Studio One 5

Reference Manual

PreSonus

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Introduction

Thank you for purchasing PreSonus™ Studio One™ software, and welcome to the *Studio One Reference Manual.*

Studio One 5.0 is a groundbreaking music-creation and production application for macOS® and Windows® that makes audio recording, MIDI sequencing, and audio mastering (in Studio One Professional) easy and fun—the way it should be. From tracking to mixing to mastering and distribution, this is a creative environment built for intuitive use, speed, and efficiency, yet robust enough for the most complex productions. Version 5.0 adds a wide range of new features, improvements, and advanced technologies.

This manual is a great place to start learning about Studio One, and it also provides an in-depth reference for experienced and new audio-software users alike.

PreSonus is committed to constant product improvement, and we value your suggestions highly. We believe the best way to achieve our goal of constant improvement is by listening to the real experts: our valued customers. We appreciate the support you have shown us through the purchase of this software.

Studio One Versions

There are three versions of Studio One 5.0: Prime, Artist and Professional. Studio One uses a single installer for all versions, and the product key with which you activate Studio One determines the version that you run. The following describes the key differences between the versions.

Studio One Prime

- Unlimited audio and instrument tracks
- Stereo inputs and outputs
- Basic set of plug-ins, Presence XT sampler
- Basic set of editing features, including Arranger Track
- Content browser with musical search and direct access to the PreSonus Shop

Studio One Artist

- Unlimited audio and instrument tracks, unlimited simultaneous record inputs
- Advanced editing features, including comping, transient detection and editing, pitch correction (Melodyne trial version), and much more
- Full SoundCloud™ integration

- 30 Native effects and 5 virtual instruments (adds Impact XT, Sample One XT, Mai Tai and Mojito)
- Adds Event-based effects
- Adds support for user-definable Macros
- Adds support for 3rd party VST/AU plug-ins and Rewire
- Adds support for Studio One Remote app

Studio One Professional

- Includes all Artist features and content
- Adds the Project page, an integrated mastering solution
- Adds the Show page, an integrated live performance environment
- Adds Arranger Track and Scratch Pads
- Adds Chord Track and harmonic editing
- Adds Score editor based on Notion
- Adds AAF and Song Data Import
- Adds fully licensed Melodyne Essential 5 pitch correction
- Adds Extended FX Chains and Multi Instruments
- Adds support for 3rd party sampler formats (EXS, Giga, Kontakt, Bitwig)
- Adds video playback and sync
- Adds Note FX, Groove Delay, Multiband Dynamics, OpenAIR, Pipeline, and IR Maker Native Effects plug-ins

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ASIO is a trademark and software of Steinberg Media Technologies GmbH

Installation and Activation

This section takes you through the Studio One installation and activation process.

Installation

The process for registering, installing, and authorizing your copy of Studio One will differ, depending on the method you used to acquire it.

Retail Purchase If you bought Studio One in a retail box and only received a Product Key in the box, you'll register the key and then download Studio One, and then activate it online upon first launching the product.

Direct Purchase from Shop.PreSonus.com If you bought the software directly from **http://shop.presonus.com**, installation and activation happen entirely online and the purchased software is automatically added to your user account.

Retail or Direct Purchase of USB Flash Drive If you're installing Studio One from the USB flash drive which comes with select retail versions and is also available as an additional accessory purchase from http://shop.presonus.com, your activation will happen online using the Product Key after launching the product for the first time.

If you purchased Studio One by any of these three first methods, see **Register and Download Studio One** for further details on registration and downloading your new software.

PreSonus Audio Interface or Audio Mixer Purchase If you bought an AudioBox, FireStudio or StudioLive Ai Mixer product, these all come with a bundle version of Studio One Artist. Registering the hardware in your My.Presonus account automatically gives you access to Studio One and a corresponding Product Key. When you launch Studio One for the first time, you can authorize the software using the provided Product Key.

If you came about acquiring Studio One by purchasing a PreSonus hardware product and wish to claim your Studio One Artist license, see **Register and Download Studio One Bundled with PreSonus Hardware** for more information.

Creating a My.PreSonus Account

You must have a PreSonus account to install and activate Studio One for use on your system. If you bought Studio One from our website, you already have a My.PreSonus user account. If you do not yet have a My.PreSonus user account, you'll want to create one.

Beyond being a requirement to download and activate the latest version of Studio One, there are many benefits to creating a My.PreSonus account including easy access to additional documentation and other content files, access to the user forums, latest tips and product videos, and the ability to easily create a technical support ticket.

To create a user account, go to: **http://my.presonus.com**. On that web page, click [Create My PreSonus Account], then fill out the provided form and then click [Create My PreSonus Account] again to create your new account.

If your computer is not connected to the internet, you can still download and activate Studio One by using a different computer that does have internet access, as described in the Offline Activation section below.

Once you create your account, a verification email from PreSonus is automatically sent to the email address you provided. Click on the link in the email to activate your account. You are now ready to download and install Studio One.

Register and Download Studio One

To download the Studio One installer, log into your My.PreSonus user account at **http://my.presonus.com**. Click the [Register a Product] button, choose Software or Extensions from the Choose Product Type menu, and enter your Product Key.

If you bought a license or upgrade for Studio One from our website, the Product Key is sent to you by email. If you bought a boxed version of Studio One, the Product Key is included in the box. If you bought your copy of Studio One in a retail store, your dealer may have provided your Product Key on the sales receipt for your purchase.

Once you've entered the Product Key, click the [Register] button to register your copy of Studio One. A confirmation window appears, and you can press the [View Your Product] button to see your new software in the software section of your My.PreSonus account. This page is where you download your Studio One installer.

The installer download button for your operating system should be the first in the list. If you are downloading from a different type of computer than the computer on which you plan to install Studio One, you can click the [View Other Systems] button to access installer downloads for other operating systems.

Once you have downloaded the appropriate installer for your type of system, run the installer and follow the on-screen prompts to install Studio One.

Register and Download Studio One Bundled with PreSonus Hardware

If your copy of Studio One came bundled with a PreSonus audio interface or mixer, follow this procedure to claim your Studio One Artist license and download the installer.

First, visit **my.presonus.com** and log into your user account. Here you can register your hardware and any software it came bundled with. If your hardware came with a Studio One Product Key, register Studio One with that key, as described in **Register and Download Studio One**, then register your new hardware as described below.

If no Studio One Product Key is provided with your bundled hardware, registering the hardware will automatically register its bundled software and enable the software to be downloaded and installed. In this case, click the [Register a Product] button in your My.PreSonus account page, choose Hardware from the Choose Product Type selector, and enter the purchase date and serial number of your new hardware into the form. Your hardware's serial number can be found on the bottom of the unit, as well as on the provided registration card.

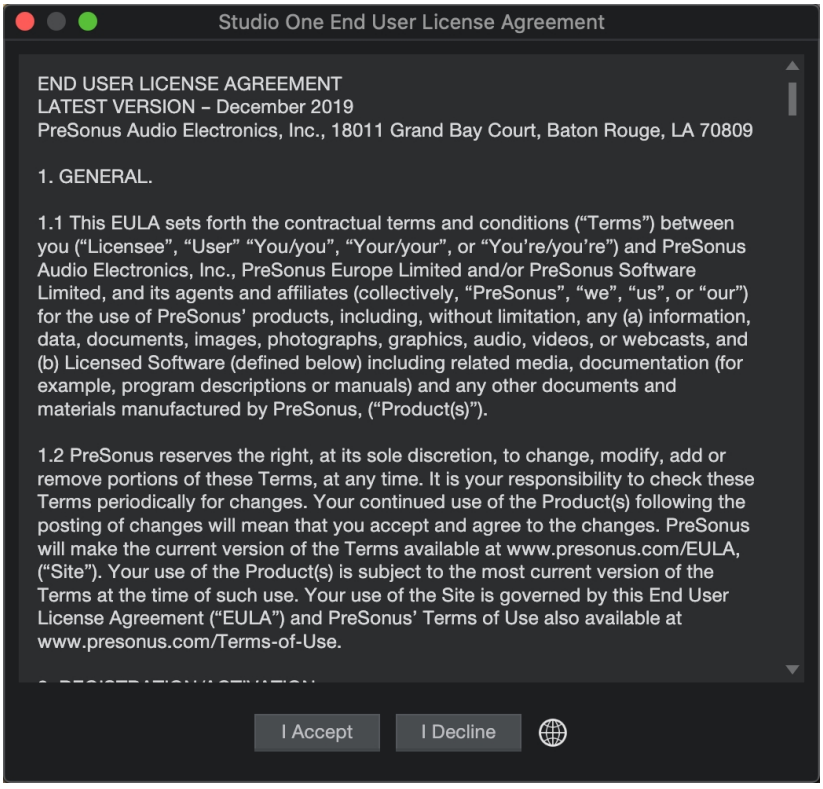
Once you have entered the serial number and purchase date, click [Register] to conclude the hardware registration process. Then, click [View Your Product] to see all the newly registered hardware and software in your account. In the Studio One Artist section, click the [View More Details] button to access software downloads and further installation information.

The Studio One installer download button for your operating system should be the first in the list. If you are downloading from a different type of computer than the computer on which you plan to install Studio One, you can click the [View Other Systems] button to access installer downloads for other operating systems.

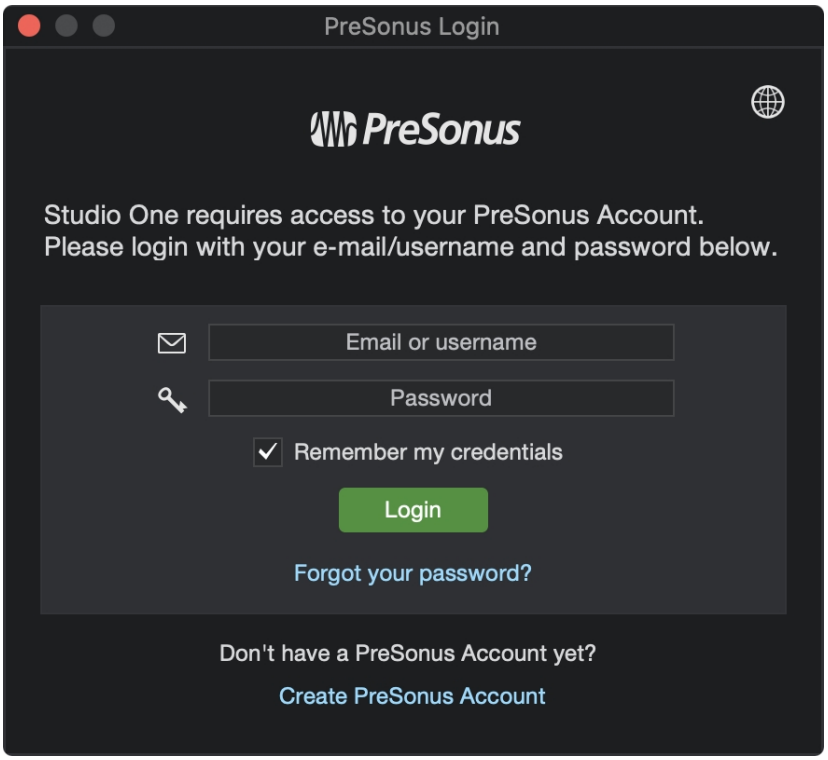
Once you have downloaded the appropriate installer for your type of system, run the installer and follow the on-screen prompts to install Studio One.

Activation

Studio One must be activated for use on your computer. Once installation is complete, launch Studio One. The License Agreement appears.

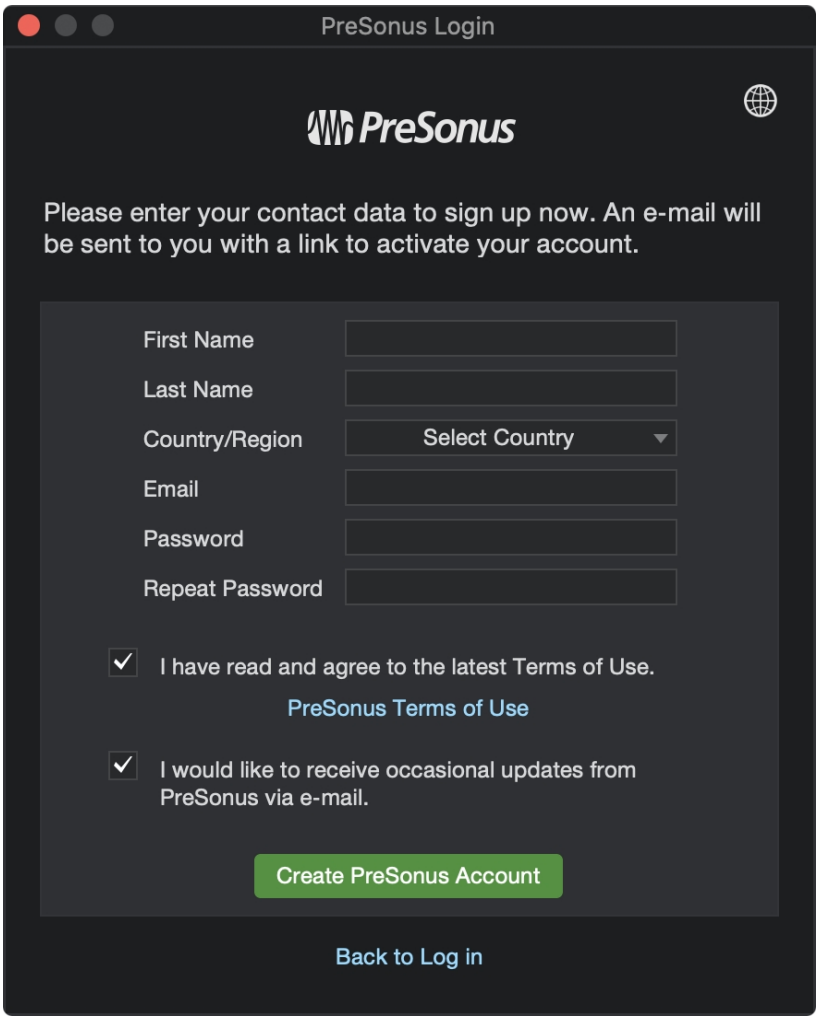


Click [I Accept] to accept the agreement. The PreSonus Login window is then displayed.



If you already have a user account, enter your email address (or My.PreSonus username) and password, and press [Login] to log into your account.

If you need to create an account and your computer is connected to the internet, click on [Create My.PreSonus Account].

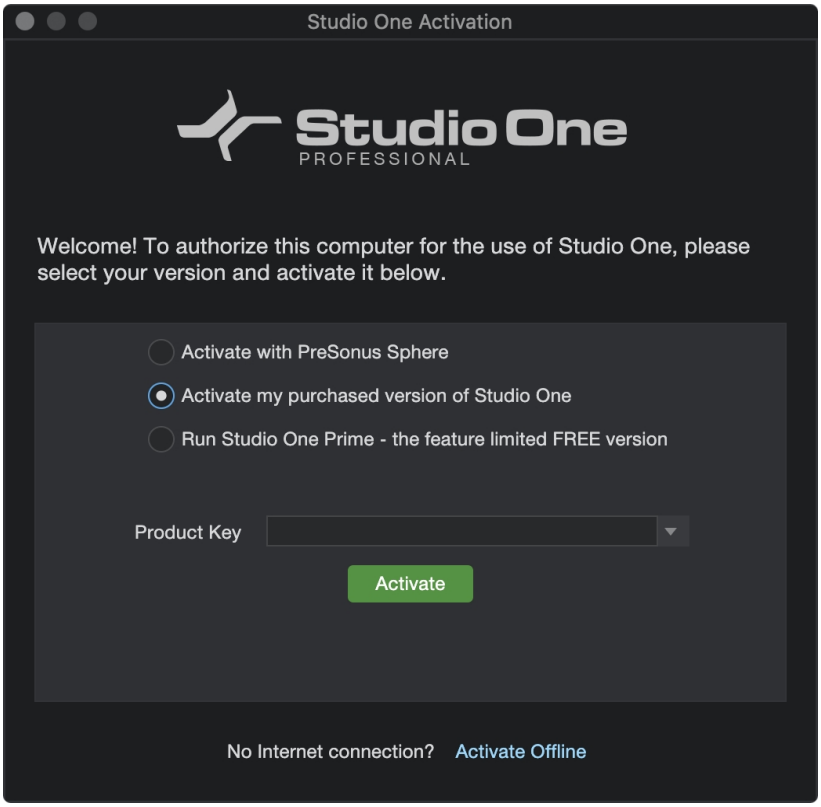


Fill in your desired user-account details, and click [Create PreSonus Account].

Activating Studio One

In most cases, Studio One will self-activate the first time you log in with your My.PreSonus account. In the rare instance where you have multiple licenses of the same Studio One version registered to the same My.PreSonus account, you will need to select which license to activate. If you have not already done so, launch Studio One and select *Studio One Activation* from the *Studio One* menu.

Online Activation

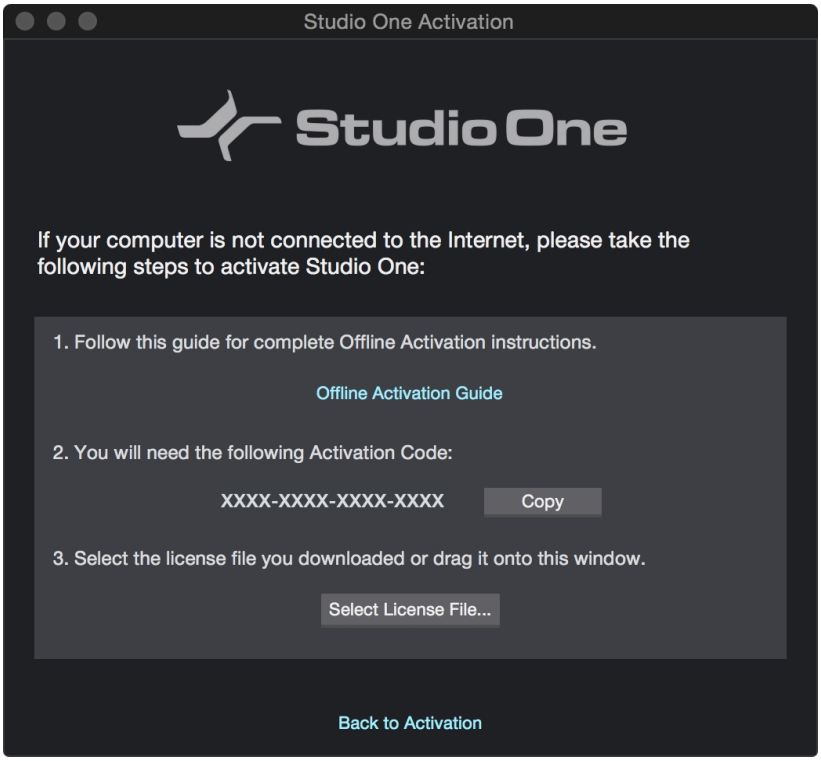


If the computer on which Studio One has been installed is connected to the Internet, select the [Activate my purchased version of Studio One] option. Click the drop-down button next to the Product Key field, and choose Show my Existing Product Keys from the menu. Your registered Studio One license (or licenses) are shown. Choose the license you wish to use, and click the [Activate] button to finish the activation process.

If you purchased a PreSonus Sphere license and your subscription license is currently active, Studio One will be activated automatically at launch if your computer is connected to the Internet. In this case, the “Activate with PreSonus Sphere” option remains active. In order to run a PreSonus Sphere license, your computer must have an active Internet connection at least once within two days.

To check the current status of your PreSonus Sphere license, check the “About Studio One” window.

Offline Activation



If the computer on which Studio One has been installed is not connected to the Internet, click [Activate Offline] in the Studio One Activation window, and make note of the Activation Code shown in the instructions. Offline Activation lets you activate your copy of Studio One using a separate, internet-connected computer. To activate Studio One in this way, you will need a USB flash drive (or other portable data storage device), a written copy of your Product Key, and your Activation Code.

Head to a computer with an Internet connection, visit **http://my.presonus.com**, and log in to your account. Click the [Register a Product] button, choose Software or Extensions from the Choose Product Type menu, and enter your Product Key, as printed on the Studio One package or provided via email. Click on [Register], and you are taken to your Software list.

Click the [View More Details] button for the version of Studio One in your Software list, and then click [Offline Activation] on the next page. Click [Activate Software], and enter the Activation Code provided by Studio One. You may also enter a computer name to help you keep track of your five allowed activations.

Click [Offline Activation] again, and then click [Download License] to download your User License file. Save this file to some sort of external media (such as a flash drive or CD-R), and then copy the file to the computer on which Studio One is installed.

In Studio One, navigate to the *Studio One/Studio One Activation* dialog again, click [Activate Online], then click [Select License File] to load your user license file, activating Studio One.

Content Installation

Studio One comes with many audio loops and instruments that are organized into Sound Sets, as well as demo songs and tutorial videos. The number of Sound Sets available for installation depends on the version of Studio One you have installed (Artist or Professional). To install the Sound Sets and demo/tutorial material, launch Studio One and open the *Studio One/Studio One Installation* menu item.

In the Install From selector, you can choose to download all selected content from your PreSonus Account, or navigate to downloaded content in your file system (or a provided USB stick). If you wish to install any further content at a later time, you can always return to *Studio One/Studio One Installation* window to do so.

By default, all packages included with your version of Studio One are selected for installation. You can set the Install To location to any desired location on your computer, then click on [Install].

As your files download, a Transfers window is shown, giving information on the status of each file queued for download. If you hide the Transfers window and later wish to see it again, navigate to *View/Additional Views/Transfers*, or just click the animated arrow button in the toolbar, which looks like this:

After installation, you can find all of the installed content in the Browser, which is on the Song page. Demos and tutorials can be accessed from the Start page. Instrument presets are listed under the related instrument in the Instruments tab of the Browser, as well as the preset browser in the plug-in window.

Downloading Included Content from My.PreSonus.com

If you have any difficulty downloading the content from within Studio One, you can always visit **my.presonus.com** to download the content directly from your user account page. To do this, first log into your user account, then click the [My Products] button to view your registered software.

Click the [View More Details] button under your current Studio One license to view available downloads. All included Sound Sets and content are available to download on this page. Once downloaded, to install the content, simply double-click each file, or drag it onto the Studio One window.

Installing Add-On Content

If you need to install additional content you've purchased from the **http://shop.presonus.com** alongside Studio One, or as an Add-on at a later time, simply locate and select it from the Studio One Installation window, listed as "My Purchased Items." Alternatively, download the content from your **http://my.presonus.com** account. To install the content to the default user location, simply double-click or drag the content onto the Studio One window.

If you wish to store the content in another location, place it there, and add that location to *Studio One/Options/Locations* (macOS: *Preferences/Locations*). There, you can add new locations for Sound Sets, Instruments, and 3rd-party plug-ins. Once you tell Studio One where your new content is located, it becomes available for use in Studio One.

Activating Add-On Content

Once you've installed add-on content, you are prompted to activate it. If your computer is connected to the internet, simply press the [Activate] button to activate the content in the current copy of Studio One.

If your computer is not connected to the internet, go to a computer with internet service, and log into your **my.presonus.com** user account. Click [My Products] to see your registered products, then click [Add-ons] to see your purchased add-on content. Locate the add-on you are trying to install, and click [View More Details].

On the following screen, click [Offline Activation], and download the license file for your add-on content. Transfer this license file to your Studio One computer using a flash drive or other form of removable storage device.

Once you install the add-on content, you are prompted to activate the content. Press [Select License...] and navigate to your new license file. Once the activation is confirmed, restart Studio One to use your new content.

Melodyne

We have partnered with Celemony to bring you access to their Grammy-winning Melodyne, a useful timing and pitch correction and manipulation tool that integrates closely with Studio One. Studio One Artist comes with Celemony Melodyne Trial.

We have partnered with Celemony to bring you access to their Grammy-winning Melodyne, a useful timing and pitch correction and manipulation tool that integrates closely with Studio One. Studio One Professional comes with a full Celemony Melodyne Essential 5 license.

Installing Melodyne

In Studio One, navigate to *Studio One/Studio One Installation*. Check the box next to the version of Melodyne that is listed to select it. Once selected, you can click [Install] to install Melodyne.

Studio One Professional comes with a full license for Melodyne Essential 5. Click the [Claim Product Key] button next to the Melodyne listing to claim your Melodyne product key. The key is displayed, and you can click the [Copy] button to copy it to the clipboard.

Authorizing Melodyne Essential

Before you can use Melodyne Essential, you must first launch the standalone Melodyne application that is installed along with the plug-in versions. Once opened, press the [Enter Serial Number] button, then type or paste in the provided Melodyne Essential serial number, and press [Continue]. You are then prompted to register your copy of Melodyne, by clicking [Create myCelemony account]. Follow the prompts to register your copy of Melodyne Essential.

Once registration is finished, you can quit the standalone Melodyne application, and then launch Studio One to begin using Melodyne Essential.

Starting your Trial of Melodyne

Before you can begin to try out Melodyne, you must first launch the standalone Melodyne application that is installed along with the plug-in versions. Once opened, press the [Try out Melodyne editor] button to start the trial process, then follow the prompts to authorize your 30-day trial.

Once the trial has been activated, you can quit the standalone Melodyne application, and then launch Studio One to begin using Melodyne Trial.

Setup

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

System Requirements

The following are the system requirements to run Studio One.

macOS® (10.13 or higher) systems

Minimum Hardware

- Intel® Core™ i3 processor
- 4 GB RAM

Recommended Hardware

- Intel Core™ i5 processor or better
- 8 GB or more RAM

Windows 10 (64-bit only) systems

Minimum Hardware

- Intel® Core™ i3 processor
- 4 GB RAM

Recommended Hardware

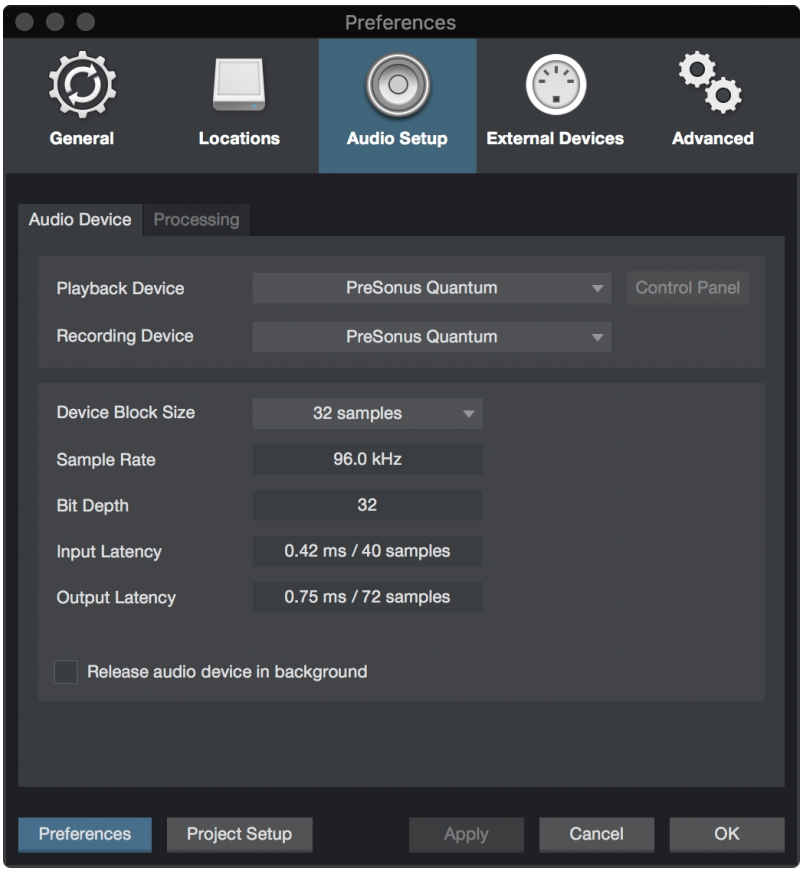
- Intel Core™ i5 processor or better
- 8 GB or more RAM

Additional Requirements (all Systems)

- Internet connection on an available computer (for installation, activation and updates)
- A monitor resolution no lower than 1366 x 768 resolution (high-dpi monitor recommended)
  - Multi-touch enabled monitor required for touch operation (in macOS systems, monitor must support TUIO)
- 40 GB available hard-drive space for installation, content, and recording projects

Set Up Your Audio Device

Studio One automatically selects an audio device to use for audio input and output, pulling from a list of devices currently installed on your computer. If you have a PreSonus audio interface, it is selected automatically.



Then follow these steps to configure your audio device for use in Studio One:

1. Navigate to *Studio One/Options/Audio Setup/Audio Device* (macOS: *Preferences/Audio Setup/Audio Device*) to open the Audio Device settings window.
2. Select your audio device:
   - macOS: Select your chosen playback (output) device from the Playback Device menu. Select your chosen recording (input) device from the Recording Device menu.
   - Windows: Select your device for audio input and output from the Audio Device menu.
3. Some devices offer a selection of configuration options. If your connected device has those controls, you can click on the [Control Panel] button next to the device selection drop-down menu and make your changes within the device's control panel. If your device does not offer these options, the Control Panel button is grayed out.
4. Set Device Block Size to fit your needs. Lower settings minimize latency, which is useful when tracking. Higher settings bring more latency, but give you additional processing power for effects and instrument plug-ins. Generally, you want to pick the lowest block size that still lets your system perform correctly. If you require higher performance but want to keep latency low, you can increase the level of Dropout Protection and employ Low-Latency Monitoring, as described **here**.
5. When the aforementioned settings are selected, your system's current total input and output latency, sample rate, and bit depth are reported below the Audio Setup menus.
6. Release Audio Device in Background (Windows only) is disabled by default. When engaged, the current audio device is made available to other applications when Studio One is minimized.

Import/Export Device Configurations

If you have already created a device configuration on a different setup, you can import that configuration into Studio One. You can also export your device configuration from Studio One and use it on a different setup. Those features are available on the Song Setup page and are described in the **Audio Device Input/Output Setup** section of the manual.

Audio Dropout Protection and Low-Latency Monitoring

When you are working with a large amount of audio tracks and virtual instruments, computer performance can limit your capabilities. You can increase the amount of buffer to help free up computer resources, but this traditionally comes at the cost of greater latency (or delay)

when monitoring audio inputs or playing virtual instruments. Set the buffer too low, and audio dropouts and glitches can occur.

To remedy this, Studio One features Audio Dropout Protection and an advanced Native Low-Latency Monitoring system. Under this system, the tasks of audio playback and monitoring of audio inputs and virtual instruments are handled as separate processes. This, in effect, lets you use a large processing buffer to handle heavy audio playback and effects processing tasks, while keeping latency low for audio input and virtual instrument monitoring.

Device Block Size Vs. Process Block Size

The latency that you hear when monitoring audio inputs or playing virtual instruments is based primarily on the Device Block Size that you specify in the *Studio One/Options/Audio Setup/Audio Device* (macOS: *Preferences/Audio Setup/Audio Device*) window. For the lowest latency, Device Block Size should be set to the lowest setting that provides the performance you need.

The Audio Dropout Protection system uses its own buffer for playback and processing of audio tracks, distinct from the Device Block Size setting. The size of this buffer (also known as the Process Block Size) depends on the Dropout Protection level that you specify in the *Studio One/Options/Audio Setup/Processing* (macOS: *Preferences/Audio Setup/Processing*) window. If you use Native or Hardware Low-Latency Monitoring, the Dropout Protection level has no effect on audible latency, though higher levels can affect the responsiveness of onscreen meters and displays.

As long as the Process Block Size is larger than the Device Block Size you've specified, you have the option to use Native Low-Latency Monitoring.

Monitoring Latencies

The Monitoring Latencies display shows you the latency values for audio inputs (round-trip, from input to output) and virtual instruments, based on the current Device Block Size and Dropout Protection settings. The "Standard" column shows the latency for the current settings if you choose not to use Low-Latency Monitoring, while the "Low Latency" column shows values for the Native Low-Latency Monitoring system.

Plug-in Use with Native Low-Latency Monitoring

When monitoring an audio input or virtual instrument through the Native Low-Latency Monitoring system, any inserted FX on the corresponding Channel continue to function and can be heard in real time, provided that they add 3 ms or less of latency. Plug-ins that meet this latency requirement show a green power button in the Console (rather than blue or gray). Any inserted plug-ins that introduce more than 3 ms of latency are not audible in the monitoring path while a Channel is armed for monitoring or recording under Native Low-Latency Monitoring. They begin functioning again when recording/monitoring mode is disengaged.

The following plug-in types and configurations are not supported on Channels that utilize Native Low-Latency monitoring:

- External effects, routed into the system using the Pipeline plug-in
- Analyzer plug-ins
- FX Chains that incorporate Splitter devices

Configuring Audio Dropout Protection and (Native or Hardware) Low-Latency Monitoring

To configure Audio Dropout Protection and Low-Latency Monitoring, do the following:

1. Navigate to the *Studio One/Options/Audio Setup/Processing* (macOS: *Preferences/Audio Setup/Processing*) settings window.
2. Choose your desired level of protection from the Dropout Protection drop-down menu. The Process Block Size display shows you the corresponding processing buffer size. If you want to use Native Low-Latency Monitoring, choose a Dropout Protection level that sets the Process Block Size to a value that is higher than the Device Block Size you have selected.
3. For low-latency performance when playing virtual instruments, enable the "Enable low latency monitoring for instruments" option. If you run into performance issues when using a virtual instrument with particularly high CPU usage, you may want to disable this option.
4. If using a supported DSP-enabled audio interface, you have the choice to use its onboard Hardware Low Latency Monitoring (and hardware DSP-based effects when available, as with the PreSonus Studio 192) for incoming audio inputs, or to use the Native Low Latency Monitoring that Studio One provides. Enable "Use native low latency monitoring instead of onboard DSP" to use Native Low-Latency Monitoring, or disable it to use Hardware Low-Latency Monitoring.
    - » Note that when using Hardware Low-Latency Monitoring to monitor an audio input, Insert FX do not function on the related Channel, since the audio input is being monitored before it reaches Studio One. If Insert FX are needed while tracking, use Native Low-Latency Monitoring instead. To do this, navigate to *Studio One/Options/Audio Setup/Processing* (macOS: *Preferences/Audio Setup/Processing*) and enable the "Use native low-latency monitoring instead of hardware monitoring" option.

Enabling Low-Latency Monitoring in the Console

Once you've configured your system to use Native or Hardware Low-Latency Monitoring, you can toggle low-latency monitoring on and off for the Main output as well as any **Cue Mix** outputs you've specified, by clicking the Enable Low-Latency Monitoring button ("Z", short for Z-Mix) below the volume fader for the related output. When low-latency monitoring is disabled, the "Z" button goes dark. When Native Low-Latency Monitoring is enabled, the "Z" button turns green. When Hardware Low-Latency Monitoring is enabled, the "Z" button turns blue.

Monitoring Mode Attributes

This table describes the primary monitoring methods available in Studio One, and the conditions that must be met to use them.

Type	Z-Mix	Necessary Conditions	Monitoring	Insert FX	Send FX
Standard Software Monitoring	Disabled	Large Device Block Size, low Process Block Size (Dropout Protection)	Standard latency	All function	All function
Native Low-Latency Monitoring	Enabled	Process Block Size (Dropout Protection) must exceed Device Block Size	Native low-latency	Plug-ins with 3ms or less of latency function normally, all others are disabled	All function
Virtual Instrument Low-Latency Monitoring	Enabled	Process Block Size (Dropout Protection) must exceed Device Block Size	Native low-latency	Plug-ins with 3ms or less of latency function normally, all others are disabled	All function
Hardware Low-Latency Monitoring	Enabled	"Use software low-latency monitoring instead of hardware monitoring" option must be disabled	Hardware low-latency	No Insert FX function	All function

Process Precision

By default, Studio One's process precision is set at Single (32-bit). If using Studio One Professional, you may choose double precision (64-bit) from the Process Precision drop-down menu.

Supported Devices

Studio One supports most audio devices, including those that run on ASIO or WASAPI (Windows) or Core Audio (macOS) drivers.

When using a WASAPI audio device in Windows, note that WASAPI offers Exclusive and Shared modes of operation. 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 Control Panel/Hardware and Sound/Sound* to configure the options for your WASAPI device.

Performance Monitor

When setting up your audio device (specifically when determining appropriate Internal or Device Block Size, or selecting Single or Double Process Precision), you should take into account the related performance demands on your computer.

Open the Performance Monitor by selecting it from the View menu, or by clicking on the [Performance] button in the Transport. This monitor displays the current relative overall CPU and disk performance, as well as the performance of instruments and automation.

When these meters approach or reach the top of their range, you may need to consider altering your audio device settings (or changing the Song or Project) to avoid audible clicks and pops or possible instability. For instance, it is common to lower the Device and/or Internal Block Size while recording to keep monitoring latency low but then to increase Block Size while mixing to provide as much CPU headroom as possible for effects processing.

If any playback issues are encountered with third-party virtual instrument or effect plug-ins that have their own multiprocessor support implementation (e.g., NI Kontakt, FL Studio), it is recommended that this support be disabled in the plug-ins. In this case, Studio One manages all processor scheduling.

Audio Device Input/Output Setup

Software I/O Channels

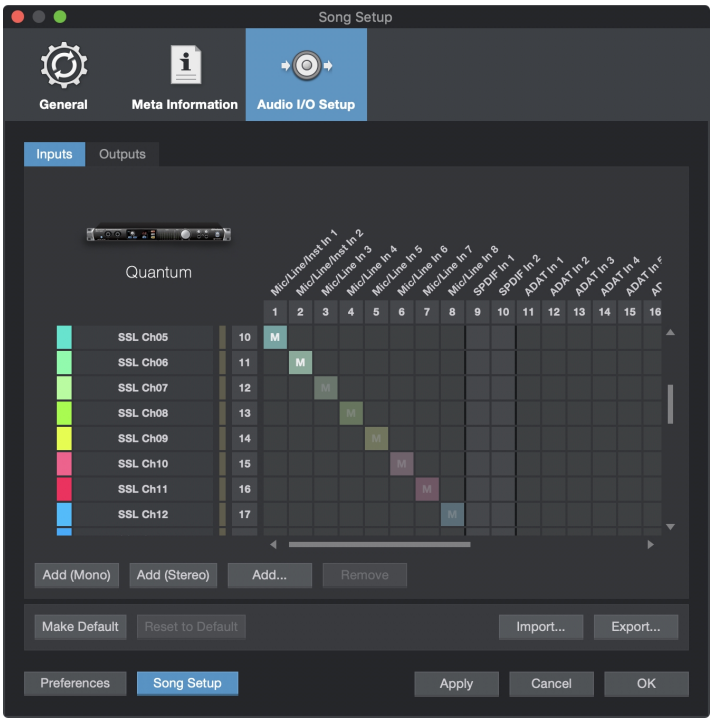
In most recording applications, audio tracks are directly correlated to the channels of your hardware audio device. In Studio One, there is a layer of software I/O (input and output) channels between your hardware audio device channels and your Tracks. This setup affords many advantages over the traditional 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 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 is automatically 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.

Audio I/O Setup Menu

Each Track in a Song receives a signal from an input source and routes 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 below in Default Device I/O Setup, 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 there are two tabs: one for input configuration and 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.

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 are assigned to the new channel by default.

To remove any channel, click on the channel to select it and then click the [Remove] button. To rename any channel, double-click on the name of the channel, type a new name, and press Enter.

It is also possible to add any number of new inputs and outputs at the same time. To do this, first select the Inputs tab or the Outputs tab, and then click [Add...] to access the Add I/O Channels window. From here you can give the new channels a name, select whether they will be mono or stereo, enter how many channels should be added, and specify a color. If you are adding more than one channel the names will increment automatically (Name, Name+1, etc.). Then click OK to create the channel(s), and they will be added to the configuration.

Finally, in order for these software I/O changes to occur, be sure to click [Apply] before exiting this menu. If you decide you want to start over with the original configuration for your device, click [Reset to Default].

Assigning Hardware I/O to Software I/O Channels

Hardware inputs and outputs are 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, Studio One creates three Input Channels: one stereo and two mono. These channels are labeled Input L+R (stereo), Input L (mono), and Input R (mono). By default, the stereo Input Channel receives input from the first stereo hardware input pair of your selected audio device. The two mono Channels receive input from the same stereo hardware input pair.

The Output Channel is labeled Main Out (stereo) and is 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 appears with an M, L, or R label, indicating whether the route is a mono route (M) or the left or right side of a stereo route (L or R).

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 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.

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 lets you 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 pop-up window appears to confirm that you wish to make the current I/O setup the default for new Songs. Click Yes, and from that point forward all new Songs are created with this audio I/O setup.

You can always use the [Reset to Default] button to apply this configuration to a song.

Import/Export Device I/O Configurations

If you have already created a device configuration on a different setup, you can import that configuration into Studio One. You can also export your device configuration from Studio One and use it on a different setup.

There are two ways to access these features: either navigate to Song > Song Setup, or use [Ctrl]/[Cmd]+, to access the Options/Preferences page. If it is not already selected, click the Song Setup button at the bottom of the page and select the Audio I/O Setup menu at the top.

The Import/Export buttons are located on the lower right side of the page. To import a device configuration, click Import, navigate to the location of the file, and click Open. The I/O configuration will replace your current one then.

You can also simply drag-and-drop the device configuration file onto the Audio I/O Setup window. Then the I/O setup will be added to your current configuration.

Be sure to click [Apply] to confirm the configuration change before you exit the menu.

If you want this configuration to be the starting point for every new Song, click the [Make Default] button. A pop-up window will appear and ask you to confirm your choice. Click Yes, and from that point forward all new Songs will begin with this audio I/O setup.

To export the configuration of the current device, click the Export button. The default location for the file is *Documents\Studio One\IO Configurations, but you can navigate to a different location. Click the Save button and the file will be exported with the extension *.ioconfig*. You will only need to do this once; the .ioconfig file contains the data for both the Input and Output tabs.

Audition Channel

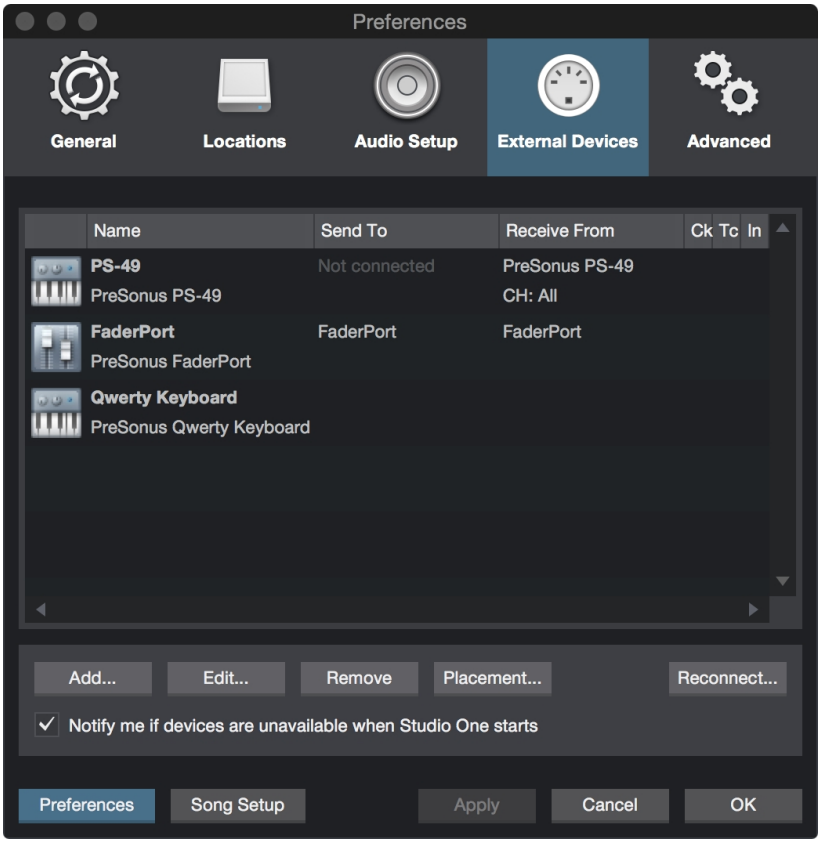
The Preview Player in the Browser and in the Import File menu uses the Audition channel for audio playback. Any stereo Output Channel can be used as the Audition channel, allowing you to audition sounds from an output other than your main output.

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: Keyboards, Instruments, and Control Surfaces. While each device type functions in a slightly different way, there is one menu to add and configure any External Device. The menu can be found by navigating to *Studio One/Options/External Devices/Add Device* (macOS: *Preferences/External Devices/Add Device*).

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. Before recording a performance with a Keyboard, the MIDI keyboard controller must first be set up in Studio One. Once a Keyboard is set up, it is available at all times for use in Studio One.



To set up your Keyboard, navigate to *Studio One/Options/External Devices* (macOS: *Preferences/External Devices*) and follow these steps:

1. In the *Options/External Devices* menu (macOS: *Preferences/External Devices*), click on the [Add...] button.
2. 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 makes identifying your Keyboard easier.
3. Specify which MIDI channels to use 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.
4. Engage Split Channels if you would like to create a separate Instrument Track input for each MIDI channel from the Keyboard.
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. Enable MPE if your Keyboard is able to transmit MPE data (MIDI Polyphonic Expression). Use the Pitch Range field to specify the range of the keyboard (the number of keys in chromatic steps). Note that when the Enable MPE box is checked, the MIDI Channels and Split Channels fields are disabled.

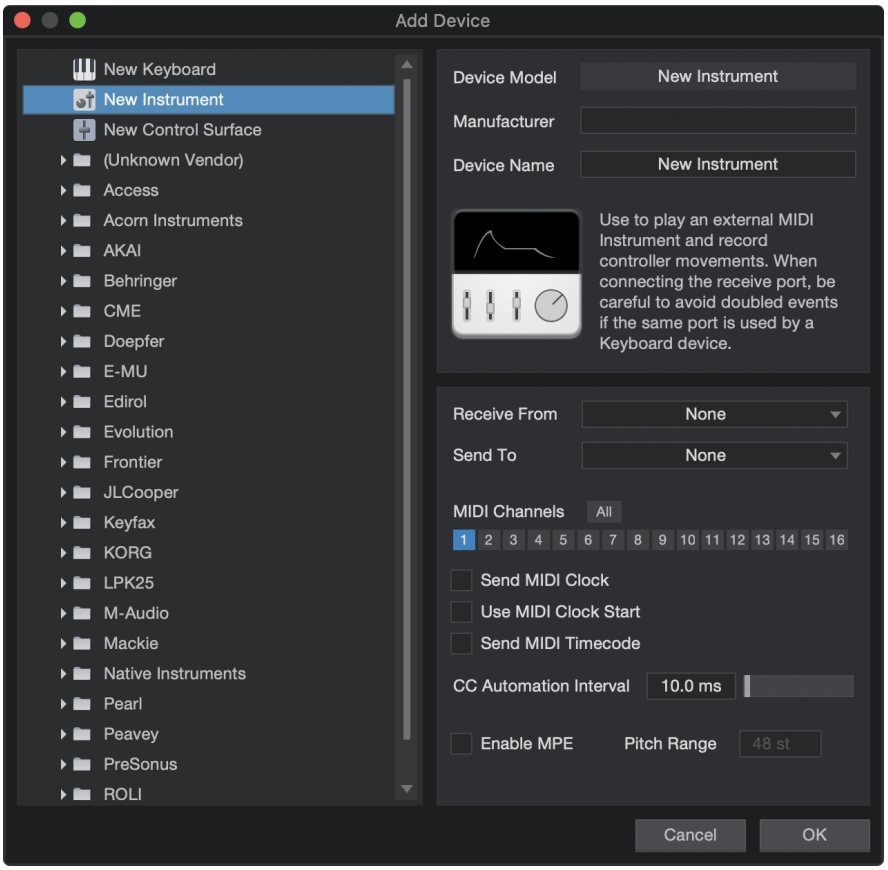
   Also, **Enable MPE** must be active for a virtual instrument if you want to take advantage of this feature. This is done in the **Instrument Editor window**.

Your Keyboard is now ready for use in Studio One.

- » Click on the "+" button in the External window of the Console to quickly set up a new Keyboard or other External Device.

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. The audio output of an external instrument can be routed through one or more Aux Channels in the Studio One Console, where its volume can be controlled with sample-accurate automation, its live signal can be processed by the effects plug-ins, and its performance can be included in a Track bounce, an exported Stem, or the mixdown of a Song.



To set up your Instrument, navigate to *Studio One/Options/External Devices* (macOS: *Preferences/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 makes identifying your New Instrument easier.
3. Specify which MIDI channels to use 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 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 sends MIDI Clock Start signals to your Instrument.
6. You can choose to send MIDI Time Code to this Instrument. You can set a Display Offset under **Song/Song Setup/General** to correct for time-code variances with external devices.
7. You can vary the speed at which Automated MIDI CC messages are transmitted, using the CC Automation Interval slider. You can vary the value between 10-100 ms, with the default value being 10 ms.
8. Enable MPE if your Instrument has is able to receive MPE data (MIDI Polyphonic Expression). Use the Pitch Range field to specify the range of the instrument (the number of chromatic steps it can reach). Note that when the Enable MPE box is checked, the MIDI Channels field is disabled.

Your external instrument is now available for use in any Song. The easiest way to use an external instrument in a Song is to set up an Aux Channel. This is described in the next section.

Note that if your 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.

Set Up an Aux Channel

An Aux Channel allows an external audio source to be monitored through the Console without the need for an associated track. The incoming audio can be processed by the native plug-in effects, and its volume can be controlled through the sample-accurate automation provided by Studio One.

An Aux Channel is also useful when working with an external MIDI hardware synthesizer, for example, as you can make changes to the MIDI data on an Instrument track without needing to record another take to your hard drive. Audio from the device returns through your audio interface into an Aux Channel, where it becomes a part of the mix like any other track.

Here's the process:

1. Click [External] in the Console Navigation column to open the External Devices panel.
2. Click the menu arrow for the external device.
3. Select Edit from the menu to open the control mapping window.
4. Click the Outputs button ( ).
5. Select Add Aux Channel at the bottom of the window. An Aux Channel appears in the Console.
6. If your external instrument has multiple outputs connected to your audio interface, add as many Aux Channels as you need.
7. **Important:** Click Save Default before closing the window; we'll explain that later.
8. Route the Aux Channel to the desired output. Your external device is now available the Console.

Remember that the external instrument needs to be physically connected to one or more inputs on your audio interface, since its audio will always be "live". Note that different versions of the Audio I/O setup can be saved for different use cases.

Note also that running external audio signals through the Console means that bouncing, rendering and mixdown automatically switches to real-time.

Make an Instrument Track for the Aux Channel

Here's why it was important to click Save Default after adding the Aux Channel. After following the steps in the previous section, the new Instrument becomes available in the “External Instruments” folder in the Browser / Instruments tab. This enables you to create a new instrument track with AUX inputs in one step: Simply drag-and-drop the instrument from the Browser onto an empty Track. This automatically creates the Instrument Track with the AUX channels already mapped.

Of course, you can always **create an audio Track** to record the output of the external instrument if you like. The easiest way to do this is to use the Bounce Track command, which creates the Audio Track and bounces the audio in one step.

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.

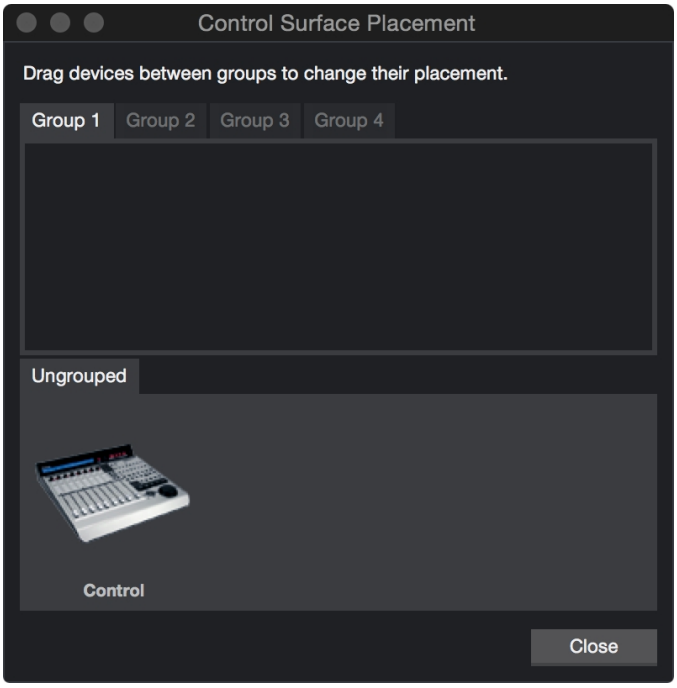
To set up a Control Surface, do the following:

1. In the *Options/External Devices* menu (macOS: *Preferences/External Devices*, 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 makes identifying 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 do not need to specify the MIDI channels your Control Surface should 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.

For more information on using Mackie Control devices with Studio One, see **Mackie Control**.

Custom Placement of Control Surfaces

If you are using multiple surfaces with motorized faders, you can customize the placement of the fader banks so that Channels in the Studio One Console are spread across your surfaces in the desired order.



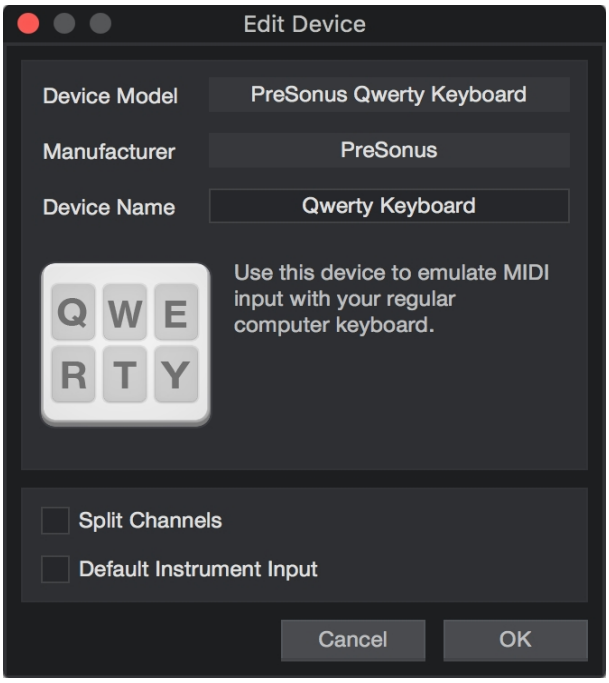
To customize this placement, click on Placement in the *Options/External Devices* menu after adding your surfaces. All ungrouped surfaces appear under the Ungrouped tab. To place a surface in a group, select a Group tab, then click-and-drag the surface from the Ungrouped area to the selected group area. To adjust the order of the grouped surfaces, click-and-drag them left or right. Channels in the Console appear in order across the surfaces from left to right.

