio, to more program-specific files such as Live Clips and Live Sets. This chapter will explain everything you need to know about working with each of these file types in Live. However, we should first take a look at Live's File Browsers, through which most files arrive in the program.

5.1 Working with the File Browsers

Live offers three File Browsers which can be accessed via their selector buttons.

The File Browser Selector Buttons.

Each Browser can point to a different disk location, something that Live will remember across sessions. The Browser display is divided into columns corresponding to "Name", "Date," etc., which you can show and hide using the 🖱 (PC) / ⌈Ctrl⌉ 🖱 (Mac) context menu options.
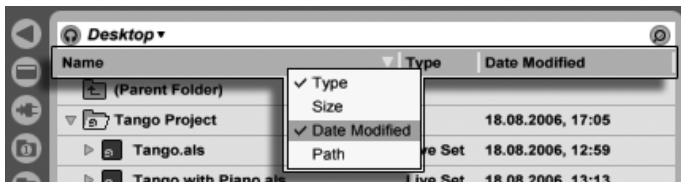
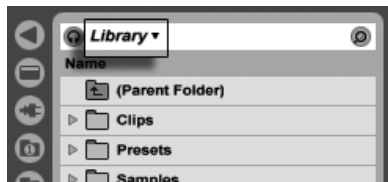*Showing/Hiding Browser Columns.*

Columns can be reordered by drag and drop. To resize the columns, drag their divider lines horizontally.


Resizing Browser Columns.

5.1.1   Browsing the Folder Hierarchy

Each of the three File Browsers has its own *root* directory, shown at the top of the Browser, the contents of which are available for browsing below.

"Library" Is this Browser's Root.

The Browser root can easily be changed: The topmost Browser item, called "Parent Folder," will move the Browser root up one step up in the disk hierarchy when double-clicked.
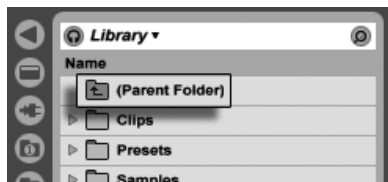
The File Browser's "Parent Folder" Item.

You can also set the Browser root to any folder in the Browser by double-clicking the folder, or by selecting it and pressing Return .
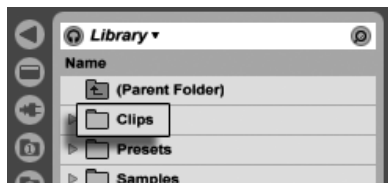
A Folder in the Browser.

Moving through the files in Live's Browser can be done with either the mouse or the computer keyboard:

- Scroll up and down in the Browser with ↑ and ↓.
- Close and open folders with ← and →.
- Jump to the parent folder of any closed folder using ←. (*Hint:* If executed on a top-level folder, this is an alternative to selecting the "Parent Folder" item, and will move the Browser root up one level.)

To clean up the Browser, use ↻ (PC) / Ctrl ↻ (Mac) to access the context menu, and then select the Close All Folders option to show only top-level folders. Double-clicking a

File Browser's selector button will do the same.

5.1.2 Browser Bookmarks

Using bookmarks, you can quickly save and recall frequently used folder locations in the Browser. Clicking in the Browser's title bar will open the Bookmark menu.
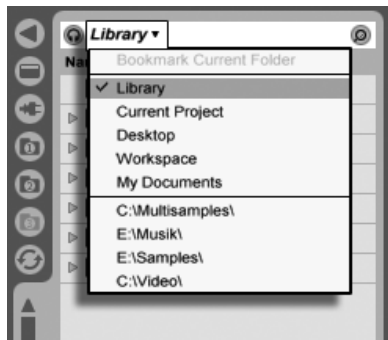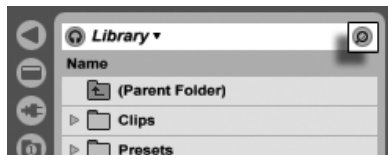

The Bookmark Menu.

The Bookmark menu lists a number of preset bookmarks such as *Desktop* and *Library*. Selecting the latter will bring you to the Live Library. To bookmark the current Browser root, choose the Bookmark menu's topmost item, the Bookmark Current Folder command. Note that if the current Browser root is *already* bookmarked, the topmost option in the Bookmark menu will remove the bookmark. All File Browsers share the same set of bookmarks; a bookmark stored in one Browser can be retrieved from another.
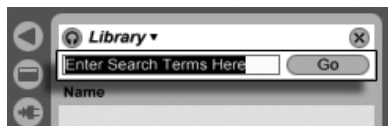
5.1.3 Searching for Files

Live's File Browsers are equipped with a search function for finding files. Clicking the Search button in the upper right corner of the Browser or using the `Ctrl` `⇧` `F` (PC) / `⌃` `⌘` `⇧` `F` (Mac) shortcut will open the Browser's Search Mode.

After entering your search terms, begin the search by clicking the Go button or pressing Return on your computer keyboard.

Live will search the entire Browser root for your search terms. The results will include files that match *all* search terms, as opposed to *any*. For example, if you search for "acoustic bass," the search will yield all acoustic bass sounds – not all acoustic sounds and all bass sounds.

By default, the search function matches the entered criteria not only to any part of a file's name and suffix (e.g., ".wav") but also to any part of its file path. This means that a search for "bass," for example, will yield not only files with names containing the word "bass" but also those located in folders with names containing the word "bass." Compressed sample metadata tags are also included in the search, making it possible to search for songs from a specific album or artist, for example. Searching file paths and metadata can be deactivated with the Search In Path and Search In Metadata settings, available in the Preferences' File/Folder tab. The names of MIDI tracks within multitrack MIDI files are also included in searches.

Live maintains an index of the hard disk so that it can deliver search results instantly. The index is kept up to date as you create, install, delete, rename and move files within Live – it has no way of knowing, however, what you are doing outside of Live. If you have subsequently moved files using programs other than Live, the initial results of a search might be incomplete. The Go button's label will change to "Rescan." If you can't find a file in the search results, or need to be sure that the results are comprehensive, click the Rescan button (or Return once more), and Live will rebuild its index for the current Browser root.
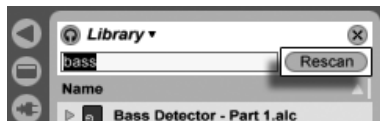
The Rescan Button.

Automatic rescanning for new searches can be activated and deactivated in the File/Folder Preferences.

While a search/rescan is going on, the adjacent search button is labeled "Stop." Rescanning happens in the background, and you can keep making music while Live does its work, but you can also abort the search with this button if the disk traffic is bothering you.

You can go back to the Browser's folder view at any time by closing the search field:

Closing the Search Field...

If you select a file from the search results and then close the search field, Live makes sure that file remains selected in the folder view, opening folders as required:
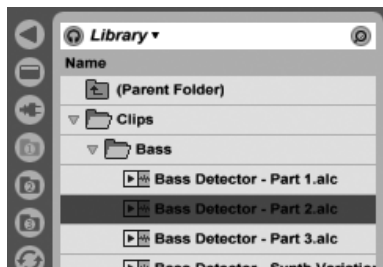
... Locates the File Last Selected Among the Search Results.

For mouse-free searching, we suggest the following sequence of shortcuts:

    1) Ctrl ⇧ F (PC) / ⌃ ⌘ ⇧ F (Mac) to open the search field;

2) Type your search terms;

3) Return to "Go";

4) ⬇ to jump to the search results;

5) ⬆ and ⬇ to scroll the search results;

6) Ctrl ⇧ F (PC) / ⌘ ⇧ F (Mac) to close the search field and go back to the folder view.

5.1.4   Previewing Files
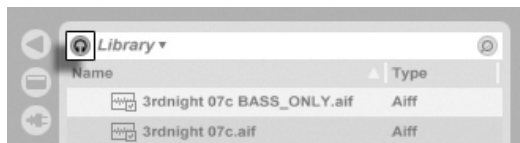
The Preview Switch.

Live allows you to preview files in the File Browser before they are imported into the program. Previewing is activated using the Browser's Preview switch.

Hint: You can preview files even when the Preview switch is not activated by pressing ⇧ Return .

Click on the files (or use ⬇ and ⬆) to select and listen to them. Live tries to preview files in sync with the current Live Set, so that you can better judge which samples will work for you.

The previewing volume can be adjusted using the mixer's Preview Volume knob.
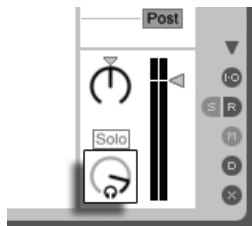
The Preview Volume Knob.

If your audio hardware offers multiple audio outs, you can privately audition, or *cue,* files via headphones connected to a separate pair of outs – while the music continues to play. To learn how to set up Live for cueing, please refer to the relevant section of the Mixing chapter.

5.1.5   Adding Clips from the Browser

There are several ways to add clips to a Live Set:

- Files can be dragged and dropped from the File Browsers into tracks in the Session or Arrangement View. Dragging and dropping material from the Browser into the space to the right of Session View tracks or below Arrangement View tracks will create a new track and place the new clip(s) there.
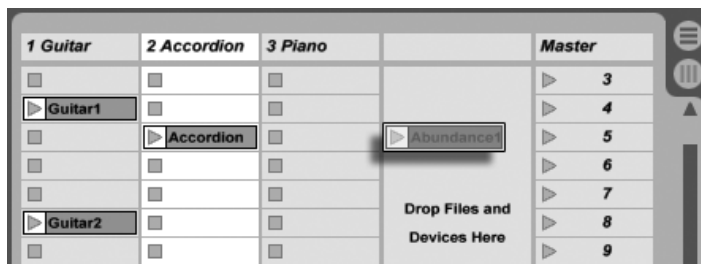
Dropping a Clip to Create a New Track.

- In the Session View, double-clicking or pressing ⏎Return on a file in the Browser will automatically create a new track to the right of the other tracks and load it with the clip.

- Files can be dropped directly into Live from the Explorer (Windows)/Finder (Mac).

5.1.6   File Maintenance in the Browser

You can use Live's File Browsers for all of the file maintenance activities that you are familiar with on your operating system.

- **Move files and folders** by dragging and dropping, or by copying/cutting and pasting. Copying, cutting and pasting can be done with either Edit menu commands or key-board shortcuts. A file can be moved from one File Browser to another by dragging it over the target Browser's ⓿ button.

- **Rename files and folders** using the Edit menu's Rename command or the `Ctrl``R` (PC) / `⇪``⌘``R` (Mac) shortcut. Cancel renaming with the `Esc` key.

- **Create folders** by opening the context menu with 🖱 (PC) / `Ctrl` 🖱 (Mac), and then selecting the Create Folder command.

- **Delete files and folders** using the Edit menu's Delete command or your computer's `⟵` or `Delete` key. Deleting items within Live moves them to the system trash; if necessary, you can recover items from the system trash via your computer's operating system.

Note that, while you can rename or delete entire MIDI files via the Browser, this is not possible with the individual MIDI tracks contained within them. This is also the case with the individual components of Live Sets.

5.1.7 Hot-Swap Mode

In addition to the drag-and-drop method of loading files from the Browser, Live offers a *Hot-Swap Mode* to save you mouse travel. Hot-Swap Mode establishes a temporary link between the Browser and, for example, a virtual instrument. While in Hot-Swap Mode, you can step through samples or presets to audition them "in place," that is, within the instrument. Hot-swapping for presets is covered in the Live Device Presets section. Let's go through an example of hot-swapping samples:

Live's built-in Impulse instrument features eight sample-player slots that can be filled by dropping samples into them. Alternatively, we can click the Hot-Swap button that appears as we move the mouse over a slot.

The Hot-Swap Button in an Impulse Slot.

Clicking the Hot-Swap button engages Hot-Swap Mode: Live's *Hot-Swap Browser* opens, and the Hot-Swap icon appears next to one of the files shown.
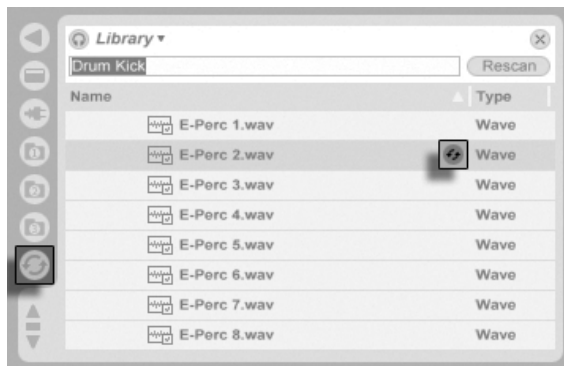
The Hot-Swap Browser.

While in Hot-Swap Mode, pressing the [Return] key loads that file into the Impulse slot (presumably while Impulse is playing incoming MIDI notes); pressing [↓] , then [Return] loads the next sample, and so on. Instead of using the keys, we can also double-click on a sample to load it. The link between the Browser and the instrument will be broken if a different view is selected, or if the Hot-Swap button is pressed again. Hot-swapping can also be cancelled with a press of the [Esc] key.

When Hot-Swap Mode is re-entered, the Hot-Swap Browser will try to reconstruct what you saw when you loaded the current file into the Impulse slot. If, for instance, the current file was found by searching for "gretsch kick," the Hot-Swap Browser will come up with that search string in the search field. In our example, we were hot-swapping for an empty Impulse slot, so Live came up with something appropriate: a search for "Drum Kick" in Library/Samples/Waveforms.

5.2   Sample Files

A *sample* is a file that contains audio data. Live can play both uncompressed file formats (WAV, AIF and Sound Designer II for Mac) and compressed file formats (MP3, AAC, Ogg Vorbis, Ogg FLAC and FLAC).

A note on using Variable Bit Rate (VBR) files: Please install QuickTime for decoding purposes if you do not already have it on your system. It can be downloaded from the Apple website[1].

As Live plays the samples directly from disk, you can work with a large number of (large) samples without running into RAM memory limitations.

Live can combine uncompressed mono or stereo samples of any length, sample rate or bit depth without prior conversion. To play a compressed sample, Live decodes the sample and writes the result to a temporary, uncompressed sample file. This usually happens quickly enough that you will be able to play the sample right away, without waiting for the decoding process to finish.

Note: When adding a long sample to a project, Live might tell you that it cannot play the sample before it has been analyzed. Please see the section on analysis for an explanation.

5.2.1 The Decoding Cache

To save computational resources, Live keeps the decoded sample files of compressed samples in the *decoding cache*, a sub-directory of the Audio Record Folder. Maintenance of the cache is normally not required, as Live automatically deletes older files to make room for those that are new. You can, however, impose limits on the cache size using the File/Folder Preferences' Decoding Cache section. The cache will not grow larger than the Maximum Cache Size setting, and it will always leave the Minimum Free Space on the hard disk. Pressing the nearby Cleanup button will delete all files not being used by the current Live Set.
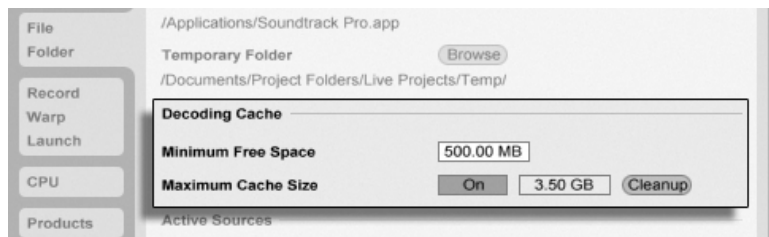
Preferences for the Decoding Cache.

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[1]http://www.apple.com/quicktime/download

5.2.2 Analysis Files (.asd)

An *analysis file* is a little file that Live creates when a sample file is brought into the program for the first time. The analysis file contains data gathered by Live to help optimize the stretching quality, speed up the waveform display and automatically detect the tempo of long samples.

When adding a long sample to a project, Live might tell you that it cannot play the sample before it has been analyzed. This will *not* happen if the sample has already been analyzed (i.e., Live finds an analysis file for this sample), or if the Record/Warp/Launch Preferences' Auto-Warp Long Samples preference has been deactivated. To prevent waiting for analysis of longer samples, you can pre-analyze them via the Browser, as we will see in a moment.

An analysis file can also store *default clip settings* for the sample:

Clicking the Clip View's *Save* button will store the current clip's settings with the sample's analysis file. The next time the sample is dragged into Live, it will appear with all its clip settings intact. This is particularly useful for retaining Warp Marker settings with the sample. Storing default clip settings with the analysis file is different from saving the clip as a Live Clip.

The analysis file's name is the same as that of the associated sample, with an added ".asd" extension. Live puts this analysis file in the same folder as the sample.

Samples that have an .asd file are displayed like this in the Browser.

Samples without an .asd file look like this.

The analysis files themselves do not appear in Live's Browsers.

Note that you can suppress the creation of .asd files by turning off the Create Analysis Files option in the File/Folder Preferences. All data (except for the default clip settings) can be recreated by Live if the .asd file is missing, however this will take some time for longer samples.

5.2.3   File Pre-Analysis

To avoid waiting for longer samples to be analyzed the first time they are imported into Live, you may want to pre-analyze them.

To pre-analyze all the files contained in any folder in the Browser, use the 🖰 (PC) / [Ctrl] 🖰 (Mac) context menu's Analyze Audio command. This process can also be cancelled via the context menu.

5.2.4   Exporting Audio

The File menu's *Render to Disk* command allows exporting Live's audio output as new samples. The resulting files can be used to burn an audio CD for listening purposes or a data CD, which could serve as a backup of your work or be used with other digital audio applications.

Which Signal Will Be Rendered?
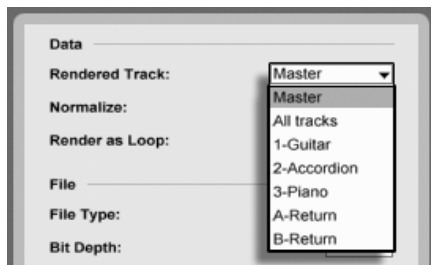
The Rendered Track Chooser.

The Render dialog's Rendered Track chooser offers several options for which signal to render:

- *Master* – the post-fader signal at Live's Master output. If you are monitoring the Master output, you can be sure that the rendered file will contain exactly what you hear.

- *All tracks* – the post-fader signal at the output of each individual track, including return tracks and MIDI tracks with instruments. Live will create a separate sample for each

track. All samples will have the same length, making it easy to align them in other multitrack programs.

- *Individual tracks* – the post-fader signal at the output of the selected track.

When Render to Disk is invoked while the Arrangement View is up, Live will render the selected time range.

If you would like to render the current Arrangement loop, choose the Select Loop command from the Edit menu prior to choosing Render to Disk. If you choose Render to Disk while the Session View is up, Live will ask you to specify the length of the sample to be rendered. The Render to Disk dialog will come up with a bars-beats-sixteenths field where you can type in the desired length. Live will capture audio starting at the current play start position for whichever duration you have specified.

Rendering Options
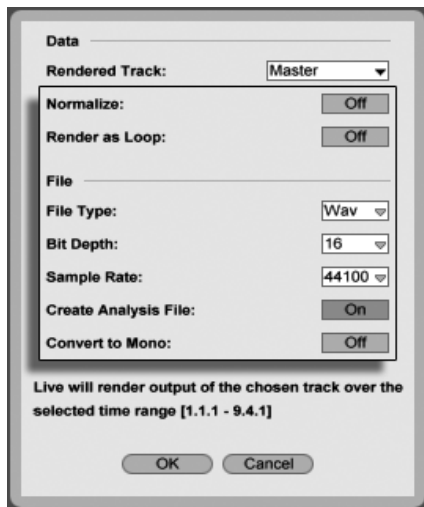
Rendering Options.

The Render dialog offers several rendering options:

- *Normalize* – If this is activated, the sample resulting from the render process will be normalized (i.e., the file will be amplified so that the highest peak attains the maximum available headroom).

- *Render as Loop* – If this is activated, Live will create a sample that can be used as a loop. For example, suppose your Live Set uses a delay effect. If Render as Loop is on, Live will go through the rendering process twice: The first pass will not actually write samples to disk, but add the specified delay effect. As the second pass starts writing audio to disk, it will include the delay "tail" resulting from the first pass.

- *File Type, Bit Depth, Sample Rate* – These options specify the type of sample to be created.

- *Create Analysis File* – If this is activated, Live will create an .asd file that contains analysis information about the rendered sample. If you intend to use the new sample in Live, check this option.

- *Convert to Mono* – If this is activated, Live will create a mono file instead of a stereo file.

5.3   MIDI Files

A *MIDI file* contains commands that prompt MIDI compatible synthesizers or instruments, such as Live's Simpler, to create specific musical output. MIDI files are exported by hardware and software MIDI sequencers. Importing MIDI files into Live works differently than with samples: MIDI file data is incorporated into the Live Set, and the resulting MIDI clips lose all reference to the original file. MIDI files appear as folders in the File Browser; opening the folders gives you access to the file's individual tracks (also called "voices" or "instruments").

A MIDI File and its Tracks in the Browser.

5.3.1   Exporting MIDI Files

Live MIDI clips can be exported as Standard MIDI files. To export a MIDI clip, use the File menu's Export Selected MIDI Clip command. This command will open a file-save dialog, allowing you to choose the location for your new MIDI file.

Exporting a MIDI file is different from saving the clip as a Live Clip.

5.4   Live Clips

Individual clips can be exported to disk in the Live Clip format for easy retrieval and reuse in any project.

To save a clip from the open Live Set to disk, simply drag it to the File Browser and drop it into any folder. You can then type in a new name for the clip or confirm the one suggested by Live with Return .
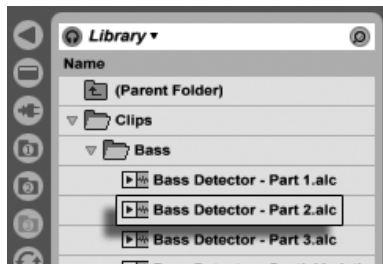
A Live Clip in the Browser.

Live Clips are a great way of storing your ideas for later use or development, as they save not only the original clip, including all its clip and envelope settings, but also the original track's devices. In order to recreate a Live Clip's device chain, either import it into a track containing no clips or devices, or drag it into the space in the Session or Arrangement View containing no tracks. Note that Live Clips that are imported into tracks already containing devices or clips will appear with their clip settings but not their devices. You could, for instance, drop a bass line Live Clip on an existing track that drives a bass instrument, rather than creating a new track.

Clips belonging to any Live Sets already on disk are also Live Clips. Please see the section on merging Sets for more on this topic.

Note that storing default clip settings with a sample's analysis file is different from saving a Live Clip. The default clip in the .asd file annotates the sample with sensible default values (warp, gain and pitch settings) so that it will play in a defined way when it is added to a Set. Live Clips, on the other hand, are stored on disk as separate musical ideas. For example, you could create a number of variations from the same audio clip by using different warp, pitch, envelope and effect settings, and store them all as separate Live Clips. In the Browser, you could then independently sort and preview these clips, even though they are all referring to the same source sample.

5.5   Live Sets

The type of document that you create and work on in Live is called a *Live Set*.

5.5.1   Creating, Opening and Saving Sets

Use the File menu's New command to create new Live Sets, and the Open or Open Recent command to open existing ones. In the File Browser, you can double-click or press Return on a Live Set to open it.

The File menu's Save command saves the current Live Set exactly as it is, including all clips and settings.

You can also use the Save As command to save the current Live Set under a different name and/or in a different directory location, or the Save a Copy command to create a copy of the current Live Set with a new name and/or new directory location.

5.5.2   Merging Sets

Live makes it easy to merge Sets, which can come in handy when combining work from different versions or pieces. To add all tracks (except the return tracks) from one Live Set into another, drag the Set from the File Browser into the current Set, and drop it onto any track title bar or into the drop area next to or below the tracks. The tracks from the dropped Set will be completely reconstructed, including their clips in the Session and Arrangement View, their devices, and their automation.
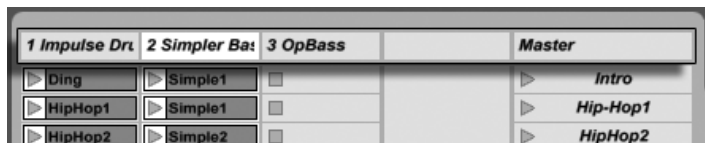
Session View Drop Area for Importing Live Sets.
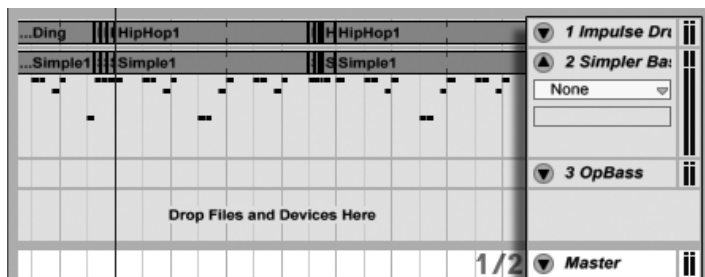
Arrangement View Drop Area for Importing Live Sets.

If you prefer to import individual tracks from a Set, you can unfold the Live Set in the File Browser just as if it were a folder.

Unfolding a Set to Reveal its Tracks.

You can now drag the individual tracks and drop them as described at the beginning of this section.

Of the three tracks contained in the "Tango" Set shown in the following figure, two contain Session View clips. These can be accessed by unfolding the tracks:
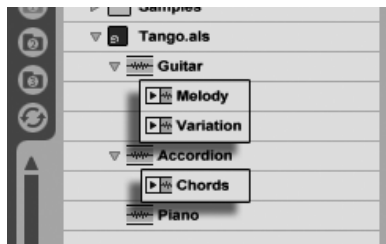
Revealing the Session View Clips Contained in a Set.

You can browse, preview and import Session View clips from the Set as if they had been stored as individual Live Clips. This, basically, means that any Live Set can serve as a pool of sounds for any other, suggesting creative reuse and crossover.

5.5.3   Exporting Session Clips as New Sets

You can export a selection of Session View clips as a new Live Set by dragging them to the File Browser. To export a Set, first click and drag, or use the ⟨⇧⟩ or ⟨Ctrl⟩ (PC) / ⟨⌃ ⌘⟩

(Mac) modifiers, to select more than one Session View clip. Then, simply drag the clips to a folder in the File Browser, where you can either confirm Live's suggested name or type in one of your own.

5.5.4   Template Sets

Use the File/Folder Preferences' Template Save button to save the current Live Set as a template. Live will use these settings as the initialized, default state for new Live Sets. You can use this to pre-configure:

- Your multichannel input/output setup.
- Preset devices, like EQs and Compressors, in every track.
- Computer key mappings.
- MIDI mappings.

The template Live Set, "Template.als," is located in Live's Preferences folder and can be copied or deleted from there. The easiest way to locate this folder is to search your disk for "Template.als."

5.5.5   Viewing and Changing a Live Set's Sample References

To view a list of the samples referenced by the current Live Set, choose the Manage Files command from the File menu, click the Manage Set button, and then click the View Samples button. Live will display one line for each sample used by the Live Set, regardless of how many clips or instruments within the Live Set are using that sample. Here is what you can do:

- **Replace a sample** – Dragging a sample from the File Browser and dropping it on a line in the list makes the Live Set reference the new sample instead of the old one. For samples used in audio clips, Live retains the clip properties; the Warp Markers are kept if the new sample has the same or a greater length as the old sample and discarded otherwise.
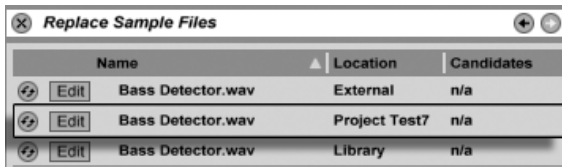
Every Line in the Sample Reference List is a Drop Target for Samples.

- **Hot-swap samples** – Using the Hot-Swap button at the left-hand side of each line, you can quickly browse through alternatives for the sample that is currently being referenced. This is like dragging samples here, only quicker.

The Sample Reference List's Hot-Swap Button.

- **Edit a referenced sample** – using an external application (which can be chosen in the Preferences' File/Folder tab). Clicking the Edit button will open the referenced sample in the external application. The sample will remain offline as long as the Edit switch is engaged. For samples used in audio clips, the current set of Warp Markers is retained only if the sample length remains the same as before.
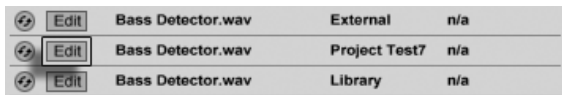
The Sample Reference List's Edit Switch.

- **View a sample's location** – The Location column states if a sample is missing, or if it resides in the Live Library, a Project or somewhere else ("external").
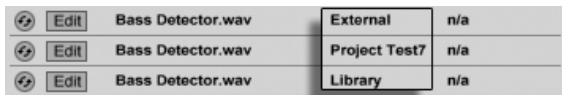
The Sample Reference List's Location Column.

5.6   Live Projects

A *Live Project* is a folder containing Live-related files that belong together. Consider, for example, work on a piece of music: You start out with an empty Live Set; you record audio and thereby create new sample files; you drag in samples from collections; you save different

versions of the Live Set along the way so that you can go back and compare. Perhaps you also save Live Clips or device presets that "belong" to this particular musical piece. The project folder for this Live Project will maintain all the files related to this piece of music – and Live's *File Manager* will provide the tools you need to manage them.

5.6.1 Projects and Live Sets

In Live, there is no need to manually create Projects, as they are automatically built for you. When you save a Live Set under a new name or in a new folder location, Live will create a new project folder and store the Live Set there – unless you are saving the Live Set into an existing Live Project. Let's look at an example to illustrate this process:

We have recorded some audio into a new Live Set. We now save the Live Set under the name "Tango" on the Desktop. Here is the result as displayed by the Live Browser:
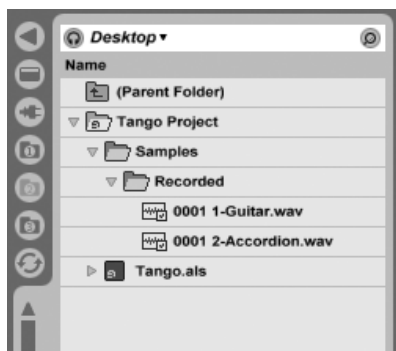
A Live Set and its Recordings in a Live Project Folder.

The project folder ("Tango Project") contains the Live Set ("Tango.als") and a Samples folder, which in turn contains a Recorded folder with two samples in it. Note that the main window of Live now shows us that we are working on Project Tango.

Next, we record another track into our Project. We save the modified version of the Live Set under a new name so that we do not lose the previous version. Accepting the Save As command's default suggestion, we store the new version of the song in the Tango Project folder.

A Second Version of the Live Set Has Been Added to the Project.

The Tango Project now contains two Live Sets, and its Samples/Recorded folder contains the samples used by both of them.

And now for something completely different: We choose the File menu's New command and record a samba tune. As this has nothing to do with our tango dabblings, we decide to save it outside the Tango Project folder, say on the Desktop. Live creates a new project folder named Samba Project next to Tango Project.

A New Project Was Added Next to Tango Project.

So far we have seen how to create Live Projects and save versions of Live Sets into them. How do we open a Project? Simply by opening any of its contained Live Sets. Double-clicking "Tango with Piano.als" opens that Set and the associated Project – as displayed in the Live window's title bar.

Let's suppose that, in the course of our work on "Tango with Piano.als," we get sidetracked:

The piece evolves towards something entirely different, and we feel that it should live in a Project of its own. So, we "Save As..." under a new name and in some location outside the current Project, say the Desktop:

A New Project Was Added by Saving a Live Set Outside its Original Project.

Note that the new project folder has no Samples folder (yet). "Electro with Piano.als" is still referencing the piano sample from the original Tango Project. There is nothing wrong with this except for when the Tango Project is moved away or deleted; then "Tango with Piano.als" will be missing samples. You can prevent this by collecting samples. Even after the fact, Live's tools for searching missing samples can help solve this problem.

There is actually no need to keep a Project's Live Set exactly one level below the Project itself. Within a project folder, you can create any number of sub-folders and move files around to organize them as desired.

In general, Live will do what it can to prevent situations such as orphaned (Project-less) Live Sets (and Live Clips and presets) or nested project folders, which have the potential of confusing both the user and Live's file management tools. It cannot, however, control situations in which Sets or files are moved out of order and become disorganized via the Explorer (Windows)/Finder (Mac).

A note for users of older Live versions: Live 6 does not allow overwriting Live Sets that were created by older versions to prevent compatibility problems. Instead, you will be requested to "Save As...". Doing this will insure that the newly saved Live Sets reside in project folders.

5.6.2 Projects and Presets

By default, new instrument and effect presets are stored in the Live Library, making them available to any project. At times however, it may make more sense to save a preset with the current Project. You might, for example, want to keep a number of alternative master EQ settings for a given piece. These EQ presets are specific to the piece and of little use to other Projects. For this reason, every device in the Device Browser has a Current Project sub-folder. Simply drag a preset here after saving it.
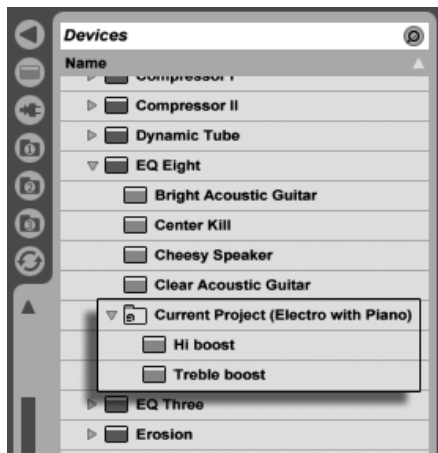
Project-Specific Presets Appear Under "Current Project" in the Device Browser.

5.6.3 Managing Files in a Project

Live's File Manager offers several convenient tools for managing Projects. Choose the Manage Files command from the File menu, and then click the Manage Project button. The File Manager will present you with an overview of the Project's contents and tools for:

- locating samples that the Project is missing;
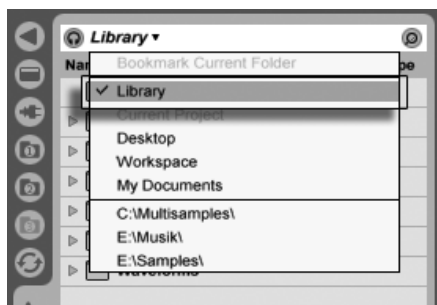- collecting external samples into the Project;
- listing unused samples in the Project;

- packing a Project in Live Pack format;
- exporting the Project's contents to the Library.

5.7   The Live Library

The Live Library acts as a repository of sounds that are available to all Live Projects. In Live's File Browsers, the Library is accessible through a bookmark:

Choosing the Library Bookmark.

Clips can be conveniently saved in Live Clip format for later reuse by dragging them from the open Live Set into the desired folder in the Library. Device presets are saved in the Library by default (but you can also save them with a Project). Note that saving presets and Live Clips in the Library does not mean that their referenced samples are also saved, but Live offers tools for collecting these samples so as to make the Library self-contained.

Ableton delivers Library content that can serve as a starting point for creative exploration. Content is shipped in the form of *Factory Live Packs*. Factory Live Packs are available from installation CDs, DVDs or the Ableton website[2]. To install a Factory Live Pack in the Library, double-click the Live Pack file (.alp), drag it into the Live main window, or locate it via the File menu's Install Live Pack command.

A list of the currently installed Factory Live Packs is available from the Preferences' Products tab. Here you can select individual Live Packs from the list and click the Uninstall button to remove them.

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[2]http://www.ableton.com/downloads

You can of course also move, remove or rename any files or folders residing in the Library, whether you have put them there yourself or they have been installed from a Factory Live Pack – the Library is intended to be your own Live space.

5.7.1 Changing the Library Location, Upgrading a Live 5 Library

The Library can reside in any hard disk location of your choice. In the Preferences' File/Folder tab, you will find the Library Path button, which brings up a dialog for selecting a Library folder.
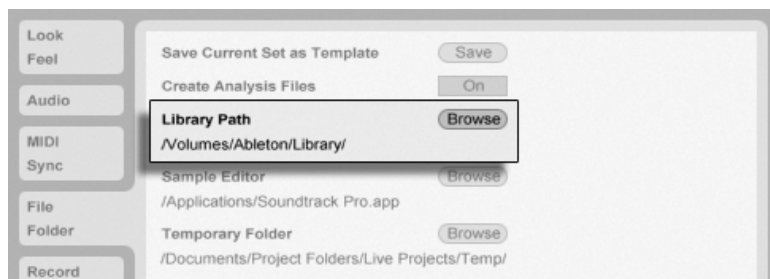
The Library Path Preference.

When you have selected a path, Live will ask whether you want the contents of the current Library merged into the target location. Doing this can have a few different effects, depending on the new location:

- If the target location is an empty folder, the contents of the current Library will be copied there.

- If the target location is a Live 6-formatted Library, the contents of the current Library will be copied into the target location without altering what was already there.

- If the target location is a Live 5-formatted Library, Live 6 will interpret this as your irreversible decision to upgrade and leave Live 5 behind. The folder structure of the Live 5-formatted Library will be changed to match new Live 6 conventions; then the current Library's contents will be merged with the pre-existing contents. The resulting Library will contain both the old files and the new files, but Live 5 will no longer be able to use it. *This is only recommended if you are sure about abandoning Live 5 or have saved a backup copy of your Library elsewhere.*

5.7.2   Importing Projects into the Library

You can merge the contents of a Live Project into the Library to make them available to any Project:

1) Open any of the Project's Live Sets to make this Project the current Project.

2) Choose the Manage Files command from the File menu.

3) Click the Manage Project button.

4) Unfold the Export to Library section by clicking the arrow on its left-hand side, and click the Export button.

Note that, as an alternative to steps 1 through 3 above, you can 🖱 (PC) / ⌈Ctrl⌋ 🖱 (Mac) on a project folder in the File Browser and select the Manage Project command.

5.8   Locating Missing Samples

If you load a Live Set, Live Clip or preset that references samples which are missing from their referenced locations, Live's Status Bar (located at the bottom of the main screen) will display a warning message. Clips and instrument sample slots that reference missing samples will appear marked "Offline," and Live will play silence instead of the missing samples.

Live's File Manager offers tools for repairing these missing links. Click on the Status Bar message to access these. (This is actually a shortcut for choosing the Manage Files command from the File menu, clicking the Manage Set button, and then clicking the Locate button found in the Missing Files section.) The File Manager will present you with a list of the missing files and associated controls.
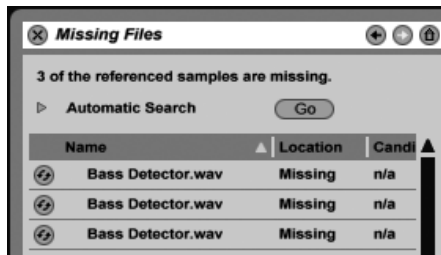
5.8.1 Manual Repair

To manually fix a broken sample reference, locate the missing sample in the File Browser, drag it over to the File Manager and drop it on the respective line in the list of missing files. Note that Live will not care if the sample you offer is really the sample that was missing. In fact, to Live, fixing a broken sample reference is no different than replacing a working sample reference.

5.8.2 Automatic Repair

Live offers a convenient automatic search function for repairing sample references. To send Live on a search, click the Automatic Search section's Go button. To reveal detailed options for guiding the automatic search function, click the neighboring triangular-shaped button.
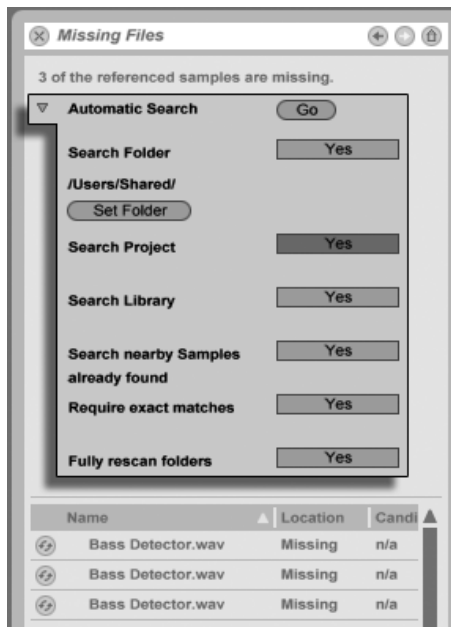
Automatic Repair Options in the File Manager.

- *Search Folder* – includes a user-defined folder, as well as any sub-folders, in the search. To select the folder, click the associated Set Folder button.

- *Search Project* – includes this Set's project folder in the search.

- *Search Library* – includes the Live Library in the search.

- *Search nearby samples already found* – includes the neighborhood of samples that have already been fixed, manually or automatically, in the search.

- *Require exact matches* – only samples that exactly match those missing will be accepted as candidates. Live will use fingerprints of header and audio data to test sample identity, somewhat slowing down the search.

- *Fully rescan folders* – guarantees all samples currently present will be considered, not only those currently known to Live's index of the file system. Note that searching the hard disk this way is much slower than using the information from the index.

For each missing sample, the automatic search function may find any number of *candidates.* Let's consider the following cases:

- *No candidate found* – you can either relax the search function's constraints and try again, or locate the sample manually.

- *One candidate found* – Live accepts the candidate and considers the problem solved.

- *Several candidates found* – Live requires your assistance: Click the Hot-Swap button (i.e., the leftmost item in every line of the list of missing samples) to have the File Browser present the candidates in Hot-Swap Mode. You can now double-click the candidates in the File Browser to load them, as the music plays if you like.

5.9   Collecting External Samples

To prevent a Live Set from containing broken sample references, Live provides the option of *collecting* (i.e., copying) them into the Set's project folder. This is accomplished via the File Manager:

- Choose the Manage Files command from the File menu

- Click the Manage Set button

- Unfold the triangular-shaped fold button in the External Samples section.
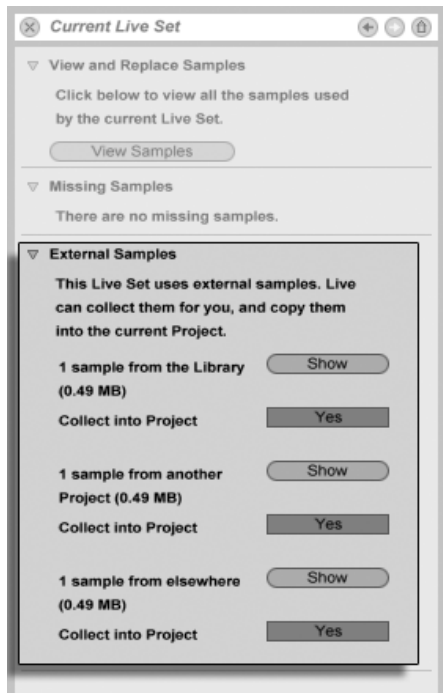
Options for Collecting External Samples.

Separated by location (the Library, other Projects and elsewhere – sample collections from external drives, for example), the File Manager provides:

- A sample count and the associated disk space used;
- A Show button that will list the samples in the File Browser;
- A Yes/No toggle for engaging or disengaging collection.

Note: Make sure to confirm your choices by clicking the File Manager's Collect and Save button!

The File Manager's Collect and Save Button.

The File menu's Collect All and Save command is a shortcut that collects and saves all external samples referenced by the current Set, including those from the Library. Note that this can cause a lot of copying, especially when the Library contains large multisample collections!

5.10   Aggregated Locating and Collecting

Instead of having to deal with problems while you are in a creative mode, you might prefer putting aside some dedicated housekeeping time to solve all the problems in one go. Using Live's File Manager, you can find missing samples and collect external samples not only for the current Live Set but also for:

- *The Library* – choose the Manage Files command from the File menu; then click the Manage Library button.

- *The current Live Project* – choose the Manage Files command from the File menu; then click the Manage Project button.

- *Any Live Project* – 🖱 (PC) / Ctrl 🖱 (Mac) on a Project in the Live Browser, and choose the Manage Project option.

- *All Projects found in a specific folder (and its sub-folders)* – 🖱 (PC) / Ctrl 🖱 (Mac) on a folder in the File Browser, and choose the Manage Projects command.

- *Any selection of Live Sets, Live Clips, Live Presets* – 🖱 (PC) / Ctrl 🖱 (Mac) on the respective items in the File Browser, and choose the Manage Files command.

Remember to click the Collect and Save button at the bottom of the File Manager when you are finished. Otherwise your changes will be discarded.

5.11   Finding Unused Samples

Live's File Manager can find the unused samples in a Project for you. You can then review them and decide to delete them individually or collectively. When searching for "unused" samples, Live will inspect each sample in a project folder, checking if it is referenced by any

of the Live Sets, Live Clips or device presets in the Project. If not, the sample is regarded as unused – *even if other Projects or programs still use it.*

To find the unused samples for the currently open Project, choose the Manage Files command from the File menu, click the Manage Project button, and then click on the triangular-shaped fold button next to "Unused Samples" to access a summary and the Show button. Clicking the Show button makes the File Browser list the unused samples; there, you can preview the samples and delete them if you like.

Note you can also find the unused samples from the Library: choose the Manage Files command from the File menu, then click the Manage Library button, and then see the Unused Samples section.

Last but not least, you can find the unused samples for all Projects found in a specific folder (and its sub-folders): 🖱 (PC) / Ctrl 🖱 (Mac) on a folder in the File Browser and choose the Manage Projects command, then see the Unused Samples section. Live inspects each Project individually and labels a sample unused even if another Projects in the same folder does use that sample. *To prevent losses, you may want to first collect the samples into their respective Projects and then purge the Projects of unused samples.*

5.12   Packing Projects into Live Packs

Live's File Manager provides the option of packing a Live Project in Live Pack format for convenient archiving and transfer. To do this, choose the Manage Files command from the File menu, click the Manage Project button, and then click on the triangular-shaped fold button next to "Packing." Click the Create Live Pack button to bring up a file-select dialog where you can specify the name and location of a new Live Pack file. Creating a new Live Pack from a Project does not affect the Project. If you want the Project deleted, you can delete it using the File Browser.

Live employs lossless compression techniques to minimize the file size of Live Packs. Depending on the audio materials in a Project, this saves up to 50 percent in file size.

To unpack a Live Pack (i.e., to restore the original Live Project), double-click the Live Pack file (.alp), drag it into the Live main window, or locate it via the File menu's Install Live Pack command. Live will then request that you choose a location for the new Project. Note:

Factory Live Packs (those provided by Ableton) will automatically be installed in the Live Library.

Chapter 6

Arrangement View

The *Arrangement View* displays the *Arrangement*, which contains music laid out along a song timeline, like a multitrack tape.
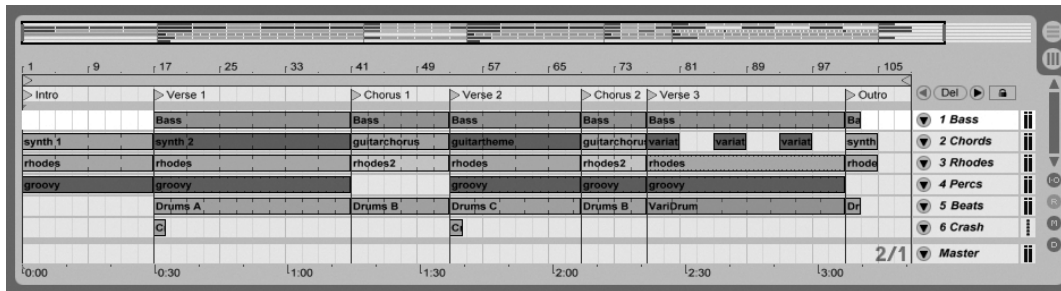
A Piece of Music in the Arrangement View.

The Arrangement View is a powerful editing tool that easily lets you combine and arrange MIDI, loops, sound effects, video and complete pieces of music.

6.1   Navigation

Live offers several fast methods for zooming and scrolling the Arrangement display:
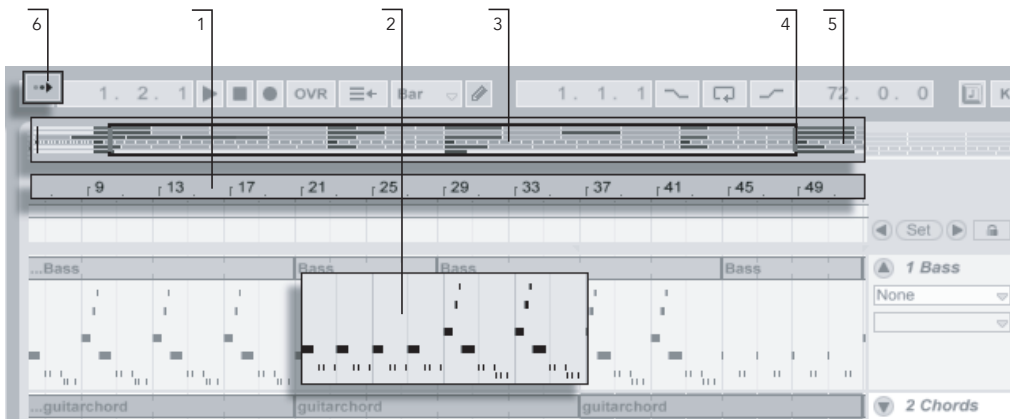
Navigating the Arrangement View.

1. To smoothly change the zoom level, click and drag vertically in the beat-time ruler at the top of the Arrangement View (you can also drag horizontally to scroll the display).

2. To zoom in and out around the current selection, use the computer keyboard's + and - keys. To "pan" the display, click and drag while holding the `Ctrl` `Alt` (PC) / `⌘` `Alt` (Mac) modifier.

3. The Arrangement Overview is like a "bird's-eye view" of your music. It always shows the complete piece, from start to end. The black rectangular outline represents the part of the Arrangement that is currently displayed in the Arrangement display below. To scroll the display, click within the outline and drag left or right; to zoom out and in, drag up and down.

4. To change the displayed part of the Arrangement, drag the outline's left and right edges.

5. To see a specific part of the Arrangement in more detail, click on it in the Overview and drag downwards to zoom in around that part. Note that you can also drag

horizontally to scroll the display. Using this method, you can zoom and scroll to focus around any part of the Arrangement with just one mouse motion.

6. To have the Arrangement display follow the song position and scroll automatically, turn on the Follow switch, or use the Follow command from the Options menu.

6.2   Transport

There are a number of ways to control Live's transport with the computer keyboard and mouse:

1. You can start Arrangement playback by clicking the Control Bar's Play button, and stop playback by clicking the Stop button. Arrangement playback can also be toggled on and off by pressing the keyboard's space bar.

The Play and Stop Buttons in the Control Bar.

2. You can set the Arrangement playback position by clicking anywhere along the Arrangement to place the flashing insert marker. Double-clicking the Stop button will return the Arrangement play position to 1.1.1.
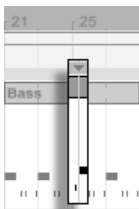
Arrangement Playback Begins from the Insert Marker.

To continue playback from the position where it last stopped, rather than from the insert marker, hold down the ⟨⇧⟩ modifier while pressing the space bar.

3. Clicking in the scrub area above the tracks will make playback jump to that point. The size of these jumps is quantized according to the Control Bar's Quantization menu setting. While the mouse is held down over the scrub area, a portion of

the Arrangement the size of the chosen quantization setting will be repeatedly played. With small quantization settings, or a setting of "None," this allows you to scrub through the music.
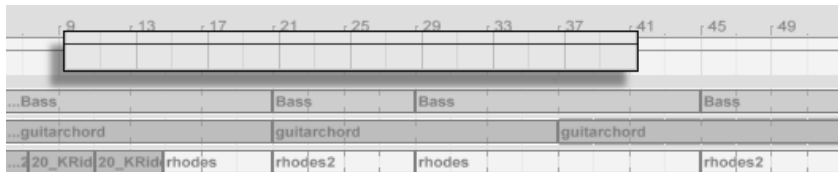
Scrubbing Arrangement Playback.

4. The song position can be adjusted numerically using the Control Bar's Arrangement Position fields.

Setting the Play Position in the Arrangement Position Fields.

The Arrangement Position fields show the song position in bars-beats-sixteenths. To change the values:

- Click and drag up or down in any of these fields.
- Click and type a number, then hit Return .
- Click and decrement or increment the value with ↓ and ↑ .

5. Arrangement playback can be started at a particular point in one of your clips using the scrub area in the Clip View.

6. Several Arrangement playback positions can be set using launchable locators.

Note that any computer keyboard key or MIDI message can be mapped to the transport controls, as described in the respective chapter.

6.3 Launching the Arrangement with Locators
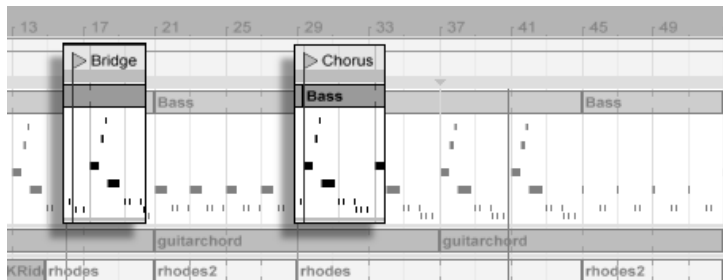
Using Locators to Launch Play in the Arrangement.

Locators can be set at any point in the Arrangement. This can be done in real time during playback or recording with the Set Locator button, and will be quantized according to the global quantization value set in the Control Bar. Clicking the Set Locator button when the Arrangement is not playing will create a locator at the insert marker or selection start. You can also create a locator using the context menu in the scrub area above the tracks or via the Insert menu. Note that the position of a new locator is quantized according to the Control Bar's Quantization menu setting.
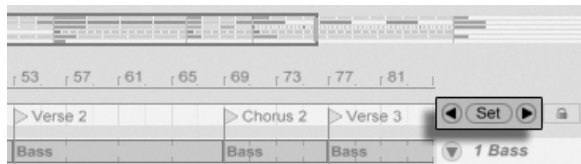
The Locator Controls.

You can recall (jump to) locators by clicking on them, or with the Previous and Next Locator buttons on either side of the Set button. Locators can also be recalled using MIDI/key mapping. Note that locator recall is subject to quantization. Double-clicking a locator will select it and start Arrangement playback from that point.

After jumping to the first or last locator in the Arrangement, the Previous and Next Locator buttons will jump to the Arrangement start or end, respectively.

Locators can be moved by clicking and dragging, or with the arrow keys on your computer keyboard.

To name a locator, select it by clicking its triangular marker, and choose the Rename Edit menu command (or use the ⌈Ctrl⌋⌈R⌋ (PC) / ⌈⇧ ⌘⌋⌈R⌋ (Mac) shortcut). Locators can be removed with your computer's ⌈←⌋ or ⌈Delete⌋ key, the Insert menu, or the Delete Locator button.

Note that the locator ⌖ (PC) / ⌈Ctrl⌋ ⌖ (Mac) context menu offers a quick way of looping playback between two locators with its Loop To Next Locator command.

The locator ⌖ (PC) / ⌈Ctrl⌋ ⌖ (Mac) context menu's Set Song Start Time Here command can be used to overrule the default "play starts at selection" rule: when this command is checked, play starts at the locator.

6.4 The Arrangement Loop

The Control Bar's Loop Switch.

For Live to repeatedly play a section of the Arrangement, activate the *Arrangement loop* by clicking on the Control Bar's Loop switch.

The Loop Start Fields (Left) and the Loop Length Fields (Right).

You can set loop length numerically using the Control Bar fields: The left-hand set of fields determines the loop start position, while the right-hand set determines loop length.

The Edit menu's Loop Selection command accomplishes all of the above at once: It turns the Arrangement loop on and sets the Arrangement loop brace to whatever timespan is selected in the Arrangement.
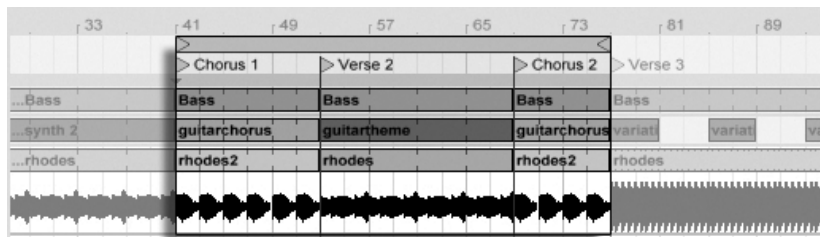
The Arrangement's Loop Brace.

The loop brace can be selected with the mouse and manipulated with commands from the computer keyboard:

- ⬅ and ➡ nudge the loop brace to the left/right by the current grid setting.
- ⬇ and ⬆ shift the loop brace left/right in steps the size of its length.
- The `Ctrl` (PC) / `⌘` (Mac) modifier used with the arrow left and right keys shortens or lengthens the loop by the current grid setting.
- The `Ctrl` (PC) / `⌘` (Mac) modifier with the arrow up and down keys doubles or halves the loop length.

You can also drag the Arrangement's loop brace: Dragging the left and right ends sets the loop start and end points; dragging between the ends moves the loop without changing its length.

The loop's 🖰 (PC) / `Ctrl` 🖰 (Mac) context menu's Set Song Start Time Here command can be used to overrule the default "play starts at selection" rule: when this command is checked, play starts at the loop start.

6.5   Moving and Resizing Clips

A piece of audio or MIDI is represented in the Arrangement View by a clip sitting at some song position in one of Live's tracks.
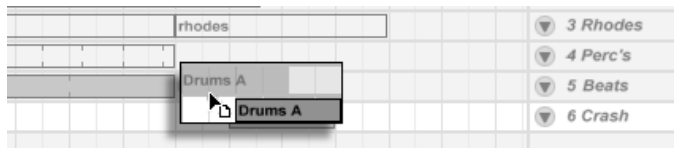
Dragging a clip moves it to another song position or track.
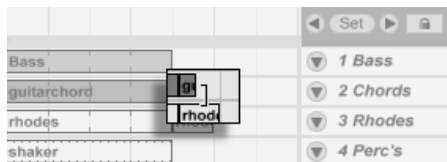
Dragging a clip's left or right edge changes the clip's length.

6.6   Selecting Clips and Time

With the exception of moving and resizing clips, Arrangement editing in Live is selection-based: You select something using the mouse, then execute a menu command (e.g., Cut, Copy, Paste, Duplicate) on the selection. This editing method lends itself to an efficient division of labor between the two hands: One hand operates the mouse or trackpad, while the other hand issues the keyboard shortcuts for the menu commands. The menu eventually is only used as a reference for looking up the keyboard shortcuts.

Here is how selection works:

- Clicking a clip selects the clip;
- Clicking into the Arrangement background selects a point in time, represented by a flashing insert mark;
- Clicking and dragging selects a timespan.
- To access the time *within* a clip for editing, "unfold" its track by clicking the ⬇ button next to the track name.
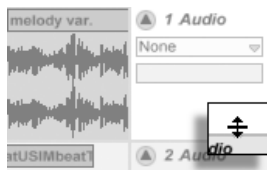
Adjusting an Unfolded Track's Height.

Notice that you can adjust the height of the unfolded track by dragging the split line below the Unfold Track button. Clicking and dragging in the waveform display below the clip's horizontal strip allows you to select time within the clip. Note that you can actually unfold all of your tracks at once by holding down the [Alt] (PC) / [Alt] (Mac) modifier when clicking the ⬇ button.

- Clicking on the loop brace is a shortcut for executing the Edit menu's Select Loop command, which selects all material included within the loop.

- Holding [⇧] while clicking extends an existing selection in the same track or across tracks.

Clicking the Loop Brace to Select the Loop for Editing.

6.7   Using the Editing Grid

To ease editing, the cursor will snap to grid lines that represent the meter subdivisions of the song tempo. The grid can be set to be either zoom-adaptive or fixed.

You can set the width of both zoom-adaptive and fixed grid lines using the 🖱 (PC) / [Ctrl] 🖱 (Mac) context menu available in either the Arrangement View track area or the Clip View display.

The following shortcuts to Options menu commands allow quickly working with the grid:

- Use `Ctrl` `1` (PC) / `⌃` `⌘` `1` (Mac) to *narrow* the grid, doubling the density of the grid lines (e.g., from eighth notes to sixteenth notes).
- Use `Ctrl` `2` (PC) / `⌃` `⌘` `2` (Mac) to *widen* the grid, halving the density of the grid lines (e.g., from eighth notes to quarter notes).
- Use `Ctrl` `3` (PC) / `⌃` `⌘` `3` (Mac) to toggle *triplets* mode; this would, for instance, change the grid from eighth notes to eighth note triplets.
- Use `Ctrl` `4` (PC) / `⌃` `⌘` `4` (Mac) to turn grid snapping on or off. When the grid is off, the cursor does not snap to meter subdivisions.
- Use `Ctrl` `5` (PC) / `⌃` `⌘` `5` (Mac) to toggle fixed and adaptive grid modes.

The current spacing between adjacent grid lines is displayed in the lower right corner of the Arrangement View or Clip View.

6.8   Using the ...Time Commands

Whereas the standard commands like Cut, Copy and Paste only affect the current selection, their "... Time" counterparts act upon all tracks by inserting and deleting time.

- *Cut Time* cuts a selection of time from the Arrangement, thereby moving any audio or MIDI on either side of the cut area closer together in the timeline. This command reduces the length of your Arrangement by whatever amount of time you have cut. Note that the Cut Time command affects all tracks, not only the selected ones.
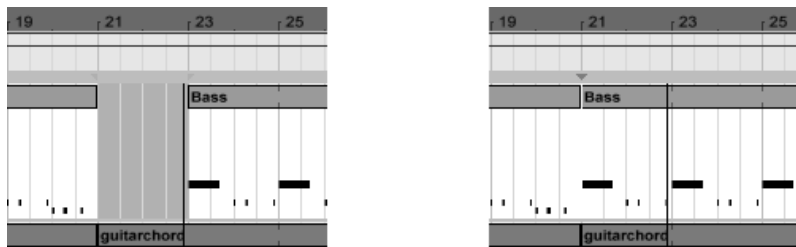
A Gap Between Clips Has Been Deleted by First Selecting It, Then Executing the Delete Time Command.

