

MachFive 3

User Guide

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Part 1

Getting Started

Quick Reference: Playing



1. Click the Parts view in the sidebar, and click the "+" button below to add a few parts.
2. Double-click the word Empty to open the browser and load an instrument, loop, or phrase into the part. In the browser that appears (not shown), navigate to your hard drive, look for the UFS files you copied from the MachFive soundbank DVDs, and double-click them to browse and load the programs inside.
3. Click a part to select it (blue border) and view its settings in the display area to the right.
4. Click the Main display (above) and the Info pane (right) to view basic information about the currently selected part.
5. For MachFive instrument programs like this one (the Hard Pop Hammond organ program in the Universal Instruments & Loops UFS soundbank), this area of the window displays basic information about the program, such as MIDI controller assignments or programming notes.
6. The macro knobs and buttons in this section, if any, offer convenient adjustments to the sound of the program. In many cases, macro knobs control two, three, or more parameters at once to produce the effect, so they may not be labeled with conventional names, and you may hear dramatic results. In this example, the buttons enable or disable effects. Of course, all settings here can be edited, tweaked, and otherwise managed "under the hood" to your precise tastes. But these controls do offer a ton of sound design power at your fingertips, with no programming effort required.
7. Use the virtual keyboard to play the program on-screen. The keyboard also provides information about how sounds are mapped to the keys. For example, Gray keys indicate that they are not used for the program.
8. The Status Bar displays useful information about the control that the cursor is hovering over.

Quick Reference: Editing



1. The Parts list displays a scrolling list of all the parts you've created. Each part holds a different instrument, loop, phrase or sound.
2. The Tree Editor provides hierarchical, alphanumeric access to the currently selected part's individual components and their organization.
3. The List Editor provides text-based, color-coded access to all of a part's settings.
4. The Browser gives you quick, direct access to all of your MachFive-related assets.
5. MachFive is a multi-timbral instrument with unlimited parts; each part plays a loaded program, which consists of an instrument, loop, or phrase. The Part list shows a scrolling list of parts, collectively referred to as a Multi. A multi also stores the other settings in the MachFive window. Use the buttons at the top of this sidebar, to add, view, and delete parts.
6. The currently selected part displays a blue border. It's settings appear in the display area to the right.
7. The File menu provides commands for saving and loading programs (individual part settings) and multis, which are a "snapshot" of the entire MachFive window.
8. These three buttons choose which view will be shown in the display area: Main, Mixer, or Performance. The Main View is shown by default.
9. The Master Section provides global settings for MachFive operation: tempo, sync to host, transport, global volume, and global tuning.
10. When the Main view (8) is chosen, these buttons display the Info, Edit, FX, and Event panes in the MachFive's main display area. These four panes provide access to settings that are specific to the currently selected part. In this example, the Edit pane is being shown for the *D-Walla* part.
11. The Main View (8) Edit pane (10) contains the Oscillator Editor, Mapping Editor, Program Editor, and Modulation Editor. Each editor can be selectively shown or hidden.
12. This is the Oscillator Editor, which can be shown or hidden using its button (11). Here you edit the waveform or synth parameters for the currently selected keygroup. Use the menus, tabs, and buttons in the bar across the top of the editor to add, edit, delete, and otherwise manage the keygroup's oscillator(s). The main area in the editor displays settings (and the waveform, if applicable) for the current oscillator.
13. This is the Mapping Editor, which can be shown or hidden using its button (11). Use it to map keygroups to the 88-note keyboard. The info bar across the top displays info for the currently selected keygroup. Right-click to access the many features available to help you map and manage keygroups.
14. This is the Program Editor, which can be shown or hidden using its button (11). These settings apply to the currently selected oscillators, keygroups, layers, and program — or, if none are currently selected, to everything in the program. The parameters in this section control MachFive's powerful synthesis engine, which lets you apply filters, envelopes, LFOs, modulation, and other synthesis parameters. For details, see chapter 17, "Editing Basics" (page 115).
15. This is the Modulation Editor, which is shown or hidden using its button (11). These settings let you control MachFive's powerful modulation settings for the currently selected keygroup, or, if nothing is selected, the entire program.
16. The keygroup mapper.
17. MIDI select lets you select keygroups from your MIDI controller.
18. The Edit button opens MachFive's powerful envelope editor.

CHAPTER 1 **About MachFive**

A universal instrument

MachFive is a universal sampler instrument for Mac OS X and Windows. MachFive supports all major Mac and Windows audio plug-in formats (VST, RTAS, and Audio Units) and reads all major audio file, sample and soundbank formats, including Akai, Kurzweil, Roland, Emu, Giga (version 1 & 3), SampleCell, Kontakt 1/2/3/4, EXS24, WAVE, ACID, AIFF, SDII, REX, Apple Loops, CAF, and more. MachFive also offers many advanced sampling features, including support for sample rates up to 192kHz and the ability to import and playback multi-channel samples in surround.

For sound design, music production or broadcast, MachFive gives you a perfect balance of speed, advanced features, superb audio quality and across-the-board compatibility.

A flexible and convenient universal plug-in

MachFive operates both as a standalone application and as a plug-in inside a host audio/MIDI sequencer application such as Digital Performer, Pro Tools, Logic, Live, SONAR, Cubase and other hosts. MachFive supports both 32-bit and 64-bit operation.

As a standalone application, MachFive turns your Mac or PC into a state-of-the-art virtual instrument powerhouse with unlimited parts, unlimited independent audio output pairs, disk streaming and 45 GB of sounds. Standalone operation also allows you to use MachFive with music software applications that do not host third-party instrument plug-ins. Standalone operation is virtually identical to plug-in operation, except for a few additional settings for audio/MIDI input and output.

As a plug-in, MachFive can be used as a flexible, state-of-the-art sound source directly within your projects. You can save all MachFive settings with the project for instant and total recall. Since all MachFive settings are saved with your host application session, you enjoy the highest degree of convenience and speed because there is no separate application or associated documents to manage.

Collaborate across platforms

Because MachFive supports every major audio production platform, you can effortlessly move from one platform to another — or collaborate with colleagues who use different audio software. For example, you could compose and track a project in Digital Performer, Logic or Cubase and then move to Pro Tools for mixing. Simply save a MachFive multi (a snapshot of all MachFive settings) in DP, Logic, or Cubase and then load it into MachFive running in Pro Tools. All settings are exactly preserved, and MachFive is ready to go.

A world of sounds at your fingertips

MachFive delivers expressive instrument sounds combined with audio loops and phrases in one window. From solo instruments to full ensembles, MachFive delivers all of the sounds you need to make any recordings imaginable. Included are seven DVD's packed with a massive 45 GB library of expressive multisample instruments, loops, and phrases, recorded with pristine audio fidelity and careful attention to detail.

Scripting engine

Included in the MachFive instrument library are several advanced acoustic and electric multi-sampled instruments, which deliver ultra-realistic performance characteristics, thanks to MachFive's state-of-the-art scripting engine. Scripting allows

the instrument to dynamically respond to MIDI performance characteristics, such as note intervals, chords, and controller data for an unprecedented level of musical expression and nuance.

MachFive uses an industry standard scripting language, allowing sound designers to quickly and easily build their own scripted instruments.

Phrases and loops

Loops and phrases can be instantly tempo-locked to your host software time line. You can slice rhythmic loops with one click to trigger each beat from your keyboard, or drag & drop loops into your host software tracks. MachFive provides multisample instruments, loops and phrases together in one seamless, integrated window, with all the flexibility you need to sculpt your music to the very smallest detail.

Operation at a glance

MachFive displays all essential settings in one window, with all crucial settings no more than a click away. Adjust your sounds quickly and intuitively.

Multi-column browsing and searching

MachFive makes it easy to browse and locate exactly the sounds you are looking for, with a large, easy to navigate, multi-column browser. Quickly scan through the browser columns to audition and select instruments, loops and phrases together in one place. Save favorite locations and frequently used sample disc images in the left-hand column for instant access. For even quicker access to your sounds, use MachFive's convenient sidebar browser. You can also find loops and instruments quickly using the browser's text search feature: just type a few letters or keyword and all sounds in the current soundbank will appear in the list for immediate browsing.

Intelligent file access and soundbank management

The most critical feature you need from a sampler is easy access to your sounds. MachFive offers unprecedented soundbank management, helping you concentrate on your music — not file handling chores on your hard disk. MachFive always remembers where sounds are located, and it has been optimized for browsing and loading libraries. Even multi-gigabyte libraries are quickly and efficiently scanned.

Direct support for 3rd-party sample libraries

Even more importantly, MachFive directly reads the native file formats for most popular sampler products, both current virtual samplers and legacy hardware samplers, including Akai, Kurzweil, Roland, Emu, Giga (version 1 & 3), SampleCell, Kontakt, EXS24 and others. Since MachFive can read these third-party native file formats directly, there is no need to go through the lengthy, inconvenient and impractical process of soundbank conversion. Instead, MachFive can instantly access your sounds, regardless of their format.

MachFive even allows you to insert sample content CD-ROMs from Roland, Emu, Akai and other formats into your computer — discs that otherwise cannot be mounted on your computer desktop — and then read programs directly from the disc. MachFive gives you access to your current sound libraries from the unified, intuitive environment of the MachFive window.

Flexible multi-timbral performance

Both the plug-in and standalone versions of MachFive let you add an unlimited number of parts (individual instruments or sounds) — or as many parts as your host software and computer processing resources permit. Each part can be played simultaneously with its own unique volume, pan, effects, etc. Each part can receive MIDI data from any channel and send its output to unique

audio outputs (if your host audio software supports this feature). Simple stacks can be created by assigning two or more parts to the same MIDI channel. However, MachFive also provides advanced programming and scripting that allows you to create complex layers, splits and crossfades that can be dynamically triggered and modified on the fly. For example, through scripting, an instrument sound can change articulations or playing style, depending on how hard you strike notes or how far you jump in the pitch interval between notes. MachFive has been designed for even the most demanding expressive performance situations.

Advanced, modular synthesis architecture

MachFive 3 delivers an advanced synthesis architecture with eleven different sound engines based on pure synthesis and samples. Program and combine an unlimited number of oscillators in a single keygroup. You can even layer pure synth oscillators with waveform samples, and apply synth-style modulation and filtering to both.

IRCAM granular synthesis, time-stretching and pitch-shifting

MachFive includes licensed granular synthesis, time-stretching, and pitch-shifting technology from the world-renowned IRCAM research institute in Paris, France. Granular synthesis can be seamlessly incorporated into your sound design efforts in MachFive, side by side with the other synthesis models that MachFive offers. The IRCAM algorithms produce pristine audio time-stretching and pitch-shifting results, even when applying extreme tempo changes or pitch intervals. The results are so usable at extreme values, you can use them as powerful sound design tools.

Powerful modulation matrix

The central section of the MachFive window provides two filters, eight LFOs, six envelopes and a variety of additional power modulation and filtering features that allow you to sculpt and tweak

your sounds to perfection. MachFive's multi-point envelopes provide unlimited control points, and they can sync to tempo. LFOs can be routed to an assortment of destinations, including filter frequency, filter resonance, drive, pitch, pan and amplitude. The architecture allows for unlimited modulation connections, available at every stage of the synth section. MachFive can sync both the LFO and effects parameters to sequence tempo. Numerous filter algorithms are provided and many parameters can be controlled and automated by MIDI. The award-winning 3rd-generation UVI-Engine that powers MachFive delivers superb sound quality, virtually unlimited polyphony (unlimited voices per program) and ultra-low latency.

Loop Lab™

MachFive provides Loop Lab™, a complete beat slice loop editor, which allows you to adjust and edit the beat slices of imported REX files and easily create your own beat sliced loops. Beat slice programming has never been more powerful or convenient.

Disk streaming

Disk streaming, which can be enabled or disabled independently for each part, is a process where only a small initial portion of each sample (instrument sound) is loaded from the hard disk into RAM in preparation for playback, and the rest of the sample is streamed from the hard disk when the note is actually played, rather than being loaded in its entirety beforehand. Streaming conserves large amounts of RAM, allowing you to load more instruments simultaneously and free up your RAM resources for other plug-ins and applications. Streaming also significantly speeds up the time it takes for instruments to load, especially instruments with large sample sets.

Full-screen, multichannel waveform editor

MachFive accepts audio samples in all formats from mono to 7.1 surround and provides a full-featured, full-screen waveform editor for truncating, normalizing, fading and many other destructive and non-destructive DSP audio manipulations – all in real time with unlimited undo/redo. You can even set the crossfade of a loop in real time while listening to your full mix. Batch processing helps you save time. MachFive's waveform editor is so complete, it rivals standalone waveform editing products.

A surround-capable sampler

MachFive is a true surround sampler. You can play and transpose 5.1 audio files in real time, add multi-channel effects and route multi-channel sounds to your host software's mixer with multiple outputs (if the host software supports these surround features).

Support for high-resolution audio

MachFive takes advantage of high definition audio interfaces, allowing you to build your sound libraries at depths up to 32 bits and sample rates up to 192kHz. MachFive also provides on-the-fly upsampling and downsampling, allowing you to build a high-resolution sample library and use it at any sample rate that your current project calls for, without the need for lengthy sample rate conversion operations.

Drag & drop import of audio files, loops and samples

MachFive supports easy drag-and-drop importing of audio files, loops and samples. You can simply drag samples from your computer desktop or host application to the MachFive keyboard (if your host app supports this feature). You can even drag multiple samples in one step to map into layers or splits, chromatically, on white keys only, or even according to their pitch, which MachFive can determine automatically (based on their names). You can also audition samples when importing

them, listening to each note as you stretch the sample over a range of keys. MachFive also lets you audition samples within the context of your sequence, while it's playing, or while being played from your MIDI controller, as you browse them on your hard disk. Once you find the sample you prefer, simply click to add it to your mix.

Complete mixing

MachFive provides a complete graphic mixer with faders, FX inserts, metering and unlimited channels. MachFive's mixing environment is flexible and powerful.

Integrated multi-effects

MachFive provides the most comprehensive and flexible effects architecture ever devised in a sampler. Unlimited effects can be applied in real-time at all levels in MachFive, from individual samples to the entire mix, with instant recall of all settings.

47 real-time effects are included, such as reverb, tempo-synced delay, tremolo, chorus (and other modulation effects), filter, BitCrusher, guitar amp simulation, CPU-efficient convolution reverb, and others.

All effects settings are saved for total recall. You can also save effects with each sound for permanent storage in your sound library. The effect section allows you to leave a part's effects in place while you audition other sounds.

Real acoustic spaces

To further enhance the stunning realism of your compositions, MachFive includes a built-in convolution reverb processor to produce the most realistic acoustic spaces available. From directly in the MachFive window, you can audition and choose authentic acoustic spaces, from natural spaces like caves and forests to spacious halls and soaring cathedrals.

CHAPTER 2 **What's New in Version 3**

Redesigned user interface

MachFive's user interface has been redesigned and re-implemented using the latest user interface technologies and techniques for both Mac and Windows.

45GB of instruments, loops & phrases

MachFive's sound library has been greatly expanded with very high-quality, expressive instrument sounds that take full advantage of Version 3's new scripting capabilities. For an overview, see chapter 11, "Using the Factory Soundbanks" (page 79).

Cutting-edge sound synthesis technology

MachFive is a full-fledged synthesizer as well as a sampler, providing an advanced, modular sound synthesis architecture with eleven sound engines that deliver both pure synthesis and expressive multi-sample playback. All of the major milestone synthesis methods developed over the years are represented, including analog (subtractive), FM (frequency modulation, or additive), and wavetable synthesis. The result is a powerful synthesis environment which makes MachFive a true "multi-synthesizer" in its own right. When combined with MachFive's multi-sample playback engine, looping, mixing, and effects, the possibilities for sound design are virtually infinite.

All forms of synthesis can be mixed and matched.

A new expanded and flexible modulation matrix provides unlimited modulation connections.

New multi-point envelopes provide full-screen editing, unlimited control points, and sync to tempo. The new step envelope provides up to 128 steps, legato adjustment, and much more.

New effects

MachFive now includes twelve different filters, including the new Xpander filter, which provides 37 new filter modes. The new Gain Matrix plug-in serves as a "Swiss army knife" for managing bus channels. It can be used for M-S conversion, stereo-expansion, matrixing, and much more.

Enhanced convolution reverb

The updated IR Verb™ convolution reverb is so CPU-efficient, you will likely find that you will use it exclusively over the algorithmic reverbs. Many new impulse response presets have been added, including many classic studio reverbs from the past 30 years. These are some of the most exclusive, high-end, sought-after reverb sounds of all time, now at your fingertips in MachFive.

IRCAM granular synthesis engine

MachFive provides powerful, yet CPU-efficient granular synthesis driven by advanced technology licensed from the world-renowned IRCAM research institute in Paris, France.

IRCAM time-stretching and pitch-shifting

MachFive's state-of-the-art audio time-stretching and pitch-shifting engine, also licensed from the IRCAM research institute, delivers stunning results, even at extreme tempo changes and pitch transpositions. For best results, algorithm presets are provided to allow you to tailor the processing to fit the material you are manipulating (voice, percussive, complex, etc.) MachFive's time-stretching and pitch-shifting offer the very best quality for even the most rigorous and demanding applications, including album production, live performance, film scoring, audio for broadcast, and advanced sound design.

Third-generation UVI Engine

MachFive is driven by the third-generation UVI Engine™, known for its superb sound quality at all standard audio resolutions up to 32-bit/192kHz.

Updated sample library support

MachFive directly reads all major third-party hardware/software sample formats, including all the latest formats for Kontakt and Giga, as well as legacy formats for EXS24, Roland, Akai, Kurzweil, E-Mu and others. MachFive reads third-party libraries directly from original files or discs, so no time-consuming importing or converting is required. Of course, MachFive supports drag and drop audio export/import of WAVE, AIFF, SDII, REX, Apple Loops, CAF files, and other standard audio file formats.

Unlimited operation

MachFive allows you to create and work with unlimited parts, multi-timbral operation, polyphony, sample zones, and synthesis zones.

Event processors

Event processors are a powerful and expressive new element to sound design and performance. They alter incoming MIDI data from your controller or DAW track, transforming your source material from the subtle to the wild and extreme. Many preset processors are included, including an in-depth arpeggiator and a MicroTuner, which opens the door for you to the world of microtuning and makes it easy for you to experiment easily. You can even program your own processors, if you have the programming chops.

Scripting engine

Under the hood, MachFive provides a new scripting engine, which allows sound library designers to program sophisticated performance rules for multi-sample instruments. For example, different articulations can be played, depending on how hard you play notes on your MIDI controller. As another example, legato or portamento can be

employed, depending on the interval between consecutive notes. Scripting opens a whole new world of expressive, yet easy-to-play virtual instruments. MachFive 3's included soundbank library provides several advanced instruments to showcase this new technology. Third-party instrument and sound library developers can also take full advantage of MachFive's new scripting capabilities.

Multi-column browsing and searching

MachFive 3 provides a new multi-column browser for fast and easy navigation, searching, and auditioning of loops and samples.

Loop Lab™

MachFive was the first sampler to introduce the concept of in-line slice loop editing, and the Version 3 Loop Lab has been updated and expanded to offer the very best complete environment for loop editing and beat-slicing of multi-channel loops. You can play back slice loops at virtually any tempo with or without time-stretching. Loop Lab offers three different loop programming engines: sample, stretch, and slice.

Full-screen editor

MachFive's full-screen editor has been overhauled and updated, with time-saving features such as unlimited undo/redo, batch processing, and applied effects processing.

Complete graphic mixing

MachFive 3 provides a fully updated and expanding on-screen mixing environment, complete with faders, FX inserts, metering and unlimited channels. You will find that MachFive operates as a complete stand-alone mixing environment.

Flexible effects architecture

MachFive's effects architecture has been expanded to allow you to apply effects at any level in the signal chain.

More effects

MachFive now offers 50 built-in effects with hundreds of presets.

Multichannel surround support with multiple outputs

One-click MIDI controller mapping

MachFive now provides one-click MIDI controller mapping for nearly all settings.

Enhanced disk streaming

MachFive's disk streaming engine has been enhanced to provide the very best performance on today's laptop and desktop computers. As usual, streaming can be enabled per part, so you can customize streaming performance to fit your exact needs.

64-bit operation

MachFive supports 64-bit operation on Mac OS X and Windows, as a stand-alone app and as a plug-in (with 64-bit host software). This allows MachFive to take full advantage of all the memory resources in your host computer.

AAX plug-in support for Pro Tools 11 and higher

MachFive supports Avid's new AAX plug-in format for Pro Tools 11 and above. MachFive includes legacy RTAS support for earlier versions of Pro Tools.

CHAPTER 3 Installation

THANK YOU FOR PURCHASING MACHFIVE.

We hope you enjoy using MachFive and the many features it has to offer. Below is an overview of the installation process.

- An iLok is required..... 19
- Package contents..... 19
- Please register your software..... 19
- System Requirements..... 19
- Preparing your iLok USB Smart Key..... 20
- Installation..... 21
- Getting started..... 22
- Familiarity with your computer..... 22
- Visit motu.com for software updates..... 22
- Technical support..... 22

An iLok is required

Before you install MachFive, you must obtain an iLok SmartKey from your local music retail shop or on-line music technology reseller. If you are upgrading from a previous version of MachFive, you can use your MachFive iLok. If you do not yet have an iLok, stop here and purchase one before you proceed with the MachFive installation process. You will not be able to use MachFive without an iLok.



Figure 3-1: MachFive is compatible with iLok 1 and iLok 2 SmartKeys.

PACKAGE CONTENTS

Your MachFive package includes:

- MachFive installer disc
- MachFive iLok USB license code card
- MachFive User Guide with tear-out registration card
- Seven (7) MachFive soundbank DVD discs

PLEASE REGISTER YOUR SOFTWARE

MOTU can only provide customer service and technical support to registered users. Therefore, it is very important for you to register your software immediately after purchase.

To do so, visit www.motu.com/registration to register online. Or, fill out and mail in the registration card found at the beginning of this User Guide (leave the rest of the cardboard page in the manual for your future reference).

👁 If you purchased an upgrade from earlier version of MachFive, you are already registered and no further action is necessary.

SYSTEM REQUIREMENTS

MachFive 3 requires the following system:

- Mac or PC with Intel Core Duo CPU 1.83 GHz or faster; multiple processors or a multi-core processor is required. Intel Core 2 Duo CPU 2.0 GHz or faster recommended. Macs with PowerPC CPUs are not supported.
- 2 GB of RAM is required; 4 GB or more is highly recommended.

Since samples (or a portion of the samples) are loaded into the computer's RAM, add as much RAM as possible to your computer.

- CD/DVD disc drive for installation.
- Mac OS X version 10.5 or 10.6 (v10.5.8 or later is required), or Windows 7 or Vista (32- or 64-bit; Vista SP2 or later is required).
- Large hard disk, preferably at least 100 GB. The disk on which the sounds are stored must be a fast hard disk. See "Hard disk format", below, for additional requirements.
- Available USB port for the iLok SmartKey.

If you have multiple products that use iLoks for authorization, you can consolidate multiple authorizations onto a single iLok. See "Managing iLok licenses" on page 21.

- A digital audio workstation program or other program that hosts AU, VST, or RTAS instrument plug-ins. Alternatively, MachFive can be used as a standalone application.

64-bit operation

For native 64-bit operation, MachFive has the following additional requirements:

- Mac OS X v10.6, or a 64-bit version of Windows 7 or Vista
- 64-bit CPU
- 64-bit plug-in host application, if using the 64-bit plug-in

Hard disk format

Due to the large size of MachFive's factory soundbank UFS files, the disk containing the soundbank files must be able to support individual files larger than 4 GB. This is determined by the disk's file system format.

The default file system format for disk drives on Mac OS X and Windows are compatible with MachFive's soundbank files:

- Mac OS X: HFS+ (Mac OS Extended, journaled or unjournaled)
- Windows: NTFS

The FAT32 format is not compatible with MachFive's soundbank files, as it does not allow file sizes greater than 4 GB.

If you experience trouble copying the UFS files to your hard disk, see "When I try to copy the UFS files to my hard disk, I get an error message and it won't copy successfully. What should I do?" on page 239.

PREPARING YOUR ILOK USB SMART KEY

MachFive will not run unless it detects an iLok Smart Key plugged into any available USB port on your computer. In addition, the iLok must hold a MachFive Version 3 license. (Version 1 or 2 licenses do not work with MachFive 3.)

Do you already own an iLok?

You may already own an iLok if:

- you upgraded from MachFive 2
- you own another MOTU instrument product
- you own a 3rd-party product that uses iLok

If so, you can skip to "Downloading your MachFive license to your iLok" below.

Purchasing an iLok

If you do not already own an iLok, you can purchase one from your local music retail shop or on-line music technology reseller.

iLok compatibility

MachFive is compatible with any iLok (1 or 2), as shown in Figure 3-1 on page 19.

Downloading your MachFive license to your iLok

Your MachFive package includes a card with your unique iLok license code printed on it. Follow the instructions below to redeem the code and download the resulting MachFive software license to your iLok.

☛ MachFive will not run without the downloaded license in your iLok, so be sure to follow these important instructions before proceeding to install and use MachFive.

Installing iLok License Manager

1 Download and install the iLok License Manager application from ilok.com.

This software is required for iLok operation on your computer.

2 Plug in your iLok into any available USB port on your computer.

3 Launch iLok License Manager and create an account, if you don't already have one.

4 Choose "Redeem Activation Code" from the Licenses menu, then enter your unique, 30-digit license code (found on the license card included with your MachFive package).

5 Click on your account name to view your new authorization in the list. Click it to select it, choose "Activate" from the Licenses menu, select your iLok in the window that appears, and click "Activate" to move your activated license into your iLok.

Your MachFive software license is now in your iLok. Be sure the iLok is connected when you run MachFive.

Managing iLok licenses

If you have multiple iLoks, you can consolidate all of your licenses onto a single iLok. Use iLok License Manager to move product licenses from

one iLok to another, consolidate them onto one iLok, protect them from loss or damage, or otherwise manage your product license assets.

If you have further questions about your iLok, visit www.iLok.com, or contact MOTU Customer Service at +1 (617) 576-2760.

INSTALLATION

Run the MachFive installer

Run the MachFive installer as follows:

1 Insert the MachFive *Installer* disc; or, if you have downloaded the MachFive installer, locate the folder containing the download.

2 Double-click *MachFive Installer* (Mac), *Setup32.exe* (Windows 32-bit), or *Setup64.exe* (Windows 64-bit).

3 Follow the directions the installer gives you.

☛ Windows VST users: setup lets you choose the location for the MachFive VST plug-in. Point your host application to this same directory.

Copy the UFS soundbank files to your hard disk

MachFive includes seven DVDs that contain multi-sampled instruments, loops, phrases, and other sounds. Together, these DVDs represent approximately 45 GB of sounds. To be able to use the audio material on these DVDs, they must be copied to a fast hard disk (at least 7200 RPM). This hard disk can either be an internal disk or an external disk connected to your computer.

Copy them to your hard disk as follows:

1 Insert the *Soundbank DVD 1* and copy its entire contents anywhere to your hard disk.

☛ Important: Do not rename any of the files; leave their names unchanged.

2 Eject DVD 1.

3 Repeat steps 1 and 2 for the remaining six soundbank DVDs.

☛ You can place the UFS soundbank files anywhere you wish. The only requirement is that the two Extreme FX library UFS files must reside together in the same folder or directory.

☛ MachFive does not require that you copy all of the soundbank libraries on the DVDs to your hard drive. You can copy over only the libraries you wish to use. If you wish to get started as quickly as possible, we recommend *Universal Loops & Instruments* and *MachFive Biosphere*, along with any other libraries that particularly interest you.

Downloading UFS soundbank libraries from motu.com

MachFive's included soundbank libraries are also available for download from motu.com/download. You can use any standard web browser or FTP client to download them, but plan accordingly because they are quite large: between 1GB and 8GB. For faster downloading, each UFS file has been individually compressed using the standard .rar (RAR) compression format. There are many free, downloadable utilities that can be used to extract them.

☛ If you experience issues with incomplete downloads, try downloading each .rar archive one at a time. For further information, visit motu.com/download.

GETTING STARTED

Follow the directions in the next few chapters of this guide to successfully begin using MachFive.

FAMILIARITY WITH YOUR COMPUTER

This manual assumes that you are familiar with using your computer. If not, please review your computer's user guide before proceeding.

VISIT MOTU.COM FOR SOFTWARE UPDATES

Software updates are periodically posted on our website, so check our website for the latest updates at www.motu.com.

TECHNICAL SUPPORT

If you have questions, please review this manual carefully first. You can reach MOTU tech support as follows:

- 24-hour online tech support database with search engine: www.motu.com
- Online: www.motu.com/support
- Phone: +1 (617) 576-3066
(9 a.m. – 6 p.m. Eastern)
- Downloads: www.motu.com

CHAPTER 4 QuickStart Guide

Open MachFive

1 After MachFive installation, launch the standalone MachFive application (found in the Mac *Applications* folder or Windows *Start* menu). Or launch your host audio sequencer application and open MachFive as a virtual instrument plug-in from within your host software in the standard fashion.

Choose a program

2 Before you can begin using MachFive, you need to go to the Parts list (as shown below in Figure 4-1) to load an instrument program into a part in MachFive's part list. To do so, double-click the word *Empty* to open the browser.



Figure 4-1: Opening the browser.

3 In the multi-column browser that appears, look in the Devices sub-menu and click on the hard drive you copied to your hard disk from the MachFive soundbank DVDs.

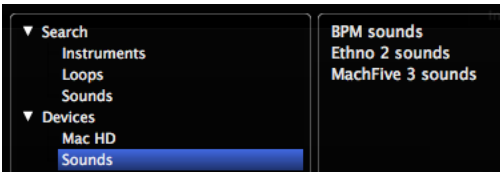


Figure 4-2: Finding your hard drive in the Devices sub-menu.

4 Use the columns in the browser to navigate to the soundbank “UFS” files. For this tutorial, look for the *Universal loops & instruments* soundbank and try loading a piano program. Either double-click the program name, or click it once to highlight it and click the OK button to load it. It is possible to listen to items in the browser to audition them as you select them. You'll learn how to do this later on when reading the section called “Browser” on page 66.

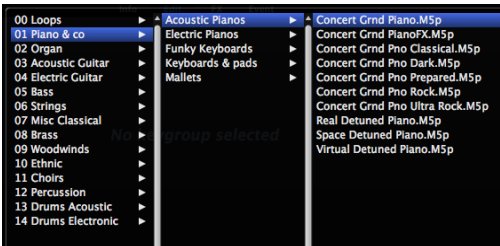


Figure 4-3: Choosing an instrument program in the browser.

Set up MIDI input to the instrument

5 If you are running MachFive as a plug-in inside your audio sequencer host, part 1 receives on MIDI channel 1 by default, as shown below in Figure 4-4 by the setting “A1”.

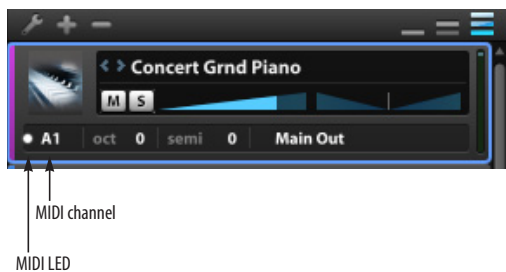


Figure 4-4: Part 1 MIDI channel assignment is "A1"

6 Send MIDI from your MIDI software to MachFive on channel A1, or choose a different channel and make sure that the MachFive part 1 assignment matches the transmit channel of your MIDI controller. (You'll see MachFive as a destination in your MIDI output menus.)

7 If you are running the MachFive standalone application, open *Audio and MIDI Settings* (File menu) and click the *MIDI Devices* tab. Make sure that an available MIDI device connected to your system is chosen for MIDI Port A. Part 1 receives on MIDI channel 1 by default, as shown above (Figure 4-4). Send MIDI from your MIDI software to MachFive on channel 1, or choose a different channel and make sure that the MachFive part 1 assignment matches the transmit channel of your MIDI controller.

Check the audio output assignment

8 If you are running MachFive as a plug-in inside your audio sequencer host, the MachFive track has an audio output assignment. Make sure that it is assigned to the appropriate audio output in your system (the headphone outs, main outs, or whatever you are using for listening).

9 If you are running the MachFive standalone application, open the *Audio and MIDI Settings* (File menu) and click the *Audio Device* tab. Check the Output Device assignment and make sure the

sample rate setting matches the setting on your audio hardware (or the built-in audio hardware of your computer, if that is what you are using).

Play the instrument

10 Try playing your MIDI controller. You should now hear the sound of the instrument you chose back in step 2.

11 If you hear it, congratulations! You are now ready to use MachFive.

If you don't hear anything

12 Check to see if the MIDI LED for the part is blinking when you play notes on your MIDI controller. If it blinks, then MIDI is OK. If not, check your MIDI cables and software settings again.

13 Check the audio output assignment for the track on which MachFive is instantiated. Make sure it is assigned to your headphones, main speakers, or whatever you are listening to.

CHAPTER 5 Tutorial

OVERVIEW

In the last chapter, the QuickStart Guide showed you how to get MachFive up and running as a virtual instrument that you can play live from your keyboard or other controller.

The extended tutorial in this chapter takes you through the process of creating your first MIDI sequence with MachFive. It also introduces you to the process of importing sounds and performing basic sound design tasks.

Part 1: Creating your first sequence 25

Part 2: Importing sounds and basic sound design ... 29

PART 1: CREATING YOUR FIRST SEQUENCE

When installed, MachFive includes a tutorial MIDI file.

- 1 Launch your host audio sequencer application.
 - 2 Open or import the MachFive tutorial MIDI file.
 - 3 Launch the standalone MachFive application (found in the Mac *Applications* folder or Windows *Start* menu). Or open MachFive as a virtual instrument plug-in from within your host software in the standard fashion.
- If you need further help with this step, see chapter 7, “Configuring the MachFive Plug-in” (page 43).
- 4 The tutorial MIDI file that you opened in step 2 has three tracks. Assign the first track to MachFive channel A1 (bank A, channel 1), and confirm that part 1 is also assigned to channel A1 as shown below:

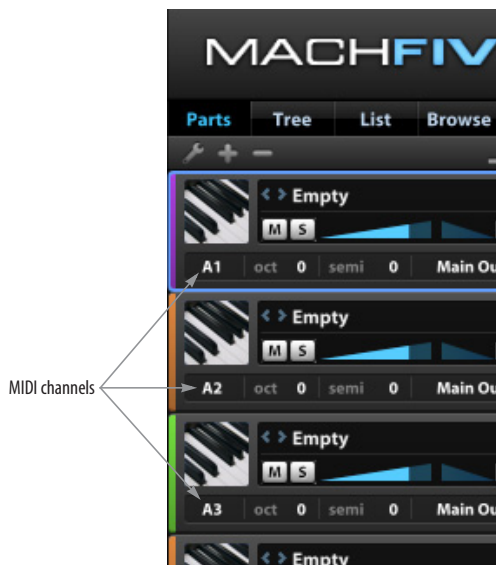


Figure 5-1: Checking the MIDI channel assignments for parts 1, 2 and 3.

Assign MIDI tracks 2 and 3 to MIDI channels A2 and A3. This means that tracks 2 and 3 in the MIDI file will play MachFive parts 2 and 3 (later on in the tutorial).

☞ If you need further help with MIDI I/O assignment in your host application, see chapter 7, “Configuring the MachFive Plug-in” (page 43). If you are running MachFive as a standalone application, your host software must support inter-application MIDI. For details, see “Running MachFive standalone on the same computer as your host software” on page 38.

MachFive sounds can be stored anywhere on your computer hard disk(s). For this tutorial, the MachFive installer creates a folder containing sounds for the demo MIDI file. Let’s load our first sound in part 1:

5 Double-click the word *Empty* in part 1 to open MachFive’s browser.



Figure 5-2: Double-clicking to open the browser.

6 Let’s start with an electric piano. Use the multi-column browser (Figure 5-4) to navigate to the folder named *Tutorial Sounds*. Start in the left-hand column and expand the *Places* item. If you are running Mac OS X, look for the *MachFive 3 Tutorial* folder in your Documents folder. In Windows, look for the *MachFive 3 Tutorial* directory in /Program Files.



Figure 5-4: Browsing the ‘Tutorial Sounds’ folder.

From the *Tutorial Sounds* folder, locate the *Elec.Piano* program in the right-hand column (Figure 5-3). Use the horizontal scroll bar, if necessary, to scroll to the right-most column.

7 Click OK in the browser to load the electric piano program into MachFive part 1.



Figure 5-5: The electric piano program loaded into part 1.

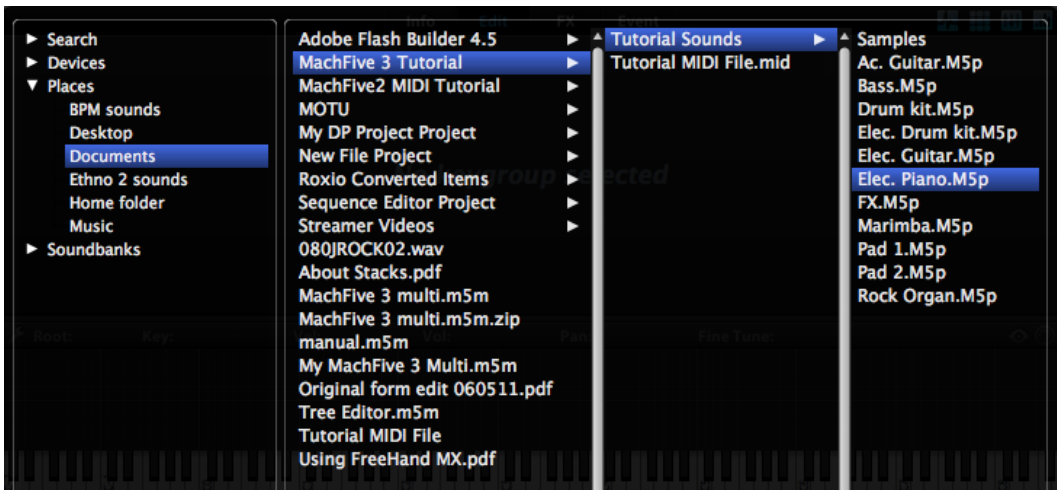


Figure 5-3: Choosing the Electric Piano program.

8 Set up your MIDI host application so that it can patch your MIDI controller through to MIDI channel A1.

9 Now try playing your MIDI controller.

You should now be hearing the piano sound when playing your MIDI controller. If this is not the case, check that the MIDI activity LED for part one is flashing (Figure 5-5). If not, refer to chapter 6, “Configuring the MachFive Application” (page 35) or chapter 7, “Configuring the MachFive Plug-in” (page 43) for tips on how to set your MIDI configuration. If you still don’t hear anything, refer to “MIDI troubleshooting” on page 242 and “Audio troubleshooting” on page 242.

10 Let’s open a few more sounds into parts 2, 3 and 4. Double-click the word *Empty* in Part 2 to open the browser again. This time, double-click the *Bass* program to load it into Part 2. Notice that the browser stays open. Now simply click the empty Part 3 once to select it (so that it has a blue border), and double-click the Drum Kit program to load it into part 3. Now do the same to load the Pad 1 program into part 4. When you are finished, click the browser’s OK button.

11 Try playing the MIDI file. You should hear the electric piano, bass and drums. Use the part volume slider (Figure 5-5) to adjust the volume levels to achieve a pleasing balance among the instruments.

☞ If the volume adjustments don’t “stick”, i.e. they jump to a different value, it is likely due to a MIDI event chasing feature in your host sequencer.

Simply disable event chasing, and the volume adjustments you make in MachFive will remain where you leave them.

12 Let’s stack the piano and pad together for a more cinematic sound. Click the MIDI channel button of part 4 to set it to channel 1 (Figure 5-6).



Figure 5-6: Assigning part 4 to channel 1.

13 Try playing back the MIDI file again. You should now hear both sounds layered. Use the volume of part 4 to mix the pad below the piano.

14 Try panning the electric piano to the left and the Pad to the right (Figure 5-8).

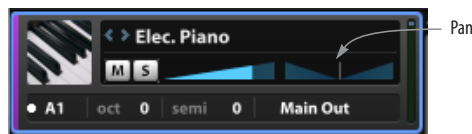


Figure 5-8: Adjusting the panning.

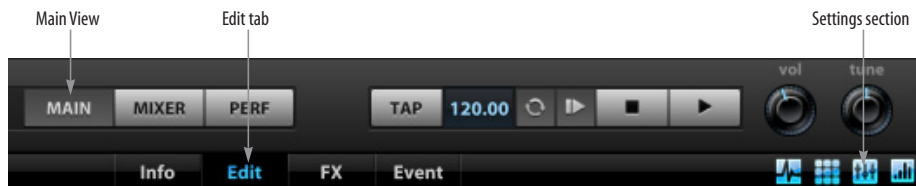


Figure 5-7: Displaying the Settings section.

15 The string pad sound might be a little bright for our taste. So let's apply a filter. First, let's make sure the filter settings are currently visible in the MachFive window (not hidden). In the Main View, click the Edit tab and make sure the Settings section toggle is enabled (Figure 5-7).

16 Select part 4 (Figure 5-9).



Figure 5-9: Click Part 4 to select it.

17 Locate the *Keygroup(s)* section (Figure 5-10), click Filter1 to enable it, and select a filter type from the menu below, such as *Analog LP* as shown below.



Figure 5-10: Applying a filter.

Set the cutoff, resonance and drive as desired (Figure 5-11). You can solo Part 4 by clicking its “S” button while adjusting the filter.



Figure 5-11: Setting the cutoff frequency and other filter settings.

Finally, let's add some effects processing. You can add effects at many different levels in MachFive. For now, let's work with *Part effects*, that is, effects processing that is applied to a specific part. In this case, let's add some effects processing to the drum kit.

18 Click Part 3 to select the drum kit.

19 Click the FX Rack tab, as shown below in Figure 5-12. The title bar of the FX Rack should display *Master>Part 3> Drum Kit* (Figure 5-12) to indicate that you are working with effects to be applied to the Drum Kit part. If not, make sure the drum part is selected.



Figure 5-12: Clicking the FX Rack tab.

20 Click the “+” menu at the right side of the FX Rack title bar and choose *Delay> Ping Pong Delay > Eight Miles* (Figure 5-13).

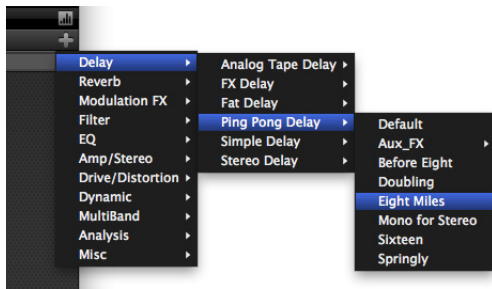


Figure 5-13: Choosing the ping pong delay program called 'Eight miles'.

21 Try adjusting the *Mix* and *Spread* settings to settle the effect into the mix (Figure 5-14). You can solo the Drum Kit part to better hear your adjustments: click the part's "S" (solo) button to toggle solo mode. You can also *bypass* the effect to A/B the part with and without the effect.

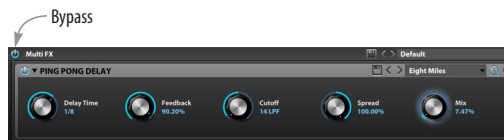


Figure 5-14: Adjusting the delay.

Congratulations! You are well on your way to becoming a MachFive power user.

PART 2: IMPORTING SOUNDS AND BASIC SOUND DESIGN

Suppose you would like to change the snare drum sound in the demo sequence:

1 Continuing from where we left off in Part 1 of this tutorial, with the drum part still selected, go back to the Edit tab and make sure that the Mapping Editor toggle is enabled (Figure 5-15).

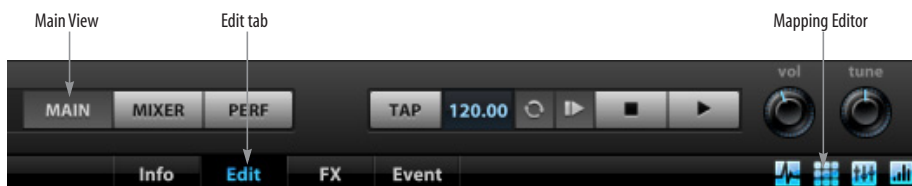


Figure 5-15: Displaying the Mapping Editor.

2 In the Mapping Editor, use the "+" button at the right side of the keyboard to zoom in the keyboard horizontally.

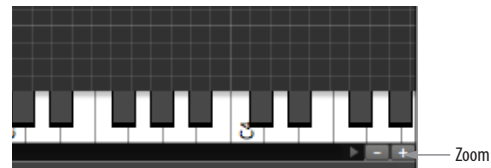


Figure 5-16: Finding E1 in the Keygroup Mapper.

3 Locate the rim snare drum note by clicking on the keyboard. The snare is on D#1, just above C1 (Figure 5-17). Once you have found the rim snare sound, click the snare *keygroup*, which is the green box in the grid above the key. Clicking the keygroup selects it, as shown below. You should now see the snare sample in the Oscillator Editor above the Mapping Editor.

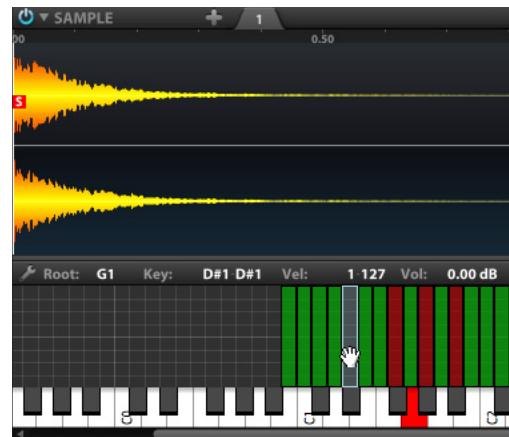


Figure 5-17: Selecting the snare keygroup in the Keygroup Mapper.

4 Now let's replace the rim snare sound. Click the Browse tab above the sidebar on the left to display the browser, click the File browser tab, and then click the star icon (Figure 5-18) to display the Places on your hard drive. Navigate to the MachFive Tutorial sounds folder, open the Samples folder.

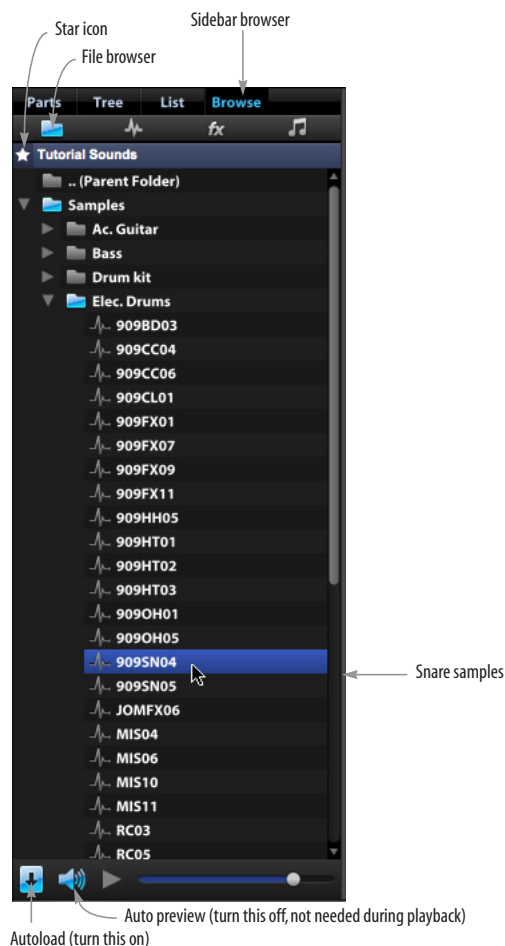


Figure 5-18: The sidebar browser.

5 Before you begin clicking samples, start MIDI sequence playback in your host software, so that you can audition during playback. Also make sure that the *AutoLoad* button is enabled (Figure 5-18) so that samples automatically load as you click them.

6 While the sequence is playing, browse the snare drum samples in the *Elec. Drums* folder.

As you click sample files in the browser, you can hear the sequence play the selected sample in real time: as soon as a sample is selected, the MIDI note triggers that sample.

☞ If the snare sound is too loud, relative to the rest of the drum kit, turn down the snare volume in the Keygroup settings below (Figure 5-19).



Figure 5-19: Controlling snare volume, independently of the rest of the drum kit, using its keygroup volume.

7 With the sequence still playing, now let's add a drum loop. Click the Parts tab in the sidebar, and click the "+" button to add a new, empty Part 5 (Figure 5-20).



Figure 5-20: Adding a new, empty Part 5.

8 Double-click the word *Empty* in Part 5 to open the browser. Navigate to the MachFive *Universal Loops & Instruments* UFS file on your hard drive. Choose *00 Loops > Old Hip Hop >* and try the first few in the list, such as *089-Old Rap MPC 1* (Figure 5-21). Use the Part volume to adjust the loop volume.

To further explore the creative tools in MachFive, let's use a single sample from your own audio library.

9 Create a new MIDI track and route it to MachFive on Channel 6.

10 Back in MachFive, add a new, empty Part 6, as you did before for the loop.

11 Switch out of MachFive and go to your computer desktop. Open your hard disk and locate a folder that contains some of your audio files.



Figure 5-21: Adding a loop.

12 Find a sound you would like to play on the keyboard (perhaps a vocal recording, a sound effect, a percussion loop...)

13 Grab this file and drop it on the C3 key on the keyboard in the keygroup mapper (Figure 5-22).

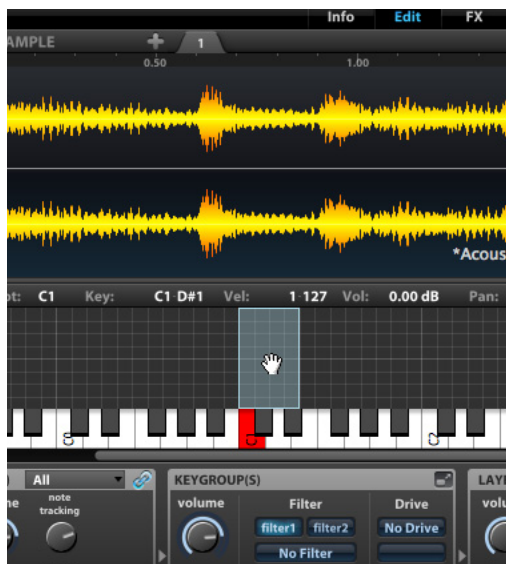


Figure 5-22: Dragging and dropping an audio file into MachFive.

14 Now if you play C3 on your keyboard you should hear your sound at original pitch and speed. You can drag the edges of the keygroup to expand it over a larger range of keys on the keyboard.

15 Click the Volume knob in the Keygroup(s) settings to select the knob. You'll now see the amplitude envelope for the keygroup in the modulation section at the bottom of the window, with envelope settings on the right. Try changing the envelope to *Bell 2* (Figure 5-23) and then experiment with playing the sample.

16 Now let's add a modulated filter. In the Keygroup section (Figure 5-19 on page 30), enable Filter1, choose a filter from the menu below, and lower the cutoff frequency knob to 200 Hz.



Figure 5-23: Changing the amplitude envelope.

17 Click the filter cutoff knob to select it, and choose an LFO using the “+” button in the Modulation section (Figure 5-24).

18 In the LFO section, click the LFO’s tempo lock icon (Figure 5-24) to lock its rate to the tempo of your host software, and set the *Frequency* to 1/4, which is a quarter note (Figure 5-25).



Figure 5-25: Setting the LFO rate and waveform.

19 Click the LFO waveform to choose a triangle waveform (Figure 5-25).

20 Set the *Depth* low and raise the *Smoothing* (Figure 5-25). Disable Bipolar.

This should create a nice effect on a sustained sound, for example.

21 Now let’s go a bit further by applying some filter resonance (Figure 5-24).

Congratulations! You’ve just completed the second MachFive tutorial.

There is much more to MachFive than this simple tour. Please take a look at the rest of this manual for more details on MachFive’s many additional features.



Figure 5-24: Modulating filter cutoff with an LFO.

CHAPTER 6

Configuring the MachFive Application

OVERVIEW

MachFive is supplied in two forms:

- As a standalone application
- As a plug-in

This chapter explains how to use the MachFive standalone application. For information about operating MachFive as a plug-in, see chapter 7, “Configuring the MachFive Plug-in” (page 43).

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STANDALONE OPERATION

MachFive can operate as a standalone instrument application, independent of a plug-in host, turning your Mac or PC into a streamlined virtual instrument powerhouse with unlimited parts, disk streaming, multiple independent audio output pairs and playback of a virtually unlimited library of instruments, loops and phrases. Standalone operation also allows you to:

- play MachFive from an external MIDI keyboard or other MIDI controller, allowing you to use MachFive as a sophisticated and powerful live instrument
- use MachFive as a comprehensive multi-timbral sound source for an external MIDI sequencer or MIDI-capable music software running on another computer
- use MachFive as a comprehensive multi-timbral sound source for MIDI-capable music software that does not host third-party instrument plug-ins but that is running on the same computer as MachFive

These three scenarios are briefly described below. The rest of this chapter explains the settings in MachFive necessary to establish MIDI and audio connections for these scenarios.

Playing MachFive as a live instrument from MIDI controller

To play MachFive as a live instrument from a MIDI controller, you need to route MIDI data from your controller to MachFive via a MIDI interface connected to the computer, and then route the audio output from MachFive to your computer's audio hardware, as shown below. The MIDI data triggers sounds in MachFive, which then produces audio signal to be routed to your headphones or speakers in your studio:

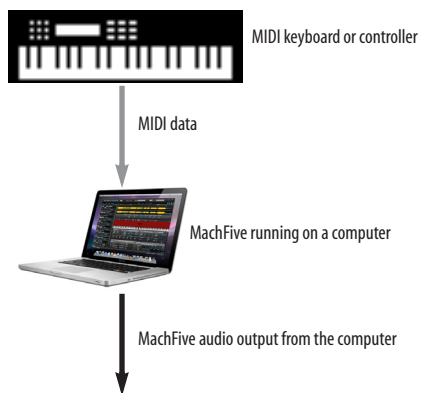


Figure 6-1: The flow of MIDI data and audio signal when playing MachFive as a live instrument.

MIDI connections

There are several ways to get MIDI data into your computer. Here are a few:

- A USB MIDI keyboard or controller that connects directly to the computer
- A MIDI-equipped keyboard connected to a USB MIDI interface, or to an audio interface that doubles as a MIDI interface, via a standard MIDI cable

Audio connections

There are many ways to play audio from your computer. The simplest method is to use the computer's built-in audio capabilities. You can also use a third-party audio interface. A perfect example is the MOTU UltraLite-mk3, an affordable, bus-powered FireWire audio interface that also provides MIDI input and output, as shown below:

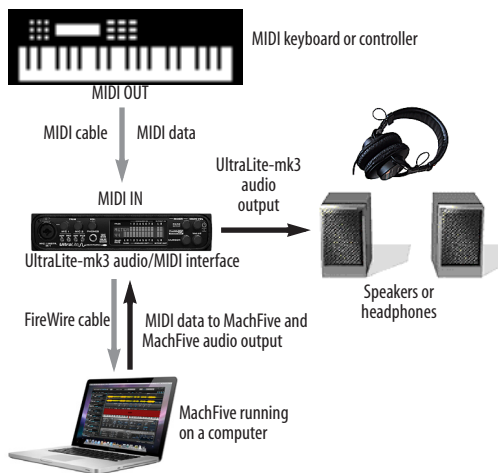


Figure 6-2: An example setup for standalone operation using a MOTU UltraLite-mk3 audio interface. In this example, the UltraLite-mk3 is also handling MIDI data transmission from the keyboard controller to the computer and MachFive.

Using MachFive as a sound source for music software running on another computer

When running as a standalone application on a computer by itself, MachFive can serve as a powerful multi-timbral sound source for MIDI equipped music software, such as an audio sequencer application, running on another computer.

The advantage of this “satellite” setup is that you can fully dedicate the MachFive satellite computer’s processing resources to MachFive, without affecting the performance of your audio sequencer, notation program or other MIDI authoring software running on your main computer.