Up to four Groups can be created, to allow for mirroring of Channels across multiple surfaces. This is helpful if you have more than one location in the studio where you wish to use control surfaces (e.g., an A room and B room or a control room and live room).

Only supported and predefined Control Surfaces appear in the Placement window. User-defined devices do not appear in this window.

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 note data in Studio One. To do this, add a new device in the *Studio One/Options/External Devices/Add Device* menu (macOS: *Preferences/External Devices/Add Device*), 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 then receives input from the QWERTY Keyboard, as shown in the QWERTY Keyboard device interface. Your keyboard only transmits data to Instrument Tracks while the QWERTY Keyboard device interface is open.

Using the PreSonus FaderPort

If you have a PreSonus FaderPort connected to a computer running macOS or Microsoft Windows, Studio One automatically recognizes it and configures it for use. Just open a Song or Project to use the FaderPort immediately.

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 *Studio One/Options/External Devices* (macOS: *Preferences/External Devices*) and click on Reconnect at the bottom of the menu. Then reconnect your devices and click OK. The devices should 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 runs 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 recognizes the device automatically, and it can be used exactly as before, with no further setup required.

Managing Your Content

Content management and file management can become unwieldy 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 are remembered. Any content you create using Studio One is similarly managed. In Studio One, your content is kept in distinct categories.

The following describes the process of managing your content using the *Studio One/Options/Locations* (macOS: *Preferences/Locations*) menu.

User Data

Any content you create using Studio One is 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 can 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 is the default save location. While we recommend using this location, you can specify any save location when creating any new Song or Project.

Engage the **Auto Save Documents** option to automatically save any open document at a specified interval of time.

Engage the **Ask to Copy External Files when Saving Song** feature to be given the option to consolidate any outside files to the central data folder when saving a Song.

File Types

All supported file extensions are listed in the *Studio One/Options/Locations/File Types* (macOS: *Preferences/Locations/File Types*) menu. Only these supported file types are displayed in the Browser.

It is possible to add file extensions to this list by clicking on the [Add...] button. In the pop-up menu, you can choose an icon, enter the file extension, and provide a description for the file type. Select a user-added extension from the list and click on Remove to remove it.

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 Visit Website link in the Browser for more information about the vendor and the content they supply.

Instrument Library

Studio One includes a native virtual instrument called Presence XT that utilizes a cross-platform sample library format, as well as standard libraries in Giga, EXS, Kontakt (version 4 and below), and Sound Font (SF2) formats. Using the Instrument Library function, you can tell Studio One where your sound sets are located, giving you access to them as presets in Presence XT.

To add sound library file locations to your Instrument Library, in the *Studio One/Options/Locations/Instrument Library* (macOS: *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 XT built-in virtual instrument, refer to the **Presence XT** section.

VST Plug-ins

When Studio One starts for the first time, most of your plug-ins are located automatically and are ready to use immediately. If Studio One fails to find certain plug-ins, adding them is easy.

To add any missing VST plug-ins, navigate to the *Studio One/Options/Locations/VST Plug-ins* (macOS: *Preferences/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 then scans these locations at startup, including searching for new plug-ins you've added. You can always add more locations if needed.

AU, VST 3, and ReWire-enabled plug-ins and applications have their own pre-set file path in the OS and do not have to be located manually.

Failed Plug-ins

If any plug-in fails to start correctly when scanned at startup, a notice appears next to its name in the startup message list, and a warning message is shown. 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 puts the plug-in in a blocklist and ignores it at startup from that point on.

To reset this blocklist and force Studio One to scan missing plug-ins again at startup, navigate to *Studio One/Options/Locations/VST Plug-ins* (macOS: *Preferences/Locations/VST Plug-ins*) and click on [Reset Blocklist]. The next time you start Studio One, the previously blocklisted plug-ins are scanned again. If the issues that caused the plug-ins to fail the scan have been resolved, the plug-ins are made available.

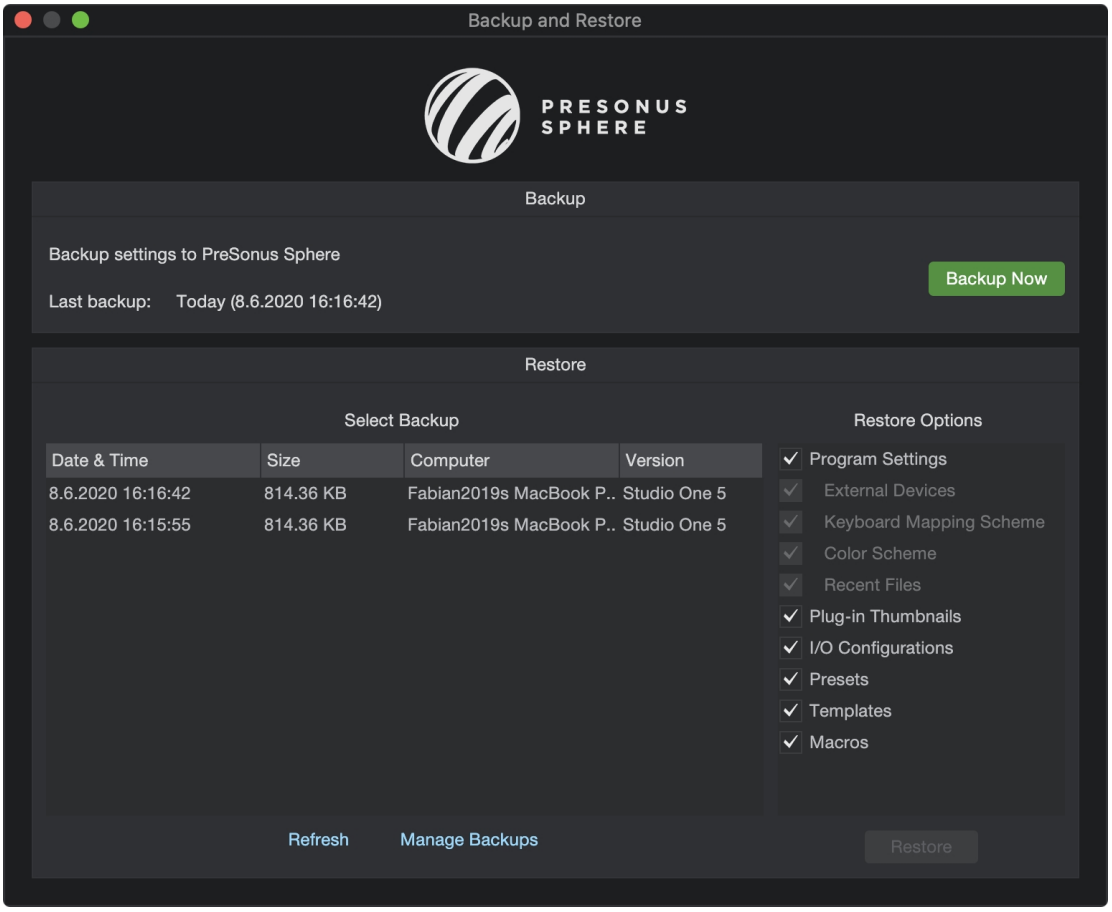
VST Format Support

Studio One Producer and Professional support VST 2.4 (including VSTXML for hierarchical parameter structure) and VST 3.

Backup and Restore

If you're running a PreSonus Sphere subscription license, you can use your available PreSonus Sphere cloud storage to backup your complete user settings. You may create individual backups for different computers, artists or projects. The number of backups is only limited by the available cloud storage space.

To backup your settings to PreSonus Sphere, select Backup and Restore from the Studio One menu. In the Backup and Restore window click the [Backup Now] button to initiate the backup process. Backups already saved to PreSonus Sphere will be listed in the Restore section of the window.



To Restore any or all settings from a cloud backup to the current computer, first select a backup from the list, then check which parts of the backup to restore in the Restore Options list. These include program settings, plug-in thumbnails, I/O configurations, presets, templates and macros. Any options unchecked will remain unchanged. With a backup and options selected, click the [Restore] button to initiate the download and restore process.

Creating a New Song

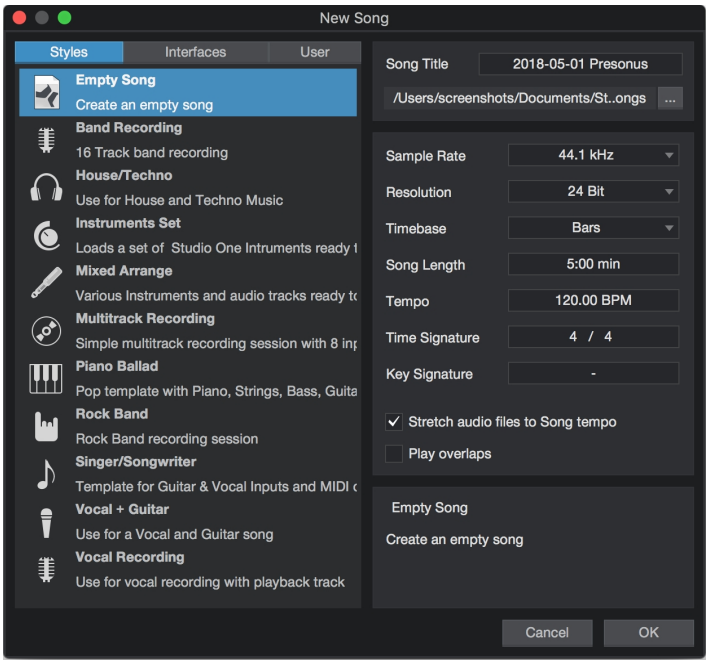
A Song is where all recording, editing, arranging, and mixing takes place. To create a New Song, do one of the following:

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

The default name of each new Song is derived from today's date and the Artist name you've set in the Artist Profile on the Start page. You can set your own title by editing the text in the Song Title field.

Song Templates

On the left side of the New Song creation menu, there is 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 creates a completely empty Song with no Tracks or preconfigured I/O setup.

Create a Song Template

If there is a particular Song setup you use 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 or Mac Finder onto the image icon to use that image. The exact current state of the Song is now available as a template in the New Song creation menu.

Song Location

New Songs and all related data are saved to your User Data location, set in *Studio One/Options/Locations/User Data* (macOS: *Preferences/Locations/User Data*). If you like, you can choose a different file location by clicking on the [...] button in the New Song dialog, and browsing to your chosen location.

Sample Rate

“Sample rate” refers to the rate at which incoming analog audio is sampled per second during 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 initiates a sample rate change in that device. If the sample rates don’t match, Studio One resamples 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 is.

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, 32, or 64-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.

Timebase

The timebase of your New Song determines 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 is an expression of hours : minutes : seconds : milliseconds.
- **Samples** The timeline division is an expression of samples.
- **Bars** The timeline division is an expression of musical bars and beats.
- **Frames** The timeline division is an expression of frames.

Song Length

Here, you can specify a length for your new Song, or go with the default setting of five minutes. If you wish to change the length of a Song once in progress, you can move the Song End marker to the desired end point, as detailed in the **Song Start and End Markers** section.

You can also change the length of the currently open Song by opening the *Song/Song Setup* dialog and setting the Song End parameter to your desired end point.

Tempo

Here, you can specify a starting tempo for your Song, or go with the default setting of 120 BPM.

Time Signature

Here, you can specify a starting time signature for your Song, or use the default setting of 4/4.

Stretch Audio Files to Song Tempo

Enable this option to automatically timestretch imported audio files (that have tempo information) 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 files with encoded tempo information are stretched automatically with this option engaged. Studio One remembers tempo information you specify within the Inspector view for any audio file.

General Options

The following options give you a variety of controls over how Studio One looks and operates. Click on each tab in the *Studio One/Options/General* (macOS: *Preferences/General*) menu to access these options.

General

- **Language** Choose your language from the list.
- **When Studio One starts** Choose the default action to be done upon startup.
  - **Do Nothing** No Song or Project opens by default.
  - **Open Last Song/Project** The most recent Song or Project opens.
  - **Open Default Song/Project** The default Song or Project opens. To set the Song or Project to open by default, set up a Song or Project and save it, with the name "default," to the Songs or Projects folder located at the current User Data location set in *Options/Locations*.
  - **Create a New Song** A new Song is created and opened.
  - **Check for Updates** Check for software updates on startup.

Appearance

Set the color balance for the user interface in Studio One, with separate controls for Background and Arrangement elements.

Independent settings for Plug-Ins and the Score View let you choose between Dark and Light viewing modes. Note that these options only affect certain Studio One plugins, not third-party plugins. They also do not affect Studio One plugins with a custom interface (Ampire, Fat Channel, Analog Delay, etc.). The "Colored" option links the Studio One plugin color to the Background and Arrangement settings.

Your settings can be stored as Presets and shared with other users or archived for personal use. Dozens of presets are provided so you can customize the appearance of Studio One quickly. Press [Reset] to set the color balance and viewing modes back to factory the settings.

Keyboard Shortcuts

This panel lets you assign and change keyboard shortcuts for features and functions in Studio One. For more information, see **Key Commands**.

Network

Toggle the "Allow remote control apps to discover this DAW" option on to let compatible networked controllers connect to Studio One.

Touch Input

Here, you can enable multi-touch operation (if you have a compatible display attached to your system), as well as specify which monitor is to be used for touch input. To specify the current monitor, click the [This] button.

Advanced Options

Studio One offers the following ways to customize your workflow. Click on each tab in the *Studio One/Options/Advanced* (macOS: *Preferences/Advanced*) menu to access these options.

Many of the following options that pertain to editing in Arrange view can be accessed and toggled on or off by clicking the Options button in the Arrange view toolbar.

Editing

Click on the Editing tab to access the following options:

- **Enable Crosshair Cursor for Tools** 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.
- **Locate When Clicked in Empty Space** is disengaged by default. When engaged, it allows the timeline cursor to be located based on clicking in empty space or clicking where there are no Events.
- **Expand Layers After Recording Takes** is engaged by default. When this and the **Record Takes To Layers** options are both engaged, the layers of each recording take are shown as soon as recording stops. If you prefer for this not to happen, disengage this feature.
- **Apply Folder Track Color to Content** is disengaged by default. When engaged, it causes all content contained in a Folder Track to be color-coded with the same color you choose for the Folder Track.
- **Colorize Track Controls** is disengaged by default, and in that state, the color you choose for each Track is shown in a small area in its controls in Arrange view. When Colorize Track Controls is engaged, it causes the whole control area of each Track to be color-coded with assigned color, for better visibility.
- **Auto-colorize Tracks and Layers** is engaged by default. This option applies to importing files, when tracks are created without using the “Add Tracks” dialog.
- **Show Channel Numbers in Tracks** is disengaged by default. Some Tracks do not have corresponding Channels in the Console (and vice versa). Because of this, Tracks and Channels are assigned numbers separately to avoid gaps in Track or Channel numbering. This means that in some cases, a Track and its corresponding Channel may be numbered differently. If this bothers you, enable the Show Channel Numbers in Tracks option to mark each Track with its corresponding Channel number, avoiding this mismatch.
- **No Overlap When Editing Events** is disengaged by default. When engaged, moving or pasting an Event over another Event deletes whatever is buried beneath, so there is no overlapping data (only the audio crossfades are preserved). If the range being copied includes data outside an Event, the range selection is treated as if it were part of the Event. So when the range selection is pasted, it overwrites the identical range at the destination.
  Note that the "No overlap" setting only works for note data if "Cut long notes at part end" is enabled at Studio One/Options/Advanced/MIDI (macOS: Preferences/Advanced/MIDI).
- **Show Event Names** removes the name labels from Events in the Arrangement view. This is purely an aesthetic difference and does not change any functions.
- **Show Envelopes on Instrument Parts** overlays a graphic representation of controller activity (volume, sustain, etc.). This does not change any functions. Disengage this to display only the notes.
- **Show Chords on Events** adds an overlay to Audio Events in the Arrangement showing detected chords. This requires the track height to be set to Small or higher.

- **Draw Events Translucent** is disengaged 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 with various editing tasks.
- **Draw Smooth Waveforms** adds smoothing to audio waveforms throughout the application. Disable this option if you experience any degradation in graphics performance or user interface responsiveness (which depends on your specific graphics engine and hardware).
- **Draw Event Badges** is engaged by default. When engaged, a darker field is added around the Event name in the Arrangement view so they're easier to read.

Automation

Click on the Automation tab to access the following options:

- **Automation Follows Events** is engaged by default. This means that automation envelopes lock to Events so that moving an Event with automation "under" it also moves the automation.
- **Disable Events Under Automation Envelopes** is also engaged by default. This makes Events unavailable to the mouse tools while viewing an automation envelope, which helps prevent you from unintentionally editing underlying Events while editing automation.
- **Automatically Create Automation Tracks for Channels** is disabled by default. Engaging this option automatically adds an automation Track for every new FX Channel, Bus, or VCA Channel that you create in the Console. This helps to retain parity between the structure of Tracks in Arrange view, versus Channels in the Console.
- **Automatically Add Envelopes for all Touched Parameters** is enabled by default. Engaging this option adds an automation envelope for any automation-friendly parameter when you touch its control.
- **Reduction Level**allows you to control the density of new automation data as it is written. This helps reduce the CPU load during playback. Note that this setting has no effect on existing automation envelopes.
- The **Default Envelopes for new Audio Tracks** selectors let you specify which types of automation envelopes are created for each new track by default. You can enable or disable Volume, Pan, and Mute.

Audio

Click on the Audio tab to access the following options:

- **Enable 'Play Overlaps' for New Audio Tracks** is disengaged by default. When engaged, the 'Play Overlaps' feature will be enabled automatically for every audio track you create. For more information, see the **Track Inspector** section of the **Editing** chapter.
- **Use Cache for Timestretched Audio Files** is engaged by default. It is described in depth in the **Using Timestretch Cache** section of the **Editing** chapter.
- **Record Tempo Information to Audio Files** is 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 is saved with the file, so that automatic timestretching can be accomplished. If another application has issues reading audio files from Studio One, try disabling this option.
- **Use Dithering for Playback and Audio File Export** is engaged by default, and means that triangular dithering (with no noise-shaping) is applied when the audio signal's bit depth is reduced from a higher bit depth by a device or during file export. Turn this off if you would like to use a third-party dithering solution, such as a limiter Insert effect on the main output that has built-in dithering with characteristics you prefer.
- **Use Realtime Processing to Update Mastering Files** ensures 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.
- **Pre-record Audio Input** creates a buffer of a length you can specify, which records continuously, even when the transport is stopped. This saves the audio you create *before* recording begins. Once recording concludes, the number of seconds of audio you've specified are available before the point at which recording started.
  - The recorded data is collected in the Input Channels as long as physical inputs are connected. After recording with Pre-Record enabled, you can reveal the pre-recorded data by pulling the Event-start handle to the left.
  - If recording restarts on the same Track, the Pre-Record data is limited to the last recording's end, so that data is not repeated and a seamless join between the two recordings is possible.
- **Record Offset** allows you to input a value, in samples, by which any recorded audio should be offset in the arrangement, thereby compensating for device/driver latency.
- **Ignore Audio Device Timestamps** (Windows only). Studio One uses the system clock by default, because some ASIO drivers have incorrect timestamps. This setting can be disengaged, but if you experience erratic behavior such as a jumping playback cursor, re-enable this setting.

MIDI

Click on the MIDI tab to access the following options:

- **Timecode Follows Loop** is engaged by default and allows MIDI Timecode to remain in sync when Loop is active in a Song or Project. With this disengaged, MIDI Timecode continues to run linearly (counting up) while Studio One's transport is looping.
- **Reveal Precount Notes** is disengaged by default. Engage this option to retain any MIDI notes played during the count-in when Precount is enabled. This can be helpful when playing in parts that start just before the downbeat.
- **Chase Long Notes** is engaged by default. When engaged, if playback starts after a note start, the note is played as though its start time were at the position at which playback started. For instance, if a synth pad note starts at bar 1 and lasts through bar 8, and playback is started at bar 4, the note plays from bar 4 as it would normally from bar 1. With this option disengaged, in the above example, the note would not play at all.
- **Cut Long Notes at Part End** is not engaged by default. When engaged, this means that notes are cut at the end of a Part where it would otherwise extend beyond the Part end. This effectively places the note-off at the Part End.
- **Record Offset** allows you to input a value, in milliseconds, by which any recorded musical performance should be offset in the arrangement, thereby compensating for device/driver latency.

Console

Click on the Console tab to access the following options:

- **Enable Undo** Enable this option to allow undo for changes in the Console, such as fader moves and channel mutes.
- **Colorize Channel Strips** Enable this option to apply channel color coding to full channel strips in the Console. Normally the color only shows on the channel labels. This sort of enhanced visual reference can be helpful when trying to navigate large Songs.
- **Colorize Plug-in Header** Enable this option to apply channel color coding to the open editor window of a plug-in. This is handy when the same plug-in is being used for several Console Channels (the PreSonus Compressor, for example).
- **Fader Mode** This sets the mouse behavior for channel faders in the Console. Choose Touch to require clicking on the fader handle itself before dragging it to the desired position. Choose Jump to allow clicking anywhere on the travel of the fader to set its position.
- **Plug-In Menu** This changes the style of the local Plug-In menus everywhere in the Console, the Inspector and the Channel Editor. Choose Basic for a simplified list of Plug-Ins sorted by folder (including custom user folders). Choose Advanced for an expanded browser-style view with search and sort options (similar to the Plug-Ins tab of the Browser). Changing this option changes the appearance of all local Plug-In menus throughout the Console.
- **Audio Input follows Selection** Enable this option to automatically engage Record and Monitor mode for any Audio Track you select.
- **Instrument Input follows Selection** Enable this option to automatically engage Record and Monitor mode for any Instrument Track you select.
- **Solo Follows Selection** With this option enabled, once a track is soloed, selecting a different track causes the newly selected track to be soloed. When this option is disabled, tracks stay soloed until solo is disengaged.
- **Channel Editor follows Selection** is engaged by default and causes 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.
- 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.
- **Audio Track Monitoring Mutes Playback (Tape Style)** mutes playback of any pre-existing audio on Audio Tracks that have monitoring enabled.
- **Cue Mix Mute Follows Channel** Enable this option to mute all other tracks within a Cue Mix when a channel in that mix is soloed. Disable this option to cause other channels in the Cue Mix to continue playing when a channel within that mix is soloed.
    - **NOTE** When this option is disabled, Cue Mix sends are not available in busses and FX channels. In this state, Cue Mix sends on channels are routed directly to the Cue Mix output

Synchronization

Click on the Synchronization tab to access the following options:

- **Sync to External Devices** Click this box to make Studio One follow incoming MIDI Time Code (MTC). Note that some MIDI devices only transmit MIDI clock data, not MTC. Studio One requires a greater degree of accuracy than a simple MIDI clock can provide. For conversion from SMPTE, an outboard synchronizer is required. For additional accuracy, using an external word clock (master) is recommended.

- **MIDI Time Code** Select the device that will receive MIDI Time Code (MTC). The gray field to the right of the device name indicates the current status of MTC transmission.
- **MIDI Machine Control** Select the device that will receive MIDI Machine Control (MMC).

Services

Studio One gives you the ability 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 enables 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 *Studio One/Options/Advanced* menu (macOS: *Preferences/Advanced*) 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 needs to be restarted for any of these changes to take effect.

Fundamentals

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

Nondestructive Editing and Undo/Redo

Almost every editing and mixing action in Studio One can be undone and redone. There is no limit to how far back actions can be undone and 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.

So, feel free to explore without fear that you might permanently alter anything. In fact, playing freely with the controls is a fast way to learn, and it often leads to unexpected results.

Undo/redo history is cleared when you save a Song or Project, or exit Studio One.

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 employs a floating point, mixed-mode engine.

64-Bit Mix Engine

Studio One Professional offers both 32-bit and 64-bit mix engine modes. 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 *Studio One/Options/Audio Setup* (macOS: *Preferences/Audio Setup*), set Process Precision to Double (64-bit) to activate 64-bit processing. Otherwise, all processing is done in single precision (32-bit).

Automatic Delay Compensation

Studio One automatically compensates for the time delay that results from some VST and AU processing. This lets you avoid having to manually realign Tracks to compensate for that delay, and keeps all Tracks perfectly in sync regardless of the number of virtual plug-ins and effects you run. For more information on this topic, refer to the **Automatic Plug-In Delay Compensation** section.

Audio Dropout Protection

When using a DAW, working with high track and plug-in counts can be challenging. Squeezing the highest performance from your computer generally requires the use of high buffer settings, which can dramatically increase the amount of latency (or delay) you experience when monitoring audio inputs or playing software instruments. Set the buffer too low, and audio playback can be compromised.

Audio interfaces that employ hardware DSP (such as the PreSonus Studio 192) can provide low-latency audio input monitoring at high buffer settings. However, they are not able to help keep virtual instruments free of disruptive latency, as those instruments must run within the DAW's native audio engine.

Next-Level Performance with Low Latency

Studio One now features an improved audio monitoring engine that can provide dropout-free audio playback and Native Low Latency Monitoring monitoring for audio inputs and virtual instruments, even as track and plug-in counts push the limits of your system.

For more information on working with and configuring the new audio engine, see **Audio Dropout Protection and Low-Latency Monitoring.**

MIDI — and beyond MIDI.

Studio One works with all the standard MIDI gear you know and love, from controllers to tone modules. But once MIDI data arrives into Studio One, it’s converted to a high-resolution, 32-bit internal format. That means no zipper noise on instruments, smoother controller changes and pitch bends, more detailed automation, and other benefits when working in the Studio One environment.

And if you need to drive external MIDI gear, you’re covered there too— Studio Onetranslates its high-resolution format back into standard MIDI data if it needs to return to the outside world.

Drag-and-Drop

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 into 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.

If, while in mid-drag, you decide you no longer want to drag the object in question, press [Esc] on the keyboard to cancel the drag action.

These, and many other drag-and-drop features, allow you to work very quickly, without having to stop for menu navigation or other distracting processes.

Transport Controls

The Transport Controls are a central set of buttons that give you control over playback, navigation, and recording in Studio One. Transport Controls are present in both the Song and Project pages. The following controls are available:

- **Play** Start playback at the current cursor location. You can also Play by hitting the spacebar on your keyboard, which also works to stop the transport, when it is in playback.
- **Stop** Stop playback. You can also Stop by hitting the spacebar on your keyboard, or [0] on the numerical keypad.
- **Record** Begin recording at the current cursor location. You can also activate recording by pressing [*] on the numeric keypad.
- **Loop** Press to enable/disable Loop mode. You can also toggle looping by pressing [/] on your keyboard.
- **Rewind and Fast Forward** Press these buttons to move the cursor back or forward in time.
- **Go To Previous/Next Marker** Press these buttons to shuttle to the previous or next marker on the Marker Track.
- **Return to Zero (RTZ)** Return the playback cursor to the beginning of the timeline. You can also zero the transport by pressing [,] on the keyboard.

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]+C in Windows, or press [Cmd]+C in macOS.”

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

In several instances, options are located in the Studio One menu in the Windows version but in Preferences in the macOS version. In these cases, the Windows location is given first, and the Mac location follows in [brackets].

A complete list of key commands is always available via *Help/Keyboard Shortcuts*, which renders an HTML document and opens it in your browser with the currently configured key commands.

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 to one specifically created to make the transition from another DAW easier.

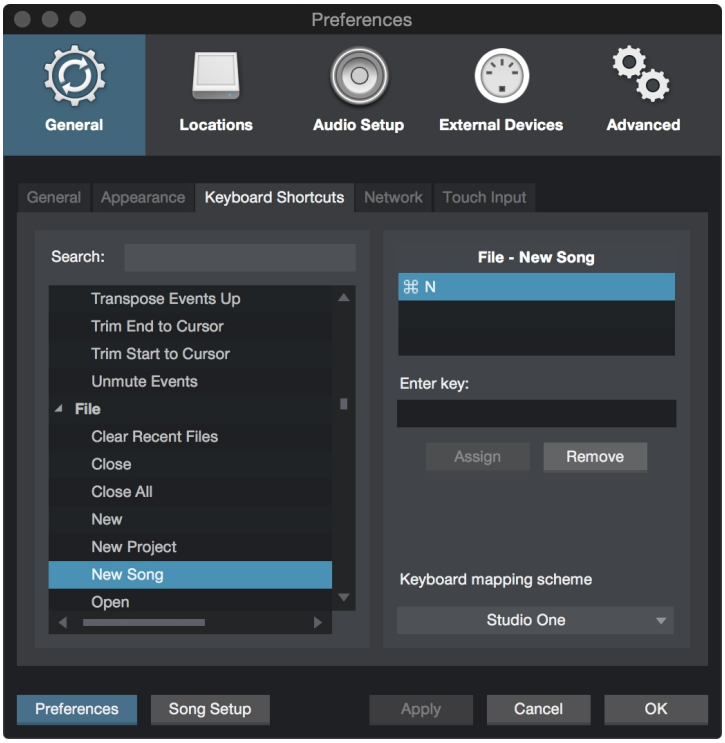
In the *Studio One/Options/General/Keyboard Shortcuts* (macOS: *Preferences/General/Keyboard Shortcuts*) menu, you can see a heading called Keyboard Mapping Scheme. Here, you can select from keyboard maps for several DAWs; select a map, and Studio One recognizes and applies common key commands from that DAW. You can then customize the key commands to fit your workflow.

The key commands used for each DAW can be viewed in the Key Command menu and can be exported in several file types for external viewing.

Mapping Custom Key Commands

In the *Studio One/Options/General/Keyboard Shortcuts* menu (macOS: *Preferences/General/Keyboard Shortcuts*), you can modify the existing key commands to be anything you like, as well as adding commands for functions that don't have default key commands.

Note that all mentions of keyboard shortcuts in this manual refer to the standard settings.



To modify any key command:

1. Find the function for which you wish to edit the key command by typing in the name of the function in the Search field.
2. When the function is found, select it by clicking on it in the list on the left.
3. Click in the Enter Key field and input any key combination using your computer keyboard. Your key combination is displayed.
4. Click Assign to assign this key command to the selected function.
5. If the key command you are trying to assign is already in use, the current use is displayed below the Enter Key field, along with a Show link that selects that function for you so that you can change it.
6. Click on the Keyboard Mapping Scheme selection box to choose from the following options:
   - **Import** Select to import a Studio One Keyboard Mapping Scheme.
   - **Export** Select to export your Studio One Keyboard Mapping Scheme.
   - **Export as Text** Select this to export your Studio One Keyboard Mapping Scheme as a text file so that you can create a reference guide to your custom mappings.

A complete list of key commands can be viewed via *Help/Keyboard Shortcuts*, which renders an HTML document that shows the currently configured key commands and opens the document in your browser.

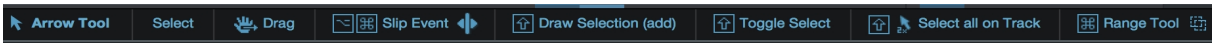
Studio One Help and Information

We have worked to make Studio One as easy to learn and use as possible, but any tool with as many capabilities as a modern DAW is bound to come with a learning curve. To help you on your way, this manual contains information about every feature in Studio One. You can access this manual at any time by navigating to *Help/Studio One Reference Manual*, or by pressing the F1 key on your keyboard.

If you have one of the built-in Studio One plug-ins open and need help with its functions, pressing F1 takes you to the relevant section of this manual.

Info View

The Info View panel, accessed via the Question Mark icon in the top toolbar on the Song and Project pages, displays all possible actions for the selected mouse tool, as well as showing the possible modifiers and their related actions. Various controls in the Studio One interface and included plug-ins also display information in the Info View when you hover the mouse pointer over them. From Info View, you can press F1 on your keyboard to jump directly to related sections of the Studio One reference manual.



Tooltips

Many controls, tools, and windows in Studio One have associated tooltips that display when you hover your mouse pointer over the control. These short descriptions can help you quickly orient yourself to the functions available in Studio One.

PreSonus.com

Our website, **http://presonus.com**, contains a wealth of information about Studio One and how best to use it. You can also get information and answers from fellow users at our forums at **http://forums.presonus.com/**

Flexible Parameter Control

Many controls and parameters throughout Studio One let you adjust their settings with the mouse and keyboard in several useful ways:

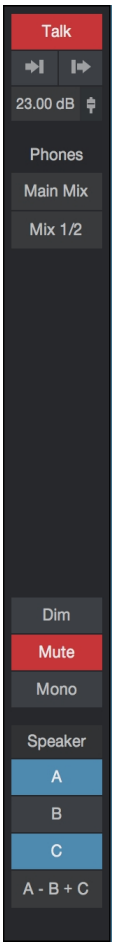
- **Scrollwheel** Hover your mouse pointer over the desired control or parameter and move the scrollwheel (or other scrolling mechanism) on your pointing device. In this way, you can smoothly adjust variable controls (such as mixer faders or plug-in parameters) and scroll quickly though lists of options (such as setting Quantize Value or channel I/O assignments).
- **Click and Drag** While moving knobs and linear faders by clicking and dragging may seem obvious, also note that many numerical settings (such as Transpose or Start and End times) can be adjusted by clicking the center of the setting's display, and dragging up or down to the desired value.
- **Double-Click and Type** Many numerical parameters can be precisely set by double-clicking the currently set value and typing in the desired value. Press [Enter] to lock in the new value.
- **[Right]/[Ctrl]-Click and Type** Many parameters of the instruments and effects included with Studio One can be **automated** or **assigned to a Macro**. Select a control, use [Right]/[Ctrl]-Click to open the Automation/Channel Macro window, and note the parameter name and value field. Values can be entered there: just double-click the value field, type in the desired value, and press [Enter] to lock it in.

Control Link

Controlling DAW software with hardware MIDI controllers can sometimes be a complex task. To make things simpler, Studio One provides the Control Link system, a clear and easy MIDI mapping protocol. With minimal configuration, you can achieve effective control over your software and external equipment.

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

PreSonus Hardware Integration



Studio One offers integrated control for the following PreSonus audio hardware products:

- **Studio 192 audio interface**
- **Studio 192 Mobile audio interface**
- **StudioLive AI-series mixers**
- **StudioLive RM-series mixers**
- **Quantum Thunderbolt Interfaces**

When you connect one of these supported units to Studio One, many of the hardware control features you know from the included UC Surface software are then available directly within Studio One.

Basic Setup Procedure

To connect your PreSonus Studio 192 interface or StudioLive AI or RM-series mixer to Studio One, do the following:

1. Connect your interface or mixer to the computer running Studio One, using the included data cable (USB or Firewire).
2. Install and launch the included UC Surface software on the computer running Studio One.
3. Launch Studio One. The control features for your hardware are now enabled in Studio One.

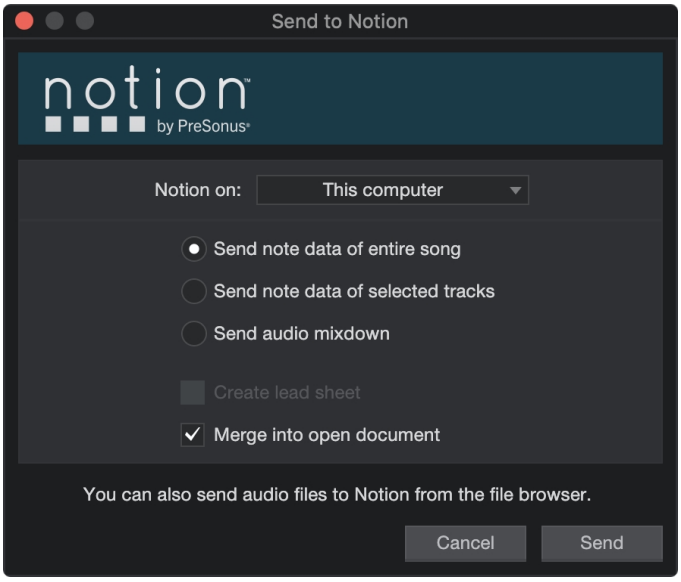
For more detailed information on setup and Studio One hardware integration, see the owner's manual for your Studio 192 series interface or StudioLive AI or RM-series mixer.

Working with PreSonus Notion Software

PreSonus Notion is our musical notation application for macOS and Windows. With Notion, you can create full-fledged musical scores for composing new work or transcription of existing music, working with both note data and audio. Notion can exchange note data and audio

freely with Studio One. Together, they create an ideal tool set for fusing the worlds of composition and production in your musical projects. This section describes the workflow for sending data between Studio One and Notion.

Sending Note Data and Audio from Studio One to Notion



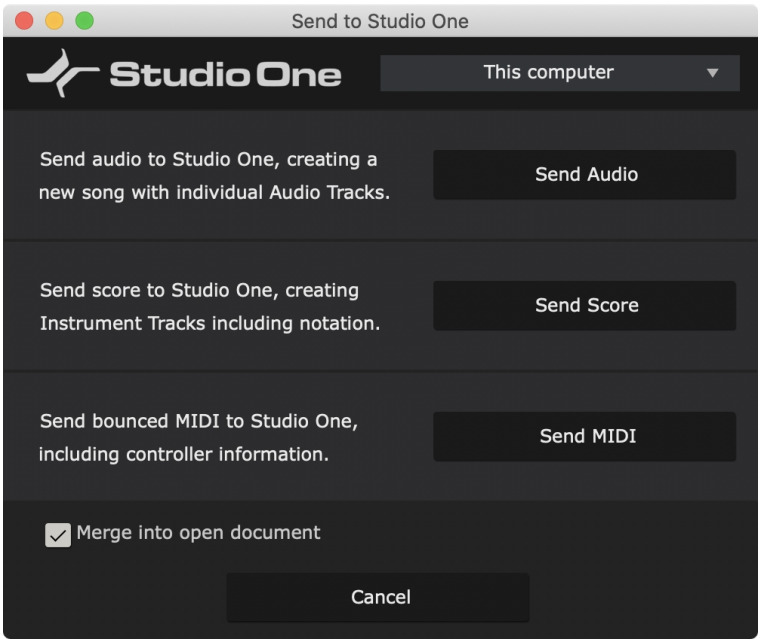
In Studio One, when you have a Song open that contains note data or audio content you wish to send to Notion, navigate to *Song/Send to Notion* to bring up the Send to Notion window. In this window, you have the following choices:

- **Computer Selector** This lets you choose to send note data and audio to an instance of Notion running on your own computer ("This Computer"), or to a Notion instance on another computer on your network. If any computers currently running Notion are on your network, they are listed in this drop-down menu for access.
- **Send Note Data of Entire Song** This option sends the note data for all Instrument Tracks in the current Song to the chosen instance of Notion. A new Score is created in Notion, with instrument parts that mirror the Instrument Tracks in your Studio One Song.
- **Send Note Data of Selected Tracks** This option works similarly to the option above, but only sends note data from the currently selected Instrument Tracks in Studio One.
- **Send Audio Mixdown** This option mixes your Song down to a stereo audio file, and sends the file to Notion, where it opens in a new Score.
- **Create lead sheet** If you have chords in your Chord Track, you can check the box in the dialog, to apply lead sheet formatting to imported note data.
- **Merge into open document** Select this option whether to merge into an existing document (overwriting a previous transfer) or to create a new document.

You can also send audio files to Notion from the Browser in Studio One. To do so, [Right]/[Ctrl]-click the audio file, choose "Send to Notion" from the pop-up menu, and follow the on-screen instructions to complete the action. This option is available for 16-bit/44.1 kHz WAV files only.

Note that upon sending MIDI and/or audio to Notion, Studio One also sends tempo map information, ensuring that tempo and time signature changes remain in sync between the two applications.

Sending Note Data and Audio from Notion to Studio One



In Notion, if you have a Score open that you wish to send as score, MIDI or rendered audio to Studio One, navigate to *File/Send to Studio One* to open the Send to Studio One window. In this window, you have the following choices:

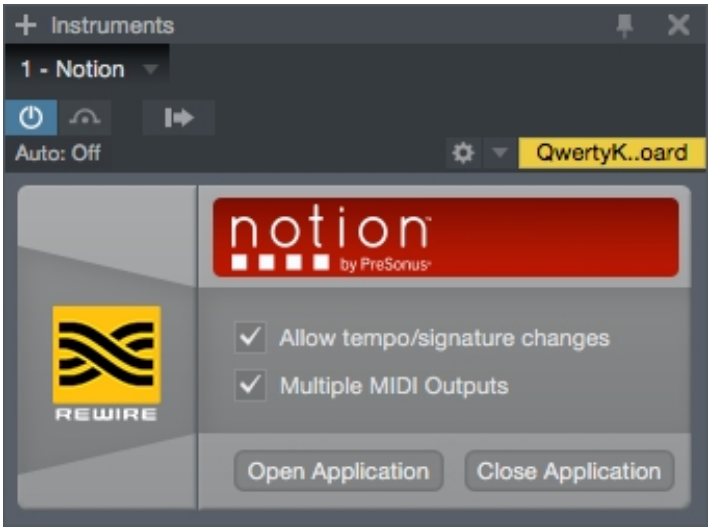
- **Computer Selector:** This lets you choose to send score, MIDI & audio to an instance of Studio One running on your own computer ("This Computer"), or to a Studio One instance on another computer on your network. If any computers currently running Studio One are on your network, they are listed in this drop-down menu for access.
- **Send Audio** This option renders audio files from each instrument part in your Notion Score (using internal sounds or 3rd-party instruments, as appropriate). It then creates a new Song in your chosen instance of Studio One, and creates Audio Tracks within it, containing the rendered audio for each part in Notion.
- **SendScore** This option transfers the score information to Studio One where you can now assign sounds.
- **Send MIDI** This option creates a new Song in Studio One and creates Instrument Parts within it, each containing the note data from the corresponding instrument parts in your Notion Score. If VST instruments are used in your Notion score, instrument and preset information is also sent to Studio One, to keep your sounds consistent across both platforms.
- **Merge into open document** Select this option whether to merge into an existing song (overwriting a previous transfer) or to create a new document.

Note that upon sending MIDI and/or audio to Studio One, Notion also sends tempo map information, ensuring that tempo and time signature changes remain in sync between the two applications.

Updating Audio and MIDI Between Studio One and Notion

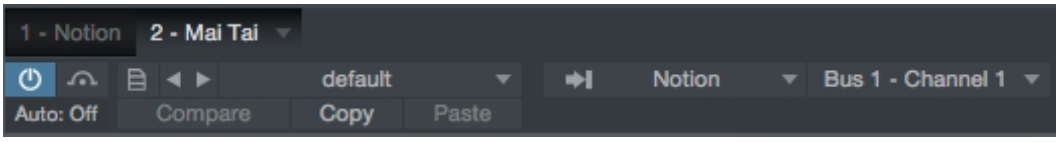
If you've already transferred MIDI or audio between Studio One and Notion, and something is changed in either program, feel free to follow the sending procedure again. Repeating the sending procedure from the application in which the change was made to the other application updates all previously sent MIDI and audio files to match the new information.

Using MIDI-Over-ReWire with Notion



Studio One and Notion can be connected using the ReWire protocol. This lets you use native PreSonus Instruments (such as Presence XT or MaiTai) as sound sources for Notion. To access Studio One Instruments in Notion, do the following:

1. In Notion, open the Preferences window, and enable the "Enable ReWire" option in the General tab.
2. Save any open work, and exit Notion. If Studio One is also open, save any open work there, and exit it as well.
3. Launch Studio One, and once it is fully open, launch Notion.
4. In Notion, enter Score Setup mode, and create a ReWire Midi track in your Score. If this is your first ReWire MIDI track, set it to the first available ReWire Bus and Channel (such as Bus 1, Channel 1).
5. In Studio One, open the Instruments tab in the Browser, navigate to the ReWire folder, and drag the Notion object to a blank area in the Track List. This creates a Notion ReWire connection object, enabling the flow of note data by ReWire.
    - » If you plan to access multiple Studio One Instruments in Notion, be sure to enable the "Multiple MIDI Outputs" option in the Notion ReWire window that opens.
6. Create Instrument Tracks in Studio One for the Instruments you wish to access with Notion.
7. Looking at the editing window for each Instrument you wish to access, set the input to "Notion," and if you plan to access multiple Instruments using ReWire, set the ReWire Bus and Channel to match those you have specified in Notion, as shown below.



Pages

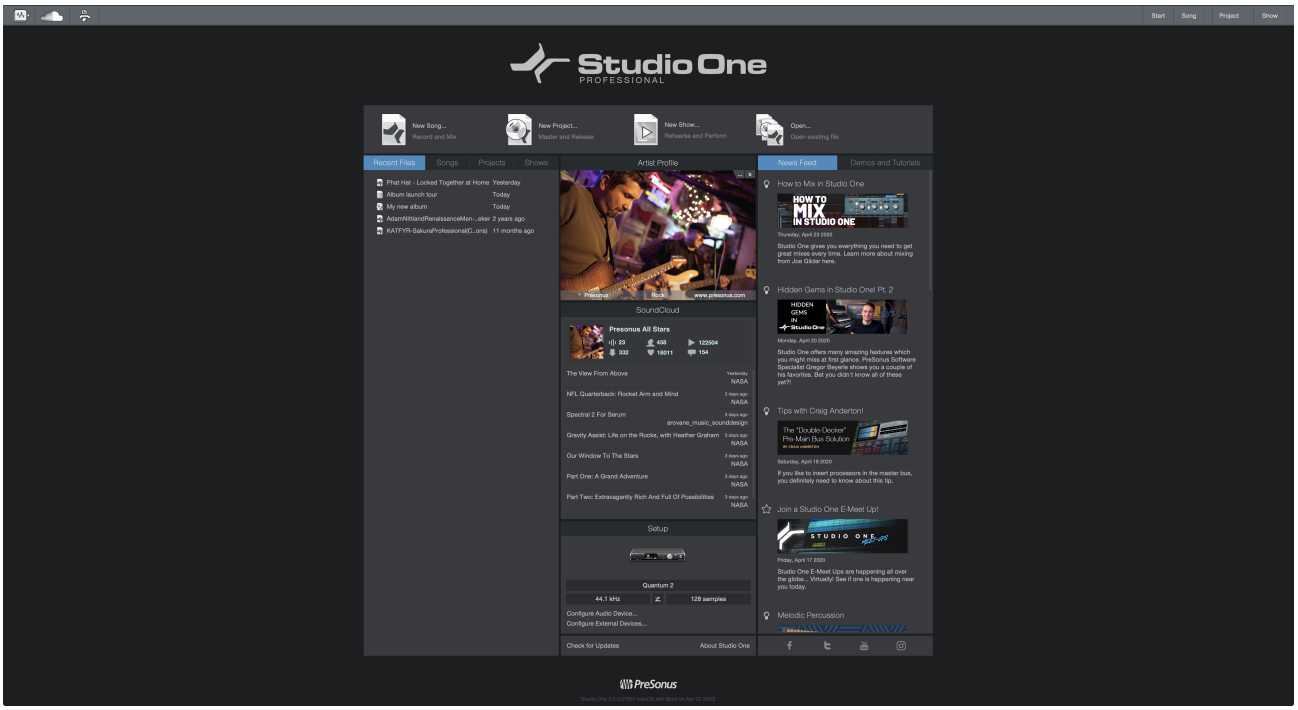
The functions in Studio One are organized into two main pages: Start and Song. Each page is designed to help you accomplish a specific set of tasks, and each page is accessible at all times.

The functions in Studio One are organized into four main pages: Start, Song, Project, and Show. Each page is designed to help you accomplish a specific set of tasks, and each page is accessible at all times.

In this chapter, we discuss the general layout of the user interface for each page.

Start

When Studio One is launched, the Start page is displayed.



This page is the central location for document management and device configuration controls, as well as your artist profile, a news feed, and links to demos and tutorials. The following section provides a brief description of the Start page.

Tasks

In the top portion of the Start page there are two options: **New Song**, for starting with an empty Song, and **Open**, so you can navigate to an existing file and open it. A Song is where you can record, edit, arrange, and mix audio and note data. Songs are accessed in the Song page.

In the top portion of the Start page there are four options. The first three allow you to create a **New Song**, a **New Project**, or a **New Show**, and the fourth allows you to **Open** an existing file. A Song is where you can record, edit, arrange, and mix audio and note 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.

Recent Files and SongsFiles, Songs, and Projects

The Recent Files list includes links to the most recently accessed documents. Click on any of these links to quickly open the associated Song or Project. Floating the mouse to the left of any listed document reveals a Pin icon that, when clicked, pins that document to the Recent Files list until it is unpinned.

To open an auto-saved version of a document, [Right]/[Ctrl]-click the name of the document and choose the desired revision from the pop-up list. This right-click menu also offers the ability to display the selected document in the Windows Explorer or the macOS Finder.

The Songs and Projects list displays all Songs and Projects contained in the User storage location.

Setup

This area displays 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.

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.

Configure External Devices

Studio One can send and receive note 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.

Check for Updates

From time to time, PreSonus issues software updates for Studio One to incorporate bug fixes and add features. To check for updates manually, click on the Check for Updates link. Your version number, as well as the most current version number, is displayed. If a newer version of Studio One is available, a link to download the new version is also displayed.

About Studio One

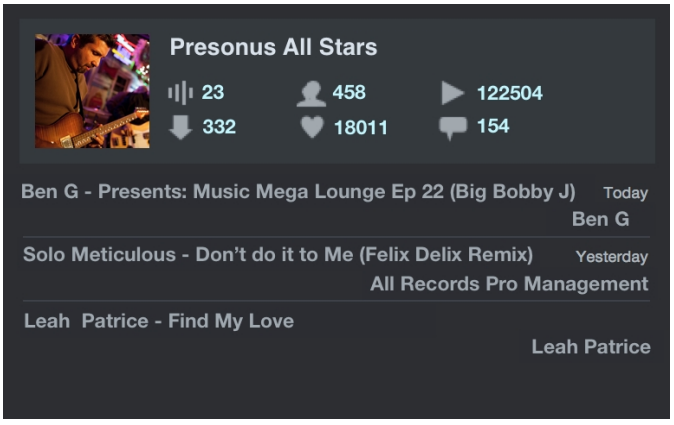
Click on the About link to view your current license and version information, as well as information about the Studio One development team.

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 URL. To add an image to the artist information, click the [...] button to choose a file, or drag-and-drop an image onto the image icon from any location on your computer. To remove the current image, click the button marked X.

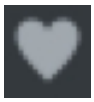
In addition to enabling you to personalize Studio One, this feature saves you the effort of filling in meta-information for every Song.

SoundCloud Dashboard



Once you've set up an account, the SoundCloud dashboard lets you have direct interaction with your fans and customers, as well as view various statistics, such as play and download numbers, and the number of followers you have.

- Shows you the number of sounds you have posted.
- Shows you how many fans you have.
- Shows you the number of plays you have.

- Shows you the number of downloads you have.
-  Shows you the number of hearts you've been given.
- Shows you the number of comments left by listeners.

News Feed

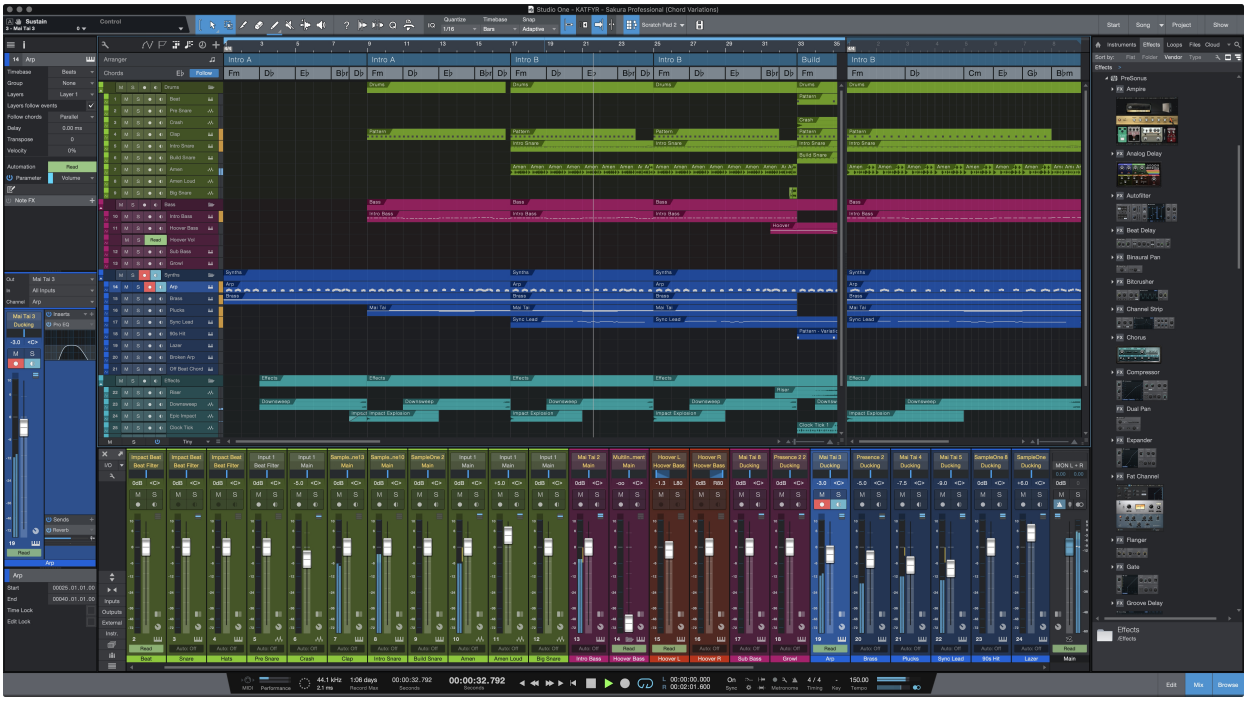
The Studio One news feed comes directly from PreSonus. This news feed contains helpful information related to Studio One and updates automatically if your computer is connected to the Internet.

Demos and Tutorials

Any installed demo or tutorial songs appears 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.