- *Paste Time* places copied time into the Arrangement, thereby increasing its overall duration by the length of time you have copied.

- *Duplicate Time* places a copy of the selected timespan into the Arrangement, thereby increasing its overall duration by the length of the selection.

- *Delete Time* deletes a selection of time from the Arrangement, thereby moving any audio or MIDI on either side of the deleted area closer together in the timeline. This command reduces the length of your Arrangement by the amount of time you have deleted. Note that the Delete Time command affects all tracks, not only the selected ones.

- *Insert Silence* inserts as much empty time as is currently selected into the Arrangement, before the selection.

6.9   Splitting Clips

The Split command can divide a clip or isolate part of it.

To split a clip in two halves, do the following:

1. Unfold the track;

2. In the waveform or MIDI display, click at the position where you want the clip to be split;

3. Execute the Split command.

To isolate a part of a clip, do the following:

1. Unfold the track;

2. In the waveform or MIDI display, drag a selection over the part of the clip you want to isolate;

3. Execute the Split command to divide the original clip into three pieces.
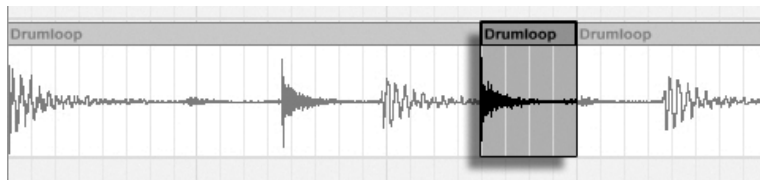
The Result of Splitting a Clip.

6.10   Consolidating Clips

The Consolidate command replaces the material in the Arrangement View selection with one new clip per track. This is very useful for creating structure.
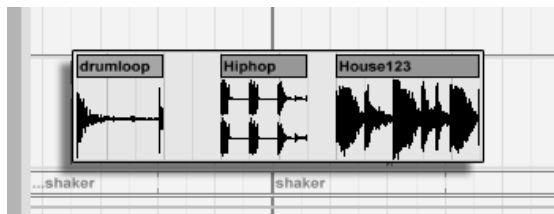
Consolidating Several Clips Into a New Clip.

Suppose you have, by editing or improvising, come up with a layout of clips that sound good in Arrangement Loop mode. Selecting that part of the Arrangement, for instance by using the Edit menu's Select Loop command, and then executing the Consolidate command creates a new clip that can be treated as a loop. You can now, for instance, drag the clip edges to create more repetitions. You might also want to drag the new loop via the Session View selector into a Session View slot for real-time arrangement purposes.

When operating on audio clips, Consolidate actually creates a new sample for every track in the selection. The new samples are essentially recordings of the time-warping engine's audio output, prior to processing in the track's effects chain and mixer. Hence, the new sample incorporates the effects of in-clip attenuation, time-warping and pitch shifting, and of the respective clip envelopes; however, it does not incorporate the effects. To create a new sample from the post-effects signal, please use the Render to Disk command.

The new samples can be found in the current Set's Project folder, under Samples/Processed/ Consolidate. Until the Set is saved, they remain at the location specified by the Temporary Folder.

Chapter 7

Session View

In Live's Arrangement View, as in all traditional sequencing programs, everything happens along a fixed song timeline. For a number of applications, this is a limiting paradigm:

- When playing live, or when DJing, the order of pieces, the length of each piece and the order of parts within each piece is generally not known in advance.

- In the theatre, sound has to react to what happens on stage.

- When working along with a piece of music or a film score, it can be more efficient and inspirational to start with an improvisation, which is later refined into the final product.

This is exactly what Live's unique *Session View* is for.

7.1   Session View Clips
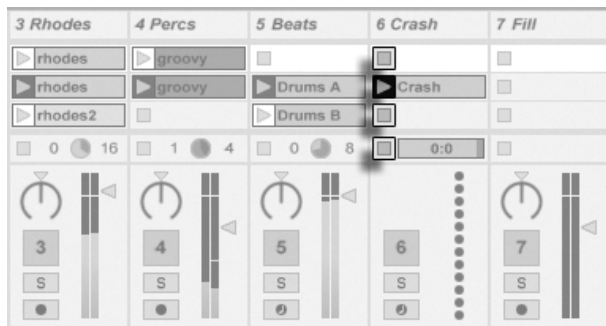
1. Each clip in the Session View has a triangular button at the left edge. Click the button with the mouse to "launch" clip playback at any time, or pre-select a clip by clicking on its name, and launch it using the computer's Return key. You can then move on to the neighboring clips using the arrow keys. Please refer the manual section on clip launch settings for details on how to customize this behavior.

2. Click on a square Clip Stop button to stop a running clip, either in one of the track's slots, or in the *Track Status field* below the Session grid.

Clips can be controlled remotely with the computer keyboard or a MIDI controller. They can even be mapped to MIDI note ranges so that they play chromatically.

Clips can be played at any time and in any order. The layout of clips does not predetermine their temporal succession; the Session grid offers random access to the clips it contains.

Notice that, even if you stop playback for a Session View clip, the Play button in the Control Bar will remain highlighted, and the Arrangement Position fields will continue running. These fields keep a continuous flow of musical time going, so that you can always know your position in song time during a live performance or while recording into the Arrangement, regardless of what your individual Session clips are doing.

You can always return the Arrangement Position fields to 1.1.1 and stop playback for the entire Live Set by pressing the Control Bar's Stop button twice.

7.2   Tracks and Scenes

Each vertical column, or track, can play only one clip at a time. It therefore makes sense to put a set of clips that are supposed to be played alternatively in the same columns: parts of a song, variations of a drum loop, etc.
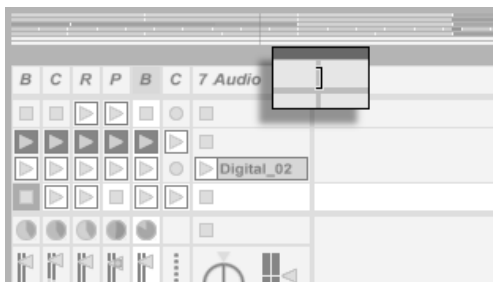
*Resized Session View
Tracks.*

For convenient access to more clips at once, you can resize Session View tracks by clicking and dragging at the edges of their title bars. Tracks can be narrowed this way so that only Clip Launch buttons and essential track controls are visibile.
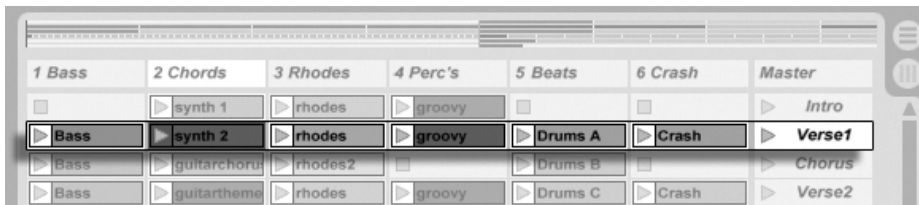
*A Scene in the Session
View.*

The horizontal rows are called *scenes*. The *Scene Launch buttons* are located in the rightmost column, which represents the Master track. To launch every clip in a row simultaneously, click on the associated Scene Launch button. This can be very useful in organizing the live performance of a song with multiple parts.

The scene below a launched scene will automatically be selected as the next to be launched unless the Select Next Scene on Launch option in the Launch Preferences is set to "Off." This allows you to trigger scenes from top to bottom without having to select them first. Computer keys or a MIDI controller can be used to launch scenes and scroll between them.

Scenes can be renamed using the Edit menu's Rename command. One can quickly rename several scenes by executing the Rename command and using the computer's Tab key to move from one scene to the next.

Each scene can actually store a tempo setting as part of its name, so that it changes the project tempo upon launch; this is accomplished by selecting the scene and renaming it with a viable tempo (e.g., "96 BPM"). Any tempo can be used, as long as it is within the range allowed by Live's Tempo control (20–999 BPM).

This Scene Will Change the Tempo to 96 BPM.

7.3   The Track Status Fields

You can tell a track's status by looking at the Track Status field just above the active track's mixer controls:

A Track Playing a Looping Session Clip...

The pie-chart icon represents a looping Session clip. The number to the right of the circle is the loop length in beats, and the number at the left represents how many times the loop has been played since its launch.

The progress-bar icon represents a one-shot (non-looping) Session clip. The value displays the remaining play time in minutes:seconds.

A microphone icon appears in an audio track that is set to monitor its input. A keyboard icon appears in a MIDI track under these same circumstances.
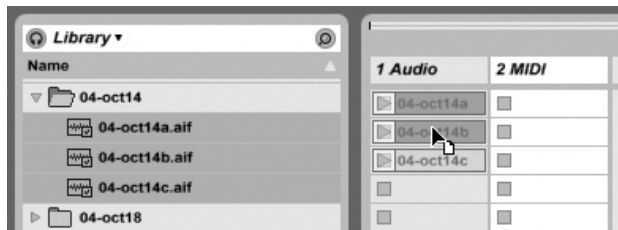
If the track is playing clips from the Arrangement, a miniature display representing the Arrangement clips being played appears.

7.4   Setting Up the Session View Grid

Clips arrive in the Session View by being imported from the File Browsers or through recording.

Dropping Multiple Clips Into the Session View.

If you are dragging multiple clips into the Session View, Live defaults to arrange them vertically, in one track. Hold down ⌜Ctrl⌟ (PC) / ⌜⌘⌟ (Mac) prior to dropping them so as to lay the clips out in one scene.

Clips can be moved around the Session grid by drag-and-drop. To move several clips at once, select them by using the ⌜⇧⌟- or ⌜Ctrl⌟ (PC) / ⌜⌘⌟ (Mac)-modifier before dragging. You can also click into an empty slot and "rubber-band" select from there. Scenes can be reordered by drag-and-drop as well.

7.4.1   Select on Launch

By default, clicking a Session View clip's Launch button also selects the clip, since you will typically want the Clip View to show the newly launched clip. However, some power-users don't want the current focus (e.g., a return track's devices) to disappear just because a clip has been launched, especially when starting a clip in order to try it with the return track device settings. Turn off the Select on Launch option from the Launch Preferences if you prefer the view to remain as is when you launch clips or scenes.

7.4.2   Removing Clip Stop Buttons
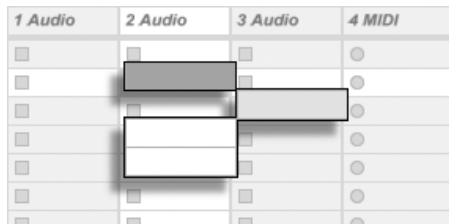
Slots Without Clip Stop Buttons.

You can add and remove Clip Stop buttons from the grid using the Edit menu's Add/Remove Stop Button command. This is useful for pre-configuring the scene launch behavior: If, for instance, you don't want scene 3 to affect track 4, remove the scene 3/track 4 Stop button.

7.4.3   Editing Scenes

There are a number of useful commands in the Edit and Insert menus that apply to scenes:

- *Cut Scenes* cuts out scenes with selected slots from the Session View, thereby reducing the total number of scenes. Please note that the Cut Scenes command affects all tracks, not only those containing selected slots.

- *Paste Scenes* works like Paste, but inserts blank scenes before pasting. Live inserts enough scenes to fit the material from the clipboard. The new scenes will be inserted behind the current selection.

- *Duplicate Scenes* works like Duplicate, but inserts blank scenes before pasting. Live inserts enough scenes to fit the material from the clipboard.

- *Delete Scenes* deletes all scenes with selected slots from the Session View, thereby reducing the total number of scenes. Please note that the Delete Scenes command affects all tracks, not only those containing selected slots.

- *Insert Scene* inserts an empty scene below the current selection.

- *Capture and Insert Scene* inserts a new scene below the current selection, places copies of the clips that are currently running in the new scene and launches the new scene immediately with no audible interruption. This command is very helpful when developing materials in the Session View. You can capture an interesting moment as a new scene and move on, changing clip properties and trying clip combinations.

7.5   Recording Sessions into the Arrangement

Your Session View playing can be recorded into the Arrangement, allowing for an improvisational approach to composing songs and scores.

The Control Bar's Record Button.

When the Record button is on, Live logs all of your actions into the Arrangement:

- the clips launched;

- changes of those clips' properties;
- changes of the mixer and the devices' controls, also known as *automation*.

To finish recording, press the Record button again, or stop playback.

The Arrangement Selector.

To view the results of your recording, bring up the Arrangement View. As you can see, Live has copied the clips you launched during recording into the Arrangement, in the appropriate tracks and the correct song positions. Notice that your recording has not created new audio data, only clips.

The Session clips and the Arrangement clips in one track are mutually exclusive: Only one can play at a time. When a Session clip is launched, Live stops playing back the Arrangement in favor of the Session clip. Clicking a Clip Stop button causes the Arrangement playback to stop, which produces silence.

The Back to Arrangement Button.

Arrangement playback does not resume until you explicitly tell Live to resume by clicking the Back to Arrangement button, which lights up to remind you that what you hear differs from the Arrangement.
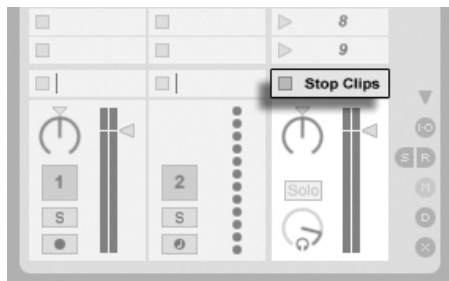
The Stop All Clips Button.

To disable all Arrangement clips simultaneously, click on the Stop All Clips button in the Master Track Status field. The clips in the Arrangement and in the Session View exist independently from one another, which makes it easy to improvise into the Arrangement over and over again until it's right.

Furthermore, you can move clips not only within the Session grid, but also from the Session View to the Arrangement and vice versa by using Copy and Paste, or by dragging clips over the ☰ or � selectors.

When pasting material from the Arrangement into the Session View, Live attempts to preserve the temporal structure of the clips by laying them out in a matching top-to-bottom order. Moving through the scenes from the top down, you can reconstruct the original arrangement. This is useful for taking a composed piece of music back to the improvisational stage.

Chapter 8

Clip View

The *Clip View* is where clip properties can be set and adjusted.
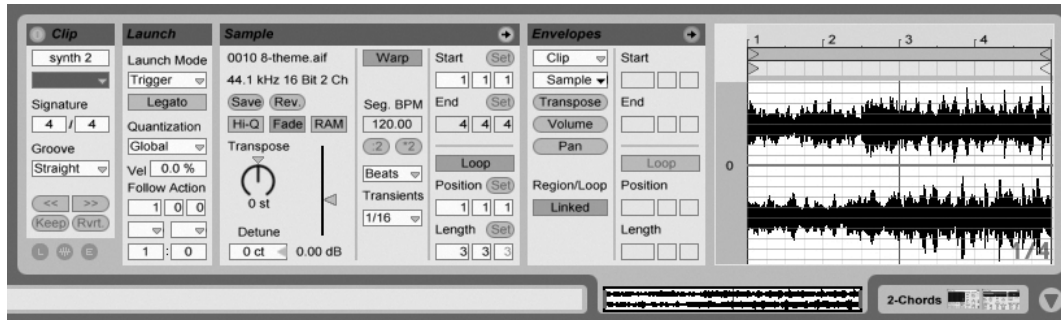
The Clip View.

The Clip View is opened by clicking on the Clip Overview or double-clicking a clip in the Session or Arrangement View.
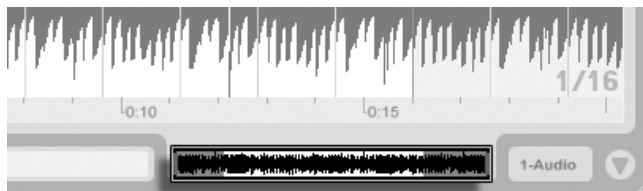
In the Session View, clicking on a Track Status Field opens the Clip View for editing the clip that is currently running in the track.

Clicking a Session View Track Status Field Opens the Clip View.

The properties of more than one clip can be edited collectively in the Clip View as a multi-selection. To create a multi-selection, click and drag to highlight the clips, or select one clip and use the ⌜Ctrl⌟ (PC) / ⌜⌘⌟ (Mac) or ⌜⇧⌟ modifiers to add to your selection. The properties available in the Clip View for a multi-selection depend on the contents of the clips; generally only properties which the clips have in common are shown.
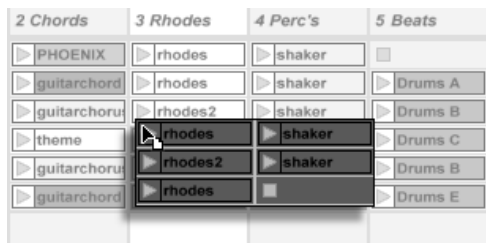
Creating a Clip Multi-Selection.

Controls such as sliders and knobs behave slightly differently when they are part of a multi-selection. If the clips in a multi-selection have differing values for any particular knob or slider parameter (clip transposition, for example), the *range* of these values will be displayed and can be adjusted with the control. Dragging the knob or slider to its absolute maximum or minimum value will make the clips' settings thereafter identical, adjustable as a single value.

MIDI clips and audio clips in Live have different sets of properties and, consequently, do not share the same set of Clip View controls. The two types of clips do have the following

in common:

- The *Clip box* contains basic clip settings.

- The *Envelopes box* and the *Envelope Editor* manage the clip's envelopes, which are used to modulate the effects, mixer, and clip or MIDI controls. Clip envelopes and their associated Clip View components are covered in detail in a separate manual chapter.

- The *Launch box* controls clip launch behavior and, as such, only appears for Session View clips. Setting Session View clip launch properties is covered in detail in a separate manual chapter.

Audio clips have these additional Clip View controls:

- The *Sample Display* toggles with the Envelope Editor on the right-hand side of the Clip View, and controls Live's sample-warping capabilities and clip playback settings.

- The *Sample box* contains settings pertaining to how the clip plays its sample and displays it in the Sample Display.
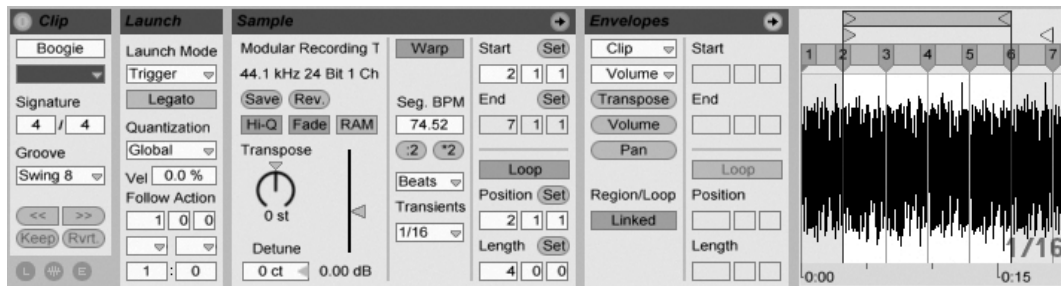
The Clip View for an Audio Clip.

MIDI clips have these additional Clip View controls:

- The *MIDI Editor* toggles with the Envelope Editor on the right-hand side of the Clip View, and allows editing and creating MIDI notes and velocities.

- The *Notes box* contains settings pertaining to how Live plays a MIDI clip and what it displays in the MIDI Editor.

The Clip View for a MIDI Clip.

To make best use of the screen real estate, you can show or hide the Launch, Envelopes, and Sample or MIDI boxes using the Clip View Box selector in the Clips box. You can also toggle between the Sample Display/MIDI Editor and the Envelope Editor by clicking in the title bars of the Sample/Notes box and the Envelopes box, respectively.

The Clip View Box Selector Shows and Hides Various Clip View Components.

8.1   The Clip Box
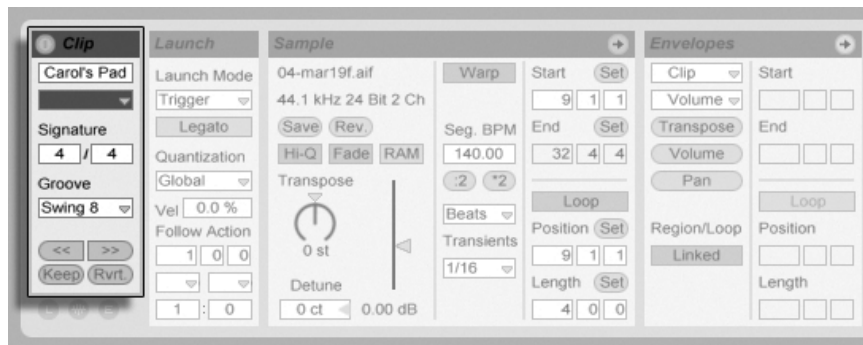
The Clip Box.

8.1.1   Clip Activator Switch

Using this switch, you can deactivate a clip so that it does not play when launched in the Session View or during Arrangement playback. Clips can also be activated/deactivated directly from the Session or Arrangement View with their 🖱 (PC) / [Ctrl] 🖱 (Mac) context menus.

8.1.2   Clip Name and Color

The Clip Name field allows naming the clip. By default, a clip's name matches the name of the file it references but, in general, the clip name is independent from the file name.

Renaming an audio clip does not rename the referenced sample file. To rename a file, select it in Live's File Browsers, and then choose the Edit menu's Rename command.

The Clip Color chooser allows choosing a clip color.

8.1.3   Clip Signature

Using the Clip Signature fields, you can specify the signature of an audio clip's sample. This setting is relevant only for display; it does not affect sample playback.

8.1.4   Groove

The Clip Groove chooser selects the *type* of groove used for the clip. "Swing 8," for example, applies an 8th-note groove.

The Control Bar's Global Groove Control.

The Global Groove control defines the *amount* of the groove for every clip in the Live Set.

So, how does it work? Imagine a simple one-bar MIDI clip that has a time signature of 4/4. Our MIDI clip is made up of 8th notes – eight of them – that play either on or between each of the four beats. With a Clip Groove setting of Swing 8, the timing of our one-bar clip becomes a bit like a rubber-band that is pinned down at each beat but flexible in between. The 8th notes that fall between beats can shift slightly forward. With a Global Groove setting of 50, for example, the notes will wait until 2/3 of the way through the beat to play, where an 8th-note triplet would normally fall.

16th- and 32nd-note swing works similarly, but on a smaller scale: Every other note shifts forward, toward the nearest 16th- or 32nd-note triplet position.

Returning to our rubber-band analogy, we can see that Swing 8 can actually affect more than just 8th notes. Actually, any notes that do not lie directly on a beat will be affected when the rubber-band is stretched – including 16th and 32nd notes. By the same token, Swing 16 (where our rubber-band is anchored to positions just an 8th note apart) can affect 32nd notes.

Groove can be applied to both MIDI clips and audio clips. Applying groove to audio clips does require that the Warp switch be activated and a Warp Mode other than Re-Pitch selected. If an audio clip is in Beats Mode, the Transients setting must be greater than or equal to the Clip Groove chooser's swing setting (e.g., with a Transients setting of 1/16, Swing 8 and Swing 16 can be used, but not Swing 32).

Because of this feature's dependency on note timing, we recommend that you quantize MIDI clips prior to applying groove – provided you want predictable results. For audio clips, any swing contained within the original sample can be removed by appropriately setting Warp Markers prior to applying the "artificial" swing of the Groove setting.

8.1.5 Clip Offset and Nudging

To jump within a playing clip in increments the size of the global quantization period, you can use the Nudge buttons in the Clip box.

Using the Nudge Buttons to Jump Through a Clip.

These buttons can also be mapped to keys or MIDI controllers. In MIDI Map Mode, a scrub control will appear between the Nudge buttons and can be assigned to a rotary encoder wheel for continuous scrubbing.

The Scrub Control in MIDI Map Mode.

With quantization set to values less than one bar, it is easy to offset clip playback from Live's master clock by launching clips, using the Nudge buttons or scrubbing within the clip.
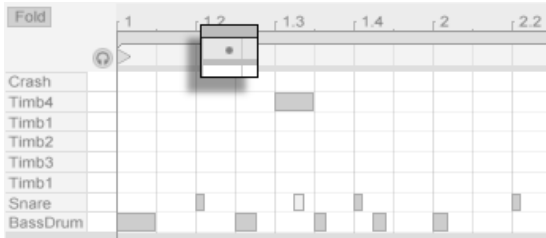
Clip Offset from Global Time as Shown in the Clip's Display.

When clip play is offset from global time in this manner, a little dot will illuminate in the Sample Display or MIDI Editor to display the offset start position.

Using the Keep and Revert Buttons to Manage Meter Offset.

The current offset as indicated by the dot can be made permanent by moving the start marker to the dot's position – and this is exactly what the Keep button, found just beneath the Nudge buttons, does. Or, the current offset can be undone using the Revert button.

8.2   The Sample Box

8.2.1   Warp Controls
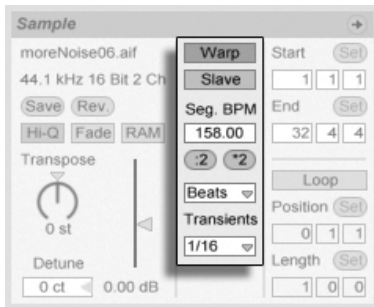
The Sample Box Warp Controls.

When the Warp switch is off, Live plays the sample at its original, "normal" tempo, irrespective of the current Live Set tempo. This is useful for samples that have no inherent rhythmic structure: percussion hits, atmospheres, sound effects, spoken word and the like. Turn the Warp switch on to play rhythmically structured samples (such as sample loops, music recordings, complete music pieces, etc.) in sync with the current song tempo.

The Control Bar's Tempo Control.

To verify this, note that a warped sample's speed follows the tempo as you change the Control Bar's Tempo control.

Live offers a number of controls to adjust the time-warping engine for optimal stretching quality. For accurate warping, Live needs to know the sample's metrical structure. For properly prepared loops, tempo and duration are calculated automatically; most of the time this is accurate enough that the sample is immediately ready for use in Live. For other samples, you may have to provide some hints. We will examine these topics thoroughly in the Tempo Control and Warping chapter.

8.2.2   Sample Loop/Region and Display

Zooming and Scrolling
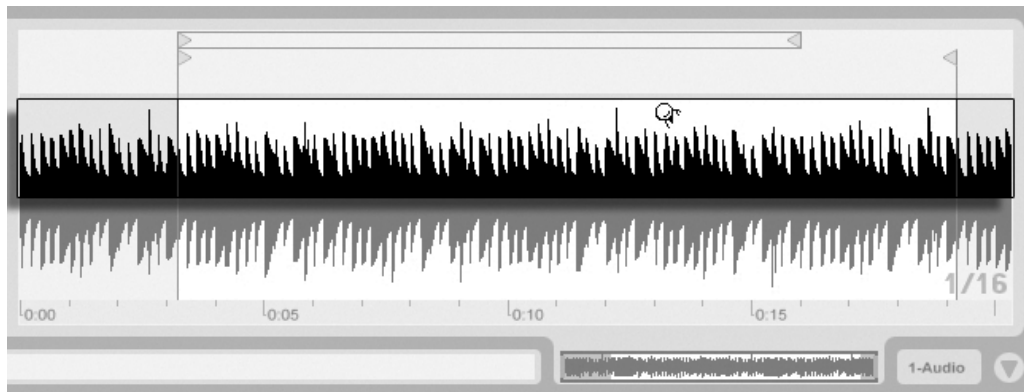
The Clip Zoom/Scroll Area.

Zooming and scrolling in the Sample Display work much like they do in the Arrangement View. Using the zoom/scroll area in the top half of the waveform, you can click and drag vertically to smoothly change the zoom level, and horizontally to scroll the display.
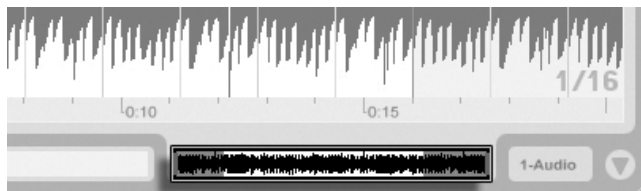
The Clip Overview.

The Clip Overview provides additional zoom/scrolling functionality. It always shows the complete clip, from start to end. The black rectangular outline represents the part of the clip that is currently displayed. You can click within the outline and drag horizontally or vertically to scroll or zoom.

To have the Sample Display follow the play position and scroll automatically, turn on the Follow switch, or use the Follow command from the Options menu.

Playing and Scrubbing Clips

The section of the sample that plays when a clip is launched is set with the clip's region and
loop controls. An unlooped clip will play from its start marker to its end marker or until it is
stopped.
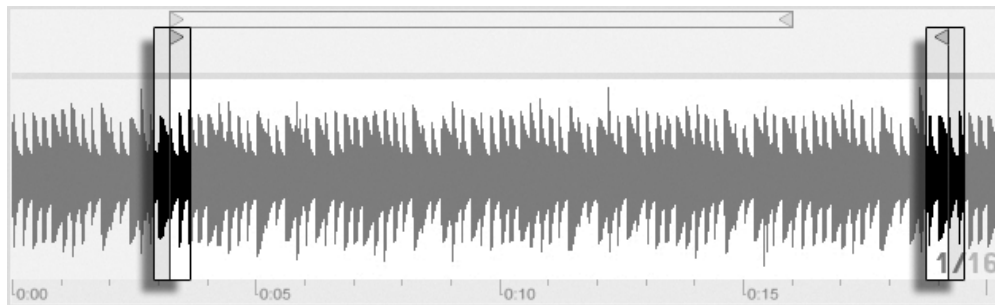
*The Clip Start and End
Markers.*

These markers can be clicked and dragged to new positions in the Sample Display, or they
can be moved with the ⬅ and ➡ keys. To move the entire clip region (i.e., both the start
and end markers), select the start marker, hold down ⬆, and use the arrow keys.
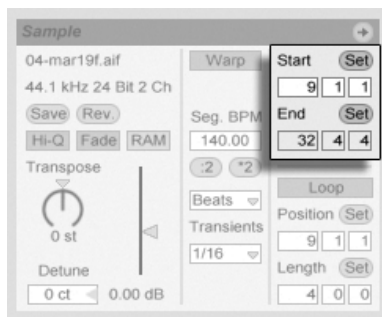
*Using Clip Start and End
Controls to Change Clip
Length.*

You can also adjust the clip start and end numerically using the respective value fields to
the left of the Sample Display. For warped clips, these fields display values as bars-beats-

sixteenths; for unwarped clips, the display is in minutes-seconds-milliseconds. Notice that you can use the Set buttons here to place the markers during playback. Setting markers this way is quantized according to global quantization.

Clicking in the scrub area in the lower half of the waveform or above the beat-time ruler will make clip playback jump to that point.
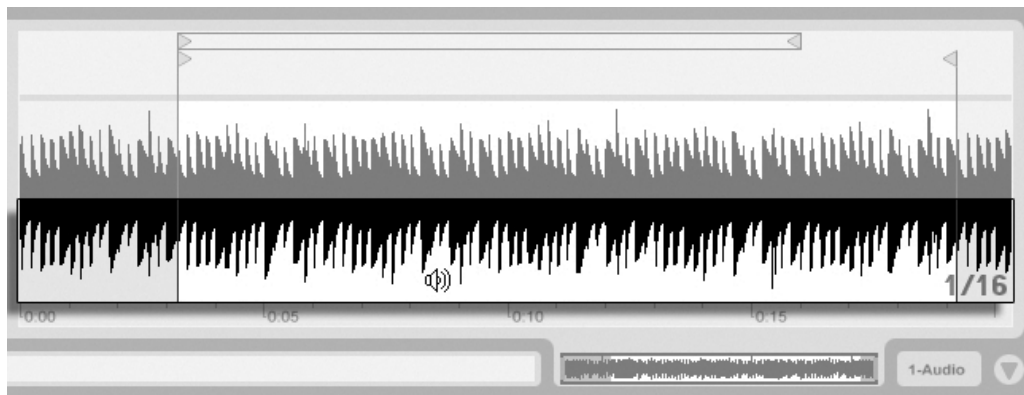
The size of this jump is quantized by the global quantization setting, which can be quickly changed using the `Ctrl` `6` (PC) / `⌃` `⌘` `6` (Mac), `7`, `8`, `9` and `0` shortcuts. While the mouse is held down over the scrub area, a portion of the clip the size of the chosen quantization setting will be repeatedly played. With small quantization settings, or a setting of "None," this allows you to scrub through the music.

Looping Clips

To have the clip play as a (potentially infinite) loop, turn on the *Loop* switch. Note that the Warp switch must be activated before the Loop switch is accessible, as unwarped clips cannot be looped.

You can click and drag to change the position and length of the *loop brace* in the Sample Display, or you can type exact values into the Loop Length and Position fields to the left of the display.
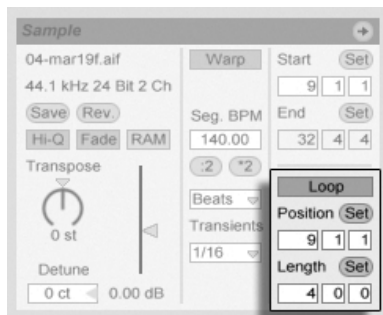
The Clip Loop Controls.

The loop brace can be selected with the mouse and its position changed with commands from the computer keyboard:

- ← and → nudge the loop brace to the left/right by the current grid setting.

- ↓ and ↑ shift the loop brace left/right in steps the size of its length.

- Ctrl ← → (PC) / ⌃ ⌘ ← → (Mac) shortens or lengthens the loop brace by the current grid setting.

- Ctrl ↑ ↓ (PC) / ⌃ ⌘ ↑ ↓ (Mac) doubles or halves the loop length.

Regardless of the position of the loop brace, clip play upon launch will begin at the position marked by the start marker, which means you can set up the clip to run into a loop.
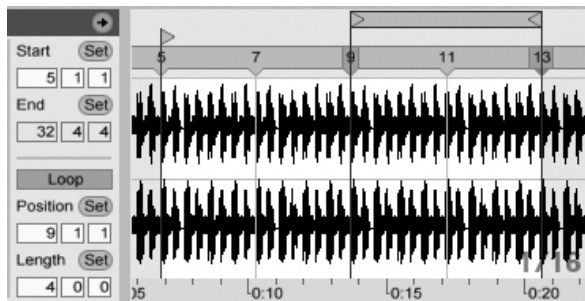
Setting the Clip to Run Into a Loop.

The Loop Length and Position fields are equipped with Set buttons, which can be used to create loops spontaneously during playback:

- Playing the clip and then clicking the Set Loop Position button moves the beginning of loop to the current playback position (rounded to the global quantization setting) and engages the loop. Then, clicking the Set Loop Length button moves the end of the loop to the current playback position. This lets you capture the music in a loop on the fly.

- While the loop is still off, you can click the Set Loop Length button to set the loop to end at the current playback position without changing its preset length. This simultaneously activates looping.

The Set buttons, the Loop switch, the loop brace and the start/end markers can all be mapped to MIDI controls. You could, for example, use a rotary encoder to move the loop through a sample in increments the size of the chosen quantization interval.

8.2.3   Clip Pitch and Gain
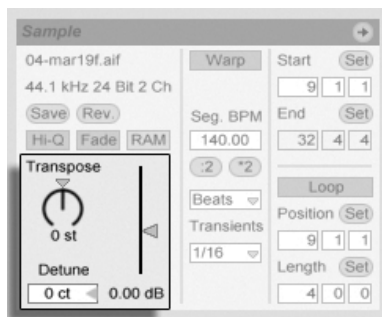
The Clip Pitch and Gain Controls.

The Transpose control shifts the clip pitch in semitones.

The Detune field fine-tunes the clip in cents (100 cents = one semitone).

The Clip Gain slider, calibrated in dB, changes the clip gain.

8.2.4   Saving Default Clip Settings with the Sample

The Save Default Clip button saves the current clip's settings with the sample. Once saved, Live will restore the current clip settings whenever you drop the sample into a Live Set. This is especially useful with regards to the Warp Markers, which have to be set correctly for Live to play long files in sync. Note that you can use the Save button without affecting any existing clips; Save just saves default settings for future clips using this sample.

The clip data becomes part of the analysis file that accompanies the sample.

Note that storing default clip settings with the sample is different from saving the clip as a Live Clip, which also saves devices and device settings.

8.2.5   High Quality Interpolation

If the High Quality switch is on, Live uses an advanced sample-rate conversion algorithm that provides better sound quality at the expense of a higher CPU load. Samples processed with the Hi-Q algorithm generate less distortion, particularly at high frequencies, when transposing a sample and/or matching an imported sample's sampling rate to the system's sampling rate. Note: This feature involves only sample rate conversion, not the time-stretching quality. There are dedicated controls for adjusting the stretching properties.

8.2.6   Clip Start and End Fades
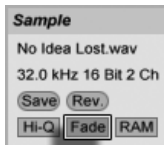
The Clip Fade Switch.

The Clip Fade switch, when enabled, applies a short fade to the clip start and end to avoid clicks at the clip edges. The length of the fade is signal-dependent and ranges from 0-4 milliseconds.

8.2.7   Clip RAM Mode
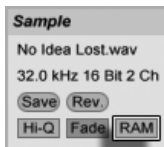
The RAM Mode Switch.

If the RAM Mode switch is on, Live is loading the audio referenced by the clip into the computer's memory rather than reading it from disk in real time. RAM Mode can help with these problems:

- Your computer's hard disk is too slow to deliver audio for as many tracks as desired in real time. For more information on disk-related problems, please refer to the respective section.
- You are experiencing audio dropouts when playing clips in Legato Mode.

Use RAM Mode with care, as RAM is usually a scarce resource. Your computer is using the hard disk for swapping out RAM contents that have not been used in a while. The more clips you are running in RAM Mode, the higher the likelihood for them to be swapped out. Live can handle disk overloads more gracefully than swapped-out audio arriving late: Disk overloads result in unwanted mutes, whereas RAM overload results in both mutes and rhythmical "hiccups."

8.2.8   Reversing Samples

This function creates a new sample by reversing the sample referenced by the current clip. It then reapplies the old clip's settings (according to some rules that we will explain in a moment), and replaces the original sample with the reversal in the Clip View. The new sample can be found, after saving the Live Set, in the Set's Project folder, under Samples/Processed/Reverse. Until the Set is saved, new samples remain at the location specified by the Temporary Folder.

There are a few rules for the reversing process. First, any Warp Markers will remain fixed to their positions *in the sample*. This means that a Warp Marker on the downbeat of the second bar of a clip will end up on the downbeat of the second-to-last bar after reversal. Clip loop/region settings are similarly flipped. Second, clip envelopes remain fixed to their position *in time*. Therefore, a mixer volume envelope that lowers the volume of the first half of a clip will continue to do exactly that after reversal.

The reversal process is quite fast (about as fast as copying), but for very long samples it might take a little time. When this is the case, the Status Bar in the lower portion of the Live screen will give you a progress display, and further actions in the program will be temporarily locked (though running clips will continue to play). You can play the reversed clip and perform other actions in the program as soon as Live begins to draw the new waveform into the Sample Display. Once a sample is reversed, a link to the reversed sample will be maintained until the you quit the program, and reversing the same clip again (or a copy) will be instantaneous.

It is not recommended that you reverse clips in a live performance situation, as a slight glitch can sometimes occur while Live reapplies the warp and loop settings.

8.2.9   Cropping Samples

The Sample Display's ☝ (PC) / Ctrl ☝ (Mac) context menu includes the Crop Sample command. This function creates, similarly to the Reverse function, a new sample by copying

the sample currently in use - but only the excerpt that is actually used plus a 50 millisecond safety margin on both ends. The new sample can be found, after saving the Live Set, in the Set's Project folder, under Samples/Processed/Crop. Until the Set is saved, the new sample remains at the location specified by the Temporary Folder.

8.2.10   Replacing and Editing the Sample

To replace the sample referenced by the clip with a different one, drop the new sample directly from the File Browser into the Clip View. Clip settings like pitch and volume will be retained. The Warp Markers will be retained only if the new sample has the exact same length as the old sample.

The Sample Display's 🖰 (PC) / Ctrl 🖰 (Mac) context menu includes the Reveal Sample command. This opens the File Manager for the current Set with the sample referenced by the clip selected. From there, you can replace and destructively edit the sample, in such a way that all clips and instruments referencing the sample will be affected.

8.3   The Notes Box
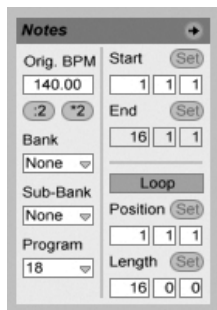
The Notes Box.

8.3.1   Tempo Controls

The Orig. BPM field displays Live's interpretation of the tempo at which the clip's MIDI was recorded. When dragging up or down in the Original BPM field, or clicking the :2 and *2 buttons, you will see that the notes in the MIDI Editor are correspondingly stretched or compressed. This is useful for aligning notes that you have recorded without a tempo reference, like Live's metronome.

8.3.2   Bank and Program Change

Live can send MIDI bank/program change messages to external devices. According to the settings in these controls, launching a clip also sends its bank/program change message. If you are using Live to send MIDI to your synth, this means that each MIDI clip in your Live Set can play a different sound on your synth. Live offers messages for 128 banks with 128 sub-banks, each of which has 128 programs. Please see the documentation that came with your synthesizer to determine how many of these messages it can use. If you do not want your clip to send program or bank change messages, simply set the bank/program choosers to "None."

8.3.3   MIDI Loop/Region

These controls manage how the contents of a MIDI clip are played and shown in the MIDI Editor. They work the same way as those for audio clips.

In the MIDI Editor, the zoom/scroll area is located above the beat-time ruler, the scrub area just below.

8.4   Clip Defaults and Update Rate

You can change the rate at which Live applies your Clip View settings to a running clip. Clip View changes will be quantized by the rate selected from the Clip Update Rate chooser in the Record/Warp/Launch Preferences. Certain clip settings, such as Launch Mode and Warp

Mode, can be set up as defaults for all new clips. This is also done in the Record/Warp/Launch Preferences.

Chapter 9

Tempo Control and Warping

Unlike music stored on tape or in a traditional digital audio workstation, the music in Live remains "elastic" at all times. Live is capable of *time-warping* samples while streaming them from disk so as to synchronize them to the current Live Set's tempo. This happens without affecting the pitch, which can be changed independently. Mixing and matching audio from different origins is therefore extremely easy.

9.1   Tempo

9.1.1   Setting the Tempo

The Control Bar's Tempo Field.

The Control Bar's Tempo field allows you to change the playback tempo of your Live Set at any time, in real time. You can even *automate* the tempo to create smooth or sudden tempo changes along the song timeline.

You can have an external sequencer (or drum machine) play along with Live or have Live play along with the sequencer. The respective settings are made in the MIDI/Sync Preferences, and the EXT switch next to the tempo control is activated to have Live follow an external MIDI clock source. Please refer to the section on synchronization for details.

9.1.2   Tapping the Tempo

The Tap Button.

You can use Live's Tap Tempo function to set the tempo at any time. As you click the Control Bar's Tap Tempo button once every beat, the tempo of the Live Set will follow your tapping.
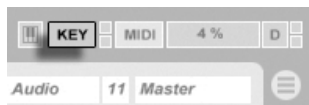
The Key Map Mode Switch.

It is better to assign the Tap button to a computer key than using the mouse. Click on the Control Bar's KEY switch to enter Key Map Mode; then select the Tap button; press the key you would like to use for tapping; click the KEY switch again to leave Key Map Mode. The assignment will take effect immediately. The Tap button can also be assigned to a MIDI note or controller, like a foot switch, in a similar fashion. Although Live responds to your tapping immediately, it does apply some degree of inertia to prevent sluggish behavior in the software. The more taps Live receives in a row, the more precisely it will be able to conclude the desired tempo.

You can also use tapping to count in: If you are working in a 4:4 signature, it takes four taps to start song playback at the tapped tempo.

9.2   Time-Warping Samples

Live's ability to play any sample in sync with a chosen tempo is a unique and important feature. In addition, you can "warp" the rhythmic flow of a piece, changing its "feel," or even move notes to other meter positions.

A clip's warping properties are set in the Sample box, which is a sub-section of the Clip View.
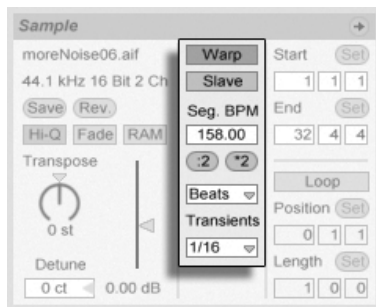
The Sample Box's Warping Controls.

The most significant control here is the *Warp* switch, which toggles a clip's warping on or off. The Warp section of Live's Preferences will determine the default warp settings for new clips, but they can always be overridden here on a per-clip basis.

When the Warp switch is off, Live plays the sample at its original, "normal" tempo, irrespective of the current Live Set's tempo. This is useful for samples that have no inherent rhythmic structure: percussion hits, atmospheres, sound effects, spoken word and the like. Turn the Warp switch on to play rhythmically structured samples (such as sample loops, music recordings, complete music pieces, etc.) in sync with the current song tempo.

To direct Live's assumptions about new samples, use the Record/Warp/Launch tab of Live's Preferences. If the Auto-Warp Long Samples preference is on, Live assumes that long samples contain music that should be played in sync with the Live Set's tempo. If you would rather have Live default to playing long samples as they are, disengage this preference.

9.2.1   Tempo Master/Slave

All warped clips in the Arrangement View have one further option: They can be defined as *tempo masters* by toggling their Master/Slave switches. Any number of clips can be set as tempo masters, but only one clip at a time can actually *be* the tempo master. This distinction is always granted to the bottom-most, currently playing clip in the Arrangement View.

The clip that is the current tempo master will play as if warping was *off,* but with one important difference – the rest of the Live Set will be warped so that it plays in sync with the

current tempo master.

This is achieved by adding tempo automation to the Master track for the duration of the tempo master clip. You will notice that the Tempo field in Live's Control Bar becomes disabled in this state; this is because all tempo control is handed over to the tempo master clip.

When toggling a clip's Master/Slave switch, or when deleting a clip that was set as tempo master, the Master track tempo automation is removed again, restoring the proper tempo to the region. If you wish instead to *keep* the generated tempo automation to continue working with it, then ☛ (PC) / [Ctrl] ☛ (Mac) on the Control Bar's Tempo field, and choose the Unslave Tempo Automation command. All clips will then be set to Slave, but the tempo automation will remain in place.

Note that when Live's *EXT* switch is enabled, the Master/Slave switch has no effect and appears disabled.

9.2.2   Warp Markers

Think of a sample as a rubber-band that you want to pin to a (musical time) ruler. In Live, the pins are called *Warp Markers*. A Warp Marker forces the software to arrive at a specific point in the sample at a specific musical time. You can use any number of Warp Markers to create an arbitrary mapping of the piece's inherent rhythm to a musical meter.

Warp Markers are set in the Clip View's Sample Display by double-clicking any of its numeric grid markers. They can then be dragged or moved with the arrow keys to different positions in the clip. Warp Markers can also be deleted by double-clicking them, or by pressing the computer keyboard's [←] or [Delete] key after selecting them.
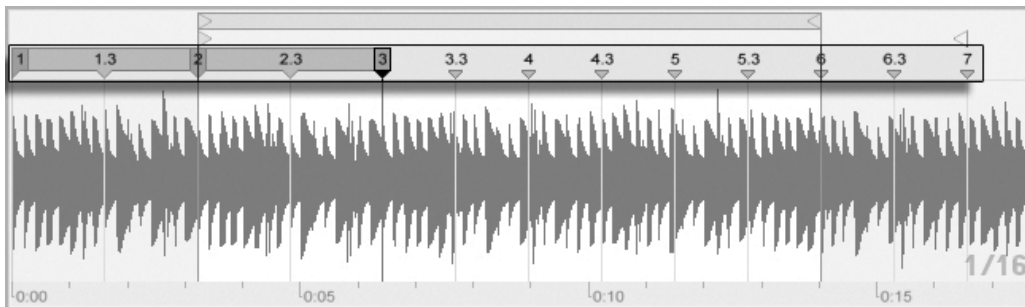
Double-Clicking a Grid Marker Creates a Warp Marker.

When working with your sample, you can have Live scroll the Sample Display to follow playback. Use the Control Bar's Follow switch to activate this feature. It also might be helpful to vertically resize the Sample Display by dragging on the split line between the Clip View and the Session View track area.

The Follow Switch in the Control Bar.

Saving Warp Markers

Your Warp Markers will automatically be saved with the Live Set, but you may also want to save them with the sample file itself, so that they are reconstructed anytime you drag the file into Live. To do this, click the Clip View's Save button.

Note that if a sample has a saved set of Warp Markers, Auto-Warp will have no effect. When this is the case, you can use any of the 🖱 (PC) / Ctrl 🖱 (Mac) context menu commands described in this section to initiate auto-warping.

9.2.3   Using Warp Markers

In the following sections, we will look at a couple of applications for time-warping samples. Warping is, of course, an optional property of clips.

Syncing Straight Loops

When you import a sample that represents a well-cut musical loop of 1,2,4 or 8 bars in length, Live usually makes the correct assumptions to play the loop in sync with the chosen tempo. It places two Warp Markers, one at the sample's beginning and one at the end.
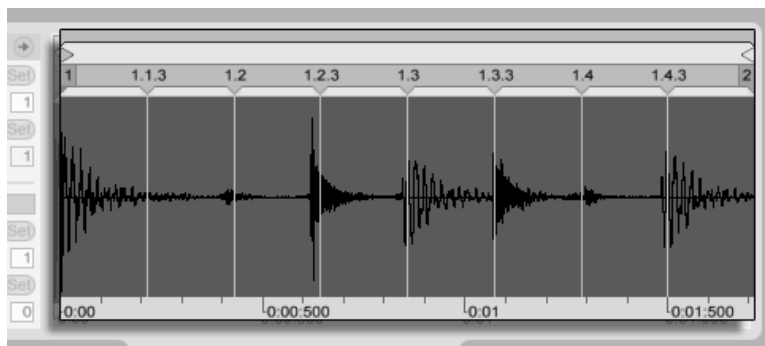
A One-Bar Loop as It Appears in the Clip View, by Default.

The Orig. BPM field displays Live's guess of the loop's tempo; if you happen to know the tempo of the loop, you can type it in here. Sometimes Live's guess of the original tempo is wrong by half or double. If so, correct this by clicking on the buttons labeled *2 and :2, respectively. The sample plays at double speed when you press :2 because you are changing Live's interpretation of the sample's tempo, which serves as a point of reference for determining the required time-stretch factor.

Syncing Uncut Loops

When importing a loop that has not been edited into a well-cut loop, Live will play it out of sync. Suppose there is a portion of silence at the sample beginning, prior to the first beat. You can easily correct this by moving the Warp Marker labeled with a "1" to the first beat's onset. Likewise, you can eliminate silence after the actual loop end by moving the Warp Marker at the sample's right edge.
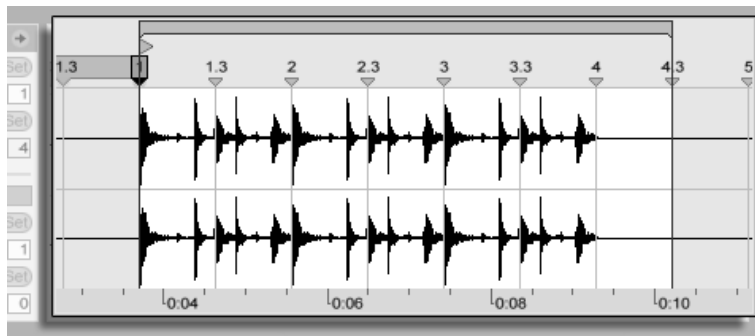
Setting the Warp Markers for a Poorly Cut Loop.

Syncing Odd-Length Loops

If you import a sample that contains a seven-bar loop, Live initially assumes the loop is eight bars long (or four, depending on its length) and plays it out of sync. For correct playback, the last marker needs to show an eight, not a nine. To achieve this do the following:

1. Double-click on the last Warp Marker to delete it.

2. Double-click on the eight to create a new Warp Marker.

3. Drag the new Warp Marker to the sample end.

If Live's initial guess had been a four-bar loop, the eight would not have been accessible. In that case, you could initially drag the Warp Marker at the end toward the left until the eight became visible.

Theoretically this should have done the job for our seven-bar loop. Practically, though, it is very likely that moving the markers led to a change of the loop start and end points. This is because the loop is tied to the meter grid and therefore moves with the Warp Markers, which define the meter grid. Live makes sure the loop fits in the sample, and therefore has to change its length if required by a Warp Marker change.

Manipulating Grooves

You can now create any number of Warp Markers by double-clicking on one of the numeric grid markers. Drag in a "straight" looped sample, set a few Warp Markers, and move them around to see what happens. Warp Markers really serve two purposes:

1. to provide a "correct" interpretation of the flow of musical time in the sample;

2. to mess up the flow of time in the sample.

If a single event in a percussion loop comes late, just pin it to the Warp Marker, which shows the beat position at which you actually want to hear that event. You may want to pin the adjacent beat positions as well, to avoid affecting neighboring regions in the sample.
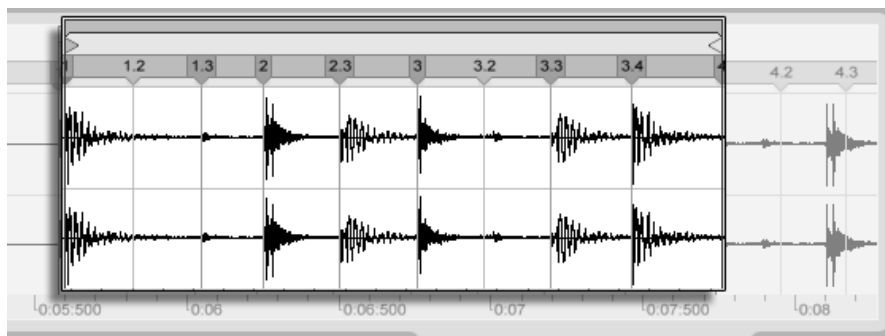
Using Warp Markers to Manipulate the Groove.

"Removing" a sample's natural groove by applying Warp Markers is an interesting creative method, particularly in conjunction with Live's ability to impose an artificial groove onto clips in real-time.

Syncing Longer Pieces

Live's *Auto-Warp* algorithm makes longer samples and entire songs readily available for integration into your project. You can use the Browser to import long samples or MP3, AAC, Ogg Vorbis, Ogg FLAC and FLAC files.

When you drag a file into Live that is too long to justify the assumption that it is a loop or a one-shot, Live will auto-warp the clip by default (though this can be changed in the

Record/Warp/Launch Preferences).

Note that, for the auto-warp mechanism to work, files which are being imported into the program for the first time will need to undergo a first-time analysis process and will not be immediately available for playing or editing. As explained in the section in this manual on analysis files, analysis can be batch-processed with the 🖱 (PC) / [Ctrl] 🖱 (Mac) context menu's Analyze Audio command. Once analysis is finished, you can view the results of Auto-Warp's assumptions about the file.
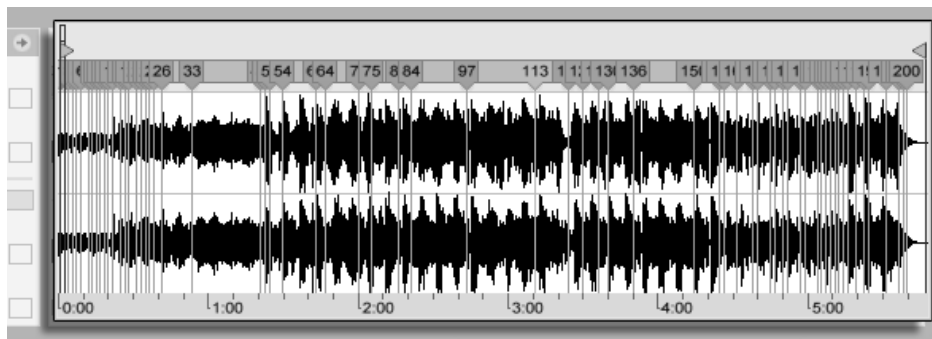
Auto-Warp's Results in the Clip View.

As long as Auto-Warp made the correct set of informed guesses, the clip will be ready to play in perfect sync with the Live Set's tempo. However, if Auto-Warp does not quite do what you want, you can control its results. The remainder of this section will focus on various ways of guiding Live's auto-warping. Remember that the metronome in the Control Bar will probably come in handy as you warp longer pieces.

The Metronome Switch.

It might happen that Auto-Warp guesses the tempo correctly but gets the downbeat wrong. To remedy this, you can do the following:

- Zoom in and drag the 1.1.1 marker to the desired position;
- Use the start marker's 🖱 (PC) / [Ctrl] 🖱 (Mac) context menu to select the *Set 1.1.1 Here* command.
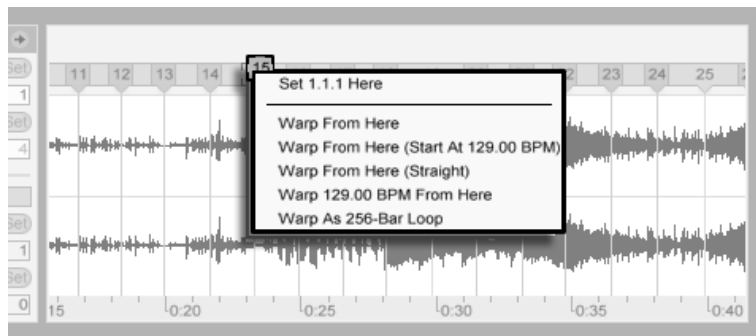
Using the Context Menu to Direct Auto-Warp.

Directing Auto-Warp is also relatively simple when you have imported a perfectly cut loop. You can tell Auto-Warp to work accordingly using the *Warp As ...-Bar Loop* command. Live will propose a loop length that makes the most sense given the current Live Set's tempo. Decreasing the Live Set's tempo can, for instance, lead Live to assume the loop is 8 bars at 90 BPM instead of 16 bars at 180 BPM.

Sometimes more accurate control of Auto-Warp is necessary. The best way to go about warping a clip that requires more detailed attention is in sections, working gradually from left to right. You can set a Warp Marker by double-clicking one of the numeric grid markers to the right of each correctly warped section, "pinning" it into place. The shortcuts for working with the clip loop brace and start/end markers can speed up this process considerably.

You might also find it helpful to select multiple Warp Markers for moving by selecting them with the ⇧ or Ctrl (PC) / ⌃ ⌘ (Mac) modifiers held down.

The four Warp From Here commands provide various ways of resetting Warp Markers to the right of the selected grid marker or Warp Marker, leaving Warp Markers to the left untouched. These commands are also available from the start marker.

- *Warp From Here* runs the Auto-Warp algorithm on the material to the right of the selected marker.

- *Warp From Here (Start At ...)* directs Auto-Warp to use the current Live Set's tempo as a starting point for tempo tracking. The strategy here is as follows:

    1. Deactivate the Warp switch for the clip so that it plays unwarped;

2. Use the Control Bar's Tap Tempo button to tap along, thereby setting the Live Set's tempo to match that of the clip;

3. Turn warping on again and use the Warp From Here (Start At ...) command to tell Auto-Warp to use your tapped tempo as a reference.

- *Warp From Here (Straight)* tells Auto-Warp that this is a clip with no tempo variations (common in electronically produced works). Auto-Warp will then set a single Warp Marker derived from its guess of the file's original tempo.

- *Warp ... BPM From Here* will also set a single Warp Marker, but in this case, Auto-Warp is forced to interpret the clip as exactly matching the Live Set's tempo. This is useful in cases when you happen to know the exact BPM value of an electronically-produced work and can type it into the Control Bar before warping.

Multi-Clip Warping

When clips of equal length are multi-selected, adding or changing Warp Markers for one clip will apply identical Warp Markers to all. This is convenient in any situation where several tracks have the same rhythm, and you wish to alter the timing of each recording in the same way. A common scenario would be when multi-tracking a band's performance, where the musicians all play in time with each other, yet the timing itself is in some way flawed.

Copying Warp Markers

You can also selectively copy and paste Warp Markers from one clip to another. Copied Warp Markers don't even need to be pasted into the same bar as the original.
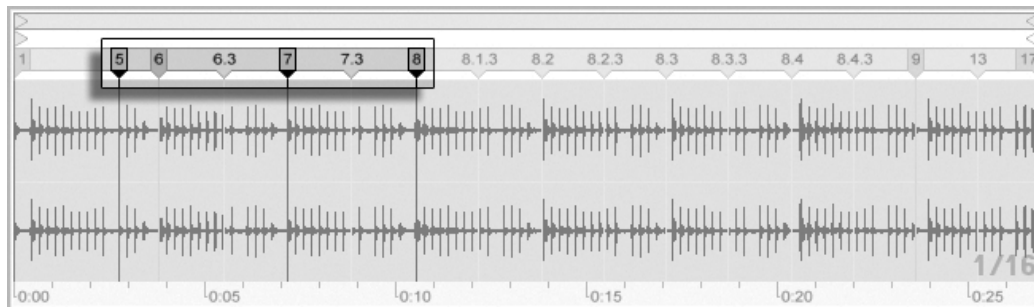
Three Selected Warp Markers.

Here are the steps:

1. Select the Warp Markers that you wish to copy by clicking on them with the mouse. After the first Warp Marker has been selected, hold `⇧` while clicking another to select the range of Warp Markers in between, or `Ctrl` (PC) / `⌘` (Mac)-click to add individual Warp Markers to your selection.