The disadvantage to this setup is that you must manage the operational overhead of two (or more) computers. For example, you will need to save MachFive settings on the satellite computer in a way that lets you easily cross reference them to the corresponding file or project for your authoring software on your main computer. If you prefer to save MachFive settings directly in your host authorizing software, you are better off running MachFive as a plug-in. But if processing resources are at a premium, and you have an extra computer on which to run MachFive, this “satellite” computing scenario can be very beneficial.

The setup for running MachFive on a satellite computer is very similar to the live keyboard scenario described in the previous section, except that audio sequencer or other authorizing software running on your main computer serves as the source of MIDI data being sent to MachFive running on the satellite computer, as demonstrated in Figure 6-3. MIDI data is transmitted from the host computer via a FastLane MIDI interface and MIDI cable to the UltraLite-mk3 audio/MIDI interface connected to the laptop running MachFive.

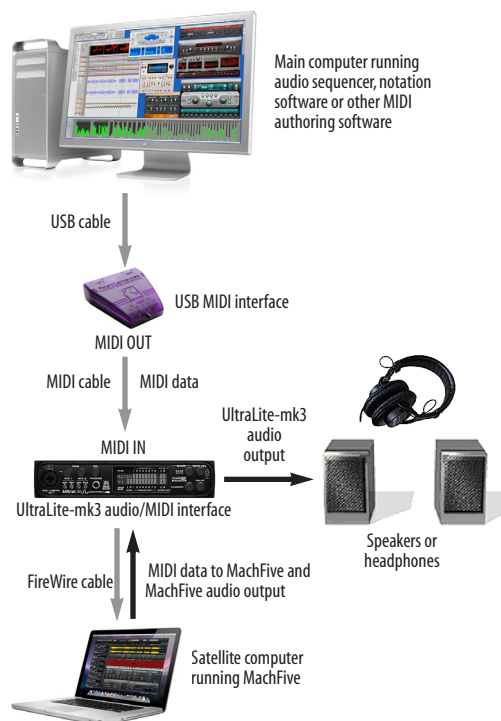


Figure 6-3: An example setup for standalone operation using a MOTU UltraLite-mk3 audio interface. In this example, the UltraLite-mk3 is also handling MIDI data transmission from the keyboard controller to the computer and MachFive.

The example setup shown in Figure 6-3 shows one satellite computer. But you can use this same basic idea for two or more satellite computers, each running MachFive as well. For multiple satellite computer setups, you may also want to consider using just one or two computer monitors connected to a computer monitor switcher. These devices, available from your favorite computer supplies retailer, allow you operate multiple computers from the same screen, keyboard and mouse.

Running MachFive standalone on the same computer as your host software

If you are planning to run MachFive on the same computer as your audio sequencer, notation program or other MIDI authoring software, it will be most convenient for you to run MachFive as a plug-in inside your host software.

If, however, your authoring software does not have the ability to host instrument plug-ins, it is possible that you might be able to run MachFive in standalone mode and trigger MachFive sounds from your host software using inter-application MIDI transmission, if your host software supports this feature. *Inter-application* MIDI transmission is when one program sends MIDI data to another program that is running at the same time. In essence, both programs are running side by side as standalone applications, and they pass MIDI data (and perhaps even audio streams) between each other.

Inter-application MIDI

On Mac OS X, inter-application MIDI functionality is supported by the operating system itself, and many current music software packages support these inter-application features. Consult your host software documentation for details. On Mac OS X, you can set up a compatible host application to publish a virtual MIDI device (stream), which then appears in MachFive's MIDI Device tab menus, as shown in Figure 6-7 on page 40.



Figure 6-4: An example of the inter-application MIDI feature in a host program. This window in Digital Performer (Setup menu > Inter-application MIDI) lets you create a 'virtual' MIDI output device (stream) from Digital Performer, as shown in this example by the name 'DPOutput'. You can then choose this a virtual MIDI device (source) from within MachFive (running standalone, not as a plug-in), as shown in Figure 6-7 on page 40. If you then play a MIDI track to the MIDI channels on this virtual output device, they will trigger parts in MachFive that are assigned to receive on those same MIDI channels.

On Windows, there are third-party utilities available for Windows, such as *LoopBe* or *MIDI Yoke*, that allow MIDI programs to transmit MIDI data to each other.

Inter-application audio

The audio output from MachFive can either play directly to your audio interface hardware connected (via the settings described later in this chapter), or you can use third-party downloadable utilities (such as Cycling 74's *Sound Flower* utility for Mac OS X or other similar downloadable third-party audio utility) to route MachFive's audio

output back into your host audio sequencer application (or any other audio software running on the same computer).

MANAGING LATENCY WITH STANDALONE OPERATION

Latency is the time it takes for MIDI data from your controller to reach MachFive and then for MachFive to respond to it and produce sound. See “Managing latency” on page 44, which discusses ways to manage latency that apply to both plug-in operation and standalone operation.

OPENING THE STANDALONE VERSION

On the Mac, the standalone version of MachFive can be found in your Applications folder. On Windows, it can be found under the *Start menu* > *Programs* > *MOTU*.

Standalone operation is identical to plug-in operation, with the exception of the additional standalone settings described in this chapter.

AUDIO AND MIDI SETTINGS

The standalone version of MachFive has a few basic settings that can be found in *File menu* > *Audio and MIDI Settings*:



Figure 6-5: The standalone version Audio and MIDI Settings.

AUDIO DEVICE TAB

The *Audio Device* tab preferences (Figure 6-5) let you make several audio hardware device settings.

API

Choose the desired audio driver API for the audio interface you are using for MachFive. For Mac OS X, this will always be set to *Core Audio*. For Windows, you may choose either *ASIO* or *MME*. If your audio device provides both ASIO and MME driver support, you are free to choose either driver for MachFive, but ASIO is recommended.

Output device

Choose the desired audio hardware from the *Output Device* menu (Figure 6-5). For example, you could choose your computer's built-in audio hardware. If you have a third-party audio interface installed or connected, and you do not see it in the menu, be sure that you have correctly installed its driver and that it is otherwise functioning properly, independently of MachFive. For example, can you access the hardware from the system software (Mac OS X or Windows) and other audio applications?

Sample Rate

Choose the desired Sample Rate (Figure 6-5) for playback. The choices in this menu are provided by your audio hardware driver, and the setting you choose here is the sample rate your hardware will be set to. 44.1 kHz is the standard rate for audio compact discs. MachFive samples are all provided in either 16- or 24-bit resolution at sample rates that range from 44.1 kHz up to 192 kHz, but if you choose to operate at a different sample rate, they are sample-rate converted on the fly to match the rate you've chosen.

Buffer Size

This setting is crucial for managing your computer's processing resources. In general, settings of 256, 128 or 64 samples produce better latency performance. But lower settings place higher demand on your computer's processor.

ASIO Config (Windows only)

Click the ASIO config button to open the ASIO driver configuration window. Consult your audio hardware documentation for details about the settings in this window for configuring your hardware's ASIO driver.

Refresh Audio Devices

If you make changes to your audio device configuration (outside of MachFive), click the *Refresh Audio Devices* button (Figure 6-5) to see those changes reflected in the MachFive Audio Devices tab.

ROUTING TAB

The standalone version of MachFive provides 17 independent stereo outputs (a main out pair, plus 16 additional separate output pairs numbered 2 through 17) to which you can freely assign each part, as explained in “Part Output” on page 64.

The *Routings* tab (Figure 6-6) provides a way for you to map each MachFive output to a physical output connector on your audio hardware. For example, you might map MachFive's “Main Out Left/Right” output pair to the headphone output of your audio interface.

The connectors you see in the *Physical Output* menus (Figure 6-6) are provided by your hardware and its software driver. If you do not see the desired hardware device outputs in the menus, be sure that you have correctly installed its driver and that it is otherwise functioning properly, independently of MachFive. For example, can you access the hardware from the system software (Mac OS X or Windows) and other audio applications?

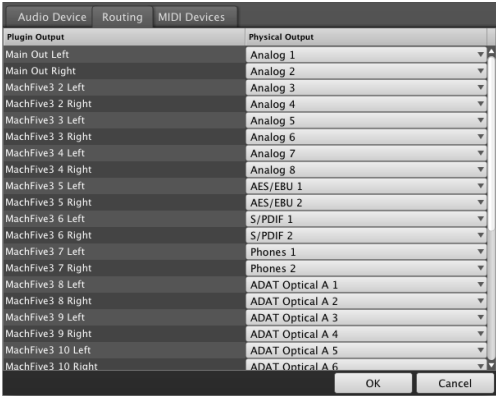


Figure 6-6: Mapping standalone version outputs to the physical connectors on your audio hardware.

MIDI DEVICES TAB

The *MIDI Devices* tab (Figure 6-7) lets you configure how external MIDI sources are mapped to MachFive's MIDI channels.



Figure 6-7: MIDI devices.

As defined by the MIDI specification, MIDI channels are supplied in banks of 16 channels. For example, one MIDI cable carries 16 MIDI channels. On multiport MIDI interfaces, such as the MOTU MIDI Express 128, each MIDI port also carries its own set of 16 MIDI channels.

This means that there is no such thing as MIDI channel 17, 18, 19, etc. So how does MachFive provide 64 MIDI channels? The answer is: by

dividing them into four banks of 16 channels each: Bank A, Bank B, Bank C and Bank D. Each bank represents one MIDI cable — or MIDI port on a MIDI interface. The *MIDI Devices* tab (Figure 6-7) lets you map external MIDI sources to each bank. These sources could be any of the following:

- A MIDI IN port on a MIDI interface that is connected to the computer
- A “virtual” MIDI cable from MIDI software running concurrently with MachFive (such as Digital Performer)
- A USB MIDI controller (a keyboard controller that is connected directly to the computer via a USB cable)
- An audio interface that also supplies one or more MIDI IN ports (such as the MOTU 828mk3 or Traveler-mk3)

When any of these devices are “on line” (that is, they are connected to your computer with their drivers properly installed — or in the case of MIDI software programs, they are running simultaneously with MachFive), they will display their available MIDI ports in the four MIDI port menus shown in Figure 6-7.

You can choose any source you wish for each port. If you choose the same source for two or more ports, just be aware that you will trigger the same MIDI channel on both ports. For example, if you assign your controller to both Port A and Port B, and it transmits on MIDI channel 1, you will trigger any MachFive parts that are assigned to either channel A1 or B1. To make channel A1 and B1 independent from one another, assign them to different sources in the MIDI Devices tab.

Refresh MIDI Devices

If you make changes to your MIDI device configuration (outside of MachFive), click the *Refresh MIDI Devices* button (Figure 6-7 on page 40) to see those changes reflected in the MachFive MIDI Devices tab.

CONFIGURATION MENU

The Configuration menu for the standalone application chooses the output channelization of MachFive’s main outputs: stereo, quad, 5.1, 6.1, 7.1, and 10.2. For more information, see chapter 16, “Working in Surround” (page 111).

CHAPTER 7 **Configuring the MachFive Plug-in**

OVERVIEW

MachFive is supplied in two forms:

- As a standalone application
- As a plug-in

This chapter provides basic setup and operation instructions for each supported plug-in format, with specific explanations for a variety of popular host software applications. After reading the first two sections (for all users), turn to the section that applies to you.

For information about operating the standalone application, see chapter 6, “Configuring the MachFive Application” (page 35).

When operating MachFive as a plug-in inside a host audio program, you can open — or *instantiate* — MachFive on two or more tracks at a time. Each independently operating MachFive is referred to as an *instance of* MachFive. For example, you could say that it is possible to open *multiple instances of* MachFive in a project. Each one opens as a separate window and operates independently. However, keep in mind that one instance of MachFive lets you create unlimited parts with up to 64 independent MIDI channels (depending on your host), so there may never be a need for you to operate more than one instance in your host software projects.

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CONSERVING CPU RESOURCES

Regardless of your host application, MachFive provides several settings that are crucial for managing your computer's precious processing (CPU) resources. Another setting, generally referred to as *hardware buffer size*, can also dramatically impact MachFive performance. This last setting is not in MachFive; instead, you'll find it either in your host application or in your audio hardware driver configuration settings.

The Polyphony setting

The Polyphony setting (see "Polyphony" on page 123) lets you control the maximum allowed number of stereo notes that can be played simultaneously by an individual part. The upper limit is 256. This setting can be adjusted separately for each part. Keep it as low as possible to conserve CPU bandwidth.

Other ways to optimize MachFive performance

Here are three additional ways you can optimize MachFive performance:

1. Filters require processing bandwidth, so disable any filters on any keygroups that are not in real use by the program. To do so, select the program's part (as explained in "Selection" on page 118), select the necessary keygroup and choose *Off* from the Filter type menu as shown in Figure 17-6 on page 120.
2. Long envelope times can increase the polyphony count — without being obvious. Make sure your amplitude envelope is set as short as possible. For details, see "Envelopes" on page 217.
3. MachFive's built-in effect processing will obviously increase the CPU load. Reverb is the most CPU-intensive effect, and inserting several reverbs must be done with careful consideration. Try to optimize effect usage by sharing them: insert the reverbs you need on an Aux bus ("Program aux effects" on page 184 and "Master aux effects" on page 186) instead of using a separate reverbs for each part.

Hardware buffer size

A third crucial setting for managing your system's resources is the *hardware buffer size*. This setting is discussed more specifically for each host application later in this chapter. In general, under Mac OS X, this setting is managed by (and found in) your host audio software. Under Windows, some host audio applications, such as SONAR, control this setting, and you'll find it in the host software. For other Windows applications, such as Cubase and Pro Tools, it is managed by the audio hardware driver and is usually found in the driver configuration software for your audio hardware. In general, settings of 256, 128 or 64 samples produce better latency performance. But lower settings place higher demand on your computer's processor.

MANAGING LATENCY

Latency is a term we use to refer to the very small delay that can occur between when a MIDI note is played and the resulting MachFive sound is triggered. The discussion below explains how to best reduce — and in some cases completely eliminate — latency. However, regardless of which host application you use, there are two general situations that you should be aware of in which latency may be an issue:

- During live MIDI input
- During MIDI track playback

Live MIDI input

Live input latency can occur when you play your MIDI controller to trigger sounds "live" in MachFive, as demonstrated below in Figure 7-1. The most important setting to control live input latency, regardless of your host application, is the "Hardware buffer size" on page 44. Lower hardware buffer settings (512 samples or below) make live input latency almost inaudible. The lower the setting, the more accurate live playing will feel. However, lower settings place higher

demand on the computer, so if you are placing high demands on MachFive, you may not want to go much lower than 512 samples. If you can live with a little “sponginess” when playing live parts, you could even set the buffer size to 1024 samples. This will give you even better MachFive performance.

☛ It is important to note that live input latency has no effect whatsoever on the accuracy with which the MIDI data is recorded. This is only a monitoring issue (i.e. what you hear when you play live).

MIDI track playback

MIDI sequencers store streams of MIDI data in their tracks. When you play back the sequence, this MIDI data is sent to MachFive (and other MIDI instruments) to trigger sounds. The question is: how much time elapses between when a MIDI data event is played from the track and when MachFive plays the sample being triggered? This period of time, if any, could be referred to as *MIDI playback latency*.

The latest versions of the host applications described in this chapter all have ways to completely eliminate MIDI playback latency for virtual instruments like MachFive: their MIDI track playback is extremely accurate — even

sample-accurate in some cases. (Host applications either send the MIDI data a little early or cue up MachFive’s audio playback a little early so that it plays exactly when the MIDI note plays.) For a few host applications, however, this period of time is affected by the “Hardware buffer size” on page 44: the higher the buffer size, the longer the playback latency. The following sections explain which applications are affected by this setting with regard to MIDI track playback. As with live input latency, lower buffer settings result in more accurate playback, but at the expense of increased processing load on your computer.

WORKING WITH MULTIPLE INSTANCES OF MACHFIVE

You can open as many instances of MachFive in your host application as your computer’s processing resources will allow. Since MachFive operates as a multitimbral instrument with unlimited parts, in many circumstances you’ll only need one instance of MachFive in your project.

☛ A single instance of MachFive supports up to 64 MIDI channels via four 16-channel MIDI ports. However, some host applications only support one MIDI port (16 channels) for each plug-in instance.

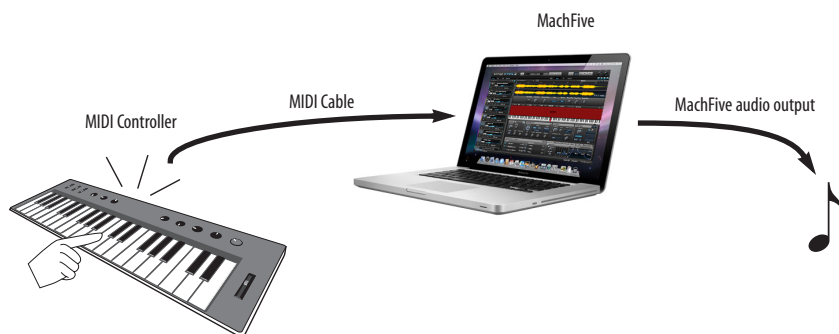


Figure 7-1: Latency during live MIDI input. You press a key on your controller keyboard. The note gets sent to MachFive, which then plays a note in response to the received MIDI data. Latency is the time it takes between when you play the note and then hear it. High latency feels “spongy”. In other words, notes seem to play consistently a little late. Live input latency has no effect whatsoever on the accuracy with which the MIDI data is recorded. This is only a monitoring issue (i.e. what you hear when you play live).

MACHFIVE AUDIO OUTPUTS

By default, MachFive sends the output of all parts to the audio output assignment of the track on which it is instantiated. But it also supplies multiple independent outputs, which let you send parts to different destinations in the host software's mixing environment.

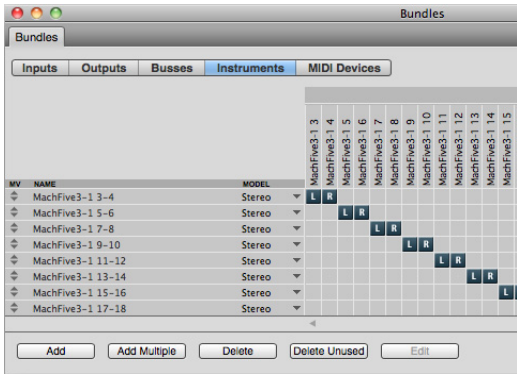


Figure 7-2: MachFive can send its output to multiple tracks in the host software, Digital Performer in this example.

For details on how to assign individual parts in MachFive to different audio outputs, see “Part Output” on page 64. For details on how to configure a multi-output instrument in your host software, refer to its documentation.

Surround

For host applications that support surround instruments, MachFive provides quad, 5.1, 6.1, and 7.1 channel configurations. Doing so allows you to play back multi-channel sounds loaded in MachFive.

For specific details on how to configure a surround instrument in your host software, refer to its documentation. In general, it is usually necessary to first create an output bus or path of the desired channel configuration (quad, 5.1, etc.) before instantiating MachFive. For example, if you wish to use the 5.1 MachFive plug-in in Digital Performer, create a 5.1 output bundle and assign it to the desired outputs of your audio hardware, then instantiate the 5.1 plug-in by choosing *Project menu > Add Track > Instrument Track > MachFive (5.1)*.

If you are not loading surround samples in MachFive and would simply like to pan MachFive's stereo output using your host software's surround panning features, instantiate the stereo version of MachFive and assign its instrument track to a surround output bus. Keep in mind that the instrument track's panner affects all parts assigned to MachFive's Main Outs, so if you wish to pan two or more parts differently you'll need to put them on several instances of MachFive running on separate tracks.

INITIATING MACHFIVE OPERATION

Before you can begin using MachFive, you need to choose a program for at least one part. For details, see chapter 4, “QuickStart Guide” (page 23).

DIGITAL PERFORMER (MAC OS X)

For Digital Performer, MachFive operates as a standard AU instrument plug-in. Refer to your DP documentation for details. Both 32-bit and 64-bit operation are supported.

Installation for Digital Performer

The MachFive installer places the MachFive plug-in in the AU plug-ins folder:

/Library/Audio/Plug-ins/Components/

Opening MachFive on an instrument track

MachFive is accessed from an instrument track in Digital Performer's Mixing Board. To create a new instrument track with MachFive already instantiated on it, choose *Project menu > Add Track > Instrument Track > MachFive*. To instantiate MachFive on an existing instrument track, just choose it from the topmost insert menu.

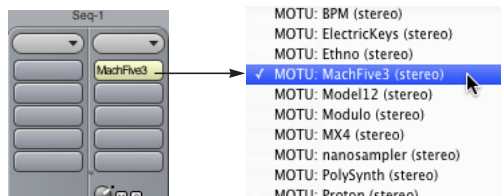


Figure 7-3: Opening the MachFive on an instrument track in Digital Performer.

Using MachFive in a V-rack

If you are working with multiple sequences in a Digital Performer project document, and the sequences are making use of the same sounds in MachFive, consider instantiating MachFive in a V-rack sequence. By doing so, you will only have to instantiate MachFive once, in the V-rack, instead of multiple times in each individual sequence. This is a much more highly efficient way to work, as it speeds up the time it takes for the project to open and the amount of time to switch between sequences. It also takes up much less computer memory.

MIDI I/O

MIDI I/O between MachFive and Digital Performer is handled by Mac OS X's built-in MIDI services (*CoreMIDI*). When you first instantiate a MachFive plug-in, MachFive publishes MIDI channels to Digital Performer. These MIDI channels appear in the output assignment menus of DP's MIDI tracks.

To send MIDI data from a DP track to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in "MIDI Input/activity" on page 64).

☛ MachFive must be instantiated in the project before you'll see its MIDI channels displayed in the MIDI output menus in DP.

Near sample-accurate MIDI playback

In regard to "Managing latency" on page 44, DP's MIDI track playback (the timing between MIDI tracks in Digital Performer and the audio being triggered in MachFive) is accurate to within one sample. In other words, MachFive audio will never trigger more than one sample earlier or later than the exact sample location prescribed by the MIDI data event triggering the sample. This is because both DP and MachFive take advantage of Mac OS X's MIDI timestamping features. This allows DP to accurately pre-cue MIDI data for playback. MachFive plays back in DP with the tightest timing possible.

Reducing live input latency

In regard to "Managing latency" on page 44, you can minimize live input latency with MachFive by keeping Digital Performer's *Buffer Size* setting as low as possible. This setting is found in the Setup menu > Configure Audio System > Configure Hardware Driver. Try values of 256 samples or lower, if your computer can handle them. Lower settings produce higher processing demands on your computer's CPU resources.

LOGIC (MAC OS X)

For Logic, MachFive operates as a standard AU instrument plug-in. Refer to your Logic documentation for details. Both 32-bit and 64-bit operation are supported.

Installation for Logic

The MachFive installer places the MachFive AU plug-in in the AU plug-ins folder:

/Library/Audio/Plug-ins/Components/

Opening MachFive on an instrument track

In Logic, create a software instrument track. Then open MachFive on the instrument track.

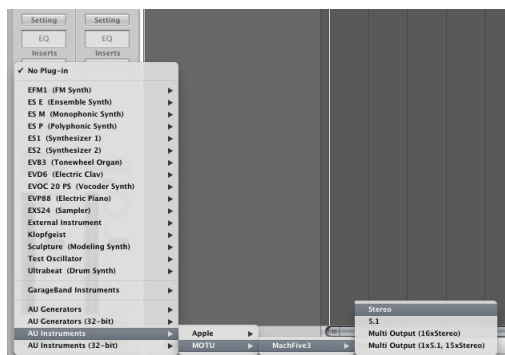


Figure 7-4: Opening MachFive on a Logic instrument track (from the track settings panel in this example).

MIDI I/O

MIDI I/O between MachFive and Logic is handled by Mac OS X's built-in MIDI services (*CoreMIDI*). When you first instantiate a MachFive plug-in and choose a program, MachFive publishes MIDI channels to CoreMIDI and Logic. These MIDI channels will automatically become available in Logic on MachFive's instrument track. No extra preparation is necessary.

☛ MachFive must be instantiated in your Logic session before you'll see its MIDI channels displayed in the MIDI output menus in Logic.

You can achieve multi-timbral operation by enabling the *Multi-timbral* option in the New Track dialog. The desired number of MIDI tracks to be assigned to MachFive should be entered in the *Number* field.

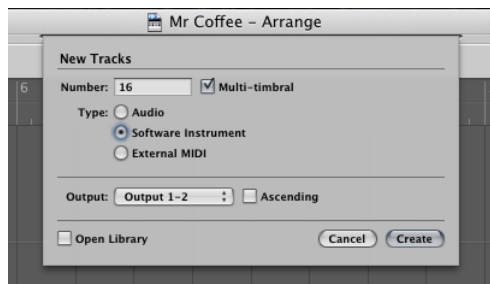


Figure 7-5: Creating a multi-timbral instrument, with 16 tracks in this example.

Latency

In regard to “Managing latency” on page 44, Logic's *I/O Buffer Size* setting (as shown below in Figure 7-6) has no effect on either live MIDI input latency or MIDI track playback, as Logic has other ways of managing them. In general, MachFive will perform as well as any other virtual instrument that you use in Logic.

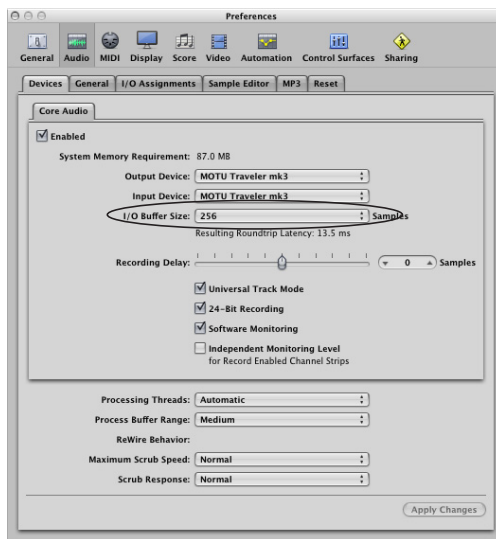


Figure 7-6: Logic's I/O Buffer Size setting.

OTHER AUDIO UNIT HOSTS (MAC OS X)

For Mac OS X applications that support Audio Units (AU) plug-ins, MachFive operates as a standard AU instrument plug-in. Both 32-bit and 64-bit operation are supported. The AU host application must also support MIDI sequencing and Mac OS X's built-in MIDI services (*CoreMIDI*) to send MIDI data to MachFive. MachFive sounds are triggered by MIDI data received from the host application.

Installation for AU hosts

The MachFive installer places the MachFive AU plug-in in the AU plug-ins folder:

/Library/Audio/Plug-ins/Components

Opening MachFive on an instrument track

MachFive is accessed in an Audio Unit host application in the standard fashion as any AU instrument plug-in.

MIDI I/O

MIDI I/O between MachFive and an AU plug-in host application is handled by Mac OS X's built-in MIDI services (*CoreMIDI*). When you first instantiate a MachFive plug-in, it publishes MIDI channels to CoreMIDI. These MIDI channels should automatically appear in the MIDI output assignment menus in your host application.

To send MIDI data from a MIDI track in your host application to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in “MIDI Input/activity” on page 64).

Reducing buffer latency

In regard to “Managing latency” on page 44, the hardware buffer size may or may not impact live MIDI input latency and MIDI track playback: it depends on the host software. Consult the documentation for your host software for information about using virtual instruments.

PRO TOOLS (MAC & WINDOWS)

For Pro Tools 10 and higher, MachFive operates as a standard AAX instrument plug-in on Mac OS X and Windows. For Pro Tools 11 and higher, MachFive supports 64-bit operation. For Pro Tools 9 and earlier, MachFive operates as a standard 32-bit RTAS instrument plug-in. Refer to your Pro Tools documentation for details.

Installation for Pro Tools

The MachFive installer places the MachFive plug-in here:

Mac OS X — AAX

/Library/Application Support/Avid/Plug-Ins

Mac OS X — RTAS

/Library/Application Support/Digidesign/Plug-Ins

Windows — AAX

\Program Files\Common Files\Avid\Plug-Ins

Windows — RTAS

\Program Files (x86)\Common Files\
Digidesign\DAE\Plug-ins

Opening MachFive on an instrument track

MachFive is accessed from the insert menus of an instrument track in Pro Tools. Just choose it from the insert menu and it will open as a plug-in.

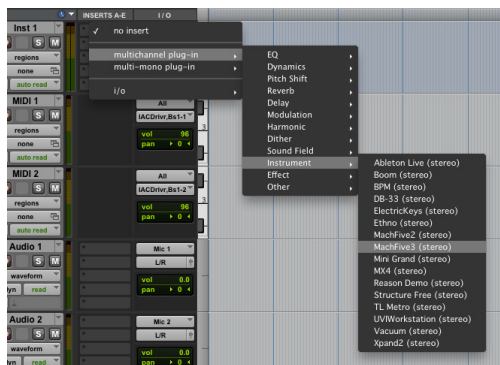


Figure 7-7: Opening the MachFive plug-in in Pro Tools.

MIDI I/O

To send MIDI data from a Pro Tools MIDI track to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in “MIDI Input/ activity” on page 64).

☛ MachFive must be instantiated in the session before you’ll see its MIDI channels displayed in the MIDI output menus in Pro Tools (Figure 7-8) below.

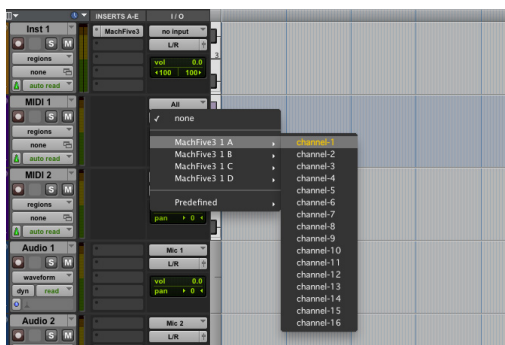


Figure 7-8: Assigning a Pro Tools MIDI track to a MachFive MIDI channel.

Reducing buffer latency

In regard to “Managing latency” on page 44, you can minimize both live MIDI input latency and MIDI track playback latency by keeping your Pro Tools DAE *Buffer Size* setting as low as possible. Consult your Pro Tools manual for details about adjusting the DAE buffer size. Lower settings produce higher processing demands on your computer’s CPU resources.

CUBASE AND NUENDO (MAC & WINDOWS)

For Cubase and Nuendo running on Mac OS X and Windows, MachFive operates as a standard VST instrument (VSTi). Refer to your Cubase or Nuendo documentation for details. Both 32-bit and 64-bit operation are supported.

Installation for Cubase or Nuendo

The MachFive installer places the MachFive VST plug-ins here:

Mac OS X

/Library/Audio/Plug-Ins/VST

Windows

\Program Files\Steinberg\Vstplugins

☛ On Windows, the installer allows you to choose your own VST plug-in path.

Opening a MachFive VSTi

Go to the *VST Instruments* rack and choose MachFive in a slot, as shown below:

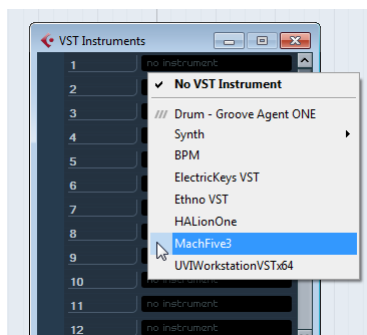


Figure 7-9: Opening MachFive in the VST Instruments window.

Alternatively, you can create an instrument track by choosing *Project menu > Add Track > Instrument* and selecting MachFive from the instrument drop-down menu, as shown below:

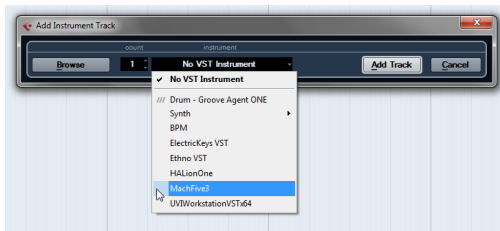


Figure 7-10: Creating an instrument track for MachFive

MIDI I/O

MIDI I/O between MachFive and Cubase or Nuendo is handled by VST. When you first instantiate a MachFive plug-in, MachFive publishes MIDI channels to Cubase or Nuendo. These MIDI channels automatically appear in the output assignment menus of Cubase or Nuendo's MIDI tracks.

MachFive must be opened in your Cubase or Nuendo project before you'll see its MIDI channels displayed in the MIDI output menus in Cubase or Nuendo.

To send MIDI data from a MIDI track to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in "MIDI Input/ activity" on page 64).

Reducing buffer latency

In regard to "Managing latency" on page 44, Cubase and Nuendo provide ways to manage virtual instrument playback timing (consult your user guide for details). You can minimize live input latency with MachFive by keeping their *Audio Buffer Size* setting as low as possible. This setting is found in the Device Setup window under the *VST Instruments* list item. Try values of 256 samples or lower, if your computer can handle them. Lower settings produce higher processing demands on your computer's CPU resources.

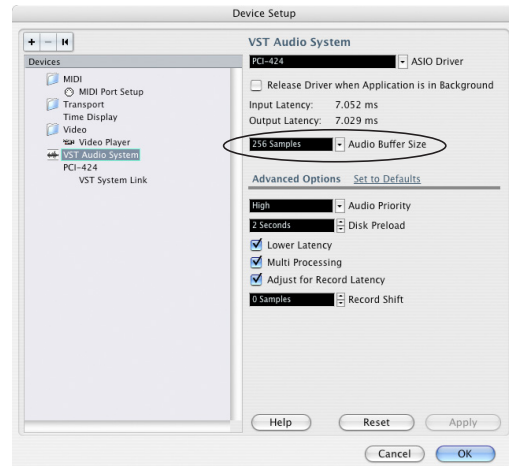


Figure 7-11: Setting the Audio Buffer Size in Cubase or Nuendo.

Under Windows, open the Device Setup window and choose your audio hardware from the list on the left, found under *VST Audio System* (Figure 7-12). Click the Control Panel button to launch your audio hardware's configuration software.

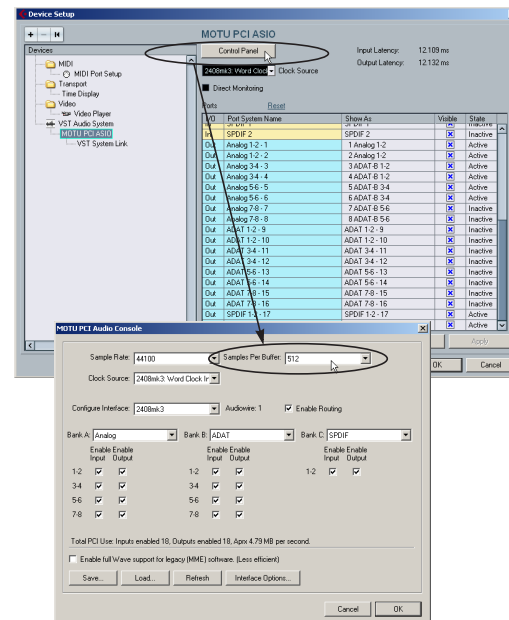


Figure 7-12: Setting the Audio Buffer Size in Cubase or Nuendo (Windows).

LIVE (MAC & WINDOWS)

For Ableton Live running on Mac OS X or Windows, MachFive operates as a standard VST instrument (VSTi). Alternatively, you may use MachFive as an Audio Unit (AU) instrument when running Live on Mac OS X; the process is the same as described for VST. In either case, 32-bit and 64-bit operation are supported.

Installation for Live

The MachFive Installer places the MachFive VST plug-in here:

Platform	Location
Mac OS X	/Library/Audio/Plug-Ins/VST
Windows	\Program Files\MOTU\Vstplugins If you want to install the VST in another Vstplugins folder, copy the MachFive VST files from this folder to the desired location.

Opening the MachFive VSTi

Go to the Plug-in Device Browser and drag the MachFive VST (or Audio Unit) onto a MIDI track, or into the Clip/Device Drop Area, to create a new track.



Figure 7-13: Opening MachFive in Live.

MIDI I/O

When you first instantiate a MachFive plug-in, MachFive publishes itself as a MIDI destination to Live, which appears in the output assignment menus of Live’s MIDI tracks.

🔊 MachFive must be opened in your Live project before you’ll see it displayed in the MIDI output menus in Live.

To send MIDI data from a Live track to a specific MachFive part, assign the MIDI track to the corresponding MachFive MIDI channel for the part.

Reducing buffer latency

In regard to “Managing latency” on page 44, Live provide ways to manage virtual instrument playback timing (consult your user guide for details). You can minimize live input latency with MachFive by keeping the *Audio Buffer Size* setting as low as possible. Try values of 256 samples or lower, if your computer can handle them. Lower settings produce higher processing demands on your computer’s CPU resources.

In Live, the *Buffer Size* setting is found in the *Preferences > Audio* window (Figure 7-14). On Mac OS X, you can directly change that setting. On Windows, click the *Hardware Setup* button to launch your audio hardware’s configuration software.

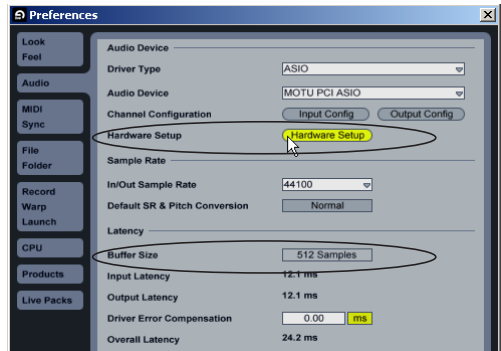


Figure 7-14: Setting the Audio Buffer Size in Live.

SONAR (WINDOWS)

For SONAR, MachFive operates as a standard VST instrument (VSTi). Refer to your SONAR documentation for details. Both 32-bit and 64-bit operation are supported.

Installation for SONAR

The MachFive Installer places the MachFive VST plug-in here:

Platform	Location
Mac OS X	/Library/Audio/Plug-Ins/VST
Windows	\Program Files\MOTU\Vstplugins If you want to install the VST in another Vstplugins folder, copy the MachFive VST files from this folder to the desired location.

Opening the MachFive VST

To open MachFive in SONAR, choose *Insert menu* > *Soft Synth* > *Vstplugins* > *MachFive 3*.

Alternatively, to open MachFive from the Synth Rack choose *View menu* > *Browser* and select the *Synth* tab. Click the “+” button and choose *Insert Synths* > *Vstplugins* > *MachFive 3*, as shown below in Figure 7-15.

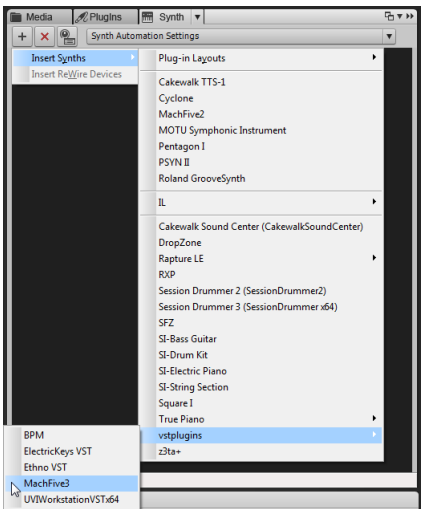


Figure 7-15: Opening MachFive in SONAR.

MIDI I/O

When you first instantiate a MachFive plug-in, it publishes MIDI channels to the host. These MIDI channels automatically appear in the MIDI output assignment menus of SONAR's MIDI and instrument tracks:

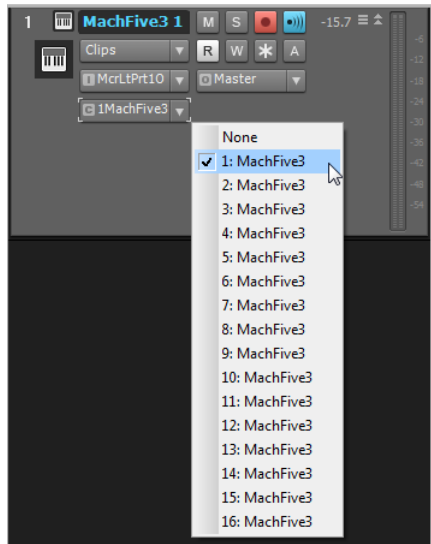


Figure 7-16: Assigning the MachFive instrument track to a MachFive MIDI channel.

MachFive must be opened in your SONAR project before you'll see its MIDI channels displayed in the MIDI output menus in the host application.

To send MIDI data from a MIDI track to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in “MIDI Input/ activity” on page 64).

Reducing buffer latency

In regard to “Managing latency” on page 44, SONAR provides ways to manage virtual instrument playback timing (consult your user guide for details). You can minimize live input latency with MachFive by keeping the *Buffer Size* setting as low as possible. This setting is found in

the Preference window's Audio section, as shown below in Figure 7-17. Lower settings produce higher processing demands on your computer's CPU resources.

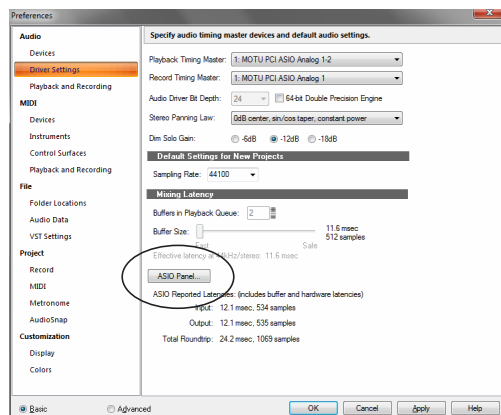


Figure 7-17: Setting the Buffer Size in SONAR. When using an ASIO driver, open the ASIO Panel to change the Buffer Size.

OTHER VST HOSTS (MAC & WINDOWS)

For other VST hosts running on Mac OS X or Windows, MachFive operates as a standard VST instrument (VSTi). Both 32-bit and 64-bit operation are supported.

Installation for VST hosts

The MachFive installer places the MachFive VST plug-in here:

Mac OS X

/Library/Audio/Plug-Ins/VST

Windows

\Program Files\MOTU\Vstplugins

Calling up MachFive on an instrument track

MachFive is accessed in a VST host application in the standard fashion as any VST instrument plug-in.

MIDI I/O

When you first instantiate a MachFive plug-in, it publishes MIDI channels to the host. These MIDI channels should automatically appear in the MIDI output assignment menus in your host application.

To send MIDI data from a MIDI track in your host application to a MachFive part, assign the MIDI track to any MachFive MIDI channel and then assign that channel to the part (as explained in “MIDI Input/activity” on page 64).

Reducing buffer latency

In regard to “Managing latency” on page 44, the hardware buffer size may or may not impact live MIDI input latency and MIDI track playback: it depends on the host software. Consult the documentation for your host software for information about using virtual instruments.

CHAPTER 8 MachFive Window Overview

SIDEBAR

Use the tabs across the top of the sidebar to display the following MachFive elements:



Parts List 63

The Parts List is where you load sounds and manage multi-timbral operation. The Display Area, Tree Editor, List Editor, and Browser all display info for the currently selected part.

Tree Editor 165

The *Tree Editor* provides a text-based, hierarchical tree view of a part's settings, including layers, the keygroups in each layer, and keygroup settings.

List Editor171

The *List Editor* provides a text-based list view of part, program layer, and keygroup settings, including an alphabetical, alphanumeric display of all layers, the keygroups in each layer, and the settings for each keygroup.

Sidebar Browser..... 71

Use the sidebar browser to browse and load programs from the sound libraries on your hard drive(s). It also lets you add sound design elements such as oscillators, effects, and event processors to your custom-built MachFive programs.



Figure 8-1: The MachFive window.

MASTER SECTION

The Master section provides several important global settings, shown below in Figure 8-2.

File menu 71

The File menu (Figure 8-2) lets you save, load, and otherwise manage programs and multis. You also access MachFive’s preferences here.

Multi controls 72

A *multi* is a snapshot of the entire state of MachFive. The multi controls (Figure 8-2) assist you in saving, loading, and browsing multis. Also see “Multis” on page 62.

Display area tabs 56

Use the display area tabs to switch between the three main views in MachFive: *Main*, *Mixer*, and *Performance*, described in the following sections. The Main view shows settings for the currently selected part in the Parts List sidebar.

Transport and tempo 77

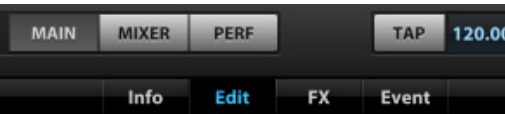
MachFive plays loops in sync with each other, and in sync with your host application when operating as a plug-in. The tempo and transport controls (Figure 8-2) give you control of overall tempo and playback.

Master volume and tuning 78

Control MachFive’s master volume and tuning here (Figure 8-2).

MAIN VIEW

Click the *Main* tab in the master section (Figure 8-2) to view the following part-specific panes in the display area.

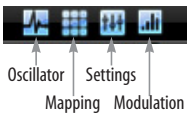


Info tab 75

The Info tab displays basic information about the program loaded into the currently selected part, plus macro controls for modifying the sound and an on-screen keyboard for playing the part.

Edit tab 116

The Edit tab gives you access to MachFive’s programming features, including:



- the Oscillator Editor (page 137)
- the Mapping Editor (page 127)
- Settings for oscillators (page 119), keygroups (page 120), layers (page 122), and programs (page 123)
- the modulation pane (page 214)

The FX Rack 180

The FX Rack tab lets you apply unlimited effects processing throughout MachFive’s object structure and signal path architecture.

Event Rack 224

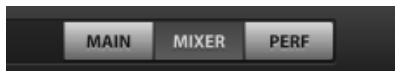
The Event Rack provides access to MachFive’s powerful event processors, like the Arpeggiator, MicroTuner, and ultra-advanced script processors.



Figure 8-2: The Master section.

MIXER VIEW

Click the *Mixer* tab in the master section (Figure 8-2) to view MachFive’s powerful on-screen mixer in the Display Area. MachFive offers a complete mixing environment that allows you to craft professional, polished mixes. See chapter 13, “Mixer View” (page 97).



PERFORMANCE VIEW

Click the *Perf* (*Performance*) tab in the master section (Figure 8-2) to view MachFive’s Performance mode in the Display Area.

Performance view lets you program MachFive’s parts to respond to external control to enable or disable parts, layer them, create crossfades between them, create key ranges, and more, giving you a very powerful and flexible environment for creating “meta-programs” that involve many parts.

See chapter 14, “Performance View” (page 101).



STATUS BAR

The status bar appears at the bottom of the MachFive window.

Version number

The left side of the status bar displays the MachFive version number. If the application or plug-in is running in 64-bit mode, “x64” will be displayed after the version number, as shown below in Figure 8-3.

Information area

The center of the status bar displays useful contextual information for the current position of the pointer on screen. For example, when the pointer is over the Mapping Editor, the information area displays “Right-click to create new keygroup, or drop an audio file”, as shown below in Figure 8-3.

RAM and CPU usage

The right side of the status bar displays the total RAM (memory) and CPU usage for MachFive. This helps you keep track of how much memory in your computer is being used for the sounds loaded into MachFive. It is important to never use all of the RAM that your computer has available, as this means that the instruments won’t be able to play properly. You can reduce the amount of RAM being used by enabling disk streaming. See “Streaming” on page 106.

To see the amount of RAM used by an individual program, view the part in the List Editor (see “Memory” on page 173).

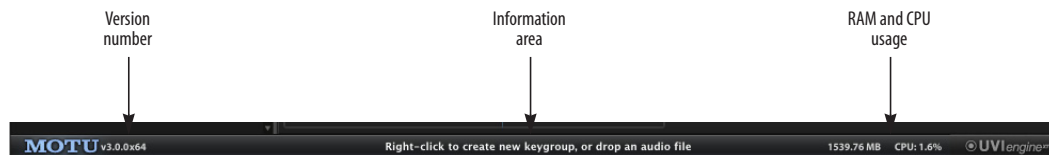


Figure 8-3: The status bar.

Part 2

*Loading and Playing
Sounds*

CHAPTER 9 Loading Sounds

OVERVIEW

This chapter explains how to load and manage sounds in MachFive. First, you'll review basic, yet important concepts and terminology so that you can quickly master MachFive's many powerful sound management features.

Basics 61

Parts List 63

Browser 66

Sidebar Browser 71

File menu 71

BASICS

MachFive employs a straightforward approach for organizing and handling sample and sound data when it is loaded into MachFive for playback and when it is stored on disk. As explained further below, the most common audio file formats are supported and used in their native format, with no conversions necessary.

MachFive's basic data structures are: *oscillators*, *programs*, and *multis*.

Oscillators

The smallest MachFive elements are *oscillators*, of which there are two kinds: *samples* and *synths*.

Samples

A *sample* is a digital audio file. It can be a mono, stereo, quad or 7.1 sample, up to 32 bits, at any sample rate up to 192 kHz. MachFive imports all common audio file formats as sample data, including AIFF, WAVE, CAF, and Sound Designer II (SD2), among others.

A loop is a special kind of sample, usually one or two or four bars long, that has been recorded, edited, and trimmed so that it can be looped

(played seamlessly over and over). Rhythmic loops often include beat slice information: rhythmic divisions within the loop that can be manipulated in rhythmic fashion. MachFive imports all common loop formats, including REX, ACID, and Apple Loops. (For a complete list of supported formats, see "Sample and loop formats" on page 91.)

Synths

A *synth* is a synthesizer module that you create within MachFive. When triggered, it produces sound according to the synthesizer settings. Oscillators are specific to MachFive and only work in MachFive.

Using oscillators

Oscillators are the basic building blocks of sound in MachFive. Samples and synths can be combined, either side by side or in layers, into a *program* to create a dynamic, richly textured multi-sample instrument. Loops are generally loaded individually in parts, but multiple loops can also be used together in a single part.

Programs

Oscillators are used to build *programs*.

A *program* contains samples and/or synths mapped across the 88 note keyboard, with up to 128 levels of note-on (or note-off) velocity. You can map them however you like: side by side, layered, or a combination of both. You can even create multiple layers of mapped samples and oscillators, with elaborate performance rules for switching between layers. MachFive provides one of the most extensive and capable environments for building multi-sample instrument programs. (For more on building a program, see chapter 18, "Mapping Editor" (page 127).)

In addition to sample and oscillator mapping, a program includes many associated settings, such as DSP effects, modulation settings using LFOs, envelopes, and more, along with other program-specific settings. The end result can be a rich and dynamic instrument that can be played from your MIDI controller and triggered from your host sequencer software.

MachFive ships with a massive 45 GB library of instruments, loops, and sounds. These libraries include hundreds of factory-supplied *preset programs*, which may be referred to as *factory presets* or just *presets*.

Multis

A *multi* is like a “snapshot” of the MachFive window, except for the actual sample data being used. A multi includes all part, program, and global parameters. A multi includes the program (sound) for the part, its MIDI channel, audio output, keymaps and their settings, and other part-related settings (octave, transpose, etc.) But it does not include actual sample data from programs. Instead, it saves a *reference* to each sample audio file used in the program being captured by the multi.

When operating MachFive as a plug-in, your host audio software will save all current MachFive settings with the project (just like it does for other plug-ins, too). So in this situation, it is not necessary to save a multi if the settings in the MachFive window are only used in the current project you have open in your host audio software. Only destructive edits made to the samples need to be saved independently.

When running MachFive in stand-alone mode, however, you’ll need to save a multi any time you wish to preserve the current settings in the MachFive window.

File types

MachFive employs the following file types:

File type	Extension	Description
Sample	.wav, .aiff, sd2, etc.	Basic audio file that serves as a building block for presets.
Loop	.rx2, .wav, .aif, .caf	Basic audio file with embedded beat slice data for beat editing.
Program	.m5p	A MachFive program saved in the form of a file on disk. Does not include any sample data.
Multi	.m5m	A MachFive program saved as a file on disk. Does not include any sample data.
UVI sound file	.ufs or .dat	A large, encoded file that contains both programs and sample data — usually an entire sound library — that can be read by MachFive but not edited or modified. See “Soundbanks” on page 68.

Organizing your MachFive files

MachFive places no restrictions on where you save your multis, programs, samples, oscillators, FX presets, and so on, so how you organize them is up to you. For best performance, store all MachFive related files on a reasonably fast disk drive: the faster the drive, the faster sounds will load, and the less likely you will encounter performance issues.

Relative paths for programs and multis

When you import a sample, MachFive simply refers to the original sample file on disk (rather than copying it or moving it). When you then save the sample as part of a program or multi, its location is stored *relative* to the location of the program or multi itself. Therefore, if you store the program or multi in a folder or directory that *encloses* the folder or directory containing the samples, you can move them together to a different location without breaking the connection between the saved program/multi and its samples.

On the other hand, you may need to relocate the samples and resave the program or multi under the following circumstances:

- If you move the program or multi, but not the samples
- If you move the samples, but not the program or multi

Generally speaking, if you've built a program or multi out of samples that are used only for that program/multi, store the samples in a folder or directory, and put that folder/directory in the same folder/directory as the program/multi itself. This will ensure that the connection between the samples and the program/multi never breaks.

PARTS LIST

The Part List (Figure 8-1 on page 55 and Figure 9-1 below) is where you load sounds into MachFive. MachFive is a multitimbral instrument that provides unlimited parts (as many as your computer processing resources allow). Each part can have its own MIDI channel, program, and audio output (if your host audio software supports independent outputs for each part). Both the standalone and plug-in version of MachFive can play a virtually unlimited number of parts.



Figure 9-1: The Parts List.

Opening the Parts List

To open the Parts List, select the *Main* tab in the master section of the MachFive window (Figure 8-2 on page 56), then select the *Parts* tab in the left sidebar (Figure 9-1).

For information about the *Tree*, *List*, and *Browse* tabs, see chapter 20, “Tree Editor” (page 165), chapter 21, “List Editor” (page 171), and “Sidebar Browser” on page 71.

Selecting a part

Many areas of the MachFive window display part-specific information for the currently selected part. Part-specific areas include the main display area (Figure 8-1 on page 55), Tree Editor, List Editor, and browser.

To select a part, click the part icon, or anywhere on the part where there isn't another control. Only one part can be selected at a time.

Selection has no effect on the part's current playback status. In other words, parts can still play, even if they are not currently selected. Selection is a mechanism for displaying the part's settings in the rest of the MachFive window.

Part controls

Each part in the Parts List has the following controls:

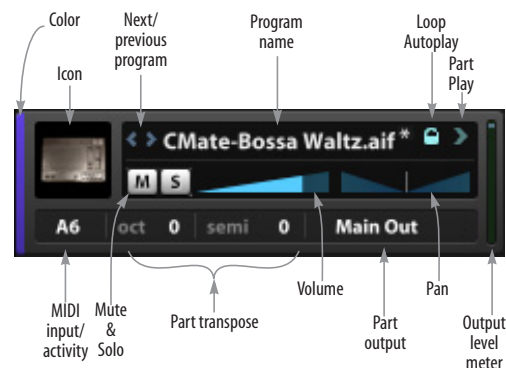


Figure 9-2: Part settings.

Program name

The name of the currently loaded program is displayed in each part (Figure 9-2), or *Empty* is displayed if no program is loaded. To load a program, double-click the program name to open the browser, or use one of the other loading methods described in “Opening the browser” on page 66.

If unsaved changes have been made to the program, an asterisk is displayed after the program name, as shown with the example in Figure 9-2.

☛ To rename a program, edit the name in the List Editor. See “Name” on page 173.

Next/previous program buttons

Click the *Next/Previous Program* buttons (Figure 9-2) to load the next or previous program on disk.

MIDI Input/activity

Choose the desired MIDI input channel for the part (Figure 9-2). You can assign each part to its own MIDI channel for multitimbral operation, or assign multiple parts to the same channel to create simple layers (“stacks”). For more flexible and elaborate layering within a single part, see chapter 18, “Mapping Editor” (page 127).

☛ The standalone MachFive application and RTAS plug-in support four MIDI ports (64 channels), while the AU and VST plug-ins support one MIDI port (16 channels). If more MIDI channels are needed than are supported by the plug-in format you are using, instantiate another instance of MachFive.

The *MIDI activity light* (Figure 9-2) lights up when the part receives MIDI data.

Part Output

The *Part Output* setting (Figure 9-2) lets you assign each part to one of MachFive’s stereo output pairs (main outs plus 16 stereo aux outputs). Each

output pair can be assigned to (or routed by your host audio software to) a pair of physical outputs on your audio hardware. This provides you with a great deal of flexibility in submixing all of MachFive’s parts.