Song

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



Done

Song Page Workflow

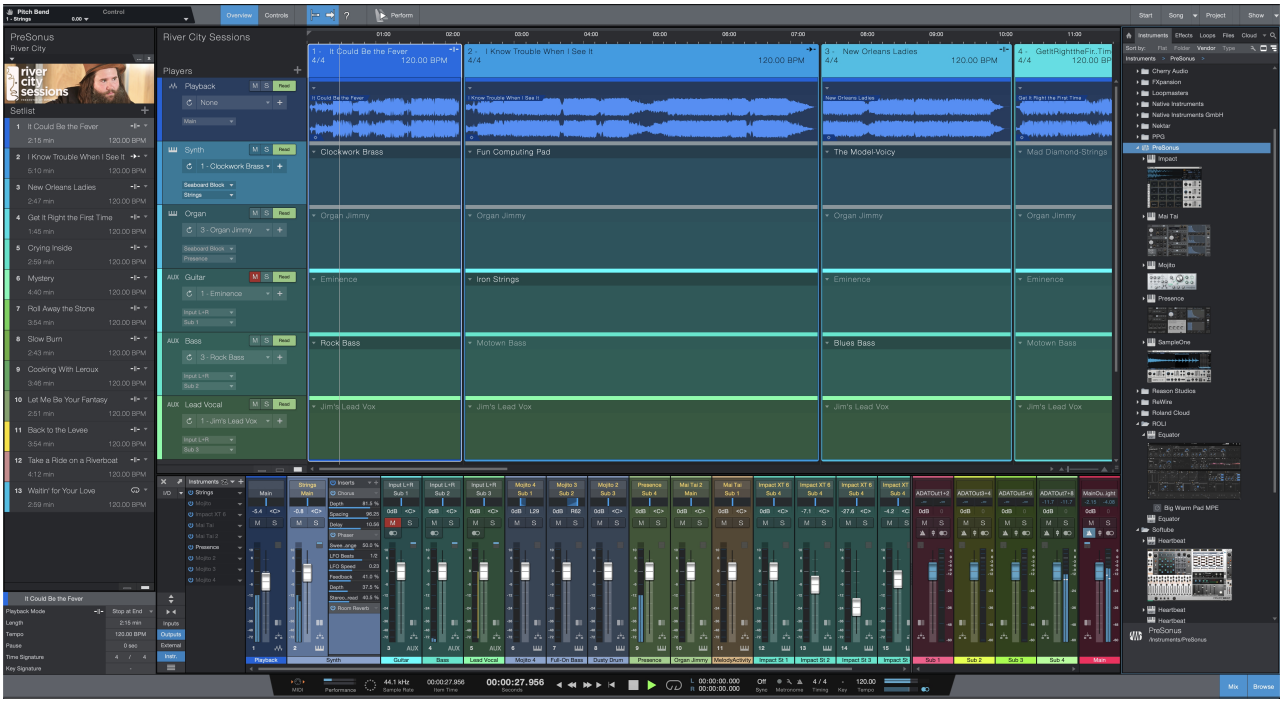
The Song page is a complete multitrack production environment with a single-window interface. On this page any number of audio and instrument Tracks can be recorded, edited, and arranged. Any number of audio effects, virtual instruments, and external effects and instruments can be used, and most parameters can be automated using Track or Part automation.

An integrated Browser makes it fast and easy to find and import audio and note data files, VST/AU audio effects, and VST/AU virtual instruments and applications. Audio files can be imported and automatically timestretched 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.

When the final touches have been made and the Song is ready for a mastering pass or a live performance, it can be added to a Project or a Show with a single command.

Show

When a new Show is created or an existing Show is opened, you are taken to the Show page.



The Show page provides an independent yet fully integrated live performance environment for performing artists, bands, and live sound engineers. It combines Setlist management with playback of backing tracks, playing virtual instruments, and processing real instrument audio signals through virtual FX racks – all from a single, intuitive interface that can easily receive content directly from any track on the Studio One Song page.

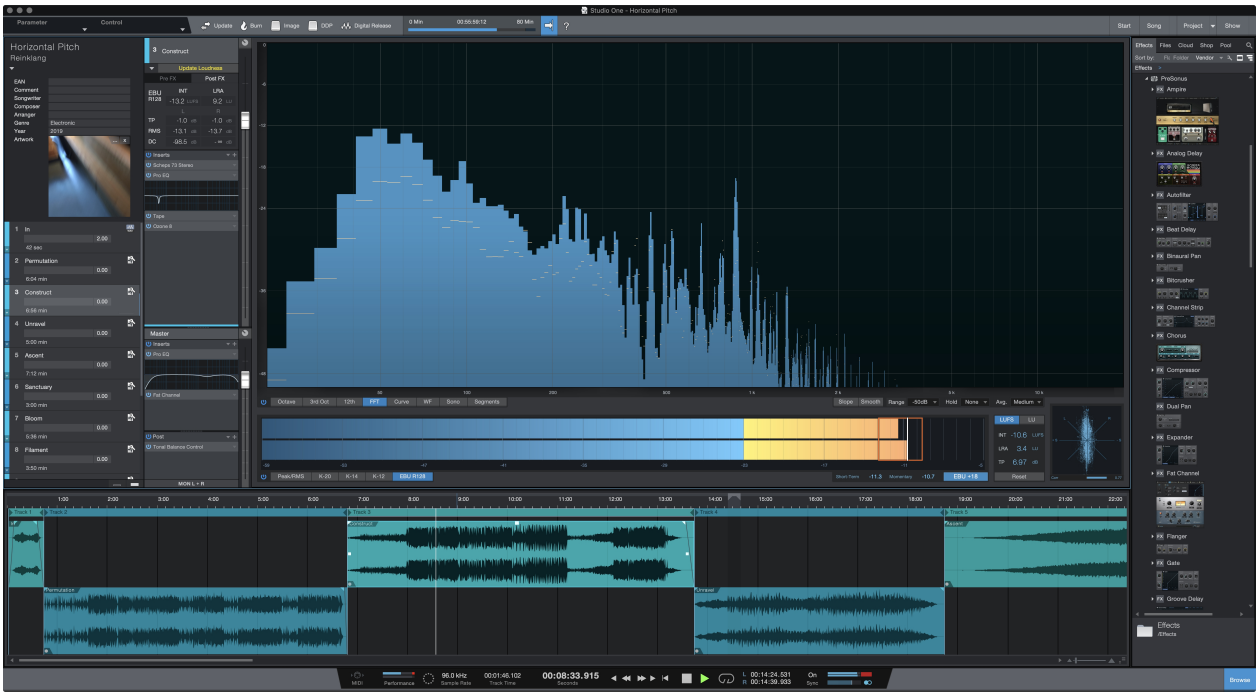
The Show page also offers two customizable views – one for editing and one for performing. The dedicated Performance View with customizable Macro Controls works hand in hand with hardware controllers such as the PreSonus FaderPort and ATOM series to create a streamlined software/hardware user interface that hides any information not needed in the actual live performance.

While presenting information in a new way, the Show page still follows the established Studio One workflow with intuitive drag-and-drop operation and convenient, easy-to-use local context menus to present available commands and options. It shares the familiar Browser, Console, External Devices and Instruments panels, as well as many functions already introduced on the Song page. Customizable keyboard shortcuts with dedicated Show page commands allow for even further customization, for example when using the Studio One Remote app (iOS/Windows/Android).

It's simple to get your Songs ready to perform using the Show page. For details, see the **Show Page chapter**.

Project

When you create or open a Project in Studio One Professional, you are taken to the Project page. This area contains the tools you need to master and publish audio.



Project Page Workflow

The Project page is a dedicated mastering solution integrated into Studio One Professional. Here you can burn industry-standard Red Book audio CDs, create high-quality MP3 albums, and standard disc and DDP images. 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 help you know at a glance exactly what is going on sonically in your Project. Loudness metering and offline loudness analysis is available, offering information in the current EBU R128 and LU/LUFS standards, for dynamic perfection in broadcast and streaming-oriented material.

As mentioned, Songs can be added directly to your Projects without having to export a Song mix. After adding a Song to a Project, you can go back and change the Song mix, and the Project is automatically updated.

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

Quick Switch

In Studio One Professional, 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 displays 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.

Recording

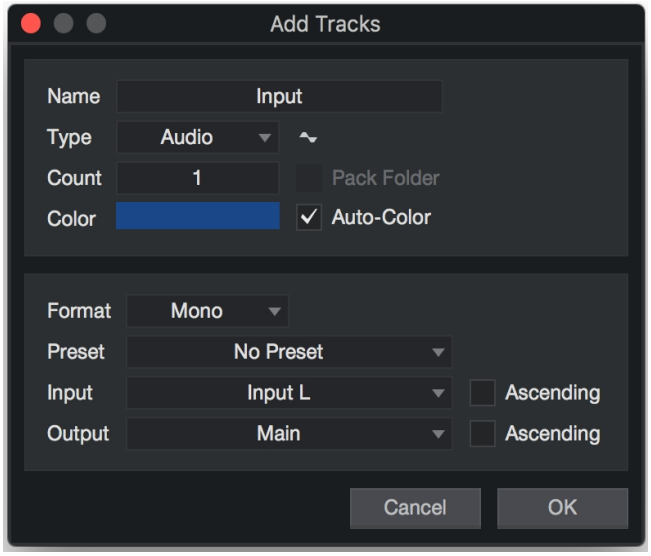
The following chapter discusses aspects of recording in Studio One, including Audio and Instrument Tracks, recording modes and formats, and recording tips.

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.

Creating an Audio Track

To create an Audio Track, navigate to *Track/Add Tracks* or press [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.
- **Type** Choose Audio.
- **Color** Choose a color.
  - **Auto-Color** Check this box if you would like your Tracks auto-colored.
- **Format** Choose mono or stereo.
- **Preset** Choose an **FX Chain** to be pre-loaded on the Tracks.
- **Input** Assign an audio Input to the new Track(s). When creating multiple Tracks, you can engage the Ascending option to assign Inputs to each Track in ascending order (Track 1, Input 1, Track 2, Input 2, etc.).
- **Output** Assign an audio Output to the new Track(s). When creating multiple Tracks, you can engage the Ascending option to assign Outputs to each Track in ascending order (Track 1, Output 1, Track 2, Output 2, etc.).

Once these options are configured, click on OK, and the Tracks appear in the Arrange view, below the currently selected Track.

Navigate to *Track/Add Audio Track* (mono or stereo) to quickly add an audio Track.

[Right]/[Ctrl]-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]/[Ctrl]-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.

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 Chains** section of the **Mixing** chapter.

Configuring an Audio Track

This section describes the editable Audio Track parameters.

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.

To select an Input Channel from the Track Column:

- If needed, expand the Track's control area to expose the input selector.
- Click the Input Selector immediately below the horizontal Track fader to choose from any configured Input Channel.

To select an Input or Output Channel from the Console:

- Open the Console by clicking the [Mix] button, or press [F3] on the keyboard.
- Click the selectors 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.

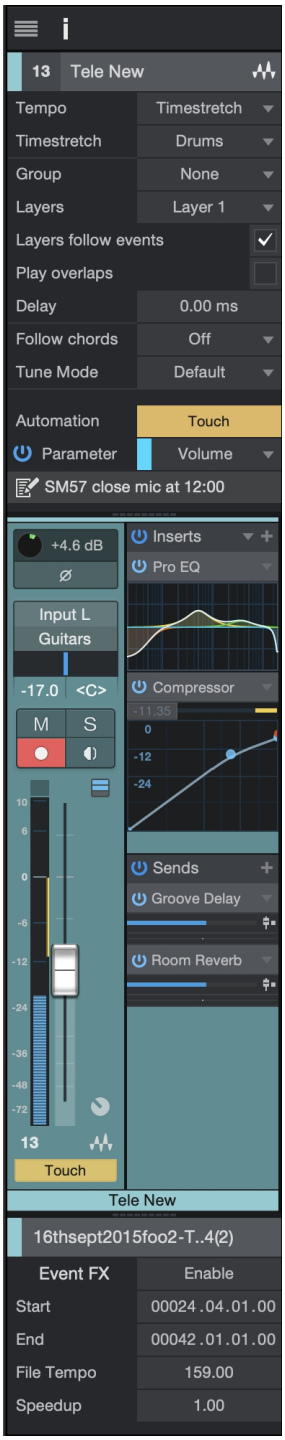
To Select an Input or Output Channel from the Inspector:

- Open the Inspector window by clicking on the [I] button above the Track Column or pressing [F4] on the keyboard.
- In the Channel area of the Inspector window, you can 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.

Stereo Tracks can select from both mono and stereo Input Channels, while Mono Tracks can only select from mono Input Channels.

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 are not affected by Song tempo.
- **Follow** The start position of Audio Events on the selected Track is adjusted with tempo changes, so the Events stay in sync with their Bars (bars and beats) position. The length of the Event is not affected.
- **Timestretch** Assuming that the Song file contains tempo information, tempo changes 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 is affected in the stretching process but the pitch of the audio remains unaffected.

If the Stretch Audio Files to Tempo option is selected when creating a new Song, Timestretch is set as the default tempo mode for all new Audio Tracks.

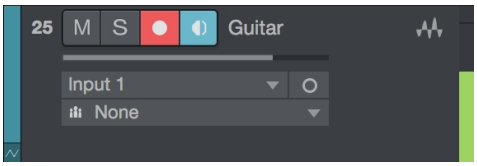
Re-Recording

Instrument Output, Bus, and ReWire channels can be selected as the input to any stereo Audio Track. These Channels are grouped in branches in the input selection menu for the Audio Track.

This is very useful in a number of situations in which you would like to "print" the live output of one of those Channel types (live virtual instrument recording to audio, hybrid analog mixing, etc.).

Record-Enabling an Audio Track

To record to an Audio Track, the Track must be record-enabled. 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 turns red when active, and the Track's meter begins 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 both record-enable the related Track and disarm record-enable for all other Tracks.

You can find the Audio Input Follows Selection in the *Studio One/Options/Advanced/Console* options list (macOS: *Preferences/Advanced/Console*). Engaging this automatically record-enables the last Track selected in the Arrange view. Monitor-enable is, by default, automatically engaged when Record Enable is engaged.

When an Audio Track is record-enabled, a clip indicator appears at the top of the input-level meter for that Track in the Arrange view. If clipping occurs at the input, the clip indicator turns 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.

Software Monitoring

To monitor (listen to) live audio input on an Audio Track, 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 you are listening to 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 has 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. The Output Channel sends to a designated stereo pair of outputs on your hardware audio interface, which presumably are 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. Otherwise, you might create a feedback loop that could quickly generate dangerously loud audio levels, possibly harming your ears and your speakers.

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, we recommend that you monitor live audio input via the hardware, rather than through the software. This can help you to avoid common problems that result from software latency, such as hearing a delay when you record vocals, or recording off-beat.

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 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 Console by clicking on the Inputs tab in the Console.

Disabling an Audio Track

When working in large Songs with high Audio and Instrument Track counts, it can be useful to disable certain Tracks that are not currently in use, to free up CPU and RAM resources for use elsewhere. Disabling an Audio Track disables and unloads any Insert effects used. To disable an Audio Track, [Right]/[Ctrl]-click the Track in Arrange view, and choose "Disable Track" from the pop-up menu. To re-enable a disabled Audio Track, [Right]/[Ctrl]-click the Track and choose "Enable Track" from the pop-up menu.

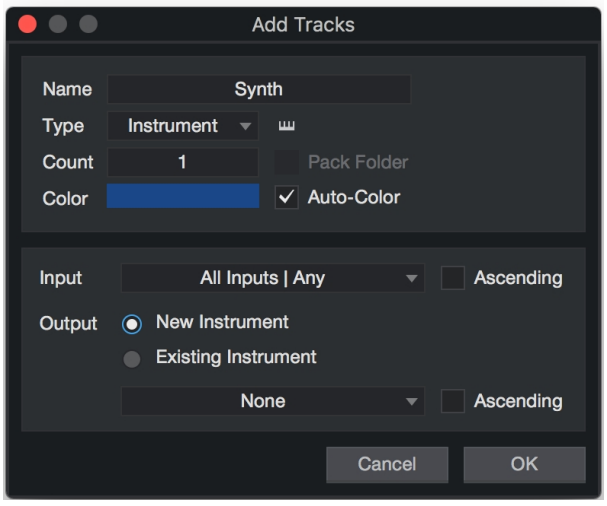
Instrument Tracks

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 or hardware sound module. Performance data is not audio; the virtual instrument or sound module 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.

Creating an Instrument Track

To create an Instrument Track, navigate to *Track/Add Tracks* or press [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.
- **Type** Choose Instrument.
- **Color** Choose a color.
  - **Auto-Color** Check this box if you would like your Tracks auto-colored.

- **Input** Assign a MIDI input Device to the new Track(s). Choose All Inputs | Any to accept input from any connected MIDI Device.
  - When creating multiple Tracks, you can engage the Ascending option to assign inputs to each Track in ascending order of device and MIDI channel.
- **Output** Assign an Instrument to the new Track(s). To create a new instance of a software instrument for each new Track, choose New Instrument and select an instrument from the provided list. To assign the new Tracks to a hardware instrument or to a software instrument already in use in the Song, choose Existing Instrument, and select from the provided list.
  - When creating multiple Tracks, you can engage the Ascending option to assign Outputs to each Track in ascending order of Instrument and MIDI channel.

Once these options are configured, click OK, and the Tracks appear in the Arrange view, below the currently selected Track. 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]/[Ctrl]-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.

Configuring an Instrument Track

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 default to using that Keyboard.

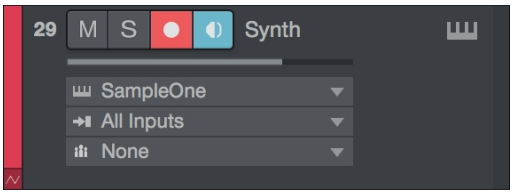
An Instrument Track can trigger a virtual instrument that has been set up in a Song or an external instrument. The Instrument Track Input and Output can each be selected in one of two places:

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

- Set the Arrange view Track size to medium or larger to be able to access the current Instrument Track Input.
- There are two I/O selectors on each Instrument Track. Click the top selector to choose an output to any previously set up virtual or external instrument. Click the bottom selector to choose from any configured Keyboard input.

Selecting an Instrument Track Input or Output from the Inspector:

- Open the Inspector window by clicking on the [I] button above the Track Column or by pressing [F4] on the keyboard.
- Click the Input or Output selector 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.

Note that it is possible to select All Inputs as the input for Instrument Tracks, which combines the input of all defined keyboard devices. If Default Instrument Input is not checked for any Keyboard device, new Instrument Tracks automatically use All Inputs.

This item is always in the inputs list, even if no keyboard device is defined. However, for any MIDI input to be received on an Instrument Track, your MIDI input device (Keyboard Controller, etc.) must first be set up in the External Devices menu as a Keyboard.

Set Up a Virtual Instrument

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

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. Then do one of the following:

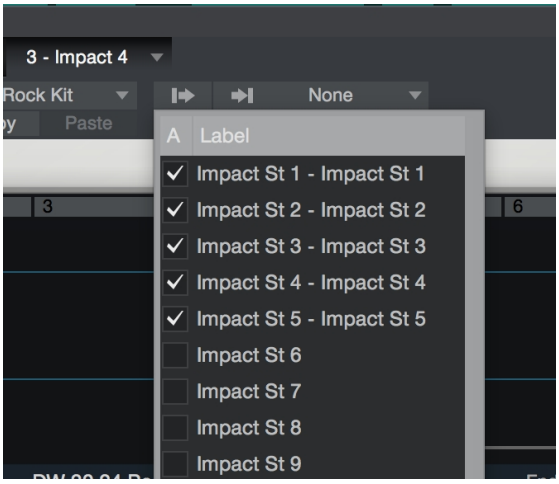
- Click on and drag any virtual instrument to an empty space in the Arrange view to simultaneously add the virtual instrument to your Song and create an Instrument Track with its output routed to the virtual instrument. The Instrument Track conveniently inherits the name of the virtual instrument.

- Click on and drag any virtual instrument on top of an existing Instrument Track to replace the Track's current virtual instrument.
- Click and drag any virtual instrument from the Instruments tab to the Console to simply add the virtual instrument to your Song. In order to control or play this virtual instrument, you need to select it as the output for an Instrument Track.
- The virtual instrument is now set up and ready to play and has one or more dedicated Audio Channels in the Console.

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.

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 is active by default.



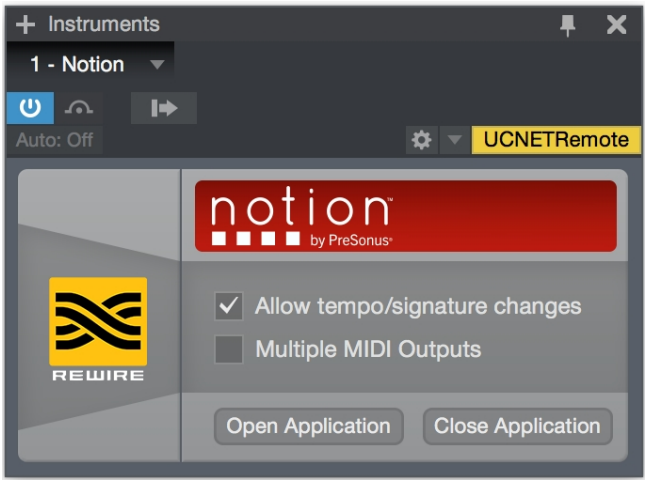
To activate the other possible virtual instrument Output Channels in the Console:

- Open the Console by pressing [F3] on the keyboard, then open the Instruments panel (open by default) by clicking 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 expands.
- Click on the checkbox next to any output to activate that output for the virtual instrument.
- Each active virtual instrument output has 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 has an Outputs button near the top of the plug-in window. Click on this button to view and activate the available outputs.

Set Up a ReWire™ Application

ReWire applications are set up in a similar way to virtual instruments. Any ReWire applications known to Studio One Professional are 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 has a special ReWire object to represent the application.



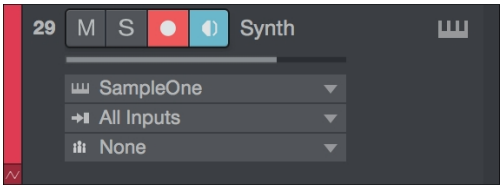
The ReWire interface window is similar to the virtual instrument interface windows. There are also two special controls, Open Application and Close Application, which can open and close most ReWire applications, so you do not need to leave Studio One to open or close the ReWire application.

If clicking on Open Application does not immediately launch your ReWire application, this means that the ReWire application does not support this function, so you need to manually launch the application. The application should launch as secondary ReWire device.

Engaging the Allow tempo/signature changes option in the ReWire interface window allows the ReWire application to make tempo and time signature changes within Studio One. To suppress these changes from the ReWire application, disable this option.

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 *Studio One/Options/Advanced/Devices* menu (macOS: *Preferences/Advanced/Devices*). If note data arrives from the Track's selected Keyboard, the Instrument Track's meter moves 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.

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.

Disabling an Instrument Track

When working in large Songs with high Audio and Instrument Track counts, it can be useful to disable certain Tracks that are not currently in use, to free up CPU and RAM resources for use elsewhere. Disabling an Instrument Track also disables and unloads any Insert effects used. To disable an Instrument Track, [Right]/[Ctrl]-click the Track in Arrange view, and choose "Disable Track" from the pop-up menu. To re-enable a disabled Instrument Track, [Right]/[Ctrl]-click the Track and choose "Enable Track" from the pop-up menu.

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 turns 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 Console are not muted.

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

Monitoring an External Instrument

You can use an Aux Channel to monitor the audio output of an external instrument if you don't want to record the audio to your hard drive. This is useful when working with an external MIDI hardware synthesizer, for example, as you can make changes to the MIDI data on an Instrument track without needing to record another take to your hard drive. Audio from the device returns through your audio interface into an Aux Channel in the Console, where it becomes a part of the mix like any other track.

Remember, 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.

Here's how to set up an Aux Channel for an external instrument:

1. If you haven't already done so, **set up the external instrument as a MIDI device**.
2. Press [F3] to open the Console.
3. Click [External] in the Console Navigation column to open the External Devices panel.
4. Click the menu arrow for the external device.
5. Select Edit from the menu to open the control mapping window.
6. Click the Outputs button ( ).
7. Select Add Aux Channel at the bottom of the window. An Aux Channel appears in the Console.
8. If your external instrument has multiple outputs connected to your audio interface, add as many Aux Channels as you need.
9. **Important:** Click Save Default before closing the window. This makes it easy to create new instrument tracks with the Aux Channels already mapped. See **Make an Instrument Track for the Aux Channel** to learn more.
10. Route the Aux Channel to the desired output. Your external device is now available the Console.

Remember that the external instrument needs to be physically connected to one or more inputs on your audio interface, since its audio will always be "live".

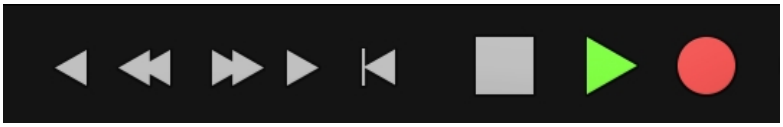
Note also that running external audio signals through the Console means that bouncing, rendering and mixdown automatically switches to real-time.

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.

Manually

Manually activating recording is the most basic way to record. Recording starts at the current playback-cursor position and continues 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 turns red, the playback cursor starts to scroll from left to right, and new Events are recorded to any record-enabled Tracks. Recording continues until you manually stop it.

Precount and Preroll

When recording audio or Instrument Parts, it is often useful to give the performer a count-in before recording begins, to alert them that recording is starting, and present the tempo of the Song so that they can play on-beat from the start. Studio One offers two ways to do this: Precount and Preroll.

Engaging Precount lets you specify a number of bars of metronome clicks to be played before recording begins. Preroll lets you specify a number of bars in the Song to play before recording begins. Choose the mode that best meets your needs as you record.

Follow these steps to use Precount or Preroll:

1. Click on the Metronome Setup button to open the Metronome Setup menu.
2. Select Precount or Preroll in the Metronome Setup menu, and enter a number in the Bars field for the number of bars you wish to play before recording begins.
    - » You can also enable the selected mode by clicking on the Precount or Preroll button in the Transport, or by pressing [Shift] + [C] on the keyboard to engage Precount, or [O] to engage Pre-Roll.
3. Set the playback cursor to the timeline position at which you wish to begin recording.
4. Click on the Record button in the Transport or press [NumPad *] to begin recording.
    - » In Precount mode, the Metronome clicks for the specified number of bars. The number of beats remaining before recording starts is displayed in the Record button in the Transport.

» In Preroll mode, playback begins a specified number of bars before the position you chose, with the playback cursor moving from left to right.

5. Recording automatically activates at the position you chose. The Record button in the Transport turns red, the playback cursor scrolls from left to right, and new Events begin recording to any record-enabled Tracks.
6. Recording continues until you manually stop it by pressing [Space Bar] on the keyboard or clicking Stop in the Transport.

Auto Punch

It is sometimes useful to automate the point at which recording begins and ends. 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:

1. 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.
2. 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.
3. Click on the Auto Punch button in the Transport, or press [I] (the letter 'i') on the keyboard.
4. With Tracks record-enabled, begin recording at any point before the Left Locator position.
5. Playback begins and recording automatically activates at the Left Locator position. The Record button in the Transport turns red, the playback cursor continues to scroll from left to right, and new Events begin recording to any record-enabled Tracks.
6. Recording automatically stops at the Right Locator position. However, playback continues 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 is very small and not audible; however, you can edit the crossfade manually.

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.

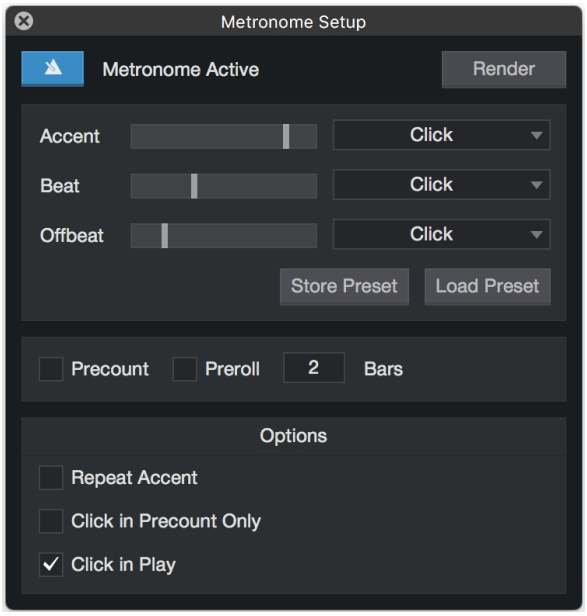
Turn the Metronome On/Off Manually

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 above the volume fader. These controls allow you to choose, for each output, whether or not the metronome is heard, and its level.

Metronome Setup

Click the Metronome Setup button (next to the Metronome button in the Transport) to access the Metronome Setup menu. In this menu, you can configure sounds and behavior for the metronome, as well as Precount and Preroll.



Here, you can choose an individual sample and volume level for Beats, Accents, and Offbeats. Accents play on the downbeat, or first beat, of each new bar. Offbeats play in the space between each Beat. You can choose from seventeen default samples for each, including Click, Clave, Rim Shot, and Tambourine. By default, the Accent Level setting is higher than the Beat Level setting, as most musicians like to have the downbeat of each bar emphasized to help keep time.

Metronome Presets

Once you have configured the Metronome, you can save the current setup as a preset by clicking the [Store] button. These presets can be recalled at any time by clicking the [Load] button.

Precount and Preroll

Precount and Preroll are two methods you can use to signal the start of recording and give a sense of the song's tempo to a musician before recording begins. When you click Record with Precount enabled, the metronome clicks for the number of bars specified in the Bars parameter, before recording starts. When you click Record with Preroll enabled, Studio One starts playback behind where the cursor is placed, by a number of bars specified by the Bars parameter. When playback passes the cursor position, recording starts.

When Precount is enabled, pressing record shows a countdown in the record button, of the number of beats remaining before recording starts.

Precount can also be enabled by clicking the Precount button, to the left of the Metronome buttons in the Transport, or by typing [Shift] + [C]. Preroll can also be enabled by typing [O].

Repeat Accent

This setting repeats the Accent sound when using a time signature with more than one accent per bar, such as 12/8. You can try this out by doing the following:

1. Open the Metronome settings, and chose a sound for the Accent that is different from both the Beat and the Offbeat.
2. Leave the Repeat Accent checkbox empty.
3. Make sure the Click in Play option is active, so that you can hear the Metronome during playback.
4. Set the time signature to 12/8, and either click the Play button or press the Space Bar.

You'll notice the Accent is only heard every 12 beats. However, if you go through steps 3 and 4 with the Repeat Accent function switched on, the Accent is heard every 3 beats.

Click in Precount Only

When recording is triggered with Pre-Roll engaged, as discussed in the **Precount and Preroll** section of this chapter, a specified number of Precount bars 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 provides a traditional count-in during the Precount bars and is not heard beyond those bars.

Click in Play

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

Render Metronome

You can create an Audio Track of the Metronome by clicking the [Render] button located in the upper-right corner of the Metronome Setup window, and choosing one of the Render range options. These options allow you to create a click track that is either the full length of your Song, or just the length of a looped range within it, such as 4, 8, or 16 bars.

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."

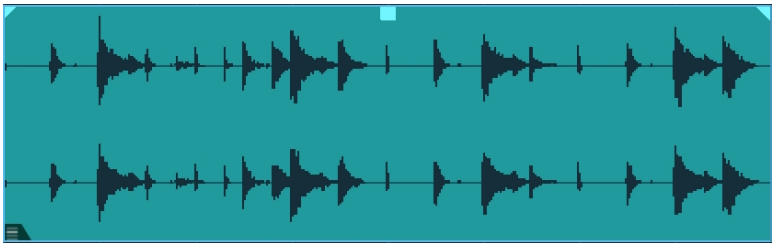
Follow these steps to accomplish Loop Recording:

1. 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.
2. Click on the Loop button in the transport or press [NumPad /] on the keyboard to engage Looping.
3. Activate recording manually or via Pre-Roll or Auto Punch.
4. When the playback cursor reaches the Right Locator position, it loops back to the Left Locator Position.
5. Recording continues 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 are created. These Takes represent each recorded pass over the looped region. If Record Takes to Layers is engaged in the Record panel, opened from the View menu or with [Shift]+[Alt]+[R] on the keyboard, the takes are automatically placed in separate layers which are expanded when recording is stopped. Refer to the **Comping** section of the **Editing** chapter of this manual for more information.

Selecting Takes of an Audio Event

When there are multiple Takes available for an Audio Event, the Take icon appears 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]/[Ctrl]-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 splices 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. For 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 of the three Takes.

Unpack Takes

When two or more Takes exist for an Audio Event, it is possible to unpack the individual takes to separate Events on new Tracks, new Layers, or existing Layers. To do this, [Right]/[Ctrl]-click on the Event and click on Unpack Takes in the contextual menu.

Choose Unpack to Tracks to place each Take at the appropriate time on its own new Track. Note that the settings of the originating Track are not duplicated for the new Tracks.

Choose Unpack Takes to New Layers to place each Take on its own Layer. This is usually done for comping, discussed in detail in the **Comping** section of the **Editing** chapter. Choose Unpack Takes to Existing Layers if you would like to unpack the Takes to existing Layers.

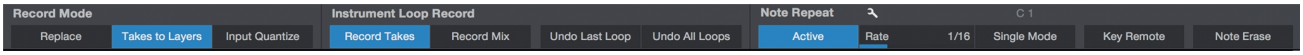
Set and Shift Loop

Several key commands that you may find helpful when loop recording are available in the Keyboard Shortcuts menu and by default have no key command assigned.

Set Loop Start and Set Loop End allow you to place the left and right locators at the current playback-cursor position. The same commands might be used when setting left and right locators for a punch-in using Auto Punch.

Shift Loop and Shift Loop Backwards allow you to move the loop range to the next or previous range of equal time. For instance, if you have eight bars looped, Shift Loop would move the loop range to the next eight bars.

Instrument Track Recording Modes



There are several modes for recording to an Instrument Track. To switch between these modes, navigate to the View menu and select Record panel, or press [Shift]+[Alt]+[R] on the keyboard. In the Record panel, you can choose between a range of recording modes, and access creative recording tools. The following describes each of the Record Panel modes and functions.

Record Mode Options

Replace and Overdub

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

When Replace is disabled, you are in Overdub recording mode. In this mode, recording over any existing Instrument Part results in the newly recorded material being overdubbed, or added to, the existing material. While recording, you hear the previously recorded Event playing, along with the material currently being recorded, assuming that you are monitoring the Instrument Track.

Takes to Layers

Engage the Record Takes to Layers option to move the contents of each Take created while recording in loop mode to its own Layer below the current Track. If you engage this option while **Record Takes** is enabled, the notes from each run-through of the loop are moved to their own new Layer. Engaged while **Record Mix** is enabled, a new Layer is created each time recording is started and stopped, containing all notes from the entirety of the most recent recording pass.

Input Quantize

Engage Input Quantize to snap recorded notes to the rhythmic value set by the **Quantize** parameter. When recording parts that are destined to be heavily quantized (such as synth arpeggios or drum-machine-style beats), this saves you the step of later Quantizing the contents of your loop.

Instrument Loop Record Options

Record Takes and Record Mix

If Loop is engaged in the Transport while recording, the recording mode changes either to Loop Record Takes or Loop Record Mix, depending on the selection in the Record panel. 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]/[Ctrl]-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 Tracks, as with Audio Event Takes, described in the **Unpack Takes** section of this chapter.

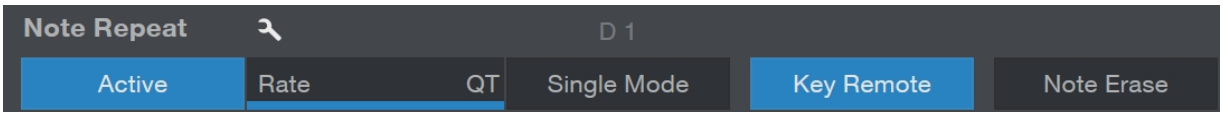
When Loop Record Mix is selected, each pass through the looped region is added to the existing material within a single new Instrument Part. For instance, if you loop a four-bar region to record a new drum part, this would allow you to play one piece of the drum kit during each pass until you have recorded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

Instrument Recording Tools

Undo Last Loop and Undo All Loops

The standard Studio one Undo/Redo functions do not apply to individual record passes in Loop mode. Instead, use these two special Undo buttons. Once you have some note information in your loop, you can click Undo Last Loop to erase only the notes added in the most recent run-through of the loop. Click Undo All Loops to erase all notes in the current loop, and start fresh.

Note Repeat

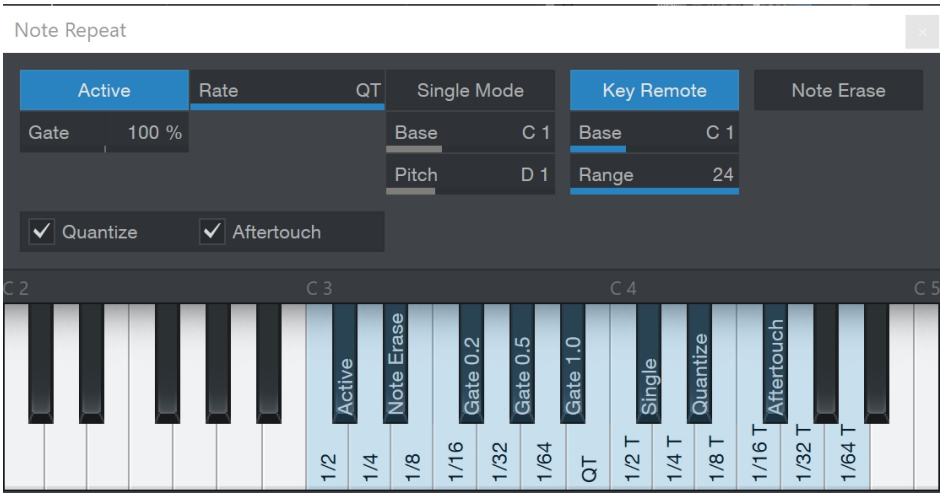


With Note Repeat active, any notes played retrigger according to the current Rate setting. This can be set to QT (to follow the current quantize value) or to any specific rythmic value.

For example, when Rate is set to 1/16, held notes create a series of 16th notes at those note values. This can come in handy when recording drum fills or rhythmic synth parts. Note that this mode cannot be combined with the Note Erase mode.

If your MIDI keyboard or controller supports aftertouch, you can vary the velocity of repeated notes by applying pressure to the keys or pads when the Aftertouch feature is enabled. The higher the pressure, the greater the velocity of the recorded notes.

Note Repeat Options



Note Repeat is highly configurable, and can be controlled extensively using MIDI, which unlocks a wealth of real-time creative options. To reach the options window for Note Repeat, click on the wrench-shaped icon in the Note Repeat section of the Record Panel. You can also open this window by enabling Key Remote mode.

- **Active** When enabled, Note Repeat is turned on.
- **Rate** Sets the rhythmic rate of Note Repeat.
- **Gate** Sets the length of each note.
- **Quantize** When enabled, all repeated notes snap to the main Song grid, even if a note is played off-beat. Disable this option to allow free play of note repeat without rhythmic correction.
- **Aftertouch** When enabled, key or poly pressure can be used to control note velocity as a note is held.
- **Single Mode** When enabled, a range of keys on your MIDI controller play one note at different rates. By default, this note is the last note played before this mode was enabled.
  - Change the **Base** parameter to move the range of Single Mode keys to a different octave on the keyboard.
  - Change the **Pitch** parameter to change the note that is played in Single Mode
- **Key Remote** Enabling this option allows MIDI control of both Note Repeat rate (as in Single Mode), as well as the active state of Note Repeat, Note Erase, Gate times, Single Mode, Quantizing, and Aftertouch.

- Change the **Base** parameter to move the starting note of the Key Remote control key range to a different octave.
- Change the **Range** parameter to expand or contract the range of keys used to control in Key Remote mode. The larger the Range, the more controls can be accessed via MIDI.

Note: While a range of keys is reserved for control of Note Repeat when in **Key Remote** mode, the rest of the MIDI controller's notes are free to change the pitch of the repeated notes. This allows radical changes in Note Repeat behavior to be made with one hand as single notes and chords are specified with the other.

Look at the keyboard display in the Note Repeat options window to see the control assignments for each note in the designated set of keys for Key Remote mode.

Note Erase

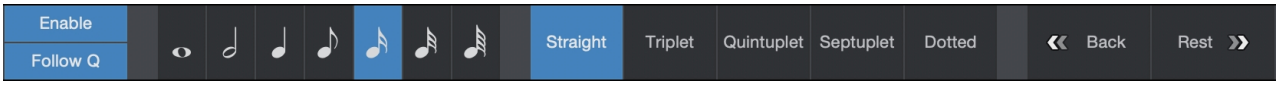
If Note Erase is selected in the Record panel, any notes played during the current recording pass erase existing notes of the same note value. For instance, if you start recording a drum pattern, and the kick pattern is on C1 and has an extra eighth-note hit on beat four, you could switch to Note Erase while recording and play C1 on beat 4 for one eighth-note, and that would erase the previously recorded note.

It is only possible to engage this mode if Record Mix is engaged and Note Repeat is disengaged; engaging Record Takes or Note Repeat disables this mode.

Step Record

Step Recording is a special, note-by-note method of recording musical note data. Rather than playing in real time, or drawing in notes with the Paint tool, you can simply specify a rhythmic value and press keys on your MIDI controller to enter notes and chords with ease and precision.

Step Record Toolbar



To access Step Record mode, click to select the Instrument Track you wish to record to, open the Editor by clicking the [Edit] button, then click the [Step] button in the Editor toolbar to display the Step Record toolbar. When you're finished, you can hide the Step Record controls by clicking the [Step] button again.

The Step Record toolbar contains the following controls:

- **Enable** Toggle this on to enter Step Record mode. When enabled, playing notes on the keyboard adds notes and chords to the selected Instrument Part. If you place the cursor in an empty area on the track, playing notes creates a new Instrument Part in that location, for notes to be recorded to. Toggle Enable off to exit Step Record mode.
- **Follow Q** Enable this to link the Step Length setting to the current Quantize setting. If you change the Quantize value, the Step Length value changes to match it.
- **Step Length** With these selectors, you can choose a Step note length between whole notes and 64th notes, in the following musical note groupings: Straight, Triplet (3 notes in the space of 2), Quintuplet (5 notes in the space of 4), Septuplet (7 notes in the space of 8), or Dotted (notes are increased in length by 50% from the chosen rhythmic value).
- **Back** Click this button to erase the most recently added note or chord and move the cursor back to where that note or chord started. Press Back multiple times to erase multiple notes.
- **Rest** Click this button to move the cursor forward in time, according to the currently selected Step Length, in effect, creating a musical rest for that step.

Recording in Step Mode

To record a Part in Step Mode, follow these steps:

1. Place the cursor at the point within the chosen Instrument Track that you wish to record to.
2. Open the Step Record toolbar by pressing the [Step] button in the Editor toolbar.
3. Press [Enable] to enable Step Recording.
4. Choose a rhythmic value from the Step Length selectors. You can change this value at any time as you create the Part.
5. Play a note on a connected MIDI controller to create a note with the specified length at the cursor location. When you release the note, the cursor moves ahead according to the Step Length setting, and you're ready to enter the next note. If you wish to enter a chord, simply play and hold the notes that make up the chord, then release.
6. When you're finished, press [Enable] again, to exit Step Record mode.

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 to two separate layers on a single Track and quickly switch between the two without needing a second Track.

To create a new layer on any Track, [Right]/[Ctrl]-click the Track's control area in the Arrange view, and choose Add Layer from the Layers menu. You can also create a layer by opening the Inspector by pressing [F4] on the keyboard, then selecting Add Layer from the Layer selection box. The new layer is effectively like having a whole new Track without 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 different edits of the same Events on two layers.

Layers are also used in the comping system of Studio One, as described in the **Comping** section of the **Editing** chapter of this manual.

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 timestamps that mark 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 for Windows and APFS for macOS.

Creating a Good Monitor Mix

When recording any performance in the studio, 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. Ideally, each performer should 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.

Cue Mixes and Low-Latency Monitoring

Studio One features a powerful **Native Low-Latency Monitoring** system that provides low-latency monitoring for audio recording and virtual instruments, without compromises in system performance. Hardware Low-Latency Monitoring is also available when using a compatible DSP-enabled audio interface. In this section, we will discuss how to take advantage of these features to create low-latency cue mixes for monitoring while recording or composing.

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 often need to hear different mixes. Many vocalists want to hear their vocal boosted in the mix, possibly with some reverb to make it sound natural, while the engineer might want to focus on how the performance balances with the rest of the mix. The cue mix functionality in Studio One makes this task easy.

The first step in building a cue mix is to create an additional Output Channel. To do this, open the *Song/Song Setup/Audio I/O Setup* window 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 can see special Send objects (called Cue Mix objects) in the Channels of the Console. In the Small Console view, Cue Mix objects appear in the right column when a Channel is expanded. In the Large Console view, Cue Mix objects appear below the Send Device Rack on each applicable Channel.

Each Cue Mix object features an Activate button, horizontal level and pan faders, and a Lock to Channel button.

The “Cue mix mute follows channel option" has to be engaged in the preferences in order to use Cue Mixes for FX Channels.

Mixing the Cue Mix

Cue mixes are built 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 is identical to the main mix in the Console. Changing the level or pan in the Cue Mix object unlocks 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.

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 the Cue Mix feature in Studio One is very useful. Monitoring with very low latency can be achieved using the **Native Low-Latency Monitoring** system in Studio One.

You can also achieve low-latency cue mixes by using **Hardware Low-Latency Monitoring** with a compatible audio interface that provides that feature, such as a PreSonus Studio 192, Studio 1810, or Studio 1824 interface. These interfaces feature internal hardware mixers that provide low-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.

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 ambiance so the voice is not dry and lifeless.

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

1. Set up a Cue Mix output for the vocalist.
2. Record-enable and monitor-enable the vocal Track.
3. Engage the Enable Low-Latency Monitoring (or "Z") button below the level fader on the Cue Mix output being used by the vocal channel. This enables Native or Hardware Low-Latency Monitoring for that Cue Mix output (depending on what is in use).
   - » **Note:** Channels that are able to be monitored using Native or Hardware Low-Latency Monitoring display a "Z" mark at the bottom of their channel strip.
4. Create a Send on the vocal channel to an FX Channel with your favorite reverb effect.
5. The vocalist hears the live low-latency input, 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 low 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 Hardware Low-Latency Monitoring engaged, you do not hear Insert FX on that channel, as you are monitoring the signal before it is processed in software. If you need to hear Insert FX, use Native Low-Latency Monitoring instead. To do this, navigate to *Studio One/Options/Audio Setup/Processing* (macOS: *Preferences/Audio Setup/Processing*) and enable the "Use native low latency monitoring instead of hardware monitoring" option.

Low-Latency Monitoring on the Main Output

The Main output always acts as a Cue Mix, and any Audio or Instrument Channels routed to it can be monitored using Native or Hardware Low-Latency Monitoring (if enabled). To engage Native or Hardware Low-Latency Monitoring for the Main output, enable the "Enable Low-Latency Monitoring" (or "Z") button, found below its volume fader. When enabled, the "Z" button is green (when using Native Low-Latency Monitoring) or blue (when using Hardware Low-Latency Monitoring).

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 are recorded at the input of any Track that uses that source. Studio One automatically compensates for any latency caused by the Insert effects.

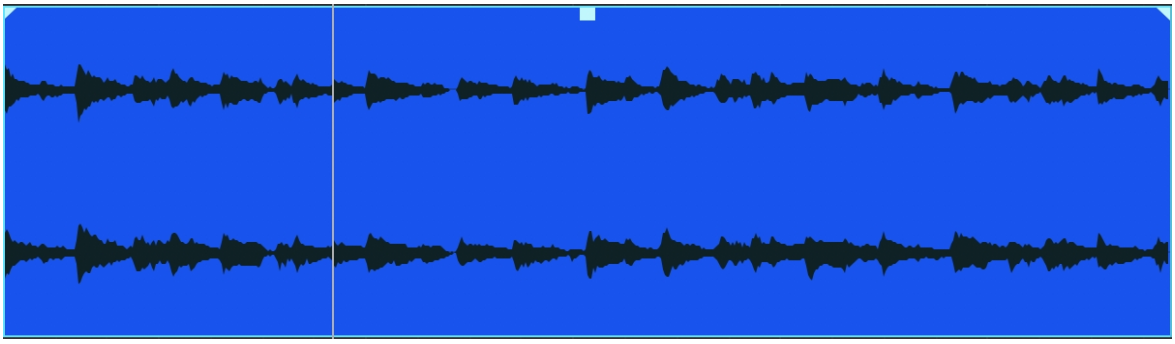
Note that when Insert effects are used on Input Channels, and effects are recorded to a Track, there is no way to go back and change the sound of the recording. To avoid this scenario, you might consider placing effects on the Audio Channels to which you are recording for monitoring purposes only and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

Editing

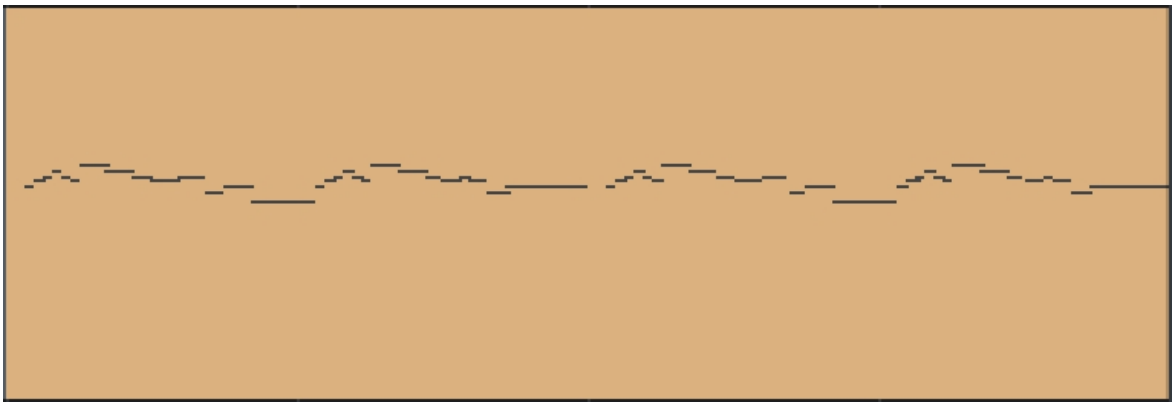
After recording, the next step in production is usually editing the recorded Events to achieve a desired sound. The following chapter discusses aspects of editing in Studio One, including Arrange view and Edit view editing, mouse tools, Event envelopes, edit groups, timestretching, comping, integrated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

Events

All audio and note data that exists within the timeline of your Song are 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. Audio Parts are Events that contain multiple Audio Events.



Events that contain note 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.

[Right]/[Ctrl]-clicking on any Event displays the Event contextual menu, which contains all related Editing actions, logically grouped. At the top of the contextual menu, you can find the Event Name, which can be edited by double-clicking on it and entering a new name. You can rename all Events on a Track by renaming the Track and holding [Shift] while pressing [Enter] after typing in the new name. You can also change the Event color by clicking on the color bar next to its name and selecting a color or scrolling through the colors with the mouse wheel.

Common editing actions are listed under the Event name, as well as a Recent Items list that contains the five most-recently used actions. In this way, you have instant access to the editing actions you most likely want to use.

Note that the available actions listed in the Event contextual menu depend on whether you are working with an Audio Event or an Instrument Part, and the actions may vary slightly depending on your version of Studio One.

Tool and Event Snapping

Snapping allows editing actions to occur only at specified divisions in time (such as bars and beats), making editing easier when working with tempo-specific material. 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 button. You can also temporarily defeat Snapping by pressing the [Shift] key while moving the mouse.

If Snap is engaged, the current Snap setting affects 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 occurs at the nearest logical subdivision of the current Timebase, based on the current timeline zoom level.
- **Bar** Snapping occurs at the nearest musical bar line.
- **Quantize** Snapping occurs at the nearest musical subdivision of the current Quantize Setting.
- **Frames** Snapping occurs at the nearest frame subdivision.

There are four optional behaviors that can be selected and applied to any of the four modes above:

- **Snap to Cursor and Loop** This option enables snapping to the playback cursor and Loop locators.
- **Snap to Events** This option enables snapping relative to Events in the Arrangement.
- **Snap to Zero Crossings** This option ensures that the audio data in an Event will snap to a zero crossing point. This will help avoid an unnatural click at the beginning of the audio data when the Event is moved or split.
- **Snap to Grid** This option is engaged by default, allowing tool and Event snapping to the grid.
- **Relative Grid** This option maintains the time relationship relative to the grid for any Event, so that when the Event is moved, the snap position maintains the original position relative to the grid, instead of snapping directly to the grid.

Arrange View Mouse Tools

The mouse tools allow direct interaction with Events, using the mouse. It is helpful to remember that the mouse tool actions can be undone at any time, so feel free to explore them. [Right]/[Ctrl]-click in any open space in the Arrange or Edit views to open a list of mouse tools and editing commands. Use the left mouse button to make a selection. You can also click the middle mouse button or the scroll wheel in the open space to display an expanded list of tools, including all of the Paint tool shapes.

In the Arrange view, the following mouse tools and related functions are available from left to right in the toolbar.

Link Button

The bracket-shaped button on the left side of the toolbar is the Link button. Click it to combine the Arrow and Range tools. When it is engaged, the mouse operates as Range tool in the area above the horizontal center line of the Event, whereas the Arrow tool is available in the area below the center line. This combination of tools is available at track heights of Normal or higher.

Arrow Tool

This tool is selected by default. Click on the Arrow tool button or press [1] on the keyboard to select the Arrow tool. The Arrow tool can be used for the following purposes:

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 moves the Event backward and forward in time, relative to the current Timebase and Timeline zoom. When dragging an Event left or right beyond the viewable arrangement, hold [Space Bar] on the keyboard to speed up the scrolling.

Dragging the Event up or down moves 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 creates a new Track of the same type.

When dragging an Event from one Track to another (up or down), the position of the Event is constrained within an automatic snapping range to make it easy to keep the Event at the same time position. To defeat this snapping, hold Shift while dragging the Event up or down.

Size an Event

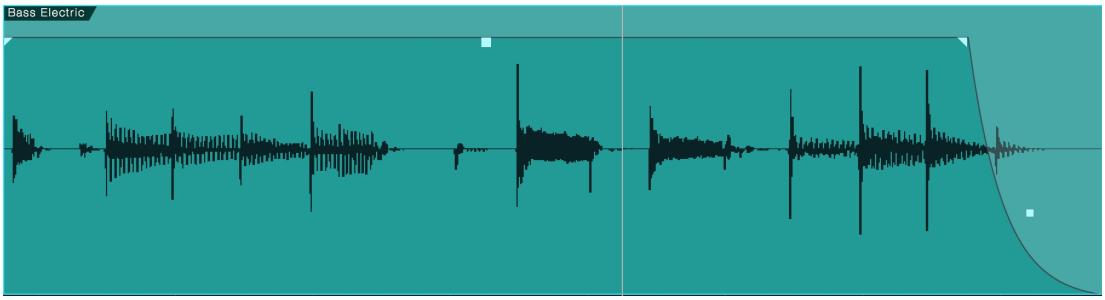
Events can be thought of as windows into audio files and musical performances, where what you see is what you hear. Sizing is a fundamental technique wherein Events are made shorter or longer, so that only a portion of the audio or note data they contain is seen and heard. To size any Event using the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

Two adjacent Events can be sized simultaneously so that no gap is created between them. To do this, float the Arrow tool to the bottom of where the two Events meet in the Timeline, where you can see the sizing icon with both left and right arrows illuminated, and then click-and-drag left or right.