2. Once your selection is complete, choose the Copy command from the Edit menu.

3. Click on the title bar of the destination clip to select it.

4. In the destination clip's Clip View, click once on any Warp Marker to select it as the starting point for placement of the new Warp Markers.

5. Choose the Paste command from the Edit menu. The Warp Markers will be pasted into the destination clip.

9.3   Adjusting for Good Stretching Quality

Live offers a number of time-stretching modes to accommodate all sorts of audio material. Each clip's time-stretching mode and associated parameters are set in the Clip View's *Sample Box.*

The warp modes are different varieties of granular resynthesis techniques. Granular resynthesis achieves time compression and expansion by repeating and skipping over parts of

the sample (the "grains"). The warp modes differ in the selection of grains, as well as in the details of overlapping and crossfading between grains.

Let's investigate which warp modes work best for different types of signals and how to adjust the warping controls for "clean" stretching. It's also fun to "misuse" these controls to achieve interesting artifacts instead of accurate stretching.

9.3.1   Beats Mode

Beats Mode works best for material where rhythm is dominant (e.g., drum loops as well as most pieces of electronic dance music). The granulation process is optimized to preserve transients (attacks, note onsets) in the audio material.

Use the *Transients* control to guide Live's assumptions about where to find transients in the waveform. If there is no rhythmic activity at odd 16th notes, choose 8th, etc. For some interesting rhythmic artifacts, choose large transient values in conjunction with pitch transposition.

9.3.2   Tones Mode

Tones Mode serves well for stretching material with a more or less clear pitch structure, such as vocals, monophonic instruments and basslines.

Grain Size provides rough control over the average grain size used. The actual grain size is determined in a signal-dependent manner. For signals with a clear sense of pitch contour, a small grain size works best. Larger grain sizes help avoid artifacts that can occur when the pitch contour is unclear, but the tradeoff can be audible repetitions.

9.3.3   Texture Mode

Texture Mode works well for sound textures with an ambiguous pitch contour (e.g., polyphonic orchestral music, noise, atmospheric pads, etc.). It also offers rich potential for manipulating all kinds of sounds in a creative way.

The *Grain Size* control determines the grain size used, but unlike in Tones Mode, this is a setting that Live will use unaltered, without considering the signal's characteristics.

Fluctuation introduces randomness into the process. Larger values give more randomness.

9.3.4   Re-Pitch Mode

In Re-Pitch Mode, Live doesn't really time-stretch or compress the music; instead, it adjusts the playback rate to create the desired amount of stretching. In other words, to speed up playback by a factor of 2, it's transposed up an octave. This is like the "DJ stretching method" of using variable-speed turntables to sync two records, or what happens to samples in samplers when they're transposed.

The Transpose and Detune controls have no effect in Re-Pitch Mode.

9.3.5   Complex Mode

Complex Mode is a warping method specifically designed to accommodate composite signals that combine the characteristics covered by other Warp Modes; it works well for warping entire songs, which usually contain beats, tones and textures.

Complex Mode is a rather CPU-intensive function, using approximately ten times the CPU resources required by the other Warp Modes. As such, you may want to freeze tracks where Complex Mode is used or record the results as a new clip to use as a substitute.

Chapter 10

Editing MIDI Notes and Velocities

A MIDI clip in Live contains notes and controller data for playing a MIDI instrument. This instrument can be a virtual instrument in a MIDI track's device chain or an external synth fed via the track's output routing. The MIDI clip provides the device with a musical score to play, specifying note pitch, length, position and dynamics (referred to as *velocity* in the MIDI lexicon). MIDI is composed and edited in Live's MIDI Editor.

10.1   Creating an Empty MIDI Clip

MIDI clips are created

- by means of recording;

- or by double-clicking an empty Session slot in a MIDI track;

- or by selecting an empty Session slot in a MIDI track and choosing the Insert menu's Insert MIDI Clip command;

- or, in the Arrangement View, by selecting a timespan in a MIDI track and choosing the Insert menu's Insert MIDI Clip command.

10.2   The MIDI Editor

To bring up the MIDI Editor, double-click a MIDI clip to open the Clip View. You can use the Clip View Box selector to make sure the Notes box is showing, then click in the title bar of the Notes box to bring up the MIDI Editor on the right-hand side of the screen.
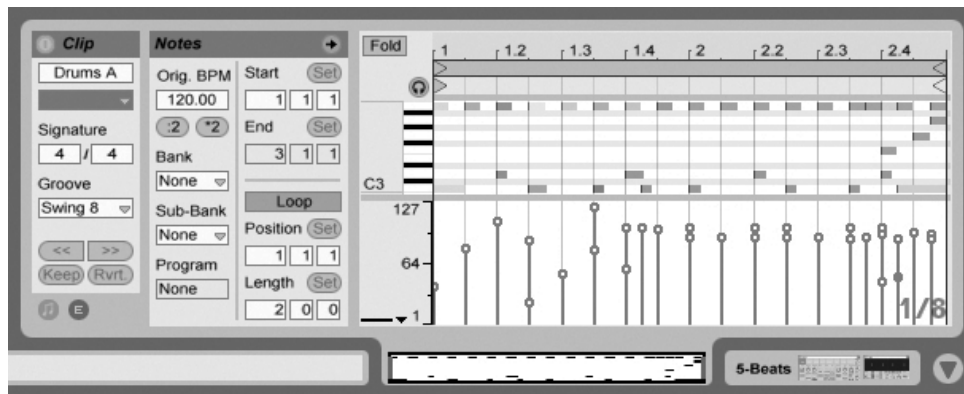
The MIDI Editor.

The MIDI Editor is comprised of two editing windows: the upper Note Editor and the lower Velocity Editor. You can resize the Velocity Editor by dragging on the split line that runs between it and the Note Editor. You can also show and hide the Velocity Editor using the triangular button on the left-hand side of the split line.

The Control Bar's Draw Mode Switch.

Switch to Draw Mode by activating the Control Bar's Draw Mode switch. You can now draw MIDI notes into the Note Editor with the mouse. Deactivating Draw Mode allows notes to be selected and moved around by clicking and dragging, either vertically to change their transposition, or horizontally to change their position in time.
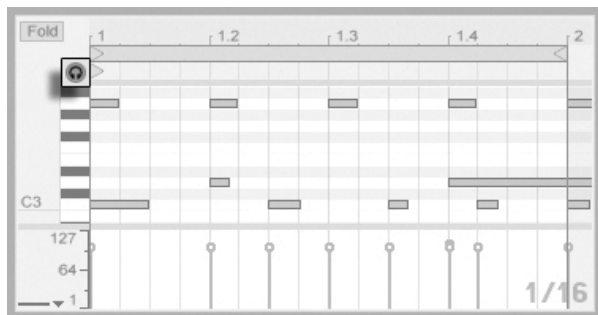
Previewing MIDI Notes.

Provided your MIDI track's device chain contains an instrument, activating the Preview switch in the MIDI Editor allows you to hear notes as you select and move them.

Note velocity is adjusted in the Velocity Editor, by clicking and dragging on the associated markers. You can also use Draw Mode in the Velocity Editor: It will draw identical velocities for all notes within a grid "tile."

After drawing a few notes and moving them around, you will probably want to know how to get around in the Note Editor. So, before we get into detailed editing information, we will first explain MIDI Editor navigation.

10.3   MIDI Editor Navigation and Transport
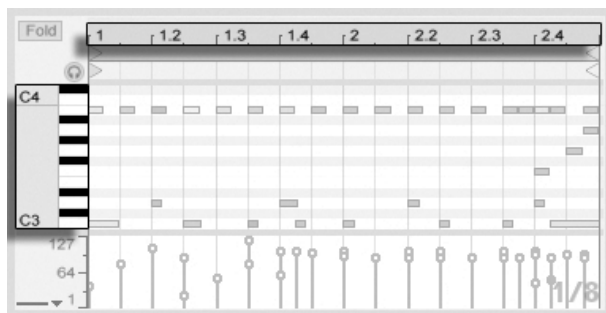
Note Scale Position Is Shown Vertically and Beat-Time Horizontally.

The MIDI Editor has both vertical and horizontal navigation. Along the horizontal axis lies

a time ruler, which shows note position along a musical timeline. The vertical axis contains both the note ruler, displaying octaves C0–C10, and a representation of a piano keyboard (the piano roll). Note that if the Preview switch at the top of the piano roll is activated, you can listen to the results of your piano roll playing.
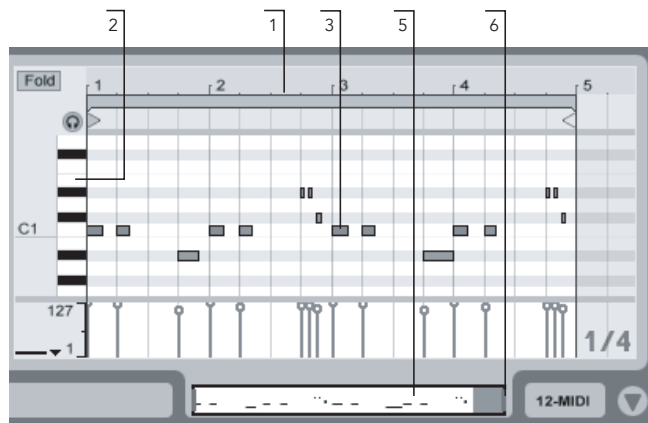
MIDI Editor Navigation.

1. To smoothly change the time-zoom level, click and drag vertically in the time ruler. Drag horizontally in the time ruler to scroll from left to right.

2. Click and drag vertically in the note ruler to change which octaves are shown, or drag horizontally to change the vertical zoom size of MIDI notes and the keyboard.

3. Click and drag over one or more notes to define a selection. Then, double-click on the note ruler to automatically zoom in on your selection. If no notes are selected, double-clicking the note ruler will zoom in on the area from the lowest to the highest note in the clip.

4. To zoom in and out around the current selection, use the computer keyboard's + and - keys.

5. The Clip Overview just beneath the MIDI Editor can also be used for navigation. It always shows the complete contents of the selected MIDI clip. The black rectangular outline represents the part of the clip that is currently displayed in the Editor above. To scroll, click within the outline and drag left or right; to zoom

in and out, drag up and down.

6. Change the length of what is shown in the Editor by dragging the left or right edges of the outline in the Clip Overview.

7. To quickly change what is shown in the Editor, click on a section that you want to examine in the Clip Overview, then drag downwards to zoom in, or scroll by dragging left and right.

8. The Page Up and Page Down keys on your computer keyboard scroll the Note Editor vertically. The `Ctrl` (PC) / `⌃ ⌘` (Mac) modifier will change this to horizontal scrolling.

The Control Bar's Follow Switch.

The area displayed in the Note Editor can be set to scroll with playback using the Follow switch from the Control Bar.
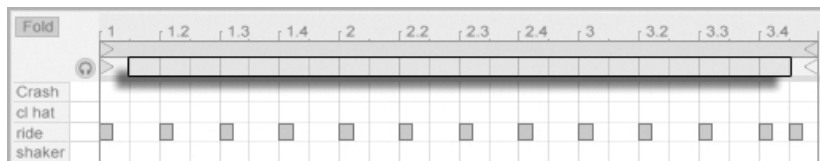
The MIDI Clip Scrub Area.

You can click in the scrub area just below the beat-time ruler to start playback from that point, rounded by the global quantization setting. Learning about the loop/region controls and associated shortcuts can also be helpful in getting around in the MIDI Editor and playing selections quickly and easily.

As you work with MIDI, you may find yourself needing extra screen space. You can click and drag vertically on the window split between the Session or Arrangement View and the Clip View to enlarge the MIDI Editor.
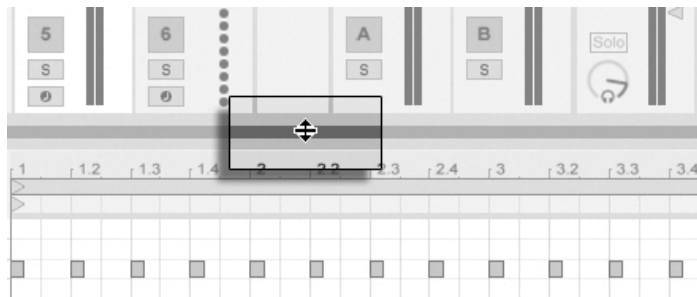
Enlarge the MIDI Editor by Dragging the Window Split Between Session and Clip Views.

10.4   Editing MIDI

10.4.1   Non-Destructive Editing

You can always return your MIDI clip to its previous state by using the Edit menu's Undo command. Furthermore, if the MIDI clip being edited originated in a MIDI file on your hard drive, none of your editing will alter the original MIDI file, as Live incorporates its contents into your Live Set when importing.

10.4.2   Folding and Looping

An important feature of the MIDI Editor is the Fold button, located in the upper left corner. Activating this button will immediately hide all rows, or *key tracks*, that do not contain MIDI notes. This is very useful when working with percussion kits, for example, which are oftentimes mapped out along a keyboard in sections corresponding to percussion type (e.g., snares grouped together two octaves down from hi-hat cymbals, etc.). When working with a MIDI file created by such a mapping, sometimes only one or two of each type of percussion sound is used, and it becomes unnecessary to view the entire keyboard range.

The Fold Button Extracts Key Tracks Containing Notes.

When editing MIDI, you might find that you want to change which part of the clip you are listening to, or loop the clip in order to listen to it repeatedly. You can use the loop/region markers for this.
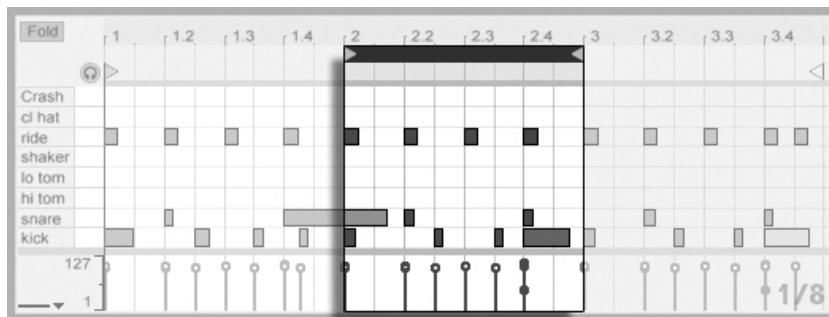
Use the Loop/Region Markers to Select a Specific Region of the Clip to Play.

10.4.3   Grid Snapping

Most functions in the MIDI Editor are subject to grid snapping. You can hold down the `Alt` (PC) / `⌘` (Mac) modifier while performing an action to bypass grid snapping.

Note movements will also snap to an "offset," which is based on the original placement of the note relative to the grid. This is useful for preserving a groove or loose playing style that you do not necessarily want to "set straight."

10.4.4   Arranging and Quantizing Notes

As we have seen, notes in the MIDI Editor can be moved both horizontally (changing their position in time) and vertically (changing their transposition). They can be moved either by clicking and dragging, or with the arrow keys on your computer keyboard; in either case, they are subject to grid and offset snapping. If you are playing the clip while you move notes, you can listen to them play in their new assignments as you drag them, without waiting until you have released the mouse button.

Multiple notes can be selected and moved in unison: "Rubber-band" select more than one note with one mouse motion by clicking in empty space, then dragging diagonally upward

or downward to enclose the notes in the dotted line that appears.

You can use the ⬆ modifier to click and add individual notes or additional "rubber-band" selections to your current selection. You can also remove a single note from your selection by holding down ⬆ and clicking on it. Holding ⬆ and clicking on the piano roll selects all notes in a single key track.

There are two options for quantizing MIDI notes in Live. As previously mentioned, you can move notes so that they snap to the visible grid lines. Alternatively, you can select a note or notes and choose the Quantize command from the Edit menu, or use the Ctrl U (PC) / ⬆ ⌘ U (Mac) hotkey. This brings up a dialog box with several quantization options.
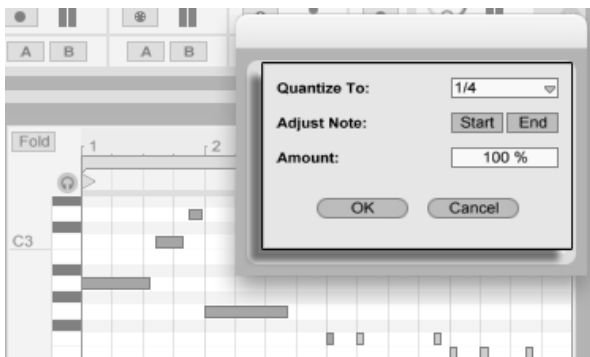
Quantizing MIDI Notes.

Using the options presented here, you can select a meter value for quantization and set either the note start or end (or both) to be quantized. Quantizing the note end will stretch the note so that it ends at the chosen meter subdivision. You can also quantize notes without giving them that "quantized" feel using the Amount control, which will move notes only by a percentage of the set quantization value.

10.4.5   Creating and Editing Notes

Selecting a note (or notes) makes it subject to commands from the Edit menu, such as Copy and Paste. You can use the Ctrl (PC) / Alt (Mac) modifier to click and drag a copy of a note to a new location.

The Edit menu's Select Loop command selects all notes that begin within the loop brace. The Select Loop command can also be executed without the menu by simply clicking the loop brace.   This command can speed up editing when coupled with the loop brace's shortcuts. Let's say you have arranged a nice 1-bar loop in the Note editor, and you want to duplicate it a couple of times. You can click the loop brace to select the notes that begin within the loop, execute the Edit menu's Copy command, shift the loop to the right by one loop length with ⬆ , and execute the Edit menu's Paste command.
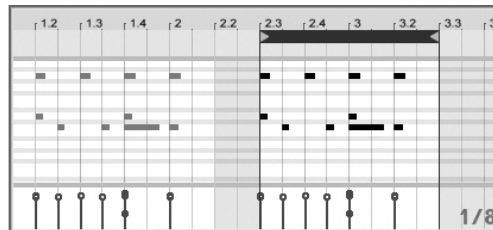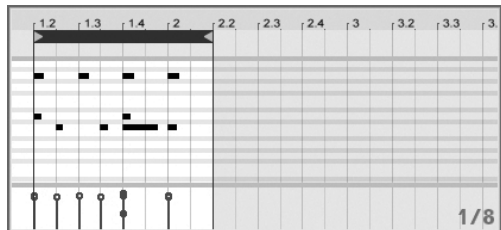
Copying (Left) and Pasting (Right) a Loop.

As we have already seen, creating new MIDI notes is as simple as activating Draw Mode and drawing them into the Note Editor. MIDI notes can also be added and deleted by double-clicking when Draw Mode is inactive.

Vertical movements in Draw Mode correspond to velocity changes. This means that, with one horizontal motion and one vertical motion, you can draw multiple notes and their velocities without releasing the mouse button. If you change velocity with this vertical movement, Live will remember the change and use your new velocity on any notes that you draw afterward.

You may sometimes, by dragging or by drawing, place a new note on top of one that already exists. If the new note overlaps with the beginning of the original note, the original note will vanish. The original note is invisible, but still exists, and will reappear intact if the new note is moved away again. If the new note overlaps with the "tail" of the original, the original note's length will change so that it lasts just until the new note's beginning. This, too, is not an irreversible action, and the old note length will be restored if the new clip is again moved.

10.4.6 Changing Note Length

Clicking and dragging on a note's left or right edges changes its length. Note length can only be changed when Draw Mode is inactive, and will be quantized unless the [Alt] (PC) / [⌥ ⌘] (Mac) modifier is held down while dragging.
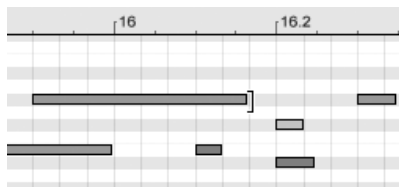
Changing Note Length.

Tip: To set a group of notes to the same length, select them all, grab the end of the longest one, drag them all down to zero length and then extend them.

MIDI Note Stretch
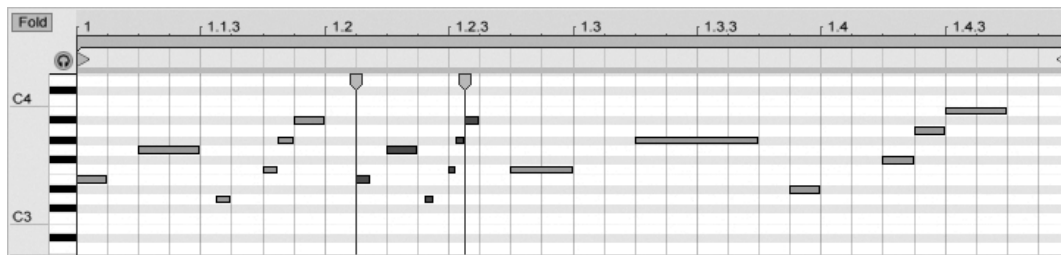
Three Variations Created with the Stretch Notes Command.

When multiple notes are selected in the Note Editor, the Stretch Notes command becomes available from the context menu, if you invoke it with [🖱] (PC) / [Ctrl] [🖱] (Mac). *Note Stretch markers* will then appear in the Note Editor, allowing notes to be scaled proportionally in time. The markers are a pair of downward-pointing indicators that snap to the beginning of the first and last notes in the selection.

By clicking and dragging one of the markers horizontally, the selected notes will move and stretch so that they continue to occupy the same proportion of time that they did when they were initially selected. The Note Stretch markers will always snap to the Note Editor's grid

lines unless the grid is not shown, or the $\boxed{\text{Alt}}$ (PC) / $\boxed{\text{⌃ ⌘}}$ (Mac) modifier is held while dragging.

If one marker is dragged beyond the boundary of the other, then the order of the stretched notes will be "reflected" in relation to their initial sequence; this is sometimes referred to as "retrograde" behavior.

Any changes occurring to the notes included in the Note Stretch before the mouse button is released will cancel the stretch operation. This can occur, for example, if the MIDI clip is simultaneously being overdubbed with new notes.

10.4.7 Editing Velocities

To change velocity for a MIDI note, click and drag on the associated marker in the Velocity Editor. (To help you locate the velocity marker belonging to a MIDI note that may be stacked vertically with others, Live highlights the velocity marker for whichever note your mouse is hovering over.) Velocity changes will be shown numerically in a small display in the time ruler.
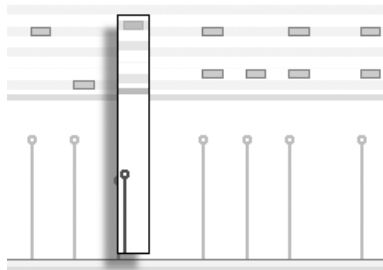
Changing Note Velocity.

As in the Note Editor, you can select multiple velocity markers to change by clicking with the $\boxed{\text{⇧}}$ modifier held down.

Tip: To set a group of notes so that they all have the same velocity, select their markers in the Velocity Editor, drag them up to maximum velocity and then decrease velocity to the desired value.

As we saw earlier, Draw Mode allows drawing identical velocities for all notes within a grid tile. Velocity drawing can be limited to only those notes that are currently selected if the

⎡⟳___⎤ modifier is held. To draw markers individually (as you would want to with a crescendo, for instance) deactivate grid snapping with the ⎡Ctrl___⎤⎡4⎤ (PC) / ⎡⟳ ⌘⎤⎡4⎤ (Mac) shortcut, or simply hold down the ⎡Alt___⎤ (PC) / ⎡⟳ ⌘⎤ (Mac) modifier.
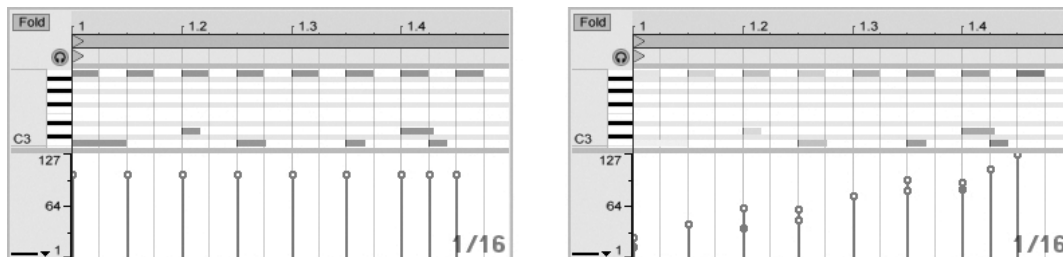
Drawing Identical Velocities (Left) and a Crescendo (Right).

Tip: To draw a velocity ramp with notes that are all in the same key track, press ⎡⟳___⎤ and click on the piano roll to select all notes within the desired key track, make sure Draw Mode is activated and draw the ramp into the Velocity Editor while holding the ⎡⟳___⎤ modifier, so that you affect only the selected notes.

Notes in the Note Editor display their velocity in their coloring – light notes play softly, and vice versa. To change the velocity of notes without the Velocity Editor open, click any selected note and drag vertically while pressing the the ⎡Alt___⎤ (PC) / ⎡⟳ ⌘⎤ (Mac) modifier.

10.4.8   Deactivating Notes

To deactivate, or mute, a note (or notes) in the MIDI Editor, select it and 🖱 (PC) / ⎡Ctrl___⎤ 🖱 (Mac) to access the context menu. The Deactivate Note(s) command will mute the note, making it appear gray in the display. To reactivate notes, use the context menu's Activate Note(s) command.

Chapter 11

Launching Clips

The Live Session View is set apart by the fact that it gives you, the musician, an spontaneous environment that encourages performance and improvisation. An important part of how you take advantage of the Session View lies within how you configure your various Session View clips. This chapter explains the group of settings used to define how each Session View clip behaves when triggered, or "launched."

11.1 The Launch Box

Remember that clips in the Session View are launched by their Clip Launch buttons or remote control. Clip launch settings are made in the *Launch box*. The Launch box only applies to Session View clips, as Arrangement View clips are not launched but played according to their positions in the Arrangement.

To view the Launch box, open the Clip View of a Session View clip by double-clicking the clip, then activating the leftmost Clip View Box selector panel.

Note that you can edit the launch settings of more than one clip at the same time by first selecting the clips and then opening the Clip View.

11.2 Launch Modes

The Launch Mode chooser offers a number of options for how clips behave with respect to mouse clicks, computer keyboard actions or MIDI notes:

- Trigger: *down* starts the clip; *up* is ignored.

- Gate: *down* starts the clip; *up* stops the clip.

- Toggle: *down* starts the clip; *up* is ignored. The clip will stop on the next down.

- Repeat: As long as the mouse switch/key is held, the clip is triggered repeatedly at the clip quantization rate.

11.3 Clip-Level Quantization

The Clip Quantization Chooser.

The Clip Quantization chooser lets you adjust an onset timing correction for clip triggering. To disable clip quantization, choose "None."

To use the Control Bar's Global Quantization setting, choose "Global." Global quantization can be quickly changed using the ⌨Ctrl⌨ ⌨6⌨ (PC) / ⌨⌘⌨ ⌨6⌨ (Mac), ⌨7⌨, ⌨8⌨, ⌨9⌨ and ⌨0⌨ shortcuts.

Note that any setting other than "None" will quantize the clip's launch when it is triggered by Follow Actions.

11.4 Velocity
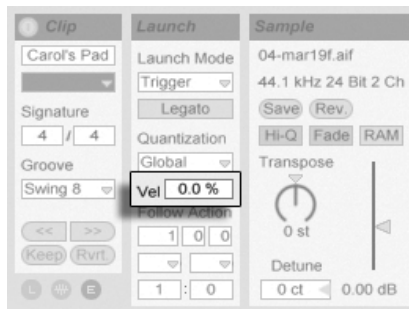
The Velocity Amount Field.

The Velocity Amount control allows you to adjust the effect of MIDI note velocity on the clip's volume: If set to zero, there is no influence; at 100 percent, the softest notes play the clip silently. For more on playing clips via MIDI, see the respective section.

11.5   Legato Mode

The Legato Mode Switch.

Suppose you have gathered, in one track, a number of looping clips, and you now want to toggle among them without losing the sync. For this you could use a large quantization setting (one bar or greater), however, this might limit your musical expression.

Another option, which works even with quantization turned off, is to engage *Legato Mode* for the respective clips. When a clip in Legato Mode is launched, it takes over the play position from whatever clip was played in that track before. Hence, you can toggle clips at any moment and rate without ever losing the sync.

Legato Mode is very useful for creating breaks, as you can momentarily play alternative loops and jump back to what was playing in the track before.

Unless all the clips involved play the same sample (differing by clip settings only), you might hear dropouts when launching clips in Legato Mode. This happens because you are unexpectedly jumping to a point in the sample that Live has had no chance to pre-load from disk in advance. You can remedy this situation by engaging Clip RAM Mode for the clips in question.

11.6   Follow Actions

Follow Actions allow creating chains of clips that can trigger each other in an orderly or random way (or both). A clip's *Follow Action* defines what happens to other clips in the

same group after the clip plays. A group is defined by clips arranged in successive slots of the same track. Tracks can have an unlimited number of groups, separated by empty slots.
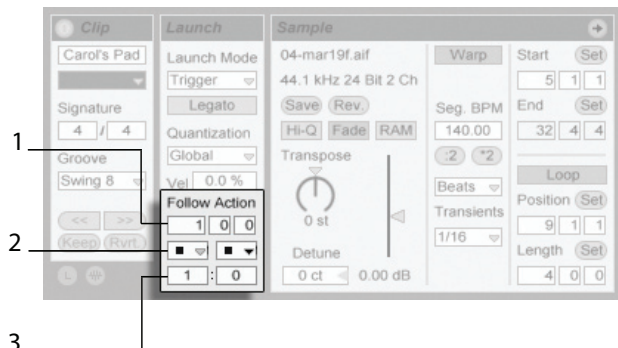
The Follow Action Controls.

1. The Follow Action Time control defines when the Follow Action takes place in bars-beats-sixteenths from the point in the clip where play starts. The default for this setting is one bar.

2. The Follow Action choosers allow selecting two different Follow Actions, A and B.

3. The Chance A and Chance B controls set the likelihood of each of the two Follow Actions occurring. If a clip has Chance A set to 1 and Chance B set to 0, Follow Action A will occur every time the clip is launched. As we can see from this example, a Chance setting of 0 means that an action will never happen. Changing Chance B to 10 in this scenario makes Follow Action A occur much less often – approximately once out of every ten clip launches.

There are eight Follow Actions available:

■ "Stop" simply stops the clip after it has played for the chosen Follow Action Time. Note that this overrides clip loop/region settings.

▶ "Play Clip Again" restarts the clip.

↑ "Play Previous Clip" triggers the previous clip (the one above the current one).

↓ "Play Next Clip" triggers the next clip down in the group. If a clip with this setting is last

in a group, this Follow Action triggers the first clip.

≣ "Play First Clip" launches the first (top) clip in a group.

▤ "Play Last Clip" launches the last (bottom) clip in a group.

✳ "Play Any Clip" plays any clip in the group.

⁝ "Play Other Clip" is similar to "Play Any Clip," but as long as the current clip is not alone in the group, no clip will play consecutively.

There is also the possibility to have no Follow Action by selecting "No Action," or leaving the chooser blank.

Note that a Follow Action happens exactly after the duration that is specified by the Follow Action Time controls *unless* clip quantization is set to a value other than "None" or "Global." Follow Actions circumvent global quantization *but not* clip quantization.

So why do you need these things? Music is repetition and change. Music based on loops or short melodic fragments has a tendency to sound static. Follow Actions allow you to create structures that will repeat but can also be surprising. Remember that you can always record the results of your experiments, so this can provide a good source for new material.

In the following sections we will look at some practical examples and ideas for Follow Actions.

11.6.1   Looping Parts of a Clip

Let's say that you want to play a longer clip, but then you want only the last eight bars to loop. You can set this up using Follow Actions:

1. Drag the clip into the Arrangement View and make sure that the Clip View's Loop switch is not activated. Use the Edit menu's Split command to split the clip between the non-looping and looping parts.

2. Click and drag the resulting two clips into the Session View by letting the mouse cursor hover over the Session View selector. Drop the two clips into a track. They now form a Follow Action group.
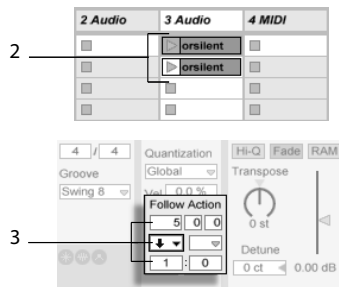
Creating a Group With the Two Clips.

3. Set up Follow Actions for the first clip. You will want to make Follow Action Time equal to the clip's length. Set the Follow Action A chooser to "Play Next Clip," with a Chance setting of 1, leaving Follow Action B alone. Now this clip is set up to advance to the looping clip after it plays.

4. Activate the Loop switch for the second clip.

The first clip will now proceed to the second after it has played in its entirety; the second clip will simply play in a loop until it is stopped.

11.6.2 Creating Cycles

One of the most obvious possibilities that Follow Actions open up is using a group of samples to form a musical cycle. If we organize several clips as a group and use the "Play Next Clip" Follow Action with each clip, they will play one after the other ad infinitum, or until we tell them to stop.

Cycles can be peppered with occasional rearrangements through the addition of other Follow Actions, such as "Play Any Clip," with smaller relative Chance settings.

11.6.3 Temporarily Looping Clips

There are some interesting applications of Follow Actions when it comes to creating temporary musical loops.

The default setting for Follow Action is actually a 1:0 chance that "Nothing" happens after the Follow Action Time, which means that there is effectively no Follow Action. But now, imagine a group consisting of one single clip. Follow Action A is set to "Play Clip Again," with a Chance of 8. Follow Action B is set to "None," with a Chance of 1. The clip uses a long sample, and Follow Time is set to one bar. Clicking on the clip will play the first bar, after which it will be very likely that it will play the first bar again. However, after a few repetitions, it will eventually come to Action B – "Nothing" – and continue playing the rest of the sample.

Or, a clip can be played from its start to a specific point, when its Follow Action tells it to "Play Next Clip." The same file can be used in the next clip in the group, but this one can be set to loop. This second clip can have any manner of Follow Action settings, so that it might then play forever, for a specified time or until random chance leads to the next clip in the group.

11.6.4 Adding Variations in Sync

Paired with clip envelopes and warping, Follow Actions can be used to create all sorts of interesting variations within a group of similar clips. You could, for example, use Follow Actions to randomly trigger clips with different MIDI controller clip envelopes, so that fine variations in pitch bend or modulation of an instrument or synth could occur as the clips in a group interacted. Audio clips could morph between different effect or clip transposition settings.

Using Follow Actions and Legato Mode together provides a powerful way of gradually changing a melody or beat. Imagine that you have several identical clips of a melody that form a group, and they are set up to play in Legato Mode. Whenever their Follow Actions tell them to move on to another clip in the group, the melody will not change, as Legato Mode will sync the new play position with the old one in beat-time. The settings and clip envelopes of each clip (or even the actual notes contained in a MIDI clip) can then be slowly adjusted, so that the melody goes through a gradual metamorphosis.

11.6.5   Mixing up Melodies and Beats

You can let Follow Actions perform unpredictable remixes and solos for you: Use a clip containing a beat or melody, and copy it so that there are several instances of it forming a group. Alternatively, you can use several different beats or melodies that you want to mix together. The start and end for each clip can be set differently, as can clip envelopes and other clip settings. As long as Follow Action Time in each clip is equal to the length of the clip that you want to play, you can set up two Follow Actions with different Chance values in each clip, launch a clip, and surprise yourself.

11.6.6   Creating Nonrepetitive Structures

Follow Actions are great when it comes to sound installations, as they allow you to create structures that play for weeks or months and never exactly repeat. You can set the Follow Action Time controls in a series of clips to odd intervals, and the clips will interact with each other so that they never quite play in the same order or musical position. Remember that each clip can have two different Follow Actions with corresponding Chance settings... have fun!

Chapter 12

Routing and I/O

In the context of Live, "routing" is the setup of the tracks' signal sources and destinations (i.e., their inputs and outputs). Routing happens in the mixer's *track In/Out section*, which offers, for every track, choosers to select a signal source and destination. The mixer's In/Out section is Live's "patchbay."

The In/Out section can be independently shown or hidden from the Session and Arrangement Views. Toggle its visibility using the I/O Mixer Section selector, or via the View menu's In/Out option.

The Mixer's In/Out Section and Mixer Section Selectors.

For every track (except the Master), the In/Out section has the same layout:

- The upper chooser pair ("Audio/MIDI From") selects the track's input. Audio tracks have an audio input, and MIDI tracks have a MIDI input. Return tracks receive their input from the respective sends.

- The Monitor radio button selects the monitor mode: the conditions under which the track's input is heard through the track.

- The lower chooser pair ("Audio/MIDI To") selects the track's output. All tracks have audio outputs, except for MIDI tracks without instruments. Remember that instruments convert MIDI to audio.

Within a chooser pair, the upper chooser selects the signal category ("Ext.," for instance, for external connections via an audio or MIDI interface), and is called the Input/Output Type chooser. If this signal type offers sub-selections or channels, they are available from the lower chooser, or the Input/Output Channel chooser. In our "Ext." example, these would be the individual audio/MIDI inputs and outputs.

12.1   Monitoring

"Monitoring," in the context of Live, means passing a track's input signal on to the track's output. Suppose you have set up an audio track to receive its input signal from a guitar. Monitoring then means that the signal from your live guitar playing actually reaches the

track's output, via the track's device chain. If the track's output is set to "Master," you can hear the guitar signal, processed by whatever effects are used (and delayed by whatever latency the audio hardware interface incurs), over your speakers.

The In/Out section offers, for every audio track and MIDI track, a *Monitor* radio button with the following three options:

- The default *Auto*-monitoring setting does the right thing for most straightforward recording applications: Monitoring is on when the track is armed (record-enabled), but monitoring is inhibited as long as the track is playing clips.
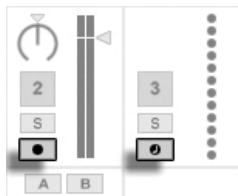
Audio and MIDI Track Arm Buttons.

- To permanently monitor the track's input, regardless of whether the track is armed or clips are playing, choose *In*. This setting effectively turns the track into what is called an "Aux" on some systems: The track is not used for recording but for bringing in a signal from elsewhere (for instance, a ReWire slave program). With this setting, output from the clips is suppressed. An "In" monitoring setting can be easily recognized even when the In/Out section is hidden by the orange color of the track's Activator switch.

- Monitoring can be turned off altogether by choosing the *Off* option. This is useful when recording acoustic instruments which are monitored "through the air," when using an external mixing console for monitoring or when using an audio hardware interface with a "direct monitoring" option that bypasses the computer so as to avoid latency. Generally, it is preferable to work with an audio interface that allows for negligible latencies (a few milliseconds). If you are recording into Live with monitoring set to "Off," you may want to make the Audio Preferences' Overall Latency adjustment, which is described in the built-in program tutorial on setting up the Audio Preferences.

12.2   External Audio In/Out

An audio interface's inputs are selected by choosing "Ext. In" from the Input Type chooser of an audio track. The Input Channel chooser then offers the individual input channels. Entries in this chooser each have meters next to their names to help you identify signal presence and overload (when the meter flashes red). Setting up the audio interface's outputs works the same way via the output chooser pair.

The list of available inputs and outputs depends on the Audio Preferences, which can be reached via the Input and Output Channel choosers' "Configure..." option. Note that the Audio Preferences also provide access to the Channel Configuration dialogs, which determine which inputs and outputs are used, and whether they are available to Live as mono or stereo pairs. Essentially, the Channel Configuration dialog tells Live what it needs to know about how the computer is connected to the other audio components in your studio.

12.2.1   Mono/Stereo Conversions

When a mono signal is chosen as an audio track's input, the track will record mono samples; otherwise it will record stereo samples. Signals in the track's device chain are always stereo, even when the track's input is mono or when the track plays mono samples.

Mono is turned into stereo simply by using the identical signal for left and right channels. When a track is routed into a mono output, the left and right signals are added together and attenuated by 6 dB to avoid clipping.

12.3   External MIDI In/Out

MIDI from the outside world is routed into Live just like audio. From the Input Type chooser of a MIDI track, you can either select a specific MIDI input port or "All Ins," which is the merged input of all external MIDI ports. The Input Channel chooser offers the individual input channels of the selected MIDI port and the merged signal of all channels, "All." As is

the case with audio inputs, the Input Channel chooser also has meters next to every entry to represent activity on the respective input channel.

12.3.1 The MIDI Ports List in the Preferences
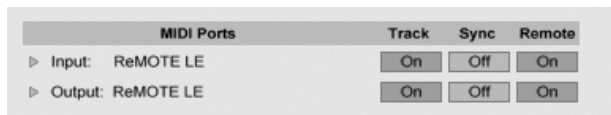
The MIDI Ports List in the Preferences.

You can configure which MIDI ports are made available to Live using the *MIDI Ports* section of the MIDI/Sync Preferences. All available input and output ports are listed here. For Live's tracks to receive/send MIDI from/to a specific MIDI port, the corresponding switch in the Track column must be set to *On*. You can use any number of MIDI ports for track input and output; the mixer's In/Out choosers allow them to be addressed individually.

12.3.2 Playing MIDI With the Computer Keyboard

The computer keyboard can be used as a pseudo-port for generating MIDI notes from computer keyboard strokes. Using this pseudo-port, you can generate MIDI even without a "real" MIDI input port. To turn the computer MIDI keyboard on, use the Control Bar's Computer MIDI Keyboard button, or the [Ctrl] [⇧] [K] (PC) / [⌃] [⌘] [⇧] [K] (Mac) shortcut to the Options menu entry.

Activating the Computer MIDI Keyboard.

The center row of letter keys on the keyboard will play notes corresponding to the white keys on a piano, beginning on the left with the note C5. The black keys on a piano correspond to the upper row of computer keys. The four leftmost letters on the lower row of the keyboard are used to transpose the note range and to set velocity. The results of changing these values are displayed in the Status Bar at the bottom of the Live screen.

As it happens, when the computer keyboard is set to send notes between C3 and C4, the keys are mapped to MIDI notes such that the center row of the keyboard (ASDF...) addresses

the Impulse percussion sampler's sample slots. This means that you can play and record drum patterns right off the computer keyboard.

Note that when the computer MIDI keyboard is activated, it will "steal" keys that may have otherwise been assigned to remote-control elements of the Live interface. To prevent this, you can turn the computer MIDI keyboard off when it is not needed.

12.3.3   Connecting External Synthesizers

Routing MIDI to an external synthesizer is straightforward: The Output Type chooser is set to whatever MIDI port the synthesizer is connected to; the Output Channel chooser is used to select which MIDI channel to send on.

Important: If you are using a keyboard synthesizer both as a master keyboard to play into Live and as a sound generator, then please make sure to check the synthesizer's "Local Off" function. Every synthesizer has this function, which effectively separates the keyboard from the sound generator, allowing you to treat both components as if they were separate devices. This allows you to use Live as the hub of your MIDI studio, which receives MIDI from the keyboard and dispatches the incoming MIDI, as well as the MIDI from the clips, as appropriate.

12.3.4   MIDI In/Out Indicators

Live's Control Bar contains three pairs of indicator LEDs that tell you about incoming and outgoing MIDI. These indicators tell you not only about the presence of signals, but also about their *use*. In every pair, the upper indicator flashes when a MIDI message is received, and the lower indicator flashes when a MIDI message is sent.
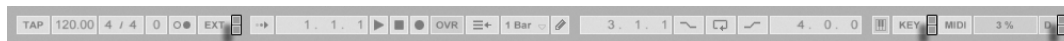
The Control Bar's MIDI Indicators.

The three indicator pairs represent, from left to right:

1. MIDI Clock and Timecode signals that are used for synchronizing Live with other sequencers;

2. MIDI messages that are used for remote-controlling Live's user-interface elements;

3. MIDI messages coming from and going to Live's MIDI tracks.

MIDI messages that are mapped to remote-control Live's user-interface elements are "eaten up" by the remote control assignment and will not be passed on to the MIDI tracks. This is a common cause of confusion that can be easily resolved by looking at the indicators.

12.4   Master and Cue Outs

The Master track is the default destination for audio signals. The Master track, in turn, is routed to the external audio outputs.

The *Cue/Preview Out* can be independently routed to allow, for instance, for previewing samples and cueing tracks via headphones.

12.5   ReWire Slave Routing

Live can operate as a ReWire master or slave in cooperation with another ReWire application. As a ReWire master, Live can send MIDI to, and receive audio from, any ReWire slave application installed on the same computer.
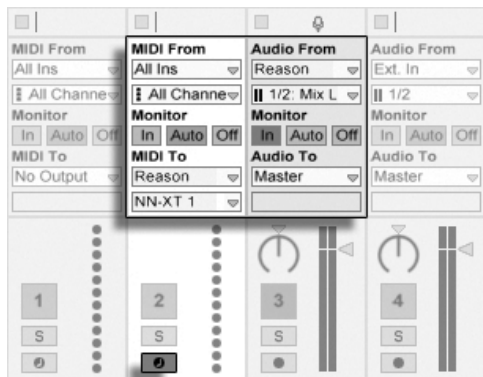
An Audio Track Receiving Audio From and a MIDI Track Sending MIDI to Reason.

The following example shows how to send MIDI from one of Live's MIDI tracks into an instrument within *Propellerhead's Reason*, and then route the audio result back into an audio track:

1. *First*, start Live.

2. *Then*, start Reason and set up the Reason rack as desired.

3. Select "Reason" from the MIDI track's Output Type chooser.

4. The Output Channel chooser presents you with a list of the instruments that you currently have in your Reason rack; select the instrument you want to address.

5. Select "Reason" from the audio track's Input Type chooser.

6. From the audio track's Input Channel chooser, select the audio channel that corresponds to the instrument to which you are sending MIDI.

7. Set the audio track's Monitor radio button to "In."

8. Select "All Ins" from the MIDI track's Input Type chooser.

9. Arm the MIDI track.

Now, any MIDI that you are playing into Live will arrive in Reason, which will generate the corresponding audio back into the audio track, ready for further processing in Live's mixer and effects. If you want to continue work on the project without reopening Reason, simply record Reason's audio by arming the audio track and engaging Record Mode.

12.6 Resampling

Live's Master output can be routed into an individual audio track and recorded, or *resampled*. Resampling can be a fun and useful tool, as it lets you create samples from what is currently happening in a Live Set that can then be immediately integrated. It can be used to record tracks that include processor-intensive devices, so as to delete the devices, or for quickly previewing before rendering to disk.

The "Resampling" option in any audio track's Input Type chooser will route the Master output to that track. You can then decide on what exactly you will be resampling and mute, solo or otherwise adjust the tracks that are feeding the Master output. You will probably want to use the Master Volume meter to make sure that your level is as high as possible without clipping (indicated by red in the meter). Then you can arm the track and record into any of its empty clip slots. Note that the recording track's own output will be suppressed while resampling is taking place, and will not be included in the recording.

Samples created by resampling will be stored in with the current Set's Project folder, under Samples/Recorded. Until the Set is saved, they remain at the location specified by the Temporary Folder.

12.7 Internal Routings

Live's mixer allows for inter-track routings. These routings, albeit potentially confusing, enable many valuable creative and technical options. Inter-track routing can work two ways:

1. Track A is set up to send its output signal to Track B. This is possible because every track that can receive an output signal of the appropriate type from Track A shows up in its Output Type chooser.

2. Track B is set up to receive its input signal from Track A. This works because every track that delivers a signal of the appropriate type appears in Track B's Input Type chooser.

Two Ways to Route Track A into Track B.

Both approaches result in Track A's output being fed into Track B. Approach 1 leaves Track B's in/out settings alone, and we can, at any time, add more tracks that feed their output into Track B. This is the method of choice for "many-to-one" routings such as submixes or several MIDI tracks playing the same instrument.

Approach 2, on the other hand, leaves Track A unaffected except for Track B tapping its output. We can easily add more tracks like Track B that all tap Track A's output. Instrument layering is a good example of such a "one-to-many" routing setup.

12.7.1   Internal Routing Points

Signals travel from Live's tracks into their respective device chains and then into the track mixer, where they might become panned or have their levels altered by the tracks' faders.

Whenever a track's Audio From input chooser is set to another track (as described in the previous section's Approach 2), the signal received can be tapped from one of three different points chosen from the Input Channel chooser: *Pre FX*, *Post FX* or *Post Mixer*.

Tap Points for Track Routing.

- *Pre FX* taps the signal that is coming directly from a track, before it has been passed on to the track's device chains (FX) or mixer. Therefore, changes that are made to the tapped track's devices or mixer have no effect on the tapped signal.

- *Post FX* taps the signal at the output of a track's device chains (FX), but before it has been passed back to the track mixer. Changes to the tapped track's devices will therefore alter the tapped signal, but changes to its mixer settings will not.

- *Post Mixer* taps the final output of a track, after it has passed through its device chains and mixer.

Routing Points in Racks
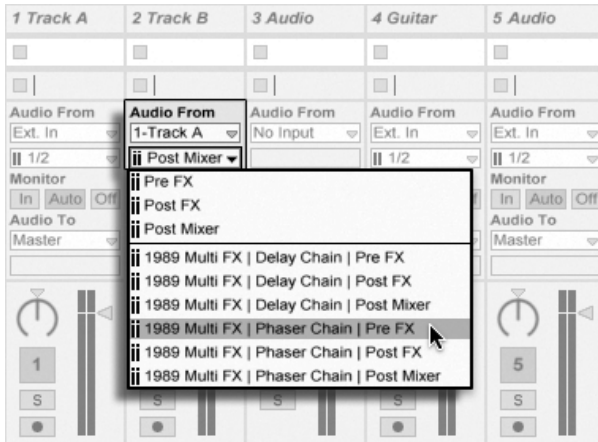
Tap Points for Every Chain in a Track.

If a track has one or more Racks in its device chain, internal routing points (Pre FX, Post FX and Post Mixer) will also be available for every chain within the Rack. In this case, each Rack will also be listed in the Input Channel chooser:

- *(Rack Name)* | *(Chain Name)* | Pre FX – The signal will be tapped from the point that it enters the Rack, before it reaches the chain's devices.

- *(Rack Name)* | *(Chain Name)* | Post FX – The signal will be tapped from the end of the chain, but before it passes to the chain's mixer.

- *(Rack Name)* | *(Chain Name)* | Post Mixer – The signal will be tapped from the output of the chain's mixer, just before the point where all of the chains in the Rack are summed together to create the Rack's output.

12.7.2 Making Use of Internal Routing

This section presents several internal routing examples in more detail.

Post-Effects Recording

Let's say that you are feeding a guitar into Live, building up a song track by track, overlaying take onto take. It is certainly powerful to have a separate effects chain per track for applying different effects to different takes – after the fact. You might, however, want to run the guitar signal through effects (a noise gate or an amp model, for instance) *before* the recording stage, and record the post-effects signal.

3 Audio	4 Guitar	5 Audio	6 Audio	7 Pad
☐	☐	☐	☐	☐
☐ |	☐ 🎤	☐ |	☐ |	☐ |
Audio From	**Audio From**	**Audio From**	**Audio From**	MIDI From
No Input	Ext. In ▽	4-Guitar ▽	4-Guitar ▽	All Ins ▽
	‖ 1/2 ▽	‖ Post FX ▽	‖ Post Mixer ▽	⁞ All Channe▽
	Monitor	**Monitor**	**Monitor**	Monitor
	In Auto Off	In Auto Off	In Auto Off	In Auto Off
Audio To	Audio To	Audio To	Audio To	MIDI To
Master ▽	Master ▽	Master ▽	Master ▽	No Output ▽

An Example Setup for Post-Effects Recording.

This is easily accomplished by devoting a special audio track for processing and monitoring the incoming guitar signal. We call this track "Guitar" and drag the desired effects into its device chain. We do not record directly into the Guitar track; instead we create a couple more tracks to use for recording. Those tracks are all set up to receive their input Post FX from the Guitar track. Note that we could also tap the Guitar track Post Mixer if we wished to record any level or panning from it.

As for monitoring, we set the Guitar track's Monitor radio button to In, because we always want to listen to our guitar through this track, no matter what else is going on in Live. The other tracks' Monitor radio buttons are set to Off.

Recording MIDI as Audio

When working with MIDI and complex software instruments, it is sometimes more useful to record the resulting audio than the incoming MIDI. A single MIDI note can prompt, for example, Native Instruments' *Absynth* to produce something that sounds more like a piece of music than a single tone. This output lends itself more to representation as an audio waveform than a single note in a MIDI clip, particularly when comparing the editing options.
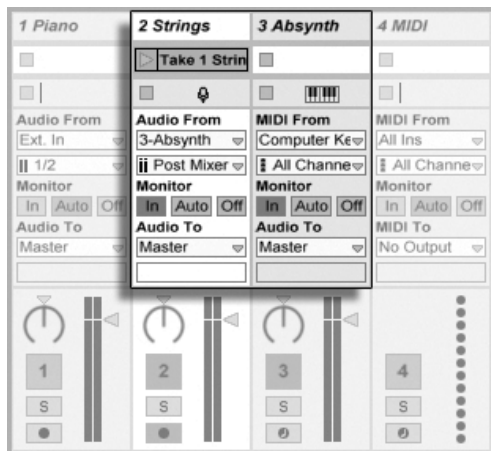
Recording the Output of a Complex Instrument in Audio Tracks.

A setup similar to the one described above accomplishes the task. We have one MIDI track hosting the virtual instrument, and we use additional audio tracks to record the audio result of playing the instrument.

Creating Submixes
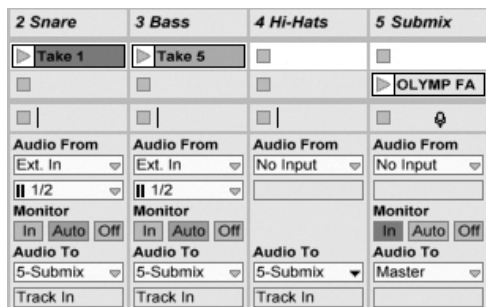
Submixing the Individual Drums of a Drum Kit.

Suppose we have the individual drums of a drum kit coming in on separate tracks for multitrack recording. In the mix, we can easily change the volumes of the individual drums, but adjusting the volume of the entire drum kit against the rest of the music is less convenient.

Therefore, we add a new audio track to submix the individual drums. The drum tracks are all set to output to the submix track, which outputs to the Master. The submix track gives us a handy volume control for the entire drum kit.

Several MIDI Tracks Playing the Same Instrument

Consider a MIDI track containing a virtual instrument – a Simpler playing a pad sound, for example. We have already recorded MIDI clips into this track when we realize that we would like to add an independent, parallel take for the same instrument. So we add another MIDI track. We could now drag another Simpler into the new track, but we would really like to reuse the Simpler from the pad track, so that changing the pad's sound affects the notes from both tracks.

Feeding an Additional MIDI Track Into an Existing MIDI Track to Reuse its Instrument.

This is accomplished by setting the new MIDI track's Output Type chooser to "Pad." Note that the Output Channel chooser now offers a selection of destinations: We can either feed the new track's output into the input of the pad track, or we can directly address the Simpler. The "Track In" option in the Output Channel represents the pad track's input signal (the signal to be recorded), which is not what we want. We instead select "Simpler Ch. 1" to send the new track's MIDI directly to the Simpler, bypassing the recording and monitoring stage. With this setup, we can choose to record new takes on either track and they will all play the same pad sound.

The Instrument Has Been Isolated in a Dedicated Track.

We might be bothered by the fact that muting the pad track (by turning off its Activator switch) also mutes the other MIDI track. To be precise, the other track keeps playing, but its MIDI is played by an instrument that is out of the mix. This can be easily remedied by cutting the clips from the pad track and pasting them into a third track that can be independently muted (and that can hold its own MIDI effects). The original pad track now acts as a mere instrument container. As we are not recording new clips into this track, we can set its Input Type chooser to "No Input," which makes its Arm button disappear and helps to avoid confusion when the mixer's In/Out section is hidden.

Tapping Individual Outs From an Instrument

Some software instruments, like Live's Impulse percussion sampler, offer multiple audio outputs for the signals they produce. By default, Impulse mixes the output of its eight sample slots internally and delivers the mix at the instrument's audio out. Any audio effects following Impulse in the same track process the composite signal. Sometimes it is desirable to take an individual drum sound out of the mix for individual effects processing and mixing. This is possible because Impulse offers its sample slots as audio sources to other tracks.
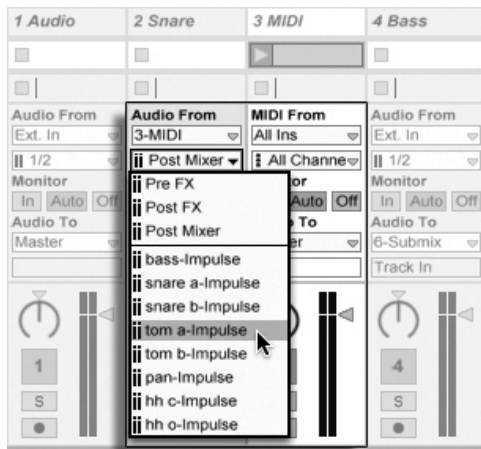
Using Impulse's Individual Outs to Separately Process Sample Slots.

We simply create an audio track and select from its Input Type chooser the track with the Impulse. The Input Channel chooser now offers, in addition to *Pre FX, Post FX* and *Post Mixer,* Impulse's eight individual outputs, labeled according to the sample used in each slot. Notice that routing an individual output from Impulse into another track automatically takes this signal out of Impulse's own internal mix. This convenience is not standard behavior of most plug-in instruments, however.

Using Multi-Timbral Plug-In Instruments

Many plug-in instruments support multi-timbral operation. A multi-timbral instrument is like several instruments in one, with each component "part" (or whatever term the manufacturer uses) receiving MIDI on a separate MIDI channel. Usually, the multi-timbral instrument offers individual outputs so that the parts can be separately routed into the mixer. Or, the instrument might offer a submixer of its own.
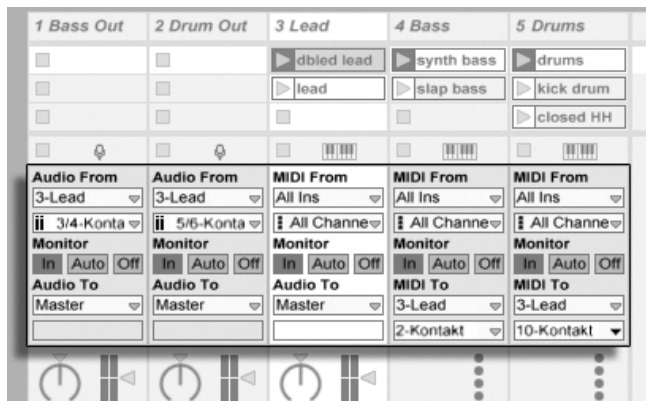
Tracks Feeding MIDI to and Tapping Audio From the Parts of a Multi-Timbral Instrument.

Sending MIDI to a multi-timbral instrument is a variation of a case described above. One MIDI track hosts the multi-timbral instrument, and additional MIDI tracks are used to feed its individual parts. Each additional MIDI track has its Output Type chooser pointed to the track that contains the instrument, and its Output Channel chooser referencing the target MIDI channel. Additional audio tracks can then be used to tap the instrument's individual outputs, as described earlier.

Feeding Sidechain Inputs

Some effects have so-called "sidechain inputs." A vocoder, for instance, imposes spectral characteristics taken from one signal (say, spoken word) onto another signal, for instance a string pad. The vocoder is inserted as an audio effect into the string track. It has a sidechain input for the speech signal, which has to be delivered from another track. So, we create an additional audio track named "Speech" and set its Output Type chooser to the "Strings" track. From the Output Channel chooser, we select the vocoder's sidechain input.
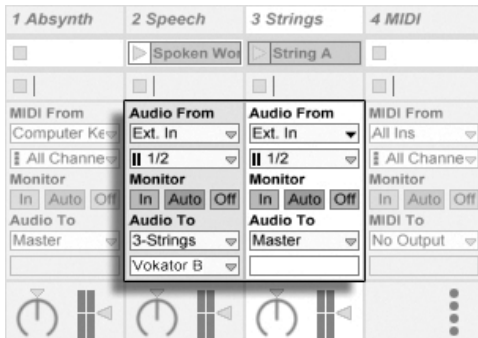
Routing a Speech Signal Into a Vocoder's Sidechain Input.

Some vocoder plug-ins include a built-in synthesizer to generate the "carrier" signal. In this case, the only difference from the above procedure is that the vocoder instrument is dragged into a MIDI track. Feeding the side-chain audio input works as described above.

Layering Instruments

Suppose that we have a MIDI track containing an instrument playing a string sound, which we would like to "lubricate" by adding a brass sound playing the same notes. This can be easily done by adding a MIDI track that contains an instrument playing the brass sound and setting its Input Type chooser to tap the string track's Post FX signal.
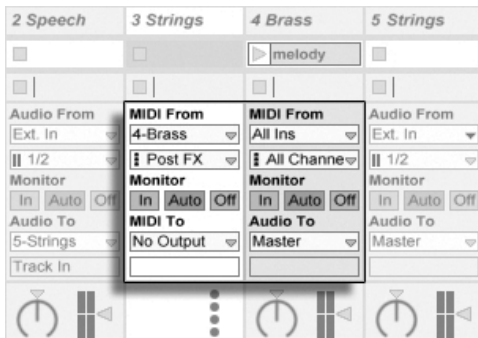
Using an Auxiliary MIDI Track to Layer Instruments.

