

Studio One

Reference Manual

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Introduction

This part of the *Studio One Reference Manual* contains general information, including information about this manual and about the basic layout and workflow of Studio One.

This is a great place to start for experienced and new audio-software users alike. Chapter 1: Getting Started

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1 Getting Started

1.1 Installation and Use

Studio One will be installed from either a physical installation disc or a downloaded installer package, depending on the method of your purchase. Once installed, Studio One must be activated in order to use the program. The following sections describe the required steps to install and use Studio One.

1.1.1 Installing Studio One

To install Studio One, insert your Studio One installation disc into your computer's DVD drive or launch the installer package previously downloaded to your computer. Follow the onscreen instructions to complete the installation process.

1.1.2 Create a User Account

After installing Studio One, launch the program, and the Activate Studio One menu will appear. If you are a new Studio One user, you will need to create a user account. Follow the Create Account link if your computer is connected to the Internet. Once you have created your account, skip to the Activate Studio One section of this chapter.

If your computer is not connected to the Internet, visit the Studio One product page at www.presonus.com on another computer to create your account. After you have created your account, you will need to follow the offline-activation instructions in the Activate Studio One section of this chapter.

1.1.3 Activate Studio One

Now that you have created a user account, you can activate your copy of Studio One. Launch Studio One, and the Activate Studio One menu will appear.

If the computer on which Studio One has been installed is connected to the Internet, click on the Activate Online link and enter your previously created account Username, Password, and the Product Key you received with the Studio One installation disc or in an email, if you made a purchase online. Click on the Activate button to finish the activation process.

If the computer on which Studio One has been installed is not connected to the Internet, click on the Activate Offline link in the Activate Studio One menu. Follow the instructions to log in to your previously created user account, register the product, and obtain a license file. Next, copy

the license file to the computer on which Studio One has been installed and locate the license file as instructed in the Activate Studio One menu. The activation process is now complete.

1.14 Installing Studio One Content

Studio One comes bundled with an array of demo and tutorial material, sampled instruments, loops and samples, and unique third-party content. The basic Studio One Artist bundle includes all that you need to begin producing music. Studio One Pro expands on the content found in Studio One Artist.

The content available to install is based on the version of Studio One you have activated. If you upgrade from Studio One Artist to Studio One Pro at any time, you will be able to install the additional content at that time.

Upon completing the Studio One installation and activation process, the Studio One Content Installer will appear. If it does not appear, navigate to Help/Studio One Installation.

At the top of the installation menu, select the source from which the content will be installed, as well as the location where you wish to install the content. The source of the content will either be a physical DVD included with Studio One or a downloaded installer package. By default, Studio One will point to your DVD drive as the content source.

Listed in the installation menu are separate entries for each available item. Click in the checkbox next to each item you wish to install, then click on the Install Packets button at the bottom left of the menu to install the selected content. Notice that under each listed item, the expected source DVD is listed.

When finished installing content, click on the Done button to exit the menu.

Studio One content can be installed at any time by accessing the Help/Studio One Installation menu. If you are not sure that you want to install any portion of the content, you can decide to do so at a later time.

1.2 About This Manual

1.2.1 Versions

There are currently two versions of Studio One: Studio One Pro and Studio One Artist. Both run under the Windows and Mac OS X operating systems. This reference manual will serve both versions; however, Studio One Artist will not include certain features. A detailed list of these exclusions is provided in Appendix Table 5.

All screenshots provided in this manual are taken from the Windows (Vista 32-bit) version.

1.2.2 Tips

This manual presents many shortcuts and alternative methods or functions. These tips are intended to improve your workflow, and will be shown as follows:

Helpful information.

Also note that if you float the mouse over any tool, button, or window in Studio One for a few seconds, a Tooltip will appear that names the function the tool, button, or window serves.

1.2.3 Key Commands

Many operations in Studio One have associated key commands, or keyboard shortcuts, that can be used in lieu of navigating menus with the mouse. Some key commands use modifier keys, and some modifier keys differ depending on the operating system.

In this manual, key commands with modifier keys are shown with the Windows modifier key first, as follows: [Win modifier key]/[Mac modifier key]+[key]. For example: [Ctrl]/[Cmd]-[C] means “press [Ctrl]/[Cmd]+C in Windows, or press [Cmd]+C in Mac OS X.”

Where there is no difference between the Windows and Mac version of a key command, only one key command will be displayed. Example: [F3].

In several instances, options are located in the File menu for the Windows version but in Preferences in the Mac OS X version. In these cases, the Windows location is given first, and the Mac location follows in [brackets].

A complete list of key commands is provided in Appendix Table 1.

1.2.4 Key Commands for Migrating Users

If you are migrating from another DAW to Studio One, you might find it helpful to switch the key-command set you are using to one specifically created to make the transition from another DAW easier.

In File/Options/General, you will find a heading called Keyboard Mapping Scheme. Here, you can select from keyboard maps for several other DAWs. Selecting one of these maps will allow Studio One to recognize and apply common key commands from that DAW.

Lists of key commands used for each DAW are provided in supplemental PDF files that can be downloaded from the Technical Support>Downloads>Tutorials/Manuals area of the PreSonus Web site (www.presonus.com).

1.2.5 Menu Functions

Many functions can be reached using hierarchical menus. Where menu navigation is referenced in this manual, it will appear as follows: Menu/Menu Entry/.../Function.

2 Pages

Studio One is a complete music-production environment featuring three main pages: Start, Song, and Project. Each page is designed to help you accomplish a specific task, and each is accessible at all times.

In this chapter, we will discuss the general layout of the user interface for each page. For more detailed information on anything mentioned in this chapter, please refer to the Index.

2.1 Start



When Studio One is launched, by default you will be taken to the Start page. On this page, you will find document-management and device-configuration controls, as well as an artist profile, a news feed, and links to demos and tutorials. The following section provides a brief description of the Start page.

2.1.1 Tasks

In the top portion of the Start page, you will find three options: Create a New Song, Create a New Project, and Open an Existing Song or Project. A Song is where you can record, edit, arrange, and mix audio and musical data. A Project is where multiple Songs or audio files can be arranged and mixed on a single timeline for mastering purposes. Songs are accessed in the Song page, and Projects are accessed in the Project page.

2.1.2 Recent Files

The recent-files list will include links to the most recently accessed documents. Click on any of these links to quickly open the associated Song or Project.

2.1.3 Setup

This window will display your currently selected audio device and contains links to configure your audio device, configure external devices, check for updates, and view information about Studio One.

2.1.4 Configure Audio Device

Studio One automatically selects, from a list of devices installed on your computer, an audio device (such as an audio interface) to use for audio input and output. To select a different device, click on the Configure Audio Device link to access the Audio Setup tab in the Options menu. For

in-depth information on how to set up your audio device, refer to the Set Up Your Audio Device section of the “Setup” chapter.

2.1.5 External Devices: Keyboards, Instruments, and Control Surfaces

Studio One can send and receive musical data to and from any MIDI device connected to your computer. Studio One’s advanced use of MIDI devices requires you to tell it a few things about your devices. For details on how to set up these devices, refer to the Set Up Your MIDI Devices section of the “Setup” chapter.

2.1.6 Check for Updates

From time to time, software updates will be issued for Studio One to incorporate bug fixes and/or new functionality. To manually check for any updates, click on the Check for Updates link. Your version number, as well as the most current version number, will then be displayed. If a newer version of Studio One is available, a link to download the newer version will also be displayed.

2.1.7 About

Click on the About link to view your current license and version information, as well as information about the Studio One development team.

2.1.8 Artist Profile

Here you can specify certain meta-information that is used to tag your Songs, including an image, artist name, genre, and artist Web-site link. To add an image to the artist information, drag-and-drop it onto the image icon from any location on your computer. In addition to personalizing Studio One, this feature is functional in that it saves you the effort of filling in this meta-information for every Song.

2.1.9 News Feed

The Studio One news feed comes directly from PreSonus. This news feed contains helpful information related to Studio One and will update automatically if your computer is connected to the Internet.

2.1.10 Demos and Tutorials

Any installed demo or tutorial songs will appear in the Demos list, which can be launched by clicking on the demo-song name. Use these demo songs to check out various aspects of Studio One.

2.2 Song



When a new Song is created, or an existing Song is opened, you will be taken to the Song page. This page contains all of the necessary tools to record, edit, arrange, and mix multitrack audio.

2.2.1 Song Page Workflow

The Song page is a complete multitrack audio-production environment with a single-window interface. On this page, any number of audio and instrument tracks can be recorded, edited, and arranged. Any number of audio effects, virtual instruments, and external effects and instruments can be used, and almost any parameter can be automated using track or part automation.

An integrated Browser makes it fast and easy to find and import audio and musical data files, VST/AU audio effects, and VST/AU virtual instruments and applications. Audio files can be imported and automatically time-stretched to fit the current tempo. Virtual instruments can be dragged from the Browser directly into the Song for instant setup of all parameters, allowing a fast workflow when inspiration hits.

For more information on the Song page, refer to the Reference section of this manual.

2.3 Project (Studio One Pro only)



When you create or open a Project, you will be taken to the Project page. This area contains the tools you need to master and publish audio.

2.3.1 Project Page Workflow

The Project page is a dedicated mastering solution integrated into Studio One Pro. Here, you can burn industry-standard Red Book audio CDs and create high-quality MP3 albums. Songs and audio files are arranged as a sequence of tracks on a continuous timeline.

You can apply effects to individual tracks, as well as to the master output track, in order to achieve sonic continuity throughout the Project. An integrated Browser makes importing Songs, audio files, and audio effects quick and simple.

High-quality master output metering is displayed at all times, including Spectrum, Peak/RMS, and Phase meters. These tools will help you know at a glance exactly what is going on in your Project.

As mentioned, Songs can be imported directly into your Projects without having to export a Song mix. After a Song has been imported into a Project, you can go back and change the Song mix, and the Project will be automatically updated.

For detailed information on the Project page, refer to the “Mastering” chapter.

2.4 Quick Switch

In Studio One Pro, you can have multiple Songs and Projects open simultaneously and can switch between them quickly. The fastest way to switch between any open Song or Project, as well as the Start page, is to press [Ctrl]+[Tab] and continue to hold [Ctrl] on the keyboard. This will display a pop-up list of all open documents.

While holding [Ctrl], press [Tab] to cycle through the open documents. Release [Ctrl] when the desired document is selected; now you can view that document.

3 Fundamentals

The following chapter presents important, fundamental design aspects of Studio One. Familiarity with these aspects of Studio One will help to ensure that your experience is as enjoyable and creatively stimulating as possible.

3.1 Nondestructive Editing and Undo/Redo

Almost every editing action in Studio One can be undone and redone. There is no limit to how far back actions can be undone or to how far forward actions can be redone once they have been undone. Most actions that cannot be undone or redone are accompanied by verification dialog boxes. Even Console and plug-in changes can effectively be undone by using the Console's Trash Bin.

So feel free to explore without fear that you will permanently alter anything. In fact, just pressing buttons might be the quickest way to learn, and it often leads to results not achievable in any other way!

3.2 High-Precision Mix Engine

Studio One features a cutting-edge high-precision mix engine. A mix engine is the "number cruncher" that does the mathematical summing required to mix multiple sources of digital audio. Studio One Pro employs a 32-/64-bit floating point, mixed-mode engine. This means that the audio engine can automatically switch between using 32-bit, single-precision floating-point and 64-bit, double-precision floating-point math, on the fly, depending on the capability of the plug-ins (VST/AU effects, etc.) inserted into the signal chain.

In Files/Options/Audio Setup (Mac OS X: Preferences/Options/Audio Setup), set Process Precision to Double (64-bit) to activate 64-bit processing. Otherwise, all processing will be done in single precision (32-bit).

Studio One will process audio as accurately as current technology allows, ensuring that your audio maintains the highest quality possible.

3.3 Automatic Delay Compensation

Studio One automatically compensates for the time delay that results from some VST and AU processing. This saves having to manually realign tracks to compensate for the delay and keeps all tracks perfectly in sync regardless of the number of virtual plug-ins and effects you run. If you do not want Studio One to automatically compensate for this, select Ignore Plug-in Latency from the Transport menu. For more information on this topic, refer to the Automatic Plug-in Delay Compensation section of the “Mixing” chapter.

3.4 The 64-Bit End-to-End Signal Path

Studio One Pro includes a built-in 32/64-bit effects suite, in which every effect can process audio using 64-bit, floating-point math. So, if you use only the built-in effects suite for all of your processing needs, you can have a full 64-bit signal path from end to end. In this way, Studio One Pro offers you the very best that current audio technology can offer.

3.5 Look Mom, No MIDI!

The Musical Instrument Digital Interface (MIDI) specification was created in 1983. While it has served musicians well for more than 25 years, it has limitations. Ironically, while the MIDI-device integration in Studio One provides revolutionary flexibility and ease of use, much of this functionality is made possible by not using MIDI internally.

As an example, near sample-accurate parameter automation is provided within virtual instrument parts, rather than much lower-resolution MIDI control-data automation. The Control Link system is also made possible by abstracting MIDI from our internal processes. As MIDI evolves, and new potential standards are developed, Studio One remains prepared for the innovations of the future.

3.6 Drag-and-Drop Support

Many functions in Studio One have integrated drag-and-drop support. This means that objects can be clicked on and then dragged to various locations and over other objects in order to accomplish certain tasks. For example, you can find an audio effect in the Browser, and then click-and-drag it directly onto a track to insert the effect onto that track. You can then click-and-drag that effect onto another track to copy that effect and its settings to a new track.

You can drag a virtual instrument from the Browser and drop it in a blank space in the Arrange view to create a new Instrument Track with that virtual instrument. You can also drop the virtual instrument on top of an Instrument Track to replace the existing virtual instrument. This allows you to work very quickly, without having to stop for menu navigation or

other distracting processes. Give your left brain a break and stay in the creative zone!

3.7 Control Link

In order to use hardware MIDI devices to control software parameters, one has generally needed a thorough understanding of MIDI architecture—and lots of patience. Studio One changes all this with the Control Link system, the most intuitive MIDI-mapping system available. With very little configuration, you can achieve a lot of control over your software and external equipment. Simply moving the hardware and software controls to be linked and then clicking the Link button accomplishes in seconds what used to require an entire afternoon. Furthermore, with Global and Focus Mapping modes, the Control Link system offers unparalleled flexibility.

For more on the Control Link System, refer to the “Control Link” chapter.

Reference

This part of the *Studio One Reference Manual* contains detailed information on all aspects of the software and is organized by the various processes and functions you will encounter in producing your recordings. We recommend that all users become familiar with the general layout and workflow of Studio One as presented in the Introduction of this manual before reading the Reference section. You also may wish to refer to the Appendix or Index.

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4 Setup

This chapter contains information about system requirements, hardware-device setup, and software setup. A thorough knowledge of this information will be helpful before attempting to work in Studio One.

4.1 System Requirements

The following are the system requirements to run Studio One.

- Macintosh
 - Operating Systems:
 - Mac OS X 10.4.11 or Mac OS X 10.5.2 or higher
 - Hardware:
 - Minimum:
 - PowerPC G4 1.25 GHz or Intel Core Solo 1.5 GHz processor
 - 1 GB RAM
 - Recommended:
 - PowerPC G5 or better or Intel Core Duo or Intel Xeon processor or better
 - 2 GB or more RAM
- Windows PC
 - Operating Systems:
 - Windows XP or Vista
 - Hardware:
 - Minimum:
 - Intel Pentium 4 1.6 GHz processor or AMD Athlon 64 (Turion)
 - 1 GB RAM
 - Recommended:
 - Intel Pentium 4 2.8 GHz EM64T or better or AMD Athlon 64 3000+ or better
 - 2 GB or more RAM

4.2 Set Up Your Audio Device



Studio One automatically selects, from a list of devices installed on your computer, an audio device to use for audio input and output. To select a different device, navigate to Files/Options/Audio Setup (Mac OS X: Preferences/Options/Audio Setup). Then follow these steps to configure your audio device for use in Studio One:

1. Select a device from the Audio Device drop-down menu under the Files/Options/Audio Setup (Mac OS X: Preferences/Options/Audio Setup) menu .

2. If you wish to change the settings for the selected device, click on the Control Panel button next to the device-selection drop-down menu and make your changes within the device's control panel.
3. When using a Core Audio device, you will see a Device Block Size setting. The Device Block Size is the audio device's buffer size, which has a direct impact on your audio device's performance. You can increase or decrease the Device Block Size by sliding the horizontal fader left or right. The appropriate setting depends upon your specific use of Studio One. For more on this refer to the Maximizing Computer Processing Power section of the "Mixing" chapter.
4. In the Windows version of Studio One, Internal Block Size can be locked to the Device Block Size by checking the Lock box (checked by default). The Internal Block Size is the software buffer size, which will have a direct impact on your computer system and on Studio One's performance. For more on this refer the Maximizing Computer Processing Power section of the "Mixing" chapter.
 - If unlocked, the Internal Block Size can be selected from a drop-down menu. If you are unsure of the best setting, leave Internal Block Size locked to Device Block Size.
 - For hardware-driven effects and virtual instruments, such as the TC Electronic Powercore and Universal Audio UAD card, locking the Internal Block Size of your Audio Device is critical to ensure proper operation.
5. By default, Studio One's process precision is set at Single (32-bit). You may choose double precision (64-bit) from the Process Precision drop-down menu.
6. If your computer has multiple processors or processing cores, Enable Multi-Processing will be checked by default. Unless you experience performance issues, it is recommended you leave this at the default setting for best performance.
7. When the aforementioned settings are selected, your system's current total input and output latency, sample rate, and bit depth will be reported below the Audio Setup menus.

4.2.1 Supported Devices

Studio One supports most audio devices, including ASIO, Core Audio (Mac OS X), Direct Sound (Windows XP), and Windows Audio Session API (Windows Vista) devices.

When using a WASAPI audio device in Windows Vista, note that WASAPI supports an Exclusive and Shared Mode. In Exclusive mode, lower latency can be achieved but other applications (such as Windows Media Player) cannot use the audio device at the same time. Refer to the Windows Vista

Control Panel/Hardware and Sound/Sound to configure the options available for your WASAPI device.

4.3 Audio Device Input/Output Setup

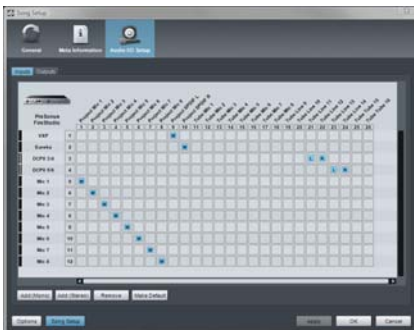
4.3.1 What Are Software I/O Channels?

In most recording applications, audio tracks directly use your hardware audio device's channels. In Studio One, there is a layer of Software I/O Channels between your hardware audio-device channels and your tracks. This setup affords many advantages over the traditional method.

For instance, let's say you produce a Song in your studio, using a multi-channel interface, then take your Song file to your friend's studio, where you will use a different audio interface. Simply connect your friend's hardware audio-device channels to the correct Software I/O Channels. When you get back to your studio, the original I/O configuration for the Song will automatically be loaded for you, as if you never left. You can do the same thing if you need to open the Song on your laptop using its built-in audio hardware.

This is possible because Studio One stores I/O configurations with your Song, per computer and per audio-device driver, ensuring that your Song remains highly portable and is never "broken" by changing audio devices.

4.3.2 Audio I/O Setup Menu



Each track in a Song will receive a signal from an input source and will route to an output destination. The input sources and output destinations made available to each track are determined by the Software I/O Channel Configuration created in the Audio I/O Setup menu. To view this menu and set up a default I/O configuration for each Song, create a new Song by clicking on Create New Song in the Start Page and navigate to Song/Song Setup/Audio I/O Setup.

The configuration of the Audio I/O Setup is done within each Song, so that it is possible for each Song to have a separate I/O setup. As discussed in the Default I/O Setup section, a default I/O setup can be created so that each new Song defaults to a particular I/O setup if you desire.

In the Audio I/O Setup menu, you will find two tabs: one for input configuration, one for output configuration. In each tab, a Matrix Routing view shows the current configuration, with the vertical columns indicating hardware audio-device channels (Hardware I/O) and the horizontal rows indicating created Software I/O Channels. Software I/O Channels function as the input sources and output destinations available to individual tracks in Studio One.

4.3.3 Add or Remove Software I/O Channels

Click on the Add (Mono) or Add (Stereo) button to add an Input or Output Channel, depending on which tab you are currently viewing. When a new Channel is added, the next unassigned hardware inputs or outputs will be assigned to the new Channel by default.

To remove any Channel, click on the Channel to select it, and then click on the Remove button. To rename any Channel, double-click on the name of the Channel, type a new name, and press Enter. In order for Software I/O changes to occur, be sure to click Apply before exiting this menu.

4.3.4 Assigning Hardware I/O to Software I/O Channels

Hardware I/O is assigned to Software I/O Channels in a matrix router, which is a visual representation of the routing. Software Channels (mono and stereo) are each given a horizontal row, and hardware inputs and outputs are given vertical columns. The points at which these rows and columns intersect represent potential connections, or routes, between the hardware I/O and Software I/O Channels.

By default, three Input Channels—one stereo and two mono—are created. These channels will be labeled Input L+R (stereo), Input L (mono), and Input R (mono). By default, the stereo Input Channel will receive input from the first stereo hardware input pair of your selected audio device. The two mono channels will receive input from the same stereo hardware input pair.

The Output Channel is labeled Main Out (stereo) and will be routed by default to the first stereo hardware output pair of your selected audio device.

To create a route between Software I/O channels and hardware I/O, click on the empty square at the intersection of the desired hardware input or output and the Software Channel Input or Output. A colored square will appear with an L, R, or M label, indicating the whether the route is the left or right side of a stereo route (L or R), or a mono route (M).

While it is uncommon for Audio I/O Setup changes to be required in the middle of Song production, the Audio I/O routing can be changed at any time. However, you should be aware that routing changes will affect all associated tracks, possibly switching inputs for audio tracks, changing the hardware output for the Main Output, and so on.

When making new routes in the Audio I/O Setup menu, notice the meters to the left of the Software I/O channels. By displaying signal levels on each channel, these meters help you ensure that the appropriate routings have been made.

4.3.5 Default Device I/O Setup

We recommend that you create a default Audio I/O Setup that can be a starting point for all new Songs. This will allow you to immediately begin working in your new Song with little or no preliminary setup.

To do so, create Software I/O Channels for all of your audio device's commonly used inputs and outputs and name them appropriately. Then, click on the Make Default button in the Audio I/O Setup menu, and a popup window will appear to confirm that you wish to make the current I/O Setup the default for new Songs. Click on Yes, and from that point forward, all new Songs will be created with this Audio I/O Setup.

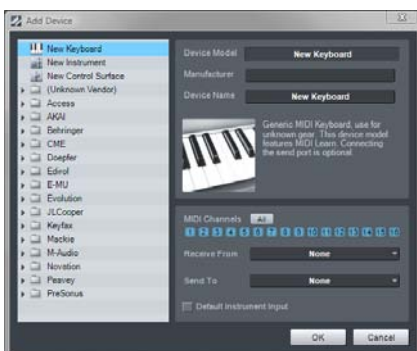
4.3.6 Audition Channel

The Preview Player in the Browser and in the Import File menu uses the Audition channel for audio playback. Any stereo output channel can be used as the Audition channel, allowing you to audition sounds from an output other than your main output.

4.4 Set Up Your MIDI Devices

All MIDI-capable hardware devices are collectively referred to as External Devices in Studio One. There are three types of External Devices, including Keyboards, Instruments, and Control Surfaces. While each device type functions in a slightly different way, there is one menu to add and set up any External Device. The menu can be found by navigating to Files/Options/External Devices/Add Device (Mac OS X: Preferences/Options/External Devices/Add Device).

4.4.1 Set Up MIDI Keyboards



A MIDI keyboard controller is a hardware MIDI device that is generally used for playing and controlling other MIDI devices, virtual software instruments, and software parameters. In Studio One, these devices are referred to as Keyboards. To use a Keyboard and record a performance, the hardware must first be set up. Once a Keyboard is set up, it will be available at all times for use in Studio One.

To set up your Keyboard, navigate to Files/Options/External Devices (Mac OS X: Preferences/Options/External Devices) and follow these steps:

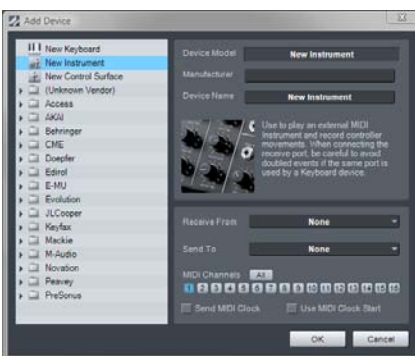
1. In the Options/External Devices menu, click on the Add button.
2. In the Add Device pop-up menu, select Keyboard.
3. Choose your device from the predefined device list or set this to New Keyboard if you do not see your device in the list.

- If set to New Keyboard, you may wish to type in a Manufacturer Name and a Device Name in the appropriate fields. This will make working with your Keyboard easier.
4. Specify which MIDI channels will be used to communicate with this Keyboard. All MIDI channels are selected by default.
 - If you are unsure of the appropriate MIDI channels to use, just leave this at the default setting.
 5. Specify the device to which the Keyboard is sending and the device from which it is receiving via Studio One. Select your device driver name from the drop-down menu for both Receive From and Send To.
 6. You can choose to use this Keyboard as your Default Virtual Instrument Input by checking the appropriate box. If you are using only one Keyboard with Studio One, you should check this box.
 7. Your Keyboard is now ready for use in Studio One.
 - Click on the Add External Device button in the External window of the Mixer to quickly set up a new Keyboard or other External Device.

4.4.2 Set Up External Hardware Instruments

In Studio One, an External Instrument is an external MIDI hardware synthesizer, workstation, or other device that can generate or manipulate sound. External Instruments are set up globally and then are available for use in any Song.

To set up your Instrument, navigate to Files/Options/External Devices (Mac OS X: Preferences/Options/External Devices) and follow these steps:



1. In the Options/External Devices menu, click on the Add button.
2. In the left-hand browser, choose your device from the predefined device list. Set this to New Instrument if you do not see your device in the list.
 - If set to New Instrument, you may wish to type in a Manufacturer Name and a Device Name in the appropriate fields. This will make using your New Instrument easier.
3. Specify which MIDI channels will be used to communicate with this Instrument. MIDI channel 1 is selected by default.
 - If you are unsure of the appropriate MIDI channels to use, just leave this at the default setting.
4. Specify the device to which Studio One is sending MIDI and the device from which the software is receiving MIDI. Select the appropriate MIDI device from the drop-down menu for Send To and (optionally) Receive From.

- It is likely your External Instrument is not connected directly to your computer. In this case, your External Instrument must be physically connected to another MIDI device (such as a MIDI interface) that does connect to your computer; you will need to select the driver for that device.
5. You can choose to send MIDI Clock to this Instrument and/or use MIDI Clock Start by checking the appropriate boxes.
 - You should send MIDI Clock to your Instrument if it has a built-in sequencer or components (such as LFOs) that need to sync to Studio One.
 - Enabling MIDI Clock Start will send MIDI Clock Start signals to your Instrument.

Your External Instrument is now available for use in any Song. To use an External Instrument in a Song, be sure that an Instrument Track is routed to it and that the appropriate Audio Tracks have been added and configured. Refer to *Monitoring an External Instrument* for more on this topic.

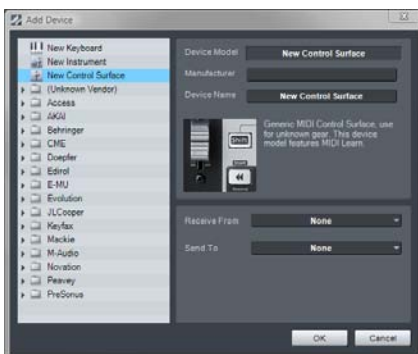
Note that if your External Instrument is also a controller (such as a keyboard workstation), you need to set it up twice. First, set it up as an External Instrument without a Receive From selection, and then set it up as a Keyboard, without a Send To selection. This allows the keyboard-controller section of the workstation to be used as a source for Instrument Tracks, while allowing the synthesizer section to be used as an External Instrument.

4.4.3 Set Up Control Surfaces

In Studio One, a Control Surface is a hardware device that includes transport controls, faders, and other specialized controls. The control surface might use MIDI directly or via a special control layer such as Mackie Control.

To set up a Control Surface, do the following:

1. In the Options/External Devices menu, click on the Add button.
2. Choose your device from the predefined device list. Set this to New Control Surface if you do not see your device in the list.
 - If set to New Control Surface, you may wish to type in a Manufacturer Name and a Device Name in the appropriate fields. This will make using the Control Surface easier.
3. Specify the device to which the Control Surface is sending and the device from which it is receiving via Studio One. Select your MIDI device-driver name from the drop-down menu for both Receive From and Send To.



4. You will not need to specify the MIDI channels your Control Surface will use, as control surfaces use alternative protocols, such as Mackie Control, to communicate with Studio One.
5. Your Control Surface is now ready for use in Studio One.

4.4.4 Use Your Computer Keyboard as a MIDI Keyboard

You can use your regular QWERTY computer keyboard as a MIDI Keyboard to play virtual instruments and record musical data in Studio One. To do this, add a new device in the Options/External Devices/Add Device menu, choosing the QWERTY Keyboard device from the PreSonus device folder.

With the device added, to use your keyboard as a MIDI Keyboard, open the interface for the QWERTY Keyboard device by double-clicking on it in the External panel of the Console. Any record-enabled Instrument Track will then receive input from the QWERTY Keyboard, as shown in the QWERTY Keyboard device interface. Your keyboard will only transmit data to Instrument Tracks while the QWERTY Keyboard device interface is open.

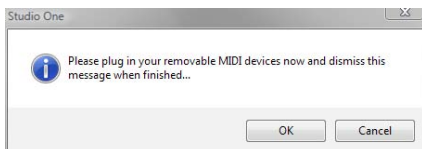
4.4.5 Using the PreSonus FaderPort

If you have a PreSonus FaderPort connected to a computer running Mac OS X or Microsoft Windows Vista, Studio One will automatically recognize it and configure it for use. Just open a Song or Project to use the FaderPort immediately.

If you are using Windows XP, follow the Set Up Control Surfaces instructions to set up your FaderPort, which can be selected from the list of predefined devices in the External Devices/Add Device menu.

4.4.6 Reconnect Devices

In most applications, when MIDI devices become disconnected while the application is running, you usually have to restart the application, and the software may crash. In contrast, if an external MIDI device becomes disconnected while Studio One is running with a Song or Project open, the device can be reconnected without restarting Studio One.



If this occurs, navigate to Files/Options/External Devices (Mac OS X: Preferences/Options/External Devices) and click on Reconnect at the bottom of the menu. Then reconnect your devices and click OK. The devices will now work normally in Studio One.

If an external device is not present when Studio One is started—for instance, if you're traveling and don't have some of your gear with you—the application still will run normally. You should see a warning message that makes you aware of the situation. If your setup frequently changes,

you may wish to turn off this warning message by disengaging the Notify Me If Devices Are Unavailable When Studio One Starts option.

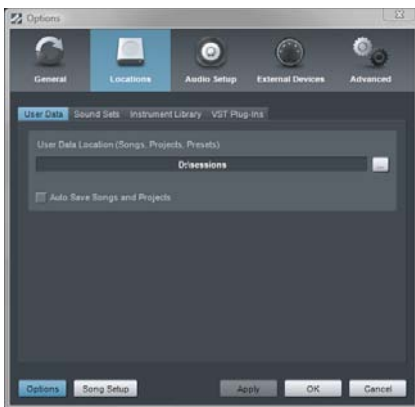
Later, when you start Studio One with the device connected to your computer, Studio One will recognize the device automatically, and it can be used exactly as before, with no further setup required.

4.5 Managing Your Content

Content management and file management can become unwieldy quickly when working with digital audio workstation software due to the sheer volume of loops, effects, song ideas, individual tracks, and so on. In Studio One, you only need to locate your preexisting content once, after which all of the locations will be remembered. Any content you create using Studio One will be similarly managed. In Studio One, your content is kept in distinct categories.

The following describes the process of managing your content using Studio One's Files/Options/Locations (Mac OS X: Preferences/Options/ Locations) menu.

4.5.1 User Data



Any content you create using Studio One will be automatically stored in the location you specify. This includes Songs, Projects, Effects Presets, and all of the files these categories contain. All of your creative output will be logically organized and kept in a single place, which makes future location and backup a breeze.

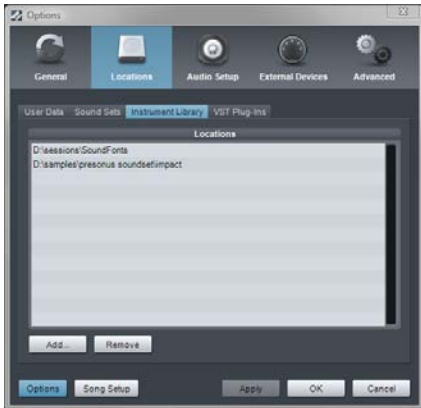
When creating a new Song or Project, the User Data folder will be the default save location. While we recommend using this location, you can specify any save location when creating any new Song or Project.

4.5.2 Sound Sets



Preconfigured packages of loops and samples are bundled with Studio One. The Browser's Sound Sets folder makes finding this content quick and easy. These packages also contain information about each content vendor, which is displayed in the Browser when a package is selected. Click on the vendor link in the Browser for more information about the vendor and the content they supply.

4.5.3 Instrument Library



Studio One includes a native virtual instrument called Presence that utilizes built-in sounds and SoundFonts. SoundFonts contain one or more audio samples that can be resynthesized at different pitches and dynamic levels. Using the Instrument Library, Presence can browse for sounds, which are seen as presets.

To add SoundFont files to your Instrument Library, in the File/Options/Locations/Instrument Library [Mac OS X: Preferences/Locations/Instrument Library] menu, click on the Add button and specify a file location, then click OK. You can specify as many locations as you need.

For more information on the Presence built-in virtual instrument, refer to the Presence section of the “Built-In Virtual Instruments” chapter.

4.5.4 Locating Plug-ins

When Studio One is started for the first time, most of your plug-ins are located automatically and are ready to use immediately. If you find that certain plug-ins are not found, adding them is easy.

To add any missing VST plug-ins to Studio One, navigate to the Files/Options/Locations/VST Plug-ins (Mac OS X: Preferences/Options/Locations/VST Plug-ins) menu and click on the Add button, then specify a location and click OK. You can also drag-and-drop any folder from the Explorer/Finder into the Locations list. Studio One Pro will then scan these locations at startup, including searching for new plug-ins you’ve added. You can always add more locations if needed.

AU, VST3, and ReWire-enabled plug-ins and applications have their own file path in the OS and will not have to be located manually.

4.5.5 Failed Plug-ins

If any plug-in fails to start correctly when scanned at startup, a notice will appear next to its name in the startup message list, and a warning message should appear. If the plug-in continues to fail at startup—for instance, if it is not authorized correctly or a required iLok key is not present—Studio One Pro will put the plug-in in a blacklist and ignore it at startup from that point on.

To reset this blacklist and force Studio One Pro to scan missing plug-ins again at startup, navigate to Files/Options/Locations/VST Plug-ins (Mac OS X: Preferences/Options/Locations/VST Plug-ins) and click on Reset Blacklist. The next time you start Studio One Pro, the previously blacklisted plug-ins will be scanned again. If the issues that caused the plug-ins to fail the scan have been resolved, the plug-ins will be made available.

4.5.6 VST Support

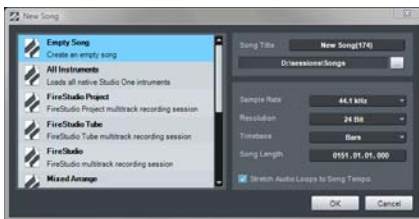
Studio One Pro supports VST 2.4 (including VSTXML for hierarchical parameter structure) and VST 3. As VST 3 is a new technology, and Studio One Pro is one of the few non-Steinberg host applications that support it, there may be incompatibility problems with some plug-ins. These problems will need to be resolved over time.

4.6 Creating a New Song

A Song is where all recording, editing, arranging, and mixing takes place. To create a New Song, do one of the following:

- From the Start page, click on the New Song link.
- Navigate to File/New Song.
- Press [Ctrl]/[Cmd]+N on the keyboard.
- From the Project page, if no Song is currently open, click on the Song quick-access button.

4.6.1 Song Templates



On the left side of the New Song creation menu (see Fig. 4-12), you will find a list of preconfigured Song templates, which are designed to help get you started quickly with various recording tasks. The templates can include particular I/O and track setups, effects plug-in and virtual-instrument processing, and all other aspects of a Song. By default, the Empty Song template is selected, which will create a completely empty Song with no tracks or preconfigured I/O setup.

4.6.2 Create a Song Template

If there is a particular Song setup you will be using again and again, it can be helpful to create a template. To do so, first create a new Empty Song. Next, configure the I/O and create and configure all tracks, and virtual instruments, effects plug-ins, and any other aspects of the Song that you need in your template. Then, in the File menu, select Save as Template.

Type in a title and description, choose an image for the Template icon, if you like, and select OK. You can also drag an image from Windows Explorer/Mac Finder onto the image icon to use that image. The exact current state of the Song will now be available as a template in the New Song creation menu.

4.6.3 Title and Location

The title of your Song will be the Song file name (Title.song) and the name of the default folder that contains all data related to your Song. The default location where new Songs and all related data will be saved is in your User Data location, under Files/Options/Locations/User Data (Mac OS X: Preferences/Options/Locations/User Data). If you like, you can choose a different file location by clicking on the New Location button and browsing to any location.

4.6.4 Sample Rate

Sample Rate refers to the rate at which incoming analog audio is sampled per second in conversion to a digital signal. The most common setting is the standard sample rate for audio CDs: 44.1 kHz, meaning 44,100 samples per second.

The Studio One sample rate should match the sample rate of your audio interface, so by default, the sample rate is set to your current audio interface's sample rate, and changing this setting will initiate a sample-rate change in that device. If the sample rates don't match, Studio One will resample all audio files to match the sample rate of the hardware, but this can cause performance problems and should be avoided. Studio One is capable of recording at any sample rate your hardware audio device offers.

Not all devices allow a third-party software application to change the hardware sample rate. The desired sample rate should be set before creating a New Song.

File size is directly proportional to the sample rate and resolution. The higher the sample rate and resolution, the larger the resulting audio file will be.

4.6.5 Resolution

Resolution refers to the bit depth of digital audio, which is related to the audio's dynamic range. Standard CD audio has a 16-bit resolution, which results in roughly 96 dB of dynamic range. Thus, with "CD-quality" audio, the difference between the quietest and loudest sounds possible is 96 dB. The most common resolution setting in professional recording is 24-bit, which produces a dynamic range of approximately 144 dB.

Studio One can record audio with 16, 24, or 32-bit (floating point) resolution. Which resolution to use is a matter of preference. If you are unfamiliar with these concepts, try experimenting with recording at each resolution and comparing your results.

4.6.6 Timebase and Song Length

The timebase of your New Song will determine the way the timeline is represented. The timebase selection can be changed at any time. You have the option of the following:

- Seconds: The timeline division will be an expression of hours:minutes:seconds:milliseconds.
- Samples: The timeline division will be an expression of samples.
- Bars: The timeline division will be an expression of musical bars and beats.
- Frames: The timeline division will be an expression of frames.

4.6.7 Stretch

When creating a new Song, you can choose to automatically time-stretch any imported audio file that has tempo information in order to match your Song's current tempo. This is highly recommended to avoid having to manually stretch audio or place tracks in Timestretch mode.

However, if you do not intend to work with Timestretching in your Song and want to ensure that nothing gets timestretched automatically by mistake, make sure this option is deselected.

Only audio tracks with encoded tempo information will be stretched automatically with this option engaged. Studio One will remember tempo information you specify within the Inspector view for any audio file.

4.7 Advanced Options

Studio One offers the following ways to customize your workflow. Click on each tab in the File/Options/Advanced menu to access these options.

4.7.1 Editing

Click on the Editing tab to access the following options.

4.7.1.1 Tools

The Enable Crosshair Cursor for Tools option is engaged by default. It enables a large, white, vertical-and-horizontal crosshair in the Arrange view that aids in displaying the exact position of the various mouse tools.

The Disable Events Under Automation Envelopes option is also engaged by default. This makes Events unavailable to the mouse tools while viewing an Automation Envelope; this helps prevent you from unintentionally editing underlying Events while editing automation.

4.7.1.2 Event Appearance

The Draw Events Translucent option is not engaged by default. It enables the Timeline grid in the Arrange and Edit view to be seen in the background, through Events. Seeing the grid may help some users with various editing tasks.

The Don't Show Event Names option will remove the name labels from events in the Arrangement view. This is purely an aesthetic difference and will not change any functions.

The Smooth Edges of Automation Envelopes option provides anti-aliasing support for the graphic lines of Automation Envelopes, helping them to look smooth and straight. This option only affects the look of the envelopes themselves and does not affect the behavior of envelopes.

4.7.2 Devices

Click on the Devices tab to access the following options.

4.7.2.1 Audio Engine

Stop Playback When Opening Options is engaged by default. It simply stops playback within a Song or Project when the File/Options (Mac OS X: Preferences/Options) menu is opened. This will prevent changes in Studio One options from immediately affecting the sound during playback.

The Use Cache for Timestretched Audio Files option is engaged by default. It is described in depth in the Using Timestretch Cache section of the "Timestretch" chapter.

The Record Tempo Information to Audio Files option is not engaged by default. When engaged, this option enables tempo tagging for any audio file recorded in Studio One. The Song tempo at the time position of the recording will be saved with the file, so that automatic timestretching can be accomplished. This may also help ensure compatibility with timestretching processes in other application.

The Use Non-Buffered Audio File Access option is engaged by default. This option disables the caching done by the operating system when reading from a file. The operating system usually reads more data than was requested by the application when caching, which has a negative impact on playback performance, especially on slow machines. We recommend you leave this option engaged unless you encounter a related technical issue.