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

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. The volume envelope applies gain changes to the audio clip in the Event and is therefore at the front end of the audio signal path.



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 is created over the length you have moved the Fade Flag. Fade times, as well as Event gain, can also be edited in the Inspector for any selected Event.

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 determines 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.

It is also possible to drag a complete crossfade left or right, or up or down, in order to change the location and characteristics of the fade. Float the mouse to the center of the crossfade until the Hand icon appears, then click and drag to adjust. Dragging left or right adjusts the location of the fade, extending or shortening the crossfaded Events. Dragging up or down alters the shape of the crossfade.

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 you adjust the volume envelope, the audio waveform is redrawn to approximate the effect of the adjustment.

You can also create complex envelopes anywhere inside an Audio Event using **Gain Envelopes**.

Select Multiple Events

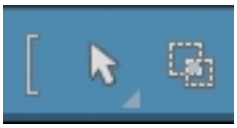
Multiple Events can be selected in order to edit them all at once, with a single action. To select multiple Events with the Arrow tool, do one of the following:

- Click outside of the range of an Event, and then drag over any other Events; a gray box is 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 are 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.
- Click on any Event, then press [Alt]/[Option]+[Shift]+[Home] or navigate to *Edit/Select/Select from Start to Event*, to select all Events on all Tracks that lie between the start of the Song and the current Event.
  - To select all Events on the currently selected Track that lie between the start of the Song and the current Event, press [Shift]+[Home].
- Click on any Event, then press [Alt]/[Option]+[Shift]+[End] or navigate to *Edit/Select/Select from Event to End*, to select all Events on all Tracks that lie between the current Event and the end of the Song.
  - To select all Events on the currently selected Track that lie between the current Event and the end of the Song, press [Shift]+[End].
- Double-click on the timeline of a Track in the Arrange or Edit view while holding [Shift], to select all Events present on that Track.

Normally, when you select multiple Events and adjust volume or fade in/out shape on one of them, all selected Events change to match the new setting. If you want to adjust an individual Event without losing your selection, hold [Alt] while making your changes.

Select a Range

Like the **Range tool**, you can use the Arrow tool to select a range, or area, within Tracks and their contents, without switching tools. Do this by hovering the Arrow tool in the upper half of a track. The cursor changes to a crosshair shape. Click-and-drag to select your chosen range.



You can enable or disable this feature by clicking the Link button to the left of the Arrow tool in the toolbar.

Alternate Arrow Tool Uses

For speed and efficiency when editing, a selection of modifier keys can be applied while the Arrow tool is selected, giving temporary access to the following alternate tools and editing modes:

- **Range Tool** Hold [Ctrl]/[Cmd].
- **Slip Editing** Hold [Ctrl]/[Cmd]+[Alt] while floating the Arrow tool over an Event.
- **Define Tempo** Hold [Ctrl]/[Cmd]+[Alt]/[Option] while floating the Arrow tool over the edge of an Event.

Range Tool

The Range tool is used to select a range, or area, within Events. Click on the Range tool button or press [number 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 is 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. Clicking once with the Range tool on a Track moves the play cursor to that location.

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 select and delete the section with the Arrow tool.

When you float the mouse cursor over a selected range, the Arrow tool temporarily appears. This makes it easy to quickly select and edit a range of Events.

To select multiple, non-contiguous 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 remain selected.

To split an event in half without reaching for the Split tool, double-click at your chosen split point. Double-click a selected range to split the Events in that range at the left and right borders of the range.

If **Snap to Grid** is enabled, your selections using the Range tool snap to the value set by the Snap Timebase parameter. To temporarily reverse the Snap to Grid option while editing, hold the [Shift] key.

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.

To temporarily switch to the Arrow tool while the Range tool is selected, hold [Alt].

Split Tool

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

With the Split tool selected, a vertical and horizontal line is 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 affects all of the selected Events in the same way.

It is also possible to split selected Events at the timeline cursor, without using the Split tool, by pressing [Alt]+[X] on the keyboard. If you have a range of time selected, pressing [Alt]+[X] will split the selected content into a new Event.

To temporarily switch to the Arrow tool while the Split tool is selected, hold [Alt].

Splitting Instrument Parts

Normally, if you split an Instrument Part at a point that falls within one or more notes, those notes are truncated at the split point, and no longer play in the newly created Part to the right of the split point. This can be an issue, especially when splitting up Parts in which some notes are held for long periods, such as pad and string passages.

For example, if you have a four-bar Part in which a chord is played and held throughout, splitting the Part in the middle leaves the Part to the left of the split point mostly untouched. However, the held notes are now missing from the newly created Part to the right of the split point.

To split an Instrument Part and split (rather than truncate) any notes that cross the split point, hold [Alt]/[Opt] while you make the split.

Eraser Tool

The Eraser tool is used to delete Events. Click on the Eraser Tool button or press [number 4] on the keyboard to select the Eraser tool. To delete any Event using the Eraser tool, simply click on the Event. If multiple Events are currently selected, clicking one of the Events with the Erase tool erases all selected Events.

You can click and drag across multiple Events with the Eraser tool, erasing each Event you touch.

To temporarily switch to the Arrow tool while the Eraser tool is selected, hold [Alt].

Paint Tool

In the Arrange view, the Paint tool can be used in two ways: to create an empty Instrument Part on an Instrument Track, or to create a complex Gain Envelope for an Audio Event. Click the Paint Tool button or press [number 5] on the keyboard to select the Paint tool.

Create an Instrument Part

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 creates an empty Instrument Part that varies in length according to the current timebase setting.

Create a Gain Envelope

To view, create, or edit a Gain Envelope, [Right]/[Ctrl]-click an Audio Event and enable the Gain Envelope box. The white line that appears inside the Audio Event represents the current Gain Envelope. If a Gain Envelope does not already exist, you'll see a white horizontal line running through the zero point of the waveform.

When using the Arrow tool you must click somewhere on that white line to add a Gain Envelope point. Note that the gain of the entire Audio Event can be raised or lowered after adding the first point: simply click-and-drag that point up or down to adust the gain of the Audio Event. When more points exist, the click-and-drag method affects only part of the Audio Event, not the whole thing.

The Paint tool lets you click-and-drag anywhere inside the Audio Event to add new points. The menu arrow under the Paint tool icon reveals the list of Paint tool shapes: Freehand, Line, Parabola, Square, Triangle, Saw, Sine, and Transform. Select one of the shapes and experiment with it by click-dragging across the Audio Event. You can always undo those actions.

For more details, see the **Gain Envelopes** section.

Mute Tool

In the Arrange view, the Mute tool is used to mute Audio Events, Audio Parts, and Instrument Parts. Click on the Mute Tool button or press [number 6] on the keyboard to select the Mute tool. To mute or unmute any Audio Event or Instrument Part, simply click on it with the Mute tool. When an Event or Part is muted, it appears grayed out, and an “m” icon appears in the lower left corner of the Event or Part.

Click and drag the Mute tool to select multiple Events to mute. If multiple Events are already selected, clicking one of them with the Mute tool mutes all selected Events.

To temporarily switch to the Arrow tool while the Mute tool is selected, hold [Alt].

Select Muted Events

Sometimes, you may use Event muting to silence superfluous Audio or Instrument content that you don't intend to use. If you decide you want to get rid of these unused Events, you can quickly select all muted Events by navigating to *Edit/Select/Select Muted Events*, then simply press [Backspace] or [Delete] to delete (and clear away) the unwanted Events.

Bend Tool

In the Arrange view, the Bend tool is used to manipulate, add, and remove Bend Markers. For more information on Bend Markers, refer to the **Transient Detection and Editing** section of this chapter.

Listen Tool

In the Arrange view, click and hold on any Track to instantly solo the Track and start playback from the position you clicked. Playback continues as long as the mouse click is held. When the mouse click is released, playback is stopped, and the related Track is un-soloed.

Clip Gain Envelopes

To view the Gain Envelope for the selected Audio Event, [Right]/[Ctrl]-click and enable the Gain Envelope box in the menu. A white line inside the Audio Event shows the current Gain Envelope. If a Gain Envelope does not already exist, the white line runs horizontally through the zero point of the waveform.

Note that Clip Gain Envelopes are Clip-based. Any changes made to an Audio Event will affect all instances of that Audio Event everywhere it is used: on the current Audio Track, on other Audio Tracks, and on other Songs.

Mouse Tool Access

To open the list of mouse tools when the Gain Envelope is already visible, hover the cursor in an empty space above the zero line. When it changes into the Trim Tool, use [Right]/[Ctrl]-click to access the mouse tools.

Using the Arrow Tool

The Arrow tool can be used to add new points to a Gain Envelope, move existing points, and select points for deletion. Note that Gain Envelope points can also be selected using the left and right arrow keys. Multiple points can be selected at once by holding [Shift] or [Option] and selecting the desired range, and then edited simultaneously as described in the following sections.

After the first point is added, the gain of the entire Audio Event can be changed by dragging that point up or down.

To add a new point, click anywhere on the current Gain Envelope. If other points exist, you can click-and-drag the new one to the desired position to create a new segment.

Move or Modify a Gain Envelope Point

To move a Gain Envelope point, click-and-drag the point up or down, left or right. Vertical changes affect the value; horizontal changes affect the timeline position. Moving a point below the center of the waveform reduces the gain; moving it above the center increases the gain.

When moving an Envelope Gain point, the pop-up value indicator displays the position, current value, and the amount of change from the previous value.

If Snap is engaged in the Arrange view, the point snaps to the grid when the cursor is released.

To enter a specific value for an existing Gain Envelope point, [Right]/[Ctrl]-click on the point and type a number into the Value field.

Another way to change a value is to float the Arrow tool over a point, hold [Alt]/[Option], and scroll the mouse wheel to move the point up or down.

To fine-tune the value or location of a Gain Envelope point, hold down [Shift] while moving the point.

If you drag a Gain Envelope point beyond other points, those points are moved also. The original positions are remembered until the cursor is released, and then any duplicate points at that position are deleted. To restore the deleted points, undo the action.

Delete a Gain Envelope Point

To delete an existing point on a Gain Envelope using the Arrow tool, select the point and press [Delete], or [Right]/[Ctrl]-click on the point and select Delete from the pop-up menu.

Change the Segment Curve

When you hover the cursor over a Gain Envelope segment a curve handle appears on the white line. Click-and-drag the handle up or down to shape the curve of that segment.

Using the Paint Tool

The Paint tool draws a series of Gain Envelope points with a single action. You can click-and-drag anywhere inside the Audio Event to add new points; you don't have to click on the existing Gain Envelope first.

The menu arrow under the Paint tool icon reveals the list of Paint tool shapes: Freehand, Line, Parabola, Square, Triangle, Saw, Sine, and Transform.

To switch from the Paint tool to the Arrow tool temporarily, hold [Alt] and then click-drag across the Audio Event.

Draw a Gain Envelope

Using the Paint tool, click-and-drag inside the Audio Event to draw a Gain Envelope. Note that drawing new Gain Envelope points overwrites any existing points.

Draw with Shapes

With one of the Paint tool shapes selected, click-and-drag across the Audio Event to draw a new envelope.

When using the waveform shape tools, hold [Alt] while dragging to adjust the frequency of the drawn waveform, or hold [Ctrl] to vary the amplitude and polarity of the waveform. Hold [Ctrl]/[Cmd]+[Alt] while drawing to move the Gain Envelope shape left or right along the timeline.

Transform a Gain Envelope Segment

The Transform tool can be used to alter existing Gain Envelope segments, or to add a new one. With the Transform tool selected, click-and-drag a selection box around any area of a Gain Envelope; then adjust the selection box by clicking-and-dragging one of eight handles (four sides and four corners) to scale the selected Gain Envelope points.

Using the Range Tool

The Range tool can be used to trim selected areas of the Gain Envelope up or down in value. This can be done in two ways.

Trimming a Gain Envelope Segment

If you want to trim a single Gain Envelope segment, select the Range tool and hover the cursor in the upper half of the segment until the cursor changes into the Trim Tool. Click-and-drag up or down to change the selected Gain Envelope segment.

Trimming a Gain Envelope Range

If you want to trim several Gain Envelope segments at the same time, use the Range tool to select a range of the Gain Envelope. Then hover the cursor in the upper half of the selected range until the cursor changes into the Trim Tool. Click-and-drag up or down to trim the selected range of the Gain Envelope.

Reset the Gain Envelope

To remove all Gain Envelope segments from an Audio Event, [Right]/[Ctrl]-click the Event, scroll down to the Audio Operations menu, and select Reset Gain Envelope from the menu.

Have Gain Envelope, Will Travel

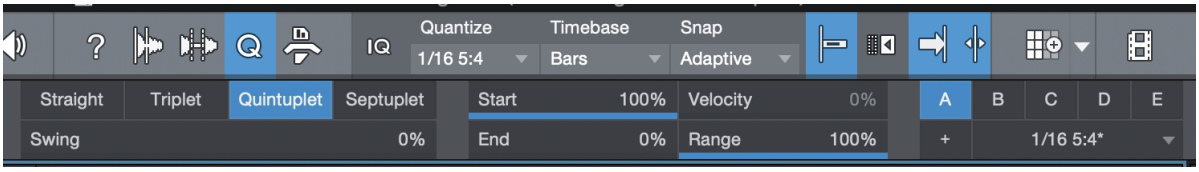
When an Audio Event is moved its Gain Envelope moves with it, because Gain Envelopes are Clip-based. This means the Gain Envelope also moves when "slipping" the audio within an Event.

The Grid

The Arrangement grid is comprised of the ticks in the timeline and the vertical lines extending from those ticks through the background of the Arrangement. This grid uses the Timebase setting as the basis for its display. The Timebase settings are Seconds, Samples, Bars, and Frames, and they determine the behavior of Event and tool snapping. The Timebase can be changed at any time, without directly affecting the arrangement.

Perhaps the most common Timebase setting is Bars, which display time in a musical format of bars and beats. With this Timebase setting, the grid is determined by the settings in the Quantize panel.

Quantize Panel



The Quantize panel can be opened from the toolbar by clicking on the Quantize Panel button, or by selecting Quantize from the *View/Additional Views* menu. The Quantize panel can be detached and freely placed on the screen. In this panel, you can edit all settings related to the Quantize grid that are displayed in the Arrangement. From left to right in the panel, you can see areas for Grid or Groove mode; note-value selection; note grouping and Swing amount; Start, End, Velocity, and Range percentages; and preset management.

Note that independent Quantize panels are also available for the Note Editor and the Audio Editor. This enables you to define the rhythmic character of each aspect of the Song and perform those edits quickly without having to adjust the settings each time. You can show or hide the Quantize panels for each of those by clicking the appropriate Quantize panel button. You can also close the Quantize panel for the currently selected view by navigating to *View/Additional Views/Quantize*.

Rhythmic Values

With Grid mode selected, you can choose a note value between whole notes and 64th notes, and the following musical note groupings: Straight (with a Swing percentage setting), Triplet (3 notes in the space of 2), Quintuplet (5 notes in the space of 4), or Septuplet (7 notes in the space of 8). These settings also determine the look and behavior of the grid in the Arrange view. For information on the Groove mode of the Quantize panel, refer to the **Groove Extraction and Quantize** section.

Swing

Swing is a rhythmic style you can apply, in which off-beats are moved forward in time relative to on-beat notes, creating a relaxed, bouncy feel. This offset is calculated based on the currently selected Quantize value. For example, at 100% Swing, with 16th-note quantize selected, a pattern of 16th notes play at a 2:1 ratio; On-beat notes play on beat, and offbeats play as though they were the final 16th-note triplet in a group of three. You can set the amount of swing between 0% (straight timing) and 100% (fully swung).

Quantize Note Starts

The Start percentage defaults to 100%, which means that the start of a selected note, Event, or transient snaps to the grid if quantized. This is effectively a quantize-strength parameter, where anything less than 100% moves the note, Event, or transient a relative amount closer to the grid, instead of all the way to the grid.

Quantize Note Ends

The End percentage only affects notes in Instrument Parts. The function is similar to the Start percentage, except that it affects the note end, effectively making quantized notes shorter or longer. The Velocity percentage also only affects notes, and adjusts note velocity according to an extracted groove if the Quantize mode is set to Groove.

Velocity Sensitivity

The Velocity percentage lets you tie Quantize strength to note velocity, to the degree that you specify.

Quantize Range

The Range percentage sets the relative range from grid lines within which notes, Events, or transients are quantized. Notes, Events, or transients beyond this relative range are not quantized. As there is no display indicating the Range, quantizing several times while adjusting this setting may lead to the best results.

The presets area of the Quantize panel allows you to quickly switch between up to five Quantize panel settings, so that working with multiple complex quantization setups is very easy. You can also store and recall Quantize panel settings, just as you would store an effect or instrument preset.

Common Editing Actions

Cut, Copy, and 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 are 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 are pasted in the appropriate Tracks and locations, starting with the first (selected) Track.
- **Paste at Original Position** If you want to copy and paste an Event from one Song into another Song (or another version of the Song), and want the Event to be placed at its original location in the timeline, copy the Event and paste by pressing [Ctrl]+[Shift]+[V].

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 appears. 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.

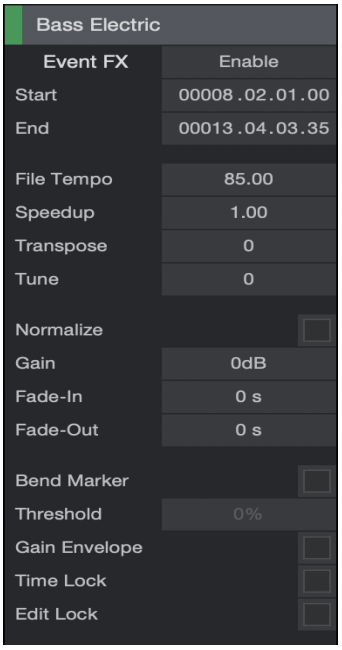
An Audio Event can be slipped only as far as the length of the audio clip it contains.

Audio Event Transpose and Tune

The ability to transpose and fine-tune audio adds a lot of flexibility when working with audio files. For instance, if you have a keyboard loop collection in which every loop is in the key of C, being able to transpose these loops to any other key opens up many possibilities.

In Studio One, transposing and tuning are a part of the same set of advanced algorithms as timestretching, so the quality is extremely high.

To transpose any audio Event, select it and open the Inspector by pressing [F4] on the keyboard or clicking on the Inspector button above the Track Column. Then enter a value in the Transpose field, from -24 to +24 semitones.



Tuning is similar to transposing but the pitch is changed in cents, rather than semitones. Enter a value from -100 to 100 cents in the Tune field to fine-tune the audio Event.

Any number of Events can be selected and transposed or tuned simultaneously, but note that this change is not relative to the current setting of each Event. All selected Events are transposed or tuned to the same chosen value.

Nudge

Nudging is an alternative to moving Events and notes across the timeline with the mouse. To Nudge any Event or note, select it and do one of the following:

- **Nudge**Press [Alt]+[Right Arrow] on the keyboard to move the Event or note forward in time by the current snap value in the Arrangement or Editor. With Snap disabled, nudging adjusts in milliseconds.
- **Nudge Back**Press [Alt]+[Left Arrow] on the keyboard to move the Event or note backward in time.
- **Nudge Bar**Press [Ctrl]/[Cmd]+ [Alt]+[Right Arrow] to move the Event or note forward by one bar.
- **Nudge Bar Back** Press [Ctrl]/[Cmd]+ [Alt]+[Left Arrow] to move the Event or note backward by one bar.

Any number of Events or notes can be selected and Nudged simultaneously. The Nudge commands are also available in the Edit menu.

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. Choose Duplicate in the Edit menu or press [D] on the keyboard to duplicate the current selection. The duplicated Event is always placed after the original Event, and it is automatically selected once duplicated. 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.

If you would like to duplicate an Event and push existing material to the right across the timeline to make room for the duplicated Event, press [Alt]+[D] on the keyboard to use the Duplicate and Insert command.

Duplicate Shared

When you duplicate an Event normally, each duplicate is treated as a separate Event, and edits made to one duplicate are not reflected in the other copies. If you want to duplicate an Instrument Part and link the content of the duplicates to that of the original Part, select the Part and choose Duplicate Shared from the Edit menu, or press [Shift] + [D] on the keyboard. A ghost icon appears on the original Part and any Shared duplicates, to alert you that those copies are now Shared. Any edits made to the original Part or a Shared copy are applied to all instances of that Part.

If you later decide you wish to edit one of the Shared copies of a Part individually, select it and choose Separate Shared Copies from the Event menu. The ghost icon disappears from that Part to alert you that the copy is no longer Shared, and can be edited without affecting the other copies.

Explode Pitches to Tracks

It is sometimes helpful to explode existing pitches within an Instrument Part to new Tracks, placing each pitch within individual Instrument Parts on separate Tracks. For instance, if you have a MIDI loop to use with a virtual drum instrument, you may want to have each piece of the drum kit on its own Instrument Track.

To do this, [Right]/[Ctrl]-click on an Instrument Part in the arrangement and select Explode Pitches to Tracks from the Instrument Parts sub-menu.You can also accomplish this by selecting the Part, and choosing Explode Pitches to Tracks from the Events menu.

Strip Silence

It is quite common that, as the result of continuous recording, some Audio Events may have gaps of silence or relatively low levels between performances. It may be helpful in these cases to remove the gaps and only keep the desired sections of the recorded Event. Studio One's Strip Silence function, controlled from the Strip Silence panel, is designed to handle this task.

Open the Strip Silence panel by clicking on the Strip Silence button in the toolbar, or select Strip Silence from the *View/Additional Views* menu. Select the Audio Events from which you wish to strip silence, make the desired settings, and then click on [Apply]. Click on the [Default] button to return all settings in the panel to their defaults.

The result of the Strip Silence process is similar to using a gate processor to only allow the desired signal to be heard, except that the Event is edited.

When the small light indicator next to the [Apply] button is lit, this means that changing the Detection or Event options and then clicking Apply automatically undos the previous operation, making it easier to find the right settings by viewing the result of the Strip Silence process, then tweaking the settings if needed without having to undo manually. Any change in selection (or other editing operation) ends this automatic state, and the indicator is no longer lit.

The following describes each setting:

Detection This determines how Studio One identifies silence in the areas you wish to process.

- **Material** The first three options set the Open and Close Threshold for the gate algorithm automatically.
  - **Lots of Silence** Choose this for material that contains lots of silence and single hits—for instance, a clean, typical single-drum recording (hat, kick).
  - **Little Silence** Choose this for material that has some action going on but still has some silence—for instance, minimal techno/single drum loops, ride, or snare tracks.
  - **Noise Floor** Choose this for material where there is almost no real silence—for instance, noisy drum recordings, overheads, drum mixes, and drum loops.
  - **Manual** Allows the Open and Close Threshold to be manually edited.
- **Open Threshold** Set between -80 and 0.00 dB.
- **Threshold Link** Engage to link the Close Threshold to the Open Threshold.
- **Close Threshold** Set between -80 and 0.00 dB.

Events This section determines the nature of the Events created after removing silence.

- **Minimum Length** Determines the minimum length in seconds for any resulting Event.
- **Pre-Roll** Determines the amount of time in seconds that should remain at the beginning of resulting Events from the time at which the previously detected silence ends.

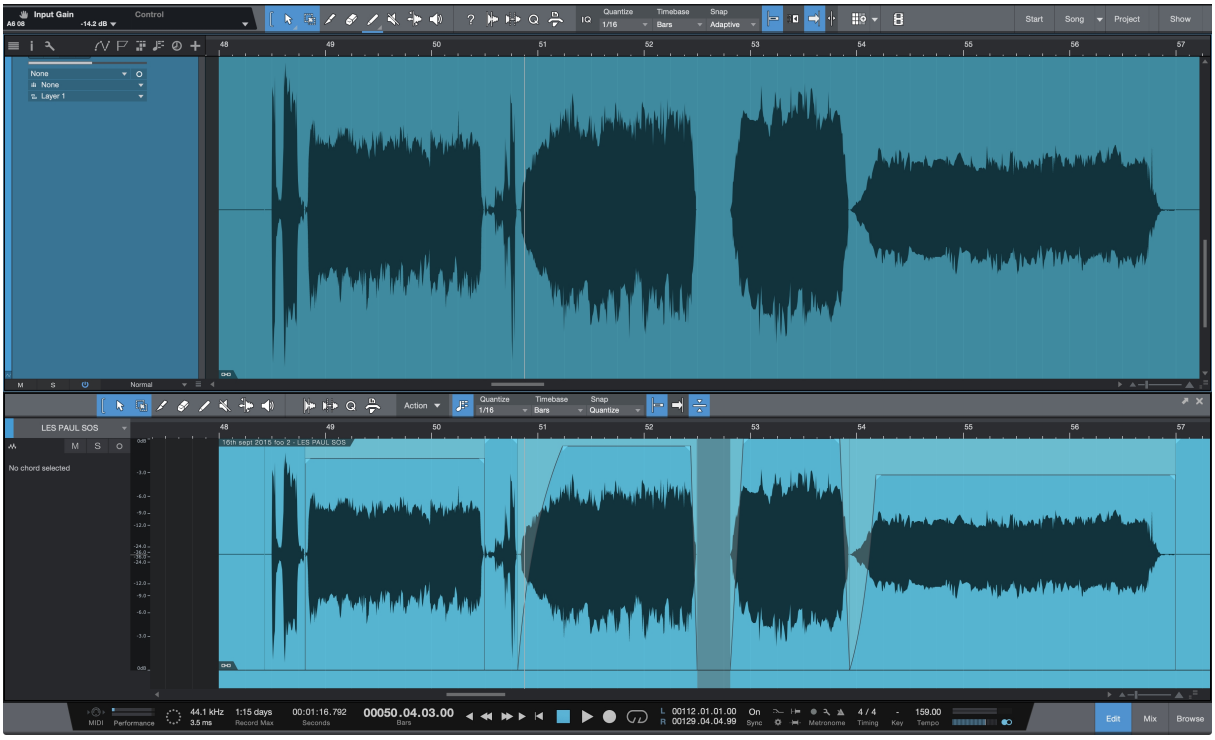
- **Post-Roll** Determines the amount of time in seconds that should remain at the end of resulting Events from the time at which newly detected silence begins.
- **Fade-In** Determines the length in seconds of the linear fade-in applied to resulting Events.
- **Fade-Out** Determines the length in seconds of the linear fade-out applied to resulting Events.
- **Link** Enable this option to automatically set the Fade-In parameter to match the Pre-Roll setting, and the Fade-Out parameter to match the Post-Roll setting.

Audio Parts

It is often convenient to merge multiple separate Events into a single object in order to move them all together or simply to clean up the Arrangement. This is accomplished with Audio Parts.

To create an Audio Part, select the Audio Events and then press [G] on the keyboard. This makes the separate Events appear and function as a single Event in the arrangement while also appearing and functioning as separate Events in the Editor. It is then much simpler to, for instance, duplicate a chorus in the arrangement and retain access to the individual Events for editing crossfades and other details.

Note that Audio Parts support shared, or ghost, copies, with the exception of any Event FX which are strictly per Event instance.



An Audio Part has two options in the Event Inspector:

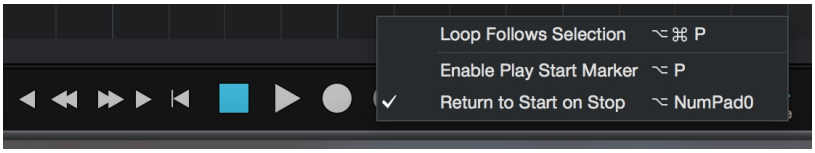
- **Play mode**
  - **Normal** plays only the topmost Events, and any overlaps are not played.
  - **Overlaps** allows any overlapping audio to play back mixed, rather than cutting off at the end of each individual slice. This often happens if individual slices are have been quantized but not timestretched.
  - **Slices** is optimized for REX and Audio Loop files, and adds short fades to slices during playback. Each slice is triggered only once, and no overlaps are played.
- **Stretch Events** timestretches Events inside the Audio Part to match the Song Tempo.

To dissolve an Audio Part, [Right]/[Ctrl]-click on the Audio Part and choose Dissolve Audio Part from the contextual menu.

Editing Options

The following options are related to Editing workflow.

Transport Options

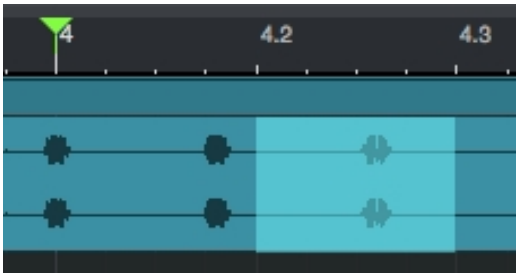


Loop Follows Selection

With this option enabled, whenever you make an edit selection, the loop markers automatically snap to surround that selection. With Cycle mode enabled, this allows for instant looping of a selection when editing, without further mouse movements or keystrokes. To disengage this new loop bracket, click the mouse outside the current selection in Arrange view. These actions can only take place when the Transport is stopped.

To enable this behavior, select *Transport/Options/Loop Follows Selection*, or [Right]/[Ctrl]-click in the Transport bar and choose Loop Follows Selection from the pop-up menu.You can also enable this option by pressing [Alt]/[Option]+[Ctrl]/[Cmd]+[P] on the keyboard.

Enable Play Start Marker



With this option enabled, the playback start marker is made separate from the edit selection, which it normally follows. This lets you always start playback from a chosen location as you're editing, no matter where the edit selection currently lies. The play start marker appears as a triangular marker in the timeline. To move this marker (and set a new playback start position), click-and-drag the marker along the timeline.

To enable this behavior, select *Transport/Options/Enable Play Start Marker*, or [Right]/[Ctrl]-click in the Transport bar and choose Enable Play Start Marker from the pop-up menu. You can also enable this option by pressing [Alt]/[Option]+[P] on the keyboard.

Return to Start Position on Stop

Many people prefer that when playback is stopped, the playback cursor returns to the position from which 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 *Transport/Options/Return to Start on Stop*, or [Right]/[Ctrl]-click in the Transport bar and choose Return to Start on Stop from the pop-up menu. You can also enable this option by pressing [Alt]/[Option]+[Num Pad 0] on the keyboard.

Locate to the Mouse Cursor

To quickly locate the playback position to the mouse-cursor position, press [Ctrl]/[Cmd]+[Space] on the keyboard. This is very useful when you want to quickly navigate to multiple edits for auditioning or further editing, without clicking in the Timeline.

Ripple Edit

In normal operation, if you delete a Part (or a section of a Part) from the timeline, all other Parts on the timeline remain in position, and a space is left where the deleted Part was. If you'd like the Parts ahead of the deleted region to move backward to fill that space, say, when editing spoken word content where gaps are undesirable, enable Ripple Edit mode. To do so, press the Ripple Edit button in the toolbar, which looks like this:

Apart from automatically filling in gaps when cutting or deleting content, Ripple Edit also introduces a sort of "displacement" behavior when editing. If you copy a Part and paste it in the middle of another, instead of replacing (or overlapping) that section of the target Part, the target Part is split at the edit point, and moved forward in the timeline, to make space for the pasted Part. If you move a Part to the start point of another Part, instead of replacing or overlapping the content below, the two Parts simply switch places.

Similarly, if you trim the end of a part to change its length, the Parts downstream move to maintain their relative position to the end of the trimmed Part. This behavior extends to other editing operations, such as Crop to Content and Nudge/Nudge Back.

Follow Song and Follow Edit Position

If you would like the Arrange view to follow the current playback-cursor position, engage Autoscroll in the toolbar, or press [F] on the keyboard. This keeps all audible Events in view.

If you would like the playback cursor to follow the current edit position, engage Cursor Follows Edit Position, which is next to Follow Song in the toolbar. With this engaged, the playback-cursor position jumps to the beginning of any Event or group of events you select, any note being selected or moved, or to the position of any marker being moved.

Bar Offset

In some cases, such as working on a Song that contains introductory sounds before the first bar of music starts, or in some video post editing situations, it can be helpful to have your song start on a bar number rather than one. To do so, open the Song Setup window by navigating to *Song/Song Setup*, or to *Studio One/Options* (macOS: *Preferences*) and clicking the [Song Setup] button.

To start your Song at a negative bar number, enter a negative number into the Bar Offset field. To start your Song at a bar number greater than one, enter a positive number.

Lock Tracks or Events

It can be a lifesaver to prevent a Track or Event from being accidentally changed, or worse, deleted. Once a Track or Event has reached a certain level of completion, you may want to lock it that way while working on something else. This is simple to do.

What Locking Does Not Do

There are some actions that are still allowed after a Track is locked. You are still able to Mute or Solo the Track, change its order in the Track List, change the color of the Track, and rename it. But every action that is not allowed will be greyed out and inaccessible until the Track is unlocked again.

Locking an Event provides two options: Time Lock and Edit Lock. You can select one or both when locking an Event. Those options will be described in the Event Lock section below.

Note that as with any other action, the process of locking a Track or Event becomes part of the Undo/Redo history. It can be undone with [Ctrl]/[Cmd]+Z. So you may want to use the Save New Version feature as an additional backup after an important Track or Event is locked.

Track Lock

The Lock Track option is available for Audio Tracks, Instrument Tracks, Automation Tracks, and Folder Tracks. To lock a Track, locate its name in the Track List, use [Right]/[Ctrl]-click, and select Lock Track from the menu. Use the same action to unlock the Track by selecting Unlock Track from the menu.

Locking a Track prevents the addition or deletion of any of the Events it contains. It also will not allow any new Events to be recorded or pasted into the Track. A locked Track cannot be removed from the Song. It also cannot be used by the **Arranger Track**.

Event Lock

To lock an Event, locate the desired Event and use [Right]/[Ctrl]-click to open the menu. At the very top, under the Transpose and Velocity fields, are two options:

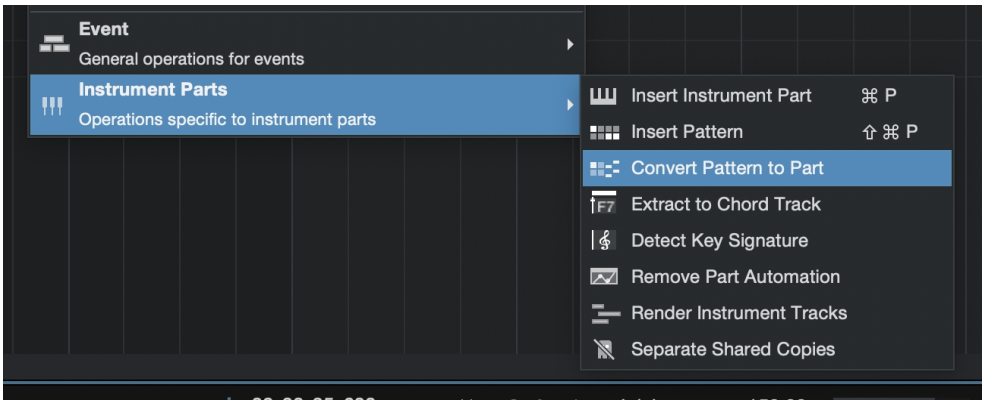
- **Time Lock** Select this option to keep the Event from being moved to a different time position within the Track. A small circle-slash clock icon will appear in the lower left corner of the Event window to indicate the Time Lock status of the Event. When an Event is Time-Locked data can be added, removed, or altered inside the Event. The Event can be copied and pasted to any time position on any Track (even on top of itself). You can also **Duplicate** this Event by pressing [D] on the keyboard repeatedly. A time-locked Event that has been pasted or duplicated will also be time-locked.
  Note that the Arranger Track is also not allowed to relocate an Event when the Time Lock option is active for that Event.
- **Edit Lock** Select this option to prevent the contents of the Event from being altered in any way. This also locks the Transpose and Velocity fields at the top of the menu. A small circle-slash pencil icon will appear in the lower left corner of the Event window to indicate the Edit Lock status of the Event.

Note that it is possible for both Time Lock and Event Lock to be active for an Event. When this is true a small lock icon will appear in the lower left corner of the Event window.

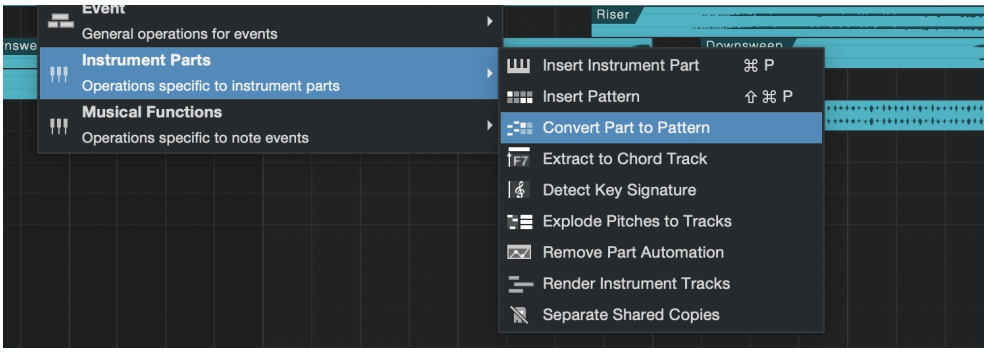
Convert a Part into a Pattern

Instrument Parts work well for extended passages and recordings of live playing, for example. But for rapid construction of a song where a brief passage plays many times in a row, such as a synth bass line, it can be very useful to switch to pattern-based editing. Studio One provides the best of both worlds and allows you to travel instantly between them.

To convert an existing Part into a Pattern, [Right]/[Ctrl]-click on the desired Part and select Convert Part to Pattern from the Instrument Parts menu. This operation is also found in the Event menu. Studio One determines whether the Pattern should use Melodic Mode or Drum Mode based on the Instrument, and the Part becomes a Pattern at that spot in the timeline. The maximum Pattern length is 64 Steps, so anything beyond that is truncated during the conversion.



After editing the Pattern as described in the **Patterns** section, you can convert it back into a Part using the same method: [Right]/[Ctrl]-click the Pattern in the timeline and select Convert Pattern to Part, or select the operation from the Event menu.

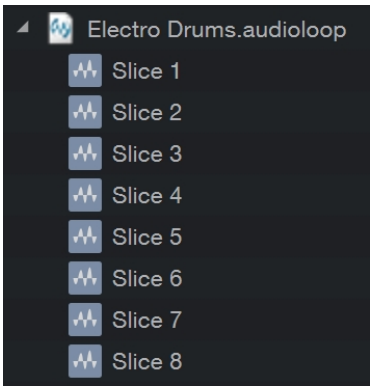


Audio Loops and Music Loops

Studio One features two proprietary file formats, Audio Loop (.audioloop) and Music Loop (.musicloop), that greatly enhance your ability to create and re-use original material in your productions and to share your material with other Studio One users. The following describes these formats and how to use them.

Audio Loops

Audio Loops are essentially Audio Parts tagged with a tempo and rendered with lossless compression. To create an Audio Loop, drag any Audio Part to the File Browser. You can then see the Audio Loop listed, along with a drop-down arrow in the Browser that, when clicked, reveals the Slices that the Audio Loop contains.



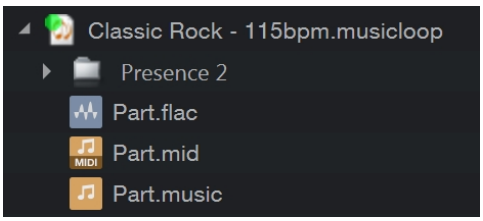
Audio Loops allow fast creation of flexible audio loops from any source. For instance, you might take part of a drum recording you just made and turn it into a loop by doing the following:

- Export a stem for the drum bus for the desired range to a new stereo Track.
- Detect transients on the new Track and then apply the Slice action, with the Merge option checked in the Audio Bend panel.
- Drag the Audio Part to Browser to export an Audio Loop you can use in any Song and can share with other Studio One users.
- Alternatively, use the stem before slicing and drag the Audio Event to the Browser to export an Audio Loop that stretches to the song tempo.

Music Loops

A Music Loop consists of everything required to recreate a musical performance, including the virtual instrument preset, multichannel FX chain presets for the virtual instrument outputs, the music-performance file, and an audio loop. Music Loops can be dragged in from the Browser, just like a MIDI file, but they are much more powerful in that they can re-create the exact setup used to make the original performance.

To create a Music Loop, drag any Instrument Part into the Browser. You can see a pop-up display indicating whether you are exporting a Music Loop or a MIDI file. By default, Music Loop is selected. To change this selection, press [Alt]/[Option] on the keyboard. Once exported, you can see the .musicloop file in the Browser.



You can now drag this Music Loop into any Song to instantly re-create that performance, including creating the Instrument Track, loading the virtual instrument, and loading any effects on the virtual instrument outputs. A Music Loop can be previewed in the Browser, just like audio; the Browser plays the rendered audio file.

To see the contents of the Music Loop, [Right]/[Ctrl]-click on the Music Loop and choose Show Package Contents. You can now see a drop-down arrow that, when clicked, reveals the elements described above. Each element can be dragged in separately; for instance, if you just wanted to load the instrument preset from the Music Loop. Another nice benefit of Music Loops is that the rendered audio can be used even if the instrument and effects used to create the Music Loop are not installed.

Note that when creating Music Loops, the related channel volume, pan, send, and busing details are not a part of the rendered audio or stored preset.

Music Loops are an excellent way to store a personal library of original material very easily and to share that material with others without worrying about what instruments or effects they have.

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 moved, the relative timing between the Tracks remains intact.

Creating Edit Groups

There are two ways to create a new Edit Group:

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

You can also use [Ctrl]/[Cmd]+G after selecting the tracks to create a Group.

Whichever way is used, all Tracks that were selected are now a part of the new Edit Group. A name will be suggested for the Edit Group based on the selected Tracks. If their names are similar, such as Snare 1 and Snare 2, the suggested name for the Group will be "Snare". If the Track names are nothing alike, new Groups will be named in the order in which they are created (Group 1, Group 2, and so on). The name of the new Edit Group is shown in the Edit Group selector box under the input selector on all Tracks in the Group. You can rename an Edit Group by clicking in the Group selection box on any Track in the Group and selecting Rename Group.

There are two ways to add a Track to an existing Edit Group.

- Click on the Edit Group box (under the input selector) on the desired Track in the Arrange view.
- In the pop-up menu, choose the Edit Group to which you wish to add the Track.

The second way is to [Right]/[Ctrl]-click the desired Track and select Group Assignment from the menu. A check mark by a Group name indicates the current Group for that Track. To change its Group assignment, select a different Group name.

When a Track is included in an Edit Group, selecting the Track selects all Tracks in the Group. Edit actions performed on any Event for any Track in the Group are performed on all Events for each Track in the Group. Selecting a new color for any Track in the Group selects that color for the entire Group.

Edit Groups also group the faders and several other features for the related Channels in the Group. This topic is discussed further in the **Groups** section of the **Mixing** chapter. Note that it is also possible to create an Edit Group from a Folder Track.

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

Dissolving Edit Groups

To dissolve (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 is dissolved. Grouping and dissolving actions can be undone and redone, as with most user actions.

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.

You can suspend an entire Group temporarily if many changes need to be made, and then reactivate the group with the same command. To do this, hold [Shift]+G and type the first letter of the Group name into the small window that appears, or enter the Group number.

There is more information about this topic in the **Groups** section of the **Mixing** chapter.

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 one-bar drum loop recorded at 120 bpm (beats per minute) can be stretched to fit into one 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 returns 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.

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. The Timestretch tool appears, allowing you to click on the edge of the Event and drag left or right to timestretch the Event, making it shorter or longer. In this case the length of the Event changes, using the Speedup factor, but the pitch of the audio the Event contains remains the same. Only the Event that you selected for timestretching is affected.

Speedup factor is a timestretching function for making an audio clip shorter or longer while maintaining its pitch. 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 value changes during manual timestretching, and it also can be entered manually in the Event Inspector. Values greater than 1 decrease the length of the clip, while values less than 1 make the clip longer.

Note that manual timestretching can not be used on an Audio Event containing a sliced loop.

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.

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 are not 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.

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]/[Cmd]+[Alt]/[Option] on the keyboard. The Define Tempo tool appears, 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 is set based on the musical length to which the Event is stretched, and all Events in the Song that use this original clip are updated.

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 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 stretches all Events in the Song that use this original clip, based on the entered tempo value.

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 determines the Audio Event tempo based on the timing of your clicks and sets 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 are stretched or moved while you are using the Tap Tempo function, making it impossible to find a consistent tempo.

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 the Timestretch menu. 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. This mode uses the Elastique Direct algorithm.
- **Sound** Use this general mode on any other type of track. This mode uses the Elastique Direct Formant algorithm.
- **Solo** Use this optimized mode on any solo instrument or vocal track to achieve the best results. This mode uses the Elastique Pro Monophonic Formant algorithm.
- **Tape** In this mode the track audio follows the song tempo by changing the sample playback rate. This results in the pitch moving up or down when the tempo changes, sort of like changing the speed control on a tape deck. Try this with drum loops or other samples when the pitch doesn't need to be exact.

Note: Some timestretch modes do not support precision timing changes. If you manipulate Bend Markers in an Event set to one of those modes, Studio One automatically slices and repositions the sections of your audio (rather than timestretching them into place) for the best results.

Using Timestretch Cache

The Use Cache for Timestretched Audio Files setting is engaged by default. This option also can be selected in the *Studio One/Options/Advanced/Audio Engine* menu (Mac: *Preferences/Advanced/Audio Engine*). 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 deselected, Studio One timestretches the file in real time during playback, as the file is being read from the computer hard drive.

Default Tempo Mode for New Tracks

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

Comping

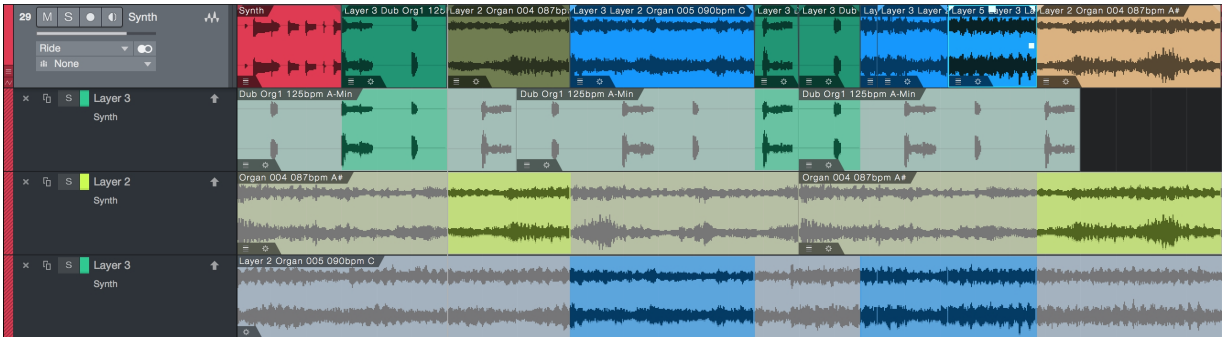
Comping is the process of piecing together multiple performances into a single, continuous performance. For instance, you might record the vocals for a verse a number of times, then edit the best parts of each pass into a single, hybrid performance that, ideally, sounds as though it was performed in one pass. Comping and related information are covered in the following sections.

Takes and Layers

The most common comping scenario involves recording multiple takes of audio and then editing those takes. In Studio One, each successive recorded take can be placed in its own layer, by enabling the Record Takes To Layers option in the Record panel, opened with [Shift]+[Alt]/[Option]+[R], or by using the View menu. With the Record Takes To Layers option engaged, all recordings are placed on layers, with one layer per take, and the layers are shown as soon as recording is stopped. The last recorded take is placed on the Track automatically. Note that this option also applies when recording Instrument Parts if the Record Takes option is engaged in the Record panel.

By [Right]/[Ctrl]-clicking on a Track, you can choose Add Layer to manually add a Layer at any time. You can then drag audio or MIDI to the Layer just as you would drag it to the Track. This allows some very interesting creative comping possibilities beyond simply recording and editing. Note that once an Event has been dragged to a layer, it cannot be moved or copied to another location, so be sure to retain a copy if you plan to use it elsewhere.

To rename an Event within a layer, [Right]/[Ctrl]-click on it and double-click on the name to enter text (e.g., “great,” “not good,” “brilliant,” and so on). This is very helpful when organizing takes to be comped. Layers are displayed as lanes directly under the Track to which they belong.



To hide or show layers, click the Expand Layers button on a Track (which looks like this), or [Right]/[Ctrl]-click on the Track, and then choose Expand Layers from the pop-up menu. Layers have their own Track controls, including Solo, Activate, Duplicate, and Remove. Click on the layer’s Solo button to solo the layer on the Track. Clicking on the Activate button places that layer on the Track, and the current contents of the Track take the place of that layer on a new layer located under the Track. Duplicate creates a duplicate of the layer on a new layer. Remove removes the layer from the Track.

If you would like layers to follow the Track Event in the arrangement—for instance, when moved or duplicated—engage the Layers Follow Events option in the Inspector for the Track.

Auditioning Takes

When comping, it is helpful to be able to quickly audition the various takes to determine the desired parts of each take. The Listen tool is well suited to auditioning takes on layers. When floating the mouse over any layer, hold [Alt]/[Option] and click anywhere on any layer to instantly hear it, starting from the point in time where you clicked. Alternatively, hold [Shift]+[Alt]/[Option] and click on a selected range on any layer to solo the layer; looping is automatically engaged around the selected range for playback.

It is also possible to solo entire layers to quickly switch between takes, as only one layer of a Track may be soloed at a time. To do this, click on the Solo button on any layer, or select the layer and press [S] on the keyboard. Note that Track Solo is independent of this, so you can solo the Track or not, depending on whether you would like to hear the performances you are comping in the context of the other Tracks in your Song.

Copying Layer Ranges to the Track

Studio One makes the comping process very simple. With the Arrow tool selected, floating the mouse over any layer switches to a special Range tool, indicated with the Range cursor icon. Click-and-drag with this tool to instantly promote any range of a take to the Track.

Once a range has been copied to the Track, it is highlighted in the Track color so that you can always be sure where material on the Track is coming from. Where a newly copied range overlaps with an existing range on the Track, an automatic crossfade is applied to help avoid clicks or other undesirable artifacts. This crossfade can be edited, just like any other, and it can be removed.

Any selected range on a layer can be sized left or right by floating the mouse cursor to the edge of the range and clicking and dragging, which alters the Track accordingly.

Comping with the Range Tool

You can use the Range tool to select areas and ranges within layers, without automatically promoting the selected layer range to the main track. This can come in especially handy when using the techniques outlined in **Comping Keyboard Navigation**. Once you have a chosen range selected within a layer, you can press the Copy Ranges to Track arrow in the controls for that layer, promoting the selected range to the main track.

Comping Keyboard Navigation

Given that you can select a range within a layer, it can be very useful to be able to quickly move that selection around within the available layer content, especially when comping tracks with many takes. You can use the following keyboard commands to quickly move and re-range your selection within the layers in a track.:

- [Arrow Up/Down] Navigates vertically through the stack of layers.
- [Arrow Left/Right] Moves the Range tool selection to the previous or following range, as determined by the chosen Event ranges

on the main track.

» [Shift] + [Arrow Left/Right] Extends the Range selection left or right.

The selection you end up with after extending or contracting an existing Range selection with [Arrow Left/Right] can be moved with the arrow keys just like the original selection.

Quick-Switching Content on the Main Track

Once you've done some comping, you'll notice that the comped sections in the main track have a menu button at the bottom. Click this button to open a pop-up menu that lets you choose between all available layers for that section of the main track. You can switch between takes even more quickly by hovering the mouse pointer over the section of your choice, then pressing and holding [Alt] on the keyboard as you move the mousewheel or press [G] (for up) or [D] (for down).

Comping With Groups

If one or more Tracks are in a Group, and comping is performed on any of those Tracks, identical edits are performed on the other Tracks in the Group. For instance, comping can be performed on a single Track within a drum Group, and those identical edits are performed across the other Tracks in the Group. This applies to soloing, activating, and removing layers, as well.

While it may be best to avoid the scenario, comping can be performed across grouped Tracks with a differing number of layers; layer positions under the Tracks determine the behavior of the edits.

Layer Naming

By default, layers in a Track are given names in ascending order from top to bottom— Layer 1, Layer 2, and so on. Even if you re-order layers within the stack, their original names stay the same, to avoid confusion. You can rename a whole layer by double-clicking its name. You can rename content within a layer by [Right]/[Ctrl]-clicking the content, and double-clicking the name shown in the pop-up menu. As layer content is added to the main track, you'll see that those Events are named with the track name and layer name, or layer number, if you have not assigned a custom name.

Color-Coding Layers

Much like you can with Audio and Instrument Tracks, you can assign colors to layers within a track. This can be helpful when establishing a color code for take quality, or simply to give more clarity to which layer is used in a given section of the main track. To set the color for a layer, click the color picker, next to the layer's solo button, and choose a color from the pop-up selector.

What Next?

After comping on an Audio Track, it is common to consolidate, or bounce, separate Audio Events into a single, continuous Event. You can do this quickly by selecting the Audio Events on the Track and pressing [Ctrl]+[B] on the keyboard. This renders a new audio file and Event, and places it on the Track at the correct position.

A more flexible way is to merge the separate Audio Events into an Audio Part by selecting the Audio Events and then pressing [G] on the keyboard. Any comping performed under the range of the Audio part results in the comps being copied directly into the Audio part.

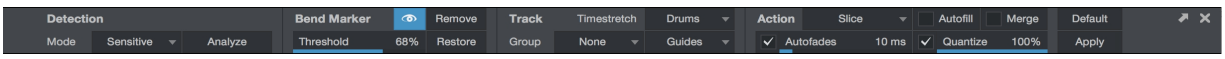
Transient Detection and Editing

Transient Detection is the process of determining the location of transients within audio material, which can then be used as the basis for editing. A transient can be defined as a short-duration signal that represents a non-harmonic attack phase of a musical sound or spoken word. It contains a high degree of non-periodic components and a higher magnitude of high frequencies than the harmonic content of that sound. When looking at the waveform of a recorded snare drum hit, the first part of the hit—the attack—looks distinctly louder than the rest of the signal; the “louder” part is the transient, and the rest of the signal is commonly called the “tail.”

