Real-Time Music Production for Mac OS and Windows

Reference Manual

version 4

Live Lite 4 for M-Audio Version 4.0.4 for Windows and Mac OS

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Chapter 1

Welcome to Live Lite 4 for M-Audio

Ableton and M-Audio are happy to present you this special edition of Live, Ableton's award-winning real-time music production software. Live has changed the way thousands of composers, musicians and performers around the world record, create and peform music with a computer. We offer you this version of Live in the belief it can greatly enhance your creative process.

Have a lot of fun with Live Lite 4 for M-Audio!

1.1 What is Live?

Ableton Live is the music-production solution that allows you to spontaneously compose, record, remix, improvise and edit your musical ideas. Live brings your acoustic, electronic and virtual instruments, as well as your digital audio recordings, together in a single interface with unparalleled ease of use. Live was made to let you focus on what really matters: your music.

1.2 What is Special about Live Lite 4 for M-Audio?

Live Lite 4 for M-Audio is a special edition that includes many of Live's exciting creative possibilities. In contrast to the full version of Live, this edition puts a limit on the number of tracks, effects, ins, outs and so on that you can run at the same time. The software will alert you as you exceed these limits. Some of the full version's features are not available in Live Lite 4 for M-Audio at all:

- Unlike the full version, Live Lite 4 for M-Audio will not run as a ReWire slave program to other DAWs such as Cubase, Logic, Digital Performer.
- The full version's MIDI sync and time code capabilites are missing.

Ableton has attractive upgrade offers for M-Audio customers. Please check the Help menu's "Upgrade" entry to learn more!

Chapter 2

First Steps

When you have installed Live and run it for the first time, you will be presented with the *Welcome dialog*.

If you own Live, you can unlock Live using this dialog. Please see the chapter on unlocking Live (see Unlocking Live) should you have questions or concerns that arise during the unlocking process.

If you do not (yet) own Live, please click the "Run Demo" button to proceed. You will be able to work with all of Live's features with the exception of saving, rendering to disk and resampling.

2.1 Learn About Live

Live comes with a set of interactive "lessons" that take you step by step through the key features of the program. The lessons can be opened via the Help menu or the Demos and Tutorials folder in

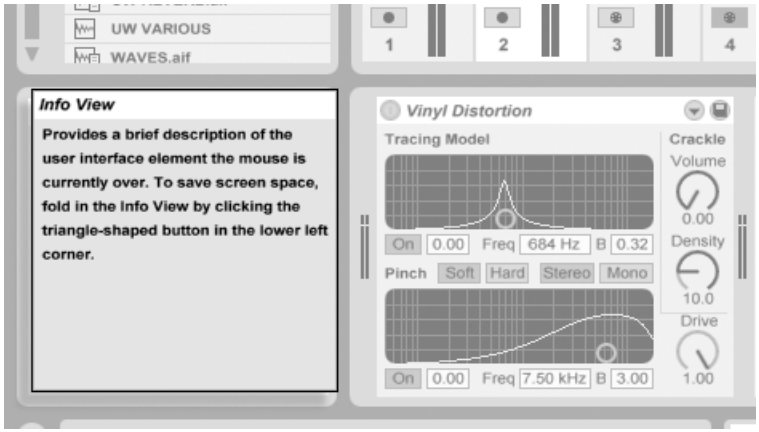
Live's File Browser. We highly recommend that you follow these lessons. Many users have told us the lessons have helped them to get familiar with the program very quickly.

A Lesson in the File Browser.

We also recommend that you read the Live Basics chapter (see Live Basics), which encapsulates everything that Live is and can do in a single chapter, and is therefore a worthwhile read for both beginners and experienced users. The remaining chapters of this manual serve as an in-depth reference for the material introduced in the Live Basics chapter.

2.1.1 Using the Info View and Index

Live's Info View tells you the name and function of the user interface element currently under the mouse.



The Info View.

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 reference manual, contains the names of all user interface elements and will lead you to the relevant section.

2.2 The Main Live Screen

Most of your work in Live happens in the main Live screen. This screen consists of a number of views. Each view manages a specific aspect of your project. As screen space is limited, the other Live views cannot all be up at the same time.

Each one of the *selector buttons* at the screen borders calls up a specific view; click this one, for instance, to access the Live devices.

A View Selector.

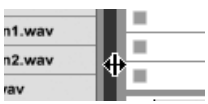
To hide one of Live's views, thus freeing up screen space, click on the triangle-shaped button next

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 "Full Screen" 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 the F11 key.

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



Adjusting the Main Window Split.

You can select from among a set of "skins" (color schemes) for Live's user interface using the Misc Preferences Load Skin chooser. You can also select the system language from the Misc Preferences.

2.3 Set up Audio and MIDI Preferences

After learning about the interface and capabilities of the program, you will probably want to start making music. You may want to configure a few preferences before doing so, in order to tell Live about your studio hardware. Open the Live Preferences by going to the Options menu (or the Live menu in Mac OS X) and selecting the "Preferences" option.

- Please see the Audio Preferences chapter (see Audio Preferences Setup) for the steps to setting up the "Audio" Preferences tab, which allows Live to run audio with your computer and hardware setup.
- The "MIDI" Preferences tab is 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, please see the chapter on routing (see External MIDI In/Out).

- Controlling parts of the interface remotely. This subject is covered in detail in the chapter on remote control (see MIDI and Key Remote Control).
- Syncing the program to an external sequencer or drum machine. Please see the manual section on sync (see Synchronizing via MIDI (Full Version Only)) for details.

Chapter 3

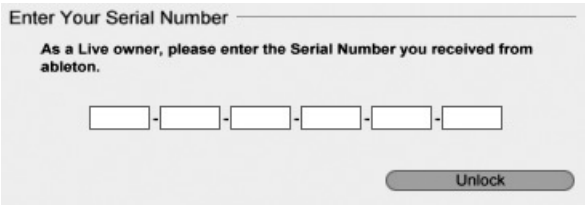
Unlocking Live

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 the customer. 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 continue developing Live.

As you start up Live, you will be presented with a dialog that walks you through the procedure in two steps.

3.1 Step 1: Entering Your Serial Number

With your M-Audio product, you have received a card that contains a *Serial Number* for Live Lite 4 for M-Audio.



The Fields for Entering Your Serial Number.

The Welcome dialog contains six fields for typing in the 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 turns red. When you have successfully entered the Serial Number, click the "Unlock" 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, 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 (see Copy Protection FAQs).

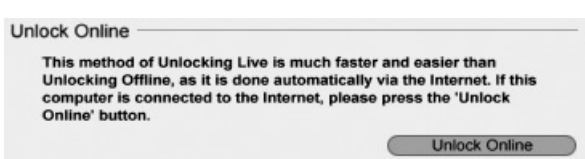
3.2.1 The Unlock Key

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 (see Copy Protection FAQs).

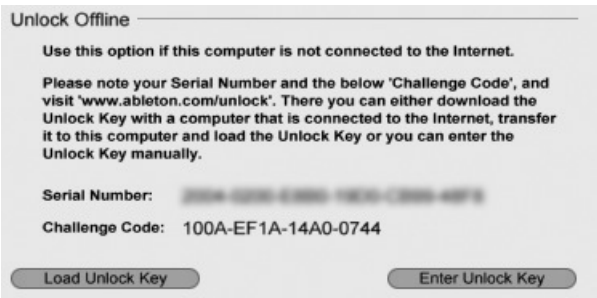
3.2.3 Unlocking Online



Unlocking Live Online.

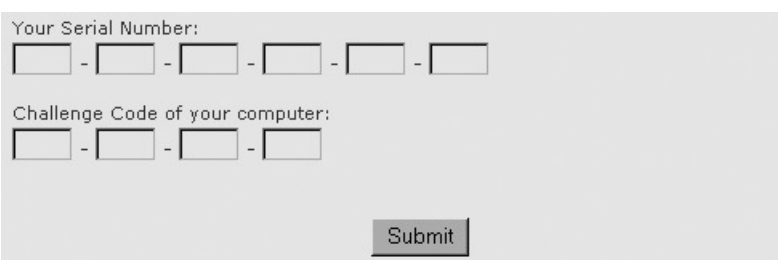
If the computer you want to unlock Live for is connected to the internet, the only thing you need to do is press the "Unlock Online" button. Live will then make a connection to the Ableton server, send your Serial Number and Challenge Code to the server, and receive the Unlock Key from the server. No information other than this is exchanged between your computer and the Ableton server.

3.2.4 Unlocking Offline



Unlocking Live Offline.

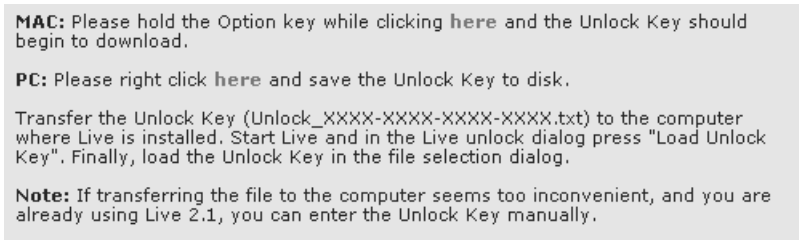
If the computer you want to unlock Live for is not connected to the internet, you can use any other computer to access the Ableton server's web interface. This is a website with fields for entering your Serial Number and the Challenge Code, which you can copy from Live's Unlock dialog.



The Live Unlocking Web Site.

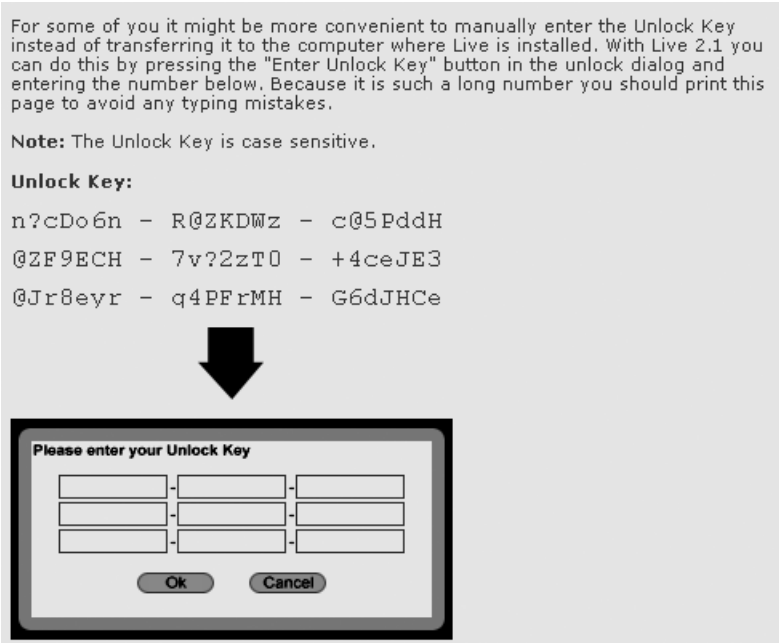
If you have entered your Serial Number and Challenge Code correctly, another website will appear to provide you with the Unlock Key. There now are two options for transferring the Unlock Key to the computer that is to be unlocked:

Follow the web link 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.

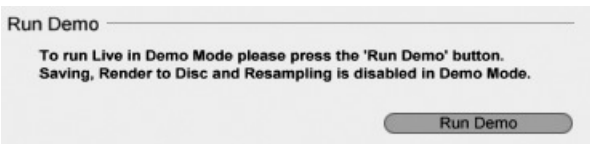
OR it might be more convenient to print the webpage with the Unlock Key on it. On the target computer, press the “Enter Unlock Key” button to open a dialog with fields for typing in the Unlock Key. Typing it in is easier than it first appears because the fields turn red if you type the wrong string.



Manually Enter Your Unlock Key.

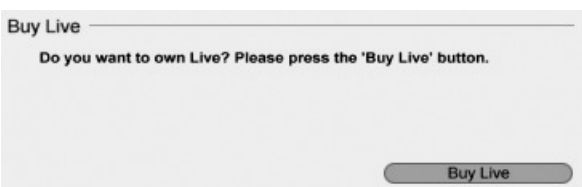
3.3 Copy Protection FAQs

3.3.1 Can I Run Live Without a Serial Number?



Live Can Run in Demo Mode.

If you do not (yet) own Live, you can work with Live in *Demo Mode*. Demo Mode offers Live's complete functionality, but saving, rendering to disc and resampling are disabled. To run Live in Demo Mode, please click the relevant button.



Click Here if You Are Interested in Buying Live.

If running Live in Demo Mode raises your interest in purchasing the full version of Live, please click the "Buy Live" button or visit the Ableton web shop. This site contains information about Ableton's distributor and dealer network. It also offers you the opportunity to buy Live online.

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 (see Can I Unlock Live More Than Once?). 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*. If you have registered your product, the Ableton server will, however, 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 (see Step 2: Unlocking Live).

You can, therefore, run Live on both a studio desktop computer and a tour laptop, but not at the same time. If you are using a Macintosh and switching back and forth between OS 9 and OS X, you can unlock Live on both systems.

Should the Ableton server reject your demand for another Unlock Key, please contact Ableton's technical support. They can be reached by:

- E-mail;
- 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;
- include a brief explanation of the circumstances.

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 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 changes to the Live Set, resample, or render to disc. 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 What Do I Do About Problems or Questions Regarding Copy Protection?

Please contact technical support. They are happy to help!

Chapter 4

Live Basics

This chapter introduces the essential concepts behind 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* (see Creating and Saving Sets). Live Sets can be opened either through the File menu's Open command or via the built-in *File Browsers*. Several Live Sets are installed with Live and show up in the Browser when Live is first launched. Double-clicking a Live Set's name opens 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, 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 (see Launching Clips).

Clips in the Session View (Left) and in the Arrangement View (Right).

The Arrangement is accessed via the *Arrangement View* (see Arrangement View) and the Session via the *Session View* (see 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.

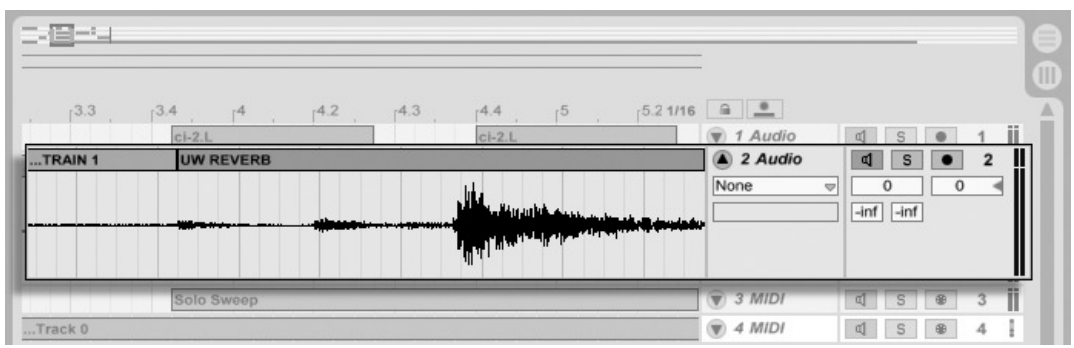
The Arrangement and Session View Selectors.

Arrangement and Session interact in useful (though potentially confusing) ways. One can, for instance, improvise with Session clips and record a log of the improvisation (see Recording Sessions

into the Arrangement) 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, the creation of new clips through recording, sound synthesis, effects processing and mixing.

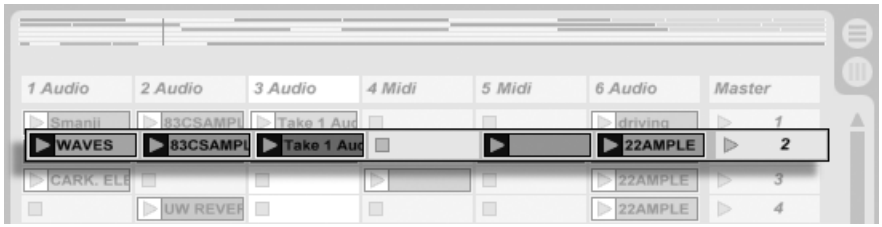


A Track in the Arrangement View.

Session and Arrangement share the same set of tracks. The tracks are vertically laid out from left to right in the Session View, and horizontally from top to bottom in the Arrangement View. 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 so-called *scenes* (see Tracks and Scenes).



A Scene in the Session View.

The exclusivity of clips in a track also implies that one track, at any time, 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 was doing before 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 Play, Stop, Record and Back to Arrangement Buttons.

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– as can be verified by clicking the *Play* button to replay the Arrangement. (Note that you can also use the computer's space bar to start and stop.) Creating and refining Arrangements by improvising with Session clips is one of Live's core applications.

4.4 Audio and MIDI

Clips represent recorded signals. Live is dealing 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* (see Working with Instruments and Effects) 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.

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 (see Audio and MIDI Tracks).

4.5 Audio Clips and Samples

An audio clip contains a reference to a *sample* (also known as a "sound file" or "audio 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.

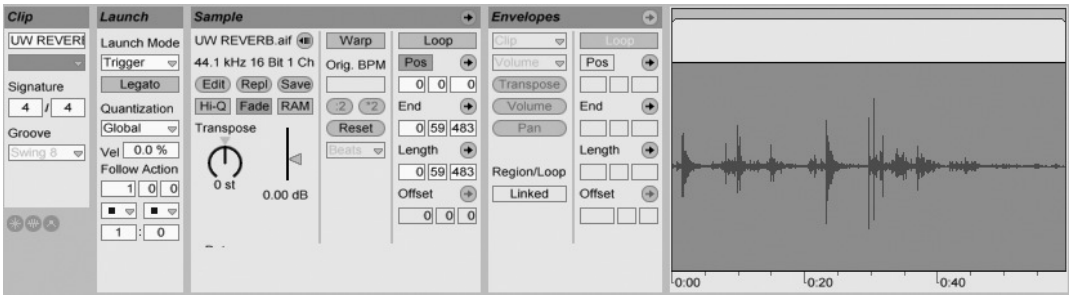
When a sample is dragged in from one of Live's built-in *File Browsers* (see Working with the File Browsers), Live automatically creates a clip to play that sample. Prior to dragging in a sample, one

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

can audition or *preview* it directly in the Browser; the switch in the Browser with the headphone icon activates previewing.

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* (see 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* (see Time-Warping Samples) capabilities. Warping means changing the speed of playback independently from the pitch, or vice versa. The most elementary use of this technique, and one that requires almost no manual setup, is synchronizing sample *loops* to the chosen tempo. With a bit more setup, warping allows you to line up *any* sample with the chosen tempo, such as a recording of a drunk jazz band's performance, or to radically change the sonic signature of a sound. To verify, change the project tempo while clips are playing by clicking in the Control Bar's *Tempo* field and dragging up and down.

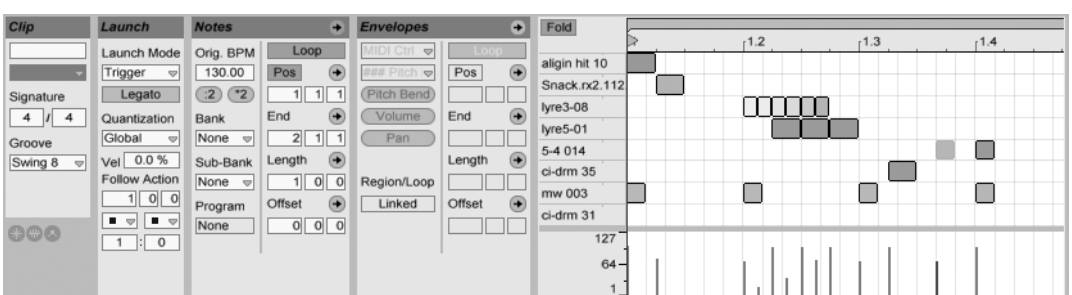
The Control Bar's Tempo Field.

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* (see Working with the File Browsers), the data gets incorporated into the Live Set, and the original file is not referenced thereafter. In the Live 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.

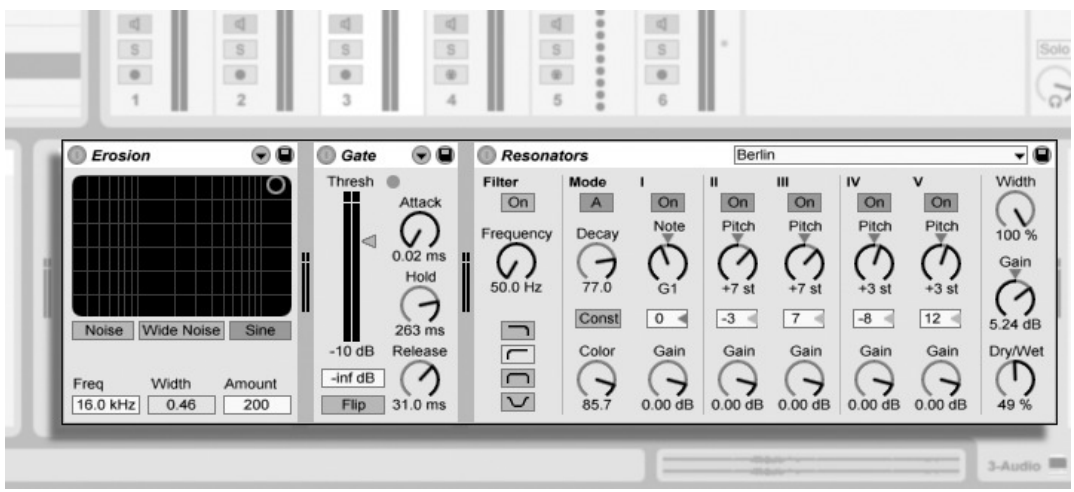
As expected, a MIDI clip's contents can be accessed and edited (see Editing MIDI Notes and Velocities) via the *Clip View*, for instance to change a melody or "paint" a drum pattern.



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* (see Working with Instruments and Effects) 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 an Audio Track's Device Chain.

Live's built-in devices (see Live Device Reference) are available from the *Device Browser* and can be dragged from there into the Track View, or onto a Track Title Bar.

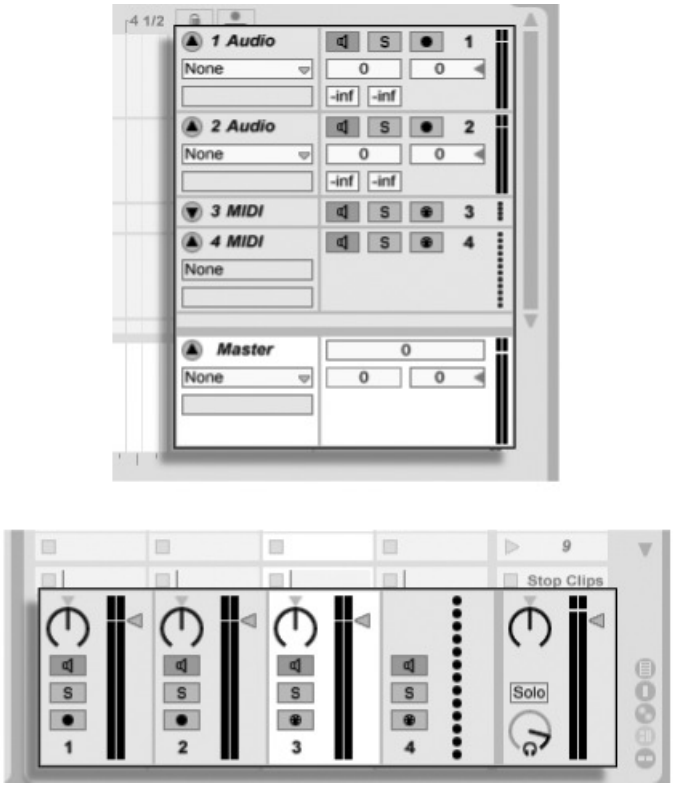
Live's Built-in Devices are Available From the Device Browser.

You can also use plug-in devices (see Using Plug-Ins) 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 (see Managing the CPU Load). Note that the signal connections between audio devices are always stereo, but the software's inputs and outputs can be configured to be mono (see Configuring Audio Device Channels).

When the signal has passed through the device chain, it ends up in Live's *mixer* (see The Live Mixer). As Session and Arrangement share the same set of tracks, so they 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.

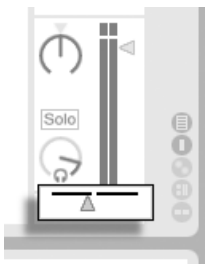


The Live Mixer in the Arrangement View (Above) and Session View (Below).

The mixer has controls for volume, pan position, and *sends*, which adjust the contribution each clip track makes to each *return track*'s input. Return tracks cannot host clips, only effects. Via their sends, all tracks can feed a part of their signal into the return track and share its effects.

The mixer also includes a crossfader (see Using Live's Crossfader) that can create smooth transitions between clips playing on different tracks. Live's crossfader works like a typical DJ mixer crossfader,

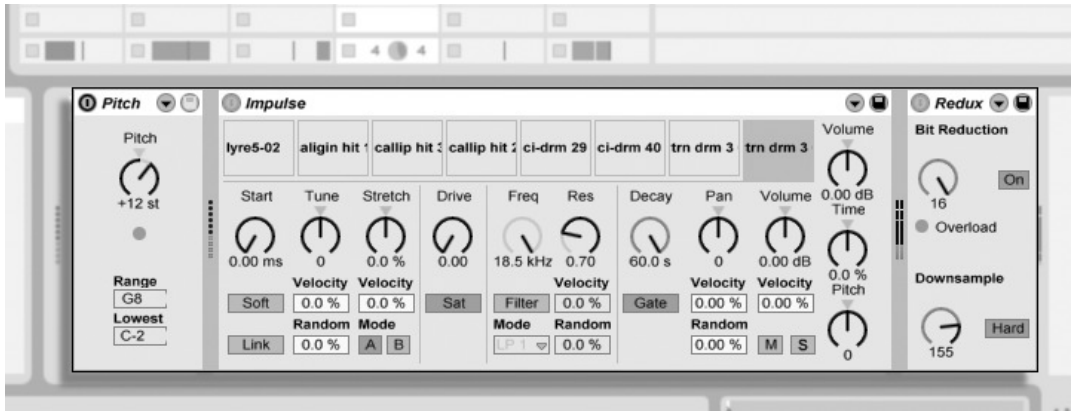
except that it allows crossfading not only two, but any number of tracks– including the returns.



Live's Crossfader.

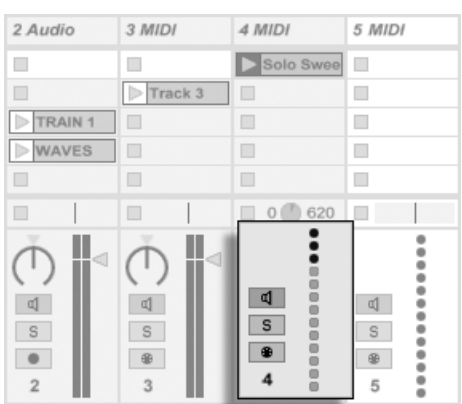
Devices that receive and deliver audio signals are called *audio effects*. Audio effects are the only type of device that fit in an audio track or a return track. Two more types of devices are available, however, for use in MIDI tracks: *MIDI effects* and *instruments*.

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.



MIDI effects, an Instrument and Audio Effects 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 That Has no Instrument.

4.8 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 Session mixer's In/Out section, accessible through the View menu's "In/Out" entry, is Live's "patchbay." Its routing options (see Routing and I/O) enable valuable creative and technical methods such as resampling, submixing, layering of synths, complex effects setups and more.