Engage the Use Realtime Processing When Updating Mastering Files option to ensure that real-time processing is used when the mastering file for a given Song is automatically updated. This is necessary when Songs utilize certain devices, such as External Instruments, that require a real-time mixdown in order to be included in the mix.

4.7.2.2 Console

The Device Editor Follows Channel Selection Option is engaged by default, and will result in the currently viewable channel devices, such as virtual effects or instruments, to automatically switch when a channel is selected. This ensures you are only viewing the devices related to the selected channel at any given time.

If you would like Audio or Instrument Track monitoring to be enabled automatically when recording is enabled on a Track, engage the Audio Track Monitoring Follows Record and Instrument Track Monitoring Follows Record options.

4.7.3 Enable and Disable Services

It is possible, in Studio One, to selectively enable and disable particular services, or modules, that enable specific features. This may be helpful when troubleshooting. For instance, if a ReWire device seems to be causing a problem, you can disable the ReWire service to see if that resolves the issue. This kind of troubleshooting will enable the Studio One technical-support team to quickly locate and resolve specific issues with your computer system and to identify any previously unknown problems in the program.

All services are enabled by default. To disable any service, click on the Services tab in the File/Options/Advanced menu and click on the confirmation button, paying special attention to the disclaimer message. Then click on any service in the list, and click on the Disable button to disable that service. You must restart Studio One for these changes to take effect.

If a service has been disabled, follow the instructions above, and click on the Enable button for the service in order to re-enable it. Again, Studio One will need to be restarted for any of these changes to take effect.

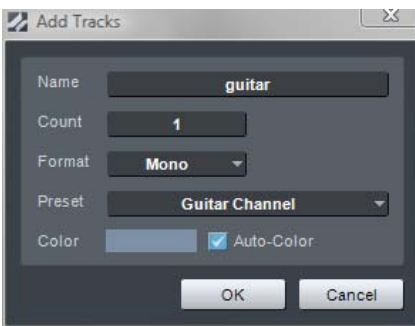
5 Recording

The following chapter discusses aspects of recording in Studio One, including Audio and Instrument Tracks, recording modes and formats, and recording tips.

5.1 Audio Tracks

Before recording can take place, you need at least one track on which to record. Studio One has two types of tracks for basic recording: the Audio Track and the Instrument Track. Audio is recorded to Audio Tracks, while musical-performance data is recorded to Instrument Tracks.

5.1.1 Creating an Audio Track



To create an Audio Track, navigate to Track/Add Tracks or Press [Ctrl]/[Cmd]+T to open the Add Tracks menu. The following options are available in this menu:

- Name: Click here and type in a name for the new track
- Count: Choose the number of tracks you would like to create
- Format: Choose a mono or stereo Audio Track
- Preset: Choose an FX Chain to be preloaded on the tracks
- Color: Choose a color
- Auto-Color: Check this box if you would like your tracks auto-colored

Once these options are configured, click on OK, and the tracks will appear in the Arrange view.

Navigate to Track/Add Audio Track to quickly add a mono audio track.

[Right]/[Control]-click in blank space in the Track Column and select Add Tracks For All Inputs to quickly add a track for every configured input in Audio I/O Setup.

Alternatively, you can right click in any blank space in the Track Column of the Arrange view and select Add Audio Track (Mono) or Add Audio Track (Stereo) to quickly add an audio track.

5.1.2 Use and Create Presets

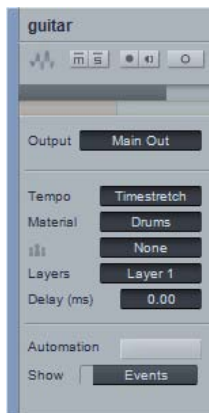
In Studio One, you can store presets of an entire chain of effects plug-ins as an FX Chain, allowing quick recall of complex effects setups on any track. Any factory-preset or user-created FX Chain can be selected as a Preset when creating a track. For more information, refer to the FX Chain section of the “Mixing” chapter.

5.1.3 Configuring an Audio Track

This section describes the editable Audio Track parameters.

5.1.4 Input/Output Selection

An Audio Track's I/O channel(s) can be selected from three places: the Track Column, the Console, and the Track Inspector.



Selecting an Input Channel from the Track Column:

- Set the Arrange view Track size to medium or larger to be able to access the current Input Channel selection for any track.
- Click in the window immediately below the horizontal track fader to choose from any configured Input Channel.

Selecting an Input or Output Channel from the Console:

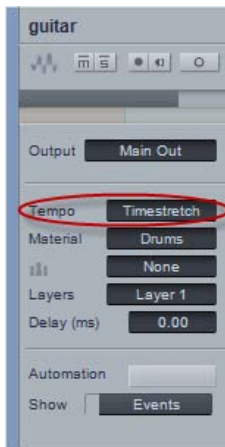
- Open the Console by clicking the Mix button, or press [F3] on the keyboard, and be sure either All Channels or Audio is selected in the Banks window.
- Click in the window above each track's Fader and Pan controls to choose an Input and/or Output Channel. The Input Channel selector is on top, with the Output Channel selector beneath.

Selecting an Input or Output Channel from the Inspector:

- Open the Inspector window by clicking on the Inspector button above the Track Column or pressing [F4] on the keyboard.
- At the top of the Inspector window, you will find the currently selected track's Channel Mode toggle (mono or stereo) and Input and Output Channel selectors)
- Click on the Input or Output Channel selector to choose a channel.

The available Input Channels for an Audio Track will be based on the track's channel mode (mono or stereo), which can be toggled with the Channel Mode button.

5.1.5 Tempo Mode



The Tempo Mode, found in the Inspector, affects the way in which Audio Events are handled on any audio track. There are three Tempo Modes:

- Don't Follow: Audio Events on the selected track will not be affected by Song tempo.
- Follow: The start position of Audio Events on the selected track will be adjusted with tempo changes, so the events stay in sync with their Bars (bars and beats) position. The length of the Event will not be affected.
- Timestretch: Assuming that the Song file contains tempo information, tempo changes will cause Audio Events on the selected track to be dynamically stretched so that the events' start and end times stay in sync with their Bars (bars and beats) positions. The length and internal timing of the Event will be affected in the stretching process; however the pitch of the audio will remain unaffected.

If the Stretch Audio Loops to Tempo option is selected when creating a new Song, Timestretch will be the default tempo mode for all new Audio Tracks.

5.1.6 Record-Enabling an Audio Track

To record to an Audio Track, the track must be record-enabled (see Fig. 5-6). To record-enable an Audio Track, click on the track's Record Enable button once or select the track and press [R] on the keyboard. Select multiple tracks and record-enable any of them to record-enable all selected tracks. The Record Enable button will turn red when active, and the track's meter will begin to move up and down if there is live audio input on the track's selected Input Channel.

Alternatively, if you press and hold [Alt]/[Option] on the keyboard, and then click on Record Enable, you will both record-enable the related track and disarm record-enable for all other tracks.

In the Track menu, you will find the Record+Monitor Follows Selection option. Engaging this automatically record- and monitor-enables the last track selected in the Arrange view.

When an Audio Track is record-enabled, a clip indicator will appear at the top of the input-level meter for that track in the Arrange view. If clipping occurs at the input, the clip indicator will turn on. When clipping occurs, you should adjust the input gain/level on your audio interface, as once the distorted signal is recorded, it cannot be fixed.

Once an Audio Track is record-enabled, you are ready to record. Refer to Activating Recording for more on this topic.

5.1.7 Software Monitoring



To monitor (listen to) live audio input on an Audio Track in Studio One, click on the Monitor enable button once. This button should turn blue, and you should begin to hear your live audio input and see its input level on the track meter. You can also hold [Alt]/[Option] on the keyboard and then click on the Monitor enable button to simultaneously engage monitoring on a track and disengage monitoring on all other tracks.

It may be helpful to picture the signal path to understand exactly what is happening. For example, if the audio source you are listening to is a guitar plugged into channel 1 on your audio interface, then Studio One receives the guitar input on Hardware Input 1.

In Audio I/O Setup, you will have created a mono Input Channel with Hardware Input 1 as its source. Your Audio Track will have that Input Channel selected as its input. The output of your Audio Track is likely to be the Main Output, which is a stereo Output Channel. That Output Channel will output to a designated stereo pair of outputs on your hardware audio interface, which normally would be connected to your monitor speakers or headphones.

When monitoring live audio input from a microphone, avoid listening with speakers that are in close proximity to the microphone. It is possible in this case to create a feedback loop that can quickly generate dangerously loud audio levels, possibly harming your ears and your speakers.

5.1.8 Hardware Monitoring

Some audio interfaces feature the ability to monitor the hardware inputs and outputs directly, as opposed to monitoring through software. This is referred to as “hardware monitoring” or “zero-latency monitoring.” When using this type of interface, it is recommended that you monitor live audio input via hardware monitoring instead of software monitoring. This will help you avoid common problems that result from software latency, such as hearing a delay on your voice while you record vocals, or recording off-beat.

5.1.9 Setting Input Levels

Setting good input levels is critical to making a good recording. This begins with the hardware audio interface. If the hardware’s input level is set too low, and you increase the level later in Studio One to compensate, you will also raise the level of any noise in the signal. If the level is too high, you can overload the hardware input, causing unpleasant clipping distortion that cannot be fixed. Therefore, you should set the input gain on your audio interface as high as possible without overloading the input. There is usually a clip indicator for each input on the audio interface to assist you in detecting overloads.

As long as the input levels are not clipping in your audio interface or on the track to which you are recording in Studio One, you can always adjust the levels of recorded material after the recording is made. To visually monitor the input levels for any input in Studio One, it is best to view the Input Channels in the Mix Console by selecting the Inputs bank in the Banks window.

5.2 Instrument Tracks

Instrument Tracks are where performance data is recorded, drawn, and edited. This data usually comes from a Keyboard, which is used to play a virtual instrument. The performance data is not audio; the virtual instrument being played by the Keyboard is the audio source.

In Studio One, MIDI controllers are referred to as Keyboards. If you have not set up a Keyboard, refer to the Set Up Your MIDI Devices section of the “Setup” chapter.

5.2.1 Creating an Instrument Track

To create an Instrument Track, navigate to Track/Add Tracks or Press [Ctrl]/[Cmd]+T to open the Add Tracks menu. The following options are available in this menu:

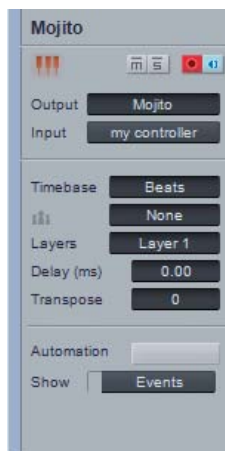
- Name: Click here and type in a name for the new track.
- Count: Choose the number of tracks you would like to create.
- Format: Choose Instrument Track.
- Color: Choose a color.
- Auto-Color: Check this box if you would like your tracks auto-colored.

Once these options are configured, click on OK, and the tracks will appear in the Arrange view. It is important to note that Instrument Tracks do not appear directly in the Console, as they do not output audio. The virtual instruments generate sound and are represented in the Console by Instrument Channels.

Alternatively, [Right]/[Control]-click in a blank space in the Track Column of the Arrange view and select Add Instrument Track from the pop-up menu to quickly add an Instrument Track.

5.2.2 Configuring an Instrument Track

In Studio One, an Instrument Track can only receive input from a Keyboard that has been set up in the External Devices menu. To set up a Keyboard, refer to the Set Up Your MIDI Devices section of the “Setup” chapter. If you have a Keyboard set up as the default Instrument Track input, all Instrument Tracks will default to using that Keyboard.



An Instrument Track can trigger a virtual instrument that has been set up in a Song or an External Instrument. The Instrument Track Input and Output can each be selected in one of two places:

Selecting an Instrument Track Input or Output from the Track Column:

- Set the Arrange view Tracks size to medium or larger to be able to access the current Instrument Track Input.
- There are two selection windows on the Instrument Track. Click in the bottom window to choose from any configured Keyboard input. Click in the Top window to choose an output to any previously set up virtual or external instrument.

Selecting an Instrument Track Input or Output from the Inspector:

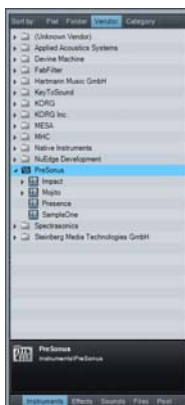
- Open the Inspector window by clicking on the Inspector button above the Track Column or by pressing [F4] on the keyboard.
- Click in the Input or Output selector window to select from any configured Keyboard input or to trigger any previously set up virtual or external instrument.

Press [F11] to open the instrument editor for the selected Instrument Track.

5.2.3 Set Up a Virtual Instrument

Studio One Pro supports VST and AU virtual instruments, ReWire applications, and Studio One Pro's Native virtual instruments. The difference between these types of virtual instruments is transparent to the user in Studio One Pro, as they are all handled in the same manner. To use any VST or AU virtual instrument, you will need to be sure Studio One knows where they are installed on your computer. Refer to the Locating Plug-ins section of the "Setup" chapter for more information on locating your plug-ins.

5.2.4 Add a Virtual Instrument from the Browser



To add any VST, AU, ReWire, or built-in virtual instrument to your Song:

- Open the Browse view and click on the Instruments tab to view your virtual instrument.
- Do one of the following:
 - Click on and drag any virtual instrument to an empty space in the Arrange view to simultaneously add the virtual instrument to your Song and create an Instrument Track with its output routed to the virtual instrument. The Instrument Track will conveniently inherit the name of the virtual instrument.

- Click on and drag any virtual instrument on top of an existing Instrument Track to replace the track's current virtual instrument.
- Click on and drag any virtual instrument to the Instruments window in the Mixer to simply add the virtual instrument to your Song. In order to control or play this virtual instrument, you will need to select it as the output for an Instrument Track.
- The virtual instrument is now set up and ready to play and will have one or more dedicated audio channels in the Mixer.

Once a virtual instrument is added to your Song, be sure that an Instrument Track is routed to it so that the instrument can be played.

5.2.5 Set Up Multiple Virtual Instrument Outputs

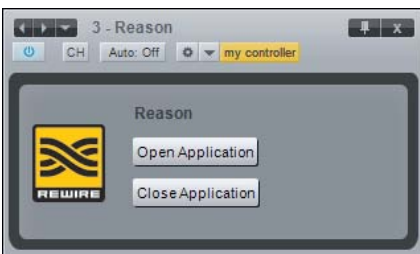
Many virtual instruments have the capability to send audio on more than one channel. In Studio One, only the first output or output pair of any virtual instrument will be active by default. To activate the other possible virtual-instrument output channels in the Console:



- Open the Console by pressing [F3] on the keyboard, then open the Instruments panel (open by default) by clicking on the Instr. button to the far left of the Console.
- Click once on the virtual instrument in the Instruments panel, and the output-channel activation menu will expand.
- Click on the checkbox next to any output to activate that output for the virtual instrument.
- Each active virtual-instrument output will have a dedicated audio channel in the Console.

You can also activate virtual-instrument outputs in the plug-in window. Any virtual-instrument plug-in that offers multiple output channels will have a Channels button at the top of the plug-in window. Click on this button to view and activate the available outputs.

5.2.6 Set Up a ReWire™ Application

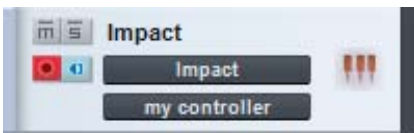


ReWire applications are set up in a similar way to virtual instruments. Any ReWire applications known to Studio One Pro will be listed in the Browser Instruments tab, along with all known virtual instruments. You can drag in the ReWire application just like an instrument, and Studio One Pro has a special ReWire object to represent the application.

The ReWire interface window is similar to the virtual-instrument interface windows. There are also two special controls, Open Application and Close Application, which can open and close most ReWire applications, so you do not need to leave Studio One Pro to open or close the ReWire application.

If clicking on Open Application does not immediately launch your ReWire application, this means that the ReWire application does not support this function. You will need to manually launch the application, as you normally would; the application should launch in ReWire slave mode.

5.2.7 Record Enabling an Instrument Track



To record musical performance data to an Instrument Track, the track must be record-enabled. To record-enable an Instrument Track, click on the Record Enable button once; it should turn red.

Also, note that monitor-enable is, by default, automatically engaged when Record Enable is engaged. This behavior can be configured in the File/Options/Advanced/Devices menu. If musical data arrives from the track's selected Keyboard, the Instrument Track's meter will move up and down, corresponding to that input.

Once an Instrument Track is record-enabled, you are ready to record musical performance data to that track. Refer to Activating Recording for more on this topic.

5.2.8 Monitoring an Instrument Track

Instrument Tracks record and output musical-performance data, not audio. The virtual or external instrument to which the Instrument Track is routed generates the audio. The following describes how virtual and external instrument audio output is monitored.

5.2.9 Monitoring a Virtual Instrument

Virtual instruments usually load with a default sound; however, you should be sure that the virtual instrument you wish to monitor is set up correctly to generate audio. With the output of an Instrument Track routed to the virtual instrument you wish to monitor, click on the Monitor button, and it will turn blue.

You should now be able to play the Keyboard that you selected as the input to the Instrument Track and should see the track meter moving, as well as hear the audio output of the virtual instrument. If you cannot hear the audio output of the virtual instrument, make sure that your virtual instrument is set up correctly and that the corresponding audio channels in the Mix Console are not muted.

If you select the Instrument Input Follows Selection option in the Track file menu, any Instrument Track you select will automatically have Monitor and Record enabled, and all other Instrument Tracks will have these disabled.

5.2.10 Monitoring an External Instrument

To monitor and ultimately record the hardware audio output of an external instrument, one or more Audio Tracks need to be created to receive that output. This means that your external instrument needs to be physically connected to one or more inputs on your audio interface. Thus, monitoring an external instrument involves the following:

- The output of an Instrument Track is routed to the external instrument, which has been set up to receive MIDI input from Studio One.
- The Instrument Track is monitor-enabled.
- One or more Audio Tracks have been created and configured to use the Input Channels to which the external instrument's audio output is connected.
- The Audio Tracks are monitor-enabled.



With the above conditions met, you will be able to play your Keyboard and see the Instrument Track meter moving. You will also see the related Audio Track meters moving, as well as hear the live audio input from the external instrument.

5.3 Activating Recording

Once you have the desired tracks created, setup, and record-enabled, the next step is to record. The following illustrates several ways to activate recording, each associated with a different purpose.

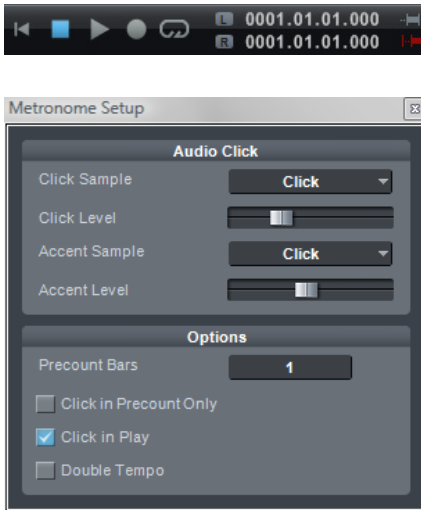
5.3.1 Manually



Manually activating recording is the most basic way to record. Recording will start at the current Playback Cursor position and will continue until you manually stop recording. To manually activate recording, click on the Record button in the Transport or press [NumPad *] on the keyboard. The Record button in the Transport will turn red, the Playback Cursor will start to scroll from left to right, and a new Event will be recorded to any record-enabled tracks. Recording will continue until you manually stop it.

5.3.2 Pre-Roll

Recording with Pre-Roll engaged allows you to specify a number of bars that will play before recording begins. For instance, when you want to record a vocal part for a chorus, the vocalist will need to hear some reference portion of the recorded tracks before beginning to sing. A guitarist recording a solo will need to hear the music leading into the solo. Pre-Roll allows you to specify the number of bars you will hear before recording automatically starts and saves you the trouble of deleting the space before the recorded part actually begins.



Follow these steps to use Pre-Roll:

- Click on the Pre-Roll button in the Transport or press [O] on the keyboard to engage Pre-Roll.
- Click on the Metronome Setup button to open the Metronome Setup menu.
- Under Precount in the Metronome Setup menu, enter a number in the Precount Bars field for the number of bars you wish to play before recording begins.
- Set the Playback Cursor to the timeline position at which you wish to begin recording.
- Click on the Record button in the Transport or press [NumPad *] to begin recording. Playback will begin at the specified number of bars before the position you chose, with the Playback Cursor moving from left to right.
- Recording will automatically activate at the position you chose. The Record button in the Transport will turn red, the Playback Cursor will continue to scroll from left to right, and a new Event will begin recording to any record-enabled tracks.
- Recording will continue until you manually stop it by pressing [Space Bar] on the keyboard or clicking Stop in the Transport.

5.3.3 Auto Punch

It is sometimes useful to automate the point at which recording will begin and end. For example, if you wish to record over a specific phrase of a vocal part, but not before or after that phrase, you can automatically begin and end recording at specified points. This process is commonly referred to as “punching in and out,” and the resulting new Audio Event is referred to as the “punch-in.”

In Studio One, punching in/out is achieved with the Auto Punch feature. Follow these steps to engage Auto Punch:

- Set the Left Locator in the Timeline Ruler of the Arrange view at the position you wish to punch in—that is, where recording should begin.
- Set the Right Locator in the Timeline Ruler of the Arrange view at the position you wish to punch out, that is, where recording should stop.
- Click on the Auto Punch button in the Transport, or press [I] (the letter ‘i’) on the keyboard.
- With tracks record-enabled, begin playback at any point before the Left Locator position.
- Recording will automatically activate at the Left Locator position. The Record button in the Transport will turn red, the Playback Cursor will



continue to scroll from left to right, and a new Event will begin recording to any record-enabled tracks.

- Recording will automatically stop at the Right Locator position. However, playback will continue beyond the Right Locator position until you manually stop it by pressing [Space Bar] on the keyboard or by clicking Stop in the Transport.

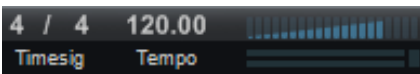
If you use the Auto-Punch feature in Studio One to record your punch-ins, or if you punch in manually, the newly recorded audio is automatically crossfaded at its edges with the existing Audio Event, so the transition between the old and new audio is not audible. The crossfade time will be very small and not audible; however, you can edit the crossfade manually.

5.4 Metronome Control

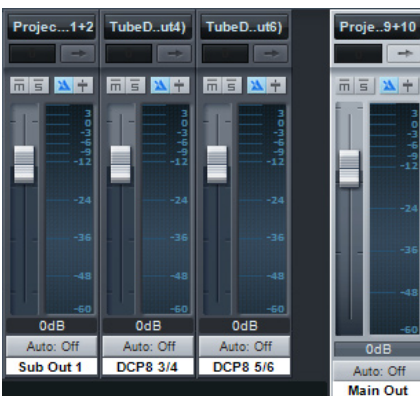
A metronome makes audible clicks or other sounds that correspond to beats at a selectable tempo, providing the musicians with a tempo reference while recording. This is especially useful when recording drums or other rhythm-intensive tracks, as the editing and arranging processes are made much easier when the recorded audio lines up with musical bars and beats.

In Studio One, the metronome can be engaged and disengaged both globally and for each hardware output in the Console, including the Main Out and any Sub Outs.

5.4.1 Turn the Metronome On/Off Manually

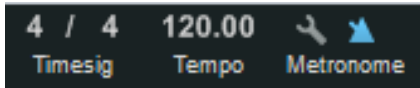


In the Transport, the Metronome button is to the left of the Master Volume fader and meter. Click on the Metronome button, or press [C] on the keyboard, to globally engage and disengage the metronome. The metronome is globally disengaged by default.



The Output Channels in the Console also feature Metronome buttons and level controls to the right of the Mute and Solo buttons. These controls allow you to choose, for each output, whether or not the metronome will be heard and its level.

5.4.2 Set Up Metronome Behavior



The Metronome settings menu can be accessed by clicking the Metronome Settings button, located next to the Metronome button in the Transport. In this menu, you will find Audio Click and Precount settings.

In the Audio Click settings, you can choose a Click sample and corresponding level, as well as an Accent sample and corresponding level. The Accent will always be the downbeat, or first beat, of each new bar. You can choose from four default samples for the Click and Accent, including Click, Clave, Rim Shot, and Tambourine. By default, the Accent Level setting is higher than the Click Level setting, as most musicians like to have the downbeat of each bar emphasized to help keep time.

The metronome can also click at double tempo. For instance, if the time signature is set at 4/4, the metronome can output eight-note clicks instead of quarter-note clicks, providing a subdivision of the beat. This may help keep time at slower tempos, or guide a performer through a complex rhythm. Engage the Double Tempo option to enable this behavior.

5.4.3 Click in Playback

The Click in Playback option in the Metronome setup menu allows you to enable/disable the Metronome during playback, as opposed to while recording. Disabling Click in Playback allows you to leave the Metronome engaged in the Transport at all times, so that if you are recording, you will hear a click, but if you are playing back, you will not hear the click. Click in Playback is engaged by default; click on the Click in Playback checkbox to disengage the Metronome during playback.

5.4.4 Click Only in Precount

When recording is triggered with Pre-Roll engaged, as discussed in the Pre-Roll section of this chapter, a specified number of Precount bars will play before reaching the current playback cursor position. The number of Precount bars is specified in the Metronome Setup menu. In this same menu, there is a checkbox to engage the Click Only in Precount option, which is disengaged by default.

With Click Only in Precount engaged, the metronome will provide a traditional count-in during the Precount bars and will not be heard beyond those bars.

5.4.5 Use Custom Sounds in the Metronome

It is possible to use any audio sample in the Metronome. To add samples to the Metronome Settings menu, browse to the Content folder for Studio One on your computer and create a new folder inside of it called "Clicks." Then copy and paste any WAV, AIFF, or MP3 audio file to that

folder. Any audio file added to the Clicks folder will become available as a choice for the Downbeat and Accent Level sample in the Metronome Settings menu.

5.5 Loop Recording on Audio Tracks

It can be very useful to loop a specific section while recording in order to capture multiple performances or takes of the same musical passage. In Studio One, this is called “Loop Recording.”

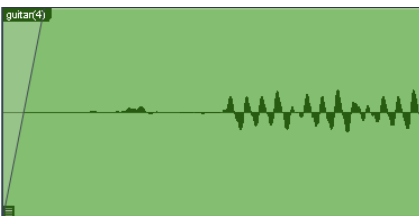
Follow these steps to accomplish Loop Recording:

- Set the Left and Right Locators in the Timeline Ruler at the beginning and end, respectively, of the area in which you wish to record.
- Click on the Loop button in the transport or press [NumPad /] on the keyboard to engage Looping.
- Activate recording manually or via Pre-Roll or Auto Punch.
- When the Playback Cursor reaches the Right Locator position, it will loop back to the Left Locator Position.
- Recording will continue until you manually stop it by pressing [Space Bar] on the keyboard or clicking Stop in the Transport.



When Loop Recording with Audio Tracks, multiple Takes will be created. These Takes represent each recorded pass over the looped region, and they are contained in a single Audio Event. Only one Take is accessible at any given time in the Arrange view, and only the currently selected take will be seen and heard.

5.5.1 Selecting Takes of an Audio Event



When there are multiple Takes available for an Audio Event, the Take icon will appear in the lower left corner of the Event in the Arrange View.

By default, the last recorded Take is selected. To select any other take, [Right]/[Control]-click on the Audio Event to expose a list of Takes. Click on any numbered Take to select it. Takes are edited as a single Audio Event, so sizing or splicing any Take will splice all of the Takes contained in the Audio Event.

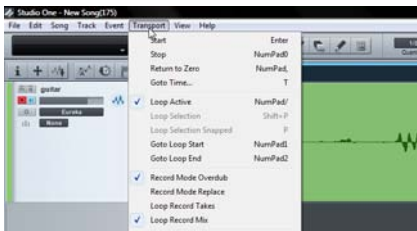


It is possible to splice an Audio Event that contains multiple Takes, then select a different Take for each splice of the original Event. As an example, if you recorded three Takes for a vocal verse, you could split that Audio Event in between each vocal phrase, and then for each phrase select the best Take from any of the three Takes.

5.5.2 Unpack Takes to New Tracks

When two or more Takes exist for an Audio Event, it is possible to unpack the individual takes to separate Events on new Tracks. To do this, [Right]/[Control]-click on the Event and select Unpack Takes to New Tracks. Each Take will be placed at the appropriate time on its own new Track. Note that the settings of the originating Track are not duplicated for the new Tracks.

5.6 Instrument Track Recording Modes



When recording to an Instrument Track, there are several recording modes. To switch between these modes, navigate to the Transport file menu and select Record Mode Overdub or Record Mode Replace, and Loop Record Takes or Loop Record Mix. The following describes each Instrument Track recording mode.

5.6.1 Record Mode Overdub and Replace

When in the Overdub recording mode, recording over any existing Instrument Part will result in the newly recorded material being overdubbed, or added to, the existing material. While recording, you will hear the previously recorded Event playing, as well as hearing the material currently being recorded, assuming that you are monitoring the Instrument Track.

When in the Replace recording mode, recording over any existing Instrument Part will result in the new material being recorded to a new Event, which replaces that portion of the original Event. While recording, you will not hear the previously recorded Event playing back, as the purpose of this mode is to replace the existing material.

5.6.2 Loop Record Takes and Mix

If Loop is engaged in the Transport while recording, the recording mode will change to Loop Record Takes or Loop Record Mix. These modes are functionally similar to the regular Record Mode Overdub and Record Mode Replace.

When Loop Record Takes is selected, each pass through the looped region is recorded to a new Take within a single new Instrument Part. When recording is stopped, each Take is individually selectable by [Right]/[Control]-clicking on the Instrument Part and choosing one of the numbered takes from the top of the pop-up menu. Only one Take can be selected at a time for any Instrument Part.

Takes on Instrument Parts can be unpacked to new Instrument Takes, as with Audio Event Takes, described in the Unpack Takes to New Tracks section of this chapter.

When Loop Record Mix is selected, each pass through the looped region is added to the existing material within a single new Instrument Part. For instance, if you are looping a four-bar region to record a new drum part, this would allow you to play one piece of the drum kit during each pass until you have recorded the whole part.

5.7 Track Layers

In Studio One, both audio and instrument tracks have optional layers that can be used to record multiple different ideas to a single track. For instance, you might want to compare one set of lyrics for a vocal track to another set of lyrics. In this case, you could record two different performances on a single track to two separate layers, and then be able to quickly switch between the two without the need for a second track.

To create a new layer on any track, open the Inspector by pressing [F4] on the keyboard and select “Add Layer” from the Layer selection box. The new layer is effectively like having a whole new track, without the need for duplicating inserts, sends, and I/O setup. You can also duplicate layers by selecting Duplicate Layer from the Layer selection box, which enables you to try out and compare two completely different edits of the same events on two layers.

5.8 Audio Recording Format

Studio One records in the Broadcast Wave file format. This is the only format supported, as it is the most widely used format, and it contains time stamps for when recordings start within a Song.

When recorded Broadcast Wave audio files get bigger than 4 GB, the RF64 file format is automatically used as the standard file format.

The recommended file system for the recording partition on your computer is NTFS on Windows and HFS+ on Mac OS X.

5.9 Creating a Good Monitor Mix

When recording any performance in the studio, it is highly recommended that you take the time to build a great monitor mix for the performers. It’s critical that they clearly hear their performance and that of the other musicians, and a good monitor mix helps inspire a better performance. The general philosophy is for each performer to feel like they are playing on a finished record.

For instance, it is common in many styles of music for the lead vocals to have some reverb so that they sit well in the space of the overall mix. Therefore, when recording vocals, it is sometimes a good idea to include reverb in the vocalist’s monitor mix. This way, the vocal will sound more like a finished production. This approach often helps when recording



guitars, keyboards, and other instruments, as well.

If your audio device supports zero-latency hardware monitoring, use that as the primary monitor source, so that no delay is heard. In addition, you can use sends and FX channels in the Console, as you normally would in a mix, to build a better monitor sound. For instance, on the audio track to which you are recording, you could add a send to an FX channel with a reverb. You could then route the FX Channel output to a Sub Out Channel and back to your audio interface, where it can be mixed with the zero-latency dry signal.

When adding time-based effects, such as reverb or delay, you generally don't have to be concerned about plug-in delay and latency that could result from using software plug-ins on a live input source. A few milliseconds of processing delay on a reverb will probably not be audible.

5.10 Cue Mixes and Zero-Latency Monitoring

Studio One features powerful hardware integration with the FireStudio line of audio interfaces from PreSonus. In this section, we will discuss how to take advantage of this integration to create cue mixes and use zero-latency monitoring.

5.10.1 Creating a Cue Mix Output

In Studio One, it is possible to quickly and easily create multiple cue mixes. A cue mix is separate from the main mix and is usually provided to musicians for monitoring purposes during recording.

For instance, when recording vocals, the engineer and vocalist will probably want to hear different mixes. Most vocalists want to hear more of their vocals in the mix, possibly with some reverb to make it sound natural, while the engineer might focus on how the performance balances with the rest of the mix. Together, Studio One and a FireStudio interface make this simple.

The first step in building a cue mix is to create another output channel. To do this, open the Song/Song Setup/Audio I/O Setup menu in a Song, switch to the Outputs tab, and add a new Stereo Output channel. Next, specify that this output is a cue-mix output by clicking on the channel's Cue Mix checkbox. You can create as many cue mixes as your audio interface has available stereo outputs.

Now that you have created a Cue Mix output, you will notice a special Send object in the channels of the Console. This Send object is called a Cue Mix object. In the Small Console view, Cue Mix objects appear in the far left column of the extended channel. In the Large Console view, Cue Mix objects appear below the Send device rack on each channel.

Each Cue Mix object features an Activate button, horizontal level and pan faders, and a Lock to Channel button. When using a PreSonus FireStudio interface, on audio channels with an assigned audio input, the Cue Mix object will also feature a Zero-Latency switch, the function of which is described below.

5.10.2 Mixing the Cue Mix

Cue mixes are mixed using Cue Mix objects. By default, the level and pan values are locked to the Channel level and pan faders. This means that each Cue Mix will be identical to the main mix in the Console. Changing the level or pan in the Cue Mix object will unlock both settings, allowing independent control of level and pan for each channel in each Cue Mix. Thus, the level and pan for channels in a Cue Mix can be completely different from the related level and pan in the main mix.

At any time, you can lock the cue-mix level and pan back to the channel settings by clicking on the Lock to Channel button. To completely remove any channel from a cue mix, simply deactivate the Cue Mix object for that channel.

5.10.3 Monitoring Live Input in a Cue Mix

Cue mixes are normally used in a recording situation in which one or more live inputs need to be monitored. This is where Studio One's Cue Mix functionality, integrated with a PreSonus FireStudio interface, gets really cool.

FireStudio interfaces feature internal hardware mixers that provide zero-latency monitoring. While these mixers are easy to use, Studio One makes it even easier by allowing you to control the mixers from within the software. Using this feature only involves clicking on one button.

Let's return to our example of recording live vocals. For a vocalist to be comfortable and perform well, it is important that the performance sound as natural and as polished as possible. Vocalists need to hear themselves well, with no audible delay of their voices in the mix. Adding some reverb provides a little ambience, so the voice is not dry and lifeless.

Here's how this scenario would look in Studio One:

- Set up a Cue Mix output for the vocalist.
- Record-enable and monitor-enable the vocal track.
- Engage the Zero Latency button on the Cue Mix object for the vocal channel. This enables zero-latency monitoring straight from the hardware (as opposed to monitoring through software) for that channel in the Cue Mix.

- Create a Send on the vocal channel to an FX Channel with your favorite reverb effect.
- The vocalist will then hear the live, zero-latency input from the hardware, as well as the rest of the cue mix, including the output of the reverb. Adjust the level of the vocal and other channels in the cue mix to the vocalist's liking, and you're ready to record.

In a few seconds, you can ensure that vocalists hear their voices with no latency, in a custom mix that includes effects. Simultaneously, you can listen to a completely independent main mix, allowing you to focus on engineering while the artist focuses on the performance.

Note that when monitoring with the Zero-Latency button engaged, you will not hear insert effects on that channel, as you are monitoring the signal before it is processed in software. If you need to hear insert effects, do not engage the Zero-Latency button.

5.10.4 The Main Output as a Cue Mix

It is possible to designate the main output in Audio I/O Setup as a cue mix. This is helpful if you often record yourself with a FireStudio interface and require quick access to zero-latency monitoring for live inputs. When the main output is designated as a cue mix, a Zero-Latency button will appear on any audio channel with an assigned audio input in the Console, below the Mute, Solo, Record, and Monitor buttons.

With the Zero-Latency button and Monitor Enable both engaged, you will hear the live zero-latency input straight from your FireStudio interface (as opposed to through software). As such, you will no longer hear the effects of any inserts on the channel. However, you will still hear the result of any sends on the channel, as Bus and FX Channels will still output normally.

5.11 Print Effects While Recording

Some people prefer to place insert effects on Input Channels so that those effects may be printed to the track while recording. For instance, you might place a compressor, EQ, or other effect on a vocal Input Channel in order to save time and computer resources later, when mixing. This is easy to accomplish in Studio One. It may be helpful to review the Mixing chapter in order to better understand these instructions.

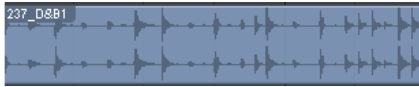
To insert an effect on an Input Channel, open the Console and click on the Inputs tab on the far left to view the Input Channels. If you're working in the Small Console view, double-click on the Input Channel to open its Insert Device Rack. Insert an effect in the Insert Device Rack on any of the Input Channels, and those effects will be recorded at the input of any track that uses that source.

Note that when insert effects are used on Input Channels, and effects are recorded to a track, there is no way to go back and change the sound of the recording. To avoid this scenario, you might consider placing effects on the audio channels to which you are recording, for monitoring purposes only, and printing with effects at mixdown.

6 Editing

After recording, the next step in production is usually editing the recorded Events to achieve a desired sound. The following chapter discusses aspects of editing in Studio One, including Arrange- and Edit-view editing, mouse tools, Event envelopes, edit groups, and timestretching.

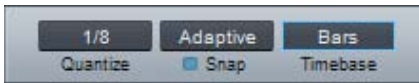
6.1 Events



All audio and musical data that exists within the timeline of your Song will be visually represented by Events. Events that contain audio are called Audio Events and can only be located on Audio Tracks. Audio Events are distinct in that they display audio waveforms. Events that contain musical data are called Instrument Parts and can only be located on Instrument Tracks. Instrument Parts are distinct in that they display musical-performance information.

Audio Events and Instrument Parts are referred to collectively as Events in this manual. Event editing can take place both in the Arrange view and the Edit view. Audio Events and Instrument Parts can be edited in similar ways, but each has special considerations.

6.2 Tool and Event Snapping



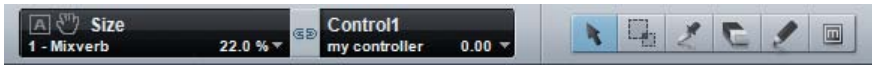
Snapping allows editing actions to occur only at specified divisions in time, such as bars and beats. For instance, Snapping makes it possible to rearrange specific beats from a bar of a drum loop while keeping the rest of the loop in time. Snap is engaged by default and can be disengaged by clicking on the Snap to Grid checkbox. You can also temporarily defeat Snapping by pressing the Shift key while moving the mouse.

If Snap is engaged, the current Snap Setting will affect the behavior of Tools and Event editing by snapping the tool or Event to nearby time values, as follows:

- **Adaptive:** The default setting, where snapping will occur at the nearest logical subdivision of the current Timebase, based on the current Timeline zoom level.
- **Bar:** Snapping will occur at the nearest musical bar line.
- **Quantize:** Snapping will occur at the nearest musical subdivision of the current Quantize Setting.
- **Frames:** Snapping will occur at the nearest frame subdivision.

6.3 Arrange View Mouse Tools

The mouse tools allow direct interaction with Events, using the mouse. It is helpful to remember that actions done using the Mouse Tools can be undone at any time, so feel free to explore them. Click the middle mouse button (scroll wheel) to display a list of the tools; then left-click to select the desired tool.



In the Arrange view, the following Mouse Tools and related functions are available.

6.3.1 Arrow Tool



This tool is selected by default. Click on the Arrow Tool button or press [number 1] (above the regular QWERTY keys) on the keyboard to select the Arrow Tool.

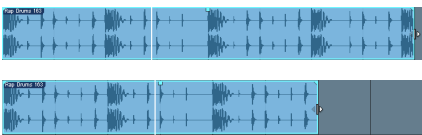
Holding [Ctrl]/[Cmd] on the keyboard while the Arrow Tool is selected will temporarily switch to the Range Tool.

The Arrow Tool can be used for the following purposes:

6.3.1.1 Move an Event

To move an Event using the Arrow Tool, click anywhere on the Event and drag left, right, up, or down. Dragging the Event left or right will move the Event backward and forward in time, relative to the current Timebase and Timeline zoom. Dragging the Event up or down will move the Event to another existing track of the same type. If the Event is dragged to a position where no track currently exists, Studio One will create a new track of the same type.

6.3.1.2 Size an Event

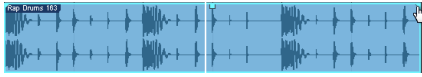


Events can be thought of as windows into audio files and musical performances, where what you see is what you will hear. Sizing is a fundamental technique wherein Events are made shorter or longer, so that only a portion of the audio or musical data they contain is seen and heard.

To size any Event using the Arrow Tool, float the mouse to the left or right edge of the Event to reveal the Sizing Tool. When this tool appears, click-and-drag left or right to size the Event. Events can be sized and resized nondestructively any number of times.

Holding [Alt]/[Option] on the keyboard and then sizing an Event from the right edge will result in the Event being Timestretched. Refer to the Timestretching section of this chapter for more information.