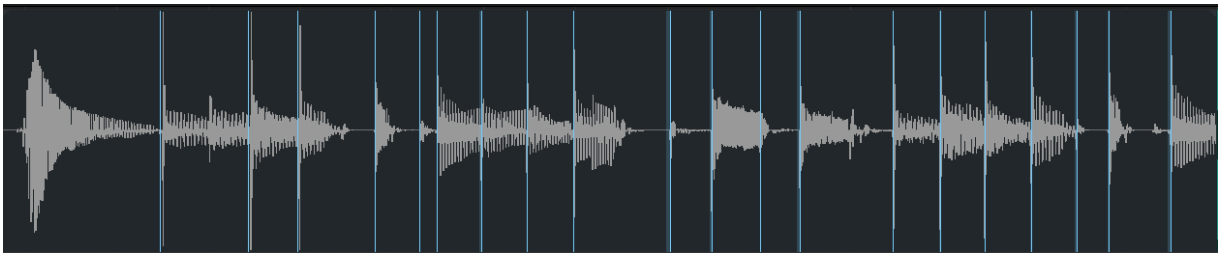
Transients usually indicate rhythm in musical material, so that when the positions of transients are known, it becomes possible to quantize, or correct the timing of, recorded audio. For instance, if a drummer was early on the downbeat after a killer fill, you could fix it so that it is perfectly in time. In fact, it is possible to alter the entire feel of a performance and even extract the feel of one recorded performance and apply it to another.

Detect Transients

To detect transients in any audio in an arrangement, select an Audio Event and open the Bend panel from the top toolbar, then choose Analyze from the Detection area. Alternatively, [Right]/[Ctrl]-click on an Audio Event and choose Detect Transients from the *Audio/Audio Bend* contextual menu. You can also open the Bend panel by clicking Audio Bend in the *View/Additional Views* menu.



The original audio clip that the Event uses is then analyzed, as indicated in the lower left of the Event with a “percentage complete” display. After detection, the Event becomes slightly translucent, and blue Bend Markers—vertical lines the height of the Event—are placed at every transient.



Two modes can be used for transient detection: Standard and Sensitive. These modes are accessed in the Bend panel.

If you intend to quantize or slice the Audio Event, you don’t need to detect transients first; you can go straight to the Action area of the Audio Bend panel. Any applied action detects transients.

Tab to Transient

It is possible to tab to transients in both the Arrange view and Audio Editor by pressing [Tab] on the keyboard, even if transients have not yet been detected for the Event. This moves the playback cursor to the next transient in the Event. The following keyboard shortcuts are also available when working with Tab to Transient:

- [Ctrl/Cmd] + [Backspace] Moves the cursor to the previous transient.
- [Shift] + [Tab] Creates or expands a range selection between transients.
- [Shift] + [Ctrl/Cmd] + [Backspace] Shortens the range selection.

Bend Markers

Bend Markers are used in Studio One to stretch audio inside an Audio Event, without the need for slicing the Event into multiple pieces. They are added to an Audio Event when detecting transients from the Bend Panel, and can also be manually added. When detecting transients, the default Threshold used to place Bend Markers at transients is 80%, which can be adjusted at the top of the Event contextual menu or in the Inspector, so that Bend Markers are placed only at the transients with which you want to work. It is also possible to manually insert Bend Markers, before or after detecting transients.

While it is possible to insert and edit Bend Markers with Bend Markers hidden, you may want them to be shown while editing. Check the Show Bend Markers box in the Bend panel or Event contextual menu to show or hide Bend Markers.

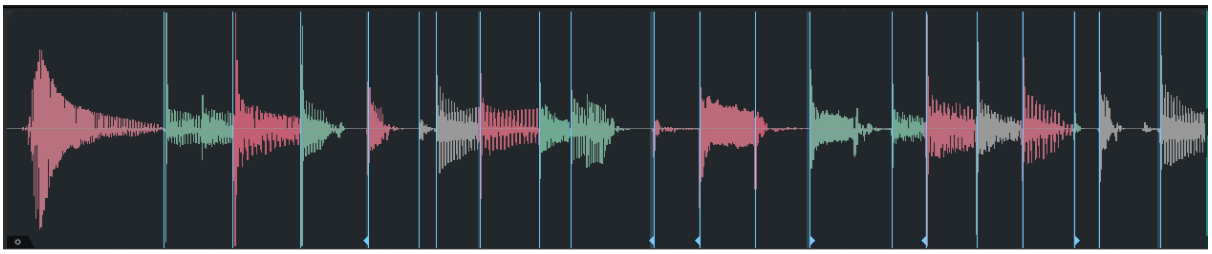
If Bend Markers have been inserted as the result of transient detection, a very short, highlighted range—visible if zoomed in far enough—precedes the Bend Marker. This range represents the distance between the onset and the peak of the transient, and it is important when Studio One quantizes audio based on Bend Markers. When cutting, the onset of the transient is used, so as to encompass the whole transient. When quantizing or snapping a Bend Marker, the peaks of the transient are referenced, for better rhythmic accuracy.

Note that Bend Markers are properties of the audio clip that an Event references, meaning that multiple Events referencing the same audio clip in the Pool (for example, a drum loop duplicated several times) share the same Bend Markers, and are effected by any Bend Marker editing. If you want to process duplicated Events differently, for instance to provide rhythmic variation with a duplicated drum loop, then bounce the Event to a new file prior to editing.

Editing Bend Markers

To manually insert Bend Markers, switch to the Bend tool, then float the mouse over any Audio Event and click where you would like to insert the Bend Marker. Double-click on any Bend Marker with the Bend tool to remove it; any effect the Marker had on the audio is undone.

With the Bend tool selected, click-and-drag on any Bend Marker to manually manipulate the audio left or right on the timeline. Doing so stretches or compresses the audio surrounding the Bend Marker, and the Bend Marker displays a left- or right-facing flag at the bottom, indicating the direction in which it has been moved. If the audio is stretched, the waveform is colored red, with the intensity of the color increasing the more the audio is stretched. If the audio is compressed, the waveform is colored green.



Like many other editing operations, when moving a Bend marker with Snap enabled, the marker snaps to the nearest interval dictated by the current Snap setting. Hold [Shift] while moving a marker to temporarily disable Snap for finer control, or to enable snapping if it's currently disabled.

If you wish to relocate a Bend marker (without timestretching the surrounding audio), hold [Alt] and click-and-drag the Bend marker to the desired position.

Note that for audio to be stretched or compressed by manipulating a Bend Marker, at least one other Bend Marker should exist to the left or right of the one being manipulated, to be used as the basis for stretching or compressing. If no other Bend Marker exists, the beginning and end of the audio clip for the Event are used. For instance, if you want to change the rhythmic phrasing of a word in a vocal part, add a Bend Marker to the left and right of the word you want to alter before attempting to move the word itself.

Multiple Bend Markers can be selected for simultaneous editing with the Bend tool by holding [Shift] and clicking on the desired markers, or selecting a group of markers while holding [Alt].

You can reset a Bend Marker to its original position by [Right]/[Ctrl]-clicking on it and selecting Reset Bend Marker. Multiple selected Bend Markers can be reset at once, making it possible to easily restore the original timing if editing produced undesirable results.

Use The Bend Panel

When working with Bend Markers, you may find it useful to have the Bend panel displayed, as this is where the most common Bend Marker-related actions are found. To open the Bend panel, click on the Bend Panel button in the toolbar or select Bend from the *View/Additional Views* menu. The Bend panel can also be detached and freely placed onscreen.

In the Detection section, you can change the transient-detection mode, which is set to Standard by default. If this mode does not accurately locate transients to your liking, switch the mode to Sensitive and analyze the audio again.

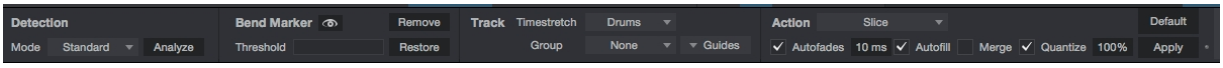
In the Bend Marker section, you can remove all Bend Markers or Restore all Bend Markers in the selected Event by clicking on the respective buttons. You can also adjust the Bend Marker Threshold, using the slider.

In the Track section, you can set the Timestretch mode for the Track on which the selected Event resides and can select Guide Tracks if that Track is in a Group.

Quantizing vs. Slicing

In the Action section, Quantize is selected by default, and a Strength percentage slider is displayed. Click on Apply to quantize any selected Event. The Strength setting alters the Start percentage in the Quantize panel, providing a simple way to alter the strength of the quantize process.

Alternatively, you can choose the Slice action, which slices the selected Event into multiple Events, using the Bend Markers as a basis.



This brings differing results, depending on the selected options:

- Check **Autofades** if you want the resulting individual slices to each have a short fade-out in order to avoid audible clicking.
- Check **Autofill** to fill the spaces between sliced Events that are moved apart with realistic-sounding "tails," emulating the natural decay between notes. This helps to keep things sounding fluid and avoid a "choppy" sound. Enabling this option also silences the overlapping ends of Events.
- Check **Merge** if you would like the individual slices to be merged into an Audio Part after processing.
- Check **Quantize** if you would like to quantize the resulting individual Events, and set the Strength using the percentage field. Note that in this process, no timestretching occurs; instead, a single continuous Event is sliced at its detected transients, and the resulting multiple Events themselves are quantized across the timeline.

As with the Strip Silence panel, when the small light indicator next to the [Apply] button is lit, this means that changing certain Detection, Bend Marker, Track, or Action options and then clicking Apply automatically undoes the previous operation, making it easier to find the right settings by viewing the result of the Bend Panel process, then tweaking the settings if needed without having to undo manually. Any change in selection (or other editing operations) ends this automatic state, and the indicator is not lit.

Quantize Audio

It is very simple to quantize audio in Studio One. Select the Audio Event, then press [Q] on the keyboard to quantize. Transients are detected for the selected Event, the audio instantly snaps to the current quantize grid, the Bend Markers indicate they have been moved left or right, and the waveforms are appropriately colored as described in the **Editing Bend Markers** section.

The same quantize commands are available for transient-detected audio as for Instrument Parts. [Q] quantizes the selected Events, [Alt]/[Option]+[Q] quantizes at 50% strength, and [Shift]+[Q] restores the original timing.

Note that the Quantize panel for the Audio Editor is independent from the Note Editor and the Arrangement. This enables you to perfect the rhythmic character of each aspect of the Song and perform those edits quickly without having to adjust the settings each time. You can show or hide the Quantize panel for the Audio Editor by clicking its Quantize panel button. You can also close the Quantize panel for the currently selected view by navigating to *View/Additional Views/Quantize*.

Elastique Pro

Studio One uses the Elastique Pro time-stretching engine from Zplane, for high-quality time-stretching. When quantizing an Audio Event, Elastique Pro is used to stretch each region of audio between the Bend Markers.

Phase-Coherent Multitrack Quantization

When multiple microphones are used to record the same instrument onto multiple Tracks, as with as a drum set, it is very important that the phase relationships across the multitrack audio remain unaltered. You can think of phase relationships as the time it takes sound to reach each microphone from the source, such as a snare drum. How the waveforms align across each Track is critically important to the sound achieved; if a snare hit is moved in time on one Track and not the others, the resulting collective sound of the snare hit can be drastically altered.

Therefore, when quantizing or slicing multitrack audio, it is important that all edits are performed across every Track in a way that preserves the phase relationships. This is referred to as phase-coherent editing. In Studio One, all that is required to ensure this happens is for the Tracks to be grouped. Once the Tracks are grouped, Studio One takes care of phase coherence for you.

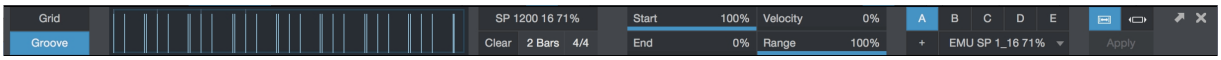
For instance, let us consider a scenario with four Tracks of drums: kick, snare, and left and right overheads. Prior to editing on any Track individually, you would Group the Tracks by selecting them and pressing [Ctrl]/[Cmd]+[G] on the keyboard. If you then quantize audio on any Track in the Group, Studio One determines the phase relationships between the Tracks and then quantizes or slices the audio across all Tracks based on transients on the individual Tracks. For instance, where there is a snare hit, the first transient found (within the range of the snare hit) in the Tracks from top to bottom is used as the basis for quantization for all four Tracks; the other Tracks simply maintain their existing phase relationships to the quantized Track, and thus are quantized in a phase-coherent manner.

In the above scenario, you can check exactly what Studio One has done by zooming in on any Bend Marker. You can see that the Bend Marker Range on each Track has been adjusted to a common start time, with the Bend Marker used as the basis for quantization. Manual Bend Marker edits on grouped Tracks performs the same process.

It is also possible to exclude any Tracks in a Group from transient analysis and therefore not use them as a reference in the quantizing or slicing process. When Events are selected that are contained on a Track in a Group, a Group selection box appears in the Track area of the Bend panel, along with a Guides-selection drop-down menu that contains all Tracks in the Group. To exclude Tracks from analysis, simply uncheck them. As an example, you may only want to use the kick and snare Tracks as the basis for quantization or slicing of the Group, in which case you would uncheck all Tracks except the kick and snare and then apply the desired action from the Bend panel.

Groove Extraction and Quantize

Groove Extraction is an extremely powerful, yet simple, feature. Let us consider the scenario in which you want a poorly played bass part to closely follow the kick drum. To make this happen, open the Quantize panel and switch to Groove mode. Next, drag the kick drum Event into the Groove panel, and then quantize the bass Event. In those few moves you have effectively detected all necessary transients, extracted the kick drum groove, and quantized the bass to that groove.



Similarly, you could drag an Instrument Part into the Groove panel to extract the groove and then quantize audio to that groove. When you extract the groove from an Audio Event or Instrument Part, the grid in the arrangement is then based on that groove, and anything in the arrangement can be quantized to that grid.

This is extremely useful for cleaning up multi-instrument performances, and it's equally useful for creative purposes, such as extracting a great groove from a funk loop and applying it to a straight-eighth drum loop.

You can also drag the groove itself to an Instrument Track, which renders the groove as a series of notes, one for each hit in the groove, even tweaking note velocity according to the relative level of the hits. This allows you to instantly build a virtual instrument bass part, for instance, that exactly match a drum performance. Just drag the drum performance into the Groove area, then drag it out to the bass Track, and change the notes to the pattern you want.

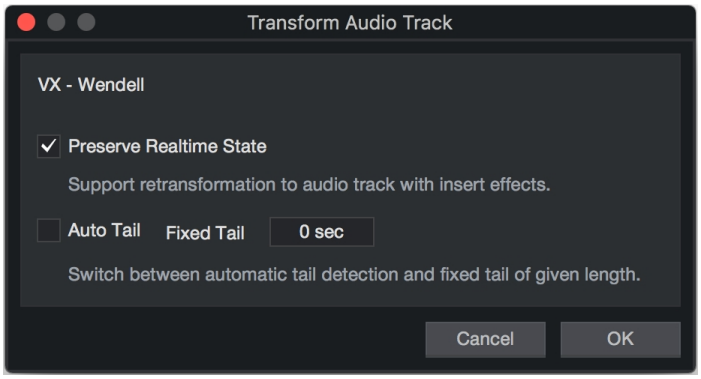
Or, you might prefer to drag in an audio Event, drag it to an Instrument Track to tweak the groove musically, then drag that Instrument Part in, and quantize the original audio Event to that. The possibilities are endless!

Track Transform

Audio Track Transform

Audio Tracks always have a directly related Channel in the Console on which Insert effects can be configured. In the editing and arranging process, it is sometimes necessary to render an Audio Track so that the Insert effects and automation moves become a part of the audio waveform on the Track. You might do this for creative purposes or simply to enable you to remove the Insert effects in order to save CPU power.

Studio One makes this incredibly simple with the Track Transform feature. With any Audio Track that has effects inserted on its corresponding Channel selected, [Right]/[Ctrl]-click on the Track and select Transform to Rendered Audio from the contextual menu.



Check Preserve Realtime State if you would like to be able to transform back to the original Track. It is then possible to switch between Automatic Tail Detection, with a Max Length property, and a fixed tail of a given length by toggling the Auto Tail option. Auto Tail is useful if there is a reverb or other effect that you want to render beyond the Event length on the Track. Note that Auto Tail may not work well with lengthy delays or extremely long reverbs, as it works by detecting a range of silence at which to cut off and fade out the transformed audio. In that case, setting a fixed tail is the best option.

Click OK, and the Audio Track is bounced with its Insert effects and mix automation applied; then the original Audio Track is replaced with the newly bounced audio on a new Audio Track with the same name. If Auto Tail was engaged, or a Tail amount was specified, fade-outs are applied automatically across the specified Tail duration for each Event. The Insert effects are not inserted on the new Track, as they have been rendered into the audio on the Track.

If you check Preserve Original Track State, it is possible to transform back to the original Track, with effects inserted on the corresponding Channel, by [Right]/[Option]-clicking on the Track and selecting Transform to Realtime Audio from the contextual menu.

The effects of Volume and Pan settings (including automation) are applied to the Track as it is bounced to audio, so the value of those settings and their automation data is set to its defaults in the resulting bounced Track. If you wish to edit those parameters later, be sure to check the Preserve Realtime State option when Transforming the Track. This allows you to revert the Track back to its original state, with original settings and automation data intact. Note that send levels, bus assignments, and other mix parameters retain their settings as normal after Transforming a Track.

Every Track Transform operation creates bounced audio files that are placed into the Pool for the current Song. These files remain in the Pool (for later access or reference) until you decide to clear them out. As mentioned in the **Pool Commands** section, you can delete a file from the Pool view in the Browser by [Right]/[Ctrl]-clicking the file and choosing Remove From Pool (which removes the file from the Pool but retains it on disk) or Delete File Permanently (which removes the file from the Pool and deletes it from disk). You can also automatically remove all unused copies of files from the Pool by [Right]/[Ctrl]-clicking in the Pool and choosing Remove Unused Files.

Note that it is possible to Transform multiple Audio Tracks at once, in which case they are all rendered simultaneously, which can be a huge time saver.

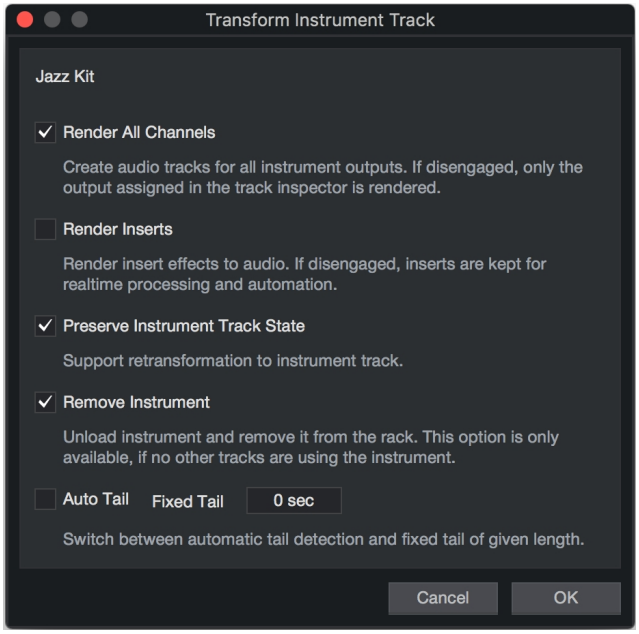
Instrument Track Transform

Instrument Tracks contain MIDI music performances that control virtual instruments. The virtual instruments output to one or more Audio Channels in the Console, and you can configure Inserts, Sends, and Output routings for the Channels. With this approach, it can be difficult to render Instrument Tracks to audio correctly.

Studio One makes it simple by transforming Instrument Tracks into Audio Tracks in one step. [Right]/[Ctrl]-click on any Instrument Track and select Transform to Audio Track from the contextual menu. You can then see several options in the pop-up menu:

- **Render All Channels** If the connected Instrument has more than one audio output engaged, this option appears. If this option is disengaged, only the Channel related to the selected Track is rendered, as specified in the Track Inspector.
- **Render Inserts** If you would like to render the Insert effects (as well as Volume and Pan settings and automation) on the related virtual instrument's Output Channel, check this option.
- **Preserve Instrument Track State** If you would like to be able to transform from the new Audio Track back to the original Instrument Track, check this option.
- **Remove Instrument** If you would like to remove the virtual instrument in order to save CPU power after rendering audio and creating the new Audio Track, check this option.
- **Auto Tail** Choose between automatic tail detection and a fixed tail of a given length, as described in **Audio Track Transform**.

Click OK, and all of the parts on the Instrument Track are rendered to audio and placed on a new Audio Track.



If a Tail amount was specified, fade-outs are applied automatically across the specified Tail duration for each Event. Also, the send configuration and output routing of the new Audio Track is identical to the original Instrument Track.

As with Audio Tracks, it is possible to Transform multiple selected Instrument Tracks at once, in which case they are all rendered simultaneously, which can be a huge time saver.

Every Track Transform operation creates bounced audio files that are placed into the Pool for the current Song. These files remain in the Pool (for later access or reference) until you decide to clear them out. As mentioned in the **Pool Commands** section, you can delete a file from the Pool view in the Browser by [Right]/[Ctrl]-clicking the file and choosing Remove From Pool (which removes the file from the Pool but retains it on disk) or Delete File Permanently (which removes the file from the Pool and deletes it from disk). You can also automatically remove all unused copies of files from the Pool by [Right]/[Ctrl]-clicking in the Pool and choosing Remove Unused Files.

Quick-Convert Instrument Parts to Audio

When working with a virtual instrument, you can drag Instrument Parts directly from the related Instrument Track onto any Audio Track in your song. The Instrument Part is rendered to audio, and placed in the location you've chosen.

Track and Event Inspectors

The Track Inspector and Event Inspector views offer you fast access to a variety of important per-Track and per-Event parameters and functions. To show or hide the Inspectors, press [F4] on the keyboard, or the "i" button, located above the Arrange view. Once the Inspectors are visible, clicking on a Track or Event brings that element into focus in the appropriate Inspector. You'll see differing sets of controls, depending on if the Track or Event is audio-based or instrument-oriented.

There's also an Inspector for the Marker Track, which is described **here**.

Track Inspector

Click on your audio Track of choice to give access to the following parameters in the Track Inspector:

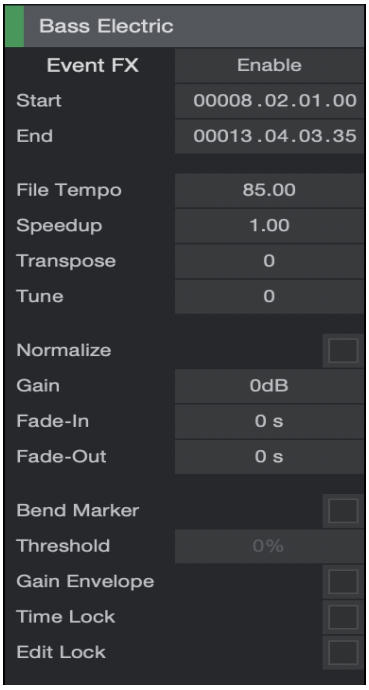
- **Tempo (Mode)** Lets you choose how playback of the current Track relates to Song tempo. For more details, see the **Automatic Timestretching** section.
- **Timestretch (Mode)** Lets you choose the optimal timestretching algorithm for the Track. For more details, see the **Timestretching Material Modes** section.
- **Group** Lets you assign the current Track to an existing Track Group. For more information, see the **Groups** section.
- **Layers** Lets you Add, Duplicate, Rename, or Remove a layer from the Track, as well as set which layer is currently chosen for playback. For more information, see the **Track Layers** section.

- **Layers Follow Events** Enable this parameter to make audio on underlying layers follow the related Event above when you move it along the timeline. When this parameter is disabled, moving an Event with one or more Layers beneath it detaches that Event from the layers below, making it a permanent part of the primary Layer.
- **Play Overlaps** Enable this option to allow any overlapping audio on the current Track to play back simultaneously, rather than cutting off at the beginning of the next Event.
- **Delay** Lets you apply a positive or negative time delay to the current Track, to help align it with other elements. Range of -100 to 100 ms.
- **Follow Chords** Use this menu to specify the **Follow Chords** mode for the Track. This defines how the Track interacts with the **Chord Track**.
- **Tune Mode** This setting applies to audio tracks only. With it you can choose the algorithm that best suits the audio material. It is described in the **Tune Modes** section.
- **Automation** Lets you choose the Automation mode for each of the automated parameters associated with the Track, as well as quickly view and enable or disable the automation for a given parameter. For more information, see the **Automation Modes** section.
- **Edit Note** Click the pencil-and-paper icon to open the Track Notes window.
- **Routing and Mix Controls** This area is a duplicate of the parameters you see when viewing a Channel in the Console. Input and Output routing, Track Volume, Pan, status, effects Inserts and Sends are all available. For more information, see **The Console**.

Click on the Instrument Track of your choice to access the following parameters in the Track Inspector:

- **Timebase** Lets you set the Timebase format for the current Track, in Beats or Seconds. Set to Beats, the Events on the Track change their position in time and speed to follow tempo changes in the Song. Set to Seconds, Events stay in place and maintain their playback speed until you change them intentionally. This can be useful, for example, in film audio, in which certain sounds must remain at certain absolute positions in time, to maintain synchronization with the visuals.
- **Group** Lets you assign the current Track to a existing Track Group. For more information, see the **Groups** section.
- **Layers** Lets you Add, Duplicate, Rename, or Remove a layer from the Track, as well as set which layer is currently chosen for playback. For more information, see the **Track Layers** section.
- **Delay** Lets you apply a positive or negative time delay to the current Track to help align it in time. Range of -100 to 100 ms.
- **Transpose** Lets you change the pitch of all notes on the current Track, in a range between -64 and +64 semitones.
- **Velocity** Lets you boost or attenuate incoming note Velocity, before it arrives at the current instrument or external MIDI device.Settings between -100% and -1% attenuate velocity. Settings between 1% and 100% boost velocity. At 0%, velocity is unchanged.
- **Layers Follow Events** Enable this parameter to make instrument data on underlying layers follow the related Event above when you move it along the timeline. When this parameter is disabled, moving an Event with one or more Layers beneath it detaches that Event from the layers below, making it a permanent part of the primary Layer.
- **Automation** Lets you choose the Automation mode for each of the automated parameters associated with the Track, as well as quickly view and enable or disable the automation for a given parameter. For more information, see the **Automation Modes** section.
- **Program** Lets you select a MIDI program number (and in some cases, a bank number) to associate with the current Instrument Track. This program change value is transmitted to the instrument, ensuring that the correct preset is loaded when you open a Song.
- **Note FX** Lets you choose and apply real-time Note FX processing to the note data of the current Track. For more information, see **Note FX**.
- **Routing and Mix Controls** This area is a miniature duplicate of the parameters you see when viewing a Track in the Mix view. All Instrument Tracks display input and output routing options and Mute/Solo/Record/Monitor status toggles. If the Track is hosting a virtual instrument, Track Volume, Pan, effects Inserts and Sends are displayed. For more information, see **The Console**.

Event Inspector



Click on the Audio Event of your choice to access the following parameters in the Event Inspector:

- **Event FX** This lets you assign effects to individual Audio Events, rather than to a Track as a whole. For more information, see the **Event Effects** section.
- **Start and End** Lets you specify the start and end times for the current Event.
- **File Tempo** If you know the tempo of the audio file associated with the current Event, you can specify it here. This gives Studio One a tempo reference to work from when timestretching an Event to match Song Tempo.
- **Speedup** Lets you speed up or slow down the tempo of the current Event, independent of other tempo settings. For more information, see the **Manual Timestretching** section.
- **Transpose** Lets you shift the pitch of the current Event up or down, in a range of -24 to +24 semitones.
- **Tune** Lets you fine-tune the pitch of the current Event up or down, in a range of -100 to +100 cents.
- **Normalize** Lets you boost the volume of the current Event, so that the highest peak in the audio reaches 0 dBFS.
- **Gain** Lets you adjust the overall level of the current Event, in a range of -40 to +24 dB.
- **Fade-In** Lets you specify the length of the fade at the beginning of the current Event. At a setting of 0 ms, no fade is applied.
- **Fade-Out** Lets you specify the length of the fade at the end of the current Event. At a setting of 0 ms, no fade is applied.
- **Bend Marker** Engage this to view the **Bend Markers** for the selected Audio Event.
- **Threshold** This field is only active when Bend Markers are visible. Use it to adjust the threshold for placing Bend Markers in the Audio Event. The range is 0-100%, with a default value of 80%.

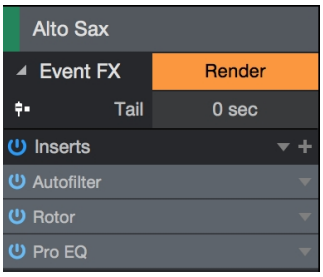
Click on the Instrument Part of your choice to access the following parameters in the Event Inspector:

- **Start and End** Lets you specify the start and end times for the current Event.
- **Transpose** Lets you shift the note pitch of the current Event up or down, in a range of -24 to +24 semitones
- **Velocity** Lets you scale the effect of note Velocity, before it arrives at the current instrument or External MIDI device. At 0%, all notes play at full velocity. At 100%, the full range of note velocity is sent.

Event Effects

It is possible to insert effects directly on an Audio Event in the arrangement, as opposed to inserting effects on the entire Audio Channel for the related Track, thereby affecting all Events on the Track. Event Effects are commonly used to add variety to the arrangement or to insert utility effects, such as pitch correction, into specific Events.

Insert Event Effects



To insert an effect on an Event, select the Event and open the Inspector by pressing [F4] on the keyboard. In the Event Inspector area of the Inspector, you can see an Event FX tab with an [Enable] button. Click on Enable, and an Insert Device Rack opens.

Insert effects or FX Chains here, as you normally would, and the Event is processed accordingly, in real time, during playback. The resulting sound is exactly as if you had inserted the effect on the Track: You can hear all other Tracks play and can make effects parameter changes while hearing the results in context with the rest of the mix.

As Event Effects may alter the relative volume of an Event, thereby skewing existing volume fade envelopes, an option has been provided to process volume envelopes after Event Effects. Click on the Tail check box, in the area above the Insert Device Rack, to enable this option.

Add Effects to Multiple Events

You can add Effects by dragging them from the Browser onto all selected Events.

Render Event Effects

Once the intended sound is achieved via an Event Effect, it is likely a good idea to render the audio in order to conserve CPU resources. Studio One provides a very flexible way to do this that allows you to revert to real-time processing at any time in order to make changes.

To render any Audio Event with inserted Event Effects, click on Render above the Event FX Insert Device Rack. The Insert Device Rack collapses, a new Audio Event with the rendered audio replaces the original Event in the arrangement, and the [Render] button is labeled [Restore]. At any time, click on Restore to replace the rendered Event with the original and restore any inserted effects to their pre-rendered states.

When rendering Event FX, note that the Tail setting above the Insert Device Rack allows you to specify a length to render beyond the end of the Audio Event. This is critical to properly capturing reverb tails, delay lines, and other similar audio tails caused by inserted effects. When a Tail value is given, a volume fade is applied across the entire length of that tail on the rendered Event after rendering to ensure smooth-sounding results. This fade envelope can then be modified, as usual.

Rendering Event FX creates bounced audio files that are placed into the Pool for the current Song.

Edit View Event Editing

In many cases, editing actions 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. Edit views allow you to avoid this inefficiency. To open the Edit view for the selected Event, click on the [Edit] button, press [F2] on the keyboard, or double-click on any Event. You can also open the Editor by selecting Editor from the View menu. While there is a common Edit view, Audio Events open in the Audio Editor, and Instrument Parts open in the Note Editor.

The Edit view displays 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. While the Edit view is open, [Alt]/[Option] + double-click an Event in the Arrange view to zoom the Editor so it contains the full Event. Note that the [Synchronize Editor to Arrangement] button must be disengaged to use this command.

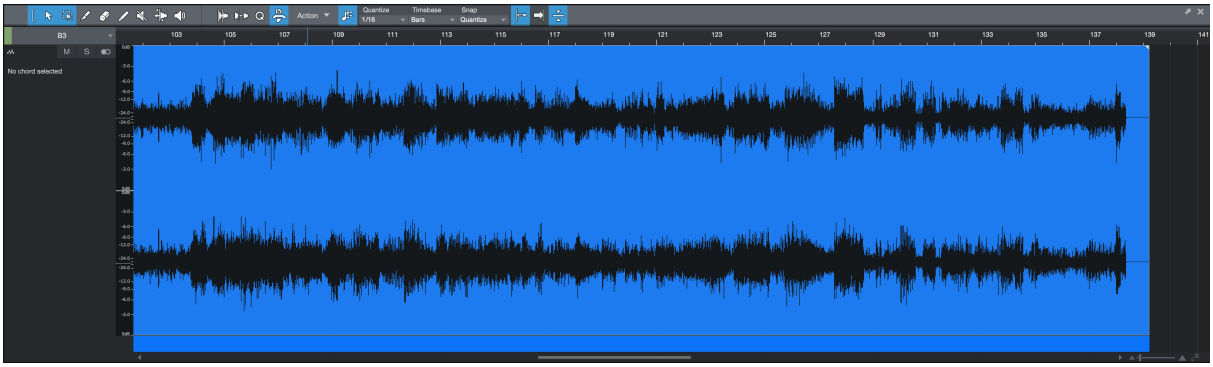
The Editor can be detached to its own sizable window by clicking on the Detach button at the upper right of the Editor. The window can then be pinned to the new location by clicking the Pin icon in the upper right corner of the window. This allows you to view the same or different contents in multiple edit windows side-by-side. Any Track can then be selected from the Track drop-down selector to the upper left of the Editor window, under the toolbar.

The [Action] button (available in both the Audio and Note Editors) gives you quick access to functions you might normally access by [Right]/[Ctrl]-clicking on an Event and exploring the Audio or Musical Functions sub-menus.

Audio Editor

The Audio Editor display operates independently of the Arrange view and has an independent Timebase setting. Most options that appear in the Editor are the same as in the **Arrange** view and affect tools and Events in the same way. Note that the Snap and Timebase settings are not shared between the Arrange view and Editor; they remain independent. A Snap to Event Hotspots option is found in the Editor

Snap dropdown menu; it allows tool and Event snapping to hotspots such as Bend Markers. The dropdown menu also includes a Snap to Zero Crossings option, which will help avoid an unnatural click at the beginning of the audio data when the Event is moved or split.



The displayed level scale to the left of the waveform lane in the Audio Editor can be adjusted by clicking on it and dragging left or right. This effectively zooms the waveform amplitude, which may be useful when editing audio with relatively low levels. [Right]/[Ctrl]-clicking in this area allows the selection of a percentage- or dB-based scale. You can also adjust this zoom level by manipulating the Data Zoom parameter, found to the right of the Time Zoom slider control.

Tools

Most of the tools in the **Arrange** view are available in the Audio Editor and function there exactly as they do in the Arrange view. (Only the Paint tool is not available in the Audio Editor.)

Note Editor

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 other Events.

For quick editing of all notes in a Part or on the Track, use [Ctrl]/[Cmd]+[A] to select all of the notes in the focused Part in the Note Editor, or [Ctrl]/[Cmd]+[Shift]+[A] to select all notes in all Parts on the Track. You can also access the full set of selection actions by navigating to the Select section of the Edit menu.

The View buttons on the left side of the Note Editor toolbar provide two three different ways of viewing, entering, and editing note data: Piano view and Drum view.Piano view, Drum view, and Score view.

- **Piano View** displays the note data in "piano roll" style. A vertical keyboard graphic helps visualize notes and scales, and can be used to trigger the notes.
- **Drum View** removes the vertical keyboard and allows more room to display sample names horizontally for each vertical note position.
- **Score View** shows the note data on a musical staff, where you can add musical symbols for dynamics and articulations that also enhance playback.

We'll describe the following features as they apply to the Piano and Drum views. For details about Score view, see the **Score Editor chapter**.

Zoom and Synchronize

You can zoom in or out horizontally in the Piano and Drum views by moving the Time Zoom control, and zoom vertically with the Data Zoom control. In Score view the Time Zoom control zooms both vertically and horizontally, as does a scroll wheel.

The horizontal zoom and timeline of the Note Editor and Arrange View can be linked. To do this, engage the [Synchronize Editor to Arrangement] button on the right side of the Note Editor toolbar.

Timebase, Quantize, and Scale

The Note Editor has independent settings similar to those in the Audio Editor. While Quantize affects the horizontal time-value snapping, the Note Editor also features Scale (vertical note-value) snapping. The Scale settings allow snapping to specific note values within different musical scales.

The Scale function must be enabled in Piano view. First click its toggle switch, then 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 Note Editor's keyboard display, as well as in the single-octave keyboard display above the Scale selector.

If you want existing notes to conform to a scale you have just selected, first select the notes, then select Apply Scale from the Action menu in the Note Editor toolbar. This can be done in Piano view or Drum view, and the change is applied instantly in Score view.

Arrow Tool

The Arrow tool in the Note 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**.

Moving Notes

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 moves it backward and forward in time, relative to the current Edit view timebase and timeline zoom. Dragging the note up or down transposes (changes the pitch of) the note. In Piano view the transposition interval can be determined by using the vertical keyboard display to the left of the Note Editor.

Creating Notes

To create a note using the Arrow tool, double-click in any empty space in the Edit view. A note is created at the location you've specified, its length determined by the currently selected Quantize value. Double-click a note with the Arrow tool to delete it.

Resizing Notes (Piano View)

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 any number of times. A Part can also be sized in this way, by floating the cursor near the top of the Part's beginning or end, revealing the Sizing tool.

To change the length of a note while simultaneously resizing the previous or following note to match, hover your cursor near the beginning or end of a note, press and hold [Alt]/[Option] to enable Resize Adjacent Notes mode, and click and drag the note to resize.

When sizing multiple selected notes in the Note Editor with the Arrow tool, three additional behaviors are possible using modifier keys. Select multiple notes, then click on the end of one note and drag it to the right just a small amount. While still dragging that note, if you press certain keys on your computer keyboard the following will happen:

- [Ctrl]/[Cmd] + drag will snap the length of all notes to match the length of the clicked note.
- [Alt] + drag will stretch the notes across the time grid. If the outer edge of either of the outermost notes is dragged, the stretching can go on indefinitely. If an inner edge of any note is dragged, the middle notes will eventually end up on top of the outermost notes.
- [Alt] + [Ctrl]/[Cmd] + drag the right edge of one note makes all of the notes end at the same time. [Alt] + [Ctrl]/[Cmd] + drag the left edge of one note makes all of the notes *start* at the same time.

Duplicating Notes

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 is duplicated to this position.

More Arrow Tool Tips

To switch temporarily to the Paint tool while the Arrow tool is selected, press and hold [Ctrl]/[Cmd].

When multiple Parts are visible in the Editor, only one is actively available for editing at a time. For example, when doing a Select All operation, only notes in the currently active Part are selected. To activate a Part, click on any note or empty space within it.

Split Tool

In Piano view, the Split tool allows you to split notes so that they become two separate notes. Clicking on any note directly splits the note at that position, while selecting multiple notes and then splitting, splits all selected notes. Holding [Alt] when clicking with this tool performs a split of any selected notes, as well as a split of the part itself, so that one part becomes two.

To switch temporarily to the Arrow tool while the Split tool is selected, hold [Ctrl]/[Cmd].

Split at Grid

It is possible in the Piano and Drum views to split a single note into multiple notes based on the current Quantize setting. Select any number of notes and choose Split at Grid from the Musical Functions menu. Notes are split based on their position relative to the bar line, with splitting occurring only up to the next bar line after the note start time.

The Split at Grid function can also be applied to whole Instrument Parts and Audio Events.

Paint Tool

The Paint tool in the Note Editor is used to draw notes in an Instrument Part. To draw a note, click at the desired position. If you click once, the new note has a length equal to the time value of the current Quantize setting. Click the note again to delete it.

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

Creating a New Part

To create a new Part in the Edit view with the Paint tool, click and drag in any open area in the Editor timeline. You can resize Parts while the Paint tool is selected, by floating the cursor near the top of the start or end of the Part, which reveals the Sizing tool.

Painting in Piano View

When drawing in Piano view, the Paint tool snaps to certain vertical and horizontal positions based on the **Quantize and Scale** settings. When the cursor hovers over the Note Editor, the note value for the current cursor position is highlighted on the vertical keyboard.

As you enter new notes, click-and-drag to the right to make the note any length you want. To edit the velocity of a note as it is being drawn, drag up and down after you click to draw the note.

To modify the length of an existing note, hover the cursor at the edge of the note to reveal the Sizing tool, then click-and-drag.

Painting in Drum View

When drawing in Drum view, the Paint tool snaps to specific horizontal positions based on the Quantize setting. When the cursor hovers over the Note Editor, the Pitch name and note number are highlighted in the Pitch Names list.

Hold [Alt] and then click-and-drag to draw a line of notes at the current Quantize value.

Adjusting Velocity Values

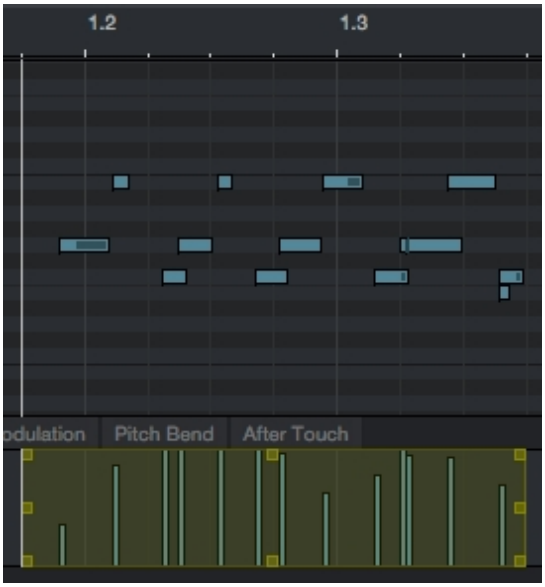
To edit the velocity of an existing note in Piano or Drum views, hold [Alt]/[Option] on the keyboard and click-and-drag up or down on the desired note.

You can also edit the velocities of notes in the Part Automation lane of the Note Editor, which is discussed in the **Instrument Part Automation** section of the **Automation** chapter.

Line Drawing Mode

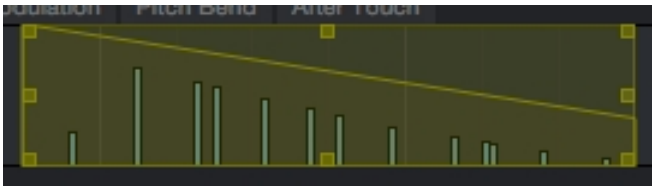
Press and hold [Alt] on the keyboard with the Paint tool selected to enter Line Drawing mode. In this mode, you can draw a line of note Events in the Note Editor, and you can draw lines in automation envelopes, as discussed later in this manual. This function also works when the Paint tool has been temporarily invoked by pressing [Ctrl]/Cmd].

Transform Tool for Note Velocity



If you want to edit velocity for many notes at once, you'll find the Transform Tool very useful. Similar to the way the **Transform Tool in Arrange view** is used for scaling and shaping automation curves, the Transform tool in the Note Editor lets you scale and shape note velocity data.

To use the Transform Tool, click the triangle at the edge of the Paint tool in the Note Editor, and choose "Transform Tool" from the pop-up list. With this tool, select a range of velocity values in the Velocity display below your chosen notes. The selected values can then be scaled smoothly up or down by dragging the handles at the top or bottom of the selection.



You can also drag the handles at the corners of the Transform selection, to scale the selected velocities with a sloping action, as shown above. This makes it easy to create smooth changes in velocity across a range of notes.

Eraser Tool

The Eraser tool in the Note Editor is used to delete notes. With the Eraser tool selected, click directly on any note to delete it. When multiple notes are selected, clicking any one of them with the Eraser tool deletes all selected notes. Click and drag with the Eraser tool (starting in empty space) to delete all notes you touch.

You can temporarily switch to the Arrow tool while the Eraser tool is selected by holding [Ctrl]/[Cmd].

Mute Tool

The Mute tool is used in the Note 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 with the Mute tool to mute all notes that fall within your selection.

Listen Tool

The Listen tool is a quick way to audition a section of a Track while editing. With the Listen tool selected, click and hold inside the Editor window to solo the Track and start playback from that position. Playback continues until the cursor is released; then playback stops and the Track is un-soloed.

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 described in the **Common Editing Actions** section of this chapter. It is also possible to cut or copy notes and then paste them (or simply drag-and-drop them) directly into the Arrangement onto a selected Instrument Track. Doing this creates a new Instrument Part containing the selected notes.

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 note data. It is possible at any time to transpose 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 Note 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 Musical Functions sub-menu, which can be accessed from the Event menu, the [Action] button, or by [Right]/[Ctrl]-clicking within the Edit view.
- Choose from one of the preset transpositions or use the horizontal fader to set the number of semitones by which the selected notes are transposed (or simply enter a semitone value into the text field). 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 Musical Functions sub-menu, which can be accessed from the Event menu, the [Action] button, or by [Right]/[Ctrl]-clicking within the Edit view.
- Choose from one of the preset transpositions, or use the horizontal fader to set the number of semitones by which the selected Part is transposed (or simply enter a semitone value into the text field). 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 notes are moved graphically to represent the change. In this case, the notes displayed are the notes you hear.

You can also use this Transpose function to set all selected notes (or all notes in a selected Part) to the same note value by enabling Set All To, then selecting your note value of choice, and pressing [OK].

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 is transposed.

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

Quantizing Instrument Parts

Quantizing Instrument Parts allows you to realign notes in time to match a given time subdivision or other grid more closely. In practice, quantizing is generally used to clean up note timing to more closely match the intended timing, although it can also be used creatively.

The results of quantizing are determined with the Quantize settings as found in the Quantize panel. The Quantize panel allows precise control over all quantize settings. Refer to the **Quantize Panel** section for more information.

It is possible to extract a groove from an instrument part by dragging-and-dropping it into the Groove section of the Quantize panel, just as with an Audio Event. Any Instrument Part or Audio Event can then be quantized to that extracted groove.

To enable quantizing notes while recording, open the Record Panel by selecting Record Panel in the View menu (or pressing [Alt]/[Option] + [Shift] + [R]), then Click on the Input Quantize button. Input quantization can be undone if you want to use the performance as it was played.

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 Musical Functions menu. To quantize an individual note or notes, select the notes in the Note Editor and then apply quantization, as before.

Alternatively, if notes are selected in the Note Editor, and then the Quantize value is changed with Auto engaged (toggled with the small [IQ] button, next to the Quantize value in the Editor toolbar), the selected notes are automatically quantized using the newly selected Quantize value.

Furthermore, you can quantize note ends, which adjusts the Note Off time for any selected notes, by selecting Quantize End from the Musical Functions menu.

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 Musical Functions menu.

Freeze Quantize

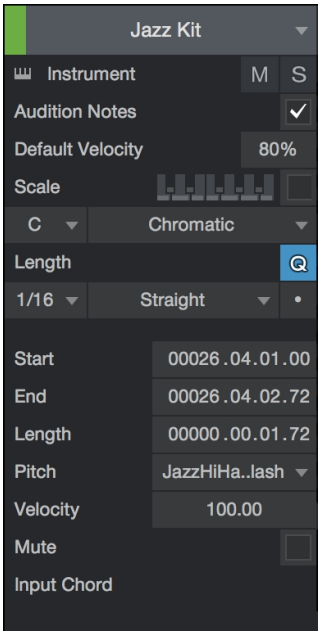
It is sometimes very helpful to make note quantization permanent so you can quantize again based on the current quantized positions, rather than the original note positions. To do this, select the notes and select Freeze Quantize from the Musical Functions menu. You cannot Restore Timing for these notes, as the newly quantized positions effectively become the original positions.

Humanize

Strictly quantizing every note so that rhythms are perfectly precise can cause notes to sound lifeless and mechanical. The Humanize function alters note start and end times and velocity within a very small threshold, based on rules modeled on common human performance patterns. This provides 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 *Event/Musical Functions* menu. Note that the exact results cannot be directly controlled. You can also choose to Humanize Less, which alters the notes in a similar fashion as Humanize but based on rules designed to result in less-humanized performance patterns.

Note Editor Inspector (Piano View)



When a note is selected, its start and end positions are displayed in the Note Editor Inspector, 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 are affected, their values changing relative to the initial setting of each note. The one exception is that when Velocity is specified for multiple notes using the Inspector, all notes snap to the new value, regardless of their previous Velocity value.

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 Velocity value in the Note Editor's Inspector panel. When you release the mouse button, the Velocity value is applied to all selected notes. The value currently set by the Velocity parameter is applied by default to any new notes created with the Paint tool.

Enable the Audition Notes option to hear the pitch of each note that is selected, created, or moved, played through the current instrument.

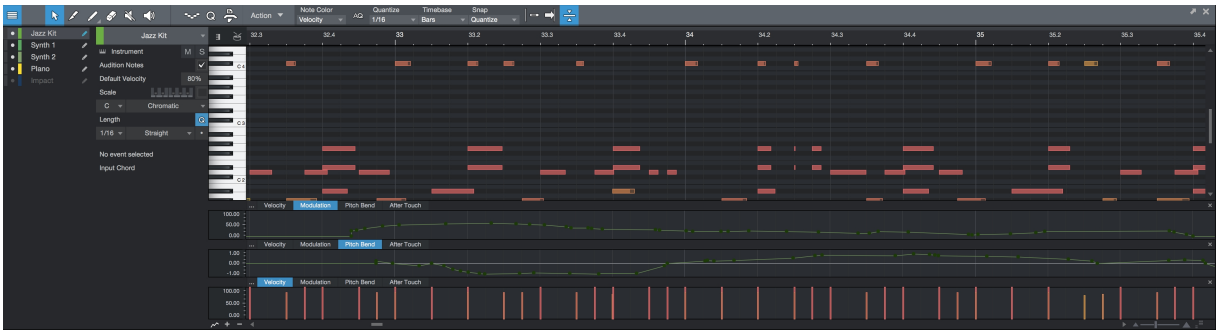
You can also Mute, Solo, or open the Device Editor for the current Track from within the Note Editor Inspector, using buttons that look much like their counterparts in the Arrange view.

To select a different Track for editing, click the Track name at the top of the Note Editor Inspector and select one of the Tracks.

Multitrack Note Editing

It is possible to view and edit more than one Instrument Track at a time in the Note Editor. To do this, hold Shift and select Instrument Parts on different Tracks in the Arrangement. More Parts can be added at any time by holding Shift and selecting them in the Arrangement.

Double-click on any Part in the Arrangement to make its Track the only one you see in the Note Editor. To zoom the Editor window so it shows all of the notes the Part contains, disengage the [Synchronize Editor to Arrangement] button, hold [Alt]/[Option], and then double-click the Part. Use the lower half of the Part for this command when the **Link button** is active in the Arrange view toolbar.



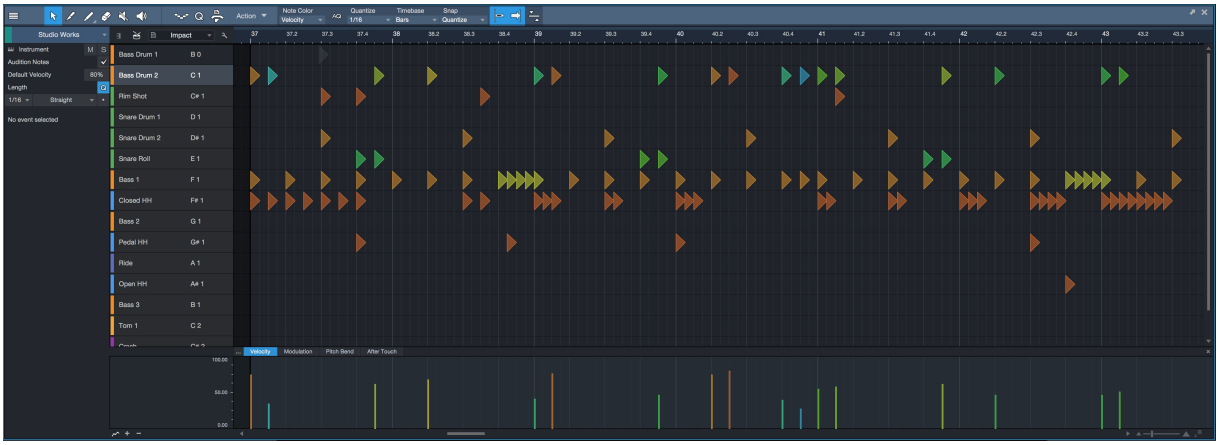
The Note Editor also has its own Track List, opened via the Track List icon in the upper left corner of the Note Editor's Inspector panel. You can show or hide Tracks in this List via the Show/Hide button to the left of the Track name, and can independently set each Track to Edit Active via the pencil-shaped Edit button to the far right of the Track name. If a Track is shown and Edit Active is not engaged, the Track's notes are not selectable. This allows it to be viewed as a reference, and keeps it safe from an accidental alteration.

When multiple Parts are displayed, the notes for each Part are colored with their Track colors and audition normally through their Tracks. Selected notes are displayed in white.

Also, when multiple Parts are displayed it is possible to transfer notes from one Part to another using the [Right]/[Ctrl]-click contextual menu item Transfer Notes. This removes the selected notes from the original Part, indicated with a checkmark in the Transfer Notes list, to the selected Part.

To bring a different Track into focus for editing when multiple Parts are displayed, click the Track name at the top of the Note Editor Inspector and select the desired Track.

Drum Editor



Standard piano-roll-style note editing is ideal for melodic and harmonic content, in which notes tend to have differing lengths. Drum programming and editing present a different challenge. Percussive sounds often contain their own amplitude envelope that ends at a predetermined time, which makes the start of each note the most important part. For added clarity when working on this sort of content, Studio One features a dedicated Drum view that shows your drum notes as "triggers," marking the start of each note.

To enter the Drum Editor, click the Drum View button at the top of the Note Editor toolbar. You can return to Piano view or Score view at any time by clicking the appropriate button.

In the Drum Editor you can add, remove, and manipulate notes just as you normally can, with some useful differences. The **Note Editor Inspector** on the left side is basically the same as in Piano view, only without the features that don't apply to Drum view.

Tight Integration with Impact XT

While you can use the Drum Editor on any Instrument Part, it shares a special connection with Impact XT. When you view an Impact XT part in the Drum Editor, instead of seeing the full range of notes, you see each currently loaded sound as a row in the grid. with its name and color code visible, for easy programming and editing. Any unused notes are hidden.

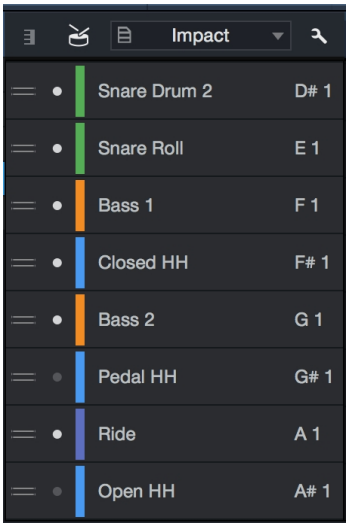
Enter Strings of Notes with the Paint Tool

When you enter notes with the Paint Tool in the Piano view, you click to begin the note, then drag to set its length. In the Drum Editor, since note length is not shown, you can click and drag across the grid, entering multiple new notes at divisions set by the current Quantize value. This makes creating drum patterns, fills, and rolls a more fluid process.