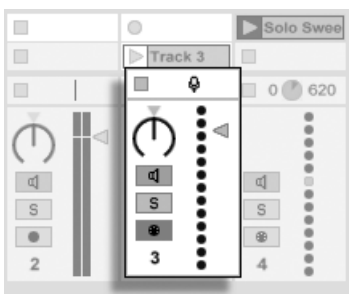
Track Routing Is Set Up Using the Live Mixer's Track In/Out Section.

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* (see Connecting 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.

4.9 Recording New Clips

Audio tracks and MIDI tracks can record their input signal, and thereby create new clips (see Recording 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.



An Armed Track, as Appears in the Session View.

It is also possible to record into Session View slots, on the fly (see Recording Into Session Slots). 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.

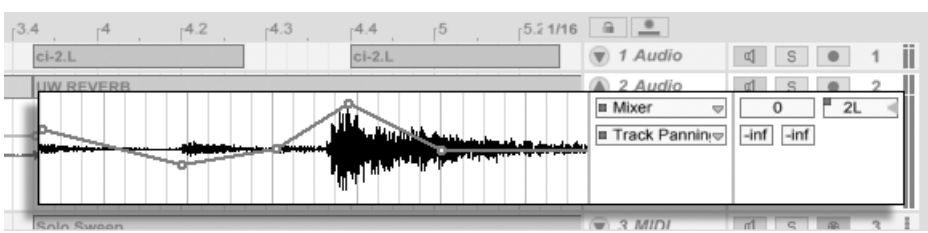
The Control Bar's Quantization Chooser.

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 (see Overdub Recording MIDI Patterns).

4.10 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* (see Automation and Editing Envelopes); 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.

4.11 Clip Envelopes

Envelopes cannot only be found in tracks, but also in clips. *Clip envelopes* (see 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.

4.12 MIDI and Key Remote (Full Version Only)

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

In this mode, you can click on any mixer or effect control, 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 leaving 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.

The Key/MIDI Map Controls.

Session clips, switches, buttons and radio buttons can be mapped to the computer keyboard keys as

well. This happens in *Key Map Mode* (see Keyboard Remote Control), which works just like MIDI Map mode.

4.13 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, the Save Set Self-Contained command (see The Sounds Folder and Self-Containing), which makes a copy of each sample and stores it in a "Sounds" folder along with the Live Set.

A separate Save button in the Clip View saves a set of default clip settings (see Saving Default Clip Settings with the Sample) 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 your work in 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 (see Exporting Audio). Live can also export individual MIDI clips as MIDI files (see Exporting MIDI Files).

Chapter 5

Audio Preferences Setup

To set up Live for audio input and output, you will need to configure a few preferences. This is a process that only needs to be done once for a given hardware setup. Open Live's Preferences from the Options menu (or the Live menu in Mac OS X); then, click on the "Audio" tab.

In order to work with an audio application such as Live, your computer needs an *audio driver* that allows communication between the software (in this case, Live) and the hardware (your audio interface or soundcard). Audio driver type depends upon the computer platform and audio interface in use. If you purchased a special audio driver or have one installed because it came with your studio hardware, you can choose to use it with Live instead of the default audio driver that came with your computer. Live supports the following audio driver types for each computer platform:

- Windows
  - MME/DirectX (see MME/DirectX) (default)
  - ASIO (see ASIO)

  - Direct I/O (see Direct I/O) (for use with Digidesign products)

- Mac OS X
  - CoreAudio (see CoreAudio) (default)
- Mac OS 9
  - Sound Manager (see Sound Manager) (default)
  - ASIO (see ASIO)
  - Direct I/O (see Direct I/O) (for use with Digidesign products)

The Driver Type chooser in the Audio Preferences shows the currently selected audio driver type. The Audio Preferences are different depending upon which driver type is being used. Go to the appropriate section among the following to set up preferences for your driver type.

5.1 Audio Preferences by Driver Type

5.1.1 MME/DirectX

When using MME/DirectX, it is only possible to access one stereo input and one stereo output channel of your audio interface, even if your interface provides multichannel capabilities. Therefore, ASIO drivers are the preferred choice for any serious audio application. ASIO drivers are available for almost every professional audio I/O interface. Check with your audio hardware's vendor if you are unsure about whether your interface supports ASIO.

If you are using MME/DirectX, do the following to set up your Audio Preferences:

1. Select the audio device(s) that you want to use with Live from the Input and Output Audio Device choosers. Your options in these choosers depend entirely on your individual software

and hardware setup– you might be offered anything from your computer's built-in soundcard to an external audio interface.

2. Select the desired Sample Rate for recording. If you want to know more about this setting and what Live does with it, please read the Sample Rate section (see Selecting a Sample Rate).

3. Please read the section on the Overall Latency adjustment (see Adjusting the Overall Latency) to find out about this setting.

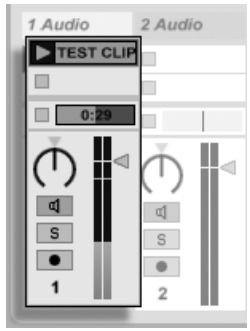
4. You can set up your audio device's input and output in the Input and Output Configuration dialogs (see Configuring Audio Device Channels). Note that, if you have a multichannel audio device, MME/DirectX drivers will only allow you access to one stereo pair for input and one for output.

5. The Input and Output Buffer Size controls are used to adjust for latency. The term *latency* refers to the time it takes for sound from the audio device's inputs to become available to the software, and for sound generated or processed by the software to arrive at the audio device's outputs.

   Latency is an undesirable, yet unavoidable fact of processing audio on a standard computer. All calculations necessary for audio are handled by the CPU. Audio software reads and writes audio in chunks, which are collected in buffers, in order to reduce the CPU load, and to have a "reservoir" of incoming or outgoing audio available for times when the processor must attend to some other task. Smaller buffers therefore create less latency but add stress to the CPU. The Buffer Size controls allow finding the smallest possible buffer size that your computer can handle without troublesome stress to the CPU.

   Do the following to find a suitable Output Buffer Size setting for your setup:

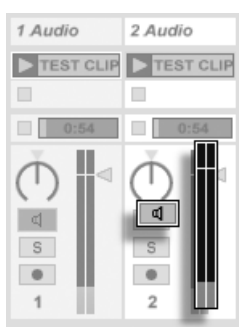
   (a) Start with an empty Live Set that has at least two audio tracks.



Launching a Test Clip in the First Track.

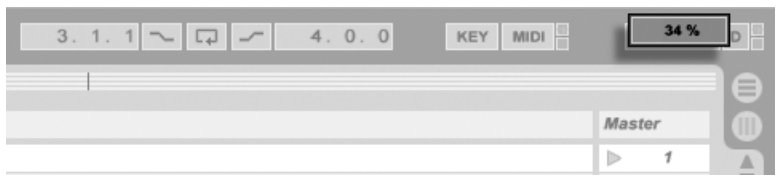
(b) Find a good sample to use for testing: We want to use a sustained sound rather than a sound that contains a lot of silence. It is best not to use percussion, or sounds containing distortion or noise, since what we will be listening for is clicking or popping sounds. Drag the sample from the Browser into the first audio track, and launch the clip. Now you should hear this clip and see its level in the level meter.

(c) In the second track, switch off the Track Activator. Then, drag your test sample into this track as well, and launch the clip. Now both clips will be playing, but you will only hear the signal from the first track, as the second track is deactivated. (Notice that it has a gray level meter.)



Switch the Second Track Off, and Notice the Gray Level Meter.

(d) The second track will be used only to "simulate" CPU traffic. To do this, drag effects one at a time from Live's Device Browser into the track. While doing this, keep an eye on the CPU Level Meter in the upper right corner. Add effects until this display shows a value close to 70 percent.



Bringing the CPU Level up to 70 Percent.

(e) Open the Audio Preferences and set the Output Buffer Size control to its lowest value. You will probably hear clicks or dropouts in the audio. Slowly increase the Output Buffer Size until the clicks or dropouts become inaudible. Find a value just high enough that the signal passes through undisturbed.

6. Now, to adjust the Input Buffer Size control, you will pass a sound from some external source (an instrument, a CD player, etc.) to the physical input of your audio interface. This sound should be of the same type used to adjust the Output Buffer Size control (i.e., no percussion, distortion or noise). Once you have selected your external sound and made the appropriate hardware connections, proceed as follows to adjust the Input Buffer Size control:

   (a) Stop playback in both clips by pressing the square Clip Stop buttons at the bottom of the tracks.

   (b) Activate the second track (the one containing the effects) with its Track Activator switch. Select "Ext. In" from its Input Type chooser.

   (c) Select a channel on which to monitor from the Input Channel chooser. You will see small level meters next to the entries that have incoming signals.

   (d) Activate the "On" Monitor button. You should now hear the input signal being processed by the effects you have inserted into the track.

From Top to Bottom: The Input Type and Channel Choosers, Monitoring "On" Switch and the Track Activator Switch.

(e) Set the Input Buffer Size slider to its lowest value. You will once again hear clicks and dropouts in the audio. Slowly increase the Input Buffer Size until you no longer hear dropouts or clicks. Find a value just high enough that the signal passes through undisturbed.

Note that lower latencies add more stress to the CPU. In situations where adding a few more plug-ins or tracks sends your system "over the edge," increasing latency a little bit may allow it to accommodate the extra load.

5.1.2 ASIO

If you are using ASIO, do the following to set up the rest of your Audio Preferences:

1. Select the audio device that you want to use with Live from the Audio Device chooser. Your options in this chooser depend entirely on your individual software and hardware setup– you might be offered anything from your computer's built-in soundcard to a multichannel audio interface.
2. Select the desired Sample Rate for recording. If you want to know more about this setting and

what Live does with it, please read the Sample Rate section (see Selecting a Sample Rate).

3. Please read the section on the Overall Latency adjustment (see Adjusting the Overall Latency) to find out about this setting.

4. If you have a multichannel audio device, you can set up your audio device's inputs and outputs in the Input and Output Configuration dialogs (see Configuring Audio Device Channels). These dialogs determine which of your individual input and output channels appear as routing options in Live's track In/Out section (see Routing and I/O), and whether they appear as mono, stereo or both.

5. The Clock Source setting is only available if your interface supports several audio clock sources. Audio clocks each use different bases, so they eventually begin to run out of sync (just like most clocks everywhere). Since an audio clock controls the sampling rate (in Hz), it might be helpful to sync the audio clocks of two connected devices together when recording into Live.

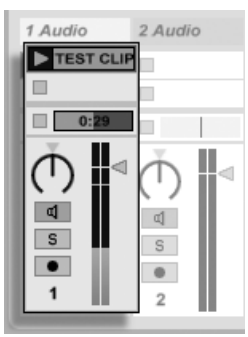
   This setting would be useful if, for example, you were using Live to record from a CD player with a digital output via the digital input on your audio interface. You could define the digital input of the interface (i.e., the CD player's audio clock) as Clock Source, and thereby avoid having the interface and CD player run out of sync.

6. Click on the Hardware Setup button. The contents of this dialog will depend entirely on your audio device, however they should include a "buffer size" or "latency" setting. The term *latency* refers to the time it takes for sound from the audio device's inputs to become available to the software, and for sound generated or processed by the software to arrive at the audio device's outputs.

   Latency is an undesirable, yet unavoidable fact of processing audio on a standard computer. All calculations necessary for audio are handled by the CPU. Audio software reads and writes audio in chunks, which are collected in buffers, in order to reduce the CPU load, and to have a "reservoir" of incoming or outgoing audio available for times when the processor must attend to some other task. Smaller buffers therefore create less latency but add stress to the CPU. The steps that follow will help you find the smallest possible latency or buffer size setting that your computer can handle without troublesome stress to the CPU.

If the Hardware Setup button is unavailable, or if nothing happens when you click this button, you need an external application or panel provided by your audio interface vendor to make latency settings. For more information, please see the documentation that came with your interface or consult the vendor directly.

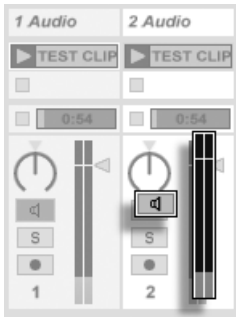
(a) Start with an empty Live Set that has at least two audio tracks.



Launching a Test Clip in the First Track.

(b) Find a good sample to use for testing: We want to use a sustained sound rather than a sound that contains a lot of silence. It is best not to use percussion, or sounds containing distortion or noise, since what we will be listening for is clicking or popping sounds. Drag the sample from the Browser into the first audio track, and launch the clip. Now you should hear this clip and see its level in the level meter.

(c) In the second track, switch off the Track Activator. Then, drag your test sample into this track as well, and launch the clip. Now both clips will be playing, but you will only hear the signal from the first track, as the second track is deactivated. (Notice that it has a gray level meter.)



Switch the Second Track Off, and Notice the Gray Level Meter.

(d) The second track will be used only to "simulate" CPU traffic. To do this, drag effects one at a time from Live's Device Browser into the track. While doing this, keep an eye on the CPU Level Meter in the upper right corner. Add effects until this display shows a value close to 70 percent.

Bringing the CPU Level up to 70 Percent.

(e) Open the Audio Preferences' Hardware Setup dialog, and set the "buffer size" or "latency" control to its lowest value. One of three things will now happen:

- The quality of the sound will change, and you will probably hear clicks or dropouts in the audio. If this is the case, slowly increase the "buffer size" or "latency" control until the clicks or dropouts become inaudible. Find a value just high enough that the signal passes through undisturbed.
- You will receive a message or dialog asking you to close the Hardware Setup panel. If this is the case, close the panel and listen to the track you are playing. You will probably hear clicks or dropouts in the audio. To find a suitable setting, reopen the

Hardware Setup dialog, slightly increase the "buffer size" or "latency" control, close the dialog again, and listen to the audible result. Repeat this process until you find a setting just high enough that the signal passes through undisturbed.

- You will be prompted to close the Hardware Setup dialog and to deselect the audio interface. If this is the case, close the dialog and set Live's Audio Preferences Audio Device chooser to "No Device." Then, reselect the Audio Device so that you can listen to the Live track you are playing. You will probably hear clicks or dropouts in the audio. To find a suitable setting, reopen the Hardware Setup dialog, increase the "buffer size" or "latency" control slightly, close the dialog again, deselect and select the audio device, and listen to the audible result. Repeat this process until you find a setting just high enough that the signal passes through undisturbed.

Note that lower latencies add more stress to the CPU. In situations where adding a few more plug-ins or tracks sends your system "over the edge," increasing latency a little bit may allow it to accommodate the extra load.

5.1.3 CoreAudio

If you are using CoreAudio, do the following to set up your Audio Preferences:

1. Select the audio device(s) that you want to use with Live from the Input and Output Audio Device choosers. Your options in these choosers depend entirely on your individual software and hardware setup– you might be offered anything from your computer's built-in soundcard to a multichannel audio interface. Though CoreAudio allows you to select two different devices for input and output, we recommend selecting the same device for both in order to avoid potential problems.

2. Select the desired Sample Rate for recording. If you want to know more about this setting and what Live does with it, please read the Sample Rate section (see Selecting a Sample Rate).

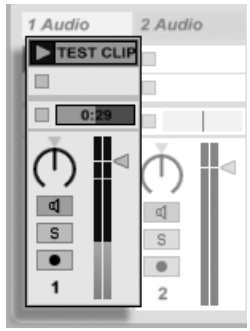
3. Please read the section on the Overall Latency adjustment (see Adjusting the Overall Latency) to find out about this setting.

4. If you have a multichannel audio device, you can set up your audio device's inputs and outputs in the Input and Output Configuration dialogs (see Configuring Audio Device Channels). These dialogs determine which of your individual input and output channels appear as routing options in Live's track In/Out section (see Routing and I/O), and whether they appear as mono, stereo or both.

5. The Buffer Size control is used to adjust for latency. The term *latency* refers to the time it takes for sound from the audio device's inputs to become available to the software, and for sound generated or processed by the software to arrive at the audio device's outputs.

   Latency is an undesirable, yet unavoidable fact of processing audio on a standard computer. All calculations necessary for audio are handled by the CPU. Audio software reads and writes audio in chunks, which are collected in buffers, in order to reduce the CPU load, and to have a "reservoir" of incoming or outgoing audio available for times when the processor must attend to some other task. Smaller buffers therefore create less latency but add stress to the CPU. The Buffer Size control allows finding the smallest possible buffer size that your computer can handle without troublesome stress to the CPU. Do the following to find a suitable Buffer Size setting for your setup:

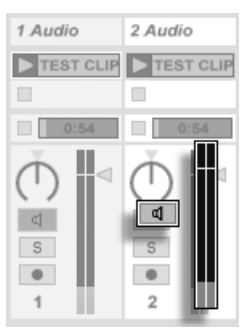
   (a) Start with an empty Live Set that has at least two audio tracks.



Launching a Test Clip in the First Track.

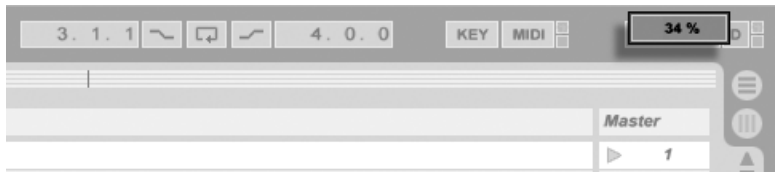
(b) Find a good sample to use for testing: We want to use a sustained sound rather than a sound that contains a lot of silence. It is best not to use percussion, or sounds containing distortion or noise, since what we will be listening for is clicking or popping sounds. Drag the sample from the Browser into the first audio track, and launch the clip. Now you should hear this clip and see its level in the level meter.

(c) In the second track, switch off the Track Activator. Then, drag your test sample into this track as well, and launch the clip. Now both clips will be playing, but you will only hear the signal from the first track, as the second track is deactivated. (Notice that it has a gray level meter.)



Switch the Second Track Off, and Notice the Gray Level Meter.

(d) The second track will be used only to "simulate" CPU traffic. To do this, drag effects one at a time from Live's Device Browser into the track. While doing this, keep an eye on the CPU Level Meter in the upper right corner. Add effects until this display shows a value close to 70 percent.



Bringing the CPU Level up to 70 Percent.

(e) Open the Audio Preferences and set the Buffer Size control to its lowest value. You will probably hear clicks or dropouts in the audio. Slowly increase the Buffer Size until the clicks or dropouts become inaudible. Find a value just high enough that the signal passes through undisturbed.

Note that lower latencies add more stress to the CPU. In situations where adding a few more plug-ins or tracks sends your system "over the edge," increasing latency a little bit may allow it to accommodate the extra load.

5.1.4 Sound Manager

When using Sound Manager, it is only possible to access one stereo input and one stereo output channel of your audio interface, even if your interface provides multichannel capabilities. Therefore, ASIO drivers are the preferred choice for any serious audio application. ASIO drivers are available for almost every professional audio I/O interface. Check with your audio hardware's vendor if you are unsure about whether your interface supports ASIO.

If you are using Sound Manager, do the following to set up the rest of your Audio Preferences:

1. Select the audio device that you want to use with Live from the Audio Device chooser. Your options in this chooser depend entirely on your individual software and hardware setup–

you might be offered anything from your computer's built-in soundcard to an external audio interface.

2. The Sample Rate setting for Sound Manager drivers is fixed at 44,100 Hz. However, if you want to know more about this setting and what Live does with it, please read the Sample Rate section (see Selecting a Sample Rate).

3. Please read the section on the Overall Latency adjustment (see Adjusting the Overall Latency) to find out about this setting.

4. You can set up your audio device's input and output in the Input and Output Configuration dialogs (see Configuring Audio Device Channels). Note that, if you have a multichannel audio device, Sound Manager will only allow you access to one stereo pair for input and one for output.

5.1.5 Direct I/O

If you are using Direct I/O, do the following to set up the rest of your Audio Preferences:

1. Select the audio device that you want to use with Live from the Audio Device chooser. Your options in this chooser depend entirely on your individual software and hardware setup– you might be offered anything from your computer's built-in soundcard to a multichannel audio interface.

2. Select the desired Sample Rate for recording. If you want to know more about this setting and what Live does with it, please read the Sample Rate section (see Selecting a Sample Rate).

3. Please read the section on the Overall Latency adjustment (see Adjusting the Overall Latency) to find out about this setting.

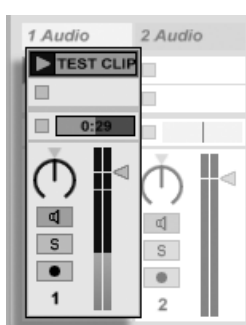
4. If you have a multichannel audio device, you can set up your audio device's inputs and outputs in the Input and Output Configuration dialogs (see Configuring Audio Device Channels). These

dialogs determine which of your individual input and output channels appear as routing options in Live's track In/Out section (see Routing and I/O), and whether they appear as mono, stereo or both.

5. The Buffer Size control is used to adjust for latency. The term *latency* refers to the time it takes for sound from the audio device's inputs to become available to the software, and for sound generated or processed by the software to arrive at the audio device's outputs.

   Latency is an undesirable, yet unavoidable fact of processing audio on a standard computer. All calculations necessary for audio are handled by the CPU. Audio software reads and writes audio in chunks, which are collected in buffers, in order to reduce the CPU load, and to have a "reservoir" of incoming or outgoing audio available for times when the processor must attend to some other task. Smaller buffers therefore create less latency but add stress to the CPU. The Buffer Size control allows finding the smallest possible buffer size that your computer can handle without troublesome stress to the CPU. Do the following to find a suitable Buffer Size setting for your setup:

   (a) Start with an empty Live Set that has at least two audio tracks.

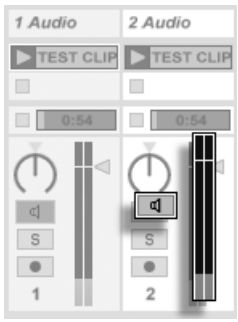


Launching a Test Clip in the First Track.

   (b) Find a good sample to use for testing: We want to use a sustained sound rather than a sound that contains a lot of silence. It is best not to use percussion, or sounds containing distortion or noise, since what we will be listening for is clicking or popping

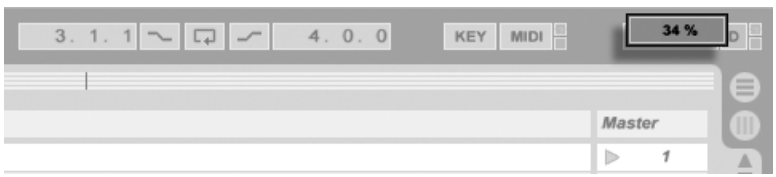
sounds. Drag the sample from the Browser into the first audio track, and launch the clip. Now you should hear this clip and see its level in the level meter.

(c) In the second track, switch off the Track Activator. Then, drag your test sample into this track as well, and launch the clip. Now both clips will be playing, but you will only hear the signal from the first track, as the second track is deactivated. (Notice that it has a gray level meter.)



Switch the Second Track Off, and Notice the Gray Level Meter.

(d) The second track will be used only to "simulate" CPU traffic. To do this, drag effects one at a time from Live's Device Browser into the track. While doing this, keep an eye on the CPU Level Meter in the upper right corner. Add effects until this display shows a value close to 70 percent.



Bringing the CPU Level up to 70 Percent.

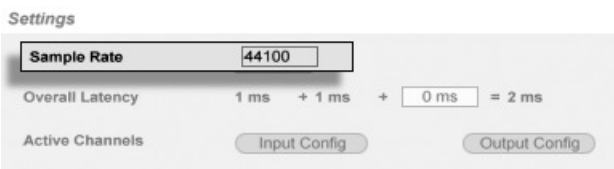
(e) Open the Audio Preferences and set the Buffer Size control to its lowest value. You will probably hear clicks or dropouts in the audio. Slowly increase the Buffer Size until the clicks or dropouts become inaudible. Find a value just high enough that the signal passes

through undisturbed.

Note that lower latencies add more stress to the CPU. In situations where adding a few more plug-ins or tracks sends your system "over the edge," increasing latency a little bit may allow it to accommodate the extra load.

5.2 General Audio Preferences

5.2.1 Selecting a Sample Rate



The Sample Rate Setting in the Audio Preferences.

The Sample Rate setting determines sampling rate at which Live and the audio interface operate.

The term "sample rate" refers to the number of samples per second that are used to represent a sound digitally. A digital representation of a sound is more accurate if a higher sample rate is used. Unfortunately, higher sample rates add stress to the CPU, since it then has to perform more calculations (read more samples) per second of audio.

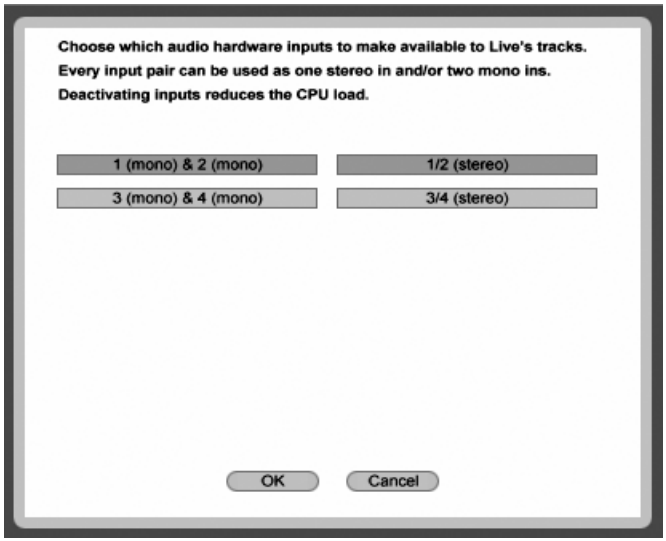
The sample rate for CD-quality audio is 44,100 samples per second. 44,100 is therefore a suitable Sample Rate setting and produces audio of the same quality as that of a CD recording.

Audio clips with an arbitrary sample rate can be read and used in Live because Live performs a real-time sample-rate conversion. However, the sample rate of audio clips that are newly recorded in Live will always be identical to the selected Sample Rate chosen in the Audio Preferences.

Depending on the selected Audio Device, this rate may be fixed (usually at 44,100 Hz).

5.2.2 Configuring Audio Device Channels

The Input and Output Configuration buttons open dialogs which you can use to describe to Live the audio connections from your computer to the rest of your studio.



The Input/Output Configuration Settings Determine Which Physical Ins and Outs Are Made Available to Live's Tracks, as Mono and/or Stereo Pairs.

There are two switches per input/output channel pair. One sets the channel pair up for use as a stereo channel and the other sets it up for use as two independent mono channels.

- If, for instance, input 15/16 is always connected to the DAT recorder, then you only need to check the stereo option for channels 15 and 16. If, however, inputs 15 and 16 are connected to two mono microphones, then you only need the mono option.
- You can check both options, saving the decision about how to use the channel pair for the moment when you are actually using it. This is useful for connections that change frequently. For instance, when working with the computer's built-in stereo hardware interface, you might

record in mono from a microphone and reconnect only a few minutes later to record in stereo from turntables.

- If you are not using a channel pair, turn off both switches. Disabling unused channels optimizes CPU performance.

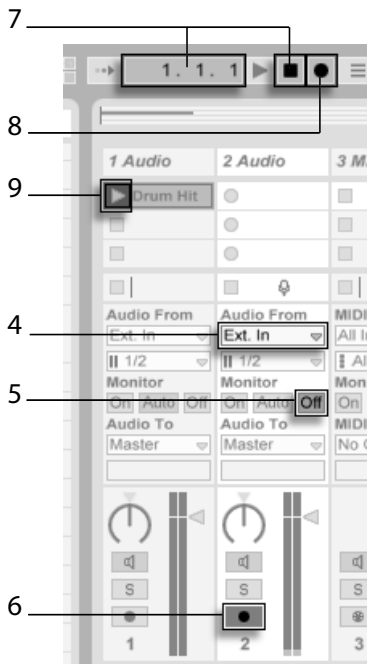
Note: Sound Manager and DirectX/MME drivers limit the use of all but one stereo input channel and one stereo output channel, regardless of what interface or soundcard you may be using. For serious audio applications, audio interfaces with ASIO drivers can be purchased for both Mac OS 9 and Windows.