6.3.1.3 Adjust Audio Event Volume Envelopes



All Audio Events feature a basic volume envelope that allows the volume of the audio to be shaped in several ways. Using the volume envelope, you can create a fade-in and fade-out, as well as set a constant volume level between the fades.

To create a fade-in or fade-out, click-and-drag left or right on the Fade Flag in the upper left or right corner of an Audio Event. By default, a linear fade will be created over the length you have moved the Fade Flag.

To change the curve of the Fade, click on the Fade Curve box in the middle of the Fade curve and drag up or down. The Fade Curve will determine how quickly or slowly the Fade occurs and changes over time. If you press and hold Shift while editing the fade length or the curve, you can edit both at once. Dragging up or down edits the curve, and dragging left or right changes the length.

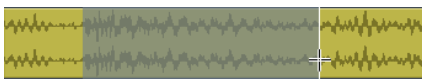
To adjust the overall volume level of an Audio Event, click on the volume box in the center of the volume envelope and drag up or down. As the volume envelope is adjusted, the audio waveform will be redrawn to approximate the effect of the adjustment.

6.3.1.4 Select Multiple Events

Multiple Events can be selected at once in order to edit them all at once, with a single action. To select multiple Events with the Arrow Tool, do one of the following:

- Click outside of the range of an Event, and then drag over any other Events; a gray box will be drawn while you drag over the target-selection area. Release the mouse button once the box is drawn over all of the Events you wish to edit, and these Events will be selected for editing.
- Click on any Event; then, while holding [Shift] on the keyboard, click on any other Events to select them. This allows you to select multiple Events that are not in close proximity to each other. All selected Events can then be edited at once.

6.3.2 Range Tool



The Range Tool is used to select a range, or area, within Events. Click on the Range Tool button or press [NumPad 2] on the keyboard to select the Range Tool.

To select a range within an Event, using the Range Tool, click-and-drag over the area to be selected; a gray box will be drawn over the target selection area. Release the mouse button when the box is drawn over the range of the Events you wish to select. The range you have selected is now treated as a single consolidated Event.

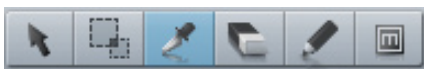
For instance, you can use the Range Tool to select the content of several Audio Events across multiple tracks in bar 12, and then use the Arrow Tool to move that section of audio to bar 14. Another common use of the Range Tool is to quickly select and delete a range of audio within an Event, rather than using the Split Tool to make two splits, then selecting and deleting the section with the Arrow Tool.

When a range has been selected and the mouse cursor is floated over the selected range, the Arrow Tool will temporarily appear. This makes it easy to quickly select and edit a range of Events.

To select multiple discontinuous ranges across any Event, on any track, hold the Shift key while using the Range Tool. Continue to hold Shift and use the Arrow Tool to select whole Events. For instance, when using the Arrow Tool, if you press and hold Ctrl, you get the Range Tool. Press and hold Ctrl and Shift to select multiple ranges, then continue to hold Shift but release Ctrl; now you have the Arrow Tool and can select whole Events. All of your selections will remain selected.

Selected ranges can be sized by floating the Range Tool at the left/right edge of the selection. You also can split a selected range at the left and right edges of the selection by choosing Split Range from the Edit menu or by pressing [Ctrl]/[Cmd]+[Alt]+X after selecting a Range.

6.3.3 Split Tool



Using the Split Tool, single Events can be split into multiple Events. Click on the Split Tool button, or press [NumPad 3] on the keyboard to select the Split Tool.

With the Split Tool selected, a vertical and horizontal line will be drawn near the current mouse-cursor position. The vertical line indicates the exact time position of the Split Tool, while the horizontal line underscores the track on which the Event to be split resides. The Split Tool is directly affected by the current Snap settings.

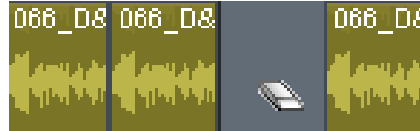
Click on any Event with the Split Tool to split the Event at that position. By splitting a single Event, you create two Events that can be edited independently. If multiple Events are selected across multiple tracks, the Split Tool will affect all of the selected Events in the same way.

6.3.4 Eraser Tool



The Eraser Tool is used to delete an Event. Click on the Eraser Tool button or press [NumPad 4] on the keyboard to select the Eraser Tool. To

delete any Event using the Eraser Tool, simply click on the Event. The Eraser Tool is unaffected by the current selection and will only affect the Event that is directly clicked on.



However, if you click on a selected element with the Erase Tool, all currently selected elements will be erased.

6.3.5 Paint Tool



In the Arrange view, the Paint Tool can only be used to create an empty Instrument Part on an Instrument Track. Click on the Paint Tool button or press [NumPad 5] on the keyboard to select the Paint Tool.

To create a new, empty Instrument Part on an Instrument Track with the Paint Tool, click-and-drag over any empty area in the track lane of the Instrument Track. Clicking once with the Paint Tool will create an empty Instrument Part that varies in length according to the current Timebase setting.

The Paint Tool will become the Arrow tool when the mouse cursor is floated over any area of an Audio Track.

6.3.6 Mute Tool

In the Arrange view, the Mute Tool is used to mute audio events and instrument parts. Click on the Mute Tool button or press [NumPad 6] on the keyboard to select the Mute Tool. To mute any Audio Event or Instrument Part, simply click on it with the Mute Tool. When an Event or Part is muted, it will appear grayed out, and an “m” icon will appear in the lower left corner of the Event or Part.

To unmute an Event or Part, click on it with the Mute Tool. Clicking and dragging the Mute Tool over any number of Events and Parts in one motion will mute or unmute all of the Events and Parts touched by the tool.

6.4 Common Editing Actions

6.4.1 Cut, Copy, Paste

As with most software applications, Studio One supports cut, copy, and paste actions. Once you have selected an Event or a range of Events, you can perform these actions:

- **Cut:** Press [Ctrl]/[Cmd]+X on the keyboard to cut the current selection.
- **Copy:** Press [Ctrl]/[Cmd]+C on the keyboard to copy the current selection.
- **Paste:** Once a selection is cut or copied, press [Ctrl]/[Cmd]+P on the keyboard to paste the selection. The Events will be pasted on the selected track, at the current Playback Cursor position. If you select and copy Events on multiple tracks, then select another timeline location on the first track, and then paste, the copied Events will be pasted in the appropriate tracks and locations, starting with the first (selected) track.

Let's say you wanted to copy and paste an Event from one Song into another Song or another version of the Song, and you want the Event to be at its original location in the timeline. You can do this by copying the Event and then pasting with [Ctrl]+[Shift]+[V].

6.4.2 Audio Event Slip

Often, after an Audio Event has been sized to fit a particular region of time, the audio clip the Event contains needs to be moved ahead or behind in time without changing the Event's length and volume envelope. This action is commonly called "slipping," or "slip," and it is often used alongside splitting, or splicing, to correct the timing of rhythm tracks. For instance, if one snare-drum hit is off the beat by a little bit, you could split the Event on either side of that section and then slip the audio into perfect time.

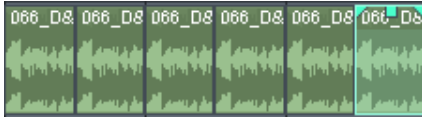


To use Slip, select the Arrow Tool, and then press and hold [Ctrl]/[Cmd]+[Alt] on the keyboard, while floating the mouse over an Audio Event. The Slip Tool icon will appear. Click-and-drag on the Event to Slip the audio left or right across the timeline. Multiple Audio Events can be selected and slipped at once, even across multiple tracks.

When slipping the audio in an Audio Event, note that all of the Event characteristics remain unchanged, including the Event size, position, Inspector parameters, and volume envelope.

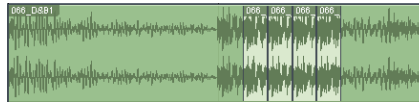
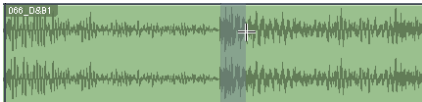
An Audio Event can be slipped only as far as the length of the audio clip it contains.

6.4.3 Duplicate



The Duplicate action essentially combines the Copy and Paste actions and intelligently places the pasted selection based on the musical timing of the selection in the Song. Press [D] on the keyboard to duplicate the current selection. The duplicated Event will always be placed after the original Event, and it is automatically selected once duplicated (see Fig. 6-18). As with the other editing actions, Duplicate can apply to any number of currently selected Events.

A good use of the Duplicate command is to quickly create copies of a loop across a region in a Song by selecting an Event and repeatedly pressing [D] on the keyboard. Another interesting use involves selecting very short regions within a loop, using the Range Tool, and duplicating them several times, consecutively, in order to create a stutter effect that is popular in electronic music.



6.4.4 Return to Start Position on Stop

Many people prefer that when playback is stopped, the playback cursor returns to the position from where it started. This allows fast auditioning of edits by repeatedly starting and stopping playback from a specific position in the timeline.

To enable this behavior, select the Return on Stop option in the Transport file menu.

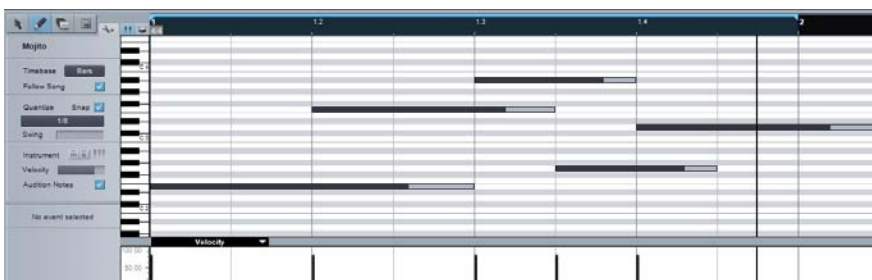
6.5 Edit View Event Editing



In many cases, editing actions will require a close look at the Events being edited. To perform these edits in the Arrange view would require zooming in to a level that would make it difficult to retain your sense of the overall Song

structure, then zooming back out after the edits are performed. The Edit views allow you to avoid this inefficiency. To open the Edit view for the selected Event, click on the Edit view button, press [F2] on the keyboard, or double-click on any Event. While there is a common Edit view, Audio

Events open in the Audio Editor, and Instrument Parts open in the Music Editor.



The Edit view will display the currently selected Event on a Timeline that is independent of the Arrange view Timeline. By default, the Edit view Timeline is zoomed in further than the default Arrange view Timeline. The center position of the display is based on position in the Event that was last clicked in the Arrange view, and clicking on a new position in the Event in the Arrange view will recenter the Edit view display.

6.6 Editing Audio Events

6.6.1 Timebase and Quantize

The Audio Editor display operates independently of the Arrange view and has independent Timebase and Quantize settings. The options for these settings are the same as in the Arrange view and will affect tools and Events in the same way. On the far left side of the window, you'll see Follow Song (located below the Display setting) and Snap (located next to the Quantize setting); these can also be turned on or off independently from the Arrange view settings.

6.6.2 Tools

All of the tools in the Arrange view are available in the Audio Editor and function there exactly as they do in the Arrange view.

6.7 Editing Instrument Parts

Instrument Parts contain Notes, which represent musical-performance data and are a type of Event. Notes can be moved, cut, copied, pasted, duplicated, and drawn using mouse tools, key commands, and certain Event menu commands. Multiple Notes can be selected and edited together as with Events.

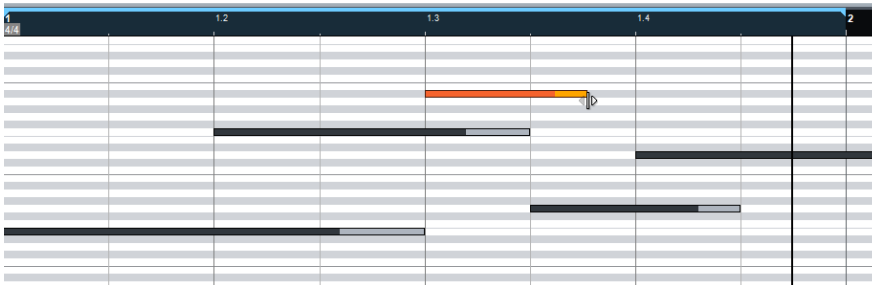
6.7.1 Timebase, Quantize, and Scale

Like the Audio Editor, described earlier, the Music Editor has independent Timebase, Auto-Follow, Quantize, and Snap settings. While Quantize affects the horizontal time-value snapping, the Music Editor also features Scale, or vertical note-value, snapping. The Scale settings allow snapping to specific note values within different musical scales. Select a scale by choosing the starting note and the musical scale in the respective selectors. The Notes contained in the selected scale are marked on the single-octave keyboard display, below the Scale selector.

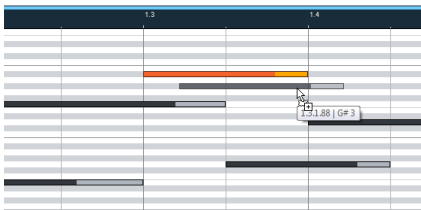
6.7.2 Arrow Tool

The Arrow Tool in the Music Editor is used with Notes in essentially the same way as the Arrow Tool in the Arrange view is used with Events. Multiple Notes can be selected and edited together in the same way as Events.

To move a Note using the Arrow Tool, click anywhere on the Note and drag left, right, up, or down. Dragging the Note left or right will move it backward and forward in time, relative to the current Edit view Timebase and Timeline zoom. Dragging the Note up or down will transpose (change the pitch of) the Note. The transposition interval can be determined by using the vertical keyboard display to the left of the Music Editor.



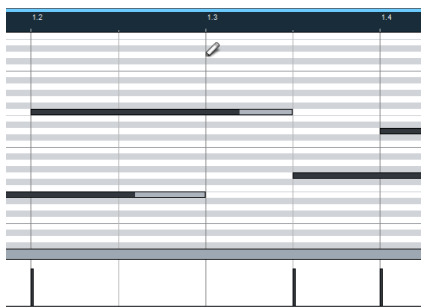
To size any Note using the Arrow Tool, float the mouse to the left or right edge of the Note to reveal the Sizing Tool. When this tool appears, click-and-drag left or right to size the Note. As with Events, Notes can be sized and resized nondestructively any number of times.



To duplicate selected Notes using the Arrow Tool, hold [Alt]/[Option] on the keyboard, click on the selection, and drag left or right. Release the mouse button when the desired position is reached, and the selection will be duplicated to this position.

To temporarily switch to the Paint Tool, press and hold [Ctrl].

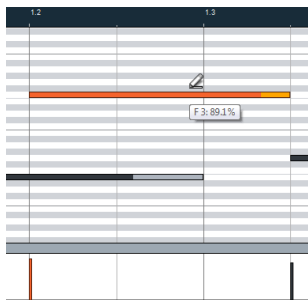
6.7.3 Paint Tool



The Paint Tool in the Music Editor is used to draw Notes in an Instrument Part. The Paint Tool will snap when drawing to certain vertical and horizontal positions based on the Scale and Quantize settings. When the mouse cursor is floated over the Music Editor with the Paint Tool selected, the Note value for the current cursor position is highlighted on the keyboard display.

Note that the Keyboard display can be switched to a Drum Map display by clicking on the Drum Map button above the Keyboard display. The Drum Map display essentially removes the virtual keyboard and allows more room to display sample names horizontally for each vertical note position.

To draw a Note with the Paint Tool, click at the desired position. If you click once, the new Note will have a length equal to the time value of the current Quantize setting. If you click-and-drag to the right, you can make the Note any length you desire. With the Paint Tool selected, float the mouse cursor to the edge of any existing Note to size the Note, as with



the Arrow Tool. To delete a Note, click on it using the Paint Tool.

To edit the velocity of a Note while drawing the Note with the Paint Tool, drag up and down after you click to draw the note. To edit the velocity of a single existing Note, using the Paint Tool, hold [Alt]/[Option] on the keyboard and click-and-drag up or down on the desired Note.

You can also edit the velocity of a Note(s) in the Part Automation lane of the Music Editor, which is discussed in the Instrument Part Automation section of the “Automation” chapter.

Press and hold [Alt] on the keyboard with the Paint Tool selected to enter Line Drawing mode. In this mode, you can draw a line of Note Events in the Music Editor, and you can draw lines in Automation Envelopes, as mentioned later in this manual.

To momentarily select the Arrow Tool while using the Paint Tool, hold [Ctrl]/[Cmd] on the keyboard.

6.7.4 Eraser Tool

The Eraser Tool in the Music Editor is used to delete Notes. With the Eraser Tool selected, click directly on any Note to delete it.

6.7.5 Mute Tool

The Mute Tool is used in the Music Editor much as it is used in the Arrange View. With the Mute Tool selected, click on any note to mute it, and click on any muted note to unmute it. Click and drag over any number of Notes in one motion to mute or unmute the entire group of notes.

6.7.6 Cut, Copy, Paste, and Duplicate Notes

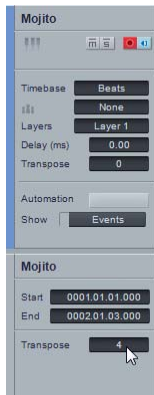
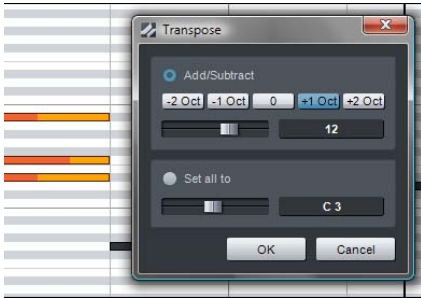
You can cut, copy, paste, and duplicate Notes exactly as you can with Events in the Arrange view, as describe in the Common Editing Actions section of this chapter.

6.7.7 Transposing Notes, Instrument Parts, and Tracks

Transposing notes, or changing a group of notes by a given interval, is a common action that takes advantage of the flexibility of musical data. It is possible at any time to transpose any notes, a whole Instrument Part, or all of the contents of an Instrument Track.

To transpose a note or group of notes within an Instrument Part, open the Music Editor by double-clicking on the desired Part, and do the following:

- Select all of the notes you wish to transpose.
- Select Transpose from the Event menu.



- Choose from one of the preset transpositions or use the horizontal fader to set the number of semitones by which the selected notes will be transposed. A positive number results in the notes being transposed up, and a negative number results in the notes being transposed down.

To transpose an entire Instrument Part:

- Select the Part you wish to Transpose in the Arrange view.
- Select Transpose from the Event menu.
- Choose from one of the preset transpositions, or use the horizontal fader to set the number of semitones by which the selected Part will be transposed. A positive number results in the Part being transposed up, and a negative number results in the Part being transposed down.

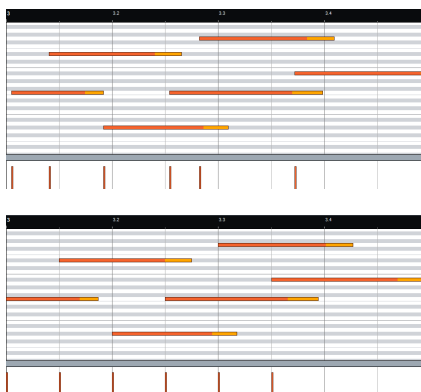
When transposing notes or Parts, the musical notes will be moved graphically to represent the change. In this case, the notes displayed will be the notes you hear.

To transpose all of the contents of an Instrument Track:

- Select the Instrument Track you wish to transpose.
- Open the Inspector by pressing [F4] on the keyboard.
- Enter a value in the Transpose field for the number of semitones by which the Track will be transposed.

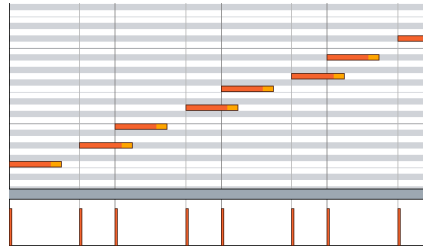
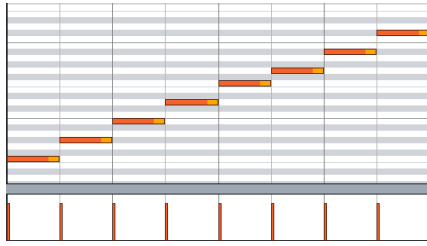
When transposing a Track via the Inspector, the transposition will not be reflected graphically. The positions of the notes in all Parts on the Track will remain unaffected. In this case, the notes displayed may not be the notes you hear. This parameter will also affect the notes you hear when you play your Keyboard.

6.7.8 Quantizing Instrument Parts



Quantizing Instrument Parts is the process of realigning notes in time to match a given musical time subdivision more closely. In practice, quantizing is generally used to clean up musical timing to more closely match the intended timing, although it can also be used creatively.

The results of quantizing are determined with the Quantize Controls to the far left of the Music Editor. The Quantize selection box allows you to choose the musical subdivision of time, or of note value, to which you would like to quantize. By default, 1/16 (16th note) is selected. Subdivisions to 1/64 notes are available, as well as other presets.



The Swing fader allows you to apply a percentage of musical “swing” to the quantization process. The current Quantize note value setting will affect how Swing is applied.

6.7.9 Quantize and Restore Timing

To quantize an entire Instrument Part, select the Part in the Arrange view and press [Q] on the keyboard or choose Quantize from the Event file menu. To quantize an individual Note or Notes, select the Notes in the Music Editor and then apply quantization, as before.

Alternatively, if Notes are selected in the Music Editor, and then the Quantize value is changed, the selected Notes are automatically quantized using the newly selected Quantize value.

To restore the original timing to quantized Instrument Parts or Notes, select the Part or Notes and press [Shift]+Q on the keyboard or select Restore Timing in the Event menu.

6.7.10 Humanize

Strictly quantizing every note so that rhythms are perfectly precise can cause the music to sound lifeless or mechanical. The Humanize function randomly alters note start and end times and velocity (within a small threshold), providing just enough variation to make a performance sound more like a human played the parts.

To use this function, select any notes and then choose Humanize from the Edit/Musical Functions menu. Note that the results are random, and there are no user controls.

6.7.11 Music Editor Inspector

When a note is selected, its start and end positions are labeled, as are its pitch, velocity, and mute status. Each of these parameters can be edited directly in the Inspector. When editing notes using the Inspector, all selected notes will be affected.

The simplest way to edit start and end positions, pitch, and velocity is to place the mouse cursor over the parameter and scroll the mouse wheel up or down. Another way to edit a selected note’s velocity is to click-and-drag the horizontal Velocity fader in the Music Editor. When you release the mouse button, the Velocity value will be applied to all selected Notes.

6.8 Editing Commands

6.8.1 Common Music Editing Commands

When editing in the Music Editor, several editing commands are likely to be used often. We have placed these commands in a menu that allows quick access to them, to the right of the Tool icons in the upper left of the Music Editor. Click on the Wrench icon to reveal a drop-down menu of commands with which you can edit any selected notes in the Music Editor.

6.8.2 Event Menu Commands

The following is a list of all Event menu commands with their corresponding descriptions.

Event Menu Command	Function
Insert Marker	Insert a marker in the Marker Track at the current timeline position.
Rename Events	Rename the currently selected Events.
Mute Events	Mute the currently selected Events.
Unmute Events	Unmute the currently selected Events.
Toggle Mute	Toggle Mute for the currently selected Events.
Select in Pool	Select the currently selected Events in the Pool.
Create Crossfades	Create crossfades for any currently selected, overlapping Audio Events.
Create Autofades	Create autofades, or fade ins and fade outs for the currently selected Audio Events.
Bounce Selection	Bounce the currently selected Audio Events.
Reverse Audio	Reverse the currently selected Audio Events.
Normalize Audio	Normalize the audio for the currently selected Audio Events.
Increase Volume	Increase the volume for the currently selected Audio Events; only possible if the volume for the Audio Event has been decreased.
Decrease Volume	Decrease the volume for the currently selected Audio Events.
Quantize Audio	Snap the beginning of a selected Audio Events to the nearest bar.
Insert Part	Insert a new Instrument Part, one bar in length, at the current timeline position.
Merge Instrument Parts	Merge the currently selected Instrument Parts on a single Instrument Track into a single Instrument Part .
Bounce Instrument Part	Bounce the currently selected Instrument Parts to an Audio file, which will be placed on a new Audio Track.
Remove Part Automation	Remove the Part Automation for the currently selected Instrument Parts.
Make Shared Parts Independent	When you duplicate Instrument Parts (MIDI Events), changes made to one copy are made to all copies. This command makes these shared parts independent of each other.
Velocity	Edit the Velocity for any currently selected Notes or entire Instrument Parts.
Transpose	Transpose any currently selected Notes or entire Instrument Parts.
Length	Change the length of any currently selected Notes or entire Instrument Parts.
Stretch	Stretch any currently selected Notes or entire Instrument Parts by a certain factor.
Quantize	Quantize any currently selected Notes or entire Instrument Parts.

Restore Timing	Restore the timing for any currently selected Notes or for entire Instrument Parts.
Delete Double Notes	Delete double notes, or simultaneous occurrences of the same note, for any currently selected Notes or for entire Instrument Parts.
Delete Short Notes	Delete short notes, or notes with extremely short time values, for any currently selected Notes or for entire Instrument Parts.

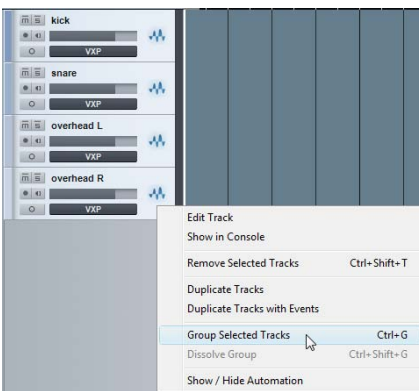
6.9 Edit Groups

It can be useful to group multiple tracks together so that any edits done to an Event on one track in the group are automatically done to all Events for each Track in the group. For instance, you may wish to group all of your drum tracks together so that when the Events are cut and/or moved, the relative timing between the tracks remains intact.

6.9.1 Creating Edit Groups

To create a new edit Group, do the following:

- Select the Tracks you wish to group.
- [Right]/[Control]-click on any currently selected Track.
- Choose Group Selected Tracks from the pop-up menu.



All Tracks that were selected will now be a part of the new Edit Group. Edit Groups are automatically named based on the order in which they are created, and they are shown as Group 1, Group 2, and so on. The name of the new Edit Group will be shown in the Edit Group selector box under the Track Type icon on all Tracks in the Group.

To add a Track to an existing Edit Group, click on the Edit Group box (under the Track Type icon) on the desired Track in the Arrange view. Then, in the pop-up menu, choose the Edit Group to which you wish to add the Track.



When a Track is included in an Edit Group, selecting the Track will select all Tracks in the Group. Any edit actions performed on any Event for any Track in the Group will be performed on all Events for each Track in the Group.

In Studio One, Edit Groups also group the faders for the related Channels in the Group. This topic is discussed further in the Groups section of the “Mixing” chapter.

If a Track is in an Edit Group, and an Event from the Track is viewed in the Edit view, the Group icon will appear at the top left of the Edit view, indicating that any edits performed on the Event in view will affect other Events.

6.9.2 Dissolving Edit Groups

To Dissolve, or ungroup, an Edit Group, [Right]/[Ctrl]-click on any Track in the Group in the Arrange View. Then select Dissolve Group (1, 2, 3...), and the Group will be dissolved. Both the Grouping and Dissolving actions can be undone and redone, as with most user actions.

6.9.3 Temporarily Suspending Edit Groups

Certain actions—such as moving a fader, muting, and soloing—can be performed on a track within an Edit Group, without affecting the group as a whole, by temporarily suspending the group. To do this, hold [Alt]/[Option] on the keyboard while performing an action on a track.

6.10 Timestretching

It is possible to stretch an Audio Event to fit a tempo other than its original tempo, without changing the pitch. This is called Timestretching, and it can be used to effectively slow down or speed up an Audio Event. For instance, a 1-bar drum loop recorded at 120 bpm (beats per minute) can be stretched to fit into 1 bar at 100 or 140 bpm, without significantly changing the pitch and overall sound of the original audio.

Timestretching and defining a file tempo are nondestructive, so they can be undone and redone. It is also possible to switch Tempo modes for any Audio Track, on the fly. For example, switching to Follow or Don't Follow from Timestretch will return any timestretched Audio Event that Track contains back to its original state.

When Timestretching, if the tempo is drastically changed (by about 30 bpm or more), the audio can become slightly distorted. While this can lead to interesting effects, you should be aware of the limitation of this technology.

In Studio One, Timestretching can occur automatically or manually. The following describes these functions.

6.10.1 Manual Timestretching

With manual Timestretching, you can stretch an Audio Event independently of the Song tempo or audio file tempo.

To manually stretch an Audio Event with the Arrow Tool, float the mouse cursor to the edge of the target Audio Event and hold [Alt]/[Option] on the keyboard (see Fig. 6-32). The Timestretch tool will appear, allowing you to click on the edge of the Event and drag left or right to Timestretch the Event, making it shorter or longer (see Fig. 6-32). In this case, the length of the Event will change, using the Speedup factor, but the pitch of the audio the Event contains will remain the same. Only the Event that you selected for timestretching will be affected.

Speedup factor is a timestretching function for making an audio clip shorter or longer while maintaining its pitch. Values greater than 1 increase the length of the clip, while values less than 1 make the clip shorter. This is used to stretch audio events when you do not wish to define a tempo for the original audio clip, which would affect all events associated with that clip. The Speedup factor can be entered in the Event Inspector.

6.10.2 Automatic Timestretching

Automatic Timestretching is based on the relationship between the Song tempo and the audio file's tempo.

Each Audio track has a Tempo mode that controls the behavior of the events on the track, based on the Song tempo. The Tempo mode can be selected in the Track Inspector. The following modes are available:

- Don't Follow: Events on this track are independent of the Song tempo. They are never moved or stretched automatically.
- Follow: The start positions of Events on this track are tied to the musical grid. Thus, the Events move when the Song tempo changes but they are not stretched.
- Timestretch: Event start positions follow the Song tempo, as in Follow mode. In addition, the Events are stretched to fit the Song tempo.

6.10.3 Audio File Tempo Information

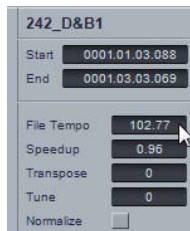
For Automatic Timestretching to work as described, Studio One needs to know the original tempo of an audio file. The software can then calculate how to stretch the file to fit the Song tempo. Many audio loops have this information encoded.

Files without tempo information will not be timestretched, even if the Track's tempo mode is set to Timestretch.

Studio One offers two ways to define or change the original tempo information of an audio file.

1. A powerful feature in Studio One is the ability to graphically define the tempo of an audio file. If the original tempo for an Audio Event is unknown, the Arrow Tool Timestretch function can be used to manually fit the Audio Event to a specific length of time (bars and beats, etc).

To do this, set the Tempo mode of the track to "Timestretch." Float the mouse cursor to the edge of the target Audio Event and hold [Ctrl]+[Alt]/[Command]+[Option] on the keyboard. The Define tempo tool will appear, allowing you to click on the edge of the Event and drag left or right to stretch it. In this case, the tempo for the original clip will be set based on the musical length to which the Event is stretched, and all Events in



the Song that use this original clip will be updated.

2. If the original tempo for an Audio Event is known but is not encoded in the original file that the Event references, you can easily set the file tempo for the Event in the Inspector. Click in the File Tempo box, type in a new value (see Fig. 6-33) and press [Enter] on the keyboard to enter a new file tempo. If the corresponding Audio Track's Tempo Mode is set to Timestretch, entering a new value in File Tempo will stretch all Events in the Song that use this original clip, based on the entered tempo value.

6.10.4 Tap Tempo

You can use the Tap Tempo function to set the current Song tempo to the tempo that you hear in your Audio Events. To do this, repeatedly click on the word "Tempo" in the Transport, clicking once on every beat you hear. Studio One will determine the Audio Event tempo based on the timing of your clicks and will set the tempo for the Song accordingly. Be sure that the Tempo mode for the Audio Track is set to "Don't Follow"; otherwise, the Events will be stretched or moved while you are using the Tap Tempo function, making it impossible to find a consistent tempo.

6.10.5 Timestretching Material Modes

Studio One features several optimized Timestretching modes that may yield better results with certain types of audio material. To access these modes, open the Inspector by pressing [F4] on the keyboard and click in the Material display. Click on any mode to select it for the currently selected Track. The modes are:

- Drums: Use this optimized mode on any percussion track to achieve the best results when stretching percussive audio.
- Solo: Use this optimized mode on any solo instrument or vocal track to achieve the best results.
- Sound: Use this general mode on any other type of track.

6.10.6 Using Timestretch Cache

By default, Use Cache for Timestretched Audio Files is engaged. This option also can be selected in the File/Options/Advanced menu (Mac: Preferences/Options/Advanced). Timestretch Cache creates a cache file at the correct tempo for any files that need timestretching, based on what is currently being stretched in your Song. This improves Studio One's performance, as the timestretch process no longer needs to occur during playback. Studio One also can use a higher-quality timestretch setting when it creates the cache file.

Using Timestretch Cache requires a certain amount of available space on your hard drive. If you know that space is relatively limited on your hard drive, or if performance issues arise, disable this feature. When Use Cache for Timestretched Audio Files is de-selected, Studio One will timestretch the file in real time, during playback, as the file is being read from the computer hard drive.

6.10.7 Default Tempo Mode for New Tracks

When creating a New Song, notice that the New Song setup menu includes a Stretch Audio Loops to Song Tempo checkbox. With this option engaged, any new Track that is created in this song will have the Tempo mode set to Timestretch, and the software will attempt to automatically stretch audio files to the current Song tempo when they are imported into the Song. Otherwise, the default Tempo mode for new Tracks will be Follow.

6.11 Navigating with Zoom

When navigating a Song for editing or arranging, zooming in and out on the timeline can be beneficial in both the Edit and Arrange views. Studio One's key commands make zooming a quick and easy alternative to using a mouse. The following key commands affect zooming:

- Zoom Horizontally
 - Zoom In [E]
 - Zoom Out [W]
- Zoom Vertically
 - Zoom In Vertical [Shift]+[E]
 - Zoom Out Vertical [Shift]+[W]
- Other Zoom Commands
 - Zoom to Loop [Shift]+[L]
 - Zoom to Selection (Horizontally & vertically) [Shift]+[S]
 - Zoom to Selection Horizontally [Alt]+[S]
 - Zoom Full [Alt]+[Z] (Zooms out horizontally as much as possible.)

6.11.1 Zoom History

The most recent horizontal and vertical zoom states in an arrangement or editor are remembered in the Zoom History. You can go back to the previous state using Undo Zoom [Alt]+[W] or forward with Redo Zoom [Alt]+[E].

6.11.2 Toggle Zoom

You can quickly toggle between two zoom states with the Toggle Zoom command [Z]. This command swaps the current zoom state with a stored zoom setting. The current state is stored, and the state from the memory gets restored. Pressing [Z] again takes you back to the original state.

The Store Zoom State command [Shift]+[Z] only stores the current state, however will not switch states. This can be used to set an anchor zoom position that you want to recall later with the Toggle Zoom command [Z].

6.12 Editing Suggestions

6.12.1 Making Clean Edits

In audio production, the editing process can be unforgiving. Small inaccuracies when splitting, moving, or performing other actions on recorded audio can lead to unwanted audible artifacts. The following describes some recommended editing practices.

6.12.2 Listen While Editing

Listening to your edits as you make them will save time and frustration in nearly every case. For instance, when sizing the edges of a vocal part to remove unwanted sounds between words, it is tempting to make edits based on the graphic representation of the waveform. Sometimes that works, but even when you edit visually, it is a good idea to loop the section you are editing and listen as you size the Events to be sure you are not removing a critical part of the vocals.

To quickly loop a precise selection, select a range with the Range Tool, and then press [P] on the keyboard to set the Left and Right Locators around that range. Then, click on the Loop button in the Transport, or press [Num Pad/] on the keyboard, to loop the playback over the selected range.

6.12.3 Eliminating Audible Artifacts

In Studio One, we make every effort to streamline the editing process and avoid tedious tasks. For instance, we apply fades automatically to punch-in recordings to be sure the new audio blends seamlessly with the existing audio. However, for reasons beyond the scope of this manual, there will be cases when editing audio leads to audible artifacts.

These artifacts may sound like short clicks or ticks of noise, and they usually occur at the beginning or end of an audio event that has been split or cut. When this happens, use the fade envelope provided on every Audio Event to apply a quick fade-in or fade-out, experimenting until the artifact can no longer be heard.

7 The Browser

The Browser is a powerful feature that allows quick navigation of virtual instruments, effects, and a variety of file types on your computer, including audio and musical-data files. The Browser works somewhat like Windows Explorer or Mac OS X Finder, in that it allows you to navigate file directories on your computer in specific ways. Audio and musical-data files, as well as virtual instruments and plug-in effects, can be dragged from the Browser directly into your Song or Project.

7.1 Importing Files with the Browser

It is possible to import several file types into your Song or Project from the Browser, including WAV (BWF and RF64), AIFF, Ogg Vorbis, FLAC, and MP3 audio files, as well as Standard MIDI Files.

7.1.1 Find an Audio File in the Browser

The Browser is the fastest way to find an audio file to import into your Song. Open the Browser by clicking on the Browse button, or press [F5] on the keyboard, and click on the Files button at the bottom of the Browser to view your files. You also can press [F9] on the keyboard to open the File Browser directly.



- By default, the File Browser will display four folders:
 - Desktop: This will contain all folders and files on your desktop.
 - Documents: This is the default Documents folder for your computer (Windows and Mac OS X).
 - Content: This is the Content folder as specified in File/Options/Locations/User Data setup menu (Mac OS X: Preferences/Options/Locations/User Data), which will contain all Songs, Projects, Presets, and other Studio One files.
 - Volumes: This folder will contain all file-storage locations on your computer, such as the (C:) drive in Windows.

Navigate the Browser by clicking on any folder to view its contents, as you would with Windows Explorer or Mac OS X Finder.

It is possible that files added to or moved in your computer while Studio One is open will not appear in the Browser. If you encounter this, right click in the Browser and select Refresh to reload the views of the storage locations on your computer.

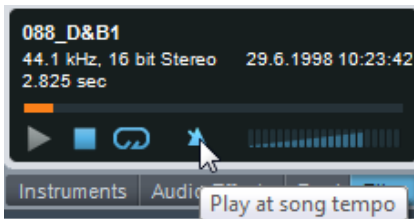
To find audio files, such as loops and samples, that are included with Studio One, click on the Sounds tab at the bottom of the browser or press [F8].

7.1.2 Preview an Audio File in the Browser



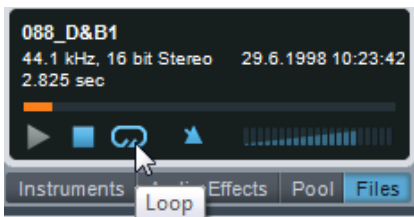
When an audio file is selected in the Browser, the bottom window of the Browser will become the Preview Player, displaying transport controls and information about the selected file. When the Preview Player appears, you can listen to the selected file directly within the Browser. To start file playback, double-click on the file in the Browser or click on the Play button in the Preview Player with the desired file selected.

Preview Player playback is independent of the main Song playback, so you will notice the playback-position cursor does not move across the Arrange view while previewing a file. The Preview Player has its own playback position indicator that moves left to right to indicate the current playback position in the selected file. The position indicator can be clicked and dragged to navigate through the selected file during playback. A volume fader controls the playback level of the Preview Player.



The Preview Player playback can be synced to Song playback to allow auditioning of files along with Song playback. Click on the Play at Song Tempo button, which is engaged by default, to allow the Preview Player to sync to the current Song tempo.

If the currently selected file's tempo is known, and Play at Song Tempo is engaged while previewing, the file will be Timestretched on the fly to match the current Song tempo. To preview while hearing your Song playback, start Song playback first, and then select a file and preview it.



To loop the selected file during preview playback, click on the Preview Player's Loop button, which is engaged by default. Looping during preview playback makes it easy to listen to the selected file in the context of your Song.

An easy way to audition many audio loops from a single folder, such as a loop library, is to set the left and right locators around the range of the Song into which you will import the loop, then loop playback in the Transport within that range. Next, preview the first loop in the folder and then use the up and down arrow keys on your keyboard to cycle through every loop in that folder.



file will be placed as a new Instrument Part on the Track, at the position to which it was dragged.

Some MIDI files will contain more than one MIDI Part in the sequence. If this is the case, multiple Parts will be shown when dragging the file into your Song.

As with all Instrument Tracks, you will need to ensure the new Instrument Track is routed to a virtual or external instrument in order

to hear the new Instrument Part. Refer to the Monitoring an Instrument Track section of the “Recording” chapter for more information.

You can also drag a MIDI file directly onto virtual instruments that support drag-and-drop MIDI importing.

7.1.6 Export a MIDI File

To export an Instrument Part to a MIDI file, [Right]/[Control]-click on the Part and select Export Instrument Parts. Choose a file name and storage location in the pop-up menu and click OK. A Standard MIDI File will be created with a .MID file extension.



Multiple Instrument Parts can be exported at once to a single file. To do this, select the desired Parts and use the same process as above. One MIDI file will be created that includes individual MIDI clips for each Part, in the correct sequence, with a common start time.

Standard MIDI Files exported from Studio One can be used by virtually any application that supports MIDI.

7.1.7 Make Finding Your Favorite Files Easy



It is common that groups of files, such as drum loops, are stored in one folder on the computer. If you know you will constantly access such folders in the Browser, you can create Tabs for these locations. By default, there is only one Tab at the top of the File Browser, called “Files.”

To create a Tab for any file location, navigate to that location and select either the location folder, or any file within that folder. Then [Right]/[Control]-click on the location, select New Tab From Here in the pop-up menu, and a new Tab will appear at the top of the File Browser with the



name of the folder, allowing instant access.

You can rename a Tab if you don’t want to use the default name. To

rename a Tab, [Right]/[Control]-click on the tab and select Rename Tab. Type a new name in the pop-up menu and click OK.