Edit a Drum Map

When using the Drum Editor with an instrument other than Impact XT, you see the full range of MIDI note names, each with its own row in the editing grid.

If you'd like to exclude certain notes that you don't plan to use, or change note names to match the corresponding sounds, click the wrench-shaped Edit button near the top of the Pitch Names panel to edit the Instrument List.



To edit the order of notes, click and drag the double line to the left of each note row. To hide a note, click the circular button in the row, turning it dark grey. To rename a note, click inside its name display, then enter your new name. You can then save the Drum Map to recall at a later time by selecting Store Preset from the Pitch Names menu.

When you're finished editing the Instrument List, click the wrench-shaped button again to lock in your changes.

Select a Drum Map

Click the drop-down menu arrow in the Pitch Names field to recall your Drum Maps. Simply select any Map from the list to load it. (A General MIDI Drum Map is provided.)

Import Drum Maps

When working with a drum instrument (or drum sample library) other than Impact XT, you can import a list of pitch names into the Drum Editor, known as a "Drum Map." This lets you auto-assign names to each available note that the instrument or library preset can respond to, for similar ease of programming as when working with Impact XT.

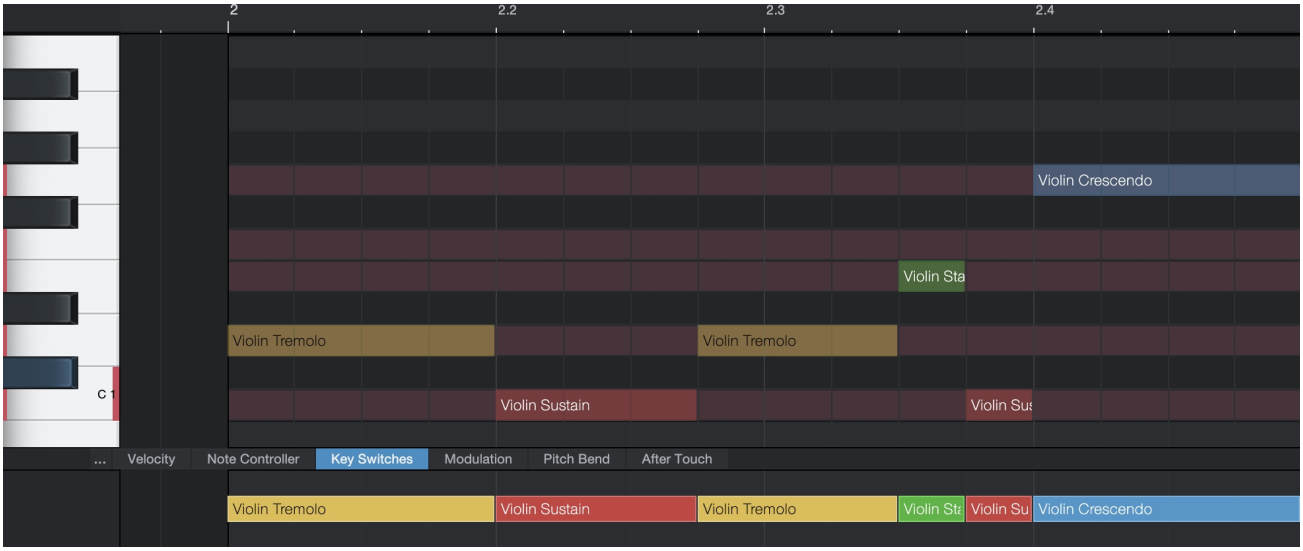
Drum maps can be downloaded for many commercially available instruments and libraries from **http://exchange.presonus.com**. To import a drum map in the Drum Editor, click the wrench-shaped button near the top of the Pitch Names panel, then simply drag the drum map file onto the list of pitch names in the left column.

Key Switches in the Note Editor

Create an Instrument Track and load “Nylon Guitar Full” from the Presence XT core library. Next, press [F2] to open the Note Editor, then click the keyboard icon in the Note Editor toolbar to select the Piano View.

Now scroll down to C0 on the vertical keyboard and notice the highlighted keys. These indicate the presence of Key Switches. The lanes in the Note Editor are highlighted for those notes too. The names of the Key Switches appear inside the lanes at a medium vertical zoom setting.

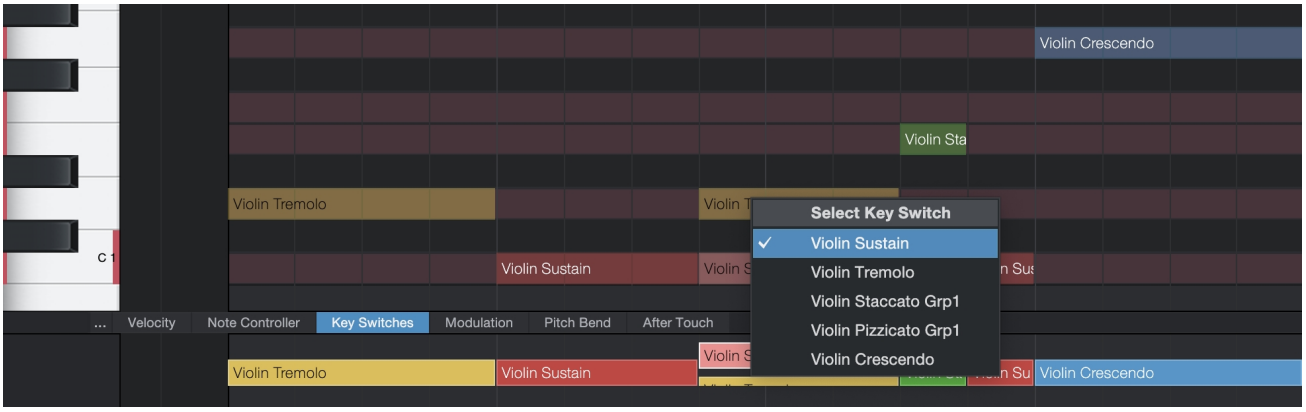
Automation Lane for Key Switches



The Note Editor has an Automation lane for the Key Switches as well. To view and edit Key Switches in an Automation lane, open the Note Editor [F2], click the Show/hide Automation Lanes button ( ), and then click the Key Switches Parameter tab at the top of the lane. This tab is available in the Piano and Drum views.

When Key Switch notes are entered in the Track, an equivalent entry appears in the Automation lane as well. This entry remains in effect until another Key Switch note is entered, and so the colored bar stretches until the next Key Switch note event.

To change the Key Switch that is used for a particular passage, first select the Key Switch you want to change in the Automation lane, then click and hold its name and select the desired Key Switch from the menu that appears. You can also enter or edit Key Switches in the Automation lane using the pencil tool.



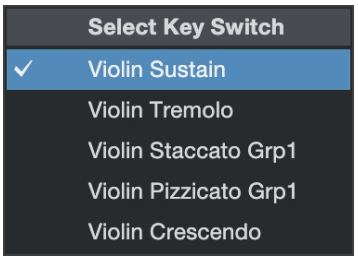
Key Switches, Transposition, and Note FX

In order to avoid conflicts with musical actions (such as transpose) or processing with Note FX or the Chord Track, Key Switches are filtered and excluded from any type of playback processing.

Instruments that report their Key Switches to Studio One (such as Presence XT) display articulations with their names automatically. For example, load “Nylon Guitar Full” from the Presence XT core library. Notice the highlighted key switches in Piano View. These keys will be unaffected if the Instrument Track is transposed, and they will not be triggered by Note FX such as an arpeggiator. This way you can reuse a particular guitar articulation in other locations, for example, even as the other notes follow the Chord Track.

Custom Key Switch Maps

Other instruments (such as third-party samplers and orchestra libraries) can be mapped manually using mapping presets. To open the Key Switch Editor, click the wrench button on the left side of the Automation lane. (You won't see the wrench button if you're using Presence XT or a third-party VST2/VST3 instrument that supports Key Switch query.) A window like this will appear:



This can be done in stages, if you like. Start by adding a few: Enter the pitches with your controller keyboard, name the ones you have entered, and then select Store Preset... from the menu to the left of the preset name. You can re-select this Key Switch map at any time and add some more. Be sure to use the Update Preset option next time to add the new Key Switches to your preset map.

Custom Key Switch maps can be re-used for any sample library that follows the same Key Switch layout. For added convenience, custom Key Switch maps can be saved with Instrument+FX presets (which also save channel insert and send fx).

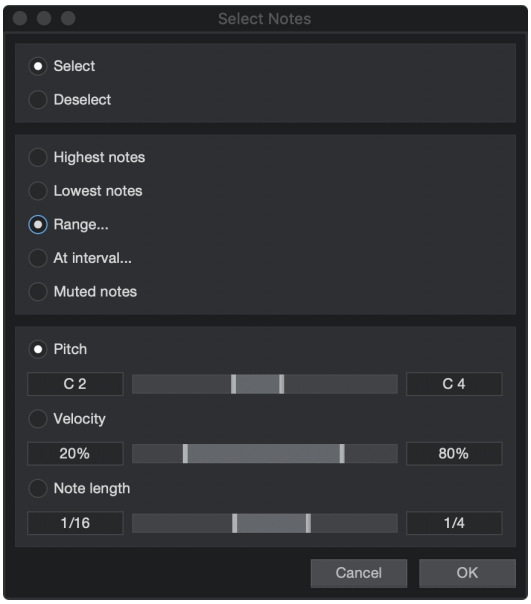
Note Chase and Cut

In the *Studio One/Options/Advanced/MIDI* (macOS: *Preferences/Advanced/MIDI*) menu, you can find two options: Chase Long Notes and Cut Long Notes at Part End.

Chase Long Notes should be engaged if you would like Studio One to play back a long note even if playback begins after that note's Note On position, effectively treating the playback position as the Note On. This is very useful when working with long, synthetic drone parts, for instance, which may have a Note On at bar 1 and then continue throughout the rest of the Song.

Cut Long Notes at Part End should be engaged if you would like a note to stop playback if the related Instrument Part ends before that note's Note Off position.

Select Notes



Selecting notes with your pointing device is often an efficient way to make changes in Instrument Parts, but sometimes, a bit of automation may come in handy. The Select Notes function lets you select certain notes within a part based on a range of parameters, such as "just the highest notes," or "just notes within a certain range of velocity."

To use this function, click the [Action] button in the Note Editor, and choose Select Notes. In the window that appears, you can choose from the following actions:

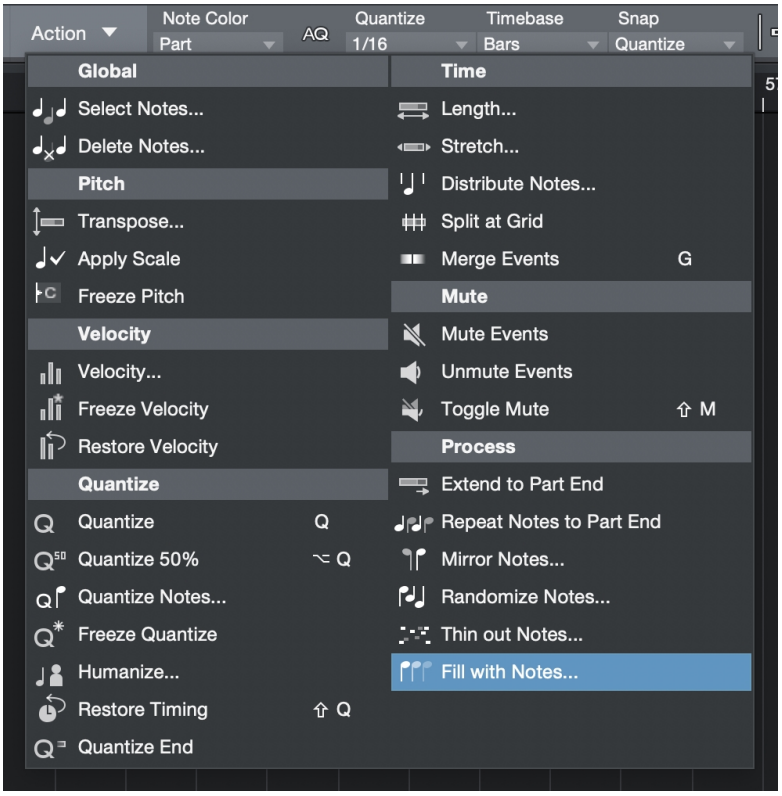
- **Select** Use this mode to select notes that fall within the chosen range of parameters.
- **Deselect** Use this mode to deselect notes that fall within the chosen range of parameters, if those notes are currently selected. If no notes are selected, using this mode selects any notes that fall outside the chosen range of parameters.

After selecting one of those modes, choose one of the following operations:

- **Highest notes** Select the highest notes that exist at any given time in the Part.
- **Lowest notes** Select the lowest notes that exist at any given time in the Part.
- **Range...** Select the notes that fall within a range of **Pitch**, **Velocity**, or **Note Length**. Select the criteria you want to focus on, then set the range of selection with the sliders.
- **At interval...** Select notes based on intervals according to position on the beat grid, or numeric relationships between notes:
  - **Beat** Choose this mode to select notes according to their relationship to the grid:
    - **Beat grid** Sets the rhythmic value at which note selection is calculated.
    - **Selection interval** Sets the number of beats (the value of which is set with Beat Grid) between note selections.
    - **Start offset** Sets the number of beats to skip before making the first set of note selections.
    - **Selection tolerance** Sets the amount of "slope" allowed in calculating note selections, to allow for selecting notes that do not conform exactly to the grid.
  - **Event count** Choose this mode to select notes based on their numerical relationships:
    - **Select at every n-th position** Sets the numeric spacing between note selections. For example, a setting of 2 selects notes at every second note. This does not necessarily relate to the grid. If there is a space in the notes, the count between selections continues when the next notes start.
    - **Start selection at n-th position** Sets the number of note occurrences to skip before making the first set of note selections.
    - **Selection tolerance** Sets the amount of "slope" allowed in calculating note selections, to allow for selecting notes that do not conform exactly to the grid.
- **Muted notes** Use this option to select only the notes that are currently muted within the specified range. If a range of notes has not been specified, all muted notes within the current Event or the current Track are selected.

Action Menu

When editing in the Note Editor, several editing commands are likely to be used often. We have placed these commands in a menu that allows quick access, located to the right of the Quantize and Macro icons in the main tool bar of the Note Editor. Click the [Action] button to reveal a drop-down menu of commands with which you can edit any selected notes in the Note Editor.



The Actions are arranged in groups of related features: Global, Pitch, Velocity, Quantize, Time, Mute, and Process actions. We'll describe some of the Actions in this section.

Apply Scale

If an existing musical passage is in a major key but you'd like to hear how it sounds in a minor key, the Apply Scale action will do that for you. After selecting a group of notes in the Editor, select the desired Scale on the left side of the window. Then open the Action menu and choose Apply Scale from the Pitch section. If you don't like the results, undo the action, select a different scale, and try it again.

Quantize Notes

In addition to the global quantization functions revealed by clicking the Quantize button, the Action menu lets you apply a very specific set of quantization parameters to a group of selected notes. You can define the resolution of the Quantize grid, select a Quantize type such as Triplet or Quintuplet, adjust the Swing, Strength and Range parameters, and then select whether you want to quantize the note starts and/or note ends.

Distribute Notes

Any selection of note events can be equally distributed at a variable percentage. The Amount parameter defines the strength of the action.

Repeat Notes to Part End

With this action a selection of notes is repeated as many times as needed to fill the length of a Part. This is will save a lot of time when creating repeating patterns manually.

Mirror Notes

This note action will mirror notes horizontally, vertically, or both. You can choose which note will be the focal point of the mirror action: first, middle, last, or any custom note within a range of 10 octaves. This can be a useful compositional tool, providing a quick way to invert or reverse a melody.

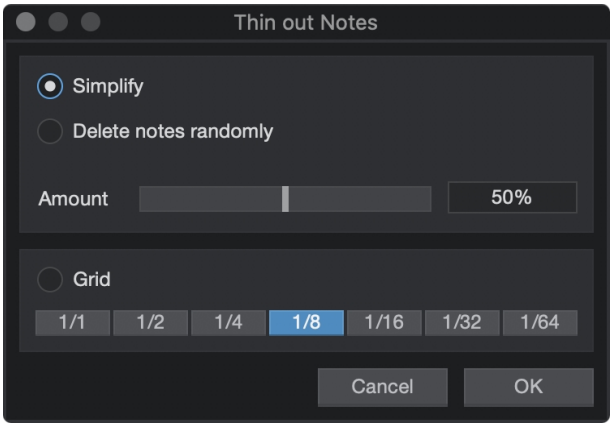
Randomize Notes

This powerful creative tool allows you to add some randomness to your music by applying a variable amount of pitch, velocity, or note length randomization, as well as any combination of those factors. You can use the original pitch range, define a custom pitch range, or constrain the results to use the original pitches only. You can also select a new Scale first and have the randomize apply that Scale to the results.

Thin out Notes

Sometimes it's the notes you *don't* play that make a song work.

This action is a great way to add some space to a busy track. It takes any selection of notes and deletes some of them according to the parameters you choose.



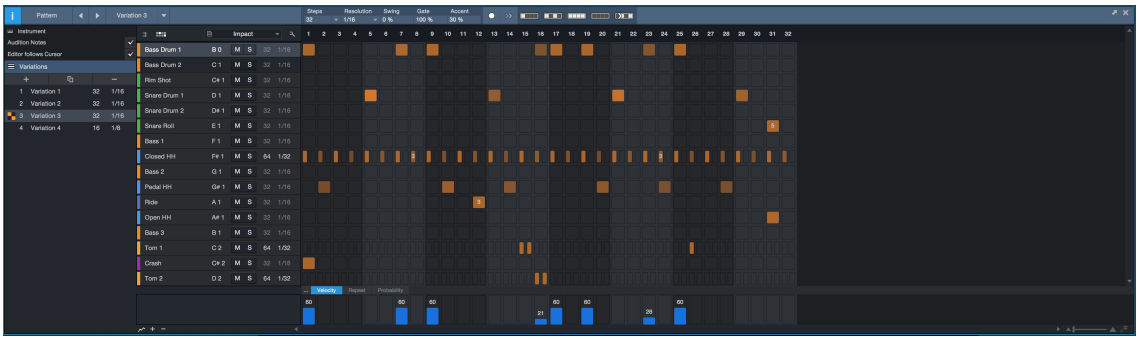
There are three methods:

- **Simplify** The selected percentage of notes is deleted, starting with notes that are less aligned to the grid. In other words, a note that is located a 64th-note before a grid line is very likely to be deleted. In contrast, a note located on the first beat of a measure is only deleted if all notes that are *not* on the first beat of a measure have already been deleted.
- **Randomly delete notes** The selected percentage of notes is removed, but all notes have the same probability of being deleted.
- **Grid** Removes all notes that do not start on a position within the selected grid.

Fill with Notes

This note action generates note events based on a set of variables to fill a range or Part. When Apply Scale is selected the results will always be musically meaningful. You can use this to fill the space between two selected notes, specify the length of the generated notes, and force the generator to use the pitches of existing notes only, among other features.

Patterns



Instrument Parts are just the thing for long, evolving passages, recordings of live playing, and other, more linear musical uses. DAW-style sequencing allows for a level of bar-by-bar flexibility that the step sequencers and drum machines of the past can hardly match. However, sometimes it can be helpful to return to those older workflows, as evidenced by the recent resurgence of hardware sequencers.

Pattern-based sequencing treats musical phrases as individual elements, to be switched and swapped at will, looped and finessed. Enabling this kind of freewheeling arrangement and musical state of play is the role of **Patterns**, a type of musical part you can create in Studio One.

Patterns have two modes of operation: One is designed for melodic and harmonic parts, showing available notes on a grid, corresponding to the related keyboard notes. The other is for drums and other percussive parts, and it offers automatic note/instrument naming when used with Impact XT, along with variable phrase lengths and note resolution for each note row.

You can enter notes into a pattern by hand with the pencil tool, or by using the Step Record mode, a note at a time with your MIDI controller of choice (including your QWERTY keyboard). There's also an option to convert an Instrument Part into a Pattern (and vice-versa), which makes pattern creation a breeze.

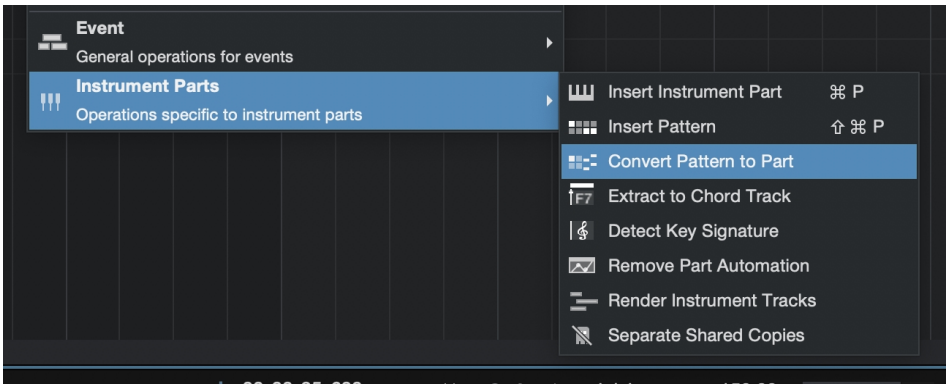
Patterns aren't just static blocks of note data, either. You can create endless variations which are stored within the Pattern. This lets you start with an idea and create iterations that you can easily switch between as you lay out your arrangement, bringing life to your sequences over time. Repeats and trigger probability can be applied per step, opening further avenues of expression.

Patterns can coexist on the same Instrument Track with standard Instrument Parts (even sitting right on top of them, if desired). This makes Patterns perfect for peppering your more traditional sequences with fills, turnarounds, and other flourishes.

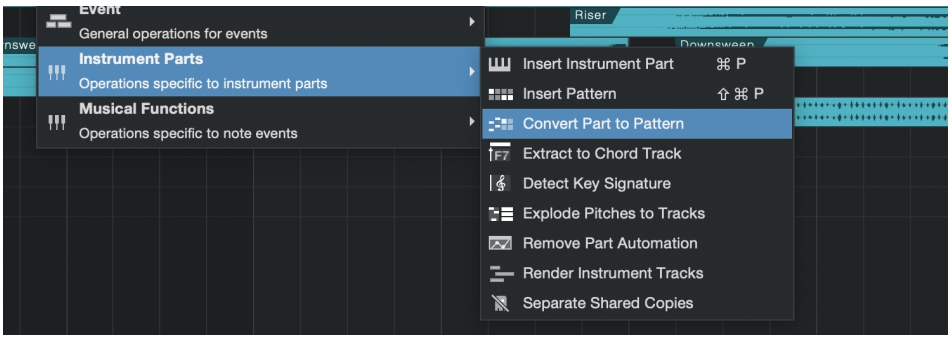
Creating Patterns

There are two ways to create a Pattern: Convert an existing Part into a Pattern, or create an empty Pattern and fill it.

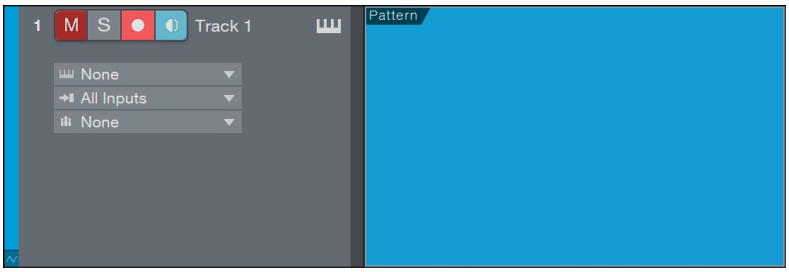
To convert an existing Part into a Pattern, [Right]/[Ctrl]-click on the desired Part and select Convert Part to Pattern from the Instrument Parts menu. This operation is also found in the Event menu. Studio One determines whether the Pattern should use Melodic Mode or Drum Mode based on the Instrument, and the Part becomes a Pattern at that spot in the timeline. The maximum Pattern length is 64 Steps, so anything beyond that is truncated during the conversion.



After editing the Pattern as described below, you can convert it back into a Part using the same method: [Right]/[Ctrl]-click the Pattern in the timeline and select Convert Pattern to Part, or select the operation from the Event menu.



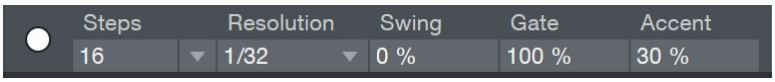
To create an empty Pattern, select an Instrument Track, and navigate to ***Event/Insert Pattern*** or press [Ctrl]/[Cmd]+[Shift]+[P] on the keyboard. An empty Pattern is created on the selected track.



To begin working with the new Pattern, click to select it. You can then view it in the Note Editor pane.

If you plan use this pattern to create melodic or harmonic content, select Melodic Mode by clicking the keyboard-shaped button shown above. For drums or other rhythmic parts, click the drumpad-shaped button.

Setting Pattern Length, Resolution, and Other Global Details



When you first create a Pattern its default state is 16 Steps in length, with 1/16th-note Resolution. This and other details can be easily changed using the parameters above the Pattern Editor window:

Steps Sets the length of the Pattern, in steps. Each step is as long as the note value specified in the Resolution selector. Click the triangle to open a menu of preset lengths. To enter a custom length, click the step number and type in the desired value between 2 and 64 Steps.

Resolution Sets the note value of each step in the Pattern. Defaults to 1/16th-notes, with a range between 1/2-notes and 1/64th-notes, with triplet ("T") and dotted ("D") variants of each.

Swing Sets the rhythmic relationship of each pair of steps. Defaults to 0%, with each note falling on even divisions. As you increase the percentage, the second step of each pair (2, 4, 6, and so on) is moved closer to the note to its right.

Gate Sets the length of each note. Defaults to 100%, with each note filling the entirety of its note value. As you decrease the value, each note becomes shorter and shorter. Values higher than 100% lengthen each note, with a maximum value of 200%. Note that changing the Gate value of a tied note only affects the duration of the final tied step. For example, a Gate value of 200% applied to two tied 16th-notes results in a 1/16th note tied to an 1/8th note. Conversely, for this example a Gate value of 50% results in a 1/16th note tied to a 1/32nd note.

Accent Sets the amount of emphasis placed on Accented notes. Defaults to 30%. As values increase, the effects of Accent increase.

Entering Notes

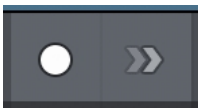
One easy way to begin fleshing out a pattern is to use the Pencil Tool. Click on a place in the grid to add a note. Click a note again to erase it. Hold [Shift] while erasing to erase notes on multiple lanes or pitches. You can also click and drag across a row to add multiple notes in Drum Mode or set the note length in melodic mode in one gesture. Hold [Ctrl]/[Cmd] to enter or toggle the accent.

Tied Notes and Chords

To enter a tied note, hold [Shift] and drag across two or more steps. Use this method to shorten a note, too: hold [Shift] and drag to the left across a long note until it occupies the desired number of steps. [Shift]-drag to the left inside the first step to reset a long note to a single step.

When several notes of the same length occupy the same step in Melodic Mode, they are a Chord. To make a Chord longer or shorter, hold [Ctrl]/[Cmd] + [Shift] and drag to the right or left across one of the notes.

Step Recording



Another way to add notes to a pattern is Step Recording. When you press the Step Record button, shown above on the left, you enter Step Recording mode. To choose where in the Pattern to begin entering notes, click the step number above the desired column in the grid. Play a note on a connected MIDI controller, and it is entered into the Pattern. You can play other notes while the first note is held to enter multiple notes on a single step. When you let go of the notes, the Pattern advances to the next step, and you can enter the next note or Chord.

Rests and Tied Notes / Chords

To insert a rest, click the double-arrow "Insert Rest" button to the right of the Step Record button. To enter a tied note or Chord, click the Insert Rest button before releasing the note(s).

When you're finished Step Recording, press the Step Record button again to go back to the standard mode.

Real-time Recording into a Pattern

At times you may prefer to enter a basic idea into a Pattern in real time, and then make precision edits to the notes and their durations using the features of Pattern mode. Studio One can do this, too.

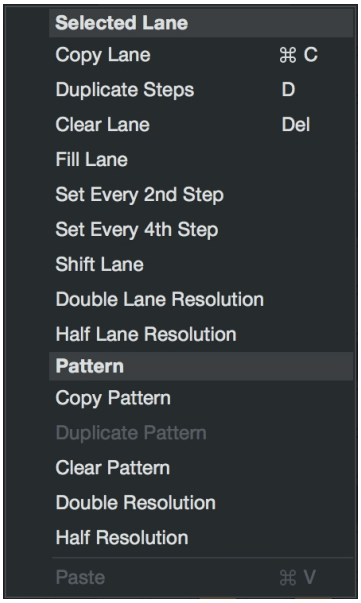
1. Create a pattern
2. Drag across the Ruler and set the loop boundaries to match the Pattern
3. Enable Loop mode
4. Press [F2] to open the Pattern Editor
5. Enable the Record / Step Record button inside the Pattern Editor window
6. Press Play (or use the space bar) to start the Transport
7. Play notes on your controller as the Pattern loops.

This method can also be used to record notes into a pattern variation in real time.

Switching Between Patterns on the Timeline

When editing a Pattern, if you'd like to edit another pattern that precedes or follows it on the timeline, click one of the Edit Previous Pattern / Edit Next Pattern buttons (pictured above) to switch between them.

Pattern Editing Operations



When you [Right]/[Ctrl]-click in the Pattern Editor a list of editing operations is shown in a pop-up menu. The size of the list is different for Melodic Mode and Drum Mode.

- **Melodic Mode**: These pattern-level operations are also available in Drum mode.
  - **Copy** Copies the entire contents of the current Pattern so that it can be pasted into another Pattern, or into another Variation within the same pattern.
  - **Paste** Applies the note data in the clipboard to the currently selected Pattern.
  - **Duplicate** Copies notes from the first half of a Pattern and pastes them onto the second half, but only if there are no notes there already. To visualize this, enter a note on step 1 of an empty Pattern and Duplicate (use [D] as a shortcut). Step 1 is duplicated to step 5. Add a note to step 7 and press [D] again: steps 1, 5, and 7 appear at steps 9, 13, and 15. This is an easy way to populate a pattern with repeating Chords or hi-hat notes, for example.
  - **Clear Pattern** Removes all notes from the Pattern.
  - **Double Resolution** Doubles the resolution of the Pattern. This increases the number of steps that exist in the space of a 1/4-note, resulting in a *decrease* in the note value of each step. For example, if the default resolution of 1/16 is doubled, the note value of each step becomes 1/32. Note that the Pattern now runs twice as fast relative to tempo. Studio One compensates by doubling the number of steps in the Pattern, up to the maximum of 64 steps.
  - **Half Resolution** Reduces the Pattern resolution by half. This decreases the number of steps that exist in the space of a 1/4-note, resulting in an *increase* in the note value of each step. For example, if the default resolution of 1/16 is cut in half, the note value of each step becomes 1/8. Note that the Pattern now runs half as fast relative to tempo. Studio One compensates by reducing the number of steps in the Pattern by half.
- **Drum Mode**: Listed below are the Selected Lane operations. The Pattern operations are the same ones listed above.
  - **Copy Lane**Copies the note information in the currently selected lane. To apply it to another lane, select the lane, then [Right]/[Ctrl]-click and choose Paste.
  - **Paste** Applies the note data in the clipboard to the currently selected lane.
  - **Duplicate Steps** Copies the contents of the selected lane and pastes them into place in the next available open space.
  - **Fill Lane** Adds notes to every available step in the currently selected lane.
  - **Set Every 2nd Step / 4th Step** Adds notes to every 2nd or 4th step in the currently selected lane, per the selected operation. This replaces any existing steps. Notes can be added or erased as needed. Use the Shift Lane feature to move the new steps to the offbeat if you like.
  - **Shift Lane** Shifts the notes of the currently selected lane to the right by one step. This is a great way to discover unexpected rhythms! Do this enough times and the notes re-appear on the left side. Note that tied notes only re-appear once the entire note value has shifted beyond the end of the Pattern.
  - **Clear Lane** Removes all notes from the selected lane. [Delete] or [Backspace] can also be used; just be sure you've selected the lane first.

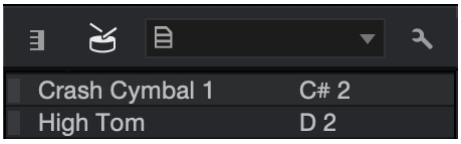
- **Double Lane Resolution** Doubles the resolution of the lane. This increases the number of steps that exist in the space of a 1/4-note, resulting in a *decrease* in the note value of each step. For example, if the default resolution of 1/16 is doubled, the note value of each step becomes 1/32. Note that a lane now runs twice as fast relative to the other lanes.
- **Half Lane Resolution** Reduces the lane resolution by half. This decreases the number of steps that exist in the space of a 1/4-note, resulting in an *increase* in the note value of each step. For example, if the default resolution of 1/16 is cut in half, the note value of each step becomes 1/8. Note that the lane now runs half as fast relative to the other lanes.

The tool bar above the Pattern Editor window has shortcut buttons for many of the Drum Mode operations previously described (Set Every 4th Step, Set Every 2nd Step, Fill Lane, Clear Lane, and Shift Lane). These add even more options to enhance your workflow. They look like this:

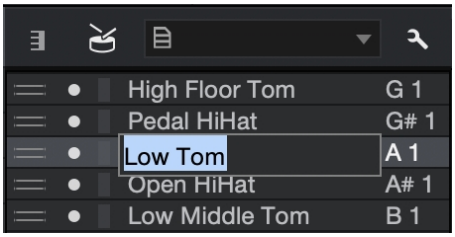
Drum Maps and Names

Drum Mode lets you build and store custom drum maps for later recall. You can name each drum, place them in any order you like, and hide any drums that aren't being used in the current Pattern. There's also a General MIDI drum map to use as a starting point, if you like.

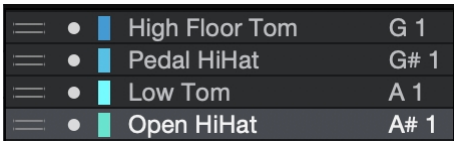
It all starts with pressing the wrench-shaped Edit button in the Drum Map selection window:



The drum list expands to reveal functions that can only be accessed here. Click a name field and you can name or rename any drum.



To the left of the name fields are three tiny areas that make a big difference:

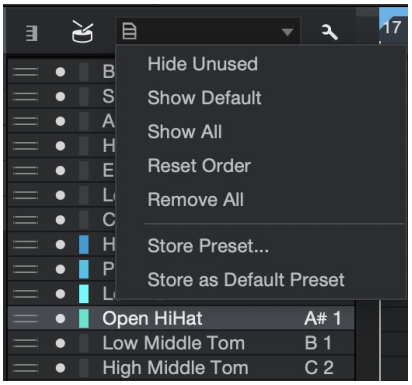


The gray parallel lines on the left are handles that allow you to click-drag the lanes into any order.

The dots to the right of the lane handles enable and disable the lanes. A disabled lane is hidden when you leave Edit mode.

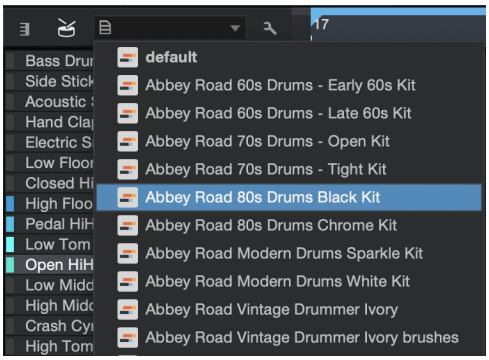
The vertical bars allow you to select a color for the selected lane.

Once the drums are arranged the way you want, you can save and name your new Drum Map. To do so, click the Pitch Names icon on the left side of the Drum Map selection window. Seven options are presented:

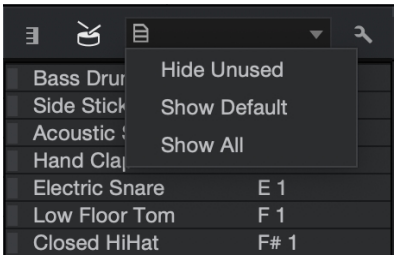


- **Hide Unused** If you only want to see the drums currently used by the Pattern, select this option.
- **Show Default** This selects the Drum Map you have stored as the Default Preset.
- **Show All** This option reveals the drums the pattern isn't using, as well as the entire MIDI Note range.
- **Reset Order** If you've reordered the lanes and want them to be placed according to their MIDI note number, select this option.
- **Remove All** This will reset the lane order, clear all name fields, disable every lane, and reset the color selections.
- **Store Preset...** Use this to save the current Drum Map for later recall. Give it a name, click OK, and it will appear in the Drum Map selection menu.
- **Store as Default Preset** If there's a Drum Map you like to use as a starting point for other Drum Maps, use this option to designate it as the Default Preset. This creates a duplicate of the current Drum Map, gives it the name "default", and places it at the top of the Drum Map selection menu.

The Drum Map selection menu is available both outside and inside Drum Map Edit mode. Simply click the name of the current Drum Map to see the list and select a new Drum Map, as shown below.



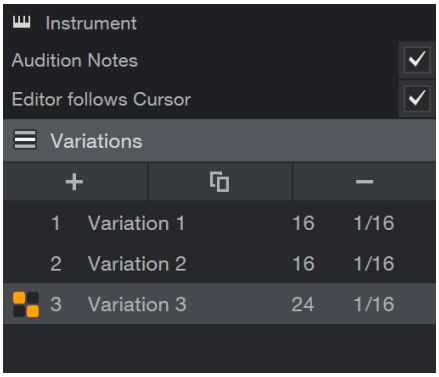
The Pitch Names icon shows a smaller list of options outside of Drum Map Edit mode. They're identical to the first three options that are shown inside Drum Map Edit mode: Hide Unused, Show Default, and Show All. Please refer to the earlier section to learn what they do.



Drum Mode Lane Options

In Drum Mode you have the option to mute or solo each note individually, using the [M] and [S] buttons on each lane. You can also set a separate Pattern length and note resolution for each lane. This allows for intricate polyrhythms and a greater sense of movement over time. To change the pattern length for a specific lane, click the current value and enter the value of your choice. To change note resolution, click the current value and choose a new value from the pop-up menu.

Pattern Inspector



If you open the Inspector while editing a Pattern, you see special options and commands that apply to working with Patterns:

Audition Notes Enabling this option causes the notes you enter into your Pattern to play through the connected instrument as you add them, making it easier to tell whether you're on the right note or instrument.

Editor Follows Cursor Enabling this option causes the Pattern Editor to show whatever pattern is currently being played on the current Track, as the transport travels along the timeline.

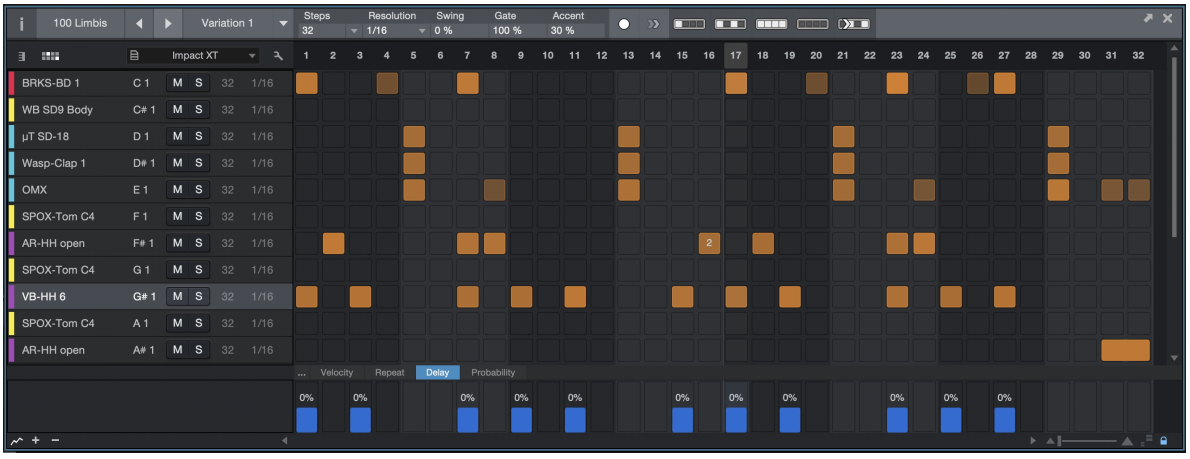
Variations

Each Pattern can hold an unlimited number of Variations. These can contain different note data, and have differing Step lengths and note resolutions. This lets you try a great many permutations of a Pattern without worrying about disrupting the others. To add an empty Variation to a pattern, press the plus-symbol button in the Pattern Inspector. To delete a Variation, select it and press the minus-symbol button in the Inspector. To rename a Variation, click its name and enter the name of your choice. Click-and-drag Variations to change their order.

At some point you may want to duplicate a Variation to preserve its current state while editing its clone. To do this, select the Variation to duplicate and press the Duplicate button (which looks like this:).

To substitute one of a Pattern's Variations for the version currently sitting on the timeline, select the Pattern and double-click a Variation in the Inspector, or click the drop-down menu next to the Variation name at the top of the Pattern Editor.

Velocity, Repeats, Delay, and Probability



The more rigid step-based nature of Patterns (as opposed to the more free-flowing note placement of Instrument Tracks) enables some useful creative features. The per-step automation of parameter values is one of them.

In the bottom-left corner of the Pattern Editor there's a small button that looks like a couple of jagged mountain peaks ( ). Click that to show / hide the Automation Lanes. Along the top of this Automation window are the Velocity, Repeat, Delay, and Probability buttons (and a mysterious button marked "...").

Velocity Click this button to allow setting of velocity for the notes in the selected lane (in Drum Mode) or for all notes on a given step (in Melodic Mode). Click and drag in the Velocity lane to set the value.

Repeat Clicking this button lets you specify the number of repeats to apply to each note in the selected lane (in Drum Mode) or to all notes on a given step (in Melodic Mode). All repeats on a note are spaced equidistantly within the span of the note resolution of the Pattern. So, for example, a value of 4 repeats on a note in a pattern with 1/16th-note resolution results in four 1/64th-notes being played.

Delay This is a great way to humanize a Pattern: Click the Delay button and select a value between +/- 50% for one or more Steps. Positive values make the Step happen later; negative values make it happen sooner. One caveat: it isn't possible to use a negative delay on the first step; notes before the start point of the Pattern will not play.

Probability Clicking this button lets you specify the percentage of probability that each note in the selected lane will play (in Drum Mode) or that all notes on a given step will play (in Melodic Mode). Lower settings cause notes to be canceled in greater numbers, creating interesting variations as the Pattern plays.

Step Automation

Pressing the "..." button lets you access any available automation parameter on a step-wise basis, in the same way you can specify note Velocity throughout a Pattern. In the pop-up window that appears, select the parameters you wish to edit from the column on the right, and press the [<< Add] button to add it to the available Step Automation parameters. If you wish to remove a parameter, select it in the left column, and click the [Remove >>] button.

The parameters you add to the Step Automation system appear as additional buttons alongside the Velocity, Repeat, Delay, and Probability buttons. Click a parameter to access its settings over the steps of the Pattern.

After selecting the desired automation parameter, note the blue columns along the bottom of the Automation Lane. Each of these represents a step that can be automated for the selected parameter. You can adjust the columns individually or drag the cursor across the row and edit many of them in a single gesture. Then select another automation parameter and repeat the process until the Pattern is exactly the way you want it.

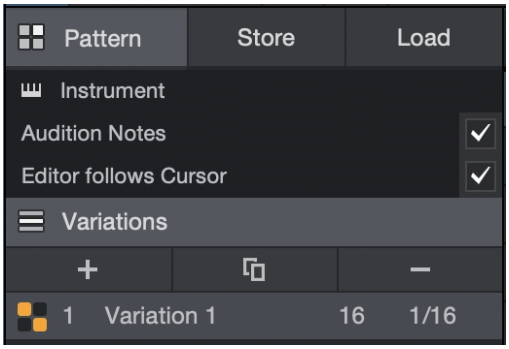
Adding Automation Lanes

To add additional lanes, to allow for more complex work with Step Automation, press the plus-symbol button to the left of the automation area. To collapse a lane, press the minus-symbol button.

Pattern Management

Patterns are automatically saved with the Song in which they are created. But if you'd like to use a Pattern and its Variations in other songs, there are two ways to do that.

Store / Load Patterns



Open the Pattern Inspector to reveal the Store Pattern Preset / Load Pattern Preset buttons. To store the Pattern, click the Store button. The window that opens lets you name the Pattern, describe it, and either select a Subfolder or create a new one by typing a name into that field.

To load a different Pattern into the current song, click the Load button. A drop-down menu reveals the folder names. Open a folder, select the desired Pattern, and it appears in the Pattern Editor window.

Drag to / from Browser

Open the Browser and drag-and-drop the Pattern from the Arrange view to the desired folder in the Browser window. Studio One stores Patterns on the Files tab, but you can drag the Pattern to the Loops tab if you like. Use the [Alt] key to specify whether to export it as a .pattern file or a .musicloop file. The difference is that a .musicloop file also recalls the instrument and its settings, not just the raw note data contained by a .pattern file. See Audio Loops and Music Loops to learn more.

Whichever format you choose, you can drag-and-drop these files into future songs and re-use them wherever they may be useful.

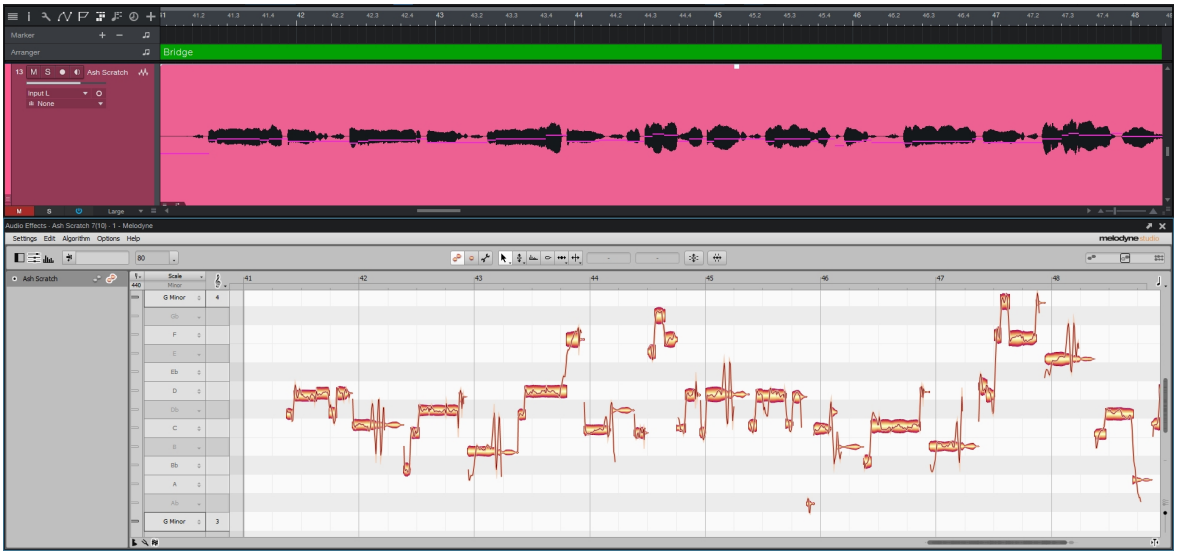
Pitch Correction with Melodyne Integration

Studio One features a unique pitch-correction solution: It tightly integrates with Celemony's Melodyne, a high-quality commercial pitch-correction software. This is accomplished with new co-developed technology and it is only possible with Studio One. Studio One Professional includes a fully licensed copy of Melodyne Essential 5, while Studio One Artist features the Melodyne Trial version. If you already own any version of Melodyne, update to version 1.3 or later for the integrated support to function in Studio One.

For deeper information on using Melodyne, please refer to the Melodyne documentation and to the helpful online materials, such as tutorial videos and FAQs, found at the **Celemony Help Center.**

Edit with Melodyne

Any Audio Event can be edited with Melodyne. To do so, select the Event and press [Ctrl]/[Cmd]+[M] on the keyboard, or [Right]/[Ctrl]-click on an Audio Event and select Edit With Melodyne from the contextual menu. Melodyne is inserted in the Event FX Device Rack for the Event, and the integrated Melodyne view opens, found in the same location as the Audio and Note Editors.



The audio in the Event is analyzed automatically, and the detected notes are displayed, ready for editing. Note that the Melodyne view can be maximized and detached in the same way as the Audio and Note Editors.

When the Melodyne Event Effect is active (meaning the Event FX have not been rendered), double-clicking on the Audio Event opens the Melodyne view. To switch to the Audio Editor, press [F2] on the keyboard, or click on the [Edit] button.

Detection Algorithms

Melodyne offers a selection of detection algorithms to choose from. These let you optimize the detection process to suit the material you're working with. Melodic mode is best for monophonic melody lines (such as vocals). Percussive mode is best for non-pitched, percussive signals.

Melodyne Essential 5, bundled with Studio One Professional, also offers Universal mode, which lets you perform pitch and rhythm manipulations on polyphonic material (such as guitar or keyboard parts, or whole mixed songs).

You can choose detection modes in the Algorithm menu within the Melodyne editing window.

For more information on the detection algorithms in Melodyne, visit the **Celemony Help Center**.

Real Time and Render

As with other Event FX, Melodyne runs in real time by default. This allows immediate auditioning of the material being edited alongside the rest of the mix. However, it is probably best to render the edits once you are finished in order to reclaim CPU resources. To do so, click on the [Render] button for the Event FX Insert Device Rack in the Event Inspector for the Audio Event.

As with other Event FX, the state prior to rendering is stored, allowing you to return for further editing. Melodyne can also be removed entirely from the Audio Event by removing it from the Event FX Insert Device Rack for the Event, in which case all edits are lost.

Applying Detected Tempo to the Tempo Track

Melodyne extracts tempo information from the audio you feed it, creating a deatiled "map" of tempo changes over time. The tempo map can be applied to the Tempo Track in Studio One. By doing this, parts you add in the future can tightly follow this new, fluid tempo, and the

editing tools can easily snap to logical rhythmic subdivisions, even as the tempo changes.

To make a tempo map with Melodyne and apply it to the Tempo Track, do the following:

1. Set the Arrange view timebase to "Bars."
2. Ensure that the Inspector panel is visible. To show it, click the "I" button, to the left of the timeline.
3. Select an audio Event that contains tempo information you wish to detect.
4. In the Inspector, set Timestretch to "Don't Follow" mode.
5. Trim the beginning of the Event so that it coincides with the first downbeat in the audio.
6. Move the Event so that its beginning sits at the first beat of a bar.
7. Enable Melodyne by navigating to *Audio/Edit with Melodyne*, or by [Right]/[Ctrl]-clicking the event and choosing *Audio/Edit with Melodyne* from the pop-up menu. You can also do this by pressing [Ctrl]/[Cmd]+[M] on your keyboard.
8. In the Melodyne sub-window that appears, do the following:
    a. Open the Algorithm menu and choose Universal (or one of the Polyphonic modes, if you have purchased and installed Melodyne Editor or Studio)
    b. Click the "Note Assignment Mode" button, and click the "Tempo Options" button to show the tempo map.
    c. Verify that the detected time signature and tempo seem accurate (and edit them, if necessary).
    d. Click and drag the first beat marker in the tempo map (marked "1") to align it with the first downbeat of your audio.
    e. Click the "Edit Mode" button to close the tempo map. This embeds the detected tempo information in your audio Event.
9. In the Arrange view in Studio One, drag your Event into the Tempo Track to apply the detected tempo to your Song.

For more information on the tempo features in Melodyne, visit the **Celemony Help Center**.

Drag Audio to Instrument Track

When an Audio Event is edited with Melodyne, the notes resulting from analysis appear on the waveform, as with Music Loops. In this state, it is possible to drag the Audio Event to an Instrument Track lane in the Arrangement to extract the notes, resulting in an Instrument Part that perfectly matches the audio performance. The notes and velocity for the Instrument Part are derived from the Melodyne analysis and editing.

This makes it possible, for instance, to sing a melody and then drag it to an Instrument Track for a virtual instrument to play, rather than trying to figure out how to play it on a keyboard controller. You might also wish to replace or enhance an acoustic instrument performance with a virtual instrument. These techniques and many more are now possible with a single drag-and-drop.

Undo History

The Undo History menu, accessed under *Edit/History*, enables you to view and step through virtually every editing or mixing function that has occurred since a document was opened. Simply click on any edit in the list to instantly roll the document back to the point where that edit was made.

Note that the history is cleared when a document is closed but remains intact when the document is saved and kept open.

Navigating with Zoom

When editing or arranging in a Song, zooming in and out on the timeline can be beneficial in both the Edit and Arrange views. Studio One's key commands and quick control methods make zooming quick and easy.You can zoom using the following techniques:

Zoom Horizontally

- **Zoom In or Out** Click and drag vertically in the Arrange or Edit view timeline.
- **Zoom In or Out** Position cursor in Arrange or Edit timeline and move mouse scrollwheel.
- **Zoom In** Press [E] on the keyboard.
- **Zoom Out** Press [W].

Zoom Vertically

- **Zoom In** (vertically) Press [Shift]+[E].
- **Zoom Out** (vertically) Press [Shift]+[W].
- **Zoom In or Out** [Ctrl] + mouse scrollwheel.

Other Zoom Commands

- **Zoom to Loop** Press [Shift]+[L].
- **Zoom to Selection Toggle (horizontally and vertically)** Press [Shift]+[S].
- **Zoom to Selection Toggle (horizontally)** Press [Alt]+[S].
- **Zoom by Selecting** Hold [Alt]+[Shift], then draw a selection across the Arrange view to zoom in fully to that range. To return to normal zoom level, hold [Alt]+[Shift] and click in the zoomed area.
- **Zoom Full** Press [Alt]+[Z] to zoom out horizontally, as much as possible.

It is also possible to set key commands to directly access the Track Heights available on the Arrange page in the Keyboard Shortcuts menu.

Zoom History

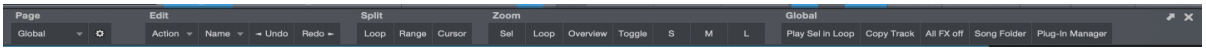
The most recent horizontal and vertical zoom states in an arrangement or editor are remembered in the Zoom History. You can go back to the previous state using Undo Zoom [Alt]+[W] and can move forward with Redo Zoom [Alt]+[E].

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 in memory is restored. Pressing [Z] again takes you back to the original state.

The Store Zoom State command [Shift]+[Z] only stores the current state and does 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].

Macro Toolbar



The Macro Toolbar is a special control panel that lets you customize your workflow in powerful ways, giving you easy access to often-used functions and custom command combinations. You can add and change command groups and buttons freely to fit your needs.