5.2.3 Adjusting the Overall Latency

The Overall Latency setting is only relevant when recording audio with monitoring set to "Off" (see Monitoring). This would be the case if you were, for example, recording an acoustic instrument and "monitoring" through the air. We will first present a procedure for making this setting, and then, for the curious, explain its necessity by expounding on the connection between recording, monitoring and latency.

1. Connect an audio cable to short-circuit Live's output 1/2 to Live's input 1/2. It does not matter whether this is an analog or a digital connection; it is important, however, that you use a "real" hardware connection.

2. Create a new Live Set by choosing "New" from the File menu.



Preparing to Adjust the Correct Overall Latency.

3. Choose a one-shot percussion sample that has a signal peak right at the sample start, and drag this sample into a Session slot of audio Track 1.

4. Check "In/Out" from the View menu to bring up the mixer's In/Out section. Make sure audio Track 2 is set up to receive its input from External In 1/2, as shown.

5. Set Track 2's Monitor radio button to "Off".

6. Arm Track 2 by pressing its Arm button.

7. Click the Control Bar's Stop button twice to make sure Live is set to Arrangement position

1.1.1.

8. Click the Control Bar's Record switch.

9. Launch the percussion clip in Track 1 by clicking its Launch button. Live will start recording.

10. Stop playback and switch to the Arrangement View.

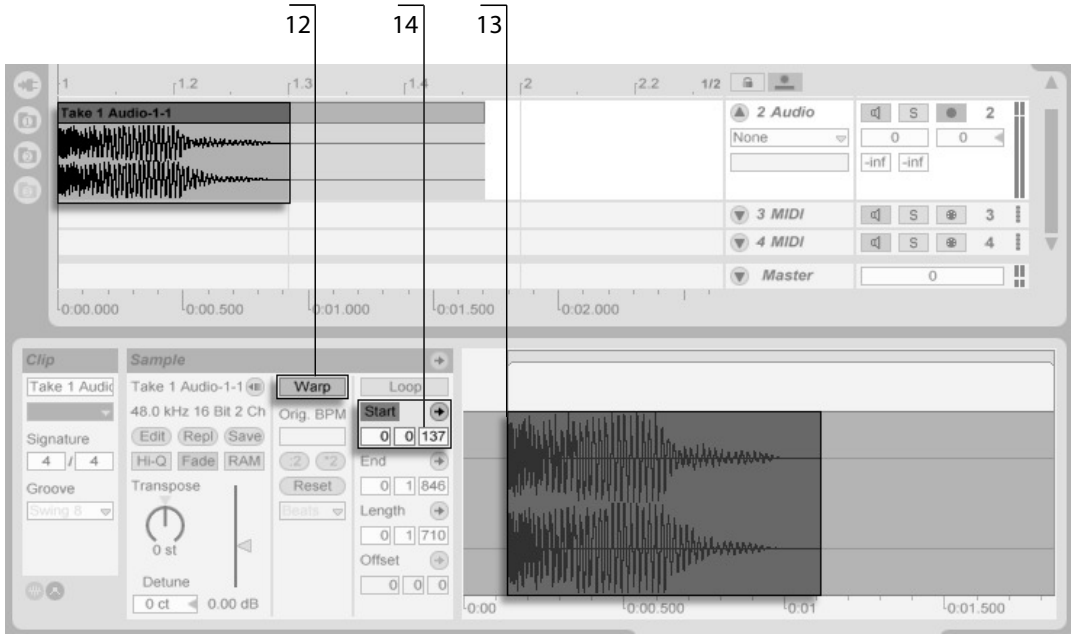
11. Now, Track 2 contains an approximate copy of the clip in Track 1, delayed by an amount of time that corresponds to the overall latency.

12. Double-click the new clip; in the Clip View, turn off the Warp switch.

13. Move the Clip Loop/Region start marker to the right. In the Arrangement display, you can observe the percussion hit's waveform in Track 2 moving left. Keep moving right until the percussion hit reaches the song start (zoom in if needed to get as close a match as possible). You have now offset the region start of the clip in Track 2 to compensate for the delay between the original and the copy.

14. From the Clip View's Start value boxes, read out the value in milliseconds.

15. Type this value into the Audio Preference's *Overall Latency* field.



Finding the Offset.

If desired, you can delete the recording from Track 2 and repeat the test above to verify that there is no offset between the original clip in Track 1 and the recorded copy in Track 2.

Caution: Dry Theory! What does the Overall Latency setting achieve and why do we need it? Imagine that you are recording a drummer into Live. The drummer plays along to Live's metronome or music from the Live Set. Monitoring is turned off on the tracks you are recording. The signal that Live receives from the drummer is late with respect to Live's own time base due to the latency incurred by the audio hardware: the time it takes the metronome or music signal from Live to reach the speakers (and thus the drummer's ears) plus the time it takes the drum signals from the microphones to reach Live.

Live compensates for these latencies by moving the recorded samples ahead in song time. To do this, it needs to have precise information about the actual input and output latencies in the system. The latency value reported to the software by the audio hardware drivers is not always completely accurate, however. The Overall Latency setting is a way to tell Live about any deviations from the reported values.

Why does all this only matter when monitoring is off? Suppose monitoring is on, and the drummer is wearing closed headphones through which he can now hear both Live's metronome and his own playing. The same latencies still apply, and the drummer is, in fact, hearing the result of his playing late. If latencies are low enough (a few milliseconds), then the drummer will (usually unconsciously) compensate for the latencies by hitting the drums a bit earlier, and the recorded samples will be in time with Live's time base.

Chapter 6

Managing Files and Sets

6.1 Relevant Types of Files

6.1.1 Sample Files

A *sample* is a standard WAV or AIF sound file. On the Macintosh, Live is capable of reading samples in Sound Designer II format as well. Live can combine mono or stereo samples of any length, sample rate or bit depth without prior conversion. As Live plays the samples directly from disk, you can work with a large number of (large) samples without running into RAM memory limitations.

6.1.2 Analysis Files (.asd)

An *analysis file* is a little file that Live creates when a sample is recorded or dragged into the program for the first time. The analysis file contains data gathered by the program to help optimize the stretching quality and speed up the waveform display.

In addition, an analysis file can store a *Default Clip* for the sample: Clicking the Clip View's *Save* button (see Saving Default Clip Settings with the Sample) will store the current clip's analysis file with the sample. Next time the sample is dragged into Live, it will appear with those clip settings. This is particularly useful for retaining the Warp Marker settings (see Time-Warping Samples) with the sample.

The analysis file's name is the same as the associated sample, but 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 Misc Preferences. All data (except for the Default Clip) can be recreated by Live if the .asd file is missing.

6.1.3 MIDI Files

A *MIDI file* contains commands that prompt MIDI-compatible synthesizers or instruments, such as Live's Simpler (see 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

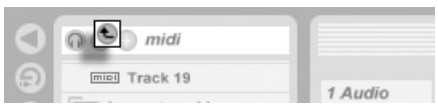
original file. MIDI files appear as folders in the File Browser; opening the folders gives you access to the file's individual tracks (also called "voices" or "instruments").

A MIDI File and Its Tracks in the Browser.

6.2 Working with the File Browsers

6.2.1 Searching the Folder Hierarchy

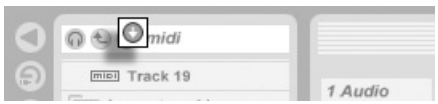
Samples and MIDI files are searched and imported from disk using Live's on-board Browsers, which can be pointed to any folder location on the computer.



The File Browser's Folder-Up Button.

The Folder-Up button moves up one step in the disk hierarchy. Clicking this enough times will take

you to your computer's desktop. Now you can browse through the disk's folders.



The File Browser's Root Button.

After locating the folder with the files you want to use, you may optionally make this folder the Browser root by clicking the Root button. Note that there are three File Browsers which you can set up to point to commonly used folders.

As described in the next section, you have the option of previewing your samples before importing them. To import samples or MIDI files, simply drag them from the Browser into your open Live Set.

6.2.2 Previewing Samples

The Preview Switch.

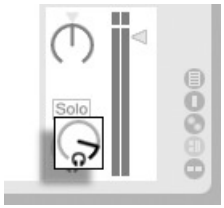
Live allows you to preview samples in the File Browser before they are dragged into the program. Previewing is activated using the Browser's Preview switch.

Click on the samples (or use ↓ and ↑) to select and listen to them.

Previewing plays samples as if they had been dragged into a track in the Live Set, that is to say:

- If a default clip has already been stored with the sample's analysis file (see Saving Default Clip Settings with the Sample), then the sample is played according to the default clip's settings.
- Otherwise, the sample is played according to the Default Preferences' clip defaults settings.

You can adjust the previewing volume using the Preview Volume knob in the mixer.



The Preview Volume Knob.

If your audio hardware offers multiple audio outs, you can privately audition, or cue, samples 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 appropriate manual section (see Soloing and Cueing).

6.2.3 Renaming and Deleting Files

You can use Live's File Browsers to rename and delete files:

- To rename a sample or MIDI file selected in Live's Browser, choose Rename from the Edit menu.
- To delete the selected sample or MIDI file, choose the Edit menu's Delete command or press your computer's Backspace or Delete key. Deleting samples or MIDI files within Live moves them to the system trash where they can be recovered if needed.

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.

6.3 Creating and Saving Sets

Use the File menu's New command to create new Live Sets, and the Open command to open existing ones.

The File menu's Save command saves the current Live Set exactly as it is, including all clips and settings, except for perhaps those belonging to plug-in devices.

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. Saving a Live Set leaves the samples referenced by that Live Set's clips in their current locations. If the samples are later moved, Live will attempt to help you find them (see Offline and Lost Samples) when next you open that particular Live Set. The File menu's Save Set Self-Contained command (see The Sounds Folder and Self-Containing) can help you avoid missing samples altogether.

6.4 Template Sets

Use the Default Preferences' Template Set Save button to save the current Live Set as a template Live Set. 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 mapping.

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.

6.5 Offline and Lost Samples

When loading a Live Set that references samples missing from their referenced locations, Live issues a warning message and asks whether you want to locate the missing samples.

If you don't, the Live Set will open anyway, with the missing samples marked "Offline." The Live Set will play silence in place of the offline samples. You can find the missing files by selecting a clip that is referencing an offline sample and clicking the Clip View's Replace button (see Replacing the Clip's Sample).

6.6 The Sounds Folder and Self-Containing

The *Sounds folder* is a Live Set's private location for storing samples. All samples that are recorded into a Live Set end up in this Live Set's Sounds folder. Live offers a convenient method for gathering all samples that are referenced by a Live Set in this folder: When you choose the File menu's *Save Set Self-Contained* command, Live copies all externally referenced samples there. After self-containing the files, there are no longer references to samples spread over one or more hard drives. You can backup the Live Set along with its Sounds folder, or send them to collaborators via the Internet, and all samples used in the project will be included.

The Sounds folder for "My Live Set" is called "My Live Set Sounds." It is located next to (in the same folder as) "My Live Set."

6.7 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.

6.8 Exporting Audio

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

6.8.1 What signal will be rendered?

Render to Disk will always render the 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. To export individual tracks, deactivate all other tracks other than the ones you want to export by turning off their Track Activator switches (see The Live Mixer) in the mixer.

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. Keep in mind that the selection of tracks is irrelevant: The signal to be rendered is the Master output.

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 length. Live will capture audio from the Master output starting at the current play start position for whatever duration you specified.

6.8.2 Rendering Options

The Render to Disk command opens a dialog that offers several rendering options:

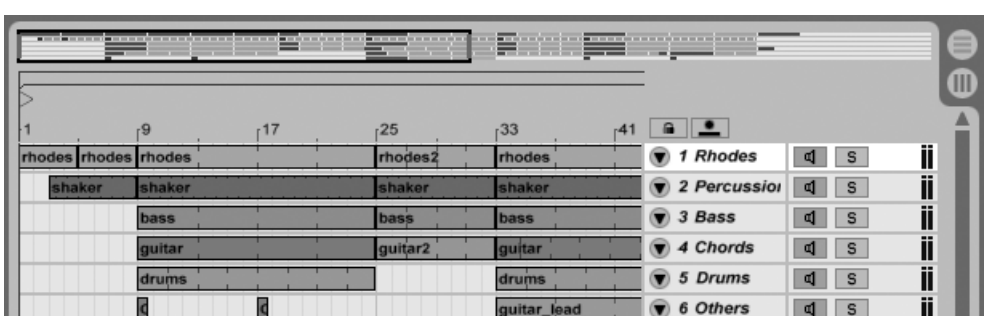
- *Normalize*. If activated, the sample resulting from the render process will be normalized (i.e., the file will be amplified so that the highest peak attains the maximum available headroom).

- *Render as Loop*. If 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 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 activated, Live will create a mono file instead of a stereo file.

Chapter 7

Arrangement View

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



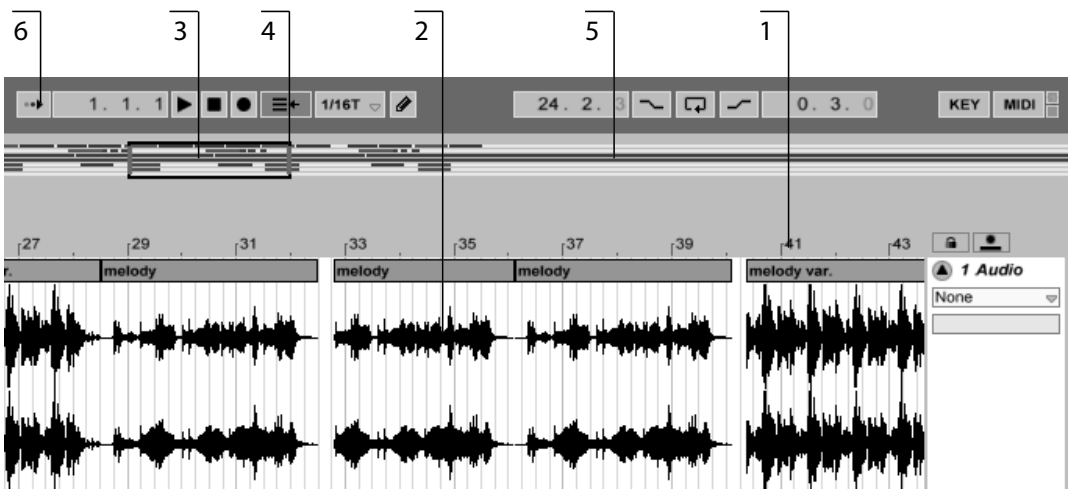
A Piece of Music Laid out in the Arrangement View.

The Arrangement View is a powerful editing tool that easily lets you combine and arrange musical

material of all types: MIDI, loops, sound effects and complete pieces of music.

7.1 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 song time ruler above the track display (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.

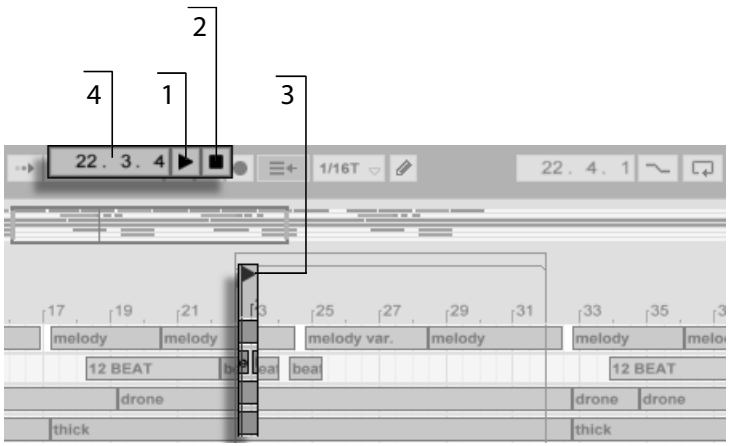
6. To have the Arrangement display follow the song position and scroll automatically, turn on the Follow switch, or use the Follow command from the Options menu.

7.2 Transport

There are a number of ways to control Live's transport.

Using the computer keyboard, you can:

- Toggle playback on and off by pressing the space bar;
- Continue playback from the position where it last stopped by holding ⇧ while pressing the space bar;
- Play what is currently selected, or play *from* the flashing insert mark, by pressing Ctrl (PC) / Alt ⌥ (Mac) and the space bar.



Controlling the Transport.

Using the mouse, you can:

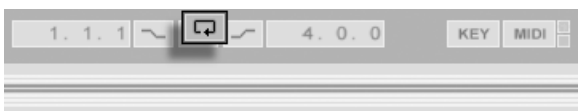
1. Start Arrangement playback by clicking the Control Bar's Play button;
2. Stop playback by clicking the Stop button;
3. Set the Arrangement playback position by dragging the Arrangement Start marker, or have the Start marker jump to a specific point in the Arrangement without "picking it up" first by Shift-clicking at the desired position along the beat ruler– this also works while Live is playing;
4. Adjust the song position numerically using the Arrangement Position fields.

The Control Bar's 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 the Enter or Return key.
- Click and decrement or increment the value with ↓ and ↑ .

Notice that any computer keyboard key or MIDI message can be mapped to the transport controls, as described in the respective chapter (see MIDI and Key Remote Control).

7.3 The Arrangement Loop



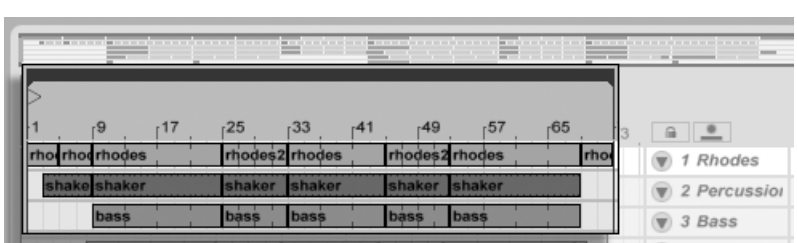
The Control Bar's Loop Switch.

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 the Loop/Region markers numerically using the Control Bar fields: The left-hand set of fields determines the loop start position, while the right set of fields is the length of the loop.

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/Region markers to match whatever timespan is selected in the Arrangement.



The Arrangement's Loop/Region Markers.

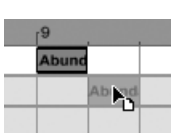
The Loop/Region markers can be selected with the mouse and manipulated with commands from the computer keyboard:

- ← and → nudge the loop/region to the left/right by the current grid setting (see Using the Editing Grid).
- ↓ and ↑ shift the loop/region 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/region by the current grid setting (see Using the Editing Grid).
- The Ctrl (PC) / ⌘ (Mac) modifier with the arrow up and down keys doubles or halves the loop/region length.

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

7.4 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 (see Tracks).



Moving a Clip.

Dragging a clip moves it to another song position or track.

Changing a Clip's Length.

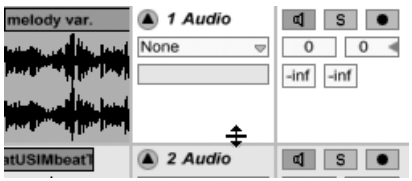
Dragging a clip's left or right edge changes the clip's length.

7.5 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:

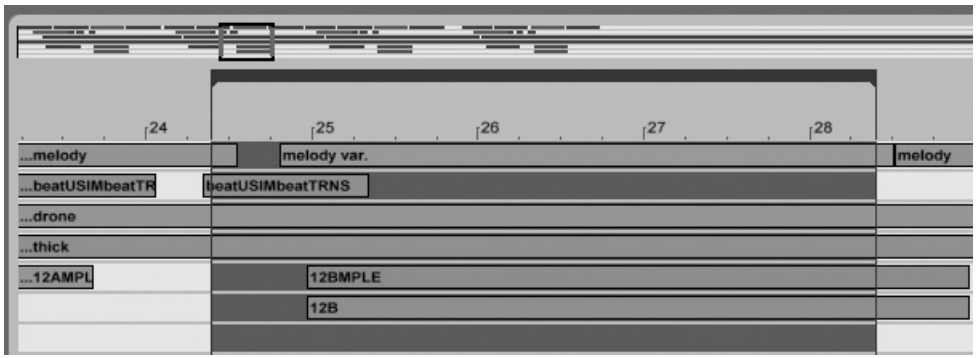
- Clicking a clip selects the clip;
- Clicking into the Arrangement background selects a point in time, represented by a flashing insert mark;
- Clicking and dragging selects a timespan.
- To access the time *within* a clip for editing, "unfold" its track by clicking the triangular button next to the 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 Unfold Track button.

- Clicking on the Loop/Region markers is a shortcut for executing the Edit menu's Select Loop command, which selects all material included within the loop.
- Holding Shift while clicking extends an existing selection in the same track or across tracks.



Clicking the Loop/Region Markers to Select the Loop for Editing.

7.6 Using the Editing Grid

To ease editing, the cursor will snap to grid lines that represent the meter subdivisions of the song tempo. Generally, the grid is zoom-adaptive, but you can modify it by using the following shortcuts to Option menu commands:

- 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.

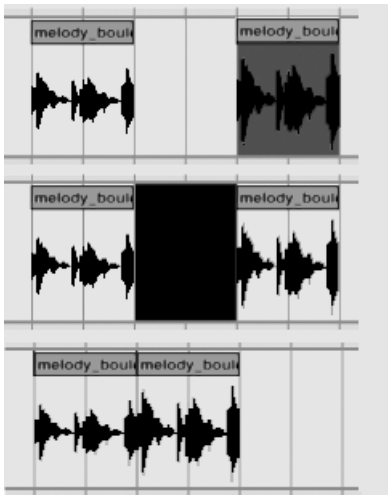
- Use Ctrl 4 (PC) / ⌘ 4 (Mac) to turn grid snapping on or off. When the grid is off, the cursor does not snap to meter subdivisions.

The current spacing between adjacent grid lines is displayed at the right-hand side of the song time ruler.

7.7 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.

7.8 Splitting Clips

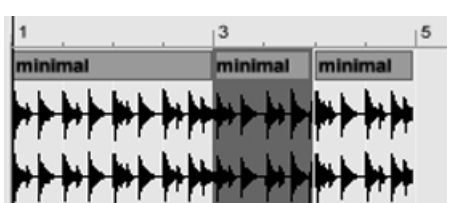
The Split command can divide a clip or isolate part of it.

To split a clip in two halves,

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,

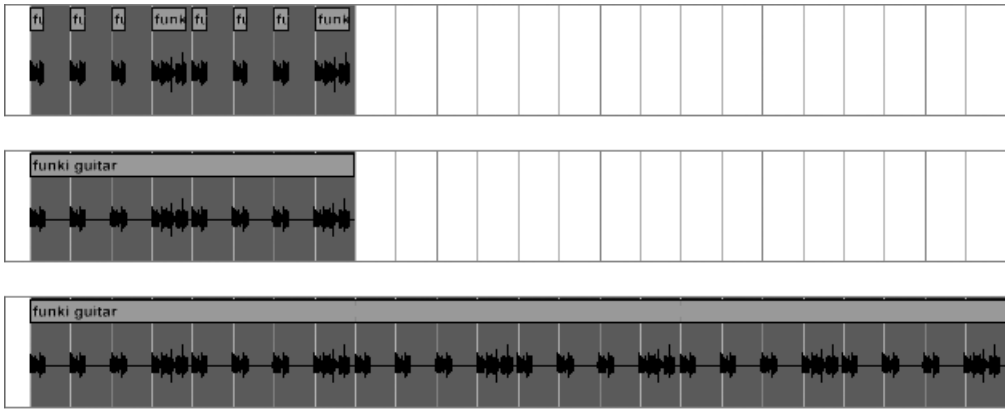
1. unfold the track;
2. in the waveform or MIDI display, drag a selection over the part of the clip you want to isolate;
3. execute the Split command to divide the original clip into three pieces.



The Result of Splitting a Clip.

7.9 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 Looping Clip.

Suppose you have, by editing or improvising, come up with a layout of clips that sound good in Arrangement Loop Mode (see The Arrangement Loop). 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 (see 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 (see Exporting Audio).

The new samples can be found in the "Sounds" folder, a disk location specific to the Live Set in which you are working. Please see the relevant section of this manual (see The Sounds Folder and Self-Containing) for more information.

Chapter 8

Session View

In the Live's Arrangement View (see 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.

8.1 Session View Clips

The Controls for a Session View Clip.

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 or Enter key. You can then move on to the neighboring clips using the arrow keys. Please refer the manual section on clip launch settings (see The Launch Box) for details on how to customize this behavior.

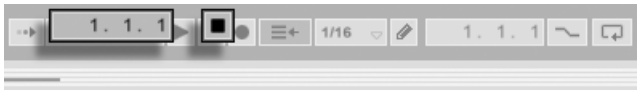
2. Click on a square Clip Stop button to stop a running clip, either in one of the track's slots, or in the *Track Status field* below the Session grid.

Clips can be controlled remotely (see MIDI and Key Remote Control) 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 (see Recording Sessions into the Arrangement), regardless of what your individual Session clips are doing.

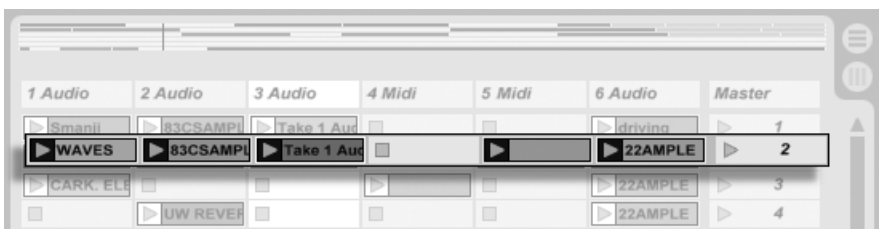
You can always return the Arrangement Position fields to 1.1.1 and stop playback for the entire Live Set by pressing the Control Bar's Stop button twice.



The Arrangement Position Fields and the Stop Button.

8.2 Tracks and Scenes

Each vertical column, or track (see Tracks), 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.



A Session View Scene.

The horizontal rows are called *scenes*. The *Scene Launch buttons* are located in the rightmost column, which represents the Master track (see Return Tracks and 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 Misc 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 (see Relative Session View Navigation).

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).

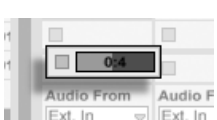
This Scene Will Change the Tempo to 96 BPM.

8.3 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:

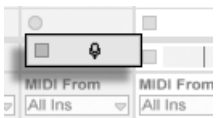
A Track Playing a Looping Session Clip. . .

The pie-chart icon represents a looping Session clip (see Sample Loop/Region). 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.



. . . A One-shot Session Clip. . .

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



. . . Monitoring the Input. . .

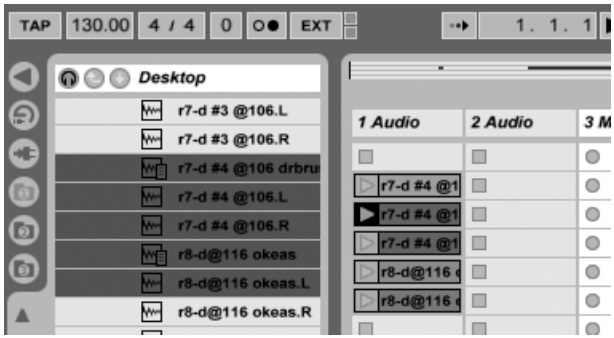
A microphone icon appears in an audio track that is set to monitor its input (see Monitoring). A keyboard icon appears in a MIDI track under these same circumstances.