Perhaps you wonder why this works, given that the string track's output is audio and not MIDI. When routing MIDI in from another track, we are tapping the MIDI at the latest possible

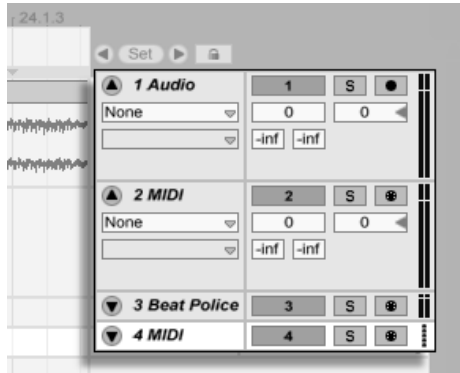stage, which is after any MIDI Effects, and just before the instrument.

Chapter 13

Mixing
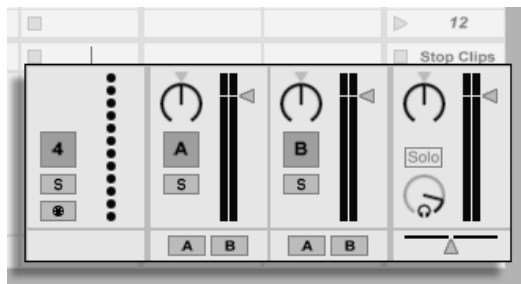
13.1 The Live Mixer

Live includes a mixer section that is accessible from two views:

The Arrangement View Mixer.

In the Arrangement View, the mixer appears as a horizontal strip to the right of the track area. To display all mixer controls for a track, unfold the track using the ⬇ button next to
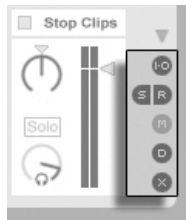
its name, and adjust its height accordingly.

The Session View Mixer.

The Session View is a standard vertical mixer layout. You'll likely find the Session View mixer more intuitive than the Arrangement mixer, which comes in handy when you work with automation. Note that the Tab key toggles between the Arrangement and Session Views.

The View menu options listed below show or hide mixer components. You can use different mixer view setups in the Session View and in the Arrangement View:
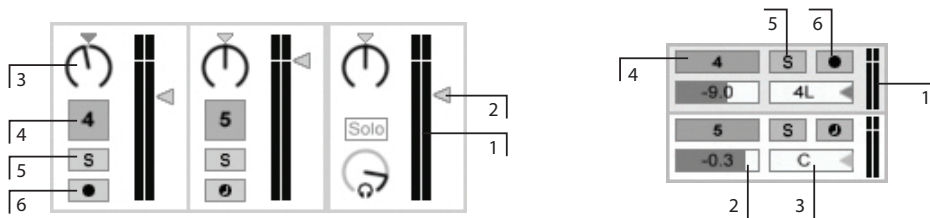
- In/Out
- Sends
- Returns
- Mixer
- Track Delays
- Crossfader

The Mixer Section selectors on the right-hand side of the screen duplicate the View Menu commands, making it possible to quickly show or hide different mixer components.

Let's look at the mixer controls:

1. The Meter shows the track's RMS (average) and peak output level. While monitoring, however, it shows the input level.

2. The Volume control adjusts the track's output level.

3. The Pan control positions the track's output in the stereo field. To reset the Pan control to center, click on its associated triangle.

4. To mute the track's output, turn off the Track Activator switch.

5. The Solo switch solos the track by muting all other tracks, but can also be used for cueing. Tracks can only be soloed one at a time unless the Exclusive Solo option in the Record/Warp/Launch Preferences is deactivated. Alternatively, you can hold down the Ctrl (PC) / ⌘ (Mac) modifier to solo more than one track.

6. If the Arm Recording button is on, the track is record-enabled. Tracks can only be armed one at a time unless the Exclusive Arm option in the Record/Warp/Launch Preferences is deactivated. Alternatively, you can hold down the Ctrl (PC) / ⌘ (Mac) modifier to arm more than one track.

13.1.1 Session Mixer Features
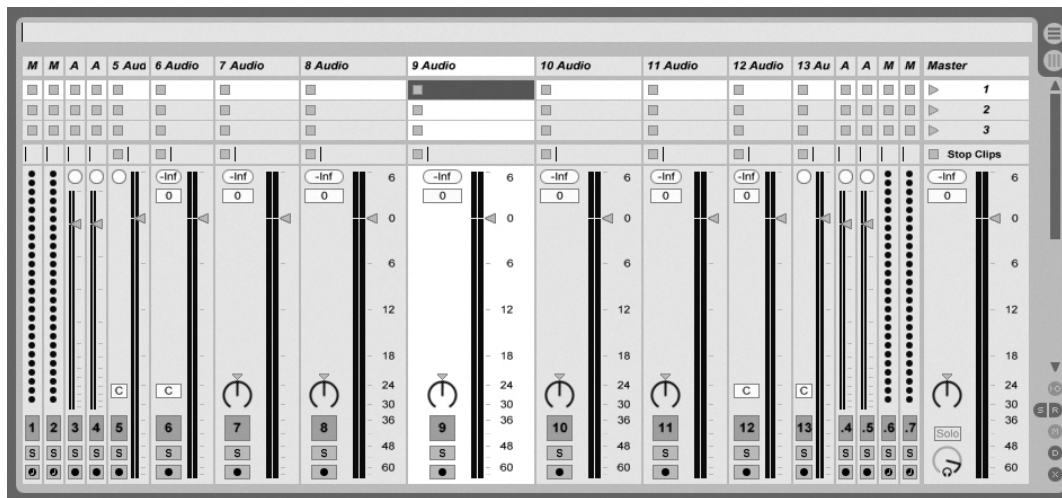
The Session Mixer's Possibilities.

The *Mixer* section of the Session Mixer has several additional features that are not visible by default. The mixer is resizable, and dragging upwards on the top of the mixer will extend the height of the track meters, adding tick marks, a numeric volume field and resettable peak level indicators. Increasing a track's width in this state will add a decibel scale alongside the meter's tick marks.

These enhancements are tailored for use in traditional mixing settings, but are available anytime the Mixer section is displayed.

Because of the enormous headroom of Live's 32-bit floating point audio engine, Live's meters can be driven far "into the red" without causing the signals to clip. The only time that signals over 0 dB will be problematic is when routing to or from *physical inputs and outputs,* like those of your sound card, or when saving audio to a file.

Nevertheless, Live provides this optional visual feedback for signals that travel beyond 0 dB in any track.

13.2   Audio and MIDI Tracks

Audio and MIDI tracks in Live are for hosting and playing clips, as explained earlier.

You can add new audio and MIDI tracks to your Live Set's mixer at any time using the appropriate Insert menu commands.

Tracks can also be created by double-clicking or pressing ⌐Return⌐ on files in the Browser to load them, or by dragging objects from the Browser into the space to the right of Session View tracks or below Arrangement View tracks. Devices or files loaded into Live in this manner will create tracks of the appropriate type (e.g., a MIDI track will be created if a MIDI file or effect is dragged in).

A track is represented by its *track title bar*. You can click on a track title bar to select the track and then execute an Edit menu command, such as Rename, on the track. One can quickly rename a series of tracks by executing this command and then using the Tab key to move from title bar to title bar.

Tracks are Represented by Track Title Bars.

You can drag tracks by their title bars to rearrange them, or click and drag on their edges to change their width (in the Session View) or height (in the Arrangement View).

Tracks are deleted using the Edit menu's Delete command.

13.3   Return Tracks and the Master Track

In addition to tracks that play clips, a Live Set has a *Master track* and up to twelve *return tracks*; these cannot play clips, but allow for more flexible signal processing and routing.

The return tracks and the Master track occupy the right-hand side of the Session mixer view and the bottom end of the Arrangement View.

Note that you can hide and show the return tracks using the *Returns* command in the View menu.

Like the "normal" clip tracks, the returns and the Master can host any number of effects. However, whereas a clip track's effect processes only the audio within that track, return tracks can process audio sent to them from numerous tracks.

For example, suppose you want to create rhythmic echoes with a delay effect. If you drag the effect into a clip track, only clips playing in this track will be echoed. Placing this effect in a return track lets it receive audio from any number of tracks and add echoes to them.
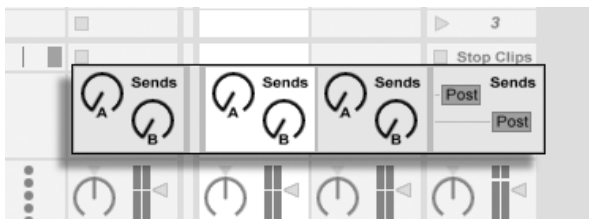
The Send Controls and Pre/Post Toggle.

A clip track's Send control regulates how much of the clip track's output feeds the associated return track's input. What's more, even the return track's own output can be routed to its input, allowing you to create *feedback*. Please use this feature with care, as runaway feedback can boost the level dramatically and unexpectedly.

Every return track has a Pre/Post toggle that determines if the signal a clip track sends to it is tapped before or after the mixer stage (i.e., the pan, volume and track-active controls). The "Pre" setting allows you to create an auxiliary mix that is processed in the return track, independently of the main mix. As the return track can be routed to a separate output, this can be used to set up a separate monitor mix for an individual musician in a band.

The Master track is the default destination for the signals from all other tracks. Drag effects here to process the mixed signal before it goes to the master output. Effects in the Master track usually provide *mastering*-related functions, such as compression and/or EQ.

You can create multiple return tracks using the Insert menu's Insert Return Track command, but by definition, there is only one Master track.

13.4 Using Live's Crossfader

Live includes a crossfader that can create smooth transitions between clips playing on different tracks. Live's crossfader works like a typical DJ-mixer crossfader, except that it allows crossfading not only two, but any number of tracks – including the returns.
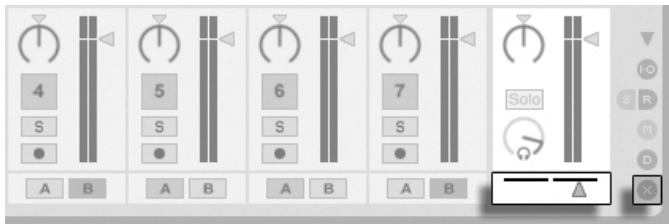
The Crossfader and Selector.

The crossfader is accessed via the Session View's mixer selectors. It features seven different crossfade curves so that you can choose the one that fits your style the best. To change the curve, ⊙ (PC) / Ctrl ⊙ (Mac) on the crossfader, then select an entry from the context menu.
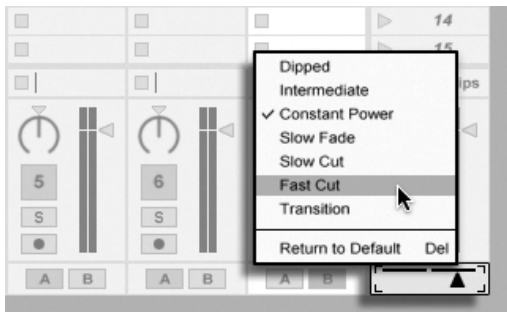

Choose from Seven Crossfader Curves.

The crossfader can be mapped to any continuous MIDI controller (absolute or incremental). In addition to the crossfader's central slider, its absolute left and right positions are separately available for MIDI or keyboard mapping. There are two special scenarios for remote control with respect to the crossfader:

- A key mapped to any one of the three assignable crossfader positions (left, center or right) will toggle the crossfader's absolute left and right positions.

- Mapping to two of the three fields allows for a "snapping back" behavior when one of the assigned keys is held down and the other is pressed and released.
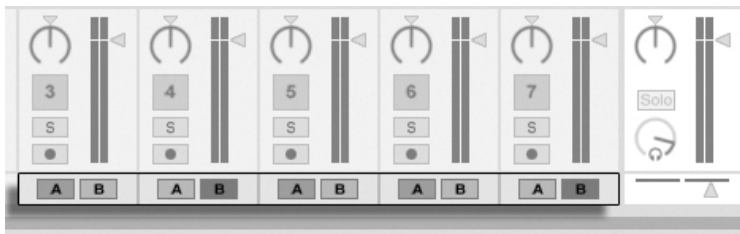
Crossfade Assign Buttons.

Each track has two Crossfade Assign buttons, A and B. The track can have three states with respect to the crossfader:

- If neither Assign button is on, the crossfader does not affect the track at all.

- If A is on, the track will be played unattenuated as long as the crossfader is in the left half of its value range. As the crossfader moves toward the right across the center position, the track fades out. At the crossfader's rightmost position, the track is muted.

- Likewise, if B is on, the track's volume will be affected only as the crossfader moves left across its center position.

It is important to understand that the Crossfade Assign buttons do not affect the signal routing: The crossfader merely influences the signal volume at each track's gain stage. The track can be routed to an individual output bus regardless of its crossfade assignment. In studio parlance, you can think of the crossfader as an on-the-fly VCA group.

As with almost everything in Live, your crossfading maneuvers can be recorded into the Arrangement for later in-depth editing. To edit each track's crossfade assignment, please choose "Mixer" from the Envelope Device chooser and "X-Fade Assign" from the Control chooser. The crossfader's automation curve is accessible when "Mixer" is chosen from the Master track's Device chooser and "Crossfade" is selected from its Control chooser.

13.5   Soloing and Cueing

By default, soloing a track simply mutes all other tracks. The signal from the soloed tracks is heard through their respective outputs, with the pan setting of each track preserved. Soloing a clip track leaves the return tracks unaffected (solo in place). Soloing a return track affects all other tracks.

Live allows you to replace the standard soloing operation with a *cueing* operation that lets you preview tracks as though you were cueing a record on a DJ mixer. This allows choosing clips and adjusting effects without the audience hearing, before bringing tracks into the mix.

In order to set Live up for cueing, you must be using an audio interface with at least four dedicated outputs (or two dedicated stereo outputs). The respective settings are accessible in the Session View mixer. Make sure you have the Mixer and In/Out options checked in the View menu.
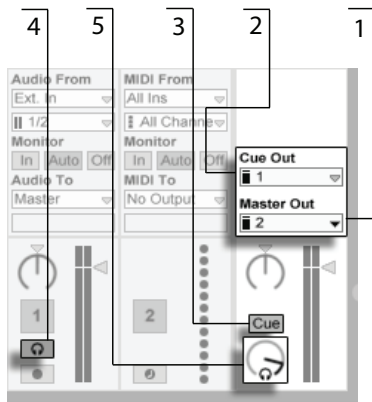
The Cueing-Related Session Mixer Controls.

1. The *Master Out* chooser selects the output on your interface to be used as the main output.

2. The *Cue Out* chooser selects the output on your hardware interface to be used for cueing. This has to be set to an output other than that selected for the Master. If the desired outputs don't show up in these choosers, please check the Audio Preferences.

3. Activate cueing by setting the *Solo/Cue Mode* switch to "Cue."

4. The tracks' Solo switches are now replaced by Cue switches with headphone icons. When a track's Cue switch is pressed, that track's output signal will be heard through the output selected in the Cue Out chooser. Note that the Track Activator switch on the same track still controls whether or not the track is heard at the Master output.

5. The *Cue Volume* control adjusts the volume of the cueing output.

Note that when cueing is set up and activated, the output of audio files that you are previewing in the Browser is also heard through the Cue Out.

13.6   Track Delays

A Track Delay control is available for every track in Live. The control allows delaying or pre-delaying the output of tracks in milliseconds in order to compensate for human, acoustic, hardware and other real-world delays.

This section of the interface can be shown or hidden using its respective Mixer Section selector.
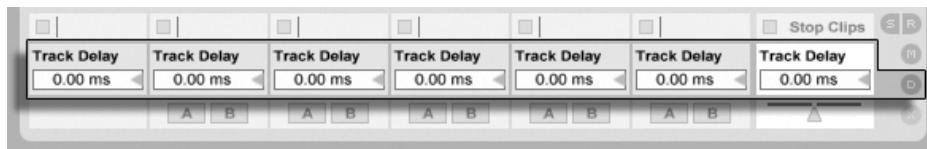
The Track Delay Control and Selector.

We do not recommend changing track delays on stage, as it could result in undesirable clicks or pops in the audio signal. Micro-offsets in Session View clips can be achieved using the nudge buttons in the Clip View, however track delays can be used in the Arrangement View for such offsets.

Note that delay compensation for plug-ins and Live devices is a separate feature, and is automatic by default. Unusually high Track Delay settings or reported latencies from plug-ins may cause noticeable sluggishness in the software. If you are having latency-related difficulties while recording and playing back instruments, you may want to try turning off

device delay compensation, however this is not normally recommended. You may also find that adjusting the individual track delays is useful in these cases. Note that the Track Delay controls are unavailable when device delay compensation is deactivated.

Chapter 14

Recording New Clips

This chapter is about recording new clips from audio and MIDI input signals. Note that this is a different kind of recording than the capturing of Session clips into the Arrangement.

For successful audio recording, please make sure the audio preferences are set up properly. For more on this, please see the built-in program lesson on setting up Audio Preferences. Also, keep in mind that devices such as microphones, guitars and turntables do not operate at line level, meaning that they will need to have their levels boosted before they can be recorded. For these devices, you must therefore use either an audio interface with a preamp, or an external preamp.

14.1   Choosing an Input

A track will record whatever input source is shown in its In/Out section, which appears when the View menu's In/Out option is checked. (In the Arrangement View, unfold and resize the track in order to completely see the In/Out section.)

The Track In/Out Section in the Arrangement (Left) and Session View (Right).

Audio tracks default to recording a stereo signal from the external input pair "1/2." MIDI tracks default to recording all MIDI that is coming in through the active external input devices. The computer keyboard is, by default, activated as a pseudo-MIDI input device, allowing you to record MIDI even if no MIDI controller hardware is currently available.

For every track, you can choose an input source other than the default: any mono or stereo external input, a specific MIDI channel from a specific MIDI-in device, audio from ReWire slave programs or a signal coming from another track. The Routing chapter describes these options in detail.

14.2   Arming (Record-Enabling) Tracks
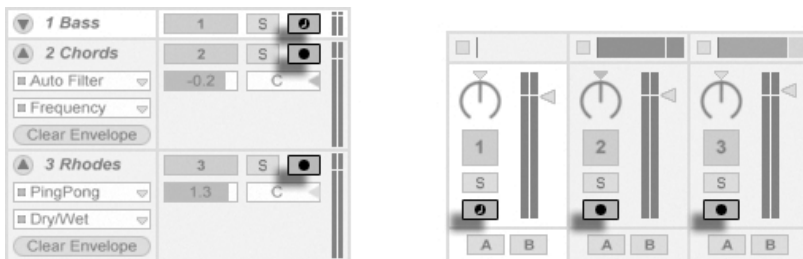
Track Arm Buttons in the Arrangement (Left) and Session (Right) Mixers.

To select a track for recording, click on its Arm button. It doesn't matter if you click a track's Arm button in the Session View or in the Arrangement View, since the two share the same set of tracks.

By default, armed tracks are monitored, meaning that their input is passed through their device chain and to the output, so that you can listen to what is being recorded. This

behavior is called "auto-monitoring" and you can change it to fit your needs.

Clicking one track's Arm button unarms all other tracks unless the Ctrl (PC) / ⌃ ⌘ (Mac) modifier is held. Arming a track selects the track so you can readily access its devices in the Track View.

14.3   Recording

Recording can be done in both the Session and the Arrangement Views. If you want to record onto more than one track simultaneously and/or prefer viewing the recording linearly and in-progress, the Arrangement View may be the better choice. If you want to break your recording seamlessly into multiple clips or record while you are also launching clips in Live, use the Session View.

14.3.1   Recording Into the Arrangement
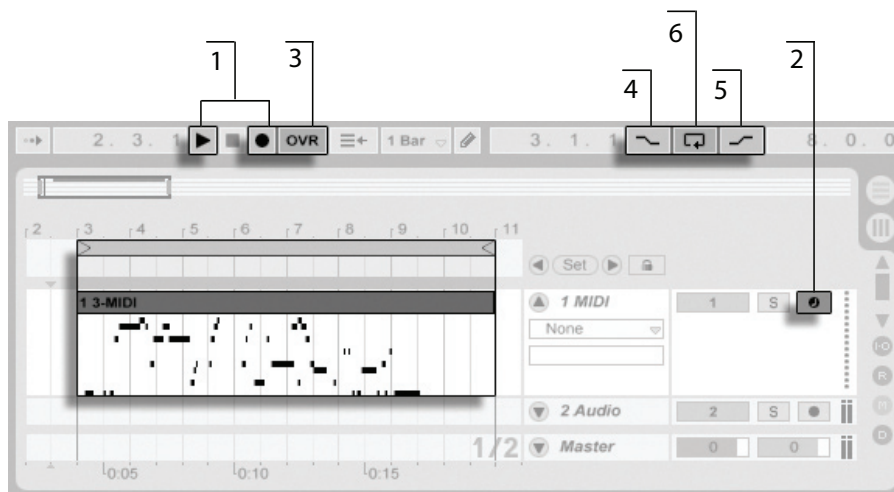
Recording Into the Arrangement.

1. Recording commences when the Control Bar's Record button is activated and the Play button is pressed.

2. Recording creates new clips in all tracks that have their Arm button on.

3. When the Overdub switch is on, the new clips contain a mix of the signal already in the track and the new input signal. The Overdub option only applies to MIDI tracks.

4. To prevent recording prior to a punch-in point, activate the Punch-In switch. This is useful for protecting the parts of a track that you do not want to record over and allows you to set up a pre-roll or "warm-up" time. The punch-in point is identical to the Arrangement Loop's start position.

5. Likewise, to prevent recording after the punch-out point, activate the Punch-Out switch. The punch-out point is identical to the Arrangement Loop's end position.

6. When you are recording into the Arrangement Loop, Live retains the audio recorded during each pass.

You can later "unroll" a loop recording, either by repeatedly using the Edit menu's Undo command or graphically in the Clip View: After loop recording, double-click on the new clip. In the Clip View's Sample Display, you can see a long sample containing all audio recorded during the loop-recording process. The Clip View's loop brace defines the audio taken in the last pass; moving the markers left lets you audition the audio from previous passes.

14.3.2   Recording Into Session Slots

You can record new clips, on the fly, into any Session slots.
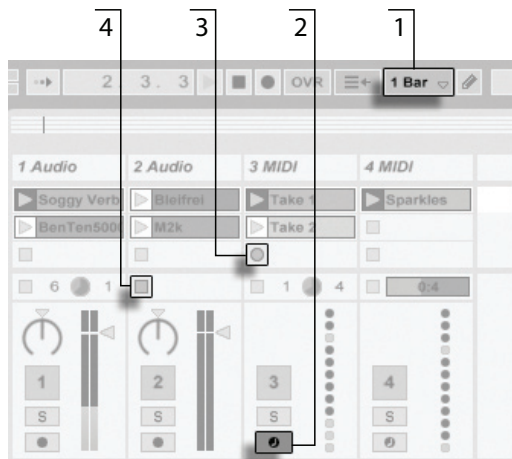
Recording a New Clip Into the Session View.

1. Set the Global Quantization chooser to any value other than "None" to obtain correctly cut clips.

2. Activate the Arm button for the tracks onto which you want to record. Clip Record buttons will appear in the empty slots of the armed tracks.

3. Click on any of the Clip Record buttons to commence recording. A new clip will appear in the slot with a red Clip Launch button that shows it is currently recording. To go from recording immediately into loop playback, press the clip's Launch button.

4. Alternatively, you can click a Clip Stop button or the Stop button in the Control Bar to stop recording, leaving the new clip silent.

Note that, by default, launching a Session View scene will not activate recording in empty record-enabled slots belonging to that scene. However, you can use the Start Recording on Scene Launch option from the Record/Warp/Launch Preferences to tell Live that you *do* want empty scene slots to record under these circumstances.

14.3.3   Overdub Recording MIDI Patterns

Live makes pattern-oriented recording of drums and the like quite easy. Using Live's Impulse instrument and the following technique, you can successively build up drum patterns while listening to the result. Or, using an instrument such as Simpler, which allows for chromatic playing, you can build up melodies or harmonies, note by note.

1. Set the Global Quantization chooser to one bar.

2. To automatically quantize the notes you are about to record, choose an appropriate value for Record Quantization.

3. Double-click any of the Session View slots in the desired MIDI track (the one containing the Impulse or other instrument). A new, empty clip will appear in the slot. The new clip will default to a loop length of one bar, but you can change that by double-clicking the clip and changing its loop properties.

4. Arm the track.

5. Launch the clip.

6. The notes you play are added into the looping clip, and you can observe your recording in the Clip View.

7. By default, the Control Bar's Overdub switch is activated, so that you can build your pattern layer by layer. However, if you would like to pause recording for a moment to rehearse, you can deactivate the Overdub switch. The contents of the clip will continue to play, but you can play along without being recorded. When you are ready to record again, simply turn on the Overdub switch.

8. Stop recording by pressing a Clip Stop button or the Stop button in the Control Bar.

Note that holding ⌐Alt⌐ (PC) / ⌐Alt ⌐ (Mac) while double-clicking the empty slot to create a new clip will implicitly arm the track and launch the clip.

At any time while overdub recording is going on, you can use the Undo command to remove the last take, or even draw, move or delete notes in the Clip View's Note Editor.

Note that you can also add notes to existing Session clips while the Overdub switch is on.

14.4   Recording in Sync

Live keeps the audio and MIDI you have recorded in sync, even when you later decide on a different song tempo. In fact, Live allows you to change the tempo at any time before, after and even during recording. You could, for instance, cheat a bit by turning down the tempo to record a technically difficult part, and pull it up again afterwards.

It is important to *record in sync* to make sure everything will later *play in sync*.

The Metronome Switch.

The easiest way to record in sync is to play along with or to use the built-in metronome, which is activated via its Control Bar switch and will begin ticking when the Play button is pressed or a clip is launched.
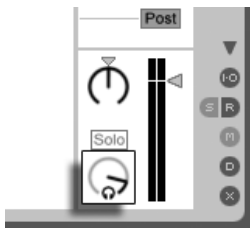
The Preview Volume Knob.

To adjust the metronome volume, use the mixer's Preview Volume knob.

Notice that Live's metrical interpretation of the audio being played can be edited, at any time, using the *Warp Markers*. Warp Markers can be used to fix timing errors and to change the groove or feel of your recordings. Using Warp Markers, you can fix things in your recordings that would otherwise require complicated editing or could not be done at all. Likewise, the metrical interpretation of recorded MIDI can be changed after recording, using the MIDI clip's Original BPM controls.

14.5 Recording Quantized MIDI Notes

If you will be recording MIDI, you have the option of automatically quantizing MIDI notes while recording. The Record Quantization chooser in the Edit menu allows selecting the meter subdivisions with which your recorded notes will align. When recording into Session slots or into the Arrangement, record quantization is an independent step in Live's Undo history. This means that if, for example, you recorded with Record Quantization set to "Eighth Note Triplet Quantization" and then changed your mind, using the Edit menu's Undo command would undo only the quantization and leave your recording otherwise intact.

For Session and Arrangement recording, the Record Quantization setting cannot be changed mid-recording.

When overdub recording with the Clip View Loop activated, changes to the Record Quantization take effect immediately, and they cannot be separately undone with the Edit menu command.

Recorded MIDI notes can also be quantized post-recording with the Edit menu's Quantize command, as described in the chapter on editing MIDI.

14.6 Recording with Count-in

A count-in for recording can be set in Live's Record/Warp/Launch Preferences. When the Count-In preference is set to any value other than "None," Live will not begin recording until the count-in is complete. The Arrangement Position fields in the Control Bar display the count-in in orange as bars-beats-sixteenths.

The Count-In is Displayed in the Control Bar.

The count-in runs from negative bars-beats-sixteenths (beginning at -2.1.1., for example, with a Count-In setting of 2 bars) up to 1.1.1., at which point recording commences.

Note that count-in recording does not apply when Live is synced to external MIDI devices or being used as a ReWire slave.

14.7   Setting up File Types

The following Preferences from the Record/Warp/Launch tab are relevant to the sample files that are created by recording:

- The sample file type you would like Live to create can be chosen from the File Type chooser in the Record/Warp/Launch Preferences.

- The bit depth of the sample file you will create by recording can be chosen from the Bit Depth chooser in the Record/Warp/Launch Preferences.

You can save time by setting up reasonable defaults for the clips you are recording in the Record/Warp/Launch Preferences tab. In particular, it is smart to indicate the rough category of sound to be recorded by choosing the appropriate default *Warp Mode*. If you decide later on a different song tempo, the program will automatically maintain good sound quality, usually without further adjustment.

14.8   Where are the Recorded Samples?

Recorded samples are stored with the current Set's Project folder, under Samples/Recorded. Until the Set is saved, it remains at the location specified by the Temporary Folder preference which is found in the Preferences' File/Folder tab. To make sure Live will not run out of disk space while recording into a new Set, please make sure the Temporary Folder is on a drive/partition with sufficient free space.

14.9   Using Remote Control for Recording

Using Key Map Mode and MIDI Map Mode, you can operate Live's recording functions without using the mouse.

You can map the Control Bar's Record and transport controls as well as the track Arm buttons. For recording into the Session slots, you can map the individual slots as well as the relative navigation controls to initiate recording remotely; for instance:
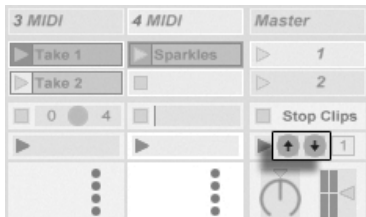
The Scene Up/Down Buttons.

One key is used to jump to the next scene...
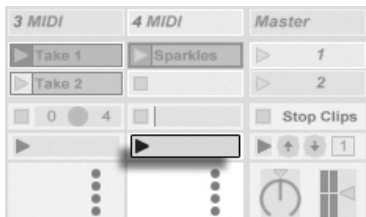

A Track Launch Button.

... and another key to start and end recording in the respective track.

Chapter 15

Working with Instruments and Effects

Every track in Live can host a number of devices. These devices can be of three different sorts:

- *MIDI effects* act upon MIDI signals and can only be placed in MIDI tracks.
- *Audio effects* act upon audio signals and can be placed in audio tracks. They can also be placed in MIDI tracks as long as they are "downstream" from an instrument.
- *Instruments* are devices that reside in MIDI tracks, receive MIDI and output audio.
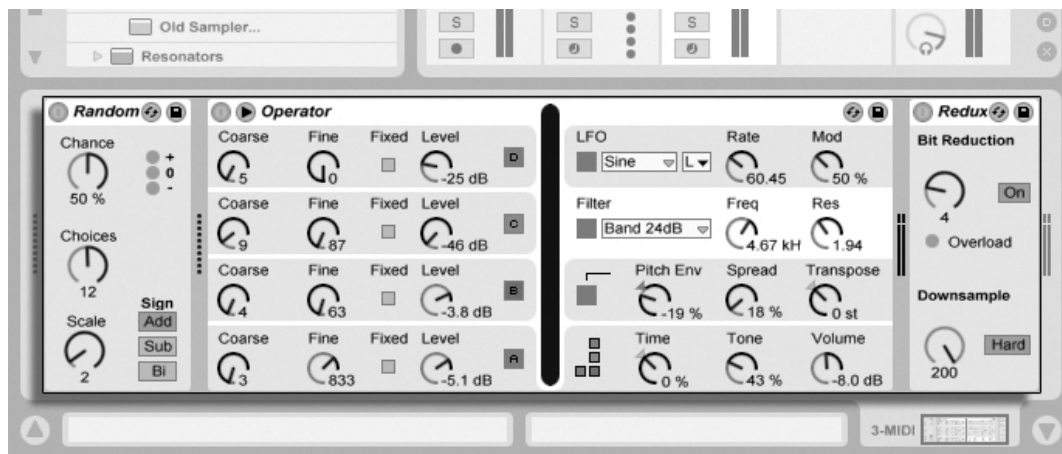
Devices in the Track View.

The Track View is where you insert, view and adjust the devices for the selected track. To select a track and open the Track View to access its devices, double-click the track's name. The Track View appears in the bottom area of the Live screen.

To learn about a particular device and how to operate it, consult the Live Audio Effect Reference, Live MIDI Effect Reference or the Live Instrument Reference.

To learn about creating and using custom groupings of instruments and effects, check out the Instrument and Effect Racks chapter.

Get "hands-on" with devices by assigning their parameters to MIDI or key remote control.

15.1 Using the Live Devices
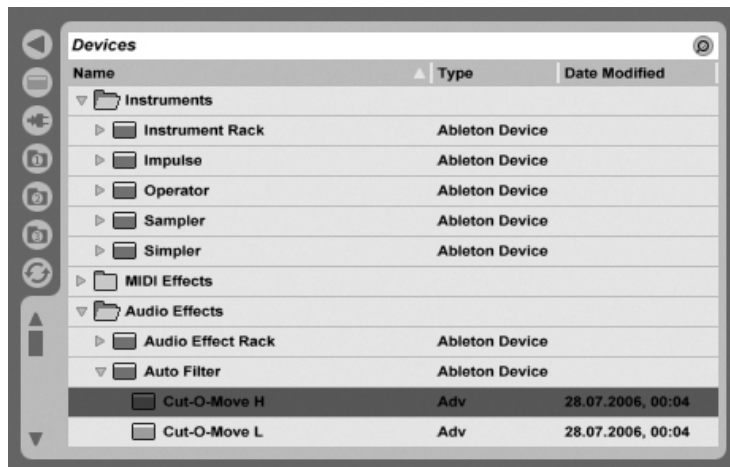
The Live Device Browser.

Click on the Device Browser selector to access the palette of Live's built-in devices. You will notice that MIDI effects, audio effects and instruments each have their own folders in the Browser.

The easiest way to place a device in a track is to double-click on it in the Browser, which creates a new track to hold the device. Alternatively, select a destination track by clicking within it, then select a device or preset in the Browser and press Return to add it to the selected track.

You can also drag devices into tracks or drop areas in the Session and Arrangement Views, or into the Track View.

Note: If you are using an external input signal to feed your Live track using the default settings, you will need to activate the track's *Arm* button in the mixer in order to hear the input through the devices in your track's device chain.
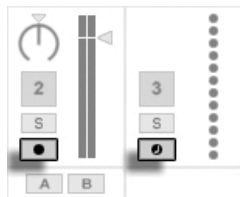
MIDI and Audio Track Arm Buttons

This is how you would play live instruments through effects on a track, for example, or use a MIDI keyboard's input to play a track's instrument. Note that you can easily move from this setup into recording new clips for further use in Live. If you have alternative monitoring preferences, please see the Monitoring section to learn how to make these settings.

To add another device to the track, simply drag it there or double-click its name to append it to the device chain. Signals in a device chain always travel from left to right.

You can drop audio effects in at any point in an audio track's device chain, keeping in mind that the order of effects determines the resulting sound. The same is true for a MIDI track's device chain.

If you drop an *instrument* into a MIDI track's device chain, be aware that signals following (to the right of) the instrument are *audio* signals, available only to audio effects. Signals preceding (to the left of) the instrument are *MIDI* signals, available only to MIDI effects. This means that it's possible for a MIDI track's device chain to hold all three types of devices: first MIDI effects, then an instrument, and finally audio effects.
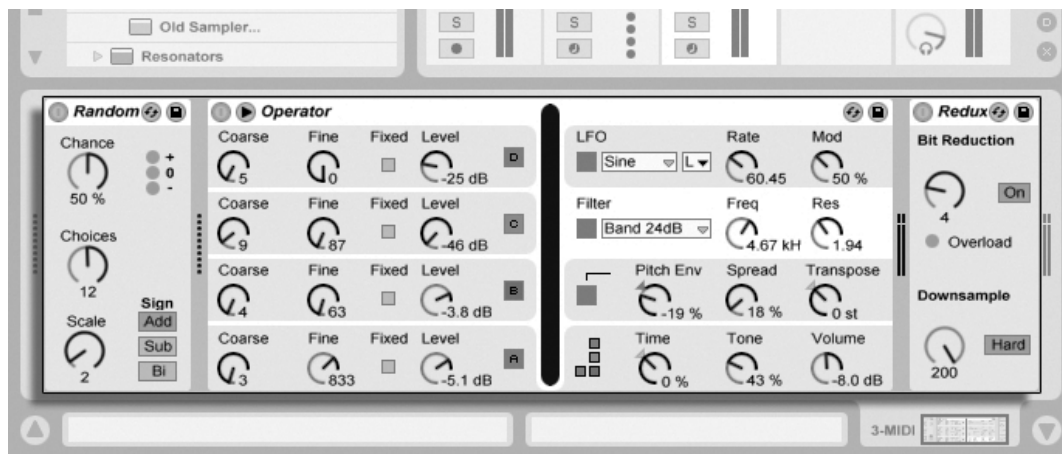
A MIDI Track's Device Chain Can Contain All Three Device Types.

To remove a device from the chain, click on its title bar and press your computer's ⌫ or ⌦ key, or select Delete from the Edit menu. To change the order of devices, drag a device by its title bar and drop it next to any of the other devices in the Track View. Devices can be moved to other tracks entirely by dragging them from the Track View into the Session or Arrangement Views. Generally, devices can be placed, reordered and deleted without interrupting the audio stream.

Device Activator Switches.

Devices are turned on and off using their Activator switches. Turning a device off is like temporarily deleting it: The signal remains unprocessed, and the device does not consume CPU cycles. Live devices generally do not load down the CPU unless they are active. For more information, please refer to the CPU load section. The Freeze Track command discussed there is especially helpful when working with CPU-intensive devices.

Devices in Live's tracks have input and output level meters. These meters are helpful in finding problematic devices in the device chain: Low or absent signals will be revealed by the level meters, and relevant device settings can then be adjusted, or the device can be turned off or removed.

The Level Meters Between Devices in a Chain.

Note that no clipping can occur between devices because there is practically unlimited headroom. Clipping can occur when an overly strong signal is sent to a *physical output* or written to a sample file.

Further information about track types in Live can be found in the Routing and I/O chapter, including information on using *return tracks* to distribute the effect of a single device amongst several tracks. After reading about using devices in Live, it might also be interesting look into clip envelopes, which can modulate individual device parameters on a per-clip basis.

15.1.1   Live Device Presets

Every Live device can store and retrieve their parameter settings as *presets*. Presets for Live instruments and effects are managed through the Device Browser. Each device appears there as a folder that can be opened to reveal its presets.

Presets in the Device Browser.

You can browse and load presets quickly with the computer keyboard:

- Scroll up and down using the ⬆ and ⬇ keys.
- Close and open device folders using the ⬅ and ➡ keys.
- Press Return to load a device or preset.
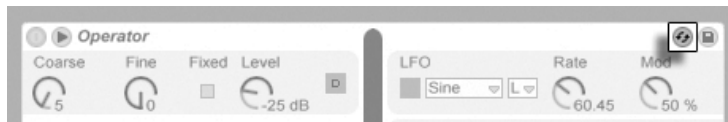
The Hot-Swap Presets Button.

Clicking a device's *Hot-Swap Presets* button will temporarily link the Browser to a device, calling up its presets in the Device Browser. With the device and Browser linked in this manner, you can quickly browse, load and audition different presets. You can even replace the current device with a new one by simply selecting another device's preset. To load a device's default factory settings, select the parent folder of its presets (i.e., the one with the device's name) from the Device Browser.

The link between the Device Browser and the device will be broken if a different view is selected, or if the Hot-Swap button is pressed again. Preset hot-swapping can also be cancelled with a press of the Esc key.

Note that although importing via the Browser is the recommended method, presets can also be dropped directly into Live from the Explorer (Windows)/Finder (Mac).

Saving Presets

You can create and save any number of your own presets in the Device Browser.

Click the Save Preset button to save a device's current settings as a new preset. You will be redirected to the Browser, where you can press `Return` to use Live's suggested name, or you can type one of your own.

For detailed information on what can be done with the Browser, please see the Managing Files and Sets chapter. For more on how to store project-specific presets, see the appropriate section.

15.2   Using Plug-Ins

The collection of devices that you can use in Live can be extended with *plug-ins*. Live supports Steinberg Media's VST Plug-ins format, as well as Apple Computer's Audio Units Plug-ins format (Mac OS X only).

Working with VST and Audio Units (AU) Plug-ins is very much like working with Live devices. VST and AU instruments can only be placed in Live MIDI tracks and, like Live instruments, they will receive MIDI and output audio signals. Plug-in audio effects can only be placed in audio tracks or following instruments. Please see the previous section, Using the Live Devices, for details.
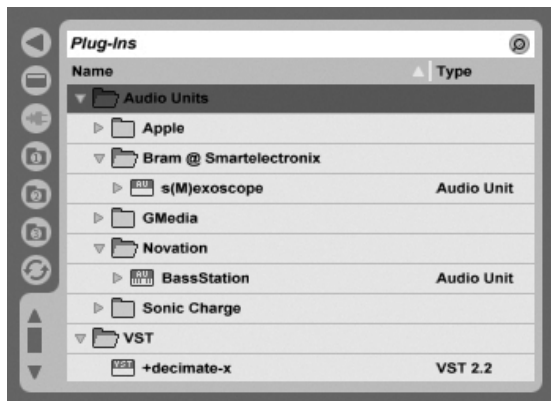
The Plug-In Device Browser.

Audio Units and VST Plug-ins are browsed and imported using the Plug-In Device Browser, which is accessed via its selector. Plug-in instruments can be differentiated from plug-in effects in the Browser, as they appear with a keyboard icon.

The Browser's search functionality is only available for Audio Units Plug-ins, as is loading presets directly from Track View devices via the Hot-Swap button. In some instances, factory presets for Audio Units will only appear in the Browser once the device has been placed in a track and its Hot-Swap button activated.

Note: The first time you start Live, no plug-ins will appear in the Plug-In Device Browser, as you must first "activate" your plug-in sources. Activating your plug-in sources tells Live which plug-ins you want to use and where they are located on your computer. Information on activating (and deactivating) plug-in sources can be found later in this chapter, in the sections on the VST Plug-in folder and Audio Units Plug-ins.

Note for "Intel Mac" users: Intel Macs cannot natively run VST or AU plug-ins that have been written for the PowerPC platform. Only plug-ins of type (Universal) or (Intel) can be used in Live.

If you install/de-install a plug-in while the program is running, Live will not detect your changes or implement them in the Plug-In Device Browser until the next time you start the program. Use the *Rescan* button in the File/Folder Preferences to rescan your plug-ins while Live is running, so that newly installed devices become immediately available in the Plug-In Device Browser.

You can also rescan if you believe that your plug-in database has somehow become corrupted. Holding down the Alt (PC) / Alt ⌐ (Mac) modifier while pressing Rescan will delete your plug-in database altogether and run a clean scan of your plug-ins.

15.2.1   Plug-Ins in the Track View
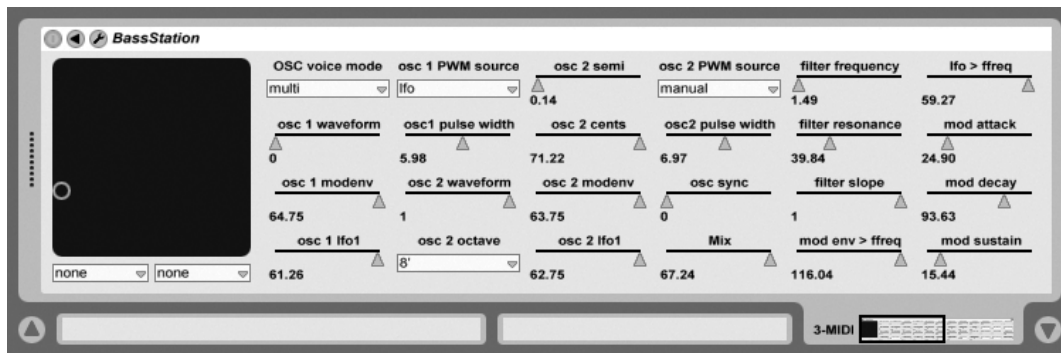
A VST Plug-In in the Track View.

Once a plug-in is dragged from the Browser into a track, it will show up in the Track View. The original plug-in panel graphics will be replaced with a Live panel, which will usually represent all of the plug-in parameters accurately and completely, unless they are simply too numerous or are not modifiable in real time. When this is the case, the plug-in's original editor panel can be opened in a separate window.
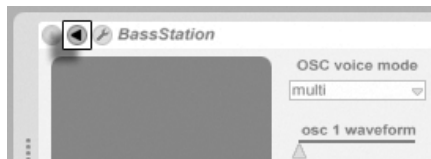
The Plug-In Unfold Button.

You can view or hide the VST Plug-in's parameters by toggling the ▶ button in the plug-in's title bar.

The X-Y control field can be used to control two plug-in parameters at once and is therefore especially well-suited for live control. To assign any two plug-in parameters to the Live panel X-Y field, use the drop-down menus directly beneath it.

Once a plug-in is placed in a track, you can use it just like a Live device:

- You can edit all of its parameters and drag it to different locations in the device chain or to other tracks, according to the rules of audio effects and instruments.

- You can map MIDI controller messages to its parameters.

- You can modulate its continuous parameters with clip envelopes.

- You can also use the multiple I/O features of some plug-ins by assigning them as sources or targets in the routing setup of tracks. See the Routing and I/O chapter for details.

Showing Plug-In Panels in Separate Windows
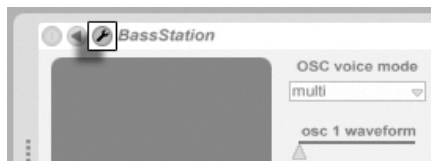
The Plug-In Edit Button.

The Plug-In Edit button opens a floating window that shows the original VST or Audio Units Plug-in panel. Changing parameters on the floating window has the same effect as changing them in the Live panel, and vice versa.

There are a few important Plug-In Preference settings for working with plug-in edit windows:

- If activated, the *Auto-Open Plug-In Windows* Preference assures that plug-in edit windows open automatically when plug-ins are loaded into tracks from the Browser.

- If the *Multiple Plug-In Windows* option in the Plug-In Preferences is activated, you can open any number of plug-in windows at once. Even with this option off, you can hold down the Ctrl (PC) / ⌃ ⌘ (Mac) modifier when opening a new plug-in window to keep the previous window(s) from closing.

- Using the *Auto-Hide Plug-In Windows* preference, you can choose to have Live display only those plug-in windows belonging to the track that is currently selected.

You can use the View menu's Show/Hide Plug-In Windows command or the ⌨Ctrl ⌨Alt ⌨P (PC) / ⌨⌘ ⌨Alt ⌨P (Mac) shortcut to hide and show your open plug-in windows. Notice that the name of the track to which the plug-in belongs is displayed in the title bar of the plug-in editor window.

Macintosh only: The floating editor windows of some VST Plug-ins do not receive computer key strokes. This is generally an implementation error in the plug-in itself. If it is necessary to type into a plug-in window, for instance for entering a serial number or unlock code, hold down ⌨ while clicking the Plug-In Edit button. The editor window will then appear as a "normal" application window, rather than as a floating window, and receive your typing. Note that this functionality is intended only as a workaround for the limitations of such plug-ins. We recommend closing the window after you have finished typing, then reopening it normally before working with the plug-in parameters.

15.2.2   Plug-In Performance Options

The CPU Preferences contain a Plug-In Buffer Size setting for balancing plug-in latency and performance. Here you can set the number of samples processed at any one time by the plug-in. Higher settings may result in a noticeable performance increase but will also result in higher latencies.

With the "As Audio Buffer" setting selected, the plug-in will calculate the exact number of samples per millisecond as the computer's sound card. This setting usually means that very few dropouts or performance problems will occur, especially with DSP cards.

The size of the computer's sound card buffer (i.e., the number of samples it calculates per millisecond) can be set using the Buffer Size setting in the Audio Preferences.

15.3   VST Plug-Ins

15.3.1   The VST Plug-In Folder

When you start Live for the first time, you will need to activate your VST Plug-in sources before working with VST Plug-ins. Depending on your computer platform, you may also

have to tell Live about the location of the VST Plug-in folder containing the devices you want to use. In order to set up your VST sources, press the Activate button in the Plug-In Device Browser, or open the File/Folder Preferences by pressing ⌈Ctrl⌉⌊,⌋ (PC) / ⌊⌃⌘⌋⌊,⌋ (Mac). There you will find the Active Sources section.

Setting up VST Plug-In Sources for Windows.

For Windows, proceed as follows:

1. Use the VST Plug-In Custom Folder entry to tell Live about the location of your VST Plug-ins: Click the *Browse* button to open a folder-search dialog for locating and selecting the appropriate folder.

2. Once you have selected a VST Custom Folder and Live has scanned it, the path will be displayed. Note that, on Windows, Live may have found a path in the registry without the need for browsing.

3. Make sure that the Use VST Plug-In Custom Folder option is set to "On," so that your selected folder is an active source for VST Plug-ins in Live. Note that you can choose not to use your VST Plug-ins in Live by turning off the Use VST Plug-In Custom Folder option.

Setting up VST Plug-In Sources for Mac OS X.

Set up your VST Plug-ins under Mac OS X by doing the following:

1. Your VST Plug-ins will normally be installed in the following folder in your home

and local directories: /Library/Audio/Plug-Ins/VST. You can turn Live's use of these plug-ins on or off with the Use VST Plug-ins in System Folders option.

2. You may have an alternative folder in which you store your VST Plug-ins (perhaps those that you use only with Live). You can use VST Plug-ins in this folder in addition to, or instead of, those in the System folders. To tell Live about the location of this folder, click the *Browse* button next to the VST Plug-In Custom Folder entry to open a folder-search dialog for locating and selecting the appropriate folder.

3. Note that you can turn off your VST Plug-ins in this folder using the Use VST Plug-In Custom folder option.

Once you have configured your Plug-In Preferences, the Plug-In Device Browser will display all plug-ins it finds in the selected VST Plug-in folder(s) as well as any sub-folders.

It is also possible to use VST Plug-ins stored in different folders on your computer. To do this, create a Mac OS or Windows *alias* of the folder where additional VST Plug-ins are stored, and then place the alias in the VST Plug-In Custom folder (or in the VST Plug-In System folder on Mac OS X) selected in Live's File/Folder Preferences. The alias can point to a different partition or hard drive on your computer. Live will scan the set VST Plug-in folder as well as any alias folders contained therein.

Some VST Plug-ins contain errors or are incompatible with Live. During the scanning process, these may cause the program to crash. When you re-launching Live, a dialog will appear to inform you about which plug-in caused the problem. Depending on what Live detects about the plug-in, you may be given the choice between performing another scan or making the problematic plug-in unavailable. If you choose to rescan and they crash the program a second time, Live will automatically make them unavailable, meaning that they will not appear in the Plug-In Device Browser and will not be rescanned again until they are reinstalled.

15.3.2   VST Programs and Banks

Every VST Plug-in instance "owns" a *bank* of *programs*. A program is meant to contain one complete set of values for the plug-in's controls.

The VST Plug-In Program Chooser.

To select a program from the plug-in's bank, use the chooser below the title bar. The number of programs per bank is fixed. You are always working "in" the currently selected program, that is, all changes to the plug-in's controls become part of the selected program.

Note that VST programs are different from Live device presets: Whereas the presets for a Live device are shared among all instances and Live Sets, the VST programs "belong" to this specific instance of the VST Plug-in.

Renaming a VST Plug-In Program.

To rename the current program, select the VST program chooser and execute the Edit menu's Rename Plug-In Preset command. Then type in a new program name and confirm by pressing Return .

The VST Program/Bank Load Button (Left) and Save Button (Right).

VST programs and banks can be imported from files. Clicking the VST Program Load button brings up a standard file-open dialog for locating the desired file.

Windows only: Please select from the File Type menu whether you want to locate VST Device Program files or VST Device Bank files.

To save the currently selected program as a file, click the VST Program/Bank Save button to bring up a standard file-save dialog; select "VST Device Program" from the Format menu (Macintosh)/from the File Type menu (Windows); select a folder and name. For saving the entire bank as a file, proceed likewise but choose "VST Device Bank" as a file type/format.

15.4   Audio Units Plug-Ins

Audio Units Plug-ins are only available in Mac OS X. In most respects, they operate just like VST Plug-ins.
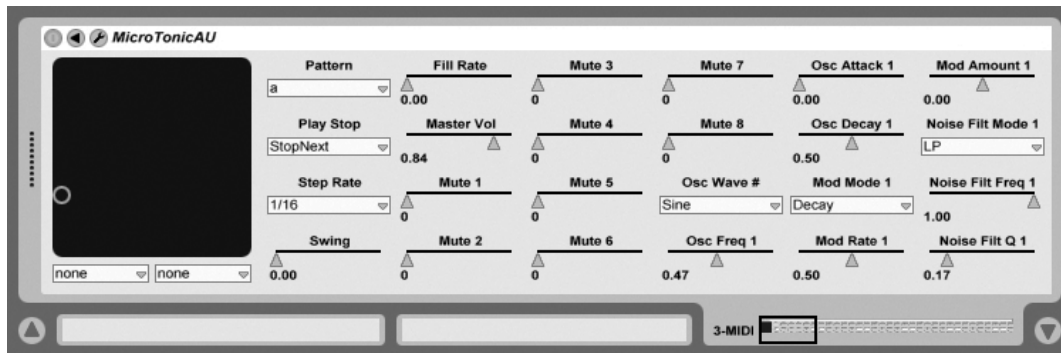
An Audio Units Plug-In.

The first time you open Live, Audio Units Plug-ins will not appear in the Plug-In Device Browser. In order to activate your Audio Units as a plug-in source, please press the Activate button in the Plug-In Device Browser, or go to the File/Folder Preferences by pressing `Ctrl` `,` (PC) / `⌃ ⌘ ,` (Mac). There you will find the Active Sources section. Turning on the Use Audio Units option activates Audio Units Plug-ins so that they appear in Live's Plug-In Device Browser.

Note that you can always turn this option off later if you decide not to use Audio Units.

Activating Audio Units Plug-Ins.

Audio Units Plug-ins sometimes have a feature that allows choosing between different modes for the device. You might be able to choose, for example, between different levels of quality in the rendering of a reverb. Choosers for these device modes can only be accessed through the original plug-in panel, which is opened using the Plug-In Edit button.
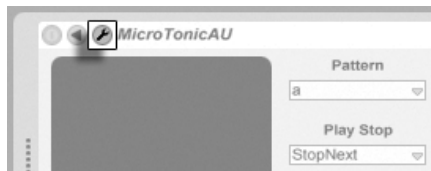
Audio Units have presets that function just like those for the Live effects. However, some AU presets cannot be dragged to different locations in the Browser, as they are read-only.

Audio Units presets have an *.aupreset* extension and are stored in the following directory according to their manufacturer's name:

[Home]/Library/Audio/Presets/[Manufacturer Name]/[Plug-in Name]

15.5   Device Delay Compensation

Live automatically compensates for delays caused by Live and plug-in instruments and effects, including those on the return tracks. These delays can arise from the time taken by devices to process an input signal and output a result. The compensation algorithm keeps all of Live's tracks in sync, regardless of what their devices are doing, while minimizing delay between the player's actions and the audible result.

Device delay compensation is on by default and does not normally have to be adjusted in any way. However, Live Sets that were created with Live 4 or earlier will open without device delay compensation. To manually turn latency compensation on (or off), use the Delay Compensation option in the Options menu.

Unusually high individual track delays or reported latencies from plug-ins may cause noticeable sluggishness in the software. If you are having latency-related difficulties while recording and playing back instruments, you may want to try turning off device delay compensation, however this is not normally recommended. You may also find that adjusting the individual track delays is useful in these cases.

Note that device delay compensation can, depending on the number of tracks and devices in use, increase the CPU load.

Chapter 16

Instrument and Effect Racks
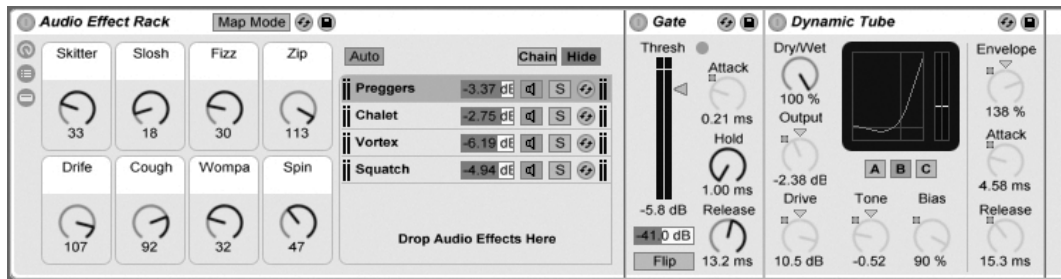
An Audio Effect Rack.

A Rack is a flexible tool for working with effects, plug-ins and instruments in a track's device chain. Racks can be used to build complex signal processors, dynamic performance instruments, stacked synthesizers and more. Yet they also streamline your device chain by bringing together your most essential controls. While Racks excel at handling multiple devices, they can extend the abilities of even a single device by defining new control relationships between its parameters.

Racks greatly expand upon the concept of device groups introduced in Live 5. The device groups of any Live Sets imported from Live 5 are automatically converted to Racks by Live 6. *Note that these Live Sets, once saved, can no longer be opened in older versions of Live.*

16.1   An Overview of Racks

16.1.1   Signal Flow and Parallel Device Chains

In any of Live's tracks, devices are connected serially in a *device chain,* passing their signals from one device to the next, left to right. By default, the Track View displays only a single chain, but there is actually no limit to the number of chains contained within a track.

Racks allow (among other things) additional device chains to be added to any track. When a track has multiple chains, they operate in *parallel:* Each chain receives the same input signal at the same time, but then processes that signal *serially* through its own devices. The output of each of these parallel chains is then mixed together, producing the Rack's output.

The entire contents of any Rack can be thought of as a single device. Indeed, when all of a Rack's views are collapsed, they take up almost no space at all. If more devices follow after a Rack in a track's device chain, the Rack's output is passed on to them, as usual.

16.1.2   Macro Controls

The Macro Controls.

One unique property of Racks are their *Macro Controls.*

The Macro Controls are a bank of eight knobs, each capable of addressing any number of parameters from any devices in a Rack. How you use them is naturally up to you – whether it be for convenience, by making an important device parameter more accessible; for defining

exotic, multi-parameter morphs of rhythm and timbre; or for constructing a mega-synth, and hiding it away behind a single customized interface.

For the greatest degree of expression, try MIDI-mapping the Macro Controls to an external control surface.

16.2   Creating Racks

Three Rack variants cover the range of Live's devices: Instrument Racks, Audio Effect Racks and MIDI Effect Racks. Just as with track types, each kind of Rack has rules regarding the devices it contains:

- *MIDI Effect Racks* contain only MIDI effects, and can only be placed in MIDI tracks.
- *Audio Effect Racks* contain only audio effects, and can be placed in audio tracks. They can also be placed in MIDI tracks, as long as they are "downstream" from an instrument.
- *Instrument Racks* contain instruments, but can additionally contain both MIDI and audio effects. In this case, all MIDI effects have to be at the beginning of the Instrument Rack's device chain, followed by an instrument, and then any audio effects.

There are different ways to create Racks. A new, empty Rack can be created by dragging a generic Rack preset (*"Audio Effect Rack,"* for example) from the Device Browser into a track. Devices can then be dropped directly into the Rack's Chain List or Devices view, which are introduced in the next section.

If a track already has one or more devices that you would like to group into a Rack, then simply select the title bars of those devices in the Track View, and use the Edit menu's *Group* command. Alternatively, 🖱 (PC) / ⌨Ctrl⌨ 🖱 (Mac) on one of the selected title bars to open a context menu featuring the same command. Note that if you repeat the command again on the same device, you will create a Rack within a Rack.

To ungroup devices, dismantling their Racks, select the *Rack's* title bar, and then use the Edit menu or the context menu to access the *Ungroup* command.

16.3   Looking at Racks
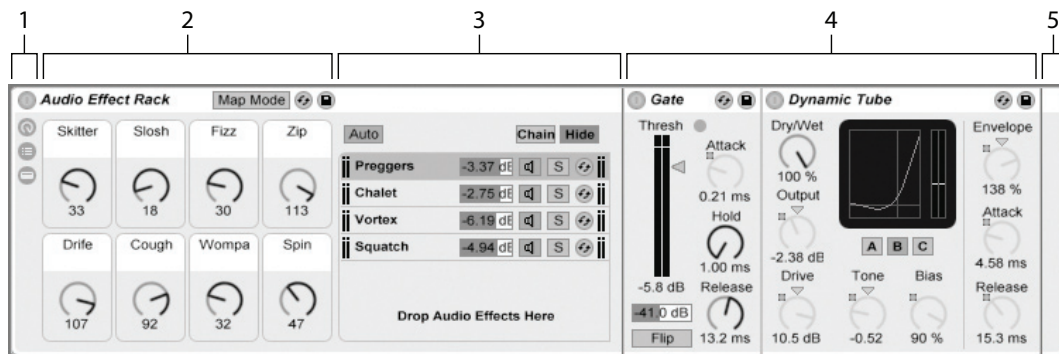
Components of a Rack.

1. Racks have three distinct views that can be shown or hidden as needed. There-fore, every Rack has a *view column* on its far left side that holds the corresponding view selectors.

2. *Macro Controls*

3. *Chain List*

4. *Devices*

5. Racks are also identifiable by their round corners, which bracket and enclose their content. When the Devices view is shown, the *end bracket* visually detaches itself to keep the Rack hierarchy clear.

To move, copy or delete an entire Rack at once, simply select it by its title bar (as opposed to the title bars of any devices that it contains). When selected, a Rack can also be renamed by using the Edit menu's *Rename* command.