The list of stereo pairs that you see in each *Outputs* menu depends on the situation in which you are running MachFive:

■ Multiple outputs and standalone operation:

If you are running MachFive as a standalone application, the output menu displays a main out pair, plus 16 additional separate output pairs, numbered 2 through 17. To learn how to map these output pairs to the physical outputs on your audio hardware, see chapter 6, “Configuring the MachFive Application” (page 35).

■ Multiple outputs and plug-in operation:

If you are running MachFive as a plug-in, the output menu displays whatever outputs are made available to the plug-in by your host software. For details regarding every type of host software, see chapter 7, “Configuring the MachFive Plug-in” (page 43), and refer to the section that applies to you.

Audio output in surround

For details about working in surround, see chapter 16, “Working in Surround” (page 111).

Volume and Pan

The volume and pan sliders (Figure 9-2) control the volume and pan for the part. Part volume can also be adjusted in the Tree Editor, List Editor, and Mixer. Volume range is from $-\infty$ to +6 dB.

Volume and pan for each part are saved with the multi and the host application session document. This gives you a great deal of flexibility when mixing and saving more complex multi-timbral or multi-layered performances.

Both volume and pan can be automated with the standard MIDI controllers #7 (volume) and #10 (pan), as explained in chapter 23, “Automation and Modulation” (page 209).

Mute and Solo

Use the mute and solo buttons (Figure 9-2) to silence or solo the part (along with any other parts currently soloed).

Part transpose

The Octave (*oct*) setting (Figure 9-2) transposes incoming MIDI notes for the part (or program) in increments of one octave. The Semitone (*semi*) setting (Figure 9-2) transposes incoming MIDI notes for the part (or program) in increments of one semitone (half step).

Loop controls

If a loop has been loaded into the part and it is in *Slice* mode (see “Slice” on page 150), the *Part Play* button appears (Figure 9-2). Click it to play or stop the loop by itself.

Click the *AutoPlay* button (Figure 9-2) to toggle the individual part’s *AutoPlay* status. When *AutoPlay* is enabled for the part, you’ll see a lock icon (to indicate that the part is locked to MachFive’s main transports). Toggling a part’s *AutoPlay* button allows you control whether or not each individual part follows MachFive’s transport controls. For complete details about the transports, see “Transport and tempo” on page 77.

Adding and deleting parts

To add a part, click the add part (+) button above the list.

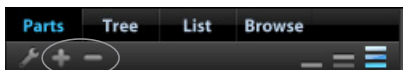


Figure 9-3: Use the Add and Delete buttons above the Parts List to add and remove parts.

To remove a part, select it (see “Selecting a part” on page 63) and click the delete part (-) button above the list.

When there are more parts than can be seen at once, use the Parts List scroll bar (Figure 9-1) to view any eight consecutive parts in the list at one time.

You can add as many parts to the Part list as you wish. Keep in mind, however, that each part adds a little bit more to the processing resources required by MachFive from your computer. In other words, the more parts you add, the greater the processor drain on your computer.

Parts menu

The Parts menu (Figure 9-4) displays commands for managing parts and their programs, including *Empty Selected Part*, *Load Program in selected part*, and *New Program in selected part*.

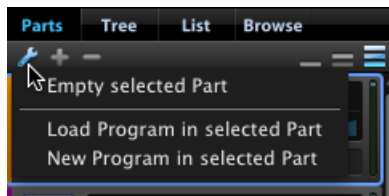


Figure 9-4: The Parts menu.

This menu can also be accessed by right-clicking the program name in any part.

Part size buttons

Parts can be displayed in three sizes: large (default), medium, and small. Click the part size buttons (Figure 9-5) to change the display size of the parts in the Parts List.



Figure 9-5: The small, medium, and large part sizes.

The medium and small part sizes can be used when you would like to see more parts at once, but keep in mind that not all part controls are shown with the medium and small part sizes. When controls are not shown in the Parts List, you can expand the size of the MachFive window to reveal more controls, or you can access them in other areas of MachFive, such as the Tree Editor and List Editor.

BROWSER

The *Browser* (Figure 9-6) provides many features to help you quickly find MachFive-related files on any available volume.

Opening the browser

The browser can be opened in a number of ways, including:

- Double-clicking a program name (or the word *Empty*) in the Parts List, Mixer, or Perf view
- Choosing *Load Program* from the File menu
- Choosing *Load Program* from the Program menu in the List Editor

If there is already a program loaded in the currently selected part, opening the browser will reveal the program's location in the browser.

The browser affects the currently selected part

The browser works interactively with the part list, loading the program you click into the currently selected part. You can freely switch to any part in the list (by clicking it), while the browser is still open, to load a program into it. There is no need to close the browser before you move to the next part.

You can also drag and drop a program from the browser directly to any part, regardless of which part is currently selected. If you drag a program to the empty portion of the parts list below the last part, a new part will be created with the program loaded into it.

Source List

The left-most column in the browser is the *Source List*. It is always visible and displays four sections: *Search*, *Devices*, *Places*, and *Soundbanks* (Figure 9-6).

Click the disclosure triangle next to a section name to expand or collapse it. Click any item in the Source List to view its contents in the columns to the right.

Search

Click *Search* to access the browser's search engine (Figure 9-6). Type in the desired text, and the browser immediately lists all programs with that text in their names.

To narrow your search results to a specific file type, click the Search section's disclosure triangle to expand it, and then select *Instruments*, *Loops*, or *Sounds*. When the main *Search* header is selected, all three types are included in the search results. You can change the search results' file type filter before or after entering a search term.

You can further sort the list by name, program, type, and volume by clicking the column headings. Clicking the heading repeatedly toggles between ascending and descending order.

Right-click the word *Search* in the browser to cause MachFive to re-index all currently indexed sound libraries. For further information about indexing, see “Path options” on page 108.



Figure 9-7: Reset Database

Devices

The *Devices* list displays all storage volumes currently mounted on your computer, such as internal hard disks, external hard disks, CDs, DVDs, mounted network volumes, and so on. If a volume is visible and accessible from the Mac OS X Finder or Windows Explorer, then it appears in the *Devices* list. Use your computer’s standard procedures for mounting and unmounting volumes to add them or remove them from the *Devices* list.

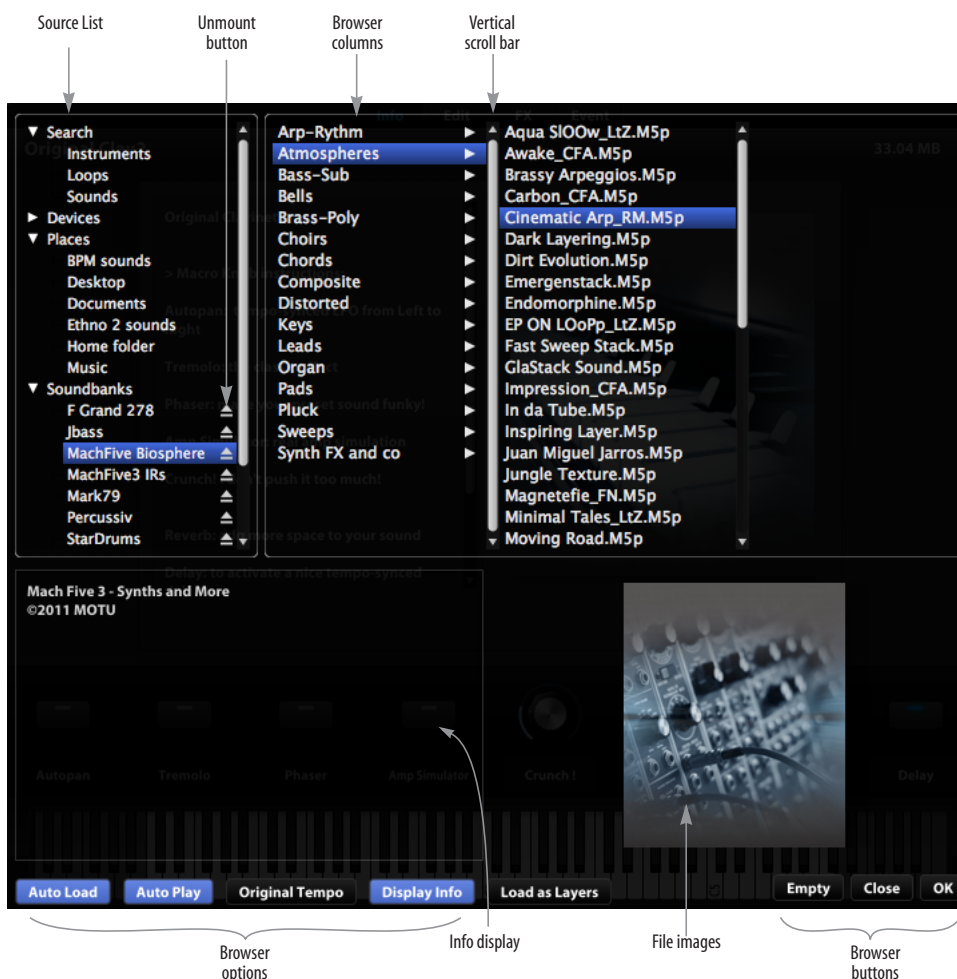


Figure 9-6: The Browser.

Refresh devices

When running MachFive under Mac OS X, you can right-click on the word *Devices* to access the *Refresh foreign disc* command (Figure 9-8). Doing so mounts any supported sampler discs that have been inserted into the computer, so that they appear in the Devices list.

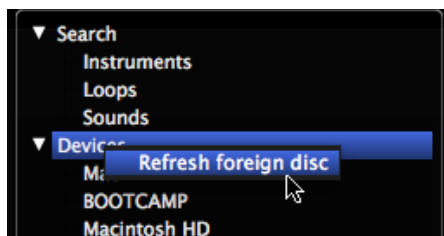


Figure 9-8: Refresh foreign disc.

Places

The *Places* list (Figure 9-6) displays volumes or folders that you have identified as a favorite.

To add folder as a favorite, drag it from a browser column to the Source List. To remove a favorite from the Places list, right-click its name in the Places list and choose *Remove From Favorite Places*.

Soundbanks

The *Soundbanks* list (Figure 9-6) displays volumes or folders that you have identified as a favorite.

MachFive ships with five DVDs of included sounds. For a summary of the DVD content, see chapter 11, “Using the Factory Soundbanks” (page 79). For your convenience, the sounds on each DVD are supplied in the form of a single, encapsulated “UFS” (universal file system) file. Similarly, if you own MOTU Symphonic Instrument, Ethno Instrument, Ultimate Soundbank’s Plugsound Pro, or other instrument products that supply their sound libraries as encapsulated UFS files, you can use their sounds in MachFive as well.

To open a UFS soundbank in the browser, locate the UFS file and double-click it to mount it. It will appear in the browser’s Soundbanks list (Figure 9-6). The selected soundbank can be browsed in the same way as folders and files on disk.

You can specify soundbanks to be mounted automatically every time MachFive is opened; for more information, see “Soundbanks” on page 108.

☞ In some cases, soundbank files may require purchased authorizations before you can mount them in MachFive’s browser and access their sounds. Consult the soundbank’s developer for details.

When using .dat and .ufs sounds in MachFive, you have access to all sounds in the library. However, when you call up a program, sample editing features may be disabled, depending on the library. In addition, individual edit zones may not be visible in the Mapping Editor, but you can still select them (see “MIDI Select” on page 129) and edit their keygroup parameters as explained in “Keygroup Info bar” on page 129. But you may not be allowed to save an edited .dat or .ufs preset as a new program. In addition, if you save a multi, edits are not saved. Edits are saved, however, with your host application session or project file (when running MachFive as a plug-in).

Verify Soundbank Integrity

Right-click any UFS file in the browser and choose *Verify soundbank integrity* to confirm that the UFS file is fully complete and operational. If not, try copying it from the DVD again, or, if you downloaded it, try doing so again.

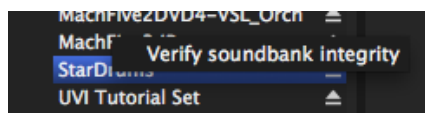


Figure 9-9: Verify soundbank integrity

Browser columns

Click a folder in a column to view its contents in the next column to the right.

Browser scroll bars

As you browse, you will often navigate through several columns, more than can be displayed in the fixed width of the browser. When this happens, the browser provides a *horizontal scroll bar* below the columns. Drag the scroll bar to slide the columns in the browser left or right to view columns that are not currently visible.

Similarly, each column also provides a *vertical scroll bar*, when necessary, to allow you to browse all of the items in the list.

Reveal in Finder / Explorer

Right-click a file or folder and choose *Reveal in Finder / Reveal in Explorer* to reveal the location of the item in the Mac OS X Finder or Windows Explorer.

☞ This command is unavailable when browsing files within a soundbank volume, such as a UFS or Giga file.

Browser options

The Browser options (Figure 9-6) control how the browser appears and behaves.

Auto Load

When *Auto Load* (Figure 9-6) is enabled, you can load loops and phrases with just one click, instead of having to double-click to load them.

Auto Play

When checked, *Auto Play* (Figure 9-6) makes loops play continuously when you click on them to highlight them in the browser. This feature only applies to loops, not phrases, and it allows you to easily listen to loops as you select them. If the *Sync to Host* option is enabled (see “Sync to Host” on page 77), and your host software is currently playing back as you are browsing, loops will play in

tempo with your music as you browse. Or you can hear them at their original tempo during browsing using the *Original Tempo* option (explained below).

Original Tempo

If you wish to hear the loop currently selected in the browser at its originally recorded tempo (during browsing only), enable (check) the *Original Tempo* option (Figure 9-6). Since MachFive does such a good job of time-stretching loops, even at extreme tempos, this option can be useful for getting a sense of how the loop is supposed to sound, as it was originally recorded. Once you select the loop and OK the browser, it will play at the tempo determined by the tempo settings (see “Transport and tempo” on page 77).

Display Info

Click the *Display Info* button to show or hide the info display (Figure 9-6), which provides information about the currently selected item in the browser.

When a program is selected, the displayed information will vary from file to file. Some possible items include a description of the instrument, key ranges, key switch assignments, performance techniques, and other comments.

When an audio file is selected, the following information will be displayed:

- its number of channels
- bit depth
- sample rate
- duration in seconds
- duration in bars and beats (if available)
- tempo (if available)

If the selected item has images associated with it (a photograph of the instrument, for example, or a logo identifying the soundbank's creator), they will be displayed on the right-hand side. If there are multiple images, arrows will appear to navigate to the next/previous image.

Load as Layers

When the *Load as Layers* button is enabled, loading a program will add it to the currently selected part as new layers instead of replacing the currently loaded program. This is useful when building a single, multi-layer program from separate program files, such as combining multiple violin articulations into a keyswitched program, or layering multiple synth sounds.

Browser buttons

The browser buttons act on the selected file in the browser and the selected part in the Parts list.

Click the *OK* button to load the file currently selected in the browser and close the browser. Alternatively, double-click the file name to load it in the currently selected part *without* closing the browser. Or, drag an item from the browser onto the desired part.

Click the *Empty* button to empty the currently selected part (no program is loaded).

Click *Close* to leave the selected part unchanged and close the browser.

MachFive 2 Sounds Folder

If you have MachFive version 2 files which rely on the MachFive Sounds Folder path:

- 1 Create a folder on disk and name it “M5 Folder”.
- 2 Place the contents of your version 2 MachFive Sounds Folder into the newly created “M5 Folder”.

- 3 In the MachFive 3 browser, locate the “M5 Folder” and drag it to the Source List to add it to the Places list.

Version 2 files using the MachFive Sounds Folder path should now load properly.

SIDEBAR BROWSER

The MachFive window sidebar (Figure 8-1 on page 55) provides a single-column browser (Figure 9-10) that lets you browse sounds, similar to the main multi-column browser. It also provides access to other sound design components such as oscillators, effects presets, and event processors.

To access the sidebar browser, click *Browse* above the sidebar as shown below:

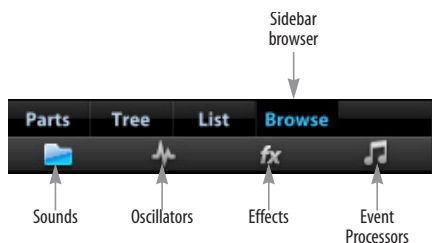


Figure 9-10: Sidebar Browser.

For information about the other sidebar tabs, see:

- “Parts List” on page 63
- “Tree Editor” on page 165
- “List Editor” on page 171

When browsing sounds the sidebar browser, use the *Parent Folder* item to advance back up one level through the folder hierarchy. Click the current folder (or the star icon) to toggle between the current level and the top level.

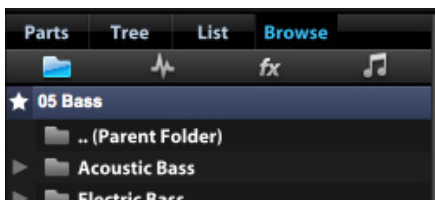


Figure 9-11: Navigating in the Sounds tab.

FILE MENU

The File Menu (Figure 8-2 on page 56) provides management for MachFive’s sounds and settings. There are four sections of the menu: *Multi*, *Program*, *Preferences* and *Window Size*.

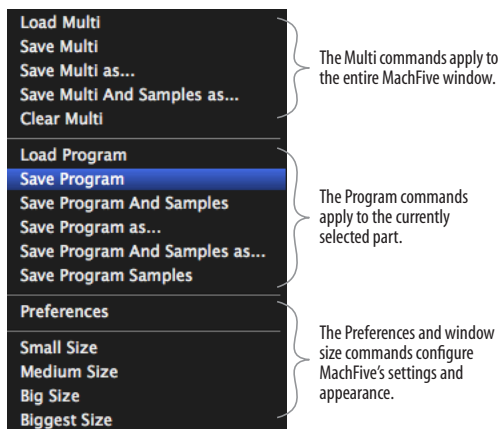


Figure 9-12: File menu.

The Multi, Program, and Window Size commands are described below. For the Preference commands, see See chapter 15, “Preferences” (page 105).

Multi commands

The Multi commands (Figure 9-12) let you manage MachFive multis. The Multi menu (Figure 8-2 on page 56) shows the *current multi* (if one is loaded). Double-click it, or choose *Load Multi* from the File menu, to browse for multis using MachFive’s multi-column browser. The File menu’s Multi commands apply globally to the entire MachFive window.

All multi-related menu items shown in Figure 9-12 apply to the multi currently displayed next to the File menu. Here is a summary of the File menu’s multi management operations:

Load Multi

Load Multi (Figure 9-12) opens MachFive’s multi-column browser, which you can use to locate and open a previously saved multi.

Save Multi

Save Multi (Figure 9-12) saves any changes that have been made in the MachFive window to the current multi (displayed next to the File menu). If the multi hasn't been saved yet, you will be prompted to name the multiband and choose a location for saving it.

Save Multi As

Save Multi As (Figure 9-12) lets you save the multi as a separate file on disk with a different name.

Save Multi And Samples As

Save Multi and Samples As (Figure 9-12) saves the multi, as well as all samples used, under a different name (the same as “Save As lets you save the sample as a separate file on disk with a different name.” on page 140). Essentially, this command allows you to save all data currently being used by MachFive. This is a powerful and convenient operation that “collects” all samples being used in the current multi and saves them together in a single folder with the multi. This command is ideal for transferring multis (as a complete, self-contained soundbank folder) to other projects, host applications, clients, colleagues, etc. It is also ideal for backing up or archiving multis.

☛ Samples from copy-protected sound libraries are not included in the save operation.

Clear Multi

Clear Multi (Figure 9-12) removes the current multi settings from the MachFive window.

Renaming a multi

To rename a saved multi, simply rename the multi file on disk.

Multi controls

The multi controls (Figure 8-2 on page 56) display the name of the current multi, if any, and let you select the next or previous multi on disk. Double-click the multi name to open the browser and choose a multi to load from disk.

Program commands

Samples and oscillators are arranged and stored in *programs*. Each program can hold up a virtually unlimited number of samples, oscillators and keygroup layers, along with many associated settings, such as keygroup mapping, advanced programming for keygroup layer switching, effects and event processors, and much more.

All Program commands in the File menu (Figure 9-12) apply to the currently selected part, so be sure to select the desired part before using any of these operations. See “Selecting a part” on page 63,

Load Program

Load Program (Figure 9-12) opens MachFive's multi-column browser, which you can use to locate and open a program on disk.

Save Program

Save Program (Figure 9-12) saves to disk any changes that have been made to the current program. When you edit a program in MachFive, you are editing the program in RAM; to permanently save those changes to disk as a separate program, use the *Save Program* command. The *Save Program* command also saves the current part settings, including effects.

Save Program and Samples

Save Program and Samples (Figure 9-12) saves the program (as described above), and all samples being used in the program. Essentially, this command allows you to save all data currently being used by the program. This is a powerful and convenient operation that “collects” all samples being used in the current program and saves them together in a single folder with the program. This command is ideal for transferring a program (in a complete, self-contained folder) to other projects, host applications, clients, colleagues, etc. It is also ideal for backing up or archiving programs. If the

program hasn't been saved yet, the browser opens to let you choose a name and location for the new program.

Save Program As

Save Program As (Figure 9-12) lets you save the program as a separate file on disk with a different name.

Save Program And Samples As

Save Program and Samples As (Figure 9-12) saves the program, as well as all samples used, under a different name.

Save Program Samples

Save Program Samples saves any changes you've made to the sample data used by the program.

Window size commands

The window size commands (Figure 9-12) provide several convenient preset sizes for the MachFive window. The *Biggest Size* setting fills your computer screen.

When using the standalone application, the window can be resized freely in the standard manner. On Mac OS X, this is done by dragging the lower right corner of the window; on Windows, any window edge may be dragged. Some host applications may also support this ability for plug-in windows.

CHAPTER 10 Playing Sounds

OVERVIEW

This chapter covers the basics of playing sounds in MachFive.

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INFO TAB

The Info tab (Figure 10-1) provides basic information about the program for the currently selected part. If the program provides macro controls (Figure 10-1), text will provide a brief explanation of each control.

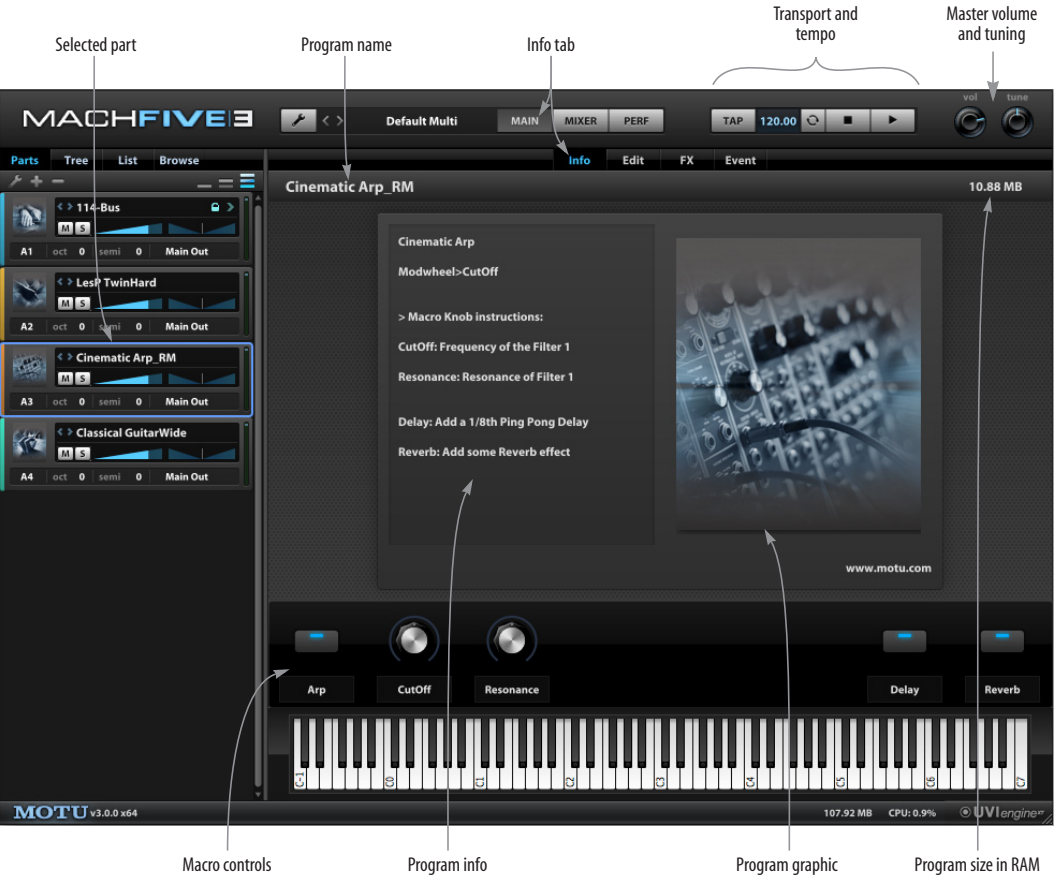


Figure 10-1: The Info tab.

Macro controls

Macro controls (Figure 10-1) are buttons and knobs that give you control of “under the hood” parameters that affect the program’s sound. Look in the info section for a brief text explanation of each macro and what it does.

Macro controls are meant to give you convenient, immediate control over some of the sound’s basic parameters, so that you don’t have to hunt through the editor panes to find crucial settings.

Most factory programs in the MachFive 3 UFS sound banks provide at least a few macro controls.

The effect that macro controls have on the sound can range from subtle to extreme. This is because macros can be programmed to control two, three, or even dozens of control parameters at once. For example, a single macro knob could change the sound’s filter cutoff frequency, resonance, drive, reverb depth, tremolo rate, and envelope depth all at the same time.

To learn how to modify macro controls or create your own, see “Macros” on page 210.

Of course, MachFive also provides complete and powerful programming features, too, as outlined in Part 3, “Creating and Editing Sounds” (page 113).



Figure 10-2: A scripted program in the Info tab.

Scripted programs

A *script* is a sequence of programmed instructions that can be applied to a MachFive program for the purpose of providing a customized user interface for the program. Scripting can also be used to make the program dynamically respond to MIDI performance data, such as note intervals, chords, and controller data, in ways that go beyond customary responses. For example, a saxophone sound might get louder as you play notes harder on your MIDI controller, but via scripting also switch to a different sample layer with harder attacks on the individual samples.

The MachFive Telematic sound bank is a great example of a scripted program (instrument).

Using scripted programs

Scripted programs can display custom graphics and controls in the Info pane, as shown in Figure 10-2 on page 76.

Learning more about a scripted program

Click the *Script Info* button (Figure 10-2) to learn more about the scripted program. The Script Info button displays information that is unique to the program (instrument).

Script view

Click the *Script* button (Figure 10-2) to access the script for a scripted program. For MachFive's factory UFS instruments, the script button simply displays basic information about the instrument. If the program is not a MachFive factory program (or otherwise not write-protected), the script view gives you access to the program's script.

Creating and editing scripts

For information about creating and editing scripts, see "Script Processor" on page 230.

Program size

The program size (Figure 10-1) shows the amount of RAM that the program is taking up. MachFive employs disk streaming (see "Streaming" on

page 106). The program size display does not indicate the total size of the program: it only displays how much RAM is being used by the portion of the program currently loaded in RAM, as prescribed by the current streaming settings. For example, if you increase the size of MachFive's streaming buffers, then the program size will increase as well.

TRANSPORT AND TEMPO

Because MachFive can play loops, the transport and tempo controls (Figure 10-1 on page 75) provide a Play and Stop button, along with a tempo setting. Together, these controls allow you play all currently loaded loops in tempo with one another.

Tempo setting

The *Tempo* setting (Figure 10-1) lets you specify the tempo in *BPM* (beats per minute). All loops are time-stretched or sliced in real time (depending on their settings) to match this global tempo setting.

Tap button

Click the *Tap* button (Figure 10-1) repeatedly to set MachFive's tempo, one click per beat. This allows you to set the tempo intuitively, by "feel", rather than by specifying a number.

Transport (play and Stop) buttons

Click *Play* and *Stop* (Figure 10-1) to start and stop all currently loaded loops that have their individual *AutoPlay* setting enabled. For details about how to enable (or disable) *AutoPlay* for each part, see "Loop controls" on page 65. Only parts with their individual *AutoPlay* setting enabled will respond to MachFive's Play and Stop buttons.

Sync to Host

When the *Sync to Host* option (Figure 10-1) is enabled in the plug-in version of MachFive, the BPM setting becomes disabled (it cannot be directly modified) and instead displays the current tempo setting of the host software. MachFive follows the tempo of the host software, so that all

loops play in tempo with your host software tracks. Use the tempo controls in the host software to control overall tempo of both MachFive and the host software tracks.

In the stand-alone version, enabled Sync to Host if you want MachFive to follow MIDI sync (MIDI beat clocks and MIDI start/stop commands) sent from another source, such as a host application or hardware sequencer.

Loop tempos and authentic rhythmic feel

Loops often have their own unique rhythmic characteristics and feel. As a result, you may sometimes hear loops that sound like they are not playing in tempo with each other. This is not because the loops are being incorrectly played by MachFive. The tempo settings of the loops themselves and MachFive's tempo-matching features are extremely sophisticated, accurate and true. Instead, loops won't necessarily always "groove" with each other, due to the authentic, sometimes irregular timing of the musicians that performed the loops. These timing variances are an essential musical component of the loop, dutifully preserved by MachFive.

In cases like these, you can use MachFive's Loop Lab (see "Slice" on page 150) to adjust individual beat slices. You could also try importing the loops into your host software to apply quantization or other tempo and beat matching features that the host software offers. For example, Digital Performer's Beat Detection Engine can work wonders on loop tempos, giving you complete control over them. For example, you can quantize loops to a more precise rhythmic grid, apply the groove of one loop to another to match them, and many other beat and tempo-related operations.

MASTER VOLUME AND TUNING

Volume

The *Volume* setting in the Master section (Figure 10-1 on page 75) serves as a global master volume setting for the entire MachFive plug-in. It is applied as a final, additional gain stage for all MachFive output streams. The same parameter is displayed in the Mixer view as the Master channel strip's volume fader (see "Master" on page 99).

If you have multiple MachFive plug-ins instantiated in your host application, this setting affects each plug-in separately.

Double-click the knob to edit the value numerically. Option- or Alt-click to return to the default value of unity gain (0 dB).

Tune

The *Tune* knob in the Master section (Figure 10-1 on page 75) is a global tuning stage for the MachFive window, adjustable from 420 to 460 Hz. It is applied to the entire plug-in as a whole, in addition to any other tuning adjustments that have been made. For example, you could tune MachFive to reference A at 442 Hz (instead of 440).

If you have multiple MachFive plug-ins instantiated in your host application, this setting affects each plug-in separately.

Double-click the knob to edit the value numerically. Option- or control-click to return to the default value of 440 Hz.

CHAPTER 11 Using the Factory Soundbanks

OVERVIEW

MachFive includes seven soundbank DVDs that contain approximately 45 GB of world-class sample material. The soundbanks includes a wide variety of multi-sample instruments, loops, and phrases, including premium material recorded at 192kHz. This chapter provides an overview of each soundbank. All sounds are provided by Ultimate Sound Bank™ (www.ultimatesoundbank.com) and Acoustic Samples™ (www.acoustic-samples.net).

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UFS FILES

For your convenience, the sounds on each DVD are supplied in the form of an encapsulated “UFS” (universal file system) files, which you should copy to your hard disk . You can then mount the UFS files as a disk image in MachFive’s File Browser, as explained in “Browser” on page 66.

None of the UFS files are required; you only need to copy and load the ones you are interested in using.

FOR FURTHER INFORMATION

Several of the UFS libraries consist of advanced, scripted single instruments (an electric guitar, acoustic bass, drum kit, etc.) For detailed information about how to play and operate these instruments, click their *Script Info* (i) button in MachFive’s info pane (Figure 10-2 on page 76).

UNIVERSAL LOOPS & INSTRUMENTS

This UFS sound bank provides approximately 6 GB of multi-sample instruments, loops, phrases, and MachFive synth instruments (which contain no samples). You'll find plenty of drum loops, acoustic drum kits, electronic drum kits, acoustic pianos, electric pianos, church organs, electric organs, acoustic guitars, electric guitars, strings,

brass, woodwinds, synths, ethnic instruments, voices, percussion, sound design, sound effects, and more.

Of all the UFS sound banks, this one is the most versatile collection of sounds, spanning a wide variety of musical genres, eras, geographical regions, and cultural styles. If you are looking for variety, DVD 1 is the place to start.



Figure 11-1: Universal Loops & Instruments.

MACHFIVE BIOSPHERE™

MachFive Biosphere provides hundreds of ambient pads, rich textures, morphing layers, and atmospheric resonances. Categories include *Atmospheres*, *Choirs*, *Sweeps*, *Synth FX*, *Distorted*, and many more. Many of these programs take full advantage of MachFive's macro controls, giving you powerful sound design control at your fingertips, without tedious programming.



Figure 11-2: MachFive Biosphere™.

STAR DRUMS

Star Drums is a meticulously recorded acoustic drum kit. World-class microphones were employed in a variety of micing positions around the kit. Separate programs are provided for dry and processed versions, with or without multiple output operation. Each program provides multiple mic positions, which you can sub-mix using volume faders and pan pots in the program Info

pane. This is an incredibly versatile drum kit. With judicious use of the mixing features, you can dial in the perfect drum kit sound for any mix. Advanced features include adjustable sample cycling (for ultra-realistic repeat hits, such as closed hi-hat patterns) and default MIDI mapping for general MIDI, V-Drums and other industry standard drum controllers.



Figure 11-3: Star Drums

J-BASS

J-Bass provides a deeply sampled electric bass with a variety of playing techniques: finger and pick (with or without muting from the right hand), legato, hammer, and slide. Harmonics are also provided. Pick volume can be controlled independently. Amp cabinet simulation is also provided, along with a host of additional settings for adjusting the sound. This is an incredibly well-sampled instrument with lots of control, so you can fine-tune it to suit your exact needs.



Figure 11-4: J-Bass

THE UPRIGHT

As its name implies, *The Upright* is an upright acoustic bass instrument. Like the other scripted instruments included with MachFive, multiple micing positions are provided: overheads, bass (near the *f*-hole) and a pickup mic (under the left side of the bridge). This gives you a lot of flexibility in creating a wide range of sounds and styles for this instrument. All of the playing styles and techniques you need can be produced with settings for hammer, slide, legato, slap, release volume, sensitivity and other settings.



Figure 11-5: *The Upright*

PERCUSSIV

This library provides comprehensive latin percussion. GM and default mappings are provided. You can also customize the mappings using MIDI Learn.



Figure 11-6: Percussiv

F GRAND 278

The Fazioli grand piano is one of the most respected piano instruments ever created. *F Grand 278* puts the sound of the Fazioli at your fingertips. Shape the sound of the instrument with controls for release volume, pedal volume, key noises, resonance volume (the sound of the body of the piano), reverb (room ambience), velocity curve, and velocity amplification.



Figure 11-7: F Grand 278

MARK 79

Mark 79 pays homage to perhaps the most revered electric piano instrument of all time: the Fender® Rhodes™ Mark II suitcase from 1979. The library consists of 2,500 samples (7.5 GB) programmed across ten velocity layers. Advanced features include time-based release samples for accurate staccato sound, resonance, and “noise” samples for the pedal and keys. Effects include autopan, tremolo, spring reverb, distortion, and amp simulation.



Figure 11-8: Mark 79

TELEMATIC

Telematic is a dynamic recreation of the Fender® Telecaster™ electric guitar consisting of 9,500 samples, five velocity layers, 4 round robin samples per note, separate up and down strokes, hammer on, pull off, slides up and down, mutes, fret noises, and just about every playing technique you can make with a guitar. Advanced features include

chord recognition, an advanced strumming engine, chord sequencing, automatic hand position and string detection in solo mode, and more. As with all of MachFive's included scripted instruments, be sure to click *Telematic's* Script Info button (as shown in Figure 10-2 on page 76) to learn how to take full advantage of this incredibly deep and expressive instrument.



Figure 11-9: *Telematic*

Xtreme FX

Xtreme FX puts 5000 of creative sound effects at your fingertips and consists of two UFS files that together provide almost 8 GB of sounds. Included categories are: Atmospheres, Scenes, Unreal, Science-Fiction, Sub & Drones, Natural, Urban, Foleys and Musical. Throughout the library you'll find sounds that are off the beaten track, original and expressive.

Be sure both Xtreme FX UFS files are installed on your hard drive in the same folder or directory.

Xtreme FX requires its own separate iLok authorization. Redeem the Xtreme FX license code supplied with your MachFive 3 package at ilok.com to download the Xtreme FX license to your hardware iLok key.

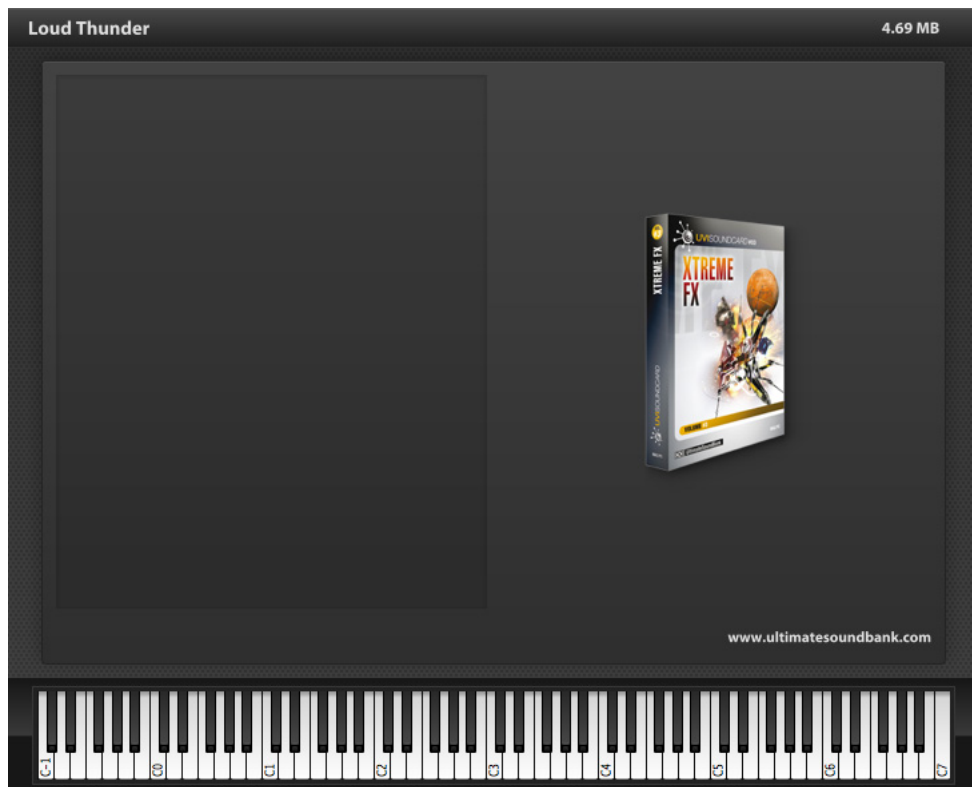


Figure 11-10: Xtreme FX

CHAPTER 12 Using Third-Party Sounds

OVERVIEW

MachFive directly reads a wide variety of soundbank and sample formats with accurate translation of the sounds and their native settings.

MachFive even allows you to mount and load sounds from non-Mac and non-PC sampler discs into MachFive with a very accurate translation. Not only are all parameters translated (mapping, loop, tuning, velocity, ADSR, filter, controller, LFO, etc.), but they are also converted using a non-linear scale to make sure you get the best possible conversion. MachFive even includes the exact Roland de-emphasis algorithm.

Essentially, MachFive allows you to use most popular third-party sound libraries as if they are native MachFive sounds themselves.

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SAMPLE AND LOOP FORMATS

MachFive can directly open and import most popular sample and loop formats:

- AIFF
- WAVE
- mp3
- FLAC
- Sound Designer II
- ACID
- Apple Loops (.aiff and .caf)
- REX 1 (.rex)
- REX 2 (.rx2)
- SND
- CAF

AIFF and WAVE (.aif and .wav)

AIFF (Audio Interchange File Format) and *WAVE* (Waveform Audio Format) files are both well-established standard file formats for Mac and PC, and personal computing in general. They hold non-copy protected, uncompressed (PCM) audio data streams and have been universally adopted for use in both consumer and professional-level audio and video applications. They can hold mono, stereo, or multichannel audio. The audio material in the file can be anything, from a short one-note sample to a loop to a non-loop phrase, or even an entire song.

mp3

The *mp3* (MPEG-1 or MPEG-2 Audio Layer III) audio file format is one of the most widely used consumer formats. It employs a patented, lossy encoding scheme.

FLAC

The *FLAC* (Free Lossless Audio Codec) has gained popularity in recent years because it employs a lossless encoding scheme. This means that file size is reduced without dropping any of the original information.

Sound Designer II (.sd2)

Sound Designer II files are a legacy file format originally developed by Digidesign for its popular Pro Tools recording platform.

ACID (.wav)

Acid files or *acidized* loops were first developed by Sonic Foundry for their Acid music software, which is now marketed by Sony. Acid files contain beat, tempo and key (pitch) information, so that Acid and other programs time stretch and pitch shift them. Due to their popularity, many programs, including MachFive, read the beat, tempo and key information to allow you to easily play Acid files in tempo at the correct pitch.

Apple Loops

Apple Loops are beat-slice loops included with Apple's free GarageBand product, as well the SoundTrack Pro application sold as part of the Final Cut Studio. They are also sold separately in the form of *JamPacks* for GarageBand. They typically consist of AIFF (.aif) or Core Audio (.caf) files with additional beat slice data and other meta data.

REX 1 and REX 2 (.rex and .rx2)

REX (Recycle) files come in two formats: version 1 (.rex) and version 2 (.rx2). They consist of one file with raw sample data and extra data that identifies individual beat slices. MachFive imports them as sliced loops.

SND (.snd)

SND files are another legacy audio file format, similar to AIFF and WAVE files.

CAF

Core Audio Files (.caf) are used extensively by Apple audio software apps like Logic for their loop and sound effects library, particularly for surround-sound audio compressed with the Apple Lossless codec.

PROGRAM FORMATS

Like MachFive, most other software samplers use standard files to store their banks, programs and samples. Cross-platform samplers (with versions for both Mac and PC) may have a common file format for both platforms or a different file format for each platform. The samples can be saved in the program itself (such as Soundfont and Giga) or in separate files (such as Halion, Kontakt, and EXS24). The samples are usually encoded in a standard format such as WAVE or AIFF files.

The following program formats can be directly opened in MachFive:

- Akai MPC
- Akai S5000/6000
- EXS24 (includes GarageBand instruments)
- GigaSampler / GigaStudio 1, 2, 3 *
- Kontakt 1, 2, 3, 4
- MachFive 1, 2
- SampleCell
- SoundFont *
- UVI soundcards (.dat and .ufs) *
- VSampler 2

* These formats are distributed in the form of encapsulated image files. See “Encapsulated third-party formats” on page 93.

Akai MPC (.pgm)

The Akai MPC mixed format employs separate files for the program and its samples. Samples can be saved as standard WAVE files or SND files.

Akai S5000/6000 (.akp)

Akai S5000/6000 is a file format consisting of separate files for samples, programs, and banks (called multis).

Apple EXS24 (.exs)

The Apple EXS24 file format also employs separate files for programs and samples. It does not use banks.

GigaSampler / GigaStudio 1, 2, 3 (.gig)

The Giga file format has the extension *.gig*, and it consists of one file that is a bank containing all programs and samples.

Native Instruments Kontakt (.nki)

Native Instruments Kontakt uses a file format with the extension *.nki*, encoded in a proprietary format, and the *.nki* parent file points to WAVE sample files and other proprietary files with the *.nac* extension.

SampleCell (.ins)

The Digidesign *SampleCell* file format employs separate files for the programs, the samples and the banks.

Soundfont (.sf2)

E-Mu *Soundfont* is a file format with the extension *.sf2*. It consists of one file containing a bank with all programs and samples.

UVI (.dat and .ufs)

UniversalSoundBank files (*.dat* or *.ufs*) can be mounted as volumes in the MachFive browser.

Vsampler 2

Vsampler is a software sampler developed by Cakewalk™ that was included with SONAR for a while.

Encapsulated third-party formats

Several third-party formats are distributed as a single, encapsulated file containing the program and sample file information. To access these files, you need to mount the image file (*.gig*, *.sf2*, etc.) in MachFive's browser, then browse the volume's contents and load the program and sample files within that image.

The following third-party sound formats fall into this category:

- GigaSampler 1, 2 and 3 (*.gig*)
- SoundFont (*.sf2*)
- UVI Soundcards (*.dat* and *.ufs*)

SAMPLER DISC FORMATS

Some hardware samplers, such as the Akai S1000/3000 series, the Roland S-7xx series, and the EMU III and IV, have their own file system that cannot be read by a Mac or PC. For example, if you try to open an Akai CD, Windows will display it as an empty disc, and Mac OS X will ask you to either format or eject the disc. Fortunately, MachFive has the ability to read these discs.

The following third-party sampler disc formats fall into this category:

- Akai S1000/3000
- Emu EIII / EIV
- Ensoniq ASR
- Kurzweil K2xxx
- Roland S7xx Series

Akai S1000/3000

Akai S1000/3000 is a proprietary disc format with a two-level directory structure made of partitions and volumes.

EMU III / IV

E-mu III/IV is a proprietary disc format with a two-level directory structure made of folders and banks.

Ensoniq ASR

The Ensoniq ASR series was a popular line of keyboard samplers that also employed a proprietary disc format.

Kurzweil K2xxx

Kurzweil K2 series discs are a proprietary, mixed format disc that contains one single file for a bank which includes all its programs and samples.

Roland S-7xx

Roland S-7xx is a proprietary disc format with a two-level directory structure made of volumes and performances.

Browsing sampler CDs directly in MachFive

While the Mac OS X Finder and Windows Explorer do not display the contents of these proprietary sampler discs, MachFive does. When you insert such a disc, you can open the MachFive browser and load the presets directly from the CD.

If the disc does not immediately appear in MachFive's browser, right-click on the word *Devices* to access the *Refresh foreign disc* command (Figure 12-1). Doing so mounts any supported sampler discs that have been inserted into the computer, so that they appear in the Devices list.

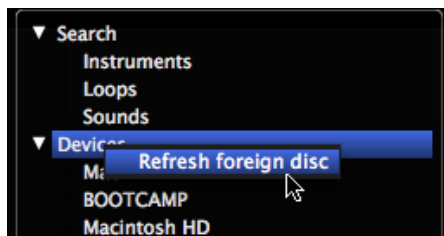


Figure 12-1: Refresh foreign disc.

Creating sampler CD disk images

If you want to use presets from different CDs at the same time, or if you want to use the CD presets when you don't have the CDs with you, you can create a *disk image*. A disk image is a file on your hard disk that contains the entire contents of the CD. When you then mount the image, it appears to the computer as if the physical disc was inserted. Using disk images allows you to have access to many discs at once, without any conversion: the files will still be in the same format as they were on the original disc.

To create a disk image from one of the above formats:

- 1 Place the disc in the drive and open MachFive.
- 2 Open MachFive's browser. Locate the disc in the Soundbanks List, and click the disc icon next to the disc name.

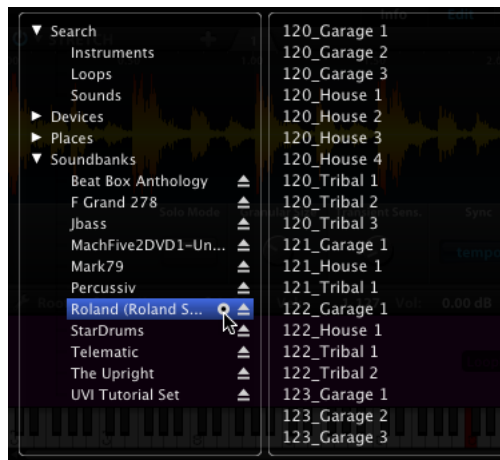


Figure 12-2: Creating a disk image of a sampler disc.

- 3 You will then be prompted to choose a location and a name for the resulting .iso disk image.

MachFive creates the disk image, and operates just like the original disc. To use the image in MachFive, treat it like an image file (.gig, .dat, etc.) as explained earlier in “Encapsulated third-party formats” on page 93.

Ejecting sampler CDs

To eject a sampler CD from your computer, you must first quit MachFive. Then use your computer’s standard procedure for ejecting CDs.

A FINAL NOTE ABOUT IMPORTING

The conversion process is a very complex task. Some parameters are easy to convert (pitch, tuning, panning, mapping, etc.) because they are available in all formats and they usually have the same meaning and the same scale. For example, a pitch is always defined by a MIDI note. But other parameters (envelopes, filter, LFO, etc.) cannot always be easily converted and require special algorithms to be converted accurately. For example, the number of envelope segments can be different, the filters can be different, some parameters available in a source format are not available in MachFive, and so on.

As such, MachFive does its best to interpret parameters and to recreate the sound of the original preset as closely as possible. In some cases, exact reproduction is simply not possible.

CHAPTER 13 Mixer View

OVERVIEW

The Mixer View provides a complete, self-contained mixing environment within MachFive. It operates like a conventional mixing board, but with powerful signal routing and effects.

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OPENING THE MIXER

To open the Mixer, click the *Mixer* tab in the Master section (Figure 13-1).

Showing and hiding channel strips

There are three kinds of channel strips shown in the Mixer: Parts, Auxes, and the Master. Each kind can be shown or hidden as needed. By default, all three sections are shown.

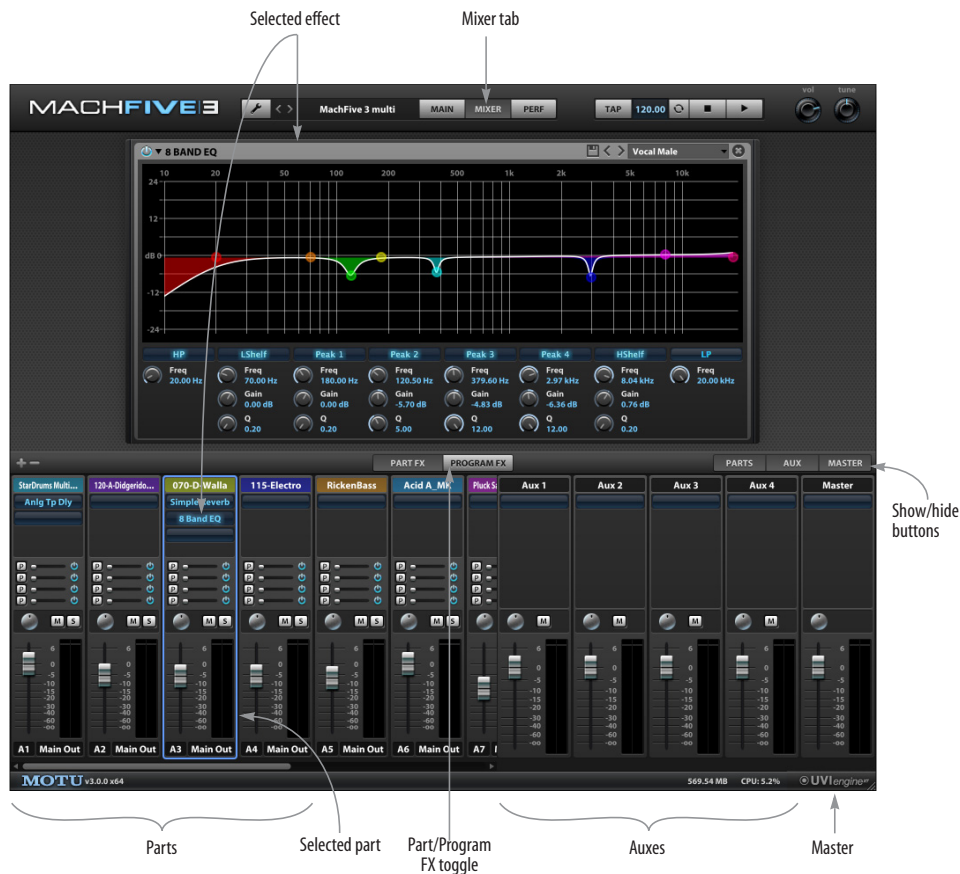


Figure 13-1: Mixer view

To hide a channel strip type, click the type's show/hide button as shown in Figure 13-2 on page 98.



Figure 13-2: Showing and hiding Mixer sections.

PARTS

Each part displays a channel strip in the Mixer (Figure 13-3).

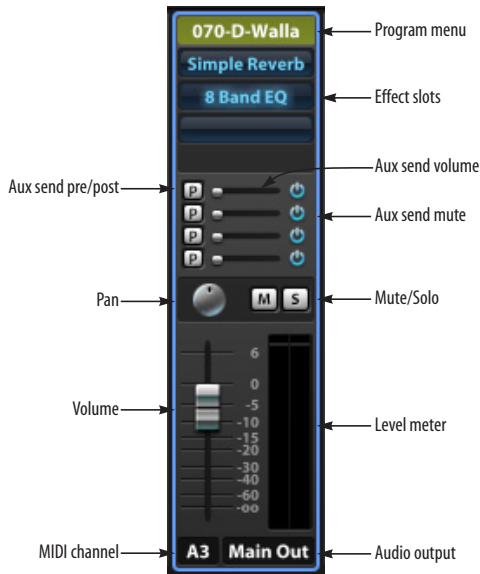


Figure 13-3: Part channel strip.

Part channel strips are displayed left-to-right in the same order that parts appear top-to-bottom in the Parts List.

Channel strip settings

Most of the part settings in each mixer channel strip are available elsewhere in MachFive, but they are provided here in a convenient mixer layout. Here is a summary of mixer channel settings:

Mixer channel setting	What it does
Program menu	Same as the Program Menu in the Part List. See “Program name” on page 64.
Effect slots	Same as the slots in the <i>FX Rack</i> , except that you can only see the name of the effect, not its settings.
Aux send pre/post	Toggles the pre/post-fader setting for the corresponding aux send. Post-fader (off) is the default; enable the button for pre-fader.
Aux send volume	Sends the output of the entire part to the four aux effects (“Master aux effects” on page 186).
Aux send mute	Mutes/unmutes the corresponding aux send.
Mute/Solo	Same as the Mute/Solo buttons in the Part List. See Figure 9-2 on page 63.
Level meter	Same as the level meter in the Part List. See Figure 9-2 on page 63.
Volume/Pan	Same as the volume and pan settings in the Part List. See Figure 9-2 on page 63.
MIDI input	Same as the MIDI channel assignment in the Part List. See Figure 9-2 on page 63.
Audio output	Same as the audio output setting in the Part List. See Figure 9-2 on page 63

Adding or deleting parts

To add a new, empty part, click the “+” button above the Parts section (Figure 13-1). To delete the currently selected part, select the desired part and click the “-” button .

Loading a program or emptying a part

To load a program, double-click the program name displayed at the top of the part’s channel strip. To empty the currently loaded program, right-click the part’s program name and choose *Empty Part* from the contextual menu.

AUXES

The Mixer provides four parallel (independent) aux channels (Figure 13-1 on page 97). To view them in the Mixer, enable their show/hide button (Figure 13-2 on page 98). Each channel provides volume, pan, effects inserts, and a level meter.

For more information, see “Master aux effects” on page 186.

MASTER

The Master channel (Figure 13-1 on page 97) controls MachFive’s main outs. To view it in the mixer, enable its show/hide button (Figure 13-2 on page 98).

The master channel *volume fader* is the same as the Volume knob in the Master section. For more information, see “Master volume and tuning” on page 78.

The *Pan* knob pans the master stereo output. This affects all parts with their audio output assigned to Main Out.

You can apply as many *effects* as you wish to the main output channel for mastering and other purposes.

EFFECTS

You can apply as many effects as you wish to each channel. Just click on the empty slot at the bottom of the effects inserts (Figure 13-3 on page 98) to add another effect from the menu. If the list gets long, a small scroll bar appears along the right edge of the effects section.

Click the effect to select it and view all of its settings in the area at the top of the Mixer. These are the same settings as shown in the FX Rack (page 180).