. . . Playing the Arrangement.

If the track is playing clips from the Arrangement, a miniature display representing the Arrangement clips being played appears.

8.4 Configuring the Grid

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.



Dropping Multiple Clips Into the Session View.

Of course, you can also drag in new clips from the Browser (see Working with the File Browsers). 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.

8.4.1 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 Misc Preferences if you prefer the view to remain as is when you launch clips or scenes.

8.4.2 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.

8.4.3 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.

8.5 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 (see Clip View);
- changes of the mixer and the devices' controls, also known as *automation* (see Recording 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.

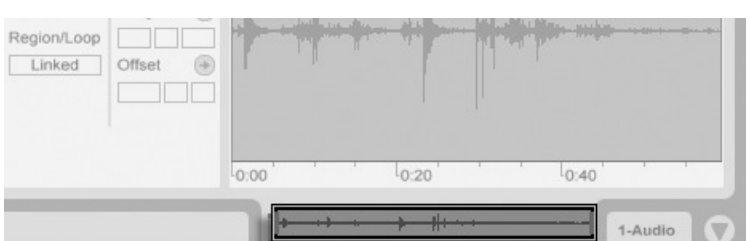
Furthermore, you can move clips not only within the Session grid, but also from the Session View to the Arrangement and vice versa by using Copy and Paste, or by dragging clips over the  or  selectors.

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 9

Clip View

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



Clicking the Clip Overview Opens the Clip View.

The Clip View is opened by clicking on the Clip Overview or double-clicking a clip in the Session or Arrangement Views.

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

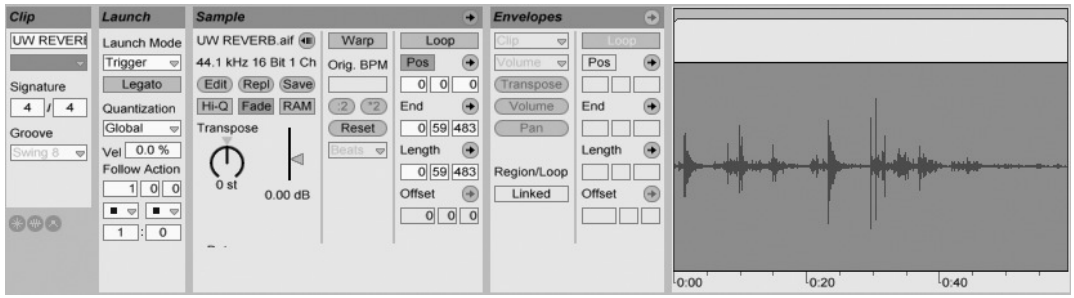
In the Session View, clicking on a Track Status Field opens the Clip View for editing the clip that is currently running in the track.

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 (see Clip Envelopes).
- 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 (see Launching Clips).

Audio clips have these additional Clip View controls:

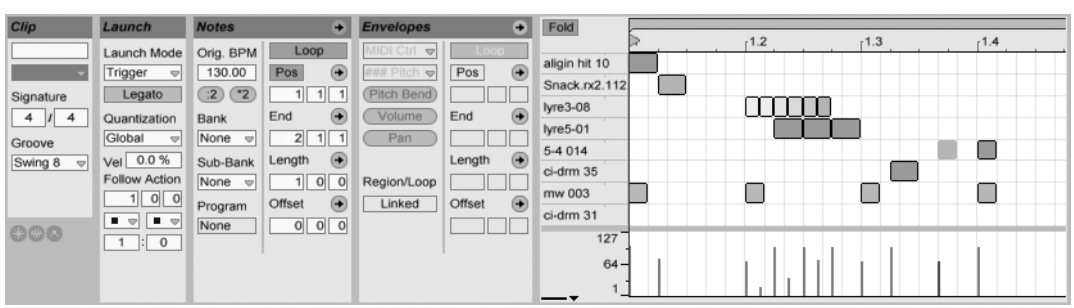
- The *Sample Display* toggles with the Envelope Editor on the right-hand side of the Clip View, and controls Live's sample-warping capabilities (see Time-Warping Samples).
- The *Sample box* contains settings pertaining to how the clip plays its sample and displays it in the Sample Display.



The Clip View for an Audio Clip.

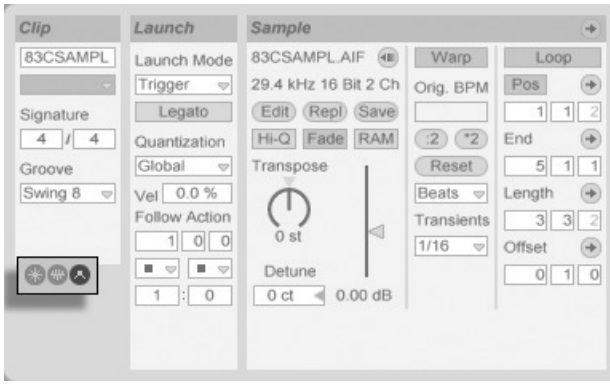
MIDI clips have these additional Clip View controls:

- 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 (see Editing 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.



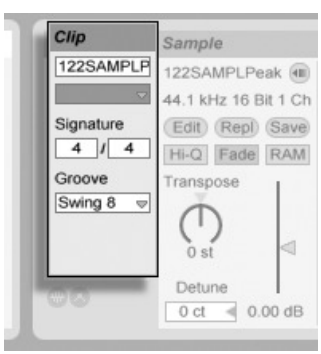
The Clip View for a MIDI Clip.

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.

9.1 The Clip Box



The Clip Box.

9.1.1 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.

9.1.2 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.

9.1.3 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.

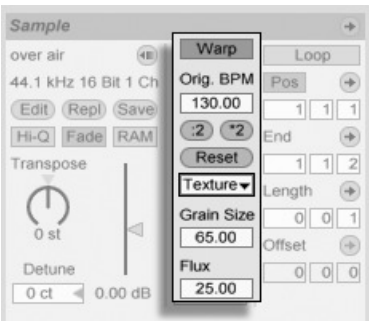
Returning to our rubber-band analogy, we can see that Swing 8 can actually affect more than just 8th notes. Actually, any notes that do not lie directly on a beat will be affected when the rubber-band is stretched– including 16th and 32nd notes. By the same token, Swing 16 (where our rubber-band is anchored 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 (see Adjusting for Good Stretching Quality) 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 (see Arranging and Quantizing Notes) 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 (see Manipulating Grooves) prior to applying the "artificial" swing of the Groove setting.

9.2 The Sample Box

9.2.1 Warp Controls



The Clip Warp Controls.

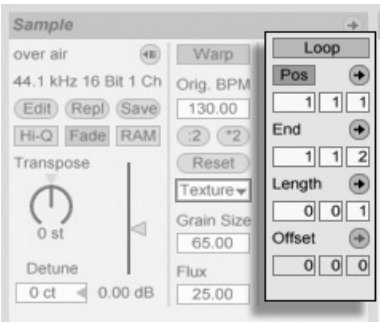
When the Warp switch is off, Live plays the sample at its original, "normal" tempo, irrespective of the current Live Set tempo. This is useful for samples that have no inherent rhythmic structure: percussion hits, atmospheres, sound effects, spoken word and the like. Turn the Warp switch on to play rhythmically 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 (see Adjusting for Good 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 will have to provide some hints (see Time-Warping Samples).

9.2.2 Sample Loop/Region



The Clip Loop/Region Controls.

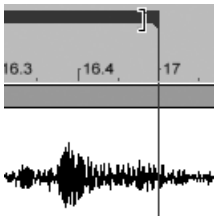
To have the clip's region played as a (potentially infinite) loop, turn on the *Loop* switch. Activating the loop also activates warping; unwarped clips cannot be played as loops.

Zooming and scrolling the Clip View's Sample Display works just like in the Arrangement (see Navigation). Note that you can use the Sample Display itself for zoom-scrolling. The Clip Overview serves as a sample overview with added zoom/scrolling functionality.

You can adjust the loop, or region, using the *Clip Loop/Region markers* in the Sample Display. The brace that runs between the Clip Loop/Region markers can be selected with the mouse, and the markers can then be manipulated with commands from the computer keyboard:

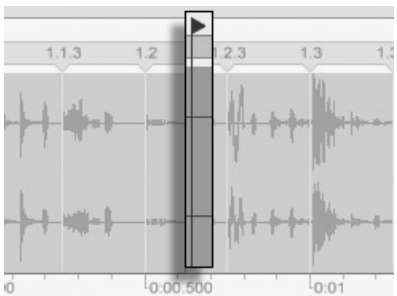
- ← and → nudge the loop/region to the left/right by the current grid setting (see Using the Editing Grid).
- ↓ and ↑ shift the loop/region left/right in steps the size of its length.
- Ctrl ←→ (PC) / ⌘ ←→ (Mac) shortens or lengthens the loop/region by the current grid setting (see Using the Editing Grid).
- Ctrl ↑↓ (PC) / ⌘ ↑↓ (Mac) doubles or halves the loop/region length.

The region or loop can also be moved by simply clicking and dragging it left or right.



Changing the Region or Loop End.

To change the region or loop start or end point, drag the left or right edge.



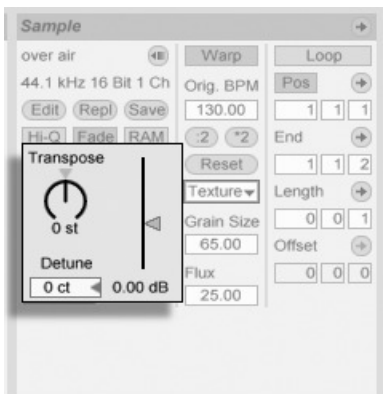
The Offset Marker.

The Offset Marker is visible only if the clip is set to loop. It represents the point in the sample where the clip starts playing. To adjust this, drag the Offset Marker left or right. You may have noticed that, as you move the clip loop, the Offset Marker jumps so that it stays within the loop. If the loop size is set to one, two, four, eight, etc. bars, any jump remains locked to the rhythm, allowing you to play with the loop in a musical way.

The loop or region can also be adjusted numerically using the respective value fields. For warped clips, these fields display values as bars-beats-sixteenths; for unwarped clips, the display is in minutes-seconds-milliseconds. The little arrow buttons are useful for bringing the loop/region's start, end, offset or complete expanse (length) into view without zooming or scrolling. If the *Start/Position* switch is set to Start, values entered in the respective value fields affect the loop /

region's start point only; if set to Pos, changing this value moves the complete region/loop.

9.2.3 Clip Pitch and Gain



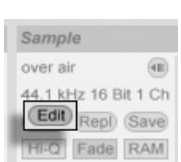
The Clip Pitch and Gain Controls.

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.

9.2.4 Destructive Sample Editing



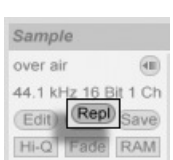
The Launch Sample Editor Button.

The Launch Sample Editor button opens the sample in a sample editing application, as specified in the Misc Preferences. To process a sample in an external program, you will have to stop Live's playback. Upon returning to Live, the edited version of the sample will be played back. The current set of Warp Markers is retained only if the sample length remains the same as before. Remember that changes to one sample may affect other clips playing the same sample.

9.2.5 Replacing the Clip's Sample

To replace the sample referenced by the clip with a different sample, 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.

Tip: When bringing multitrack audio from another program into Live for remixing, it is convenient to set Warp Markers for only one of the composite samples and copy the same set of Warp Markers to the other tracks. This can be easily done provided the individual samples have the exact same length (which usually is the case if they all have been exported from several tracks in one go): Pick the sample with the clearest rhythmical pronunciation and set the Warp Markers for this sample as described elsewhere (see Time-Warping Samples). Next, make enough copies of this clip to hold all the individual samples, and drop the samples from the Browser into the clips. The Warp Markers will be retained, because the samples all have the same length.



The Replace Sample Button.

The Replace Sample button is for replacing a sample throughout the entire Live Set. All clips that reference the "old" sample will reference the "new" sample, which is selected using a file-chooser dialog. Live retains the clip properties; the Warp Markers (see Time-Warping Samples) are kept if the new sample has the same or a greater length as the old sample and discarded otherwise. This

function is also useful for locating missing samples that are marked "offline" (see Offline and Lost Samples).

9.2.6 Saving Default Clip Settings with the Sample

The Save Default Clip Button.

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 (see Analysis Files (.asd)) that accompanies the sample.

9.2.7 High Quality Interpolation

The High Quality Switch.

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

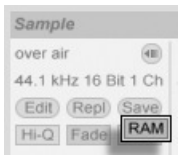
feature involves only sample rate conversion, not the time-stretching quality. There are dedicated controls for adjusting the stretching properties (see Adjusting for Good Stretching Quality).

9.2.8 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 0-20 milliseconds. Live attempts to start a fade-in, or a crossfade, early enough so that there is no attack smearing at the clip start. Likewise, fade-outs are set up so that they end with the clip end.

9.2.9 Clip RAM Mode



The RAM Mode Switch.

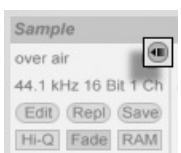
If the RAM Mode switch is on, Live is loading the audio referenced by the clip into the computer's memory rather than reading it from disk in real time. RAM Mode can help with these problems:

- 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 (see Managing the Disk Load).

- You are experiencing audio dropouts when playing clips in Legato Mode (see 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."

9.2.10 Reversing Samples



The Reverse Button.

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 is stored in your temporary recording folder until you save your Live Set, at which point it is moved to your Sounds folder (see The Sounds Folder and Self-Containing). The reversed sample has an "R" appended to the end of its name so that it is easily distinguishable from the original.

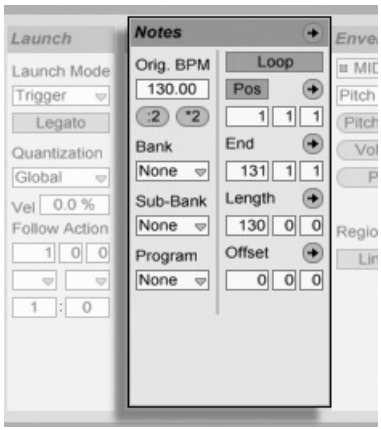
There are a few rules for the reversing process. First, any Warp Markers (see Time-Warping Samples) will remain fixed to their positions *in the sample*. This means that a Warp Marker on the downbeat of the second bar of a clip will end up on the downbeat of the second-to-last bar after reversal. Clip Loop/Region markers are similarly flipped. Second, clip envelopes (see 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.

9.3 The Notes Box



The Notes Box.

9.3.1 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 (see Recording in Sync).

9.3.2 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."

9.3.3 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 (see Sample Loop/Region).

9.4 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 Misc

Preferences.

Certain clip settings, such as Launch Mode and Warp Mode, can be set up as defaults for all new clips. This is done in the the Default Preferences.

Chapter 10

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 project tempo. This happens without affecting the pitch, which can be changed independently. Mixing and matching audio from different origins is therefore extremely easy.

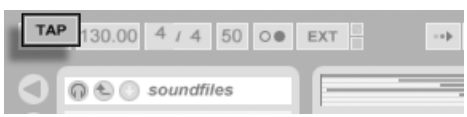
10.1 Tempo

10.1.1 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 (see Editing the Tempo Automation) to create smooth or sudden tempo changes along the song timeline.

10.1.2 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's 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 (see MIDI and Key Remote Control).

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.

10.2 Time-Warping Samples

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

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 sample's inherent rhythm to a musical meter.

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.

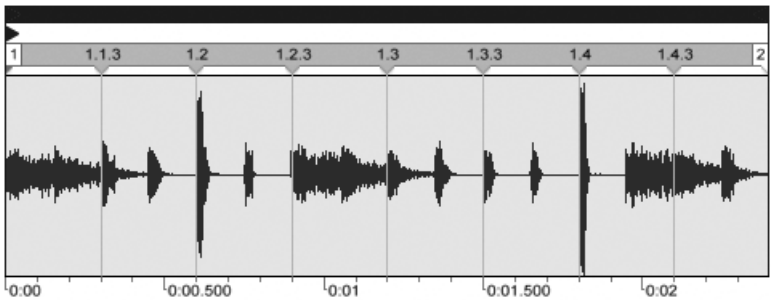
The Follow Switch in the Control Bar.

Note: For a tip on how to apply the same set of Warp Markers to several multitrack samples, please see here (see Replacing the Clip's Sample).

In the following sections, we will look at a couple of applications for time-warping samples.

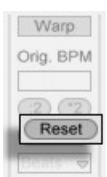
10.2.1 Syncing Straight Loops

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. 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.



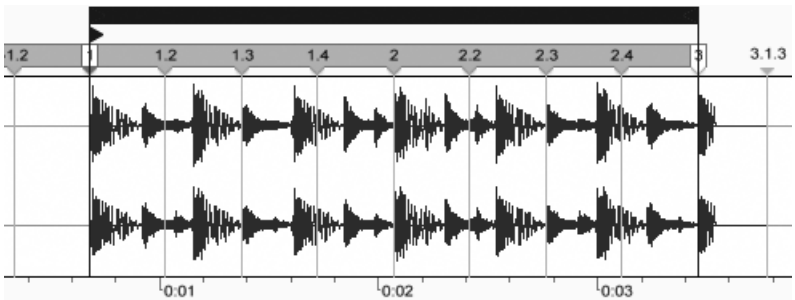
The Reset To Default Button.

The Reset To Default button restores the Warp Marker settings, just as if the sample had been dragged into the Live Set over again.

10.2.2 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 Badly Cut Loop.

10.2.3 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 a 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

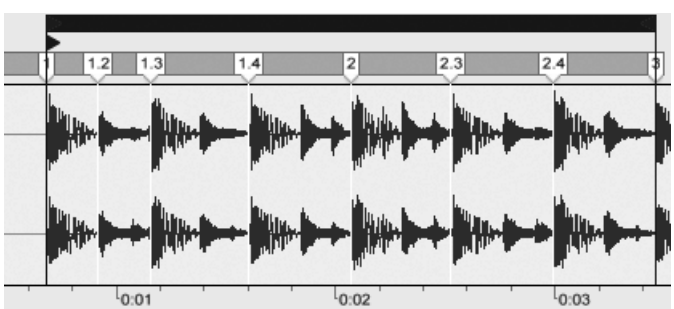
grid. Live makes sure the loop fits in the sample, and therefore has to change its length if required by a Warp Marker change.

10.2.4 Manipulating Grooves

You can now create any number of Warp Markers by double-clicking on one of the gray 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 artifical groove onto clips in real time (see Groove).

10.2.5 Syncing Longer Pieces

Once you are familiar with the basic concept of warping, you are ready for a slightly more complicated task: warping longer pieces.

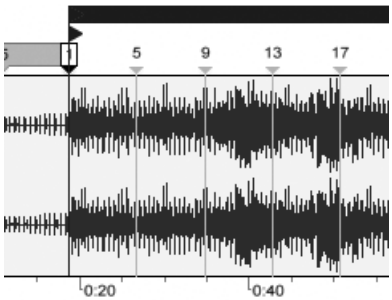
- Drag a long sample into a Session View slot. When you drag in a sample that is too long to justify the assumption that it contains a loop, Live will play the sample "unwarped" by default. Double-click on the clip to view its properties in the Clip View. Make sure the Warp switch is off.

- To get a reasonable initial tempo guess for the piece, we will use Live's tapping facility (see Tapping the Tempo). Play the unwarped clip, with everything else muted, and tap along with the beat for a bar or two. Tapping sets the Live Set's tempo without affecting the unwarped clip's playback speed; tapping along with the unwarped clip syncs Live to the sample's original tempo.

- Now turn on the Warp switch. Note that the Original BPM field shows the same value as the Control Bar's tempo field. Live has used the current song tempo as a guess for the sample's original tempo.

- Turn on the Clip View's Loop switch.

- Initially, there is just one Warp Marker (labeled "1"). Drag that marker to where you believe the first downbeat is. Start playback to test if your assumption is right; if it is not, move the Warp Marker and try playing it again until you find the first downbeat. Incidentally, you can zoom in and out around the loop start (which now coincides with the Warp Marker we are moving) by pressing the computer's + and - keys.

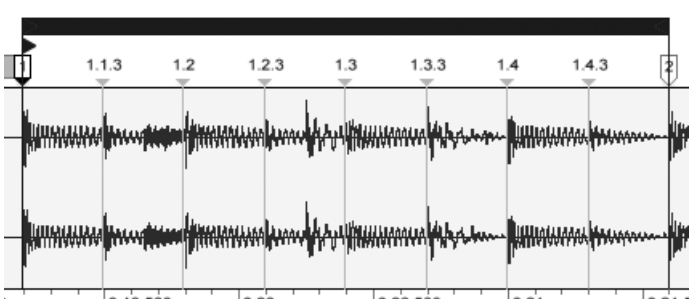


The First Downbeat Has Been Identified.

- When you have found the downbeat, you are ready to match the tempo. Activate the metronome. Alternatively, you could drop a simple loop into another track and play along with that.

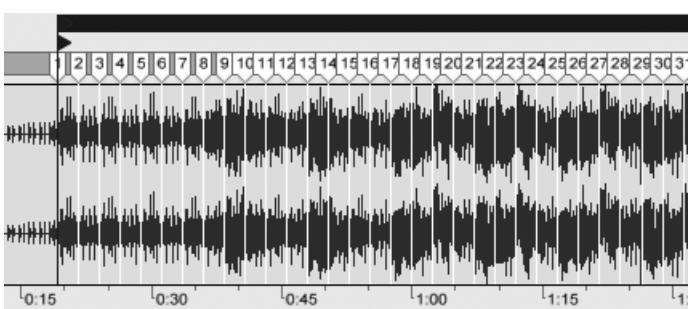
- Set the loop length of the clip to be warped to 1, 2 or 4 bars; the easiest way to do this is to type the value directly into the leftmost Length value field.

- While playing, drag one of the gray markers above the clip waveform horizontally until the loop sounds in sync with the metronome or your reference loop. Once this loop sounds right, advance the loop by one loop period. The easiest way to do this is to click on the loop braces and press [↑] .



Dragging the "2" Marker to Match the Sample's Tempo.

- Now, as you listen to the looping sample along with the metronome or your reference loop, move the gray marker at the loop start to make sure it matches with respect to the tempo. Use the + and - keys to zoom around the loop start. Once it's right, "pin" the gray marker at the loop start by double-clicking. You have now created the second Warp Marker.
- Keep moving forward through the sample by selecting the loop braces and pressing ⇧ ; for each consecutive loop position, adjust the gray marker at the loop start, and then pin it by creating a Warp Marker. Repeat this procedure until you have reached the end of the sample.
- Now your sample has one Warp Marker per loop period. With a little practice, you will soon find it is not necessary to create a Warp Marker for every loop position. If the sample's tempo is stable, you may use longer loop lengths and set fewer markers; if the tempo changes very often, you will likely want to use a one-bar loop, and set a Warp Marker at every bar.
- Once you are done setting Warp Markers, don't forget to turn off the Loop switch and to set the region start and end correctly.



The Result of Setting Warp Markers for the Piece.

Of course, your Warp Markers will be saved with the Live Set. In addition, you probably want to save them with the sample, so that they are reconstructed the next time you drag the sample into Live. To do this, click the Clip View's Save button (see Analysis Files (.asd)).

If you frequently warp long pieces, you will learn to set Warp Markers very quickly. Some Live users prefer different ways to warp, like "real-time warping," where you set the Warp Markers in one go,

while the complete piece is running unlooped. We found that the method described above allows for faster-than-real-time warping: You can "loop-hop" through the sample at any speed desired. Loop-hopping can be an interesting thing to do in the course of a performance, too!

10.3 Adjusting for Good Stretching Quality

Live offers a number of time-stretching methods to accommodate all sorts of audio material. The time-stretching method, and additional controls for each method, are set up in the Clip View's "Warp" 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 by the selection of grains, as well as by 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 correct stretching.

10.3.1 Beats Mode

Beats Mode works best for samples where rhythm is predominate (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 sample. If there is no rhythmical activity at odd 16th notes, choose 8th, etc. For some interesting rhythmic artifacts, choose large transient values in conjunction with pitch transposition.

10.3.2 Tones Mode

Tones Mode serves well for stretching samples 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 way. 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.

10.3.3 Texture Mode

Texture Mode works well for complex sound textures with an ambiguous pitch contour (e.g., polyphonic orchestral music, all sorts of 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; unlike in Tones Mode, this is a setting that Live will use unaltered, without factoring in the signal's characteristics.

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

10.3.4 Re-Pitch Mode

In Re-Pitch Mode, Live doesn't really time-stretch or compress the sample; instead, it adjusts the sample playback rate to create the desired amount of stretching. In other words, to speed up the sample 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.

Chapter 11

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 (see Working with Instruments and Effects) or an external synth fed via the track's output routing (see Routing and I/O). The MIDI clip (see MIDI Clips and MIDI Files) 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.

11.1 Creating an Empty MIDI Clip

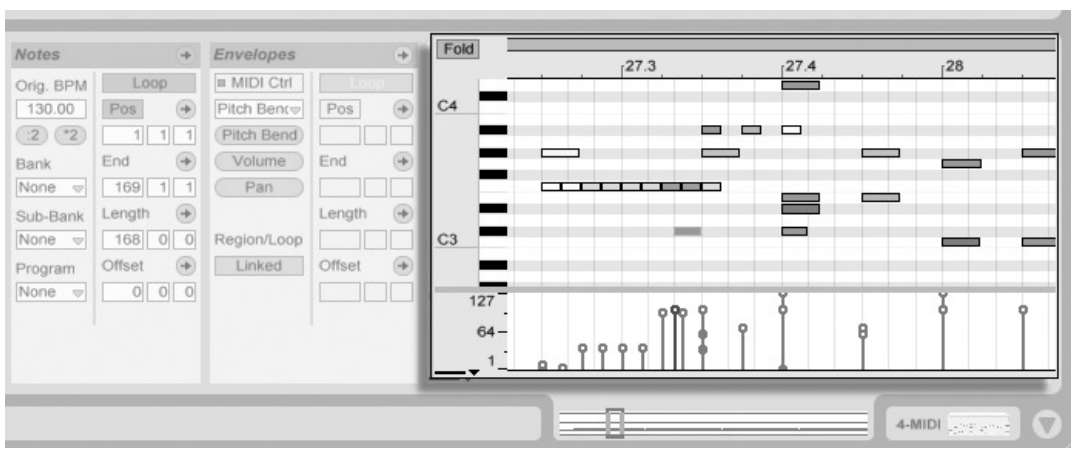
MIDI clips are created

- by means of recording (see Recording New Clips);
- 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.

11.2 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 (see 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.

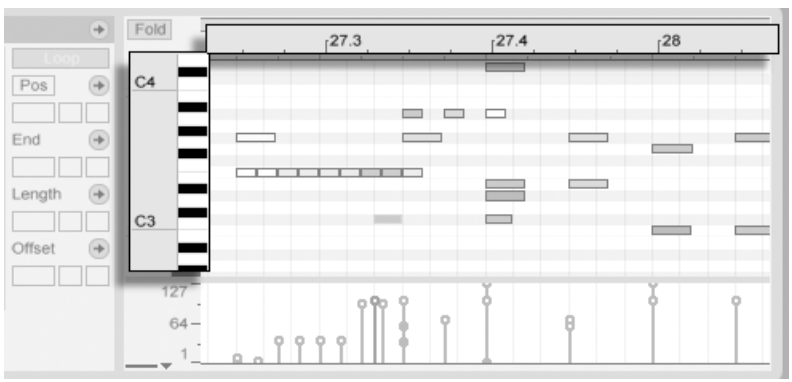
The Control Bar's Draw Mode Switch.