Macros are grouped into Pages of related commands. To view the available Pages, click the menu arrow next to the name of the current Page on the left side of the Macro toolbar. Then make a selection from the menu.

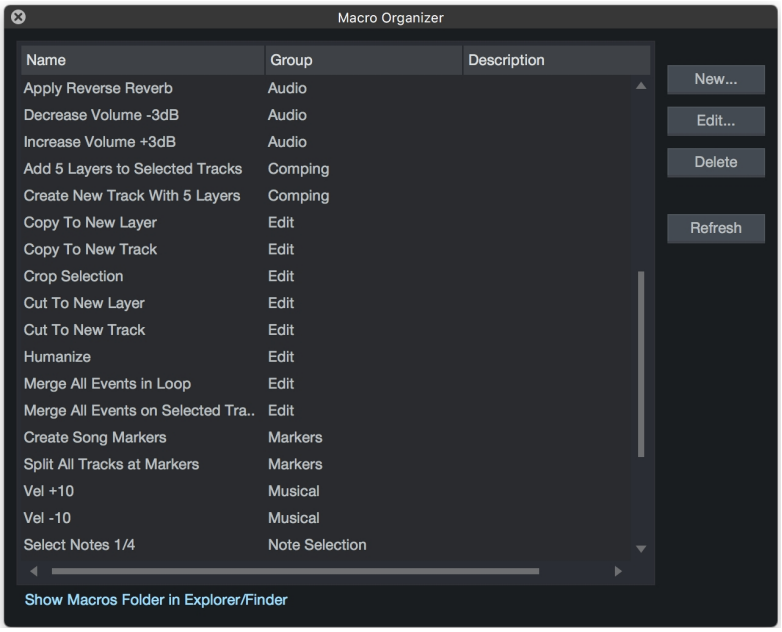
You can create Macros, which string together multiple commands to form a single action. For instance, you might want a quick way to select multiple events across multiple tracks within the loop range and merge them to form single continuous events. This would normally involve a number of separate actions, either with the mouse or keyboard, but creating a Macro for this reduces the process to a single action.

Independent Macro Toolbars are available for the Arrangement, Note Editor, and Audio Editor views. You can show or hide the Macro Toolbar for any of the views by clicking the appropriate Macros button or by navigating to *View/Additional Views/Macros*.

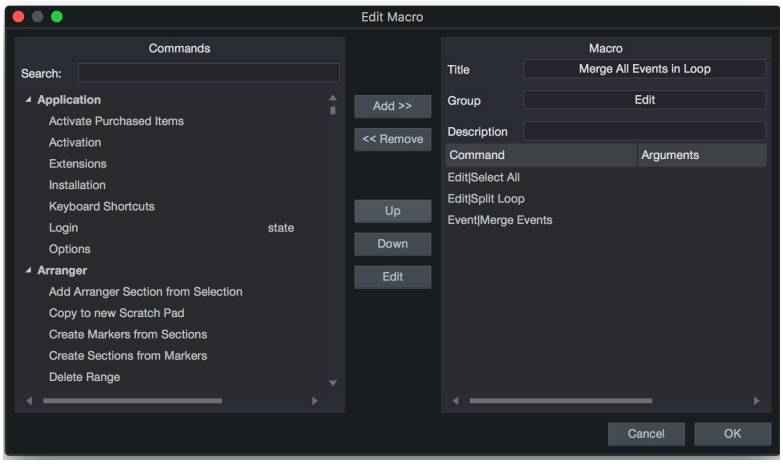
Overview

When you open a Song in Studio One, the Macro Toolbar button is shown next to the Audio Bend, Strip Silence, and Quantize panel buttons in the top toolbar. Click this button to expand the Macro Toolbar panel, which is docked to the top panel by default. However, it can be detached like the other panels by clicking on the detach button to the far right of the panel. When detached, [Right]/[Control]+click in the panel to adjust for vertical or horizontal orientation.

Several items are in the Toolbar by default for demonstration purposes. Note that any button can be moved or removed, as well as any entire group of buttons. This toolbar is completely customizable. To see how Macros are put together, click the gear icon next to the Page name and select Macro Organizer. You can also navigate to *Studio One/Macro Organizer*.



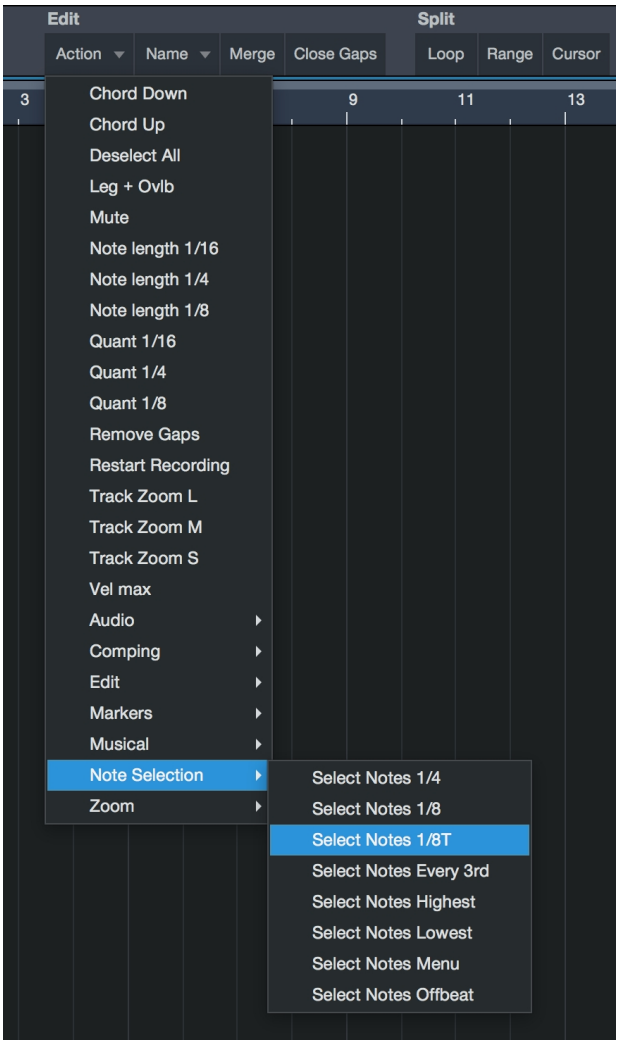
Select Merge All Events in Loop from the list and then click the Edit button.



This is the Edit Macro window where you can create and modify your Macros. On the left is the Commands list, which lists all available commands in Studio One. On the right are the Macro Title, Group, and list of commands that the Macro performs when triggered. Commands are executed in the order in which they are listed here. So, this Macro selects all events, splits them at the left and right locator locations, then merges the events that are still selected (those within the loop range, in this case).

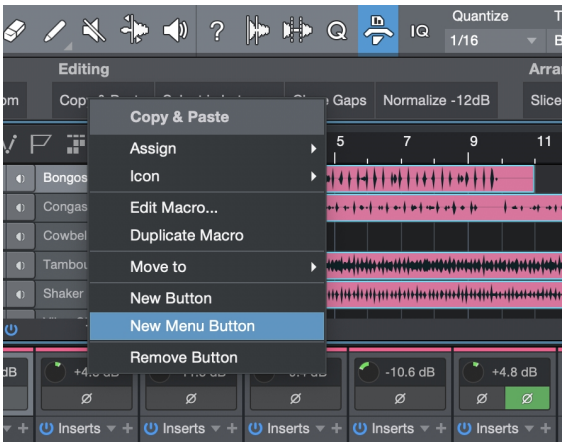
Close the Edit Macro and Macro Organizer windows and look again at the Macro Toolbar. Click on the Action button in the Edit group, and a list of all of your Macros is displayed, categorized by the Groups you entered in the Group field for each Macro in the Edit Macro window. Clicking on any item in this list performs the associated Macro.

Click on the Name button in the Edit group to rename any selected events. The list of predefined names can be customized by clicking on *Edit Names* in the Edit group to open the file 'EventNames.txt', which uses a simple syntax to build the menu hierarchy.



Customize the Toolbar

It is possible to add new Groups and Buttons to the Toolbar, as well as remove or modify any existing item. [Right]/[Option] + click on the Edit group in the Toolbar, and a contextual menu is displayed.



Double-click on the name to rename the Group. The Compact toggle makes the interface use as little horizontal space as possible when engaged. Click on Remove Group to completely remove the Group and all Buttons it contains. Click on New Group, New Menu Button, or New Button to create one of those items. Groups are named Group by default, and are renamed in the [Right]/[Option]+click contextual menu by double-clicking on the name. New Buttons are blank but can be named and edited, which is described below.

Modify a Macro Button

[Right]/Option]+click on a Button and choose one of your Macros from the top level list, or navigate to Assign/Assign Command to select a Key Command to associate with the button. You can associate any Macro or command to a button, or create a new Macro from this menu.

Buttons can also make use of custom icons. [Right]/Option]+click on a Button and click *Icon/Select Image*, then choose any 22x22 pixel PNG image file to use a custom icon.

Rearrange Buttons and Groups

Buttons and groups of buttons can be placed in any order on the Toolbar. Hold [Ctrl]/[Cmd] and click-drag a Button to the desired location, even into another Group. To move an entire Group, hold [Ctrl]/[Cmd] and click-drag on the Group name to move it to the new location.

Macro Menu Buttons

These buttons help you to collect and organize your Macros. They can hold many Macros and Submenus of their own, which the menu arrows reveal. To give the Macro Menu button a name, [Right]/Option]+click the button and select *Edit Menu*. Then double-click the grey bar at the top to enter a name.

To add items to the Menu button, [Right]/Option]+click the darker area under the name. This presents three choices:

- **New Menu Item** This one adds an empty Menu Item. [Right]/Option]+click the new item and use it like a Macro button: Assign a Command, an existing Macro, or create a new Macro.
- **New Submenu** This creates another menu inside the Menu button. It can do everything a higher-level Menu can do.
- **New Separator** This adds a line that can be clicked and dragged anywhere inside the Menu, which can help you find specific items more easily.

Items inside a Macro Menu can be reordered: just click-drag the items until they are in the desired order.

Make a New Macro

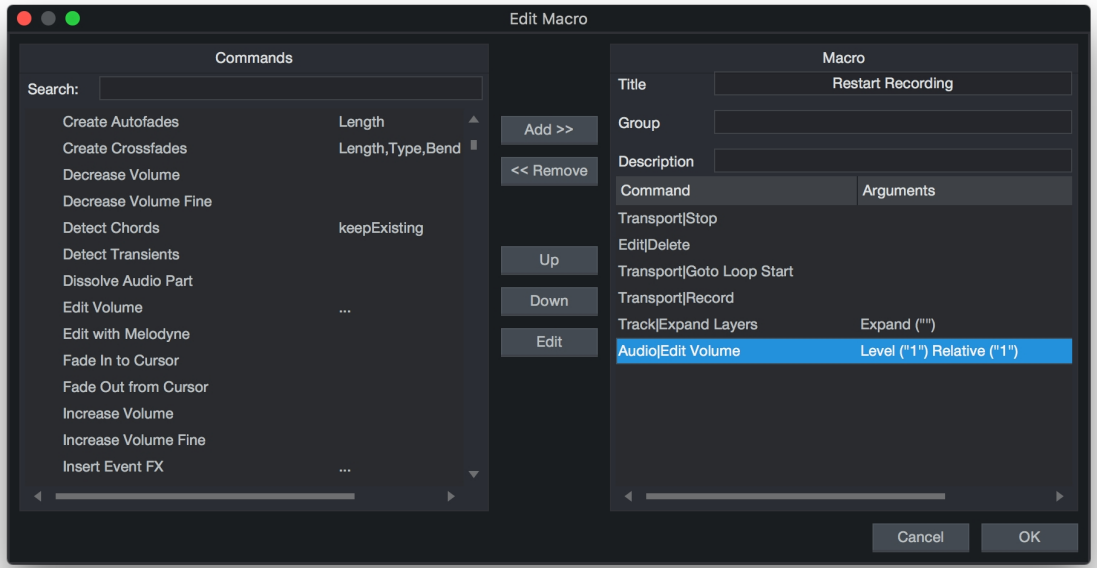
There are two ways to make your own Macro; the first was described above. The second way is to open the Macro Organizer window by selecting it from the gear menu next to the Page name in the Macro Toolbar, or by navigating to *Studio One/Macro Organizer* Click on New to open the Edit Macro window. Give your Macro a Title, which is how it appears in any menu, as well as a Group Name, which determines how it is organized in the previously mentioned Action list of the Macro Toolbar.

Next, navigate the list on the left to find the first command for your Macro, select it, and then click on Add to add the command to the list on the right. Repeat this until each command you need is in the list. Note that the commands are performed in the order they are listed, so be sure the order is set up to achieve the desired result. Select any item in the list and click on Up or Down to move the item in the list.

Arguments

Note that some commands have Arguments associated with them, such as Track|Expand Layers. Commands with Arguments show an Argument descriptor next to the command in the command list. Arguments provide a specific behavior for commands where multiple behaviors are possible.

With the Track|Expand Layers command, the Argument 'Expand' should be set to 0 or 1. Setting the Argument to 0 disengages the Expand Layers option, whereas setting it to 1 engages the option.



Some commands can have multiple arguments. For instance, Edit Volume has 'Level' and 'Relative' as separate arguments, where 'Level' is a dB value and 'Relative' can be "0" or "1" to either set the event volume to the absolute dB value or to add/subtract it from the current level.

Edit a Macro

If a Macro needs to be modified, [Right]/[Ctrl]-click on its button in the Macro Toolbar and select Edit Macro from the menu. This will open the Edit Macro window as described above. Note that some Macro buttons are built-in commands that cannot be altered, so the Edit Macro window is not available for them.

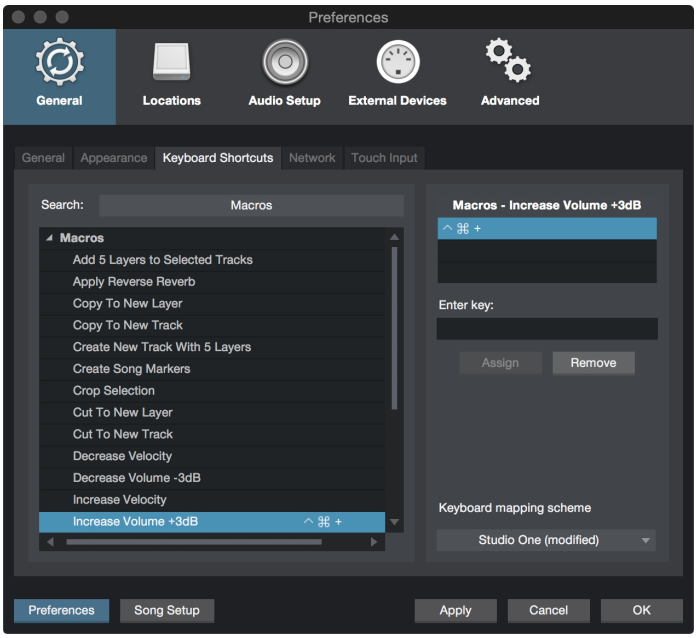
Duplicate a Macro

There's a quick way to duplicate a Macro. This can be useful if you want to keep an existing Macro the way it is, but also need another that has a few modifications.

To do this, [Right]/[Ctrl]-click on the button and select Duplicate Macro from the menu. A new Macro button will appear next to the first one, ready to be edited and named. Note that the Macro buttons for built-in commands do not offer the Duplicate Macro menu option.

Make a Key Command for your Macro

Key commands can be associated with your Macros just like any command in Studio One. Open the *Studio One/Keyboard Shortcuts* window (OSX: *File/Keyboard Shortcuts*), and type {macros" in the search field to quickly show the Macros section. Select any Macro from the list and assign a key command by typing into the Enter Key field and clicking on Assign.



Map Macros to your MIDI Hardware

As with any command in Studio One, Macros can be mapped to your MIDI hardware. To do this, open the device map for the hardware you want to map macros by double-clicking on the device in the External panel of the Console. While any control you have learned for the device can be mapped, buttons are the most logical choice. [Right]/[Option]+click on any button in the map and choose Assign Command.

Type macros in the search field to quickly find your Macros, select the one you want, and click on OK. Note that even control surfaces that are not natively supported can have commands assigned, so long as the desired controls transmit MIDI CC values.

Macro Storage

Your individual Macro commands are stored in a single location, reached via the [Show Macros Folder in Explorer/Finder] button at the bottom of the Macro Organizer window. Each Macro is a unique file in XML format, and it is possible to edit the XML directly if desired. These files are also portable, so you can share them with other users via the **PreSonus Exchange**.

Editing Suggestions

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.

Listen While Editing

Listening to your edits as you make them saves 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 [Shift]+[P] on the keyboard to set the Left and Right Locators precisely 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.

You can also use the Listen tool to quickly solo and listen to any element in the arrangement.

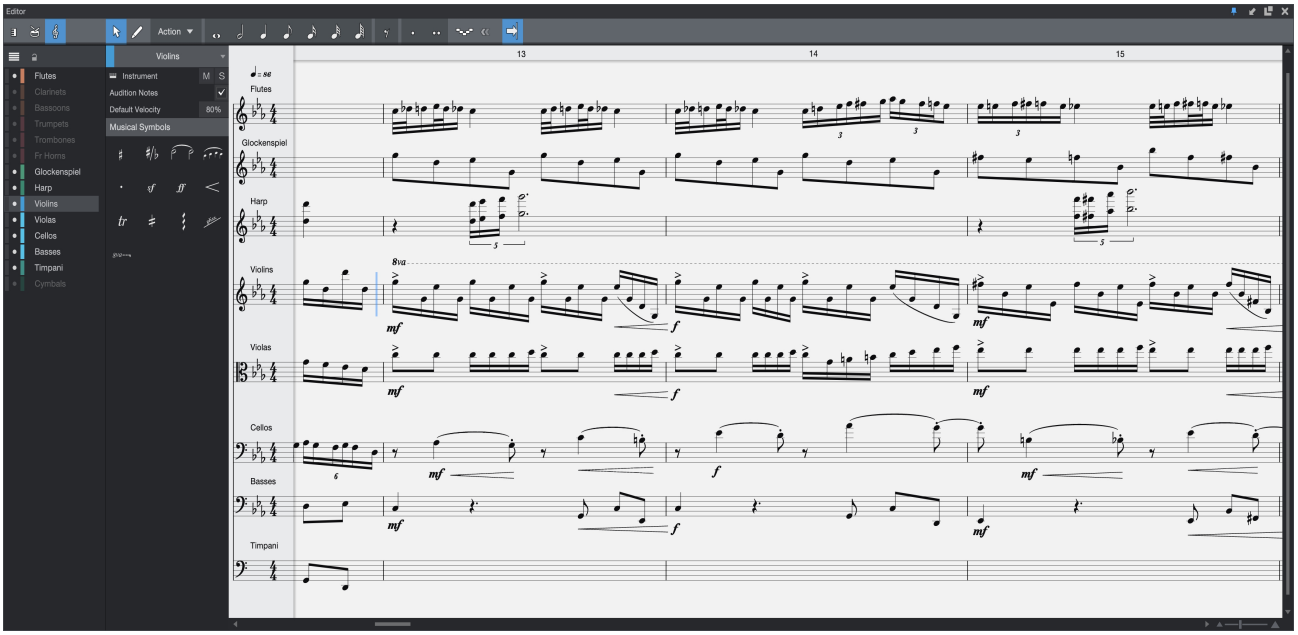
Eliminating Audible Artifacts

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, inevitably, there can 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.

The Score Editor

Studio One Professional provides the ability to view, enter, and edit notes in standard music notation through its Score Editor. A Score can display any number of Tracks simultaneously. Notes can be added to the Score and edited in many ways, including the ability to add musical symbols for articulation and dynamics.

The View buttons on the left side of the Note Editor toolbar let you transition seamlessly between three approaches of capturing and refining your creativity. Follow these links for descriptions of **Piano view** and **Drum view**. In this chapter we will focus on the Score view.



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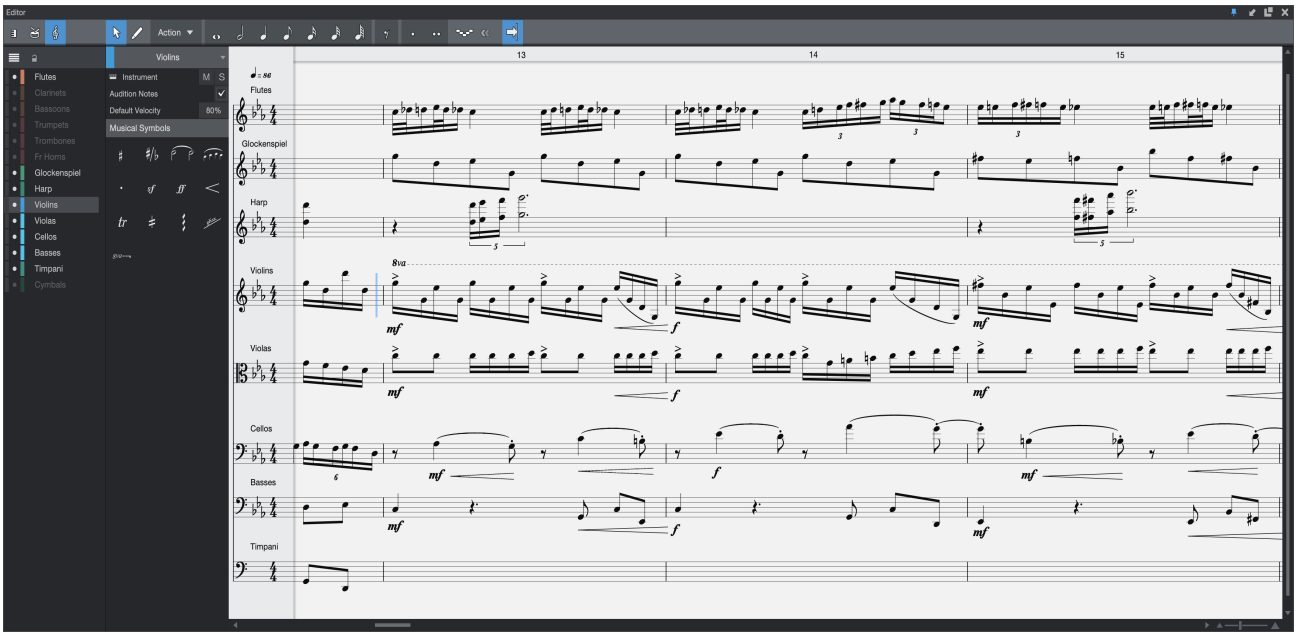


Overview

Click the "treble clef" Score View button to access the Score Editor. In this view notes can be entered on a musical line (or "staff") using a mouse and a computer keyboard, or entered in real-time or step recording modes using an external controller. Musical symbols for articulation and dynamics can be added, and these symbols also enhance the playback of the associated Track.

The Score automatically scrolls during playback, and while editing it jumps instantly to any place you click on the timeline. The window can be detached, so you can look at it side-by-side with the same note data in Piano view or Drum view.

Grand staff for keyboard instruments is included, which shows two staves for a single instrument. This allows notes to be allocated between the left and right hands, and you can move pitches between the staves once they have been entered. Note pitches are shown with the enharmonic 'spelling' that conforms to the key signature of the Song (for example, in the key of C minor an Eb is shown, rather than a D#). Proper formatting is automatic for note spacing, beaming, stem length and direction, ledger lines, etc. Manual formatting options include trills, 8va/8vb lines, clefs for various instruments, and more.

How the Views Interact

When note pitch or duration are changed manually in Piano, Drum, or Score view they also change in the others. However, musical symbols added to the Score affect playback but don't affect how notes are displayed in Piano and Drum views (with the exception of adding a sharp or flat sign to a note, which changes its pitch).

The Key Signature and Score View

The key signature of the Song determines how the pitches are displayed on the staff in terms of their enharmonic spelling (e.g., whether a pitch is shown as an Ab or G#). The key signature also dictates what you will hear when you drag notes up and down diatonically, either with the mouse or the up and down arrow keys.

When working in the key of C major, for example, if you want to add an E-flat to the score, place the note on the E and then select the flat sign (*b*) from the Accidentals menu in the Musical Symbols panel.

To set the key signature for the Song, click the [Key] button in the Transport and select the key of your choice from the pop-up selector that appears.

Time Signatures

The **time signature of the Song** is automatically part of the Score. Note that **time signature changes** must be made in the Arrange view timeline, and appear instantly in the Score.

Familiar Actions in Score View

The Score Editor has some of the same recording and editing functions as the Piano and Drum views, with a few changes as noted in this section.

Three Ways to Enter Notes

As in the Piano and Drum views, you can use three different methods to enter notes in Score view:

- **Real time** Notes can be entered in real time using a keyboard controller; just click the Record button in the transport and start playing.
- **Step time** Entering notes in step-time with a keyboard controller is also possible; just click the Step Record button in the Score view toolbar and play the keys. Note values and rests can be selected using the computer keyboard as described **here**.
- **Manually** Notes can be entered one at a time **using the Paint tool**, which is also used to enter **articulations and dynamic markings**.

Using the Tools

The **Arrow tool** is used the same way as in the Piano and Drum views: to select notes, to place the cursor at a specific location, etc. Selected notes are displayed in orange.

The **Paint tool** is used to add notes to a staff. Notes are added according to the global key signature, not the Track Scale. Line Drawing mode is not available.

Remember that you can select the Arrow tool with the [1] key and the Paint tool with the [2] key. This allows you to switch between them very quickly.

The Cursor

When you click inside the Score with the Arrow tool, a vertical blue line appears on one staff at that location. During playback, the blue line becomes a bar that moves across the entire Score. This is the playback cursor. When playback stops, the blue line returns to the selected staff and indicates the current position.

Zoom

In Score view the Time Zoom control zooms both vertically and horizontally. You can also zoom by holding [Ctrl]/[Cmd] and using the scroll wheel.

Score Editor Toolbar

The Score Editor toolbar makes the creation of a Score fast and intuitive. Using the number keys to select tools and note values, and a mouse to place notes and symbols, a full Score can be produced very quickly. A keyboard controller is not required, although the process is even faster with one.

Using the Arrow Tool

Use the Arrow tool to select locations and items inside the Score, including notes, rests, dynamic markings, and articulations. Click an item inside a staff to select it, and it turns orange. To select multiple items, click a blank spot in any measure and drag across the items you want to select. Hold [Shift] and then click or drag to select items from multiple staves.

The cursor can be placed in front of any note or rest in a measure. Clicking inside an empty measure places the cursor at the beginning of the bar.

Selected notes can be edited using various commands, or you can cut/copy/paste/delete them using standard computer key combinations. Many options are available in the [Right]/[Ctrl]-click contextual menus.

Shifting Notes

To change the pitch of a note using the Arrow tool, click the note and drag it up or down. To change the pitch of a chord or a series of notes after selecting them, use the following keys:

- **Up/Down arrow** shifts the notes within the key signature if one has been selected, or diatonically within the key of C if a key has not been defined for the Song.
- **[Ctrl]/[Cmd] + Up/Down arrow** shifts the notes chromatically.
- **[Shift] + Up/Down arrow** shifts the notes by octaves.

Using the Paint Tool

Select the Paint tool with the [2] key. You are now able to add notes to the score with the cursor. We'll walk through the basics in this section; follow this link to learn the **quick entry method**.

Select the desired note value from the toolbar, and then hover the cursor over the score. The cursor has become a pencil, with a gray note of the selected value linked to it. The gray note changes its pitch as it is moved up and down the staff.

Click the staff at the desired location to place a note there. The note turns black to indicate that it has been added to the staff. You can make a chord by placing more notes on different pitches at that location, or move the cursor to another location in the Score and place some notes there.

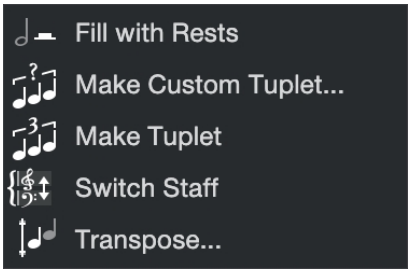
If you want to place a rest in the Score instead, select the note value first and the equivalent rest value appears in the toolbar to the right of the 64th note.

Remember, there's **a faster way** to do all of this. But here are two things you might want to know now.

- A red note or rest means you've put too many items that bar. Try a shorter note value or place the extra item in the next bar.
- It isn't necessary to fill a measure with notes or rests right away. Just put the notes in the right bars first, if you like. Rests can be added easily using the Fill with Rests feature, which is described next in the Action menu section.

For more details on using the Paint tool, see the **Editing the Score section**.

The Action Menu



Note: Many of the following items are also available in one or more of the contextual menus. [Right]/[Ctrl]-click a selected note for one menu; [Right]/[Ctrl]-click a group of selected notes for a different menu. Still another menu appears when you [Right]/[Ctrl]-click inside the Score without any notes selected. See **Contextual Menus** in the **Editing the Score** section for full details.

- **Fill with Rests** This option places the appropriate rests in any empty sections of the selected measures, including whole-measure rests, up to the limit set by the time signature. To use it, click-and-drag across the desired areas of the Score and then select this option from the Action menu. You can also use [Ctrl]/[Cmd]+[A] to select all measures in the current staff, or use the contextual menu option **Select All on Tracks** to select the entire Score, and then select Fill with Rests from the Action menu. If no selection is made, then all measures are filled with rests from the beginning up to the current caret position.
- **Tuplets** are notes whose division differs from the normally permitted subdivisions of the current time signature (for example, a triplet in 2/4 time). They can be made from groups of notes inside a single measure of a single staff. They are not available across bar lines, or if notes from different staves are selected.
  - **Make Custom Tuplet...** This option allows you to make more unusual tuplets in addition to the standard tuplets such as triplets, etc. You also have greater control over the notation used to represent the tuplet.
    - **Fit X Into Y** Group the number of selected notes (X) into the space of the specified denominator (Y).
    - **Brackets** A bracket is often placed around tuplet as a visual aid. If deactivated, the brackets are hidden and only the number is shown above the grouped notes. The rhythm of the notes is the same, with or without the brackets.
    - **Show as ratio** If you want to display a tuplet as a ratio instead of a single number, engage this option. The tuplet will be displayed as 4:3, 6:4, 5:8, etc.
  - **Make Tuplet** Use this option when the grouping of notes is fairly standard (triplets, quintuplets, etc.). If you want to specify the notation as a ratio, etc., use the Make Custom Tuplet option.
- **Switch Staff** This action is only available when the Grand staff is used. It allows you to switch a note from the upper staff to the lower staff, or vice versa.
- **Transpose** Use this to transpose the selected notes up or down after you specify the Interval, Interval quality, and Octave range of the transposition. These options are similar to those described in the **Transposing Notes** section. They can force notes or chords to conform to the key (Diatonic), allow them to maintain the same interval relationships, or follow a number of other permutations, all while transposing up or down in specified intervals by as much as three octaves.

Note value Seven options from whole note through 64th note. These also can be select with the number keys on the keyboard, as described here. For triplets, etc., use the Tuplet options in the Action menu or the contextual menus.

Rest The note value for rest symbol is always the counterpart of the selected note value. These also can also be selected with the number keys on the keyboard; they follow the same keys as the note values. Simply toggle between the note or rest by pressing the key repeatedly.

Augmentation Dots A single dot lengthens the note value by half (i.e., a dotted eighth note equals three sixteenth notes). A double dot lengthens the note by three-quarters of its original value (i.e, a double-dotted quarter note equals three eighth notes plus a sixteenth note).

Step Record Activate this button to enter notes from an external controller in step time.

Move backwards/undo This can be used during step-recording to undo multiple entries without having to move your hand to the computer keyboard and type [Ctrl]/[Cmd]+[Z].

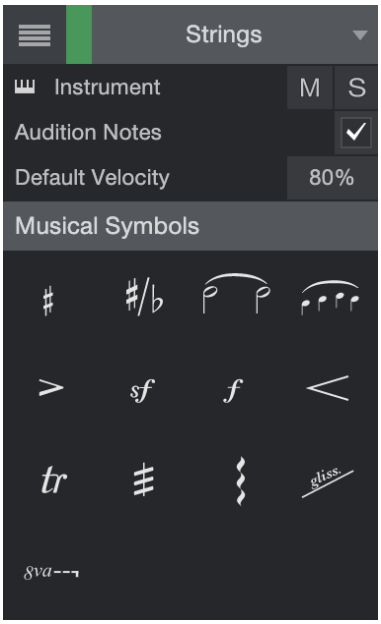
Autoscroll When this is button is engaged the Score view window follows the timeline position during playback. Disengage this button to freeze the Score view window at its current location.

Detach This button allows you to detach the Score view window and place it in another area of the screen, or even move it to a different monitor. You can then select a different Editor view in the main display window if you like.

- **Pin** When the Score window has been detached and placed at the desired location, click the Pin icon to lock its status and position. This will keep it from closing when [F2] is used to toggle the Editor window status.

Close Click the X to close the Score Editor window. This can also be done with the [F2] key.

Note Editor Inspector (Score View)

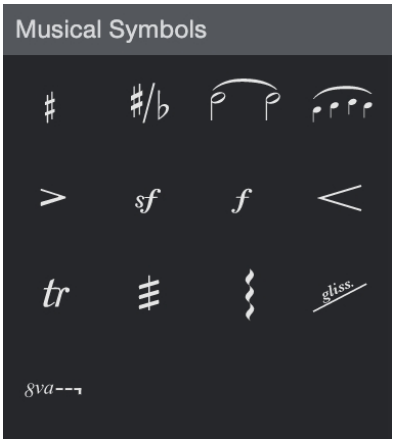


The Note Editor Inspector on the left side of the window offers some unique features in Score view. It is divided into two areas, with Track settings in the top half and the Musical Symbols panel in the lower half.

The following settings are located at the top of the Note Editor Inspector.

- **Track List** Click this button to open a list of all of the Instrument Tracks in the song. You can show or hide the staves of each Track in the Score using the Show/Hide buttons to the left of the Track name. It is possible to click-and-drag through many buttons and add their Tracks to the Score view very quickly.
- **Track Selector** To view only one staff and close the others, click the Track name at the top of the Note Editor Inspector and select the desired Track.
- **Instrument** Click the keyboard icon to open the Instrument Editor for the selected Track.
- **Mute/Solo** These buttons affect the Console Channel and the Track.
- **Audition Notes** Engage this option to hear notes when they are selected with the mouse. To hear a chord, click anywhere on the stem of the chord.
- **Default Velocity** This is the value used when adding notes to the Score with the Paint tool. Dynamic markings that you add affect the playback velocity, but those changes are made "behind the scenes"; they are not visible in Piano or Drum views.

Musical Symbols Panel



The buttons in this window are used to select dynamic markings and performance articulations and add them to the Score. As with the Default Velocity setting, these markings affect the playback of the Track, but the changes are made "behind the scenes"; they are not visible in Piano or Drum views.

Many of the buttons have arrows that appear in their bottom corners as the cursor hovers over them. These indicate the presence of pull-down menus that allow you to specify the impact or behavior of the selected icon when it is applied to the Score.

After selecting a symbol you must click a note to anchor the symbol. Some of the symbols indicate changes that are made over time, and in that case you must click-and-drag across a range of notes.

- **Accidentals** The key signature dictates whether a note is part of the scale or not. Accidentals are used to mark a note that is outside the scale, such as an Ab in the key of F major. Single, double, and natural options are available.
- **Enharmonic spelling** Use this to change the enharmonic spelling of a note (e.g., from Eb to D#, or vice versa).
- **Tie** These are placed between two or more identical pitches that are adjacent, either inside a bar or across a bar line. The notes can have different values.
- **Slur** After selecting this option, click the first note and then drag the slur to the end note in the group of notes to be slurred. These can be placed above or below the staff, and can be nested inside longer slurs. Once you have placed a slur you can adjust its overall position, its start and end point, and the curve itself. To do this, use the Arrow tool to select the existing slur, and then use the slur control points to adjust the slur as desired.
- **Articulation** Select the appropriate icon for various types and combinations of staccato and accent.
- **Articulations of force** These indicate a sudden, forceful change in dynamics. The fortissimo options tell the musician to play with even greater forcefulness.
- **Dynamic** Select one of ten options that range from *pppp* (Piano piano pianissimo) to *ffff* (Forte forte fortissimo).
- **Hairpins** These markings indicate a gradual increase or decrease in dynamics. Select the appropriate option, click a note, and then drag the hairpin to the end note or bar line by which the change in dynamics should be complete.
- **Trill** There are three choices: Trill, Trill sharp, and Trill flat. Trills are always above the original pitch, but the width of a trill depends on the enharmonic relationship of the note to the key of the Song; it could be a half-step higher, a whole step higher, or as wide as a minor third higher than the original pitch. Click a note to add a trill, or click the note and drag to show a longer trill.
- **Tremolo** There are two types and a total of six options. You can use a tremolo marking as a shorthand to represent repeated rhythmic figures. A single slash tremolo is an eighth note tremolo, a double slash tremolo is a sixteenth note tremolo, and a triple slash represents a faster 'unmeasured' tremolo.

  There are two types of tremolo in Studio One:

  - The single note tremolo (or slash tremolo) affects the single note or chord to which it is applied.
  - The two-note or fingered tremolo (or shake) is a tremolo between two alternating notes or chords. Fingered tremolo is represented by a unique form of notation, in that the total duration of the tremolo is the count of one of the notes.
- **Arpeggio** There are three choices: standard (up), up (with an up arrow), and down (with a down arrow). This only works on a chord (i.e., notes that are stacked on the same event). Remember this a note effect; it does not change the position of the original notes in Piano view or Drum view.
- **Glissando/Portamento** Select the preferred option, then click a note to add the effect between it and the next note.

- **Octave signs** There are four options: 1 octave up or down, and 2 octaves up or down. Select one, then click-and-drag across the range to be transposed. This is a note effect; it does not change the original notes in Piano view or Drum view.

Editing the Score

The basics of using the Paint tool to enter notes are covered in the **Score Editor Toolbar** section. Here we'll describe the advanced features of the Score Editor and also provide some helpful shortcuts.

Quick Entry Methods

Without a Controller

A combination of keyboard shortcuts and mouse actions can be used for the rapid entry and editing of notes in Score view.

1. Press the [2] key to activate the Paint tool.
2. Select the desired note value with keys [3]-[9].
3. Press the same key a second time to select a rest of the same value. (Steps 3 and 4 can be swapped.)
4. To select a dotted value for the note or rest, press the [0] key repeatedly to reach the dotted and double-dotted symbols. Press [0] a third time to remove the dot.
5. Click the left mouse button to enter the note or rest.
6. Use the mouse to place the cursor anywhere on the Score, or use the left and right arrow keys to move within the current staff. The next event can be added between two existing events.
7. To add notes to a chord, select the matching note value in the tool bar, then click on the staff to add the note.

Press the [2] key to exit Step Record mode.

Controller and Mouse

The process is slightly different when you are using a keyboard controller.

1. Click the Step Record button. You can play the keys on the controller at any time during the following steps to add an event and advance the cursor.
2. Select the desired note values with numbers [3]-[9] on your computer keyboard.
3. Press the same computer key a second time to enter a rest of the same value.
4. To select a dotted value for the note or rest, press the number [0] on your computer keyboard repeatedly to reach the dotted and double-dotted symbols. Press [0] a third time to remove the dot.
5. Play a key on your controller to enter the note or chord and move the cursor to the next location. You can also place the cursor anywhere on the Score, even between two existing notes. Keep in mind that one or more events to the right of the cursor could be replaced by the next key you play, depending on the selected note value.
6. Repeat steps 2-5 while playing the keyboard until you have entered all of the desired events. You can also add ties whilst in step time, by clicking the tie icon with the mouse in between entering two notes of the same pitch.
7. Press the [2] key to exit Step Record mode.

You can also enter notes from your controller while recording in real time; just use the recording capabilities of your DAW as you normally would to capture a live recording.

Change a Rhythmic Value

To change the rhythmic value of an existing note or rest:

- Click the desired note value in the tool bar, or use the appropriate number key. This automatically selects the Paint tool.
- If the desired event is a rest, select the rest symbol on the right, or press the same number key a second time.
- Click over the existing notehead and its value will change to the new value.

To change the rhythmic value of an entire chord:

- Click the desired note value in the tool bar, or use the appropriate number key. This automatically selects the Paint tool.
- Click over the existing notehead in the chord. All notes in the chord will change to the new duration.

When Events Are Red

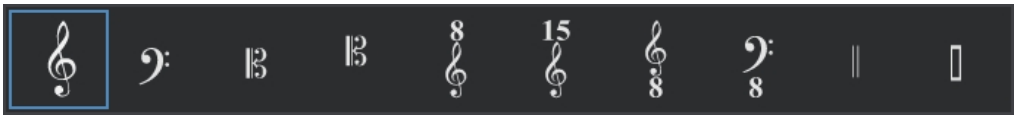
If you see notes or rests that are red, that means you've exceeded the limits of the time signature for that bar. Studio One will add as many events as possible within the bar, but the time signature is always maintained. During playback the excess events are skipped and the next

bar plays normally.

There are several ways to eliminate red events:

- Select a shorter note value and replace the events
- Place the extra events in a different bar, or
- **Change the time signature,** if those events belong in the same bar.

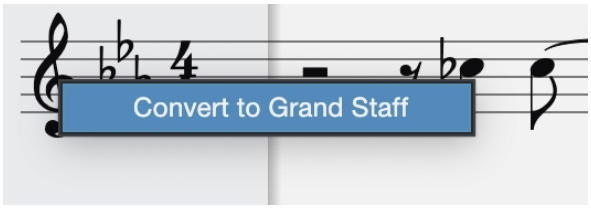
Staff configuration

Choosing the Clef

Left-click the current clef to view all available clefs. There are ten options, including Treble, Bass, C clefs, Octave clefs, and two neutral percussion clefs. Make a choice and the menu will close.

Time Signature

The time signature must be set or edited in the Arrange view. Follow this link to learn how to **set the Time Signature**. There's also a section that describes how to **change the time signature** in the middle of the Score.

Convert to Grand Staff / Single Staff

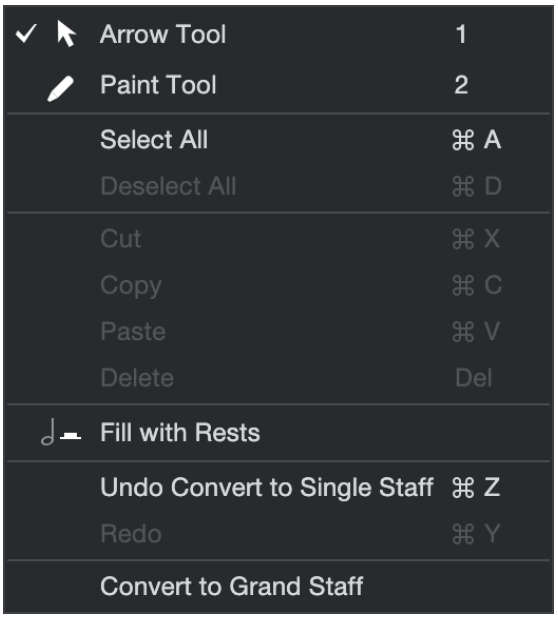


[Right]/[Ctrl]-click next to the clef or time signature to convert a single staff to a Grand staff, or vice versa.

Contextual Menus

Score view has three contextual menus that are accessed inside the Score. Each menu has unique options and ones it shares with the other menus.

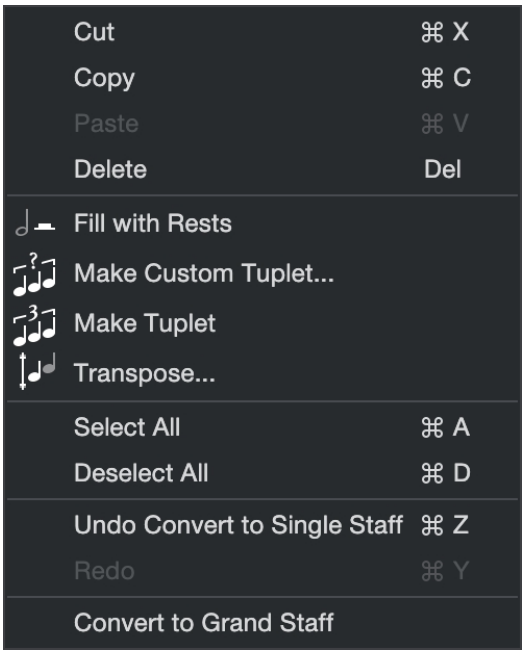
The Staff Menu



[Right]/[Ctrl]-click in an empty area of the staff to view the options of its contextual menu.

- **Arrow Tool** Use this option to select the **Arrow tool**.
- **Paint Tool** Use this option to select the **Paint tool**.
- **Select All** Use this option to select all events in a single staff, or to select all events in both staves when the Grand staff is being used for the selected Track.
- **Select All in Staff** Use this option to select all events in a single staff when the Grand staff is shown. Click inside the desired staff first, then select this option from the contextual menu.
- **Select All on Tracks** This option selects all events in all staves that are visible in the Score.
- **Deselect All** Use this option to deselect every item that is currently selected.
- **Cut/Copy/Paste/Delete** These perform the same function as the computer keyboard actions.
- **Fill with Rests** This option places the appropriate rests in any empty sections of the selected measures, including whole-measure rests, up to the limit set by the time signature. To use it, click-and-drag across the desired areas of the Score and select this option from the Action menu.
  To fill the entire Track with any rests that are needed, click anywhere within the staff and use [Ctrl]/[Cmd]+[A] to select the entire Track, then open the contextual menu and select Fill with Rests.
  If no events are selected, rests of the proper duration are placed in every available location to the left of the cursor, including the measure where the cursor is placed.
- **Undo/Redo** This option will undo and re-do the most recent action.
- **Convert to Single/Grand Staff** Use this option to convert a single staff into a Grand staff, and vice versa.

The Note Menus



After selecting one or more notes, [Right]/[Ctrl]-click to open the contextual menu. The full menu includes the Tuplet options, when appropriate; otherwise a smaller menu is shown.

- **Cut/Copy/Paste/Delete** These perform the same function as the computer keyboard actions.
- **Fill with Rests** This option places the appropriate rests in any empty sections of the selected measures, including whole-measure rests, up to the limit set by the time signature. See the description in the Staff Menu section above for more details.
- **Make Tuplet/Custom Tuplet...** These options appear when notes or chords from different positions within the same measure and staff are selected. See their descriptions in the **Action Menu section**.
- **Switch Staff** This action is only available when the Grand staff is used. It allows you to switch a note from the upper staff to the lower staff, or vice versa.

- **Transpose** Use this to transpose the selected notes up or down after you specify the Interval, Interval quality, and Octave range of the transposition. These options are similar to those described in the **Transposing Notes** section. They can force notes or chords to conform to the key (Diatonic), allow them to maintain the same interval relationships, or follow a number of other permutations, all while transposing up or down in specified intervals by as much as three octaves.
- **Select All/All in Staff/All on Tracks** See descriptions in the Staff Menu section above for more details.
- **Deselect All** Use this option to deselect every item that is currently selected.
- **Undo/Redo** This option will undo and re-do the most recent action.
- **Convert to Single/Grand Staff** Use this option to convert a single staf into a Grand staff, and vice versa.

Multitrack Score Editing

It is possible to view and edit the staves for many Instrument Tracks simultaneously. The quickest way to do this is to open the Track List by clicking its icon in the upper left corner of the Note Editor's Inspector panel. In this list you can show or hide the staves of each Track in the Score using the Show/Hide buttons to the left of the Track name. It is possible to click-and-drag through many buttons and add their Tracks to the Score view very quickly.

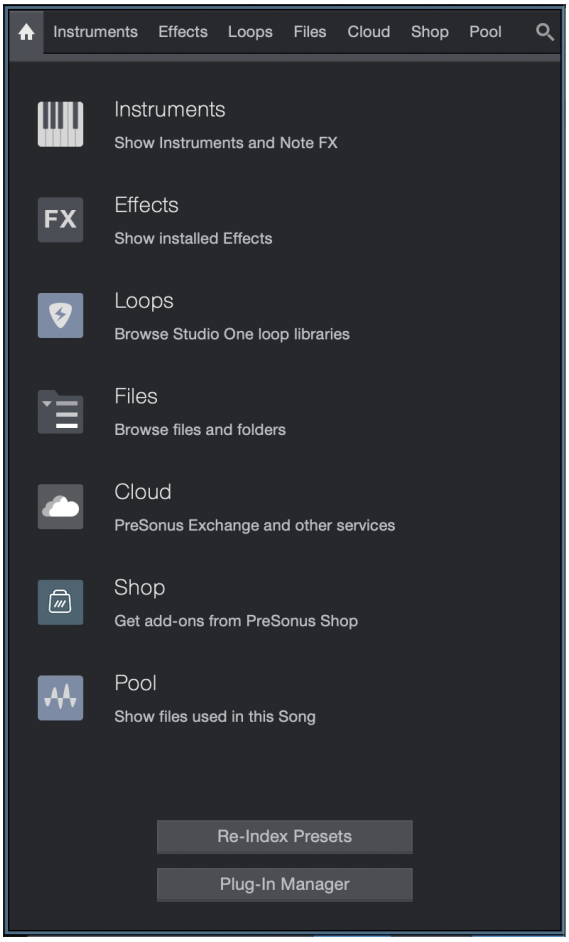
When the staves for multiple instruments are displayed you can duplicate or move notes from one staff to another using standard key commands for Cut, Copy, and Paste. These options are also available in the [Right]/[Ctrl]-click contextual menu.

When a Select All action is performed with [Ctrl]/[Cmd]+[A], only the notes in the current staff are selected (both staves when the Grand staff is used). To select all of the staves that are visible in the Score, use [Right]/[Ctrl]-click inside the Score and choose Select All on Tracks from the contextual menu.

To select a specific staff within the Score when multiple staves are visible, click on a note or an empty space within the staff you want to edit. The vertical blue cursor will appear at that location.

To view only one staff and close the others, click the Track name at the top of the Note Editor Inspector and select the desired Track.

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 note-data files. The Browser works somewhat like Windows Explorer or macOS Finder, in that it allows you to navigate file directories on your computer in specific ways. Audio and note-data files, as well as virtual instruments and plug-in effects, can be dragged from the Browser directly into your Song or Project.

Searching for Files in The Browser

Each page of the Browser has a search function, accessed by clicking the search button in the upper-right corner. This shows a search field in which you can type strings to search for content by name. Searching in the Home page of the Browser searches through content in all pages of the Browser.

Browser Tabs and Search

At the top of the Browser are the Home icon and seven tabs that organize your content and provide links to external resources.

The **Home** page gives access to every tab, so it enables you to search for content by name across all tabs at once. At the bottom of this page are two utility buttons: Re-Index Presets and the Plug-In Manager.

- **Re-Index Presets** scans all of the instrument / plug-in presets to detect changes that affect the way they are presented when you use the Browser search function. For example, use this if a preset has been moved, deleted, or renamed outside of Studio One.
- **Plug-In Manager** provides a quick way to access the **Plug-In Manager** window.

Each of the tabs holds a different set of features and content:

- **Instruments** opens a tab from which virtual instruments may be added to the tracks.
- **Effects** opens a tab from which one or more effects may be added to a channel.

- **Loops** reveals all of the audio and music loop content currently installed in Studio One.
- **Files** gives you direct access to your computer's file system, as well as other local storage areas related to Studio One.
- **Cloud** has links to the cloud services, such as PreSonus Exchange services or your SoundCloud account.
- **Shop** connects to the PreSonus Shop, where a variety of content is available for free and for purchase.
- **Pool** allows quick access to all files associated with the current Song.

It is possible to search within any tab and within any location a tab may contain. Clicking on the Search icon at the top right of the Browser opens a search text field and shows the location being searched. Typing text into the search field immediately begins the search, and only results matching the search text are displayed in the Browser.

Once search results are populated, the found content can be used directly. You can also [Right]/[Ctrl]-click on any search result and choose Show in Context from the pop-up menu, to gain access to content in the same location.

Thumbnail View

The Browser makes it possible to identify items in a list quickly by showing their thumbnail images. For example, the Instruments and Effects tabs can show a miniature version of the user interfaces for the included plug-in instruments and effects. You could also see an image of the album cover art provided by an artist on the Cloud tab, or recognize a product immediately by its signature graphics on the Shop tab.

To show or hide the thumbnail images, click the Show Thumbnails button in the upper-right corner of the Browser. Note that thumbnail images are not available on the Loops, Files, or Pool tabs.

Gallery View / Toggle Tree Mode

Plug-in instruments and effects can also be listed by their Gallery images in the Browser. To access the Gallery view, click the Toggle Tree Mode button ( ) in the upper-right corner of the Browser. Next, click the Show Gallery button ( ) on the right edge of the navigation bar. To show or hide the Gallery images, click the button again. To return to the Thumbnail view or to access the Plug-In Manager button, click the Toggle Tree Mode button again.

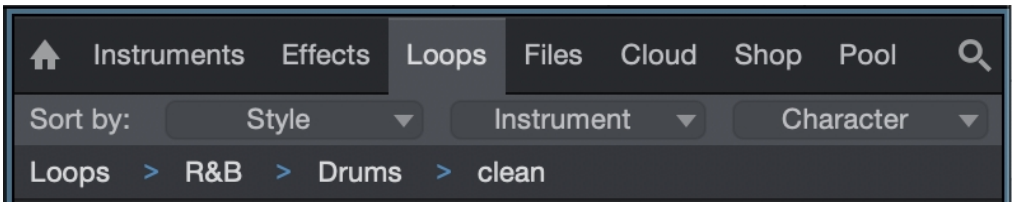
Adding Thumbnail and Gallery Images for 3rd-Party Plug-ins

If a thumbnail image was not provided for a 3rd-party plug-in you've installed, it is possible to add one. Simply follow these steps:

1. Insert the 3rd-party plug-in of choice to a Channel in Studio One
2. Open the editing window for the plug-in
3. Near the top of the editing window, click on the right side of the corresponding plug-in tab for that plug-in to open a pop-up menu
4. Choose the Update Plug-in Thumbnail option to add and apply a new image for this plug-in. It appears in both the Thumbnail and Gallery views.

As with the included thumbnail images, you can show/hide the thumbnails you create by clicking the Show Thumbnails button in the upper-right corner of the Browser. In Gallery view, toggle the Show List button.