You can temporarily bypass an effect: shift-click it to toggle bypassing.

Right-click an effect to empty its slot or choose a different effect for the slot.

Part FX / Program FX toggle

The effects section of the Part channel strips can display either Part effects or Program effects. To toggle which effects are displayed in the Mixer, click the *Part FX* or *Program FX* buttons in the center of the window (Figure 13-1 on page 97). For an explanation of the difference between part effects and program effects, see “Program effects versus part effects” on page 185.

CHAPTER 14 Performance View

OVERVIEW

The *Performance* view lets you program MachFive’s parts to respond to external control to enable or disable parts, layer them, create crossfades between them, create key ranges, and more, giving you a very powerful and flexible environment for creating “meta-programs” that involve many parts. The Performance view is especially useful for live performance situations where dynamic control over switching, layering, and blending the sounds being played can be crucial.

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☞ The Performance view is not required for simply layering two parts such that they both play at the same time when you play notes on your keyboard — referred to as a *stack*. To do this, simply assign two or more parts to the same MIDI channel. But if your needs are more advanced, the Performance view is the way to go.

OPENING THE PERFORMANCE VIEW

To open the Performance view, click the *Perf* button in the Master section (Figure 14-1).

The Performance view displays the Parts List on the left, and is divided into three sections on the right, described in detail on the following pages:

- Keyboard range
- Velocity range
- Keyswitches

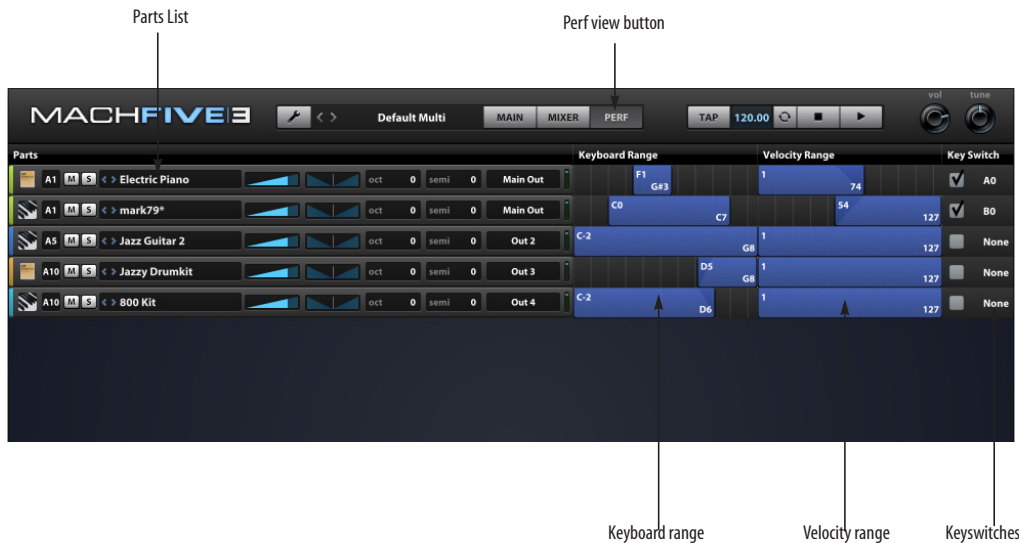


Figure 14-1: Performance view

KEYBOARD RANGE

The *Keyboard range* setting (Figure 14-2) provides a way to constrain the key range of a part.

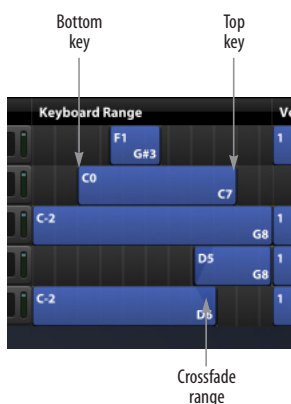


Figure 14-2: Keyboard Range controls.

To constrain the key range of the part, drag the left and right edges of the blue bar in the Keyboard range column to set the bottom (lowest) and top (highest) keys. The note names displayed in the bar update in real-time as you drag the edges.

☛ The keyboard range controls only constrain the key range of a part; they do not extend it. If you wish to extend the key range, edit the program's keygroups.

Crossfade range

You can also create a crossfade range at the top and/or bottom of the key range. Option/Alt-drag the edges and drag to create a fade in or fade out. The shaded ramp denotes the crossfade range.

By overlapping crossfade ranges for adjacent key ranges in multiple parts, you can create smooth transitions between parts.

Numerical editing

To edit the key range values numerically, see “Key range” on page 173 in chapter 21, “List Editor”.

VELOCITY RANGE

The *Velocity range* is similar to *Keyboard range* (above), except that the velocity is constrained.

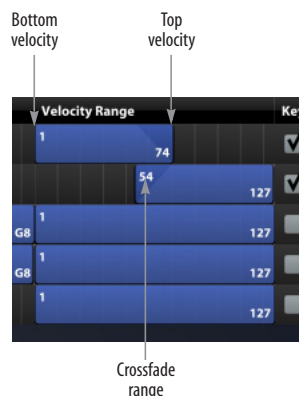


Figure 14-3: Velocity Range controls.

To constrain the velocity range of the part, drag the left and right edges of the blue bar in the Keyboard range column to set the bottom (lowest) and top (highest) velocities. The velocity values displayed in the bar update in real-time as you drag the edges.

Crossfade range

Velocity crossfade ranges are created in the same manner as described earlier for key range crossfades.

Numerical editing

To edit the key range values numerically, see “Velocity range” on page 173 in chapter 21, “List Editor”.

KEYSWITCHES

Keyswitches let you enable a part by pressing a MIDI key.

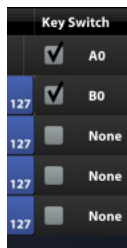


Figure 14-4: Keyswitches

Check the box to enable keyswitches for the desired part. Double-click the note name and type in the desired trigger key note number (0-127) or play the note on your MIDI controller keyboard. The specified key will now turn the part on or off. You might find it useful to use keys that are in the left-hand (lower portion of the keyboard) so that you can enable parts with the left hand while playing them with your right hand.

Triggering multiple parts simultaneously

To enable a part, press its key. To switch to another part, press its key. The first part will become muted when the second part's key is pressed. To play two or more parts simultaneously, press all of their keys at once. All parts will play, even if they share the same range of keys. This allows you to set up and play extremely elaborate layers that you can control dynamically as you play. If you are triggering multiple parts from the same MIDI track or MIDI controller, you'll need to assign them all to the same MIDI channel.

Part keyswitches vs. Program keyswitches

Keyswitches in the Performance view are saved as a Part setting. This is useful when you want to keyswitch between different parts, and configure keyswitches on-the-fly.

Sometimes you may want to add keyswitches within a single program to switch between its layers. For keyswitches which are saved as Program settings, use layer rules or scripts. For details, see "Layer Rules" on page 134 and "Script Processor" on page 230.

CHAPTER 15 Preferences

OVERVIEW

MachFive’s *Preferences* help you to configure and customize MachFive’s operations and appearance.

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OPENING THE PREFERENCES WINDOW

To open the Preferences window, choose *Preferences* from MachFive’s File menu.

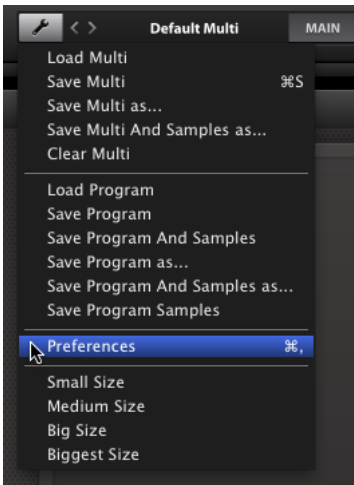


Figure 15-1: Opening the Preferences window.

GENERAL

The *General* preferences pane (Figure 15-2) contains general configuration settings for MachFive. Currently, there is only one general preference, but future versions may introduce others.

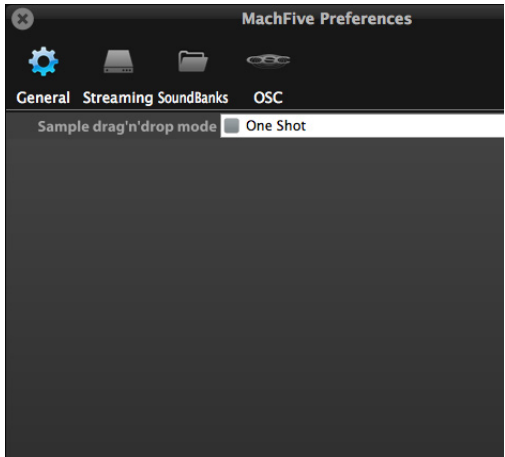


Figure 15-2: General preferences.

Sample drag & drop mode

By default, when a sample is imported via drag & drop, the sample will not be looped unless it already has a loop saved in the file. If you would like all imported samples to default to One Shot, enable the *Sample drag & drop mode* One Shot checkbox.

For more information on loop types, see “Loop options” on page 147.

STREAMING

Disk streaming allows you to load programs that use of a large amount of audio sample data, even if the samples are larger than the amount of available memory (RAM) in your computer. Rather than loading the entire sample set into RAM, the samples are read (streamed) from the hard disk as the program is being played. This allows the use of programs that use many gigabytes of sample data.

The *Streaming* preferences pane (Figure 15-3) provides settings to optimize streaming performance for your computer. In most cases the default settings will be ideal, but you may need to adjust them if you encounter performance issues when streaming.

Preload Time

Preload Time is the amount of each sample preloaded into RAM when the program is first loaded.

Lower values require less RAM overall, but increase the load on the host computer processor and the hard disk. Don't use very small values

because this causes many small samples to be streamed unnecessarily. The result is unnecessary strain on your computer.

If you would like to place a limit on the minimum size of the samples to be streamed, use this setting. Samples that are smaller than the *Sample preload size* will not be streamed.

In situations where a program consists of a large number of very large samples, and you have lots of extra RAM installed in your computer, a higher sample preload size can actually allow you to play more parts because the strain on the processor and hard disk will be lower.

Ring Buffer Size

Ring Buffer Size is the number of samples reserved for each voice after streaming has begun and the sample is being played. Lower values can sometimes help eliminate dropouts and similar artifacts, but lower values also increase the load on

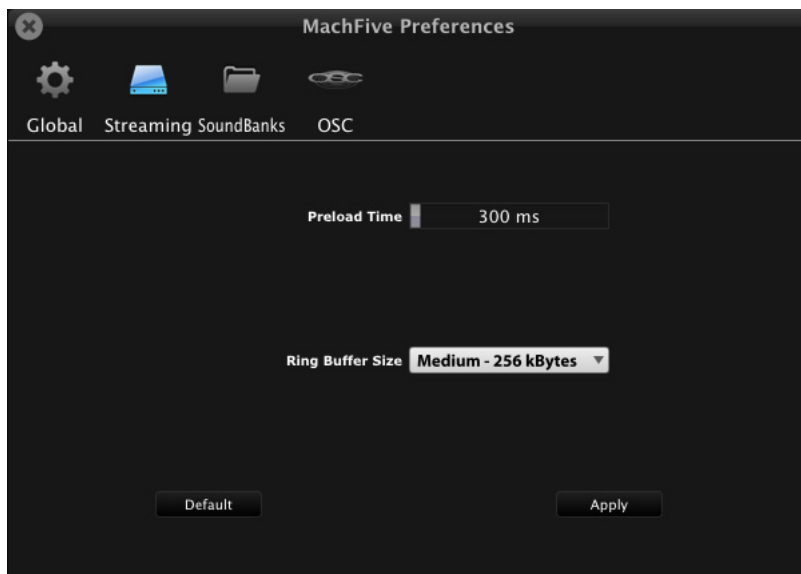


Figure 15-3: Streaming preferences.

the host computer processor and the hard disk. Higher values reduce processor strain, but require more memory.

Memory requirements and recommendations

Disk streaming is not a “cure all” for running MachFive on a computer that has lower amounts of memory installed. It is still strongly recommended that you install as much RAM as possible. Optimum performance will be achieved with 8 GB of RAM or more. The streaming feature allows you to play much larger samples, but it doesn’t necessarily squeeze more samples into less RAM.

Disk performance

Disk streaming performance can be heavily affected by the speed of the hard disk on which the sample material resides. For streaming, the faster the hard disk is, the better. You should use at least a 7200RPM hard disk, or a solid-state disk.

If you are using MachFive as a plug-in in a host application, and you are also recording and playing back audio tracks in the host software, you should

strongly consider placing your MachFive sounds their own, dedicated disk. If your host software is recording and playing audio files while MachFive is attempting to stream samples from the same disk, the disk can quickly be pushed beyond its performance limits. If the audio tracks are playing from one disk, and MachFive is streaming from another disk, you are much less likely to encounter disk performance issues.

Enabling streaming per part

In MachFive, disk streaming is enabled or disabled on a part by part basis. Streaming is enabled by default.

To toggle disk streaming on or off for a part, select the part in the Parts List (Figure 9-1 on page 63) and then click the Streaming button in the Program Settings section (Figure 17-8 on page 123).

Viewing the memory size of a part

Use the List Editor to see how much memory a part is currently using. See “Memory” on page 173.

SOUNDBANKS

The *Soundbanks* preferences pane (Figure 15-4) provides settings for managing your soundbank files.

Search paths

A *search path* (Figure 15-4) is a location (disk, folder, or directory) on your computer system that you would like MachFive to remember as a place where your sounds are stored. MachFive can then examine the sound data and store information about your sounds, as specified by the search path options discussed below.

Adding a search path

To add a search path, you can click on the search path bar (Figure 15-4) and type in the path by hand. Alternately, you can click the button to the right of the bar to browse.

Removing a search path

To remove a search path, click the path text and hit the delete (backspace) key to delete the text.

Path options

Each path has three options next to it which can be enabled or disabled.

Indexed

Enabling *Indexed* means that soundbanks in that search path will be indexed for the Search function in MachFive's browser. For more information, see "Search" on page 66. This is recommended for soundbanks which will be used frequently.

Recursive

With the *Recursive* option disabled, only the files directly in the specified search path file will be indexed and auto-mounted (if enabled), and the files in any subfolders will be ignored. With *Recursive* enabled, both the files directly in the search path folder and in all of its subfolders will be included.

For example, let's say you have a folder on disk that contains the MachFive factory soundbank files:

```
/Sounds/MOTU/MachFive/
```

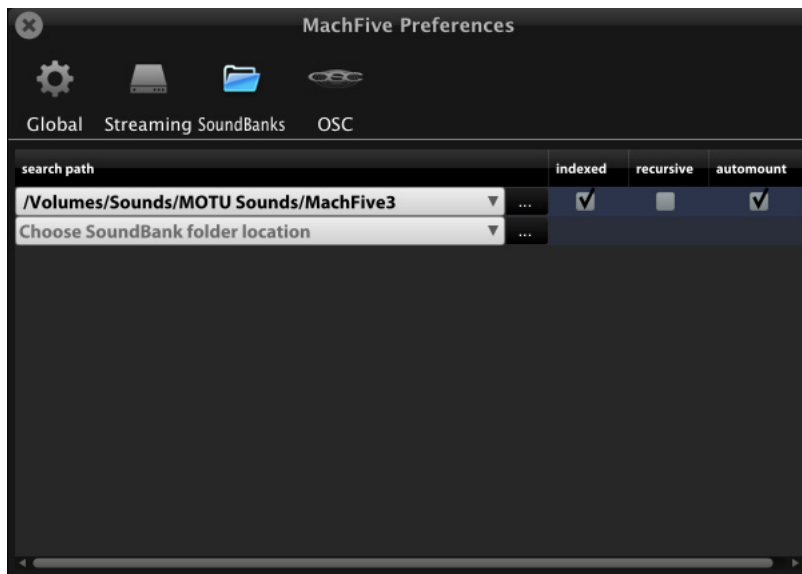


Figure 15-4: Soundbank preferences.

Inside that “MachFive” folder you also have a subfolder named “My Sounds” which contains files that you’ve created yourself:

```
/Sounds/MOTU/MachFive/My Sounds/
```

With the *Recursive* option disabled, only the files directly in the “MachFive” folder will be included and the files in “My Sounds” subfolder or any other subfolder will be ignored. With *Recursive* enabled, the files directly in the “MachFive” folder and in the “My Sounds” will be included.

Auto-mount

Enabling *Auto-mount* will automatically mount any soundbank files in the search path. This makes the soundbanks available in the browser’s Soundbanks List immediately upon launching the MachFive application or instantiating the plug-in. For more information on the browser’s Soundbanks List, see “Soundbanks” on page 68.

OSC (OPEN SOUND CONTROL)

OSC, or *Open Sound Control* is a communication protocol used by hardware and software devices, such as Max/MSP, Pure Data, CSound, TouchOSC, Monome 40h, and more. OSC can be used to control MachFive over a local area network by sending properly-formed OSC messages to MachFive.

For general information on the OSC protocol, please see <http://opensoundcontrol.org>.

The OSC preferences pane (Figure 15-5) configures MachFive’s OSC settings.

Enable

The *Enable* checkbox toggles MachFive’s OSC server.

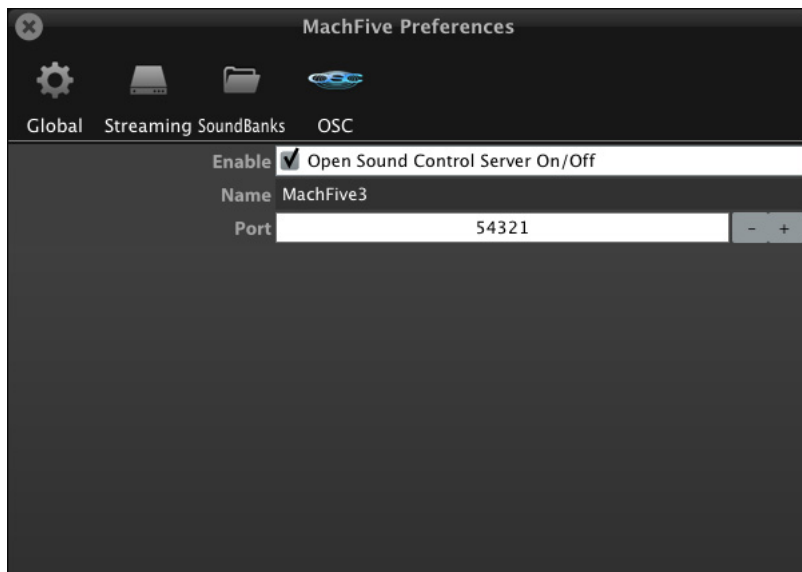


Figure 15-5: OSC preferences.

Name

Name is the name that will be used to identify MachFive to other OSC devices. If you are using multiple copies of MachFive on your network, each name should be unique. Click the name and type to change it.

Port

Port specifies the network port to be used by MachFive for OSC communication. The default is port 54321, but any non-conflicting port may be used. Click the port number and type in the desired port, or use the + and - buttons to increment or decrement the port number.

OSC implementation documentation

For details on MachFive's OSC implementation, please visit motu.com. This information is needed only if you are creating your own OSC application or hardware device; it is not needed if you are simply using a hardware or software device which supports OSC.

OSC path display

To establish a link between your OSC host and parameters in MachFive, you need the OSC path for each parameter. To do so, right-click the parameter to access the OSC path in the automation menu, as explained in “OSC path display” on page 210.

CHAPTER 16 Working in Surround

OVERVIEW

MachFive can play surround samples in any format up to 7.1 (depending on the host) with host applications that support MachFive’s surround output features.

Configuring MachFive for surround 111
Importing surround samples 111
Surround waveform editing 111
Digital Performer 111

CONFIGURING MACHFIVE FOR SURROUND

To configure the stand-alone version of MachFive for surround, choose the desired surround format from the Configuration menu (in the main title bar).

If you are running MachFive as a surround plug-in, refer to your host documentation for information about how to configure virtual instruments for surround operation. In most cases, you have two choices:

- Run MachFive as a stereo instrument, which can be panned around the n-speaker surround field by the the surround panning controls in your host software.

OR

- Run MachFive as a surround instrument, where multi-channel samples are mapped directly to surround channels configured in your host.

If you are a Digital Performer user, see the “Digital Performer” section below for details. For other hosts, refer to your host software documentation.

IMPORTING SURROUND SAMPLES

Surround samples can be imported into MachFive using the same techniques as mono or stereo samples, as explained in “Importing samples” on page 142. MachFive can import interleaved multi-channel audio files or de-interleaved sets of mono files. In the latter case, the files must have the same name, except for their file name extensions (.L, .R etc.) MachFive recognizes the following file name extensions to identify surround channels:

Surround channel	Recognized file name extensions
Left	.FL , .fl , .Fl , (L) , (l) , -L , -l , .L , .l
Right	.FR , .fr , .Fr , (R) , (r) , -R , -r , .R , .r
Center	.FC , .fc , .Fc , (C) , (c) , -C , -c , .C , .c
Left surround	(RL) , (rl) , -RL , -rl , .RL , .rl , .RL , .ls , .Ls
Right surround	(RR) , (rr) , -RR , -rr , .RR , .rr , .Rr , .RS , .rs , .Rs
Rear center	(RC) , (rc) , -RC , -rc , .RC , .rc , .Rc , .RC , .rc , .Rc
LFE	(LFE) , (lfe) , -LFE , -lfe , .LFE , .lfe , .Lfe , .LF , .lf , .Lf

SURROUND WAVEFORM EDITING

Surround waveform editing works the same way as stereo editing. Loop points and crossfades can be programmed, DSP can be applied and all other Sample Editor procedures can be applied to the multi-channel sample as described elsewhere in this manual. For complete details, see “Oscillator Editor” on page 137.

DIGITAL PERFORMER

MachFive supports up to 7.1 channels in Digital Performer.

Setup for surround

To set up MachFive in surround in Digital Performer:

- 1 In the Bundles window (Studio menu), click on the Outputs tab. Create a quad, 5.1, or 7.1 surround bundle and assign it to the desired outputs.
- 2 Create a surround MachFive instrument by selecting *Project menu > Add Track > Instrument track* and selecting the desired MachFive surround configuration, such as MachFive3 (5.1).
- 3 Make sure the instrument track output is assigned to the desired surround output bundle.
- 4 Assign the output of a MIDI track to any channel of MachFive.
- 5 Record-enable the MIDI track to patch through from your MIDI controller.

Panning and MachFive surround output in Digital Performer

You can use mono, stereo or multi-channel samples in a multi-channel instance of MachFive. Digital Performer handles their panning and surround output as follows:

When a multi-channel plug-in is inserted on a track in Digital Performer, the track's surround panner disappears. This is because each channel of multi-channel output from the plug-in is routed directly to the appropriate surround output channel. The same holds true for MachFive: when you instantiate a quad, 5.1 or 7.1 version of MachFive, the channels for each surround sample are routed directly to their respective n-speaker output channels. Stereo samples being played in a surround version of MachFive are simply played on the left and right channels.

If you would like to steer stereo MachFive output around a surround speaker matrix in Digital Performer, create a stereo track and assign it to a surround output path. But instead of instantiating a surround variant of MachFive, open the stereo version. In this case, the track displays Digital Performer's standard left- and right-channel panners, which allow you to pan the left- and right-channel signals independently around the n-speaker matrix. Keep in mind that the panner affects all samples (parts) being played on that track, so if you wish to pan two or more parts differently, you'll need to put them on several instances of MachFive running on separate tracks.

Part 3

*Creating and Editing
Sounds*

CHAPTER 17 Editing Basics

OVERVIEW

MachFive provides a powerful sound design environment. This chapter provides an overview of sound programming and explains the basic settings for programs in MachFive.

- Conventions and shortcuts 115
- Edit tab 116
- MachFive’s hierarchy..... 117
- Oscillator settings..... 119
- Keygroup settings 120
- Layer settings..... 122
- Program settings 123

CONVENTIONS AND SHORTCUTS

MachFive provides the following user interface conventions and shortcuts.

Right-click

There is extensive support for right-clicking in MachFive. Except where noted, Mac users can use Control-clicking as an alternative for right-clicking.

Scroll wheel support

MachFive supports the scroll wheel on your mouse.

Option/Alt key

In this manual, we will use the convention *Option/Alt* for any operation or shortcut that involves the Option key on the Mac or the Alt key on Windows.

Parameter editing shortcuts

Here are several shortcuts for changing settings for MachFive’s controls, knobs, sliders and so on:

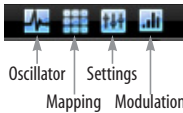
Action	Shortcut
Return to default	Option/Alt-click
Enter numeric value	Double-click
Fine adjustment	Hold Command key (Mac) / Control key (Win) while dragging parameter
Contextual menu	Right-click

EDIT TAB

The *Edit* tab in the *Main* view of the MachFive window (Figure 17-1) provides detailed control over the program loaded in the currently selected part (see “Selecting a part” on page 63), sample mapping, waveform editing of individual samples, Loop Lab editing of beat-slice loops, and much more.

Showing and hiding sections

Use the show/hide buttons (Figure 17-1) to show or hide the four sections displayed in the Edit tab: the Oscillator Editor, Mapping Editor, Program Settings, and Modulation Settings.



Resizing sections with the divider

The Sample Editor and the Mapping Editor can be resized vertically by vertically dragging the divider (Figure 17-1) to shrink or expand the height of the two sections.

The Edit tab provides the following sections:

Mapping Editor127

The Mapping Editor is where you map samples to notes and velocity ranges to construct a program. See chapter 18, “Mapping Editor” (page 127).

Oscillator Editor137

The Oscillator Editor is where you program sound-generating oscillators. See chapter 19, “Oscillator Editor” (page 137).

Settings section118

This section provides basic settings for the currently selected oscillator, keygroup, layer, or program.

Automation and Modulation.....209

MachFive provides powerful and flexible automation and modulation programming. See chapter 23, “Automation and Modulation” (page 209).



Figure 17-1: The Edit tab.

MACHFIVE'S HIERARCHY

MachFive can be understood as a logical hierarchy of building blocks.

Oscillator

Oscillators are the most basic building block in MachFive. Oscillators are the units which actually generate sound.

There are two kinds of oscillators: sampling and synthesis. *Sampling oscillators* play back an audio file, while *synthesis* oscillators generate sound by pure synthesis.

The Oscillator Editor is the primary editor for oscillators. For more information, see chapter 19, “Oscillator Editor” (page 137).

Keygroup

Keygroups contain one or more oscillators. A keygroup is mapped to a range of MIDI notes and note velocities. A single keygroup can span the entire keyboard and velocity range, or there can be hundreds of keygroups meticulously representing every note and velocity.

The Mapping Editor is the primary editor for keygroups. For more information, see chapter 18, “Mapping Editor” (page 127).

Layer

Layers contain one or more keygroups. If keygroups cover width and height (X, Y axes), layers add depth (Z axis). Layers provide a way to organize keygroups in a logical manner. For example: you could separate articulations by layer by placing all legato samples in one layer, staccato samples in another, and normal articulations in a third layer.

Layers can be dynamically enabled or disabled using Layer Rules or Script Processors. For more information, see chapter 24, “Event Processors” (page 223).

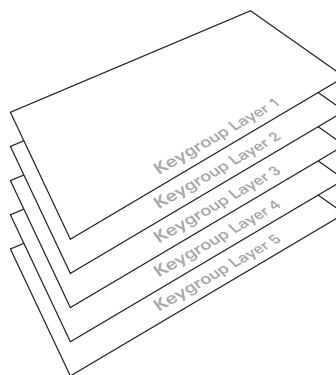


Figure 17-2: Keygroup layers.

Program

Programs contain one or more layers, along with any programmed Layer Rules or Scripts that determine how the program triggers sounds in the layers in response to external MIDI notes, controllers, and other data.

In addition, a program includes many associated settings, such as synth processing settings, applied DSP effects, and other program-specific settings. The end result can be a rich and dynamic instrument that can be played from your MIDI controller and triggered from your host sequencer software.

Programs are the basic elements that you will load, save, and play as you work with MachFive.

MachFive provides one of the most extensive and capable environments for building multi-sample, multi-oscillator, scripted instrument programs.

Part

A program is loaded into a *part*. The part provides performance settings, such as the MIDI receive channel, audio output, and mixing settings such as volume, pan, aux sends, and more. One instance of MachFive can have an unlimited number of parts. This means that you can play an unlimited number of programs simultaneously.

Master

The Master output, or Master fader, is the final global audio output stage for all parts assigned to MachFive's Main Out bus. The master fader provides volume, pan, and insert effects, which will be applied to the entire mix. For example, you could apply mastering effects processing at this final output stage.

Auxes

Auxes are additional busses that can be mixed in with the Main Out bus. Input to the aux busses can come from a range of sources within MachFive, including parts, keygroups, etc. You can then use the Aux to apply effects, panning and level control before finally mixing in with the Main Out bus

Multi

A *multi* is like a “snapshot” of the MachFive window. It saves the entire window in its current state, except for the actual samples being used. A multi includes all preset parameters, all global parameters, the program for each part, MIDI channel assignments, audio output assignments, keygroups and their settings, and all other settings.

The Tree Editor

The Tree Editor is an excellent way to visually understand and explore the hierarchy of MachFive. For more information, see “Tree Editor” on page 165. In addition, the Tree Editor Inspector provides complete access to all settings for the currently selected node item in the Tree Editor. See “Inspector” on page 168.

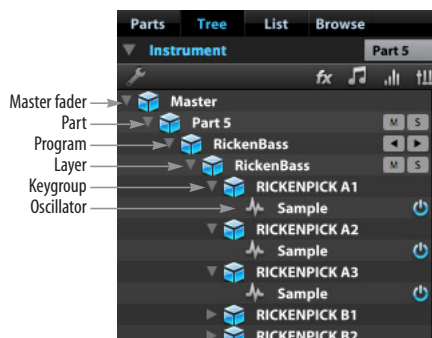


Figure 17-3: Viewing MachFive's hierarchy in the Tree Editor.

SETTINGS SECTION

Each component (oscillator, keygroup, layer, and program) has its own settings, accessed in the Settings Section (Figure 17-4). These settings can be shown or hidden, as explained in “Showing and hiding sections” on page 116.

Selection

The parameters in the Settings section apply to the currently selected oscillator, keygroup(s), and layer(s) in the program for the currently selected part. If none (or all) of the keygroups in a layer are currently selected, then the settings apply to all samples and keygroups in the current layer. For details about how to select samples and keygroups in the Mapping Editor, see “Basic Mapping Editor techniques” on page 128 and “MIDI Select” on page 129. You can freely apply settings to any keygroup or combination of keygroups. Any changes you make will override any current settings for the affected oscillators or keygroups.



Figure 17-4: The Settings section.

OSCILLATOR SETTINGS

The *Oscillator* settings (Figure 17-5) apply to the currently selected oscillator. They are general-purpose settings common to all forms of oscillators in MachFive (sample, analog, noise, drum, etc.) If multiple keygroups are selected, any changes you make to these settings will be applied to all oscillators belonging to the selected keygroups.

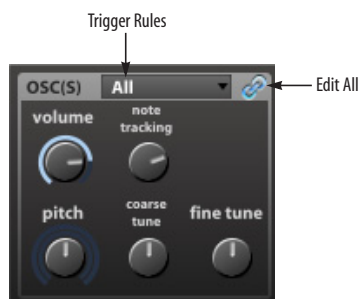


Figure 17-5: Oscillator settings.

Volume

Volume (Figure 17-5) controls the loudness relative to other oscillators.

Pitch

Pitch (Figure 17-5) transposes the pitch of the oscillator on a continuous pitch scale from -48 to +48 semitones. Because this setting offers continuous pitch variation, it is best suited for pitch envelopes and other continuous modulation and automation manipulations. For sample oscillators, pitch adjustment may or may not affect playback speed, depending on the type of oscillator.

Coarse Tune

Coarse Tune (Figure 17-5) transposes the oscillator in stepped units of one semitone, with a range of ± 24 semitones. Because this setting is stepped, it is well-suited for adjusting the default pitch (along with the Fine Tune setting below).

Fine Tune

Fine Tune (Figure 17-5) transposes the oscillator in cents (one one-hundredth of a semitone), with a range of ± 100 cents.

Note Tracking

Note Tracking (Figure 17-5) determines how the oscillator responds to MIDI notes. At 100%, there is a direct correspondence as you play up and down the keyboard. For example, if you play a one octave interval, the oscillator matches the one octave interval. At 200%, the oscillator would jump two octaves.

Negative note tracking values invert the interval (playing higher notes on the keyboard makes the oscillator pitch go down, and vice versa).

With a note tracking value of zero (0), the oscillator always plays its root pitch, regardless of which key triggers it. This behavior is commonly referred to as *constant pitch*. It is often useful to employ this mode for drum samples.

Oscillator name

To rename an oscillator, edit the name in the Tree Editor inspector. See “Inspector” on page 168.

Root

You can specify the root pitch for an oscillator in the Tree Editor Inspector (“Inspector” on page 168), or in the Mapping Editor (see “Keygroup Info bar” on page 129).

More oscillator settings

Additional oscillator settings are specific to the oscillator type. For further in-depth information about working with and programming oscillators, see chapter 19, “Oscillator Editor” (page 137).

Working with multiple oscillators

Keygroups can contain multiple oscillators, which can be added, deleted, viewed, and edited as separate tabs in the Oscillator Editor. See “Working with multiple oscillators” on page 139. The following settings apply to multiple oscillators.

Trigger Rules

The *Trigger Rules* menu (Figure 17-5) determines how oscillators respond to incoming MIDI notes. Four modes are provided.

All triggers all of the oscillators simultaneously. This is the default mode, and the mode to use if you wish to stack oscillators for a layered sound. For example, you could stack a kick drum sample and a drum synth.

Cycle triggers each of the oscillators in turn with each successive note. After the last oscillator is triggered, the first oscillator will be triggered with the next note. This provides “round robin” playback.

Random Cycle mode plays all oscillators randomly, but only once per cycle. When all oscillators have finally been played once, a new cycle begins. Random Cycle mode helps prevent repetition, as an oscillator is not played again until the current cycle is complete.

Here is a simple example with three oscillators:

- random choice among (1,2,3) -> 2
- random choice among (1,3) -> 3
- random choice among (1) -> 1
- restart cycle with (1,2,3)

Random mode plays all oscillators randomly.

Both modes can produce excellent results, depending on the sounds involved and the effect you are trying to achieve. You can experiment with each mode to see which one sounds best.

Edit all toggle

If the *Edit All* option (Figure 17-5) is enabled, changes to oscillator parameters will apply to all oscillators in the keygroup. When the option is disabled, you can adjust synth parameters independently for each oscillator.

KEYGROUP SETTINGS

The *Keygroup* settings (Figure 17-6) apply to the currently selected keygroup. If multiple keygroups are selected, any changes you make to these settings will be applied to all selected keygroups.



Figure 17-6: Keygroup settings.

The keygroup settings apply volume, pan, filter and drive to any keygroup, regardless of the type of oscillator(s) present in the group. Continuously variable parameters can be automated with MIDI controller data (i.e. “MIDI Learn”). They can also be modulated from a variety of internal and external modulation sources.

Volume

Volume (Figure 17-6) lets you set the volume for the keygroup. Setting the volume independently for an individual keygroup can be useful for boosting material recorded at low levels, or for attenuating samples to avoid distortion when using high levels of resonance.

Keygroup amplitude can be automated and modulated, as explained in “Automation and Modulation” on page 209. Amplitude modulation is the key for shaping the dynamics of your instrument. For example, an LFO can provide tremolo for electric pianos.

Pan

Pan (Figure 17-6) sets the stereo pan position for the keygroup. The range is from -100 (hard left) to +100 (hard right), with zero as centered.

Filter

The *Filter* section (Figure 17-6) provides two separate filters with a wide variety of filter types for various applications — from classic low pass filters to phasing comb effects. All filter section settings can be automated and modulated as explained later in “Automation and Modulation” on page 209.

Filter 1 and 2

Use the *Filter 1* and *2* buttons (Figure 17-6) to choose the filter you are programming. You can use one or both at the same time.

Filter Type

Use the *Filter Type* menu (Figure 17-6) to choose the type of filter you wish to apply. Over 50 different filter choices are provided.

The comb filter adds a delayed signal to the input signal. Two variations are provided for the *Comb Filter*. With the *Comb+* filter, the direct signal is added with positive polarity or phase. With the *Comb-* filter, the signal is added with inverted (negative) polarity.

Cutoff (Cutoff Frequency)

Turn the *Cutoff* knob (Figure 17-6) to modify the cutoff frequency of the filter. The cutoff frequency can be automated, as explained in “Automation and Modulation” on page 209. Additionally, you can modulate the cutoff frequency from a variety of internal and external modulation sources (see “Automation and Modulation” on page 209).

Resonance

Resonance (Figure 17-6) emphasizes the cutoff frequency. Higher resonance values can significantly boost gain, so you may need to attenuate the volume of the keygroup to achieve a clean sound. Use the keygroup volume for this

(Figure 17-6). Resonance can be automated and modulated, as explained in “Automation and Modulation” on page 209.

Drive

Drive (Figure 17-6) applies distortion to the keygroup. Choose the type of drive you wish to apply from the *Drive* menu (Figure 17-6) and then use the *Amount* knob to control the amount. The *Oversampling* menu provides choices for further amplifying the effect.

Drive can be automated and modulated, as explained in “Automation and Modulation” on page 209.

Use the keygroup effects rack (“Keygroup effects” on page 183) to place drive before or after the filters, before or after other keygroup effects, and so on.

Keygroup effects

Each keygroup can have its own effects, accessed by the *keygroup effects rack* (Figure 17-6). This effect rack operates the same as slots in the effects section. See “Keygroup effects” on page 183. Effect settings can be automated and modulated, as explained in “Automation and Modulation” on page 209.

Keygroup Aux Sends

Keygroups have their own program aux sends, which can be found in the Tree Editor and List Editor. See “Program aux sends for keygroups” on page 184.

Keygroup name

To rename a keygroup, edit the name in the List Editor. See “Keygroup name” on page 176.

Additional keygroup settings

There are additional keygroup settings in the List Editor (“Keygroup settings” on page 175) and the Tree Editor Inspector (page 168).

LAYER SETTINGS

The *Layer* settings (Figure 17-7) apply to the entire layer for the current program. If the program has multiple layers, any changes you make to these settings will be applied to the current layer being edited, or, if the program is selected (in the Tree Editor), changes will be applied to all layers. For details about working with multiple layers, see “Working with multiple layers” on page 134.




Figure 17-7: Layer settings. Right-click to access the preset menu.


Volume and pan


Volume and *Pan* (Figure 17-7) control the loudness and panning for the entire layer. This is a stage of control that is independent from keygroup volume and pan, part volume and pan, etc.


Velocity curve

The Velocity Curve (Figure 17-7) allows you to adjust the layer’s response to MIDI note-on velocities. Drag the curve vertically to change the curve shape. Option-click to return to linear response (a diagonal line). Double-click to enter a constant velocity between 1 and 127. Below are several typical curves and a brief description of their resulting response characteristics.

 Double-click to enter a *constant velocity* from 1-127. You can type in a velocity from your computer keyboard, or you can play a note on your MIDI controller. Click anywhere outside of this text box, or press Enter, to confirm the value. All notes played by the layer will then be played at the note-on velocity that you specify. A setting of 127 is good for analog synth and vintage drum sounds.

 Type in zero (0) or option-click to choose the *linear curve* for a 1-to-1 response curve: all notes are played at the velocity at which the key is struck. This is the normal response for MIDI data.

 Drag the curve downwards to produce an *exponential curve* for medium velocity values, which result in a lower volume than in linear mode. This curve is well-suited for soft keyboards that send high velocity values with a light touch.

 Drag the curve upwards to produce a *logarithmic curve* for higher velocity values that result in a higher volume than linear mode. This curve is good for piano-action keyboards that need hard hitting to send high velocity values.

Right-click the Velocity Curve menu to access convenient presets (Figure 17-7).

Playing mode

Click the *Playing Mode* menu (Figure 17-7) to determine the layer’s polyphonic or monophonic response. There are four choices.

Poly

Choose *Poly* mode (Figure 17-7) for normal, polyphonic instrument operation, where you would like to be able to play multiple notes at once. In Poly mode, there is no portamento “glide” (pitch bend) between consecutive notes that overlap.

Poly Portamento

Poly Portamento mode (Figure 17-7) is similar to MonoPortamento mode (below), except that each note continues to sustain, without being cut off by the next note. This allows you to play chords that include portamento transitions (*glide*) between moving notes within the chord. The direction of the portamento bend into the next note being played (down or up) is determined by the last note played: if it is higher, then the portamento bends

down into the next note. If it is lower, portamento bends up into the next note. The speed of the portamento bend is determined by the *Glide* setting (below).

☛ The *Polyphony* setting (see “Polyphony” below) must be 2 or higher for Poly Portamento mode to fully work as intended.

Mono Retrigger

Choose *Mono Retrigger* (Figure 17-7) to make the currently selected part play like a monophonic synth, where only one note can play at a time. Each new note played replaces any currently sustaining notes, without any *glide* between them (below). Mono Retrigger mode is ideal for solo instruments.

Mono Portamento

Mono Portamento mode (Figure 17-7) is similar to Mono Retrigger mode above, except that when consecutive notes overlap, you’ll hear portamento (bending pitch) between the two notes. The speed of the portamento is controlled by the *Glide* setting (below).

Mono Portamento 2

Mono Portamento 2 mode (Figure 17-7) is similar to Mono Portamento mode above, except that it produces glide between notes, even when they are played in a non-overlapping fashion. The regular Mono Portamento setting produces glide only when notes overlap.

Glide time

Glide Time (Figure 17-7) controls the length of the portamento transition between notes in the two portamento modes described in the previous section. The range is from 0.00 ms (milliseconds) to 10.00 seconds.

Layer name

To rename a layer, edit the name in the List Editor. See “Name” on page 174.

Additional layer settings

There are additional layer settings in the List Editor (“Layer settings” on page 174) and in the Tree Editor Inspector (page 168).

PROGRAM SETTINGS

The *Program* settings (Figure 17-8) apply to the program for the currently selected part (see “Selecting a part” on page 63).

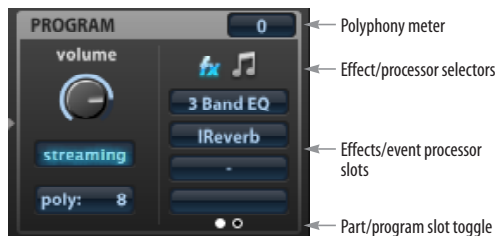


Figure 17-8: Program settings.

Volume

Volume (Figure 17-8) controls the loudness of the program, independently of the part volume.

Polyphony

The *Polyphony* setting (Figure 17-8) determines how many stereo notes the program can play simultaneously. For example, a setting of 12 lets you play 12 stereo notes. It also lets you play 12 surround notes (multi-channel samples). The maximum setting is 256 notes.

If the program has two or more keygroup layers, this polyphony setting applies to each layer independently. For example, if the polyphony is set to 12, and the program has four layers, the result is 12 stereo voices per layer for a total of 48 voices (12 per layer).

☛ **Caution:** higher polyphony settings require more of your computer’s RAM resources. For example, if you set the polyphony to 64 voices and played only 12 notes, MachFive would require much more RAM than it would when playing those

same 12 notes with a polyphony setting of 12. Try to keep the polyphony setting as low as possible — only use what you know you'll need for the part.

Advanced polyphony applications

The basic polyphony setting above can be used to effectively manage the computer system's CPU and RAM resources. However, sound designers and sound library developers can also take advantage of several additional polyphony settings, which can be used for advanced sound design applications. See “Unison Voices” and “Custom Polyphony” on page 168, plus “Note Polyphony” on page 173.

Polyphony meter

The *Polyphony Meter* (Figure 17-8) shows how many notes are currently playing for the current part. This is a great way to see just how much polyphony is required when you play the part. If, when you play the part, the number in the meter (Figure 17-8) goes up to the number of the part's polyphony setting (Figure 17-8), you may need to increase the polyphony to successfully play all the notes.

Streaming

Streaming (Figure 17-8) lets you enable or disable disk streaming for the program. This feature only affects programs with sampling oscillators. The sample data can either be streamed from disk, or loaded entirely into RAM. For a complete discussion, see “Streaming” on page 106.

Effects and Event Processors

The *Effects/Event Processor slots* (Figure 17-8) display the first four effects or event processors that have been applied to the program (or part, see below). Use the *effect/processor selectors* to toggle the slots between showing effects or showing processors.

The effects shown here are the same as viewed in the part's channel strip in the Mixer (Figure 13-3 on page 98) and the FX Rack (chapter 22, “Effects” (page 179).

If more than four effects or event processors are applied, use the FX Rack or Event Processor rack to view them all.

The processors are the same as viewed in the Tree Editor (Figure 20-1 on page 165) and the Event Rack, as described in chapter 24, “Event Processors” (page 223).

Double-click a slot to jump to the FX or Event Rack, where you can add, delete, modify, and otherwise manage effects or processors.

Shift-click to toggle its bypass state.

To add a new effect or processor, click and hold in an empty slot and choose the desired preset from the menu.

Part/Program toggle

Effects can be applied to programs, but they can also be applied to parts, as explained in “Program effects versus part effects” on page 185.

The same is true for event processors: they can be applied to a program or a part.

If an effect or event processor is assigned to the part, you can load a different program into the part, but the part effects and processors remain the same.

Conversely, if an effect or event processor is assigned to a program, it can be saved and reloaded with the program, essentially becoming a part of the program itself.

The *Part/program toggle* (Figure 17-8) lets you switch the display between part slots or program slots.

In addition, the effect/processor selectors let you toggle the slots between showing effects or event processors.

Together, the two toggle switches above let you view four different things in the slots:

- Program effects
- Program event processors
- Part effects
- Part event processors

Program name

To rename a program, edit the name in the List Editor. See “Name” on page 173.

Saving and reloading a program

To save and reload programs, use the Program menu in the List Editor (Figure 21-1 on page 171).

Additional program settings

There are additional program settings in the List Editor (“Keygroup settings” on page 175). These settings can also be accessed in the Tree Editor Inspector (page 168).

CHAPTER 18 Mapping Editor

OVERVIEW

The *Mapping Editor* (Figure 18-1) is where you manage how keygroups (see “MachFive’s hierarchy” on page 117) are mapped to MIDI notes. We refer to any sampling or synth oscillator as a *keygroup*, even if it is mapped only to a single key.

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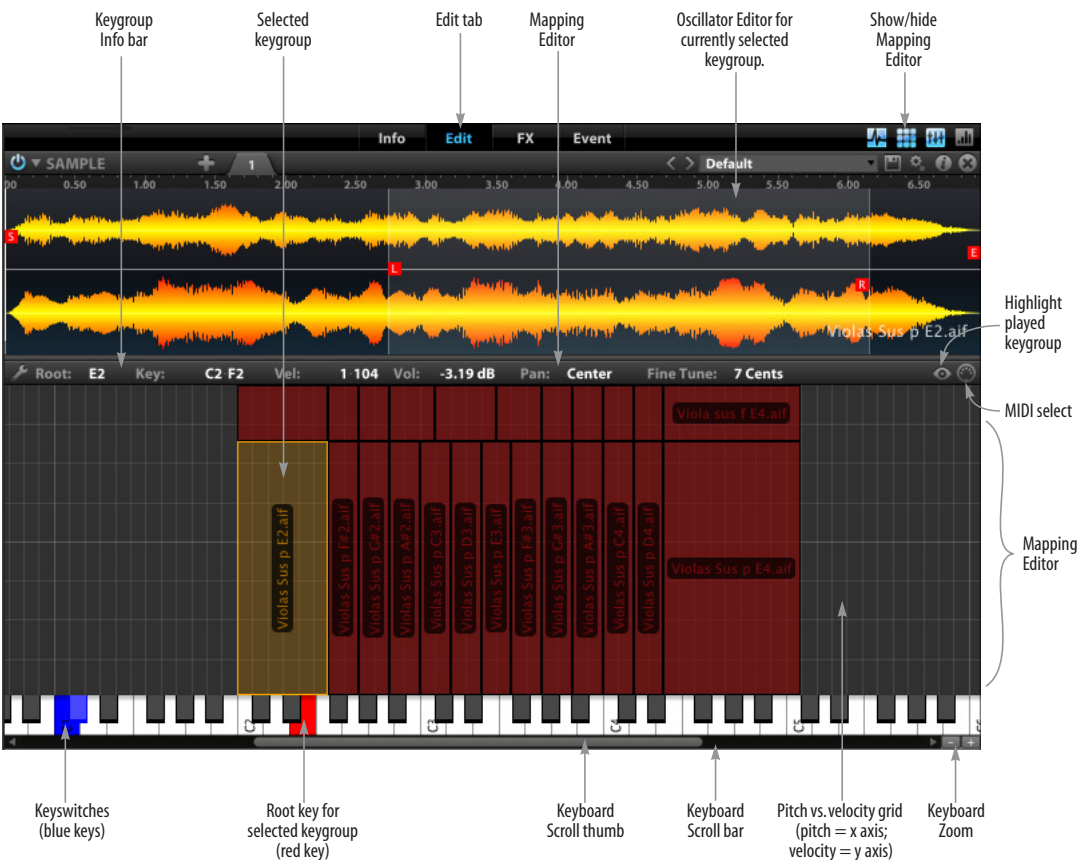


Figure 18-1: Mapping Editor.

OPENING THE MAPPING EDITOR

To open the Mapping Editor, click its show/hide button in the upper right corner of the Edit tab (Figure 18-1), which is accessed in the Main view (“Main View” on page 56).

Changing the Mapping Editor’s size

Use the divider between the Mapping and Oscillator Editors (Figure 17-1 on page 116) to change their sizes relative to each other. You can also hide other sections in the Edit tab using their show/hide buttons (Figure 17-1 on page 116).

MAPPING EDITOR BASICS









Mapping to pitches and velocity

The keyboard (Figure 18-1) represents the 128 MIDI pitches, where note #60 is middle C. Each octave is numbered for your convenience. Click the keys to play a note. The pitch keyboard is also velocity sensitive: click lower or higher on black and white keys alike to get higher or lower velocities, respectively.

The grid above the keyboard represents samples as blocks mapped horizontally (pitch) and vertically (MIDI velocity). This area is very flexible: you can map a sampling or synthesis oscillator to one key or horizontally stretch it across two or more keys — referred to as a *keygroup* (some other samplers may refer to these as *zones*.) Similarly, you can stretch a sample vertically to cover any portion of the MIDI note-on velocity range (0-127). You can stack two or more samples vertically on a key to create velocity switching. Figure 18-1 provides a few examples of the many possible mapping techniques.

Basic Mapping Editor techniques

More advanced techniques are discussed in the following sections. Here is a summary of basic mapping editor techniques:

To do this	Do this	Cursor
To select a keygroup	Click it.	
To deselect a keygroup	Shift-click it or click somewhere else.	
To select two or more adjacent keygroups	Shift-drag over them.	
To select two or more non-adjacent keygroups	Hold the command key (Mac) or control key (Windows) while clicking individual keygroups or dragging over multiple keygroups.	
To deselect all keygroups	Shift-click, or click anywhere on the empty grid.	
To move a keygroup	Drag it with the hand cursor.	
To move any edge of a keygroup	First select it, then grab the edge with the edge tool.	
To remove a keygroup	Select it and press the delete key.	
To undo any action	Press Command-Z (Mac) or Control-Z (Windows)	--
To redo any action	Press Command-Shift-Z (Mac) or Control-Shift-Z (Win)	--

Mapping Editor shortcuts

Here are several shortcuts for the Mapping Editor:

Action	Shortcut
Contextual menu	Right-click
Replace sample	Double-click to open the sidebar browser (page 71)
Move horizontally	Scroll wheel
Zoom horizontally	Option-scroll wheel
Select keygroups	Click to select Command-click to select multiple Shift-click and drag to select a range

KEYGROUP INFO BAR

Each keygroup is defined by the settings shown in the *Keygroup Info Bar* (Figure 18-1) from left to right:

- Root pitch (usually the original, untransposed pitch of the sample)
- Key range (low key - high key)
- Velocity range (low - high)
- Volume
- Pan
- Fine-tune

To view and edit these settings numerically, click the keygroup to select it. Drag them vertically to change their value. Or double-click the setting to modify it. After double-clicking, you can either type a new value or play it from your MIDI controller.

☞ You can also edit these settings, including the keygroup name, in the List Editor. See “Keygroup name” on page 176.

Settings for multiple selected keygroups

A dash appears when multiple keygroups are selected and their values are different for a setting. Double-click the dash to apply the same value to all currently selected samples. This is a convenient way to apply the same setting to multiple samples.

You can also edit samples numerically in the List Editor. See chapter 21, “List Editor” (page 171).

Highlight played keygroups

When the *Highlight played keygroups* option (Figure 18-1) is enabled, keygroups will flash when played from your MIDI controller or the Mapping Editor keyboard. This is a great way to quickly identify a keygroup. Note that the keygroups only

flash but do not become selected. To select keygroups from your MIDI controller, see *MIDI Select* below.

MIDI Select

When the *MIDI Select* option (Figure 18-1) is enabled, keygroups will become selected when played from your MIDI controller or the Mapping Editor keyboard. This is a great way to quickly select a keygroup.

MAPPING EDITOR CONTEXTUAL MENU

Right-click anywhere in the Mapping Editor to access the Mapping Editor contextual menu, shown below in Figure 18-2.

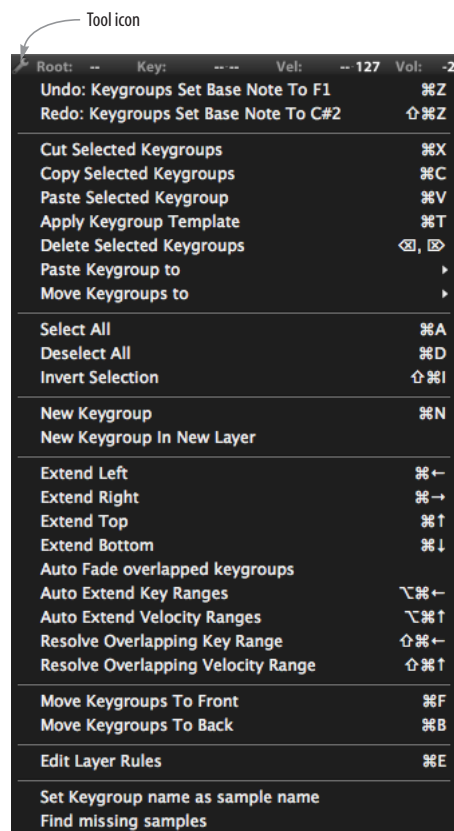


Figure 18-2: Mapping Editor contextual menu.

The contextual menu can also be accessed by clicking the tool icon in the upper left of the Mapping Editor.

Unlimited Undo/Redo

The Mapping Editor supports unlimited *Undo* and *Redo*. Use the Undo/Redo commands to step forwards or backwards through the undo history.

Cut, copy, paste, move, delete keygroups

Select one or more keygroups and then use the editing commands in the Mapping Editor menu (Figure 18-2) to apply basic cut, copy and paste editing as follows:

Edit command	What it does
Cut Selected Keygroups	Removes the keygroup and places it in the clipboard for pasting.
Copy Selected Keygroups	Puts the keygroup in the clipboard for pasting.
Paste Selected Keygroup	Pastes the keygroup currently in the clipboard into the layer you choose from the menu. It pastes at the same location from which it was copied.
Apply Keygroup Template	Pastes the keygroup settings from the source keygroup on the clipboard onto a currently selected destination keygroup, while leaving the oscillator settings of the destination keygroup unchanged. In other words, only keygroup settings are pasted.
Delete Selected Keygroups	Removes the keygroups without putting them on the clipboard.
Paste Keygroup to	Copies selected keygroup from its current layer to the layer you choose from the sub-menu, while maintaining its current position on the pitch vs. velocity grid.
Move keygroups to	Moves selected keygroups from their current layer to the layer you choose from the sub-menu, while maintaining their current position on the pitch vs. velocity grid.

Select All and Deselect All

The *Select All* and *Deselect All* commands select or deselect all of the displayed keygroups.

Invert Selection

The *Invert Selection* command toggles the selection state for every currently visible keygroup. If it is currently selected it will become deselected, and vice versa.