Tabs you create in the File Browser will appear for all Songs and Projects, and you can create as many Tabs as you need. When the Browser runs out of space for Tabs to be displayed, a dropdown list is created to the far right of the Tab bar. Click on the Tab drop-down button to choose a Tab from the list.

To close or remove Tabs, [Right]/[Control]-click on the desired Tab and select Close Tab from the pop-up menu. To move up one level in the File Browser, [Right]/[Control]-click and select "Up."

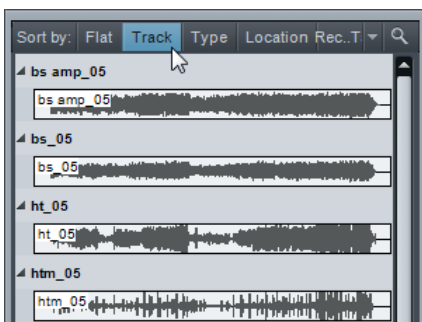
7.2 The Pool



When audio is recorded on an Audio Track, or when an audio file is imported, an Audio Event is created in the Arrange view of the Song, and a representation of the original audio file associated with the Event, called a Clip, is placed in the Pool. The Pool will thus contain all audio files that are at any point associated with an Audio Event in your Song.

To open the Pool, first open the Browser by clicking the Browse button, then click on the Pool button. You also can press [F10] on the keyboard to open the Pool directly.

7.2.1 Navigate the Pool



The Pool displays audio Clips as waveforms. These Clips can be sorted using the Sort By menu at the top of Pool. The following Sort By options are available:

- Flat: View all Clips with no order.
- Track: View Clips by the Track on which they are currently used or were previously, used.
- Type: View Clips by Clip Type (Audio or Sounds)
- Location: View Clips by the storage location in which they exist on your computer.
- Record Take: View Clips by the order of record takes within your Song.

7.2.2 Use Audio Files from the Pool

The audio Clip associated with any Event in your Song will always be available in the Pool, regardless of whether the Events associated with that Clip remain in the Arrange view of the Song. This means that the original state of a Clip with which an Event is associated can be quickly restored by loading it directly from the Pool.

Click-and-drag any Clip from the Pool into the Arrange view, as you would when importing any file from the Browser.

7.2.3 Import Audio Files to the Pool

If you know a certain set of files will be used in a Song but do not want to import them into the Song directly, you can simply import the files into the Pool. Later, you can quickly import files from the Pool. If you want copies to be placed in the Song's Media folder when you import files into the Pool, [Right]/[Control]-click in the Pool and select Copy External Files from the pop-up menu. This ensures that all of the elements of your Song are contained in the Song folder.

To import a file into the Pool, [Right]/[Control]-click on it in the File Browser and select Import to Pool. Alternatively, you can simply drag files from Windows Explorer or the Mac Finder into the Pool.

7.2.4 Copy External Files to the Song Folder

If audio loops and other files used in your Song are stored in many different file locations on your computer, it can be difficult to find them, especially if files are moved or deleted. Scattered files also make it difficult to back up your Song and all of its contents to a single location or to share your Song with a collaborator.

To quickly copy all external files used in your Song to the Song's Media folder, [Right]/[Control]-click in the Pool and select Copy External Files from the pop-up menu. Only those files that did not previously exist in the Song folder will be copied and placed into the Media folder.

7.2.5 Backup or Share Your Song

Once all of the external files have been copied to your Song folder, you can back up your Song and all of its contents simply by copying the Song folder to an external hard drive or DVD. To share your Song with another Studio One user, you can simply compress the Song folder in a .zip or .sit archive, and then email or transfer the archive.

It's unwise to rely on a compressed archive for backup, as future compatibility with the archive type is uncertain, and file-write errors could lead to an unusable archive. The best practice is to create a Wave file for every track in your Song and store these files, uncompressed, along with the original Song file.

7.2.6 Useful Pool Commands

[Right]/[Control]-click in the Pool Browser window to select from the following commands:

- **Rename File:** Rename the currently selected Clip.
- **Locate File:** Locate a file for the currently selected Clip (e.g., to find a missing file).
- **Show in Explorer:** Open the file location for the currently selected Clip in Windows Explorer/Mac Finder.
- **Select on Track:** Select any Events associated with the currently selected Clip in the Arrange view.
- **Remove from Pool:** Remove the currently selected Clip from the Pool. This does not delete the file.
- **Delete File Permanently:** Permanently delete the file associated with the currently selected Clip.
- **Convert Files:** Convert selected files in the Pool to the current Song's sample rate and bit depth. The Convert Files menu will appear with file options. A new file will be created for each selected file and placed in the current Song's Media folder.
- **Refresh:** Refresh the contents list of the Pool to reflect the current state of your Song and computer.
- **Locate Missing Files:** If any files are missing in your Song—usually this occurs because the files were moved—use this command to locate the missing files.
- **Remove Unused Media:** Remove any Clips from the Pool that are not currently used in the Song. This will not delete the files.
- **Show Media Folder in Explorer:** Open the Media Folder for the current Song in Windows Explorer or the Mac Finder.

7.3 Instruments and Audio Effects

The Browser makes finding and using your virtual Instruments and Audio Effects fast and easy. The following describes this feature.

7.3.1 Browse for Virtual Instruments



Click on the Instruments tab in the Browser or press [F6] on the keyboard to browse your virtual instruments.

7.3.2 Sort the Instruments View

The list of virtual instruments can be sorted to help you find what you are looking for. Click on the Sort By window at the top of the Browser to sort by the following:

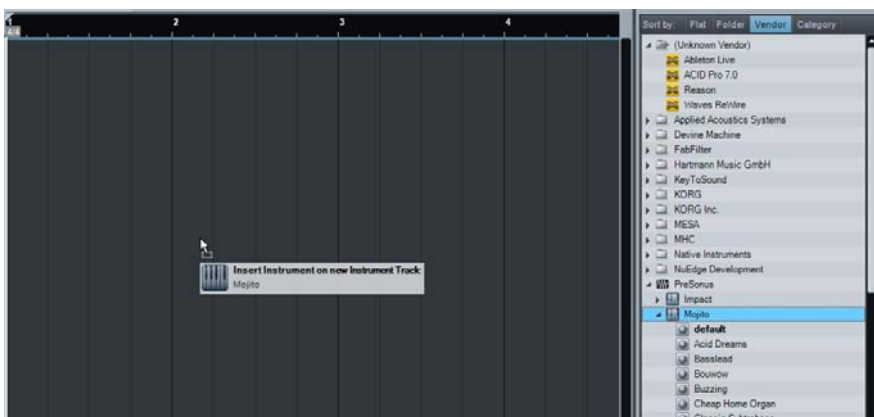
Flat: Sorts the instruments in alphabetical order in a continuous list.

Folder: Sorts the instruments based on the storage location folders in which they reside.

Vendor: Sorts the instruments in folders by vendor.

Category: Sorts the instruments in folders by type (Native, ReWire, VST2, VST3, AU).

7.3.3 Drag a Virtual Instrument into Your Song

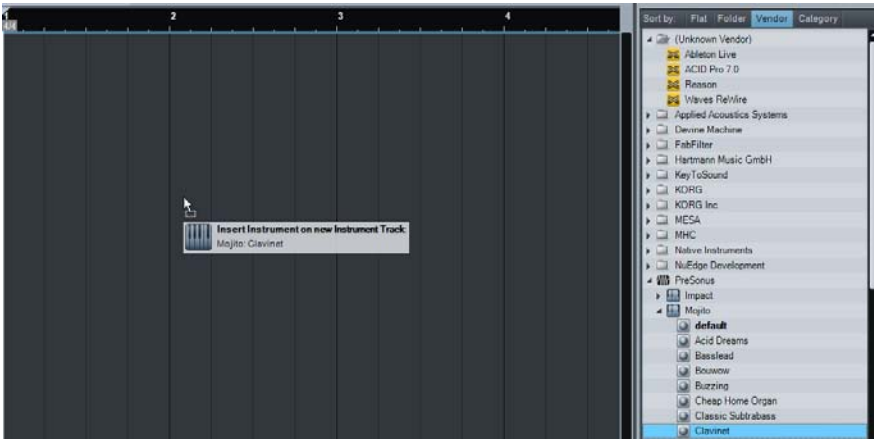


When you have found a virtual instrument you wish to use in your Song, you can simply click-and-drag it into the Arrange view from the Browser. If you drag the instrument into blank space, the virtual instrument will be loaded in the Instruments Device Rack, and a new Instrument Track will be created that is routed to the Instrument. The new track will be record-enabled and monitor-enabled by

default, so you can play the virtual instrument immediately with your default Keyboard.

If you drag-and-drop an instrument from the Browser on top of another instrument or onto an existing Instrument Track that is routed to another virtual instrument, the previously loaded instrument will be replaced by the new instrument. A pop-up menu will appear to verify this action.

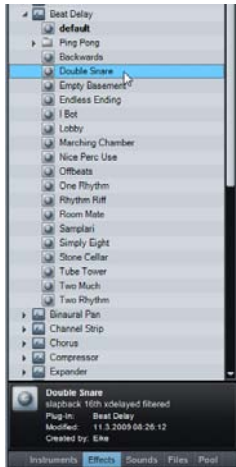
7.3.4 Instrument Presets



The presets for Studio One's built-in virtual instruments, including Impact, SampleOne, and Presence, can be loaded into your Song in the same way as the instruments. Drag-and-drop a preset from the Browser to load the instrument into your Song, with that preset already loaded. Alternatively, when the instrument is open, you can load any preset for that instrument by simply double-clicking on the

preset in the Browser or by clicking on the preset to select it and then hitting [Return].

7.3.5 Browse for Audio Effects



Click on the Effects tab in the Browser or press [F7] on the keyboard to find your Audio Effects.

7.3.6 Sort the Audio Effects View

You can sort the list of Audio Effects to help you find what you are looking for. Click on the Sort By window at the top of the Browser to sort by the following:

- Flat: Sorts the effects in alphabetical order in a continuous list.
- Folder: Sorts the effects based on the storage location folders in which they reside.
- Vendor: Sorts the effects in folders by vendor.
- Category: Sorts the effects in folders by the type of plug-in (Native, VST2, VST3, AU, FX Chains).

7.3.7 Drag an Audio Effect into your Song

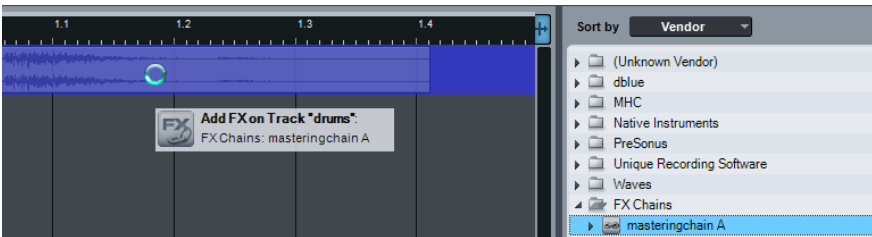


Audio Effects can be dragged into your Song in a number of ways, with slightly different results. To load an effect on an existing Audio Track, drag-and-drop the effect from the Browser onto the Track in the Arrange view. You can also drag-and-drop an effect onto any Channel in the Console. If you prefer, you can even drag-and-drop an effect from the Browser directly into a particular position in the Insert Device Rack of any Channel.



To create a new FX Channel in the Console with a particular effect pre-loaded, drag-and-drop the effect from the Browser into any blank space in the Console. The new FX Channel will automatically be given the name of the effect.

7.3.8 Audio Effects Presets and FX Chains



The presets for Studio One's built-in Audio Effects can be loaded into your Song in the same way as third-party Audio Effects. Drag-and-drop a preset from the Browser into your Song to load the effect with that preset. Alternatively, if

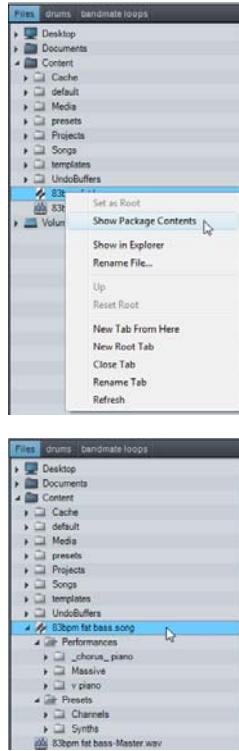
an Audio Effect is open, you can load any preset for the effect by double-clicking on the preset in the Browser or by clicking on the preset to select it and then hitting [Return]. FX Chains can be loaded in the same way, as described in the FX Chains section of the "Mixing" chapter. This makes configuring even the most complicated mix quick and easy.

7.4 Sound Sets

The audio loops, samples, and instrument presets included with Studio One are bundled into Sound Sets and can be quickly located and used by clicking on the Sound Sets tab in the Browser. The Sound Sets and are carefully organized to make finding what you want very easy.

7.5 Browsing Song and Project Content

When working in a new Song or Project, incorporating previously used elements can be helpful in a variety of ways. For instance, you may want to reuse a particular synth sound or Instrument Part, or perhaps you want to use a particular effect setting or chain of effects on a channel. Browsing the contents of previously created and saved Songs and Projects is a quick and easy way to find reusable material.



To browse previously created Song content, open the Files tab in the Browser and navigate to the Content folder (which contains all of your Songs, Projects, and associated files, by default) or to the location you have chosen for these files. Open the Song or Project folder to view the Song or Project file and then [Right]/[Control]-click on this file and select Show Package Contents from the pop-up menu.

The file will then have a navigation arrow next to it that, when clicked, will expose one or two folders—Performances and Presets—depending on the contents of the Song or Project. The Performances folder contains all Instrument Parts recorded in a Song, which are saved as an internal “.music” file type. The Presets folder contains a Channels folder that stores the current settings for each audio effect used and an Instruments folder that contains the settings for any virtual instruments.

Simply click-and-drag any of this content directly from the Browser into a new Song or Project.

7.6 Importing Other Application Project Files

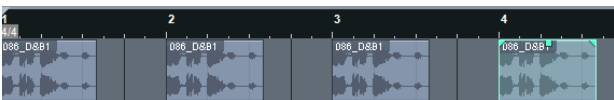
Studio One can open several other application project-file types. These include PreSonus Capture Sessions (.capture), Steinberg Cubase Track Archives (.xml), Steinberg Sequel Projects (.steinberg-project), Kristal Audio Engine Projects (.kristal), and Open TL (.tl). To open any of these project-file types in Studio One, navigate to File/Open and select the desired file.

8 Arranging

Arranging can entail repositioning recorded or imported audio and musical data to change the song structure, inserting tempo or time-signature changes, and many other processes. The following chapter discusses aspects of arranging in Studio One, including importing files, working with audio loops, the Tempo Track, and more.

8.1 Quickly Duplicating Events

Events are often copied and pasted across a certain region to quickly build an arrangement. For instance, you might want a one-bar drum loop to continue for eight bars, or you might want a 4-bar synth melody to continue for the next 12 bars. You can use the Duplicate function to quickly copy and paste any Event in this fashion.



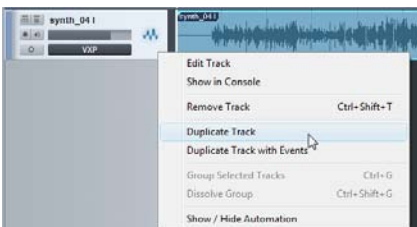
To Duplicate any Event, select it and press [D] on the keyboard. The results are affected by the current Arrange view Snap and Timebase settings. With Snap disengaged, the Event will be copied and a new instance of the Event will be placed precisely at the end of the original Event.

With Snap engaged, when an Event is duplicated, the new instance of the Event will be placed at the next logical Snap position. For example, an Event approximately one bar in length will be placed at the beginning of the next bar, whereas an Event one-half bar in length would be placed at the next half-bar.

Press [D] on keyboard multiple times to quickly copy and paste a selected Event across any region. If multiple Events are selected, they can all be duplicated simultaneously in the same way as a single Event. For instance, you could duplicate an entire verse and chorus for 24 tracks in a few seconds. This is often done to build a rough arrangement of a Song, after which unique parts for each section are later recorded.

To understand the Duplicate function in Studio One, experiment with Events of various lengths and with various Snap and Timebase settings in the Arrange view.

8.2 Duplicating Tracks



Tracks can also be easily duplicated, with or without the Events they contain. To duplicate a Track, select the Track or any Event it contains and then select Duplicate from the Track menu. This will duplicate the Track and all of its settings, including Inserts and Sends.

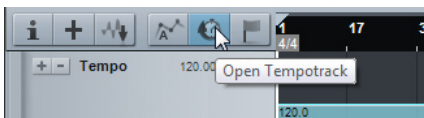
If you want the Events the Track contains to be duplicated as well, select Duplicate with Events from the Track menu. If multiple Tracks are selected when the Duplicate Tracks function is used, each of the selected Tracks will be duplicated.

Alternatively, you can duplicate selected Tracks by holding [Ctrl] on the keyboard and clicking-and-dragging the Tracks up or down in the Track Column. A horizontal blue line will appear in the Track Column while dragging the Tracks to indicate the Duplicate function, as opposed to the regular function of reordering Tracks in the Track Column.

8.3 Tempo Track

Many modern recordings sound mechanical, like a machine playing music. This is often because the recording has a single, static tempo, whereas the tempo in a natural performance tends to drift slightly. Interesting and musical results can be achieved by varying the tempo in your recordings. Using Tempo Changes will not affect your ability to sync recordings to the tempo, as the click track and all other elements in Studio One will follow the Tempo as it changes.

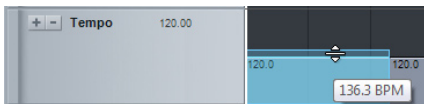
8.3.1 Inserting Tempo Changes



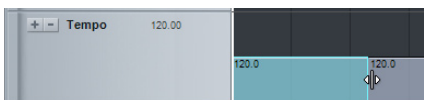
To insert a Tempo Change, open the Tempo Track by clicking on the Tempo Track button above the Track Column. Then select the Draw Tool in the Arrange View. Click at any position in the Tempo Track to insert a



Tempo Change and drag up or down to adjust the Tempo value at that position.



To change an existing Tempo value in the Tempo Track, float the Draw or Arrow Tool to the top of the Tempo region and click-and-drag the tempo value up or down (see Fig. 8-6). You can also click-and-drag the beginning of any new Tempo region left or right across the Timeline to reposition the tempo change in the Tempo Track (see Fig. 8-7).

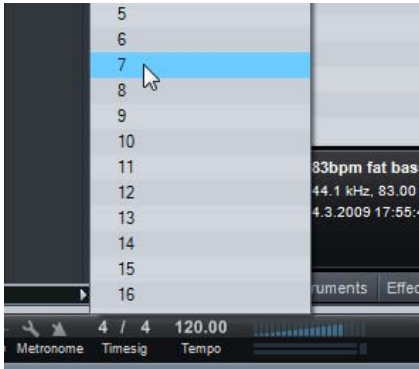


The tempo value set by the Tempo Change will continue for the rest of the Song or until the next Tempo Change. Also, the tempo value in the Transport will be immediately updated at the appropriate time, according to each Tempo Change.

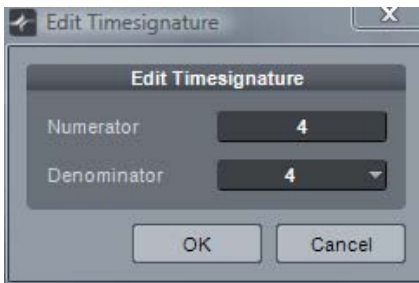
8.4 Time Signature

The time signature is a convention used in Western music notation to specify how many beats are in each bar and what note value constitutes one beat. The time signature is notated as a fraction, where the numerator (the upper number) equals the number of beats in the bar, and the denominator (the bottom number) equals the note value for each beat.

By default, the time signature is set to 4/4 for all new Songs. This means there will be four quarter-notes per bar. To change the time signature for your Song, do one of the following:



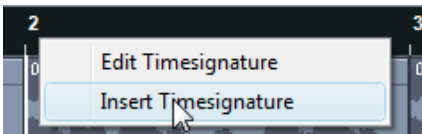
- Click on upper or lower number of the time signature in the Transport and select a new value from the pop-up menu.



- Double-click on the Time Signature Marker to the far left of the Ruler in the Arrange view and select new values from the pop-up menu.

Metronome behavior will be affected by the time signature. The down-beat and other beats determine the sample and level used for the Accent and Click respectively.

8.4.1 Inserting Time Signature Changes



It is possible that your Song requires more than one time signature, in which case you will want to insert time-signature changes at various places. To insert a time-signature change, [Right]/[Control]-click in the Timeline ruler where you wish to insert the change and select Insert Time Signature. Enter the values for the new time signature in the pop-up menu and click OK, and a new Time Signature marker will be inserted at that position.

You can click-and-drag a Time Signature marker to any bar-line position in the Ruler; the time signature must change on a new bar. Double-click on the Time Signature marker and choose new values to change the time signature at that marker's position.

Your Song can contain any number of time-signature changes, and the current time signature is always displayed in the Transport.

8.5 Bouncing

8.5.1 Bouncing Instrument Parts



When working with musical-performance data, users often want to print the audio being generated by external MIDI and internal virtual instruments to audio so that the part can be treated like a normal Audio Track. Studio One offers a special feature to accommodate this kind of workflow.

To quickly bounce any Instrument Part to an Audio Track, select the Instrument Part, and then select Bounce Instrument Parts in the Event file menu or simply press [B] on the computer keyboard. This will render the



selected Instrument Part to a new Audio Event and place it at the correct Timeline position on a new Audio Track.

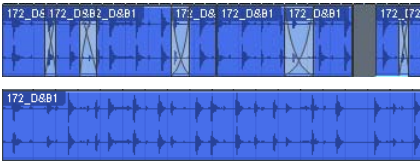
When an Instrument Part is bounced, the Part will be muted, since the new Audio Event is taking its place. The Instrument Part will be grayed out to indicate this. To toggle the mute on the Part, select the part and press [Shift]+[M] on the keyboard.

Any number of Instrument Parts can be selected and bounced to audio at once, even across multiple Instrument Tracks. A new Audio Track will be created for each Instrument Track whose Part is bounced to audio.

If you want to create a single Audio Event, you should first merge various Instrument Parts on an Instrument Track to create a single continuous Instrument Part. To do this, select the desired Parts and choose Merge Instrument Parts, or press [G] on the keyboard.

8.5.2 Bouncing Audio Events

When many edits have been performed across an Audio Track to one or multiple Audio Events, the arrangement can become difficult to look at and hard to work with. For instance, if a drum loop has been cut into many slices, with some parts duplicated, other parts deleted, and so on, moving or rearranging the Events can become difficult.



In this case, it is helpful to render some or all of the contents of a Track to a single, continuous new Audio Event. To do this, select the desired Audio Events and press [Ctrl]/[Cmd]+B on the keyboard or select Bounce Selection from the Event menu. A new Audio Event will be created for each Track that has an Event selected. The new Audio Events will be created and placed according to the position and range of the selected Events for each Track.

Note that the Bouncing Selection process is unaffected by Track Volume, Pan, and Insert settings, as it is only dealing with the Audio Events exactly as they exist in the Arrange view. Thus, the result of this process will not affect what you hear; it is simply an organizational tool.

8.6 Adding Time to the Arrangement

It is often useful to insert a range of silence into an arrangement, effectively adding time to a section. To do this, select the Range tool in the Arrange view, then select a range across any tracks on which you wish you insert silence. With the range selected, press [Ctrl]+[Alt]+[I] on the keyboard to insert silence in that range.

Any events that were in the range where silence was inserted will be split, if necessary, and moved to the right across the timeline.

9 Mixing

Mixing is the part of the production process where all recorded and arranged material is balanced in relative volume, frequency, and dynamic content in order to achieve a desired cohesive sound.

The following chapter discusses basic aspects of mixing in Studio One, including the Console, the Channel types, and Inserts and Sends. For more advanced mixing topics, such as Automation, please refer to the later chapters.

9.1 The Console

Mixing in Studio One is primarily done in the Console. Open the Console by clicking on the Mix button or by pressing [F3] on the keyboard.

Each channel of audio in your Song is represented by a Channel in the Console. Audio Tracks in the Arrange view are directly represented by Audio Channels in the Console, whereas Instrument Tracks have no direct representation in the Console. Instead, Instrument Channels represent the audio output of virtual instruments. There are several other Channel types discussed below, including Input, Output, Bus, and FX Channels.

It is important to note that the Console opens by default in Small mode, and the following descriptions assume this mode is engaged unless otherwise noted. For more on this topic, refer to the Alternative Console Layout section of this chapter.

9.1.1 Channel Features



Certain features are common to all Channels.

9.1.2 Input/Output

At the top of each Channel is a display of its configured input and output, with the input shown at the top and the output shown at the bottom. All Channels are configured with Main Out as their output by default.

Audio Channels will show the hardware audio-input selection, and Bus and FX Channels will display no input, as their input source is usually from multiple channels. Instrument Channels will display the name of the virtual instrument from which they get their input.

Click on any input or output to display and choose from a list of available routing options for any Channel. Clicking on the Input for an Instrument Channel will open the interface for the source virtual instrument.

9.1.3 Panner and Fader

All Channels feature a horizontal Panner and vertical Fader below the I/O-selection display. The Panner can be clicked-and-dragged horizontally, allowing the audio for each Channel to be positioned left or right in the stereo field. The Fader can be click-and-dragged vertically to control the output volume for each Channel.

9.1.4 Mute/Solo

Channels can be muted or soloed by clicking on their Mute and Solo buttons, respectively. You can also press [M] for Mute or [S] for Solo on the keyboard to mute or solo the selected Channels. Muting will silence the Channel's audio from the Console so you won't hear it. Soloing will silence all except the audio for the soloed Channel, so you will only hear the soloed Channel. Any number of Channels can be muted or soloed simultaneously.

You can perform a Global Solo Off, which disengages Solo on any track that has it engaged, by pressing and holding [Ctrl] on the keyboard and then clicking on any Solo button. Performing the [Ctrl]+Click again will recall the previous solo settings, returning any previously soloed channels to the solo state. This can be useful when comparing a group of soloed tracks to other tracks in your mix.

9.1.5 Automation Mode

The Automation Mode for each Channel is displayed at the bottom of the Channel. By default, this mode is set to Off. Click on this display to choose an Automation Mode or to add and remove automation parameters.

9.1.6 Name

Channel names are shown at the bottom of each Channel in the Console. Double-click on the name, type a new name, and then press Enter to change the name of any Channel.

9.1.7 Expand Channel

All Channels feature an Expand Channel button, which expands the visible Channel to the right, revealing further Console routing possibilities. Audio, Instrument, and Bus Channels will include Insert and Send Device Racks. FX Channels will only have an Insert Device Rack.

9.1.8 Channel Types

9.1.8.1 Input



Input Channels represent the configured hardware audio inputs. They can be mono or stereo, depending on the configuration of the hardware input they represent. Use the Input Channels to accurately meter inputs or to add effects processing to an input.

9.1.8.2 Audio



Audio Channels are direct representations of Audio Tracks in the Arrange view. Each Audio Track will have a corresponding Audio Channel in the Console, with corresponding Record Enable, Monitor Enable, Solo, and Mute controls.

9.1.8.3 Instrument



Instrument Tracks in the Arrange view have no directly corresponding Channels. An Instrument Track outputs to a virtual instrument, and the virtual instrument then creates sound. Thus, virtual instruments output audio to Instrument Channels in the Console. A virtual instrument might have any number of outputs, as described in the Set Up Multiple Virtual Instrument Outputs section of the “Recording” chapter, and each will have a corresponding Channel in the Console.

9.1.8.4 Bus



The audio output of multiple Channels can be routed directly to a single Bus Channel, which is always a stereo Channel. This lets you create a sub-mix, so that the audio from several Channels can be processed together before being routed to the main output. Although less common, it is also possible to use Sends to route audio to Bus Channels.

For instance, several drum tracks might be routed to a Drum Bus, where the audio is compressed and equalized, and then routed to the main output. That audio could also be routed to an FX Channel through a Send to apply a reverb effect, which would be applied to all audio routed to that FX Channel.

9.1.8.5 FX



The FX Channel is used to apply effects to audio via Sends from other Channels. Audio can be routed from any Channel through a Send to an FX Channel, which can have any number of effects inserted in its Insert Device Rack. For instance, several keyboard tracks and a guitar track could be routed via Sends to an FX Channel with a reverb inserted so that they sound like they are in the same space.

9.1.8.6 Output



Output Channels are routed directly to hardware audio outputs and can be stereo or mono, depending on the configured outputs to which they connect. Every Song will have at least one stereo Output Channel, which is named Main Out by default. The Main Out is, by default, where the entire Console mix of all other Channels is routed. You will generally listen to this output when monitoring your mix, as this is the output from which exported mix-downs are derived.



The Main Out Channel is always locked to the far right end of the Console and cannot be moved. This output features a stereo Peak/RMS meter, as well as K-System Metering options. Other configured hardware outputs are represented in the Console by a type of Output Channel called a Sub Out. The Main Out and Sub Out Channels feature Metronome controls, allowing independent metronome on/off and level control for each hardware output.

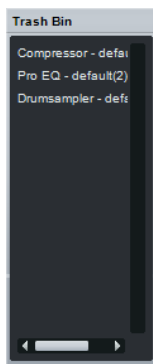
9.1.9 Console Panel Overview

The Console features several panels that can be shown or hidden as needed. Each panel has different functions and is accessed from the Console navigation column to the far left of the Console.

9.1.9.1 Inputs

The Inputs panel is closed by default and can be opened and closed by clicking on the Inputs button in the Console navigation column. The Inputs panel will display audio channels in the Console for each configured hardware audio input as described in the Channel Types section of this chapter.

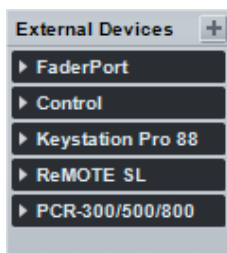
9.1.9.2 Trash Bin



The Trash Bin panel is closed by default and can be opened and closed by clicking on the Trash button in the navigation column. The Trash Bin panel displays a list of removed Console objects, including channels, virtual effects, and virtual instruments. Each object in the list will contain the exact state of the entire channel, effect, or instrument when it was removed, making it possible to restore previous settings and states in the Console at any time.

To restore an object in the Trash Bin to its previous state and location in the Console, [Right]/[Control]-click on it in the Trash Bin and select Restore from the pop-up menu. To permanently remove an object from the Trash Bin, [Right]/[Control]-click on it in the Trash Bin and select Delete from the pop-up menu.

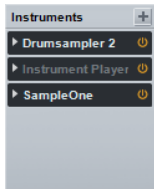
9.1.9.3 External



The External panel is closed by default and can be opened and closed by clicking on the External button in the navigation column. The External Panel displays a list of configured External Devices, including Keyboards, External Instruments, and Control Surfaces.

The configuration for each device can be accessed and edited by clicking on the menu arrow for the device and selecting, from the pop-up menu, either Edit for mapping configuration or Setup for device configuration. Click on the Add External Device button to add an external device.

9.1.9.4 Instruments



The Instruments panel is open by default and is closed and opened by clicking on the Instrument button in the Navigation column. The Instruments panel displays all currently loaded virtual instruments. Open the interface for a virtual instrument by double-clicking on it in the Instrument panel or by clicking on the virtual instrument's menu arrow and selecting Edit from the pop-up menu.

By clicking on the menu arrow and selecting Save Preset from the pop-up menu, you can save the current settings for any virtual instrument as a Preset. Selecting Remove from the pop-up menu will remove the virtual instrument from your Song.

9.1.9.5 Banks



The Banks panel is open by default and is closed and opened by clicking on the Banks button in the Navigation column. The Banks panel controls which Channels in the Console are visible, as well as which Channels are available to a configured Control Surface.

Channels that appear in the Banks panel list can be shown or hidden in the Console. Click directly on any Channel name in this list to show or hide the Channel; hidden Channels are highlighted in gray. Each Channel type has an associated button at the bottom of the Banks panel that can be clicked to show or hide all Channels of that type in the Console.

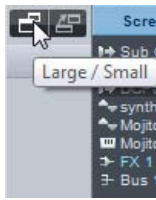
Console scenes can be stored and switched between in the Banks panel to allow very fast navigation of certain sets of Channels in the Console. Click on the Plus button at the bottom of the Banks channel list to save the current Banks setup as a scene. Any number of scenes can be saved and recalled within each Song. Click on the Minus button to remove the current Console scene.

Channel numbers and level meters can be displayed in the Banks list to help you understand where sound is coming from during mixing, regardless of which channels are shown or hidden in the Console. To do this, right-click in the Banks panel and select View/Levels and View/Channel # (number).

9.1.10 Alternative Console Layout

The Console has been designed to meet the needs of most users. It has two possible modes: Small and Large. The Console can also be detached from the rest of the single-screen user interface. The Console layout is strictly a matter of preference: There is no functional difference between the Small and Large mode, nor does detaching the Console affect its functions.

9.1.11 The Large Console

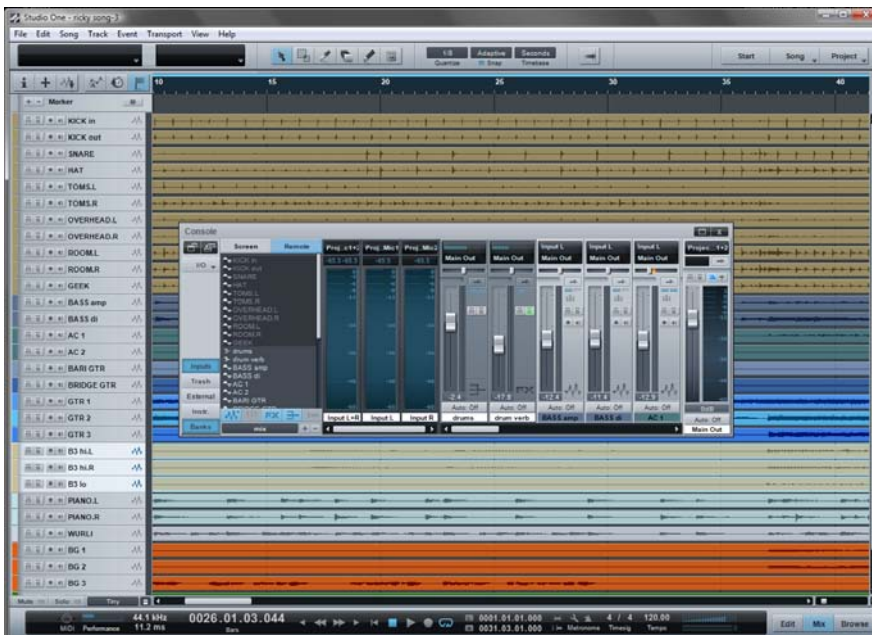


To switch to the Large Console mode while in Small Console mode (Console is in Small mode by default), click on the Maximize button at the top of the Console Navigation column. Alternatively, you can press [Shift]+[F3] on the keyboard when the Console is open.



In Large mode, you can see the Insert and Send Device Racks at the top of each Channel, allowing faster access to these elements. The lower portion of the Channel is slightly larger as well, allowing easier viewing of meters and other elements.

9.1.12 The Detached Console



The Console can be detached from the main window and placed in an independent window so that it can be located freely onscreen or on a second computer monitor.



To Detach the Console, click on the Detach button at the top of the Console navigation column. The Detached Console can be in Small or Large mode, and the window can also be sized and maximized to fit the computer monitor. To reattach the Console to the main interface, click on the Detach button at the top of the Console navigation column.

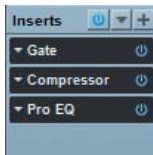
9.2 Signal Routing

Effects processing, including dynamics processing and modulation, is critical when mixing. Effects are traditionally applied to audio via an Insert or a Send.

9.2.1 Configuring Inserts

An Insert is used to apply an effect directly to a single Channel. The effect is literally inserted into the audio signal chain within the Channel.

9.2.2 Add an Insert



The Insert Device Rack contains all Insert Effects on a given channel and is visible in the Console. To add an Insert Effect to any Channel, click-and-drag an effect from the Browser into the Insert Device Rack of a Channel in the Console or click-and-drag directly to a Track or Track Lane in the Arrange view.

You will notice, when navigating Audio Effects in the Browser, that some effects have a navigation arrow next to them. Click on this arrow to expose the Presets for the effect. Click-and-drag a Preset into the Insert Device Rack on any Channel to add the effect with the Preset already loaded.

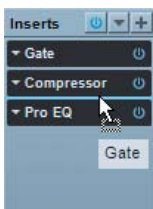
Alternatively, you can click on the Add Insert button at the top of the Insert Device Rack to add an Insert Effect to a Channel from a pop-up menu.

9.2.3 Edit an Insert

To edit an Insert, double-click on it in the Insert Device Rack or click on the menu arrow and select Edit from the pop-up menu. This opens the user interface for the Insert Effect, where you can edit the effect parameters.

The user interface for effects from third-party manufacturers will vary drastically; for more information, please refer to the documentation for each effect. Studio One built-in effects are discussed in depth in the “Built-In Effects” chapter.

9.2.4 Reorder Inserts



Inserts affect the audio signal path in the top-to-bottom sequential order in which they are inserted. An Insert can be reordered by clicking and dragging it above, below, or in between other Inserts. It is helpful to experiment with different signal paths to achieve the best possible sound or a particular effect.

9.2.5 Navigating Inserts

By default, only one window displays the user interface for an open Insert Effect. This keeps screen clutter and window juggling to a minimum. To quickly switch between Insert Effects on a single Channel, open one of the Insert Effects and do one of the following:

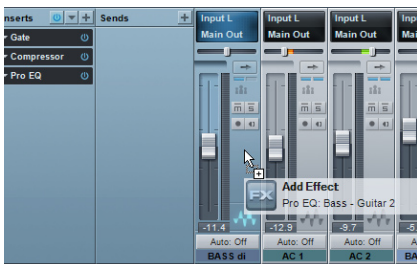
- Click on the left or right arrow at the top left of the Insert Effect window to step sequentially through the interface for each Insert on the Channel.
- Click on the down arrow at the top left of the Insert Effect window and choose from the list of Inserts to select the interface for a specific Insert on the Channel.
- Float the mouse cursor over the down arrow at the top left of the Insert Effect window, then mouse-wheel up or down to step sequentially through the interface for each Insert on the Channel.



Alternatively, press [F11] on the keyboard to open the effect editor for the selected Audio Track, then press [Ctrl]+[Page Up]/[Page Down] to cycle through the effects in that channel's device rack.

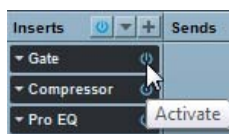
By clicking on the Pin button in the upper right of the Insert Effect window, the interface for any Insert can be made to stay open in an independent window until you choose to close it. With an Insert Effect Pinned, opening another Insert Effect will open a new Insert Effect Window. Any number of Insert Effect windows can be Pinned and open simultaneously.

9.2.6 Copy an Insert to Another Channel



It is often helpful to be able to copy an Insert Effect, including its current settings, to another Channel. To do this, click on the desired Insert Effect in the Insert Device Rack and drag it directly onto any other Channel or into the Insert Device Rack on any other Channel. Dragging an Insert Effect to the left or right edge of the viewable Console will scroll the Console left or right to expose any Channels beyond those currently viewable.

9.2.7 Deactivate an Insert



To deactivate, or turn off, an Insert Effect, click on the Activate button for the Insert Effect in the Insert Device Rack. There is also an Activate button at the top left of every Insert Effect window. The Activate button will turn gray when the Insert Effect is switched off and blue when it is active (turned on). Deactivating an Insert Effect will stop any and all processing related to it, which frees the computer processing resources previously dedicated to that Insert Effect.

To deactivate or activate all Insert Effects in any Insert Device Rack, click on the Activate All button at the top of the Insert Device Rack.

9.2.8 Remove an Insert

To remove an Insert Effect from the Insert Device Rack, do one of the following:

- Click on the menu arrow for the Insert Effect in the Insert Device Rack and select Remove from the pop-up menu.
- Click on the Insert Effect in the Insert Device Rack and drag it into the Trash Bin panel of the Console.

All inserts can be simultaneously removed from an Insert Device Rack by clicking on the menu arrow at the top of the Rack and selecting Remove All. When any Insert Effect is removed, it is placed in the Trash Bin, where it can be restored to its original state and location at any time.

9.2.9 Hardware Inserts

You can insert external hardware processors into audio channels in the Console, using the Pipeline plug-in. The Pipeline plug-in can be found in the PreSonus folder of the Effects Browser when sorted by Folder, Vendor, or Category.

The Pipeline plug-in routes audio to a hardware processor and then back from that processor through specific inputs and outputs on your audio interface, while automatically compensating for the round-trip latency incurred in that process. You can insert an instance of Pipeline in any Insert Device Rack.

To learn more about Pipeline, refer to section 13.11 of this manual.

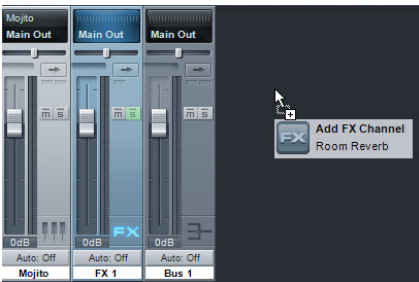
9.2.10 Configuring Sends

A Send is used to route the audio output, pre- or post-fader, from one Channel to another source, such as an FX Channel.

9.2.11 Send to an FX Channel

To simultaneously create a new FX Channel and create a Send to that FX Channel from an existing Channel, click-and-drag an effect from the Browser into the Send Device Rack on a Channel. This will create a Send for the Channel to a new FX Channel with the selected effect loaded in its Insert Device Rack.

You can also drag an audio effect into a blank space in the Console to create an FX Channel with that effect loaded into its Insert Device Rack. To route audio from a Channel to an existing FX Channel, click on the Add Send button in the Send Device Rack and choose the FX Channel from the list.