When all of a Rack's views are hidden, its title bar will fold into the view column, making the entire Rack as slim as possible.
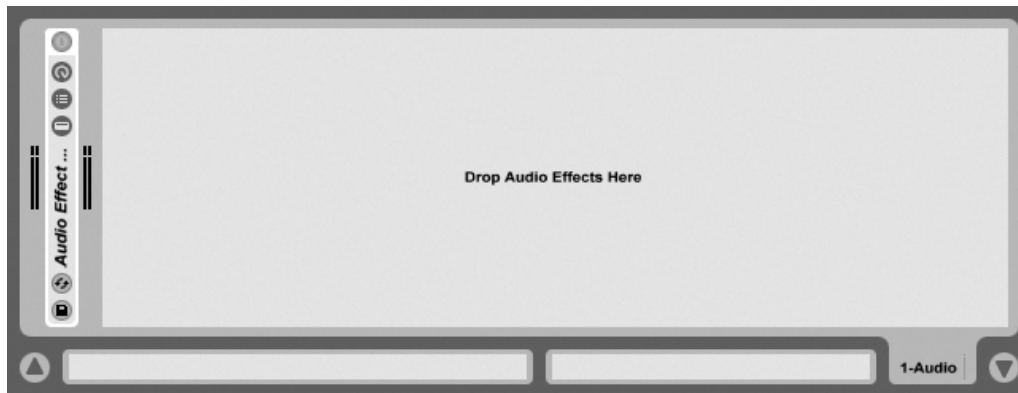
Racks Can Be Very Compact.

If you would like to locate a particular device in a Rack without searching manually through its entire contents, you will appreciate this navigation shortcut: □ (PC) / Ctrl □ (Mac) on the Track View selector, and a hierarchical list of all devices in the track's device chain will appear. Simply select an entry from the list, and Live will select that device and move it into view for you.

Navigate Racks Quickly Via a Context Menu.

16.4   Chain List
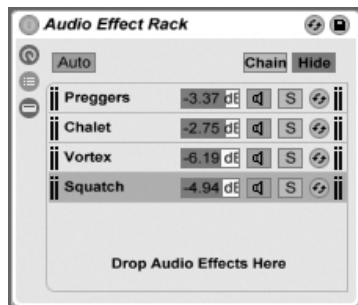
The Chain List.

As signals enter a Rack, they are first greeted by the Chain List. We will therefore also choose this point for our own introduction.

The Chain List represents the branching point for incoming signals: Each parallel device chain starts here, as an entry in the list. Below the list is a drop area, where new chains can be added by dragging and dropping presets, devices, or even pre-existing chains.

Since the Track View can show only one device chain at a time, the Chain List also serves as a navigational aid: The list selection determines what will be shown in the adjacent Devices view (when enabled). Try using your computer keyboard's ⬇ and ⬆ keys to change the selection in the Chain List, and you'll find that you can quickly flip through the contents of a Rack.

The Chain List also supports multi-selection of chains, for convenient copying and organizing. In this case, the Devices view will indicate how many chains are currently selected.

Each chain has its own volume slider, as well as Chain Activator, Solo and Hot-Swap buttons. Like Live Clips, entire chains can be saved and recalled as presets in the Device Browser. You can give a chain a descriptive name by selecting it, then choosing the Edit menu's Rename command. You'll appreciate your effort once your Racks start growing in size and complexity!

16.4.1 Auto Select

When the Auto Select switch is activated, every chain that is currently processing signals becomes selected in the Chain List. This feature works in conjunction with zones, which are discussed next, and is quite helpful when troubleshooting complex Racks.

16.5 Zones

Zones are sets of data filters that reside at the input of every chain in a Rack. Together, they determine the range of values that can pass through to the device chain. By default, zones behave transparently, never requiring your attention. They can be reconfigured, however, to form sophisticated control setups. The three types of zones, whose editors are toggled with the buttons above the Chain List, are *Key, Velocity,* and *Chain Select.* The adjacent *Hide* button whisks them out of sight.

Note: Audio Effect Racks do not have key or velocity zones, since these two zone types filter MIDI data only.

Zones contain a lower, main section, used for resizing and moving the zone itself, and a narrow upper section that defines fade ranges. Resizing of either section is done by clicking and dragging on its right or left edges, while moving is accomplished by clicking and dragging a zone from anywhere except its edges.

16.5.1 Signal Flow through Zones

To understand how zones work, let's examine the signal flow in a MIDI Effect Rack. Our MIDI Effect Rack resides in the device chain of a MIDI track, and therefore processes MIDI signals. We will assume that it contains four parallel device chains, each containing one MIDI effect.

1. All MIDI data in the track is passed to its device chain, and therefore into the input of the MIDI Effect Rack.

2. Our MIDI Effect Rack has four device chains, all of which receive the same MIDI data at the same time.

3. Before any MIDI data can enter a device chain, it must be able to pass through *every* zone in that chain. Every chain in a MIDI Effect Rack has three zones: a key zone, a velocity zone and a chain select zone.

4. An incoming MIDI note gets compared to a chain's key zone. If the MIDI note lies within the key zone, it is passed to the next zone for comparison; if it does not, then we already know that the note will not be passed to that chain's devices.

5. The same comparisons are made for the chain's velocity and chain select zones. If a note also lies within both of these zones, then it is passed to the input of the first device in that chain.

6. The output of all parallel chains is mixed together to produce the MIDI Effect Rack's final output. If there happened to be another device following after the Rack in the track's device chain, it would now receive the Rack's output for processing.

16.5.2 Key Zones
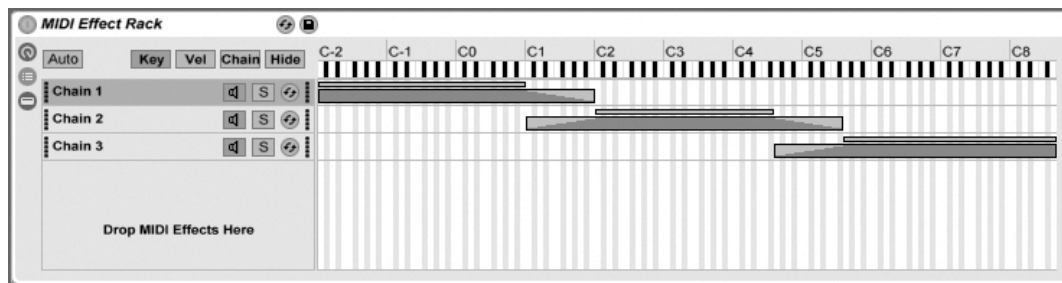
The Key Zone Editor.

When the Key button is selected, the Key Zone Editor appears to the right of the Chain List, illustrating how each chain maps to the full MIDI note range (nearly 11 octaves). Chains will only respond to MIDI notes that lie within their key zone. The zones of individual chains may occupy any number of keys, allowing for flexible "keyboard split" setups.

Key zone fade ranges attenuate the *velocities* of notes entering a chain.

16.5.3 Velocity Zones
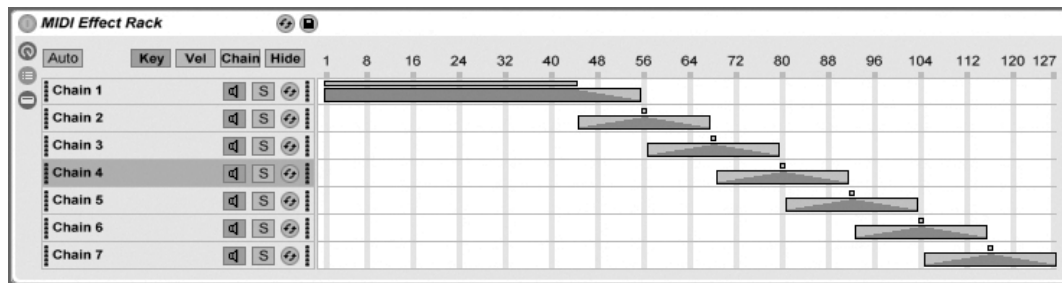
The Velocity Zone Editor.

Each chain in an Instrument Rack or MIDI Effect Rack also has a velocity zone, specifying the range of MIDI Note On velocities that it will respond to.

The Velocity Zone Editor, when displayed, replaces the Key Zone Editor to the right of the Chain List. MIDI Note On velocity is measured on a scale of 1-127, and this value range spans the top of the editor. Otherwise, the functionality here is identical to that of the Key Zone Editor.

Velocity zone fade ranges attenuate the velocities of notes entering a chain.

16.5.4 Chain Select Zones
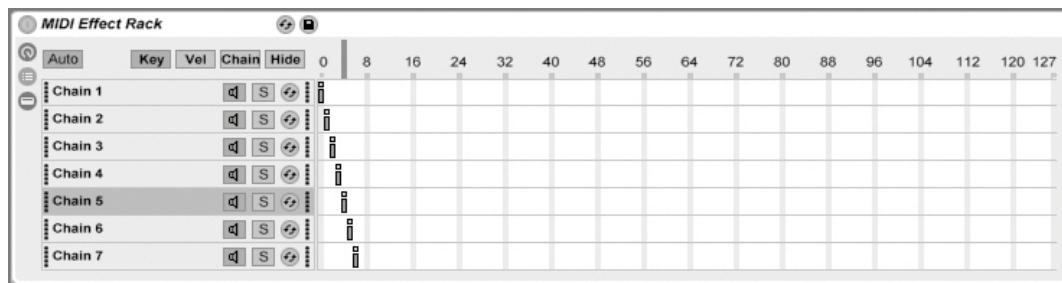
The Chain Select Editor.

Activating the Chain button displays the Chain Select Editor. All Rack types have chain select zones, which allow you to filter chains spontaneously via a single parameter. The editor has

a scale of 0-127, similar to the Velocity Zone Editor. Above the value scale, however, you will find a draggable indicator known as the Chain selector.

The chain select zone is a data filter just like the other zones; although all chains in a Rack receive input signals, only those with chain select zones that overlap the current value of the Chain selector can be addressed and thereby produce output.

In *MIDI Effect Racks,* chain select zones filter all incoming MIDI events (such as MIDI CCs), not just notes. Fade ranges attenuate the velocities of notes entering a chain.

In *Instrument Racks* and *Audio Effect Racks,* which both output audio signals, fade ranges attenuate the volume level at each chain's output. So what happens, then, if the Chain selector is moved outside of the chain select zone where a sound is currently playing? If the zone ends in a fade range, the chain's output volume is attenuated to zero while the Chain selector is outside of the zone. If the zone had no fade range, the output volume is *not* attenuated, allowing the chain's effects (like long reverb tails or delays) to fade out according to their own settings.

Let's consider how we can make use of chain select zones in a performance situation:

Making Preset Banks Using Chain Select
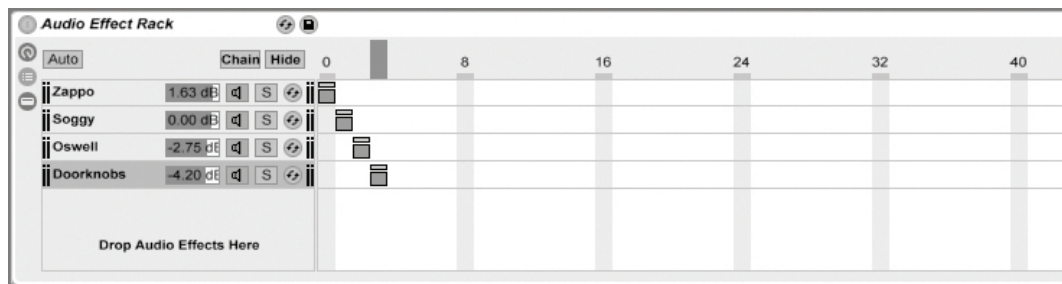
Using Chain Select Zones to Create Effects Presets.

Unlike the other zone types, the default length of a chain select zone is 1, and the default value is 0. From this setup, we can quickly create "preset banks" using the Chain Select Editor.

Again, we will use a Rack with four chains as our starting point. Each of the four chains contain different effects that we would like to be able to switch between. To make this

a "hands-on" experience, we have MIDI-mapped the Chain selector to an encoder on an external control surface.

Let's move the chain select zones of the second and third chains so that each of our zones is occupying its own adjacent value: The first chain's zone has a value of 0, the second chain's zone has a value of 1, the third has a value of 2, and the fourth has a value of 3.

Since each of our chain select zones has a unique value, with no two zones overlapping, we now have a situation where only one chain at a time can ever be equal to the Chain selector value (shown at the top of the editor). Therefore, by moving the Chain selector, we determine which chain can process signals. With our MIDI encoder at hand, we can now flip effortlessly between instrument or effect setups.

Crossfading Preset Banks Using Fade Ranges
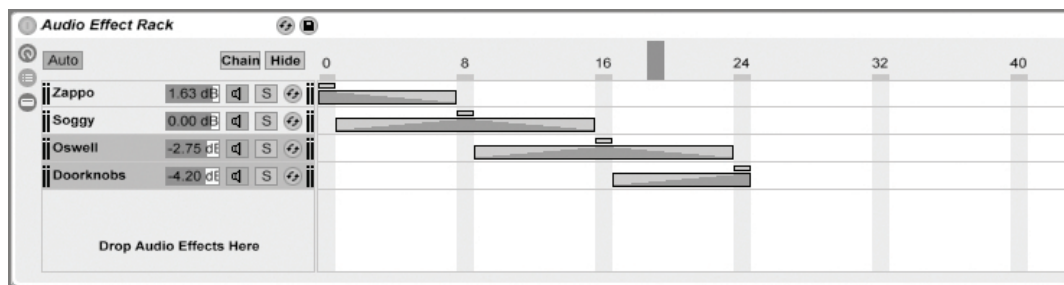
Crossfading Between Effects Presets Using Chain Select Zones.

Taking the previous example one step further, we can tweak our chain select zones to produce a smooth transition between our "presets." To accomplish this, we will make use of our zones' *fade ranges.*

To create some room for fading, let's extend the length of our zones a bit. Setting the zones as shown maintains four exclusive values for our presets, so that each still has one point where neither of the others are heard. We crossfade between the presets over eight steps. If this is too rough a transition for your material, simply reposition the zones to maximize the fade ranges.

16.6   Using the Macro Controls
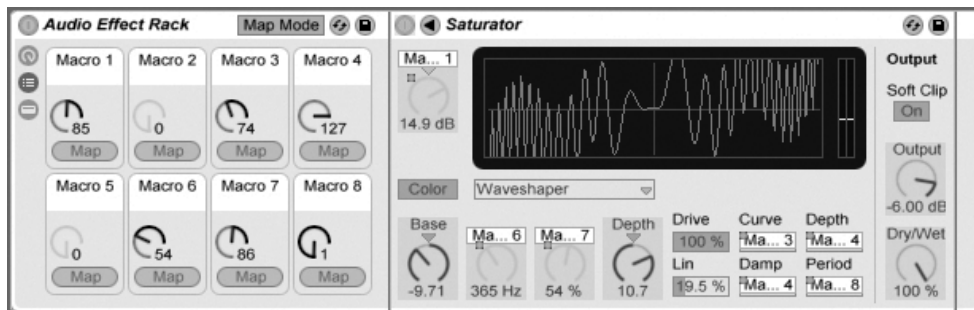
Making Macro Control Assignments in Map Mode.

With the potential for developing such complex device chains, Macro Controls keep things manageable by taking over the most essential parameters of a Rack (as determined by you, of course!). Once you have set up your ideal mapping, the rest of the Rack can be hidden away.

The Macro Control view's dedicated *Map Mode* button opens the door to this behavior. Enabling Macro Map Mode causes three things to happen:

- All mappable parameters from a Rack's devices will appear with a colored overlay;
- Map buttons will appear beneath each Macro Control dial;
- The Mapping Browser will open.

The following steps will get you started mapping:

1. Enable Macro Map Mode by clicking the Map Mode button;
2. Select a device parameter for mapping by clicking it once;
3. Map the parameter by clicking on any Macro Control's Map button. The details will be added to the Mapping Browser.
4. Refine the value range if desired using the Min/Max sliders in the Mapping Browser. Inverted mappings can be created by setting the Min slider's value greater than the Max slider's value. The current values can also be inverted by pressing 🖰 (PC) / Ctrl 🖰 (Mac) on the entry in the Mapping Browser.

5. Select another device parameter if you'd like to create more mappings, or click
    on the Map Mode button once more to exit Macro Map Mode.

Note that once assigned to a Macro Control, a device parameter will appear disabled, since
it hands over all control to the Macro Control (although it can still be modulated externally,
via Clip Envelopes).

You can edit or delete your assignments at any time using the Mapping Browser (which only
appears when Map Mode is enabled).

16.7   Racks Within Racks

Now that you have seen all of the components that make up a Rack, we will introduce
an advanced concept: A Rack can contain any number of other Racks within its device
chains! This idea is easier to grasp if you remember our statement from the beginning of
this chapter: *The entire contents of any Rack can be thought of as a single device.* With this
in mind, adding a new Rack at any point in a device chain is no different than adding any
other device.
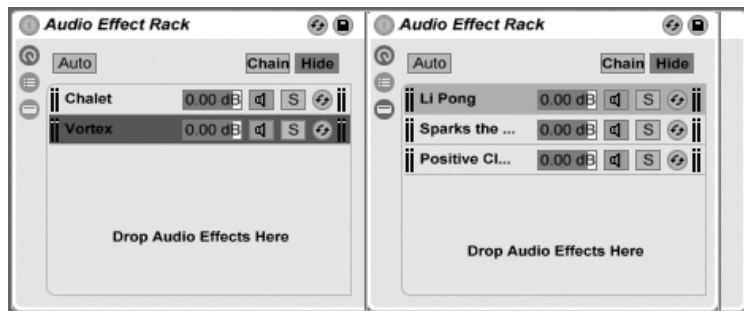
*One MIDI Effect Rack
Contained Within
Another.*

A Rack can be enclosed in another Rack by first selecting it, and then selecting the Group
command from the Edit menu. In the Track View, the contents of Racks are always contained
between end brackets: Just as with punctuation or in mathematics, a Rack within a Rack will
have a pair of brackets within a pair of brackets.

Racks, chains and devices can be freely dragged into and out of other Racks, and even

between tracks! Selecting a chain, then dragging and hovering over another Session or Arrangement View track will give that track focus; its Track View will open, allowing you to drop your chain into place.

Chapter 17

Automation and Editing Envelopes

Often, when working with Live's mixer and devices, you will want the controls' movements to become part of the music. The movement of a control across the song timeline is called *automation*; a control whose value changes in the course of this timeline is *automated*. Practically all mixer and device controls in Live can be automated, including the song tempo.

17.1   Recording Automation

Creating automation is straightforward: All changes of a control that occur while the Control Bar's Record switch is on become automation. Try recording automation for a control, for instance a mixer volume slider. After recording, play back what you have just recorded to see and hear the effect of the control movement. You will notice that a little LED has appeared in the slider thumb to indicate that the control is now automated. Try recording automation for track panning and the Track Activator switch as well; their automation LEDs appear in their upper left corners.
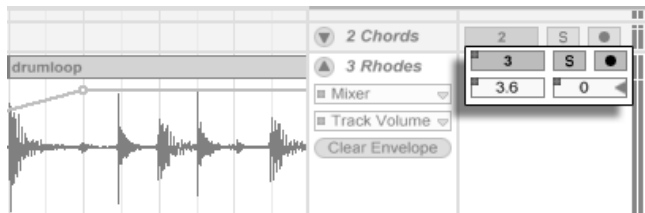
Volume, Pan and the Track Activator Switch Have Been Automated.

17.2   Deleting Automation

To delete automation data, simply select an automated control by clicking on it, and choose the Edit menu's Delete Automation command. The automation LED disappears, and the control's value stays constant across the entire song. Note that this will not work with controls that are switches, like the Track Activator switch, because they cannot be selected by clicking. You can only delete automation for switches by editing their breakpoint envelopes.

17.3   Overriding Automation

In practice, you will often want to try out new control moves without overwriting existing automation data. Well, nothing is forever in the world of infinite Undo, but it's easy to disable a control's automation temporarily to avoid overwriting existing data: If you change an automated control's value while *not* in Record mode, the automation LED goes off to indicate the control's automation is inactive. Any automation is therefore *overridden* by the current manual setting.

The Back to Arrangement Button.

When one or more of the automated controls in your Live Set are not active, the Control Bar's Back to Arrangement button lights up. This button serves two purposes:

1. It reminds you that the current state of the controls differs from the state captured in the Arrangement.

2. You can click on it to reactivate all automation and thereby return to the automation state as it is written "on tape."

17.4   Drawing and Editing Automation

In the Arrangement View, automation curves can be viewed and edited as breakpoint envelopes.
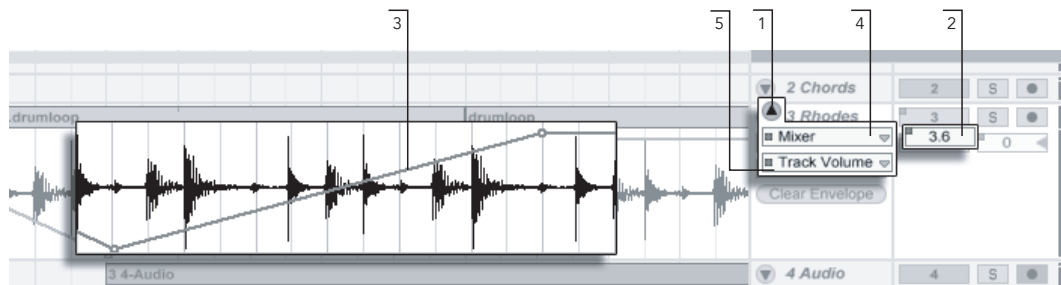
An Automation Envelope in the Arrangement View.

1. To access a track's envelope, "unfold" the track by clicking the ▼ button next to the track name.

2. Clicking on one of the track's mixer or device controls will display this control's envelope.

3. The envelope appears "on top of" the audio waveform or MIDI display. Its vertical axis represents the control value and the horizontal axis represents time. For switches and radio buttons, the value axis is discontinuous.

4. The Automation Device chooser either selects the track mixer, one of the track's devices or "None" to hide the envelope. It also provides you with an overview of what devices actually have automation by showing an LED next to their labels.

5. The Automation Control chooser selects a control from the device chosen in the Automation Device chooser. The labels of automated controls have an LED.

17.4.1   Drawing Envelopes

With Draw Mode enabled, you can click and drag to "draw" an envelope curve.

The Draw Mode Switch.

To toggle Draw Mode, select the Draw Mode option from the Options menu, click on the Control Bar's Draw Mode switch, or press Ctrl   B (PC) /   ⇧ ⌘ B (Mac).
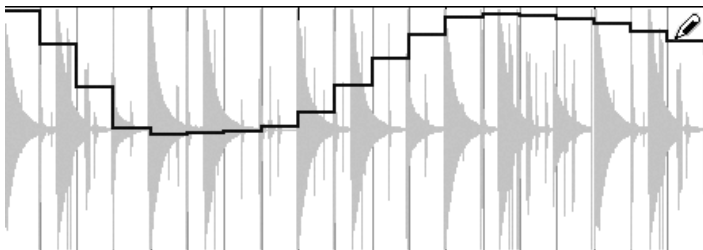
Drawing an Envelope.

Drawing creates steps as wide as the visible grid, which you can modify using a number of handy shortcuts. For freehand drawing, you can hide the grid using the Snap to Grid Options menu entry or the Ctrl   4 (PC) /   ⇧ ⌘ 4 (Mac) shortcut.

17.4.2   Editing Breakpoints

With Draw Mode off, the envelope display looks and works differently. The line segments and the breakpoints connecting them become draggable objects. Clicking and dragging in the envelope's background defines a selection. Here is what you can do:

- Double-click at a position on a line segment to create a new breakpoint there.
- Double-click on a breakpoint to delete it.
- Click and drag a breakpoint to move it to the desired location. If the breakpoint you are dragging is in the current selection, all other breakpoints in the selection will follow the movement.
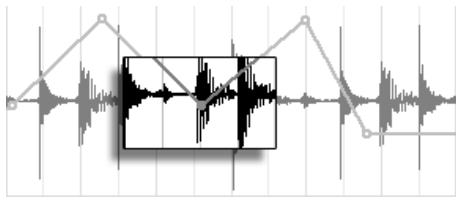
To Move all Breakpoints Within the Selection, Drag Any One of Them.

Your movement is constrained by the neighboring breakpoints unless you hold down the ⇧ modifier while dragging, which will eliminate breakpoints as you wipe over them. Holding down the Ctrl (PC) / ⌘ (Mac) modifier while dragging switches to a finer resolution.

- Click and drag a line segment between two breakpoints to move it vertically, without affecting the breakpoint's horizontal position. If the line segment is in the current selection, the envelope is moved vertically across the selected timespan. Live inserts breakpoints at the selection's edges to make sure the move only affects the selected part of the envelope.
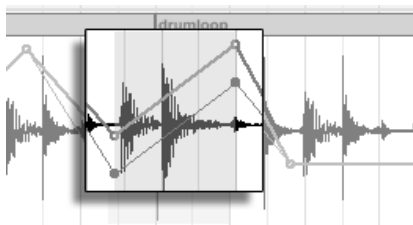
Dragging an Envelope Line Segment Moves the Segment Vertically.

17.4.3 Locking Envelopes

When moving clips, Live normally moves all automation with the clip. Sometimes, you might want to lock the envelopes to the song position rather than to the clips, and the Arrangement View's Lock Envelopes switch does just that.

You can also choose to lock envelopes from the Options menu.

The Lock Envelopes Switch.

17.4.4   Edit Menu Commands

There are a number of useful Edit menu commands for editing envelopes.

To cut or copy automation from a track, independent of the associated clip, use the Edit menu's Cut Envelope and Copy Envelope commands, respectively.

To simultaneously copy and paste a selection of envelope into a track's "future," use the Duplicate Envelope command.

Note that Live allows you to copy and paste envelope movements not only from one point in time to another, but also from one parameter to another. However, there is obviously no meaningful conversion from a pan movement to, say, an equalizer frequency, and all Live can do is somehow preserve the gesture.

17.4.5   Editing the Tempo Automation

The ability to dynamically stretch and compress audio to track any tempo or tempo variation is one of Live's specialties. In Live, the song tempo is just another automated control.

To edit the song tempo envelope, unfold the Master track, choose "Mixer" from the top envelope chooser and "Song Tempo" from the bottom one.
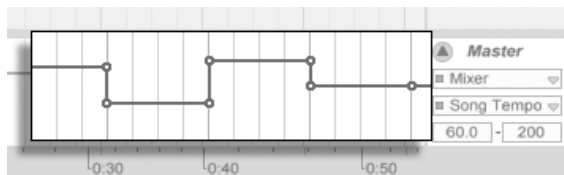
The Tempo Envelope.

When adjusting the tempo envelope, you might want to scale the value axis display, which is the function of the two value boxes below the envelope choosers: The left box sets the minimum, and the right box sets the maximum tempo displayed, in BPM.

Note that these two controls also determine the value range of a MIDI controller assigned to the tempo.

Chapter 18

Clip Envelopes

Every clip in Live can have its own *clip envelopes*. The aspects of a clip that are influenced by clip envelopes change depending upon clip type and setup; clip envelopes can do anything from representing MIDI controller data to modulating device parameters. In this chapter, we will first look at how all clip envelopes are drawn and edited, and then get into the details of their various applications.

18.1   The Clip Envelope Editor

Use the Clip View Box Selector to Bring up the Envelopes Box.

To work with clip envelopes, bring up the Clip View's Envelopes box by activating the rightmost Clip View Box selector panel. The Envelopes box contains two choosers for selecting an envelope to view and edit.
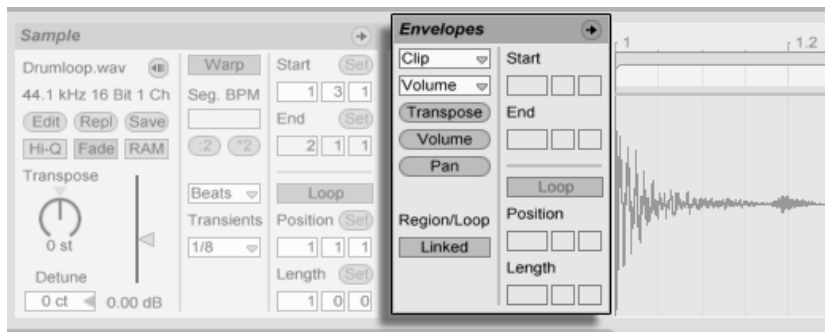
The Clip View's Envelopes Box.

The top menu is the Device chooser, which selects a general category of controls with which to work. Device chooser entries are different for different kinds of clips:

- Audio clips have entries for "Clip" (the clip's sample controls), every effect in the track's device chain and the mixer.

- MIDI clips have entries for "MIDI Ctrl" (MIDI controller data) and every device in the track's device chain.

The bottom menu, the Control chooser, selects among the controls of the item chosen in the top menu. In both the Device and the Control chooser, you can easily identify the items that have a non-neutral clip envelope by a little LED appearing next to their names.

The "quick-chooser" buttons below the menus select commonly edited controls.

Clicking the menus or the quick-chooser buttons brings up the Envelope Editor showing the selected envelope, instead of the Sample Display or MIDI Editor. You can toggle the display by clicking on the title bars of the Sample/Notes and Envelopes boxes.

The techniques for drawing and editing clip envelopes are the same as those for automation envelopes in the Arrangement View.

If you create a nice section of envelope that you want to have repeat several times, try the following:

1. Enclose the desired selection in the loop brace, and click the brace so that it is selected. This will execute the Edit menu's Select Loop command, which selects all material in the loop.

2. Copy the envelope with `Ctrl` `C` (PC) / `⌃` `⌘` `C` (Mac).

3. Shift the loop brace to the right by one loop length with `⬆`.

4. Paste the envelope with `Ctrl` `V` (PC) / `⌃` `⌘` `V` (Mac).

Note that you can use the arrow keys to quickly manipulate the loop brace and start/end markers in other useful ways to expedite clip envelope editing tasks.

To delete a clip envelope (i.e., to set it back to its default value), first go to Edit/Select All, then to Edit/Delete.

Let us now look at some uses of clip envelopes.

18.2 Audio Clip Envelopes

Clip envelopes extend Live's "elastic" approach to audio and, in conjunction with Live's audio effects, turn Live into a mighty sound-design tool. Using clip envelopes with audio

clips, you can create an abundance of interesting variations from the same clip in real time – anything from subtle corrections to entirely new and unrelated sounds.

## 18.2.1   Clip Envelopes are Non-Destructive

Using clip envelopes, you can create new sounds from a sample without actually affecting the sample on disk. Because Live calculates the envelope modulations in real time, you can have hundreds of clips in a Live Set that all sound different, but use the same sample.

You can, of course, export a newly created sound by rendering, or by resampling. In the Arrangement View, you can use the Consolidate command to create new samples.

18.2.2   Changing Pitch and Tuning per Note

Drop a sample loop from the Browser into Live and play it. Click on the Transpose quick-chooser button. You can now alter the pitch transposition of individual notes in the sample as you listen to it.

The fast way to do this is by enabling Draw Mode and drawing steps along the grid. Deactivate Draw Mode to edit breakpoints and line segments. This is useful for smoothing the coarse steps by horizontally displacing breakpoints.
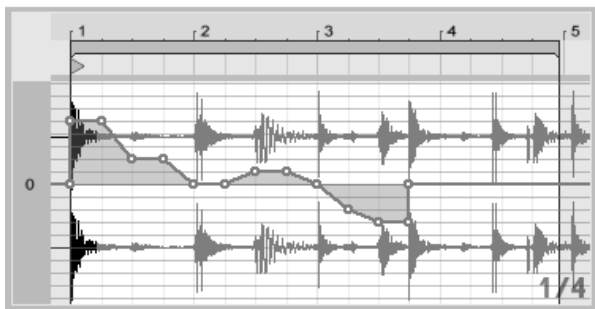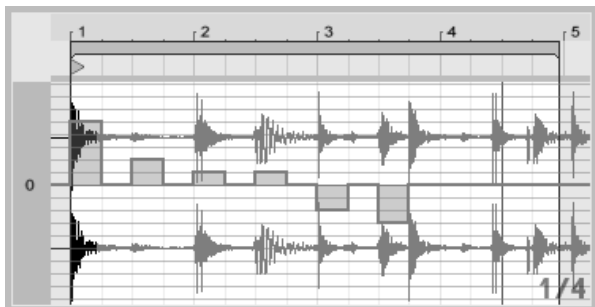
The Transposition Envelope with Steps (Top) and Ramps (Bottom).

Note that the warp settings determine how accurately Live's time-warping engine tracks the envelope shape. To obtain a more immediate response, reduce the Grain Size value in Tones and Texture Mode or choose a smaller value for the Transients control in Beats Mode.

To correct the tuning of individual notes in the sample, hold down the Ctrl (PC) / ⌘ (Mac) modifier while drawing or moving breakpoints to obtain a finer resolution.

To scroll the display, hold down the Ctrl Alt (PC) / ⌘ Alt (Mac) modifier while dragging.

Pitch is modulated in an *additive* way. The output of the transposition envelope is simply added to the Transpose control's value. The result of the modulation is clipped to stay in the available range (-48..48 semitones in this case).

18.2.3   Muting or Attenuating Notes in a Sample

Click on the Volume quick-chooser to access an audio clip's volume envelope. By drawing steps in Draw Mode or creating shapes with breakpoints, you can impose an arbitrary volume shape onto the sample.
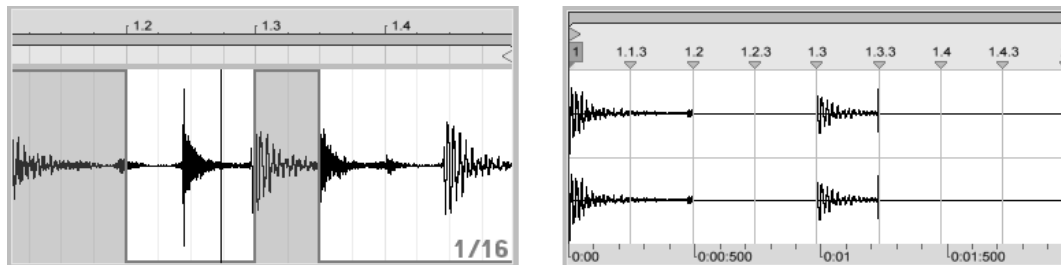
Imposing a Volume Envelope on a Sample.

The volume envelope's output is interpreted as a relative percentage of the clip volume slider's current value. The result of the clip envelope's modulation can therefore never exceed the absolute volume setting, but the clip envelope can drag the audible volume down to silence.

18.2.4   Scrambling Beats

One very creative use of clip envelopes is to modulate the sample offset. Sample offset modulation makes the most sense for rhythmical samples, and is only available for clips that are set up to run in the Beats Warp Mode.

Try sample offset modulation with a one-bar drum loop: Make sure Beats Mode is chosen; in the Envelopes box, choose "Clip" from the Device chooser and "Sample Offset" from the Control chooser. The Envelope Editor appears with a vertical grid overlay. In envelope Draw Mode, set steps to non-zero values to hear the loop scrambled. What is going on?

Imagine the audio is read out by a tape head, the position of which is modulated by the envelope. The higher a value the envelope delivers, the farther away the tape head is from its center position. Positive envelope values move the head towards the "future," negative values move it towards the "past." Fortunately, Live performs the modulation in beats rather

than centimeters: A vertical grid line is worth a sixteenth note of offset and the modulation can reach from plus eight sixteenths to minus eight sixteenths.

Sample offset modulation is the tool of choice for quickly creating interesting variations of beat loops. We discourage using this technique for "analytical" cut-and-splice tasks; they are much easier to perform using Live's Arrangement View, and the results can easily be consolidated into new clips.
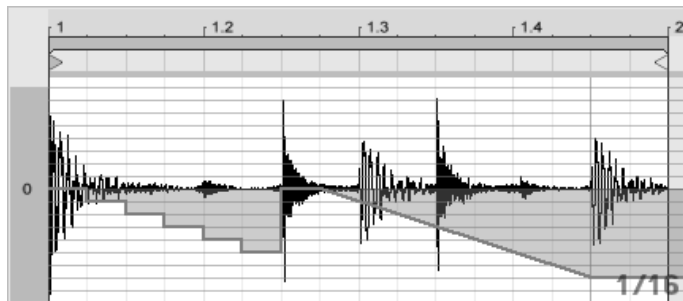
Repeating Steps and Slowing Time with the Sample Offset Envelope.

Some sample offset envelope gestures have a characteristic effect: a downward "escalator" shape, for instance, effectively repeats the step at the envelope's beginning. Similarly, a smooth ramp with a downwards slope is slowing time and can create nice slurring effects when the slope is not quite exactly 45 degrees; try this with a 1/32 Transients setting.

18.2.5   Using Clips as Templates

As you are making creative use of clip envelopes, the clips containing them develop a life of their own, independent of the original sample. You might wonder at a point: What does this clip sound like with a different sample? This is easy to find out by selecting the clip so that it is displayed in the Clip View and dragging the desired sample from one of the File Browsers, or the Session or Arrangement View, onto the Clip View. All clip settings, including the envelopes, will remain unaltered; only the sample will be replaced.

18.3   Mixer and Device Clip Envelopes

Clip envelopes can be used to *modulate* mixer and device controls. Since mixer and device controls can also be controlled by the Arrangement's automation envelopes, this is a potential source of confusion. However, clip envelopes differ from automation envelopes in one important way: Whereas automation envelopes *define* the value of a control at any given point in time, clip envelopes can only *influence* this defined value. This difference allows the two types of envelopes to work together in harmony when controlling the same parameter.

Imagine that you have recorded volume automation for an audio clip so that it gradually fades out over four bars. What happens to your fade-out when you create a clip envelope that gradually increases the mixer volume over four bars? At first, your fade-out will become a crescendo, as the clip envelope gradually increases the volume within the range allowed by the automation envelope. But, once the decreasing automated value meets with the increasing clip envelope value, the fade-out will begin, as automation forces the absolute control value (and the operable range of the clip envelope) down.

18.3.1   Modulating Mixer Volumes and Sends

Notice that there are actually two volume modulations: Clip Volume and Mixer Volume. The latter is a modulation for the mixer's gain stage and therefore affects the post-effect signal. To prevent confusion, a small dot below the mixer's volume slider thumb indicates the actual, modulated volume setting.
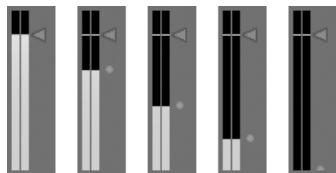
Modulating the Mixer Volume. The Little Dot Below the Volume Slider Thumb Represents the Modulated Volume Setting.

As you raise and lower the Volume slider, you can observe the dot following your movement in a relative fashion.

Modulating the track's Send controls is just as easy. Again, the modulation is a relative

percentage: The clip envelope cannot open the send further than the Send knob, but it can reduce the actual send value to minus infinite dB.

18.3.2   Modulating Pan

The Pan envelope affects the mixer pan stage in a relative way: The pan knob's position determines the intensity of the modulation. With the pan knob set to the center position, modulation by the clip envelope can reach from hard left to hard right; the modulation amount is automatically reduced as you move the pan knob towards the left or right. When the pan knob is turned all the way to the left, for instance, the pan clip envelope has no effect at all.

18.3.3   Modulating Device Controls

All devices in a clip's track are listed in the upper clip envelope Device chooser. Modulating the devices' controls works just as you would expect. When modulating device controls, it is important to keep the interaction of clip envelopes and device settings in mind: Unlike a device preset, the clip envelope cannot define the values for the devices' controls, it can only *change* them relative to their current setting.

18.4   MIDI Controller Clip Envelopes

Whether you are working with a new MIDI clip that was recorded directly into Live, or one from your files, Live allows you to edit and create MIDI controller data for the clip in the form of clip envelopes.

Choose "MIDI Ctrl" from a MIDI clip's Device chooser and use the Control chooser below it to select a specific MIDI controller. You can create new clip envelopes for any of the listed controllers by drawing steps or using breakpoints. You can also edit clip envelope representations of controller data that is imported as part of your MIDI files or is created

while recording new clips: Names of controllers that already have clip envelopes appear with a little LED in the Control chooser.

Live supports most MIDI controller numbers up to 119, accessible via the scroll bar on the right-hand side of the menu. Note that devices to which you send your MIDI controller messages may not follow the conventions of MIDI control channel assignments, so that "Pitch Bend" or "Pan," for example, will not always achieve the results that their names imply.
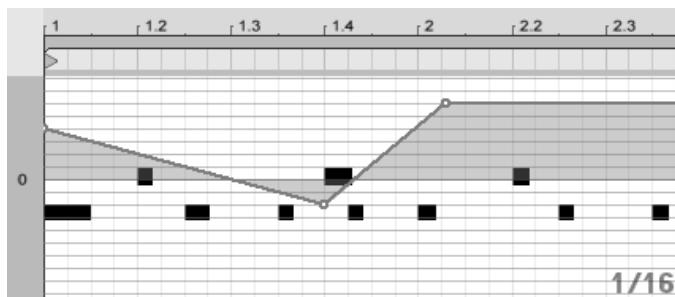
A MIDI Controller Clip Envelope.

Many of the techniques described in the following section on unlinking a clip envelope from its associated clip can be adapted for use with MIDI controller clip envelopes.

18.5   Unlinking Clip Envelopes From Clips

A clip envelope can have its own local loop/region settings. The ability to unlink the envelope from its clip creates an abundance of exciting creative options, some of which we will present in the rest of this chapter.

18.5.1   Programming a Fade-Out for a Live Set

Let us start with a straightforward example. Suppose you are setting up a Live Set and wish to program a fade-out over eight bars to occur when a specific clip is launched – but all you have is a one-bar loop.
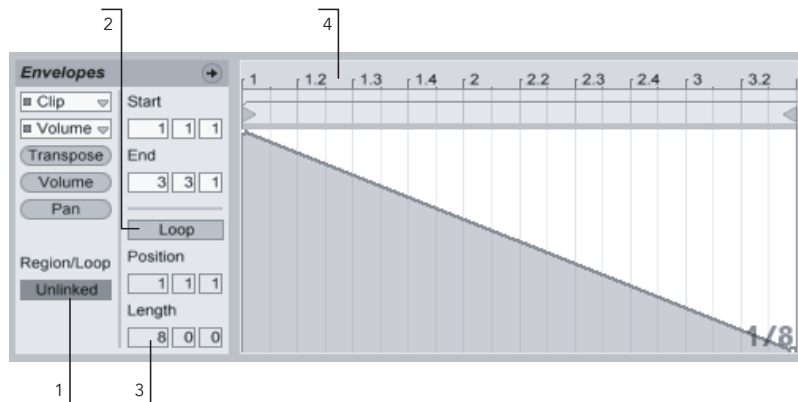
Using a Clip Envelope to Create a Fade-Out Over Several Repetitions of a Loop.

1. Choose the Clip Volume envelope, and *unlink* it from the sample.

   The clip envelope's loop braces now appear colored to indicate this envelope now has its own local loop/region settings. The loop/region controls in the Envelopes box "come to life."

2. Make sure the clip envelope's Loop switch is off. Notice the Sample box's Loop switch is not affected. The sample will keep looping although the envelope is now playing as a "one-shot."

3. Type "8" into the leftmost envelope loop-length value box.

4. Zoom the envelope display out all the way by clicking on the Envelope's time ruler and dragging upwards.

5. Insert a breakpoint at the region end and drag it to the bottom (zero percent).

Now, as you play the clip, you can hear the one-bar loop fading out over eight bars.

Please note: toggling Linked Mode changes the envelope data. Toggling back and forth effectively deletes the envelope data. To return to the previous state, please use the Edit menu's Undo command.

18.5.2   Creating Long Loops from Short Loops

Let us take this a step further. For a different part of your set, you would like to use the same one-bar loop – because it sounds great – but its repetition bores you. You would like to somehow turn it into a longer loop.

We depart from the clip we just set up to fade out over eight bars. Activate the clip volume envelope's Loop switch. Now, as you play the clip, you can hear the eight-bar fade-out repeating. You can draw or edit any envelope to superimpose onto the sample loop. This, of course, not only works for volume but for any other control as well; how about a filter sweep every four bars?

Note that you can create as much time as needed in the Envelope Editor, either by dragging the loop braces beyond the view limit, or by entering values into the numeric region/loop controls.

You can choose an arbitrary loop length for each envelope, including odd lengths like 3.2.1. It is not hard to imagine great complexity (and confusion!) arising from several odd-length envelopes in one clip.
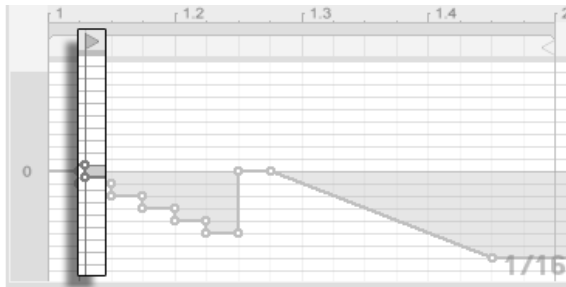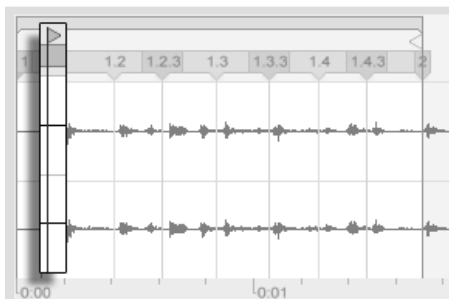
The Sample (Left) and Envelope (Right) Start Marker.

To keep this complexity under control, it is important to have a common point of reference. The start marker identifies the point where sample or envelope playback depart from when the clip starts.

Note that the start/end markers and loop brace are subject to quantization by the zoom-adaptive grid, as is envelope drawing.

18.5.3   Imposing Rhythm Patterns onto Samples

So far, we have been talking about imposing long envelopes onto small loops. You can also think of interesting applications that work the other way around. Consider a sample of a song that is several minutes long. This sample could be played by a clip with a one-bar volume envelope loop. The volume envelope loop now works as a pattern that is repeatedly "punching" holes into the music so as to, perhaps, remove every third beat. You can certainly think of other parameters that such a pattern could modulate in interesting ways.

18.5.4   Clip Envelopes as LFOs

If you are into sound synthesis, you may want to think of a clip envelope with a local loop as an LFO. This LFO is running in sync with the project tempo, but it is also possible to set up a loop period odd enough to render the envelope unsynchronized. By hiding the grid, you can adjust the clip envelope loop start and end points completely independent of meter grid.

Chapter 19

Working with Video

Live's flexible architecture makes it the perfect choice for scoring to video. You can trim video clips to select parts of them, and then use *Warp Markers* to visually align music in the Arrangement View with the video.

Before diving in, you will want to be familiar with the concepts presented in the Tempo Control and Warping chapter.

If you are interested in syncing Live with external video equipment, you'll also want to read the chapter on synchronization.

19.1   Importing Video

Live can import movies in Apple's QuickTime format (.mov) to be used as video clips. Movie files appear in Live's File Browser alongside audio files and Live Sets, and can be imported in the same way, by simply dragging them into the Live Set.

Note that Live will only display video for video clips residing in the Arrangement View. Movie files that are loaded into the Session View are treated as audio clips.

19.2   The Appearance of Video in Live

19.2.1   Video Clips in the Arrangement View

A video clip in the Arrangement View looks just like an audio clip, except for the "sprocket holes" in its title bar.
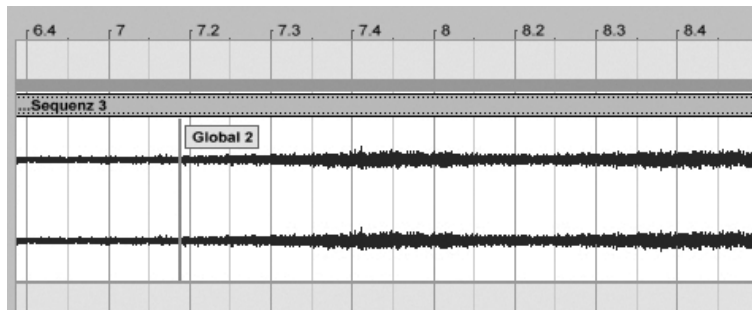
A Video Clip with a QuickTime Marker.

Live also displays a movie file's QuickTime markers, if present, in the Arrangement View and Clip View. QuickTime markers are created by external video authoring applications, and although they cannot be selected or edited in any way by Live, they do provide visual cues that can be helpful when scoring. Note that these markers are always read from the original movie file, and are not stored in the Live Set or video clip.

For the most part, video clips in the Arrangement View are treated just like audio clips. They can be trimmed, for example, by dragging their right or left edges. *However*, there are some editing commands that, when applied to a video clip, will cause it to be replaced by an audio clip (which by definition has no video component). This replacement only occurs internally – your original movie files are never altered. The commands which will cause this are: *Consolidate*, *Reverse* and *Crop*.

19.2.2   The Video Window

The Video Window is a separate, floating window that always remains above Live's main window: It can be dragged to any location you like, and it will never get covered up by Live. By default, it opens at the same resolution as the video clip, but it can be resized by dragging its bottom right-hand corner. The video can be shown in full screen (and optionally on a second monitor) by double-clicking in the Video Window.

Movies with Partial Tracks

In the QuickTime file format, the audio and video components do not have to span the entire length of a movie: Gaps in playback are allowed. During gaps in video, Live's Video Window will display a black screen; gaps in audio will play silence.

19.2.3   Clip View

Soundtrack composers will want to note the Tempo Master option in Live's Clip View. When scoring to video, video clips are usually set as tempo masters, while audio clips are left as tempo slaves. These are, therefore, the default warp properties of clips in the Arrangement View. In this scenario, adding Warp Markers to a video clip defines "hit points" that the

music will sync to. *Note that a video clip's Warp switch needs to be activated in order for the clip to be set as the tempo master.*
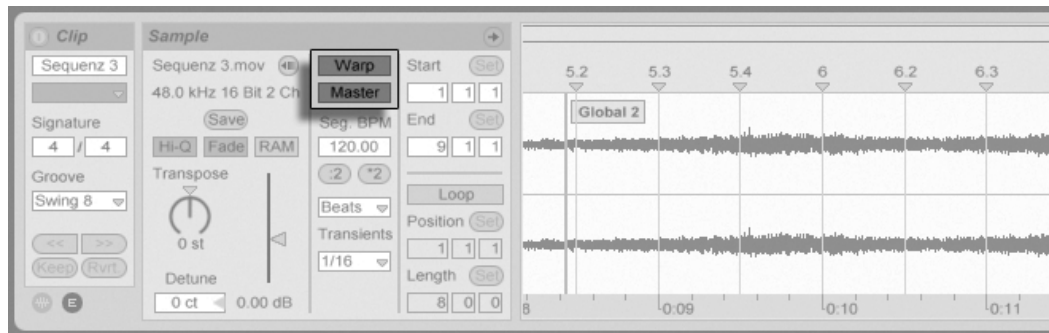
Setting a Video Clip as Tempo Master.

Remember from the Tempo Control and Warping chapter that, although any number of warped Arrangement clips can have the Tempo Master option activated, only the bottom-most, currently playing clip is the actual tempo master.

This also means that it is possible for video clips that are not the current tempo master to become warped, resulting in warped video output in the Video Window.

Warp Markers

While dragging a Warp Marker belonging to a video clip, you will notice that the Video Window updates to show the corresponding video frame, so that any point in the music can be easily aligned with any point in the video clip.

Since Live displays a movie file's embedded QuickTime markers, they can be used as convenient visual cues when setting Warp Markers.

19.3   Matching Sound to Video

In Live, it takes just a few steps to get started with video. Let's look at a common scenario – matching a piece of music to edits or hit points in a video:

1. Make sure that Live's Arrangement View is visible. Your computer keyboard's ⎯⇄⎯ key will toggle between the Session View and Arrangement View.

2. Drag a QuickTime movie from Live's File Browser and drop it into an audio track in the Arrangement View. The Video Window will appear to display the video component of the movie file. (Remember that you can move this window to any convenient location on the screen.)

3. Now that the video clip is loaded, drag an audio clip into the Arrangement View's drop area. A new track will automatically be created for it. Unfold both tracks so you can see their contents by clicking the ⬇ buttons to the left of their names.

4. Double-click on the video clip's title bar to view it in the Clip View. In the Sample box, make sure that the Warp button is enabled. Warped clips in the Arrangement View can be set as tempo master or slave. We want the Master/Slave switch set to *Master*, which will force the rest of the clips in the Live Set to adapt to the video clip's tempo (i.e., its normal playback rate).

5. Now add Warp Markers to the video clip, and adjust them to your liking. The locations of the Warp Markers define the synchronizing points between our music and our video. Notice how the video clip's waveform in the Arrangement View updates to reflect your changes as you make them.

6. If desired, enable the Arrangement Loop to focus on a specific section of the composition.

7. When you have finished, choose the Render to Disk command from Live's File menu. All of your audio will be mixed down and saved as a single audio file, which can then be imported into your chosen video authoring program.

19.4 Video Trimming Tricks

Commonly, composers receive movie files with a few seconds of blank space before the "real" beginning of the action. This pre-roll ("two-beep") serves as a sync reference for the mixing engineer, who expects that the composer's audio files will also include the same pre-roll. While working on music, however, the pre-roll is in the composer's way: It would be

more natural for the movie action to start at song time 1.1.1 and SMPTE time 00:00:00:00. This can be accommodated by trimming video clips, as follows.

First, we drop a movie file at the start of the Arrangement (1.1.1).

A Video Clip at the Start of the Arrangement.

Next, we double-click on the video clip's title bar to display its contents in the Clip View. There, we drag the Start Marker to the right so the video clip starts at the beginning of the action.
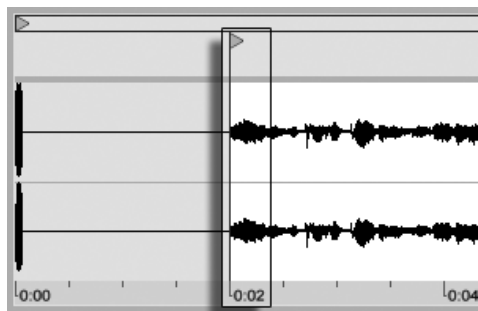

Dragging the Start Marker behind the Pre-Roll.

Now, both the action and the music to be composed start at 1.1.1 / 00.00.00.00. Once the music is done and ready to be rendered to disk, we need to bring back the pre-roll:

In the Arrangement View, we select all materials (Edit menu/Select All), then drag the entire composition a few seconds to the right:
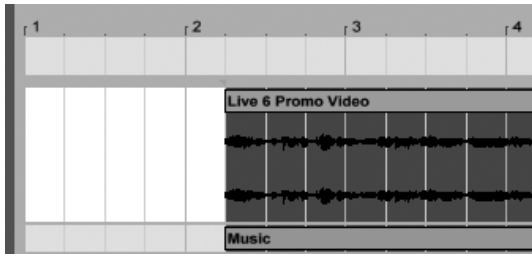
The Video Clip and the Final Clip of Music.

Now, we click on the video clip's title bar (to deselect everything else), then drag the video clip's left edge to the left as far as possible to reveal the pre-roll again.
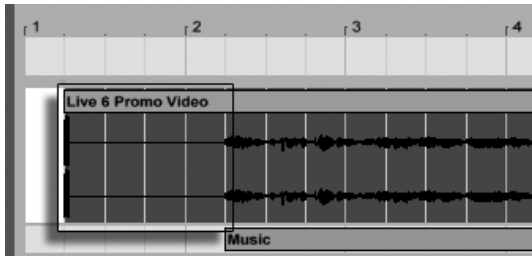
The Video Clip with Pre-Roll Restored.

The Render to Disk command, per default, creates sample files as long as the Arrangement selection; as the video clip is still selected, the exported sample file will have the exact same duration as the original movie file, including the pre-roll.

Chapter 20

Live Audio Effect Reference

Live comes with a selection of custom-designed, built-in audio effects. The "Working with Instruments and Effects" chapter explains the basics of using effects in Live.

20.1   Auto Filter
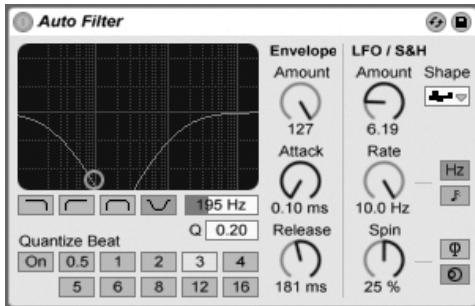
The Auto Filter Effect.

The Auto Filter effect provides classic analog filter emulation. It can be modulated by an envelope follower and/or an LFO to create moving filter effects.

There are four different filter types: lowpass, highpass, bandpass and notch. For each type, the X-Y controller adjusts frequency (to adjust, click and drag on the X-axis) and Q (also called resonance; to adjust, click and drag on the Y-axis). You can also click on the Freq and Q numeric displays and type in exact values.

Low Q values create a broad filter curve, while higher values introduce a narrow, resonant peak to the sound. With bandpass filtering, Q sets the bandwidth of the passed signal.

The Quantize Beat control applies quantized modulation to the filter frequency. With Quantize Beat off, frequency modulation follows the control source. Turning this feature on updates the filter modulation rhythmically with "stepped" changes that track the master tempo. The numbered buttons represent 16th notes, so, for example, selecting "4" as a beat value produces a modulation change once per beat.

The Envelope section controls how the envelope modulation affects the filter frequency. The Amount control defines the extent to which the envelope affects the filter frequency, while the Attack control sets how the envelope responds to rising input signals. Low Attack values cause a fast response to input levels; high values integrate any changes gradually, creating a looser, slower response. Think of it as adding inertia to the response.

Lower Release values cause the envelope to respond more quickly to falling input signals. Higher values extend the envelope's decay.

The Auto Filter also contains a Low Frequency Oscillator to modulate filter frequency in a periodic fashion. The respective Amount control sets how much the LFO affects the filter.

The Rate control specifies the LFO speed. It can be set in terms of hertz, or synced to the song tempo, allowing for controlled rhythmic filtering.

Available LFO waveform shapes are sine (creates smooth modulations with rounded peaks and valleys), square, triangle, sawtooth up, sawtooth down, and sample and hold (generates random positive and negative modulation values) in mono and stereo.

There are two LFOs, one for each stereo channel. The Phase and Offset controls define the relationship between these two LFOs.

Phase keeps both LFOs at the same frequency, but can set the two LFO waveforms "out of phase" with each other, creating stereo movement. Set to "180", the LFO outputs are 180 degrees apart, so that when one LFO reaches its peak, the other is at its minimum.

Spin detunes the two LFO speeds relative to each other. Each stereo channel is modulated at a different frequency, as determined by the Spin amount.

For sample and hold, the Phase and Spin controls are not relevant and do not affect the sound. Instead, the Auto Filter offers two kinds of sample and hold: The upper sample and hold type available in the chooser provides independent random modulation generators for the left and right channels (stereo), while the lower one modulates both channels with the same signal (mono).

20.2 Auto Pan
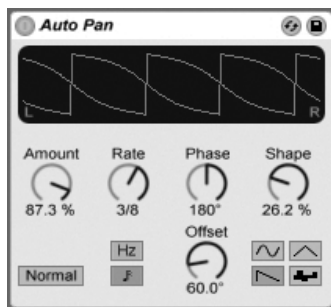
The Auto Pan Effect.

Auto Pan offers LFO-driven manipulation of amplitude and panning for creating automatic panning, tremolo and amplitude modulation, and beat-synchronized chopping effects.

Auto Pan's LFOs modulate the amplitude of the left and right stereo channels with sine, triangle, sawtooth down or random waveforms.

The Shape control pushes the waveform to its upper and lower limits, "hardening" its shape. The waveform can be set to "Normal" or "Invert" (use "Invert" to, for example, create the saw up waveform from the saw down waveform).

LFO speed is controlled with the Rate control, which can be set in terms of hertz. Rate can also be synced to the song tempo.

Though both LFOs run at the same frequency, the Phase control lends the sound stereo movement by offsetting their waveforms relative to each other. Set this to "180", and the

LFOs will be perfectly out of phase (180 degrees apart), so that when one reaches its peak, the other is at its minimum. Phase is particularly effective for creating vibrato effects.

The Offset control shifts the start point of each LFO along its waveform.

The device's influence on incoming signals is set with the Amount control.

20.3   Beat Repeat
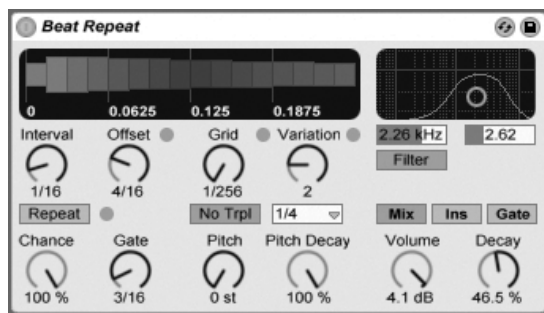
The Beat Repeat Effect.

Beat Repeat allows for the creation of controlled or randomized repetitions of an incoming signal.

The Interval control defines how often Beat Repeat captures new material and begins repeating it. Interval is synced to and set in terms of the song tempo, with values ranging from "1/32" to "4 Bars." The Offset control shifts the point defined by Interval forward in time. If Interval is set to "1 Bar," for example, and Offset to "8/16", material will be captured for repetition once per bar on the third beat (i.e., halfway, or eight-sixteenths of the way, through the bar).

You can add randomness to the process using the Chance control, which defines the likelihood of repetitions actually taking place when Interval and Offset "ask" for them. If Chance is set to 100 percent, repetitions will always take place at the given Interval/Offset time; if set to zero, there will be no repetitions.

Gate defines the total length of all repetitions in sixteenth notes. If Gate is set to "4/16", the repetitions will occur over the period of one beat, starting at the position defined by

Interval and Offset.

Activating the Repeat button bypasses all of the above controls, immediately capturing material and repeating it until deactivated.