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.

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."

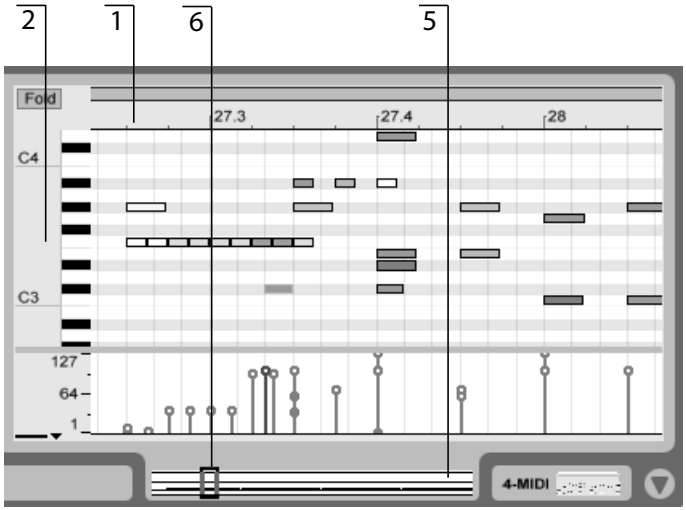
After drawing a few notes and moving them around, you will probably want to know how to get around in the Note Editor. So, before we get into detailed editing information, we will first explain MIDI Editor navigation.

11.3 Navigation and Resizing the Editor



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).



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.

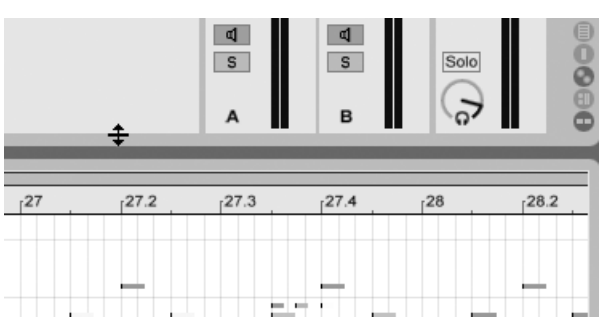
7. To quickly change what is shown in the Editor, click on a section that you want to examine in the Clip Overview, then drag downwards to zoom in, or scroll by dragging left and right.

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.

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 Views and the Clip View to enlarge the MIDI Editor.



Enlarge the MIDI Editor by Dragging the Window Split Between Session and Clip Views.

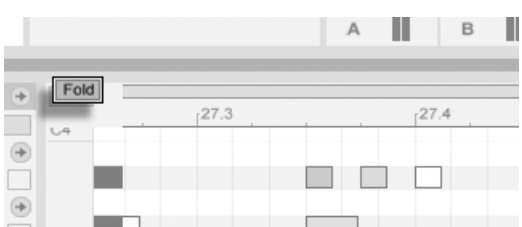
11.4 Editing MIDI

11.4.1 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.

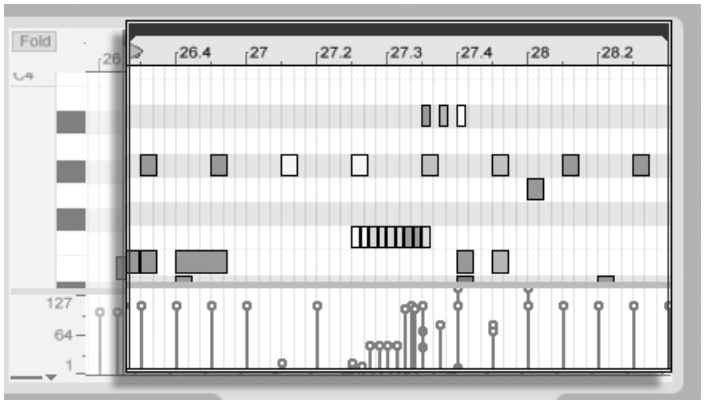
11.4.2 Folding and Looping

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 Clip Loop/Region markers (see Sample Loop/Region) for this.



Use the Clip/Loop Region Markers to Select a Specific Region of the Clip to Play.

11.4.3 Grid Snapping

Most functions in the MIDI Editor are subject to grid snapping (see Using the Editing Grid). 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."

11.4.4 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.

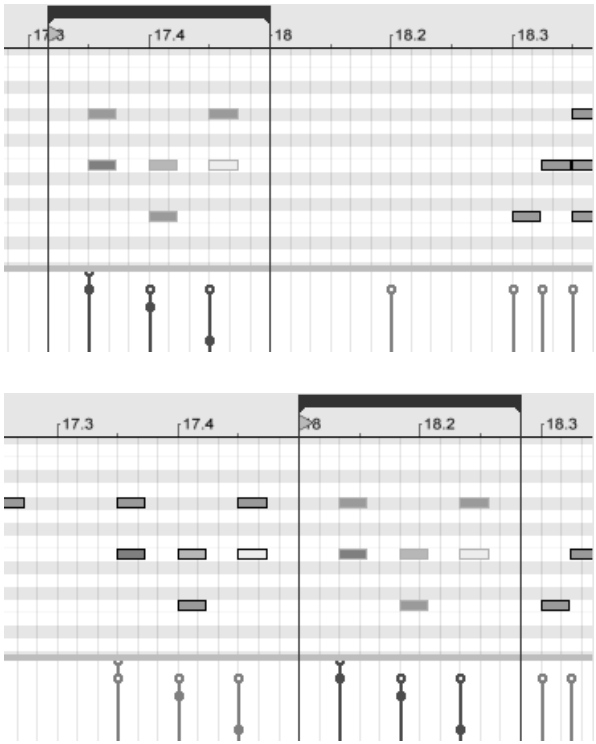
You can use the ⇧ modifier to click and add individual notes or additional “rubber-band” selections to your current selection. You can also remove a single note from your selection by holding down ⇧ and clicking on it. Holding ⇧ and clicking on the piano roll selects all notes in a single key track.

If you are working with an imported MIDI file or one that was recorded into Live, you may find while editing that you want to quantize all or some of the MIDI notes. Notes in Live are quantized according to the visible grid, which you can modify using a number of handy shortcuts (see Using the Editing Grid). After choosing a quantization setting, rubber-band select the notes and choose “Quantize” from the Edit menu, or use the Ctrl U (PC) / ⌘ U (Mac) hotkey. The selected notes will promptly be aligned with the specified meter subdivisions.

11.4.5 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 Clip Loop/Region markers. The Select Loop command can also be executed without the menu by simply clicking the loop braces. This command can speed up editing when coupled with Clip Loop/Region marker behavior (see Sample Loop/Region). 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 braces 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 (Above) and Pasting (Below) a Loop.

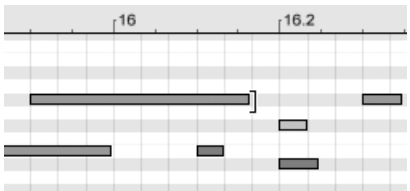
As we have already seen, creating new MIDI notes is as simple as activating Draw Mode and drawing them into the Note Editor. MIDI notes can also be added and deleted by double-clicking when Draw Mode is inactive. You can click on the piano roll to "play" the keyboard and listen to the results.

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.

11.4.6 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.

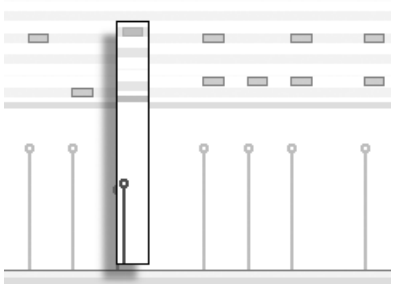


Changing Note Length.

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.

11.4.7 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.

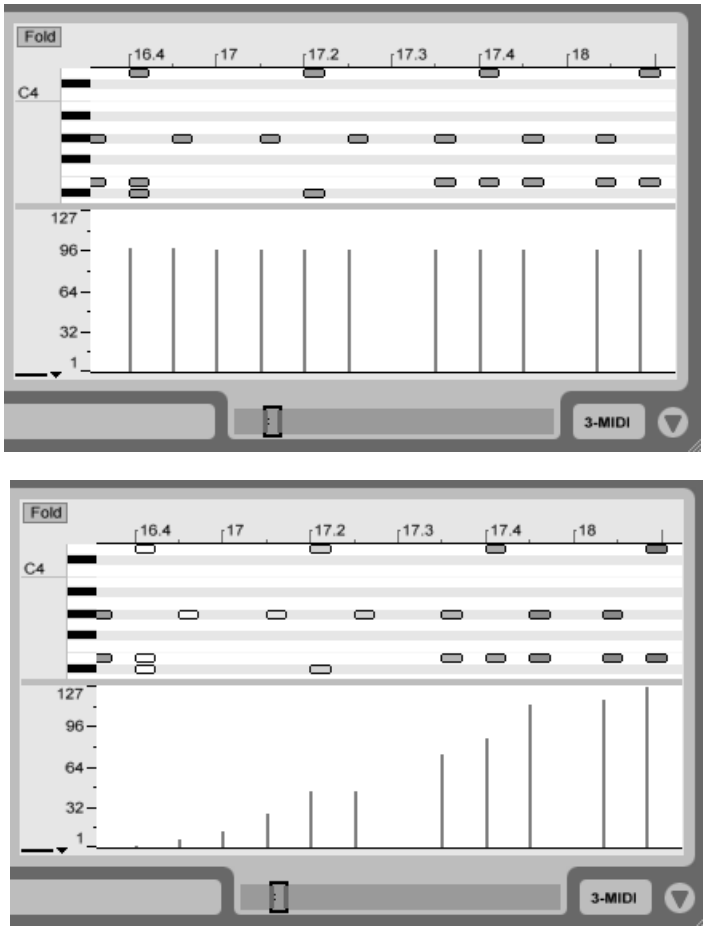


Changing Note Velocity.

As in the Note Editor, you can select multiple velocity markers to change by clicking with the ⇧ 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 the grid display switch in the upper right corner of the MIDI Editor, or simply hold down the Alt (PC) / ⌘ (Mac) modifier.



Drawing Identical Velocities (Above) and a Crescendo (Below).

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.

Chapter 12

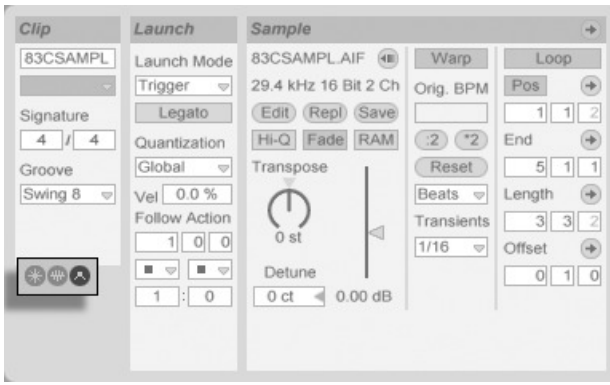
Launching Clips

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."

12.1 The Launch Box

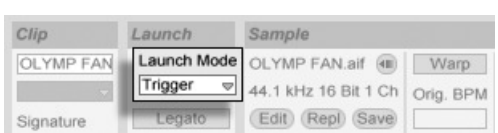
Remember that clips in the Session View are launched by their Clip Launch buttons (see Session View Clips) or remote control (see MIDI and Key Remote Control). Clip launch settings are made in the *Launch box*. The Launch box only applies to Session View clips, as Arrangement View clips are not launched but played according to their positions in the Arrangement.

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



Use the Clip View Box Selector to Bring up the Launch Box.

12.2 Launch Modes



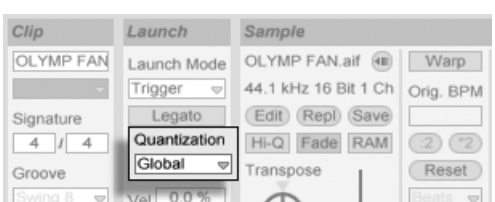
The Clip Launch Mode Chooser.

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

- 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.

12.3 Clip-Level Quantization



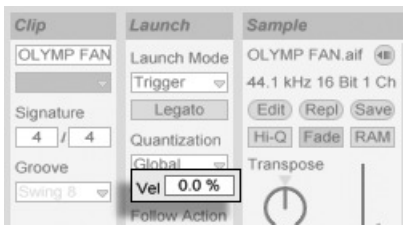
The Clip Quantization Chooser.

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.”

Note that any setting other than “Global” or “None” will quantize the clip’s launch when it is triggered by Follow Actions (see Follow Actions).

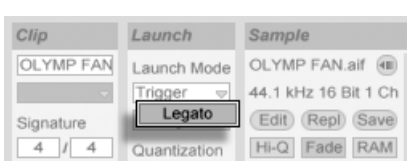
12.4 Velocity (Full Version Only)



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 (see MIDI Remote Control (Full Version Only)).

12.5 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

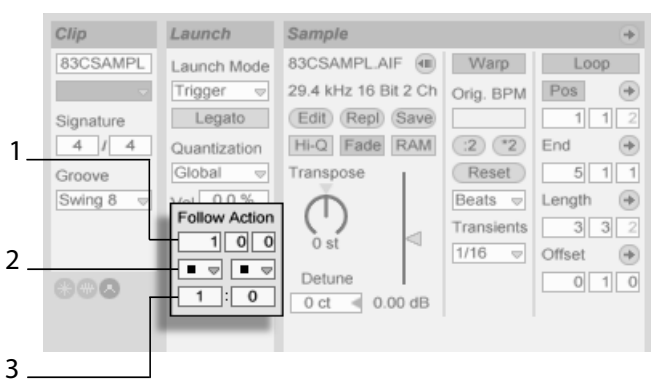
whatever clip was played in that track before. Hence, you can toggle clips at any moment and rate without ever losing the sync.

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 (see Clip RAM Mode) for the clips in question.

12.6 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:

▶ "Play Clip Again" restarts the clip.

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

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

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

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

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

There is also the possibility to choose no Follow Action by 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

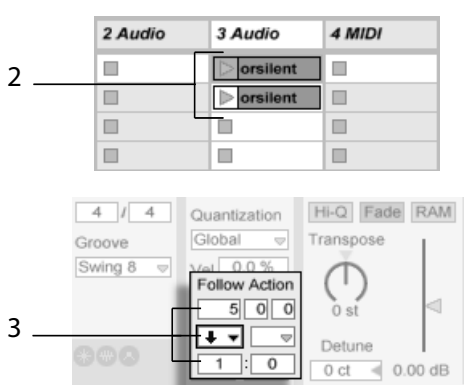
melodic fragments has a tendency to sound static. Follow Actions allow you to create structures that will repeat but can also be surprising. Remember that you can always record (see Recording New Clips) the results of your experiments, so this can provide a good source for new material.

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

12.6.1 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 (see Splitting Clips) 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.

12.6.2 Using Multiple Warp Modes

Live has several Warp Modes (see Adjusting for Good Stretching Quality), each of which is useful for time-stretching samples containing certain types of musical material. Follow Actions allow combining Warp Modes when one is dealing with a sample containing various types of sounds.

Imagine that you have a long clip containing mostly material that sounds best when set to Beats Mode. However, there is a violin solo in the middle of the clip that sounds better in Tones Mode. In this case, you can use the Arrangement View's Split command, as explained earlier (see Looping Parts of a Clip), to separate the clip into multiple clips– those that you want to play in Beats Mode and the solo that you want to play in Tones Mode.

These clips can then be lined up as a Follow Action group in the Session View. They can be set up to flow together just as the original clip did by setting the Follow Actions to "Play Next Clip" and the Follow Action Times to match their respective lengths. The only audible difference between this group of clips and the original piece will be that the clip containing the violin solo can now have its own Warp Mode settings.

12.6.3 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.

12.6.4 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.

12.6.5 Adding Variations in Sync

Paired with clip envelopes (see Clip Envelopes) and warping (see Time-Warping Samples), 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 (see 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.

12.6.6 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 Clip Loop/Region markers (see Sample Loop/Region) for each clip can be set differently, as can clip envelopes (see 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.

12.6.7 Creating Nonrepetitive Structures

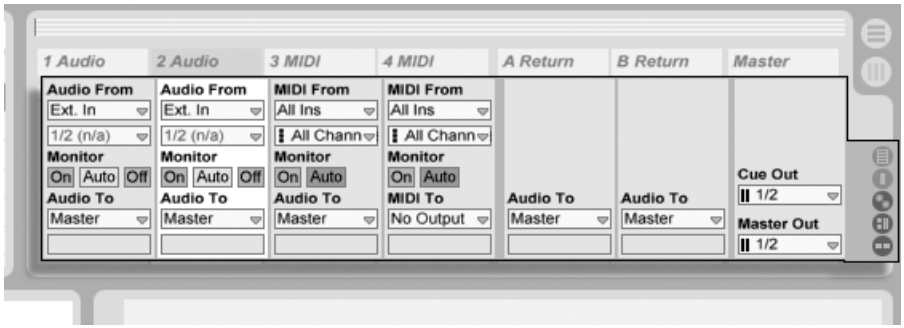
Follow Actions are great when it comes to sound installations, as they allow you to create structures that play for weeks or months and never exactly repeat. You can set the Follow Action Time controls in a series of clips to odd intervals, and the clips will interact with each other so that they never 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 13

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 mixer's In/Out section is available only from the Session View. You can check the "In/Out" View menu entry or use the Mixer Section selector to access the In/Out section.



The Session View Mixer's In/Out Section With the Mixer Section Selector (Right).

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 (see Return Tracks and the Master Track).

- The "Monitor" radio button selects the monitor mode, or 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 (see Devices and the Mixer).

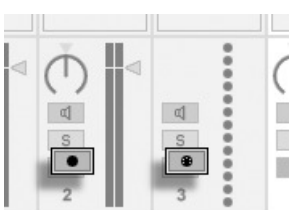
Within a chooser pair, the upper chooser selects the signal category ("Ext.," for instance, for external connections via an audio or MIDI interface), and is called the Input/Output Type chooser. If this signal type offers sub-selections or channels, they are available from the lower chooser, or the Input/Output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

13.1 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 (see Adjusting the Overall Latency), 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) (see Recording New Clips), 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 *On*. 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.
- For audio tracks, software 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 (see Adjusting the Overall Latency).

13.2 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 (see Audio Preferences Setup), 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 (see Configuring Audio Device Channels) 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.

13.2.1 Mono/Stereo Conversions

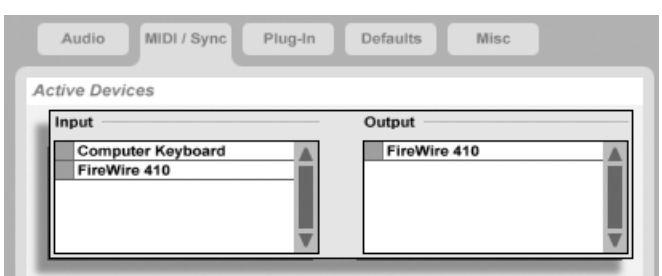
When a mono signal is chosen as an audio track's input, the track will record mono samples; otherwise it will record stereo samples. Signals in the track's device chain are always stereo, even when the track's input is mono or when the track plays mono samples.

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.

13.3 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 device or "All Ins," which is the merged input of all external MIDI devices. The Input Channel chooser offers the individual input channels of the selected MIDI device 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 in channel.

13.3.1 The Preferences' Active MIDI Device List



The MIDI Device List in the Preferences.

You can configure which MIDI devices are made available to Live using the *Active Devices* section in the MIDI Preferences. Live, by default, uses every available MIDI device. Reasons to exclude devices from the list include eliminating troublemakers (unstable drivers and such), or leaving a device to another application (applies only to Windows, where a single MIDI input device can only be used by one application at a time).

13.3.2 Playing MIDI With the Computer Keyboard

Among the devices in the Active Devices list, you can see the "Computer Keyboard." This is a pseudo-device that generates MIDI notes from computer keyboard strokes. Using this pseudo-device, you can generate MIDI even without a "real" MIDI input device.

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 (see Impulse). This means that you can play and record drum patterns right off the computer keyboard.

Note that this pseudo-MIDI device has nothing to do with Live's ability to map controls to computer keys (see MIDI and Key Remote Control) and that computer keys assigned to remote control will no longer generate MIDI notes.

13.3.3 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.

13.3.4 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:

1. MIDI Clock and Timecode signals that are used for synchronizing Live with other sequencers (see Synchronizing via MIDI (Full Version Only));
2. MIDI messages that are used for remote-controlling Live's user-interface elements (see MIDI and Key Remote Control);
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.

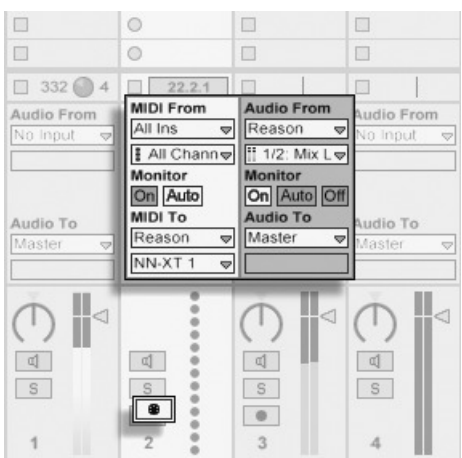
13.4 Master and Cue Outs

The Master track (see Return Tracks and 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 (see Soloing and Cueing).

13.5 ReWire Slave Routing

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 "On."
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.

13.6 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 (see Exporting Audio).

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 (see Recording

Into Session 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.

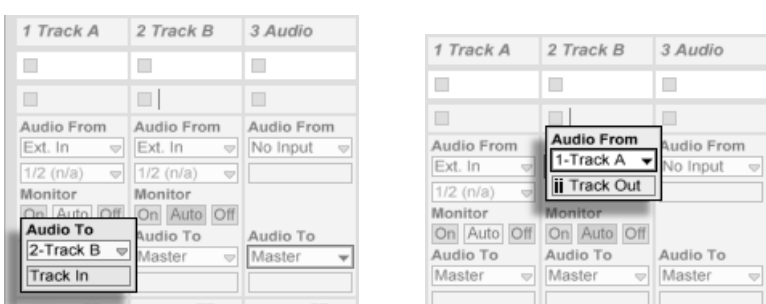
Samples created by resampling will be stored in the Live Set's Sounds folder (see The Sounds Folder and Self-Containing).

13.7 Internal Routings

Live 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.

The rest of this section presents internal routing examples in more detail.

13.7.1 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.

An Example Setup for Pre-Effects Recording.

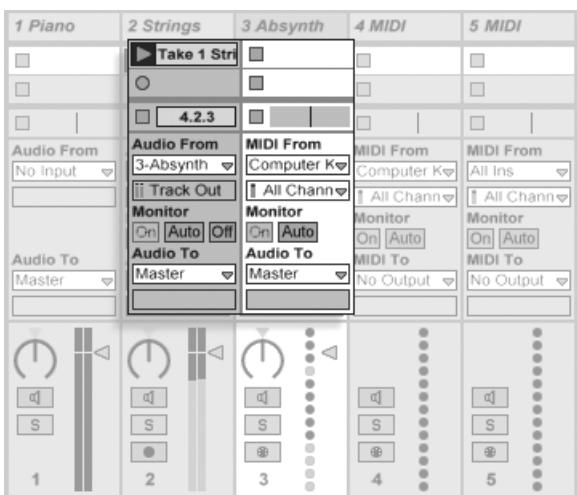
This is easily accomplished by devoting a special audio track for processing and monitoring the incoming guitar signal. We call this track "Guitar" and drag the desired effects into its device chain.

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 from the Guitar track.

As for monitoring, we set the Guitar track's Monitor radio button to On, 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.

13.7.2 Recording MIDI as Audio

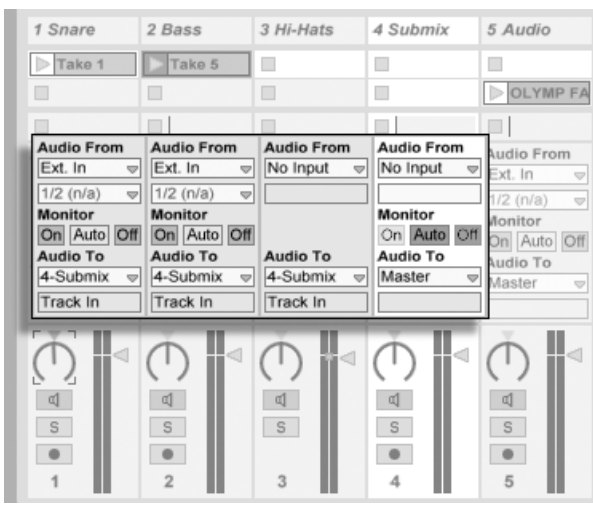
When working with MIDI and complex software instruments, it is sometimes more useful to record the resulting audio than the incoming MIDI. A single MIDI note can prompt, for example, Native Instruments' *Absynth* to produce something that sounds more like a piece of music than a single tone. This output 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 (see Post-Effects Recording) 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.

13.7.3 Creating Submixes

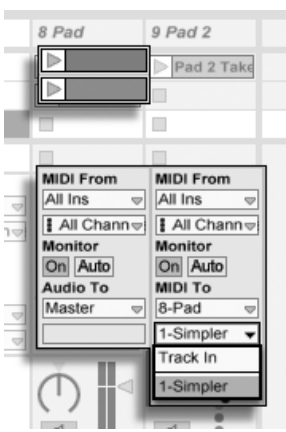


Submixing the Individual Drums of a Drum Kit.

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.

13.7.4 Several MIDI Tracks Playing the Same Instrument

Consider a MIDI track containing a virtual instrument– a Simpler (see 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.

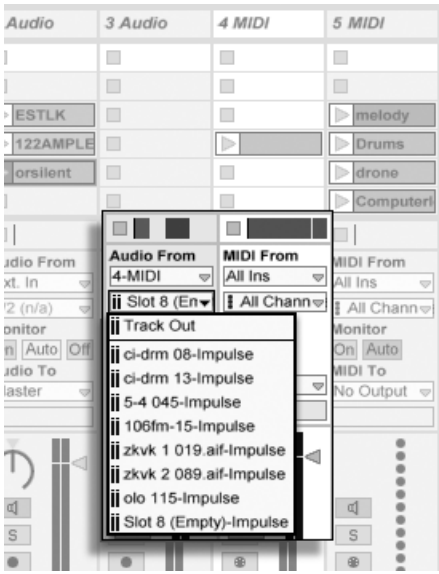
This is accomplished by setting the new MIDI track's Output Type chooser to "Pad." Note that the Output Channel chooser now offers a selection of destinations: We can either feed the new track's output into the input of the pad track, or we can directly address the Simpler. The "Track In" option in the 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.

13.7.5 Tapping Individual Outs From an Instrument

Some software instruments, like Live's Impulse percussion sampler (see Impulse), 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.



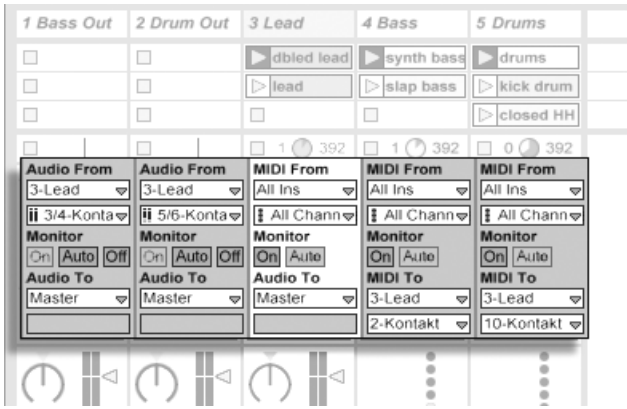
Using Impulse's Individual Outs to Separately Process Sample Slots.