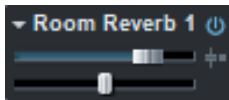


Alternatively, you can create an FX Channel by [Right]/[Control]-clicking in blank space in the Console, or on any channel, and selecting Add FX. This will add an FX Channel to the Console with no inserts, which can be the destination for any Send.

FX Channels can only output to the Main Out channel of the Console.

To quickly view the effects in the Insert Device Rack of a Send destination Channel, double-click on the Send. You can then navigate the Insert Effect window as usual.

9.2.12 Send Level and Pre/Post Fader

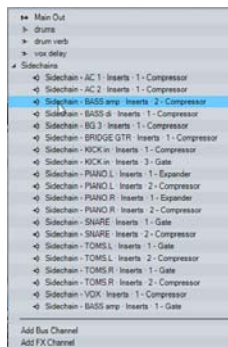


Once a Send has been added to a Channel, the send device will appear in the Send Device Rack for that Channel. You will find an Activate button, horizontal Level and Pan faders, and a Pre/Post Fader button. Click on the Activate button to activate/deactivate the Send; this does not affect the Send's destination Channel.

Click-and-drag on the horizontal Level fader to adjust the Send level between $-\infty$ and +10 dB. Click-and-drag on the Pan fader to adjust the balance of the source material going to the Send destination. Click on the Pre/Post Fader button to switch the Send source to pre-fader or post-fader. Pre-fader allows you to set a Send level independent of the channel fader so that the level is unaffected by fader position.

The Send source signal is always post-inserts.

9.2.13 Sidechaining



Certain effects can accept an input from an audio source that dynamically changes the behavior of the effect. This is called “sidechaining,” and it facilitates processes such as keying, ducking, and de-essing. Sidechaining is accomplished by using a Send to route audio to a special Sidechain input on an Insert Effect.

It is possible to send to the Sidechain input of any Insert Effect, whether or not the sidechain is engaged in the effect. For the sidechain to work in the effect, it must be engaged in the effect.

An example of sidechaining is when a gate is triggered by a specific audio signal. In this case, the gate will open and close dynamically in response to the audio signal coming in the sidechain, rather than responding to the program signal on the Channel where the Gate is inserted. Several of Studio One's included built-in effects support sidechaining, including the Compressor and Gate. For more information, refer to the “Built-In Effects” chapter.

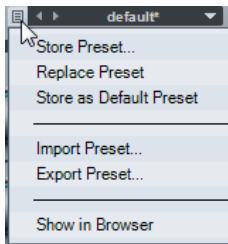
9.2.14 Send to a Bus

It is possible to use a Send to route audio to a Bus Channel. This is done in the same manner that a Send is used to route audio to an FX Channel, except that the Bus Channel is selected. You might want to send to a Bus when you want a Channel to remain routed to a particular Output Channel but you also need to route that Channel to another Bus. This process is often called “multing,” and it is often used to layer a single Channel multiple times into a mix to build a particular sound.

9.2.15 Copy a Send to Another Channel

Sends can be copied from Channel to Channel in the same way as Inserts. To do this, click-and-drag a Send from one Send Device Rack to another one. This will create an identical Send on the Channel.

9.2.16 Navigate and Create Effects Presets



At the top of every plug-in window is a set of standard controls. In the upper left, next to the Activate button, are Preset controls, including a Store Preset button and a Presets window. To view the presets for an effect, click on the Presets window and browse the pop-up list. To select a preset, click once on the preset in the list.

9.2.17 Store a Preset

To store a preset containing the current settings of an effect, click on the Store Preset button and choose Store Preset. Type a name for the preset in the pop-up menu and click OK to store the preset.

To replace an existing preset, select Replace Preset from the pop-up menu. The settings for the preset currently displayed in the Preset window will be replaced with the current settings of the effect.

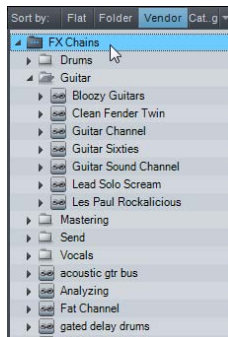
9.2.18 Store a Default Preset

It is possible to store the current settings of an effect as a default preset, so that the effect will open with these settings when loaded in a Song. To store a default preset for any effect, click on the Store Preset button and select Store as Default Preset.

9.2.19 Use Presets to Build a Unique Sound

Studio One's preset system is very easy to use. If you take the time to load plug-in presets and tweak them even a little bit, then save your personalized sounds as unique presets in Studio One, you can build a distinctive library. After that, you can quickly locate your custom presets in the Browser; no digging through every preset just to find the one you want.

9.2.20 FX Chains



You may wish to insert certain combinations of effects together on a Channel. For instance, you might regularly apply a compressor, EQ, and chorus to your vocal tracks.

In Studio One, FX Chains are used to save the exact setup of an Insert Device Rack so that the entire chain of effects, including all settings, can be recalled instantly. To create an FX Chain:

- Configure an Insert Device Rack on a Channel with the desired effects and settings.
- Click on the menu arrow at the top of the Insert Device Rack, next to the Insert label, and select Save Preset from the pop-up menu.
- Type in a unique name for the FX Chain and click OK or press [Enter] on the keyboard.
-

FX Chains can be found in the FX Chains folder in the Audio Effects Browser. To insert the FX Chain in the Insert Device Rack of a Channel, drag any FX Chain from the Browser to the Channel.

Click on the menu arrow next to the FX Chain name in the Audio Effects Browser to view and select the individual effects. You can then click on the menu arrow next to each effect name within the FX Chain to view the presets used for each effect in the FX Chain. Both the individual effects and each preset can be dragged to the Insert Device Rack of any Channel.

It is also possible to access FX Chains from the Insert Device Rack by clicking on the menu arrow at the top of the Rack and selecting an FX Chain from the list. This will load the selected FX Chain in the Insert Device Rack

9.2.21 Busing



Buses can be extremely useful when mixing. You can route Channels directly to Buses to help organize a mix into common elements, such as routing all Drum Tracks directly to a drums bus. Sends are often used to route a channel to

multiple buses in order to layer a signal into various elements of a mix.

To create a new Bus, [Right]/[Control]-click in blank space in the Console, or on any Channel, and select Add Bus. You can then choose that bus as the Output or Send destination for any Audio or Instrument Channel in the Console. The Bus sends its summed signal to the Main Out by default but can also be routed to Sub Out Channels. Buses have sends that can be used the same way as other sends in Studio One.

9.2.22 Save Solo:

It is possible to place Console channels in Save Solo mode. When any channel in the Console is soloed, all channels with Save Solo engaged are also soloed, and all other channels are muted. To engage Save Solo on any channel, [Shift]+Click on its solo button in Console. The Solo button will change color to show Save Solo is engaged.

Note that FX Channels have Save Solo engaged by default because effects may be critical to how soloed channels sound in the mix, so when any channel is soloed, you will probably want to hear the applicable FX Channel output as well.

9.3 Groups

As discussed in the Edit Groups section of the “Editing” chapter, it is possible to group multiple tracks together so that any edits done to an Event on one track in the group are automatically done to all Events for all Tracks in the group. These same Edit Groups affect how their related Channel Faders will behave in the Console.

9.3.1 Create or Dissolve a Group in the Console



To create a Group in the Console, select the desired Channels and then [Right]/[Control]-click and select Group Selected Tracks from the pop-up menu. To dissolve, or ungroup, grouped Channels in the Console, [Right]/[Control]-click on any Channel in the Group and select Dissolve Group from the pop-up menu.

When a Channel is in a Group, the Group icon will appear on the Channel.

9.3.2 Group Behavior in the Console



When a Channel is placed in a Group, its fader will be linked to the faders for all other Tracks in the Group, so that all of the faders will move when any of them is moved. The movement of faders in the Group will be relative to one another, maintaining the correct dB value relationships among the faders. Note that Channel Pan is not affected by grouping, as channels within a group are very often panned separately.

Solo, Mute, Record Enable, and Monitor Enable controls will also be linked for all Channels in a Group. No other aspect of the Channel in the Console is affected by grouping.

Instrument Tracks in the Arrange view have no direct representation in the Console. The audio outputs of the virtual instruments to which they are routed will have Channels in the Console. It should be noted, however, that grouping Instrument Tracks in the Arrange view only affects editing those Tracks and has no effect on the Instrument Channels for the virtual-instrument audio outputs.

9.3.3 Temporarily Suspend Groups

It is possible to temporarily suspend a Group so that, for instance, the fader for a Channel in a Group can be edited without affecting the other Channels in the Group. To suspend the Group, hold [Alt]/[Option] on the keyboard while clicking on the Fader, Mute, Solo, Record Enable, or Monitor Enable controls.

9.4 Metering

Metering is a critical part of the production process. Studio One's meters visually display audio levels that closely correspond with perceived loudness, and you can meter these levels at various stages in the signal path. Peak meters can be found on every Channel in the Console except the Output Channels, which appropriately feature a more informative Peak/RMS meter with K-System Metering options.

9.4.1 Peak Meters



Peak meters measure the instantaneous audio level from moment to moment at a very fast resolution and display the highest output level at any instant. These meters help ascertain the relationship between a given audio level and other audio levels in the mix. Many effects plug-ins feature peak meters at the input and output so that any level attenuation the effect imparts on the audio signal can be seen.

The Peak Meters in Studio One will automatically be mono or stereo depending on the audio source.

9.4.2 Peak/RMS Meters

The Main Out and Sub Out Channels feature Peak/RMS meters, which simultaneously show both Peak and RMS levels. Whereas a peak meter will show the highest output level at any instant, an RMS meter will show an average of the peaks and troughs of an audio signal over time. An RMS meter is intended to indicate the perceived loudness of the audio being measured by functioning in a way similar to the human ear and is therefore often used as a true measure of effective loudness.

9.4.3 Main Out Clip Counter

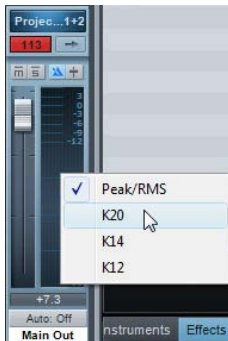


The Main Out Channel features a Clip Counter above its Peak/RMS meter. The counter will turn red when the Main Out signal clips, and it will count the total number of clips that occur. Use the counter to help prevent clipping the final stereo mix of your Song. The counter will reset when clicked or when the Main Out fader is adjusted.

9.4.4 K-System Metering

The Peak/RMS meters in Studio One also feature K-System Metering options. The K-System is an integrated metering system tied to monitoring gain, and it is intended to standardize the levels at which sound is mixed and mastered. This metering system features three different meter scales called K-20, K-14, and K-12. These three scales are meant to be used with different types of audio production and have been described by the K-System inventor, Bob Katz, in his Audio Engineering Society technical paper "An Integrated Approach to Metering, Monitoring, and Levelling Practices." Katz wrote:

"The K-20 meter is for use with wide dynamic-range material, e.g., large theater mixes, 'daring home theater' mixes, audiophile music, classical (symphonic) music, hopefully future 'audiophile' pop music mixed in 5.1, and so on. The K-14 meter is for the vast majority of high-fidelity



productions for the home, e.g., home theater and pop music (which includes the wide variety of moderately compressed music, from folk music to hard rock). And the K-12 meter is for productions to be dedicated for broadcast.”

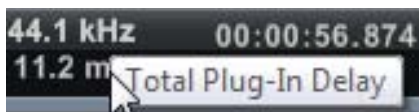
To switch to any K-System meter, [Right]/[Control]-click on any Peak/RMS meter and choose an option from the menu.

When using any of the three K-System scales, the 0 VU mark should be calibrated to 85 dB SPL from your monitors, which you should measure with an SPL meter. For instance, playing back a -14 dBFS sine wave in Studio One while using the K-14 scale will cause the meter to read 0 VU for both the peak and average levels, and your monitors should be adjusted so that the SPL meter at the listening position reads 85 dB SPL.

9.5 Automatic Plug-In Delay Compensation

Some plug-in effects inherently have some delay, or latency. It takes a certain amount of time for these plug-ins to process the audio routed to them, which means the resulting output audio is slightly delayed. This especially applies to dynamics-processor plug-ins that feature a look-ahead function, such as the included Compressor.

In Studio One, this inherent delay is managed with Plug-in Delay Compensation through the entire audio path. There are no settings to manage, as this feature is completely automatic. The sync and timing of every audio channel in your Song are automatically maintained, no matter what processing is being used.

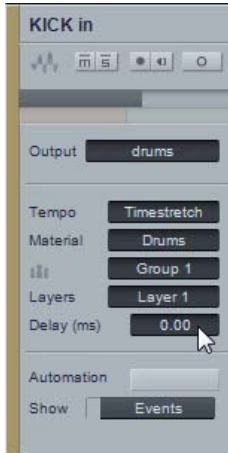


The current total Plug-in Delay time is displayed in the left side Transport, below the current sample rate.

If you desire, you can turn off Plug-in Delay Compensation by selecting Ignore Plug-in Delay in the Transport file menu. When this mode is selected, the sync of all audio channels will need to be handled manually by adjusting Event positions or Track Delay times in the Track Inspector.

9.6 Manual Audio Track Delay

It is sometimes necessary to manually delay the playback of audio to keep it in sync with other audio. A classic example is in the case of recording a live performance, where tracks are recorded directly from the mixing console, while ambient microphones capture the audience sound from a position well away from the stage. The direct sound from the console arrives at the recorder almost instantaneously; it takes longer for the sound to reach the ambient mics from the stage. When the signals are mixed, the time difference results in audible delay and phase problems. To properly align the recorded audio from the ambient mics with the rest of the recorded mix, you can apply a negative amount of manual delay to the ambient recording.

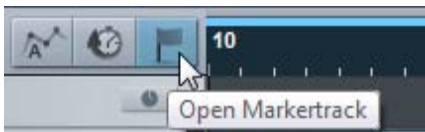


Open the Inspector view by clicking on the Inspector button or pressing [F4] on the keyboard. Enter a positive or negative Delay value, in milliseconds, to apply a delay to the Track.

To calculate the value to apply to ambient mics in the example, do the following:

- Measure the distance from the stage to the ambient mics.
- Divide the distance in feet by 1,129, which is roughly the speed of sound in feet/second. (Divide the distance in meters by 343 for meters per second.) The resulting value is the amount of seconds it took for sound to reach your ambient mics. For example, if the distance was 100 feet, the resulting amount of time is 0.0885 seconds ($100/1,129=0.0885$), or 88.5 milliseconds.
- For the stereo ambient mic Track, or for each mono Track, you will enter a Delay value of -88.5, which removes the recorded delay and puts the Tracks in sync with the rest of the recording.

9.7 Using the Marker Track



You'll probably want to quickly navigate to various areas of your Song during mixdown. In Studio One, the Marker Track is used to place Markers at desired places in the timeline, after which navigation to the Markers is easy. To open the Marker Track, click on the Marker Track button above the Track Column in the Arrange view.

Notice the Timebase button to the right of the Marker Track in the Track column. The musical-note icon on the Timebase button indicates that Markers will adhere to their position based on Bars and Beats, so if the tempo changes, the Markers will move forward or backward in time in relation to their musical position.

If you click on the Timebase button, it will switch to a clock icon, indicating that the Markers will adhere to their absolute position in time. If the tempo changes, the Markers will not move, as they are locked to an absolute time position in the timeline.

9.7.1 Inserting Markers



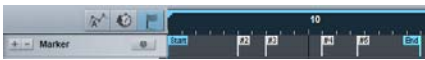
To insert a new Marker into the Marker Track, with playback running or stopped, click on the Add Marker button or press [Insert]/[Y] on the keyboard. Each new marker will be numbered sequentially by default (1, 2, 3...). To rename a Marker, double-click on it in the Marker Track, type in a new name, and then press [Enter] on the keyboard.

9.7.2 Navigating Markers

You can quickly jump the Playback Cursor between Markers in the Marker Track. Click on the Previous Marker button in the Transport, or press [Shift]+B on the keyboard, to jump to the previous Marker. Click on the Next Marker button in the Transport, or press [Shift]+N on the keyboard, to jump to the next Marker. Jumping to Markers during playback enables quick comparisons between sections of your Song.

You can also jump to up to seven different markers from the Transport/ Goto Marker menu.

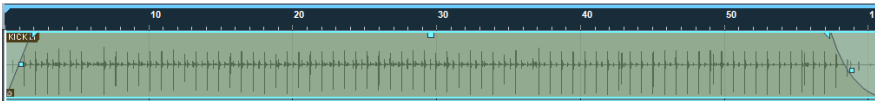
9.7.3 Song Start and End Markers



When a new Song is created, you can specify a Song Length. The default length is 5 minutes or 151 bars at the default 120 bpm tempo. At the beginning and end of the specified region, Song Start and End Markers are automatically placed in the Marker Track. These markers can be used in the Export to Audio File menu to define the timeline region to be exported, and they are used by default in the Update Mastering File process.

9.8 Looping During Mixing

Looping a section of audio (for instance a chorus) while mixing allows you to focus on a particular area of your overall Song without having to constantly stop, rewind, and resume playback.



To quickly loop a section of audio, first select the audio you want to loop by either selecting a range

with the Range Tool or directly selecting an Event or multiple Events with the Arrow Tool in the Arrange view. Then press [P] on the keyboard to set the Left and Right Locators around your selection. Alternatively, press [Shift]+P on the keyboard to ignore Snap while setting the Locators. Finally, click on the Loop button in the Transport, or press [Num Pad /] on the keyboard, to loop the playback between the Left and Right Locators.



Alternatively, you can manually set the Left and Right Locators to a desired range and then engage Loop in the Transport. To do this, float the mouse cursor to the top of the Timeline Ruler until you see the Draw Tool appear. Then click-and-drag to the right to draw the loop region (Left and Right Locators) around the area you wish to loop and engage Loop in the Transport.

You can also manually move the Left and Right Locators by clicking and dragging them left or right in the Timeline Ruler.

9.9 Mixing Down

Most often, you'll record multiple tracks in each Song, but you will need to mix these tracks to stereo for distribution on CD, DVD, or the Web. With a DAW such as Studio One, this simply means saving your mix to a stereo file.

9.9.1 Create a Mix



To create a mix of your Song in Studio One, navigate to Song/Mixdown to Audio File or press [Ctrl]/[Cmd]+E on the keyboard to open the Export to Audio File menu (see Fig. 9-41).

9.9.2 Location

The top section of the Mixdown to Audio File menu is where you will select a location and name for the mix file. Click on the Location button to choose a file location. Double-click on the filename, type in a new name, and press [Enter] to choose a name for the file.

9.9.3 Format

Select the format for your mix file in the middle section of the Export to Audio File menu. Choose from Wave, AIFF, Ogg Vorbis, or MP3 file, and then choose the desired resolution and sample rate.

If you want to put your mix on a standard audio CD, create a 16-bit, 44.1 kHz Wave file.

9.9.4 Options

The bottom section of the Export to Audio File menu has several options that affect how the mix file is created.

Choose from Export Loop Range or Export between Song Start/End Marker. The Export Loop Range option will only export the range of your Song between the Left and Right Locators. Export between Song Start/End Marker will export the range of your Song between the Song Start and End Markers, as seen in the Marker Track. The duration of the range to be exported is displayed in the Duration field.

You choose an output from which the mix will be created in the Output selection box. Only the Main Out will appear in the list, by default, but if there are any Sub Outs in the Console, they will appear in this list as well. Check Import to Track if you would like the mix imported to a new Track in your Song.

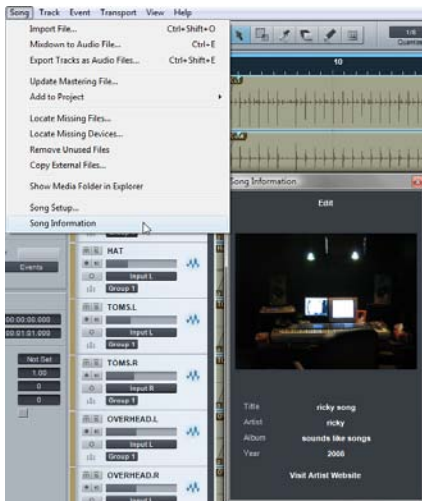
Check Realtime Processing if you wish to export your mix in real time. This option should be used if your Song requires External Instruments or external hardware processing so that musical data and audio will flow to and through these external sources during mixdown.

Check Close After Export if you would like to close the Mixdown to Audio File menu after exporting your mix.

9.9.5 Song Meta-Information



In the Song/Song Setup/Meta Information menu are many fields of data that can be filled in for each Song. These fields are commonly used to tag audio files so that they are labeled correctly for playback in software and various media players. All audio files exported from a Song will be tagged with the meta-information supplied here.



At the bottom of the Meta Information menu, you can choose to display the Song's meta-information when the Song is opened. The information can also be viewed at any time by selecting Song Information from the Song menu.

The meta-information displayed represents what listeners will see in their media players when playing the Song. Displaying this info could also be helpful in remembering aspects of the Song production later.

Meta-information filled in for any Song will be automatically filled in for that Song when it is imported into a mastering Project. For more on this, refer to the Meta-Information section in the "Mastering" chapter.

9.10 Export Individual Tracks from your Song

It can be helpful to quickly export individual tracks from your Song. For instance, you might wish to send the tracks to someone who will prepare a different mix or remix the Song. The Export Tracks as Audio Files feature in Studio One provides an easy way to accomplish this.

9.10.1 Select Tracks

To export tracks from your Song in Studio One, navigate to Song/Export Tracks as Audio Files to open the Export Tracks as Audio Files menu. Once in this menu, select the tracks you wish to export by checking each track in the list on the left.

Note that the audio file created for any selected track will be the equivalent of putting the track into solo in the Console and listening to the result. The audio file will include the results of all inserts and sends on the track. If you don't want the inserts or sends included in the exported tracks, disable them (or mute FX channels and Bus channels, as necessary) before exporting the tracks as audio files.

9.10.2 Location

You can select a location and name for the exported files in the top section of the Export Tracks as Audio Files menu. Click on the Location button to choose a file location. Double-click on the filename, type in a new name, and press [Enter] to choose a name for the file. The name of each track in the Song that is being exported will be appended to the user-specified filename.

9.10.3 Format

Select the format for your mix file in the middle section of the Export Tracks as Audio Files menu. Choose from Wave, AIFF, FLAC, Ogg Vorbis, or MP3 and then choose the desired resolution and sample rate.

9.10.4 Options

The bottom section of the Export Tracks as Audio Files menu has several options that affect how the files are created.

Select a time range to export by selecting Loop, Between Song Start/End Marker, Between Each Marker, or Between Selected Markers. The Export Loop Range option will only export the range of your Song between the Left and Right Locators. Export Between Song Start/End Marker will export the range of your Song between the Song Start and End Markers, as seen in the Marker Track.

The Export Between Each Marker option will export separate audio files for the range between each marker in the Song for each track. The Export Between Selected Markers option allows you to choose any time range between two markers in the Song. The duration of the range to be exported is displayed in the Duration field.

Check Keep Mono Tracks Mono if you would like mono tracks to render mono audio files. If you are using stereo effects with mono tracks, you may wish to disengage this option. Check Import to Track if you would like the exported tracks to be imported to new tracks in your Song.

Check Realtime Processing if you wish to export your tracks in real time. This option should be used if your Song requires External Instruments or external hardware processing, so that musical data and audio will flow to and through those external sources during mixdown.

Check Close After Export if you would like to close the Export Tracks as Audio Files menu after exporting your tracks.

9.11 Mixing Suggestions

9.11.1 Before Mixing

The production work done before mixing has a great impact on the mixing process. Here are a few guidelines you may find helpful:

- Finish the arrangement of your Song before attempting to mix. The addition, deletion, and rearrangement of parts can change the relationship between all of the parts in your Song, which will affect the mix.
- If any part of your Song is problematic, it is unlikely to work well in a mix. The “fix it in the mix” approach usually leads to a lot of wasted time, only to achieve poor results. Be sure you are pleased with the individual parts of your Song before attempting to mix.
- Some parts of your Song might rely on a certain amount of mixing and effects processing to achieve the desired sound and character in the arrangement. It is very easy to let this type of “mixing” carry over into mixing the entire Song. If you find yourself working on many tracks at once, you are probably mixing the Song, rather than a particular part.
- If your Song lacks personality, vibe, or feeling before you start mixing, it is unlikely to gain any of these subjective qualities during mixdown. In this case, take the time to re-record certain parts, rearrange the Song, or even start over from scratch.

9.11.2 Mixing Workflow

While mixing requires an objective knowledge of many tools, the process is an art form. If you were to ask ten mix engineers to mix the same Song, each mix would sound different. There are no step-by-step or “mix by numbers” instructions you can follow to achieve good results. The following broad concepts may help guide you in the mixing process.

9.11.3 Balance

Mixing is largely about balance. The various elements in a mix are balanced with each other so that each element can be clearly heard and contributes as desired to the overall mix. This entails using the faders to vary levels and equalizing sounds so that there is no “competition” between elements with similar frequency content. There is a limited amount of space in the mix, based on individual energy levels for each frequency in the audible spectrum and the relationships of the sounds within the stereo field. For more information on this concept, refer to the Equalizers section of the Appendix.

A popular view on mixing maintains that auditory perception occurs within a three-dimensional space, wherein the principles of mixing are highly visual. A number of variables determine how we perceive location, including frequency, phase, reflections, and relative amplitude (level). Therefore, while mixing, various elements can be positioned in the 3-D listening space using faders, equalizers, ambient effects, and panning to achieve appropriate balance across the entire mix.

9.11.4 Busing

Busing can make mixing much easier by creating submixes of certain elements. For instance, a live drum set may be recorded across eight or more individual channels. In this case, the drums can first be submixed to their own bus or stereo channel, and then the submix can be blended into the overall mix. To accomplish this in Studio One, refer to both the Busing and Groups sections of this chapter.

Busing is also used to build on individual tracks to create a “larger” sound. For instance, a vocal track might be bused to an FX Channel with a chorus effect inserted, as well as to a bus where all of the vocals are mixed and sent to a reverb. These various elements are all mixed using individual faders and add to the overall vocal sound in the mix.

Busing can be used creatively to achieve an endless variety of results. Experiment with this concept to help achieve a unique sound.

9.11.5 Preparing Your Mix for Mastering

Too often, mixes are sent to the mastering phase of production after they have been compressed, equalized, limited, and generally processed to the loudest possible levels. This is usually the result of people comparing their unmastered mixes to finished, mastered, published songs. Indeed, it's tempting to make your mixes as loud as possible while mixing.

However, mixing is mostly about achieving excellent balance. It is not about making the mix loud, especially when compared to mastered mixes. During mastering, you can bring the overall loudness up without affecting the balance achieved during mixing. But if your mixes are already as loud as they possibly can be, little can be done during mastering to make the most of the balance you achieved in the mix, nor can you easily balance one mix with another to create a cohesive album.

Therefore, when listening to reference material (which we highly recommend), try to ignore the overall loudness and just pay attention to how the individual elements are balanced. And avoid placing compressors/limiters on the master channel of your mix.

9.11.6 Maximizing Computer Processing Power

If you are only listening to playback of previously recorded tracks, and not to live inputs being recorded, input and output latency (the time it takes to get audio into and back out of your computer) is irrelevant. Besides, Studio One's Automatic Delay Compensation will keep all playback tracks in sync with each other, regardless of plug-in processing. Therefore, during mixdown, the Block Size can be increased to allow more time for processing to occur before the audio is heard, which will enable you to use more plug-ins and other processing.

9.11.7 Block Size

To adjust the Block Size, navigate to the File/Options/Audio Setup menu (Mac OS X: Preferences/Options/Audio Setup). In Windows, if your audio interface allows it, as most ASIO devices do, adjust the Hardware Block Size by clicking and dragging the horizontal fader. The value of the Hardware Block Size is reported next to the horizontal fader. In Mac OS X, there is a popup menu to adjust Block Size.

In the Windows version of Studio One, the Internal Block Size is locked by default to the same value as the Hardware Block Size. Click on the Lock selection box to unlock the Internal Block Size. Then click on the Internal Block Size value to choose from the list of available values.

In Mac OS X, there is no difference between Internal and Hardware Block Size.

9.11.8 Rendering and Deactivating Virtual Instruments

Virtual instruments can require a lot of computer resources, which limits the computing power that's available for other processes. Therefore, it is sometimes worthwhile to render the audio output of an Instrument Track to an Audio Track, and then deactivate the virtual instrument. Do the following to accomplish this:

- Select all of the Instrument Parts on the Instrument Tracks that you would like to render to audio.
- Select Bounce Instrument Parts from the Event menu or press [B] on the keyboard. Each Instrument Part will be rendered to an Audio Event and placed appropriately on a new Audio Track.
- Click on the Instrument icon on the Instrument Tracks to open the user interface for its virtual instrument and click on the Activate button to deactivate it. This will free any computer resources previously being used by the virtual instrument.

The same concept applies to resource-intensive Audio Effect plug-ins. You can export audio to a new track using the Song/Export to Audio File menu, then remove the pre-rendered audio track.

9.11.9 Audio Engine Overload

Computers have a limited amount of processing power, and you can reach a point where the system can't support all of the running processes. If this occurs while using Studio One, the Studio One audio engine will overload, causing the application to become unresponsive or frozen.

If this happens, and Studio One becomes unresponsive for more than 15 seconds, the system is automatically stopped, and the audio device is suspended. A warning message will be displayed to notify you this has happened.

When you see this message, immediately save your Song or Project. After saving, disable some plug-ins, including Audio Effects and virtual instruments, to reduce the amount of computer processing needed to play the Song or Project. When you resume playback, the audio engine will function normally. If you see the warning again, try disabling more plug-ins.

This feature is intended to make the experience of using Studio One stable and enjoyable on less-powerful computers. If you are using a relatively powerful computer, you will probably never overload the audio engine.

10 Automation

Automation is a critical part of modern mixing. The following chapter discusses aspects of automation in Studio One, including what automation is, Track and Part Automation, Automation Modes, and Automation Envelopes.

10.1 What is Automation?

Automation lets you record changes in parameter values; thereafter, Studio One can automatically perform these value changes. For instance, you can record level changes in a Track by capturing your fader movements during playback; from then on, Studio One can perform the level changes for you.

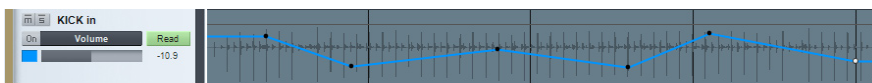
Before the advent of automation, mixing was very much a performance. Sometimes it took many pairs of hands on the mixing console to accomplish all of the fader, mute, solo, and other movements to achieve a mix. Automation makes it possible to record the mixing performance in any way you desire and endlessly tweak every parameter until the desired mix is achieved.

Automation is recorded in Automation Envelopes, which are a series of data points connected by lines that represent the changing values of the parameter being automated.

10.2 Track Automation

Nearly every parameter in Studio One can be automated. Several ways to automate parameters are provided, including Audio Track Automation, Instrument Part Automation, and Automation Tracks. The following describes these automation types.

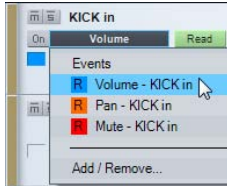
10.2.1 Audio Track Automation



Audio Track automation allows you to automate any parameter related to an Audio Track and the Events it

contains. The Automation Envelopes are drawn directly on top of the Audio Track lane, with the Audio Events visible in the background. Automation envelopes will move with their associated Audio Events.

To view automation, press [A] on the keyboard or click on the Show Automation button at the top of the Track Column in the Arrange view. In the Automation view, the Track Column of the Arrange view changes to reveal automation parameters, including an On/Off button, the parameter name for the currently shown Envelope, and Automation Mode selection.



Click on the automation Parameter display, which is labeled “Events” by default, to reveal the available Automation Envelopes for a Track. (“Events” indicates that the events on the Track will be displayed, instead of an automation Parameter Envelope.) Volume and Pan Automation Envelopes are available by default on every Audio Track. Select a parameter from the list to view and edit the Automation Envelope, or click on Add/Remove to open the Automation menu for the Track.

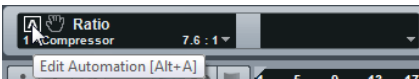
10.2.2 Turn Automation On/Off

Automation envelopes can be turned on and off, so you can decide when they will affect the controlled parameter. To turn an envelope on or off, switch to the Automation view by pressing [A] on the keyboard, select the desired parameter in the Parameter window, and then click on the On/Off button. The Automation Envelope for each parameter in the Parameter window can be turned on/off independently. Turning an Automation Envelope on/off during playback has different results depending on the current Automation Mode for the Track.

10.2.3 Add Automation Envelopes to an Audio Track

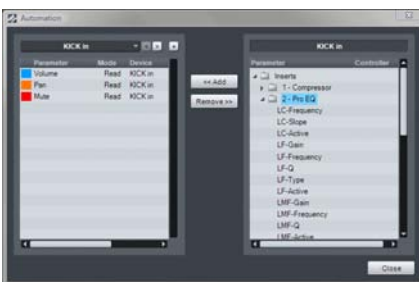
Any number of Automation Envelopes can be added to an Audio Track. The fastest way to add an Automation Envelope to an Audio Track is as follows:

- Modify any parameter for an Audio Track or its Inserts or Sends, and that parameter should be displayed in the Software Parameter window in far left of the Arrange view toolbar in the Song window.
- Click on the Edit Automation button in the Software Parameter window to add an Automation Envelope to the related Track. If the envelope already exists, it will be displayed and a new envelope will not be added.



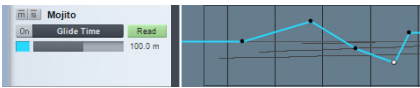
An alternative way to add Automation Envelopes to an Audio Track is described as follows.

- Press [A] on the keyboard to show automation.
- Click on the Parameter window on the Track in the Track column of the Arrange view and select Add/Remove from the list. This will open the Automation menu for that Track.
- On the left side of the Automation menu, the existing Automation Envelopes will be listed, along with their associated Automation mode and device. On the right side of this menu are the parameters for which new Automation Envelopes can be added.
- Select any parameter on the right and click on Add to create a new Automation Envelope. Click on any parameter on the left and click on Remove to remove the existing Automation Envelope.



At the top of the Automation menu, you will notice that you can browse through all Tracks in your Song to view and edit the Automation Envelopes for any track. You can also click on the Add Automation Track button to add a new Automation Track.

10.2.4 Instrument Track Automation



Instrument Tracks can also have Automation Envelopes. In this case, an Automation Envelope controls the parameters of the virtual instrument to which the Instrument Track is routed. All other aspects of Instrument Track Automation Envelopes work in the same way as with Audio Track automation.

10.2.5 Automation Tracks



Studio One features mono and stereo Audio Tracks, Instrument Tracks, and Automation Tracks. An Automation Track only contains Automation Envelopes. An Automation Track can contain Automation Envelopes related to any Track and any plug-ins. To add an Automation Track, press [Ctrl]+[T] on the keyboard to open the Add Track menu and select Automation. Note that the envelopes on Automation Tracks are always visible.

Only those parameters for which an Automation Envelope does not already exist will be available for automation. All other aspects of Automation Track Automation Envelopes work in the same way as with Audio Track automation.

You can use Automation Tracks to automate Bus, FX, and Output Channel parameters and inserts and to keep critical Automation Envelopes organized in one place and easily accessible at all times.

10.3 Editing Track Automation Envelopes

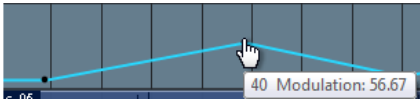
Track Automation Envelopes can be edited directly, using the mouse, as well as with external hardware controllers. The following describes editing Automation Envelopes with the mouse. Refer to the Automation with External Controllers section of the “Control Link” chapter for more on editing envelopes with external hardware controllers.

To edit an Automation Envelope, you first need to show automation by pressing [A] on the keyboard or by clicking on the Show Automation button at the top of the Track Column. Select the desired envelope on a given Track to view and edit that envelope.

10.3.1 Arrow Tool

Editing an Automation Envelope with the mouse, using the Arrow Tool, allows you to add new points to the envelope, move existing points, and select and delete existing points. Be sure to select the Arrow Tool in the Arrange view before attempting the following processes.

10.3.2 Add a New Automation Point



To add a new point to an Automation Envelope using the Arrow Tool, float the mouse above the envelope in the Track Lane so that the Hand tool appears. Click to create a new point, hold the click, and move the mouse to move the new point.

10.3.3 Move an Automation Point

To move any point on an Automation Envelope using the Arrow Tool, click and hold on any existing point on the envelope. While holding the click, you can move the selected point vertically, which changes the parameter value of the point, and horizontally, which changes the time position of the point.

When moving an automation point, notice the pop-up value indicator. This displays the current parameter value. The range and type of value depend on the parameter being automated and on the current time value displayed in the Timebase selected in the Arrange view.

In Studio One, you can drag an automation point as far beyond the position of other automation points as needed. Moving an automation point beyond other points on the envelope will cause the other points to move as well. The other points being moved will be restored to their original positions on the timeline if the point that caused them to be moved is moved back beyond their original positions.

10.3.4 Delete an Automation Point

To delete an existing point on an Automation Envelope using the Arrow Tool, first click on a point to select it. Then, press [Delete] on the keyboard to delete the point. Alternatively, [Right]/[Control]-click on any automation point and select Delete from the pop-up menu to delete it.

10.3.5 Editing Multiple Points at Once

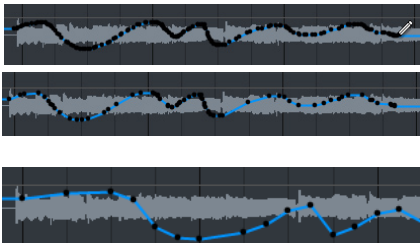
It is possible to simultaneously edit any number of points on an Automation Envelope at once. Using the Arrow Tool, click in the Track Lane away from any existing automation point, and then drag to draw a selection box around any number of points to select them. With multiple points selected, click-and-drag, using the Arrow Tool, on any of the selected points, in order to move them all. Moving multiple points vertically to adjust the

parameter values will adjust each parameter value relative to the point being moved.

10.3.6 Paint Tool

Editing an Automation Envelope with the Paint Tool allows you to draw many automation points with a single move of the mouse, effectively painting an envelope. Be sure to Show Automation and select the Paint Tool in the Arrange view before attempting the following processes.

10.3.6.1 Draw an Automation Envelope

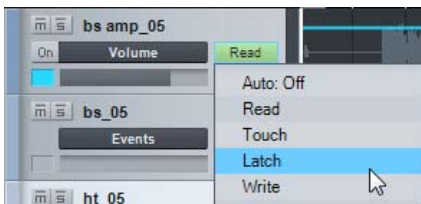


To draw an Automation Envelope using the Paint Tool, click-and-drag in the Track Lane. While you are drawing the envelope horizontally, points will be added at different time increments based on the current Time-base. However, when the mouse button is released after drawing the desired envelope with the Paint Tool, the drawn curves of the envelope will be intelligently and accurately approximated to achieve the desired result with as few points as possible, which may or may not remove some unnecessary points from the envelope. If Snap is engaged in the Arrange View, the envelope points being drawn will snap to the grid accordingly.

You can draw a continuous line, rather than a series of points, by holding [Alt] when the Paint Tool is selected.

Drawing an envelope with the Paint Tool over any existing points on an Automation Envelope will cause the existing points to be overwritten with the newly drawn points. These actions can be undone and redone.

10.4 Automation Modes



In Studio One, Automation Modes are specific to devices on each Track. A delay effect on an Audio Track might be in Touch mode, while the volume, pan, and other effects on that Track are in different modes. This allows a great deal of flexibility when automating.

With Show Automation selected, the current automation mode is visible. To select any mode, click on the Automation Mode window and select from the list. The following describes the automation modes.

10.4.1 Auto: Off

When Auto: Off is selected in the Automation Mode window, all automation for the current parameter and for all related parameters will be turned off.

For instance, if you are currently viewing the Attack parameter envelope for a compressor inserted on an Audio Track, and you select Auto:Off, all parameter automation for the compressor will be turned off. However,

automation envelopes for parameters that do not belong to the compressor can still use a different automation mode.

This is not the same as turning an individual Automation Envelope on and off, as described in the Turn Automation On/Off section of this chapter, as that on/off button only affects the currently visible Automation Envelope.

10.4.2 Read

When you select Read in the Automation Mode window, any existing Automation Envelopes on the Track for the related device will be read, and these envelopes will control the related parameters. Read mode will automatically be engaged when you draw a new Automation Envelope with the mouse.

- Press [J] on the keyboard to switch to Read Automation mode manually on the selected Tracks.

10.4.3 Touch

When Touch is selected in the Automation Mode window, Automation Envelopes can be affected by touch-sensitive, external hardware controllers, so that new automation is written when a hardware control is touched, and automation is read when the hardware control is not being touched. This allows the user to manipulate the control at any time in order to write new automation or overwrite existing automation. Studio One will resume reading automation when the control is released.

- Press [K] on the keyboard to switch to Touch mode manually on the selected Tracks.

Touch mode can be used even if your hardware controller does not have touch sensitivity. In this case, automation is written when you move the hardware controller, and existing automation will be read when you are not moving the hardware controller.

10.4.5 Latch

When Latch is selected in the Automation Mode window, automation will be read until a hardware control is manipulated, at which point automation will be written continuously until playback is stopped. When playback is resumed, automation will be read until a hardware control is again touched.

10.4.6 Write

When Write is selected in the Automation Mode window, Automation Envelopes can be affected by external hardware controllers such that automation is continuously written based on the current position of the hardware control. Existing automation will not be read at any point, and will instead be overwritten with the new automation.

10.5 Instrument Part Automation

A unique feature in Studio One is the ability for Automation Envelopes for any given virtual instrument to be written and accessed directly within Instrument Parts, just like musical-data parameters such as velocity and pitch bend. Part Automation is integrated into Instrument Parts, so that no matter where an Instrument Part is moved, or how it is edited, the automation will stay in place. In this way, virtual-instrument automation can be kept where it belongs with the Instrument Parts in your Song.