The Grid control defines the grid size – the size of each repeated slice. If set to "1/16", a slice the size of one sixteenth note will be captured and repeated for the given Gate length (or until Repeat is deactivated). Large grid values create rhythmic loops, while small values create sonic artifacts. The No Triplets button sets grid division as binary.

Grid size can be changed randomly using the Variation control. If Variation is set to "0", grid size is fixed. But when Variation is set to higher values, the grid fluctuates considerably around the set Grid value. Variation has several different modes, available in the chooser below: Trigger creates variations of the grid when repetitions are triggered; 1/4, 1/8 and 1/16 trigger variations in regular intervals; and Auto forces Beat Repeat to apply a new random variation after each repetition – the most complex form of grid variation in Beat Repeat (especially if triplets are also allowed).

Beat Repeat's repetitions can be pitched down for special sonic effects. Pitch is adjusted through resampling in Beat Repeat, lengthening segments to pitch them down without again compressing them to adjust for the length change. This means that the rhythmical structure can become quite ambiguous with higher Pitch values. The Pitch Decay control tapers the pitch curve, making each repeated slice play lower than the previous one. *Warning:* This is the most obscure parameter of Beat Repeat.

Beat Repeat includes a combined lowpass and highpass filter for defining the passed frequency range of the device. You can turn the filter on and off, and set the center frequency and width of the passed frequency band, using the respective controls.

The original signal (which was received at Beat Repeat's input) is mixed with Beat Repeat's repetitions according to one of three mix modes: Mix allows the original signal to pass through the device and have repetitions added to it; Insert mutes the original signal when repetitions are playing but passes it otherwise; and Gate passes only the repetitions, never passing the original signal. Gate mode is especially useful when the effect is housed in a return track.

You can set the output level of the device using the Volume control, and apply Decay to create gradually fading repetitions.

20.4   Chorus
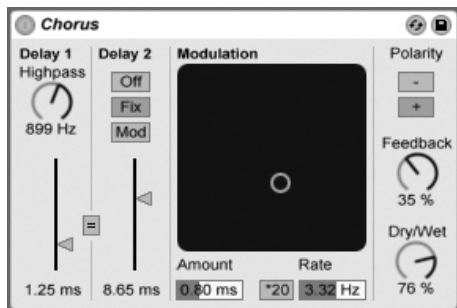
The Chorus Effect.

The Chorus effect uses two parallel time-modulated delays to create chorus (thickening) and flanging effects.

Each delay has its own delay time control, calibrated in milliseconds. Delay 1 has a highpass filter that can remove low frequencies from the delayed signal. Greater highpass values let only very high frequencies pass through to Delay 1.

Delay 2 can switch among three different modes. When off, only Delay 1 is audible. In Fix Mode, only Delay 1's delay time will be modulated. When Mod is activated, Delay 2 will receive the same modulation as Delay 1.

To set both delay lines to Delay 1's delay time, turn on the link button ("="). This is especially useful if you want to change both delays with a single gesture.

The Modulation X-Y controller can impart "motion" to the sounds. To change the modulation rate for the delay times, click and drag along the horizontal axis. To change the amount of modulation, click and drag along the vertical axis.

You can also make changes by entering parameter values in the Amount and Rate fields below the X-Y controller. The Amount value is in milliseconds, while the modulation frequency rate is in Hertz.

Clicking the *20 switch multiplies the modulation frequency by 20 to achieve more extreme sounds.

The Feedback control determines how much of the output signal feeds back into the input,

while the Polarity switch sets (surprise!) the polarity. Polarity changes have the most effect with high amounts of feedback and short delay times.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent when using Chorus in a return track.

20.5   Compressor I
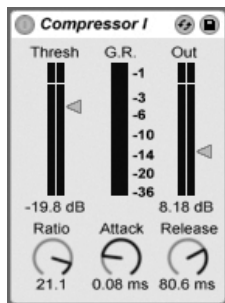
The Compressor I Effect.

A Compressor reduces gain for signals above a user-settable threshold. Compression reduces the levels of peaks, opening up more headroom and allowing the overall signal level to be turned up. This gives the signal a higher average level, resulting in a sound that is subjectively louder and "punchier" than an uncompressed signal.

The two most important parameters are the Threshold and the compression Ratio:

The Threshold slider sets where compression begins. Signals below the threshold are not processed. Signals above the threshold are attenuated by an amount specified by the Ratio parameter, which sets the ratio between the input and output signal. For example, with a compression ratio of 3:1, if a signal above the threshold increases by 3 dB, the compressor output will increase by only 1 dB. If a signal above the threshold increases by 6 dB, then the output will increase by only 2 dB.

The red Gain Reduction meter shows how much the gain is being reduced at any given moment. The more reduction, the more audible the effect; a gain reduction above 6 dB or so might produce the desired loudness, but significantly alters the sound and is easily

capable of destroying its dynamic structure. This is something that cannot be undone in later production steps. Keep this in mind especially when using a compressor, limiter or sound loudness-maximizing tool in the master channel. Less is often more here.

Because compression reduces the volume of loud signals and opens up headroom, you can use the Out slider so that the peaks once again hit the maximum available headroom. The Out meter shows the output signal's level.

A second set of two essential parameters defines how fast a compressor reacts to input-level changes: Attack time and Release time.

Attack defines how long it takes to reach maximum compression once a signal exceeds the threshold, while Release sets how long it takes for the compressor to return to normal operation after the signal falls below the threshold.

A slight amount of attack time (5–10 ms) allows peaks to come through unprocessed, which helps preserve dynamics. If these peaks cause overloads, you can try shortening the attack time, but extremely short times take the "life" out of the signal, and may lead to a slight "buzziness" caused by distortion. Short release times can cause "pumping" as the compressor tries to figure out whether to compress or not; while generally considered an undesirable effect, some engineers use it on full drum kits to give unusual "sucking" effects.

20.6   Compressor II
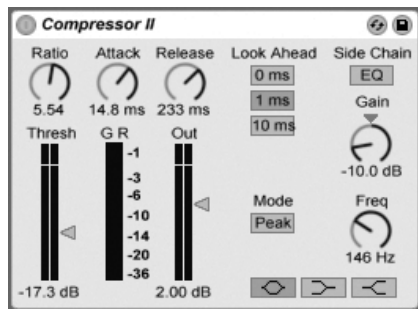
The Compressor II Effect.

Compressor II is a state of the art compression unit – the tool of choice for a wide range of

dynamic processing applications including limiting and loudness maximization. Compressor II's design is a lot more sophisticated and capable than Compressor I's. It includes frequency-selective compression using a sidechain EQ, variable look-ahead times and two response modes, Peak and RMS. Compressor I is still a valuable sound design tool in spite of, or rather because of, its simplicity and roughness, which can add interesting flavors to your sounds.

A compressor can only react to an input signal once it occurs. Since it also needs to apply an attack/release envelope, the compression is always a bit too late. A digital compressor can solve this problem by simply delaying the input signal a little bit. Compressor II offers three different predelay times: zero ms, one ms and ten ms. The results may sound pretty different depending on this setting. Keep in mind that using ten ms of predelay makes the output appear significantly later. You may have to delay other tracks with a Simple Delay in order to stay in sync.

Compressor II can either react to short peaks within a signal or to something that is more related to how people perceive loudness. The parameter for this is the Peak/RMS switch. If you intend to use Compressor II as a limiter in the master section, "Peak" is probably better since it reacts more to the actual signal level, while "RMS" is usually more musical. But as always if it comes to compression, trust your ears and not the meter!

The most exotic feature of Compressor II is the sidechain EQ. The "sidechain" is the part of the signal that is used to control the compressor. Normally the sidechain signal is the same as the input signal. However, it can make sense to apply some filtering here. Imagine a bass drum, a snare and some chords in the background. The bass drum has a pretty high level and it will normally determine how the compressor reacts. If you now turn the side chain EQ on and set its Frequency to 100 Hz and the Gain to -15 dB, the bass drum will not influence the compression anymore and the behavior of the compressor will be very different. You could also set the Frequency to around 1 kHz and turn up the gain to make the compressor more responsive to the snare. Since the EQ is only in the sidechain and not part of the normal signal path, it will not change the sound of the input signal. It only changes how the compressor reacts to different frequencies of the input.

Unlike Compressor I, Compressor II has a built-in compensation stage that counteracts the gain loss due to the compression and makes it much easier to adjust the other parameters.

Careful adjustment of attack and release times is essential when it comes to compression of rhythmical sources. If you are not used to working with compressors, play a drum loop and spend some time adjusting Attack, Release, Threshold and Gain. It can be very exciting!

20.7   Dynamic Tube
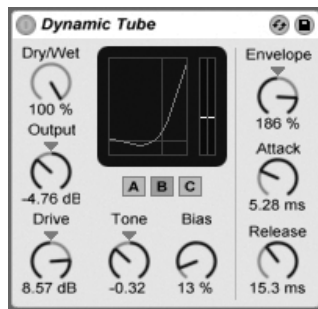
The Dynamic Tube Effect.

The Dynamic Tube effect infuses sounds with the peculiarities of tube saturation. An integrated envelope follower generates dynamic tonal variations related to the level of the input signal.

Three tube models, A, B and C, provide a range of distortion characteristics known from real amplifier tubes. Tube A does not produce distortions if Bias is set low, but will kick in whenever the input signal exceeds a certain threshold, creating bright harmonics. Tube C is a very poor tube amp that produces distortions all the time. The qualities of Tube B lie somewhere between these two extremes.

The Tone control sets the spectral distribution of the distortions, directing them into the higher registers, or through the midrange and deeper.

The Drive control determines how much signal reaches the tube; greater Drive yields a dirtier output. The intensity of the tube is controlled by the Bias dial, which pushes the signal into the celebrated realms of nonlinear distortion. With very high amounts of Bias, the signal will really start to break apart.

The Bias parameter can be positively or negatively modulated by an envelope follower, which is controlled with the Envelope knob. The more deeply the envelope is applied, the more the Bias point will be influenced by the level of the input signal. Negative Envelope values create expansion effects by reducing distortion on loud signals, while positive values will make loud sounds dirtier.

Attack and Release are envelope characteristics that define how quickly the envelope reacts

to volume changes in the input signal. Together, they shape the dynamic nature of the distortions. Note that if Envelope is set to zero, they will have no effect.

Cut or boost the device's final signal level with the Output dial.

20.8   EQ Eight
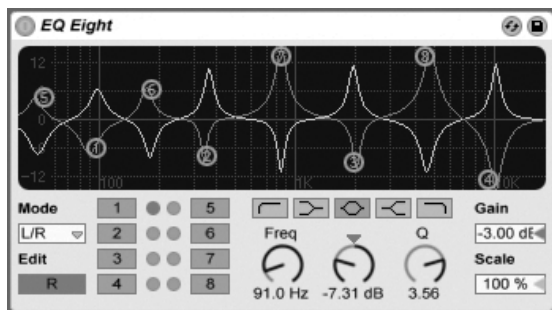
The EQ Eight Effect.

The EQ Eight effect is an equalizer featuring up to eight parametric filters per input channel, useful for changing a sound's timbre. It extends the functionality of the former EQ Four device, and is fully backward-compatible with EQ Four presets.

The input signal can be processed using one of three modes: Stereo, L/R and M/S. Stereo mode uses a single curve to filter both channels of a stereo input equally. L/R mode provides an independently adjustable filter curve for the left and right channels of a stereo input; M/S mode (Mid/Side) provides the same functionality for signals that have been recorded using M/S encoding.

When using the L/R and M/S modes, both curves are displayed simultaneously for reference, although only the active channel is editable. The Edit switch indicates the active channel, and is used to toggle between the two curves.

The filters can switch among five responses:

- High cut (cuts frequencies above the specified frequency);
- High shelf (boosts or cuts frequencies higher than the specified frequency);

- Bell curve (boosts or cuts over a range of frequencies);

- Low shelf (boosts or cuts frequencies lower than the specified frequency);

- Low cut (cuts frequencies below the specified frequency).

Each filter band can be turned on or off independently. Turn off bands that are not in use to save CPU power.

To edit the filter curve, click and drag on the filter dots in the display. Horizontal movement changes the filter frequency, while vertical movement adjusts the filter band's gain. To adjust the filter Q (also called resonance or bandwidth), hold down the [Alt] (PC) / [Alt] (Mac) modifier while dragging the mouse.

You can also use the numbered filter selector buttons to select a band for editing, and then edit parameter values with the Freq, Gain and Q dials (and/or type values into the number fields below each dial).

To achieve really drastic filtering effects, assign the same parameters to two or more filters.

As boosting will increase levels and cutting will decrease levels, use the Gain field to optimize the output level for maximum level consistent with minimum distortion.

The Scale field will attenuate the gain of all filters that support gain (all except high cut and low cut).

20.9   EQ Three
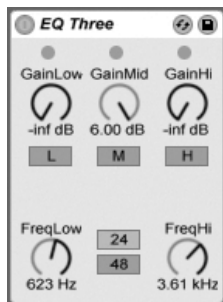
The EQ Three Effect.

If you have ever used a good DJ mixer you will know what this is: An EQ that allows you to adjust the level of low, mid and high frequencies independently.

Each band can be adjusted from -infinite dB to +6 dB using the gain controls. This means that you can completely remove, for example, the bass drum or bassline of a track, while leaving the other frequencies untouched.

You can also turn on or off each band using the On/Off buttons located under the gain controls. These buttons are especially handy if assigned to computer keys.

EQ Three gives you visual confirmation of the presence of a signal in each frequency band using three green LEDs. Even if a band is turned off, you can tell if there is something going on in it. The internal threshold for the LEDs is set to -24 dB.

The frequency range of each band is defined via two crossover controls: FreqLo and FreqHi. If FreqLo is set to 500 Hz and FreqHi to 2000 Hz, then the low band goes from 0 Hz to 500 Hz, the mid band from 500 Hz to 2000 Hz and the high band from 2000 Hz up to what ever your soundcard or sample rate supports.

A very important control is the 24 dB/48 dB switch. It defines how sharp the filters are cutting the signal at the crossover frequency. The higher setting results in more drastic filtering, but needs more CPU.

Note: The filters in this device are optimized to sound more like a good, powerful analog filter cascade than a clean digital filter. The 48 dB Mode especially does not provide a perfect linear transfer quality, resulting in a slight coloration of the input signal even if all controls are set to 0.00 dB. This is typical behavior for this kind of filter, and is part of EQ Three's unique sound. If you need a more linear behavior choose 24 dB Mode or use the EQ Eight.

20.10   Erosion
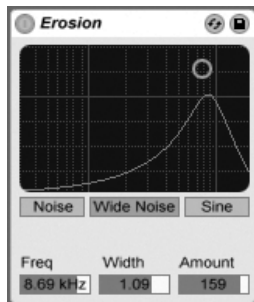
The Erosion Effect.

The Erosion effect degrades the input signal by modulating a short delay with filtered noise or a sine wave. This adds noisy artifacts or aliasing/downsampling-like distortions that sound very "digital."

To change the sine wave frequency or noise band center frequency, click and drag along the X-axis in the X-Y field. The Y-axis controls the modulation amount. If you hold down the Alt (PC) / Alt (Mac) modifier key while clicking in the X-Y field, the Y-axis controls the noise bandwidth.

The Frequency control determines the color, or quality, of the distortion. If the Mode control is set to Noise, this works in conjunction with the Width control, which defines the noise bandwidth. Lower values lead to more selective distortion frequencies, while higher values affect the entire input signal. Width has no effect in Sine Mode.

Noise and Sine use a single modulation generator. However, Wide Noise has independent noise generators for the left and right channels, which creates a subtle stereo enhancement.

20.11 Filter Delay
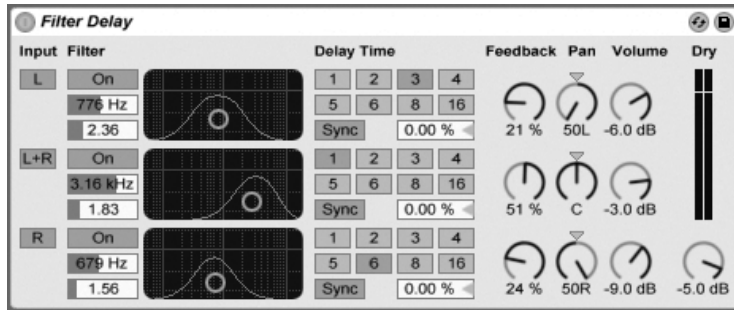
The Filter Delay Effect.

The Filter Delay provides three independent delay lines, each preceded by linked lowpass and highpass filters. This allows applying delay to only certain input signal frequencies, as determined by the filter settings. The feedback from each of the three delays is also routed back through the filters.

Each of the three delays can be switched on and off independently. The Filter Delay device assigns delay 1 to the input signal's left channel, delay 2 to the left and right channels and delay 3 to the right channel. The Pan controls at the right can override the delay channels' outputs; otherwise each delay outputs on the channel from which it derives its input.

Each delay channel's filter has an associated On switch, located to the left of each X-Y controller. The X-Y controllers adjust the lowpass and highpass filters simultaneously for each delay. To edit filter bandwidth, click and drag on the vertical axis; click and drag on the horizontal axis to set the filter band's frequency.

To refer delay time to the song tempo, activate the Sync switch, which allows using the Delay Time beat division chooser. The numbered switches represent time delay in 16th notes. For example, selecting "4" delays the signal by four 16th notes, which equals one beat (a quarter note) of delay. With Sync Mode active, changing the Delay Time field percentage value shortens and extends delay times by fractional amounts, thus producing the "swing" type of timing effect found in drum machines.

If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay time, click and drag up or down in the Delay Time field, or click in the field and type in a

value.

The Feedback parameter sets how much of the output signal returns to the delay line input. Very high values can lead to runaway feedback and produce a loud oscillation – watch your ears and speakers if you decide to check out extreme feedback settings!

Each delay channel has its own volume control, which can be turned up to +12 dB to compensate for drastic filtering at the input.

The Dry control adjusts the unprocessed signal level. Set it to minimum if using Delay in a return track.

20.12   Flanger
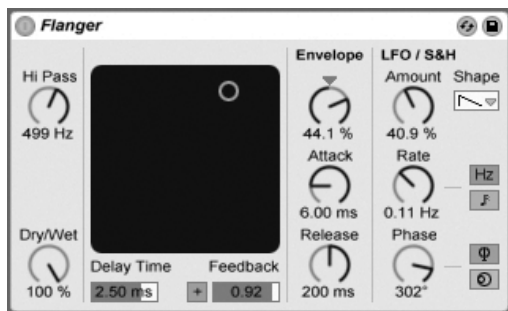
The Flanger Effect.

Flanger uses two parallel time-modulated delays to create flanging effects.

Flanger's delays can be adjusted with the Delay Time control. The Feedback control sends part of the output signal back through the device input, while the Polarity switch ("+" or "-") sets the polarity. Delay Time and Feedback can be changed simultaneously using the effect's X-Y controller.

Periodic control of delay time is possible using the envelope section. You can increase or decrease the envelope amount (or invert its shape with negative values), and then use the Attack and Release controls to define envelope shape.

Flanger contains two LFOs to modulate delay time for the left and right stereo channels.

The LFOs have six possible waveform shapes: sine, square, triangle, sawtooth up, sawtooth down and random. The extent of LFO influence on the delays is set with the Amount control.

LFO speed is controlled with the Rate control, which can be set in terms of hertz. Rate can also be synced to the song tempo and set in meter subdivisions (e.g., sixteenth notes).

The Phase control lends the sound stereo movement by setting the LFOs to run at the same frequency, but offsetting their waveforms relative to each other. Set this to "180", and the LFOs will be perfectly out of phase (180 degrees apart), so that when one reaches its peak, the other is at its minimum.

Spin detunes the two LFO speeds relative to each other. Each delay is modulated at a different frequency, as determined by the Spin amount.

Adjusting the HiPass control will cut low frequencies from the delayed signal.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent if using Flanger in a return track.

20.13 Gate

The Gate Effect.

The Gate effect passes only signals whose level exceeds a user-specified threshold. A gate can eliminate low-level noise that occurs between sounds (e.g., hiss or hum), or shape a sound by turning up the threshold to where it cuts off reverb or delay tails or truncates an instrument's natural decay.

The Threshold slider sets the gate's sensitivity. If the gate is open and passing signal (i.e., the signal exceeds the gate threshold), the green LED lights.

The Floor parameter, located beneath the Threshold fader, can allow attenuating signals below the threshold rather than just cutting them off. If set to -inf dB, a closed gate will mute the input signal. A setting of 0.00 dB means that even if the gate is closed, there is no effect on the signal. Settings in between these two extremes attenuate the input to a greater or lesser degree when the gate is closed.

The Attack time determines how long it takes for the gate to switch from closed to open when a signal goes from below to above the threshold. Very short attack times can produce sharp clicking sounds, while long times soften the sound's attack.

When the signal goes from above to below the threshold, the Hold time kicks in. (Note to tech heads: the gate has hysteresis, so the release occurs about 3 dB lower than the threshold.) After the hold time expires, the gate closes over a period of time set by the Release parameter.

20.14   Grain Delay
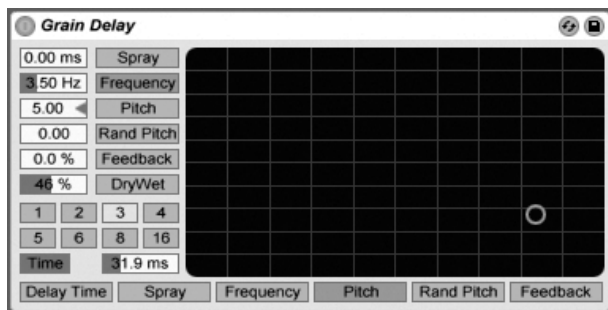
The Grain Delay Effect.

The Grain Delay effect slices the input signal into tiny particles (called "grains") that are then individually delayed and can also have different pitches compared to the original signal source. Randomizing pitch and delay time can create complex masses of sound and rhythm that seem to bear little relationship to the source. This can be very useful in creating new

sounds and textures, as well as getting rid of unwelcome house guests, or terrifying small pets (just kidding!).

To refer delay time to the song tempo, activate the Sync switch, which allows using the Delay Time beat division chooser. The numbered switches represent time delay in 16th notes. For example, selecting "4" delays the signal by four 16th notes, which equals one beat (a quarter note) of delay. With Sync Mode active, changing the Delay Time field percentage value shortens and extends delay times by fractional amounts, thus producing the "swing" type of timing effect found in drum machines.

If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay time, click and drag up or down in the Delay Time field, or click in the field and type in a value.

You can route each parameter to the X-Y controller's horizontal or vertical axis. To assign a parameter to the X-axis, choose it from the parameter row below the controller. To assign a parameter to the Y-axis, use the parameter row on the left side.

The Feedback parameter sets how much of the output signal returns to the delay line input. Very high values can lead to runaway feedback and produce a loud oscillation – watch your ears and speakers if you decide to check out extreme feedback settings!

You can transpose the grain pitch with the Pitch parameter, which acts much like a crude pitch shifter.

The Spray control adds random delay time changes. Low values smear the signal across time, which adds "noisiness" to the sound. High Spray values completely break down the structure of the source signal, introducing varying degrees of rhythmic chaos. This is the recommended setting for anarchists.

The Random Pitch control adds random variations to each grain's pitch. Low values create a sort of mutant chorusing effect, while high values can make the original source pitch completely unintelligible. This parameter can interact with the main Pitch control, thus allowing degrees of stability and instability in a sound's pitch structure.

The size and duration of each grain is a function of the Frequency parameter. The sound of Pitch and Spray depends very much on this parameter.

Grain Delay now also has a dry/wet control; it can be routed to the vertical axis of the X-Y controller.

20.15   Phaser
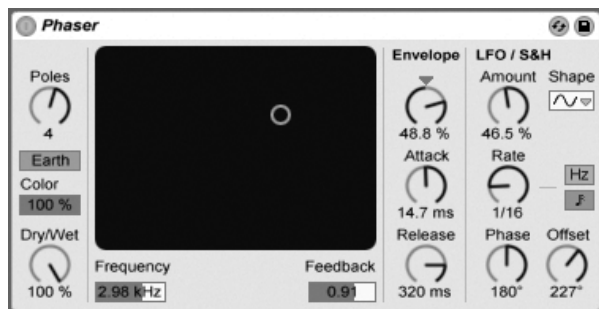
Phaser uses a series of all-pass filters to create a phase shift in the frequency spectrum of a sound.

The Poles control creates notches in the frequency spectrum. The Feedback control can then be used to invert the waveform and convert these notches into peaks (or poles). Filter cutoff frequency is changed with the Frequency control, which can be adjusted in tandem with Feedback using the effect's X-Y controller.

The device has two modes, Space and Earth, for changing the spacing of notches along the spectrum, and hence the "color" of the sound. This effect can be further adjusted with the Color control.

Periodic control of the filter frequency is possible using the envelope section. You can increase or decrease the envelope amount (or invert its shape with negative values), and then use the Attack and Release controls to define envelope shape.

Phaser contains two LFOs to modulate filter frequency for the left and right stereo channels. The LFOs have six possible waveform shapes: sine, square, triangle, sawtooth up, sawtooth down and random. The extent of LFO influence on the filter frequency is set with the Amount control.

LFO speed is controlled with the Rate control, which can be set in terms of hertz. Rate can also be synced to the song tempo and set in meter subdivisions (e.g., sixteenth notes).

The Phase control lends the sound stereo movement by setting the LFOs to run at the same frequency, but offsetting their waveforms relative to each other. Set this to "180", and the

LFOs will be perfectly out of phase (180 degrees apart), so that when one reaches its peak, the other is at its minimum.

Spin detunes the two LFO speeds relative to each other. Each filter frequency is then modulated using a different LFO frequency, as determined by the Spin amount.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent if using Phaser in a return track.

20.16   Ping Pong Delay
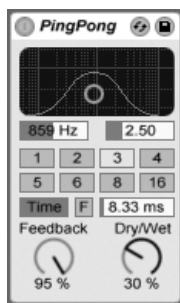
The Ping Pong Delay Effect.

The Ping Pong Delay effect uses a single tapped delay line to create a delay that jumps from the left to the right output.

The delay is preceded by a lowpass and highpass filter that can be controlled with an X-Y controller. To define the filter bandwidth, click and drag on the vertical axis. To set the position of the frequency band, click and drag on the horizontal axis.

To refer delay time to the song tempo, activate the Sync switch, which allows using the Delay Time beat division chooser. The numbered switches represent time delay in 16th notes. For example, selecting "4" delays the signal by four 16th notes, which equals one beat (a quarter note) of delay. This delay time represents the time it takes for the input signal to appear at the left channel. The delay time between the input and the right channel is twice as long.

If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay

time, click and drag up or down in the Delay Time field, or click in the field and type in a value.

The Feedback parameter controls how much of the right channel output signal returns to the delay line input. The feedback loop also includes a filter that can color the feedback sound, thus producing different timbres with successive echoes.

The Freeze button, labeled "F", will cause the delay to endlessly cycle the audio which is in its buffer at the moment that the button is pressed, ignoring any new input until Freeze is disabled.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent if using Ping Pong Delay in a return track.

20.17   Redux

The Redux Effect.

Nostalgic for the famed low-resolution sound quality of the Ensoniq Mirage, Fairlight CMI or Commodore-64 computer? Redux returns us to the Dark Ages of digital by reducing a signal's sample rate and bit resolution.

The Downsample section has two parameters: "Downsample" and a downsample Mode switch.

If the downsample dial is set to "1", every input sample passes to the output and the signal does not change. If set to "2", only every second sample will be processed, so the result sounds a bit more "digital." The higher the number, the lower the resulting sample rate,

and the more "deconstructed" the sound. Downsampling is like applying a mosaic effect to an image: There's a loss of information and sharp edges occur between the blocks.

The Downsample Mode switch defines if the downsampling either interpolates over a smaller range ("soft," down to 20.0 samples) or does not interpolate over a larger range ("hard," down to 200 samples).

Bit Reduction is similar, but while downsampling superimposes a grid in time, bit reduction does the same for amplitude.

If the Bit Reduction amplitude dial is set to 8, amplitude levels are quantized to 256 steps (8 bit resolution). If set to 1, the result is pretty brutal: Each sample contains either a full positive or full negative signal, with nothing in between.

Bit Reduction defines an input signal of 0dB as 16 bit. Signals above 0dB are clipped, and the red overload LED will light up.

Turning off Bit Reduction results in modest CPU savings.

20.18   Resonators
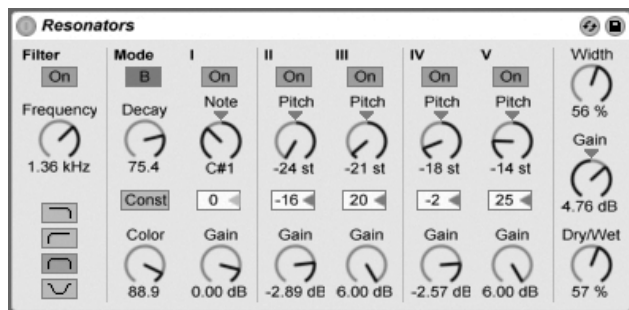
The Resonators Effect.

This device consists of five parallel resonators that superimpose a tonal character on the input source. It can produce sounds resembling anything from plucked strings to vocoder-like effects. The resonators are tuned in semitones, providing a musical way of adjusting them. The first resonator defines the root pitch and the four others are tuned relative to this pitch in musical intervals.

The input signal passes first through a filter, and then into the resonators. There are four input filter types to select from: lowpass, bandpass, highpass and notch. The input filter frequency can be adjusted with the Frequency parameter.

The first resonator is fed with both the left and right input channels, while the second and fourth resonators are dedicated to the left channel, and the third and fifth to the right channel.

The Note parameter defines the root pitch of all the resonators ranging from C1 to C5. It can also be detuned in cents using the Fine parameter. The Decay parameter lets you adjust the amount of time it takes for the resonators to be silent after getting an input signal. The longer the decay time, the more tonal the result will be, similar to the behavior of an undamped piano string. As with a real string, the decay time depends on the pitch, so low notes will last longer than higher ones. The Const switch holds the decay time constant regardless of the actual pitch.

Resonators provides two different resonation modes. Mode A provides a more realistic sounding resonation, while Mode B offers an effect that is especially interesting when Resonator I's Note parameter is set to lower pitches.

The brightness of the resulting sound can be adjusted using the Color control.

All of the resonators have an On/Off switch and a Gain control. A resonator that is turned off does not need CPU. Turning off the first resonator does not affect the other ones.

Resonators II through V follow the Note parameter defined in Resonator I, but they can each be individually transposed +/- 24 semitones using the Pitch controls and detuned in cents using the Detune controls.

The output section features the obligatory Dry/Wet control and a Width parameter that affects only the wet signal and blends the left and right outputs of Resonators II-V into a mono signal if set to zero.

20.19   Reverb
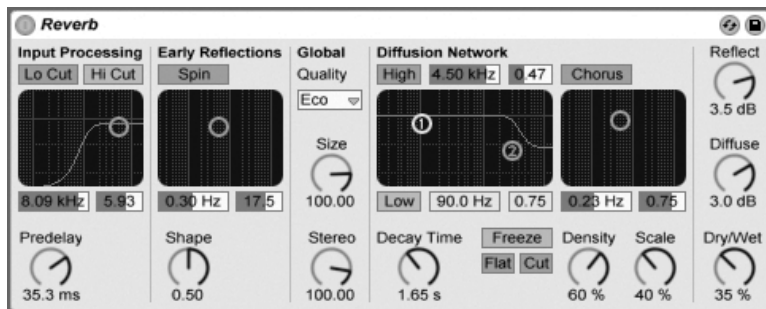
The Reverb Effect.

20.19.1   Input Processing

The input signal passes first through high and low cut filters, whose X-Y controller allows changing the band's center frequency (X-axis) and bandwidth (Y-axis). Either filter may be switched off when not needed to save CPU power.

Predelay controls the delay time, in milliseconds, before the onset of the first early reflection. This delays the reverberation relative to the input signal. One's impression of the size of a real room depends partly on this delay. Typical values for "natural" sounds range from 1ms to 25ms.

20.19.2   Early Reflections

These are the earliest echoes that you hear after they bounce off a room's walls, before the onset of the diffused reverberation "tail." Their amplitude and distribution give an impression of the room's character.

The Shape control "sculpts" the prominence of the early reflections, as well as their overlap with the diffused sound. With small values, the reflections decay more gradually and the diffused sound occurs sooner, leading to a larger overlap between these components. With large values, the reflections decay more rapidly and the diffused onset occurs later. A

higher value can sometimes improve the source's intelligibility, while a lower value may give a smoother decay.

Spin applies modulation to the early reflections. The X-Y control accesses the depth and frequency of these modulations. A larger depth tends to provide a less-colored (more spectrally neutral) late diffusion response. If the modulation frequency is too high, doppler frequency shifting of the source sound will occur, along with surreal panning effects. Spin may be turned off, using the associated switch, for modest CPU savings.

20.19.3   Global Settings

The Quality chooser controls the tradeoff between reverb quality and performance. "Eco" uses minimal CPU resources, while "High" delivers the richest reverberation.

The Size parameter controls the "room's" volume. At one extreme, a very large size will lend a shifting, diffused delay effect to the reverb. The other extreme – a very small value – will give it a highly colored, metallic feel.

The Stereo Image control determines the width of the output's stereo image. At the highest setting of 120 degrees, each ear receives a reverberant channel that is independent of the other (this is also a property of the diffusion in real rooms). The lowest setting mixes the output signal to mono.

20.19.4   Diffusion Network

The Diffusion network creates the reverberant tail that follows the early reflections. The decay time control adjusts the time required for this tail to drop to 1/1000th (-60 dB) of its initial amplitude.

High and low shelving filters provide frequency-dependent reverberation decay. The high-frequency decay models the absorption of sound energy due to air, walls and other materials in the room (people, carpeting and so forth). The low shelf provides a thinner decay. Each filter may be turned off to save CPU consumption.

The Freeze control freezes the diffuse response of the input sound. When on, the reverberation will sustain almost endlessly. Cut modifies Freeze by preventing the input signal from

adding to the frozen reverberation; when off, the input signal will contribute to the diffused amplitude. Flat bypasses the high and low shelf filters when freeze is on. If Flat is off, the frozen reverberation will lose energy in the attenuated frequency bands, depending on the state of the high and low shelving filters.

The Echo Density and Scale parameters provide additional control over the diffusion's density and coarseness, and, when the room size is extremely small, have a large impact on the coloration contributed by the diffusion.

The Chorus section adds a little modulation and motion to the diffusion. Like the Spin section, you can control the modulation frequency and amplitude, or turn it off.

20.19.5   Output

At the reverb output, you can adjust the effect's overall Dry/Wet mix, and vary the amplitude of reflections and diffusion with the Reflect Level and Diffuse Level controls.

20.20   Saturator
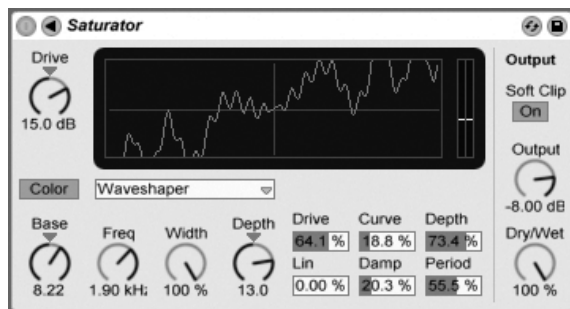
The Saturator Effect.

Saturator is a waveshaping effect that can add that missing dirt, punch or warmth to your sound. It can coat input signals with a soft saturation or drive them into many different flavors of distortion.

An X-Y grid helps to visualize Saturator's shaping curve. The shaper's input and output values are mapped to the X and Y axes, respectively. The curve defines the transfer function, which is the extent to which output values fluctuate in relation to input values. Because this is usually a nonlinear process, the incoming signal is reshaped to a greater or lesser degree depending upon its level at each moment in time.

Incoming signals are first clipped to the dB level set by the Drive control. The meter on the right side of the display shows how much Saturator is influencing the signal.

Signal shaping has six fixed modes: Analog Clip, Soft Sine, Medium Curve, Hard Curve, Sinoid Fold and Digital Clip. There is also the flexible Waveshaper mode, featuring six adjustable waveshaping parameters.

In the Analog Clip and Digital Clip modes, the signal is clipped completely and immediately. Soft Sine, Medium Curve and Hard Curve modes soften signal clipping to varying degrees. Sinoid Fold mode can be good for special effects.

The most dramatic effects can be created by selecting the *Waveshaper* curve, which has its own dedicated set of controls. To access these six parameter fields, unfold the Saturator window by toggling the ◀ button in its title bar.

The Waveshaper mode's six additional parameters are: Drive, Lin, Curve, Damp, Depth and Period.

- *Drive* determines how much the input signal will be influenced by the Waveshaper parameters. Setting Drive to zero will negate the effect entirely.

- *Lin* works together with the Curve and Depth parameters to alter the linear portion of the shaping curve.

- *Curve* adds mostly third-order harmonics to the input signal.

- *Damp* flattens any signal near the grid's origin. It behaves like an ultra-fast noise gate.

- *Depth* controls the amplitude of a sine wave that is superimposed onto the distortion curve.

- *Period* determines the density of ripples in the superimposed sine wave.

Activating the Color button enables two filters. The first of these, controlled with the Base control, dictates how much the effect will be reduced or increased for very low frequencies.

The second filter, essentially an equalizer, is used for controlling higher frequencies. It is shaped with the Freq (cutoff frequency), Width and Depth controls.

The Output control attenuates the level at the device output. When the Soft Clip switch is activated, Saturator will also apply an instance of its "Analog Clip" curve to the output.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent when using Saturator in a return track.

20.21   Simple Delay
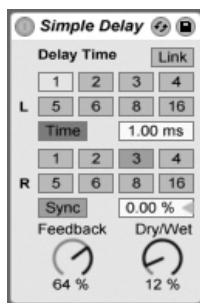
The Simple Delay Effect.

The Simple Delay provides two independent delay lines, one for each channel (left and right).

To refer delay time to the song tempo, activate the Sync switch, which allows using the Delay Time beat division chooser. The numbered switches represent time delay in 16th notes. For example, selecting "4" delays the signal by four 16th notes, which equals one beat (a quarter note) of delay.

If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay time, click and drag up or down in the Delay Time field, or click in the field and type in a value.

The Feedback parameter defines how much of each channel's output signal feeds back into the delay lines' inputs. Internally, they are two independent feedback loops, so a signal on the left channel does not feed back into the right channel and vice versa.

The Dry/Wet control adjusts the balance between the processed and dry signals. Set it to 100 percent when using Simple Delay in a return track.

20.22   Utility

The Utility Effect.

Utility can perform some very useful tasks, especially in combination with other devices.

The Mute button simply silences the incoming signal when enabled. *Note:* The active/mute controls of a track are always placed at the very end of the signal chain. However, since you can place Utility anywhere in a signal chain, you can use its mute function to cut the input of a delay line or reverb without turning off the output of these devices.

The Gain control adjusts the level of the input signal +/- 35 dB.

The Channel Mode chooser allows selective processing of the left and right channels of a sample. If, for example, Left is selected, the right channel is ignored and the left channel appears on both outputs. This is especially useful if you have a stereo file that contains different information on both channels and you want to use only one.

The Panorama chooser pans the signal anywhere in the stereo field. Its main purpose is to individually pan an Instrument or Effect Rack's *parallel device chains*.

The Width control acts as a continuous mono to stereo controller when set from 0 to 100 percent. However, beyond 100 percent the output starts to "fold in" on itself. At 200 percent the output contains only the difference between the left and right channels. If

either Left or Right have been chosen in the Channel Mode chooser, the Width control has no function and is therefore disabled.

At the bottom of the device you will find two Phase controls, one for each channel. As their names imply, they invert the phase of each channel.

20.23   Vinyl Distortion
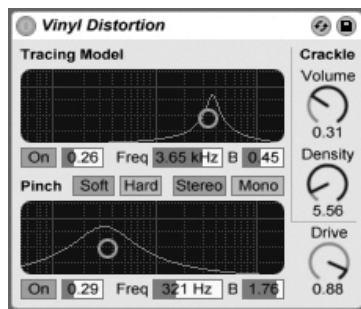
The Vinyl Distortion Effect.

The Vinyl Distortion effect emulates some of the typical distortions that occur on vinyl records during playback. These distortions are caused by the geometric relationships between the needle and the recorded groove. The effect also features a crackle generator for adding noisy artifacts.

The Tracing Model section adds even harmonic distortion to the input signal. Adjust the amount of distortion with the Drive knob, or click and drag vertically in the Tracing Model X-Y display. To adjust the distortion's frequency or "color," drag horizontally in the X-Y display or double-click on the Freq field and type in a value. Holding the [Alt] (PC) / [Alt] (Mac) modifier while dragging vertically in the X-Y display changes the frequency band's Q (bandwidth).

The Pinch Effect section adds odd harmonics to the input signal. These distortions typically occur 180 degrees out of phase, creating a richer stereo image. The Pinch Effect has the same controls as the Tracing Model, but generates a rather different sound.

The Drive control increases or decreases the overall distortion amount created by both the

Tracing Model and Pinch.

There are two distortion modes: Soft and Hard. The Soft Mode simulates the sound of a dub plate, while Hard Mode is more like that of a standard vinyl record.

The stereo/mono switch determines whether the Pinch distortion occurs in stereo or mono. Set it to stereo for realistic simulation of vinyl distortions.

The Crackle section adds noise to the signal, with noise density set by the Density control. The Volume control adjusts the amount of gain applied to the noise.

Chapter 21

Live MIDI Effect Reference

Live comes with a selection of custom-designed, built-in MIDI effects. The "Working with Instruments and Effects" chapter explains the basics of using effects in Live.

21.1 Arpeggiator
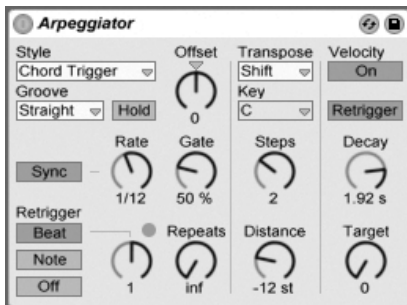
The Arpeggiator Effect.

Live's Arpeggiator effect takes the individual MIDI notes from a held chord (or single note), and plays them as a rhythmical pattern. The sequence and speed of the pattern can be

controlled by the device, which also provides a full complement of both classic and original arpeggiator features.

Arpeggiators are a classic element in Eighties synth music. The name originates with the musical concept of the "arpeggio," in which the notes comprising a chord are played as a series rather than in unison. "Arpeggio" is derived from the Italian word "arpeggiare," which refers to playing notes on a harp.

21.1.1   Style and Rate Sections

Arpeggiator's Style chooser determines the sequence of notes in the rhythmical pattern.

"Up" and "Down".

"UpDown" and "DownUp".

"Down & Up" and "Up & Down".

"Converge" and "Diverge".

"Con & Diverge".

"Pinky Up" and "Pinky UpDown".

"Thumb Up" and "Thumb UpDown".

Play Order places notes in the pattern according to the order in which they are played. This is therefore only recognizable when more than one chord or note has been played.

In addition to the Arpeggiator styles above, there are a number of random styles. Random randomly selects incoming MIDI notes for playback. Random Other creates a random pattern from incoming MIDI notes, and then plays the randomly generated chord repeatedly. Random Once creates a random pattern from incoming MIDI notes and repeats the pattern until it has been transposed or retriggered, at which point a new pattern is created.

Arpeggiator will play the pattern of notes at the speed set by the Rate control, which can be calibrated in either milliseconds or beat-time using the neighboring Sync/Free button. With Sync chosen, Arpeggiator will be synced to the song tempo.

A Gate control to the right of Rate determines the length of notes played by Arpeggiator as a percentage of the current Rate setting. Any setting larger than 100% will therefore play notes that overlap (i.e., are legato).

The rhythmic pattern generated by Arpeggiator does not necessarily have to be straight; patterns can be given groove with the respective control just beneath the Mode chooser. Groove in Arpeggiator works just like it does for clips, so that the intensity of the groove is set in the Control Bar.

With the Hold parameter active, Arpeggiator will continue to play the pattern even after the keyboard keys have been released. The pattern will be repeated until any other key is

pressed. When Hold is active and any of the original keys also remain physically held, notes can be added to the pattern simply by playing them. Notes can also be removed from the pattern in this scenario by playing them a second time, allowing the gradual buildup and rearrangement of the pattern over time.

Tip: If you want the pattern to stop playing, momentarily deactivate Hold.

The Offset parameter shifts the sequence of notes in the pattern by the number of places selected with the control. This is best illustrated with an example: A setting of "1" makes the second note in the pattern play first, and the first note last. If you imagine the pattern as a circle of notes that is played in a clockwise direction from a set start point, the Offset parameter effectively rotates this circle counter-clockwise one note at a time, changing where in the pattern play begins.

With the Repeats parameter, the pattern can be set to repeat a specified number of times until it is retriggered. A setting of "inf" will repeat the pattern indefinitely. *Hint:* This feature provides an excellent way of emulating the strum of a guitar or playing a chord as an arpeggio once or twice. Another interesting effect can be achieved by combining this feature with the Retrigger parameter, which we will explain in a moment. This can be used to create rhythmically generated arpeggios separated by pauses.

The Retrigger parameter resets the pattern so that it starts again from the beginning. Retriggering can be deactivated (Off), set to occur when new notes are pressed (Note) or set to occur at a specified song position or beat-time (Beat). Beat retriggering can be specified in terms of notes or bars and is aligned with song position. An LED in the upper right corner of the section indicates when the pattern has been retriggered.

21.1.2   Transposition and Velocity Sections

The pattern generated by Arpeggiator can be transposed; the device's transposition controls allow forcing this transposition into a specific major or minor key or (using the Transpose chooser's Shift option) doing it in semitones. The distance between transposition steps is set in scale intervals (for Major and Minor transposition) or semitones (for Shift transposition) with the Distance control. Using the Steps parameter, you can choose the number of times the sequence is transposed: A setting of 8 will transpose the sequence a total of eight times, playing it in higher notes each time.

The dynamics of Arpeggiator are controlled using the velocity section. With Velocity set to "On" and Target set to 0, for example, the sequence will gradually fade out, eventually reaching 0 velocity. The Decay control sets the amount of time Arpeggiator takes to reach the Target velocity. With Retrigger activated, retriggering of the sequence will also retrigger the velocity slope.

Tip: The velocity section's Retrigger option can be used in conjunction with Beat retriggering to add rhythm to the dynamic slope.

21.2   Chord
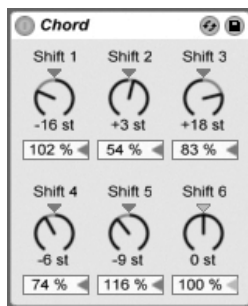
The Chord Effect.

This effect assembles a chord, as the name implies, from each incoming note and up to six others of user-defined pitch. The Shift 1-6 knobs allow selecting the pitch of the notes that contribute to the chord from a range of +/- 36 semitones relative to the original. Setting Shift 1 to +4 semitones and Shift 2 to +7 semitones, for example, yields a major chord in which the incoming note is the root.

The Velocity control beneath each Shift knob makes further harmonic sculpting possible, given that the instrument allows for changes in volume or timbre as function of velocity. It is a relative control, with a range of 1 to 200 percent (100 percent defined as playing at a velocity equal to that of the incoming MIDI note). Use the Velocity controls to do anything from adding slight overtones to washing out most of the other chord elements.

The order in which pitches are added to the chord is inconsequential: The effect of a +12 semitone shift added with the Shift 1 control, for example, is equal in effect to a +12

semitone shift added with the Shift 6 control.

Note that no two notes of the same pitch can contribute to the chord, and that selecting the same shift value twice (e.g., +8 semitones on both Shift 2 and Shift 3) will result in the latter control appearing disabled, indicating that it is a duplicate and therefore not in use. Actually, there is no such thing as two notes with the same pitch playing at the same time within the entire Live universe.

21.3   Note Length
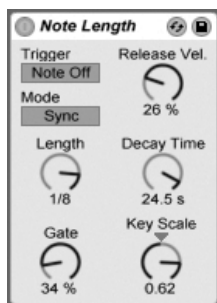
The Note Length Effect.

Note Length alters the length of incoming MIDI notes. It can also be used to trigger notes from MIDI Note Off messages, instead of the usual Note On messages.

When the device is set to trigger from a Note On message, only the timing controls are available. The length of held notes can be adjusted in milliseconds or synced in relation to the song tempo. Gate defines the percentage of the Length value that notes should be held for. At 200 percent, the Gate parameter will double a note's length.

When the device is set to trigger from a Note Off event (the moment at which a played note is released), the timing of an incoming note will be delayed by its length (because it will be *starting* at the point at which it would have been *stopping*). Note Length's other settings will then determine the duration of the newly triggered note.

Three other parameters are available when the device is triggering from Note Off messages:

On/Off Balance – This determines the velocity of the output note. It is a balance between the incoming note's Note On and Note Off velocities. If your MIDI keyboard does not support MIDI Note Off velocity, you can just set this to zero.

Decay Time – This is the time needed for an incoming note's velocity to decay to zero. The decay begins immediately from the moment the device receives a MIDI Note On message. The value at the time of Note Off will become the velocity of the output MIDI note.

Key Scale – The pitch of incoming notes can be used to alter the length of the output notes. With positive values, notes below C3 will be made progressively longer, and notes above C3 will be made shorter. Negative values will invert this relationship.

21.4   Pitch

The Pitch Effect.

Pitch is a transposition tool that changes incoming note pitch by +/- 48 semitones.

The Range and Lowest controls act together to define a pitch range through which notes are allowed to pass. Notes outside of the defined pitch range will be blocked, and the effect's LED light will flash when this happens.

Notes outside of the pitch range are limited based on their untransposed pitch, prior to the transposition stage of the effect.

21.5   Random
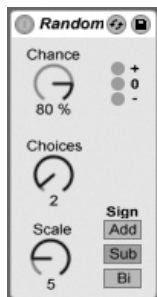
The Random Effect.

Random adds an element of the unknown to the otherwise commonplace pitch parameter. The Chance control defines the likelihood that an incoming note's pitch will be changed by a random value. You can think of it as being something like a dry/wet control for randomness.

The random value that determines the pitch change is created by two variables: The Choices control defines the number of different random notes possible, from a range of 1 to 24; the Scale control value is multiplied by the Choices control value, and the result dictates the pitches that random notes are allowed to have relative to that of the incoming note.

For example, with Chance set to 50 percent, Choices set to 1 and Scale set to 12, half of the resulting notes will play at the original pitch and half will play 12 semitones higher. But, with Chance set to 50 percent, Choices set to 12 and Scale set to 1, half of the resulting notes will play at the original pitch and half will play at one of any that are 12 semitones higher.

These examples assume that the Sign buttons are set to "Add." The Sign controls decide whether the random alteration adds to the original note's pitch, subtracts from it, or does a little of both. The LEDs below the Sign controls give you a visual idea of how output pitch compares with that of the original.

Hint: Try using the *Scale* effect after Random to obtain random values within a specific harmonic range.

21.6 Scale
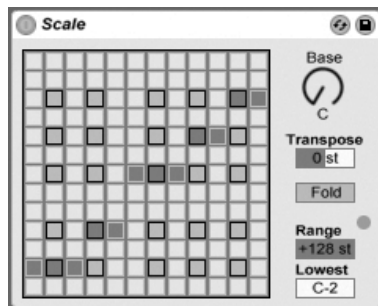
The Scale Effect.

Scale alters incoming note pitch based on a scale mapping. Each incoming note is given an outgoing equivalent on the X-Y scale map of the effect: All incoming Cs, for example, might be converted to outgoing Ds.

The X-Y scale map is 12 squares in length and width, corresponding to the 12 notes in a full octave. Darker squares represent the black keys on a keyboard. The base of the diagonal scale (the lower left square) shown on the map can be changed using the Base control. The X-axis of the map shows incoming note values, and the Y-axis their outgoing equivalents. Use mouse-clicks to move or delete the yellow squares, which define where an incoming note will be sent on the scale. (Deleting a note on the scale map means that it will no longer play.)

The Range and Lowest controls work together to define the note range within which scale mapping will take effect. Outside of the range defined by these controls, the Scale effect will be inapplicable, and the LED light will flash to indicate that some notes are not being processed by the effect, but are playing at their unaltered pitch.

21.7   Velocity
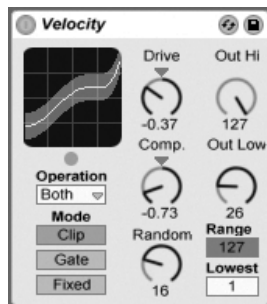
Velocity re-maps the 127 MIDI note velocity values. It can function on MIDI Note On or Note Off messages, or both, depending on the setting of the Operation chooser.

The Out Low and Out Hi knobs control the outgoing velocity (from 1 to 127), which is represented by the Y-axis of the X-Y display. Incoming velocities that are shown in the display are within the range chosen by the Range and Lowest controls, and are represented on the X-axis. The resulting curve shows how velocity is being altered by the effect.

If *Lowest* and *Out Low* are both set to zero, and *Range* and *Out Hi* are set to 127, the display will show a straight diagonal line that indicates the equivalent of an effect bypass: Softly played notes are being output quietly and vice versa. If instead, *Out Hi* is set to zero and *Out Low* to 127, the slope of the line will be reversed, and softly played notes will actually produce the loudest output.

What happens to incoming notes that are outside of the range set with the Range and Lowest controls? This depends on which Mode is selected. Clip Mode does just what it says: It clips incoming note velocities so that they stay within the range. Gate Mode removes incoming notes altogether if their velocities are outside of the range. You will see the little LED below the X-Y display flash when a note is blocked by gating. In Fixed Mode, the Out Hi velocity defines all outgoing note velocities, regardless of incoming note velocity.

The Random function adds or subtracts a random value to the all velocities, and is represented by a gray area on the display curve.

The Drive and Compand controls can be combined to create more complex curves. Com-

pand is a simultaneous expanding and compressing tool. When set to values greater than zero, it forces incoming notes to the outer boundaries of the curve, making them play either loudly or softly. Compand values of less than zero, on the other hand, force outgoing velocity toward the mid-range. Drive pushes all values in the curve to the outer extremes. Use these two controls together to sculpt or even redefine the dynamic structure of a piece.

Chapter 22

Live Instrument Reference

Live comes with a selection of custom-designed, built-in instruments. The "Working with Instruments and Effects" chapter explains the basics of using instruments in Live.

The boxed version of Live 6 ships with the *Essential Instrument Collection,* a multi-gigabyte library of meticulously sampled and selected instruments ready for use in either Simpler or our newest add-on instrument, Sampler. Learn how to access the EIC sounds at the end of this chapter.

22.1 Impulse
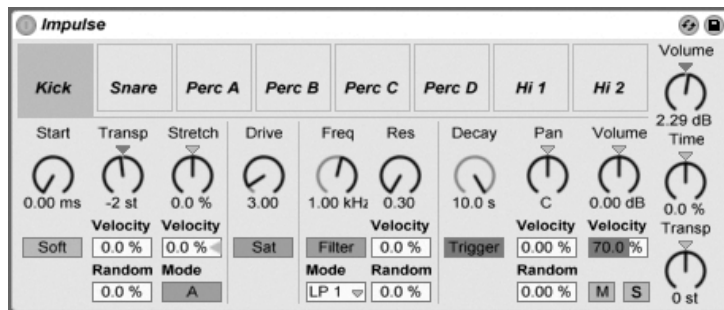
The Impulse Instrument.

Impulse is a drum sampler with complex modulation capabilities. The eight drum samples loaded into Impulse's sample slots can be time-stretched, filtered and processed by envelope, saturation, pan and volume components, nearly all of which are subject to random and velocity-based modulation.

22.1.1 Sample Slots

Drag and drop samples into any of Impulse's sample slots from the Browser or the Session and Arrangement Views. Alternatively, each sample slot features a Hot-Swap button for hot-swapping samples. Loaded samples can be deleted with your computer keyboard's ⌫ or Delete key.

Imported samples are automatically mapped onto your MIDI keyboard, providing that it is plugged in and acknowledged by Live. C3 on the keyboard will trigger the leftmost sample, and the other samples will follow suit in the octave from C3 to C4. Impulse's eight slots will appear labeled in the MIDI Editor's key tracks when the Fold button is active, even if the given key track is void of MIDI notes. Mapping can be transposed from the default by applying a Pitch device, or it can be rearranged by applying a Scale device.

Each of the eight samples has a proprietary set of parameters, located in the area below the sample slots and visible when the sample is clicked. Adjustments to sample settings are only captured once you hit a new note – they do not affect currently playing notes. Note that

this behavior also defines how Impulse reacts to parameter changes from clip envelopes or automation, which are applied once a new note starts. If you want to achieve continuous changes as a note plays, you may want to use the Simpler.

Slot 8's parameters also include a Link button, located in the lower left corner, which links slot 8 with slot 7. Linking the two slots allows slot 7's activation to stop slot 8's playback, and vice versa. This was designed with a specific situation in mind (but can, of course, be used for other purposes): Replicating the way that closed hi-hats will silence open hi-hats.

Each slot can be played, soloed, muted or hot-swapped using controls that appear when the mouse hovers over it.

22.1.2   Start, Tune and Stretch

The Start control defines where Impulse begins playing a sample, and can be set up to 100 ms later than the actual sample beginning. The Transposition control adjusts the transposition of the sample by +/- 48 semitones, and can be modulated by incoming note velocity or a random value, as set in the appropriate fields.

The Stretch control has values from -100 to 100 percent. Negative values will shorten the sample, and positive values will stretch it. Two different stretching algorithms are available: Mode A is ideal for low sounds, such as toms or bass, while Mode B is better for high sounds, such as cymbals. The Stretch value can also be modulated by MIDI note velocity.

22.1.3   Filter

The Filter section offers a broad range of filter types, each of which can impart different sonic characteristics onto the sample by removing certain frequencies. The Frequency control defines where in the harmonic spectrum the filter is applied; the Resonance control boosts frequencies near that point. Filter Frequency can be modulated by either a random value or by MIDI note velocity.

22.1.4   Saturator and Envelope

The Saturator gives the sample a fatter, rounder, more analog sound, and can be switched on and off as desired. The Drive control boosts the signal and adds distortion. Coincidentally, this makes most signals much louder, and should usually be compensated for by lowering the sample's volume control. Extreme Drive settings on low-pitched sounds will produce the typical, overdriven analog synth drum sounds.

The envelope can be adjusted using the Decay control, which can be set to a maximum of 60 seconds. Impulse has two decay modes: Trigger Mode allows the sample to decay with the note; Gate Mode forces the envelope to wait for a note off message before beginning the decay. This mode is useful in situations where you need variable decay lengths, as is the case with hi-hat cymbal sounds.

22.1.5   Pan and Volume

Each sample has Volume and Pan controls that adjust amplitude and stereo positioning, respectively. Both controls can be modulated: Pan by velocity and a random value, and Volume by velocity only.

22.1.6   Global Controls

The parameters located to the right of the sample slots are global controls that apply to all samples within Impulse's domain. Volume adjusts the overall level of the instrument, and Pitch adjusts the transposition of all samples. The Time control governs the time-stretching and decay of all samples, allowing you to morph between short and stretched drum sounds.

22.1.7   Individual Outputs

When a new instance of Impulse is dragged into a track, its signal will be mixed with those of the other instruments and effects feeding the audio chain of the track. It can oftentimes make more sense to isolate the instrument or one of its individual drum samples, and send

this signal to a separate track. Please see the Routing chapter to learn how to accomplish this for Impulse's overall signal or for Impulse's individual sample slots.

22.2 Operator
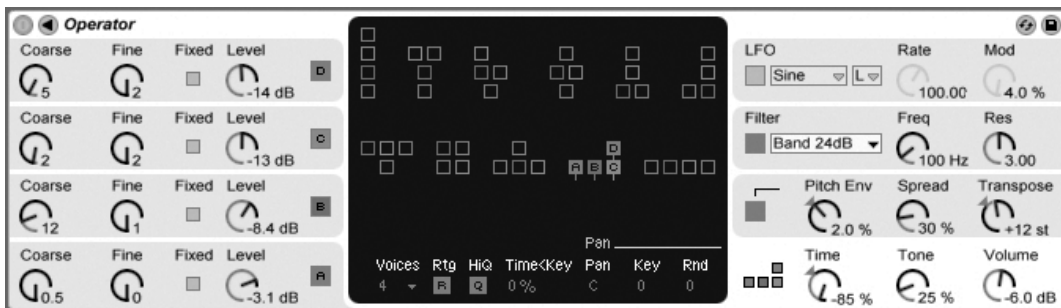
The Operator Instrument.

Operator is an advanced and flexible synthesizer that combines the concept of "frequency modulation" (FM) with classic subtractive synthesis. It utilizes four multi-waveform oscillators that can modulate each other's frequencies, creating very complex timbres from a limited number of objects. Operator includes a filter section, an LFO and global controls, as well as individual envelopes for the oscillators, filter, LFO and pitch.

The full version of Operator is not included with the standard version of Live, but is a special feature available for purchase separately. For details, please visit the Ableton webshop[1], where you will be offered the opportunity to buy Operator online. Once you have purchased Operator, you will need to unlock it before using it, as described in the chapter on unlocking.

22.2.1 General Overview

The interface of Operator consists of two parts: the *display* surrounded on either side by the *shell*. The shell offers the most important parameters in a single view and is divided into eight sections. On the left side, you will find four oscillator sections, and on the right side

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[1]http://www.ableton.com/shop

from top to bottom, the LFO, the filter section, the pitch section and the global parameters. If you change one of the shell parameters, the display in the center will automatically show the details of the relevant section. When creating your own sounds, for example, you can conveniently access the level and frequency of all oscillators at once via the shell, and then adjust each individual oscillator's envelope, waveform and other parameters in its display.