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 "Track Out" (the audio signal at the end of the track's device chain), 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.

13.7.6 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 (see Several MIDI Tracks Playing the Same Instrument). 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 (see Tapping Individual Outs From an Instrument).

13.7.7 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

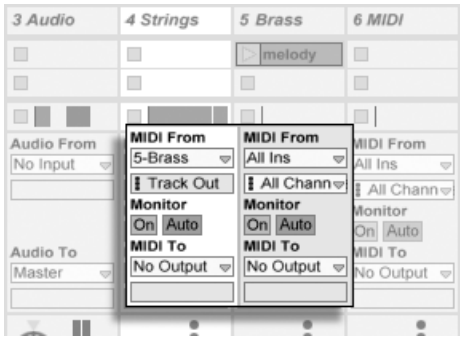
"Speech" and set its Output Type chooser to the "Strings" track. From the Output Channel chooser, we select the vocoder's sidechain input.

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.

13.7.8 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 output signal.



Using an Auxiliary MIDI Track to Layer Instruments.

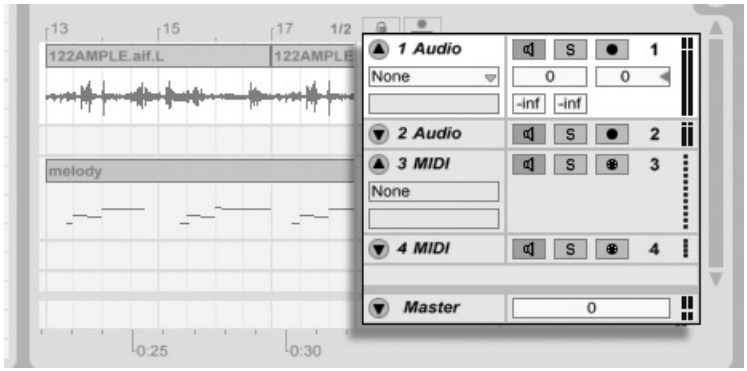
Perhaps you wonder why this works, given that the string track's output is audio and not MIDI. When routing MIDI in from another track, we are tapping the MIDI at the latest possible stage, which is just before the instrument.

Chapter 14

Mixing

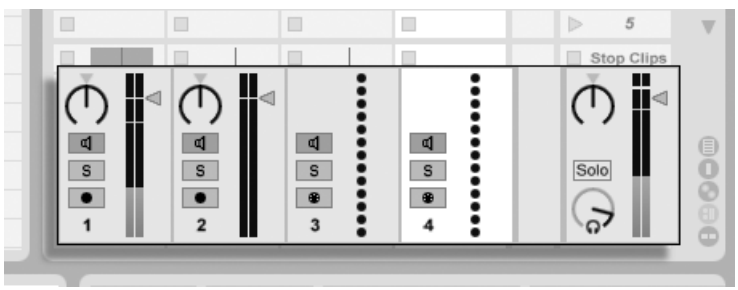
14.1 The Live Mixer

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 triangular 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 (see Automation and Editing Envelopes). 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:

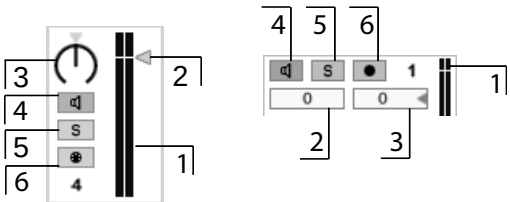
- Clips
- In/Out
- Sends
- Returns
- Mixer
- Crossfader

Uncheck “Clips” from the View menu to hide the clips from the Session View mixer, thus creating a more spacious mixer layout that fits more tracks on screen.

The Mixer Section selector on the right-hand side of the screen makes it possible to quickly show or hide different mixer components.

The Mixer Section Selector.

Let’s look at the mixer controls:



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 the little 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 (see Soloing and Cueing). Tracks can only be soloed one at a time unless the Exclusive Solo option in the Misc 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 (see Recording New Clips). Tracks can only be armed one at a time unless the Exclusive Arm option in the Misc Preferences is deactivated. Alternatively, you can hold down the Ctrl (PC) / ⌘ (Mac) modifier to arm more than one track.

14.2 Audio and MIDI Tracks

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

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 dragging objects from the Browser into empty mixer or clip space according to the following rules:

- A MIDI track will be created if a MIDI effect or an instrument is dragged into empty space in the mixer.
- An audio track will be created if an audio effect is dragged into empty space in the mixer.
- Any devices or files dragged into empty space in the clip area will create a track of the appropriate type.

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 also drag tracks by their Title Bar to reorder them.

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

14.3 Return Tracks and the Master Track

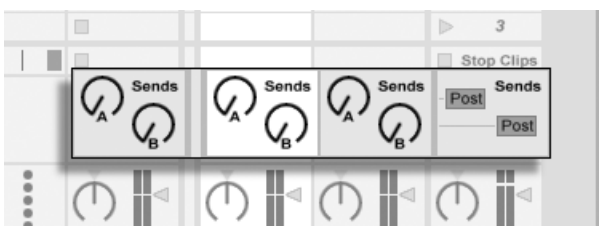
In addition to tracks that play clips, a Live Set has a *Master track* and up to twelve *return tracks*; these cannot play clips, but allow for more flexible signal processing and routing.

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 (see Working with Instruments and 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 (see Routing and I/O), 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.

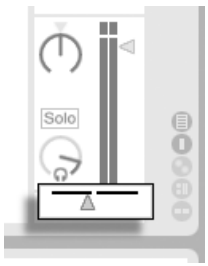
You can create multiple return tracks using the Insert menu's Insert Return Track command, but by

definition, there is only one Master track.

14.4 Using Live's Crossfader

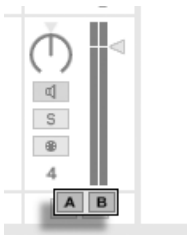
Live includes a crossfader that can create smooth transitions between clips playing on different tracks. Live's crossfader works like a typical DJ-mixer crossfader, except that it allows crossfading not only two, but any number of tracks– including the returns.

The crossfader is accessed via the Session View mixer.



The Crossfader.

The crossfader is a horizontal slider that can be mapped to any continuous MIDI controller (absolute or incremental).



A Track's 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.

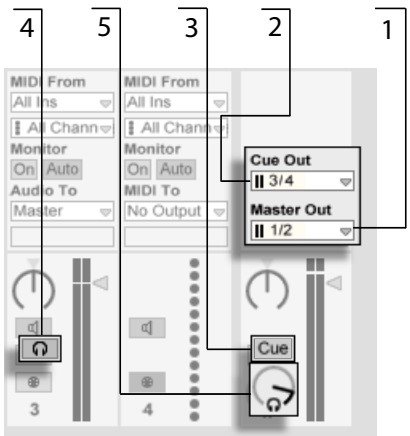
As with almost everything in Live, your crossfading maneuvers can be recorded into the Arrangement (see Automation and Editing Envelopes) for later in-depth editing. To edit each track's crossfade assignment, please choose "Mixer" from the Envelope Device chooser and "X-Fade Assign" from the Control 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.

14.5 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 "Mixer" and "In/Out" checked from 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 (see Audio Preferences Setup).
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.

Chapter 15

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 (see Recording Sessions into the Arrangement).

15.1 Setting up Preferences

For successful audio recording, please make sure the audio preferences are set up properly (see Audio Preferences Setup). 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.

The following Misc Preferences 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 Record File Type chooser in the Misc Preferences.
- The bit depth of the sample file you will create by recording can be chosen from the Record Bit Depth chooser in the Misc Preferences.
- The Audio Record Folder selected in the Misc Preferences is the disk location where Live will put the samples you record into an unnamed Live Set. When the Live Set is saved, Live will attempt to move (space permitting) all samples from the temporary record folder to the saved Live Set's Sounds folder (see The Sounds Folder and Self-Containing).

You can save time by setting up reasonable defaults for the clips you are recording in the Defaults 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 (see Adjusting for Good Stretching Quality), usually without further adjustment.

15.2 Recording in Sync

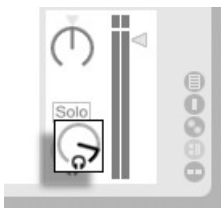
Live keeps the audio and MIDI you have recorded in sync, even when you later decide on a different song tempo. In fact, Live allows you to change the tempo at any time before, after and even during recording. You could, for instance, cheat a bit by turning down the tempo to record a technically difficult 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* (see Time-Warping Samples). 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 (see The Notes Box).

15.3 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 (see Recording Into Session Slots) or into the Arrangement (see Recording 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 (see Overdub Recording MIDI Patterns) 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 (see Arranging and Quantizing Notes).

15.4 Choosing an Input

A track will record whatever input source is shown in its In/Out section, which appears in the Session View when the View menu's "In/Out" option is checked.

Track In/Out Section in the Session View.

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 (see The Preferences' Active MIDI Device List). The computer keyboard is, by default, activated as a pseudo-MIDI input device (see Playing MIDI With the Computer Keyboard), 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 (see Routing and I/O) describes these options in detail.

15.5 Arming (Record-Enabling) Tracks

Track Arm Buttons in the Session (Left) and Arrangement (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 (see Tracks).

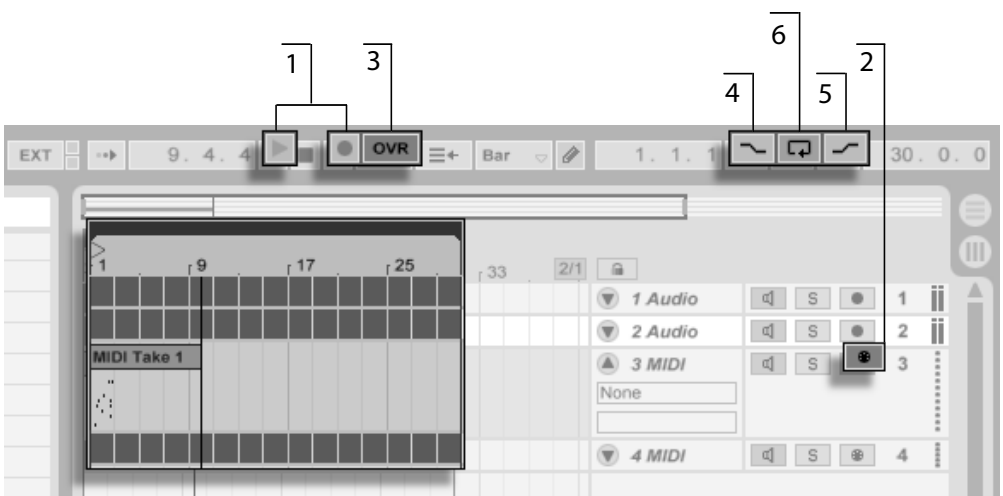
By default, armed tracks are monitored, meaning that their input is passed through their device chain and to the output, so that you can listen to what is being recorded. This behavior is called "auto-monitoring" and you can change it to fit your needs (see Monitoring).

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 (see Working with Instruments and Effects).

15.6 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.

15.6.1 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.

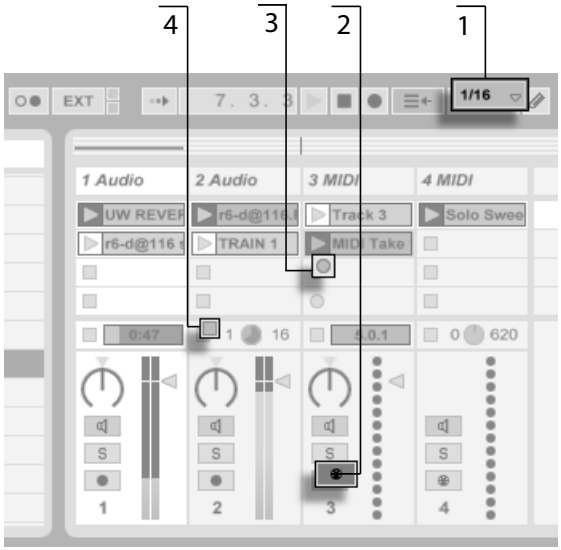
5. Likewise, to prevent recording after the punch-out point, activate the Punch-Out switch. The punch-out point is identical to the Arrangement Loop's end position.

6. When you are recording into the Arrangement Loop (see 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 Clip Loop/Region markers (see Clip View) define the audio taken in the last pass; moving the markers left lets you audition the audio from previous passes.

15.6.2 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 (see Tracks and Scenes) 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 Misc Preferences to tell Live that you *do* want empty scene slots to record under these circumstances.

15.6.3 Overdub Recording MIDI Patterns

Live makes pattern-oriented recording of drums and the like quite easy. Using Live's Impulse (see 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 (see 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 (see Recording Quantized MIDI Notes).
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 (see The Notes Box).
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.

15.7 Using Remote Control for Recording

Using Key Map Mode (see Keyboard Remote Control), 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.

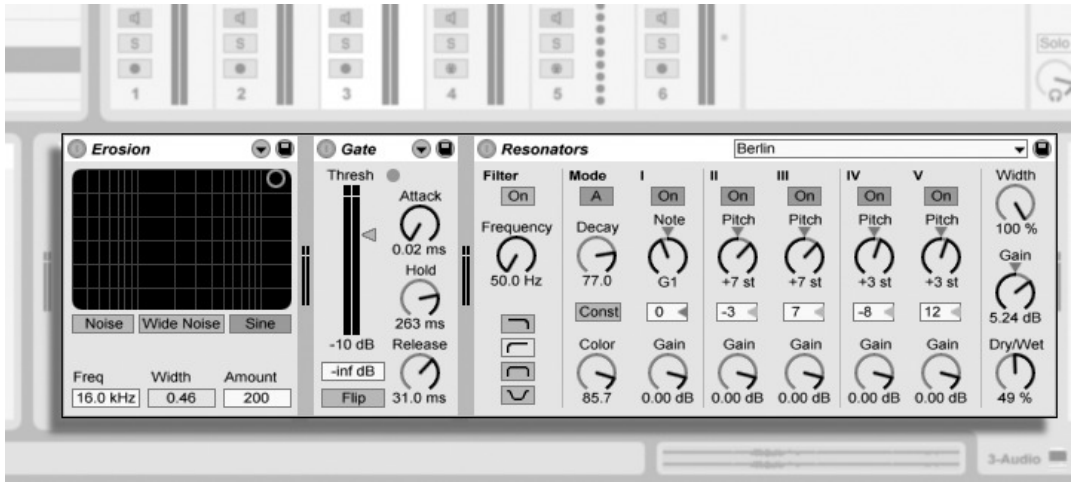
. . . and another key to start and end recording in the respective track.

Chapter 16

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.

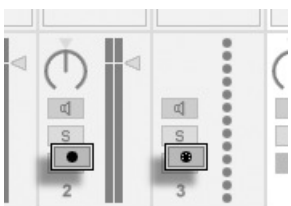
16.1 Using the Live Devices

The Live Device Browser Selector.

Click on the Live Device Browser selector to access the palette of Live Lite 4 for M-Audio's built-in devices. You will notice that MIDI effects, audio effects and instruments each have their own folders in the Browser.

To place one instance of a device in a track, click on the desired device and drag it into the Track View of an appropriate track. You can also select a track by clicking on its Track Title Bar, then double-click a device in the Browser to add it to the selected track. *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. 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 (see Recording New Clips) for further use in Live. If you have alternative monitoring preferences, please see the appropriate manual section (see Monitoring) for information on how to make these settings.

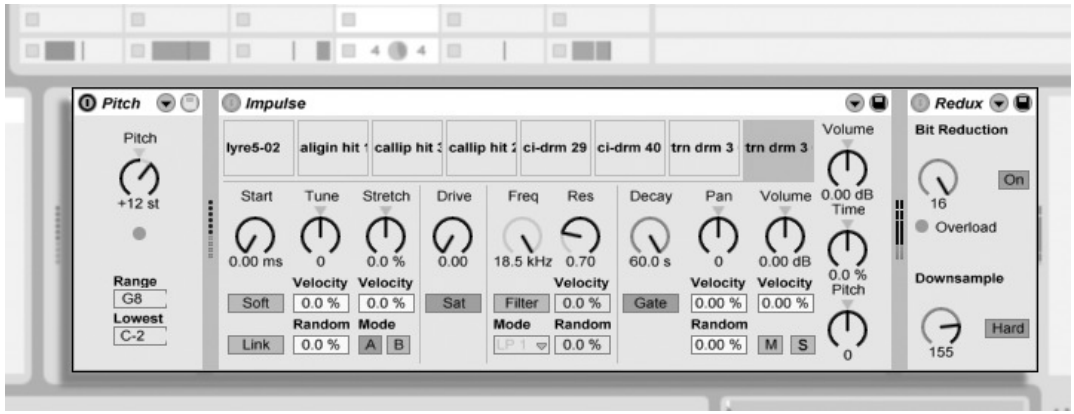


MIDI and Audio Track Arm Buttons

Play with the device's controls to change the result, or get more "hands-on" by assigning device controls to MIDI or key remote control (see MIDI and Key Remote Control). To learn what a device does and how to operate it, consult the Live Device Reference section (see Live Device Reference).

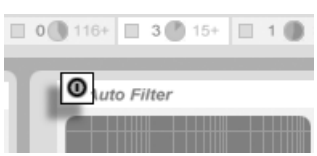
To add another device to the track, simply drag it there or double-click its name to append it to the device chain. Signal processing travels from left to right on the track.

- 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, as effects on the left will pass altered signals on to those on the right.
- The above also applies to a MIDI track's device chain.
- If you drop an instrument into a MIDI track's device chain, signals following (to the right of) the instrument are now audio signals, available only to audio effects. Signals preceding (to the left of) the instrument are available only to MIDI effects. This means that it is possible to have a MIDI track device chain consisting of all three types of devices: first a MIDI effect, then an instrument, and finally an audio effect.



A MIDI Track's Device Chain Can Contain All Three Device Types.

To remove a device from the chain, click on the name and either press your computer's Delete or Backspace key, or select Delete from the Edit menu. To change the order of devices, drag a device by its name and drop it between any of the other devices in the Track View, or drag it onto another track in the mixer to place the device in that track. Generally, devices can be placed, reordered and deleted without interrupting the audio stream.



A Device Activator Switch.

Devices can be 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 (see Managing the CPU Load).

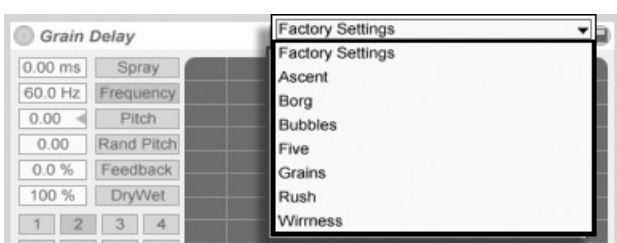
Devices in Live's tracks have input and output level meters. These meters facilitate finding a problematic device in the device chain: Low or absent signals will be apparent in the level meters

between devices, and relevant device settings can then be adjusted, or the device can be turned off or removed. 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.

Further information about track types in Live can be found in the Routing and I/O chapter (see Routing and I/O), including information on using *return tracks* to distribute the effect of a single Live device amongst several tracks. After reading about using devices in Live, it might also be interesting look into clip envelopes (see Clip Envelopes), which can modulate individual device settings on a per-clip basis.

16.1.1 Live Device Presets

Every Live device can store and retrieve particular sets of parameter values as *Presets*. Two buttons for managing the device presets are located at the top right of each device.



Recalling a Preset.

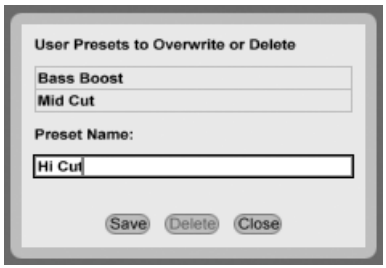
To audition presets for possible selection, click once on the Recall Preset button to make the preset chooser appear. Use ↓ and ↑ to go through the existing presets while listening to their effect and watching the device settings change. To select a preset by name, click on the chooser to open it. The available presets will be listed and sorted alphabetically:

- *Factory Settings* is the device's default state when it is inserted from the Live Device Browser. This preset is always at the top of the list.

- Below the factory settings are the *Factory Presets*, which are installed with the program. These presets are updated as new versions of Live become available.
- The *User Presets* are listed below the factory presets. You can create any number of user presets that are not bound to a particular instance of the device or to the current Live Set. They will be available in any other instance of the device and any other Live Set as well.

The Preset Save Button.

The Preset Save button is for saving, overwriting and deleting user presets. Clicking on this button opens a dialog window.



The Preset Save/Delete Dialog.

To *overwrite* an existing user preset, select it from the list of user presets and click the Overwrite button.

To *save* a user preset, type a preset name into the text edit field and click the Save button. If a preset with that name already exists, you will be asked if you want to overwrite that preset. If not, choose a different name and try again. Otherwise, click on “ok” to overwrite.

To *delete* a user preset, select it and click the Delete button.

To leave the preset dialog, choose Close.

16.2 Using Plug-Ins

The collection of devices that you use in Live can be extended with *plug-ins*. Live supports Steinberg Media's VST Plug-ins and Apple Computer's Audio Units Plug-ins (Mac OS X only).

Working with VST and Audio Units Plug-ins is very much like working with Live devices. VST and Audio Units 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 section on working with Live devices (see Using the Live Devices) for general information about working with devices in Live.

The Plug-In Device Browser Selector.

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

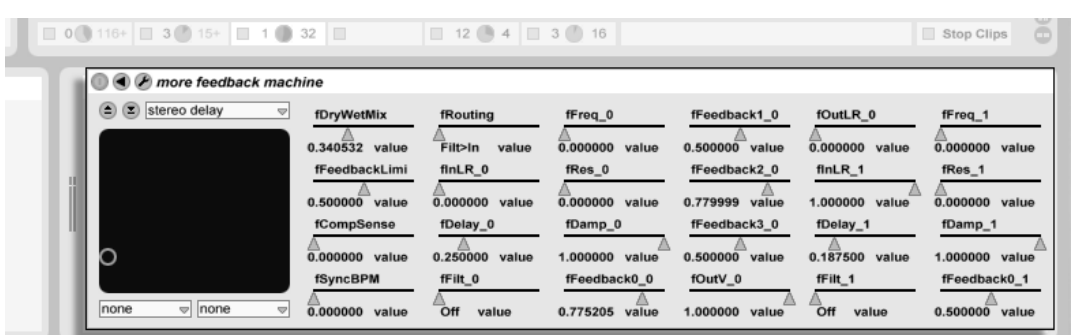
Browser, as they appear with a keyboard icon, while effects have a plug-shaped icon.

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, by plug-in type, in the sections on the VST Plug-in folder (see The VST Plug-In Folder) and Audio Units Plug-ins (see Audio Units Plug-Ins).

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 *Re-Scan* button in the Plug-In Preferences to re-scan your plug-ins while Live is running, so that newly installed devices become immediately available in the Plug-In Device Browser.

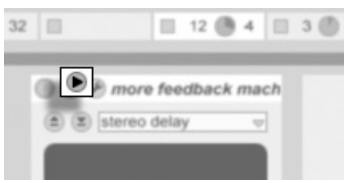
Hint: You can also use Re-Scan if you believe that your plug-in database has somehow become corrupted. Holding down the Alt (PC) / Alt (Mac) modifier while pressing Re-Scan will delete your plug-in database altogether and run a clean scan of your plug-ins.

16.2.1 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's 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 (see Showing Plug-In Panels in Separate Windows).



The Plug-In Unfold Button.

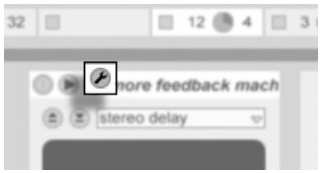
You can view or hide the VST Plug-in's parameters by toggling the triangle-shaped button in the plug-in's title bar.

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 modulate its continuous parameters with clip envelopes (see 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 chapter on routing (see Routing and I/O) for details.

16.2.2 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.

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.

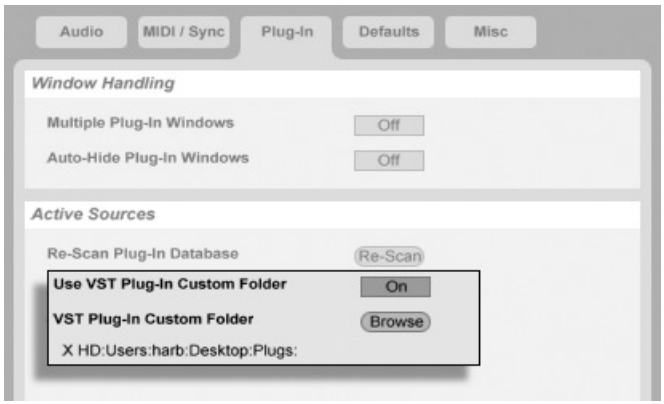
You can use the View menu's Show/Hide Plug-In Windows command or the Ctrl P (PC) / ⌘ P (Mac) shortcut to hide and show your open plug-in windows. Notice that the name of the track to which the plug-in belongs is displayed in the title bar of the plug-in editor window.

Macintosh only: The floating VST Plug-in editor windows do not receive computer key strokes. If it is necessary to type into the 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 a plug-in limitation. We recommend closing the window after you have finished typing, then reopening it normally before working with the plug-in parameters.

16.3 VST Plug-Ins

16.3.1 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 go to the Plug-In Preferences via the Options menu (or the Live menu in Mac OS X). There you will find the "Active Sources" section.



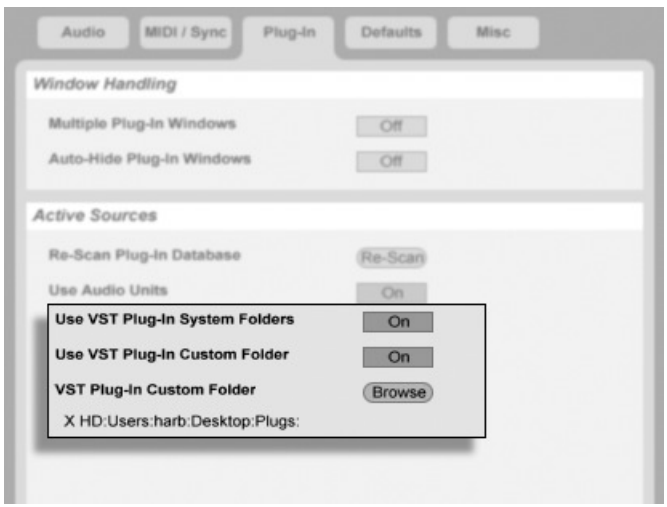
Setting up VST Plug-In Sources for Windows and Mac OS 9.

For Mac OS 9 and 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.

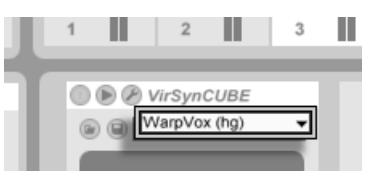
3. Note that you can turn off your VST Plug-ins in this folder using the Use VST Plug-In Custom folder option.

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.

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 re-scan 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 re-scanned again until they are reinstalled.

16.3.2 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.



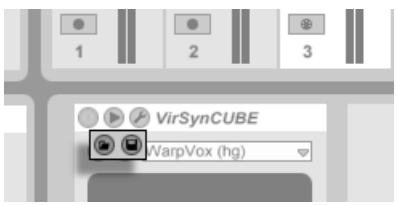
The VST Plug-In Program Chooser.