New keygroup

Use the *New Keygroup* command to create a new keygroup. When you create the keygroup, it will span the entire keyboard. If you wish to restrict it to a smaller key range, edit its left and right edges (low and high keys) as usual.

To change the oscillator type once the keygroup has been created, use the Oscillator Editor (page 137).

New keygroup in new layer

New keygroup in new layer works the same as “New keygroup” above, except that the keygroup will be created in a new layer.

Extend commands

Use the *Extend Left/Right/Top/Bottom* commands to extend the selected keygroups to the next or previous keygroup on the grid in the chosen direction.

Auto Fade overlapped keygroups

The *Auto Fade overlapped keygroups* command applies keygroup key fades to the selected keygroups, automatically configuring *Low Key Fade* and *High Key Fade* so that overlapping keygroups are crossfaded.

For details on keygroup key fades, see “Key Fade and Velocity Fade” on page 177.

Auto Extend commands

Auto Extend Key Ranges and *Auto Extend Velocity Ranges* extends the top and bottom of the keygroup’s key or velocity range until it encounters another keygroup, or it reaches the minimum or maximum value.

Resolve Overlapping commands

When multiple keygroups are mapped to the same key or velocity range and you wish to separate them, the *Resolve Overlapping Key Range* and *Resolve Overlapping Velocity Range* commands will adjust the selected keygroups' key or velocity ranges as needed to ensure that there are no overlaps.

Move keygroup to Front/Back

The *Move Keygroup To Front/Back* commands visually move the selected keygroup(s) to the front or back of the mapper grid. This can be helpful when working with keygroups that overlap on the grid. These commands only affect the visual appearance of keygroups on the grid; they have no affect on how the keygroups function.

Edit Layer Rules

Use the *Edit Layer Rules* command to open the Rules window, as described in "Layer Rules" on page 134.

Set keygroup name as sample name

Use the *Set keygroup name as sample name* command to make the name of the keygroup match the name of the sample file loaded in the keygroup.

Find missing samples

If you are working with a program that currently cannot locate its associated sample files, use the *Find Missing Samples* command to open a browser that will allow you to locate them on disk and reconnect them to the program. Remember to save the program afterwards.

IMPORTING SAMPLES

There are many ways to import samples into the Mapping Editor:

- Drag and drop an audio file from the sidebar browser
- Drag and drop an audio file from the computer desktop onto the keyboard or anywhere in the Mapping Editor. (Some host applications may not support this feature.)
- Drag and drop an audio file from a window in your host application onto the keyboard or anywhere in the Mapping Editor. (Note: some host applications may not support this, or they may only support drag and drop from certain windows.)
- Double-click an existing keygroup to replace its current sample with the imported one. See "MIDI auditioning while using the sidebar browser".

If no program or layer is currently loaded for the currently selected part when you drag and drop a sample into the grid, MachFive creates a new program and layer for you.

MIDI auditioning while using the sidebar browser

When you double-click to import a sample, the MachFive sidebar browser appears (Figure 9-11 on page 71) to let you search for and select any sample. When this window is open, and you are browsing audio files on disk, you can audition samples by selecting them in this window, before you import them. Just click the sample you wish to audition to select it, and then play the appropriate notes on your MIDI controller. Or you can audition the sample during playback, with your sequencer playing in the background while you click different samples on disk to audition them.

Bulk sample import via drag and drop

Some host applications, such as Digital Performer, allow you to drag and drop multiple samples into the Mapping Editor at one time, either from within the application or from your computer desktop. This can save huge amounts of time when importing a large number of samples.

To drag and drop multiple samples into the Mapping Editor, select the desired samples in your host software (from within DP, this can only be done from the Soundbites window) or on your computer desktop and drop them into the Mapping Editor. You can either drop them on the keyboard itself, or onto mapper grid above.

☛ When dragging from Windows Explorer, be sure to drag directly from the Explorer window *directly onto the mapper grid*. If you pass over other portions of the MachFive window before you move onto the grid, the drag and drop operation may not work.

Mapping multiple imported samples

Where you position the mouse vertically on the mapper grid, or on the keyboard, affects how the samples are initially mapped to the grid, spreading them out over a small or large range, or even stacking them vertically on one key.

If you hold down the option/alt key before dropping multiple samples onto the mapper grid, MachFive then presents you with the dialog shown below in Figure 18-3:

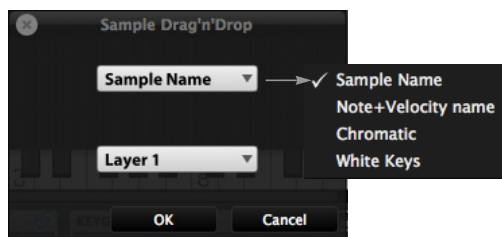


Figure 18-3: MachFive provides a variety of ways to map multiple samples to the keyboard.

Successful drag and drop technique on the Mac

If you are using a Mac, be sure to follow these tips to successfully invoke the mapping options shown in Figure 18-3:

- 1 First, select the group of samples you wish to import in the Mac OS Finder.
- 2 Click the MachFive window so that it is the active window. This is important: the MachFive window must be active during the drag and drop gesture.
- 3 Click on the samples you wish to drag, *before you hold down the option key*.
- 4 Move the samples onto the mapper grid in the MachFive window *but before you release them*, press the option key, and keep pressing it while you let the samples go.

The trick here is to *click first, then* press option, with the MachFive window as the active window.

Successful drag and drop technique on Windows

If you are using a PC, be sure to follow these tips to successfully invoke the mapping options shown in Figure 18-3:

- Be sure you are pressing the alt key as you release the samples to drop them into the mapper grid. You can press alt before or after you click to grab the samples.
- Be sure to drag directly from the Explorer window *directly onto the mapper grid*. If you pass over other portions of the MachFive window before you move onto the grid, the drag and drop operation may not work.

Mapping options

Here is a brief explanation of the mapping menu options shown in Figure 18-3:

Sample Name

Improved from earlier versions of MachFive, the *Sample Name* option (Figure 18-3) begins by searching for a two- to four- letter sequence anywhere in the sample's name to determine its pitch: C3, F#5 or D#-1 are valid examples. The pound sign (#) is interpreted as a sharp, and a lower case "b" indicates flatted notes. The minus sign (-) is used for octaves below zero (e.g. G#-1). Once a pitch is determined, MachFive then looks for other samples with the same pitch and sorts them alphabetically and/or numerically to create velocity stacks. For example, *violin_C3_v1*, *violin_C3_v2*, and *violin_C3_v3* would be stacked vertically on the same key as velocity layers.

Note+Velocity Name

The *Note+Velocity Name* option (Figure 18-3) is similar to Sample Name above, except that for velocity, it looks for standard musical dynamics nomenclature, such as ppp, pp, p, mf, f, ff, etc. For example, *violin_C3_p*, *violin_C3_mf*, and *violin_C3_f* would be stacked vertically on the same key as velocity layers.

With properly named samples, mapping tasks that might take hours can be accomplished in a split second with a simple drag and drop gesture using the *Sample Name* or *Note+Velocity Name* options.

Chromatic

The *Chromatic* option (Figure 18-3) applies the samples to the pitch map keyboard chromatically, starting in ascending order (starting with the highest selected sample in the list and working down from there).

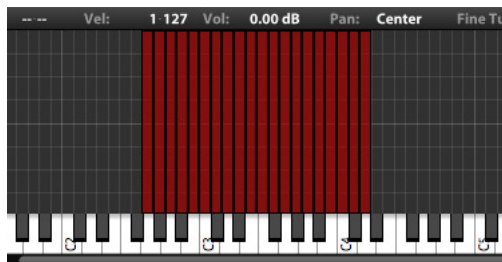


Figure 18-4: Chromatic mapping.

White keys

The *White Keys* option (Figure 18-3) applies the samples to the pitch map keyboard diatonically (to the white keys only) in ascending order (starting with the highest selected sample in the list and working down from there).

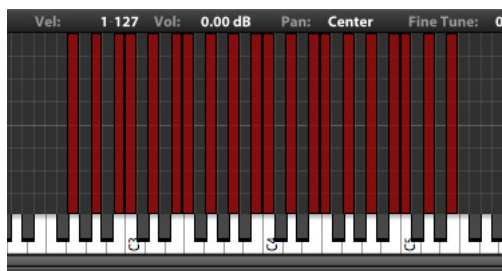


Figure 18-5: White keys mapping of 11 samples starting at C3.

Layer menu

The *Layer* menu (Figure 18-3) lets you choose the layer for the imported samples, or you can create a new layer just for them.

Importing surround samples

Surround samples can be imported using the same techniques as mono or stereo samples. Interleaved multi-channel audio files or de-interleaved sets of mono files can be imported. In the latter case, the

files must have the same name, except for their file name extensions (.L, .R etc.). The following file name extensions are recognized to identify surround channels.

Surround channel	Recognized file name extensions
Left	.L, .l, -L, -l, (L), (l), .FL, .Fl, .fl
Right	.R, .r, -R, -r, (R), (r), .FR, .Fr, .fr
Center	.C, .c, -C, -c, (C), (c), .FC, .Fc, .fc
Left surround	.RL, .Rl, .rL, -RL, -rL, (RL), (rL), .LS, .Ls, .ls
Right surround	.RR, .Rr, .rr, -RR, -rr, (RR), (rr), .RS, .Rs, .rs
Center surround	.RC, .Rc, .rc, -RC, -rc, (RC), (rc), .CS, .Cs, .cs
LFE	.LFE, .Lfe, .lfe, -LFE, -lfe, (LFE), (lfe), .LF, .Lf, .lf

Supported file formats

All common audio file formats can be imported, 16-bit, 24-bit or 32-bit at any sample rate up to 192 kHz. For a summary of supported file formats, see “Sample and loop formats” on page 91.

WORKING WITH MULTIPLE LAYERS

The mapping grid shown in Figure 18-1, along with the keygroups mapped onto the grid, represent a single keygroup *layer*. However, MachFive allows you to create multiple layers for a program, each with their own set of mapped keygroups, as demonstrated in Figure 17-2 on page 117. Keygroups in each layer are semi-transparent, so you can see them on top of one another.

Use the List Editor to create, name, color-code, select, and otherwise manage multiple layers. See “Layer settings” on page 174.

You can also use the Tree Editor to view, select and manage layers in their hierarchical context within MachFive. See “Tree Editor” on page 165.

Once you’ve set up multiple layers using the List and Tree Editors, you can apply *layer rules*, which allow you to program dynamic and expressive response characteristics across layers.

LAYER RULES

Layer Rules provide a way to enable dynamic and expressive behaviors for switching between layers in instrument programs. In terms of complexity, layer rules fall somewhere between simple key switches (in Performance mode) and the ultimate flexibility of event processors (scripts). At first glance, layer rules may seem quite simple, but they are extremely powerful in terms of what they allow you to accomplish.

You can create as many layer rules as you wish and apply them to any combination of layers. Each rule can have sub-rules, and those sub-rules can have sub-rules, and so on, to create complex behaviors.

Opening the Layer Rules editor

To open the Layer Rules editor (Figure 18-6), choose *Edit Layer Rules* from the Mapping Editor’s contextual menu or Edit menu (Figure 18-2 on page 129), or choose *Edit Layer Rules* from the List Editor’s Layer Edit menu (Figure 21-4 on page 175).

Understanding Layer Rules

There are two columns in the Layer Rules editor: *Rules* and *Layers*.

The *Rules* column (Figure 18-6) is the rule “tree.” This is where you add, remove, and specify rules.

The *Layers* areas is the layers list. For a rule to do something, it needs to have layers on which to operate.

Rules have three basic functions, which are good to keep in mind as you learn and experiment with them:

- 1.) They have a behavior which affects sub rules.

- 2.) They work as control items for parent rules.
- 3.) They work as groups, containing any number of layers.

Rules

The *Rules* column (Figure 18-6) is where you create and set up rules as follows:

To do this	Do this
To add a new rule	Right-click an existing rule and choose <i>Add sub-rule</i> . Rules are always created as a sub-rule to the one you click; to get started with your first rule, right-click the Root Rule.
To delete a rule	Right-click it and choose <i>Delete Rule</i> .
To show/hide sub-rules	Click the triangle next to the rule name.
To add or remove layers to/from a rule	Click the rule to select it, and then check or uncheck layers in the right-hand column.
To specify what the rule does	Choose its function from its menu on the right.

Layers

Each rule acts as a group, containing one or more layers (Figure 18-6). Any layers which are added to a rule will be affected by the rule (more on this below).

To add layers to a rule, click the rule to select it, and then check the box(es) for the desired layer(s) on the right. To remove the layer from the rule, uncheck its box.

Rule settings

The *Rule settings* (Figure 18-6) are where everything comes together. The rules and Layers sections establish the connection between the rule and its layers, but they don't do anything on their own: you have to add rule settings to create dynamic behavior such as keyswitching.

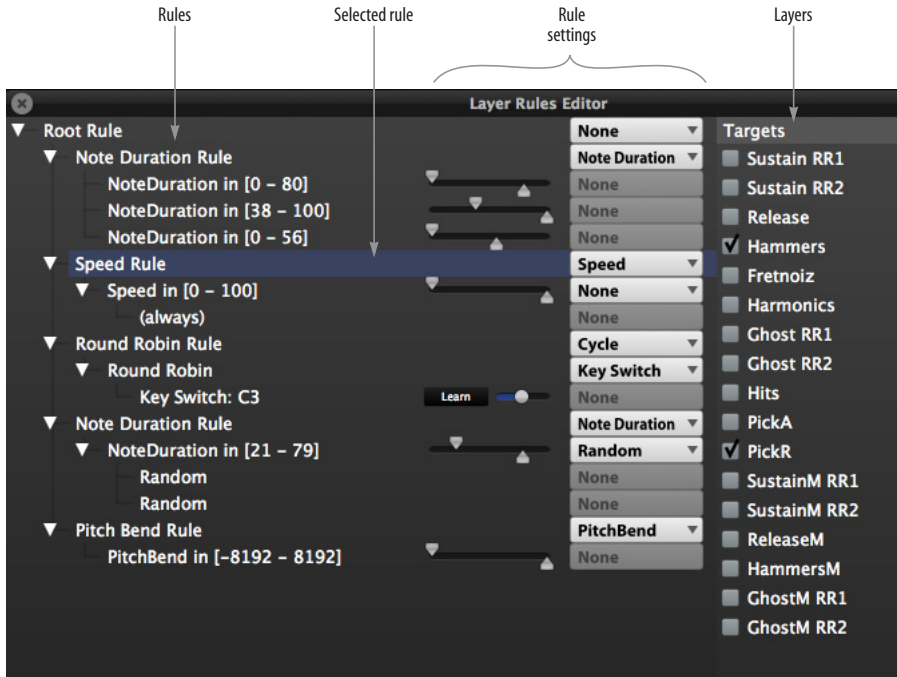


Figure 18-6: The Layer Rules Editor.

Choose the desired rule setting from its menu:

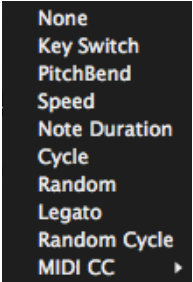


Figure 18-7: Rules menu

For example, let's say we have a program with two layers — one with a staccato articulation, the other with a sustained articulation — and we want to add a keyswitch to toggle between them:

- 1 Right-click the root rule to add a sub-rule.
- 2 Repeat step 1 to add second sub-rule.
- 3 Choose *keyswitch* from the root rule menu.
- 4 The two sub-rules now display the names: Key Switch: C3.
- 5 Click the first Key Switch rule to select it, and then check the box next to the staccato layer to assign it to the rule.
- 6 Repeat Step 5 for the second rule to assign the sustain layer to the second rule.
- 7 Use the slider (or MIDI learn button) for each rule to assign a unique key switch to it.
- 8 You can now enable or disable each layer by playing their respective key switches.

You can repeat this process as needed for more layers and keyswitches.

Sub-rules

You can further refine how a layer is triggered by adding sub rules. You can add as many layers to the hierarchy as you wish.

The Rules menu

The *Rules* menu (Figure 18-7) provides the following choices for rules:

Rule	Explanation
Key switch	Enables/disables the layer with a MIDI note trigger.
Pitch Bend	Assigns each layer to a pitch bend range.
Speed	The triggered layer is determined by the length of time between MIDI notes.
Note duration	The triggered layer is determined by the duration of MIDI notes.
Cycle	Each layer is triggered sequentially.
Random	Each layer is triggered randomly.
Legato	Layers are triggered depending on the interval between MIDI notes. Legato is a specialized type of rule where connections are made automatically based on the name of the layer, using conventions primarily used by libraries such as Gigasampler.
Random Cycle	Each layer is triggered randomly, but never twice in a row.
MIDI Control Change	Assigns each layer to a range of MIDI controller values.

CHAPTER 19 Oscillator Editor

OVERVIEW

Oscillators are the basic building block of sound in MachFive. Oscillators are the blocks which actually generate sound.

There are two kinds of oscillators: sampling and synthesis. *Sampling oscillators* play back an audio file, while *synthesis oscillators* generate sound by pure synthesis. Each keygroup contains one or more oscillators.

The Oscillator Editor is the primary editor for oscillators.

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Figure 19-1: The Oscillator Editor.

OPENING THE OSCILLATOR EDITOR

To open the Oscillator Editor, click its show/hide button in the upper right corner of the Edit tab (Figure 19-1), which is accessed in the Main view (“Main View” on page 56).

To select an oscillator for editing in the Oscillator Editor, click on its parent keygroup in the Mapping Editor.

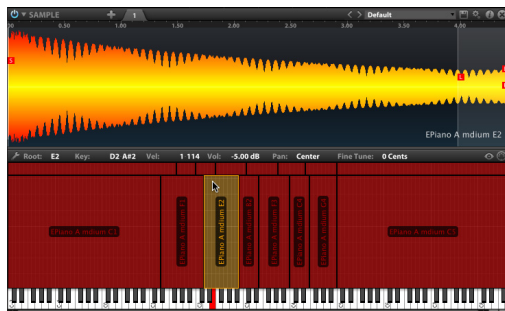


Figure 19-2: Selecting a keygroup for editing in the Oscillator Editor.

If there are no oscillators in the selected keygroup, see “Adding an oscillator”, below.

Changing the Oscillator Editor’s size

Use the divider between the Mapping and Oscillator Editors (Figure 17-1 on page 116) to change their sizes relative to each other. You can also hide other sections in the Edit tab using their show/hide buttons (Figure 17-1 on page 116).

MANAGING OSCILLATORS

Keygroups contain one or more oscillators. You can mix and match sample and synthesis oscillators any way you like within a program and within individual keygroups.

Adding an oscillator

By default, keygroups contain one oscillator. Drag and drop a sample into the Mapping Editor to create a new keygroup with a sampling oscillator (see “Importing samples” on page 131), or right-click in the Mapping Editor and choose *New Keygroup* to create a new keygroup with a synthesis oscillator.

To add additional oscillators within a keygroup, click the “+” button and choose the desired oscillator type from the menu (Figure 19-1). A new tab will appear for the new oscillator and its settings will be displayed.



Figure 19-3: Adding a second oscillator.

If the selected keygroup does not contain any oscillators, you can create a new oscillator by clicking anywhere in the Oscillator Editor and choosing the desired oscillator type from the menu.

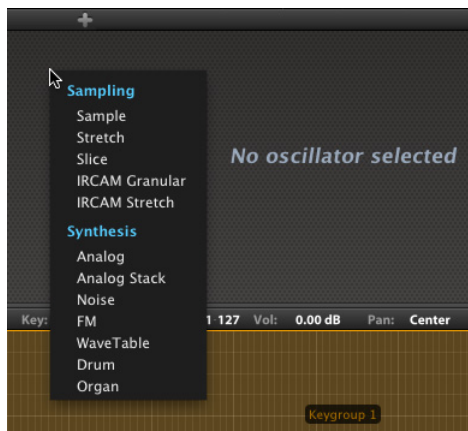


Figure 19-4: Creating an oscillator.

Changing oscillator type

To change an oscillator's type, click the oscillator type in the upper left and choose a different oscillator type from the menu.



Figure 19-5: Changing the oscillator type.

For details on each oscillator type, see the sections of this chapter beginning on page 146.

Adjusting oscillator settings

Oscillators have general-purpose settings, such as volume, root pitch, etc. that apply to any type of oscillator. See “Oscillator settings” on page 119.

Working with multiple oscillators

Each oscillator in a keygroup displays a tab along the top of the Oscillator Editor (Figure 19-6). Click a tab to display the oscillator's settings.



Figure 19-6: Tabs for multiple oscillators.

Saving and loading oscillators

Oscillators can be saved and loaded independently of program files.

Oscillator preset menu

Presets for the current oscillator type are displayed in the upper right of the Oscillator Editor (for most preset types). Choose a preset from the menu, or use the next/previous buttons to step through the presets.



Figure 19-7: Loading an oscillator preset from the menu.

Oscillator preset browser

Oscillator presets can also be viewed in the sidebar browser. Click the *Browse* tab at the top of the sidebar (Figure 19-8), then click the oscillator browser to view oscillator presets. The oscillator browser displays presets for all oscillator types, not just presets for the currently selected oscillator type.

To load an oscillator preset from the browser, drag it to the Oscillator Editor to load it as an additional oscillator in the currently selected keygroup. Or you can drag it onto the Mapping Editor to create a new keygroup.

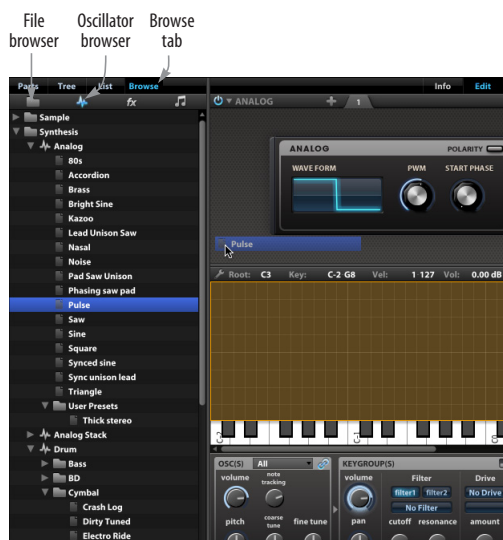


Figure 19-8: Loading an oscillator preset from the sidebar browser.

Browsing and importing samples from disk

To browse audio files on your hard drive for a sampling oscillator, click the file browser folder icon above the sidebar browser (Figure 19-8). Navigate to the audio files you wish to load and click them in the browser. If *Auto Load* is enabled (Figure 19-9), they are immediately loaded into the current oscillator tab. If *AutoPlay* is enabled, samples play when you click them. If not, hit the play/stop button to audition them. Adjust audition volume with the slider (Figure 19-9).

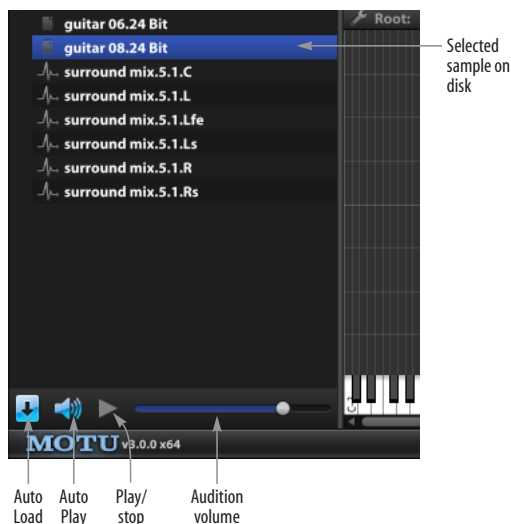


Figure 19-9: Browsing samples on disk.

Saving sampling oscillators

To save a sampling oscillator, click the *Save* button and choose the desired command from the menu, described below.

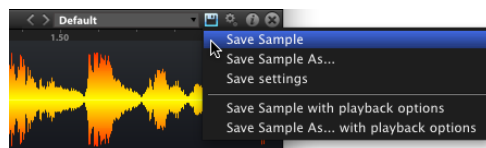


Figure 19-10: Save menu for sampling oscillator types.

Save saves to disk any changes that have been made to the current sample. When you edit a sample in MachFive, you are editing the sample in RAM; to permanently save those changes (write them to disk), you must save your changes with the *Save* command.

Save As lets you save the sample as a separate file on disk with a different name.

The *Save Settings* command saves an oscillator preset independent of the audio file. The preset contains the oscillator parameters (described on page 145) which can be applied to any audio file loaded in a sampling oscillator.

The Sampling oscillator type has two additional options (Figure 19-10). *Save Sample with playback options* saves the sample to disk along with its general oscillator settings (“Oscillator settings” on page 119). *Save Sample As with playback options* is similar, but saves the sample as a separate file on disk with a different name.

The IRCAM Stretch oscillator has an additional menu item called *Export with stretch/pitch applied* (Figure 19-11). This command lets you easily “bounce” (export) the oscillator waveform with the current IRCAM stretch settings applied. For example, if you wish to time-stretch some audio (to take full advantage of the IRCAM technology to achieve the highest possible quality) and then export the result to use in your DAW, this option makes it a one-step process.

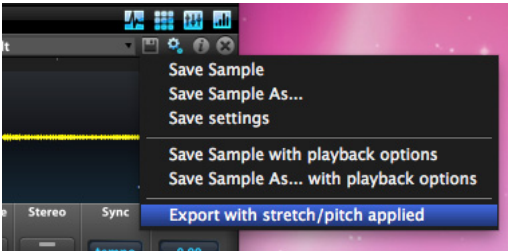


Figure 19-11: IRCAM Stretch oscillator save menu

🔊 Oscillator presets are not available for the Slice oscillator type.

Saving synthesis oscillators

There are no additional options when saving a synthesis oscillator preset. Simply click the Save button and enter the desired preset name.

User oscillator presets

User oscillator presets are saved here:

OS	Location
Mac	/Users/username/Documents/MOTU/MachFive3/ User Presets/Oscillators
Windows	\Users\username\Documents\MOTU\MachFive3\ User Presets\Oscillators

Editing oscillators

Though each oscillator type has a unique set of controls (described in detail starting on page 146), there are some general editing guidelines which apply to all oscillator types.

See the following pages for details:

- “Editing Basics” on page 115 for editing in general
- “Oscillator settings” on page 119 for oscillator settings in the Settings section
- “Sampling oscillator types”, below, for audio editing in sampling oscillator types

Automating and modulating oscillator controls

Most oscillator controls can be automated or modulated. Right-click a control to open the automation and modulation contextual menu. For details, see chapter 23, “Automation and Modulation” (page 209).

Disabling an oscillator

To disable an oscillator, click the power button in the upper left.

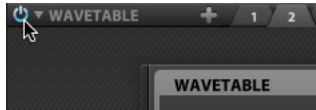


Figure 19-12: Disabling an oscillator.

Deleting an oscillator

To delete an oscillator, click the “x” button in the upper right.

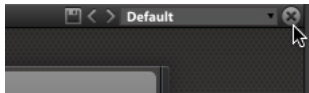


Figure 19-13: Deleting an oscillator.

SAMPLING OSCILLATOR TYPES

The sampling oscillator types provide a wide range of audio file playback and editing features.

Audio file formats

Samples can be a mono, stereo, quad, 5.1, or 7.1 sample, up to 32 bits, at any sample rate up to 192 kHz. MachFive imports AIFF, WAVE, mp3, Sound Designer II (SD2), REX, ACID, SND, FLAC, CAF, and Apple Loop audio files directly.

Importing samples

See “Browsing and importing samples from disk” on page 140.

Changing oscillator type

When changing between different sampling oscillator types (Figure 19-14), the oscillator retains the audio file. This makes it easy to audition the effect of each oscillator type on the same audio file.

Real-time waveform editing and looping

The Oscillator Editor provides complete non-destructive and “destructive” waveform editing and looping of mono, stereo, and multichannel samples. By *destructive*, we mean that the actual sample data is being modified. Keep in mind, however, that when you edit a sample in MachFive, you are editing the sample data currently loaded in RAM. The changes you make won’t become permanent changes on disk until you save the sample. See “Saving sampling oscillators” on page 140.

All waveform editing can be performed in real time, as the sample plays.

Time Ruler

The *Time Ruler* (Figure 19-14) displays time in one of three time formats: seconds, bars/beats, or samples. Right-click anywhere on the time ruler to choose the desired format (Figure 19-15).



Figure 19-14: Sample editing.

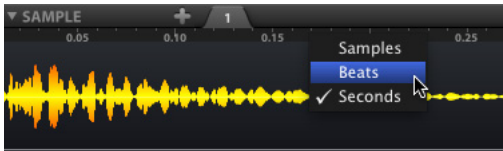


Figure 19-15: Changing the ruler time format.

To zoom the waveform horizontally in or out, hold the option/alt key and use your scroll wheel. Zooming in gives you more precision in your edits.

Insertion Point

Click anywhere on the waveform to place the *Insertion Point* (Figure 19-14). This is the location where sample material in the clipboard will be inserted. See “Cut” on page 143. This point also determines where playback begins when you use the Play Selection command (page 144).

Making selections

To select any portion of the waveform, drag horizontally over the desired portion. Use the horizontal zoom controls to gain higher precision. You can also use the following shortcuts to make quick selections between the various handles:

To Select This	Do This
To select the entire sample	Double-click anywhere on the waveform.
To select the entire sample within the bounds of the start and end handles	Double-click the Sample Start or End handle.
To select from the Sample Start to the Loop End	Double-click the Loop End handle.
To select from the Loop Start to the Loop End	Double-click the Loop Start handle.
To select just the crossfade region	Double-click the Crossfade Start handle.

Selection Info

The *Selection Info* (Figure 19-14) appears at the top of the waveform when a selection is made, indicating the start, end, and duration of the selection (in samples). The Selection Info updates in real-time as you change the selection.

Sample editing contextual menu

Right-click anywhere in the audio waveform to access the contextual menu (Figure 19-16).

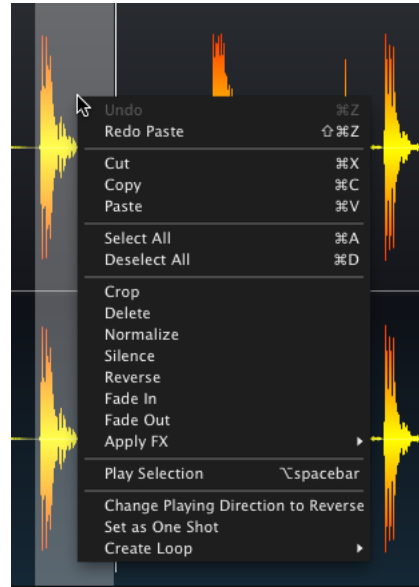


Figure 19-16: Sample editing contextual menu.

Undo and Redo

The Oscillator Editor supports unlimited *Undo* and *Redo*. Use the Undo/Redo commands to step forwards or backwards through the undo history.

Cut

The *Cut* command removes the selected sample data and closes the resulting gap. Cut removes time and makes the sample shorter; if you wish to remove waveform data and maintain the same file length, use *Silence* (page 144).

Copy

The *Copy* command places the currently selected sample data in the clipboard for pasting.

Paste

The *Paste* command pastes the sample data in the clipboard. Click anywhere in the waveform to place the Insertion Point (page 143), and Paste will insert

the clipboard data at the insertion point. All data after the insertion point will be moved later in the sample.

Alternatively, select a portion of the sample and Paste will replace the selection with the clipboard data, even if their lengths aren't the same. For example, if you select 2 seconds and paste 10 seconds, the 2-second portion of the waveform is replaced with the 10 seconds of material on the clipboard.

Select All and Deselect All

The *Select All* and *Deselect All* commands select or deselect the entire sample.

Crop

The *Crop* command removes all sample data that is not within the current selection. To use Crop, you must first make a selection over the sample data you wish to preserve. Then use Crop to remove everything else.

Delete

The *Delete* command does the same thing as Cut, except that it does not place the deleted material on the clipboard. This command allows you to remove sample data without affecting any data currently on the clipboard.

Normalize

The *Normalize* command boosts amplitude by whatever amount is needed to make the loudest peak in the selection reach digital full scale (zero dBFS).

Silence

The *Silence* command replaces the selection with silence. Silence is similar to Cut, but the length of the audio file is maintained.

Reverse

The *Reverse* command reverses the selection.

Fade In and Fade Out

Applies a linear fade to/from zero dB.

Apply FX

The *Apply FX* submenu destructively applies an effect as a permanent modification to the sample data.

For details on MachFive's effects, including EQ, reverb, and many others, see Appendix B, "Effects" page (173).

To non-destructively apply an effect to a keygroup, use Keygroup Effects (page 183).

Play Selection

Use the *Play Selection* command to audition the selection.

Change Playing Direction

The *Change Playing Direction* commands are available only when using the Sample or IRCAM Stretch oscillator types. For details, see "Changing Playing Direction" on page 148.

Loop commands

The *Loop* commands are available only when using the Sample or IRCAM Stretch oscillator types. For details, see "Working with sample loops" on page 147.

Batch editing multiple samples

To apply the same edit to multiple samples at one time, select their keygroups in the Mapping Editor and click the Batch button (Figure 19-17):

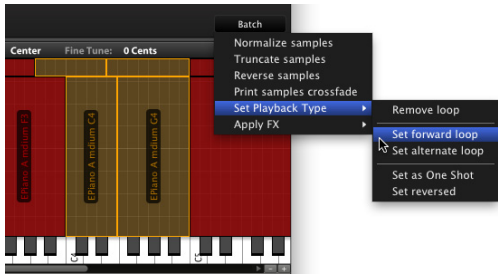


Figure 19-17: Batch editing oscillators in multiple keygroups.

The Batch menu provides operations that can be applied to all of the currently selected keygroups.

Here is a brief summary of the *Batch* menu operations.

Batch menu item	Description
Change oscillator type	Switches all to the oscillator type you choose from the sub-menu.
Normalize samples	“Normalize” on page 144.
Truncate samples	Discards the portions of the sample that are outside the Sample Start and Sample End points.
Reverse samples	“Reverse” on page 144
Print Samples Crossfade	If any currently selected keygroups contain crossfades, this command writes the crossfade permanently to the sample. To then permanently save the sample with its new printed crossfade to disk, see “Saving sampling oscillators” on page 140.
Set Playback Type	“Change Playing Direction” on page 144 “Loop commands” on page 144
Apply FX	“Apply FX” on page 144

Sample editing shortcuts

There are several shortcuts for sample editing:

Action	Shortcut
Contextual menu	Right-click the waveform
Change ruler	Right-click the ruler
Select all	Double-click
Select from sample start to end	Double-click the Sample Start or End marker
Select from loop start to end	Double-click the Loop Start or End marker
Zoom horizontally	Option/alt–scroll wheel up/down
Move horizontally	Scroll wheel
Zoom vertically	Shift–scroll wheel

Working with surround samples

Surround sample editing works the same way as stereo editing. Loop points and crossfades can be edited, effects can be applied, and all other sample editing operations can be used.

Sample Info

Click the *Sample Info* “i” button (Figure 19-14) to display information about the oscillator’s audio file, including the file path, bit depth, sample rate, number of channels, duration, and loop settings.

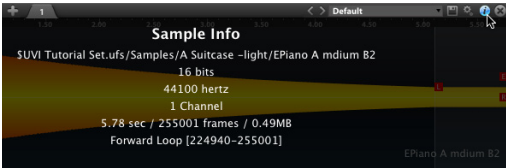


Figure 19-18: Batch Displaying Sample Info.

Oscillator parameters

Each sampling oscillator type has a unique set of parameters displayed beneath the waveform. To toggle the oscillator parameters display, click the gear icon (Figure 19-14 on page 142). The parameters shown for each sampling oscillator type are described in detail in the following sections.

SAMPLE

With the *Sample* oscillator (Figure 19-19), the audio file is triggered in the same fashion as a traditional sampler: when you trigger the sample at its root note, it will play back at its original tempo and pitch. When you play a note higher or lower than the root, its pitch and tempo are adjusted accordingly. The higher the note, the higher the pitch of the sample and the faster it plays; the lower the note, the lower and slower it plays. MachFive's global tempo setting (and the tempo setting of the host software, if any) is ignored. The sample plays at the speed dictated by the note played.

Sample mode is good for material such as vocals, where precise tempo control is not required. It is also good for producing the “sampler effect”.

Sample oscillator parameters

The Sample oscillator has one parameter shown at the bottom of Figure 19-19. To display this bar, click the gear icon, as described on page 145.

Sample Start knob

The *Sample Start* knob specifies the sample start time for the currently selected oscillator, specified as a percentage of the total sample length. There are really two different sample start times: one for the sample file (“Sample Start and End” on page 147) and another for the oscillator. This setting controls

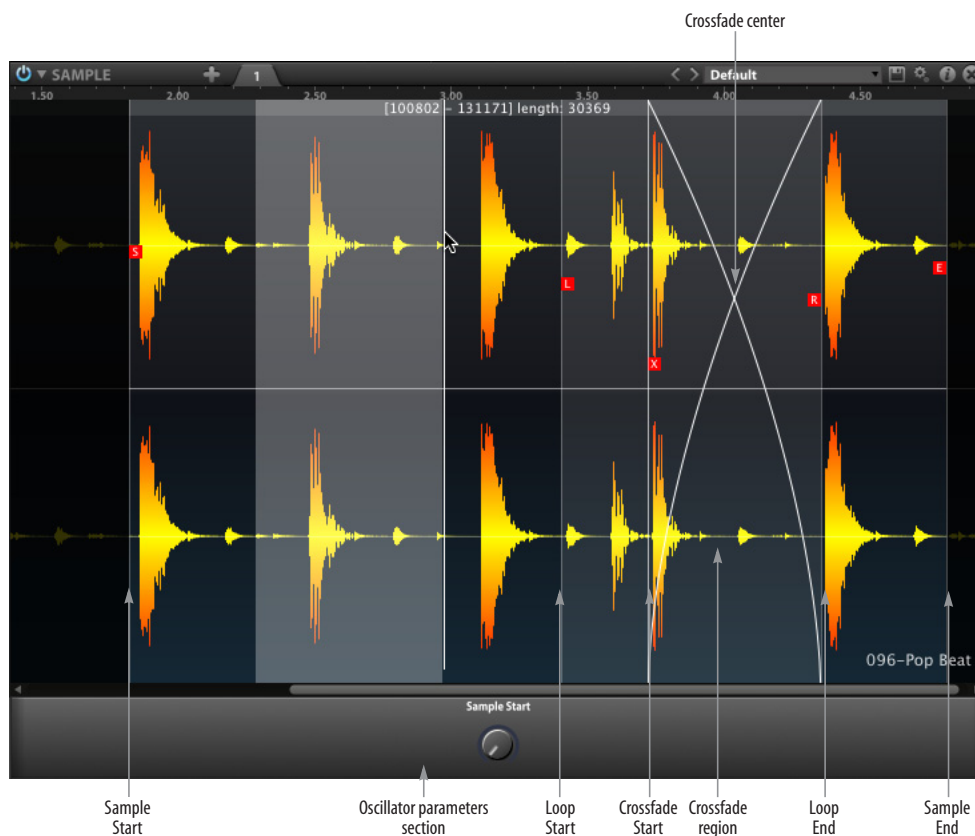


Figure 19-19: Sample oscillator.

the oscillator sample start, and it is relative to the sample file's sample start. This setting is good for adjusting sample start time in a way that doesn't affect the actual sample file start times.

Sample Start and End

Sample Start determines where the sample begins playback when triggered. Likewise, *Sample End* determines where the sample playback ends.

Drag the Sample Start and End markers (Figure 19-19) to change them. As you drag, the sample position is displayed above the waveform.

Working with sample loops

MachFive supports a variety of sample looping features, which determine how the sample plays back when you trigger a note (attack), hold it (sustain), and then release it.

Creating a loop

To create a loop, make a selection in the waveform, right-click, and choose *Create Loop > Forward*, *Create Loop > Alternate*, or *Set as One Shot* from the contextual menu (Figure 19-16 on page 143). If you do not make a selection, the Loop Start and End will be placed at the Sample Start and End.

Loop options

The following loop options are available:

Loop options	Explanation
(No loop)	The sample plays just one time through as you hold the note. If you release the note, it stops playing.
Forward	The sample cycles between the loop points until the note is released. The material to the right of the Sample End marker is never played.
Alternate	The sample plays forwards and then backwards inside the loop region, rather than playing forward, jumping to the beginning and then playing forward again. Playing forwards and then backwards in this fashion can produce much more desirable results for certain types of sample material.
Set as One shot	The sample plays forward once, in its entirety, even if the note isn't held.

Loop Start and End

Once a loop is created, the *Loop Start* and *Loop End* markers appear in the waveform. Loop Start determines the beginning of the looped region when a triggered note is held. Likewise, Loop End determines the end of the looped region.

Drag the Loop Start and End markers (Figure 19-19) to change them. As you drag, the sample position is displayed above the waveform.

☛ When using a One Shot loop, the Loop Start and End markers are not displayed since the entire sample is always played.

Crossfades

Crossfades help to eliminate audible artifacts at the boundary of the sample loop. More specifically, a crossfade creates a smooth transition between sample data from *before* the loop start and the sample data at the end of the looped region. Therefore, the maximum possible crossfade length is determined by how far the loop start is from the beginning of the sample.

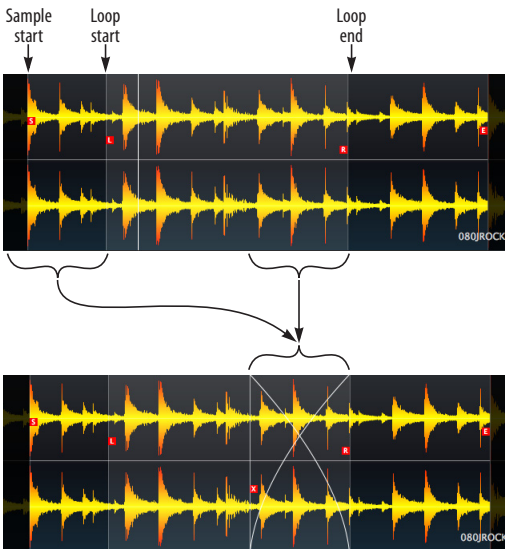


Figure 19-20: A crossfade creates a smooth transition at the loop boundary by mixing sample data from before the loop with sample data at the end of the loop.

Right-click in the waveform and choose *Enable Xfade* from the contextual menu (Figure 19-16 on page 143) to enable a loop crossfade.

Drag the Crossfade Start handle to set the crossfade region while the sample is looping. As you drag, the sample position is displayed above the waveform.

Keep in mind, however, that the maximum length of the crossfade region is determined by the distance between the loop start and the beginning of the sample. Therefore, as you drag, the handle may seem like it is “stuck” and can’t go any further.

Drag the Crossfade Center handle to control the shape of the crossfade.

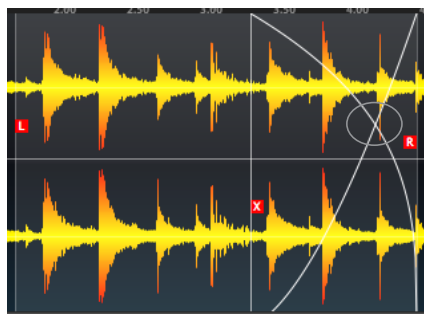


Figure 19-21: The crossfade handle.

To disable the loop crossfade, right-click in the waveform and choose *Disable Xfade* from the contextual menu (Figure 19-16 on page 143).

Looped release

When you trigger a sample with a loop and the triggered note is released, the sample continues looping during the amplitude envelope release time. Choose *Disable Release Looped* if you want the sample to simply play from the point at which the key was released and ignore the loop points. Choose *Enable Release Looped* if you want the sample to continue looping during the release.

Deleting a loop

To remove a loop, choose *Delete Loop* from the contextual menu. If you have chosen a One Shot loop type, *Disable One Shot* will appear in the contextual menu instead.

Batch editing loops

To edit loop settings of multiple samples at once, use the Batch menu (page 145).

Choosing One Shot loop as default

When importing samples, you can choose whether the default mode is One Shot or not. This is a global preference. See “Sample drag & drop mode” on page 105.

Changing Playing Direction

Change Playing Direction to Reverse causes the sample to be played back in reverse, but the actual audio data remains the same. To change the sample back to forward playback, use *Change Playing Direction to Forward*.

STRETCH

The *Stretch* oscillator (Figure 19-22) uses a granular synthesis method to change the duration of the loop while maintaining the correct pitch. It cuts the audio into small chunks and rearranges them to change the length of playback. Transients are cut into larger blocks to keep the rhythm accurate, while other portions are sliced smaller (generally the harmonic or pitched content of the loop).

The default settings should be good for both rhythmic and pitched samples, but some samples may benefit from adjustments.

Loop settings

The Stretch oscillator has the same loop settings as the Sample oscillator, as described earlier in this chapter.

Stretch oscillator parameters

The Stretch oscillator has the parameters shown at the bottom of Figure 19-22. To display these parameters, click the gear icon, as described on page 145.

Solo mode

Solo mode (Figure 19-22) enables a special algorithm that is optimized for monophonic sounds such as vocals or solo instruments.

Granular Size / Transient Sensitivity

The *Granular Size* slider (Figure 19-22) determines the size of the audio chunks, and the *Transient Sensitivity* (Figure 19-22) determines how sensitive MachFive is in determining what is a transient section and what is not. Stronger transients are at the left end of the slider, and more subtle transients are at the right end.

Note that even when the default settings sound natural, you may want to adjust these settings to achieve a particular effect when using extreme stretching.

Sync

The *Sync* setting is the same as explained in “Sync” on page 152, with the exception that the *Position* option is not available for the Stretch oscillator.



Figure 19-22: Stretch oscillator.

Tempo

When Sync (above) is off, the *Tempo* setting determines the base tempo for the stretch loop. Use *Tempo Fine* for more fine-tuned tempo adjustment (relative to the base tempo), and use the *Tempo Factor* for extreme tempo adjustments. These controls can be modulated for interesting real-time tempo adjustments.

Sample Start

The *Sample Start* setting is the same as explained in “Sample Start knob” on page 146.

Pitch and tempo

The MIDI note you play to trigger the sample changes the playback pitch, but not its tempo. To adjust the sample’s tempo, use the Tempo controls described above.

Legato

The *Legato* setting for the stretch oscillator is accessed in the Tree Editor Inspector. See “Oscillator settings in the Inspector” on page 169.

SLICE

The *Slice* oscillator (Figure 19-23) puts the loop into Slice mode with the Loop Lab™ slice controls shown. In Slice mode, the MIDI note you play to trigger the loop or phrase affects its pitch, but not the tempo. For example, if you play a three-note chord, all three triggered loops (or phrases) will play at the same speed (but at the different pitches you played). Playback speed is determined by the speed controls (see “Tempo setting” on page 77), the host tempo (if sync is enabled, as discussed in “Sync to Host” on page 77) and the *Loop sync* setting below.

Alternately, you can map each slice to individual notes on your MIDI controller to then trigger each slice separately.

The Slice oscillator is not typically used for phrases because phrases consist of musical material (such as a vocal utterance) that does not lend itself to being split up into short rhythmic pieces. There are

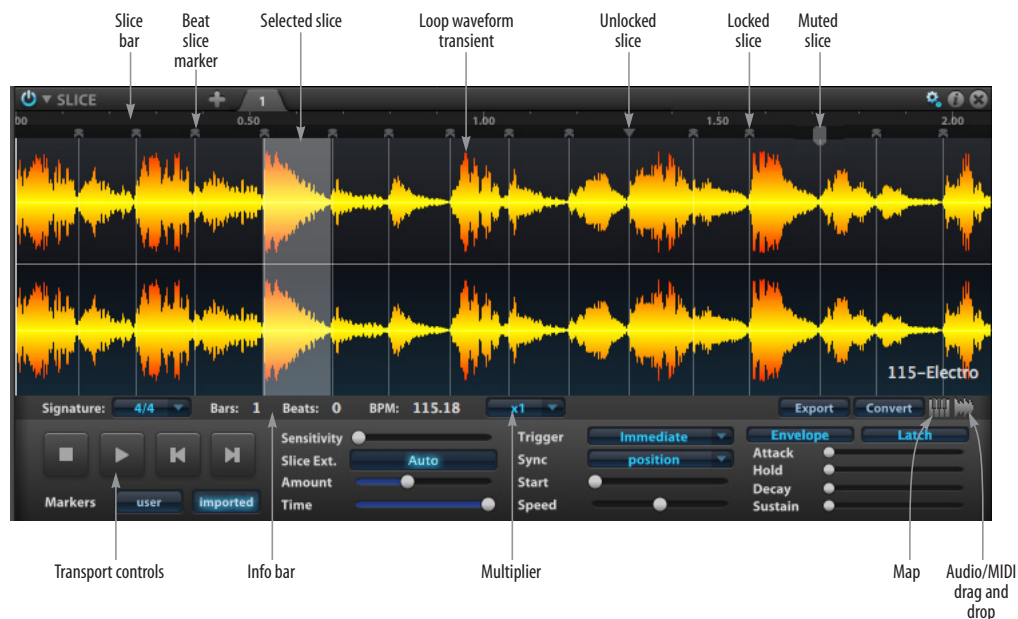


Figure 19-23: Slice oscillator.

no restrictions, however, so you can use any oscillator type with any loop, phrase, or sample, as you wish.

The *Loop Lab* editor (Figure 19-23) provides access to MachFive’s powerful slice loop editing features. Loop Lab lets you work individually, in detail, with a single, loop, phrase, or sample. You can directly load a loop, phrase or sample by itself into Loop Lab in any format (AIFF, WAV, SDII, REX, RX2, Apple Loop, ACID, CAF and UFS loops). You can use the loop’s imported slices or create your own.

Loop Waveform

The *Loop Waveform* (Figure 19-23) displays the shape of the waveform, including transients (sharp peaks) that usually indicate audible beats within the audio.

Click a slice to select it and audition it.

Drag over several slices to select them.

Slice Bar

The Slice Bar (Figure 19-23) is where you define the beat slice locations in the waveform. Once you define a beat slice, you can then manipulate the loop — and even the individual slice — based on that slice point. Some operations are not allowed when the loop is in Imported mode (see “Markers” on page 151).

Here is a summary of techniques for working with beat slices in the Slice Bar:

To do this	Do this
To add a slice	Double-click anywhere.
To delete a slice	Right-click its handle and choose Delete from the menu.
To mute (temporarily disable)	Right-click its handle and choose Mute from the menu.
To lock a slice	Right-click its handle and choose Lock from the menu.

Slice Info Bar

The *Slice Info bar* (Figure 19-23) has the following settings.

Slice Machine Setting What it does

Signature	Determines the meter (time signature) for the loop.
Bar / Beat	Determines the length of the sample or loop in bars & beats. MachFive uses this setting together with the time signature to determine the tempo. You can change these settings to manipulate the tempo.
BPM original	The tempo of the sample itself.
Multiplier	Multiplies or divides the loop’s tempo; you can choose /4, /2, x1 (the default, which is the current tempo), x2, and x4.
Export, Convert, etc.	See the following sections.

Slice oscillator parameters

The Slice oscillator has the parameters shown at the bottom of Figure 19-23. To display these parameters, click the gear icon, as described on page 145.

Transport controls

The Slice *transport controls* (Figure 19-23) start and stop playback, and play the next or previous slice.

Markers

There are two possible sets of beat slice markers: *User* and *Imported* (Figure 19-23). *User* mode employs slices that you’ve specified, or that are generated by the Sensitivity slider (below). *Imported* uses the slices which are stored in the file, such as with UFS, REX, and Apple Loop files.

To permanently save your own Loop Lab beat slices, you must save the loop as explained in “Saving sampling oscillators” on page 140. Once saved, you can then use the *User* and *Imported* buttons to toggle between the two sets of slices (Loop Lab or Imported) at any time, as both are saved separately in the sample file.

Sensitivity

In *User* mode, the loop is analyzed and its transients are detected, and each transient is given a score. Higher scores are given to the sharpest transients, and lower scores to more subtle transients. The *Sensitivity* (Figure 19-23) slider sets the threshold for the transient score, with higher scores at the left and lower at the right. As you drag the slider further to the right, more slices appear; at the far right, all detected slices are used.

☛ The Sensitivity slider is only active when the *User* button is pressed (Figure 19-23). It is disabled when the *Imported* button is pressed because the beat slice markers are taken from the source loop file, instead of being calculated by MachFive.

Slice Extension / Amount / Time / Auto

If the original tempo of the loop is higher than the current tempo, there will be gaps between the slices. This silence may sound strange, so the slices can be extended to fill the space, by taking a portion of the end of the slice and looping it (in a crossfaded alternating loop). Normally, you can leave the *Slice Ext. (Extension)* setting in *Auto* mode (Figure 19-23), but if you want to control this manually, disable the *Auto* button and adjust the *Amount* and *Time* sliders (Figure 19-23). *Amount* determines how much of the end of the slice is looped, and *Time* determines how long that portion will be looped.

Trigger

The *Trigger* menu (Figure 19-23) lets you specify when the loop or phrase begins to play after you trigger it. Note that this is different from the *Sample Start* (see below), which determines the location within the loop where it starts. Instead, the *Trigger* menu settings determines when the loop begins to play, relative to other loops currently

playing, and/or the global tempo of MachFive during playback (or your host software, if MachFive is syncing to it).

Trigger setting	What happens
Immediate	Plays immediately, as soon as the loop or phrase is triggered.
Next Beat	Begins playing at the next beat
Next Bar	Begins playing at the downbeat of the next measure.

If you choose *Next Beat*, the loop or phrase will begin playing at the next beat from its beginning. This may or may not be what you want musically. For example, if you trigger the loop or phrase just after beat 2, it will come in on beat 3, but start playing at its beginning (beat 1). If you are creating poly rhythms in this manner, this might be just what you want. But if you want the loop to come in on beat 3 playing its own beat 3, then use *Position sync* (explained further in the next section). *Position sync* keeps the loop's beats aligned with the global tempo, regardless of when the loop begins playing (on the next beat or next bar).

Sync

The settings in the *Sync* menu (Figure 19-23) let you synchronize the slice loop to MachFive's global tempo (BPM) setting. If the *Sync to Host* option (page 77) is enabled, then the loop or phrase will also synchronize to the tempo of your host software, if any.

Sync menu item	What it does
Off	The loop does not sync to tempo.
Tempo	The loop follows tempo, but not position. Loops always start at the beginning.
Position	Loops follow both tempo and position (their beats and barlines always align with the tempo).

Tempo sync

When you choose the *Tempo* setting (Figure 19-23), the loop or phrase will play at the tempo indicated by MachFive's BPM setting, or as

determined by the host software if the Sync to Host option is enabled. However, in this mode, the loop or phrase always starts at the beginning (or at the location determined by the Sample start setting). In addition, it begins to play at the instant it is triggered, so it is up to you to trigger it “on the beat”. If you trigger it between beats, it will play in tempo, but offset from the beat by what you played.

Position sync

For the *Position* sync setting (Figure 19-23), it might be helpful to think of the loop as looping indefinitely, whether you are actually playing it or not. When you play a note to “trigger” the loop, you are actually just “unmuting” it, and it begins to play at the position in the loop that currently matches the tempo and meter. For example, if the loop is two bars long, and you trigger it at the second measure of your music, then it plays starting at bar two of the loop.

Start

The *Start* slider (Figure 19-23) allows the loop to start playing at a slice other than the first one. Normally, playback of the loop begins at the first slice, but you can use this control to start on any other slice.

The *Start* slider provides a range from the first slice (0) to the last slice. The number of the last slice depends on the length of the loop and the number of slices. For example, if a two-bar loop is divided into 16th note slices, it will have 32 slices total. This means that slice 16 is the downbeat of measure 2. So if you set the Sample Start slider to 16, the loop will start on the downbeat of measure 2.

Speed

The *Speed* slider (Figure 19-23) adjusts the speed of the loop over a range of $\pm 50\%$, independent of MachFive’s (or your host’s) tempo.

Latch

When the *Latch* button (Figure 19-23) is off (disabled), the slice loop plays for as long as you hold down the note on your MIDI keyboard (or other controller). When Latch is on (enabled), the loop continues to play, even when you lift your finger from the key on your controller.