Operator can be folded with the triangular button at its upper left. This is convenient if you do not need to access the display details.
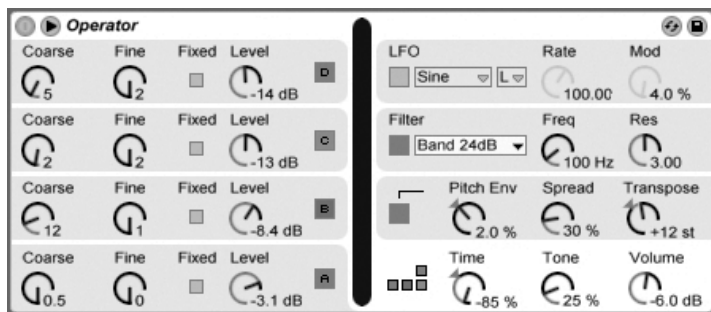
Operator Folded.

Each of Operator's oscillators can either output its signal directly or use its signal to modulate another oscillator. Operator offers eleven predefined *algorithms* that determine how the oscillators are connected. An algorithm is chosen by clicking on one of the structure icons in the global display, which will appear if the bottom right (global) section of the shell is selected. Signals will flow from top to bottom between the oscillators shown in an algorithm icon.
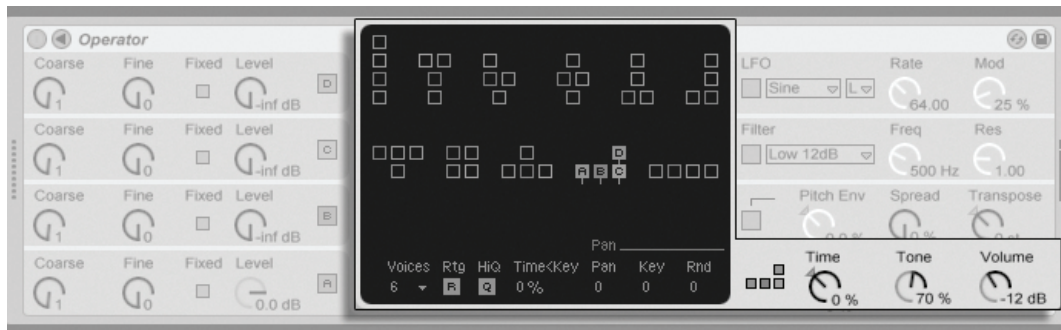
Operator's Global Display.

Typically, FM synthesis makes use of pure sine waves, creating more complex waveforms via modulation. However, in order to simplify sound design and to create a wider range of possible sounds, we designed Operator to produce a variety of other waveforms, including noise. The instrument is made complete with an LFO, a pitch envelope and a filter section. Note that lots of "classic" FM synthesizers create fantastic sounds without using filters at all, so we suggest exploring the possibilities of FM without the filter at first, and adding it later if necessary.

Operator will keep you busy if you want to dive deep into sound design! If you want to break the universe apart completely and reassemble it, you should also try modulating Operator's controls with clip envelopes or track automation.

22.2.2 Oscillator Section and Aliasing
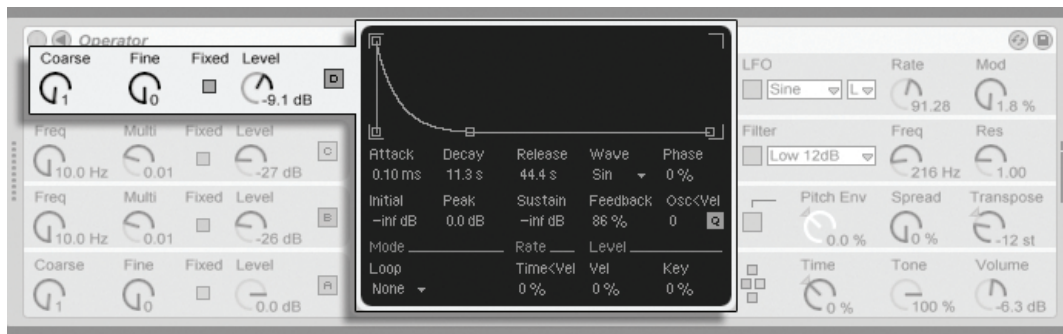
Oscillator D's Display and Shell Parameters.

The oscillators can basically play back five waveform types – sine, square, sawtooth, triangle and noise – as chosen from the Wave chooser in the individual oscillator displays. The first of these waveforms is a pure, mathematical sine wave, which is usually the first choice for many FM timbres. Since FM synthesis has a long tradition in hardware synthesizers, we added some variations of the pure sine wave that allow for more realistic modeling of vintage digital synthesizers. The differences between these sine waves are very subtle, and whether or not they are audible is highly dependent upon the individual sound. We also added "Sine 4 Bit" and "Sine 8 Bit" to provide the retro sound adored by C64 fans, and "Saw D" and "Square D" digital waveforms, which are especially good for digital bass sounds. Another special case is the noise waveform. This is not real noise, generated by a random generator,

but a looping noise sample. For more "statistical" noise, one could modulate the noise oscillator with another oscillator, or with real noise from the LFO. The square, triangle and sawtooth waveforms are resynthesized approximations of the ideal shape. The numbers included in the displayed name (e.g., "Square 6") define how many harmonics are used for the resynthesis. Lower numbers sound mellower and are less likely to create *aliasing* when used on high pitches.

Hint: Oscillator waveforms can be copied and pasted from one oscillator to another using the 🖱 (PC) / Ctrl 🖱 (Mac) context menu.

Aliasing distortion is a common side effect of all digital synthesis and is the result of the finite sample rate and precision of digital systems. It mostly occurs at high frequencies. FM synthesis is especially likely to produce this kind of effect, since one can easily create sounds with lots of high harmonics. This also means that more complex oscillator waveforms, such as "Saw 32," tend to be more sensitive to aliasing than pure sine waves. Aliasing is a two-fold beast: A bit of it can be exactly what is needed to create a cool sound, yet a bit too much can make the timbre unplayable, as the perception of pitch is lost when high notes suddenly fold back into arbitrary pitches. The Tone parameter in the global section allows for controlling aliasing. Its effect is sometimes similar to a lowpass filter, but this depends on the nature of the sound itself and cannot generally be predicted. If you want to familiarize yourself with the sound of aliasing, turn Tone up fully and play a few very high notes. You will most likely notice that some notes sound completely different from other notes. Now, turn Tone down and the effect will be reduced, but the sound will be less bright.

The frequency of an oscillator can be adjusted in the shell with its Coarse and Fine controls. An oscillator's frequency usually follows that of played notes, but for some sounds it might be useful to set one or more oscillators to fixed frequencies. This can be done for each individual oscillator by activating the Fixed option. This allows the creation of sounds in which only the timbre will vary when different notes are played, but the tuning will stay the same. Fixed Mode would be useful, for example, in creating live drum sounds. Fixed Mode also allows producing very low frequencies down to 0.1 Hz. Note that when Fixed Mode is active, the frequency of the oscillator is controlled in the shell with the Frequency (Freq) and Multiplier (Multi) controls.

Operator includes a special Osc<Vel control for each oscillator that allows altering frequency as a function of velocity. This feature can be very useful when working with sequenced sounds in which the velocity of each note can be adjusted carefully. Part of this functionality

is the adjacent quantize control. If this control is activated, the frequency will only move in whole numbers, just as if the Coarse control were being manually adjusted. If quantize is not activated, the frequency will be shifted in an unquantized manner, leading to detuned or inharmonic sounds (which very well could be exactly what you want...).

The amplitude of an oscillator depends on the Level setting of the oscillator in the shell and on its envelope, which is shown in its display and can be adjusted from there. It can also be modified by note velocity and note pitch with the Level<Vel and Level<Key parameters available in the lower portion of each oscillator's display.

The phase of each oscillator can be adjusted using the Phase control in its display.

As explained earlier oscillators can modulate each other when set up to do so with the global display's algorithms. Oscillator D can also modulate itself, via the Feedback parameter available in its display. When an oscillator is modulating another oscillator, two main properties define the result: the amplitude of the modulating oscillator and the frequency ratio between both oscillators.

22.2.3   LFO Section
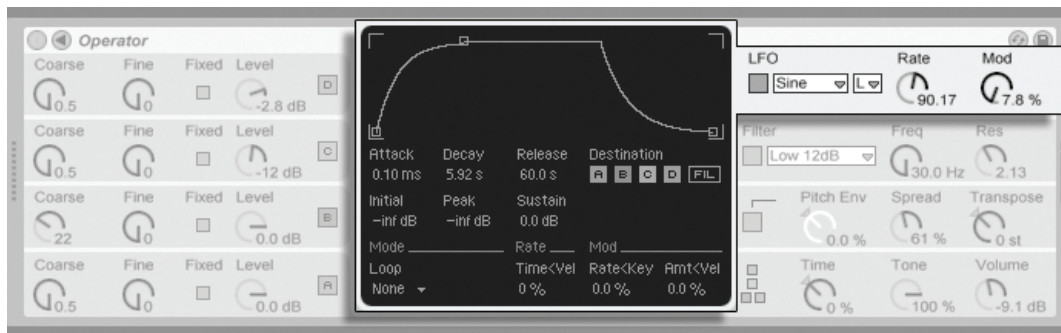
Operator's LFO Parameters.

The LFO in Operator can practically be thought of as a fifth oscillator. It runs at audio rates, and it modulates the frequency of the other oscillators. It is possible to switch modulation by the LFO on or off for each individual oscillator (and the filter) using the Destination buttons in the LFO's display. The LFO can also be turned off if it is unused.

The LFO offers a choice of classic LFO waveforms, sample and hold (S&H), and noise. Sample and hold uses random numbers chosen at the rate of the LFO, creating the random steps useful for typical retro-futuristic sci-fi sounds. The noise waveform is simply bandpass-filtered noise.

Tip: FM synthesis can be used to create fantastic percussion sounds, and using the LFO with the noise waveform is the key to great hi-hats and snares.

The frequency of the LFO is determined by the LFO Rate control in the shell, as well as the low/high setting of the adjacent LFO Range switch. The frequency of the LFO can follow note pitch, be fixed or be set to something in between. This is defined by the Rate<Key parameter in the LFO's display.

The intensity of the LFO is set by the LFO Mod control in the shell. This parameter can be modulated by note velocity via the display's Amt<Vel control. The LFO's intensity is also affected by its envelope.

22.2.4   Envelopes

Operator has seven envelopes: one for each oscillator, a filter envelope, a pitch envelope and an envelope for the LFO. All envelopes are constructed similarly and feature some special looping modes.

An envelope's shape is defined by six parameters: three rates and three levels. A rate is the time it takes to go from one level to the next. For instance, a typical pad sound starts with the *initial* level "-inf dB" (which is silence), moves with an *attack* rate to its *peak* level, moves from there to the *sustain* level with a *decay* rate, and then finally, after note-off occurs, back to "-inf dB" at the *release* rate. Operator's display provides a good overview of the actual shape of any particular envelope and lets you directly adjust the curve by clicking on a breakpoint and dragging. The breakpoints retain their selection after clicking, allowing them to be adjusted with the keyboard's cursor keys, if desired.

Hint: Envelope shapes can be copied and pasted from one place to another in Operator using the 🖱 (PC) / Ctrl 🖱 (Mac) context menu.

With FM synthesis, it is possible to create spectacular, endless, permuting sounds; the key to doing this is *looping envelopes*. Loop Mode can be activated in the lower left corner of

the display. If an envelope in Operator is in Loop Mode and reaches sustain level while the note is still being held, it will be retriggered. The rate for this movement is defined by the Loop Time parameter. (Note that envelopes in Loop Mode can loop very quickly and can therefore be used to achieve effects that one would not normally expect from an envelope generator.)

While Loop Mode is good for textures and experimental sounds, Operator also includes Beat and Sync Modes, which provide a simple way of creating rhythmical sounds. If set to Beat Mode, an envelope will restart after the beat time selected from the Repeat chooser. In Beat Mode, the repeat time is defined in fractions of song time, but notes are not quantized. If you play a note a bit out of sync, it will repeat perfectly but stay out of sync. In Sync Mode however, the first repetition is quantized to the nearest 16th note and, as a result, all following repetitions are synced to the song tempo. Note that Sync Mode only works if the song is playing, and otherwise it will behave like Beat Mode.

Note: To avoid the audible clicks caused by restarting from its *initial level*, a looped envelope will restart from its *actual level* and move with the set attack rate to peak level.

The rates of all the envelopes in Operator can be scaled in unison by the Time control in the global section of the shell. Note that beat-time values in Beat and Sync Modes are not influenced by the global Time parameter. Envelope rates can be further modified by note pitch, as dictated by the Time<Key parameter in the global section's display. The rate of an individual envelope can also be modified by velocity using the Time<Vel parameter. These modulations in conjunction with the loop feature can be used to create very, very complex things...

The pitch envelope can be turned on or off for each individual oscillator and for the LFO using the Destination A-D and LFO buttons in its display. It can also be turned off altogether via the pitch section of the shell. The pitch envelope amount is adjusted with the adjacent Pitch Env control.

Tip: If the pitch envelope is only applied to the LFO and is looping, it can serve as another LFO, modulating the rate of the first. And, since the envelope of the LFO itself can loop, it can serve as a third LFO modulating the intensity of the first!

22.2.5   Filter Section
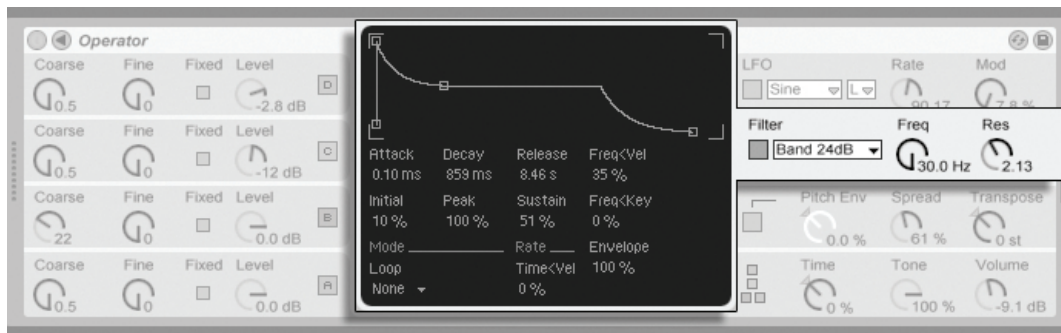
Operator's Filter Section.

As mentioned earlier, the filters are not the main focus of this instrument. However, they can be very useful for modifying the sonically rich timbres created by the oscillators. And, since the oscillators also provide you with the classic waveforms of analog synthesizers, you can very easily build a subtractive synthesizer with them.

The filter section offers lowpass, bandpass, highpass and notch filters, each with the choice of 12 dB or 24 dB slopes. The 24 dB modes attenuate the filtered frequencies to a much greater degree, and are commonly used in the creation of bass patches.

Filter cutoff frequency and resonance can be adjusted in the shell. Filter frequency can also be modulated by note velocity, note pitch, the LFO and the filter envelope. The Freq<Vel, Freq<Key and Envelope controls in the filter's display set these three functions, respectively.

22.2.6   Global Controls

The maximum number of Operator voices (notes) playing simultaneously can be adjusted with the Voices parameter in the global display. Ideally, one would want to leave this setting high enough so that no voices would be turned off while playing, however a setting between 6 and 12 is usually more realistic when considering CPU power.

Tip: Some sounds should play monophonically by nature, which means that they should only use a single voice. (A flute is a good example.) In these cases, you can set Voices to 1. If Voices is set to 1, another effect occurs: Overlapping voices will be played legato, which

means that the envelopes will not be retriggered from voice to voice, and only pitch will change.

A high quality setting (HiQ) can be switched on and off in the global display, controlling the interpolation algorithm of the oscillators and LFO. This setting will affect the sound of some waveforms more than others (especially the noise waveform) and also affects CPU resources.

Global Volume and Transpose controls for the instrument can be found in the global section of the shell, and a Pan control is located in the global section's display. Pan can be modulated by a random factor or by note pitch, using the adjacent Rnd and Key controls, respectively.

MIDI pitch bend messages will affect Operator as defined by the PB Range control in the pitch section of the display.

22.2.7   Glide and Spread
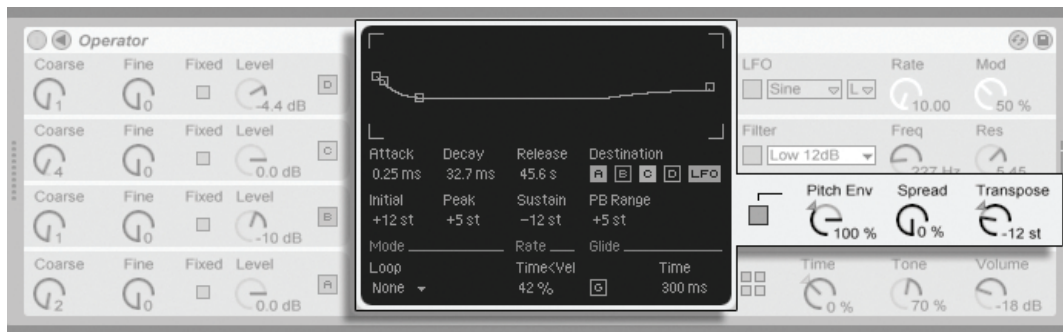
Operator's Pitch Section.

Operator includes a polyphonic glide function. When this function is activated, new notes will start with the pitch of the last note played and then slide gradually to their own played pitch. Glide can be turned on or off and adjusted with the Glide Time control in the pitch display.

Operator also offers a special Spread parameter that creates a rich stereo chorus by using two voices per note and panning one to the left and one to the right. The two voices are detuned, and the amount of detuning can be adjusted with the Spread control in the pitch section of the shell.

Tip: Whether or not spread is applied to a particular note depends upon the setting of the Spread parameter during the note-on event. To achieve special effects, you could, for instance, create a sequence where Spread is 0 most of the time and turned on only for some notes. These notes will then play in stereo, while the others will play mono.

22.2.8 Strategies for Saving CPU Power

If you want to save CPU power, turn off features that you do not need or reduce the number of voices. Specifically, turning off the filter or the LFO if they do not contribute to the sound will save CPU power.

For the sake of saving CPU resources, you will also usually want to reduce the number of voices to something between 6 and 12, and carefully use the Spread feature. The high quality setting can also be turned off to conserve CPU resources.

Note that turning off the oscillators will not save CPU power.

22.2.9 Finally...

Operator is the result of an intense preoccupation with FM synthesis and a love and dedication to the old hardware FM synthesizers, such as the Yamaha SY77, the Yamaha TX81Z and the NED Synclavier II. FM synthesis was first explored musically by the composer and computer music pioneer John Chowning in the mid-1960s. In 1973, he and Stanford University began a relationship with Yamaha that lead to one of the most successful commercial musical instruments ever, the DX7.

John Chowning realized some very amazing and beautiful musical pieces based on a synthesis concept that you can now explore yourself simply by playing with Operator in Live.

We wish you loads of fun with it!

22.2.10 The Complete Parameter List

The function of each Operator parameter is explained in the forthcoming sections. Remember that you can also access explanations of controls in Live (including those belonging to

Operator) directly from the software by placing the mouse over the control and reading the text that appears in the Info View. Parameters in this list are grouped into sections based on where they appear in Operator.

Global Shell and Display

Time – This is a global control for all envelope rates.

Tone – Operator is capable of producing timbres with very high frequencies, which can sometimes lead to aliasing artifacts. The Tone setting controls the high frequency content of sounds. Higher settings are typically brighter but also more likely to produce aliasing.

Volume – This sets the overall volume of the instrument.

Algorithm – An oscillator can modulate other oscillators, be modulated by other oscillators, or both. The algorithm defines the connections between the oscillators and therefore has a significant impact on the sound that is created.

Voices – This sets the maximum number of notes that can sound simultaneously. If more notes than available voices are requested, the oldest notes will be cut off.

High Quality (HiQ) – This changes the interpolation algorithm of the oscillators and the LFO. If turned off, some timbres will sound more rough, especially the noise waveform. Turning this off will also save some CPU power.

Time<Key – The rates of all envelopes can be controlled by note pitch. If the global Time<Key parameter is set to higher values, the envelopes run faster when higher notes are played.

Pan – Use this to adjust the panorama of each note. This is especially useful when modulated with clip envelopes.

Pan<Key (Key) – If Pan<Key is set to higher values, low notes will pan relatively more to the left channel, and higher notes to the right. Typically this is used for piano-like sounds.

Pan<Random (Rnd) – This defines the extent to which notes are randomly distributed between the left and right channels.

Pitch Shell and Display

Pitch Envelope On – This turns the pitch envelope on and off. Turning it off if it is unused saves some CPU power.

Pitch Envelope Amount (Pitch Env) – This sets the intensity of the pitch envelope. A value of 100% means that the pitch change is exactly defined by the pitch envelope's levels. A value of -100% inverts the sign of the pitch envelope levels.

Spread – If Spread is turned up, the synthesizer uses two detuned voices per note, one each on the left and right stereo channels, to create chorusing sounds. Spread is a very CPU-intensive effect.

Transpose – This is the global transposition setting for the instrument. Changing this parameter will affect notes that are already playing.

Pitch Bend Range (PB Range) – This defines the effect of MIDI pitch bend messages.

Pitch Envelope Rates<Velocity (Time<Vel) – This parameter exists for filter, pitch, LFO and volume envelopes. It is therefore listed in the section on envelopes.

Glide (G) – With Glide on, notes will slide from the pitch of the last played note to their played pitch. Note that all envelopes are not retriggered in this case if notes are being played legato.

Glide Time (Time) – This is the time it takes for a note to slide from the pitch of the last played note to its final pitch when Glide is activated. This setting has no effect if Glide is not activated.

Pitch Envelope to Osc (Destination A-D) – The pitch envelope affects the frequency of the respective oscillator if this is turned on.

Pitch Envelope to LFO (Destination LFO) – The pitch envelope affects the frequency of the LFO if this is turned on.

Filter Shell and Display

Filter On – This turns the filter on and off. Turning it off when it is unused saves CPU power.

Filter Type – Lowpass, bandpass and highpass are second order filters with resonance. Their names imply the part of the spectrum they affect. The notch filter passes everything apart from its center frequency and is more audible with low resonance settings. The 24 dB filter modes attenuate the filtered frequencies to a much greater degree than the 12 dB modes.

Filter Frequency (Freq) – This defines the center or cutoff frequency of the filter. Note that the resulting frequency may also be modulated by note velocity and by the filter envelope.

Filter Resonance (Res) – This defines the resonance around the filter frequency of the lowpass and highpass filters, and the width of the bandpass and notch filters.

Filter Frequency<Velocity (Freq<Vel) – Filter frequency is modulated by note velocity according to this setting.

Filter Frequency<Key (Freq<Key) – Filter frequency is modulated by note pitch according to this setting. A value of 100% means that the frequency doubles per octave. The center point for this function is C3.

Filter Envelope Rates<Velocity (Time<Vel) – This parameter exists for filter, pitch, LFO and volume envelopes. It is therefore listed in the section on envelopes.

Filter Frequency<Envelope (Envelope) – Filter frequency is modulated by the filter envelope according to this setting. A value of 100% means that the envelope can create a maximum frequency shift of approximately 9 octaves.

LFO Shell and Display

LFO On – This turns the LFO (low-frequency oscillator) on and off. Turning it off when it is unused saves some CPU power.

LFO Waveform – Select from among several typical LFO waveforms. Sample and Hold creates random steps, and Noise supplies bandpass-filtered noise. All waveforms are band-limited to avoid unwanted clicks. Cyclic waveforms restart with each note-on message.

LFO Range – The LFO covers an extreme frequency range. Choose Low for a range from 50 seconds to 30 Hz, or Hi for 8 Hz to 12 kHz. Due to the possible high frequencies, the LFO can also function as a fifth oscillator.

LFO Rate (Rate) – This sets the rate of the LFO. The actual frequency also depends on the setting of the LFO Range and the LFO Rate<Key controls.

LFO Amount (Mod) – This sets the intensity of the LFO. Note that the actual effect also depends on the LFO envelope.

LFO to Osc (Destination A-D) – The LFO modulates the frequency of the respective oscillator if this is turned on.

LFO Envelope Rates<Velocity (Time<Vel) – This parameter exists for filter, pitch, LFO and volume envelopes. It is therefore listed in the section on envelopes.

LFO Rate<Key (Rate<Key) – The LFO's frequency can be a function of note pitch. If this is set to 100%, the LFO will double its frequency per octave, functioning like a normal oscillator.

LFO Amount<Velocity (Amt<Vel) – This setting adjusts modulation of the LFO intensity by note velocity.

Oscillators A-D Shell and Display

Osc On – This turns the oscillator on and off.

Osc Coarse Frequency (Coarse) – The relationship between oscillator frequency and note pitch is defined by the Coarse and Fine parameters. Coarse sets the ratio in whole numbers, creating a harmonic relationship.

Osc Fine Frequency (Fine) – The relationship between oscillator frequency and note pitch is defined by the Coarse and Fine parameters. Fine sets the ratio in fractions of whole numbers, creating an inharmonic relationship.

Osc Fixed Frequency On (Fixed) – In Fixed Mode, oscillators do not respond to note pitch but instead play a fixed frequency.

Osc Fixed Frequency (Freq) – This is the frequency of the oscillator in Hertz. This frequency is constant, regardless of note pitch.

Osc Fixed Multiplier (Multi) – This is used to adjust the range of the fixed frequency. Multiply this value with the value of the oscillator's Freq knob to get actual frequency in Hz.

Osc Output Level (Level) – This sets the output level of the oscillator. If this oscillator is modulating another, its level has significant influence on the resulting timbre. Higher levels usually create bright and/or noisy sounds.

Osc Waveform (Wave) – Choose from a collection of carefully selected waveforms, including slight derivations of sine waves that are especially useful for creating emulations of vintage digital hardware synthesizers.

Osc Phase (Phase) – This sets the initial phase of the oscillator. The range represents one whole cycle.

Osc Frequency<Velocity (Osc<Vel) – The frequency of an oscillator can be modulated by note velocity. Positive values raise the oscillator's pitch with greater velocities, and negative values lower it.

Osc Freq<Vel Quantized (Q) – This allows quantizing the effect of the Frequency<Velocity parameter. If activated, the sonic result is the same as manually changing the Coarse parameter for each note.

Volume Envelope Rates<Velocity (Time<Vel) – This parameter exists for filter, pitch, LFO and volume envelopes. It is therefore listed in the section on envelopes.

Osc Output Level<Velocity (Vel) – This defines how much the oscillator's level depends upon note velocity. Applying this to modulating oscillators creates velocity-dependent timbres.

Osc Output Level<Key (Key) – This defines how much the oscillator's level depends upon note pitch. The center point for this function is C3.

Osc D Feedback (Feedback) – Osc D can modulate itself. The modulation is dependent not only on the setting of the feedback control but also on the oscillator level and the envelope. Higher feedback creates a more complex resulting waveform.

Envelope Display

Envelope Attack Time (Attack) – This sets the time it takes for a note to reach the peak level, starting from the initial level. The shape of this segment of the envelope is linear.

Envelope Decay Time (Decay) – This sets the time it takes for a note to reach the sustain level from the peak level. The shape of this segment of the envelope is exponential.

Envelope Release Time (Release) – This is the time it takes for a complete fade-out of a note after a note-off message is received. The shape of this segment is exponential. The note will fade out from the value of the envelope at the moment the note-off message occurs, regardless of which segment is currently active.

Envelope Initial Level (Initial) – This sets the initial value of the envelope.

Envelope Peak Level (Peak) – This is the peak level at the end of the note attack.

Envelope Sustain Level (Sustain) – This is the sustain level at the end of the note decay. The envelope will stay at this level until note release unless it is in Loop, Sync or Beat Mode.

Envelope Mode (Mode) – If this is set to Loop, the envelope will start again after the end of the decay segment. If set to Beat or Sync, it will start again after a given beat-time. In Sync Mode, this behavior will be quantized to song time.

Envelope Beat/Sync Rate (Repeat) – The envelope will be retriggered after this amount of beat-time, as long as it is still on. When retriggered, the envelope will move at the given attack rate from the current level to the peak level.

Envelope Loop Time (Time) – If a note is still on after the end of the decay/sustain segment, the envelope will start again from its initial value. The time it takes to move from the sustain level to the initial value is defined by this parameter.

Envelope Rates<Velocity (Time<Vel) – Envelope segments will be modulated by note velocity as defined by this setting. This is especially interesting if the envelopes are looping. Note that this modulation does not influence the beat-time in Beat or Sync Modes, but the envelope segments themselves.

22.3   Sampler
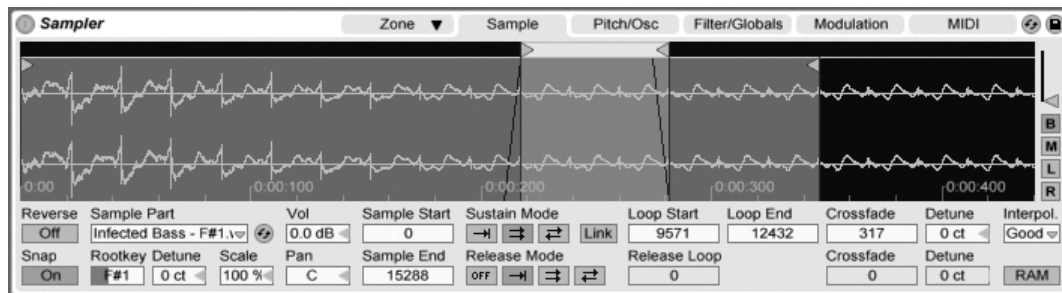
The Sampler Instrument.

Sampler is a sleek yet formidable multisampling instrument that takes full advantage of Live's agile audio engine. It has been designed from the start to handle multi-gigabyte instrument libraries with ease, and it imports most common library formats. But with Sampler, playback is only the beginning; its extensive internal modulation system, which addresses nearly every aspect of its sound, makes it the natural extension of Live's sound-shaping techniques.

The full version of Sampler is not included with the standard version of Live, but is a special feature available for purchase separately. For details, please visit the Ableton webshop[2], where you will be offered the opportunity to buy Sampler online. Once you have purchased Sampler, you will need to unlock it before using it, as described in the chapter on unlocking.

Getting started with Sampler is as easy as choosing a preset from the Device Browser. Like all of Live's devices, Sampler's presets are located in folders listed beneath its name. Presets imported from third-party sample libraries are listed here, too, in the *Imports* folder.

Once you have loaded a Sampler preset into a track, remember to arm the track for recording (which also enables you to hear any MIDI notes you might want to play), and then start playing!

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[2]http://www.ableton.com/shop

22.3.1   Multisampling

Before going on, let's introduce the concept of *multisampling*. This technique is used to accurately capture the complexity of instruments that produce dynamic timbral changes. Rather than rely on the simple transposition of a single recorded sample, multisampling captures an instrument at multiple points within its critical sonic range. This typically means capturing the instrument at different pitches as well as different levels of emphasis (played softly, moderately, loudly, etc.). The resulting *multisample* is a collection of all the individually recorded sample files.

Sampler is designed to let you approach multisampling on whatever level you like: You can load and play multisample presets, like those from Ableton's *Essential Instrument Collection*, import multisamples from third-party vendors, or create your own multisamples from scratch.

Importing Third-Party Multisamples

To import a third-party multisample, navigate to the file in Live's File Browser and double-click to import it into the Live Library. *(Note that AKAI-formatted CD-ROMs require one step before this can be done – please see the next section.)*

Importing will create new Sampler presets, which you can find in the Device Browser under Sampler/Imported.   Live automatically brings up the Device Browser to show the new presets, ready to drag in, sort, rename or delete.

Note that some multisample files will be converted to Instrument Rack presets that contain several Sampler instances used to emulate the original more accurately.

For all multisample formats except Apple EXS24/GarageBand and Kontakt, Live will import the actual audio data into the Library, where they will appear as new samples (found under Samples/Imported). This means the new Sampler presets will work regardless of whether the original multisample file is still around.

To import Apple EXS24/GarageBand and Kontakt multisamples, Live will create new Sampler presets that reference the original WAV or AIF files. This means that removing the original WAV or AIF files will render the new Sampler presets useless. Live's File Manager offers the option to collect and save these external samples into the Library.

Mounting AKAI Multisample CDs

To import multisamples from AKAI-formatted CD-ROMs, you first have to mount the CD-ROM so that Live can "see" its contents. This is only necessary because the legacy AKAI CD format cannot be processed by the operating system like standard CD-ROM formats, which are mounted automatically upon inserting and can be browsed as usual with Live's File Browser. Here are the steps:

1. Insert the AKAI-formatted sample CD.

2. *On a Mac,* click on the title bar of Live's File Browser and select "All Volumes." *On a PC,* navigate Live's File Browser to the Workspace by clicking on the Browser's title bar and selecting "Workspace."

3. Click on the Browser item found at the bottom named "Find Sample CDs..."

4. Double-click the item that appears to import the CD's contents.

22.3.2 Sampler's Tabs

Once you begin working with Sampler, you will notice that its features are organized categorically into tabs, accessed from Sampler's title bar. We will get to know Sampler by examining each of them.
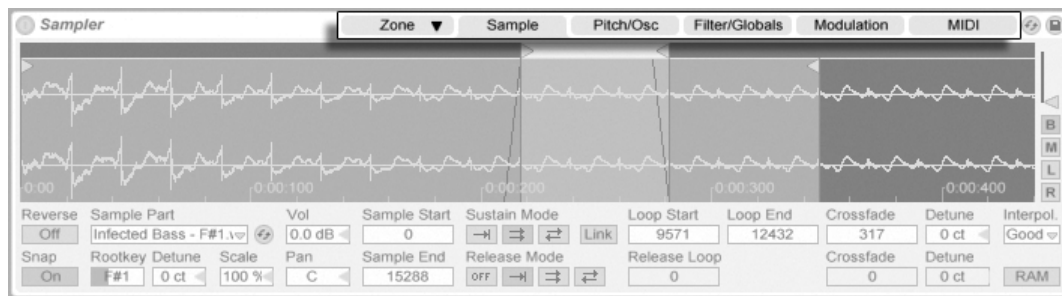
Sampler's Tabs in the Title Bar.

22.3.3   The Zone Tab
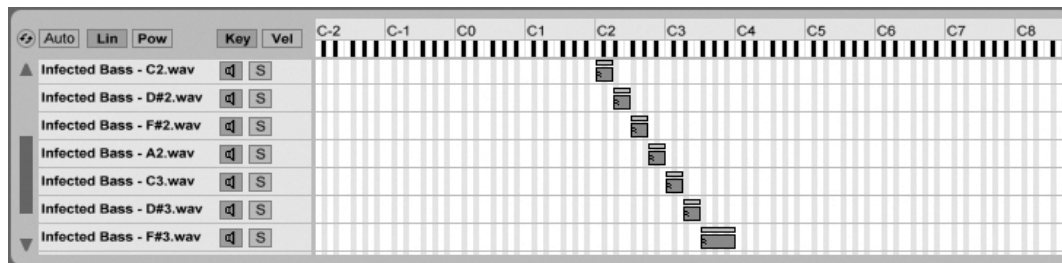
The Key Zone Editor.

Clicking on the Zone tab toggles the display of Sampler's Zone Editor, which offers a hands-on interface for mapping any number of samples across key and velocity ranges.

The Zone Editor opens in its own dedicated view, directly above the Track View. When used in conjunction with Sampler's other tabs, this layout greatly accelerates the creation and editing of multisamples.

On the left side of the Zone Editor is the sample layer list, where multisamples are organized. All of the individual samples belonging to a multisample are shown in this list, where they are referred to as *layers*.

The rest of the view is occupied by one of two editors that correspond to the sample layers: the Key Zone Editor, and the Velocity Zone Editor. These editors can be horizontally zoomed by pressing ⊙ (PC) / ⌷Ctrl ⊙ (Mac) within them to bring up a context menu with sizing options.

Auto Select (Auto) – As MIDI notes arrive at Sampler, they are filtered by each sample layer's key and velocity zones. With Auto Select enabled, all sample layers that are able to play an incoming note will become selected in the sample layer list for the duration of that note.

Zone Fade Mode (Lin/Pow) – These buttons toggle the fade mode of all zones between linear and constant-power (exponential) slopes.

Zone Editor View (Key/Vel) – These buttons toggle the display of the Key Zone Editor and the Velocity Zone Editor.

The Sample Layer List

All samples contained in the currently loaded multisample are listed here, with each sample given its own layer. For very large multisamples, this list might be hundreds of layers long! Fortunately, layers can be descriptively named (according to their root key, for example). Selecting any layer will load its sample into the *Sample* tab for examination.

Key Zones

Key zones define the range of MIDI notes over which each sample will play. Samples are only triggered when incoming MIDI notes lie within their key zone. Every sample has its own key zone, which can span anywhere from a single key up to the full 127.

A typical multisampled instrument contains many individual samples, distributed into many key zones. Samples are captured at a particular key of an instrument's voice range (known as their *root key*), but may continue to sound accurate when transposed a few semitones up or down. This range usually corresponds to the sample's key zone; ranges beyond this zone are represented by additional samples, as needed.

By default, the key zones of newly imported samples cover the full MIDI note range. Zones can be moved and resized like clips in the Arrangement View, by dragging their right or left edges to resize them, then dragging them into position.

Zones can also be faded over a number of semitones at either end by dragging their top right or left corners. This makes it easy to smoothly crossfade between adjacent samples as the length of the keyboard is traversed. The Lin and Pow boxes above the sample layer list indicate whether the zones will fade in a linear or exponential manner.

Velocity Zones

Each sample also has a velocity zone, determining the range of MIDI Note On velocities that it will respond to. The timbre of most musical instruments changes greatly with playing intensity. Therefore, the best multisamples capture not only individual notes, but also each of those notes at different velocities.

The Velocity Zone Editor, when toggled, replaces the Key Zone Editor alongside the sample layer list. Velocity is measured on a scale of 1-127, and this number range appears across the top of the editor. The functionality of the Velocity Zone Editor is otherwise identical to that of the Key Zone Editor.

22.3.4 The Sample Tab
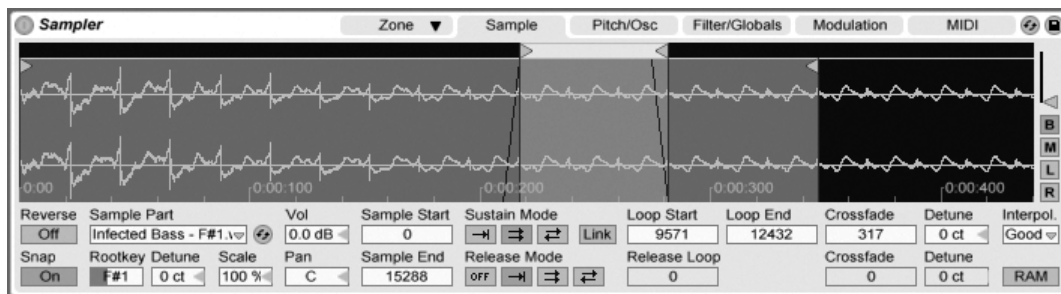
The Sample Tab.

The playback characteristics of individual samples are set within the Sample tab. Most of this tab is dedicated to displaying the waveform of the currently selected sample. It is important to keep in mind that most of the values in this tab reflect the state of the currently selected sample only. The Sample chooser always displays the current sample layer's name, and is another way to switch between layers when editing.

The RootKey, Detune, Vol and Pan parameters add basic per-sample mixing tools for quick assembly and tweaking of multisamples.

Reverse – This is a global, modulatable control that reverses playback of the entire multi-sample. Unlike the Reverse function in the Clip View, a new sample file is not generated. Instead, sample playback begins from the Sample End point, proceeds backwards through the Sustain Loop (if active), and arrives at the Sample Start point.

Snap – Snaps all start and end points to the waveform zero-crossings (points where the amplitude is zero) to avoid clicks. As with Simpler, this snap is based on the left channel of stereo samples, so a small Crossfade value may be necessary in some cases to completely eliminate clicks.

Sample – Displays the name of the current sample layer, and can be used to quickly select from among the sample layers of the loaded multisample.

Root Key (RootKey) – Defines the root key of the current sample.

Detune – The sample tuning can be adjusted here by +/- 50 cents.

Volume – A wide-range volume control, variable from full attenuation to a gain of +24 dB.

Pan – Samples can be individually panned anywhere in the stereo panorama.

Sample Playback

All of the following *sample-specific* parameters work in conjunction with the *global* volume envelope (in the Filter/Global tab) to create the basic voicing of the Sampler instrument. If you are unfamiliar with how envelopes work, you will find that they are well documented in Operator's *Envelopes* section.

All time-based values in this tab are displayed in either samples or hours:seconds:milliseconds, which can be toggled using the 🖱 (PC) / Ctrl 🖱 (Mac) context menu on any of their parameter boxes. *Samples in this context refer to the smallest measurable unit in digital audio, and not to the audio files themselves, which we more commonly refer to as "samples."*

Sample Start – The time value where playback will begin. If the volume envelope's Attack parameter is set to a high value, the audible result may seem to begin some time later than the value shown here.

Sample End – The time value where playback will end (unless a loop is enabled), even if the volume envelope has not ended.

Sustain Mode – The optional Sustain Loop defines a region of the sample where playback will be repeated while the note is in the sustain stage of its envelope. Activating the Sustain Loop also allows the Release Loop to be enabled. This creates several playback options:

⇥ *No Sustain Loop* – Playback proceeds linearly until either the Sample End is reached or the volume envelope completes its release stage.

⊒ *Sustain Loop Enabled* – Playback proceeds linearly until Loop End is reached, when it jumps immediately to Loop Start and continues looping. If Release Mode is OFF, looping will continue inside the Sustain Loop until the volume envelope has completed its release stage.

⇄ *Back-and-Forth Sustain Loop Enabled* – Playback proceeds to Loop End, then reverses until it reaches Loop Start, then proceeds again towards Loop End. If Release Mode is OFF, this pattern continues until the volume envelope has completed its release stage.

Link – Enabling the Link switch sets Sample Start equal to Loop Start. Note that the Sample Start parameter box doesn't lose its original value – it simply becomes disabled so that it can be recalled with a single click.

Release Mode – Whenever the Sustain Loop is active, Release Mode can also be enabled.

OFF *OFF* – The volume envelope's release stage is active, but will occur within the Sustain Loop, with playback never proceeding beyond Loop End.

→| *Release Enabled* – When the volume envelope reaches its release stage, playback will proceed linearly towards Sample End.

⊒ *Release Loop Enabled* – When the volume envelope reaches its release stage, playback will proceed linearly until reaching Sample End, when it jumps immediately to Release Loop and continues looping until the volume envelope has completed its release stage.

⇄ *Back-and-Forth Release Loop Enabled* – When the volume envelope reaches its release stage, playback will proceed linearly until reaching Sample End, then reverses until it reaches Release Loop, then proceeds again towards Sample End. This pattern continues until the volume envelope has completed its release stage.

Sustain- and Release-Loop Crossfade (Crossfade) – Loop crossfades help remove clicks from loop transitions.

Sustain- and Release-Loop Detune (Detune) – Since loops are nothing more than oscillations, the pitch of samples may shift within a loop, relative to the loop's duration. With Detune, the pitch of these regions can be matched to the rest of the sample.

Interpolation (Interpol) – This is a global setting that determines the accuracy of transposed samples. Be aware that raising the quality level above "Normal" will place significant

demands on your CPU.

RAM Mode (RAM) – This is also a global control that loads the entire multisample into RAM. This mode can give better performance when modulating start and end points, but loading large multisamples into RAM will quickly leave your computer short of RAM for other tasks. In any case, it is always recommended to have as much RAM in your computer as possible, as this can provide significant performance gains.

22.3.5   The Pitch/Osc Tab
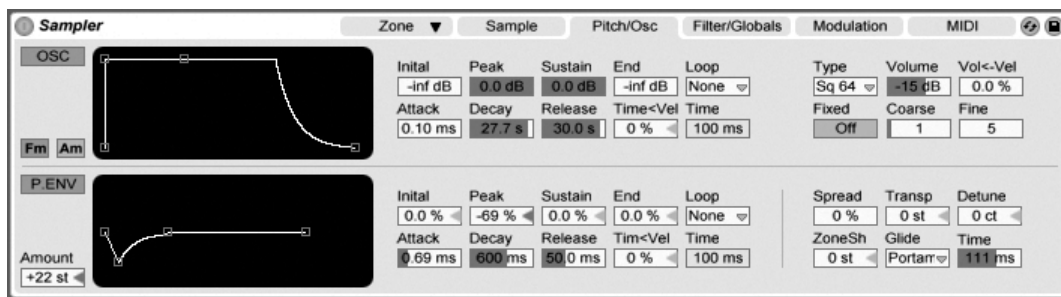
The Pitch/Osc Tab.

The Modulation Oscillator

Sampler features one dedicated modulation oscillator per voice, which can perform frequency or amplitude modulation *(FM or AM)* on the multisample. The oscillator is fully featured, with 21 waveforms, plus its own loopable amplitude envelope for dynamic waveshaping. Note that this oscillator performs modulation only – its output is never heard directly. What you hear is the *effect* of its output upon the multisample.

The Pitch Envelope

The pitch envelope modulates the pitch of the sample, as well as of the Modulation Oscillator, if it is enabled.

22.3.6   The Filter/Global Tab
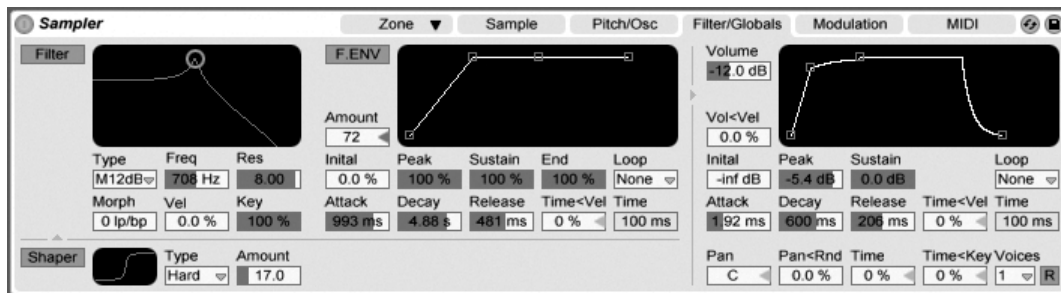
The Filter

Sampler features a powerful, morphable filter with an integrated waveshaper. The filter can morph continuously from lowpass to bandpass to highpass to notch and back to lowpass. Naturally, filter morphs can be automated.

Classic 24 dB lowpass, bandpass and highpass modes supplement the morphable filter's 12 dB and 24 dB modes.

The Volume Envelope

The volume envelope is global, and defines the articulation of Sampler's voices. Up to 32 voices are available simultaneously from each instance of the device. Voice retriggering can optionally be enabled by activating the Retrigger button to the right of the Voices chooser.

22.3.7   The Modulation Tab
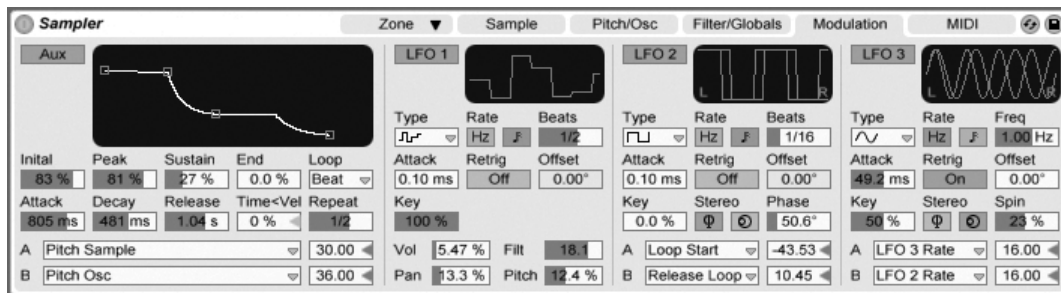
The Modulation Tab.

The Modulation tab offers an additional loopable envelope, plus three LFOs, all capable of modulating multiple parameters, including themselves. Each LFO can be free running, or synced to the Live Set's tempo, and LFOs 2 and 3 can produce stereo modulation effects.

22.3.8   The MIDI Tab

The MIDI Tab.

The MIDI tab's parameters turn Sampler into a dynamic performance instrument. The fundamental MIDI controllers *Key, Velocity, Release Velocity, Channel Pressure* and *Pitch Bend* can be mapped to two destinations each, with varying degrees of influence.

22.4   Simpler
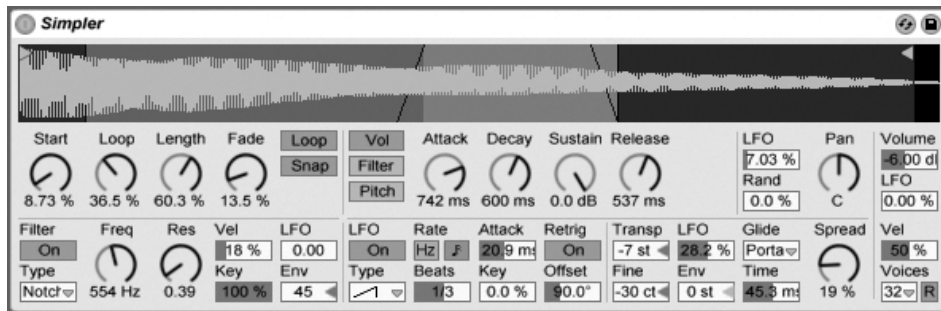
Simpler is an instrument that integrates the basic elements of a sampler with a set of classic synthesizer parameters. A Simpler voice plays a user-defined sample section, which is in turn processed by envelope, filter, LFO, volume and pitch components.

Owners of *Sampler* who wish to take their Simpler creations further can convert Simpler's current settings to an identical setup in Sampler by   (PC) / [Ctrl]   (Mac) on Simpler's title bar and choosing the Simpler -> Sampler command.

22.4.1   Sample View

The Sample View displays the sample waveform. Samples can be dragged into Simpler either directly from the Browser, or from the Session or Arrangement View in the form of clips. In the latter case, Simpler will utilize only the section of the sample demarcated by the clip's start/end or loop markers. Samples can be replaced by dragging in a new sample, or by activating the integrated Hot-Swap button.

22.4.2   Sample Controls

Simpler plays a specific region or loop of the sample, as determined by a group of sample controls.

The Start and Length controls work together to specify where Simpler begins and ends its sweep of the sample. As the name implies, Start defines where sample playback starts. The sample will play for the length defined by the Length parameter. Both parameters are defined as a percentage of the whole region, so setting start to 25 percent and length to 50 percent, for example, will start playback 1/4 of the way through the sample and stop playback at the 3/4 mark (using 50 percent of the sample).

Samples are played by Simpler as one-shots or as loops, depending on whether or not the Loop switch is active. When looping is active, the Loop control dictates the length of the loop, starting from the end of the playing sample. Simpler will play the first instance of a looped sample beginning with the Start point, then continue playing only the loop region.

When the sample's start or end points are moved, Simpler will try to preserve the loop length for as long as possible by automatically adjusting the Start, Loop and Length settings.

It is possible for glitches or pops to occur between a looped sample's start and end points due to the discontinuity in waveform amplitude (i.e., the sample's loudness). The Snap switch will help mitigate these by forcing Simpler's loop markers to snap to *zero-crossing* points in the sample (points where the amplitude is zero). Note: Snapping is based on the left channel of stereo samples. It is therefore still possible, even with Snap activated, to encounter glitches with stereo samples.

The transition from loop end to loop start can be smoothed with the Fade control, which crossfades the two points. This method is especially useful when working with long, textural samples.

22.4.3   Zoom

Quite often, one starts with a longer region of a sample and ends up using only a small part of it. Simpler's Sample view can be zoomed and panned just as in other parts of Live; drag vertically to zoom, and drag horizontally to pan different areas of the sample into view.

22.4.4   Envelope

Simpler contains three classic ADSR envelopes, as seen in most synthesizers, for shaping the dynamic response of the sample. Volume-, filter frequency-, and pitch modulation are all modifiable by toggling their respective buttons in the envelope section. *Attack* controls the time in milliseconds that it takes for the envelope to reach its peak value after a note is played. *Decay* controls the amount of time it takes for the envelope to drop down to the *Sustain* level, which is held until the note is released. *Release* time is the amount of time after the end of the note that it takes for the envelope to drop from the Sustain level back down to zero.

The influence of envelopes on pitch and filter cutoff can be decided using the envelope amount (Env) controls in each of these sections.

22.4.5   Filter

The Filter section offers classic 12 dB or 24 dB lowpass, bandpass and highpass filters, as well as a notch filter, each of which can impart different sonic characteristics onto the sample by removing certain frequencies from the waveform. The most important parameters are the typical synth controls Frequency and Resonance. *Frequency* determines where in the harmonic spectrum the filter is applied; *Resonance* boosts frequencies near that point.

The best way to understand the effects of these controls is simply to play with them!

The Frequency parameter can be modulated by an LFO, note velocity and an envelope – each of which have an amount control in the Filter section. The Key (tracking) control allows for shifting the filter's frequency according to note pitch.

22.4.6   LFO

The LFO (low-frequency oscillator) section offers sine, square, triangle, sawtooth down, sawtooth up and random waveforms. The LFO run freely at frequencies between 0.01 and 30 Hz, or sync to divisions of the Set's tempo. LFOs are applied individually to each *voice*, or played note, in Simpler.

The Key parameter scales each LFO's Rate in proportion to the pitch of incoming notes. A high Key setting assigns higher notes a higher LFO rate. If Key is set to zero, all voices' LFOs have the same rate and may just differ in their phase.

The LFO will modulate the filter, pitch, panorama and volume according to the setting of the LFO amount controls in each of these sections.

The time required for the LFO to reach full intensity is determined by the Attack control.

22.4.7   Glide and Spread

Simpler includes a glide function. When this function is activated, new notes will start from the pitch of the last note played and then slide gradually to their own pitch. Two glide modes are available: Glide, which works monophonically, and Portamento, which works polyphonically. Glide is also adjusted with the Glide Time control.

Simpler also offers a special Spread parameter that creates a rich stereo chorus by using two voices per note and panning one to the left and one to the right. The two voices are detuned, and the amount of detuning can be adjusted with the Spread control.

Tip: Whether or not spread is applied to a particular note depends upon the setting of the Spread parameter during the note-on event. To achieve special effects, you could, for instance, create a sequence where Spread is zero most of the time and turned on only for some notes. These notes will then play in stereo, while the others will play mono.

22.4.8   Pitch, Pan, Volume and Voices

Simpler plays back a sample at its original pitch if the incoming MIDI note is C3, however the Transpose control allows transposing this by +/- 48 semitones. Pitch can also be modulated by an LFO or pitch envelope using the amount controls in this section. The pitch envelope is especially helpful in creating percussive sounds. Simpler reacts to MIDI Pitch Bend messages with a sensitivity of +/- 5 semitones. You can also modulate the Transpose parameter with clip envelopes and external controllers.

The Voices parameter sets the maximum number of voices that Simpler can play simultane-ously. If more voices are needed than have been allocated by the Voices chooser, "voice

stealing" will take place, in which the oldest voice(s) will be dropped in favor of those that are new. For example, if your Voices parameter is set to 8, and ten voices are all vying to be played, the two oldest voices will be dropped. (Simpler does try to make voice stealing as subtle as possible.) A small LED near the Voices control flashes when a voice has been stolen.

Panorama is defined by the Pan control, but can be further swayed by randomness or modulated by the LFO.

Finally, the output volume of Simpler is controlled by the Volume control, which can also be dependent upon note velocity, as adjusted by the Velocity control. Tremolo effects can be achieved by allowing the LFO to modulate the Volume parameter.

22.4.9   Strategies for Saving CPU Power

Real-time synthesis needs lots of computing power. However, there are strategies for reducing CPU load. Save the CPU spent on Simpler by doing some of the following:

- Turn off the Filter if it is not needed.
- Use filter types that are less expensive when possible. A filter's cost correlates with the steepness of its slope – "LP24" is more expensive than "LP12."
- Turn off the LFO for a slightly positive influence on CPU.
- Stereo samples need significantly more CPU than mono samples, as they require twice the processing.
- Decrease the number of simultaneously allowed voices with the Voice control.

22.5   The Essential Instrument Collection

The boxed version of Live 6 ships with the Essential Instrument Collection, a multi-gigabyte library of meticulously sampled and selected instruments from the SONiVOX (formerly Sonic Implants) premium collections.

Note – The Essential Instrument Collection is not included with downloadable purchases. Download customers can choose, however, to have the Live 6 box including the Essential Instrument Collection shipped to them later for an additional fee[3].

22.5.1 EIC Installation

The Essential Instrument Collection is installed separately from the main Live installation. The various instruments on the EIC DVD are grouped into separate Live Packs that can be installed as needed. To install a Live Pack, double-click the Live Pack file (.alp), drag it into the Live main window, or locate it via the File menu's Install Live Pack command.

After you have installed the EIC Live Packs, you will need to unlock them using the unlock code provided in your Live 6 box. To do this, open Live's Preferences with the keyboard shortcut ⌨Ctrl ⌨, (PC) / ⌨⌘ ⌨, (Mac), and then select the Products tab, where you'll find the Essential Instrument Collection listed amongst any other Ableton products that you own. Further details can be found in the Unlocking Live chapter.

22.5.2 Accessing The EIC Multisamples

After installation, the instruments are accessed through Live's Device Browser. You will find them as *Instrument Rack presets* located in the Instruments folder. Many of the orchestral instruments are also available in "Lite" variations, with lower memory and CPU requirements.

All of the EIC presets come conveniently mapped to Macro Controls for greater expression.

22.5.3 The Included Instruments

The following multisampled instruments are included:

- **Acoustic Keyboards –** *Grand Piano, Harpsichord, Celesta*
- **Electric Keyboards –** *E-Piano MK 1, B3 Jazz Organ, B3 Rock Organ*

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[3]http://www.ableton.com/shop

- **Orchestral Strings –** *Solo Strings (legato): Double Bass, Cello, Viola, Violin; Ensemble Strings (legato, pizzicato)*

- **Orchestral Brass –** *Solo Brass (legato): French Horn, Bass Trombone, Tuba (Eb), Trumpet; Ensemble Brass (legato, staccato)*

- **Orchestral Woodwinds –** *Solo Woodwinds (legato, legato vibrato): English Horn, Bassoon, Clarinet, French Oboe, Concert Flute, Alto Sax; Ensemble Woodwinds (legato)*

- **Plucked Instruments –** *Harp (fingers), Jazz Upright Bass, P-Bass (fingers, picks), Six-String Nylon Guitar (tones, chords), Strat Clean (tones, chords)*

- **Mallets –** *Glockenspiel (hard mallets), Xylophone (hard mallets)*

- **Voice** – *Mixed Choir (ahh, ohh)*

Special Features of the Guitar and Bass Banks

The EIC's guitar instruments have additional banks for single-key chords with strumming, and the PBass instrument has a similar bank for down- and up- strokes played with a pick. In all cases, lower octaves play down strums, while upper octaves play up strums.

Chapter 23

MIDI and Key Remote Control

To liberate the musician from the mouse, most of Live's controls can be *remote-controlled* with an external MIDI controller and the computer keyboard. This chapter describes the details of mapping to the following specific types of controls in Live's user interface:

1. *Session View slots* – Note that MIDI and computer key assignments are bound to the slots, not to the clips they contain.

2. *Switches and buttons* – among them the Track and Device Activator switches, the Control Bar's tap tempo, metronome and transport controls.

3. *Radio buttons* – A radio button selects from among a number of options. One instance of a radio button is the crossfader assignment section in each track, which offers three options: The track is assigned to the crossfader's A position, the track is unaffected by the crossfader, or the track is affected by the crossfader's B position.

4. *Continuous controls* – like the mixer's volume, pan and sends.

5. *The crossfader*, the behavior of which is described in detail in the respective section of the Mixing chapter.

23.1   MIDI Remote Control

Live can be controlled remotely by external MIDI control surfaces, such as MIDI keyboards or controller boxes. Live also supports the Mackie Control, a topic that is covered in its own section, for completely mouse-free program operation.

Before we explain how remote control assignments are made and implemented, let's first make the distinction between MIDI remote control and a separate use of MIDI in Live: as the input for our MIDI tracks. Let's suppose that you are using a MIDI keyboard to play an instrument in one of Live's MIDI tracks. If you assign C-1 on your MIDI keyboard to a Session View Clip Launch button, that key will cease play C-1 of your MIDI track's instrument, as it now "belongs" solely to the Clip Launch button.

MIDI keys that become part of remote control assignments can no longer be used as input for MIDI tracks. This is a common cause of confusion that can be easily resolved by observing the Control Bar's MIDI indicators.

Before making any MIDI assignments, you will need to set up Live to recognize your control surfaces. This is done in the MIDI/Sync tab of Live's Preferences, which can be opened with the keyboard shortcut `Ctrl` `,` (PC) / `⌘` `,` (Mac).

23.1.1   Natively Supported Control Surfaces

Control Surfaces are defined in the table at the top of the MIDI/Sync tab. Up to six supported control surfaces can be used simultaneously in Live.

	Control Surface	Input	Output	
1	RemoteSL	RemoteSL (Port 1)	RemoteSL (Port 1)	Dump
2	Oxygen8v2	Oxygen8 (Port 1)	Oxygen8 (Port 1)	Dump
3	Tranzport	RemoteSL (Port 2)	RemoteSL (Port 2)	Dump
4	None	None	None	Dump
5	None	None	None	Dump
6	None	None	None	Dump

Setting Up Control Surfaces.