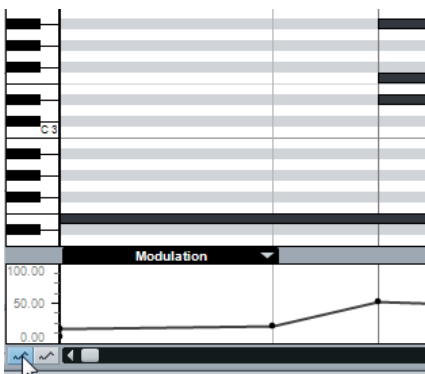
Thus, Instrument Part Automation is functionally similar to the Track Automation system but is dedicated to Instrument Parts and the virtual instruments they control, offering enormous flexibility.

10.5.1 Recording Part Automation

When an Instrument Part is being recorded, and any of the connected virtual instrument's or External Instrument's controls are manipulated with the mouse or via an external hardware controller, those control changes are recorded into the part as Part Automation. Thus, at any time, Part Automation can be recorded live to a new or existing Part by enabling Record and manipulating the virtual-instrument controls.

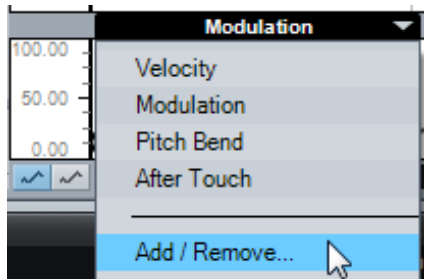
The related Instrument Track must be connected to a virtual instrument or External Instrument in order for Part Automation to be recorded.

10.5.2 View Part Automation



To view and edit Part Automation for a Instrument Part, select the desired Instrument Part and open the Edit view by pressing [F2] on the keyboard, double-clicking on the Instrument Part, or clicking on the Edit button. Below the Music Editor (which shows the musical notes for the selected Instrument Part), you will notice the Part Automation lane. At the upper left of the lane, the Parameter Tab shows the parameter currently displayed in the lane.

10.5.3 Manually Add and Edit a Part-Automation Envelope



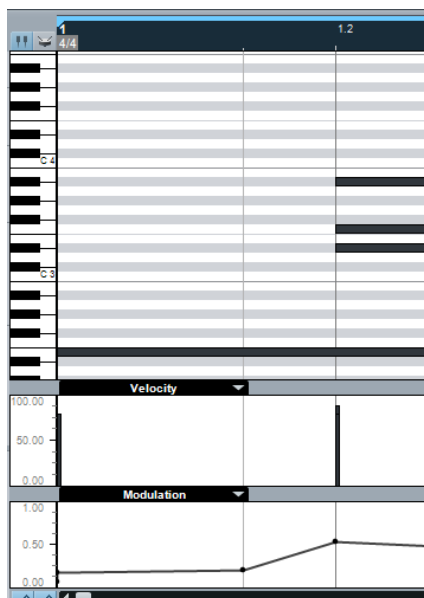
Click on the Parameter Tab to choose a parameter to view and edit in the Part Automation Lane. By default, Velocity, Modulation, Pitch Bend, and Aftertouch (Pressure) are available.

To add a new Automation Envelope to the Part Automation lane, select Add/Remove from the list to open the Automation menu. This Automation menu is identical to the Automation menu mentioned in the Add Automation Envelopes to an Audio Track section of this chapter.

Alternatively, you can edit the parameter of the desired instrument, then click on the hand icon in the top left parameter window and drag it to the Music Editor to add a Part Automation envelope for that parameter to the Instrument Part.

The parameters that you can add to the Part Automation lane are based on the virtual instrument to which the Instrument Track that contains the selected Instrument Part is connected. Only those parameters for which an Automation Envelope does not already exist will be available.

Editing Part Automation envelopes is nearly identical to editing Track Automation envelopes, as described in the Editing Track Automation Envelopes section of this chapter. The one exception is that if you press [Alt]/[Option] on the keyboard when using the Paint Tool to draw an automation envelope, you can draw straight lines of any length, which will only use two envelope points.



It is possible to view and edit two different parameters in separate Part Automation lanes. Click on the two Part Automation Envelope buttons to the bottom left of the Part Automation lane to show/hide the two Part Automation lanes. Any written Part Automation will be read, regardless of whether it is currently being viewed in either Part Automation lane.

11 Control Link

Studio One features Control Link, a cutting-edge system for integrating external hardware controllers with your virtual instruments, effects, and other software parameters. The following chapter describes this system.

11.1 What is Control Link?

In most DAW software, you can use external hardware devices to control software parameters. For instance, you could map several knobs on a hardware MIDI controller to the software knobs of an EQ effect, so that when the hardware knobs are turned, the software knobs will turn. However, in most cases the implementation is limited and difficult to learn.

Studio One has revolutionized hardware and software control integration with the Control Link system. This system requires no knowledge of MIDI, as it eliminates the complex MIDI-mapping systems used in other DAW software. Control Link is also capable of context-sensitive mapping, so the same hardware controls can control many different things based on the current context in Studio One.

The following sections describe how to use the Control Link system.

11.2 Set Up Your External Devices

To use any external hardware device with Studio One, it must first be set up so that Studio One recognizes it. Once an External Device is set up, it will be available for use in any Song. To set up an external hardware controller, refer to the information in the Set Up Your MIDI Devices section of the “Setup” chapter.

11.3 Map Your Keyboard



For the Control Link system to work with your Keyboard, a software map must be made of the hardware controls you wish to use. This simple process works as follows:

- Open the Mix view by pressing [F3] on the keyboard, and open the External window by clicking on External in the Console navigation column to the far left of the Console.
- Double-click on the desired device in the External panel to open the Device Control Map.
- In the upper left corner of the Device Control Map window, click on the MIDI Learn button to enter MIDI Learn mode.
- With MIDI Learn enabled, simply move any hardware control to map it. As controls are mapped, you will see the default Knob object created for that control, which will move in correspondence with its related hardware control.



- When you have mapped all of the desired controls, click on the MIDI Learn button to exit MIDI Learn mode.

Now that the hardware controls for your Keyboard have been mapped, they can be used to control almost any software parameter, as discussed in Control Mapping below.

Keyboard control maps are global in Studio One and are used across every Song, so you will only need to map your Keyboard once.

When using predefined devices from the Keyboards menu, it is not possible to map new controls for the device. You must follow the instructions in the Add Device window (for example, select a certain preset).

11.3.1 Controller Map Object Types

The default Knob object is used when hardware controls are mapped for the first time. This object can be changed for each control to better reflect the actual hardware control type, making your mapped controls much easier to recognize. To change the object for any mapped control, do the following:

1. Click on MIDI Learn to enter MIDI Learn mode.
2. In MIDI Learn mode, you will see a description box beneath each control, with an arrow in the upper left corner.
3. Click on the arrow to expose the Object Selection list, where you can choose a Knob, Fader, Button (On/Off), or Button (Press/Release).
4. Choose one of the object types and notice the graphic change for that control.
5. When you are finished changing the control objects, click on the MIDI Learn button to exit MIDI Learn mode.



Note that there is a functional difference between the two button object types. Some hardware controllers send MIDI messages to Studio One when a button is pressed or released, and some send messages when the button state is toggled between on and off. You must know how the buttons on your controller behave in order to select the correct button-object type. Use the MIDI Monitor to view this behavior directly.

To use the MIDI Monitor, choose MIDI Monitor from the View file menu. The MIDI Monitor will be displayed and will list all incoming MIDI messages sent to Studio One. Press the buttons in question to view their behavior so you can choose the correct map-object type.

It is highly recommended that the control objects be made to look similar to the controls they represent, using the map-object types, as this will help make the relationship of the software object to the related hardware control easier to recognize.

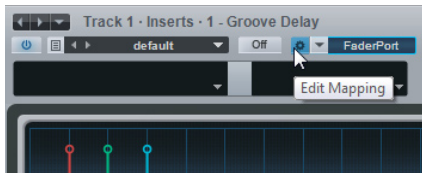
11.4 Control Linking

With an Keyboard set up, and its control map created, you are one click away from controlling almost any software parameter using Control Link. The following describes the various ways to use Control Link.

11.4.1 Parameter Windows



To the far left of the Arrange view toolbar in the Song window, you will notice two windows separated by a button. The windows are empty by default. The name, value, and other related information regarding the last-changed software parameter are displayed in the left window. The MIDI name and value of the last-changed, mapped hardware control are displayed in the right window.



You also can open Parameter windows in each plug-in window. To do this, click on the Edit Mapping button at the top of the plug-in window.

11.4.2 Link a Hardware Control to a Software Control

The fastest way to link a hardware and software control is:

1. Manipulate the desired software control with the mouse.
2. Manipulate the desired hardware control; for instance, turn a knob. That control should appear in the right parameter window.
3. Click on the Link button in the middle of the two parameter windows, or press [Alt]/[Option]+[M] on the keyboard, and the button should turn blue.
4. Your hardware control is now linked to the software control, so that manipulating the hardware control will in turn manipulate the linked software control.



A second way to link a hardware and software control is:

1. Open the control map for the desired Keyboard by double-clicking on it in the External panel of the Console.
2. Manipulate the desired software control with the mouse.
3. Click on the Hand icon in the left parameter window and drag it over the desired hardware control in the control map, then release the mouse button.
4. Your hardware control is now linked to the software control, so that manipulating the hardware control will in turn manipulate the linked software control.



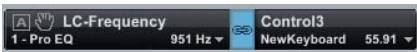
Finally, you can right-click on any knob or fader in the Console, or in a plug-in editor, to link a hardware control to a software control. To accomplish this, do the following:

1. Manipulate the desired hardware control; for instance, turn a knob. That control should appear in the right parameter window.
2. Right-click on the desired software parameter and choose “Assign X to Y,” wherein X is the software parameter and Y is the hardware control you just manipulated.
3. Your hardware control is now linked to the software control, so that manipulating the hardware control will manipulate the linked software control.

11.5 Global and Focus Mapping

There are two modes for mapping hardware and software controls: Global and Focus mode.

11.5.1 Global Mapping



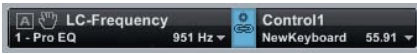
With Global mapping, hardware and software controls maintain a one-to-one relationship, where a single hardware control is linked directly to a single software control. Some controls, such as Track fader, pan, and mute, can only be mapped globally. To map a plug-in control globally, be sure Focus is disengaged in the plug-in window by clicking on the Focus button for the Keyboard you are using, so that it is no longer highlighted.

11.5.2 Focus Mapping

While only one software control can be manipulated at a time by a single hardware control, a hardware control can be linked to any number of software controls, based on context, using Focus mapping. For instance, a single hardware knob could control the release of a Gate plug-in, as well as the Gain of a distortion plug-in, and any number of other parameters, depending on which plug-in is in Focus.

The process of Focus mapping is identical to Global mapping, with one critical difference. To see this difference, open the interface for any virtual instrument or effect. By default, all virtual instruments and effects open in Focus mode, and the Focus button in the plug-in window’s toolbar is highlighted. The Focus button will display the name of the related Keyboard being used.

Only one plug-in window can be in Focus at any time. Click on the Focus button to enable Focus in any open plug-in window.



When a parameter has been mapped in Focus, the link icon used in the parameter window is different from the icon used when a parameter is mapped globally.

Control maps only apply to the plug-in window that is in Focus. For instance, a hardware knob might be linked to a software knob in an EQ plug-in that is in Focus. When another plug-in is brought into Focus, the hardware knob will no longer affect the software knob in the EQ, and it is possible to link this hardware knob to a different control for the plug-in that is in Focus.

In this way, Focus mapping allows different control maps to be made for each plug-in, using the same hardware controls for each. Better still, each Focus map is stored with the plug-in, making it usable in any Song. Thus, you can make Focus maps for each of your favorite plug-ins and never worry about them again. In practice, this means that the plug-in currently in Focus will always be what your external hardware is controlling.

Certain parameters cannot be Focus mapped, including Track controls such as fader, pan, and mute.

11.5.3 Control Link with External Instruments

Using the Control Link system, it is possible to control your MIDI-capable external hardware instrument just like a software instrument. The first step in this process is to add your hardware instrument as an external device, as discussed in the Set Up Your MIDI Devices section of the “Setup” chapter. Once you have the device set up, create a new Song and open the External panel of the Console.

Double-click on your External Instrument in the External panel to open the control map for the Instrument. If you created a new Instrument (that is, you are not using a predefined device), all possible Continuous Controller commands (MIDI CCs) are active and are represented by knobs in the control map. If you are using a predefined map, only relevant controls will appear. Also, notice the MIDI channel selector above the control map. Only MIDI channels you enabled for the Instrument will be selectable.

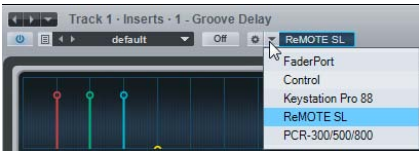
When working with a new Instrument, you will want to customize its control map to include only the relevant controls with the appropriate parameter names. To customize the control map, click on the Wrench icon, which opens the control list. As mentioned, all continuous controllers (CCs) are enabled by default, and they are labeled by their common uses. To add or remove any CC from the list, click its corresponding check box. To edit the Title or the CC, click on the title and enter a new one.

Related controls can be grouped together in the control map by placing them in the same folder in the control map list. Click in the Folder field of any control in the control list and type a folder name to group that control with other controls that have the same folder name.

Once you have finished editing the control map for the Instrument, moving any knob in the control map with the mouse should adjust the desired parameter on the hardware Instrument. The parameter shows up in the left Parameter window, just like any virtual software instrument parameter. This means the same Control Link functions described previously in this chapter for virtual software instruments are now available for controlling (and even automating) your hardware Instrument.

11.5.4 Using Multiple External Devices

Any number of External Devices can be used simultaneously. As long as the device has a control map with some controls learned, it can be used with the Control Link system. In each plug-in window, you will notice mapping controls to the right of the preset and automation controls. Only the External Device displayed in the Focus button can be used to Focus-map controls. If the External Device you are using is not displayed there, the mapping will be Global.



To choose a different device with which to Focus-map a plug-in's controls, click on the down-arrow menu button and choose the External Device you wish to use.

11.6 Automation with Hardware Controllers

As mentioned earlier in the Editing Track Automation Envelopes section of the "Automation" chapter, external hardware controllers can be used to edit automation. When an external hardware controller has been mapped, and controls are linked to various parameters using Control Link, hardware controller movements, and therefore the movements of the software parameters they control, can be recorded in automation.

Combining Studio One's automation system with Control Link delivers a powerful integrated hardware- and software-automation platform. The following describes how these systems are used together.

11.6.1 Hardware Controller Capabilities

You need to understand the capabilities of your hardware controllers. For instance, some controllers offer touch-sensitive faders and knobs, and others do not. Some controllers have endless rotary encoders, and others have fixed-position knobs. These capabilities affect how the hardware controllers will integrate with the automation and Control Link systems.

11.6.2 Touch Sensitivity

Various automation modes are discussed in the Automation Modes section of the “Automation” chapter. These modes directly relate to the specific capability of your hardware controllers. Touch automation mode is most effective if the hardware control is touch-sensitive. However, you can use Touch automation with hardware controls that are not touch-sensitive.

11.6.3 Endless Rotary Encoders and Fixed-Position Knobs

The type of controls offered with hardware controllers varies widely. Many controllers offer knobs called “endless rotary encoders.” These encoders can be rotated continuously in both directions. They increment and decrement values, rather than sending absolute values based on fixed positions, as with fixed-position knobs. Therefore, you will get different results when automating an endless rotary encoder versus a fixed-position knob.

For example, if you are using a touch-sensitive, endless rotary encoder to control a software parameter that has an Automation Envelope on a track, setting the track to the Touch automation mode will have the following results:

- During playback, touching the rotary encoder will begin to write automation until the encoder is no longer being touched. When the encoder is not being touched, any existing automation will be read.
- If automaton is being read during playback, and then the rotary encoder is turned, automation will begin to be written by incrementing/decrementing from the current automation position. In this way, the new automation being written effectively picks up from the existing automation.

If you do the same thing with a touch-sensitive, fixed-position knob, the following will result:

- During playback, touching the knob will begin to write automation until the control is no longer being touched. When the control is not being touched, any written automation will be read.
- If automation is being read during playback, and then the knob is turned, automation will begin to be written at whatever the current value of the knob is, based on its absolute position. The new automation being written will not pick up from the existing automation.

11.6.4 Writing Track Automation

There are three Track Automation modes in which automation can be written using external controls, including Write, Touch, and Latch. It is recommended you be familiar with these modes, as described in the Track Automation Modes section of the “Automation” chapter.

To write Track Automation using an external control, first link a control to a software parameter, as described in the Control Linking section of this chapter. Then, show automation by pressing [A] on the keyboard, add an Automation Envelope to a track for the desired parameter, and enable Touch, Latch, or Write mode. Finally, start playback and manipulate the hardware control to write the desired automation.

Automation can be written using hardware controls only during playback.

When overwriting existing automation, note that the three automation modes will give different results.

- Touch mode will allow automation to be read until a touch-sensitive control is manipulated, and it will be read again when the control is no longer being manipulated.
- Latch mode will result in automation being read until a control, touch-sensitive or not, is manipulated, after which automation will continue being written until playback is stopped.
- When in Write mode, no existing automation will be read during playback, and automation is written for the duration of playback.

Track Automation cannot be written using an external control if Read or Off mode is selected on the track.

11.6.5 Writing Instrument Part Automation

Using external controls with Part Automation is similar to using them with Track Automation, except that there are no automation modes. Existing Part Automation is read and can be overwritten, and new automation can be written at all times while recording to a Part, as explained in the Recording Part Automation section of the “Automation” chapter. The concept is that Part Automation is an integral part of the Instrument Part itself and should therefore be used and accessible at all times.

12 Mastering (Studio One Pro)

Mastering is the process of preparing and transferring the final mix to a master copy from which all distribution copies will be made. In the mastering process, the source material is usually processed using equalization, compression, and so on. Editing, level adjustments, fades, noise reduction, and other signal restoration and enhancement may also be done during mastering. Individual songs are put into their final order at this stage, a process commonly called assembly or track sequencing. The mastered material is then ready for CD/DVD replication, vinyl pressing, or Web distribution.

Studio One Pro features the Project page, a complete mastering solution that is integrated into Studio One. Before Studio One, users had to rely on at least two separate applications—one for multitrack audio production and the other for mastering—to complete their audio production. This can be very inefficient for the average musician/producer.

The Studio One Pro Project page redefines this process into one that is smart, simple, and efficient. In the Project page, your Songs can be mastered and arranged on a single timeline, and then published to many professional formats. The following chapter describes the mastering process, Project workflow, and how Songs and Projects are integrated to provide a total solution not available in any other DAW.

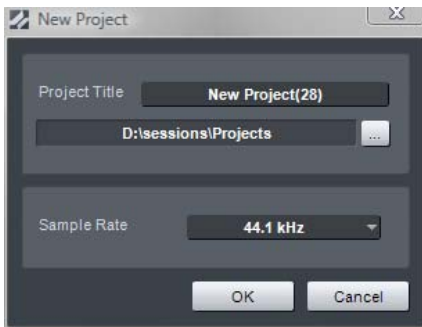
Many of the capabilities of the Song page are available in the Project page, such as Control Link. As such, you should become familiar with the Song page. The following describes in detail only the workflow specific to the Project page.

12.1 Creating a New Project

To create a new mastering Project, do one of the following.

- Select Create a New Project from the Start page.
- Navigate to File/New Project.
- Press [Ctrl]/[Cmd]+[Shift]+N on the keyboard.
- From the Song page, click on the Project quick-access button if no Project is currently open.

12.1.1 Project Setup

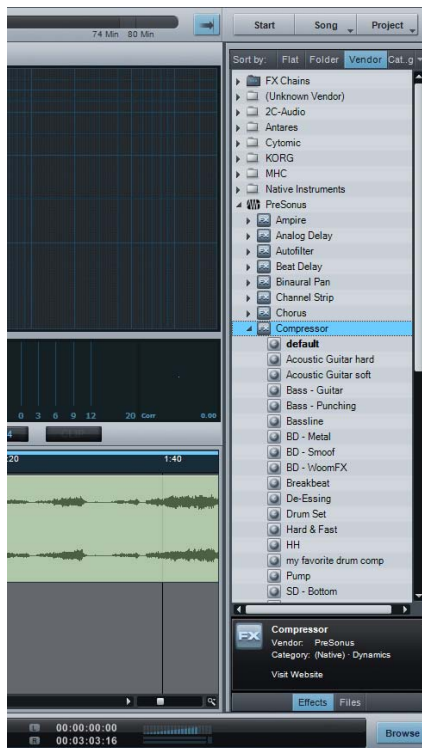


In the New Project menu, you can specify a Project Title and save a location, as well the Project sample rate. Click on OK to create the New Project.

12.2 Adding Tracks

The first step in the mastering process is to place the desired source material into a Project.

12.2.1 The Browser

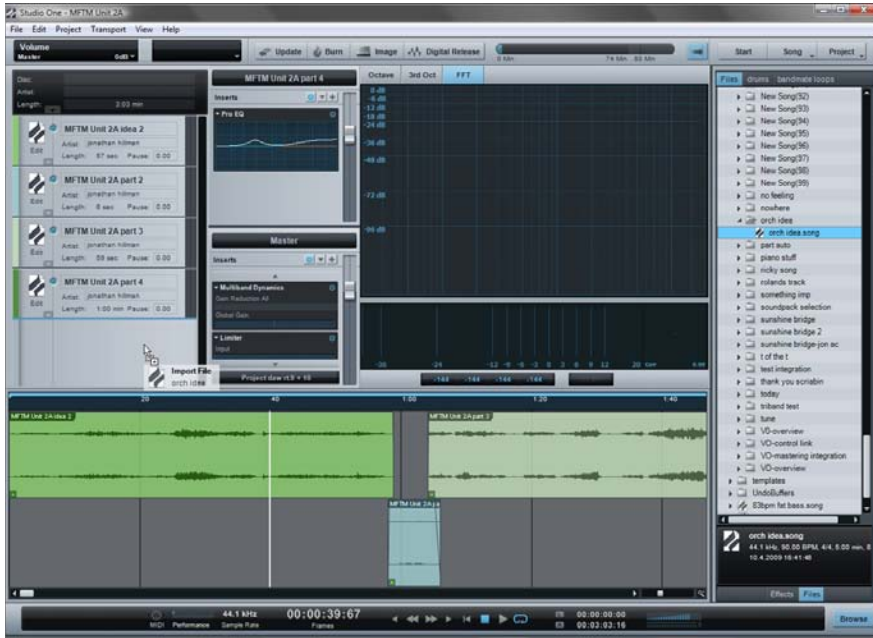


Just as on the Song page, the Project page has an integrated Browser, allowing you to browse for Audio Effects and files to add to your mastering Project. Press [F5] on the keyboard, or click on Browse in the lower right hand corner of the Project page interface, to open the Browser.

12.2.2 Add a Song

Any Song created in Studio One Pro can be added directly to a Project by importing the Song file itself into the Project. There is no need to create a mix-down of the Song first, as this process is automated in Studio One Pro.

By default, your Song files are contained in the Content/Songs folder of the File Browser, with each Song file contained in its own Song folder. To



add a Song to your Project, browse to the desired Song in the File Browser and then click-and-drag the Song file to the Track Column or Track Lane.

Adding the Song to your Project will place it in the Track Column. If no master file exists for the Song, you will be asked if you would like to create a mix of the current state of the Song, which can then be rendered and added to the Track Lane.

When a mix of the Song you added is rendered, the length the of the mix is determined by the Song Start and End markers, as seen in

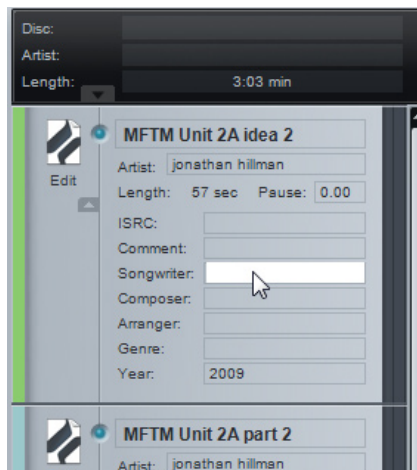
the Marker Track of the Arrange view. Be sure these markers are set to the desired locations in the Song.

12.2.3 Add an Audio File



Of course, any Wave, Ogg Vorbis, AIFF, or MP3 audio file can also be added to the Project by dragging it into the Project from the Browser, just as you would with a Song. Imported MP3 files are converted to Wave format, using the sample rate of the current Project.

12.2.4 Track Column



All Songs and audio files in your Project will be listed vertically in the Track Column, with the name of the Song or audio file clearly displayed.

- Introduction
- Reference
- Appendix
- Index

12.2.5 Meta-Information

At the top of the Track Column, you will notice three meta-information fields, including Disc, Artist, and Length. The Length field is updated automatically based on the total length of your Project. To edit the Disc and Artist fields, click in the space next to the field, type your text, and then press Enter.

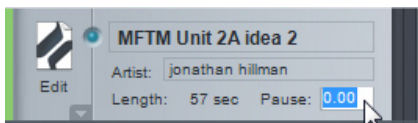
Beneath the file-type icon for each Track in the Track Column, you will notice a Down Arrow button. Click on this button to reveal all other meta-information fields. These fields may be edited on a track-by-track basis, or multiple Tracks may be selected and their fields edited simultaneously.

Meta-information is used when publishing your Project to any medium. You should fill in this information so your production is accurately labeled when published and distributed to your adoring fans.

Meta-information that has been filled in for any Song will automatically be imported to any mastering Project that includes the Song.

12.2.6 Pause

It is common for the tracks on audio CD's to be separated by a brief pause, usually two seconds. By default, any Track added to the Project will have a Pause setting of two seconds. In practice, this means that two seconds of silence will be appended to the beginning of the Track, so that although the Track begins immediately after the end of the previous Track, there will be a brief pause in playback in between.



The Pause setting can be set to any amount of time up to 10 seconds, as per the Red Book Audio CD standard. The timing between Tracks is an important creative part of the mastering process and often differs between Projects. To change the Pause setting, click in the Pause field for a Track in the Track Column and type in a value or click-and-drag the audio events in the Timeline.

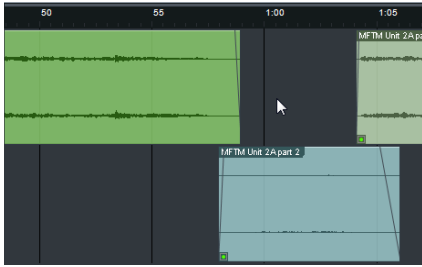
12.3 Track Sequencing



To sequence the Tracks in your Projects, simply click on the file-type icon for any Track and drag the Track above or below the other Tracks in the Track Column.

Notice that the Tracks are automatically relocated in the Timeline of the Track Lane, with all other Track Sequencing still intact, including Track Pauses. Most standalone mastering applications don't offer this feature.

12.3.1 Track Lane and Timeline

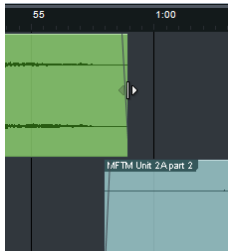


The Track Lane is where your Tracks are represented as Audio Events. You will notice that the Tracks are staggered in the Track Lane, alternating between an upper and lower position across the Timeline. This allows two adjacent Tracks to overlap if so desired. By default, the Tracks will be separated by an amount of time dependent on the Pause setting for each Track.

To move any Track manually across the Timeline, click-and-drag the Track left or right. Notice that the sequencing of all other Tracks in the Project is maintained when any Track is moved across the Timeline.

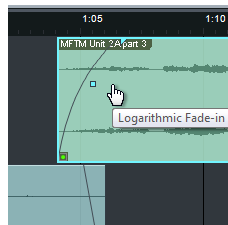
12.4 Editing Tracks

12.4.1 Sizing Tracks



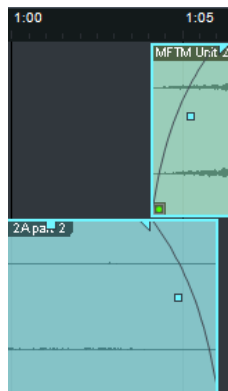
Tracks in the Track Lane can be sized with the Arrow Tool, as described in the Size an Event section of the "Editing" chapter. The relative sequencing of all other Tracks in the Project is maintained when any Track is sized.

12.4.2 Volume Envelope Editing



Each Track in the Track Lane features a volume envelope, which can be edited like the volume envelopes of Audio Events, as described in the Adjust Audio Event Volume Envelopes section of the "Editing" chapter. A volume envelope lets you create fade-ins and fade-outs.

12.4.3 Crossfading Overlapping Tracks



When a Track is manually moved across the Timeline so that it overlaps in time with another Track, it is possible to crossfade the two Tracks so that one will fade out as the other fades in. To crossfade overlapping Tracks, select the two tracks and press [X] on the keyboard. A linear crossfade will be drawn that can be edited by clicking-and-dragging on each track's fade handle.

Any Track that begins after another Track in time will naturally be the beginning of a new track on a CD or other medium, with the starting position of that Track serving as the beginning of the track, regardless of the timing of crossfades.

12.4.4 Enabling and Disabling Tracks

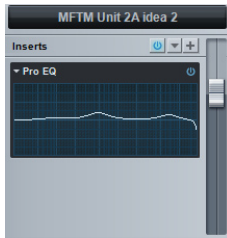
Any Track can be disabled at any time. Disabling a Track will remove the Track from the Timeline but will keep the Track in the Track Column, with the label “This Track is disabled.” This is helpful if you need to remove a Track from the Project timeline but are unsure of whether the Track should be removed completely.

To disable any Track, select it in the Track Column and choose Disable Track from the Project file menu. To enable a disabled Track, select it and choose Enable Track from the Project file menu.

12.5 Using Insert Effects

Insert Effects can be used in the Project page in much the same way as on the Song page. Each Track has a dedicated Device Rack, and there is also a Master Device Rack. Inserts are handled in the Project page as described in the Configuring Inserts section of the “Mix” chapter, including the ability to use FX Chains, as well as the built-in effect Micro Views.

12.5.1 Track Device Rack



Inserts in the Track Device Rack can be used to process each Track individually. The most common use is to achieve a balance with other Tracks in the mastering Project, so that any Master Device Rack processing will affect each Track in a similar way. For instance, each Track will probably require individual equalization. A Track fader is also available in the Track Device Rack to fine-tune the output level of each track.

12.5.2 Copy A Track’s Effects to Another Track

To quickly copy any effect from one Track’s Device Rack to another, simply click-and-drag the effect from the Device Rack onto another Track in the Track Column.

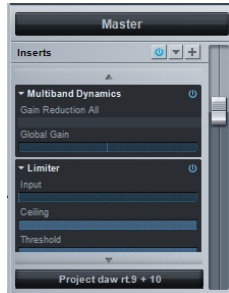
You can also save the entire Device Rack as a single preset, called an FX Chain, by clicking on the arrow next to Inserts at the top of the Device Rack and selecting Store Preset. Then locate the FX Chain in the Browser under Audio Effects and drag it onto any Track in your Project.

12.5.3 Using Hardware Inserts in a Project

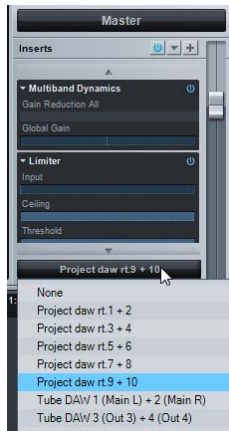
As mentioned in section 9.2.9 and fully discussed in section 13.11, you can use hardware inserts by means of the Pipeline plug-in in Studio One Pro. When using Pipeline, you may need to access the Audio I/O Setup for your Project (found in the Project/Project Setup/Audio IO Setup menu) in order to configure the inputs and outputs your hardware insert will use.

Note that when Pipeline is inserted anywhere in a Project, it will no longer be possible to render audio exports offline for CD burning, disc-image creation, or digital-release creation. Real-time processing will be used, as this is required to incorporate your hardware insert into the audio export.

12.6 Master Device Rack

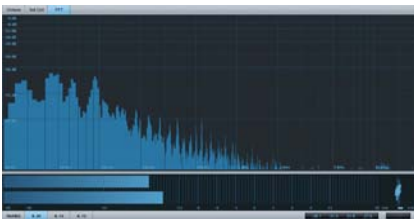


Inserts in the Master Device Rack will affect every Track in the mastering Project. Peak limiting, multiband dynamics processing, and other similar processes are commonly used in the Master Device Rack to finely adjust the overall sound of the Project. Generally, a certain amount of balance and equalization between all Tracks in the mastering Project should be achieved before applying Master Device Rack processing.



A Master Channel output fader is available to dial in the master output level of your Project, and you can select the output for your audio device (audio interface). All of the output pairs provided on your audio interface can be accessed by clicking on the currently displayed audio output.

12.7 Metering



High-quality metering is critical during the mastering process. The Project page offers three types of meters, each visible at all times, to help you make creative and technical decisions while processing your material.

12.7.1 Spectrum Meter

The Spectrum Meter is a flexible audio-spectrum meter that offers octave, 1/3-octave, and FFT displays. The Spectrum Meter can be adjusted to reflect standard peak/RMS levels, as well as the three K-System scales described in the K-System Metering section of the “Mix” chapter. To adjust the Spectrum Meter, click on the options at the upper left and upper right of the display.

12.7.2 Level Meter

The Level Meter is located directly beneath the Spectrum Display, and is capable of displaying high-resolution peak/RMS levels, as well as the three K-System scales as described in the K-System Metering section of the “Mix” chapter.

Nowhere is it more important to accurately meter levels than at the mastering stage of production. It is critical to be sure that the levels across all tracks are as consistent as desired and that the signals are never clipped. When any amount of clipping occurs in your Project, a red clip indicator will illuminate at the top of the Spectrum Meter display, which can only be cleared by clicking on the indicator.

12.7.3 Phase Meter

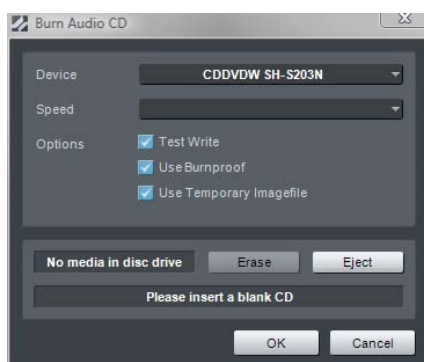
The Phase Meter, located to the right of the Level Meter, is helpful when checking stereo playback issues and mono compatibility. There are two components to this meter: a Goniometer at the center of the plug-in window and a Correlation Meter at the very bottom.

The Goniometer displays left- versus right-channel amplitude on an X/Y scope. The horizontal Correlation Meter compares the amount of in-phase and out-of-phase audio signal in the left and right channels. The parameters of the Correlation Meter range from +1 (mono signal) to -1 (reversed-phase mono signal), with 0 indicating the presence of totally independent signals (true stereo).

12.8 Publishing Your Project

When your Project has been mastered, the next step is to publish it. The Project page offers many options, categorized into three main operations, including burning an audio CD, making a disc image file, and making audio files.

12.8.1 Burn an Audio CD



You can burn your mastered Project to a standard Red Book audio CD directly from the Project page. Red Book is the most widely adopted technical standard for audio CDs, and it includes specifications for minimum and maximum track durations and maximum number of tracks, as well as for how audio is encoded to the CD. As the Project page adheres to this standard, you can be sure your audio CDs will be compatible with almost any CD player.

To burn your Project to an audio CD, click on the Burn CD button at the top of the Project page. In the Burn CD menu, you can select the device you will use to burn the CD, as well as the speed of the burning process. In general, using slower speeds in the burning process reduces the chance for errors.

12.8.2 Burn Options

Several options in the Burn CD menu are intended to prevent common CD burning errors, which include Test Write, Use Burnproof, and Use Temporary Imagefile. These options will usually increase the time it takes to burn a CD in the Project page, but they could prevent wasting time and blank CDs on failed attempts.

The Test Write option will run tests before attempting to burn the CD, in order to be sure the necessary computer resources are available.

Burnproof is a technology capable of preventing buffer under-run errors with some CD burners, in which the CD writing process is interrupted and the CD writer is forced to stop burning the CD before it is finished.

The Use Temporary Imagefile option will change the burn process so that an image of the CD to be burned is created before attempting to burn the CD. This helps to eliminate potential problems related to data not being made available fast enough while writing to the CD.

12.8.3 Make a Disk Image

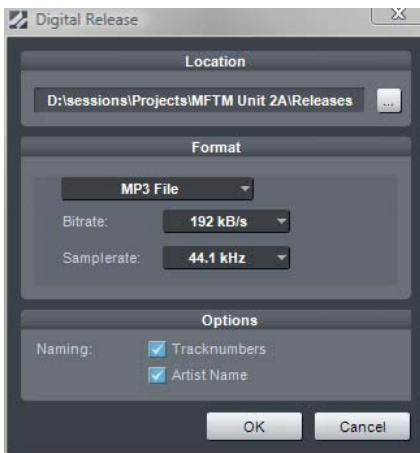
Publishing your project might require a disk-image file. For instance, sending your Project to a professional CD duplicator might require digital transmission of the content of your CD, rather than sending a potentially imperfect physical copy. Also, you may wish to use a different application to burn your CDs, in which case you need an image file. There are many file formats for disk images, with some better suited to audio CD creation than others. Studio One uses a continuous audio Wave file and a cue file to achieve the most universal support.



To create an image of your Project, click on the Make Image button at the top of the Project page. This will create a single continuous Wave file of your entire Project and a cue file and will place them in your Project folder. The cue file contains all of the necessary information to create the separate audio tracks for your CD by referencing the continuous Wave file. Many third-party CD burning applications can create a CD using the Wave and cue files together.

12.8.4 Digital Release

It is possible to publish your Project to a single folder containing all Tracks in your Project, properly tagged with the appropriate meta-information. A common use for this would be to quickly create an MP3 album in one folder and then upload it to a Web site or online retailer for distribution. This process is similar to creating a mix on the Song page, as described in the Create a Mix section of the “Mix” chapter.



Click on the Release button at the top of the Project page to open the Digital Release menu. In this menu, you can choose whether you want to create WAV, AIFF, Ogg Vorbis, or MP3 files and where you wish to store the files. You can also choose a sample rate and a resolution (bit rate), depending on the format.

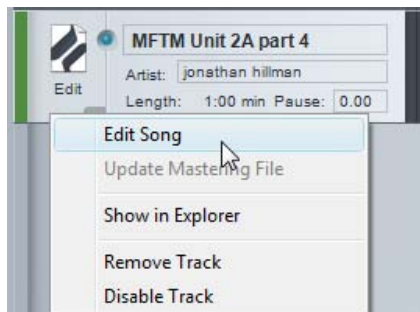
The folder to which all new files are written will be named according to the Disk field in the Project meta-information at the top of the Track Column. The name of each Track in the Track Column is used for the name of the new files created. In the Options section of this menu, you can include Track Numbers and the Artist Name in the name of each new file to be created in the Album. All other meta-information supplied for each Track will be used to tag the new files appropriately.

12.9 Song and Project Integration

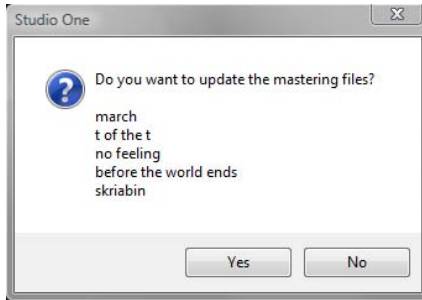
At the center of Studio One Pro’s design is Song and Project integration. This is where the usual gaps between mixing and mastering have finally been eliminated. When Songs are placed in a Project, a link is established that allows the Song and Project to be intelligently aware of each other so that changes to either are known to both. This integration, as described in the following sections, is sure to change the way you think about mixing and mastering.

12.9.1 Open a Song from Within a Project

It is common in the mastering process that changes are needed in various tracks in a project, after which changes to the mix are made. This process is often grossly inefficient, taking many hours, if not days or weeks.



You can quickly make changes to the mix of a Song in your Project. To open a Song in your Project, click on the Edit button in any Track in the Track Column. Your Song will open on the Song page, where you can make your changes. When finished, save and close the Song.



When you go back to the Project page, or open the Project in the future, you will be prompted with a message informing you that the master file is no longer current for the Song to which you just made changes, and you will be given the opportunity to update the master file. The Automatic Update of Mastering Files section below explains this option.

12.9.2 Automatic Update of Mastering Files

Of the most common questions that arise when mastering is also one of the most time-consuming: "Are these mixes the most current versions?" Often, changes are made to multitrack mixes in response to problems found during mastering. When these changes are made, such as bringing the lead vocals up 0.3 dB, new mixes have to be made and reinserted into the mastering project.

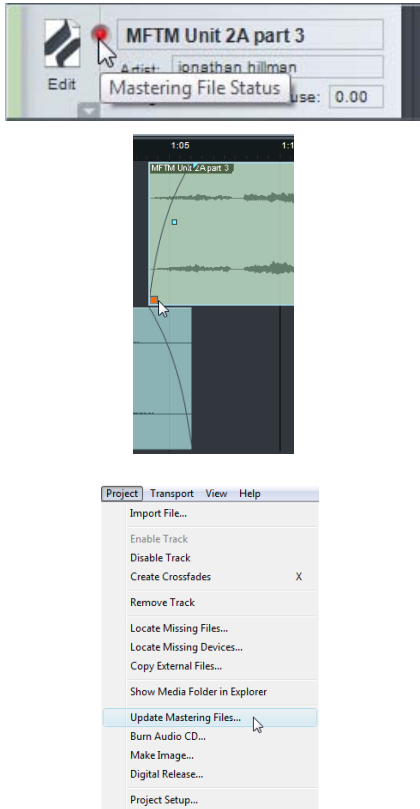
There can be many rounds of changes for each track, resulting in a potentially confusing situation in which it is hard to tell which mix is which, and which is the final version that should be in the mastering project. When the right mix file is finally found, the old mix is removed, and the new mix is added back into the project, usually requiring resequencing the tracks in the project.