Envelope

The *Envelope* (Figure 19-23) is an amplitude envelope which can be applied to every slice. By default, the envelope is turned off. When on, adjust the Attack, Hold, Decay, and Sustain as desired.

If you need more advanced envelope options, such as different envelopes for each slice, or multi-point envelopes, use the *Convert* button to change your loop into a MachFive program.

Export

Click *Export* (Figure 19-23) to save all slices as individual audio files on disk.

Convert

The *Convert* button (Figure 19-23) converts the loop into a regular MachFive program, with each slice as a separate keygroup mapped chromatically to MIDI notes starting with middle C (C3). In doing so, the original slice loop keygroup is replaced by the newly mapped slice keygroups. Each MIDI note will trigger its respective slice. This allows you to play each individual slice by itself from a note on your MIDI controller. This also lets you perform more advanced editing for each slice (for example, adding effects or changing the envelope for individual keygroups).

Convert replaces the original slice loop with the newly mapped slice keygroups. However, if you drag and drop the *Convert* button to another part (or a new empty part) in the Parts List, you’ll preserve the original slice loop program and create the new mapped program all in a single step.

To trigger a mapped sliced loop, make sure that the MachFive part that currently holds the mapped loop is properly receiving MIDI data from your MIDI keyboard (or other controller).

Mapping allows you to drag and drop the loop, in the form of MIDI note data, into a MIDI track in your host software. You can then manipulate the loop as MIDI data in your host, as explained in “Audio Drag and Drop” below.

Map

Map (Figure 19-23) does the same thing as *convert*, except that it creates a new separate layer in the same program, preserving (and muting) the original slice loop layer. You can then freely switch between the two forms of the loop by muting one layer or the other.

Audio Drag and Drop

The *Audio Drag and Drop* button (Figure 19-23) lets you drag and drop loops and phrases into the tracks of your host software or your computer desktop. Loops are transferred as a standard mono, stereo or multi-channel audio clip.

You can drag and drop it anywhere into your host software that accepts audio clips via drag and drop. Popular software titles that support this feature include: Digital Performer, Pro Tools, SONAR, Cubase and Nuendo. A good rule of thumb is this: if it works from your computer desktop, it should work from MachFive. If your host makes a distinction between mono, stereo and multi-channel audio material, it may place restrictions on where the audio can be placed based on the channel format.

If the *Sync to Host* option is enabled (“Sync to Host” on page 77) when you perform the drag and drop operation, the loop or phrase will snap to the host’s tempo when you place it in an audio track, such that it conforms to the host’s time line. If your

host software has the ability to snap the drag and drop operation to measures and/or beats, this will help produce rhythmically accurate results quickly.

If *Sync to Host* is disabled, the loop or phrase retains its original tempo when placed in the track.

MIDI Drag and Drop

The drag and drop button changes to *MIDI Drag and Drop* if the *Map* button has been used to map slices to individual keygroups. The loop can then be dragged as MIDI data (MIDI notes) into a MIDI track, which can then trigger the mapped slices in MachFive.



Figure 19-24: MIDI drag and drop.

In either case, once the loop is placed in your host software, it is completely independent of MachFive at that point, and you can treat it as regular audio or MIDI data. This opens up a world of possibilities for manipulating the raw audio or MIDI data using the features in your host software.

When using MIDI drag and drop, find a destination in your host software that accepts MIDI data, such as a MIDI track, although your host may also provide other possible destinations. For example, in Digital Performer, you could drag a MIDI loop into a clipping window.

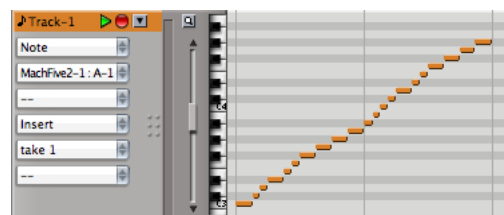


Figure 19-25: Dragging and dropping a MIDI loop into a MIDI track.

Triggering MachFive slices from the host

When a mapped MIDI loop is dropped into a MIDI track, it looks similar to the MIDI data shown in Figure 19-25. Each MIDI pitch triggers a different loop slice. If you play notes chromatically upwards from C3, you will recreate the original loop. If you play them rhythmically in a different order, you'll play the individual slices but the result will sound quite different from (but similar to) the original loop.

Notice in the example that the MIDI track is assigned to play its MIDI data output to the MachFive part that holds the mapped loop. Be sure that your host software MIDI track output is directed to the part in MachFive that holds the mapped loop. Otherwise, the MIDI data from the track will not reach the sliced mapped loop.

IRCAM GRANULAR

As with the Stretch oscillator (page 149), the *IRCAM Granular* oscillator (Figure 19-26) uses granular synthesis. This is state-of-the-art synthesis technology licensed from the renowned IRCAM institute in Paris.

Granular oscillator parameters

The IRCAM Granular oscillator has the parameters shown at the bottom of Figure 19-26. To display these parameters, click the gear icon, as described on page 145.

Direction and Speed

Direction specifies the direction of scrubbing in the audio sample, continuously variable from -1.00 (reverse) to +1.00 (forward). Direction is complementary to Speed (described below), and can be considered to be a bipolar modulation source for Speed.



Figure 19-26: IRCAM Granular oscillator.

Speed changes the grain reading head speed without changing pitch. A value less than 1.00 leads to time stretching, while a value greater than 1.00 leads to time compression. A value of zero freezes the audio texture.

Grain Size

Grain Size is the duration of the window applied to each grain taken from the audio sample, ranging from 5 to 500 ms. It also affects the period between two grains (proportional to grain size) also known as inter-onset time (IOT) in granular synthesis terminology.

To preserve the perceived pitch, Grain Size should be twice as long as the lowest fundamental note period in the audio sample; going below creates progressively noisier textures. Using longer grains creates rhythmic patterns. The default value of 100 ms is a good general purpose value.

Density

Density controls the number of simultaneous grains. It also affects the inter-onset time, which is inversely proportional to Density.

A value of 1.00 means constant summing overlap with two grains. A value less than 1.00 creates a tremolo-like effect, while a value greater than 1.00 creates a unison/chorus-like effect.

Jitter

Jitter modulates the inter-onset time by random amounts, specified from 0 to 100%.

This is useful to break the very repetitive sounds generated at very low inter-onset times (high Density, low Grain Size).

Position

Position moves the grain playhead from 0 to 100% of the audio file, allowing for random access scrubbing in the audio file. The actual read

position is reset each time Position is changed, but continues to advance according to Speed and Direction values. A common usage scenario is to set Speed to nearly zero and use Position to explore the audio file.

Position Var modulates the grain reading position by random amounts, in values from 0 to 500 ms. This is useful to bring life to frozen textures.

Pitch Var

Pitch Var transposes each grain individually by random amounts within the PitchVar range, from 0 cents (slight chorusing) to 12 semitones (wobbling textures).

Loop Mode

The *Loop Mode* menu determines the looping behavior of the sample. The *None*, *Forward*, and *Forward-Backward* loop modes operate in the same manner as described in “Loop options” on page 147.

Pitch Correction

The *Pitch Correction* menu sets the behavior when transposing grains.

Grain Size keeps grain size constant by sampling smaller or bigger chunks of audio before windowing. This is useful if the spacing between two grains (inter-onset time) is an important property of your texture (beating) that you want to preserve when playing different notes or chords.

Period makes grains smaller or larger because of the grain resampling after windowing. This is useful if the grain size and inter-onset time should change with frequency (for example, if you use them to impose a pitched character to a noisy texture).

IRCAM STRETCH

The *IRCAM Stretch* oscillator (Figure 19-27) provides high-quality phase/vocoder-based time-stretching and pitch-shifting with phase-locking between channels and transient, shape, and envelope preservation.

This, however, requires a significant amount of CPU usage. Monitor your CPU usage when using this oscillator, and consider utilizing other oscillator types when the the absolute highest-quality time-stretching and pitch-shifting is not required.

IRCAM stretch oscillator parameters

The IRCAM stretch oscillator has the parameters shown at the bottom of Figure 19-27. To display these parameters, click the gear icon, as described on page 145.

Sample Start

The *Sample Start* setting is the same as explained in “Sample Start knob” on page 146.

Speed

The *Speed* setting is the same as explained in “Direction and Speed” on page 155.

Tempo

The *Tempo*, *Tempo Factor*, and *Tempo Fine* settings are the same as explained in “Tempo” on page 150.

Window

Window is the grain size used by the algorithm, specified from 40 to 200 ms. This value should be larger than twice the lowest note period in the audio file. Use larger values for complex sounds, and smaller values for high register instruments and more accurate transient preservation.

Padding

Padding sets the amount of spectral oversampling, at x1, x2, or x4. Padding helps to improve spectral peak resolution as well as frequency and phase estimation, but uses larger FFT sizes, which requires more CPU bandwidth.

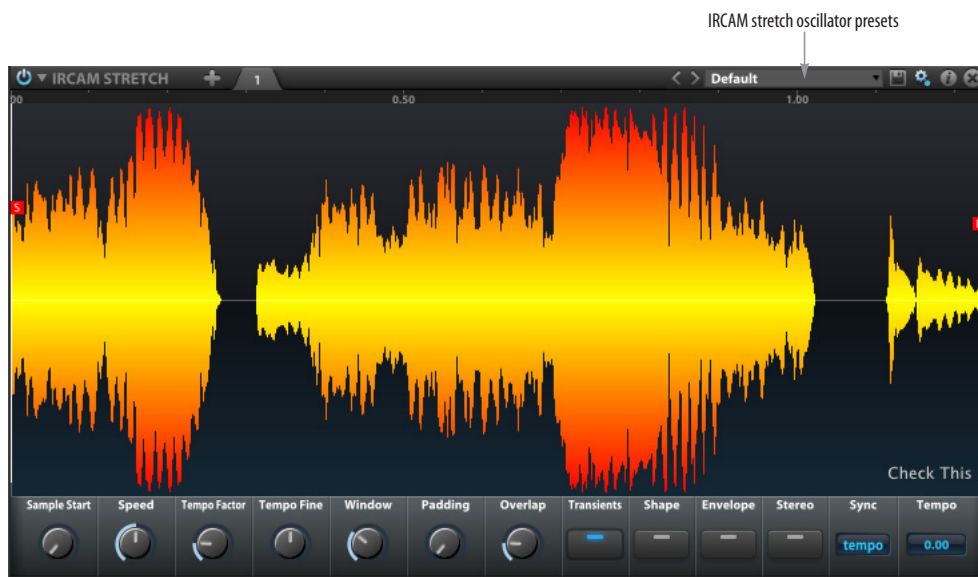


Figure 19-27: IRCAM Stretch oscillator.

Overlap

Overlap is specified in a range from 3 to 8. Larger values help to avoid wobbling mp3-like artifacts, but it requires higher CPU usage. Values of 4 and 8 are generally the most useful values. A value of 3 is a lower CPU-cost alternative if the sounds are not too challenging. A value of 8 is very good for harmonic evolving textures, but can generate some pre-echo/reverberation artifacts.

Transients

The *Transients* button enables or disables transient preservation.

Shape

The *Shape* button enables or disables waveform shape preservation. This is only useful for preserving the naturalness of some monophonic sounds, mainly voice.

Envelope

The *Envelope* button enables or disables spectral envelope preservation when pitch-shifting. Enabling this setting helps to avoid the “chipmunk” effect.

Stereo

The *Stereo* button enables or disables phase-locking between stereo channels.

Sync

The *Sync* modes are the same as explained in “Sync” on page 152, with the exception that only the *Off* and *Tempo* modes are available.

Working with sample loops

Sample loops operate in the same manner as with the Sample oscillator, as explained in “Working with sample loops” on page 147, with the following differences:

- Only Forward loops may be used; Alternate and One Shot loops are not available.
- Loop crossfades are not available.

- Releases are always looped.

Sample Start and End

The *Sample Start* and *Sample End* settings are the same as explained in “Sample Start and End” on page 147.

SYNTHESIS OSCILLATOR TYPES

Synthesis oscillators are not based on samples or digital audio files on disk. Instead, they are sound-producing algorithms that produce sound using a variety of classic synthesis techniques. MachFive provides most of the major milestone synthesis methods developed over the years, including analog (subtractive), FM (frequency modulation, or additive), and wavetable synthesis. The result is a powerful synthesis environment which makes MachFive a true “multi-synthesizer” in its own right. When combined with MachFive’s multi-sample playback engine, looping, mixing, and effects, the possibilities for sound design are virtually infinite.

The following sections explain how to program and use MachFive’s synthesis oscillators.

ANALOG

The *Analog* oscillator (Figure 19-28) provides classic analog sound. It is effective when used alone or in combination with other oscillators.

Waveform

Waveform shape choices are: saw, square, triangle, sine, noise, and pulse.

PWM

PWM (pulse width modulation) alters the symmetry of the waveform when modulated.

Start Phase and Polarity

Start Phase determines at what point in the period (one full cycle) of the waveform the sound will start when a note is played. *Polarity* inverts the oscillator's polarity.

Shift

Shift transposes the slave oscillator's frequency when hard sync is enabled, producing formant-shifting effects.

Hard sync

Hard sync provides classic oscillator hard sync when shift is applied.

Unison

The *Unison multiplier* multiplies each note played. For example, if you set the unison multiplier to 2, each time you play a note, you'll actually be triggering two notes in unison. If the unison multiplier is set to 4, each note played actually triggers four unison notes. The unison multiplier is good for thickening sounds, especially when used with the detune feature.

Detune

Detune allows you to determine how much pitch variation there will be on unison triggered notes.

The *Stereo* button enables stereo output for unison voices. The placement (width) of voices in the stereo field is determined by the *Stereo Spread* control.



Figure 19-28: Analog oscillator.

ANALOG STACK

The *Analog Stack* oscillator (Figure 19-29) provides eight individual oscillators. Four oscillators can be displayed at one time; to switch between oscillators 1–4 and oscillators 5–8, click the page toggle button as shown in Figure 19-29. Each of the eight oscillators has its own set of controls.

Enable/disable

Enables or disables the oscillator.

Polarity

When enabled, the *Polarity* control inverts the oscillator's polarity.

Sync

When enabled, *Sync* resets the phase of the oscillator when the main (first) oscillator restarts its phase.

Waveform

The *Waveform shape* choices are: saw, square, triangle, sine, noise, and pulse.

PWM (pulse width modulation) alters the symmetry of the waveform when modulated.

Start Phase determines at what point in the period (one full cycle) of the waveform the sound will start when a note is played.

Gain and Pan

Gain and *Pan* adjust the amplitude and stereo placement of the oscillator.

Pitch

Oct and *Semi* determine the MIDI input transposition in octaves and semitones, while *Fine* and *Pitch* determine the audio output transposition in cents and semitones.

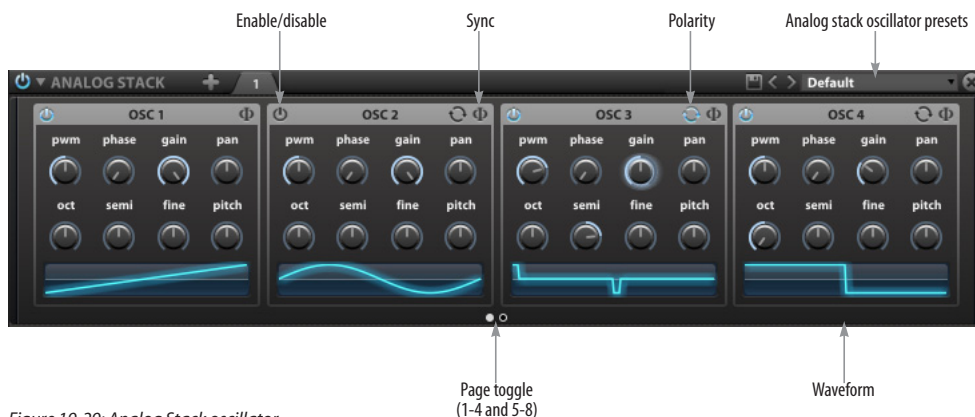


Figure 19-29: Analog Stack oscillator.

NOISE

The *Noise* oscillator (Figure 19-30) generates eleven standard types of noise.

Noise Type

The *Noise Type* choices are Band, Sample and Hold, Static I, Static II, Violet, Blue, White, Pink, and Brown.

Bandwidth / Rate / Density

Several noise types provide the following additional parameters:

Noise	Parameter
Band	Bandwidth
SampleAndHold	Rate
Static	Density

FM

The *FM* oscillator (Figure 19-31) is a four op (operator) frequency modulation synthesizer.

Ratio and Level

There are four operators, each with their own *Ratio* and *Level* controls.

Feedback and topology

Use *Feedback* and the operator *Topology* menu to further shape the sound.



Figure 19-30: Noise oscillator.



Figure 19-31: FM oscillator.

WAVETABLE

The *Wavetable* oscillator (Figure 19-32) provides classic wavetable synthesis, as made popular by the KORG Wavestation.

Waveform

Click the waveform menu (Figure 19-32) to select a wavetable, or use the next/previous arrows to step through the available wavetables.

MachFive provides dozens of preset wavetables, but you can also import your own. Drag and drop an audio file onto the waveform display to import it.

Start Phase and Symmetry

Start Phase and *Symmetry* operate in the same manner as Start Phase and PWM (pulse width modulation) for the Analog oscillator (page 159).

Stereo

The *Unison*, *Detune*, *Stereo Spread*, and *Stereo on/off* settings operate in the same manner as the Unison settings in the Analog oscillator type (page 159).

Smooth Octaves

To avoid aliasing, each octave uses its own wavetable. When *Smooth Octaves* is enabled, an aligned crossfade is performed between octaves; this results in harmonics appearing and disappearing smoothly.

When *Smooth Octaves* is disabled, only one octave's wavetable is used. To avoid aliasing, the octave with fewer harmonics is chosen. This is more CPU-efficient, but results in a timbre which is not as bright. If a pitch modulation is applied that covers more than one octave, you may hear harmonics appearing and disappearing as you switch from one octave to the next.

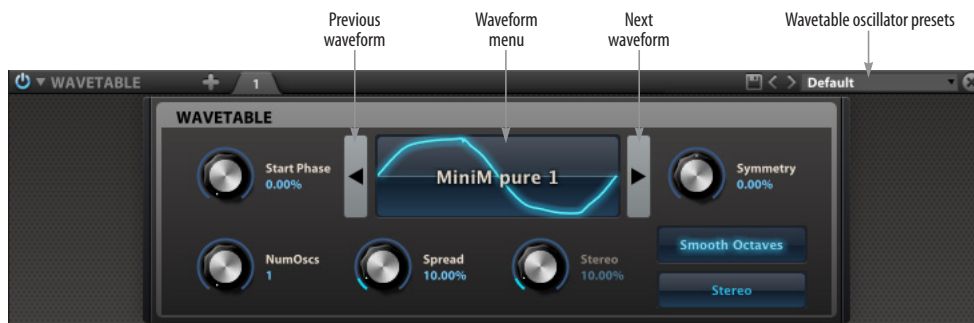


Figure 19-32: Wavetable oscillator.

DRUM

The *Drum* oscillator (Figure 19-33) is ideal for synthesizing drum and percussion sounds. You can use the drum synthesizer just like a sample layer and even mix and match drum synth keygroups with sample keygroups.

Drum oscillator presets

Dozens of drum sound presets are provided in the Drum oscillator preset menu (Figure 19-33). For faster results, try choosing a preset and then tweak the drum synth settings from there.

Osc

The *Osc* section provides straightforward oscillator settings (Figure 19-33), including basic waveform (sine, triangle, saw, or pulse), oscillator frequency, simple two-stage attack/decay amplitude envelope, and pitch modulation with rate and depth controls.

Noise

The *Noise* section provides a standard low/high/band-pass filter, plus a two-stage amplitude envelope.

Mix

Use the *Mix* control (Figure 19-33) to blend the oscillator output with the noise generator, which provides a standard low/high/band-pass filter, plus a two-stage amplitude envelope

Master

The *Master* section (Figure 19-33) provides EQ, distortion, volume, and velocity sensitivity controls for the oscillator amplitude, oscillator pitch modulation, and noise amplitude.



Figure 19-33: Drum oscillator.

ORGAN

The *Organ* oscillator (Figure 19-34) provides a synthesized emulation of classic electric organ sounds.

Drawbar gain and pan

The drawbars control the level and panning for each partial.

Percussion

As on a Hammond organ, the Percussion setting adds a short percussive sound when a note is played.

Fast perc

The *Fast perc* setting serves as a simple shaper for the decay of the percussion. The percussion volume follows a linear envelope that can either have a fast decay or a slow one. When this setting is enabled, the decay is fast.

Harmonic

The percussion setting produces a certain harmonic of the note played. Typically, Hammond organs only offer the second or third harmonic above the note (respectively +12 and +19 semitones). In MachFive, all the harmonics are available. Each graduation on the *Harmonic* knob corresponds to the frequency of the same drawbar, i.e. -12, -5, 0, +12, +19, etc.



Figure 19-34: Organ oscillator.

CHAPTER 20 Tree Editor

OVERVIEW

The *Tree Editor* provides a text-based, hierarchical tree view of a part's settings, including an itemized, alphanumeric display of all layers, the keygroups in each layer, and the settings for each keygroup. The Tree Editor is powerful because it gives you complete access to every element of your sounds in MachFive.

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Instrument section	166
Inspector	168

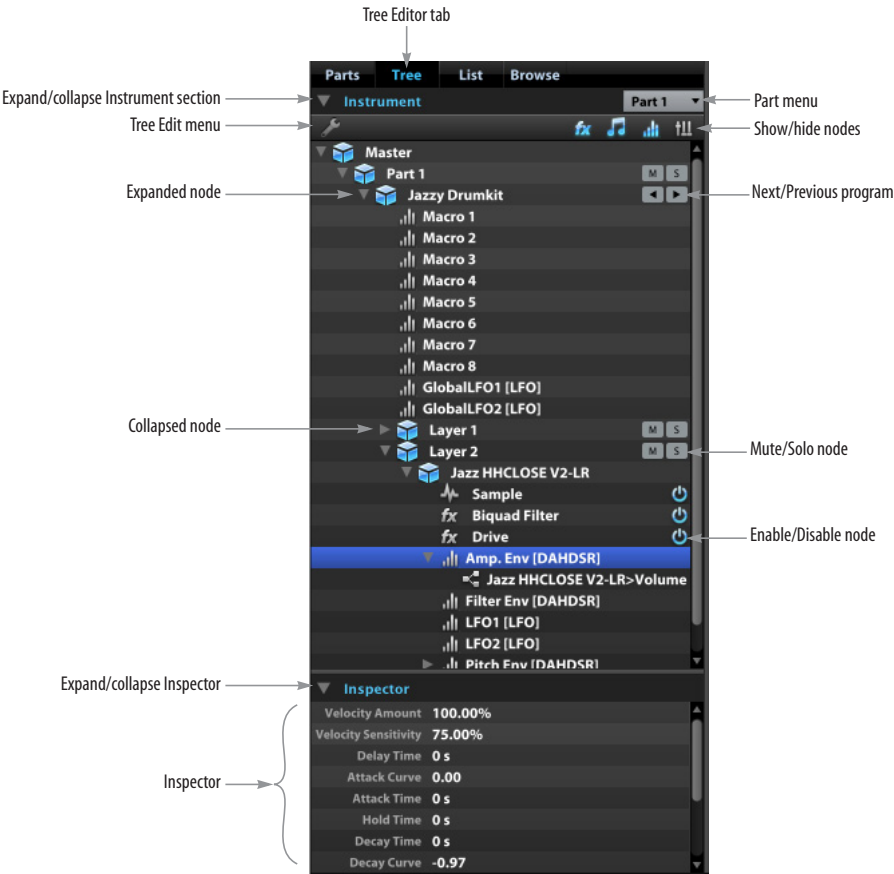


Figure 20-1: The Tree Editor.

OPENING THE TREE EDITOR

To open the Tree Editor, click the *Tree* tab in the sidebar (Figure 20-1), which is accessed in the Main view (“Main View” on page 56).

To expand the width of the Tree Editor, drag the divider between the sidebar and the main display area (Figure 8-1 on page 55), as shown below.

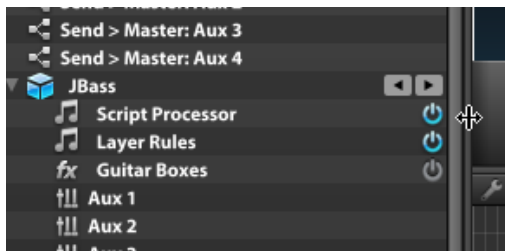


Figure 20-2: Resizing the Tree Editor.

When the MachFive window is at its smallest size, this divider cannot be adjusted; resize the window larger before adjusting the divider.

Expanding and collapsing sections

The *Instrument* and *Inspector* sections in the Tree Editor can be expanded or collapsed as needed. By default, both sections are expanded. To collapse a section, click the disclosure triangle next to the section header, as shown in Figure 20-1.

INSTRUMENT SECTION

The Instrument section of the Tree Editor (Figure 20-1) displays the settings for the currently selected part, as chosen in the Parts List, Mixer, or List Editor. You can also change the current part from within the Tree Editor itself using *Part menu* (Figure 20-1).

Showing and hiding node types

Use the four *show/hide node types* buttons (Figure 20-3) to view only the elements you wish to see in the list:

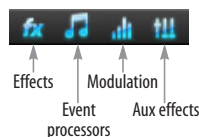


Figure 20-3: Show/hide node types.

Expanding and collapsing nodes

Use the Expand/collapse triangles to show or hide the items belonging to a node. This has no effect on the node’s operation, only its display in the list.

Adding nodes

To add a node to the tree, select the parent (enclosing) node and choose the desired node type from the Tree Editor menu (Figure 20-4). For example, if you wish to add a keygroup layer to a program, click the program node to select it and choose Add Layer from the Tree Editor menu. Items in this menu become active (or disabled) depending on what is currently selected in the list.

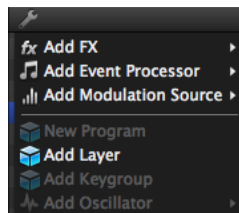


Figure 20-4: Tree Editor menu.

You can also access this menu contextually by right-clicking on the parent node.

Removing nodes

To remove a node, select it and hit the delete (backspace) key. Some types of items in the Tree Editor, such as effects sends, cannot be deleted. Anything that can be added, however, can be deleted as well.

Viewing the settings for a node

Depending on the type of node (Part, Program, Layer, Keygroup, etc.), there are several places where you can view its settings:

- The inspector section at the bottom of the Tree Editor. See “Inspector” on page 168.
- The Info, Edit, FX or Event tabs in the Main display area. See “Main View” on page 56.

Enable/Disable

Enable/Disable buttons (Figure 20-1) are available for each oscillator and effect. Click the enable/disable button to toggle its state.

Mute and Solo

The *Mute* and *Solo* buttons (Figure 20-1) mute or solo a node’s output. Independent Mute and Solo buttons are available for the part and for each layer.

Next/Previous Program

The *Next/Previous Program* buttons (Figure 20-1 on page 165) step through the programs in the same folder on disk as the currently loaded program.

Tree Editor quick reference

Figure 20-5 provides a quick reference for each type of item you can work with in the Tree Editor. This example shows Part 1 with a single program (*New Program*), a Micro Tuner processor, and a single Part effect (*Gate Reverb*). The program contains an arpeggiator processor, 2 band EQ effect, DAHDSR envelope, and a single keygroup layer (*Layer 1*), which contains a single keygroup (*Keygroup 1*). The Keygroup contains an oscillator (*Analog*) and a keygroup effect (*Rez Filter*).

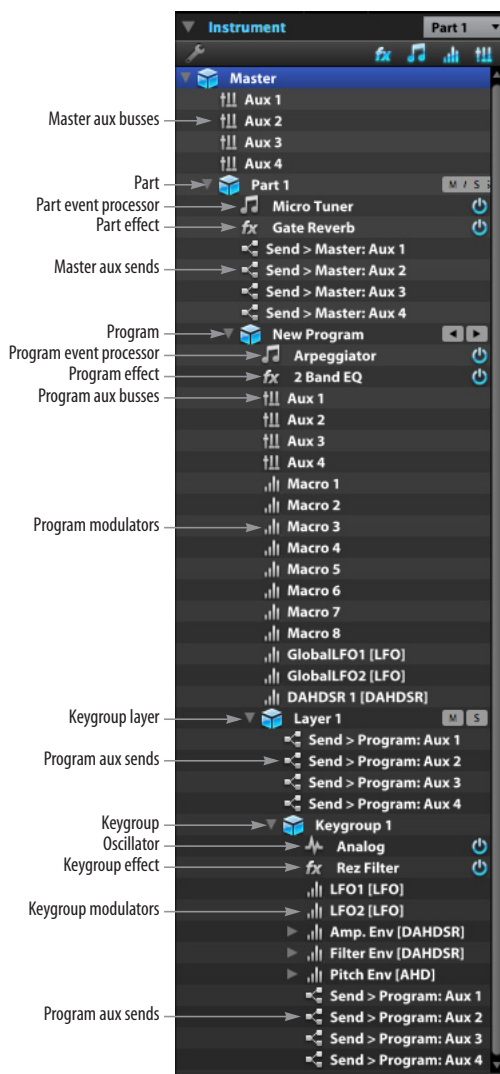


Figure 20-5: Tree Editor quick reference.

Aux busses, sends, and effects

For information about aux busses, sends, and effects processors in the Tree Editor (Figure 20-5), refer to chapter 22, “Effects” (page 179).

Modulators and event processors

For more about modulators and event processors in the Tree Editor (Figure 20-5), refer to chapter 23, “Automation and Modulation” (page 209) and chapter 24, “Event Processors” (page 223).

INSPECTOR

The *Inspector* (Figure 20-1 on page 165) shows detailed settings for the selected tree node.

Editing parameters

When a node is selected, its parameters appear in the Inspector. The name of the selected node’s parameters are displayed on the left and their values are on the right. Double-click a value to edit it, and press return to confirm the entry.

☞ Some parameters are display-only and cannot be edited (program memory usage, for example).

Resizing the Inspector

The Inspector can be resized as needed. Drag the divider between the Instrument and Inspector sections, as shown below.

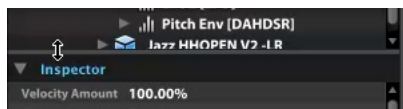


Figure 20-6: Resizing the Inspector.

Layer settings in the Inspector

The Inspector displays several layer settings that are not found in the Tree Editor or Edit settings (“Layer settings” on page 122).

MIDI Mute

When checked, *MIDI Mute* causes the layer to temporarily stop responding to incoming MIDI data.

Unison Voices

When *Unison Voices* is enabled, for each note received, the layer creates the specified number of voices instead of just one voice. MachFive offers custom modulation sources (*Unison* and *Bipolar*

Unison, see “Unison and Unipolar Unison” on page 213) that typically can be assigned to pitch, pan, and filter settings to create deep unison synth textures or rich string ensembles using violin and cello samples, for example.

Custom Polyphony

Custom Polyphony overrides the program polyphony. For example, an elaborate piano program may call for a very high polyphony setting of 50-100 voices for a sustain layer, while the release sample layer would only require a polyphony setting of 5 or 6.

Additional layer settings

There are additional layer settings in the Edit settings section (“Layer settings” on page 122) and in the List Editor (“Layer settings” on page 174).

Keygroup settings in the Inspector

When a keygroup node is selected in the Tree Editor, the Inspector displays the keygroup settings shown below in Figure 20-7. These are explained in “Keygroup settings” on page 175. There is one keygroup setting found only here in the Inspector: enable the *FX Post Gain* option (Figure 20-7) if you want effects, especially non-linear filters and drive effects, to follow the keygroup’s envelope stages (or other keygroup gain controls).

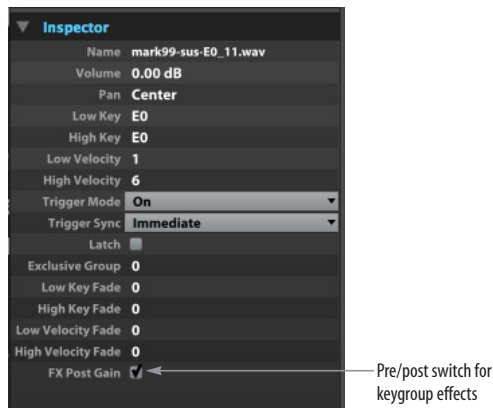


Figure 20-7: Keygroup inspector in the Tree Editor

Oscillator settings in the Inspector

When an oscillator node is selected in the Tree Editor, the Inspector displays the oscillator settings shown below in Figure 20-8. These are explained in “Sampling oscillator types” on page 142 and the rest of that chapter. There is one stretch oscillator setting found only here in the Inspector: the *Legato* option (shown below). When enabled, the Legato option allows you to play new notes while others are sustaining, and the new notes will play in sync with the held notes. In other words, when you play a new note while others are already playing, it doesn’t start playing at the beginning of the sample but instead starts at the position of the other voices, producing a smooth, legato effect.

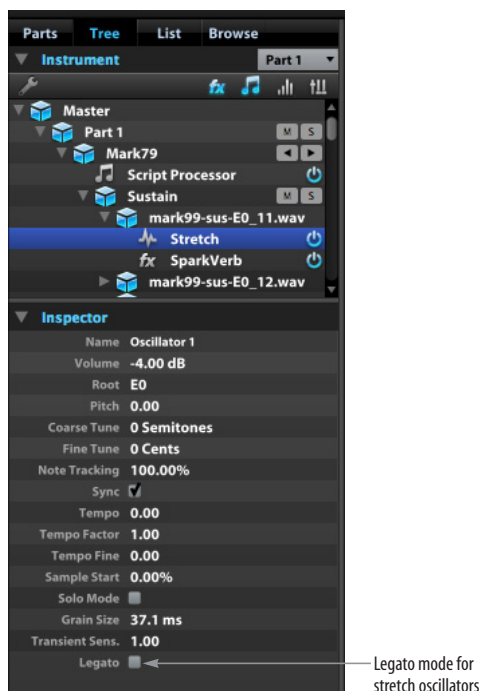


Figure 20-8: Oscillator inspector in the Tree Editor

CHAPTER 21 List Editor

OVERVIEW

The *List Editor* provides a text-based list view of part, program layer, and keygroup settings, including an alphabetical, alphanumeric display of all layers, the keygroups in each layer, and the settings for each keygroup.

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Figure 21-1: The List Editor.

Figure 21-1: The List Editor.

OPENING THE LIST EDITOR

To open the List Editor, click the *List* tab in the sidebar (Figure 21-1), which is accessed in the Main view (“Main View” on page 56).

The List Editor displays the settings for the currently selected part, as chosen in the Parts List, Mixer, or Tree Editor. You can also change the current part from within the List Editor itself by using the *Part* menu (Figure 21-1).

To expand the width of the List Editor, drag the divider between the sidebar and the main display area (Figure 8-1 on page 55), as shown below.

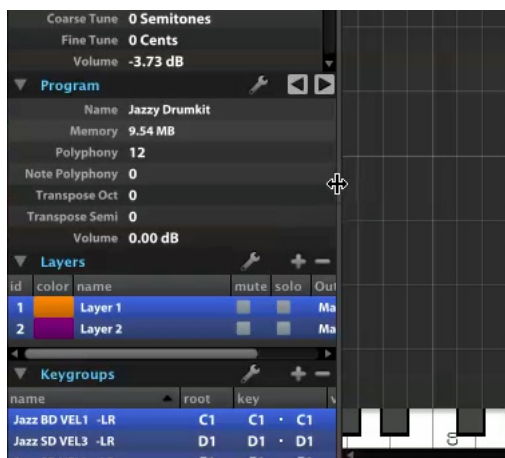


Figure 21-2: Resizing the List Editor.

When the MachFive window is at its smallest size, this divider cannot be adjusted; resize the window larger before adjusting the divider.

Expanding and collapsing sections

The four sections of the List Editor can be expanded or collapsed as needed. By default, all four sections are expanded. To collapse a section, click the disclosure triangle next to the section name, as shown in Figure 21-1.

PART SETTINGS

The *Part* section of the List Editor (Figure 21-1) displays part-specific settings. These settings will remain even when the program loaded in the part is changed. Many of these settings also appear in the Parts List. For more information, see “Parts List” on page 63.

MIDI In

MIDI In sets the MIDI receive channel for the part. See “MIDI Input/activity” on page 64.

MIDI Mute

MIDI Mute (Figure 21-1) temporarily disables MIDI input to the part.

Streaming

Streaming enables or disables disk streaming for the part. See “Streaming” on page 106.

Transpose Oct and Semi

Transpose Oct and *Transpose Semi* transpose the part’s MIDI input, in octaves and semitones, respectively.

Coarse and Fine Tune

Coarse Tune and *Fine Tune* transpose the part’s audio output, in semitones and cents, respectively.

Volume and Pan

The *Volume* and *Pan* settings control the volume and pan for the part.

Mute and Solo

The *Mute* and *Solo* checkboxes mute or solo the part’s output.

Output

The *Output* menu sets the part’s audio output assignment.

Key range

The key range controls provide a way to constrain the key range of the part. To set the key range of the part, enable the *Restrict Key* option and set the *Low Key* and *High Key* as desired.

In addition, you can create a crossfade range at the top and/or bottom of the key range. Set *Low Key Fade* and *High Key Fade* to the number of keys you would like to fade in and out.

For example, set *Low Key* to C0 and *High Key* to C6, and set *Low Key Fade* to 12 and *High Key Fade* to 24. The part will gradually fade in over the 12 keys at the bottom of its range (C0 to B0), attaining full volume by the time you get to C1, then fade out over the 24 keys at the top of its range (C4 to C6).

To edit the key range values graphically, see “Keyboard range” on page 102 in chapter 14, “Performance View”.

Velocity range

The velocity range settings operate in the same manner as the key range settings, but constrain the part’s velocity range instead.

To constrain the velocity range of the part, enable the *Restrict Vel* option and set the *Low Vel* and *High Vel* as desired.

To create a crossfade range at the top and/or bottom of the key range, set *Low Vel Fade* and *High Vel Fade* to the size of the velocity range you would like to fade in and out.

To edit the key range values graphically, see “Velocity range” on page 102 in chapter 14, “Performance View”.

PROGRAM SETTINGS

The *Program* section of the List Editor (Figure 21-1) displays program-specific settings. These settings will change when the program loaded in the part is changed.

Name

Displays the name of the currently loaded program. If there are unsaved changes to the program file, an asterisk appears after the program name. Double-click to edit the name.

Memory

Displays the memory (RAM) used by the program.

Polyphony

Polyphony determines how many stereo notes the program can play simultaneously. For details, see “Polyphony” on page 123.

Note Polyphony

Note Polyphony determines the polyphony for a single note. The default setting is zero, which results in no limit. A positive value will limit the number of available voices per note. This is useful to model percussion instruments where the theoretical note polyphony is 1 (though it may be necessary to use a value of 2–4 for optimal results).

Here’s another example. Typically, multi-sample instruments, such as pianos, require a high amount of polyphony, but at the same time, only one (or just a few) sample(s) should be active for each key. The Note Polyphony setting does just that: it limits the effective polyphony per key, not globally.

Transpose Oct and Semi

These settings operate in the same manner as *Transpose Oct* and *Transpose Semi* in the Part section (page 172), except that the setting is saved with the program.

Volume

This is the same Program Volume setting as explained on page 123.

Program menu

The Load and Save commands available under the Program menu (Figure 21-1) are the same as in the File menu. For details, see “Program commands” on page 72.

Next/Previous Program

The *Next/Previous Program* buttons step through the programs in the same folder on disk as the currently loaded program.

LAYER SETTINGS

The *Layers* section of the List Editor (Figure 21-1) displays the layers in the program.

Each row represents one layer; click a row to select the layer. Only the selected layers’ keygroups will be displayed in the Mapping Editor.

Showing/hiding layer columns

By default only some of the layer settings are displayed, but you can show or hide as many columns as you’d like by right-clicking and choosing the desired columns in the contextual menu. When the enabled columns are wider than the sidebar, a horizontal scroll bar appears. You can resize the sidebar to view more columns at a time.

ID

The layer *ID* indicates the order of the layers. This is for display purposes only and cannot be edited.

Color

The layer *Color* indicates a unique color for the layer’s keygroups when they are displayed in the Mapping Editor. Click the colored block to open the color picker, shown in Figure 21-3. Drag the double arrows up and down to set the hue, and drag the lens around the large swatch to set the saturation and brightness.

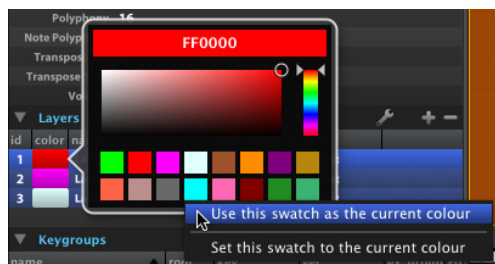


Figure 21-3: The layer color picker.

There are also sixteen swatches along the bottom of the color picker. Click a swatch to use it as the current color, or to assign the current color to the swatch.

Name

Double-click the *Layer name* to change it.

Mute and Solo

The *Mute* and *Solo* checkboxes mute or solo the part’s output.

Key range

This setting functions in the same manner as the *Key Range* setting in the Part section, with the difference that the range is applied to the individual layer rather than the whole part. For details, see “Key range” on page 173.

Volume and pan

Each layer has independent volume and pan settings.

Output

By default, layers are assigned to MachFive’s main output. However, The *Output* lets you choose an independent audio output for the layer (if your host audio software supports this feature). This lets you play an individual layer to a different output than other layers, or even to a different output than the part to which the program is assigned. See “Routing tab” on page 40.

Layer menu

The layer menu (Figure 21-1) provides shortcuts to layer management commands.

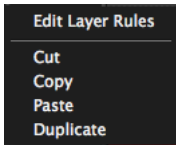


Figure 21-4:

Use *Edit Layer Rules* command to open the Rules window, as described in “Layer Rules” on page 134.

Cut, *Copy*, *Paste*, and *Duplicate* commands are also available and work in their standard manner on the selected layers.

Add/Delete Layer buttons

Use the *Add Layer* “+” button (Figure 21-1) to add a new, empty layer. The *Delete Layer* “-” button removes the currently selected layers.

Automating layer settings

You can right-click the Mute and Solo layer settings listed above to automate them. For more details on automation, see chapter 23, “Automation and Modulation” (page 209).

Additional layer settings

There are additional layer settings in the Settings section (“Layer settings” on page 122) and in the Tree Editor (“Layer settings in the Inspector” on page 168).

KEYGROUP SETTINGS

The *Keygroups* section of the List Editor (Figure 21-1) displays the keygroups in the layers currently selected in the Layers section of the List Editor.

Each row represents one keygroup; click a row to select the keygroup. Keygroup selection in the List Editor affects keygroup selection in the Mapping Editor, and vice versa.

Double-click a text setting to edit it. Press return to confirm the entry.

name	root	key	vel	trigger	volume	pan	trigger sync	latch	ex. group	layer	Output	Program aux send	Pro
Jazz SD VEL3 -LR	E1	E1 · E1	1 · 127	On	2.59 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	
Jazz RIDE4 VEL1-LR	D#2	D#2 · D#2	1 · 120	On	0.00 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	
Jazz RIDE4 VEL3-LR	D#2	D#2 · D#2	121 · 127	On	0.00 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	
Jazz RIM2 VEL1-LR	C#2	C#1 · C#1	1 · 127	On	-1.91 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	
Jazz TOM5 VEL3-LR	F#2	A1 · A1	1 · 127	On	-2.27 dB	Center	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz TOM5 VEL3-LR	E2	G1 · G1	1 · 127	On	0.00 dB	Left 68	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz TOM5 VEL3-LR	D2	F1 · F1	1 · 127	On	0.00 dB	Left 68	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz TOM5 VEL3-LR	F#2	B1 · B1	1 · 127	On	-2.27 dB	Center	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
120BREAKB8-LR copie	B2	D#1 · D#1	1 · 127	On	-3.03 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	
Jazz TOM5 VEL3-LR	C2	C2 · C2	1 · 127	On	0.00 dB	Right 68	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz TOM5 VEL3-LR	D2	D2 · D2	1 · 127	On	0.00 dB	Right 68	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz RIDE4 VEL3-LR	C#2	C#2 · C#2	1 · 127	On	0.00 dB	Center	Immediate	Off	0	Layer 1	Main Out	-12.00 dB	
Jazz HHCLOSE V2-LR	F#1	F#1 · F#1	1 · 127	On	0.00 dB	Center	Immediate	Off	0	Layer 1	Main Out	-∞ dB	

Figure 21-5: Keygroup settings in the List Editor.

Add/Delete Keygroups buttons

Use the *Add Keygroup* “+” button to add a new keygroup to the selected layer. The *Delete Keygroup* “-” button removes the currently selected keygroups.

Keygroup menu

The Keygroup menu (Figure 21-1) provides shortcuts to layer management commands. *Cut*, *Copy*, *Paste*, and *Duplicate* commands work in their standard manner on the selected keygroups.

Columns

By default only some of the keygroup settings are displayed, but you can show or hide as many columns as you’d like by right-clicking and choosing the desired columns in the contextual menu. Figure 21-1 below shows a large number of columns enabled.

The list of keygroups is sorted alphabetically by keygroup name by default. This is indicated by the *Sort indicator*, a small triangle in the column header. To change the sort method, click a different column header. Click the same header a second time to reverse the sort order.

To resize a column’s width, drag the right edge of a column to resize it manually, or right-click it and choose *Auto-size this column* or *Auto-size all columns* from the contextual menu to resize it automatically. When the enabled columns are wider than the sidebar, a horizontal scroll bar appears.

Keygroup name

Double-click the *keygroup name* to change it. This column cannot be hidden.

Root

The *Root* is the root pitch of the keygroup. Normally, this is the original, untransposed pitch of the sample. It is indicated on the keyboard in the Mapping Editor as the key shaded in red (when the keygroup is selected). The Root determines how

the sample is transposed when mapped to other keys on the keyboard. The range for this setting is 0-127, where 60 is middle C.

Key range

The *Key range* is the range from the lowest note used by the keygroup to the highest note used by the keygroup. Editing the Key range is the same as dragging the left or right edges of the keygroup in the Mapping Editor. The range for this setting is 0-127, where 60 is middle C.

Velocity range

The *Velocity range* is the lowest MIDI note-on velocity used by the keygroup to the highest MIDI note-on velocity used by the keygroup. Editing the Velocity range is the same as dragging the bottom or top edges of the keygroup in the Mapping Editor. The range for this setting is 0-127.

Trigger

The *Trigger Mode* menu lets you choose how the keygroup is triggered. The choices are:

Trigger Mode	Menu item	What it does
Note On Trigger	On	Sample is triggered by a MIDI note-on data event.
Note Off Trigger	Off	Sample is triggered by a MIDI note-off data event.
Note Off, Use Envelope	Off+E	Same as above, and the initial amplitude for the sample will match the current position of the amplitude envelope. This ensures that the release sample matches the volume of the previous sample.
Note Off, Use Release Vel	Off+V	Sample is triggered by a MIDI note-off data event, and the note-off velocity is used to determine the initial volume of the release sample (instead of the amplitude envelope as above).
Note Off, Use Release Vel & Envelope	Off+VE	A combination of the above two modes.

Key Fade and Velocity Fade

These settings function in the same manner as the *Key Fade* and *Vel Fade* settings in the Part section, with the difference that the range is applied to the individual keygroup rather than the whole part. For details, see “Key range” and “Velocity range” on page 173.

Volume and Pan

These are the same keygroup settings as described in “Volume” and “Pan” on page 121.

Trigger sync

This is the same oscillator setting as described for slice oscillators in “Trigger” on page 152.

Latch

This is the same oscillator setting as described for slice oscillators in “Latch” on page 153.

Ex. Group

The *Ex. Group* (Exclusive group) setting lets you assign a keygroup to one of 32 separate groups. You can assign as many keygroups as you want to a group. Keygroups that belong to the same group cut each other off when they play. This allows you to create the classic open/closed hi-hat effect, where the closed hat sample cuts off the open hat sample.

Each layer has its own set of 32 groups. For example, if you assign a keygroup in layer 1 to group 1, and another keygroup in layer 2 to group 1, they do not belong to the same group (because

they are in different layers) and therefore don't cut each other off. So any keygroups that you wish to group together must reside in the same layer.

Program aux sends

For information about program aux sends, refer to chapter 22, “Effects” (page 179).

Layer

The *Layer name* displays the layer that the keygroup belongs to. Double-click the layer name to rename the layer.

Output

The *Output* setting lets you choose an independent audio output for the keygroup (if your host audio software supports this feature). This lets you play an individual keygroup to a different output than other keygroups, or even to a different output than the part to which the program is assigned. See “Routing tab” on page 40.

Spread

When a stereo sample is being used for a part that is assigned to a multi-channel (surround) output, the *Spread* (Figure 21-5) determines the degree to which the stereo signal is fed to the rest of the surround speaker channels.

FX Post Gain

The *FX Post Gain* keygroup setting is accessed in the Tree Editor Inspector. See “Keygroup settings in the Inspector” on page 168.

CHAPTER 22 **Effects**

OVERVIEW

MachFive provides a comprehensive and flexible effects architecture. Unlimited effects can be applied in real-time at all levels in MachFive, from individual samples to the entire mix, with instant recall of all settings. 47 real-time effects are included, such as reverb, tempo-synced delay, tremolo, chorus, filters, guitar amp simulation, CPU-efficient convolution reverb, and many others. All effects settings are saved for total recall. You can add effects to a sound for permanent storage in your sound library. Conversely, you can create part effects that remain while you load and audition different sounds in the part.

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SEVEN TYPES OF EFFECTS

Effects in MachFive can be applied to objects, such as a keygroup, and to auxiliary (aux) busses. All in all, there are seven different types of effects:

1. *Keygroup* effects
2. *Layer* effects
3. *Program* effects
4. *Program Aux* effects
5. *Part* effects
6. *Master Aux* effects
7. *Master* effects

The two master effects types be applied globally throughout MachFive, and the others are applied independently to each part. In addition, both parallel and serial (chained) effects configurations are provided.

ACCESSING EFFECTS

There are five primary ways to access effects settings in MachFive:

- *The FX Rack* (Figure 22-1 on page 180) — this is the primary way to view and access effects.
- *The Mixer* (Figure 13-1 on page 97) — access part and program effects, one at a time, within the context of a conventional mixing board with channels and effects inserts.
- *The Tree Editor* (Figure 20-3 on page 166 and Figure 20-5 on page 167) — access effects within the context of the object hierarchy in MachFive.
- *The Program Settings* (Figure 17-8 on page 123) — access the first four part and program effects.
- *The List Editor* (Figure 21-5 on page 175) — access program aux sends for each layer.

THE FX RACK

The *FX (Effects) Rack* (Figure 22-1) is the primary way to view and manage all types of effects in MachFive: *Keygroup* effects, *Layer* effects, *Program* effects, *Program Aux* effects, *Part* effects, *Master Aux* effects, and *Master* effects.

Accessing the FX Rack

To access the FX Rack, click the Main View button and the FX Rack (Figure 22-1).

Part selection

With the exception of the Master effects and Master Aux effects, the FX Rack applies to the currently selected part in the Parts list (or one of its components). See “Selecting a part” on page 63.

FX Rack navigation bar

The FX Rack navigation (nav) bar (Figure 22-1) indicates the object or bus effects currently being viewed and edited in the FX Rack. This bar gives you full access to all of MachFive’s effects. It operates in a hierarchical fashion, going from global effects to local object effects as you move from left to right across the bar. The right-most item displayed in the bar is the object whose effects are currently being displayed in the FX Rack area below.

For example, in Figure 22-1, the FX Rack is showing the effects for the *Classical GuitarHard* program in Part 1 (selected). To access the Master



Figure 22-1: Effects Rack.

effects (which apply to MachFive's Main Outs), click the word *Master* at the far left of the bar (Figure 22-2):

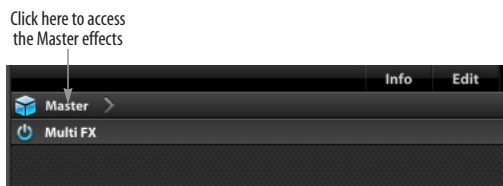


Figure 22-2: Using the Nav bar to access the Master effects.

Click the arrow menu to access the Master Aux effects or Part effects (Figure 22-3):

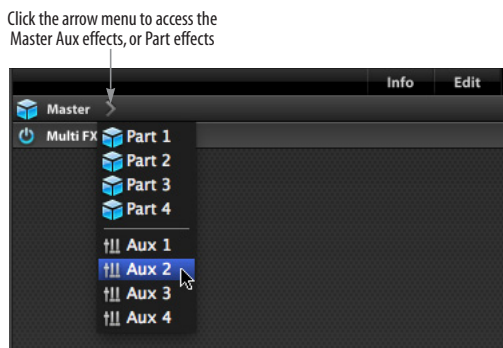


Figure 22-3: Accessing the Master Aux effects and Part effects.

You can keep going, all the way down to keygroup effects (Figure 22-4):

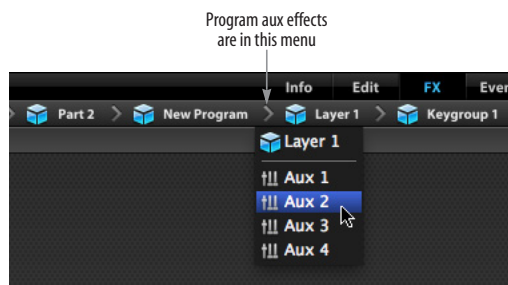


Figure 22-4: Accessing part, program, program aux, layer, and keygroup effects.

To go back up the path, click the name of the item you want to view. For example, to view the part effects in Figure 22-4, click the word *Part 2*. Use the arrow menus to drill down into the hierarchy or to access the master aux or program aux effects.

Navigating effects with the Tree Editor

Similar to the effects nav bar, the FX Rack also follows the Tree Editor. So, if you click a part, layer, keygroup, or other item in the Tree Editor, the FX Rack will display all of the effects assigned to that object. This is an especially convenient way to access master aux busses and program aux busses.

MANAGING EFFECTS

The FX Rack (Figure 22-1) displays one or more effect modules for the currently selected part, program, aux bus, etc. (as indicated in the nav bar). You can add as many modules as you wish, and a vertical scroll bar appears if necessary. Effects are applied in serial fashion, with signal flow proceeding from top to bottom. If you wish to set up effects in parallel, rather than serially, use aux effects busses as explained later in this chapter.

Adding effects

Use the *Add module* (“+”) menu on the right-hand side of the Effects nav bar (Figure 22-1) to add the desired effect.

Re-ordering effects

To change the order of multiple effects, drag them vertically in the list. To grab an effect for dragging, click the module's title bar (Figure 22-1).

Changing the type

To change an effect module from one type of an effect to another, click its name in the module title bar to access the effects menu (Figure 22-5).



Figure 22-5: Changing the type of effect.

Disabling an effect

To disable (bypass) an effect, click the power button on the left of the module title bar (Figure 22-6).



Figure 22-6: Disabling an effect.

Deleting an effect

To delete an effect, click the “x” button in the upper right (Figure 22-7).

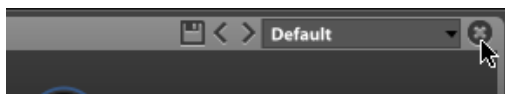


Figure 22-7: Deleting an effect.

Saving and loading effect presets

Effects can be saved and loaded independently of program files.

Effect preset menu

Presets for the current effect type are displayed in the upper right of each effect. Choose a preset from the menu (Figure 22-8), or use the next/previous buttons to step through the presets.



Figure 22-8: Loading an effect preset from the menu.

Effect preset browser

Effect presets can also be viewed in the sidebar browser (Figure 22-9). Click the *Browse* button in the sidebar, then click the effect icon to view effect presets. The effect preset browser displays presets for all effect types, not just presets for the currently selected effect.

To load an effect preset from the browser, drag it to the Effects view to add it after the last existing effect.



Figure 22-9: Loading an effect preset from the sidebar browser.

Saving effect presets

To save an effect preset oscillator, click the Save button (Figure 22-10) and enter the desired preset name.



Figure 22-10: Saving an effect preset.