Open the first chooser in the *Control Surface* column to see whether your control surface is supported natively by Live; if it is listed here, you can select it by name, and then define its MIDI input and output ports using the two columns to the right. *If your controller is not*

listed here, don't fret – it can still be enabled manually in the next section, Manual Control Surface Support.

Depending on the controller, Live may need to perform a "preset dump" to complete the setup. If this is the case, the *Dump* button to the right of your control surface's choosers in the Live Preferences will become enabled. Before pressing it, verify that your control surface is ready to receive preset dumps. The method for enabling this varies for each manufacturer and product, so consult your hardware's documentation if you are unsure. Finally, press the Dump button; Live will then set up your hardware automatically.

Instant Mappings

In most cases, Live uses a standard method for mapping its functions and parameters to physical controls. This varies, of course, depending upon the configuration of knobs, sliders and buttons on the control surface. These feature-dependent configurations are known as *instant mappings.*

Within Live's built-in lessons, you will find a *Control Surface Reference* that lists all currently supported hardware, complete with the details of their instant mappings. The Lessons View can be accessed at any time by selecting the Lessons option from the View menu.

Note: You can always *manually override* any instant mappings with your own assignments. In this case, you will also want to enable the Remote switches for the MIDI ports that your control surface is using. This is done in the MIDI Ports section of the MIDI/Sync Preferences tab, and is described in the next section.

Instant mappings are advantageous because the control surface's controllers will automatically reassign themselves in order to control the currently selected device in Live.
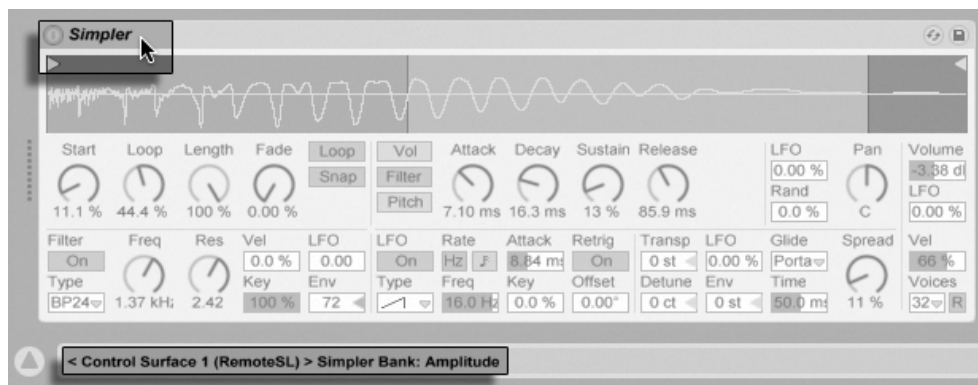
Control Surfaces Can Follow Device Selection.

In addition to following device selection, *natively supported* control surfaces can be "locked" to specific devices, guaranteeing hands-on access no matter where the current focus is in your Live Set. To enable or disable locking, (PC) / Ctrl (Mac) on a device's title bar, and then select your preferred controller from the "Lock to..." context menu. You'll recognize the same list of control surfaces that you defined in the MIDI/Sync Preferences.

Getting Hands-On: Control Surfaces Can Be Locked to Devices.

A hand icon in the title bar of locked devices serves as a handy reminder of their status.

Note: Some control surfaces do not support locking to devices. This capability is indicated for individual controllers in the *Control Surface Reference* lesson. Select the Lessons option from the View menu to access Live's built-in lessons.

23.1.2   Manual Control Surface Setup

If your MIDI control surface is not listed in the MIDI/Sync Preferences' Control Surface chooser, it can still be enabled for manual mapping in the *MIDI Ports* section of this tab.

MIDI Ports		Track	Sync	Remote
▷ Input:	Oxygen8 (Port 1)	On	Off	Off
▷ Input:	RemoteSL (Port 1)	On	Off	Off
▷ Input:	RemoteSL (Port 2)	Off	Off	On
▷ Output:	Oxygen8 (Port 1)	Off	Off	Off
▷ Output:	RemoteSL (Port 1)	Off	Off	Off
▷ Output:	RemoteSL (Port 2)	Off	Off	On
▷ Output:	RemoteSL (Port 3)	Off	Off	Off

Defining Control Surfaces Manually.

The MIDI Ports table lists all available MIDI input and output ports. To use an input port for remote control of Live, make sure the corresponding switch in its *Remote* column is set to "On." You can use any number of MIDI ports for remote mapping; Live will merge their incoming MIDI signals.

When working with a control surface that provides physical or visual feedback, you will also need to enable the Remote switch for its output port. Live needs to be able to communicate with such control surfaces when a value has changed so that they can update the positions of their motorized faders or the status of their LEDs to match.

To test your setup, try sending some MIDI data to Live from your control surface. The Control Bar's MIDI indicators will flash whenever Live recognizes an incoming MIDI message.

Once your controller is recognized by Live, you have completed the setup phase (but we recommend that you take the time to select a Take-Over Mode before you leave the Preferences behind). Your next step will be creating MIDI mappings between your control surface and Live. Luckily, this is a simple task, and you only need to do it for one parameter at a time.
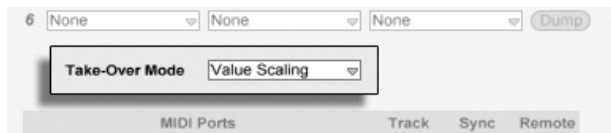
23.1.3 Take-Over Mode

When MIDI controls that send absolute values (such as faders) are used in a bank-switching setup, where they address a different destination parameter with each controller bank, you will need to decide how Live should handle the sudden jumps in values that will occur when moving a control for the first time after switching the bank. Three Take-Over modes are available:

None – As soon as the physical control is moved, its new value is sent immediately to its destination parameter, usually resulting in abrupt value changes.

Pick-Up – Moving the physical control has no effect until it reaches the value of its destination parameter. As soon as they are equal, the destination value tracks the control's value 1:1. This option can provide smooth value changes, but it can be difficult to estimate exactly where the pick-up will take place.

Value Scaling – This option ensures smooth value transitions. It compares the physical control's value to the destination parameter's value and calculates a smooth convergence of the two as the control is moved. As soon as they are equal, the destination value tracks the control's value 1:1.

23.2   The Mapping Browser
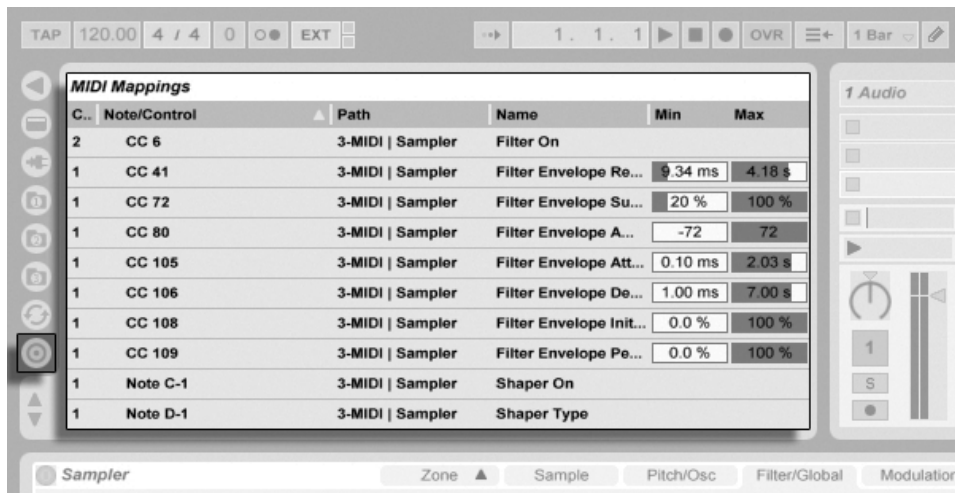
The Mapping Browser and Selector.

All manual MIDI, computer keyboard and Macro Control mappings are managed by the *Mapping Browser.* The Mapping Browser is hidden until one of the three mapping modes is enabled. It will then display all mappings for the current mode. For each mapping, it lists the control element, the path to the mapped parameter, the parameter's name, and the mapping's *Min* and *Max* value ranges. The assigned Min and Max ranges can be edited at any time, and can be quickly inverted with a 🖱 (PC) / Ctrl 🖱 (Mac) context menu command. Delete mappings using your computer's ⟵ or Delete key.

Note that Instant Mappings are context based and are not displayed in the Mapping Browser. Their mapping structure can be displayed while working in Live by choosing the Lessons option from the View menu and then opening the *Control Surface Reference* lesson.

23.2.1 Assigning MIDI Remote Control
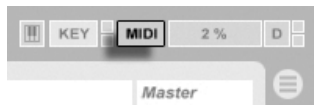
Once your remote control setup has been defined in the MIDI/Sync Preferences, giving MIDI controllers and notes remote control assignments is simple:

1. Enter MIDI Map Mode by pressing the MIDI switch in Live's upper right-hand corner. Notice that assignable elements of the interface become highlighted in blue, and that the Mapping Browser becomes available. *If your Browser is closed,* Ctrl Alt B *(PC) /* ⌃ ⌘ Alt ⌐ B *(Mac) will open it for you.*

2. Click on the Live parameter that you'd like to control via MIDI.

3. Send a MIDI message by pressing a keyboard key, turning a knob, etc., on your MIDI controller. You will see that this new MIDI mapping is now listed in the Mapping Browser.

4. Exit MIDI Map Mode by pressing the MIDI switch once again. The Mapping Browser will disappear, but you can always review your mappings by entering MIDI Map Mode again.

23.2.2 Mapping to MIDI Notes

MIDI notes send simple Note On and Note Off messages to Live's interface elements. These messages can produce the following effects on controls in Live:

- *Session View Slots* – Note On and Note Off messages affect clips in the slot according to their Launch Mode settings.

- *Switches* – A Note On message toggles the switch's state.

- *Radio Buttons* – Note On messages toggle through the available options.

- *Variable Parameters* – When assigned to a single note, Note On messages toggle the parameter between its Min and Max values. When assigned to a range of notes, each

note is assigned a discrete value, equally spaced over the parameter's range of values.

Hint: Session View slots can be assigned to a MIDI note range for chromatic playing: First play the *root* key (this is the key that will play the clip at its default transposition), and then, *while holding down the root key*, hold one key below the root and one above it to define the limits of the range.

23.2.3   Mapping to Absolute MIDI Controllers

Absolute MIDI controllers send messages to Live in the form of absolute values ranging from 0 to 127. These values lead to different results depending on the type of Live control to which they are assigned. A value message of 127, for example, might turn the Volume control on a Live track all the way up or play a Session View clip. Specifically, MIDI controller messages from 0 to 127 can produce the following effects on controls in Live:

- *Session View Slots* – Controller values 64 and above are treated like Note On messages. Controller values 63 and below are treated like Note Off messages.

- *Switches* – Controller values 64 and above turn the switch on. Controller values below 64 turn it off.

- *Radio Buttons* – The controller's 0...127 value range is mapped onto the range of available options.

- *Continuous Controls* – The controller's 0...127 value range is mapped onto the parameter's range of values.

Live also supports pitch bend messages and high-precision ("14-bit Absolute") controller messages with a 0...16383 value range. The above specifications apply to these as well, except that the value range's center is at 8191/8192.

23.2.4   Mapping to Relative MIDI Controllers

Some MIDI controllers can send "value increment" and "value decrement" messages instead of absolute values. These controls prevent parameter jumps when the state of a control in Live and the corresponding control on the hardware MIDI controller differ. For example,

imagine that you have assigned the pan knob on your control surface to the pan parameter of a track in Live. If the hardware control is panned hard right, and the Live control is panned hard left, a slight movement in a hardware pan knob that sends absolute values would tell Live to pan right, causing an abrupt jump in the track's panning. A pan knob sending relative messages would prevent this, since its incremental message to Live would simply say, "Pan slightly to the left of your current position."

There are four types of relative controllers: Signed Bit, Signed Bit 2, Bin Offset and Twos Complement.

Convention (Mode)	Increment	Decrement
Relative (Signed Bit)	001–064	065–127
Relative (Signed Bit 2)	065–127	001–064
Relative (Bin Offset)	065–127	063–001
Relative (2's Comp.)	001–064	127–065

Each of these are also available in a "linear" mode; Some MIDI encoders use "acceleration" internally, generating larger changes in value when they are turned quickly. For control surfaces that are not natively supported, Live tries to detect the controller type and whether acceleration is being used or not.

You can improve the detection process by moving the relative controller slowly to the left when you make an assignment. Live will offer its suggestion in the Status Bar's "mode" chooser, but if you happen to know the relative controller type, you can manually select it.

Live will do the following with relative MIDI controller messages:

- *Session View Slots* – Value increment messages are treated like Note On messages. Value decrement messages are treated like Note Off messages.

- *Switches* – Increment messages turn the switch on. Decrement messages turn it off.

- *Radio Buttons* – Increment messages make the radio button jump forward to the next available option. Decrement messages make it jump backward.

- *Continuous Controls* – Each type of relative MIDI controller uses a different interpretation of the 0...127 MIDI controller value range to identify value increments and decrements:

Please consult the documentation that came with your MIDI controller if you need further information on relative MIDI controllers.

Relative Session View Navigation

Notice that you can make not only *absolute mappings* to individual slots and scenes, but also *relative mappings* to move the highlighted scene and operate on the highlighted clips.

In both MIDI Map Mode and Key Map Mode, a strip of assignable controls appears below the Session grid:

The Relative Session Mapping Strip.

1. Assign these buttons to keys, notes or controllers to move the highlighted scene up and down.

2. Assign this scene number value box to a MIDI controller – preferably an endless encoder – to scroll through the scenes. For details, see the previous section on Relative Map Modes.

3. Assign this button to launch the highlighted scene. If the Record/Warp/Launch Preferences' Select Next Scene on Launch option is checked, you can move successively (and hopefully successfully!) through the scenes.

4. Assign these buttons to launch the clip at the highlighted scene, in the respective track.

Relative Session mapping is useful for navigating a large Live Set, as Live always keeps the highlighted scene at the Session View's center.

Mapping to Clip View Controls

The Clip View displays the settings for whichever clip happens to be currently selected, but it will also display the settings of multi-selected clips. To avoid unpleasant musical surprises, it is important to remember that creating remote control mappings for any control in the Clip View interface could potentially affect *any* clip in the Live Set. For this reason, we recommend mapping Clip View controls to relative MIDI controllers to prevent undesirable jumps in parameter values.

23.2.5   Computer Keyboard Remote Control
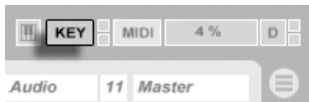
The Key Map Mode Switch.

Creating control surface assignments for your computer keyboard is straightforward:

1. Enter Key Map Mode by pressing the KEY switch in the upper right-hand corner of the Live screen. Notice that the assignable elements of the interface become highlighted in red when you enter Key Map Mode. The Mapping Browser will also become available. If the Browser is hidden, you will want to show it at this point using the appropriate View menu command.

2. Click on the Live parameter that you wish to assign to a key. Remember that only the controls that are shown with a red overlay are available for mapping.

3. Press the computer key to which you wish to assign the control. The details of your new mapping will be displayed in the Mapping Browser.

4. Leave Key Map Mode by pressing Live's KEY switch once again. The Mapping Browser will disappear, but your mappings can be reviewed at any time simply by entering Key Map Mode again.

Keyboard assignments can produce the following effects in Live:

- Clips in Session View slots will be affected by mapped keys according to their Launch Mode settings.

- Keys assigned to switches will toggle switch states.

- Keys assigned to radio buttons will toggle through the available options.

Please be sure not to confuse this remote control functionality with Live's ability to use the computer keyboard as a pseudo-MIDI keyboard that can generate MIDI notes from computer keystrokes for use with instruments.

23.3 Mackie Control

The comprehensive Mackie Control mixing surface puts all of Live's real-time creative power at your fingertips.

The Mackie Control allows for mouse-free program operation and navigation. Through the bi-directional connection between Live and the Mackie Control, any changes made in the program are reflected in the mixing surface, and vice versa. To establish this connection, open Live's MIDI/Sync Preferences. At the bottom of the window, you will find the Remote Control Surfaces options. Selecting "Mackie Control" from the Control Surface chooser, and then setting the necessary input and output, will establish the connection between Live and the control surface.

It is possible to expand the number of Mackie Control channel strips available using a hardware extension. This extension is separately set up in Live's Preferences (signified by "MackieControlXT" in the Control Surface chooser). If the Mackie Control extension is selected from the topmost chooser, it will control the Live tracks beginning at the left-hand side of the program, and should therefore be placed to the left of the Mackie Control mixing surface. If selected from the lower chooser, the Mackie Control extension should be placed to the right of the main Mackie Control.

The following sections will describe how to operate the Mackie Control with Live. You may find the Mixing chapter to be particularly useful in locating and understanding Live's track controls.

23.3.1 Channel Strips
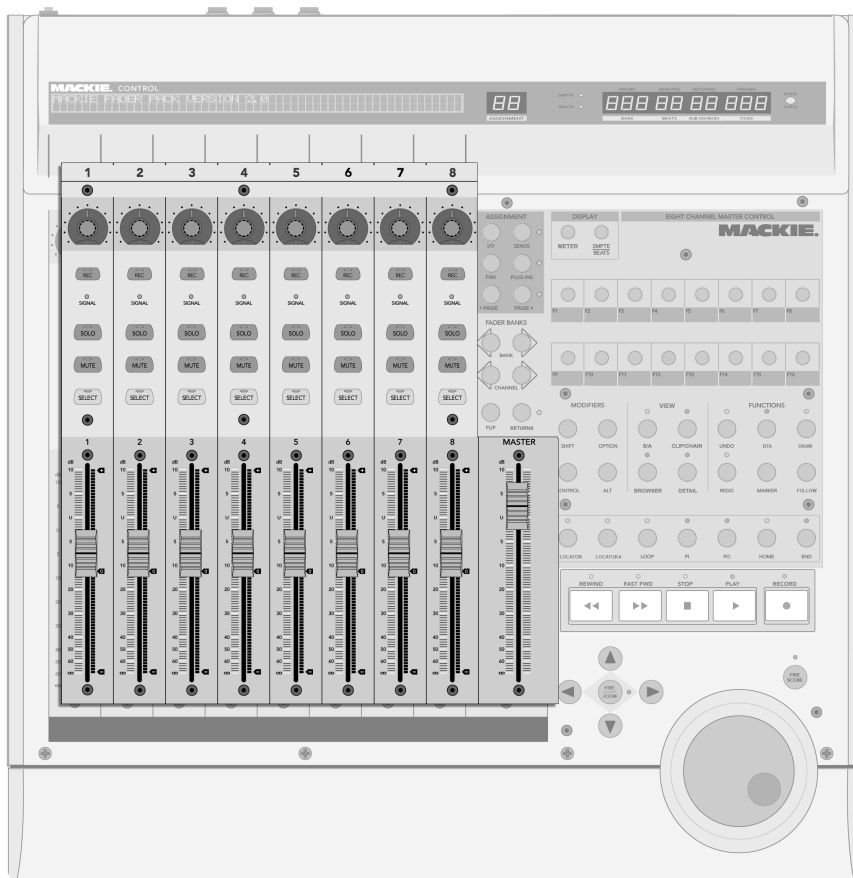
The Eight Channel Strips and the Master Strip.

The Mackie Control's eight channel strips and master strip are automatically assigned to tracks in Live. Each of these strips has a set of track controls, including a motorized fader and a V-Pot, for controlling any number of track parameters. The Mackie Control's bank/channel controls allow reassigning the channel strips to access an unlimited number of Live tracks.

1. *Arm* – By default, this arms the track for recording in exclusion of all other tracks. To arm the track nonexclusively (i.e., in addition to other tracks), hold down the Mackie Control's *Control* button while pressing this. Note that a Misc Preference setting in Live allows deactivating exclusive track arming. When this setting is deactivated, the behavior of this knob with respect to exclusive and nonexclusive arming is reversed.

2. *Signal LED* – Shows an armed track's input signal level from MIDI or audio; shows an unarmed track's output signal level.

3. *Solo* – Activates/deactivates soloing for the track in exclusion of all other tracks. To solo the track nonexclusively (i.e., in addition to other tracks), hold down the Mackie Control's *Control* button while pressing this. Note that a Misc Preference setting in Live allows deactivating exclusive track soloing. When this setting is deactivated, the behavior of this knob with respect to exclusive and nonexclusive soloing is reversed.

4. *Mute* – Mutes/unmutes the track nonexclusively.

5. *Select* – Selects the track, both in Live and on the Mackie Control, for various functions.

6. *V-Pot/Fader* – The fader controls track volume by default but can be flipped to control track panning. Please see the next section for the details on V-Pots.

23.3.2   V-Pots and Assignment Switches
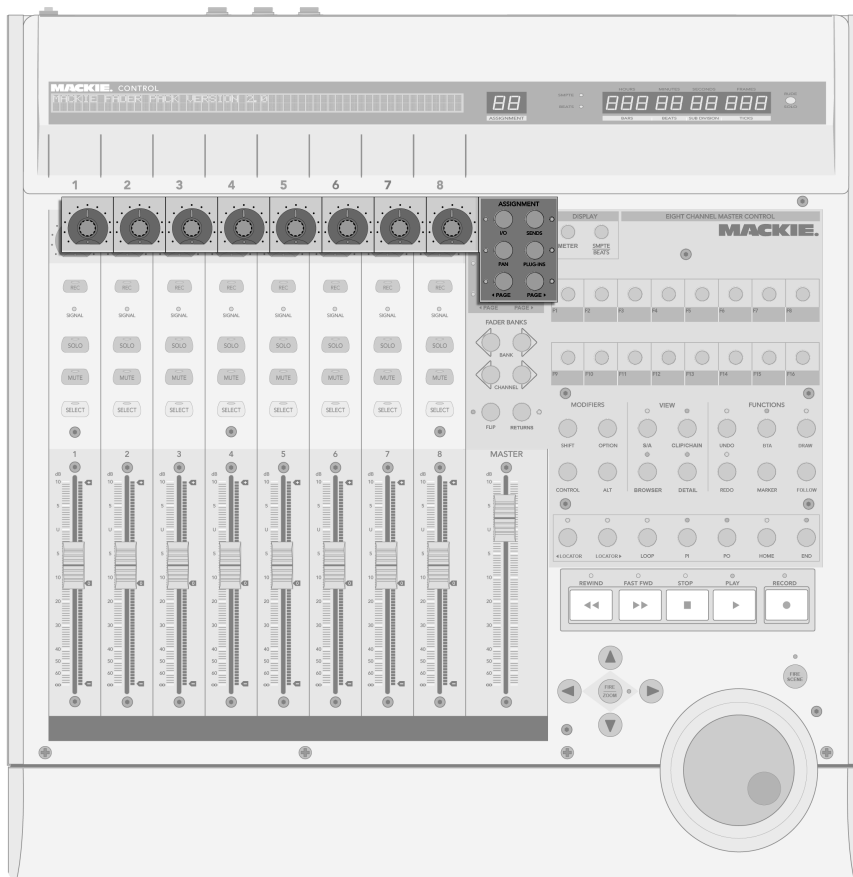
The V-Pots and Assignment Switches.

The Mackie Control's V-Pots have dual functionality in many cases, as they can be both rotated and pressed. When being used to adjust single parameters (those belonging to track devices, for example), pressing a V-Pot returns a control to its default value. Pressing a V-Pot when dealing with a control that has various options (filter type choosers, for example), selects the options in sequence. With controls having only two options (e.g., an on/off

switch) pressing a V-Pot toggles the options.

There are six assignment switches to the right of the channel strips on the Mackie Control. These select which parameters are displayed in the main display, and set these parameters to be available for control with the V-Pots. The two-character display above the assignment switches shows the currently selected assignment mode.

1. *I/O* – Switches the V-Pot and main display to I/O mode. This allows Live's track inputs and outputs to be set with the V-Pots.

   - Click once to select the track's Input Type chooser.

   - Click twice to select the track's Input Channel chooser.

   - Click three times to select the Output Type chooser.

   - Click four times to select the Output Channel chooser.

2. *Send* – Switches the V-Pot to control the levels of all available Send controls for the currently selected track. If more than eight sends are available, you can navigate through them using the previous and next buttons (see item 5, below).

3. *Pan* – Assigns the V-Pot and main display to the track's Pan control.

4. *Devices* – Pressed once, this will bring up all available devices for the currently selected track in the main display. Using the page buttons (see item 5, below), you can then scroll through the available devices and choose a particular device to edit by pressing the V-Pot. When you are done editing device settings, you can change the selected track or press the device assignment switch again to return to scrolling and selecting devices.

   When device settings are being changed, the name and settings of the selected device are shown in the main display. You can use the V-Pot to change parameter values as described in the introduction to this section.

5. *Previous/Next* – If, in any of the above assignment modes (especially with devices), more than one page of parameters is available, these buttons will scroll through the pages. LEDs above these switches illuminate when more pages are available before or after the current one.

23.3.3   Bank/Channel and Flip/Return
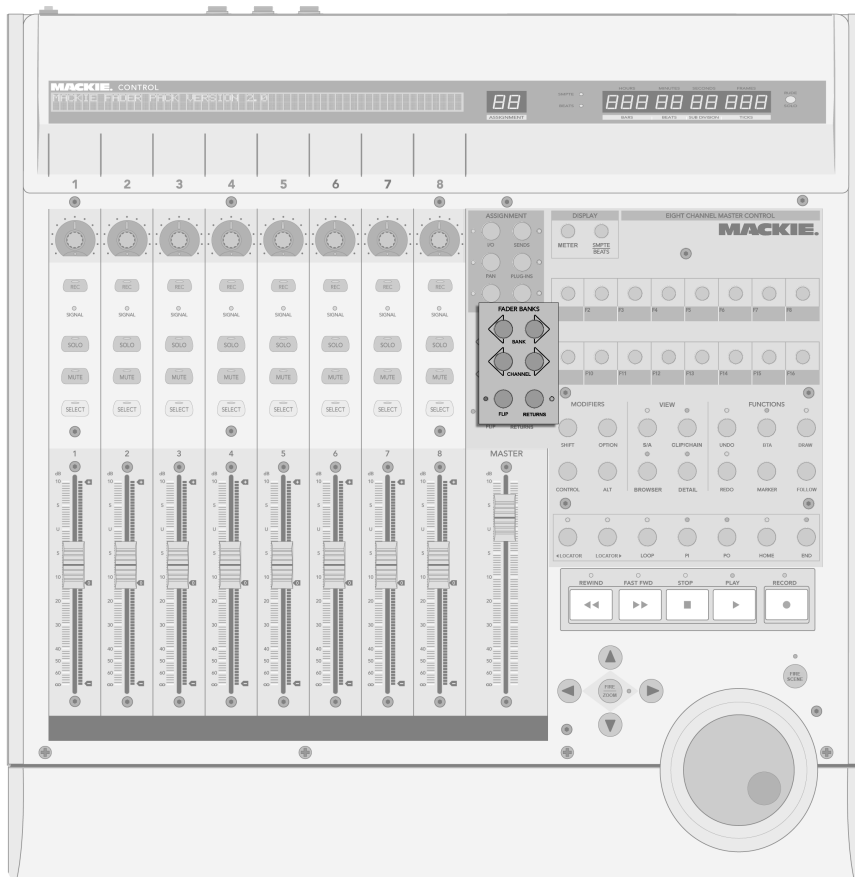
Bank, Channel, Flip and Return Buttons.

1. *Bank* – If more than eight tracks are being used in Live, these buttons can be used to page through the additional tracks and set them to the Mackie Control's eight channel strips. The bank "+" and "-" buttons page the channel strips in increments of eight (or more, if a fader extension is installed) to the right or left, respectively. To go to the first/last page, hold down the Mackie Control's *Shift*

button while pressing these.

2. *Channel* – You can use the channel "+" and "-" buttons to scroll through the additional tracks singly, setting them to the Mackie Control's eight channel strips. To go to the first/last track, hold down the Mackie Control's *Shift* button while pressing these.

3. *Flip* – When flip mode is enabled (as shown by the illuminated LED above the button), the functionality of the V-Pots and faders is switched. This is the case in all available assignment modes.

4. *Return* – By default, the channel strips display only those tracks in Live that contain clips. When return mode is enabled (as shown by the illuminated LED above the button), the channel strip will show and control the return tracks. All assignments and modes will function otherwise identically.

23.3.4 Transport
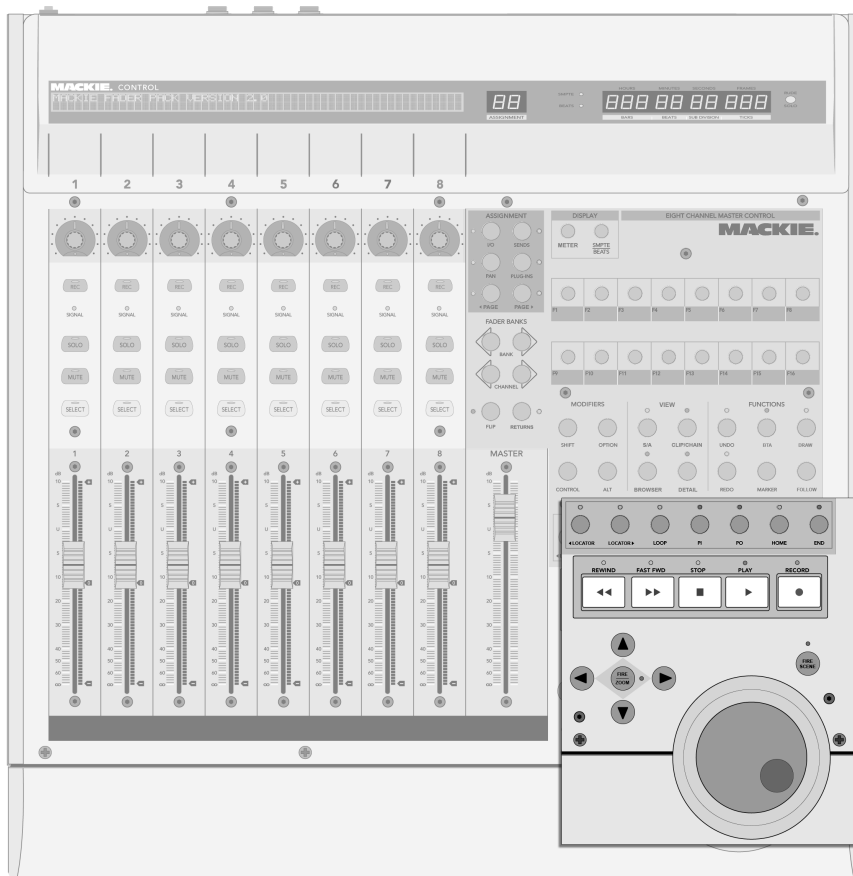
The Transport Controls.

1. *Previous/Next Locator* – Using these buttons, you can skip forward or backward through the Arrangement from locator to locator. Note that the Arrangement start and end are also marked with "invisible" locators to which you can navigate using these buttons. The LEDs above these buttons are illuminated when a previous/next locator is available in the respective direction.

2. *Loop On/Off* – Toggles the Arrangement Loop switch on/off.

3. *Punch-In/Punch-Out* – Toggles Live's Punch-In/Punch-Out switches on/off.

4. *Home* – Jumps to the Arrangement start, 1.1.1.

5. *End* – Jumps to the Arrangement end.

6. *Rew/Forw* – When pressed once, these buttons will move the play position one beat backward/forward. When held down, the buttons move forward/backward in increments of one bar during Arrangement playback, one beat if the Arrangement is stopped. Holding down the Mackie Control's *Alt* button when the Arrangement is playing will also move in one-beat increments forward/backward.

7. *Stop* – Stops Arrangement playback.

8. *Play* – Plays the Arrangement from the song start or insert marker.

9. *Record* – Toggles the Record button on/off.

10. *Arrows* –

    - In the Session View, the arrows navigate through the Session View grid. Pressing the zoom button in the middle of the arrows will fire the currently selected clip, or stop another playing clip in the same track if the currently selected slot is empty. To stop playing the selected clip, hold down the Mackie Control's *Options* button while pressing zoom, and use the *Alt* button to add/remove the selected slot's Clip Stop button.

      Note that the LEDs associated with the zoom buttons will display the play status of a clip: an illuminated LED signifies a playing clip; a blinking LED signifies a clip that has been triggered but is not yet playing; and an unilluminated LED signifies a stopped clip or empty slot.

    - In the Arrangement View, with the zoom button enabled (i.e., its LED illuminated), you can use the arrow buttons for zooming and scrolling in the currently selected track. When zoom is not enabled, the arrow buttons can be used to select tracks.

11. *Scrub* – This fires the currently selected scene in the Session View and has no effect in the Arrangement View. To stop all running clips, hold down the Mackie

Control's *Options* button while pressing this.

12. *Jog Wheel* – In the Session View, the jog wheel scrolls through the scenes. In the Arrangement View, the jog wheel moves the play position. To change global quantization, hold down the Mackie Control's *Control* button while turning the jog wheel. You can also use the Mackie Control's *Alt* button in the Arrangement View to move the play position in smaller increments.

23.3.5   Software-Specific Controls

The Software-Specific Controls.

1. *Shift, Option, Control, Alt* – Used to access additional Mackie Control options.

2. *SMPTE/Beats* – Toggles between displaying beats/bars and SMPTE in the time display.

3. *Name/Value* – Switches the meters in the main display on/off. Note that these

meters appear only when pan assignment mode is active.

4. *F-Keys* – These keys can be mapped freely to controls in Live.

5. *ViewArr (On)* – Toggles Arrangement View and Session View. When the Mackie Control's *Shift* key is held down, this sets the program focus to the Arrangement View or Session View, whichever is currently on screen.

6. *ToggleDetail (Rec/Rdy)* – Toggles Clip View and Track View. When the Mackie Control's *Shift* key is held down, this sets the program focus to the Clip View or Track View, whichever is currently on screen.

7. *ViewBrowser (SnapShot)* – Shows/hides the Browser. When the Mackie Control's *Shift* key is held down, this sets the program focus to the Browser.

8. *ViewDetail (Touch)* – Shows/Hides the Clip/Track View. When the Mackie Control's *Shift* key is held down, this sets the program focus to the Clip View or Track View, whichever is currently on screen.

9. *Undo* and *Redo* – Undoes/redoes the last change made to the Live Set. The LED will illuminate if there is an available action to undo/redo.

10. *BTA (Cancel)* – Stops clips in the Session View from playing differently than how they were recorded into the Arrangement, and returns to playing the Arrangement. The LED will illuminate if there is an Arrangement state available to which to return.

11. *Locator (Marker)* – Deletes a locator when a locator is currently selected and the song is stopped. Otherwise, it creates a new locator at the current play position.

12. *DrawMode (Enter)* – Enables/disables Draw Mode, for drawing notes and envelopes.

13. *Follow (Mixer)* – Toggles Follow Mode, which scrolls Live's display to follow playback.

Chapter 24

Synchronization and ReWire

24.1 Synchronizing via MIDI

The MIDI protocol defines two ways to synchronize sequencers, both of which are supported by Live. Both protocols work with the notion of a sync *master*, which delivers a sync signal that is tracked by the sync *slave(s)*.

- MIDI Clock. MIDI Clock works like a metronome ticking at a fast rate. The rate of the incoming ticks is tempo-dependent: Changing the tempo at the sync master (e.g., a drum machine) will cause the slave to follow the change. The MIDI Clock protocol also provides messages that indicate the song position. With respect to MIDI Clock, Live can act as both a MIDI sync master and slave.

- MIDI Timecode. MIDI Timecode is the MIDI version of the SMPTE protocol, the standard means of synchronizing tape machines and computers in the audio and film industry. A MIDI Timecode message specifies a time in seconds and frames (subdivisions of a second). Live will interpret a Timecode message as a position in the Arrangement. Timecode messages carry no meter-related information; when slaving Live to another sequencer using MIDI Timecode, you will have to adjust the tempo manually. Tempo changes cannot be tracked. Detailed MIDI Timecode preferences

are explained later in this chapter. With respect to MIDI Timecode, Live can only act as a MIDI sync slave, not a master.

24.1.1 Synchronizing External MIDI Devices to Live

Live can send MIDI Clock messages to an external MIDI sequencer (or drum machine). After connecting the sequencer to Live and setting it up to receive MIDI sync, turn the device on as a sync destination in Live's MIDI/Sync Preferences.
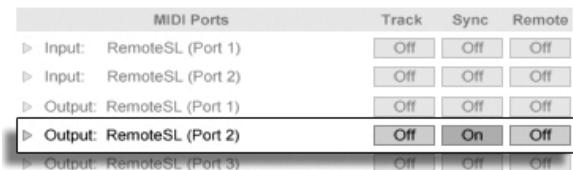
Choosing a MIDI Slave for Live.

The lower indicator LED next to the Control Bar's EXT button will flash when Live is sending sync messages to external sequencers.

24.1.2 Synchronizing Live to External MIDI Devices

Live can be synchronized via MIDI to an external sequencer. After connecting the sequencer to Live and setting it up to send sync, use Live's MIDI/Sync Preferences to tell Live about the connection.

Setting up Live as a MIDI Slave.

Then, activate external sync either by switching on the EXT button in the Control Bar or using the External Sync command in the Options menu. The upper indicator LED next to the EXT button will flash if Live receives useable sync messages.

When Live is synced to an external MIDI device, it can accept song position pointers from this device, syncing it not only in terms of tempo but in terms of its position in the song. If the master jumps to a new position within the song, Live will do the same. However, if the Control Bar's Loop switch is activated, playback will be looped, and song position pointers will simply be "wrapped" into the length of the loop.

24.1.3 MIDI Timecode Options

Timecode options can be set up per MIDI device. Select a MIDI device from the MIDI/Sync Preferences' MIDI Ports list to access the settings.

The *MIDI Timecode Frame Rate* setting is relevant only if "MIDI Timecode" is chosen from the MIDI Sync Type menu. The MIDI Timecode Rate chooser selects the type of Timecode to which Live will synchronize. All of the usual SMPTE frame rates are available. When the Rate is set to "SMPTE All," Live will auto-detect the Timecode format of incoming sync messages and interpret the messages accordingly. Note that you can adjust the Timecode format that is used for display in the Arrangement View: Go to the Options menu, and then access the Time Ruler Format sub-menu.

The *MIDI Timecode Offset* setting is also only relevant if "MIDI Timecode" is chosen from the Sync Type menu. You can specify a SMPTE time offset using this control. Live will interpret this value as the Arrangement's start time.

24.1.4 Sync Delay

The *Sync Delay* controls, which are separately available for each MIDI device, allow you to delay Live's internal time base against the sync signal. This can be useful in compensating for delays incurred by the signal transmission. The Sync Delay for a specific MIDI device appears as you select the MIDI device from the MIDI/Sync Preferences' MIDI Ports list. To adjust the delay, have both Live and the other sequencer play a rhythmical pattern with

pronounced percussive sounds. While listening to the output from both, adjust the Sync Delay control until both sounds are in perfect sync.

24.2   Connecting via ReWire

Live supports the *ReWire* interface for connecting with another ReWire-compatible audio program running on the same computer.

The ReWire technology, developed by *Propellerhead Software*, provides ReWire-compatible programs with:

- common access to the audio hardware;
- shared transport functionality;
- synchronization to audio word clock and song positioning;
- exchange of audio streams.

The programs in a ReWire connection play distinct roles: The *ReWire master* accesses the audio hardware and provides mixing facilities; the *ReWire slave(s)* have no direct link to the audio hardware, but instead send their audio output into the Master's mixer.

Common ReWire master applications are Digidesign Pro Tools, Steinberg Cubase and Nuendo, Emagic Logic Audio, MOTU Digital Performer, Cakewalk Sonar and Cycling 74 Max/MSP. Common ReWire slave applications are Propellerheads Rebirth, Propellerheads Reason, Arturia Storm, Cakewalk Project 5 and Cycling 74 Max/MSP. Live can act as both a ReWire master and slave.

Note that the ReWire protocol itself does not consume much CPU power. However, as expected, running two audio-intensive programs on the same computer requires more

resources than running a single program.

24.2.1   Running Live in ReWire Master Mode

The step-by-step procedure for sending MIDI to and receiving audio from a ReWire slave program is presented in the routing chapter.

24.2.2   Running Live in ReWire Slave Mode

In ReWire slave mode, Live can both receive MIDI from, but also send audio to the master application. All of Live's MIDI tracks are accessible to the master application as destinations for MIDI signals, and all of its audio tracks and MIDI tracks containing instruments are accessible as audio sources.

If you have not used Live yet, please launch Live so that it can install its ReWire engine in your system.

Live will run in ReWire slave mode if it detects a running ReWire master application upon startup. Therefore, always start the ReWire master application first, and then start Live.

Likewise, you will first have to quit Live, then the ReWire master application.

Live's operation in ReWire slave mode differs from the usual operation in some regards:

- Live will not have direct access to the audio interfaces; audio input/output is handled by the ReWire master application. No audio input will be available to Live.

- The sample rate is determined by the host application rather than by Live.

- External synchronization will be disabled (synchronize to the ReWire master application instead). Live will not send sync or controller messages to the MIDI output. Controlling Live via MIDI is still possible.

- Live will not act as a ReWire master application. For instance, you cannot run Rebirth as a ReWire slave of Live while Live is running as a ReWire slave of Cubase. You can, however, run both Live and Rebirth as ReWire slaves of Cubase at the same time.

24.2.3   More on ReWire

You can find tutorials on connecting Live to specific ReWire master programs at the Ableton tutorial website[1].

The Ableton FAQ website[2] is the first place to go if you encounter ReWire-related problems.

If you cannot seem to find an answer there, please contact the Ableton support team[3].

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[1] http://www.ableton.com/tutorials
[2] http://www.ableton.com/faq
[3] http://www.ableton.com/support

Chapter 25

Computer Audio Resources and Strategies

Real-time audio processing is a demanding task for general-purpose computers, which are usually designed to run spreadsheets and surf the Internet. An application like Live requires a powerful CPU and a fast hard disk. This section will provide some insight on these issues, and should help you avoid and solve problems with running audio on a computer.

25.1   Managing the CPU Load

To output a continuous stream of sound through the audio hardware, Live has to perform a huge number of calculations every second. If the processor can't keep up with what needs to be calculated, the audio will have gaps or clicks. Factors that affect computational speed include processor clock rates (e.g., speed in MHz or GHz), architecture, memory cache performance (how efficiently a processor can grab data from memory) and system bus bandwidth – the computer's "pipeline" through which all data must pass. For this reason, many people involved with pro audio use computers that are optimized for musical applications.

Fortunately, Live supports multicore and multiprocessor systems, allowing the processing load from things like instruments, effects and I/O to be distributed among the available resources. Depending on the machine and the Live Set, the available processing power can be several times that of older systems.

If you are working on a multicore or multiprocessor system, you will want to enable support for it in the CPU tab of Live's Preferences.

The CPU Load Meter.

The Control Bar's CPU meter displays how much of the computer's computational potential is currently being used. For example, if the displayed percentage is 10 percent, the computer is just coasting along. If the percentage is 100 percent, the processing is being maxed out – it's likely that you will hear gaps, clicks or other audio problems. Note that the CPU meter takes into account only the load from processing audio, not other tasks the computer performs (e.g., managing Live's user interface).

Audio calculations have the highest priority in Live. Therefore, even if the CPU shows a high percentage of processor usage, the audio stream should remain uninterrupted. However, non-critical functions (such as screen redraws) might slow down because these tasks are handled only when the audio processing "lightens up" a bit.

25.1.1   CPU Load from Multichannel Audio

One source of constant CPU drain is the process of moving data to and from the audio hardware. This drain can be minimized by disabling any inputs and outputs that are not required in a project. There are two buttons in the Audio Preferences to access the Input and Output Configuration dialogs, which allow activating or deactivating individual ins and outs.

Live does not automatically disable unused channels, because the audio hardware drivers usually produce an audible "hiccup" when there is a request for an audio configuration change.

25.1.2   CPU Load from Tracks and Devices

Generally, every track and device being used in Live incurs some amount of CPU load. However, Live is "smart" and avoids wasting CPU cycles on tracks and devices that do not contribute anything useful.

For example, dragging devices into a Live Set that is not running does not significantly increase the CPU load. The load increases only as you start playing clips or feed audio into the effects. When there is no incoming audio, the effects are deactivated until they are needed again. (If the effect produces a "tail," like reverbs and delays, deactivation occurs only after all calculations are complete.)

While this scheme is very effective at reducing the average CPU load of a Live Set, it cannot reduce the peak load. To make sure your Live Set plays back continuously, even under the most intense conditions, play back a clip in every track simultaneously, with all devices enabled.

25.1.3   Track Freeze

Live's Freeze Track command can greatly help in managing the CPU load incurred by devices and clip settings. When you select a track and execute the Freeze Track command, Live will create a sample file for each Session clip in the track, plus one for the Arrangement. Thereafter, clips in the track will simply play back their "freeze files" rather than repeatedly calculating processor-intensive device and clip settings in real time. The Freeze Track command is available from Live's Edit menu and from the 🖰 (PC) / Ctrl 🖰 (Mac) context menu of tracks and clips.

Once any processing demands have been addressed (or you have upgraded your machine!), you can always select a frozen track and choose Unfreeze Track from the Edit menu to change device or clip settings. On slower machines, you can unfreeze processor-intensive tracks one at a time to make edits, freezing them again when you are done.

Many editing functions remain available to tracks that are frozen. Launching clips can still be done freely, and mixer controls such as volume, pan and the sends are still available. Other possibilities include:

- Edit, cut, copy, paste, duplicate and trim clips;

- Draw and edit mixer automation and mixer clip envelopes;

- Consolidate;

- Record Session View clip launches into the Arrangement View;

- Create, move and duplicate Session View scenes;

- Drag frozen MIDI clips into audio tracks.

When performing edits on frozen tracks that contain time-based effects such as reverb, you should note that the audible result may be different once the track is again unfrozen, depending on the situation. This is because, if a track is frozen, the applied effects are not being calculated at all, and therefore cannot change their response to reflect edited input material. When the track is again unfrozen, all effects will be recalculated in real time.
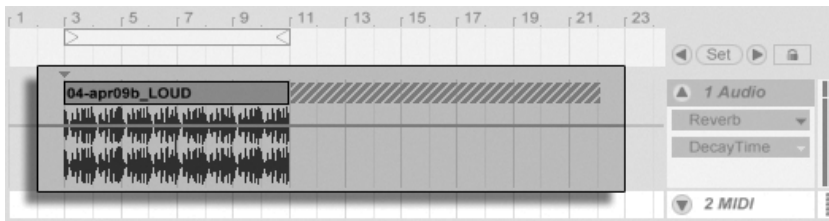
A Frozen Arrangement Track with a Reverb Tail.

Frozen Arrangement View tracks will play back any relevant material extending beyond the lengths of their clips (e.g., the "tails" of Reverb effects). These frozen tails will appear in the Arrangement as crosshatched regions located adjacent to their corresponding clips. They are treated by Live as separate, "temporary" clips that disappear when unfrozen, since the effect is then calculated in real time. Therefore, when moving a frozen clip in the Arrangement, you will usually want to select the second, frozen *tail* clip as well, so that the two remain together.

For frozen Session clips, only two loop cycles are included in the frozen clip, which means that clips with unlinked clip envelopes may play back differently after two loop cycles when frozen.

The samples generated by the Freeze Track command are stored in your temporary recording folder until you save your Live Set, at which point they are moved to the following project folder sub-directory: Samples/Processed/Freeze.

You can also decide to *flatten* frozen tracks, which completely replaces the original clips and devices with their audible result. The Flatten command is available from the Edit menu.

Besides providing an opportunity to conserve CPU resources on tracks containing a large number of devices, the Track Freeze command simplifies sharing projects between computers. Computers that are a bit low on processing power can be used to run large Live Sets as long as any CPU-intensive tracks are frozen. This also means that computers lacking certain devices used in one Live Set can still play the Set when the relevant device tracks are frozen.

25.2   Managing the Disk Load

A hard drive's access speed (which is related to, but not the same thing as rotational speed) can limit Live's performance. Most audio-optimized computers use 7200 RPM or faster drives. Laptops, to save power, often use 5400 RPM or slower drives, which is why projects on laptops usually have lower track counts. The amount of disk traffic Live generates is roughly proportional to the number of audio channels being written or read simultaneously. A track playing a stereo sample causes more disk traffic than a track playing a mono sample.
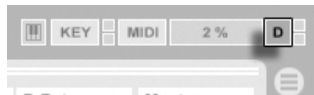
The Disk Overload Indicator.

The Disk Overload indicator flashes when the disk was unable to read or write audio quickly enough. When recording audio, this condition causes a gap in the recorded sample; when playing back, you will hear dropouts.

Do the following to avoid disk overload:

- Reduce the amount of audio channels being written by choosing mono inputs instead of stereo inputs in the Audio Preferences' Channel Configuration dialog.

- Use RAM Mode for selected clips.

- Reduce the number of audio channels playing by using mono samples instead of stereo samples when possible. You can convert stereo samples to mono using any standard digital audio editing program, which can be called up from within Live.

Chapter 26

Live Keyboard Shortcuts

26.1   Showing and Hiding Views

	Windows	Macintosh
Toggle Full Screen Mode	`F11`	`Ctrl` `F11`
Toggle Session/Arrangement View	`⇤`	`⇤`
Toggle Track/Clip View	`⇧` `⇤`	`⇧` `⇤`
Hide/Show Track/Clip View	`Ctrl` `Alt` `L` Double-Click Clip/Track	`⌃` `⌘` `Alt` `⌥` `L` Double-Click Clip/Track
Hide/Show Info View	`?`	`?`
Hide/Show Browser	`Ctrl` `Alt` `B`	`⌃` `⌘` `Alt` `⌥` `B`
Hide/Show Overview	`Ctrl` `Alt` `O`	`⌃` `⌘` `Alt` `⌥` `O`
Hide/Show In/Out	`Ctrl` `Alt` `I`	`⌃` `⌘` `Alt` `⌥` `I`
Hide/Show Sends	`Ctrl` `Alt` `S`	`⌃` `⌘` `Alt` `⌥` `S`
Hide/Show Mixer	`Ctrl` `Alt` `M`	`⌃` `⌘` `Alt` `⌥` `M`
Hide/Show Crossfader	`Ctrl` `Alt` `F`	`⌃` `⌘` `Alt` `⌥` `F`

	Windows	Macintosh
Open the Preferences	⌈Ctrl⌉ ⌈,⌉	⌈⌘⌉ ⌈,⌉
Close Window/Dialog	⌈Esc⌉	⌈Esc⌉

26.2 Accessing Menus

Under Windows, you can access each menu by pressing ⌈Alt⌉ and the first letter of the menu (⌈Alt⌉⌈F⌉ for "File," for instance). While a menu is open, you can use:

- ⌈↓⌉⌈↑⌉ to navigate the menu items;
- ⌈←⌉⌈→⌉ to open the neighboring menu;
- ⌈Return⌉ to choose a menu item.

26.3 Adjusting Values

	Windows	Macintosh
Increment/Decrement	⌈↓⌉ ⌈↑⌉	⌈↓⌉ ⌈↑⌉
Large Increment/Decrement	⌈↓Page⌉ ⌈↑Page⌉	⌈↓Page⌉ ⌈↑Page⌉
Return to Default	⌈Delete⌉	⌈←⌉
Type in Value	⌈0⌉ .. ⌈9⌉	⌈0⌉ .. ⌈9⌉
Go to Next Field (Bar.beat.16th)	⌈.⌉⌈,⌉	⌈.⌉⌈,⌉
Abort Value Entry	⌈Esc⌉	⌈Esc⌉
Confirm Value Entry	⌈Return⌉	⌈Return⌉

26.4   Browsing

In addition to the shortcuts shown here, editing shortcuts can also be used in the Browser.

	Windows	**Macintosh**
Scroll Up/Down	⬇ ⬆	⬇ ⬆
Open/Close Folders	← →	← →
Set Selected Folder as Browser Root	Return	Return
Load Selected Item from Browser	Return or Double-Click	Return or Double-Click
Preview Selected File	⇧ Return	⇧ Return
Activate Browser Search Mode	Ctrl ⇧ F	⌃ ⌘ ⇧ F
Jump to Search Results	⬇	⬇

26.5   Transport

	Windows	**Macintosh**
Play from Start Marker/Stop	Space	Space
Continue Play from Stop Point	⇧ Space	⇧ Space
Play Arrangement View Selection	Ctrl Space	Alt ⌥ Space
Record	F9	F9
Back to Arrangement	F10	F10
Activate/Deactivate Track 1..8	F1 .. F8	F1 .. F8

26.6 Editing

	Windows	**Macintosh**
Cut	Ctrl X	⌘ X
Copy	Ctrl C	⌘ C
Paste	Ctrl V	⌘ V
Duplicate	Ctrl D	⌘ D
Delete	Delete	←
Undo	Ctrl Z	⌘ Z
Redo	Ctrl ⇧ Z	⌘ ⇧ Z
Rename	Ctrl R	⌘ R
Select All	Ctrl A	⌘ A

By holding down an additional modifier key, some of the above commands can also be applied to:

	Windows	**Macintosh**
Clips and Slots Across all Tracks	⇧	⇧
Time Across all Tracks	⇧	⇧
The Selected Part of the Envelope	Alt	Alt ⌥

⇥ can be used to move from one track or scene to another while renaming.

26.7   Loop Brace and Start/End Markers

The loop brace and start/end markers must first be selected before any of the following commands will apply to them.

	Windows	Macintosh
Move Start Marker to Position	⇧ Click	⇧ Click
Nudge Loop Left/Right	← →	← →
Move Loop By Loop Length	↓ ↑	↓ ↑
Double/Halve Loop Length	Ctrl ↓ ↑	⌃ ⌘ ↓ ↑
Shorten/Lengthen Loop	Ctrl ← →	⌃ ⌘ ← →
Select Material in Loop	Click Loop Brace or Ctrl ⇧ L	Click Loop Brace or ⌃ ⌘ ⇧ L

26.8   Session View Commands

See also the editing commands.

	Windows	Macintosh
Launch Selected Clip/Slot	Return	Return
Select Neighbouring Clip/Slot	Arrow Keys	Arrow Keys
Select all Clips/Slots	Ctrl A	⌃ ⌘ A
Copy Clips	Ctrl Drag	Alt ⌥ Drag
Add/Remove Stop Button	Ctrl E	⌃ ⌘ E
Insert MIDI clip	Ctrl ⇧ M or Double-Click Slot	⌃ ⌘ ⇧ M or Double-Click Slot
Insert Scene	Ctrl I	⌃ ⌘ I
Insert Captured Scene	Ctrl ⇧ I	⌃ ⌘ ⇧ I
Drop Browser Clips as a Scene	Ctrl	⌃ ⌘

26.9   Arrangement View Commands

The shortcuts for zooming, snapping/drawing and loop/region settings also work in the Arrangement View. See also the editing commands.

	Windows	Macintosh
Split Clip at Selection	Ctrl E	⌃ ⌘ E
Consolidate Selection into Clip	Ctrl J	⌃ ⌘ J
Loop Selection	Ctrl L	⌃ ⌘ L
Insert Silence	Ctrl I	⌃ ⌘ I
Pan Left/Right of Selection	Ctrl Alt	⌃ ⌘ Alt
Unfold all Tracks	Alt Unfold button	Alt Unfold button
Scroll Display to Follow Playback	Ctrl F	⌃ ⌘ F

26.10   Commands for Tracks

See also the editing commands.

	Windows	Macintosh
Insert Audio Track	Ctrl T	⌃ ⌘ T
Insert MIDI Track	⇧ Ctrl T	⇧ ⌃ ⌘ T
Insert Return Track	Ctrl Alt T	⌃ ⌘ Alt T
Rename Selected Track	Ctrl R	⌃ ⌘ R
While Renaming, Go to next Track	⇥	⇥
Arm/Solo Multiple Tracks	Ctrl Click	⌃ ⌘ Click
Add Device from Browser	Double-Click	Double-Click

26.11   Commands for Breakpoint Envelopes

The shortcuts for zooming, snapping/drawing and loop/region settings also work in the Envelope Editor and Arrangement View. See also the editing commands.

	Windows	Macintosh
Finer Resolution for Dragging	Ctrl	⌃ ⌘
Enable Dragging Over Breakpoints	⇧	⇧

26.12   Key/MIDI Map Mode and the Computer MIDI Keyboard

	Windows	Macintosh
Toggle MIDI Map Mode	Ctrl M	⌃ ⌘ M
Toggle Key Map Mode	Ctrl K	⌃ ⌘ K
Computer MIDI Keyboard	Ctrl ⇧ K	⌃ ⌘ ⇧ K

26.13   Zooming, Display and Selections

	Windows	Macintosh
Zoom In	+	+
Zoom Out	−	−
Drag/Click to Append to a Selection	⇧	⇧
Click to Add Adjacent Clips to Multi-Selection	⇧	⇧
Click to Add Nonadjacent Clips to a Multi-Selection	Ctrl	⌃ ⌘
Follow (Auto-Scroll)	Ctrl F	⌃ ⌘ F
Pan Left/Right of Selection	Ctrl Alt	⌃ ⌘ Alt ⌥

26.14   Clip View Sample Display

The shortcuts for zooming and loop/region settings also work in the Sample Display.

	Windows	Macintosh
Move Selected Warp Marker	← →	← →
Select Warp Marker	Ctrl ← →	⌃ ⌘ ← →
Scroll Display to Follow Playback	Ctrl F	⌃ ⌘ F
Move Clip Region with Start Marker	⇧ ← →	⇧ ← →

26.15   Clip View MIDI Editor

The shortcuts for zooming, snapping/drawing and loop/region settings also work in the MIDI Editor.

	Windows	**Macintosh**
Quantize	Ctrl U	⌃ ⌘ U
Scroll Editor Vertically	↓Page ↑Page	↓Page ↑Page
Scroll Editor Horizontally	Ctrl ↓Page ↑Page	⌃ ⌘ ↓Page ↑Page
Copy Note	Ctrl Drag	Alt ⌥ Drag
Change Velocity From Note Editor	Alt Drag	⌃ ⌘ Drag
Add/Delete Note in Edit Mode	Double-Click	Double-Click
Scroll Display to Follow Playback	Ctrl F	⌃ ⌘ F
Move Clip Region with Start Marker	⇧ ← →	⇧ ← →

26.16   Grid Snapping and Drawing

	Windows	**Macintosh**
Toggle Draw Mode	Ctrl B	⌃ ⌘ B
Narrow Grid	Ctrl 1	⌃ ⌘ 1
Widen Grid	Ctrl 2	⌃ ⌘ 2
Triplet Grid	Ctrl 3	⌃ ⌘ 3
Snap to Grid	Ctrl 4	⌃ ⌘ 4
Fixed/Zoom-Adaptive Grid	Ctrl 5	⌃ ⌘ 5
Bypass Snapping While Dragging	Alt	⌃ ⌘

26.17   Global Quantization

	Windows	Macintosh
Sixteenth-Note Quantization	Ctrl 6	⌃ ⌘ 6
Eighth-Note Quantization	Ctrl 7	⌃ ⌘ 7
Quarter-Note Quantization	Ctrl 8	⌃ ⌘ 8
1-Bar Quantization	Ctrl 9	⌃ ⌘ 9
Quantization Off	Ctrl 0	⌃ ⌘ 0

26.18   Working with Sets and the Program

	Windows	Macintosh
New Live Set	Ctrl N	⌃ ⌘ N
Open Live Set	Ctrl O	⌃ ⌘ O
Close Live Set	Ctrl W	⌃ ⌘ W
Save Live Set	Ctrl S	⌃ ⌘ S
Save Live Set As...	⇧ Ctrl S	⇧ ⌃ ⌘ S
Quit Live	Ctrl Q	⌃ ⌘ Q
Hide Live		⌃ ⌘ H
Render to Disk	Ctrl ⇧ R	⌃ ⌘ ⇧ R
Export MIDI file	Ctrl ⇧ E	⌃ ⌘ ⇧ E

26.19   Working with Plug-Ins and Devices

	Windows	**Macintosh**
Show/Hide Plug-In Windows	`Ctrl` `P`	`⌃` `⌘` `P`
Open Second/Multiple Windows with Plug-In Edit Button	`Ctrl`	`⌃` `⌘`
Open Mac Keystroke Plug-In Window with Plug-In Edit Button		`⇧`
Group/Ungroup Devices	`Ctrl` `G`	`⌃` `⌘` `G`
Activate/Deactivate All Devices in Group	`Alt` Device Activator	`Alt` `⌥` Device Activator
Click to Append Devices to a Selected Device	`⇧`	`⇧`
Load Selected Device From Browser	`Return` or Double-Click	`Return` or Double-Click

26.20   Using the Context Menu

A context menu is available in Live for quick access to many commonly used menu items. To access the context menu, 🖱 (PC) / `Ctrl` 🖱 (Mac) on the part of the interface where you would like to execute a particular command. It is worth noting that Live's context menu may sometimes contain applicable settings from the Preferences. You should change these options with care, as they will affect not only the currently selected item but the general settings of the program.

Some commands *only* appear in the context menu. Among these are: the Create Folder, Analyze Audio, Search In Folder, Close All Folders and Refresh commands from the Browser; the special grid marker commands for directing Auto-Warp; detailed options for zoom-adaptive and fixed grid line width; and copying and pasting for Operator's envelopes and oscillators.

Chapter 27

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