Studio One Pro solves this problem with automatic updating of mastering files for any Song in a Project. When you change any Song included in a Project, and then open the Project, you will be asked if you would like to update that Song's mastering file. If you choose to do so, the following will happen:

- The Song will be automatically opened in its last saved state.
- A mixdown of the Song will be then rendered.
- The new mix file will replace the old one in the Project.
- The Song will be automatically closed.
- A report will be displayed in the Project indicating which files were updated and how long the entire process took.

Note that when Songs are automatically updated, and a new mix is rendered, the length of the mix is determined by the Song Start and End markers, as seen in the Marker Track of the Arrange view. Be sure that these markers are set to the desired locations in the Song. If an update of a Song fails, check the Song for missing files and plug-in effects and then try the update again.

Any number of mastering files can be updated in a single process. This way, every time you open a Project, you can be sure you have the latest mix of each Song.



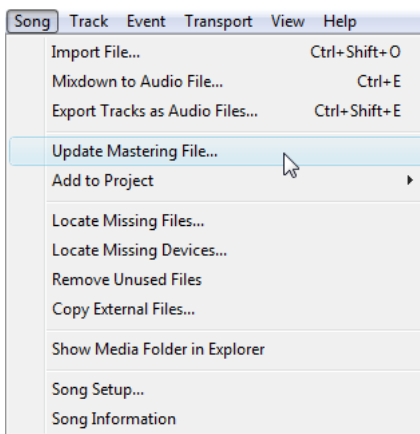
When a mastering file in a Project is not up to date, a red light will appear to the left of the track name in the Track Column, as well as in the lower left corner of the track in the Track Lane. You can choose to manually update any of these files by [Right]/[Control]-clicking on the Track and selecting Update Mastering File. When the file is up to date, a green light will appear.

You can also update every mastering file in the Project at once by clicking on the Update button at the top of the Project page. Any files that need to be updated, based on whether saved changes have occurred to the Songs, will be updated in the same process described above.

12.9.3 Add Currently Open Song to a Project

To add a Song you are currently working on to a new or open Project, select Add to Project from the Song file menu. Select any open Project from the list or select New Project. This will add the Song file to the desired Project and will automatically render a mixdown that will be placed in the Project timeline.

12.9.4 Update a Mastering File from the Song Page

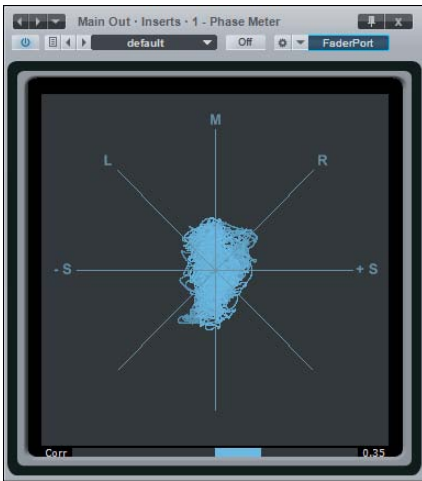


To update a mastering file for the currently open Song from within the Song page, select Update Mastering File from the Song file menu. This will update the mastering file for the Song, which can exist in any number of Projects. The next time any Project that contains the Song is opened, the new mastering file will appear automatically for that Song.

13 Built-In Effects

Studio One features a number of high-quality, 64-bit, built-in audio effects and virtual instruments. The following chapter describes each audio effect in detail. Virtual instruments will be covered in a separate chapter.

13.1 Built-In Effect Micro Views



All of the built-in effects feature Micro Views, which are small, expandable control panels within the Insert Device Rack that allow control over the critical parameters of each effect. Using the Micro View in the Insert Device Rack will often prevent having to open the entire effect interface, and it also allows easy monitoring of compression, gating, and other effects. Try the built-in effects Micro Views in both the small and large Console views.

To expand the Micro View for any built-in effect, open the Console and click once on the effect in the Insert Device Rack. The Micro View will expand downward, revealing certain parameters of the effect. Not all parameters of each effect are available in the Micro View, only those you are likely to change frequently.

In the large Console example, notice the arrows at the very top and bottom of the Insert Device Rack. Click on these arrows to scroll up and down in the Insert Device Rack to view any number of open Micro Views. To collapse any Micro View, click once on the effect name at the top of the Micro View.

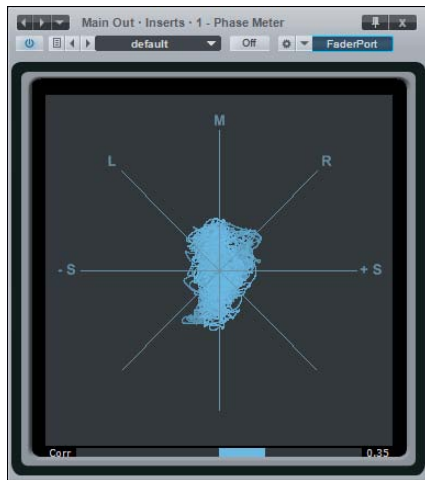
13.2 Built-In Effect Metering Options

All of the built-in effects that feature Peak/RMS meters can optionally meter using K-System metering, as discussed in the “Mixing” chapter. To view and select a K-System metering option, [Right]/[Control]-click on the Peak/RMS meter of the effect.

13.3 Analysis

Visually keeping track of various elements of audio playback while mixing and mastering can be very helpful when making critical production decisions. The following audio effects are excellent tools for visually monitoring your audio.

13.3.1 Phase Meter



The Phase meter is helpful when checking stereo-playback issues and mono compatibility. There are two components to this meter: a large Goniometer at the center of the plug-in window and a Correlation meter at the very bottom.

The Goniometer displays left versus right channel amplitude on several axes. The Goniometer parameters are:

- M-Axis: Mono signal
- +/-S Axis: Mono with one channel totally out-of-phase
- L/R Axes: Mono on one channel (left or right)
- M/S Axes: Channels in Mid-Side (MS) encoded or recorded signal

The Correlation meter shows the average amount of in-phase and out-of-phase audio signal. The Correlation meter parameters are:

- +1: Mono signal
- -1: Reversed-phase mono signal
- 0: Independent signals (true stereo or dual mono)

13.3.2 Spectrum Meter



The Spectrum meter (see Fig. 13-3) is helpful when determining the frequency content of an audio signal. For instance, you might know that a drum loop needs some EQ, but you might not be sure what frequencies to bring up or down. Or there might be an annoying ring in a guitar part that you want to get rid of, but you do not know the frequency of the ring. The Spectrum Meter will help diagnose these problems and many others.

The Spectrum meter is fully adjustable using the following parameters at the bottom of the plug-in window:

- Bands
 - Oct-Band: Octave Band, displays frequency content divided into octaves, useful for determining broad balance across the frequency spectrum.
 - 3rd-Oct-Band: Third Octave Band, displays frequency content divided into 1/3 of an octave, useful for determining balance with good precision across the frequency spectrum.
 - FFT: A Fast Fourier Transform, or FFT—also called a “sonogram”—displays frequency content divided into many bands. It’s useful for accurate metering of a specific range of the frequency spectrum.

- When FFT is selected, you can select the FFT window size (FFT size = time vs. freq. resolution). You can choose from 16,384, 8,192, 4,096, and 2,048. The default setting is 16,384.
- As FFT measurements are divided into bands, exact frequencies across the entire spectrum are not measured.
- Channels
 - When the Spectrum Meter is inserted on a stereo track, you can choose from the following channels to be analyzed in the meter:
 - L: Left channel only
 - R: Right channel only
 - L+R: Sum of Left and Right channels
 - L-R: Difference of Left and Right channels
 - Min. Level: Minimum amplitude to be displayed for all frequencies. Variable from -144 dB to 6 dB less than the maximum level.
 - Max. Level: Maximum amplitude to be displayed for all frequencies. Variable from 0 dB to 6 dB more than the minimum level.
 - Min. Freq.: Minimum frequency to be displayed. Variable from 20 Hz to within 10 Hz of the maximum frequency.
 - Max. Freq. = Maximum frequency to be displayed. Variable from 20 kHz to within 10 Hz of the minimum frequency.

The Min and Max Level/Freq values can be changed by typing in a new value, or by clicking-and-dragging up or down on the value.

13.3.3 Tuner



The Tuner proves invaluable when inserted on guitar, bass, and other instruments that require frequent tuning. The Tuner features a switchable standard/strobe display, with exact Frequency and Difference readouts in the upper left- and right-hand corners. A Calibration knob enables calibrating the Tuner to a center frequency from 415 Hz to 465 Hz. Click on the Strobe Mode button to enable the strobe display, in which the rotation speed is a measure of the amount you need to tune.

There is a center-note indicator with an arrow to either side. When the left arrow is displayed, the signal is tuned below the closest note; when the right arrow is displayed, the signal is tuned above the closest note. When both arrows are displayed, the signal is perfectly tuned.

13.4 Delay

13.4.1 Analog Delay (Studio One Pro)



The Analog Delay emulates a one-head tape delay with optional tempo sync, LFO, filtered feedback, and other features (see Fig. 13-5). It can be used to create deteriorating echoes, echoes with changing delay and pitch, and flanging/chorus effects. These types of sounds are often used in Dub Music or '70s rock.

The following parameters are available in the Analog Delay:

- Time: The base delay time
 - Sync: Optional Sync mode for Time
 - Sync disengaged will result in Speed expressed as Time from 1 ms to 3s.
 - Sync engaged will result in Time expressed as Beats from 4/1 to 1/64, with triplet and dotted-time variants, and will sync to Song position.
- Speed
 - Factor: Modifies tape speed. Variable from 0.5 (double the delay length) to 2 (half the delay length).
 - Inertia: Modifies speed of changes over time based on Factor. Variable from 0 to 5.
- LFO
 - Mod: Modifies the effect of the LFO on delay speed. Variable from -50% to 50%.
 - Shape: The shape of the LFO waveform; select from triangle, sine, sawtooth, and square.
 - Sync: Optional Sync mode for LFO Speed
 - Sync disengaged will result in Speed expressed as frequency from 0.01 Hz to 5 Hz.
 - Sync engaged will result in Speed expressed as Beats from 4/1 to 1/64, with triplet and dotted-time variants.
- Synced LFO and synced delay with LFO slower than delay means that modulation will not be perceptible (other than with high inertia).
- Damping
 - Low Cut: Filter all frequencies below this value from the delay feedback. Variable from Off to 20 Hz to 3.2 kHz. Filter is 6 dB per octave.
 - High Cut: Filter all frequencies below this value from the delay feed-

back. Variable from 400 Hz to 16 kHz to Off. Filter is 6 dB per octave.

- Feedback
 - Feedb.: Feedback percentage of delay. This is the amount of delayed signal to be fed back into the delay input. Variable from 0 to 100%.
 - Width: Regulates the stereo width of the delay feedback. Variable from inverted stereo (ping pong) to full stereo width.
 - Sat.: Saturation. Emulates tape saturation. Variable percentage from 0 to 100%.
- Mix: Adjust mix of Analog Delay-processed signal with the original dry signal. Variable from 0 to 100%.
 - Setting of 100% will very likely increase feedback—use caution!

13.4.2 Beat Delay



The Beat Delay is a tempo-synced delay with optional cross-delay and filtered feedback. Use this effect for adding/changing the feel of rhythmic parts (e.g., adding off-beats) or “spatially doubling” parts (for instance, slap-back echo). The Beat Delay has the following parameters:

- Cross Delay: When not set to Off (center), the input will be put into mono in the Left or Right channel, with the delayed signal put into the other channel. Variable from L 50 ms to R 50 ms. Setting to L 50 ms or R 50 ms will create a pronounced stereo effect.
- Beats: Delay time expressed as beats. Variable from 4/1 to 1/64, with triplet and dotted-time variants.
- Feedback: Percentage of delayed signal added back into the delay input. Variable from 0 to 99.99%.
- Width: Regulates the stereo width of the delay feedback. Variable from inverted stereo (ping pong) to full stereo width.
- Low Cut: Filter all frequencies below this value in the delay feedback signal. Variable from 20 Hz to 1 kHz, filter is 6 dB per octave.
- High Cut: Filter all frequencies below this value in the delay-feedback signal. Variable from 1 kHz to 20.00 kHz. Filter is 6 dB per octave.
- Mix: Adjust mix of Beat Delay-processed signal with the original dry signal. Variable from 0 to 100%.

13.4.3 Groove Delay (Studio One Pro)



The Groove Delay is a four-tap, tempo-synced delay with variable filters and a variable beat grid. Use the Groove Delay to create tempo-synced delay patterns ranging from simple subdivision taps to intricate evolving grooves or granular effects.

The Groove delay has the following parameters:

- **Grid Display:** This display shows the current value for each tap for either Level, Pan, Cutoff, or Swing, based on the selected view mode across a grid of beats. The current value for each tap is color-coded and can be edited with the mouse directly within the display.
 - Tap 1, 2, 3, 4: Click on these buttons to select the respective Tap parameters in the Tap Edit menu in the bottom left of the interface.
 - Level, Pan, Cutoff, Swing: Click on these buttons to display and edit the respective parameter for each tap in the Grid Display.
 - Level: Adjust the output level and timing for each tap.
 - Pan: Adjust the pan and timing for each tap.
 - Cutoff: Adjust the cutoff frequency of the filter for each tap.
 - Swing: Adjust the Groove parameter for all taps that fall on off-beat positions between straight and dotted values, while simultaneously adjusting Tap 4 and possibly Tap 2 levels (for all on- or offbeat positions). Helps achieve “swing” grooves.
- **Tap Parameters:**
 - Beats: Adjust the delay length for the currently select tap in beats. Variable from one beat to two bars.
 - Groove: Adjust the delay time relative to the Beat setting as a percentage. Variable from Triolic (= 66.67%, the last note of the previous triplet) to Dotted (= 150%).
 - Filter: Click on the Filter button to engage the filter for the currently selected tap.
 - X/Y Grids:
 - Cut/Reso: Adjust the cutoff frequency and resonance of the filter by dragging the point around the X/Y grid.
 - Cut Mod: Drag the horizontal fader to adjust the relative amount that the Cutoff Mod LFO can affect the cutoff setting for the filter. Variable from -1 to 1. (Negative values differ from positive only in phase.)
 - LP, Peak, HP/BP: Adjust the character of the filter (x axis: low pass to high pass; y axis: bandpass to peak) by dragging the point around the X/Y grid.

- **Level:** Adjust the level of the currently selected tap as a percentage of the input level. Variable from 0 to 100%.
- **Pan:** Adjust the pan of the currently selected tap. Variable from Left to Center to Right.

Tap 4 has an additional Feedback output (unfiltered and not panned), which is normally used as a feedback control only.

- **Grid:**
 - **Beatlength:** Adjust the Grid subdivisions by note value. Variable from 1/2 to 1/64.
- **Cutoff Mod:** The Cutoff Mod is an LFO that can affect the cutoff value of the filter for each tap, depending on each tap's Cut Mod setting.
 - **Beats/Speed:** Adjust the speed of the LFO. Beats variable from 4/1 to 1/64 with triplet and dotted time variants. Speed variable from 0.1 Hz to 30 Hz.
 - **Sync:** Click to engage Cutoff Mod LFO sync; enables LFO speed adjustment in Beats (synced to Song position).
- **Mix:**
 - **Dry/Wet:** Adjust mix of Groove Delay-processed signal with the original dry signal. Variable from 0 to 100%.

13.5 Distortion

13.5.1 Ampire



Ampire is an easy-to-use amplifier-modeling plug-in that features a wide range of guitar-and bass-amplifier models, speaker-cabinet models, and variable front-to-back microphone positioning . Use this effect to create rougher and harmonically enriched sounds, or as a “dirty” filter bank, using parameter automation to dynamically filter the frequency range.

The following parameters are available in Ampire:

- **Amplifier Model:** Select the characteristics of the amplifier directly by clicking on the model display to see the menu or via the timeline fader. The amp model changes the characteristics of the entire amplifier, including preamp and power-amp distortion and amplification, A- and B-channel differences, and tone-stack behavior.
- **In Trim:** Trim the input gain directly at Ampire’s input to pull up weak instrument signals or to attenuate loud, processed signals. With a good input level, the signal will be in the optimal range for dynamic distortion within Ampire. Variable from -12 dB to 24 dB.

- **A and B Channels:** The A and B channels have different distortion and amplification strength depending on the selected amp model. Use the channels to create two different sounds (e.g., rhythm and solo, or chorus and verse) and switch between them.
 - **Drive:** Adjust the degree of overdrive/amplification in the preamplifier. Variable from 0 to 11.
 - **Bass, Mid, Treble:** Control the emulation of the tonestack model (results dependent on the selected amp model). Each parameter variable from 0 to 10.
 - **Gain:** Adjust the degree of overdrive/amplification in the power-amplifier. Variable from 0 to 11.
- **Cabinet Model:** Click on the cabinet model display to choose a cabinet model from the 1x10, 1x12, 2x10, 2x12, 4x10, and 4x12 options, as well as DI (no cabinet).
- **Mic Mix:** Select the relative front and back microphone mix for the cabinet. This effectively adjusts balance between speaker emulation and cabinet emulation. Variable from 100% front to 100% back.
- **Out Trim:** Distortion and amplifier emulation may result in massive level changes. Use Out Trim to adjust the signal to normal levels. Variable from -24 dB to 12 dB.

13.5.2 Red Light Distortion



Red Light Distortion is an analog-distortion emulator with several selectable distortion models.

The following parameters are available in Red Light Distortion:

- **In:** Input gain to the distortion. Variable from -12 dB to 24 dB.
- **Distortion:** Only for Hard and Bad Tube types, tube working-point adjustment (bias). Variable from 0 to 10.00.
- **Low Cut:** Filter all frequencies below this value. Variable from 20 Hz to 5 kHz, depending on High Cut setting.
- **High Cut:** Filter all frequencies above this value. Variable from 800 Hz to 16 kHz.
- **Drive:** Amplification during overdrive. Variable from 0 to 11; drive increases a lot between 10 and 11 for really distorted sounds.
- **Stages:** Number of overdrive stages used serially in the signal path (including Filters). Select from 1, 2, or 3 with the horizontal fader.
- **Model.** Select the type of distortion emulation by clicking on the display and selecting Soft Tube, Hard Tube, Bad Tube, Transistor, Fuzz, or OpAmp from the list.

- Bypass. Click to Engage/Disengage bypass of the entire Red Light Distortion signal path.
- Out. Adjust the output gain of Red Light Distortion. Variable from -12 dB to 24 dB.

13.6 Dynamics

Dynamics processing is a key aspect of mixing and mastering. Studio One features very high-quality dynamics processors that give you complete control. The following contains fundamental information on dynamics processors to help in your use of Studio One's dynamics processors.

Refer to the Dynamics Tutorial in the Appendix of this manual for educational information about dynamics processing.

13.6.1 Compressor



The Compressor is a full-featured, RMS-based mono/stereo compression processor with internal and external sidechain capabilities. Use this effect to reduce the dynamic range (signal peaks) of any signal.

The following parameters are available in the Compressor:

- Ratio: Adjusts compression range. Variable from 1:1 (no compression) to 20:1.
- Threshold: Adjusts the lower limit for compression. Variable from -48 dB to 0 dB.
- Knee: Adjusts the soft-knee width. (Width refers to the distance from the threshold to the end of soft-knee.) Variable from 0.1 dB to 20 dB.
- Look Ahead: Click to engage/disengage 2 ms Look Ahead function.
- Stereo Link: Click to engage/disengage Stereo Link. Stereo Link will sum a stereo input signal to mono for signal-power detection.
- Display
 - Input Level: Displays input level + RMS.
 - Reduction: Displays level of compressor attenuation (-60 dB to +3 dB) and the maximum reduction amount. Highest peak is held until surpassed by another peak or parameters are adjusted or clicked on.
 - Compression Curve: Click in the display to control compressor settings.
 - Ratio: Click the top right handle to adjust when Auto-Gain is not engaged.

- **Threshold:** Click the middle handle to adjust when Auto-Gain is not engaged.
- **Knee:** Use the mouse wheel while floating the cursor over the middle handle to adjust when Auto-Gain is not engaged. If you don't have a mouse wheel, type in a value or use the Knee knob.
- **Gain:** Click the bottom left handle to adjust when Auto-Gain is not engaged.
- **Auto-Gain Engaged:** Click on middle handle to adjust all parameters.
- **Output Level:** Displays output level + RMS.
- **Input Gain:** Attenuate or amplify the compressor input. Variable from -12 dB to 24 dB.
- **Auto/Gain:** Engage to automatically fix the 0 dB input level to the 0 dB output level (guarantees a 0 dB input level will result in a 0 dB output level).
 - When Auto is not engaged:
 - Gain (output gain) is variable from 0 dB to 48 dB.
- **Attack:** Adjusts attack time for dynamics processing. Variable from 0.1 ms to 400 ms.
- **Release:** Adjusts release time for dynamics processing. Variable from 1 ms to 2s
- **Speed**
 - **Auto:** Engage Auto to automatically set varying attack and release settings based on signal content.
 - **Adaptive:** Engage to automatically vary attack and release times to avoid pumping. This will result in less aggressive but smoother compression.
- **Sidechain:** Engage by clicking Sidechain button at the top of the effect window to allow other sources to control the Compressor or use the internal Filter Sidechain.
 - **Sidechain Channel Display:** Displays the current Sidechain channel source.
 - **Internal Sidechain:** Click to activate internal Filter Sidechain (for frequency dependent compression). Uses 48 dB filters.
 - **Listen Filter:** Click to listen to the filtered control signal of the Internal Sidechain. Helps find specific target frequency for control signal when de-essing, transient damping, etc.

- LC/HC Freq: Frequency selection for Internal Sidechain Filters. LC variable from Off to 20 Hz to 16 kHz; HC variable from 20 Hz to 16 kHz to Off.
- Filter Type Display: Shows Notch or Bandpass characteristic of filter.
- Swap: Click to swap the frequencies used for LC and HC.

13.6.2 Expander (Studio One Pro)



Expander is a fully variable downward expander with range control. It features sidechain capability, including an internal sidechain filter with variable low-cut and high-cut. Expanders increase the dynamic range of a signal such that low-level signals are attenuated while the louder portions are neither attenuated nor amplified. This is effectively the opposite of compression. Use Expander to decrease the levels of unwanted noise or bleed from other sources in the desired signal, or to restore dynamic range to a compressed signal.

The following parameters are available for the Expander:

- Threshold: Adjust the maximum amplitude at which processing will occur. Variable from -60 dB to 0 dB.
- Range: Adjust the maximum amount of attenuation applied to the signal. Variable from -72 dB to 0 dB.
- Ratio: Adjust the ratio of the Expander. Variable from 1:1 to 1:20.
- Look Ahead: Click to engage/disengage 2 ms Look Ahead function.
- Attack: Adjusts attack time for dynamics processing, reaction speed to falling signal. Variable from 0.1 ms to 500 ms.
- Release: Adjusts release time for dynamics processing, reaction speed to rising signal. Variable from 50 ms to 2s.
- Sidechain: Engage by clicking Sidechain button at the top of the effect window to allow other sources control the Expander.
 - Sidechain Channel Display: Displays the current Sidechain channel source.
 - Internal Sidechain: Click to activate internal Filter Sidechain (for frequency-dependent compression). Uses 48 dB filters.
 - Listen Filter: Click to listen to the filtered control signal of the Internal Sidechain. Helps find specific target frequency for control signal when de-essing, transient damping, etc.
 - LC/HC Freq: Frequency selection for Internal Sidechain Filters. LC variable from Off to 20 Hz to 16 kHz; HC variable from 20 Hz to 16 kHz to Off.

- Filter Type Display: Shows notch or bandpass characteristic of filter.
- Swap: Click to swap the frequencies used for LC and HC.

13.6.3 Gate (Studio One Pro)



Gate is a noise-gate processor with range control. It features sidechain capability with an internal sidechain filter that includes variable low cut and high cut. Gating is an extreme form of expansion that severely attenuates the processed signal or silences it entirely. Use Gate to eliminate unwanted noise or low levels in any track, or to creatively control the level of a given track using another track via Sidechain.

The following parameters are available for the Gate:

- Thres: Threshold, adjust the level at which the Gate is to attenuate below. Variable from -60 dB to 0 dB.
- Range: Adjust the maximum amount of reduction. Variable from -72 dB to 0 dB.
- Reduction Display: Displays the amount of reduction, ranging from -72 dB to 0 dB.
- Attack: Adjust the amount of time it takes for the gate to open and let signal through. Variable from 0.05 ms to 500 ms.
- Hold: Adjust the amount of time the gate is held open once the signal has dropped below the Threshold setting. Variable from 1 ms to 1s.
- Release: Adjust the amount of time it takes for the gate to close after the Hold period. Variable from 50 ms to 2s.
- LkA (Look Ahead): Click to engage/disengage the 2 ms Look Ahead function.
- Sidechain: Engage by clicking Sidechain button at the top of the effect window to allow other sources control the Gate.
 - Sidechain Channel Display: Displays the current Sidechain channel source.
 - Internal Sidechain: Click to activate internal Filter Sidechain (for frequency-dependent compression), uses 48 dB filters.
 - Listen Filter: Click to listen to the filtered control signal of the Internal Sidechain. Helps find specific target frequency for control signal when removing narrow-band noise.
 - LC/HC Freq: Frequency selection for Internal Sidechain Filters. LC variable from Off to 20 Hz to 16 kHz; HC variable from 20 Hz to 16 kHz to Off.

- Filter Type Display: Shows notch or bandpass characteristic of filter.
- Swap: Click to swap the frequencies used for LC and HC.
- Duck (for External Sidechain): Engage to invert the external side-chain source signal.

13.6.4 Limiter



The Limiter is a brickwall-limiting processor with optional K-System metering. Use it to prevent your output signal from clipping or to maximize signals with very dynamic peaks.

The following parameters are available for the Limiter:

- Input: Adjust the input level into the Limiter. Variable from 0 dB to 18 dB.
- Ceiling: Adjust the ceiling of the Limiter, the maximum output of the Limiter. Variable from -12 dB to 0 dB.
- Threshold: Allows Limiter to be used as a leveling amp. When Threshold is below Ceiling, a soft knee and 1:20 ratio between Threshold and Ceiling values is used. Threshold setting is relative to Ceiling. Numerical display is absolute value. Variable from Ceiling value to 12 dB below Ceiling value.
- Release: Adjust the amount of time it takes for the limiter to stop processing once the input level has fallen below the Ceiling setting. Variable from 2 ms to 1s.
- Softclip: Reduces square-wave clipping characteristics when the Limiter is clipped. Click to engage Softclip.
- Metering
 - PkRMS: Click to engage Peak/RMS metering.
 - K-14, K-20, K-12: Click to engage a K-System metering option, refer to the K-System Metering section of the “Mixing” chapter for more information.
 - Reduction: Displays the amount of limiting reduction, ranging from -24 dB to 0 dB.
 - Max: Displays the maximum reduction level reached in dB.

13.7 Mastering

13.7.1 Multiband Dynamics (Studio One Pro)



Multiband Dynamics is a compressor/expander with five completely independent compression/expansion bands, optional simultaneous adjustment over all bands, and multi-band metering. Use it to reduce unwanted signals or banded noise and to emphasize or limit instruments. In practice, this effect can function as a dynamic equalizer or can be used for mastering compression on a complete mix.

This type of compression is regarded by many as an art form, and can be difficult for beginners to use. We recommend you load the factory presets as a starting point and learn how Multiband Dynamics works by using it.

The following parameters are available for Multiband Dynamics:

- **Global Display:** Float mouse in display to view parameter-editing Tooltips above the display.
 - **Input:** Horizontal lines represent Low and High Threshold for dynamics processing.
 - **Output:** Horizontal lines represent transformation of the High and Low Thresholds using Gain and Ratio.
 - A signal at the Low Threshold on the Input would be at the low level on the Output.
 - **Color Coded Output Gain:** Red means attenuation, green means amplification.

Dynamic changes will occur only between Low/High Threshold and Low/High Gain. If the signal is above or below these settings, only linear gain will be applied.

- **Bands**
 - L, LM, M, HM, H: Low, Low Mid, Mid, High Mid, High.
 - **Frequency Knob:** Adjust crossover frequency between bands. You must have at least one octave between adjacent bands.
 - M, S, Bypass: Mute, Solo, and Bypass engage buttons for each band.

Editing the crossover frequencies in the display will move other bands when the bandwidth is below one octave. Editing via automation will be limited to a one-octave bandwidth. Moving the crossover to limit frequencies will disable bands.

- Metering
 - Range Low: Lowest amplitude to be displayed in band meters. Click to select from -120 dB, -80 dB, -48 dB, -24 dB, or -12 dB.
 - Range High: Highest amplitude to be displayed in band meters. Click to select from +12 dB, 0 dB, -12 dB, -24 dB, or -48 dB.
 - Metering On/Off: Click to engage/disengage metering for all bands.
- Edit All Relative: Click to engage/disengage relative dynamics-settings editing for all bands. When engaged, changing dynamics settings for the selected band will change the same settings for all bands by the same amount.
- Auto Speed: Click to engage/disengage Auto Speed for the dynamics for all bands. Sets adaptive Attack and Release times for all bands globally.
- Dynamics: Click on any band to select it and view/edit dynamics settings for that band.
 - Dynamics Display: Click on handles in display to adjust dynamics settings.
 - Thresholds: No dynamics processing occurs for signals outside of the Threshold settings—only gain amplification/attenuation.
 - Low Threshold: Adjusts the lower limit for signal to be processed. Variable from -60 dB to 2x the knee length.
 - High Threshold: Adjusts the upper limit for signal to be processed. Variable from 0 dB to 2x the knee length.
 - Ratio: Adjusts dynamics-processing range. Variable from 1:10 (gating) to 20:1 (limiting).
 - Gain: Adjusts output gain. Variable from -36 dB to 36 dB.
 - Attack: Adjusts attack time for dynamics processing. Variable from 1 ms to 200 ms.
 - Release: Adjusts release time for dynamics processing. Variable from 4 ms to 200 ms.

Dynamics speeds are adapted to provide a comparable smoothness at the same setting for expansion and compression, so expansion will be slightly slower than the shown length.

13.7.2 Tricomp



Tricomp is a three-band compressor (see Fig. 13-15). It provides automatic threshold and ratio settings for all three bands and relative control for the low and high bands, as well as switchable automatic attack and release controls. Tricomp can be used to finalize your mix or to add brilliance or punch to frequency-rich signals.

The following parameters are available for Tricomp:

- **Input Meter:** Displays Tricomp's input level.
- **Low:** Adjust the relative amount of compression to be applied to the Low compression band. Variable from -5 to 5 depending on the Compress setting.
- **Low Freq:** Adjust the upper corner frequency of the Low compression band. Variable from 80 Hz to 480 Hz.
- **High:** Adjust the relative amount of compression to be applied to the High compression band. Variable from -0.50 to 0.50, depending on the Compress setting.
- **High Freq:** Adjust the lower corner frequency of the High compression band. Variable from 800 Hz to 12 kHz.
- **Compress:** The relative amount of compression to be applied to all three compression bands. Variable from 0 to 10.
- **Speed:** When Auto Speed is not engaged, adjusts the compressor Attack and Release times simultaneously. Attack variable from 0.1 ms to 10 ms; Release variable from 3 ms to 300 ms.
- **Auto Speed:** Click to engage adaptive settings for the compressor attack and release times, based on signal content.
- **Knee:** Adjust the distance/curve of the compressor knee. Variable from 0 dB (hard knee) to 6 dB (soft knee).
- **Sat:** Saturation emulates the saturation sound found in famous leveling amplifiers. Variable from 0 to 100%.

13.8 Mixing

When mixing, there are many tools that can help to achieve proper balance and create space for the various parts of your mix. The following effects will help you craft your mix with precision and excellent sound quality.

13.8.1 Binaural Pan



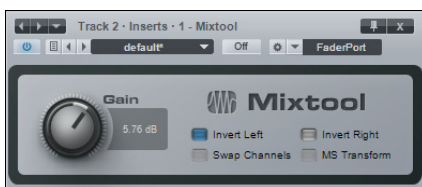
The Binaural Pan is a stereo-panning effect that can pan from mono to double stereo width. Use the Binaural Pan on any stereo track to tightly control its stereo width and pan, as well as to check for mono compatibility using the Mono switch.

The following parameters are available for the Binaural Pan:

- **Width:** Adjust the stereo width of the stereo track. Variable from 0 (mono) to 200% (double stereo width).
- **Mono:** Switch to mono playback of the stereo track.
- **Pan:** Adjust the balance in the left and right channels for the stereo track. Variable from 100% L to 100% R.

The Binaural Pan can only be used on stereo tracks. If loaded onto a mono track, the plug-in display will simply say “MONO TRACK.”

13.8.2 Mixtool



Mixtool provides common track utilities, including independent left- and right-channel inversion, left- and right-channel swap, and MS transformation of stereo signals. Use Mixtool when inverting channels to correct for phase cancellation and correlation issues, as well as to provide MS transformation to decode signals recorded with Mid-Side stereo configurations.

The following parameters are available for Mixtool when used on a stereo track:

- **Invert Left:** Click to invert the phase of the left playback channel for a stereo track.
- **Invert Right:** Click to invert the phase of the right playback channel for a stereo track.
- **Swap Channels:** Click to swap left and right Mixtool input channels. Stereo tracks only.
- **MS Transform:** Click to perform an Mid-Side Transform on the Mixtool input channels. Stereo tracks only. Generally used to decode MS-recorded signals, or to create MS-Signals for stereo image processing.

When used on a mono track, the Mixtool plug-in has one control to invert the phase of the signal.

13.8.3 Pro EQ



Pro EQ is a seven-band parametric equalizer with optional spectrum metering; variable low-cut, high-cut, low-frequency, and high-frequency multimode filters; and an optional Auto-Gain output-gain setting. Use Pro EQ on any mono or stereo track to accurately apply highly musical equalization to any signal.

The following parameters are available for Pro EQ:

- **Display:** Click-and-drag on frequency-band handles in the display to edit Gain (up/down) and Freq (left/right) parameters. If you click on a handle, the mouse-wheel edits the Q. (If you don't have a mouse wheel, click on the desired Q knob or type in a value below the knob.)
 - **Show Curve All/Current:** Click to select All or Current.
 - **All:** Simultaneously displays curves for each band and the resulting EQ curve being applied to the signal (white).
 - **Current** will display the resulting EQ curve (white), as well as one curve for any band being actively edited.
 - **Spectrum:** Click to engage/disengage Pro EQ output-spectrum metering. Drawn behind the EQ curves in 1/3-octave bands.
 - Spectrum display is fixed at 20 Hz to 20 kHz and -24 dB to 24 db.
 - **High Quality:** Click to engage High Quality mode. Allows more accurate equalization. Achieved using 2x oversampling and requires more computer processing power.
 - **Bands:** Click Activate button to engage/disengage each band.
 - **LC, HC:** Low-Cut and High-Cut filters.
 - **Freq:** Adjust point at which filter cut begins.
 - **Slope:** Select from 6, 12, 24, 36, and 48 dB per octave. Affects the shape of the filter curve.
 - **LF, HF:** Low Frequency and High Frequency. Selectable Shelf or Peaking filter modes.
 - **Q:** Adjust the Q of the frequency band. $Q = \frac{\text{center frequency}}{\text{bandwidth}}$. When the center frequency is constant, Q is inversely proportional to bandwidth (i.e., higher Q = narrower bandwidth).
 - **Gain:** Attenuate/Amplify frequency band.
 - **Filter Mode:** Select from Peaking and Shelf. Six, 12, or 24 dB per octave.
 - **Freq:** Adjust the center frequency of the band.
 - **LMF, MF, HMF:** Peaking filters.

- Q: Adjust the Q (center-frequency:bandwidth) of the frequency band.
- Gain: Attenuate/Amplify frequency band.
- Freq: Adjust center frequency of band.
- Auto: Click to engage Auto-Gain, adjusts Pro EQ output level to match original input-signal power (guarantees a 0 dB input signal equals a 0 dB output signal).
- Output Meter: Peak/RMS meter, RMS level represented by white horizontal line.

13.8.4 Channel Strip



Channel Strip features three processors in one, including a low-cut filter, dynamics processor, and three-band parametric EQ. Channel Strip optionally applies automatic gain correction to the EQ so that the input-signal power matches the output-signal power. Use Channel Strip on any mono or stereo Track that needs basic channel processing.

The following parameters are available for Channel Strip:

- LC and Freq: Click on Activate button to engage/disengage the Low Cut filter. Adjust frequency to change the filter-cutoff frequency.
- Compress: Adjust compression amount. Variable from Off to 100%. Simultaneously adjusts threshold (0 dB to -20 dB) and ratio (2:1 to 10:1).
- Expand: Adjust Expansion amount. Variable from Off to 100%. Simultaneously adjusts threshold (-64 dB to -24 dB) and ratio (1.5:1 to 2.5:1).
- Active gain reduction is indicated by red "LED".
- Display: Displays Low Cut and Parametric EQ settings. Click on handles to adjust gain (up/down) and frequency (left/right).
- Low, Mid, High: Adjust Gain and Frequency for each band of the parametric EQ. Each band has fixed Q.
- Gain: Adjust the output gain of the Channel Strip. Variable from -12 dB to 12 dB.
 - Auto: Click to engage automatic output-gain setting. Guarantees a 0 dB input signal equals a 0 dB output signal.

13.9 Modulation

Modulation processors are great tools for creating interesting and innovative sound. Studio One features the following modulation processors.

13.9.1 Auto Filter



Auto Filter features two resonant filters with six selectable filter models (see Fig. 13-20). The filter-cutoff frequency and resonance can be modulated by an LFO using standard waveforms, a 16-step sequencer, and an envelope. Use Auto Filter to create filtered effects from basic filter sweeps to complex tempo-synced rhythmic filter patterns.

The following parameters are available for Auto Filter:

- Filter 1 and Filter 2: Select from 6 filter emulation types, including Ladder LP 12 dB, 18 dB, and 24 dB; Analog SVF 12 dB and 24 dB; and Digital SVF 12 dB.
 - SVF's are State Variable Filters and can blend between low-pass, band-pass, and high-pass.
 - Click-and-drag the Filter Mix horizontal fader (below the filter-model selection) to blend filter types.
- FLT Spread: Adjust the spread between Filter 1 and Filter 2 Cutoff Frequencies. Variable from -2 octaves to 2 octaves. (Filter 2 Cutoff is the result of the Cutoff setting and FLT Spread amount.)
- Chained/Parallel: Switch the two filters between chained in series (Filter 1 followed by Filter 2; good for adding peaks, creating band-reject filters, etc.) and parallel (Filter 1 and Filter 2 process and output the same signal simultaneously; good for creating wide bandpass filters).
- Drive: Adjust the filter's feedback overdrive. Variable from 0 to 100%.
- Cutoff: Filter cutoff frequency. Variable from 30 Hz to 16 kHz.
 - Can be modulated by the envelope and LFO.
 - Adjust the modulation amount from each using the Env and LFO vertical faders. Variable from -100% to 100%. Negative values are phase-inverted. LFO modulates around the value.
- Reso: Adjust the resonance of the filters. Variable from 0 to 100%.
 - Can be modulated by the envelope or LFO.
 - Adjust the modulation amount from each using the Env and LFO vertical faders. Variable from -100% to 100%. Negative values are phase-inverted. LFO modulates around the value.
- Envelope Length: Adjust the attack and release times of the volume envelope (Env), affecting Cutoff and Resonance.
 - Auto: Click to engage/disengage automatic envelope-length selection
 - Sidechain: Click the Sidechain button at the top of the effect window to engage sidechain for Envelope detection (use another track to control the Env).

- LFO: Click on waveform buttons to select from 16-step, Triangle, Sine, Sawtooth, and Square waveforms.
 - LFO Speed: Can be synced to tempo or have free time.
 - Sync: Click to engage/disengage LFO tempo sync.
 - When tempo synced speed is variable from 4/1 to 1/64 with various triplet and duple time variants.
 - 16-step: When 16-step is engaged, click in display to edit values for each step. Divides current Speed/Beats time into 16 steps, each step variable from -1 to +1.
- Gain: Adjust Auto Filter output gain. Variable from -6 dB to 6 dB.
- Mix: Adjust mix of Auto Filter-processed signal with the original dry signal. Variable from 0 to 100%.

13.9.2 Chorus



The Chorus is a one- to three-voice chorus processor with optional LFO delay-time modulation and stereo width control. Chorus processing is often used on vocal tracks to help create a more full vocal sound so the track fits better in the overall mix. Guitar and synth parts sometimes feature chorus processing for similar reasons.

The following parameters are available for the Chorus:

- Spacing: Adjust the delay of the Chorus voices.
 - The Spacing value is the delay time between voices.
- Voices: Adjust the number of added voices in the Chorus, select from 1, 2, or 3.
- LFO: The LFO modulates the Spacing parameter.
 - LFO Speed: Adjust the speed of the LFO.
 - LFO Width: Adjust the range of the LFO modulation on Spacing. Variable from 0 to 100%. Value of 100% would modulate Spacing parameter from 0 to 2x Spacing.
 - Depth: Adjust the mix of the processed Chorus output with the dry input signal. Variable from 0 to 100%.
- Stereo Width: Adjust the spreading of the Chorus voices in the stereo field.

13.9.3 Flanger

Flanger creates spatial depths, swirls, timbre shifts, and percussive effects. Flanging is often used on guitar tracks to create interesting shifts in timbre and tone, and it can help create lush synth sounds, as well. It works by splitting an audio signal into two identical signals; applying a varying, short delay to one signal; feeding its output back to its input by varying amounts; and mixing the processed and unprocessed signals. You can modulate Flanger's delay time with an LFO, which can be tempo-synced.