User effect presets are saved here:

OS	Location
Mac	/Users/username/Documents/MOTU/MachFive3/ User Presets/FX
Windows	\\Users\\username\\Documents\\MOTU\\MachFive3\\ User Presets\\FX

You can use as many subfolders inside of those as you'd like to organize your presets.

Working with multiple effects

Multiple effects can be saved together as a *Multi FX*. Use the controls in the Multi FX bar at the top of the Effects view, just above the first effect (Figure 22-1 on page 180). To load a Multi FX preset, choose it from the menu or use the next/previous buttons to step through the presets.

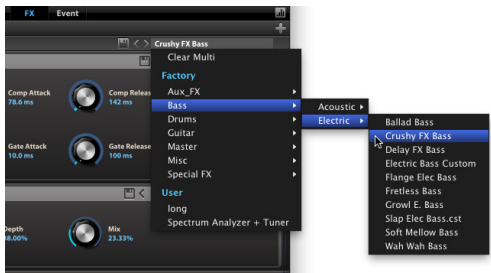


Figure 22-11: Loading a Multi FX preset.

To save a Multi FX preset, load the effects you wish to include, then use the *Save* button in the Multi FX section to save them as single Multi FX preset.

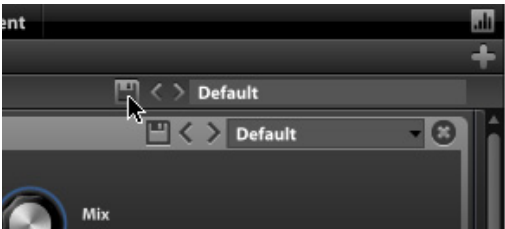


Figure 22-12: Saving a Multi FX preset.

KEYGROUP EFFECTS

The *Keygroup* effects rack provides unlimited effects per keygroup, processed in serial from top to bottom in the rack. These effects can be applied individually to any keygroup in a program, even if the keygroup is only one sample on one key. Keygroup effects are saved as part of the program. See “Saving and reloading a program” on page 125.

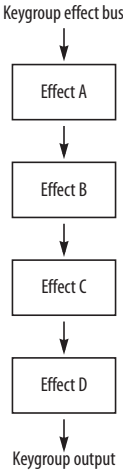


Figure 22-13: Keygroup effects operate in serial.

Accessing keygroup effects

Keygroup effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access keygroup effects:

- Keygroup settings (Figure 17-6 on page 120)
- Effects nav bar (Figure 22-4 on page 181)
- With the FX rack currently in view, click the keygroup in the Tree Editor (Figure 20-5 on page 167)

Keygroup effects and your computer's processing resources

Keygroup effects place a very high demand on your computer's processing resources because the DSP is applied independently to each voice. For example, if you instantiate a reverb on a synth keygroup, and you play 8 voices, doing so produces

the same processing overhead as instantiating eight reverbs (a separate reverb for each voice). This is a very powerful feature that allows you to produce extremely dynamic and expressive effects, but the trade-off is that it requires a lot more processing than the other types of effects (insert, aux, etc.)

Keygroup effect duration

Keygroup effects have a duration that is only as long as the length of the sample itself. For example, if you have a 1 second sample and a 10 second reverb, you will only hear the reverb for 1 second.

Program aux sends for keygroups

Each keygroup has four program aux sends, which allow you to send keygroup audio output to the four program aux sends. See “Program aux effects” below and “Program aux sends” on page 185.

FX Post Gain

The *FX Post Gain* keygroup setting is accessed in the Tree Editor Inspector. See “Keygroup settings in the Inspector” on page 168.

LAYER EFFECTS

The *layer* effects rack provides unlimited effects per keygroup layer, processed in serial from top to bottom in the rack. Layer effects are applied to all keygroups in the layer. In turn, if a program has multiple layers, each layer can have its own effects rack. Layer effects are saved as part of the program. See “Saving and reloading a program” on page 125.

Accessing layer effects

Layer effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access layer effects:

- Effects nav bar (Figure 22-4 on page 181)
- With the FX rack currently in view, click the layer in the Tree Editor (Figure 20-5 on page 167)

Program aux sends for layers

Each layer has four program aux sends, which allow you to send layer audio output to the four program aux sends. See “Program aux effects” below and “Program aux sends” on page 185.

PROGRAM EFFECTS

The *program* effects rack provides unlimited effects for a program, processed in serial from top to bottom in the rack. Program effects are applied to the program as a whole. Essentially, program effects could be considered as part of the program itself. This means you can use MachFive’s powerful effects as part of your sound design arsenal: you can include filters, reverbs, delays, or any such effects as part of the sound itself. When you save the program, the program effects are saved with it, as part of the sound, for future recall with the sound when loaded into a part. See “Saving and reloading a program” on page 125.

☛ Program effects are similar to part effects, but with an important difference. See “Program effects versus part effects” on page 185.

Accessing program effects

Program effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access program effects:

- Program settings (Figure 17-8 on page 123)
- Effects nav bar (Figure 22-4 on page 181)
- With the FX rack currently in view, click the program in the Tree Editor (Figure 20-5 on page 167)

PROGRAM AUX EFFECTS

The *program aux* effects racks (Figure 22-4 on page 181) provide four independent (parallel) effects busses per program, which are available to keygroups or layers belonging to the program. Program aux effects are completely independent of program effects (above), but their output is mixed

back in with the overall output of the program. Each keygroup and keygroup layer in the program has four program aux sends, which allow you to send the keygroup or layer output to the four program aux effects busses. This allows you to apply effects to individual keygroups or layers that are independent of the program effects.

Parallel versus serial effects processing

You can use the program aux effects for parallel effects processing, as demonstrated below in Figure 22-14, as opposed to the serial processing provided by keygroup, layer, and program effects (as demonstrated in Figure 22-13 on page 183).

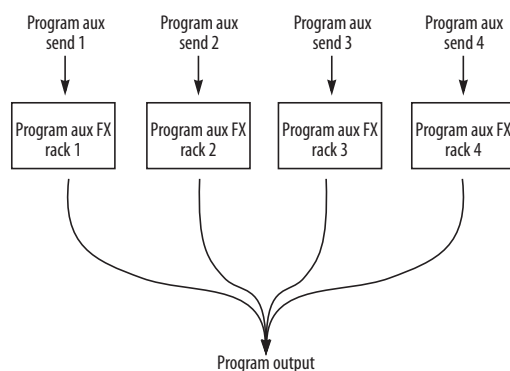


Figure 22-14: Program aux effects operate independently (in parallel). But notice that the program aux effects busses are mixed back in with the overall program output.

Program aux effects are saved with the program, so they can be employed as an integral part of your program sound design, essentially becoming part of the program itself.

Using program aux effects

To use program aux effects, you first add the effects you wish to each program aux effect rack, and then route the output of keygroups and/or layers to each aux effect rack as desired using the keygroup or layer's program aux sends.

Accessing program aux effects

Program aux effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access program aux effects:

- Effects nav bar (Figure 22-4 on page 181)
- With the FX rack currently in view, click the program aux bus (listed just below the program name) in the Tree Editor (Figure 20-5 on page 167)

Program aux sends

The program aux sends for a keygroup or layer can be found in the Tree Editor (Figure 20-5 on page 167). Click the send in the Tree Editor list and then adjust the send level in the Inspector below. The Inspector also provides a *Prefader* check box. When enabled, this routes the signal to the aux send bus before the volume control for the keygroup or layer.

For keygroups, they can also be found in the Tree Editor (Figure 20-5 on page 167).

Program aux return gain

The program aux busses are returned (mixed back into) the program's output. You can control the level of each aux bus return by clicking the program aux return in the Tree Editor (Figure 20-5 on page 167) and adjusting its gain in the Tree Editor Inspector (Figure 20-6 on page 168).

PART EFFECTS

Part effects are similar to program effects because they apply to the entire program loaded into the part. However, there is an important difference as explained below.

Program effects versus part effects

Both *program effects* and *part effects* apply to the entire program currently loaded in the part. However, *part effects* “belong to” to the part slot, not the program currently loaded in the part slot. For example, if you load a reverb into a part effect rack, you'll hear that reverb applied to any program

you load into the part. In addition, they are saved with that instance of MachFive in your host audio software project or session. They are also saved with MachFive multis.

Program effects, on the other hand, are stored independently with the program. Essentially, program effects could be considered as part of the program itself. They are saved on disk with the program and can be loaded into any instance of MachFive in any project in any host application.

Accessing part effects

Part effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access part effects:

- Effects nav bar (Figure 22-4 on page 181)
- With the FX rack currently in view, click the part in the Tree Editor (Figure 20-5 on page 167)

MASTER EFFECTS

The *Master* effects rack provides unlimited serial (stacked) effects that can be applied globally to MachFive's *Main output*. Master effects are good for mastering applications, such as multi-band compression.

Accessing master effects

Master effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access master effects:

- Effects nav bar (Figure 22-2 on page 181)
- With the FX rack currently in view, click the *Master* item in the Tree Editor (Figure 20-5 on page 167).

Saving master effects

Master effects are saved with that instance of MachFive in your host audio software project or session. They are also saved with MachFive multis.

MASTER AUX EFFECTS

The *master aux* effects rack provides four independent (parallel) effects busses, which are available to parts. The master aux effects are completely independent of master effects (above), but their output is mixed back in with the overall master output. Each part has four master aux sends, which allow you to send the part's output to the four master aux effects busses. This allows you to apply effects to parts that are independent of the master effects.

Parallel versus serial effects processing

You can use the master aux effects for parallel effects processing, similar to program aux effects, as demonstrated in Figure 22-14 on page 185, as opposed to the serial processing provided by master effects.

Using master aux effects

To use master aux effects, you first add the effects you wish to each master aux effect rack, and then route the output of parts to each aux effect rack as desired using the part's master aux sends.

Master aux sends

The master aux sends for a part can be found in the part's channel strip in the Mixer (Figure 13-3 on page 98) and in the Tree Editor (Figure 20-5 on page 167). Click the send in the Tree Editor list and then adjust the send level in the Inspector below. Both the Mixer and the Inspector provide a *Prefader* (pre/post fader) option. When enabled, this routes the signal to the aux send bus before the part fader.

Accessing master aux effects

Master aux effects are displayed in the FX Rack (Figure 22-1 on page 180). There are several ways to access program aux effects:

- Effects nav bar (Figure 22-3 on page 181)

- With the FX rack currently in view, click the master aux bus (listed just below *Master*) in the Tree Editor (Figure 20-5 on page 167)

Master aux return gain

The master aux busses are returned (mixed back into) MachFive’s main outs. You can control the level of each aux bus return in the Mixer via the Aux tab, a shown in Figure 13-2 on page 98, or by clicking the Master Aux return in the Tree Editor (Figure 20-5 on page 167) and adjusting its gain in the Tree Editor Inspector (Figure 20-6 on page 168).

EFFECTS ROUTING SUMMARY

Here is a summary of MachFive effects routing:

Effects rack	Output	Serial or parallel
Keygroup	Program	Serial
Layer	Program	Serial
Program Aux	Program	Parallel
Program	Program	Serial
Part	Part	Serial
Master Aux	Main out	Parallel
Master	Main out	Serial

SYNC, MODULATION AND AUTOMATION

Each effect has a unique set of controls, displayed in its effects rack module (Figure 22-1 on page 180). Drag them to adjust their setting with the mouse. Double-click to enter values numerically. Option/alt-click to return to zero or the setting’s nominal (default) value.

Sync

Some effects have parameters, such as delay taps, that can be synced to MachFive’s tempo (or the tempo of your host). To do so, enable the sync button at the right side of the effect module’s title bar (Figure 22-15). When the sync button is

engaged, tempo-related parameters are specified in note values and divisions, rather than in seconds or milliseconds (msec).



Figure 22-15: Tempo sync

Automating and modulating effect controls

Many effect controls can be automated or modulated. Right-click a control to access the automation and modulation options.

Use the Show/Hide modulation section button (Figure 22-1 on page 180) to display or hide automation and modulation settings.

For details, see chapter 23, “Automation and Modulation” (page 209).

EFFECT PROCESSORS

MachFive includes dozens of effects. Each effect is described briefly in this section.

- Delays188
- reverbs190
- Convolution reverb192
- Modulation FX197
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- Amplitude/Stereo202
- Drive/Distortion.....203
- Dynamics204
- Multi-Band Processors205
- Analysis206
- Miscellaneous.....207

DELAYS

Simple Delay

This is a basic all-purpose delay, with the addition of multi-channel capabilities up to 7.1. The delay time can be entered in seconds or synchronized to the host application's tempo. Use *Cutoff* to add a low-pass or high-pass filter to the delay feedback.

Stereo Delay

This delay has all the capabilities of the simple delay, including the feedback filter, plus independent left- and right-channel delay times. As the name implies, it only supports stereo signals.

Ping Pong Delay

This effect is a simple stereo ping-pong delay in which you can easily set how much stereo effect you want just by adjusting the stereo spread parameter. Of course, the filter is still there, as well as the ability to sync it to your host application's tempo.

Fat Delay

Fat delay is a versatile effect. It is in fact four delays with their parameters initially linked: your signal is mixed and sent to the two first delays (one left and one right). The result of this first delay stage is then mixed with the original signal being again delayed in a left/right delay with two different delay times. Each delay pair has an independent left and right delay time that is calculated from the diffusion parameter:

- Left delay 1 = Delay time
- Right delay 1 = Delay Time + Diffusion
- Left delay 2 = Left delay time + (1 - Diffusion)
- Right delay 2 = Right delay time + (1 - Diffusion)

This simple scheme, combined with the feedback parameter and the ubiquitous delay filter, allows you to create advanced delays with incredible repeating patterns and even reverb like sounds.

FX Delay

This effect is phunky! Built on the simple delay, we added a bit of magic that sounds a lot like a distorted filter inside the delay. There is also a surround autopan at the delay output to allow experimentation with sound spatialization.

Analog Tape Delay

The Analog Tape Delay effect is modeled after classic analog tape delays. In addition to the standard controls for controlling wet/dry mix, delay and feedback, this delay adds several additional settings: *Trash* adds an element of "dirt" to the sound, as you might experience with dust on a piece of magnetic tape. *Spread* adds stereo spread to the delay lines. *Distortion Mode* lets you choose between three distinct vintage sounds: *tape*, *tape/tube* and *analog*.



Figure 22-16: MachFive's delays.

REVERBS

Plain reverb

If you are looking for more streamlined CPU performance than the convolution-driven acoustic spaces provided by *IR Verb* (page 192), try using these fast reverbs. These are non-convolution (synthesized) reverbs that place a negligible load on your host computer.

These fast reverbs all have the following settings:

Fast reverb setting	Unit	Range	Explanation
Decay time	sec	0-10	<i>Reverb time</i> controls the length of the <i>reverb tail</i> (the portion of the sound as it trails off to silence). Longer reverb times make your music sound like it is in a larger space; shorter times sound like a smaller space. The maximum allowed time varies and depends on the specific acoustic space you have chosen.
High Damp	-	0-1	A low pass filter that reduces high frequencies as you increase the high damp setting.
Mix	dB	-∞ to 6	A signal with no reverb applied to it is commonly referred to as being <i>dry</i> . Therefore, a signal that is being processed with reverb is referred to as being <i>wet</i> . The <i>Mix</i> setting controls the amount (volume) of the treated (wet) signal. If you want more reverb, turn up this setting; if you want less reverb, turn it down.

Simple Reverb

This is a musically useful reverberation effect. Of course, we added a filter, so that you can control which part of the signal gets affected (for example, you can get rid of muddy bass). The filter, combined with the dampening parameter, will keep your reverberated sound fresh and clean.

Simple Reverb presets

Background Verb
Big Cathedral
Big Room
Canyon Percussion
Concert Hall
Jazz Club
Large Hall
Opera Cosmic
Piano Room
Short Verb
Warm Quartet Room
Warm Room

Predelay Reverb

This effect is built on the simple reverb, but we’ve tweaked it a bit with delay lines to produce a predelay reverb. Again, the predelay time can be synced to your host application’s tempo.

Gate Reverb

This effect takes the Predelay & reverb effect a bit further by adding a gate effect to the reverberated sound, producing a gated reverb right out of the 1980s. As usual, tweaking the knobs will get you some new incredible sounds from it, not just the usual “thump” gated drums.



Figure 22-17: MachFive's simple reverbs.

CONVOLUTION REVERB

MachFive is equipped with *convolution* (sampled) reverb processing called *IR Verb*. Convolution is a process where the characteristics of a real acoustic space are directly sampled, such as a church, concert hall, theater, or outdoor space. The resulting *impulse response* (IR) consists of an audio file that holds the actual sound decay characteristics of the acoustic space. By sophisticated signal processing, that impulse response can then be applied to any audio material, making it sound exactly as if it were being heard in the acoustic environment captured by the impulse response.

🔊 Convolution reverb is the most realistic type of reverb ever developed because it faithfully reproduces the actual characteristics of real acoustic spaces. As a result, it requires intense processing. Therefore, when you use IR Verb, be mindful of the amount of processing demands it imposes on your computer.

Because of the intensive processing required to produce a convolution reverb in real time, a fast computer is highly recommended when using IR Verb. The processing demands of convolution reverb can be reduced by the following techniques:

- Shorter reverb times require less processing power. Choose shorter reverbs. You can also simply turn down the reverb (see “Time (0-100%)” in the next section).
- Raise the buffer size of your hardware as explained in “Hardware buffer size” on page 44.
- Employ the CPU conservation techniques discussed in “Conserving CPU resources” on page 44.
- If your host audio application has a track freeze or bounce-to-disk feature, you can use it to “print” CPU-intensive MachFive tracks and then take them off line.

Here is a brief summary of the reverb settings for IR Verb.

Impulse response waveform editor

The waveform editor shows the overall contour of the impulse response for the preset. Drag and drop any audio file you wish into this display to create your own convolution reverb presets. Drag from the left edge of the display to create a selection region for editing. Right-click to access the contextual edit menu shown in Figure 22-19:



Figure 22-18: IR Verb convolution reverb.

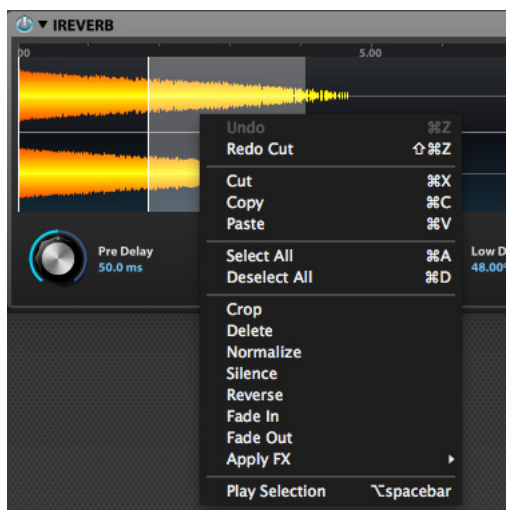


Figure 22-19: Impulse response waveform contextual menu.

Predelay (0-100msec)

PreDelay (Figure 22-18) is the amount of time before you hear the very first reflections. For example, if you are in a large room, it takes longer for the first reflections return. *PreDelay* is useful for clarifying the original sound. For example, if you apply a larger amount of predelay to an instrument, the reflections won't start until after a note has been played.

Time (0-100%)

Time (Figure 22-18) controls the length of the *reverb tail* (the portion of the sound as it trails off to silence). Longer reverb times make your music sound like it is in a larger space; shorter times sound like a smaller space.

The maximum allowed time varies and depends on the specific acoustic space you have chosen.

Longer reverb times cause your computer to work harder. So you can conserve computer resources by choosing shorter reverb times.

Low damp (-1 to +1)

Low damp (Figure 22-18) is a high pass filter that reduces low frequencies as you increase the High damp setting. Positive values damp high frequencies, while negative values expand high frequencies.

High damp (-1 to +1)

High damp (Figure 22-18) is a low pass filter that reduces high frequencies as you increase the Low damp setting. Positive values damp low frequencies, while negative values expand low frequencies.

Width (-1 to +1)

Width (Figure 22-18) controls the stereo imaging of the reverb. If you turn this control down, the reverb effect will become mono.

Wet ($-\infty$ to +6dB)

A signal with no reverb applied to it is commonly referred to as being *dry*. Therefore, a signal that is being processed with reverb is referred to as being *wet*. The *Wet* setting (Figure 22-18) does what its name implies: it controls the amount (volume) of the treated (wet) signal. If you want more reverb, turn up this setting; if you want less reverb, turn it down.

Dry ($-\infty$ to +6dB)


Dry (Figure 22-18) controls the volume of the original dry (unprocessed) signal. This allows you to precisely control the amount of the original dry signal that is mixed in with the wet (processed) signal.

IR Verb presets

Real acoustic spaces throughout the world were carefully selected and recorded to be included with MachFive. A wide variety of spaces are provided, and each space can be fine-tuned even further by adjusting the reverb settings. These reverbs were captured in cathedrals, temples, concert halls, forests, canyons, caves and other locations.

Emulations of classic hardware reverbs are also provided, including vintage and classic spring and plate reverbs.

A host of sound design presets are included, as IR Verb can produce unexpected and pleasing results with these unconventional impulse responses.

 Remember, the longer the reverb time, the more processing it requires, and the greater the demand placed on your computer.

Classic UVI Presets

Cathedrals & Churches

Big Chapel Hall.fxps

Bright Cathedral.fxps

Cathedral Hall.fxps

Cathedral Organ.fxps

Church Organ Hall.fxps

Church Reflexions.fxps

Huge Church.fxps

Mystic Canyon.fxps

Requiem Room.fxps

Small Chapel.fxps

Concert Halls

Bright Concert Hall.fxps

Concert Half.fxps

Concert Hall.fxps

Large Ensemble Room.fxps

Majestic Room.fxps

Open Opera Space.fxps

Symphonic Hall.fxps

Warm Ambiance.fxps

Deluxe Reverb

Flat Room.fxps

Large Hall.fxps

Large Plate.fxps

Medium Hall.fxps

Medium Plate.fxps

Small Hall.fxps

Small Plate.fxps

Warm Room.fxps

Wood & Large.fxps

Temple & Co

Calm And Beauty.fxps

Hypnotic Reflections.fxps

Meditation Temple.fxps

Small Temple Ambiance.fxps

Spacious Church.fxps

THE Cathedral.fxps

Warm Chapel.fxps

Acoustic spaces: Cathedral

Cathedral 33m

Cathedral 22m

Cathedral 09m

Cathedral 16m

Other IR Verb presets

Acoustic spaces

Cathedral ...

Chapelle-Church...

Concert Halls...

Misc Large...

Misc Medium...

Misc Small...

Hardware

Digital Plate...

Digital Verb...

ETM...

German Q-tec...

KSP Eight...

L-FortyEighty...

L-MPX One...

L-NineSixty...

L-PCM...

M Series...

Rol DEP Three...

Studio Cheap Device...

Springs and Echo

Classic...

Modeled...

Modern...

Space Echo Mono...

Sound Design

Water Room

Cymbalic Ride 1

Mode FX Echo

Spectral Design

Cymbalic Crash 1

Space FX

Cymbalic Ride 2

Cymbalic Crash 2

Combination Echo

Laundry

Cymbalic Hi-Hat 1

Dusty Spectral

Robotic Echo

Space Double

Cymbalic Crash 3

Room Long FX

Room Short FX

Echo Slap

Robot Echo

Cymbalic Ride 3

Combo FX Long

Cold Impressions

Short Combo

Small Cabinet

In da Tube

Soda Sound

Water Glass

Cymbalic Hi-Hat 2

Percu Box

Cabinetix

Cymbalic Hi-Hat 3

Speaker Cellular

SPARKVERB

SparkVerb (Figure 22-20) is a complete synthetic reverb that focuses on sound quality and maximum control of essential parameters. It uses a feedback delay network with modulated delays and three-band control of the decay rate.

A unique and crucial feature is the explicit control of detune in cents, which can be used to produce stratospheric choruses, resonant unisons, and lush ambiences. An input diffusion stage helps increase short-term echo density, which can be especially useful when applied to rhythmic material.

Special care has been taken to make SparkVerb as efficient and versatile as possible. Intuitive controls allow you to quickly control the room size and shape.

Presets

SparkVerb provides dozens of useful presets. Use them as is, or use them as a good starting point for your own creations.

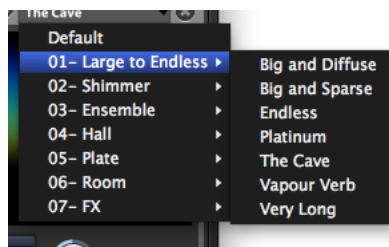


Figure 22-21: SparkVerb presets

Room geometry

Use the *Room Size*, *Shape*, *Density*, and *Decay Time* controls to adjust the overall characteristics of the space. *Density* controls the number of delays in the feedback delay network.

Bass controls

Use the *Bass Decay* multiplier and *Bass Xover* (crossover) controls to manage the presence of the low end. The *Decay Low-Cut* button changes the bass decay shelving filter to a highpass filter and disables the Bass Decay multiplier.



Figure 22-20: MachFive 3.1.0's new SparkVerb.

Hi-frequency controls

Use the *Hi Decay* multiplier and *Hi Xover* (crossover) controls to manage the high frequency content. The *Decay Hi-Cut* button changes the high decay shelving filter to a highpass filter and disables the Hi Decay multiplier.

Freeze

The *Freeze* button holds the reverb in its current state with infinite decay.

Diffusion

Use the *Diffusion On/Off* button to enable or disable diffusion. Depth and start time controls let you control the density and timing. Diffusion can be especially useful for rhythmic material.

Modulation

The modulation controls at the bottom of the panel can have a dramatic affect on the overall sound of SparkVerb. *Modulation* (depth) is adjusted in cents (one one-hundredth of a semitone) and fractions of one cent, with a wide range from zero to 20 cents. The *Mode* setting lets you specify the overall color of the sound. The *Mod Rate* setting multiplies the rate of all delay line modulators.

Output

Use *Mix* and *Width* to shape the final output of the effect. *Rolloff* controls the cutoff frequency of a lowpass filter on the final reverb output.

MODULATION FX

Analog Chorus

The Analog Chorus is modeled after a very popular chorus/flanger guitar pedal. It produces smooth analog sound with pleasing, authentic transient shaping.

Analog Flanger

Similar to the Analog Chorus, the Analog Flanger is modeled after a very popular chorus/flanger guitar pedal.

Chorus

There is no such thing as a multi-effect section without a chorus. MachFive is no exception and provides a nice 4-stage stereo chorus that you can even sync to your host application's tempo.

Ensemble 505

Ensemble 505 is deeply inspired by the ensemble circuit found on the Roland Paraphonic RS-505. Through examination of circuit schematics and measurements taken on a working unit, the specific behavior of the BBD delay lines, modulator shapes, and signal path found in the original have all been faithfully reproduced. The result is a very smooth and “analogish” ensemble effect that can be used with a wide variety of sounds, from raw synth waveforms to voices, choirs and even drum loops.

Mode

Three options (I, II or III) in the *Mode* menu allow you to choose from the most subtle to the most obvious effect.

Tone

Tone controls the overall tone of the output using different filter combinations.

Mix

Adjust the mix from dry to wet. The original RS-505 is fixed on 100% wet.

Flanger

This flanger can give you a varied palette of sounds, from smooth to deadly to synced and fast flange.

Phaser

In the phaser you can control the minimum and maximum frequency of the sound on which the phaser will operate. You can also set the speed — syncable to your host application's tempo as usual — of the feedback and the depth of this 6-stage phaser.

Cross Phaser

The Cross Phaser is essentially an enhanced double phaser with stereo cross-feedback in between the 12 stages of the effect.



Figure 22-22: MachFive's modulation effects.

FILTERS

MachFive provides twelve filters, with conventional frequency cutoff, drive, resonance, and/or Q controls. Below are a few highlights.

Analog Filter

The Analog Filter is modeled after the filter section of a very popular American synth.

Autowah

The Autowah can be used in sync or in free mode. In free mode the input level will drive the wah filter frequency. When synchronized, an internal LFO will change this frequency over time. You can change the level of sensibility with the input gain and sens parameters, and the color of the effect can be changed thanks to the resonance and the amount of overdrive to add to the filter output.

Biquad

This filter is a conventional biquad filter with HP, LP, BP and notch variants.

Comb Filter

A conventional comb filter with both positive and negative notches.

FX Filter

A more specialized filter with low and high frequency cutoff and Q settings.

LPF1 and LPF2

Standard low-pass filters with cutoff and resonance.

OnePole

A new superfast one-pole lowpass filter. In most cases, you can use this filter instead of more “expensive” filters, when the goal is to soften and blend velocity samples.

Rez Filter

The Rez Filter is modeled after the filter section of a very popular Japanese synth.

TalkBox Filter

The TalkBox Filter is a vowel filter with lowpass, highpass and bandpass capability as well.

UVI Filter

This is a simple resonant filter that can be used in two ways: low-pass and high-pass. You can change the resonance of the filter to sharpen any sound.

WahWah Filter

The WahWah Filter emulates the sound of a classic wah wah pedal. Right-click any of the parameters, including amount (Wah), Drive, Model and Master to modulate them or assign remote control (via MIDI or OSC).

Xpander Filter

Xpander is based on the Oberheim Xpander. This is an order 4 Moog ladder-style filter with built-in saturation and oversampling, plus dozens of modes. Traditional low-pass, high-pass, band-pass, notch, and peak filters are provided, along with more esoteric and creative filters. Xpander broadens the number of modes found in the original Oberheim and analog variants by Doepfer. This filter is more CPU-intensive than the others, but the results are often worth the extra bandwidth.

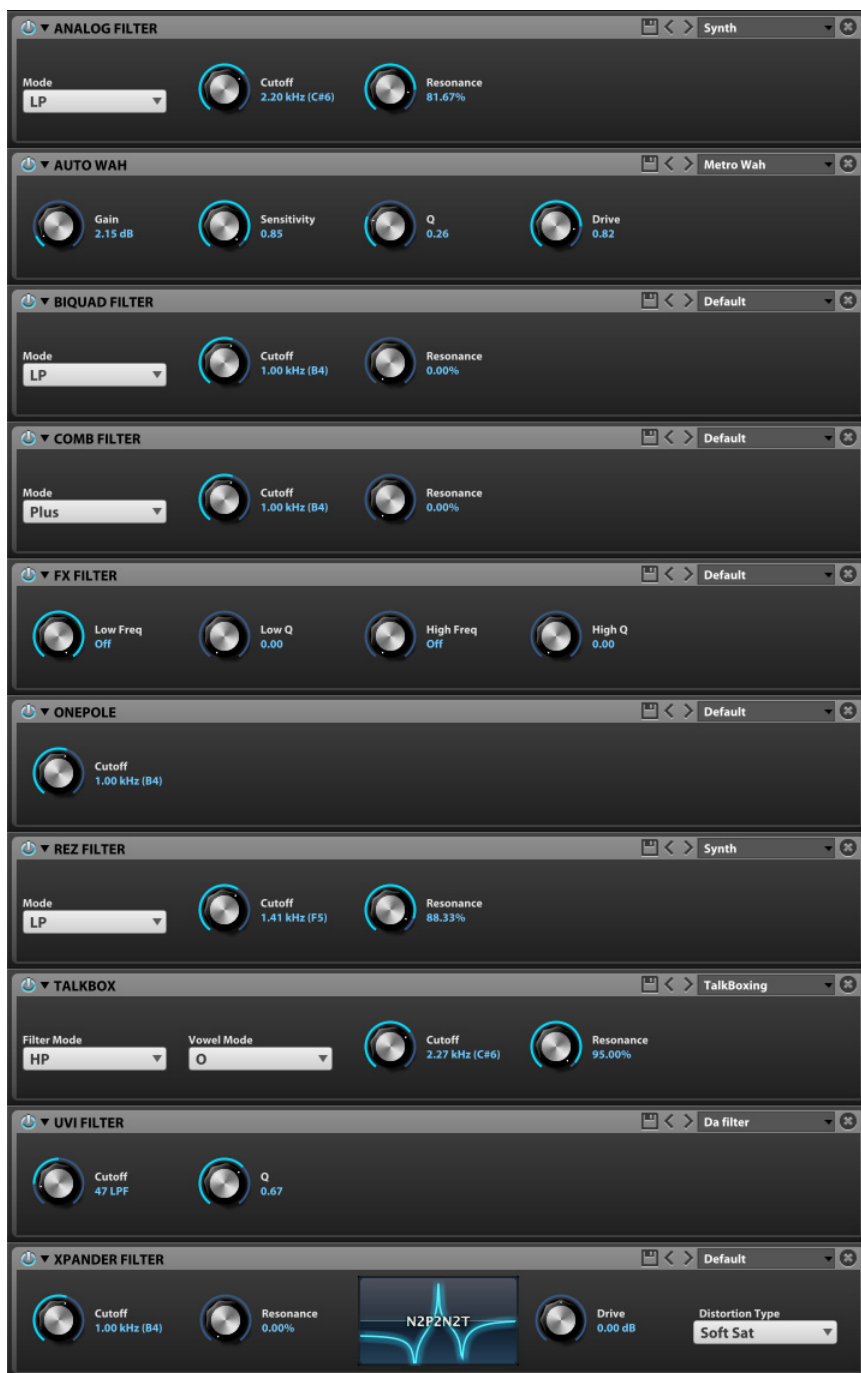


Figure 22-23: A few of MachFive's twelve filters.

EQ

2-band EQ

This two-band equalizer can adjust the frequency content of any instrument — or even a complete mix as a master effect.

3-band EQ

This is a simple, effective 3-band equalizer. You can adjust the low and high frequencies by controlling the two shelving filters, and the third band is a parametric middle filter with adjustable Q, frequency and gain.

8-band EQ

The 8-band EQ provides four parametric bands, plus low and high shelf filters, plus low-pass and high-pass filters. Drag the control points directly on the grid to edit them graphically.



Figure 22-24: MachFive's 2-band, 3-band, and 8-band EQ.

AMPLITUDE/STEREO

Autopan

This easy-to-use autopan effect can play it safe when used in stereo — or go wild in quad and 7.1.

Gain Matrix

Gain Matrix lets you control how stereo channels are redistributed across the stereo field, providing unlimited control over stereo manipulation. This effect is a Swiss army knife for managing bus channels. It can be used for M-S conversion, stereo-expansion, matrixing, and much more.

Rotary Simple

The simple version of our rotary speaker emulation contains only one speaker, but is still very effective.

Rotary Speaker

This double-rotating speaker simulation will work miracles on all vintage keyboards and guitar sounds. Even the microphone distance is simulated.

Tremolo

This very simple volume effect from the sixties lets you control the depth and speed — and synchronize it to your host application's tempo using the *Sync* button.

UVI Wide

UVI Wide is a stereo enhancer that employs phase and delay to produce a unique widening effect.

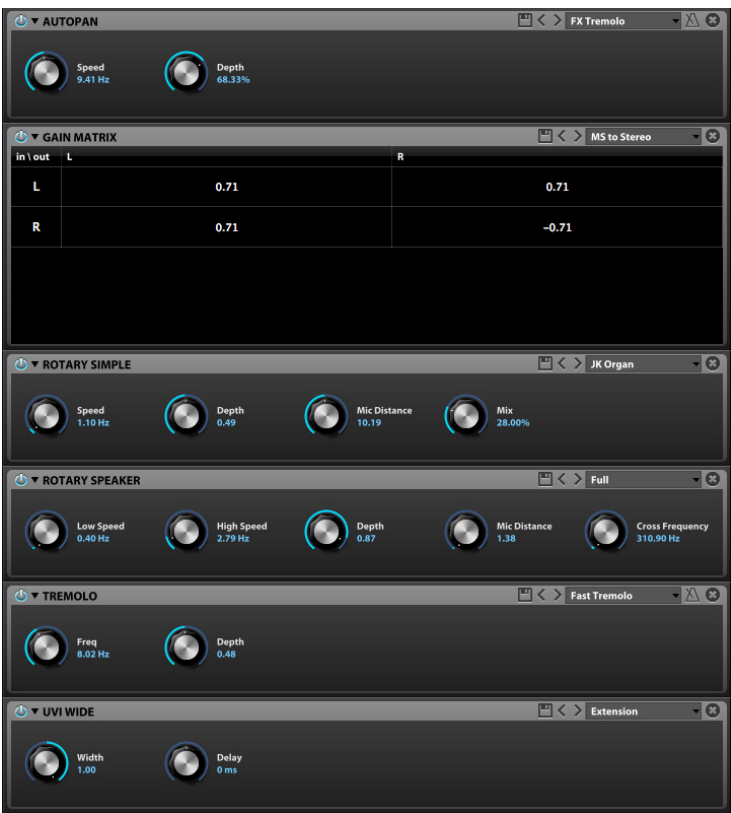


Figure 22-25: MachFive's amplitude/stereo effects.

DRIVE/DISTORTION

Analog Crunch

The Analog Crunch effect emulates classic “crunchy” guitar distortion.

Double Drive

The Double Drive combines an analog drive simulation, followed by a UVI Filter that is reinjected into a strong digital distortion effect.

Exciter

Exciter models classic exciter hardware processors produced over the years.

Fuzz

The Fuzz effect emulates classic “fuzz” guitar distortion.

Guitar Boxes

The Guitar Amps effect emulates the sound of fourteen popular guitar cabinets.

Overdrive

The Overdrive effect emulates classic “overdrive” guitar distortion.

UVI Drive

This unique combination of an analog overdrive simulation and a UVI Filter can give a nice tone to most guitars, drums and keyboards.



Figure 22-26: MachFive's drive/distortion effects.

DYNAMICS

Compressor Expander

The Compressor Expander provides conventional single-band compression/expansion with gating. Auto Makeup can also be enabled.

Gate

Gate provides conventional gating with straight-forward threshold, attack and release controls.

Studio Limiter

The Studio Limiter is a high-performance limiter with three basic controls. It performs as effectively as the very best software limiters available, on a wide variety of audio material.



Figure 22-27: MachFive's dynamics processors.

MULTI-BAND PROCESSORS

3 Band Compressor

The 3 Band Compressor provides classic three-band compression.

3 Band Limiter

The 3 Band Limiter provides classic three-band limiting.

UVI Mastering

UVI Master provides advanced mastering processing with combined 3-band compression, limiting, EQ and tape emulation. This effect is ideal for use as a Master effect (for MachFive's Main Outs).



Figure 22-28: MachFive's multi-band effects.

ANALYSIS

Spectrum Analyzer

The Spectrum Analyzer provides a graphic display of the frequency content currently being output by MachFive. Frequencies are displayed across the top of the window. The settings across the bottom let you control how the FFT is displayed and how often the display is refreshed.

Tuner

The Tuner can detect the pitch of a sample and help you tune it. By default, MachFive uses the standard tuning reference of A = 440 Hz (the A above middle C). However, you can use MachFive's master tune adjustment (see "Tune" on page 78) to change the tuning reference to A = 442 Hz, or any other reference you wish.

Tuning a sample

To tune a sample, stop any loops that may be playing and hold down (sustain) any note from your MIDI controller. The Tuner detects the note's pitch and displays the pitch in the center of the tuner. In addition, the meter displays how sharp or flat the note is in cents on a scale from -50 cents (a quarter tone flat) to +50 cents (a quarter tone sharp). Use the Fine Tune knob in the Keygroup Settings section (see "Fine Tune" on page 119) to fine-tune the keygroup until the meter reads zero (or any other desired tuning).

Tuning keygroups

If a sample is stretched across two or more keys as a keygroup, it is recommended that you start by tuning the root pitch (Base Key). After tuning the base key, check other pitches to further adjust the tuning for the keygroup.



Figure 22-29: MachFive's Spectrum Analyzer and Tuner.

MISCELLANEOUS

Beat Repeat

Beat Repeat takes an initial slice of a loop or sound and then repeats it over and over. Use the Active button to start and stop the effect.

Ring Modulator

This is a very basic ring modulator. A ring modulator has the ability to add harmonics to a signal in an odd fashion. For example, if you play a 1000Hz signal into a ring modulator at 100Hz, you will obtain a signal that contains the original

1000Hz signal mixed with a composited 900Hz and 1100Hz signal (1000-100 and 1000+100, respectively). It is very effective for creating special effects on drums and even guitars and synth sounds. You can set the frequency of the composited signal from 0.1Hz to 1000Hz.

Robotizer

The Robotizer is a ring modulator with a twist: it adds a frequency modulation parameter (that distorts the frequency of the ring modulator) and a UVI filter to smoothen the resulting sound.



Figure 22-30: MachFive's extra effects.

UVI Destructor

The UVI Destructor has it all in one package:

- Bit reduction. You can simulate any number of bits, from (almost) 0 to 24 bits.
- Sample rate reduction from 2,000Hz to 48kHz.
- An Analog overdrive.
- A UVI Filter.
- All of the above in series.

UVInyl

UVInyl makes audio sound like it is being played from a vinyl record on a turntable. Settings include (needle) wear amount, dust amount, year (era) and turntable RPM (33, 45 or 78).

CHAPTER 23 Automation and Modulation

OVERVIEW

Almost every setting in the MachFive window can be automated, modulated or both. Automation is handled via MIDI continuous controller data or MachFive’s Macros; in many cases there are factory default MIDI controller assignments, which you can change if you wish. For modulation, both internal and external sources can be employed. MachFive’s modulation architecture is open-ended and flexible, giving you an unlimited number of internal sources (LFOs and envelopes) and completely flexible external assignments.

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WHAT CAN BE CONTROLLED?

Generally speaking, here is an overview of MachFive parameters that can be controlled with automation and modulation:

- Oscillator settings (page 119)
- Keygroup settings (page 120)
- Layer settings (page 122)
- Program volume (page 123)
- Mixer channel strip settings (Figure 13-3 on page 98)
- Effects settings (Figure 22-1 on page 180 and Figure 13-1 on page 97)
- Keygroups, layers and programs in the Tree Editor (Figure 20-5 on page 167)

MAKE A SELECTION FIRST

Automation and modulation assignments made in the Settings section (Figure 17-1 on page 116) apply to the currently selected oscillator, keygroup(s), and layer(s) in the program for the currently selected part. If none (or all) of the keygroups in a layer are currently selected, then the settings apply to all samples and keygroups in the current layer. Be aware of the current selection as you work with MachFive’s automation and modulation features. See “Selection” on page 118.

AUTOMATION

Use *automation* to control a parameter from another source, such as a MIDI controller. Automation provides direct control of the parameter’s setting. In many cases, a MachFive parameter may already have a factory setting for MIDI control.

To assign MIDI automation control to a parameter, right-click the parameter knob or switch to access the automation/modulation menu (Figure 23-1):

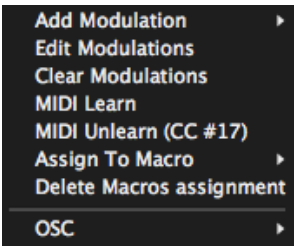


Figure 23-1: Right-click to access the automation/modulation menu.

☛ If the setting cannot be controlled with automation or modulation, the menu (Figure 23-1) does not appear when you right-click.

MIDI Learn

Choose *MIDI Learn* from the menu (Figure 23-1) to make a new MIDI controller assignment (Figure 23-2):

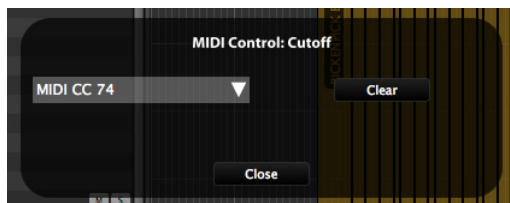


Figure 23-2: MIDI Learn.

If a MIDI automation assignment is already present, the menu displays it. To make a new assignment, choose the desired controller from the menu. To make an assignment using your MIDI controller, send the desired controller data.

Click *Clear* to remove the current assignment and click *Close* to put away the MIDI Learn window.

MIDI Unlearn

Use *MIDI Unlearn* (Figure 23-1) to clear the current MIDI controller assignment (displayed in parentheses in the menu, as shown in Figure 23-1).

OSC path display

The modulation menu shows the OSC path for the parameter you've right-clicked, and lets you copy the path to the clipboard. For further information about OSC automation, see “OSC (Open Sound Control)” on page 109.

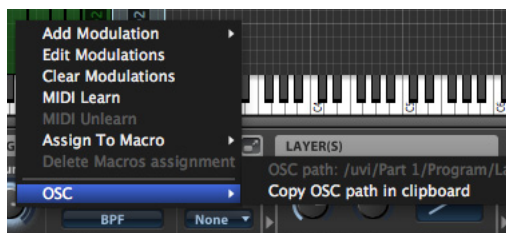


Figure 23-3: Modulation menu OSC path sub-menu

MACROS

Macros are a powerful feature because they allow you to map multiple MachFive settings to a single macro knob. You can then assign MIDI automation to the macro knob for total automation of multiple parameters.

Making a macro assignment

To assign a macro to a MachFive parameter, right-click it and choose *Assign to Macro* from the automation/modulation menu (Figure 23-1), and choose the desired macro (1-8) from the sub-menu.

Viewing macro assignments in the Tree Editor

Every program has eight macros, which are listed below the program in the Tree Editor. Any parameters assigned to a macro appear hierarchically below the macro. In the example in Figure 23-4, Macro 1 has four parameters assigned to it: the low gain control for a 3-band EQ, the filter cutoff and resonance for a biquad filter, and the program (*RickenBass*) pan.

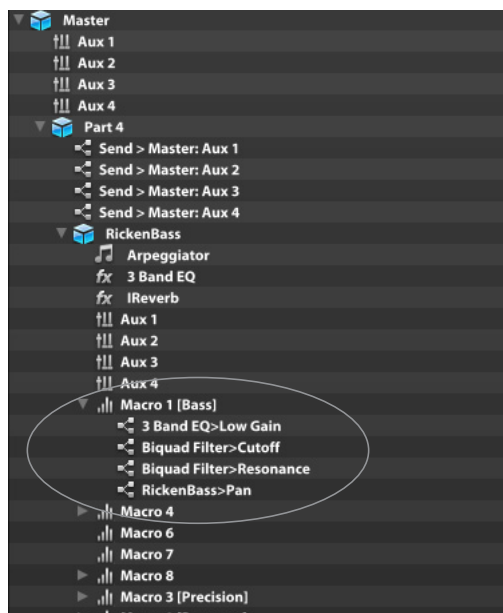


Figure 23-4: Viewing macro assignments in the Tree Editor.

Macro settings

To adjust how a control responds to the macro knob, click the assignment in the Tree Editor (Figure 23-4) to select it and then adjust its settings in the Tree Editor Inspector (Figure 23-5):

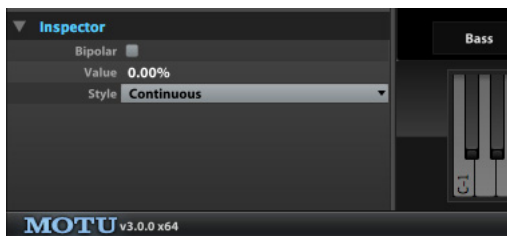


Figure 23-5: Macro settings in the Tree Editor Inspector.

Bipolar

When bipolar is unchecked, the macro has a range from zero (0) to 100%. When checked, the bipolar range goes from -100% to +100%.

Value

Value displays the current setting for the Macro.

Style

If *Style* is set to *continuous*, it operates as a knob with a continuous range; if *style* is set to *on/off*, the macro appears as a switch that can be pushed on or off.

Using macros

As soon as you assign a parameter to a macro, it appears in the Info tab for the part in which the program is loaded (Figure 10-1 on page 75), either as a knob (continuous) or button (on/off), as shown below.



Figure 23-6: Using macros in the Info pane.

Renaming a macro

To rename a macro, double-click its name in the Info pane.

Removing macro assignments

To get rid of a macro assignment, select the assignment you wish to remove in the Tree Editor (Figure 23-4) and hit the backspace key.

Alternately, right-click the MachFive parameter that is bound to the macro and choose *Delete Macros Assignment* from the menu (Figure 23-1 on page 209).

Automating macros

Macros can themselves be automated. To do so, right-click the macro in the Info tab (Figure 23-6), choose MIDI Learn from the menu (Figure 23-1), and make your MIDI controller assignment as explained in “MIDI Learn” on page 210.

Modulating macros

Alternately, you can modulate the macro by choosing Add Modulation from the automation/modulation menu (Figure 23-1), as explained in the next section.

MODULATION

Use *modulation* to control MachFive parameters from a wide variety of internal or external sources.

To assign modulation control to a parameter, right-click the parameter knob or switch to access the automation/modulation menu, and then access the Add Modulation sub-menu (Figure 23-7):

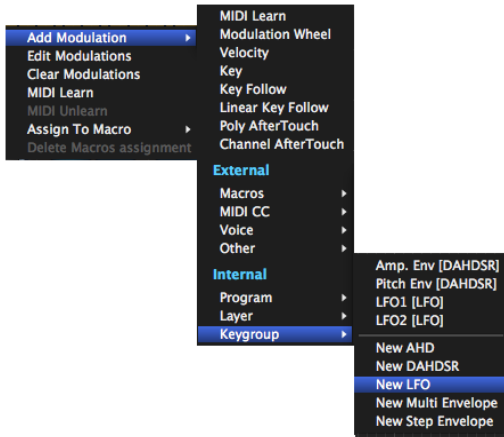


Figure 23-7: Right-click to access the automation/modulation menu.

☞ If the setting cannot be controlled with automation or modulation, the menu (Figure 23-7) does not appear when you right-click.

☞ Not all modulation settings shown in Figure 23-7 are available for all MachFive parameters; only eligible modulation sources are displayed in the menu.

External modulation sources

External modulation sources (Figure 23-7) consist of macros, MIDI controllers, pitch bend, aftertouch, and parameters related to MIDI notes, such as pitch, velocity, and so on.

Macros and MIDI CC's as modulation sources

As discussed earlier, macros and MIDI controllers (CC's) serve as automation sources, but they also serve as modulation sources, as shown in

Figure 23-7. So what is the difference? When serving as an automation source, a macro or MIDI CC directly affects the actual value of the parameter. For example, any changes to the parameter's value made via automation would be saved with the program.

When serving as a modulation source, a macro or MIDI CC affects the value of the parameter for the internal processing of the sound, but without altering the currently displayed value of the parameter. This “modulated” value is represented around knobs as a moving dot, to indicate that the parameter is being modulated, but without changing the parameter's current value. For example, modulated values would not be saved with the program, thus preserving the current parameter setting. In addition, modulated values are made relative to the current setting for the parameter.

Voice modulation sources

Voice modulation sources (Figure 23-8) consist of MIDI note-related parameters such as note-on velocity, pitch, key follow, etc.

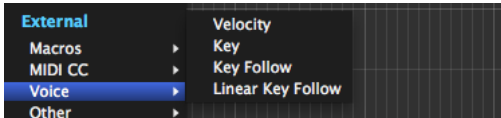


Figure 23-8: Voice modulation sources.

Other external modulation sources

The *Other* sub-menu provides additional modulation sources (Figure 23-9), such as polyphonic aftertouch, channel aftertouch, pitch bend, and others. See the following sections for further explanation.

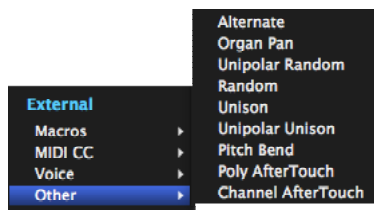


Figure 23-9: Voice modulation sources.

Alternate modulation

The *Alternate* modulation option (Figure 23-9) sends maximum and minimum modulation values alternately. For example, if applied to pan with a depth of 1, this modulation source would alternate between the hard-right and hard-left pan position. To lower the values, just lower the depth.

Organ Pan modulation

The *Organ Pan* modulation option (Figure 23-9) is based on the way organ pipes are set in a church organ. This option is primarily for panning samples, but it can be used for other creative effects, too. This option determines modulation values depending on incoming MIDI pitch numbers. For pitches lower than 36, maximum and minimum values are sent alternately (i.e. note 32 will be generating a value of 0, 33 will generate 127). For pitches between 36 and 108, the alternating continues but with smaller and smaller amplitude, until finally, above note 108, all notes generate a value of 64.

Unison and Unipolar Unison

Unison and *Unipolar Unison* are modulation sources that work hand in hand with the *Unison Voices* setting (“Unison Voices” on page 168) and affect how the unison voices are spread among the available voices.

Random modulation

The *Random* modulation option (Figure 23-9) generates a new, random value each time a note-on is received.

Internal modulation sources

Internal modulation sources include LFOs and a variety of envelopes (Figure 23-10).

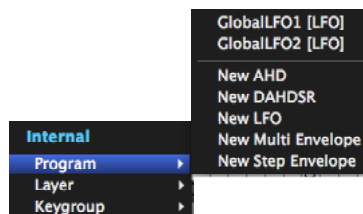


Figure 23-10: Internal modulation sources.

Existing sources (either preset sources or ones you’ve already created) are displayed by name above the line in the menu with their type (LFO, envelope, etc.) in brackets. (See “Modulator name” on page 215.) To create a new source, choose one of the *New* commands below the line.

Internal modulator hierarchy

Internal modulators (LFOs and envelopes) can be global to the entire program (i.e. available to all parameters and effects settings associated with the program), or they can be specific to layers or keygroups. This provides a high degree of modularity and flexibility when employing the internal modulation sources. For example, a MachFive parameter can have its own individual modulators. Conversely, multiple parameters (or keygroups) can share the same modulator.

Use the *Program*, *Layer*, and *Keygroup* sub-menus as shown in Figure 23-10 when adding a modulator to specify what type of LFO or envelope it is.

A parameter can be controlled by LFOs and envelopes the same level or higher in the hierarchy. For example, a keygroup could be controlled by a keygroup, layer or program LFO. But the volume for a program could only be controlled by a program-level LFO or envelope (not a keygroup LFO).

LFO and envelope retriggering

LFOs and envelopes are retriggered when notes are played from the keygroups they are assigned to. So keep this in mind when assigning them as modulation sources to MachFive parameters. LFOs can also be set to *not* retrigger. See “Retrigger” on page 216.

Modulation settings

The *modulation settings* (Figure 23-11) let you further view and manage MachFive’s modulation matrix. To view the modulation settings, go to the Edit tab and click the show/hide button for the modulation section (Figure 17-1 on page 116).

If you are working in the FX Rack, you can show and hide the modulation settings as shown in Figure 22-1 on page 180.

Make a selection first

To view the modulation settings for a MachFive parameter, click it to select it. The currently selected parameter displays a glow around it. Keep in mind, however, that the modulation settings (Figure 23-11) show settings for the currently selected control for the currently selected keygroup, or, if no keygroup is selected, the current keygroup layer. Here are a few tips for making selections when using the modulation settings:

- Keep the Mapping Editor and Tree Editor open so that you can make selections and visually keep track of what is currently selected.
- Select the desired keygroup, or, if you want the modulation assignment to affect all keygroups in the layer, make sure *all* keygroups are selected (or *none*). If there are multiple layers in the program, select the layer you want in the Tree Editor.
- Once you have made the keygroup and/or layer selections above, click the desired parameter to view its modulation settings (Figure 23-11).

Modulation sources and settings tabs

The list on the left shows each modulation source for the currently selected MachFive parameter. You can add, select, delete, and disable the currently selected source.

Invert

Use *Invert* (Figure 23-11) to swap the range of the modulation source.

Mapper

See “Mappers” on page 220.

Modulation Depth

Use *Depth* (Figure 23-11) to determine the degree to which the automation source affects the parameter being automated. Negative values produce opposite effect, such as pitch going down when you move the mod wheel up, for example.