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.

Please don't mistake the VST Plug-In Program chooser for the Live device preset chooser (see 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 The VST Program/Bank Save Button (Right).

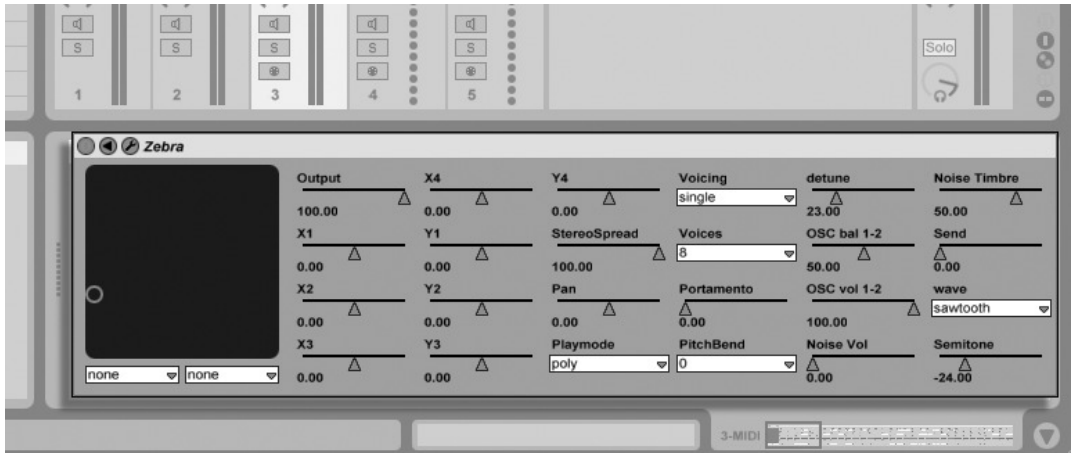
VST programs and banks can be imported from files. Clicking the VST Program Load button brings up a standard file-open dialog for locating the desired file.

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.

16.4 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 (see 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 Plug-In Preferences via the Live menu. 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.

Opening an Audio Units Plug-In Window.

Audio Units have presets that function just like those for the Live effects (see Live Device Presets).

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].

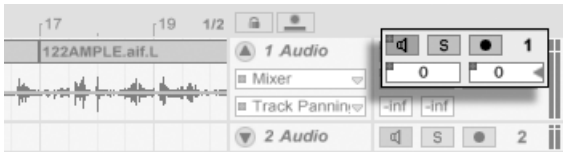
Chapter 17

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 (see Drawing and Editing Automation).

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 (see Non-Destructive Editing), 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.

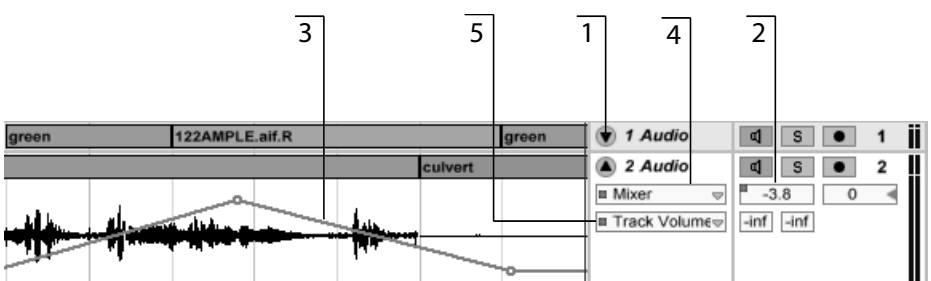
The Back to Arrangement Button.

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 triangular 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.

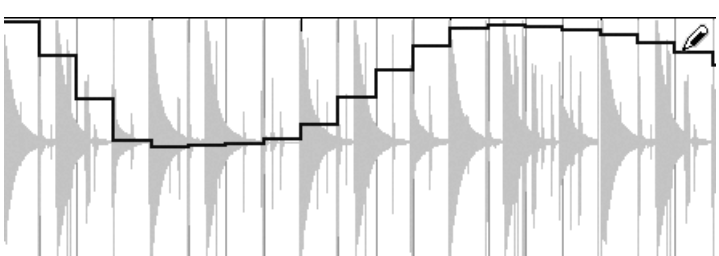
5. The Automation Control chooser selects a control from the device chosen in the Automation Device chooser. The labels of automated controls have an LED.

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 "Draw Mode" from the Options menu, click on the Control Bar's Draw Mode switch, or press Ctrl B (PC) / ⌘ B (Mac).



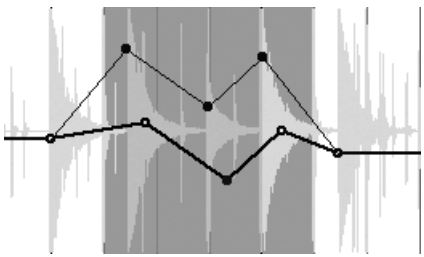
Drawing an Envelope.

Drawing creates steps as wide as the visible grid, which you can modify using a number of handy shortcuts (see Using the Editing Grid). For freehand drawing, you can hide the grid using the "Snap to Grid" Option menu entry.

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:

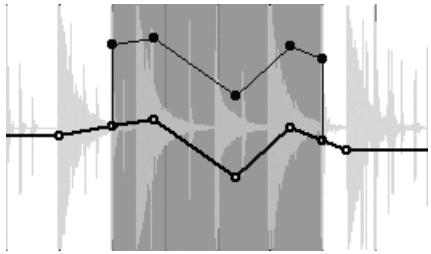
- Double-click at a position on a line segment to create a new breakpoint there.
- Double-click on a breakpoint to delete it.
- Click and drag a breakpoint to move it to the desired location. If the breakpoint you are dragging is in the current selection, all other breakpoints in the selection will follow 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.

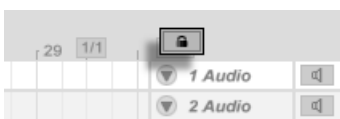
- Click and drag a line segment between two breakpoints to move it vertically, without affecting the breakpoint's horizontal position. If the line segment is in the current selection, the envelope is moved vertically across the selected timespan. Live inserts breakpoints at the selection's edges to make 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.

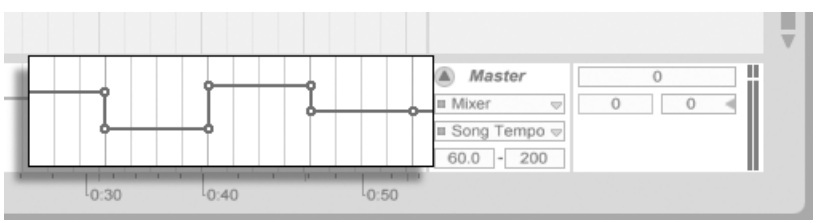
Note that Live allows you to copy and paste envelope movements not only from one point in time to another, but also from one parameter to another. However, there is obviously no meaningful

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.

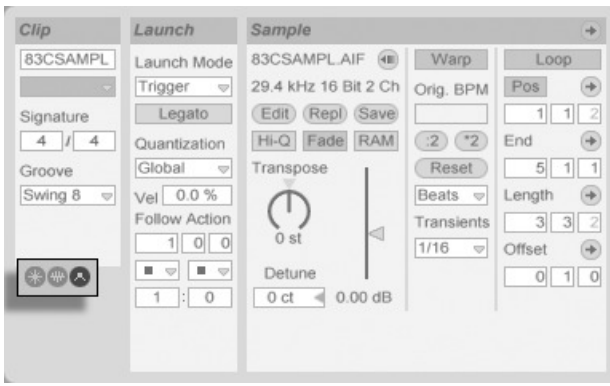
When adjusting the tempo envelope, you might want to scale the value axis display, which is the function of the two value boxes below the envelope choosers: The left box sets the minimum, and the right box sets the maximum tempo displayed, in BPM.

Chapter 18

Clip Envelopes

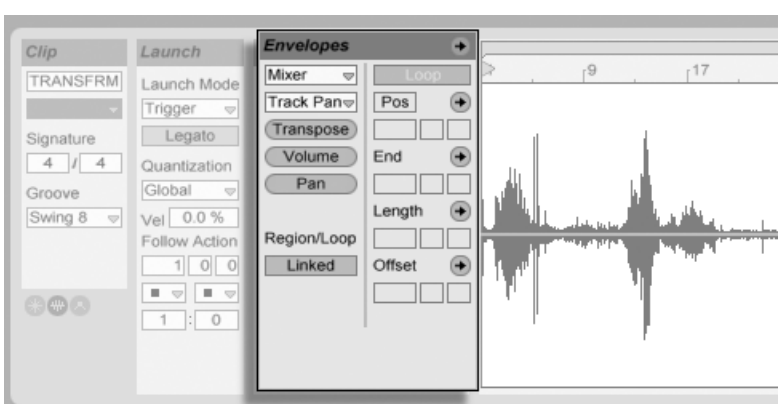
Every clip in Live can have its own *clip envelopes*. The aspects of a clip that are influenced by clip envelopes change depending upon clip type and setup; clip envelopes can do anything from representing MIDI-controller data to modulating device parameters. In this chapter, we will first look at how 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 (see Drawing and Editing Automation).

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 Clip Loop/Region markers, and click the brace that runs between them. This will execute the Edit menu’s Select Loop command, which selects all material in the loop/region.
2. Copy the envelope with Ctrl C (PC) / ⌘ C (Mac).
3. Shift the loop/region 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/Region markers (see Loop/Region and Start 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

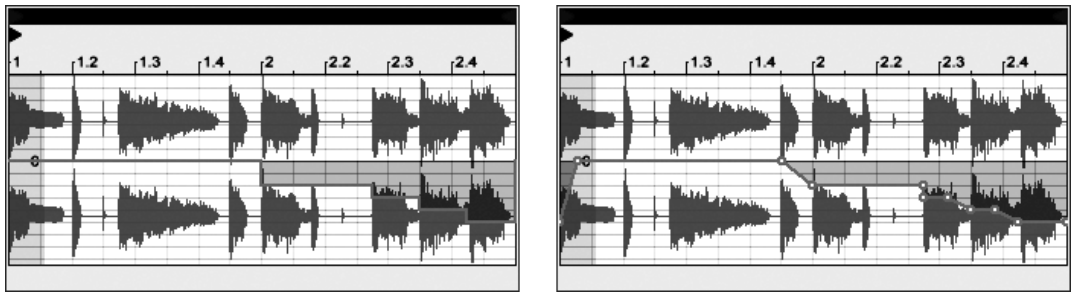
Using clip envelopes, you can create new sounds from a sample without actually affecting the sample on disk. Because Live calculates the envelope modulations in real time, you can have hundreds of clips in a Live Set that all sound different, but use the same sample.

You can, of course, export a newly created sound by rendering (see Exporting Audio), or by resampling (see Recording New Clips). In the Arrangement View, you can use the Consolidate command (see Consolidating Clips) 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" envelope 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 (see Drawing Envelopes) 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 (Left) and Ramps (Right).

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.

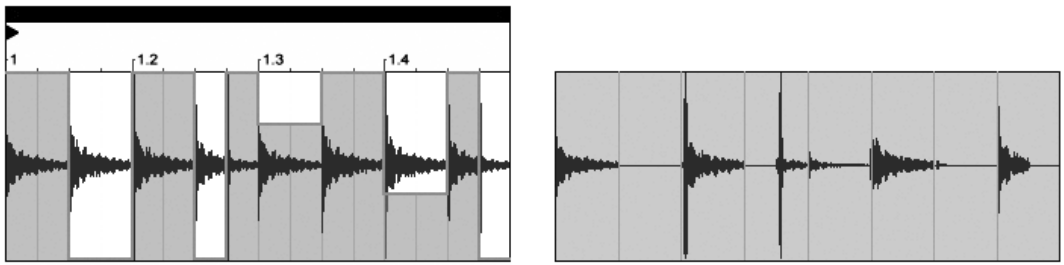
To correct the tuning of individual notes in the sample, hold down the Ctrl (PC) / ⌘ (Mac) modifier while drawing or moving breakpoints to obtain a finer resolution.

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" envelope 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.

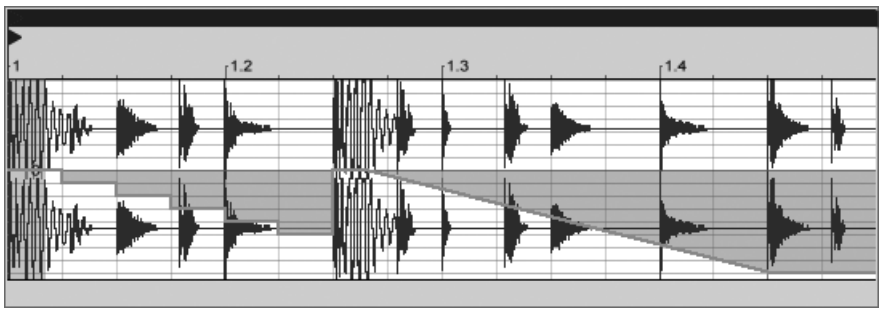
18.2.4 Scrambling Beats

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 (see Drawing Envelopes), 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 (see Consolidating 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.

Notice this procedure affects only the selected clip, whereas replacing a sample with the Clip View's Replace button (see Replacing the Clip's Sample) will affect all clips using that sample.

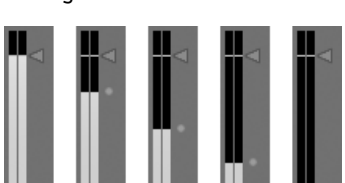
18.3 Mixer and Device Clip Envelopes

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 (see Drawing and Editing Automation), 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.

Modulating a Send. The Send Knob's Position Ring Indicates the Modulated Value.

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

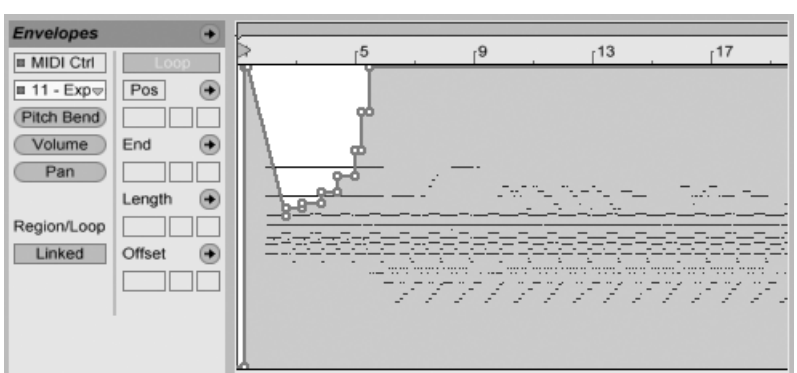
All devices in a clip's track are listed in the upper clip envelope Device chooser. Modulating the devices' controls works just as you would expect. When modulating device controls, it is important to keep the interaction of clip envelopes and device settings in mind: Unlike a device preset (see Using the Live Devices), 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 (see Recording New Clips) 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.

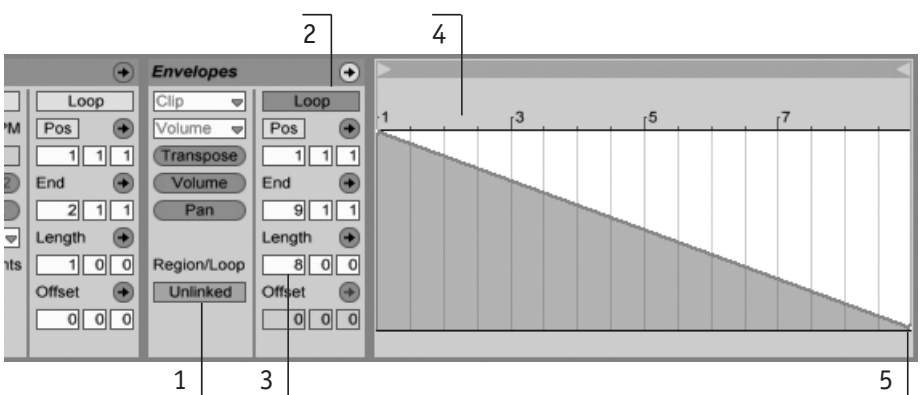
Many of the techniques described in the following section on unlinking a clip envelope (see Unlinking Clip Envelopes From Clips) from its associated clip can be adapted for use with MIDI-controller clip envelopes.

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. (It is actually faster to click the "Show Loop" arrow next to the loop/region length controls.)
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.

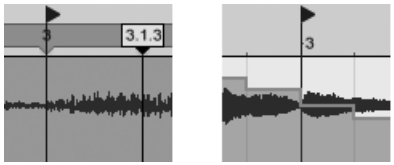
18.5.2 Creating Long Loops from Short Loops

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) Loop Offset Marker.

To keep this complexity under control, it is important to have a common point of reference. The Offset Marker identifies the point where sample or envelope playback depart from when the clip starts.

Note that the region/loop and Offset markers are subject to quantization by the zoom-adaptive grid (see Using the Editing Grid), as is envelope drawing (see Drawing Envelopes).

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 (see Using the Editing Grid), you can adjust the clip envelope loop start and end points completely independent of meter grid.

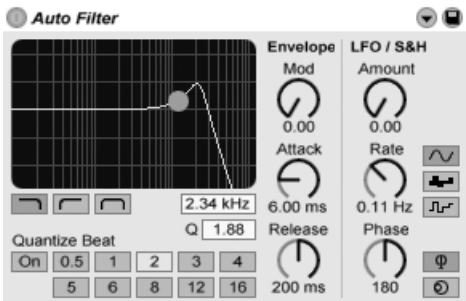
Chapter 19

Live Device Reference

Live comes with a selection of custom-designed, built-in devices. The "Working with Instruments and Effects" chapter (see Working with Instruments and Effects) explains the basics of using devices in Live.

19.1 The Live Lite 4 for M-Audio Audio Effects

19.1.1 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 three different filter types: low-pass, high-pass and bandpass. 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. In Bandpass Mode, 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 for Beat value produces a modulation change once per beat.

The EnvelopeMod section controls how the envelope modulation affects the filter frequency. The Mod

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 Amount control sets how much the LFO affects the filter.

The Rate control specifies the LFO speed.

Available waveform shapes are Sine (creates smooth modulations with rounded peaks and valleys), and Sample and Hold (generates random positive and negative modulation values).

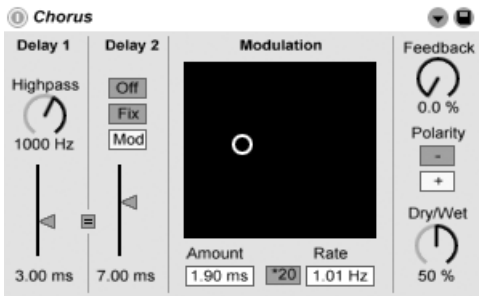
There are two sine wave LFOs, one for each stereo channel. The Phase and Spin controls define the relationship between these two LFOs.

Phase keeps both LFOs at the same frequency, but can set the two LFOs' waveforms "out of phase" with each other, creating stereo movement. At maximum, 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 LFOs' 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 Spin and Phase 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 provides independent random modulation generators for the left and right channels, while the lower one modulates both channels with the same signal.

19.1.2 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 high-pass filter that can remove low frequencies from the delayed signal. Greater high-pass 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.

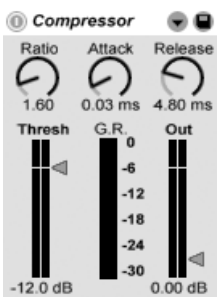
You can also make changes by entering parameter values in the Amount and Rate fields below the X-Y controller. The Amount value is in milliseconds, while the modulation frequency rate is in Hertz.

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 wet only if using the Chorus in a return channel.

19.1.3 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.

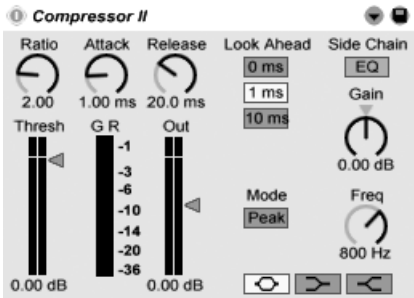
Because compression reduces the volume of loud signals and opens up headroom, you can use the Out(put) slider so that the peaks once again hit the maximum available headroom. The Output meter shows the output signal's level.

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.

19.1.4 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.

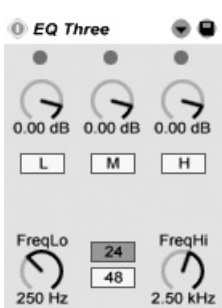
Compressor II can either react to short peaks within a signal or to something that is more related to how people perceive loudness. The parameter for this is the "Peak/RMS" switch. If you intend to use Compressor II as a limiter in the master section, "Peak" is probably better since it reacts more to 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!

19.1.5 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...

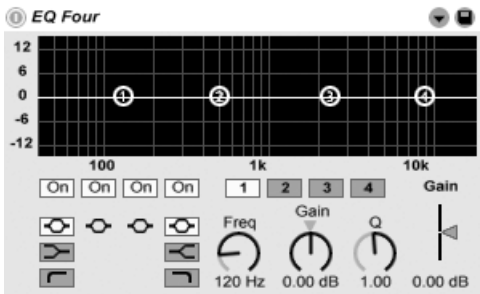
EQ Three gives you visual confirmation of the presence of a signal in each frequency band using three green LEDs. Even if a band is turned off, you can see if there is something going on in it. The internal threshold for the LEDs is set to -24 dB.

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 Four.

19.1.6 EQ Four



The EQ Four Effect.

The EQ Four effect is an equalizer composed of four parametric filters. Equalizers are useful for changing a sound's timbre.

Filter One can switch among three responses: bell-curve (boosts or cuts over a range of frequencies), low-shelf (boosts or cuts frequencies lower than the specified frequency) or low-cut (cuts frequencies below the specified frequency). Filters Two and Three are always bell-curves. Filter Four can switch among bell-curve, high-shelf (boosts or cuts frequencies higher than the specified frequency) or high-cut (cuts frequencies above the specified frequency) modes. Each filter band can be turned on or off independently. Turn off bands that aren't in use to save CPU power.

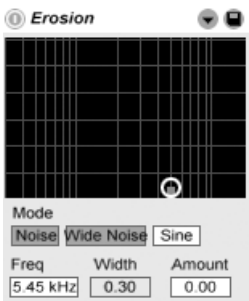
To edit the filter curve, click and drag on one of the filter dots in the XY View. Horizontal movement changes the filter frequency, while vertical movement adjusts the filter band's gain. To adjust the filter Q (also called resonance or bandwidth), hold down the Alt (PC) / Alt (Mac) modifier while dragging the mouse.

You can also use the numbered filter selector buttons to select a band for editing, 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, or use more than one EQ Four.

As boosting will increase levels and cutting will decrease levels, use the Gain slider to optimize the output level for maximum level consistent with minimum distortion.

19.1.7 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 XY field. The Y-axis controls the modulation amount. If you hold down the Alt (PC) / Alt (Mac) modifier key while clicking in the XY 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.

19.1.8 Filter Delay

The Filter Delay Effect.

The Filter Delay provides three independent delay lines, each preceded by linked low-pass and high-pass 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 plug-in 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 XY controller. The XY controllers adjust the low- and high-pass 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 master 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.

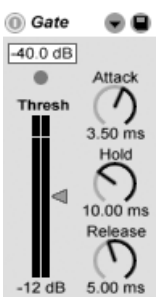
If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay time, click and drag up or down in the Delay Time field, or click in the field and type in a value.

Feedback controls 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 the Delay in a return channel.

19.1.9 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.

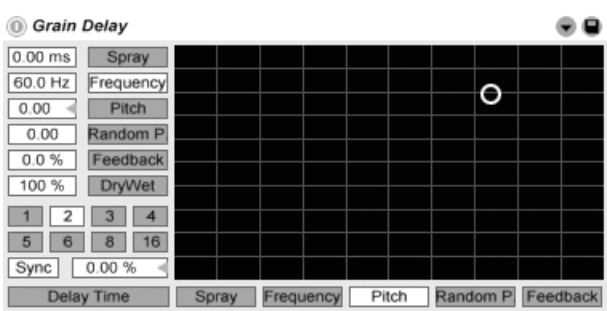
The Threshold slider sets the gate's sensitivity. If the gate is open and passing signal (i.e., the signal exceeds the gate threshold), the green LED lights.

The Floor parameter located above 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.

19.1.10 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 master 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.

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 XY 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.

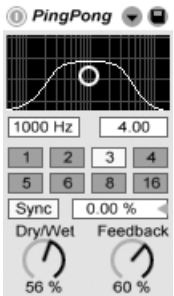
The Spray control adds random delay time changes. Low values smear the signal across time, which adds "noisiness" to the sound. High Spray values completely break down the structure of the source signal, introducing varying degrees of rhythmical chaos. This is the recommended setting for anarchists.

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 XY controller.

19.1.11 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 low- and high-pass filter that can be controlled with an XY 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 master 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.

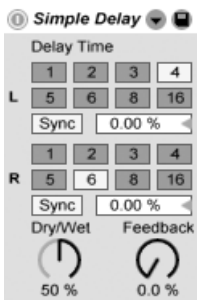
If the Sync switch is off, the delay time reverts to milliseconds. In this case, to edit the delay time, click and drag up or down in the time field, or click in the field and type in a value.

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 Dry/Wet control adjusts the balance between the processed and dry signals. Set it to full wet if

using the Ping Pong Delay in a return channel.

19.1.12 Simple Delay



The Simple Delay Effect.

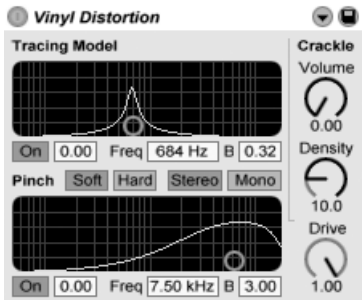
The Simple Delay provides two independent delay lines, one for each channel (left and right).

To refer delay time to the master 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 there 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 full wet if using the Simple Delay in a return channel.

19.1.13 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 XY window. To adjust the distortion's frequency or "color," drag horizontally in the XY window or double-click on the Freq field and type in a value. Holding the Alt (PC) / Alt (Mac) modifier while dragging vertically in the XY window 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.

19.1.14 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).

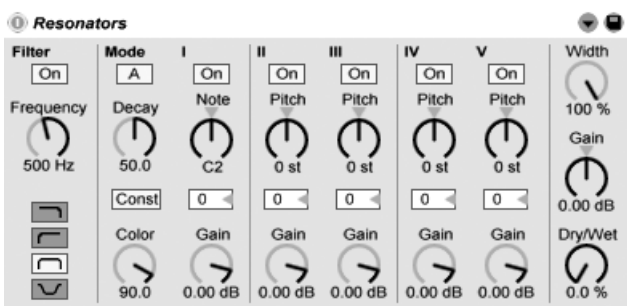
Bit Reduction is similar, but while downsampling superimposes a grid in time, bit reduction does the same for amplitude.

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.

19.1.15 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: low-pass, bandpass, high-pass 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.

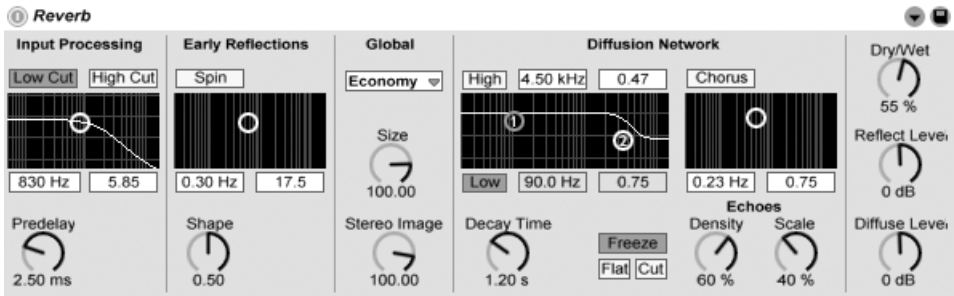
The brightness of the resulting sound can be adjusted using the Color control.