The following parameters are available for Flanger:

- LFO: The LFO modulates the Speed/Beats parameter.
 - Speed/Beats: Adjust the speed of the LFO.
 - Sync: Click to engage LFO tempo sync. Time will be expressed as Beats.
 - Speed: Variable from 0.01 Hz to 10 Hz.
 - Beats: Select from 4/1 to 1/64 with triplet and dotted-time variants.
 - LFO Width: Adjust the range of the LFO modulation on delay time (speed). Variable from 0 to 100%. Value of 100% would modulate Spacing parameter from 0 to 2x Speed.
 - Depth: Adjust the wet/dry mix of the Chorus output.
- Feedback: Adjust the amount of delayed output to be fed back into the input. Variable from -90% to 90%. Negative value results in inverted feedback.
- Delay: Adjusts the delay time for the copied input signal. Variable from 0.25 ms to 10 ms.
- Depth: Adjust the mix of the processed Flanger output with the original dry input signal. Variable from 0 to 100%.

13.9.4 Phaser



Phaser applies a variable number of allpass filters in series (one fed into the other), along with one overall feedback loop, to the input signal. Phaser features an LFO to modulate the center frequencies for each allpass filter.

The allpass filters function as frequency-dependent delays, so that when the filtered output is added to the original input signal, certain frequencies can be attenuated or amplified as the result of phase shifting. Phasers are commonly used on many types of tracks, including synths, guitars, and even vocals, to create a distinctive frequency shifting effect.

The following parameters are available for Phaser:

- LFO: Modulates the center frequency for the allpass filters between the range set by Range Low and Range High.
 - Range Low: Adjust the lowest center frequency for the allpass filters. Variable from 10 Hz to either 8 kHz or the Range High value.
 - Range High: Adjust the highest center frequency for the allpass filters. Variable from either 10 Hz or the Range Low value to 8 kHz.
 - Speed/Beats: Adjust the speed of the LFO.
 - Sync: Click to engage LFO tempo sync. Time will be expressed as Beats.
 - Speed: Variable from 0.01 Hz to 10 Hz.
 - Beats: Select from 4/1 to 1/64 with triplet and dotted-time variants.
- Feedback: Adjust the amount of the filtered output signal to be fed back into the input. Variable from 0 to 95%.
- Stages: Adjust the number of allpass filter stages for the Phaser. Variable from 2 to 20.
- Depth: Adjust the mix of the effected Phaser output with the original dry input signal. Variable from 0 to 100%.

13.9.5 X-Trem



X-Trem is a tremolo effect that applies amplitude modulation at a varying amount and rate over time. The X-Trem features tempo sync and a variable LFO with selectable 16-step and 16-gate sequencers, as well as auto-pan capability. Use Tremolo on any track to create anything from subtle shifts in amplitude to tempo-synced, glitchy, gated drums; trancy, gated pads; panned hi-hats; and other popular sounds.

The following parameters are available for the Tremolo:

- Depth: Adjust the relative amount of maximum amplitude modulation. Variable from 0 to 100%.
- Speed/Beats: Adjust the speed of the LFO.
 - Sync: Click to engage LFO tempo sync. Time will be expressed as Beats.
 - Speed: Variable from 0.01 Hz to 30 Hz.
 - Beats: Select from 4/1 to 1/64 with triplet and dotted-time variants.
- Pan/Trem: Click to switch the mode of the Tremolo to affect overall amplitude (Trem) or the left- and right-channel balance (Pan). Pan is only selectable on stereo tracks.

- LFO Mode: Select from Triangle, Sine, Sawtooth, or Square LFO waveforms or a 16-step or 16-gate sequencer.
 - 16 Steps: Click in the LFO display to adjust each step. The steps divide the current Speed/Beats time value; the value of each step represents amplitude/pan at that step from 0/hard left to 100%/hard right.
 - 16 Gates: Click in the LFO display to open/close the gate at each step. The steps divide the current Speed/Beats time value. For each step, no color fill means gate is closed and total color fill means gate is open.

13.10 Reverb

Reverb effects are used in almost all music productions for a variety of purposes. In everyday life, reverberation is the result of the many reflections of sound that occur in a given room or other space. In an ambient space, sound may travel directly to your ear and also be reflected many times off the walls and ceiling of a room before again reaching your ear. With each reflection, the sound is attenuated as sound energy is absorbed by the reflecting surfaces and dissipated by traveling through a medium (usually air). This collection of reflected and attenuated sounds is what we know as reverb.

Reverb provides essential aural cues about the nature of any given space. As such, reverb is commonly used in music production to create virtual spaces in which the various parts of a mix can interact.

Studio One features two built-in reverbs: MixVerb and Room Reverb. The following describes these reverb effects.

13.10.1 MixVerb



MixVerb is a simple and efficient reverb that is meant to be used as an insert on mono or stereo tracks. MixVerb features adjustable size, pre-delay, and damping, as well as an adjustable gate and stereo-width control.

MixVerb offers the following parameters:

- Pre-delay: Adjust the pre-delay time. Variable from 0 ms to 500 ms. Pre-delay is the amount of time before the first reverberated signals will be heard.
- Size: Adjust the relative size of the reverberating space. Variable from 0 to 100%.
- Damp: Adjust the relative amount of damping (attenuation of the upper frequencies) of the reverberated signal. Variable from 0 to 100%.
- Gate: The gate is applied to the reverb output signal.

- Gate: Click to engage/disengage the gate.
- Gate Thresh: Adjust the threshold of the gate. Variable from -36 dB to 12 dB.
- Gate Release: Adjust the release time of the gate. Variable from 10 ms to 250 ms.
- Width: Adjust the width of the stereo field. Variable from 0 to 100%. Only for stereo tracks.
- Mix: Adjust mix of MixVerb-processed signal with the original dry signal. Variable from 0 to 100%.

13.10.2 Room Reverb



Room Reverb is a room-simulator reverb that adjusts its internal reverb parameters based on virtual-room models. It is meant for use as a Send effect or as a main output-channel effect. Room Reverb features variable room parameters and geometry, selectable room models, and population, damping, and surface-smoothness controls.

Room Reverb provides the following parameters:

- Display: Displays the overall reverb characteristics across a self-adjusting time scale. Early reflections are represented by vertical lines, and the reverb tail is represented by colored envelope.
- Pre: Adjust the offset for room-derived natural predelay amount. Variable from 0 ms to a higher value determined by current Room settings.
- Length: Adjust the offset for room-derived natural reverb tail length. Value range is variable based on current Room settings.
- Room:
 - Size: Adjust the geometric average of the Width, Depth, and Height of the virtual-room model. Variable from 1 m to 20 m.
 - Width: Adjust the Width relative to Size. Variable from 0.1 to 2.
 - Height: Adjust the Height relative to Size. Variable from 0.1 to 1.
- Geometry:
 - Dist: Adjust the relative distance between the source and the listener position within the virtual room. Variable from 0.1 to 1.
 - Asy: Adjust the left and right asymmetry between the source and the listener position. Variable from -1 (listener position far right) to 1 (listener position far left).
 - Plane: Adjust the relative height of the stereo source and listener position within the virtual room. Variable from 0 (half the height of the room) to 1 (ceiling).

- **Room Model:** Select a synthetic reverb models. Choose from Small Room, Room, Medium Hall, and Large Hall.
 - **W, D, H Display:** Displays approximate room dimension values based on current Room settings.
- **Character:**
 - **Population:** Adjust the relative population of people in the virtual room. Variable from 0 to 1.
 - Value of 0 results in enhanced bass, “static” tail.
 - Value of 1 results in attenuated bass, “moving” tail.
 - **Dampness:** Adjust the relative humidity of the air in the room. This has the effect of attenuating the upper frequencies of the reverberated signal. Variable from 0 to 1.
 - **Reflexivity:** Adjust the relative smoothness of the surfaces of the virtual room. Variable from 0 to 1. Higher values evoke a more echo-like reverb tail.
- **Reverb Mix:** Adjust the mix of the reverb tail and early reflections. Variable from 0 to 1. Reverb display is updated to indicate this mix.
- **Send Mix:** Adjust mix of MixVerb-processed signal with the original dry signal. Variable from 0 to 100%.
- **Perform/Quality:** Quality mode is selected by default. Engage Perform mode (economy performance mode) to use less CPU resources by disabling floor and ceiling reflections and reducing the calculation accuracy for the reverberation.

13.11 Pipeline (Studio One Pro)

As mentioned in section 9.2.9 of this manual, Pipeline allows hardware processors to be inserted on audio channels in much the same way that virtual effects are inserted. This feature is commonly called a Hardware Insert.

13.11.1 Configuring an Instance of Pipeline

Insert an instance of Pipeline on any channel just like any other effect, either by dragging it in from the Browser, or through the Add menu in the Insert Device Rack. Note that there are Mono and Stereo versions of Pipeline; use the version that is appropriate for your hardware processor.

The center of the Pipeline interface features the following controls:

- **Label:** Click in the empty space to type in a label. This is used to clearly identify the inserted hardware.

Send controls:

- **Gain:** Adjust the send gain to prevent clipping the hardware input.
- **Output Selection:** Select the output channel that is used to route audio from Studio One to your hardware processor.

Return controls:

- **Gain:** Adjust the return gain as needed to prevent clipping after the hardware insert.
- **Input Selection:** Select the input channel that is used to route audio from your hardware processor into Studio One.
- **Phase Invert:** Invert the phase of the return signal (relative to the send signal).
- **Offset:** Set an offset value in samples to account for the latency induced directly by your hardware processor.

To the far left and right of the Pipeline interface are Send and Return meters with separate clip indicators, enabling you to accurately monitor send and return levels.

13.11.2 Automatic Latency Compensation

Pipeline will automatically compensate for the latency introduced by routing audio from and back into your audio interface. This is based on the reported input and output latency for your hardware interface. The roundtrip latency being compensated for is displayed in milliseconds at the bottom of the Pipeline interface.

13.11.3 Manual Offset

For practical purposes, analog hardware processors do not introduce latency (aside from the latency introduced by the interface), as their processing takes place at close to the speed of light. However, some digital hardware processors might introduce latency that is separate from the latency introduced by your audio interface.

For instance, if you insert a hardware digital reverb, the digital processing is likely to introduce a small amount of latency. This latency is not compensated for automatically, which could result in the signal being delayed very slightly, altering its phase relationship to the rest of the mix.

Adjust the Offset knob to compensate for latency introduced by the hardware processor. The Offset value is added to the total roundtrip latency. Setting a positive value will increase the latency-compensation time, and setting a negative value will decrease the latency-compensation time. Therefore, set a positive Offset value when compensating for hardware-processor latency.

13.11.4 Storing Pipeline Presets

Once Pipeline has been configured for a particular piece of hardware, you should store the setting as a preset so that the configuration can be recalled at a later time, as with a virtual-effect preset. Any number of presets can be stored, which allows you to recall configurations for any number of hardware processors. These presets will appear under the Pipeline effect in the Browser, just like a preset stored for a virtual effect.

If you create new I/O channels in the Audio I/O Setup while configuring a Pipeline preset, be sure to click on Make Default before exiting the menu. This will ensure that the required I/O for that Pipeline preset is available in every Song and Project.

Normally, you would use only one instance at a time of Pipeline with a particular I/O configuration. However, it is possible to insert the same Pipeline preset on multiple channels, in which case the signal from each channel will effectively sum at the specified output, and that summed signal will return from the hardware processor to every channel simultaneously. While this might lead to interesting possibilities, exercise caution, as levels could easily become excessive.

13.11.5 Mixing Down with Pipeline

When Pipeline is being used in any Song, you must render a mixdown in real time, as this is required in order for your hardware insert to be incorporated in the mix.

In the Options/Advanced/Devices/Audio Engine menu, there is an option to force real-time processing to be used when updating mastering files, as discussed in section 12.9.2 of this manual. This option should be engaged if you intend to use Pipeline in your Songs in order to avoid possible offline rendering of a mixdown during the automatic update process.

14: Built-in Virtual Instruments

Studio One has three built-in virtual instruments: SampleOne, Impact, and Presence. These instruments provide a solid foundation for music production in any style. The following sections describe each instrument in detail.

14.1 SampleOne



A sampler is an instrument closely related to a synthesizer. However, instead of generating sounds from basic waveforms, a sampler starts with an audio clip, or “sample,” and then plays that sample based on how the instrument is configured.

SampleOne is a basic sampler with adjustable keymap range and loop capabilities, amplifier and filter envelopes, and LFO modulation parameters. The following describes how to use SampleOne.

14.1.1 Interface

The main display shows the currently selected sample waveform and allows playback/loop-range and keymap-range editing. To the right of this display is the list of all currently loaded samples, which will triggered simultaneously and can therefore be considered sample layers. Click on the Edit button below the main display to expand the global Amplifier, Filter, and LFO parameters.

14.1.2 Add and Play a Sample

To add a sample to SampleOne, drag any audio clip from the Browser, or any Audio Event from the Arrange view, into the sample list. The waveform for the audio clip will appear in the main display. If you drag in a sized Audio Event from the Arrange view, the entire original audio-clip waveform will be displayed, with the range set around the sized portion.

By default, the keymap range is set from C0 to B5, with C3 set as the sample’s root note. With the SampleOne instrument track properly set up, and Monitor engaged, press any key within the default keymap range on your keyboard to play the loaded sample. Playing the C3 (middle C) key on your keyboard will play the sample at its original pitch and speed because C3 is set by default as the sample’s root note. Playing the keys above C3 will shift the sample pitch higher, and below C3 will shift the sample pitch lower and will slow down playback speed.

Samples can be tuned by adjusting the Tune parameter above the main display. Float the mouse over the Tune parameter and use the mouse wheel to adjust the parameter, or click and enter a value. The Tune parameter is expressed in cents.

The output of SampleOne can be stereo (default) or mono. To switch to mono, click on the Mono button.

Click on the Glide button to engage Glide and adjust the relative amount of Glide using the horizontal fader. Glide will create gradual shifting over time between consecutive notes, as opposed to the usual immediate switch from one note to the next.

14.1.3 Adjust Sample Playback Range

To adjust the time range of the sample that will play when triggered, float the mouse to the left or right edge of the sample until the Hand cursor appears, then click-and-drag left or right. The range highlighted in blue will play when the sample is triggered.

14.1.4 Loop a Sample

To loop playback of a sample, click on the Loop button above the main display. A Loop Range display will appear above the sample waveform, indicating the section of the sample to be looped. Any range of the sample can be looped. If the loop range begins after the initial playback range begins, the sample will play from the beginning of the playback-range position to the end of the loop-range position, then it will play from the start of the loop range to the end of the loop range and back for as long as the sample is triggered.

14.1.5 Change Root Note and Keymap Range

To change the Root note, click-and-drag the root-note handle (displayed immediately above the keyboard display, C3 by default) left or right across the keyboard display. The notes on your keyboard that will trigger the sample are indicated with the Keymap Range display, which is the blue bar extending to the right and left of the note handle. To restrict the range of notes that will trigger the sample, click-and-drag on the left or right edge of the Keymap Range display.

14.1.6 Playing Multiple Samples

Any number of samples can be loaded into SampleOne at once, with each loaded sample displayed in the sample list. Select any sample in the list to edit its playback, loop, and keymap range, as well as its root note, and loop status. All loaded samples will be triggered simultaneously, depending on the keymap range for each sample. For instance, if C3 on your keyboard is set to trigger every sample, pressing C3 will trigger every sample at once. In this way, multilayered, or multitimbral sample playback can be achieved.

Note that the amplifier envelope, filter envelope, and LFO are global and affect the overall output of SampleOne.

14.1.7 Replace a Sample

To replace a sample in SampleOne, select, in the sample list, the sample that you wish to replace. Then drag any audio clip from the Browser, or any Audio Event from the Arrange view, into the main display. The sample will replace the previous one in the sample list, and the previously displayed sample waveform will be updated to reflect the new sample.

14.1.8 Edit Amplifier and Filter Envelopes

The output of SampleOne can be modified with Amplifier and Filter ADSR (Attack, Decay, Sustain, Release) Envelopes. The following describes the use of these envelopes.

- **Amplifier Envelope:** Modify the amplitude characteristics of the audio output. Click activate button to activate/deactivate.
 - **Volume:** Adjust the maximum volume of the audio output. Variable from $-\infty$ to 6 dB.
 - **Pan:** Adjust the stereo pan of the audio output. Variable from full L to full R.
 - **Attack:** Adjust the amount of time it takes to reach full volume once a sample has been triggered. Variable from 0.98 ms to 1,024s.
 - **Decay:** Adjust the amount of time it takes to reach the Sustain level after reaching full volume. Variable from 0.98 ms to 1,024s.
 - **Sustain:** Adjust the Sustain level. Variable from -96 dB to 0 dB. The Sustain period continues until the sample trigger stops.
 - **Release:** Adjust the amount of time it takes to reach a level of $-\infty$ after sample trigger has stopped. Variable from 0.98 ms to 1,024s.
 - **Velocity:** Adjust the amount in dB that note velocity affects the maximum amplitude. Variable from $-\infty$ to 0 dB (the value used when velocity equals 127).
 - **Wheel:** Adjust the range, expressed in dB, with which the modulation wheel on your Keyboard can adjust the instantaneous amplitude at any time (the value used when the mod-wheel value equals 127).
- **Filter Envelope:** Modify the frequency characteristics of the audio output. Click activate button to activate/deactivate.
 - **Frequency:** Adjust the filter cutoff frequency. Variable from 19.4 Hz to 19.913 kHz.

- **Resonance:** Adjust the relative resonance of the filter. Variable from 0 to 100.
- **Attack:** Adjust the amount of time it takes for the filter cutoff frequency to move from the Frequency value to the Envelope value once a sample has been triggered. Variable from 0.98 ms to 101.6s.
- **Decay:** Adjust the amount of time it takes to reach the Sustain level after reaching the Envelope value. Variable from 0.98 ms to 101.6s.
- **Sustain:** Adjust the Sustain level, which is the mix of signal filtered at Envelope value with the signal filtered at the Frequency value. Variable from -96 dB to 0 dB. Sustain period continues until sample trigger stops.
- **Release:** Adjust the amount of time it takes the filter to reach the Frequency value after sample trigger has stopped. Variable from 0.98 ms to 101.6s.
- **Envelope:** Adjust the maximum Frequency value, expressed as distance from Frequency value in octaves, reached after the initial Attack period and during the Sustain time period. Variable from -10 octaves to 10 octaves.
- **Velocity:** Adjust the maximum range in octaves that note velocity can affect the maximum filter range (the value used when velocity equals 127).
- **Wheel:** Adjust the range, expressed as distance in octaves, with which the modulation wheel on your Keyboard can adjust the instantaneous filter cutoff frequency at any time (the value used when the mod wheel value equals 127).

14.1.9 Modulate Parameters with LFO

Various parameters of SampleOne can be modulated, or varied over time, with the LFO. The following describes how to use the LFO to modulate parameters.

- **LFO:** Click Activate button to activate/deactivate.
 - **Sync:** Click to tempo-sync the LFO.
 - **Beats:** Select the time division of the current tempo to which the LFO is synced. Variable from 4/1 to 1/64 with dotted and triplet variations.
 - **Waveform:** Click to select, from top to bottom, the Triangle, Sine, Sawtooth, or Square LFO waveform.
 - **Speed:** Adjust the speed of the LFO when not tempo-synced. Variable from 0.5 Hz to 147 Hz.
 - **Delay:** Adjust the amount of time before the LFO affects anything once a sample is triggered. Variable from 0.98 ms to 18s.

- **Vibrato:** Adjust the range within which the LFO will affect sample pitch. Variable from -200 cents (start at -200 cents, range from -200 to +200) to 200 cents (start at +200 cents, range from +200 to -200).
- **Filter:** Adjust the frequency range, expressed as distance in octaves, within which the LFO will affect the instantaneous cutoff-frequency value of the Filter. Variable from -6.7 oct to 6.7 oct.
- **Amplifier:** Adjust the peak amplitude amount with which the LFO will modulate the instantaneous amplitude. Variable from $-\infty$ to 0 dB.
- **Wheel:** Adjust the peak amplitude amount with which the modulation wheel will control the LFO signal strength (LFO strength when mod wheel value equals 127). Variable from $-\infty$ to 0 dB.

14.2 Impact



Impact features a grid of pads into which samples are loaded and played back independently, as with many popular hardware drum-sample players. Each pad has its own pitch, amplifier, and filter controls with accompanying envelopes. There are multiple stereo and mono outputs for each pad, making sophisticated output busing simple.

14.2.1 Interface

Impact is arranged as a 4x4 grid of pads, with controls for each pad. Below each pad are Solo and Mute controls, as well as an output-channel assignment. Click on any pad to select it and view its parameters, located on the right side of the interface. Below the pad parameters are Add and Remove buttons for adding or removing a sample from the currently selected pad, as well as Group controls for grouping pads.

14.2.2 Add and Play a Sample

To add a sample to a pad, drag any audio clip from the Browser, or any Audio Event from the Arrange view, directly onto the desired pad. Each pad can contain only one sample. Dragging a sample to a pad that already contains a sample will replace the old sample with the new one. To remove any sample, [Right]/[Control]-click on the desired pad and select Remove Clip.

Once a sample has been added to a pad, you can trigger the sample by clicking on the pad with the mouse, or by playing that pad's assigned note on your Keyboard. The note assignment is displayed in the upper left corner of each pad. To solo a pad, so that no other pad will play when

triggered, click on the Solo button beneath the desired pad. To mute a pad, so that pad will not play when triggered, click on the Mute button beneath the desired pad.

Note that each pad has its own controls.

14.2.3 Pitch Control

You can modify the pitch for each pad's sample using the Pitch controls.

- Pitch Env
 - Attack: Adjust the amount of time from when the pad is triggered to when the Envelope value is reached. Variable from 0s to ∞ .
 - Decay: Adjust the amount of time it takes after the Attack period to return to the Envelope value. Variable from 0.98 ms to ∞ .
- Pitch
 - Envelope: Adjust the detune range of the Pitch Env in cents. Variable from -1,200 to 1,200. (The default value is 0, meaning the Pitch Envelope has no effect.)
 - Velocity: Adjust the maximum detune value in cents that pitch is affected by velocity (the maximum detune value when triggered note velocity equals 127). Variable from -1,200 to 1,200.
 - Trans: Adjust the transposition in semitones for the selected pad. Variable from -10 to 12.
 - Tune: Adjust the tuning in cents for the selected pad. Variable from -100 to 100.

14.2.4 Amplifier Control

To adjust the amplitude for each pad, use the following parameters:

- Amp Env
 - Attack: Adjust the amount of time from when the pad is triggered to when maximum amplitude is reached. Variable from ∞ (no attack, sample starts at maximum amplitude) to 0s to ∞ .
 - Decay: Adjust the amount of time it takes after the attack period to reach an amplitude of $-\infty$ from the maximum amplitude. Variable from 0.98 ms to ∞ .
- Amplifier
 - Velocity: Adjust the maximum amplitude value in dB affected by velocity (the maximum amplitude value when triggered note velocity equals 127). Variable from $-\infty$ to 0 dB.

- **Pan:** Adjust the sample's stereo pan for the selected pad. Variable from -1 (L) to 1 (R).
- **Gain:** Attenuate or boost the amplitude in dB of the sample assigned to the selected pad. Variable from $-\infty$ to 6 dB.

14.2.5 Filter Control

Each pad features a variable filter to allow anything from subtle tonal shaping to heavily processed filter sweeps.

- **Filter Env**
 - **Attack:** Adjust the amount of time it takes for the filter cutoff frequency to move from the Frequency value to the Envelope value once a sample has been triggered. Variable from 0s to ∞ .
 - **Decay:** Adjust the amount of time it takes to reach the Sustain level after reaching the Envelope value. Variable from ∞ (no Decay period) to 0.98 ms to ∞ .
- **Envelope:** Adjust the range of the Filter Envelope in octaves, relative to the Cutoff value. Variable from -10 to 10. (The default value is 0, meaning the Filter Envelope has no effect.)
- **Velocity:** Adjust the maximum value in octaves affected by velocity (the maximum value when triggered note velocity equals 127). Variable from -10 to 10.
- **Cutoff:** Adjust the cutoff frequency of the Filter. Variable from 20 Hz to 20 kHz.
- **Reso:** Adjust the resonance of the Filter. Variable from 0 to 100.

14.2.6 Grouping Pads

Pads can be grouped so that when one pad in the group is triggered, all of the pads in the group are triggered simultaneously. You can add pads to one of four groups by doing the following:

- Select a pad you wish to assign to a Group.
- Click on the Group select box under the pad parameters and choose 1, 2, 3, or 4.
- Repeat the process for any pad you wish to assign to a group.

When any pad in Group 1, 2, 3, or 4 is triggered, all pads in the same group will be triggered at the same time.

14.2.7 Using Multiple Outputs

Impact features two stereo outputs and three different mono outputs for each pad. To change the output routing, do the following:

- Click on the Channels button at the top of the Impact window to open the output-channel's Activation menu.
- Click on the checkbox next to any output you wish to use. These channels will then appear in the Mix Console.
- Click on the Output selection box below the desired pads and choose the desired output channel for each pad.

14.3 Presence



Presence is a virtual sample-player instrument that enables you to play an enormous variety of sounds. Presence uses a native sound format packaged into Sound Sets, and can also load and play any SoundFont. The Sound Sets include a wide variety of instruments, such as pianos, strings, horns, and percussion. These sounds can be extensively shaped using the built-in Filter and Amplifier Envelopes and Modulation LFO.

14.3.1 Load and Play a Preset

The Sound Sets included with Studio One can be found as presets in Presence. To browse the presets, click on the Preset window. Click once on any preset in the list to load the preset in Presence. When loaded, the preset is immediately playable by clicking on the keyboard display or by using your Keyboard.

14.3.2 Add SoundFonts to Your Library

In order to be accessed directly in Presence, SoundFonts must be added to the Studio One Instrument Library, found in File/Options/Locations/Instrument Library [Mac OS X: Preferences/Options/Locations/Instrument Library]. To make your SoundFonts directly accessible in Presence, simply add the storage location in which they reside to the Instrument Library.

To do this, click on Add in the Instrument Library menu, browse to the appropriate location, and click OK. SoundFonts found in the specified location will be added to the preset list in Presence.

14.3.3 Relative Control Parameters

Multiple samples are used to create sounds in a single instrument, and presets can potentially be comprised of multiple instruments. Expressive playback is achieved by modifying the samples within a preset, using relative controls, as each sample in any given preset can have different absolute settings.

The parameter values for the controls in Presence are relative to the absolute settings for the samples in the loaded preset and are expressed as percentages or something similar. While this might appear confusing in theory, in practice these controls are very easy to use.

14.3.4 Filter Control

The Filter allows you to shape the tonality of the audio output using the following parameters:

- **Frequency:** Adjust the relative filter cutoff frequency. Variable from -100% to 100%.
- **Resonance:** Adjust the relative resonance of the filter. Variable from -960 to 960.
- **Attack:** Adjust the relative amount of time it takes for the filter cutoff frequency to move from the Frequency value to the Envelope value when a note is played. Variable from -100% to 100%.
- **Decay:** Adjust the amount of time it takes to reach the Sustain level after reaching the Envelope value. Variable from -100% to 100%.
- **Sustain:** Adjust the Sustain level, which is the mix of the signal filtered at the Envelope value with the signal filtered at the Frequency value. Variable from -100% to 100%, Sustain period continues until note trigger stops.
- **Release:** Adjust the amount of time it takes the filter to reach the Frequency value after note trigger has stopped. Variable from -100% to 100%.
- **Envelope:** Adjust the maximum relative Frequency value, reached after the initial Attack period and during the Sustain period. Variable from -100% to 100%.
- **Velocity:** Adjust the maximum range that note velocity can affect the maximum relative filter range (the value used when velocity=127).

14.3.5 Amplifier Control

The Amplifier allows you to modify the amplitude characteristics of the audio output using the following parameters:

- **Gain:** Amplify or attenuate the relative gain. Variable from -100% to 100%.
- **Pan:** Adjust the relative pan of the audio output. Variable from -100 (L) to 100 (R).
- **Attack:** Adjust the relative amount of time it takes to reach full volume when a note is played. Variable from -100% to 100%.
- **Decay:** Adjust the relative amount of time it takes to reach the Sustain level after reaching full volume. Variable from -100% to 100%.
- **Sustain:** Adjust the relative Sustain level. Variable from -100% to 100%. Sustain period continues until note trigger stops.
- **Release:** Adjust the relative amount of time it takes to reach a level of $-\infty$ after note trigger has stopped. Variable from -100% to 100%.
- **Velocity:** Adjust the relative amount by which note velocity affects the maximum amplitude. Variable from -100% to 100% (the value used when velocity value equals 127).

14.3.6 LFO Control

Use the LFO to modulate Presence parameters over time, using the following parameters:

- **Delay:** Adjust the relative amount of time before the LFO becomes active when a note is triggered. Variable from -100% to 100%.
- **Speed:** Adjust the relative speed of the LFO. Variable from -100% to 100%.
- **Pitch, Filter, Amp:** Adjust the relative effect of the LFO on Pitch, the Filter, and the Amplifier, each variable from -100% to 100%.
- **Vibrato:** The Vibrato control is an independent LFO that affects only Pitch.
 - **Delay and Speed:** The same as the LFO Control parameters. Variable from -100% to 100%.
 - **Depth:** Adjust the signal strength of the LFO. Variable from 0 to 2.

14.3.7 Other Controls

Below the Filter, Amplifier, and LFO controls is a keyboard display, with the following parameters to its left:

- Pitch Bend (PB): Adjust relative pitch. Variable from -1 to 1.
- Mod Wheel (Mod): Adjust modulation amount. Variable from 0 to 1.
- Glide (GL): Click to engage Glide. Adjust Glide time with vertical fader. Variable from 9 ms to 1s.
- Monophonic (MN): Click to engage Monophonic mode. Will allow only one note trigger at a time.

14.4 Mojito

Mojito is a simple, monophonic, subtractive synthesizer with effects, capable of generating a wide range of sounds. It models a classic analog synthesizer and features a low-aliasing oscillator and a 24 dB filter emulation. Mojito can generate killer bass sounds, lead sounds, and special effects.

14.4.1 Interface

Mojito is organized into Oscillator (OSC), Amplifier (AMP), Filter (FLT), and FX sections, with easy-to-use, yet powerful controls.

14.4.2 Oscillator

Mojito's Oscillator section is on the upper left. Here you can set up the harmonic content of the sound source. The basic controls are the three large knobs on top: Pitch, Wave, and Width.

- Pitch: Adjusts the frequency from one octave below to one octave above the played note. Note that this will affect the cutoff frequency only via keytracking. Pitch will be modified by the pitch-bend wheel (+/- 2 semitones).
- Wave: Selects between a sawtooth wave and a pulse wave. These two waveforms have a rich and regular harmonic content, making them classic sources for subtractive synthesis. Sawtooth waves contain the fundamental and all harmonics whereas pulse waves have only the fundamental and odd harmonics. Mixed settings will effectively adjust the level of the even harmonics.
- Width: Adjusts the pulse width of the pulse wave from almost zero to square. This will adjust the balance between the fundamental and the higher and lower harmonics.

Below the three main OSC controls is a smaller row of knobs that adjust how much the oscillator settings will be modulated. The speed of the

14.4.3 Amplifier

modulation is adjusted using the LFO Speed controls, located to the right of these knobs. The LFO can be synced to tempo or it can oscillate with a freely adjustable period. Use the modulators to create chorus-like or stringy sounds, vibrato, and other familiar modulated sounds.

Below the Oscillator section is the Amplifier section. This consists of a Gain control, which will react to MIDI Volume messages, and a Velocity-to-Volume control, which modulates the volume of a note in response to key velocity.

The most important part of this section is the ADSR Envelope. (“ADSR” stands for “Attack, Decay, Sustain, Release.”) With these four sliders, you can adjust the amplitude characteristics over time. These characteristics play a huge role in defining the overall sound. The ADSR Envelope can control the volume of a played note and can also control the Filter Cutoff.

- **A:** Adjust the attack time, which is the time required for the sound’s amplitude to go from zero (silence) to full amplitude. The range is from 2 to 500 ms.
- **D:** Adjusts the decay time, which is the time required to drop from full amplitude to the sustain level. The range is from 2 ms to 1s.
- **S:** Adjusts the sustain level, which is the level that is held from the end of the decay until the key is released. The range is from -96 dB (silence) to 0 dB (full amplitude).
- **R:** Adjusts the release time, which is the time required to fall back to silence after the key is released. The range is from 2 ms to 2s.

To the left of the AMP section is the Portamento control. Using the Portamento mode selector, you can choose between three modes.

- **No Portamento:** A note that is played while another note is playing will silence the previous note and trigger the new one.
- **Legato:** An overlapped note will not trigger a new envelope but the pitch will slowly change to the pitch of the new note.
- **Retrigger:** An overlapped note will retrigger the current envelope, starting at its volume at the moment it is retriggered. This also slowly changes the note’s pitch.
 - **Note:** Velocity will not be applied or updated for overlapped notes.

The Time knob adjusts the glide speed (that is, the duration of the pitch change) when using portamento. The range is from 5 ms to 1s.

14.4.4 Filter

The section on top of the right side of Mojito only affects the resonant 24 dB Lowpass Filter.

- **Reso:** Controls the resonance of the filter, which is an amplification, or emphasis, of the signal at the cutoff-frequency.
 - **Note:** If the amount of resonance of a filter is raised high enough, the filter begins oscillating at the cutoff frequency, thus generating its own waveform. Be careful, this can be loud!
- **Cutoff Knob:** Controls the corner, or cutoff, frequency, which is the point above which frequencies will be attenuated. The range is from 20 Hz to 16 kHz.
- The other controls affect the modulation of the cutoff frequency.
 - **Key:** Controls how much the played note scales the cutoff-frequency.
 - **Velo:** Controls how much the velocity of the played note shifts the cutoff frequency up or down.
 - **Envelope:** Controls how much the ADSR Envelope shifts the cutoff frequency up or down.
 - **LFO:** Controls the amount of shifting that the Filter LFO applies to the cutoff frequency. The LFO can either be synced to tempo or it can oscillate with an adjustable period.

14.4.5 FX

On the bottom right is a small effects section where you can apply a modulation effect to enliven or broaden the sound. Mod Depth controls the amount of this effect. Using Mod Color, you can adjust the timbre from a flanger-like to a chorus-like effect. The modulation utilizes an LFO that has the same speed as the Filter LFO.

Finally, there is an Overdrive, the amount of which is controlled by the Drive control.

Appendix

Table 1 Key Commands

The following chart is a reference for all available key commands in Studio One.

Action	Key Command
Start Page	Alt+Home
Next Perspective	Cmd+Tab
Previous Perspective	Cmd+Shift+Tab
Editor	F2
Console	F3
Inspector	F4
Browser	F5
Instrument Browser	F6
Effect Browser	F7
Sound Browser	F8
File Browser	F9
Pool Browser	F10
Show Channel Editor	F11
Toggle Floating Windows	F12
Toggle Optional Views	Shift+F12
Zoom In	E (Cmd++)
Zoom Out	W (Cmd+-)
Zoom In Vertical	Shift+E
Zoom Out Vertical	Shift+W
Zoom to Loop	Shift+L
Zoom to Selection	Shift+Alt+S
Zoom to Selection Horizontally	Alt+S
Zoom Full	Alt+Z
Undo Zoom	Alt+W
Redo Zoom	Alt+E
Toggle Zoom	Z
Store Zoom State	Shift+Z
File	
Action	Key Command
New Song	Cmd+N
New Project	Cmd+Shift+N
Open	Cmd+O
Close	Cmd+W
Save New Version	Cmd+Shift+Alt+S
Save	Cmd+S
Save As	Cmd+Alt+S

Options	Cmd+,
Quit	Cmd+Q
Edit	
Action	Key Command
Undo	Cmd+Z
Redo	Cmd+Y
Cut	Cmd+X
Copy	Cmd+C
Paste	Cmd+V
Paste at Original Position	Cmd+Shift+V
Delete	Del
Select All	Cmd+A
Deselect All	Cmd+D
Invert Selection	Cmd+I
Select All in Loop	Alt+L
Select All on Tracks	Cmd+Shift+A
Deselect All on Tracks	Cmd+Shift+D
Duplicate	D
Duplicate Shared	Shift+D
Move to Cursor	Cmd+L
Create Ranges on Tracks	Shift+R
Create Ranges	Alt+R
Insert Silence	Cmd+Alt+I
Split Loop	Cmd+Shift+X
Event Edit	
Toggle Mute	Shift+M
Decrease Volume	Alt+Num Pad -
Increase Volume	Alt+Num Pad +
Reverse Audio	Cmd+R
Create Auto Crossfade	Shift+X
Create Autofades	X
Bounce Selection	Cmd+B
Insert Part	Cmd+P
Merge Instrument Parts	G
Bounce Instrument Parts	B
Quantize	Q
50% Quantize	Alt+Q
Restore Timing	Shift+Q
Nudge	Alt+Right Arrow
Nudge Back	Alt+Left Arrow
Nudge Bar	Cmd+Alt+Right Arrow
Nudge Bar Back	Cmd+Alt+Left Arrow

Song	
Import File	Cmd+Shift+O
Mixdown to Audio File	Cmd+E
Export Tracks as Audio Files	Cmd+Shift+E
Track	
Action	Key Command
Add Tracks	Cmd+T
Remove Tracks	Cmd+Shift+T
Solo Track	S
Mute Track	M
Record enable Track	R
Show Automation	A
Show Instrument Editor	F11
Group Selected Tracks	Cmd+G
Dissolve Group	Cmd+Shift+G
Transport	
Action	Key Command
Toggle Playback	Space bar
Start	Enter
Stop	Num Pad 0
Record	Num Pad *
Loop Selection	P
Locate Selection	L
Toggle Loop	Num Pad /
Click	C
Return to Zero	Num Pad ,
Locate Loop Start	Num Pad 1
Locate Loop End	Num Pad 2
Auto Punch In/Out	I
Preroll	O
Goto Time	T
Autoscroll	F
Marker	
Action	Key Command
Insert Marker	Y,Ins
Locate Next Marker	Shift+N
Locate Previous Marker	Shift+B
Locate Marker 3-9	Num Pad 3-9
Navigation	
Action	Key Command
Previous Preset	Alt+Page Up

Next Preset	Alt+Page Down
Previous Device	Cmd+Page Up
Next Device	Cmd+Page Down
Focus Next	Tab
Focus Previous	Shift+Tab
Next Preset	Alt+Page Down
Previous Preset	Alt+Page Up
Home	Alt+Home
Left	Left Arrow
Extend Selection Left	Shift+Left Arrow
Extend Selection Left Add	Cmd+Shift+Left Arrow
Skip Left	Cmd+Left Arrow
Right	Right Arrow
Extend Selection Right	Shift+Right Arrow
Extend Selection Right Add	Cmd+Shift+Right Arrow
Skip Right	Cmd+Right Arrow
Up	Up Arrow
Extend Selection Up	Shift+Up Arrow
Extend Selection Up Add	Cmd+Shift+Up Arrow
Skip Up	Cmd+Up Arrow
Down	Down Arrow
Expand Selection Down	Shift+Down Arrow
Expand Selection Down Add	Cmd+Shift+Down Arrow
Skip Down	Cmd+Down Arrow
Page Up	Page Up
Extend Selection Page Up	Shift+Page Up
Extend Selection Page Up Add	Cmd+Shift+Page Up
Skip Page Up	Cmd+Page Up
Page Down	Page Down
Extend Selection Page Down	Shift+Page Down
Extend Selection Page Down Add	Cmd+Shift+Page Down
Skip Page Down	Cmd+Page Down
Start	Home
Extend Selection Start	Shift+Home
Extend Selection Start Add	Cmd+Shift+Home
Skip Start	Cmd+Home
End	End
Extend Selection End	Shift+End
Extend Selection End Add	Cmd+Shift+End
Skip End	Cmd+End
Tools	
Action	Key Command
Select Arrow Tool	1

Select Range Tool	2
Select Split Tool	3
Select Eraser Tool	4
Select Paint Tool	5
Automation	
Action	Key Command
Show Automation	A
Show/Edit Current Parameter	Alt+A
Map Current Parameter to touched Control	Alt+M
Automation Read	J
Automation Touch	K
Mixer	
Action	Key Command
Toggle Size	Shift+F3
Toggle Detach	Cmd+F3
Next Channel]
Previous Channel	[
Next Bank	}
Previous Bank	{
Global Solo	Cmd+Shift+S
Global Mute	Cmd+Shift+M
Help	
Action	Key Command
Studio Context Help	F1
Studio Contents Help	Alt-F1
Studio Key Commands	Alt-F2
Special Modifier Keys	
Command in Arrangement switches to Range Tool when using the Select Tool.	
Command while dragging audio events or instrument parts creates copy.	
Alt while dragging instrument part drag creates ghost copy.	
Alt while resizing audio event stretches event.	
Command + Alt while dragging slips audio events.	
Shift + Click and Drag on Controls uses fine tune.	
Command + Click on Controls switches to the default value.	
Alt + Click and Drag on Mixer loses channel from Group.	
Command + Click and Drag on Track Control duplicates track.	
Alt + Click and Drag on Track Control duplicates track with data.	
Mouse wheel in arrangement/editor scrolls vertically.	
Shift + Mouse wheel in arrangement/editor scrolls horizontally.	
Command + Mouse wheel in arrangement/editor zooms vertically.	

Command + Shift + Mouse wheel in arrangement/editor zooms horizontally.
Command + Click on Solo in channel is like Anysolo.
Alt + Expand button in Mixer expands channel exclusively.
Alt + Record button in Mixer/Track control arms audio track exclusively.
Alt + Monitor button in Mixer/Track control monitors exclusively.
Command while dragging velocities in Editor sets all to the same value.
Alt + Paint in part automation editor draws line.

Table 2 Features Excluded from Studio One Artist

The following Studio One features are not included in Studio One Artist:

- The Project window (mastering)
- VST, AU, and ReWire support (except for bundled third-party plug-ins)
- Multiband Dynamics, Analog Delay, Groove Delay, Gate and Pipeline plug-ins
- 64-bit processing (Studio One Artist uses 32-bit, single-precision processing only.)
- Expander

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