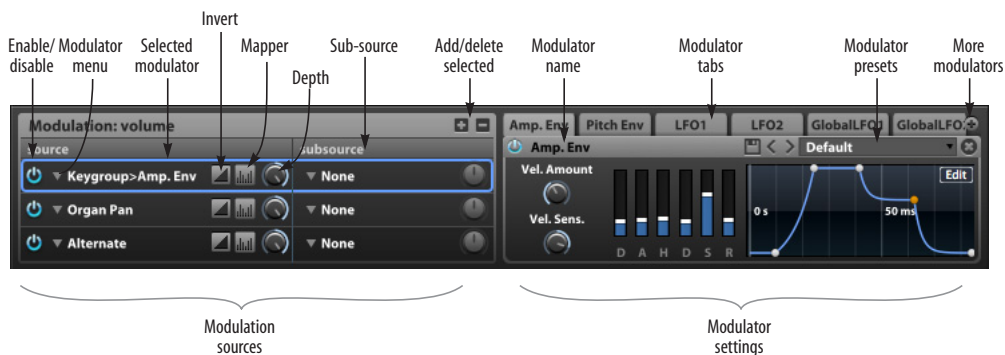


Figure 23-11: Modulation settings

Subsource

Modulation sources can also have a *Subsource* (Figure 23-11), with its own *Depth* setting. A sub-source controls the depth of the modulator. For example, if the modulation source is an LFO, and you’ve assigned mod wheel as its sub-source, turning the mod wheel all the way down produces zero LFO modulation. Turning it all the way up produces maximum LFO effect.

Add/delete modulation sources

Use the “+” button (Figure 23-11) to add additional modulation sources to the currently selected MachFive parameter. To delete a source, select it and click the “-” button.

Modulator settings

If you click a source in the list on the left, its settings appear in the settings section on the right (Figure 23-11).

Modulator tabs

If you click one of the modulator tabs (Figure 23-11), any parameters in the currently selected keygroup, layer or effect will highlight and the modulations settings will be displayed, along with any other modulation sources currently assigned to the same parameter. If you click a tab and it says *No parameter selected*, this means that this modulation source is not currently assigned to any parameters in the currently selected keygroup or layer.

More modulators

MachFive allows you to create as many modulators as you wish, and their tabs will often not fit in the display. Therefore, to access tabs that are not currently visible, click the More modulators menu (Figure 23-11). The modulator you choose from the menu will then be displayed in the settings section.

Modulator name

Double-click the modulator name (Figure 23-11) to rename it.

Modulator presets

Use the Save button, Next/Previous preset buttons, and the preset menu to manage modulator presets. User modulation presets are saved here:

OS	Location
Mac	/Users/username/Documents/MOTU/MachFive3/ User Presets/Modulations
Windows	\Users\username\Documents\MOTU\MachFive3\ User Presets\Modulations

LFO and envelope settings

For further information about LFO and envelope settings, see “LFOs” below and “Envelopes” on page 217.

LFOs

LFOs (Low Frequency Oscillators) can be applied as modulation sources for a wide variety of parameters throughout MachFive.



Figure 23-12: LFO settings.

By default, MachFive provides two global (program) LFOs and two keygroup LFOs, but you can add as many as you want at all three levels (keygroup, layer and program) as explained in “Internal modulation sources” on page 213.

Choosing an LFO to view and edit

The LFO settings (Figure 23-12) are displayed for the currently selected LFO. Select the keygroup and parameter (see “Make a selection first” on

page 209) and then either select the LFO in the source list (Figure 23-11) or click its tab in the settings section (Figure 23-11).

LFO name

Double-click the LFO name (Figure 23-12) to change it.

LFO Type

Choose the LFO Type (Figure 23-12) from the menu provided:



Figure 23-13: LFO type menu.

Frequency

The *LFO rate* (Figure 23-12) sets the speed of the LFO. The unit of measurement depends on the sync mode (above). When sync mode is *Off*, the LFO rate is set in hertz (cycles per second) from zero to 20.00 Hz. When sync is enabled, the LFO rate is set in fractions or multiples of a beat, which follows the tempo of your host software. For example, if you choose $1/2$, the LFO will complete one cycle in half a beat.

LFO rate can be automated and modulated. Right-click to assign a modulator.

Phase

Phase (Figure 23-12) determines the offset of the LFO from the global tempo, or MachFive's global time reference. The value is expressed in terms of a percentage of one full cycle.

Sync

Enable the LFO *Sync* button (Figure 23-12) to synchronize the timing of the LFO with MachFive's tempo, or the tempo of your host software (when "Sync to Host" on page 77 is enabled). When sync is off, LFOs oscillate in cycles per second (Hz). When sync is on, they oscillate in multiples or fractions of the host software tempo (e.g. $1/2$ for half a beat).

Bipolar

When *Bipolar* is enabled (Figure 23-12), the LFO oscillates in normal fashion between -1 and +1. When unchecked, it oscillates in a "one-sided" fashion between zero and +1 only.

Retrigger

Retrigger (Figure 23-12) causes each new note that is played to restart the LFO waveform. When *Legato* retriggering is chosen, the LFO is not retriggered when notes are played in legato (overlapping) fashion.

Delay time

LFO *Delay time* (Figure 23-12) changes where in the cycle the LFO starts when triggered or retriggered. The range is from zero msec to 10.00 seconds. LFO Delay can be automated and modulated.

Rise time

LFO *Rise time* (Figure 23-12) is the length of time over which the LFO starts from zero and fades into its full amplitude. The range is from zero msec to 10.00 seconds. LFO Rise can be automated and modulated.

Depth

The *Depth* of the LFO (Figure 23-12) is specified independently for each parameter that uses the LFO as a modulation source. If a parameter can use an LFO as a modulation source, it has its own Depth setting, as explained in “Modulation Depth” on page 214.

Saving and loading LFO presets

Use the modulator preset controls to save and load LFO presets.

ENVELOPES

Envelopes can be used to shape a sound with multistage changes over time. MachFive provides four different types of envelopes: *AHD*, *DAHDSR*, *multi envelopes*, and *step envelopes*. You choose the type when you first create the envelope.

As explained in “Internal modulation sources” on page 213, envelopes can be available globally to all program parameters, or they can be specific to keygroups or layers. By default, MachFive supplies pitch, amplitude, and filter envelopes at the keygroup level, but you can add as many as you want at all three levels (keygroup, layer and program).



Figure 23-14: Envelopes settings. This is a DAHDSR envelope.

Choosing an envelope to view and edit

The envelope settings (Figure 23-14) are displayed for the currently selected envelope. Select the keygroup and parameter (see “Make a selection first” on page 209) and then either select the envelope in the source list (Figure 23-11) or click its tab in the settings section (Figure 23-11).

Envelope name

Double-click the envelope name (Figure 23-12) to change it.

Velocity (Vel.) amount

Velocity Amount (Figure 23-14) determines the degree to which MIDI note-on velocity affects maximum envelope value. For example, a value of 80% means that the base value will be at least 20% and velocity will affect the remaining 80%.

Velocity Sensitivity (Vel. Sens.)

Velocity Sensitivity determines the velocity response on a continuous scale that goes from linear to exponential to logarithmic.

Saving and loading envelope presets

Use the modulator preset controls (Figure 23-11 on page 214) to save and load envelope presets. User envelope presets are saved here:

OS	Location
Mac	/Users/username/Documents/MOTU/MachFive3/ User Presets/Modulations/Multi Envelope
Windows	\\Users\\username\\Documents\\MOTU\\MachFive3\\ User Presets\\Modulations\\Multi Envelope

AHD envelopes

AHD envelopes (Figure 23-15) provide a standard three-stage envelope: *attack*, *hold* and *decay*.



Figure 23-15: Multi envelope.

You can change the length of the three stages by editing the bars. You can also edit the shape of the envelope by dragging the control points and lines between them. For graphic editing techniques, see “Envelope Editor” on page 219. Since this is a fixed, three-stage envelope, you cannot add or remove points, like you can with the multi-stage envelope (Figure 23-16).

DAHDSR envelopes

DAHDSR envelopes (Figure 23-14) provide a conventional six-stage envelope. A DAHDSR envelope provides the following six-stage controls:

Stage	Name	Unit of measurement
D	Delay time	Milliseconds
A	Attack time	Milliseconds
H	Hold time	Milliseconds
D	Decay time	Milliseconds
S	Sustain level	See below.
R	Release time	Milliseconds

You can change the length of the six stages by editing the bars. You can also edit the shape of the envelope by dragging the control points and lines between them. For graphic editing techniques, see “Envelope Editor” on page 219. Since this is a fixed, six-stage envelope, you cannot add or remove points, like the multi envelope (Figure 23-16).

Filter sustain

For the filter envelope, *Sustain Level* is expressed as a percentage of the filter cutoff frequency. For the pitch envelope, Sustain Level is expressed as a percentage of the pitch envelope depth, which is expressed in semitones and cents.

Multi -envelopes

Multi envelopes (Figure 23-16) allow you to create advanced multi-stage envelopes with as many stages as you wish . See “Envelope Editor” on page 219. Additional controls are explained below.



Figure 23-16: Multi envelope.

Envelope Sync

Enable envelope *Sync* (Figure 23-16) to snap envelope control points (stages) to a beat grid.

Retrigger

Retrigger (Figure 23-12) causes each new note that is played to restart the envelope. When *Legato* retriggering is chosen, the envelope is not retriggered when notes are played in legato (overlapping) fashion.

Speed

Speed (Figure 23-12) determines how quickly the envelope proceeds after being triggered. Lower values are slower; higher values are quicker. See “Envelope playback indicator (red dot)” on page 220.

Step envelopes

Step envelopes (Figure 23-17) provide any number of fixed *Steps* (from 1 to 128) of arbitrary length (*Frequency*) or beat subdivisions when the envelope is synced to tempo. The *Smooth* option helps smooth out the stair-step effect between consecutive steps. *Bipolar* allows the steps to have either a negative or positive value. Retrigger works the same as explained earlier for multi envelopes (see “Retrigger” above).

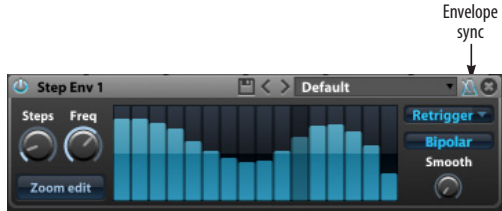


Figure 23-17: Step envelope.

Editing the step grid

Click or drag in the step envelope grid to set the step values. Right-click to reset the grid. Click the *Zoom Edit* button to edit a large version of the grid.

Envelope Editor

You can directly edit the envelope graphs for the AHD, DAHSDR and multi envelopes. Here is a summary of techniques for graphically editing any of these envelopes:

To do this	Do this
To move a point	Drag it.
To reshape a curve segment	Drag it.
To scroll the editor horizontally	Use the scroll bar, if there is one
To constrain vertically while dragging	Hold down command/control key
To constrain horizontally while dragging	Hold down option/alt key/

Multi envelope Editor shortcuts

The multi envelope offers further flexibility with these additional editing techniques:

Action	Shortcut
To add a point	Double-click anywhere on the curve
To remove a point	Right-click it
To draw a line segment	Option/alt drag

Envelope Editor contextual menu

Right-click anywhere on the envelope editor grid to access the contextual menu:

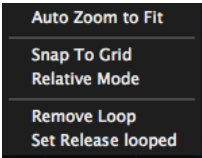


Figure 23-19: Right-click to access the Envelope Editor contextual menu

Auto Zoom to Fit scales the envelope horizontally to fit in the visible portion of the grid.

Snap to Grid, when checked, causes control points to snap to the gridlines on the edit grid.

When *Relative Mode* is checked, and you drag a control point to move it, all control points to the right of it move with it.

The *Add/Remove Loop* contextual menu items are available for multi envelopes only. Choose *Add Loop* to repeat a segment of the envelope curve for while the note is sustaining. The looped segment is

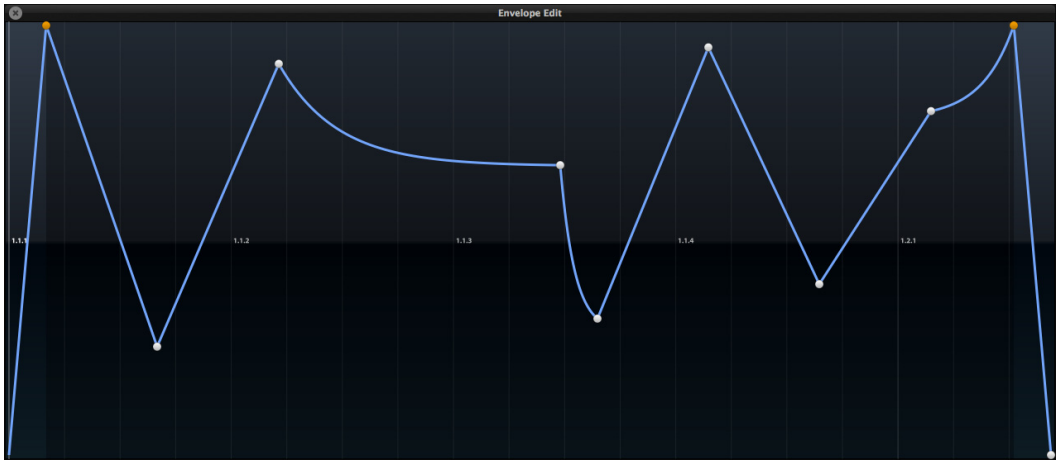


Figure 23-18: Envelope Zoom Edit.

indicated by orange points and darkened grid behind. Build the rest of the envelope around the looped segment.

When you choose *Set Release looped*, envelopes will continue looping in the looped segment of the envelope, even if the voice has been released (by a note off). When you choose *Set Release not looped*, it will exit from the looped segment and continue playing the portion of the envelope after the looped segment.

Envelope playback indicator (red dot)

When the envelope is triggered, an animated red dot appears on the envelope curve to indicate the current playback position. This can be especially helpful on complex multi-segment envelopes.

Envelope Zoom Edit

Click the *Envelope Zoom Edit* button (Figure 23-14 on page 217) to open a large, expanded envelope editor (Figure 23-18). Use the same graphic editing techniques as described in the previous sections to edit the envelope curve.

MAPPERS

Mappers (Figure 23-11 on page 214) permit you to change a control signal. You are remapping how a modulator affects the item it is modulating.

Adding a mapper to modulation source

To add a mapper to a modulation source, click its mapper button (Figure 23-11 on page 214). This opens the Mapper Editor (Figure 23-20).

Use the *Add*, *Delete* and *Rename* buttons to manage the list of mappers in the menu. Then choose the mapper you wish to use from the menu.

Mapper settings

Mappers have the following settings:

Size

Mapper *Size* (Figure 23-20) is the number of steps you want to control with the mapper. If you are remapping a MIDI controller, 128 is a good choice as it allows you to reinterpret each controller value one-to-one. However, you may want to use 8 or 16 if you are using the mapper as a step sequencer (more on this in the examples below).

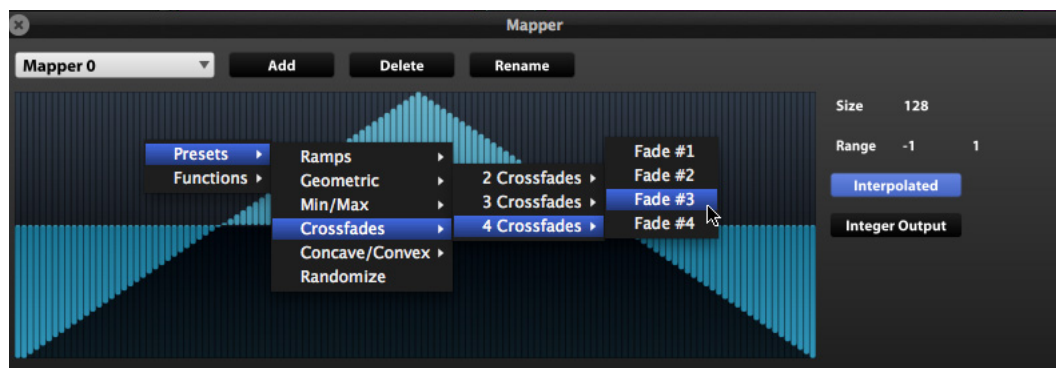


Figure 23-20: Mappers

Range

Mapper *Range* (Figure 23-20) determines how the mapper's output relates to the input source. Most input sources have a control signal which use a range of 0 to 1, such as controllers and envelopes. Other sources use -1 to +1, such as LFOs and pitch bend. If you want to remap a control one-to-one, set the mapper's range to the same as the modulation source. If you use a range that's different from the input source, it will adjust the values accordingly. For example, let's say you attach a mapper with a range of 0 to 2 to a MIDI controller modulator; when the maximum value of that MIDI controller is received, the mapper will output double the value.

The maximum values for the range are -128 and +128.

Shape

The *Mapper Shape* (Figure 23-20) determines how the input is remapped. To edit the shape:

To do this	Do this
To adjust an individual step	Drag it vertically.
Reshape the curve	Drag over it.
Draw a straight line	Hold down the option or alt key while dragging.
Apply a shape template	Right-click anywhere on the mapper grid.

Interpolation and Integer Output

The incoming signal is a floating point value between 0 and 1 (or -1 and +1, depending on the source). When *Interpolated* (Figure 23-20) is enabled, linear interpolation occurs between mapper steps. When *Integer output* is enabled, the incoming signal is quantized to the nearest integer (e.g., 10.38 to 10).

You could use interpolation to create a pitch sequencer (see below). Try turning interpolation and Integer output on and off to see how they affect the results.

Mapper examples

Here are a few examples of how you can use mappers.

Crossfading evenly between layers

Let's say you have an instrument, such as a violin, that is been multi-sampled at three velocity layers. You could use one layer and map each set of samples to its own velocity range. However, you may want to give each set of samples their own layer, map each sample over the entire velocity range (on top of each other from top to bottom) and then use the mod wheel (or any other MIDI CC) to crossfade between the layers.

- 1 Select the first layer (the softest).
 - 2 Right-click the Keygroup volume knob.
 - 3 Assign MIDI Controller modulation for the mod wheel (CC 1).
 - 4 Select this new modulation and create a new mapper.
 - 5 Right click the mapper editor grid and choose Presets> Crossfades > 3Crossfades > Fade #1.
 - 6 Set the range to 0 - 1.
 - 7 Enabled the *Interpolated* option.
 - 8 Repeat the above for the medium and loud layers. Make sure to choose Fade #2 for the medium layer, and Fade #3 for the loud layer.
- Once this is done, you can smoothly crossfade in between your layers using CC 1.
- #### Basic step sequencer
- 1 Set one of the LFOs as a ramp; set the rate to sync to tempo, at 1x.
 - 2 Assign that LFO as a modulator for pitch, and set the depth to 1.0.

- 3 Attach a mapper with a range of -12 to +12 to edit the pitch +/- 1 octave.
- 4 Use Size to determine the number of steps which will occur during each LFO period.
- 5 You can then adjust the rate of the LFO to run faster or slower, if desired.

Changing the pitch bend up/down response

You can use a mapper to change the pitch bend response so that it bends in different amounts up and down. For example, you could set up the mapper to pitch bend up 2 semitones, but pitch bend down 12 semitones:

MODULATORS IN THE TREE EDITOR

The Tree Editor is an excellent way to view and manage modulators because it displays all modulators within their hierarchical context within MachFive.

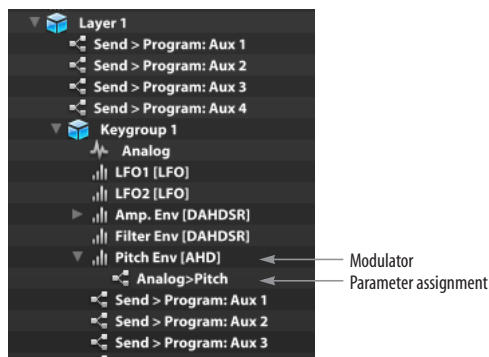


Figure 23-21: Modulators in the Tree Editor.

Click a modulator in the Tree Editor to view all of its settings in the modulation section (Figure 23-11 on page 214). Click its disclosure triangle to expose any parameters it is assigned to. Click the parameter assignment (Figure 23-21) select it and view it in the Edit settings or FX Rack.

CHAPTER 24 Event Processors

OVERVIEW

Event Processors receive an incoming MIDI data stream, analyze it, and — based on a prescribed set of actions — produce altered MIDI output, which is then fed to the sound-producing engine in MachFive. For example, an event processor might take MIDI chords as input and produce a sequence of arpeggiated notes as output.

Event processors can range from very simple tasks, such as inverting notes around a center pitch, to incredibly advanced, elaborate processes, such as nuanced strumming techniques for jazz rhythm guitar. Event processors can produce output that barely resembles the input, with virtually no limit to the ways incoming data can be transformed.

MachFive provides preset event processors, which by themselves provide a world of sound design possibilities. If you have programming skills, you can code up your own MachFive event processors using MachFive’s Lua-based scripting language.

Event processors operate very similarly to effects in MachFive. It might be useful to think of them as “MIDI effects” modules that are handled and managed similarly to MachFive’s effects processing modules. For example, event processors are available at the master, part, program, and layer levels of MachFive’s object hierarchy.

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FOUR TYPES OF EVENT PROCESSORS

Like effects, event Processors can be applied to MachFive objects. Unlike effects, there are no aux busses for event processors, however. All in all, there are four different types of event processors:

1. *Layer* processors
2. *Program* processors
3. *Part* processors
4. *Master* processors

The master processors are applied globally to all MachFive MIDI input, and the others are applied independently to each part. If multiple processors are applied to an object, they are processed in serial fashion.

ACCESSING EVENT PROCESSORS

There are three primary ways to access effects settings in MachFive:

- *The Event Rack* (Figure 24-1 on page 224) — this is the primary way to view and access event processors.
- *The Tree Editor* (Figure 20-3 on page 166 and Figure 20-5 on page 167)— access event processors within the context of the object hierarchy in MachFive.
- *The Program Settings* (Figure 17-8 on page 123) — access the first four part and program event processors.

EVENT RACK

The *Event Rack* (Figure 24-1) is the primary way to view and manage all types of event processors in MachFive: *Layer*, *Program*, *Part*, and *Master* event processors.

Accessing the Event Rack

To access the Event Rack, click the Main View button and the Event (Figure 24-4).

Part selection

The Event Rack applies to the currently selected part in the Parts list (or one of its components). See “Selecting a part” on page 63.

Event Rack navigation bar

The Event Rack navigation (nav) bar (Figure 24-4) indicates the event processors currently being viewed and edited in the Event Rack. This bar gives you full access to all of MachFive’s Event Processors. It operates in a hierarchical fashion, going from global event processors to local object processors as you move from left to right across the bar. The right-most item displayed in the bar is the object whose processors are currently being displayed in the Event Rack area below.

This bar works the same way as the FX Rack nav bar. See “FX Rack navigation bar” on page 180. For example, if you click the word *Master*, you can add event processors to the Master rack that apply to all MIDI input to MachFive, not just input to a part.

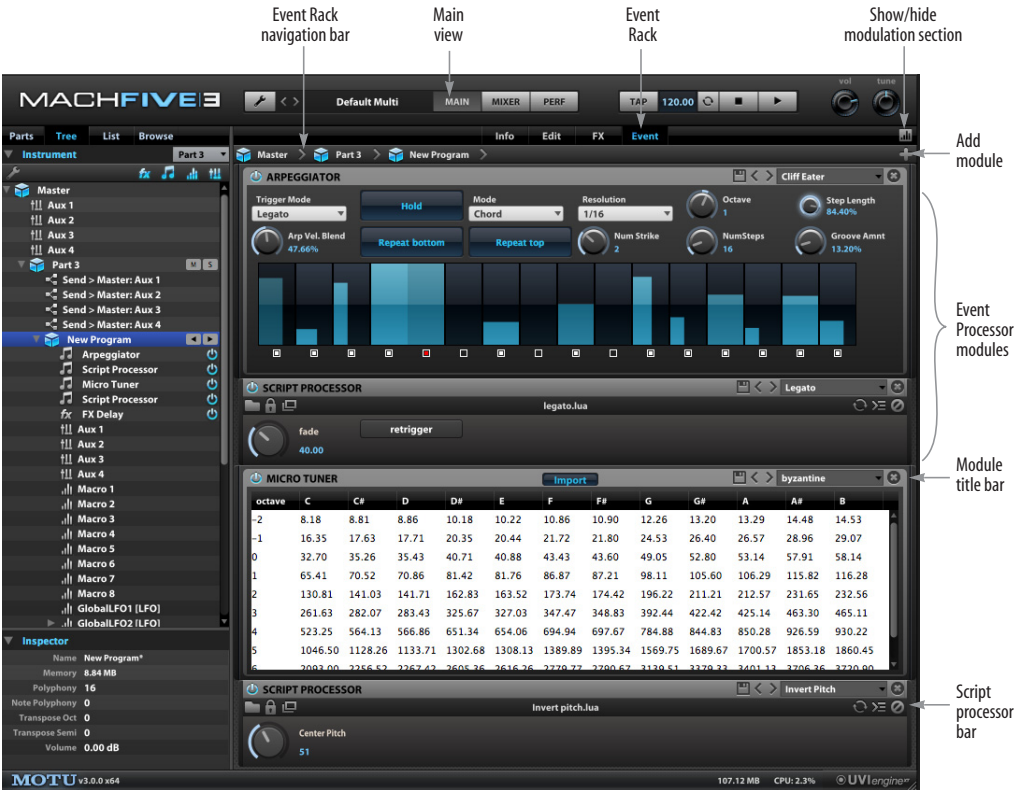


Figure 24-1: Event Rack.

Navigating event processors with the Tree Editor

Similar to the nav bar, the Event Rack also follows the Tree Editor. So, if you click a part, program, or layer in the Tree Editor, the Event Rack will display all of the processors assigned to that object.

MANAGING EVENT PROCESSORS

The Event Rack (Figure 24-1) displays one or more processor modules for the currently selected part, program, or layer (as indicated in the nav bar). You can add as many modules as you wish, and a vertical scroll bar appears if necessary. Processors are applied in serial fashion, with signal flow proceeding from top to bottom.

Event processor modules can be managed in exactly the same fashion as effects processors. Please refer to the following sections for details:

- “Adding effects” on page 181
- “Re-ordering effects” on page 181
- “Changing the type” on page 181
- “Disabling an effect” on page 182
- “Deleting an effect” on page 182
- “Saving and loading effect presets” on page 182

Event Processor preset browser

Event Processor presets can also be viewed in the sidebar browser (Figure 24-2). Click the *Browse* button in the sidebar, then click the event processor icon to view event processor presets. The event processor preset browser displays presets for all event processor types, not just presets for the currently selected event processor.

To load an event processor preset from the browser, drag it to the Event Rack to add it after the last existing event processor.



Figure 24-2: Loading an event processor preset from the sidebar browser.

Automating and modulating event processor controls

Some event processor controls can be automated or modulated. Right-click a control to access the automation and modulation options. See chapter 23, “Automation and Modulation” (page 209).

WORKING WITH EVENT PROCESSORS

Event Processors can be applied to keygroup layers, programs, parts and even MachFive’s Master MIDI input stream, just like effects processors. In fact, event processors are managed in exactly the same fashion as effects, with the exception that there are no “program aux” or “master aux” event processor busses, and no “keygroup processors”. Event processors are applied to objects only. For example, if an event processor is applied to a layer, it only affects that layer. An event processor applied to a program affects all layers in the program.

Program and Part event processors have the same difference as their corresponding effects, as explained in “Program effects versus part effects” on page 185.

Master event processors affect all MIDI input to MachFive.

When multiple event processors are loaded into a rack, they are processed in serial fashion:

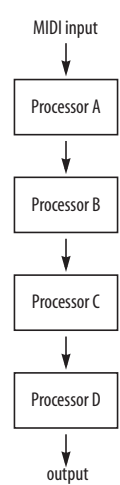


Figure 24-3: Event processors operate in serial.

For further information about working with each type of event processor, review its corresponding effect type:

- “Layer effects” on page 184
- “Program effects” on page 184
- “Part effects” on page 185
- “Master effects” on page 186

EVENT PROCESSOR TYPES

Each event processor type has a unique set of controls, described in detail in the following sections.

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Script Processor230

ARPEGGIATOR

The *Arpeggiator* can be employed as a pattern gate, arpeggiator, or even an advanced rhythmic processor for your live MIDI performance or sequenced MIDI tracks.

Steps

The number of steps is set with the *NumSteps* knob, from 1 to 128. The *Resolution* menu sets the value of the steps, in metric values from 32 bars to 64th note triplets.

You can manipulate each step in the following ways.

To do this	Do this
Enable/disable step	Click checkbox
Merge with previous step	Shift-click checkbox
Change velocity	Drag slider/up down
Change length	Shift-drag slider left/right

Additionally, the step length can be set globally with the *Step Length* knob. The *Step Length* knob setting is combined with the setting of each individual step. For example, if you have shortened a step to 50% by Shift-dragging it and have the *Step Length* knob set to 50%, that step will be 25% of the usual length.

The *Arp Vel. Blend* knob controls the depth of the steps' velocity. At 0%, the full velocity range is used; at 100%, a constant velocity is used (effectively making all steps the same velocity, regardless of their individual values).

Trigger Mode

Trigger Mode determines where in the pattern of steps each note will start.

Note: Each played note restarts from the first step.

Legato: the first played note starts on the first step, and the pattern of steps continues as additional notes are played. If all held notes are released, the pattern will restart from the first step when the next note is played.

Song Position: the position in the pattern is determined by the song position, regardless of how notes are being played.

Hold

When *Hold* is enabled, arpeggiated notes are held.

Mode

The *Mode* menu determines the order in which the arpeggiated notes are played.



Figure 24-4: Arpeggiator.

Octave

The *Octave* knob determines how many octaves above or below the played notes will be arpeggiated.

Strike and Repeat

To further tailor the way in which each arpeggiated note is triggered, use the following settings:

NumStrike: the number of times the note is triggered before moving on to the next note.

RepeatBottom: the bottom note is repeated.

RepeatTop: the top note is repeated.

Groove Amnt: applies swing to the steps.

Apreggiator presets

The apreggiator provides three three sub-menus of presets: *Arp*, *Chord*, and *Mono*.

Arp

- Ama D House
- Break It
- Ducky Walk
- Hunderhand
- Ice Walk
- Malicious
- Odyssey
- Plucked
- Point
- Red Head
- Spiral Tap
- Step Storm
- Sweep Me
- Swingy
- Wedding Time

Chord

- A Tension
- Cliff Eater
- Easy Orange
- Letter
- Sixty Fingers
- Tough
- Train
- Trancy Bang

Mono

- 80s Synth Bass
- Bass Line
- Dancing
- Jilted
- Light Dancefloor
- One Finger
- Percussion
- Pinky Style
- Poison
- Salsa
- Slap Bass
- Tactical
- Voodoo World
- Waiting
- Welcome Home
- Wendy Love

MICRO TUNER

The *Micro Tuner* event processor (Figure 24-5) opens the door for you to the world of authentic microtonal tuning, providing an eclectic selection of authentic, non-Western scales with microtonal tuning and the ability to create your own tunings.

What is microtonal tuning?

Generally speaking, *microtonal tuning* refers to music based on scales that use tonal intervals not found in the Western system of twelve equal intervals to the octave.

Traditional world music is typically microtonal in nature, due to its extensive use of the entire range of possible intervals in a wide variety of musical palettes and forms. Having emerged as an essential component of oral lore, traditional tonal scales use natural intervals which are not only the most resonant, they are also the most directly identifiable, and therefore the easiest to sing, play, and faithfully reproduce.

Just intonation

Just intonation refers to any musical tuning in which the frequencies of notes are related by ratios of whole numbers. Almost all microtonal scales are

based on just intonation systems: consonant pitch intervals that each culture, ethnic group, village or even individual musicians intuitively develop, building a musical vernacular of their own.

Tuning scales

Jacques Dudon is a luthier and musical researcher who works on modeling indigenous tonal systems. Jacques provided the MachFive development team with a cutting-edge collection of scales produced entirely in just intonation, with advanced microtonal qualities such as differential coherence, harmonic fusion, synchronous beating, and fractal consistency. These are the scales you see in the Micro Tuner preset menu (Figure 24-5).

The Micro Tuner display

Rows and columns are displayed for each octave and note name, covering the range from C-2 to B7. Click on any note in a row to highlight the entire row.

The value displayed for each note is its pitch, in Hertz. When using some mapping presets, an “X” may be displayed for some notes; these note will not sound when triggered.

Micro Tuner
presets

MICROTUNER														Import		Default	
octave	C	C#	D	D#	E	F	F#	G	G#	A	A#	B					
-2	8.18	8.66	9.18	9.72	10.30	10.91	11.56	12.25	12.98	13.75	14.57	15.43					
-1	16.35	17.32	18.35	19.45	20.60	21.83	23.12	24.50	25.96	27.50	29.14	30.87					
0	32.70	34.65	36.71	38.89	41.20	43.65	46.25	49.00	51.91	55.00	58.27	61.74					
1	65.41	69.30	73.42	77.78	82.41	87.31	92.50	98.00	103.83	110.00	116.54	123.47					
2	130.81	138.59	146.83	155.56	164.81	174.61	185.00	196.00	207.65	220.00	233.08	246.94					
3	261.63	277.18	293.66	311.13	329.63	349.23	369.99	392.00	415.30	440.00	466.16	493.88					
4	523.25	554.37	587.33	622.25	659.26	698.46	739.99	783.99	830.61	880.00	932.33	987.77					
5	1046.50	1108.73	1174.66	1244.51	1318.51	1396.91	1479.98	1567.98	1661.22	1760.00	1864.65	1975.53					
6	2093.00	2217.46	2349.32	2489.02	2637.02	2793.82	2959.96	3135.96	3322.44	3520.00	3729.31	3951.07					

Figure 24-5: Micro Tuner.

Importing a scale preset

The *Import* menu is used to load scale preset files from disk. You can load the Micro Tuner's included preset files, or any of your own preset files in the Scala format.

Choose *Import Scala Tuning* to load tuning presets, and *Import Scale Mapping* to load mapping presets.

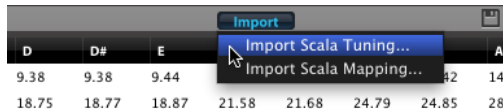


Figure 24-6: The Tuning sub-menu.

The Huygens-Fokker Foundation scale archive

Over 4,000 scales in the Scala format have been gathered by Manuel Op de Coul from the Huygens-Fokker Foundation and are available for free download from the Scale Archive here:

<http://www.huygens-fokker.org/scala/downloads.html#scales>

Creating your own scale presets

Scala scale files are human readable ASCII or 8-bit character text files. Therefore, you can create your own easily with any simple text editor. For complete details, visit:

http://www.huygens-fokker.org/scala/scf_format.html

This URL provides complete instructions and examples for creating your own Scala scale files, which you can then import into the Micro Tuner as described above.

SCRIPT PROCESSOR

The *Script Processor* provides advanced, customized transformations and analysis of a MIDI data stream. Many useful presets are provided. Custom scripts can be created and loaded. Standard and custom user interface elements can be employed.

MachFive scripts are written using *MachFiveScript™*, a scripting language base on the industry-standard Lua programming language (www.lua.org), and a MachFive-specific API. Lua is a simple yet efficient and powerful scripting language used in many video games.

For more information about custom script programming using MachFiveScript, see Appendix A, “Additional documentation” page (237).

Loading a script

To load and save Script Processor presets in the same manner as other event processors, use the standard preset controls in the event processor module title bar (Figure 24-1 on page 224). This is the recommended method if you are just getting started with scripts, as the included presets provide an introduction to the Script Processor's capabilities and do not require that you know how to write your own scripts. See “The included presets” on page 232.

To load a script file from disk that you have created or downloaded, click the *Load a script* button and choose the desired .lua file, or drag and drop the .lua file onto the Script Processor.

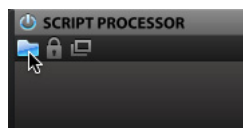


Figure 24-8: Loading a script file.

Playing a scripted instrument

Each script defines the parameters which will appear in the Script Processor, so each script will have a unique set of parameters. Scripts may define a few simple controls, such as knobs and menus, or may have more elaborate controls, including images, sliders, configuration dialogs, and more. The scripted instruments that are included on the MachFive soundbank DVDs (*Telematic*, *J-Bass*, *StarDrums*, etc.) are excellent examples of the depth of the UI that is possible.

Standard controls can be edited in the same manner as elsewhere in MachFive, including all standard shortcuts (Option/Alt-click to return to the default value, double-click to enter value, and so on).

For more information on individual scripts, see the following pages:

- “The included presets” on page 232
- “Using the Factory Soundbanks” on page 79
- The documentation included with third-party scripted instruments.

Presets

Some scripted instrument programs may include a preset menu as part of their script’s parameters. These presets operate independently from the

standard Script Processor preset controls. For information on the presets included with a script, refer to the script documentation.

Info tab

Some scripted instruments display their settings in the Info tab, as well as in the Event Rack. This is useful when you simply want to play the instrument and aren’t concerned with editing the script itself or other instrument settings. For more information, see “Info tab” on page 75.

Creating and editing scripts

As you become familiar with MachFive’s scripting abilities, you may wish to edit existing scripts or create your own.

To edit the currently loaded script, click the *Edit in External Editor* button.

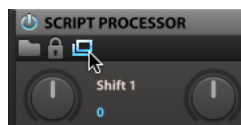


Figure 24-9: Editing a script in an external text editor.

To start with a new script, create a new, empty text file in any text editor application, save the file with a “.lua” file extension, and open the file in the Script Processor.



Figure 24-7: Script Processor.

After making changes to your script, save the file, then click the *Reload* button in the Script Processor.



Figure 24-10: Reloading the current script.

Displaying script output

Scripts can display text output. This is often used for debugging purposes when creating or editing a script.

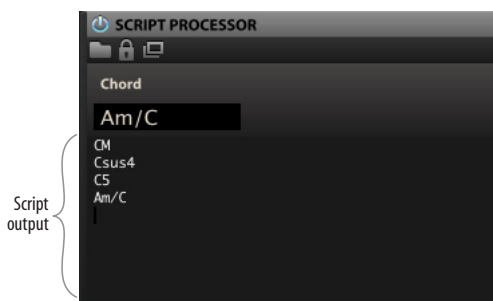


Figure 24-11: Script output.

To show or hide the script output section, click the *Show/Hide output* button. To clear the output, click the *Clear output* button.



Figure 24-12: Changing the script output display.

Password-protecting a script

Scripts can be password-protected to prevent others from reading the script's source code. To password-protect a script, click the lock icon in the upper left and enter a password.



Figure 24-13: Password-protecting a script.

MachFive scripting documentation

For full details on the MachFive script language and its capabilities, including examples and tutorials, refer to Appendix A, “Additional documentation” page (237).

The included presets

Each Script Processor factory preset is described briefly below.

Chord Recognition

Chord recognition displays the detected chord, if any, of the currently held notes.

Chorder

Chorder creates chords from a single note, adding up to six additional notes. Each of those six notes has a *Shift* knob to set its pitch offset (in semitones) and a *Velocity* knob to set its velocity offset (specified as a ratio from 0.01 to 2.00).

The *Presets* menu provides ready-to-use configurations.

Ensemble

Ensemble creates multiple slightly detuned, panned and delayed voices for each played note to simulate an ensemble playing in unison. It works well on strings or voices. Use the *Spread* knob to emphasize the effects. Also see “Unison” below.

Invert Pitch

Invert Pitch chromatically inverts notes around a center pitch. The *Center Pitch* knob determines an axis point around which MIDI notes will be chromatically inverted. For example, if C3 (60) is selected, playing C#3 will trigger B3, and playing B3 will trigger C#3.

Legato

When overlapping notes are played, the *Legato* processor simulates legato articulations on instruments for which these transitions couldn't be recorded initially. Legato notes are faded and their timbre altered in order for articulated notes to blend together in a single articulation.

Use the *Fade* knob to adjust the fade time and optionally to enable the retrigger button to retrigger the last held notes when playing legato (similar to monophonic synthesizers).

Mod Wheel Glissando

Mod Wheel Glissando lets you hold chords on a MIDI keyboard (or other controller) and strum back and forth using a modwheel.

Portamento

When overlapping notes are played, the *Portamento* processor simulates legato articulations on instruments for which these transitions couldn't be recorded initially. A simultaneous pitch-bend and cross-fade is done on source and target note samples to emulate the portamento effect. Also see “Legato” above.

Program Change Switcher

When playing MachFive from a MIDI controller, Program Change Switcher lets you use MIDI program change messages sent from your controller to change which MachFive part you are playing on the fly. For example, you could have a piano sound loaded into part 1, organ in part 2, and strings in part 3. If you assign the parts to MIDI channels 1, 2 and 3 respectively, you can use MIDI program change messages #0, 1 and 2 to switch among the three sounds on the fly. Three controls are provided, as explained below.

Incoming: specifies the MIDI channel that the processor will listen to. Choose zero (0) for omni mode (all channels).

Destination: shows the current MIDI channel that the processor is sending to. If you send program changes, you'll see this knob change to reflect them.

Offset: lets you add to (or subtract from) the destination MIDI channel. For example, if the destination channel is 1, but the offset is +2, the resulting destination MIDI channel will be 3. This could be used, for example, if your MIDI controller has eight program change buttons (that send program change messages 0 through 7), but you'd like use them to access channels 9-16 in MachFive's part list.

Shepard

Shepard reproduces the classic endless rising/dropping pitch effect made famous by Roger Shepard and Jean-Claude Risset. Now you can use it with any instrument.

StepLine

StepLine is a standard electronic bass line editor with 16 steps. Each step includes a velocity bar, pitch offset (specified in semi-tones), and link (to the previous step). The *Resolution* menu determines the length of each step. Gate

determines the duration of each step. Groove applies swing. Press *Record* mode to play in a bass line, one step at a time, from your MIDI controller, using the *Skip* button to skip steps when desired. Or generate entirely new bass lines with one click using the *Random* button. Create and transpose bass lines quickly using this simple yet powerful processor.

Strum

Strum enforces a minimum time between notes in order to make chords sound more natural.

Timbre Shifting

The *Timbre Shifting* processor transposes MIDI notes up or down according to the *Shift* knob and applies an opposite pitchbend effect to restore the original note pitch. This alters the instrument timbre. This is an effective way to create several variations of a single instrument. For example, if you don't have a second violin section, you can apply timbral shifting to a second instance of your violin program to emulate the slightly different sound of a separate violin section.

Tonal Harmonizer

Tonal Harmonizer harmonizes each note of a scale with a chord belonging to the same scale. A chord voicing editor allows you to select which scale degree and octave to play.

Several dozen chord voicings (closed, cluster, open, quartal, etc.) are provided to explore the different kinds of textures that can be produced with the same chord.

Tremolo

Use the *Freq* knob to set the frequency (in Hertz) of the *Tremolo* effect.

Unison

Use the *numVoices* knob to set the number of unison voices and the *Detune* knob to set the detune amount (in cents).

Vibrato

Use the *Freq* knob to set the frequency (in Hertz) of the vibrato and the *Depth* knob to set the intensity of the effect (specified as a ratio from 0 to 1).

Virtual Pitch

Given a chord played on the keyboard, Virtual Pitch computes the strength of each note as a virtual root for the chord and plays this note an octave below the lowest note of the chord. This technique can be useful as a musicological tool. It is also a good way to make (dissonant) chords sound more full.

Part 4

Appendices

APPENDIX A **Additional documentation**

For additional documentation not covered in this User Guide, please see your MachFive installer disc or check www.motu.com for more information on the following.

FACTORY SOUNDBANKS

The content of the factory soundbank files are covered with in-depth information, included a full list of included programs and details on playing scripted programs.

SCRIPTING LANGUAGE

Full details are provided for MachFive's scripting language and its capabilities, including examples and tutorials.

OSC (OPEN SOUND CONTROL)

Details and examples are provided for MachFive's OSC (Open Sound Control) implementation, enabling you to create and configure OSC devices which communicate with MachFive.

APPENDIX B Troubleshooting

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FREQUENTLY ASKED QUESTIONS

When installing MachFive, should I install the included sounds?
MachFive ships with 45 GB of included samples. It is possible to install MachFive only (without its included samples), but to get started, it is recommended that you install at least a small set of the included sounds: at the very least, we recommend that you install the Universal Loops & Instruments UFS soundbank. (You can always install the other included soundbank files later.) To use MachFive, you do need samples on a local hard disk. You can use the included samples from the soundbank disc, or you can import samples from another format.

Where should I put my MachFive sounds? Can I change their location later?
You can install the included soundbanks and any other sample libraries anywhere you like on any disk connected to your computer. Sample libraries can take up a great deal of space, so it's a good idea to plan ahead. It's not a bad idea to have a fast disk that is dedicated to your MachFive sounds.

When I try to copy the UFS files to my hard disk, I get an error message and it won't copy successfully. What should I do?
First, make sure that you have enough free disk space; most of the .ufs files are approximately 6 to 8 GB each (the two Xtreme FX files are 4 GB each).

Next, check the format of your hard disk. The .ufs files cannot be copied to a FAT32 formatted hard disk, as the FAT32 format has a 4 GB file size limit.

For Macs, you should copy the .ufs files to a hard disk formatted as *Mac OS Extended* (also called HFS+) or *Mac OS Extended (Journaled)*. To check the format of your drive, go to */Applications/Utilities* and launch *Disk Utility*. Select the drive from the list on the left, and check the *Format* item in the info strip along the bottom of the window. *Mac OS Extended (Journaled)* is the default drive format for OS X.

For Windows, you should copy the .ufs files to a hard disk formatted as NTFS. To check the format of your drive, go to *My Computer*, right-click the drive, and choose *Properties*. In the *Properties* window, check the *File system* item. NTFS is the default file system for Windows XP and later.

How do I make MachFive work in my sequencer?
MachFive is an audio instrument plug-in. You will call MachFive up in your sequencer on an audio track, aux track, or instrument track, depending on how your sequencer handles virtual instruments. Always use a mono track if you have the choice. MachFive will provide 2-channel, 4-channel, or 6-channel output depending on how you configure the track output (4- and 6-channel outputs are also dependent on the sequencer supporting those formats).

To get MIDI into MachFive, you need a MIDI track (or instrument Track). The MIDI or Instrument Track must be record-enabled in order to receive MIDI from an external source into MachFive.

For complete setup details, see chapter 7, "Configuring the MachFive Plug-in" (page 43).

I have my soundbank and program loaded, but I don't hear anything.

If you are playing notes from an external controller, make sure the MIDI track or instrument track in your host software is record-enabled. For other MIDI troubleshooting tips, see “MIDI troubleshooting” on page 242.

MachFive's MIDI activity LEDs are flashing, so it's receiving MIDI data successfully, but I still don't hear any sound.

It's time to check audio. See “Audio troubleshooting” on page 242.

When I play on my keyboard, there's a delay before I hear a note.

In order to get the fastest possible response from MachFive, you'll need to set the sample buffer of your audio hardware driver to a low number. Experiment with this setting to get the best response and computer performance. For complete details, see “Managing latency” on page 44. Also refer to the section in chapter 7, “Configuring the MachFive Plug-in” (page 43) that refers to your host software.

How do I get MachFive to send each part to a different audio output?

Not all sequencers support this feature. If your sequencer does support this feature, you'll see several choices in the audio output menu for each part. The additional choices (other than *Main*) let you assign the part's output to a bus, which can then be routed anywhere in the virtual mixing environment.

When I move the cutoff frequency knob for the Filter, nothing happens.

Does the filter have an envelope? Make sure the envelope depth is set to a value where you can actually hear the envelope. For example, if you have set the depth to a value of 1 and the attack of the envelope is 0.00, the filter will have no effect at all.

After editing my samples, I save my session, but the next time I open it, all the edits are lost.

All edits made to samples in the waveform editor need to be saved manually. Make sure you use the *Save* feature in the Oscillator Editor. See “Saving sampling oscillators” on page 140.

I'm sending my samples through AUX 1, and only the first effect is working.

The AUX effects busses work in parallel, which means that each one is processed independently. If you want to process effects in serial fashion, apply them to a keygroup, layer, or program.

When I imported my drum sounds, they sound really weird. It seems like they are really high pitched.

Make sure that “Note Tracking” on page 119 is set to zero (0). If it's set to any other value, MachFive transposes the samples as if they were notes.

Why is the output of MachFive distorted?

It is possible for MachFive to output more than unity gain. This can happen in many ways, given MachFive's extensive mixing and effects architecture. Use the Mixer and try soloing parts to zero in on the problem and then check the volume levels of all the components for the part.

How do I record the audio output of MachFive?

Many sequencers have a freeze function that renders the output of MachFive as an audio file. If your sequencer doesn't have this feature, bus the output of the MachFive track to another audio track, and record the audio output of MachFive onto that track.

The samples I've imported from another format sound different than they did on their original sampler. Why?

MachFive is designed to import all available information for a third party sample format. In some cases, the original sampler will have a capability that is not found in MachFive. For example, when importing Kurzweil samples, MachFive will get the samples, but does not include

the elements of sound that were made by the Kurzweil synthesizer section. It is also possible that a third-party sample library is written in a way that MachFive does not support. MachFive is designed to have the best possible sample import. If you have a sample disk that is not translating completely or properly into MachFive, contact MOTU Tech Support to let them know. If we can add support for a certain library or feature, we'll make every effort to do so.

Everything is working fine, except that intermittently, samples don't play for no apparent reason. Why?

Check your polyphony setting for the program. If you're sure the program has more than enough voices, how many samples have you loaded into MachFive? As a general rule of thumb, you shouldn't load more than about 70% of the total amount of RAM your computer has ($\pm 10\%$). For example, if your computer is equipped with 4 GB, don't load more than around 2.8 GB of samples into MachFive.

If you are running on a Mac, there is potentially an unlimited amount of "virtual RAM", but when Mac OS X runs out of real RAM, it starts caching the overflow to disk. This can wreak havoc on MachFive performance. Unfortunately, Mac OS X doesn't provide any means for applications to know — or report to the user — that it has run out of real RAM, so there is no way for MachFive to alert you if Mac OS X is caching MachFive samples to disk. Therefore, if you are loading lots of sample data, you need to keep an eye on how much RAM they use up. There are third-party utilities available that can help you keep tabs on your RAM usage.

IMPROVING PERFORMANCE

See "Conserving CPU resources" on page 44 and "Managing latency" on page 44 for tips on how to get the best performance from MachFive.

GENERAL TROUBLESHOOTING

Troubleshooting is always simplest and most effective when the exact problem can be specified clearly and concisely. If you are surprised by an error message or by seemingly erratic behavior in the program, take a moment to jot down the relevant details: exactly what the error message said (including any error ID numbers), what actions were done on-screen just before the problem occurred, what kind of file you were working with, how you recovered from the problem, and any unusual conditions applying during the occurrence of the problem. This may not enable you to solve the problem at once, but will greatly aid in isolating the problem should it reoccur.

If the problem you are encountering seems inconsistent, try to determine what the necessary pattern of actions are that will cause it to occur. Genuine bugs in application software like MachFive are almost always consistent in their manifestation: the same set of actions under the same conditions invariably brings about the same results. Determining the exact cause of a bug often requires experiments which replicate the problem situation with one factor changed: choosing a different (smaller) program, opening MachFive in a different host application, etc.

If the problem is truly inconsistent, then it is likely to be a hardware problem: a faulty hard disk, a failing computer motherboard, a loose connection, etc.

Isolate the problem...

One of the best troubleshooting techniques is to try to isolate the problem. If you can whittle down a complicated setup or scenario to a much simpler case, chances are you'll zero in on the problem more quickly. For example, you could try running MachFive in a different host application to see if the problem persists. If it does, it may have to do with the actual samples, programs, and/or multis being used.

Simplify your setup...

One of the most common causes of problems is a conflict with other software in the system. Run MachFive by itself, with no other plug-ins or virtual instruments, and see if the problem you are having still happens.

Check the 'Read Me First'...

It's human nature to blow right past the Read Me First, but you'll probably be glad you took the time. If you experience problems with MachFive, check the Read Me notes that ship with the current version you are using.

If you cannot open a particular MachFive project or session in your host application...

First try opening other existing files, or a new file, to be sure MachFive is working at all. If other files work fine, try temporarily removing the MachFive plug-in, or disable audio in your host application. If other files also exhibit similar behavior, then you know that the problem is not specific to one file.

MIDI TROUBLESHOOTING

The most important tool for tracking down MIDI input problems is the MIDI Activity LEDs for each part. If there is a hardware problem, or if your channel assignments are wrong, the problem should be apparent by looking at the MIDI LEDs.

In order for external MIDI to get to MachFive, the MIDI track or Instrument track must be record-enabled. A quick test to determine whether MIDI is reaching the track is to hit record and tap a few notes on your controller. If no MIDI appears in the track, check that your controller and MIDI interface are set up properly. If MIDI data does show up in the track, and your sequencer uses a separate MIDI and audio track for virtual instruments, make sure the MIDI track output is assigned to MachFive and is assigned to a part that has a preset sound ready to go.

If MachFive is unable to play any MIDI data...

Does your host software receive MIDI data from your MIDI controller? Does MIDI play back successfully to other MIDI instruments? If the answer is no to either question, double-check your cable connections and MIDI controller settings. See if your controller registers in the MIDI system management software on your computer, if any (such as Mac OS X's Audio MIDI Setup).

If you are trying to play MachFive from your MIDI controller, make sure that the MachFive MIDI track or instrument track in your host software is record-enabled.

If all else fails, you may need to resort to A/B tests to reveal the source of the problem. It may be necessary to switch your MIDI cables, and if possible, to try using a different MIDI interface or synthesizer for input/output. The easiest way to test if MIDI data is actually getting to MachFive is to look at the MIDI activity LEDs in the Part list.

AUDIO TROUBLESHOOTING

In order for audio to be heard from MachFive, the output of the audio, aux, or instrument track in your host software must be sent to an output that is connected to speakers or headphones. Can you play back any pre-recorded audio? That's always a good way to check that the rest of the audio system is set up correctly. In some cases, a sequencer requires an available voice for MachFive playback. Make sure all outputs and voice assignments are correct for the MachFive track.

If you still don't hear sound, check the following things:

- Make sure part is unmuted and its volume is turned up (in MachFive's Mixer). Also check MachFive's master fader in the Mixer.
- Make sure that the appropriate faders are up in your host application.

- Make sure you have cables connected to the correct plugs on the outputs of your audio hardware.

PREVENTING CATASTROPHE

Keep up-to-date backups of your MachFive sounds, multis, user presets, and other related files so that you always have copies of the most recent work you have done. Almost any software problem is survivable as long as you have kept backups of your work.

Keep plenty of free space on your hard disks. This will prevent the computer from running out of disk space.

TECHNICAL SUPPORT

We are happy to provide customer support to our registered users. If you haven't already done so, please take a moment to complete the registration card in the front of the manual and send it in to us. When we receive your card, you'll be properly registered for technical support.

Registered users who are unable, with their dealer's help, to solve problems they are encountering with MachFive may contact our technical support department in one of the following ways:

- Online: www.motu.com/support
- Phone: +1 (617) 576-3066
(9 a.m. – 6 p.m. Eastern)

If you decide to contact technical support, please have your MachFive User Guide at hand, and be prepared to provide the following information to help us solve your problem as quickly as possible:

- **Your MachFive serial number.** This is printed on the cardboard page (at the front of the manual) which holds the registration card. (If you purchased MachFive as an upgrade, your manual won't have this cardboard page. Instead, MOTU will have notified you separately of your serial

number.) Be sure to retain this page in the manual for your reference. You must be able to supply this number to receive technical support.

- **The version of MachFive you are working with.** This is displayed in the lower left corner of the MachFive window.
- **The system software** you are using to run the computer.
- **The host application software** you are using to run MachFive.
- **A brief explanation of the problem**, including the exact sequence of actions which cause it, and the contents of any error messages which appear on the screen. It is often very helpful to have brief written notes to refer to.
- **The pages in the manual** which refer to the parts of the program which you are having trouble with.

We're not able to solve every problem immediately, but a quick call to us may yield a suggestion for a problem which you might otherwise spend hours trying to track down.

Our technical support telephone line is dedicated to helping registered users solve their problems quickly. In the past, many people have also taken the time to write to us with their comments, criticism and suggestions for improved versions of our software. We thank them; many of those ideas have been addressed in this version of MachFive. If you have features or ideas you would like to see implemented in our music software, we'd like to hear from you. Please send email to customerservice@motu.com, or write to the MachFive Development Team, MOTU Inc., 1280 Massachusetts Avenue, Cambridge, MA 02138.

Although we do not announce release dates and features of new versions of our software in advance, we will notify all registered users immediately by mail as soon as new releases become available. If

you move or otherwise change your mailing address, please send us a note with your change of address so that we can keep you informed of future upgrades and releases.

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