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.

19.1.16 Reverb



The Reverb Effect.

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.

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 2-D 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, with modest CPU savings.

Global Settings

The Quality chooser controls the tradeoff between reverb quality and performance. Economy mode uses minimal CPU resources, while First Class 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.

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.

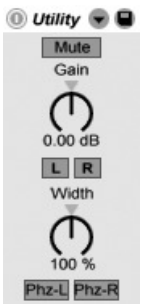
The Echo Density and Scale parameters provide additional control over the diffusion's density and coarseness, and, when the room size is extremely small, have a large impact on the coloration contributed by the diffusion.

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.

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.

19.1.17 Utility



The Utility Effect.

Utility can perform some very useful tasks, especially in combination with other effects.

Most obvious is the Gain control, which allows adjusting the level of the input signal from -36 to +36 dB. The Gain control is located below the Mute button, which simply turns the signal off if pressed.

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 Left/Right buttons allow further processing of only the left or right channel of a sample. If, for example, Left is turned on, 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.

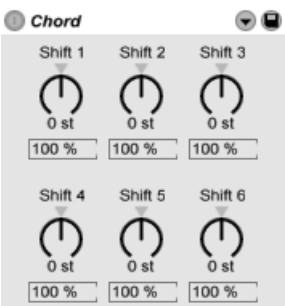
The Width control acts as a continuous mono to stereo controller when set from 0 to 100 percent. However, beyond 100 percent the output starts to "fold in" on itself. In the full right position the output contains only the difference between the left and right channels. If either the Left or Right button is activated, the Width control has no function and is therefore bypassed.

At the bottom of the device you will find two Phase (ø) controls, one for each channel. As the name

implies they invert the phase of each channel.

19.2 The Live Lite 4 for M-Audio MIDI Effects

19.2.1 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.

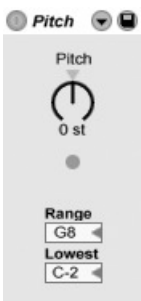
The Velocity control beneath each Shift knob makes further harmonic sculpting possible, given that the instrument allows for changes in volume or timbre as function of velocity. It is a relative control, with a range of 1 to 200 percent (100 percent defined as playing at a velocity equal to that of the 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 becoming gray, 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.

19.2.2 Pitch



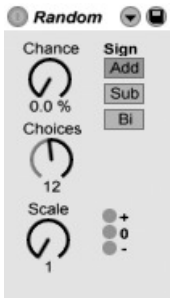
The Pitch Effect.

Pitch is a transposition tool that changes incoming note pitch by +/- 48 semitones.

The Range and Lower Limit controls act together to set 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.

19.2.3 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.

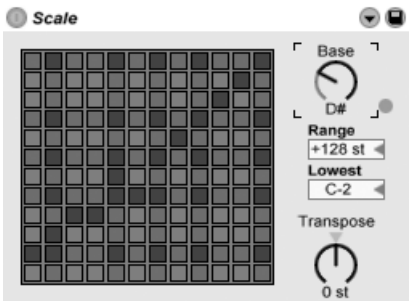
The random value that determines the pitch change is created by two variables: The Choices control defines the number of different random notes possible, from a range of 1 to 24; the Scale control value is multiplied by the Choices control value, and the result dictates the pitches that random notes 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 Sign buttons that 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.

19.2.4 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 Lower Limit controls 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.

19.2.5 Velocity

The Velocity Effect.

Velocity re-maps the 127 MIDI note velocity values. 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 In Low and In Hi choosers, and are represented on the X-axis. The resulting curve shows how velocity is being altered by the effect.

If In Low and Out Low are both set to 1, and Out Hi and In 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 1 and out Low to 127, the slope of the line will be reversed, and softly played notes will actually produce the loudest output.

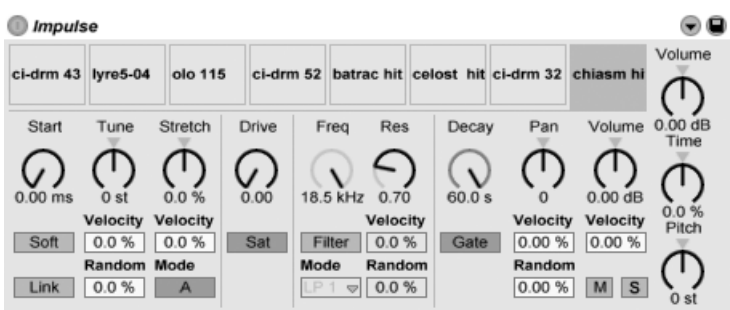
What happens to incoming notes that are outside of the range set with the In Low and In High controls? This depends on which Mode is selected. Clip Mode does just what it says: It clips incoming note velocities so that they stay within the range. Gate Mode removes incoming notes altogether if their velocities are outside of the range. You will see the little LED in the effect 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. Compand is a simultaneous expanding and compressing tool. When set to values greater than 0, it forces incoming notes to the outer boundaries of the curve, making them play either loudly or softly. Compand values of less than 0, 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.

19.3 The Live Lite 4 for M-Audio Instruments

19.3.1 Impulse



The Impulse Instrument.

Impulse is a drum sampler with complex modulative 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.

Sample Slots

Samples are dragged and dropped into Impulse's eight sample slots from the Browser or the Session and Arrangement Views. Samples can be deleted with your computer keyboard's Backspace/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 (see Editing MIDI Notes and Velocities) 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 (see Pitch), or it can be rearranged by applying a Scale device (see Scale).

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 (see 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): Naturalistic closed hi-hat cymbals will shut down open hi-hat cymbals.

Each slot can be played, soloed or muted using controls that appear when the mouse hovers over it.

Start, Tune and Stretch

The Start control defines where Impulse begins playing a sample, and can be set to up to 100 ms later than the actual sample beginning. Tune 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.

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 the points in the spectrum where frequencies are excluded by filtering. Filter Frequency can be modulated by either a random value or by MIDI note velocity.

Saturator and Envelope

The Saturator gives the sample a fatter, rounder, more analog sound, and can be switched on and off using the appropriate switch. The Drive control boosts the signal and adds distortion. Note: Turning Drive up makes almost every signal get much louder, and so will usually require that volume be lowered manually. 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 60.0 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.

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.

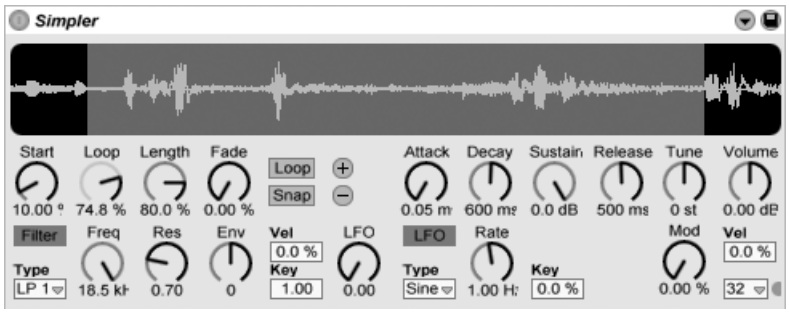
Global Parameters

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 notes. The Time control governs the time-stretching and decay of all samples, allowing you to morph between short and stretched drum sounds.

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 (see Tapping Individual Outs From an Instrument) to learn how to accomplish this for Impulse's overall signal or for Impulse's individual sample slots.

19.3.2 Simpler



The Simpler Instrument.

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.

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 Views in the form of clips. In the latter case, Simpler will utilize only the section of the sample demarcated by the Clip Loop/Region markers. Samples can be replaced by dragging in a new sample.

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 length of the loop.

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 in the right channel of a stereo sample.

You can also smooth the transition from loop end to loop start by using the Fade control, which crossfades the two points. This method is especially useful when working with long, textural samples.

Zoom

Quite often, one starts with a longer region of a sample and ends up using only a small part of it. Simpler's two Zoom buttons ("+" and "-") allow you to zoom in around the selected length, or zoom out to access a larger area. When zooming in on small portions of long samples, it will probably be necessary to repeatedly shrink the highlighted sample region, as Simpler will zoom no further than the length of this region. Note: After zooming in, the Start, Loop and Length parameters will be resized so that there is no audible difference. This means that the Start and Length values are altered by zooming, and automation or clip envelopes utilizing these parameters will behave differently after the operation.

Envelope

This is a classic a ADSR Envelope section, as seen in most synthesizers, for shaping the dynamic structure of the sample. *Attack* controls the time in milliseconds that it takes for the instrument to play the sample signal at full amplitude after a note is played. *Decay* controls the amount of time taken for the sample to drop down to the *Sustain* level (dB), 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 sample amplitude to drop from the Sustain level back down to zero.

The envelope can also be used to modulate the filter frequency.

Filter

The Filter section offers a broad range of filter types, including classic 12 dB or 24 dB low-pass filters, as well as bandpass, high-pass and notch, 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 the points in the spectrum where frequencies are excluded by filtering.

The best way to understand the effects of these controls is to play with them. . .

The Frequency parameter can be modulated by an LFO, note velocity, note pitch and the Envelope section– 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.

LFO

The LFO (low frequency oscillator) section offers square, sine, triangle, sawtooth and random waveforms. The main control in this section is the Rate control, which changes the LFO frequency within

a range of 0.05 to 30 Hz. LFOs are applied individually to each *voice*, or played note, in Simpler. Square, triangle and sawtooth LFOs restart each time a new voice is played, while sine and random do not. The Detune parameter changes the definition of each LFO's Rate as a function of the pitch of incoming notes. A high Detune setting assigns higher notes a higher LFO rate. If Detune is set to zero, all voices' LFOs have the same rate and may just differ in their phase.

Note: Sawtooth, Square and Random are waveforms that, by nature, create sudden jumps. These jumps can cause clicks when applied to filters. This effect cannot be avoided without losing the "bite" of the waveform. However, we may provide smoothied variations of these in future versions of Simpler.

Pitch, Volume and Voices

Simpler plays back a sample at its original pitch if the incoming MIDI note is C3, however the Tune control allows transposing this by +/- 48 semitones. Pitch can also be modulated by an LFO using the amount control in this section. Simpler reacts to pitch bend MIDI messages with a sensitivity of +/- 5 semitones. You can also modulate the Tune parameter with clip envelopes and external controllers.

The Voices parameter sets the maximum number of voices that Simpler can play simultaneously. If more voices are trying to play than what you have allocated with the Voice control, "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.

Finally, the output volume of Simpler is controlled by the Volume control, and can also be dependent upon note velocity, as adjusted by the Velocity control.

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– a "LP 24" is more expensive than a "LP 12."
- 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.

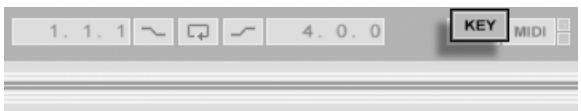
Chapter 20

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, metronome and transport controls.
3. Radio buttons. A radio button selects among a number of options. One instance of a radio button is in the crossfader assignment section (see Using Live's Crossfader) 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.

20.1 Keyboard Remote Control



The Key Map Mode Switch.

Creating remote-control 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 assignable elements of the interface become highlighted when you enter Key Map Mode.
2. Click on the Live control you wish to assign to a key.
3. Press the key to which you wish to assign the control.
4. Leave Key Map Mode by again pressing the Key Map Mode switch.

Keyboard assignments can be deleted using your computer's Backspace or Delete key while Key Map Mode is active.

Keyboard assignments will be implemented by Live in the following ways:

- Clips in Session View slots will be affected by mapped keys according to their Launch Mode settings (see Launch Modes).
- 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 the Key remote functionality with Live's ability to use the keyboard as a pseudo-MIDI device (see Playing MIDI With the Computer Keyboard) that can generate MIDI notes from computer keystrokes for use with instruments.

20.2 MIDI Remote Control (Full Version Only)

Live can be controlled remotely with an external MIDI device, such as a keyboard or controller box.

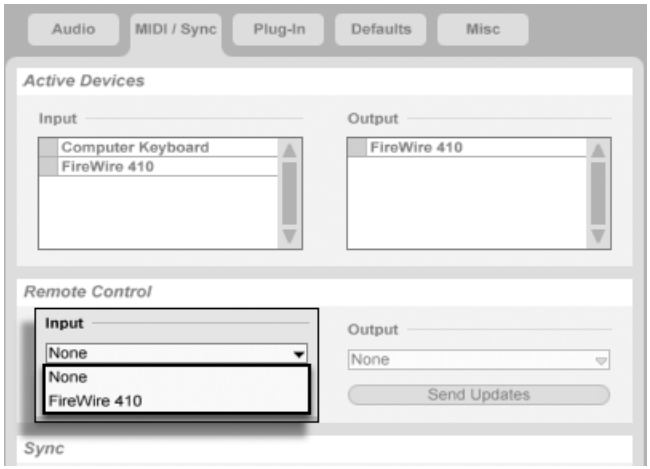
Before we explain how remote-control assignments are made and implemented, let us first make the distinction between MIDI remote control and a separate use of MIDI in Live: input for MIDI tracks. Let's say that you are, for instance, using a MIDI keyboard to play an instrument in one of Live's MIDI tracks (see Working with Instruments and Effects). If you assign F2 on your MIDI keyboard to a Session View Clip Launch button, that key will cease play F2 on 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 looking at the Control Bar's MIDI indicators (see MIDI In/Out Indicators).

20.2.1 MIDI Remote Input and Output

Before making any MIDI assignments, you must first set up Live to recognize whatever MIDI device(s) you are using for remote control. This is done in the MIDI/Sync tab of the Live Preferences.

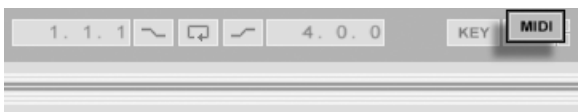


Selecting a MIDI Device for Remote Control.

The MIDI Remote Control Input Device choosers select the MIDI devices from which Live will receive MIDI notes and controller messages. Live merges the MIDI coming in through the two devices. When Live recognizes a MIDI message, the MIDI Map Switch in the Control Bar flashes.

Use the MIDI Remote Control Output chooser in the MIDI/Sync Preferences when working with external controller boxes that use endless knobs or motorized faders. These devices need to be updated when a control's value changes in Live, because the position of the motorized faders or LED chains has to match the new value. After connecting your external device to the computer or adjusting assigned Live controls via the mouse, use the Send Control Updates Now button in the MIDI/Sync Preferences to send your external control the current state of all of Live's controls.

20.2.2 Assigning MIDI Remote Control



The MIDI Map Mode Switch.

Once your remote-control setup is made in the Preferences, giving MIDI controllers and notes remote-control assignments is simple:

1. Enter MIDI Map Mode by pressing the MIDI switch in the upper right-hand corner of the Live screen. Notice that assignable elements of the interface become highlighted.
2. Click on the Live control you wish to assign to MIDI.
3. Send a MIDI message by pressing a keyboard key, turning a knob, etc., on your MIDI controller. To assign a Session slot to a MIDI note range for chromatic playing, first play the *root* key (this is the key that will play the clip at the default transposition), then, *while holding down* the root key, press keys below or above the root to define the limits of the range.
4. Leave MIDI Map Mode by again pressing the MIDI Map Mode switch.

MIDI assignments can be deleted using your computer's Backspace or Delete key while MIDI Map Mode is active.

20.2.3 Mapping to MIDI Notes

MIDI notes send simple on/off messages to Live's interface elements. MIDI note-on and note-off messages have 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 (see Launch Modes).
- *Switches* A note-on message toggles the switch state.

- *Radio Buttons* Note-on messages toggle through the available options.

20.2.4 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 have the following effects on controls in Live:

- *Session View Slots* Controller values above 63 are treated like note-on messages. Controller values below 64 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 controller messages with a 0...16383 value range. The above specifications apply to pitch bend and high-precision controllers as well, except that the value range's center is at 8191/8192.

20.2.5 Mapping to Relative MIDI Controllers

Some MIDI controllers can send "value increment" and "value decrement" messages instead of absolute MIDI messages. 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 controller box to the pan control in a Live track. 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 messages 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 left."

There are several types of relative controllers: Signed Bit, Signed Bit 2, Bin Offset and Twos Complement. Live can recognize the type of relative controller you are working with as you make remote-control assignments, and you can help this by moving the relative controller knob slowly to the left when you make the assignment. If you know the relative controller type , you can manually select it in the chooser that appears in the Status Line at the bottom of the Live screen while mapping a Live control.

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 backwards.
- *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:

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

Please consult the documentation that came with your MIDI controller if you need further information on relative MIDI controllers.

20.3 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 Key or MIDI 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 with an endless knob, to scroll through the scenes. For details, see the discussion of Relative Map Modes (see Mapping to Relative MIDI Controllers).
3. Assign this button to launch the highlighted scene. If the Misc Preferences' "Select Next Scene on Launch" option is checked, you can successively go 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.

Chapter 21

Synchronization and ReWire

21.1 Synchronizing via MIDI (Full Version Only)

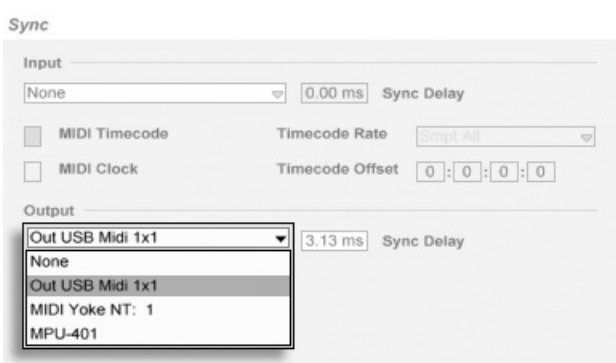
The MIDI protocol defines two ways to synchronize sequencers, both of which are supported by Live. Both protocols work with the notion of a sync *master* that delivers a sync signal, which is tracked by the sync *slaves*.

- 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 to synchronize 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 (see MIDI Timecode Options (Full Version Only)). With respect to MIDI Timecode, Live can only act as a MIDI sync slave, not a master.

21.1.1 Synchronizing External MIDI Devices to Live (Full Version Only)

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, simply select the device to send sync messages to from the *MIDI Sync Output* device chooser, which is found in the MIDI Preferences "Sync" section.

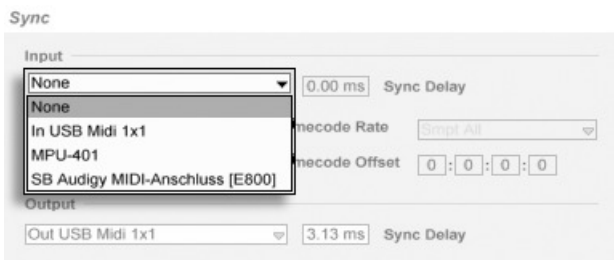


Choosing a MIDI Slave for Live.

The lower indicator "LED" next to the Control Bar's EXT button flashes when Live is sending sync messages to external sequencers.

21.1.2 Synchronizing Live to External MIDI Devices (Full Version Only)

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 Preferences' "Sync" section to tell Live about the connection.



Setting up Live as a MIDI Slave.

1. The MIDI Sync Input device chooser selects the MIDI device from which Live receives its MIDI sync messages.
2. Choose what type of sync messages Live will respond to in the MIDI Input Sync Type menu.
3. 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 flashes if Live receives useable sync messages.

The External Sync Switch.

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.

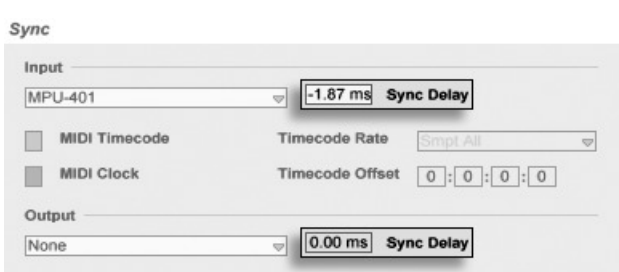
21.1.3 MIDI Timecode Options (Full Version Only)

The *MIDI Timecode Frame Rate* setting is relevant only if "MIDI Timecode" is chosen from the MIDI Input Sync Type menu. The MIDI Timecode Frame Rate chooser selects the type of Timecode to which Live will synchronize. All of the usual SMPTE frame rates are available. When the Frame Rate is set to "SMPTE All," Live auto-detects the Timecode format of incoming sync messages, and interprets 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, then access the Time Ruler Format sub-menu.

The *MIDI Timecode Start Offset* setting is also only relevant if "MIDI Timecode" is chosen from the Sync Type menu. You can specify a SMPTE time offset using the MIDI Timecode control. Live interprets this value as the Arrangement's start time.

21.1.4 Sync Delay (Full Version Only)

The *Sync Delay* controls, separately available for the sync input (Live acting as sync slave) and output (Live acting as sync master), allow you to delay Live's internal time base against the sync signal. This can be useful to compensate for delays incurred by the signal transmission. To adjust the Sync Delay, have both Live and 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.



Adjusting Sync Delay.

21.2 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 slaves* 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 Lite 4 for M-Audio acts as a ReWire master.

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.

21.2.1 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 (see ReWire Slave Routing).

21.2.2 Running Live in ReWire Slave Mode (Full Version Only)

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 at startup time. 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.

21.2.3 More on ReWire

You can find tutorials on connecting Live to specific ReWire master programs at the Ableton tutorial website.

The Ableton FAQ website is the place to go first if you encounter ReWire-related problems.

If you cannot seem to find an answer there, please contact the Ableton support team.

Chapter 22

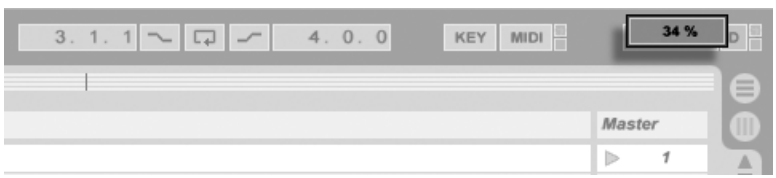
Computer Audio Resources and Strategies

Real-time audio processing is a demanding task for general-purpose computers, which were likely 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.

22.1 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 the processor's

clock rate (e.g., speed in MHz or GHz), architecture, memory cache performance (how efficiently the 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.



The CPU Load Meter.

The Control Bar's CPU meter displays how much of the processor's computational potential is currently being used. For example, if the displayed percentage is 10 percent, the computer is just loafing along. If the percentage is 100 percent, the processor 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.

22.1.1 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.

22.1.2 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.

22.2 Managing the Disk Load

A hard drive's access speed (which is related to, but not identical to, 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 (see Clip 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 (see Destructive Sample Editing).

Chapter 23

Live Lite 4 for M-Audio Keyboard Shortcuts

23.1 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	F12 Double-Click Clip / Track	F12 Double-Click Clip / Track
Hide/Show Info View	?	?
Hide/Show Overview	Ctrl Alt O	Alt O
Hide/Show Clips	Ctrl Alt P	Alt P

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
Open the Preferences	Ctrl ,	⌘ ,
Close the Preferences	N/A	Esc

23.2 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.

23.3 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

23.4 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

23.5 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 Y	⌘ Y
Rename	Ctrl E	⌘ E
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

[Tab] can be used to move from one track or scene to another while renaming.

23.6 Loop/Region and Start Markers

Loop/Region markers must first be selected before any of the following commands will apply to them.

	Windows	Macintosh
Move Start Marker to Position	[Shift] Click	[Shift] Click
Nudge Loop/Region Left Right	[←] [→]	[←] [→]
Move Loop/Region By Length	[↓] [↑]	[↓] [↑]
Double/Halve Loop/Region	[Ctrl] [↓] [↑]	[Ctrl] [↓] [↑]
Shorten/Lengthen Loop/Region	[Ctrl] [←] [→]	[Ctrl] [←] [→]
Select Material in Loop	Click Loop Brace	Click Loop Brace

23.7 Session View Commands

	Windows	Macintosh
Launch Selected Clip/Slot	[Return]	[Return]
Select Neighbouring Clip/Slot	Arrow Keys	Arrow Keys
Select all Clips/Slots	[Ctrl] [A]	[Ctrl] [A]
Copy Clips	[Ctrl] Drag	[Alt] Drag
Add/Remove Stop Button	[Ctrl] [E]	[Ctrl] [E]
Insert MIDI clip	[Ctrl] [Shift] [M] or Double-Click Slot	[Ctrl] [Shift] [M] or Double-Click Slot
Insert Scene	[Ctrl] [I]	[Ctrl] [I]
Insert Captured Scene	[Ctrl] [Shift] [I]	[Ctrl] [Shift] [I]
Drop Browser Clips as a Scene	[Ctrl]	[Ctrl]

23.8 Arrangement View Commands

The shortcuts for zooming (see Zooming, Display and Selections), snapping/drawing (see Grid Snapping and Drawing) and Loop/Region markers (see Loop/Region and Start Markers) also work in the Arrangement View.

	Windows	Macintosh
Split Clip at Selection	Ctrl E	⌘ E
Consolidate Selection into Clip	Ctrl J	⌘ J
Loop Selection	Ctrl L	⌘ L
Zoom around Selection	+ -	+ -
Insert Silence	Ctrl I	⌘ I
Pan Left/Right of Selection	Ctrl Alt	⌘ Alt
Unfold all Tracks	Alt Unfold button	Alt Unfold button

23.9 Commands for Tracks

	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 E	⌘ E
While Renaming, Go to next Track	⇆	⇆
Arm/Solo Multiple Tracks	Ctrl Click	⌘ Click
Add Device from Browser	Double-Click	Double-Click

23.10 Commands for Breakpoint Envelopes

The shortcuts for zooming (see Zooming, Display and Selections), snapping/drawing (see Grid Snapping and Drawing) and Loop/Region markers (see Loop/Region and Start Markers) also work in the Envelope Editor and Arrangement View.

	Windows	Macintosh
Finer Resolution for Dragging	Ctrl	⌘
Enable Dragging Over Breakpoints	⇧	⇧

23.11 Key and MIDI Map Mode

	Windows	Macintosh
Toggle MIDI Map Mode	Ctrl M	⌘ M
Toggle Key Map Mode	Ctrl K	⌘ K

23.12 Zooming, Display and Selections

	Windows	Macintosh
Zoom In	+	+
Zoom Out	-	-
Drag/Click to Append to a Selection	⇧	⇧
Follow (Auto-Scroll)	Ctrl F	⌘ F
Pan Left/Right of Selection	Ctrl Alt	⌘ Alt

23.13 Clip View Sample Display

The shortcuts for zooming (see Zooming, Display and Selections) and Loop/Region markers (see Loop/Region and Start Markers) also work in the Sample Display.

	Windows	Macintosh
Move Selected Warp Marker	← →	← →
Select Warp Marker	Ctrl ← →	⌘ ← →

23.14 Clip View MIDI Editor

The shortcuts for zooming (see Zooming, Display and Selections), snapping/drawing (see Grid Snapping and Drawing) and Loop/Region markers (see Loop/Region and Start Markers) 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

23.15 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
Bypass Snapping While Dragging	Alt	⌃ ⌘

23.16 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	Ctrl H	⌃ ⌘ H
Render to Disk	Ctrl R	⌃ ⌘ R
Export MIDI file	Ctrl ⇧ E	⌃ ⌘ ⇧ E

23.17 Working with Plug-Ins

	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	N/A	⇧

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