The Navigation Bar



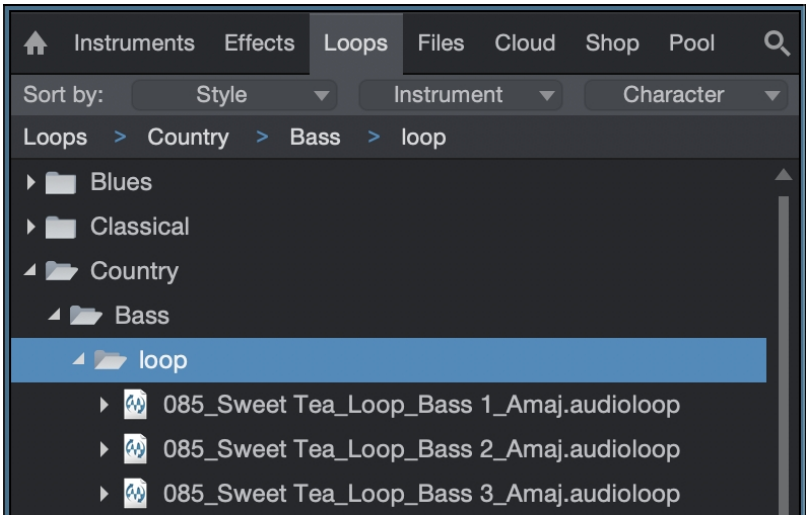
When Thumbnail view is selected, the Navigation bar appears below the Sort By options. It is available on every tab except the Home tab.

The Navigation bar is visible even when the Thumbnail images are hidden. It helps you know at a glance exactly where you are in a file tree or a hierarchy of nested folders, and then gives you two ways to jump to the desired folder. Here's a brief summary:

- **"Breadcrumbs" navigation** Click the folder names to move quickly to a higher level without scrolling.
- **Menu navigation** Use the separator arrows between each folder name to open a menu of nested folders.

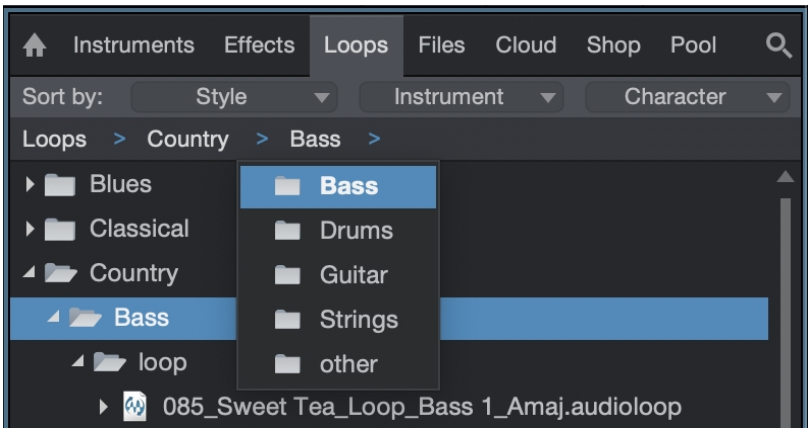
See the following sections for more details. Note: the Navigation bar is not available in Gallery view.

"Breadcrumbs" navigation



"Breadcrumb" navigation gained that nickname because it provides a "trail" you can follow back to where you started. The path in the Navigation bar shows which folders were opened on the way down to the one you opened most recently (*highest folder > lower folder > lower folder (etc.) > most recent folder*). As shown in the image above, the folders listed in the Navigation bar correspond to those that are open in the tab page. Click any folder name in the path to jump instantly back to that level.

Menu navigation



The Navigation bar has separator arrows between the names of each folder in the path. Click an arrow to reveal a list of the folders that are available at that level, and then make a selection from the menu. You'll be taken to the top level of the selected folder, which prevents a lot of scrolling when there are a lot of folders already open.

Instruments and Audio Effects

The Browser makes finding and using your virtual Instruments and audio effects fast and easy. Studio One provides many ways to view, sort, and search for items, both internally and externally via the **Cloud** and **Shop** tabs. The **Thumbnail and Gallery views** can be helpful, and you can even **add an image for a 3rd-party plug-in** if needed.

Browsing for Instruments

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

Sorting 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 options at the top of the Browser to sort by one of the following categories:

- **Flat** Sorts the instruments in alphabetical order in a continuous list.
- **Folder** Works much like Flat, but adds category folders. Folders can be used to quickly sort and find available instruments by function (such as Synth or Sampler). For more information, see Folders.
- **Vendor** Sorts the instruments in folders by vendor.
- **Type** Sorts the instruments in folders by type (PreSonus, ReWire, Audio Unit, VST2, VST3).

Dragging Virtual Instruments 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 is loaded in the Instruments Device Rack, and a new Instrument Track is created that is routed to the instrument. The new Track is record-enabled and monitor-enabled by default, so you can play it immediately with your default Keyboard.

If you drag-and-drop an instrument from the Browser on top of an existing Instrument Track that is routed to another virtual instrument, the previously loaded instrument is replaced by the new one. A pop-up menu appears, giving you the choice to Replace (remove the old instrument from the Instrument panel and replace it with the new), Combine (place the new and existing instruments into a new **Multi Instrument**), or Keep the old instrument (re-route the Track to address the new instrument and retain the old instrument in the Instrument panel).

Dragging External Instruments into Your Song

If you want to use an existing external instrument in your Song, simply click-and-drag it from the External Instruments folder onto an empty track in the Arrange view. A new Instrument Track is created that is routed to the external instrument, which is already mapped to any **Aux Channels** that were previously added to the instrument. The External Devices control mapping window opens when the new track is created, which provides an opportunity to add or disable Aux Channels as needed.

The new Track is record-enabled and monitor-enabled by default, so you can play it immediately with your default Keyboard.

Note that if you drag-and-drop an external instrument from the Browser on top of an existing Instrument Track that is routed to a virtual instrument, the previously loaded instrument is replaced by the new one.

Instrument Presets

The presets for Studio One's built-in virtual instruments, as well as those associated with any 3rd-party instruments, can be loaded into your Song in the same way as an instrument. Drag-and-drop a preset from the Browser to load the instrument into your Song with that preset pre-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]. If the editing window for an instrument is open, you can load any preset for that instrument by dragging the preset from the Browser onto the instrument window.

Browsing for Audio Effects

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

Sorting 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 options at the top of the Browser to sort by one of the following categories:

- **Flat** Sorts the effects in alphabetical order in a continuous list.
- **Folder** Works much like Flat, but adds category folders. Folders can be used to quickly sort and find available effects by function (such as Distortion or Reverb). For more information, see Folders.

- **Vendor** Sorts the effects in folders by vendor.
- **Type** Sorts the effects in folders by the type of plug-in (FX Chains, PreSonus, VST2, VST3, Audio Units).

Searching for Effects

The Effects tab has a search function, as do all parts of the Browser. You can enable search by clicking the search button in the upper-right corner of the Browser. When searching for effects, you can type in an effects category (such as "Reverb" or "Dynamics") to show all effects in that category.

Dragging Audio Effects 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 any area of 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. This also lets you to replace any currently loaded plug-in by dropping another plug-in on top of its slot in the Insert Device Rack.

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 or into the Send of any Channel. The new FX Channel is automatically given the name of the effect.

When dragging in effects from the browser onto Tracks in the arrangement, hold [Alt]/[Option] to load the effects as Event Effects instead of Insert Effects. Note that the drop target changes from the entire Track to specific Events when doing this, as every Event can have its own Event Effects.

Send FX Mix Lock

Inserting an effect into the first slot of a Bus/FX Channel sets dry/wet mix to 100% and enables a lock for the mix. The lock state is saved in the Song but is not overwritten/saved by presets. This exists in:

- Beat Delay
- Analog Delay
- Groove Delay
- MixVerb
- Room Reverb

Audio Effects Presets and FX Chains

The presets for Studio One's built-in audio effects and any 3rd-party effects can be loaded into your Song in the same way as the effects themselves. Drag-and-drop a preset from the Browser into your Song to load an instance of the effect with your chosen preset loaded. Alternatively, if the window for an Audio Effect is open, you can load any preset for that effect by dragging the preset from the Browser onto the Effect window, or by double-clicking on the preset in the Browser, or by clicking on the preset to select it and then hitting [Return] on the keyboard. FX Chains can be loaded in the same way, as described in the **FX Chains** section. This makes configuring even the most complicated mix quick and easy.

Folders

The Instruments and Effects tabs in the Browser each feature a sorting method called Folders. In this view, plug-ins can be sorted into category-specific folders, making it easy to choose from all available plug-ins that specialize in the function you're seeking (such as Distortion or Delay effects, or Synth or Sampler instruments). A set of category folders are provided by default, and some plug-ins are placed into their appropriate folders by default. You can move plug-ins into whatever folder makes sense to you, and create folders of your own to suit your needs.

- To **move a plug-in instrument or effect into a folder**, drag-and-drop it from the list to the folder of your choice. You can also move plug-ins from folder to folder in this way.
- To **create a new folder**, [Right]/[Ctrl]-click in the Browser, and choose [New Folder...] from the resulting pop-up menu. If you [Right]/[Ctrl]-click on an existing folder, your new folder is created as a sub-folder to the selected folder. If you [Right]/[Ctrl]-click in the list of plug-ins below the list of folders, your new folder is created as a top-level folder. Enter a name for the new folder, and click [OK] to create it. To cancel, click [Cancel].
- To **delete a folder**, [Right]/[Ctrl]-click the folder in the Browser, and choose [Delete Folder...] from the resulting pop-up menu. You will be prompted to confirm this deletion. Press [Yes] to delete the selected folder. Press [No] to cancel. You can also delete a folder by selecting it and pressing the [Delete] key on your computer keyboard. If any plug-ins are in a folder when it is deleted, they are moved to the list of non-categorized plug-ins below the folder list.
- To **rename a folder**, [Right]/[Ctrl]-click the folder in the Browser, and choose [Rename Folder...] from the pop-up menu. Enter a new name for the folder, and click [OK] to rename the folder. To cancel, click [Cancel].

Favorite and Recent Plug-ins

The Instruments and Effects tabs in the browser each offer a drop-down list of Favorites (chosen by you), and a Recent plug-ins list, which displays the 10 most recently used instruments or effects.

To mark a plug-in as a Favorite, [Right]/[Ctrl]-click the plug-in in the Browser and choose [Favorite] from the resulting pop-up menu. That plug-in is now displayed when you open the Favorites list, for easy retrieval. To remove a plug-in from the Favorites list, [Right]/[Ctrl]-click the plug-in (in the Favorites list or Browser) and choose [Favorite] from the pop-up menu.

You can also add and remove plug-ins from the Favorites list using the wrench-shaped button, as described below in the **Managing Plug-ins** section.

Hiding Plug-ins

To hide an effect or instrument plug-in, [Right]/[Ctrl]-click the plug-in in the Browser and choose [Hide] from the resulting pop-up menu. This removes the plug-in from the Browser list, hiding it from view. You can hide and un-hide plug-ins individually, by Vendor, or by Type using the Plug-In Manager as described in the next section.

Managing Plug-ins

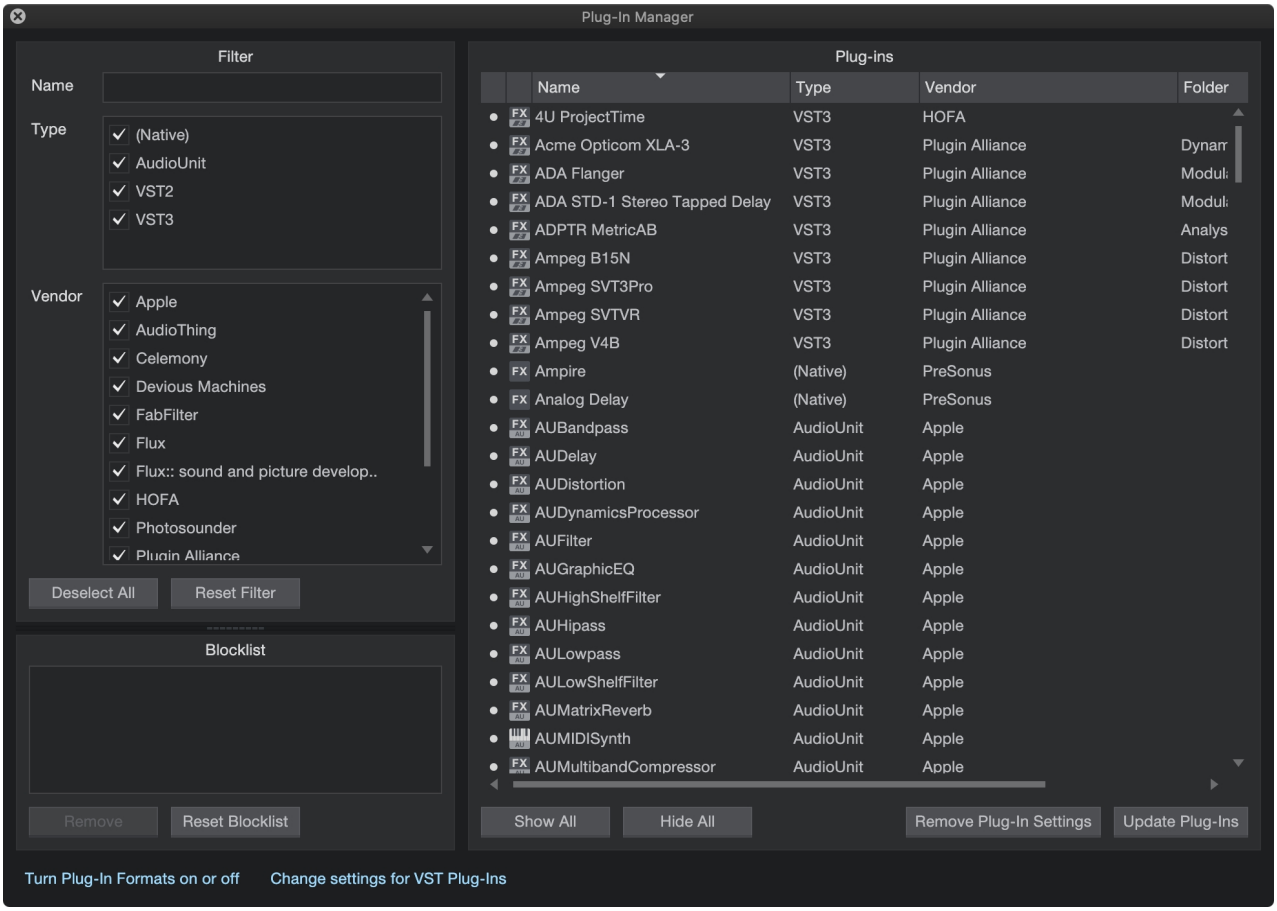
There are two ways to manage the plug-ins in Studio One. Either locally as part of the Browser, or in a dedicated window with additional options.

The Manage Plug-ins view

Click the wrench-shaped button in the upper-right corner of the Browser to toggle the Manage Plug-ins view. A list of all plug-ins is displayed, sorted according to the currently selected sort method. To hide (or un-hide) a plug-in, click the circle to the left of its name. To add (or remove) a plug-in from the Favorites list, click the star to the left of its name.

To return to the normal Browser view, click the wrench-shaped button again.

The Plug-in Manager



To access the Plug-In Manager, click the Home tab in the Browser, then click on the Plug-In Manager button at the bottom. Alternatively, select the Plug-in Manager from the View menu. A window will open with all of the Plug-ins listed on the right and various filters on the left. From here it is possible to hide (for example) all of the plug-ins of a particular type, such as Audio Units, or all of the plug-ins from a particular vendor. You can search for particular plug-ins by name and hide only those plug-ins by clicking the dot to the left of their name.

A separate section of the Plug-In Manager lists all plug-ins that are currently blocklisted. These are plug-ins that failed during the plug-in scan for whatever reason. This could be missing resources, missing activation or any type of incompatibility with Studio One. In any case it may make sense to remove plug-ins from the blocklist so they're scanned again when Studio One is launched the next time. In this case you have two options. You can remove a single plug-in from the blocklist by selecting it and pressing the backspace/delete key. Or you can reset the entire blocklist by clicking the Reset Blocklist button.

In addition to the above, the Plug-In Manager has two links for more advanced options (you should only use if you cannot solve a particular problem any other way). Clicking "Turn Plug-In Formats on or off" will take you to the Advanced>Services tab of the Preferences window. Here you have the option to disable plug-in formats such as VST2, VST3 or Audio Units completely. Clicking "Change settings for VST Plug-Ins" will take you to the Locations>VST Plug-Ins tab of the Preferences window. See Setup > **Managing Your Content** for more details.

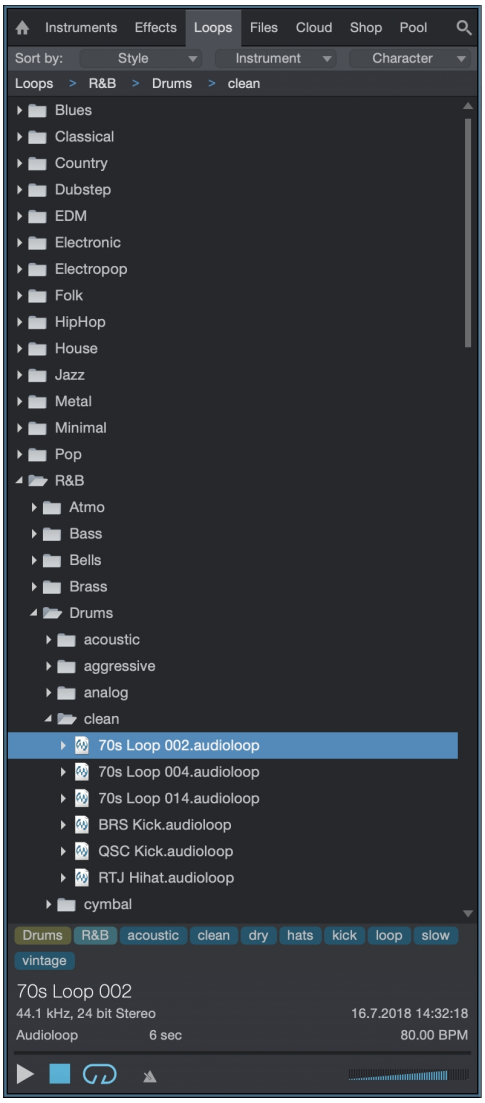
Reset and Revert

At times, you may wish to restore the Browser to its default hide/show and Favorites state, or to the state it was in before a recent change. To reset the Browser to its original state, [Right]/[Ctrl]-click in empty space within the Browser and choose [Reset] from the pop-up menu. This shows all hidden plug-ins, and removes all plug-ins from the Favorites list. To revert the Browser to its most recently saved state, [Right]/[Ctrl]-click in empty space within the Browser and choose [Revert] from the pop-up menu. This state is saved each time you exit Manage Plug-ins mode, and when quitting Studio One.

Sound Sets

The 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 Files tab in the Browser and navigating to the Sound Sets folder. Sound Sets are carefully organized for easy exploration. Loops can also be browsed directly, by clicking on the Loops tab in the Browser.

Loops Tab



The Loops tab lets you locate and explore audio and music loop content made for Studio One in the Browser, with intelligent sorting to assist you in finding the right loops quickly and easily. Click on the Loops tab in the Browser or press [F8] on the keyboard to browse through any installed loop content.

Sorting Loops

The Loops tab offers a three-tiered sorting system. At the top of the Loops tab window, you'll see Sort by... followed by three category selectors. You can choose to sort by any of the following criteria:

- **Style, Instrument and Character** Sorts your loops into folders corresponding to the Style, Instrument, and Character tags each loop is associated with. This lets you quickly locate specific types of loops based on your needs.
- **Type** Sorts your loops into folders corresponding to their file type.
- **Product** Sorts your loops into folders corresponding to the products or bundles they are part of.
- **Vendor** Sorts your loops into folders corresponding to the vendor that made them.

Using the three sorting category selectors, you can structure the way loop content is shown. The first sorting category sets what you see at the top level of the Loops tab. For example, set to Style, you'll see loops categorized in folders corresponding to their Style tag settings.

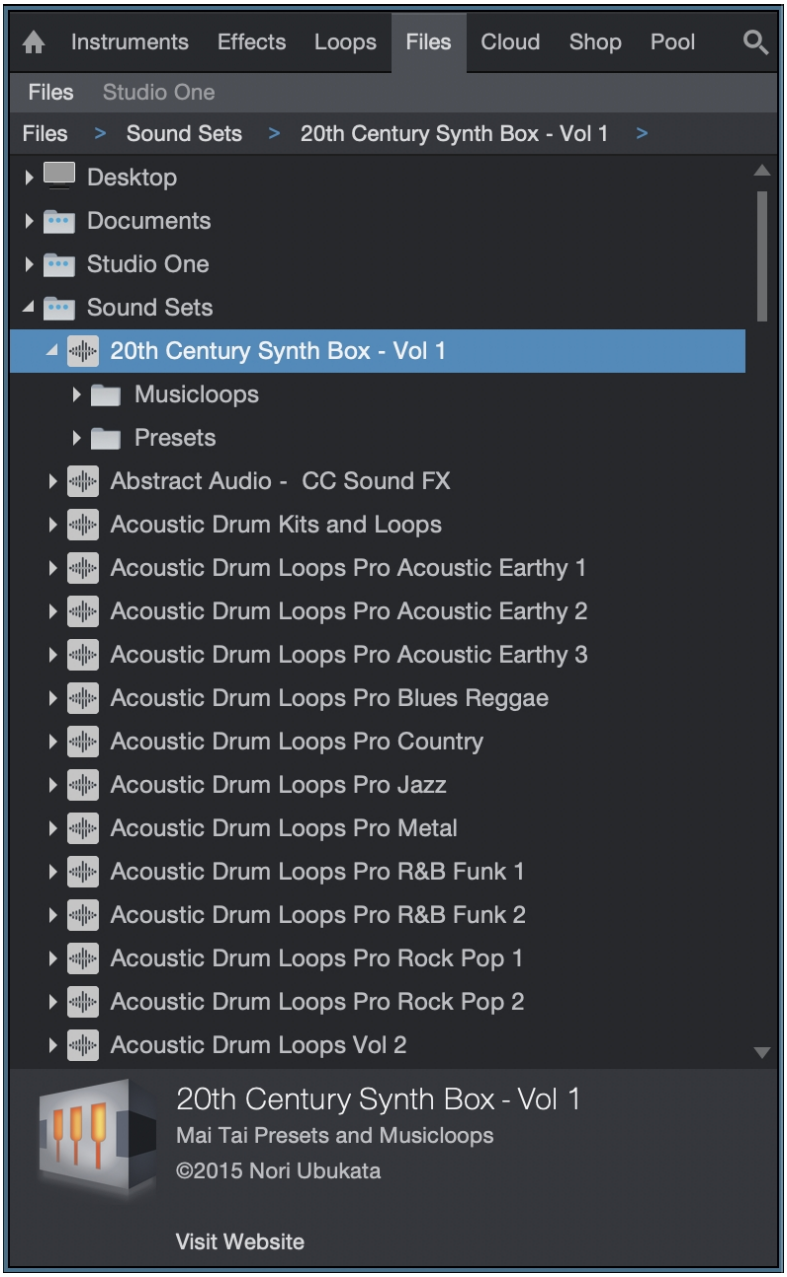
The second sorting category sets what you see when you open a folder in the list created by the first sorting category. For example, with the first category set to Instrument and the second set to Type, you'll see a list of loops in folders corresponding to their Instrument tag settings. Expanding one of those folders show a list of its content, sorted by file Type.

The same operating model extends to the third sorting category, which lets you refine how loops are displayed when you're looking two folder levels deep in the list of loops.

Importing Loops into Your Song

Audio and music loops can be dragged right into your Song from the Browser, with the **loop tempo perfectly aligned**. For more information on working with loops, see **Audio Loops and Music Loops**.

Files Tab



The Files tab gives you access to files and folders throughout your computer's file system, as well as Studio One-specific content locations.

It is possible to import several file types from the Files tab into your Song or Project, including WAV (BWF and RF64), AIFF, REX, Apple Loops (CAF only in macOS), Ogg Vorbis, FLAC, and MP3 audio files, as well as Standard MIDI Files, and of course Studio One's Audio Loops and Music Loops.

Finding Audio Files in the Files Tab

Open the Browser by clicking on the [Browse] button, or press [F5] on the keyboard, and click on the [Files] button at the top of the Browser to view files and locations on your computer. You also can press [F9] on the keyboard to open the Files tab directly.

By default, the Files tab displays the following sub-tabs:

- **Desktop** Displays any folders on your desktop and allows access to their files. Note that this will not display shortcuts or aliases.
- **Documents** Displays the contents of the Documents folder for the logged-in User.
- **Studio One** Content sub-tab, as specified in *Studio One/Options/Locations/User Data* setup menu (macOS: *Preferences/Locations/User Data*), which contains all Songs, Projects, Shows, Presets, and other Studio One files.
- **Sound Sets**Contains all sound sets installed from your PreSonusAccount, including loops, instruments, and samples.
- **Volumes** Contains all folders and files within your computer's file system, and also provides access to the contents of any attached storage devices.

Click on any folder to view its contents, as you would with Windows Explorer or macOS Finder.

When browsing Audio Loop files and REX audio files, note the drop-down arrow that expands to reveal the slices of the REX file. If you drag in either of these types of files, the slices are contained in an Audio Part.

When moving files onto or within your computer while Studio One is open, you may need to refresh the Browser to see the subsequent changes. If you encounter this, [Right]/[Ctrl]-click in the Browser and select Refresh.

File Management in the Files Tab

[Right]/[Ctrl]-click on a file or folder in the Files Tab to access the following commands. Note that the context menu may change depending on the selected file:

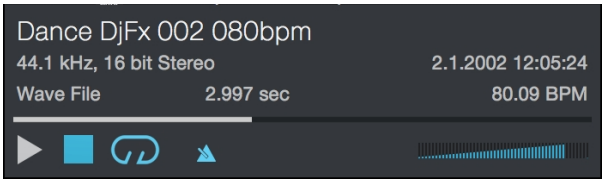
- **Show Package Contents** Select to allow Browser access to files within a bundled file, such as a .song file.
- **Set as Root** Select to set the folder to the root of the current Tab.
  - **Up** Once a folder has been set as the root of the current tab, select this command to set its enclosing folder as root.
  - **Reset Root** Resets the root of the current tab to its default top-level directory.
- **Upload To** Select to upload the chosen file to a connected cloud service, such as SoundCloud.
- **New Folder** Select to create a new folder within another folder.
- **Show in Explorer/Finder** Select to show the file or folder in the Windows Explorer or macOS Finder.
- **Rename File/Folder** Select to rename any file or folder.
- **Delete File/Folder** Delete any file or folder permanently. This places the file or folder in the Recycling Bin or Trash.
- **Send To new SampleOne** Sample, loop, or .wav/mp3. Opens the file as a new SampleOne instrument.
- **Send To new Impact** Sample, loop, or .wav/mp3. Opens the file as a new Impact instrument, sliced across multiple pads.
- **Import to Pool** Sample, loop, .wav/mp3, or video. Places the file into the Pool of resources associated with the current Song.
- **Import Song Data...** when right-clicking .song file. Specify which parts of the Song to import: tracks, tempo, markers, Instruments, etc.

You can also move or copy any file or folder to another location within the File Browser. To move a file or folder, click-and-drag on top of another folder. To copy a file or folder, hold [Ctrl]/[Cmd] while dragging.

Use [Alt]/[Option]+[Up Arrow] to collapse all of the directories when navigating the Files Browser. Use [Alt]/[Option]+[Left Arrow] to collapse the currently selected top-level directory (and any of its sub-directories).

Previewing Audio Files

When an audio file is selected in the Browser, the bottom window of the Browser becomes 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; 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.

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 is timestretched on the fly to match the current Song tempo. To preview while hearing your Song, start Song playback first, and then select a file to preview.

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 plan to 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 the loops in that folder.

Importing Audio Files into Your Song

Importing an audio file from the Browser into your Song is as easy as clicking on the file and dragging it into the Arrange view of the Song. When the file is dragged to empty space, a mono or stereo Audio Track is created with the file placed on it as a new Audio Event, located at the position to which it was dragged. When the file is dragged to an existing Audio Track, it is placed as a new Audio Event on that Track, at the position to which it was dragged.

If you import a stereo file to a mono Track, the Event created is stereo, but the output is mono, since the Track is mono. If you import a mono file to a stereo Track, the output is dual mono, that is, the same signal equally on both sides.

If you wish to replace the audio clip associated with an Event with another audio clip from the Browser, you can hold [Alt]/[Opt] while you drag-and-drop the new audio onto the Event to be replaced. This effectively swaps out the existing audio with the new audio, and the edits to the Event stay intact.

It is possible to select multiple files in the Browser and drag all of them in at once, making the transfer of recordings done in another DAW a one-click process. If you would like to insert multiple audio clips, selected in the browser, to the same Track, with one placed after the other across the timeline, hold [Ctrl]/[Cmd] while dragging the audio clips to empty space on a Track. This can be helpful if you want to quickly drag in multiple variations of similar audio, or for laying out an entire song structure in one move.

For virtual instruments that support audio-file importing using drag-and-drop (such as many drum samplers), you can drag-and-drop audio files from the Browser directly onto the instruments to load audio files.

You can also [Right]/[Ctrl]-click on any audio file and select Send to New SampleOne to instantly load the file as a sample in the built-in SampleOne™ virtual instrument. If you do this with an Audio Loop or REX audio file, its slices are automatically mapped across the keyboard (up to 96 slices).

Audio Loops and Tempo

Many audio loops have a rhythmic component such as a drum beat or a time-based effect. If tempo information is available for the audio loop, as described in the section **Audio File Tempo Information**, Studio One stretches the loop to match the tempo of the song. The process is normally effortless, but if a file doesn't conform to tempo, try one or more of these steps:

- Select an audio file that is less than 60 seconds long.
- Audition the file in Previewer with "Play at song tempo" enabled.
- Drag the file to an Audio Track with timestretching enabled in the **Track Inspector**.
- Add the track tempo to the file name (e.g., "110", "89bpm", etc.), if it isn't there already. Most loop providers embed tempo information in the names of the files and the file meta data, so this may only be necessary for audio loops you've made yourself.

Automatic MP3 to WAV Conversion

When you import an MP3 file into a Song, or any other file type, it is automatically converted to a WAV file. The WAV file created during conversion is stored in the Media folder of the Song in which the file was imported and has the same name as the original file, with the .wav file extension. The newly created WAV file inherits the Song's sample rate and resolution (bit depth), as set in *Song/Song Setup*.

Audio File Operations

Audio files can be processed directly from the Browser using the [Right]/[Ctrl]-click contextual menu as follows. Note that in every case, the original audio file is left unmodified. It is possible to select multiple audio files of the same format and apply processing to all of them at once.

- **Split to Mono Files** Split a multi-channel audio file into separate mono files, one for each channel.
- **Merge to Stereo File** Merge a pair of L/R mono audio files to a single stereo file. Select two mono audio files, then [Right]/[Ctrl]-click and select Merge to Stereo File.
  - When merging mono files that are not marked with the .L and .R suffixes to stereo in the Browser, the first selected file becomes the L channel, and the second becomes the R channel.
- **Convert to Wave File** Convert a non-Wave format audio file to a Wave file. This can also be used to flatten sliced files such as Audio Loop and REX, wherein the slices are rendered at their original tempo.
- **Convert to Audio Loop** Convert any audio file to an Audio Loop.

Importing MIDI Files into Your Song

To import a MIDI file using the Browser, navigate to the desired file, as you would for an audio file, and click-and-drag it into your Song. If the MIDI file is dragged to an empty space in the Arrange view, a new Instrument Track is created with that file placed on the Track at the position to which it was dragged. If the file is dragged to an existing MIDI Track, the file is placed as a new Instrument Part on the Track, at the position to which it was dragged.

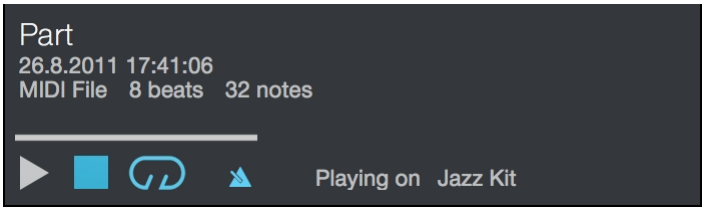
Some MIDI files contain more than one MIDI Part in the sequence. If this is the case, a drop-down arrow is shown next to the file in the Browser. You can click the drop-down arrow to reveal the independent Parts. If you drag in a file with multiple Parts, they are shown when dragging the file into your Song.

As with all Instrument Tracks, you need to ensure that 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.

Previewing MIDI Files

When any MIDI file is selected in the Browser, you can preview the MIDI file through any virtual instrument loaded in the Song. To do this, select a MIDI file, then select an Instrument Track in the arrangement and it appears in the Preview Player, sending to the selected channel.



Now, when you start playback with the Preview Player, the MIDI file plays through the virtual instrument to which that Instrument Track is routed. You can switch Instrument Tracks on the fly to audition a part quickly through many different instruments.

Exporting Audio Files

You can drag-and-drop any Audio Event to a location in the File Browser to export it as an audio file to that location. As you hover over the Browser, you can press [Alt] to choose between rendering the Audio Event with or without its associated Insert FX.

Exporting MIDI Files and MIDI Musicloops

You can drag-and-drop any Instrument Part to a location in the File Browser to export a Musicloop or MIDI file to that location. As you hover over the Browser, you can press [Alt] to choose between Musicloop and MIDI file formats. If you drag-and-drop multiple parts at once, they are written to one file with multiple Parts.

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

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 want constant access to such folders in the Browser, you can create Tabs for these locations. By default, there are two Tabs at the top of the File Browser, called “Files" and "Studio One". The Files tab gives you access to the entire file structure of your computer, and the Studio One tab shows you the User Data location as set in the *Studio One/Options/Locations/User Data* menu (macOS: *Preferences/Locations/User Data*).

To create a Tab for any file location, navigate to that location and drag it onto the top bar, or simply drag the chosen folder from the Browser onto the bar where the Tabs reside. This adds a new Tab at the top of the File Browser with the name of the folder, allowing instant access. You can also [Right]/[Ctrl]-click on any location, or any file within that location, and select New Tab From Here in the pop-up menu.

You can create an additional Root Tab (analogous to the standard "Files" tab, showing the root of your file system) by [Right]/[Ctrl]-clicking in any location and choosing New Root Tab. You can also set any current tab to point the root of your file system by [Right]/[Ctrl]-clicking the tab of your choice and selecting Reset Root.

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

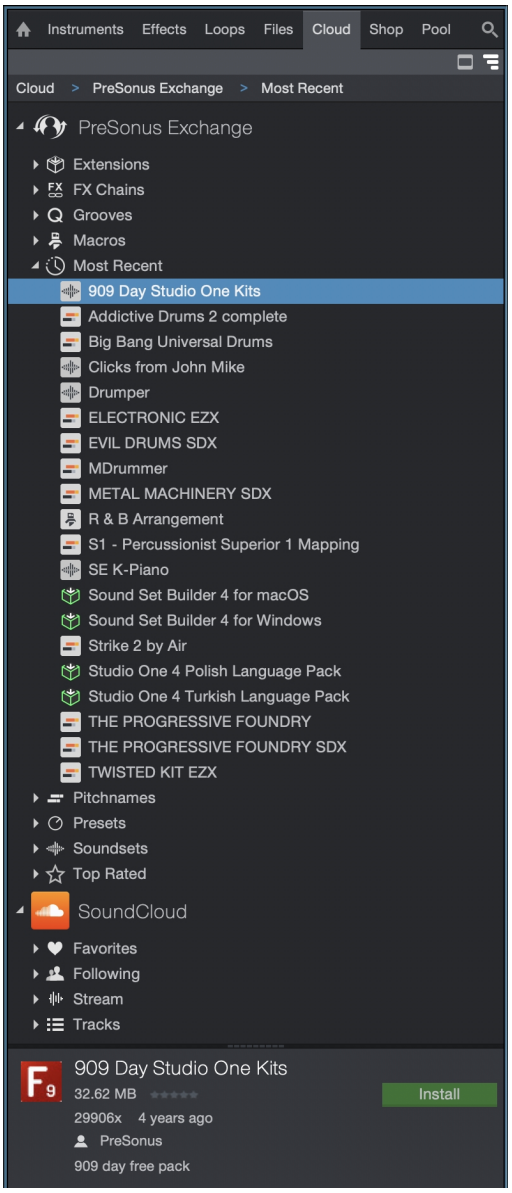
To close or remove Tabs, [Right]/[Ctrl]-click on the desired Tab and select Close Tab from the pop-up menu.

To move up one level in the File Browser, [Right]/[Ctrl]-click and select Up.

Tabs you create in the File Browser 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 drop-down 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.

If changes you make in your file system (such as moving a file or folder in the Windows Explorer or Mac Finder) have yet to show up in your File Browser, [Right]/[Ctrl]-click in the Browser and choose Refresh to renew the Browser's view.

Cloud Tab



The Cloud tab gives you access to sounds, effect and instrument presets, loops and other content available from connected cloud services such as thePreSonus Exchange, or your SoundCloud account.

PreSonus Exchange

The PreSonus Exchange is a place for Studio One users like you to share self-created content with other users. Here, you can find new plug-in presets, FX chains, loops, grooves, sound libraries, and more. The Exchange is also host to a variety of Studio One-specific system extensions, such as hardware control scripts for your favorite controllers.

Click on the Cloud tab in the Browser, then click [PreSonus Exchange] to explore its contents. If you are not already signed in to your PreSonus user account, you can click the [Sign In] button at the bottom of the Browser and enter your account credentials to log in.

Once you're signed in you'll see the current offerings in the PreSonus Exchange, and be able to explore and use the content to fit your needs. The optional **Thumbnail and Gallery views** can help you quickly identify the content. For more information on dragging instruments, effects, presets, and sounds into your Song from the Browser, see **Instruments and Effects Tabs** and **Files Tab**.

SoundCloud

Your SoundCloud account can be a valuable resource for content to use in Studio One. The SoundCloud browser within the Cloud tab gives you access to your own self-posted sounds, as well as sounds from artists you follow, songs you've marked as favorites, and the

recent contents of your SoundCloud stream.

Click on the Cloud tab in the browser to see SoundCloud in the list of available cloud services. Click on SoundCloud to see the Favorites, Following, Stream, and Tracks folders. If you have not yet linked your SoundCloud account to Studio One, click the [Sign in to SoundCloud] button at the bottom of the Browser. This opens a web browser window allowing you to sign into your SoundCloud account and allow it to be linked to Studio One.

If a track in your SoundCloud listings is available for free download, a blue arrow is shown next to its waveform icon, and you can drag the sound directly into your Song, or to the Pool, as described in **Importing Audio Files into Your Song** and **Importing Audio Files to The Pool**. When you do this, a window is displayed showing the download progress. When the download is completed, the sound appears in the place to which you have dragged it.

If free download is not available for a sound, you can still play the song from within the Studio One Browser as described in **Previewing Audio Files**. This is a handy way to find and listen to commercial reference tracks, for mix comparisons with your own Songs.

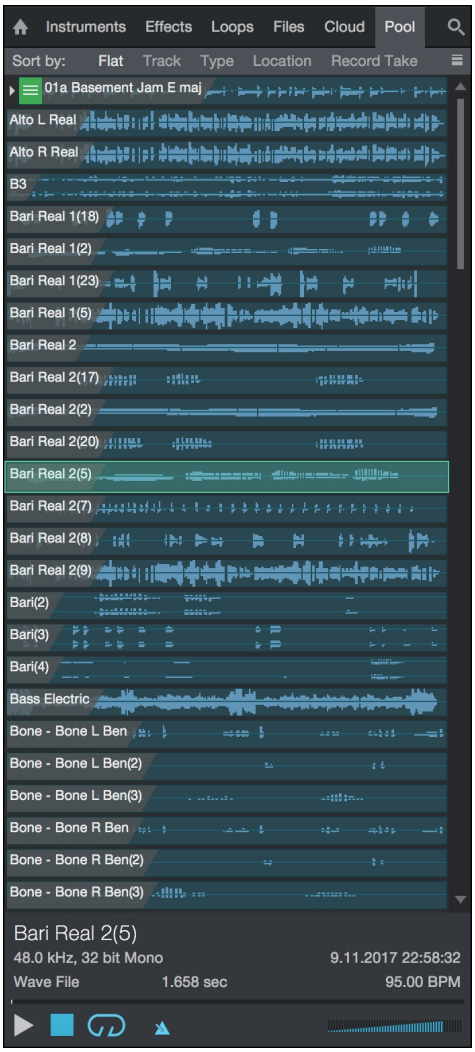
Shop tab

The PreSonus Shop is a centralized store for commercial Studio One content. Here you can find new plug-in instruments and effects, sound libraries, and more.

Click on the Shop tab in the Browser to explore its contents. If you are not already signed in to your PreSonus user account, you can click the [Sign In] button at the bottom of the Browser and enter your account credentials to log in.

Once you're signed in, you'll see the current offerings in the Shop and be able to purchase and use content to fit your needs. The optional **Thumbnail and Gallery views** can help you quickly identify the content. Click on a product in the list to see its price and other useful information. When you have selected a product to buy, click the [Buy] button and follow the provided instructions to complete your purchase.

The Pool



When you import an audio file or record on an Audio Track, 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 contains 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.

Navigate the Pool

The Pool displays audio Clips as waveforms. You can zoom in or out on these waveforms by manipulating the Pool's Data Zoom control. Clips can be sorted using the Sort by... options at the top of Pool. The following sorting 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 instrument-oriented Sound).
- **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.

File Management in the Pool Tab

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

- **Rename File** Rename the file associated with the currently selected Clip.
- **Locate File** Locate a file for the currently selected Clip (e.g., to find a missing file).

- **Show in Explorer/Finder** 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.
- **Delete Attachments** Permanently delete any attachments 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 appears, with file options. A new file is created for each selected file, replacing the original file in the Pool. The original file is retained 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 Files** Remove any Clips from the Pool that are not currently used in the Song. This does not delete the files.
- **Show Media Folder in Explorer/Finder** Open the Media Folder for the current Song in Windows Explorer or the Mac Finder.

Using Audio Files from the Pool

The audio Clip associated with any Event in your Song is always 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 or video from the Pool into the Arrange view, as you would when importing any file **from the Browser**.

Some audio clips in the Pool show an attachment icon:

- Music Loops imported to Tracks show the musical performance as an attachment.
- Audio clips with transformed Event FX show the original Event as an attachment.
- Audio clips edited with Melodyne show the detected notes as an attachment.

Files with attachments are marked with a paper clip icon. Click the triangle button to the left of a file to display all attachments. Attachments can be dragged separately into the Arrangement, or deleted using the Delete command in the [Right]/[Ctrl]-click contextual menu. Note that no undo is possible after deleting an Attachment, so before doing so, please ensure that the files you delete are no longer needed elsewhere.

Importing 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 find and make use of these files from the Pool.

To import a file into the Pool, drag it to the Pool from the Files tab of the Browser, or from Windows Explorer or the Mac Finder.

To quickly copy all external files used in your Song to the Song's Media folder, [Right]/[Ctrl]-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 are copied and placed into the Media folder.

Enable the "Ask to copy external files when saving Song" option in *Preferences/Locations/User Data* if you'd like to be given the option to copy any new external media files to the Song's media folder when saving a Song.

Backing Up and Sharing Your Songs

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 archive and email or transfer the archive.

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 re-use 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 Studio One tab (which contains all of your Songs, Projects, and associated files, by default) or to the location you have chosen for these files. Open the Songs or Projects folder to locate the Song or Project file you're looking for. [Right]/[Ctrl]-click the Song or Project file and choose Show Package Contents from the pop-up menu to gain access to its internal assets.

Each file in the list has a navigation arrow next to it that, when clicked, exposes 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, a Synths folder that contains the settings for any virtual instruments, and an External Devices folder that holds settings for any external devices used.

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

Arranging

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

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

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 8 bars, or you might want a four-bar synth melody to continue for 12 bars. You can use the Duplicate function to quickly copy and paste any Event in this fashion.

To Duplicate an 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 is copied, and a new instance of the Event is placed precisely at the end of the original Event. With Snap engaged, when an Event is duplicated, the new instance of the Event is placed at the next logical Snap position. For example, an Event approximately one bar in length is 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 recorded.

When working with Instrument Parts, you can use a special type of duplication called Duplicate Shared, in which copies are made of a Part, that are linked to the original Part, reflecting any changes made to the original or any Shared duplicates. For more information, see the **Duplicate Shared** section.

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.

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 duplicates 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 (complete) from the Track menu. If multiple Tracks are selected when the Duplicate function is used, each of the selected Tracks is duplicated. To select multiple Tracks in order, select a Track, hold [Shift], and then press the Up or Down Arrow keys to select adjacent Tracks.

You can also duplicate a Track by [Right]/[Ctrl]-clicking its control area and choosing Duplicate Track or Duplicate Track (complete) from the pop-up menu.

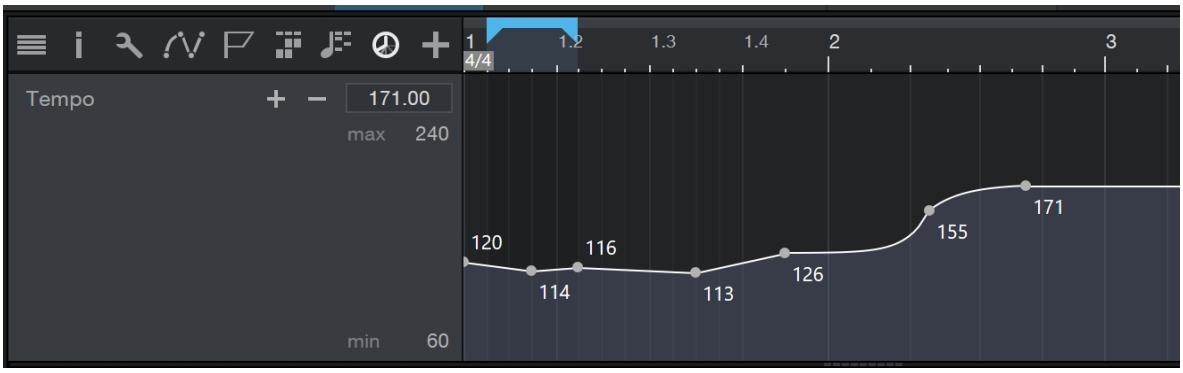
Alternatively, you can duplicate selected Tracks by holding [Ctrl] on the keyboard and clicking-and-dragging the Tracks up or down in the Track Column. Holding both [Ctrl] and [Alt] lets you duplicate Tracks along with their Events. A horizontal blue line appears in the Track Column while dragging the Tracks to indicate the Duplicate function, as opposed to simply reordering Tracks in the Track Column.

Duplicating Instrument Tracks

By default, duplicating an Instrument Track creates a second Instrument Track that sends its note data to the instrument on the original track. This comes in handy when you wish to have several Tracks of note data, all addressing the same Instrument (discrete Tracks for each drum type in an instance of Impact, for example).

If you want to completely duplicate an Instrument Track (including its instrument and effects plug-ins and settings), use the Duplicate (Complete) command in the Track menu, or Duplicate Track (complete) in the contextual menu reached by [Right]/[Ctrl]-clicking the control area of the Track in Arrange view.

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. Tempo changes do not affect your ability to sync recordings to the tempo, as the click track and all other elements in Studio One follow the tempo dynamically as it changes.

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 Arrow or 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, in much the same way you can with other automation types in Studio One.

To change an existing tempo value in the Tempo Track, click-and-drag your chosen point with the Arrow tool. To enter a specific tempo, [Right]/[Ctrl]-click a point and type a number into the value field.

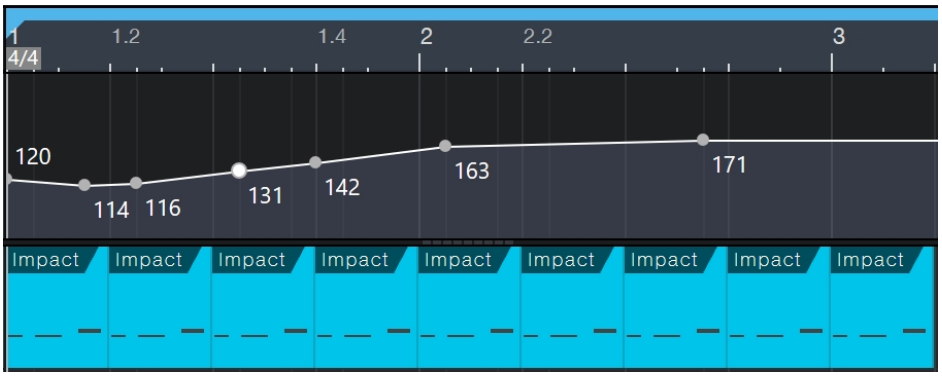
Tempo smoothly changes between points on the Tempo Track. To create a curve, hover the mouse pointer over the middle of a line segment until a small handle appears. Drag the handle up or down to change the shape of the curve. You can also click-and-drag any point left or right across the Timeline to reposition the tempo change in the Tempo Track.

The value set by the tempo change continues for the rest of the Song or until the next tempo change. Also, the tempo value in the Transport is immediately updated at the appropriate time, according to each tempo change.

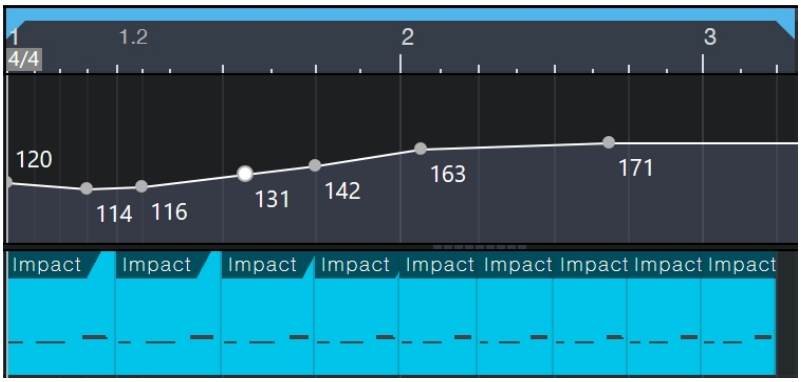
If the related Audio Tracks are in Timestretch mode, Audio Events are stretched dynamically to reflect any tempo change on the fly, with no need to split or otherwise edit the Events.

Beat-Linear vs. Time-Linear Timebase

Given this flexibility with smooth tempo changes over time, you may appreciate these two visualization options, accessible by right-clicking in the time ruler above the tempo track and navigating to Timebase/Beat-Linear or Timebase/Time-Linear.



When Beat-Linear is selected, all bars in your Song are shown with the same length, while the time scale of the timeline shifts to match your tempo changes. For example, with the timebase set to Seconds, as the tempo changes, the spacing between seconds changes even as the space between bars remains the same.



When Time-Linear is selected, bars in your song change their visual length to represent the shortening or lengthening effect of tempo changes. With the timebase set to Seconds, you'll see that the spacing of seconds remains the same, even as the space between bars changes.

Set Tempo Range

By default, Studio One shows you a range from 60-240 BPM in the Tempo Track. However, in most cases, Songs do not require that amount of tempo range, and you may find it useful to narrow the scope of the display. This makes fine-tuning tempo changes easier and more accurate.

To set the range of the Tempo Track, double-click in the "max" and "min" fields to the left of the Tempo Track. Enter your new maximum and minimum BPM values, and watch the display focus in on your chosen tempo range. Changes to these settings are saved with the current Song.

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 are 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 or [Right]/[Ctrl]-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 is affected by the time signature. The downbeat and other beats determine the sample and level used for the Accent and Click, respectively.

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]/[Ctrl]-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 is 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.

Arranger Track

The Arranger Track is an arrangement tool that lets you work with portions of your entire Song as though they were individual Events, and rearrange them quickly and easily. This saves you the time and challenge of traditional editing, which can be difficult when dealing with many Tracks at once.

Using the Arranger Track

The Arranger Track sits at the top of the Arrange view, and you can show or hide it by clicking the Open Arranger Track button, which looks like this: At first, the Arranger Track is empty, showing that no Arranger Track sections have been defined in your Song. Once you define sections, you can freely move them along the timeline, insert them between other sections, copy/cut and paste, or delete them.

These actions are performed across all Tracks in your Song that exist in the time covered by the section, including all Events, Parts, Markers, tempo changes, and automation data.

Defining the Sections of Your Song

To define a section in the Arranger Track, follow these steps:

1. If the Arranger Track is not visible, click the Open Arrangertrack button to show it.
2. Enable the Paint tool, or press and hold [Ctrl]/[Cmd] to temporarily switch to the Paint tool while leaving a different tool selected.
3. Click-and-drag in the Arranger Track, over the part of your Song you wish to define as a section. A section of the Arranger Track is marked, signifying that the section of the Song is now defined in the Arranger Track.

Each new Arranger Track section is given a default title, but you can enter a new title by [Right]/[Ctrl]-clicking the section and double-clicking its title in the pop-up menu, then typing the new title into the provided text field.

To change the color of a section, [Right]/[Ctrl]-click the section, then click on the colored square in the pop-up menu to choose a new color.

To remove the Arranger Track definition from a section of your Song, select the section and press [Backspace] or [Delete], or [Right]/[Ctrl]-click the section, and choose Delete from the pop-up menu.

To remove an Arranger Track definition as well as the time on the timeline that it covers (along with any Events or Parts that lay within it), [Right]/[Ctrl]-click the section in the Inspector or Arranger Track and choose Delete Range from the pop-up menu that appears.

Timebase Button

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

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

Editing Sections in the Arranger Track

Once you've defined the sections of your Song, you can begin working with them. Using the Arrow tool, you can accomplish the following actions:

- **Move** Click-and-drag a section to move it to a new location on the timeline.
- **Move Arranger Track Section Only** Click-and-drag a section, then press and hold [Ctrl]/[Cmd] and [Alt]/[Option] to move only the Arranger Track section, without any of the content that sits within it, to a new location on the timeline.
- **Insert** Click-and-drag a section between two other sections. When a line appears between the sections, let go of the mouse button to insert the section there. This automatically moves the sections to the right of the insertion point forward in time, to make space for the inserted section.
- **Replace** Click-and-drag a section over another section. Let go of the mouse button to delete the existing section and replace it with the new section.
- **Partially Replace** Click-and-drag a section over another, longer section while holding [Shift]. Position the section at your location of choice within the larger section, and let go of the mouse button to replace that portion with the new section.
- **Copy/Cut and Paste** Select a section and copy or cut it, using the standard keyboard shortcut ([Ctrl]/[Cmd]-[C] to copy, [Ctrl]/[Cmd]-[X] to cut) or by [Right]/[Ctrl]-clicking the section and choosing Copy or Cut from the pop-up menu. Place the cursor in your chosen place in the timeline, and either press [Ctrl]/[Cmd]-[V] to paste the section, or [Right]/[Ctrl]-click on the timeline and choose Paste from the drop-down menu. You can also click-and-drag a section while holding the [Alt]/[Option] key to create a copy of the section. Let go of the mouse button to place the copy in your location of choice.
- **Create Markers from Arranger Sections** [Right]/[Ctrl]-click a section in the Arranger Track and choose Create Markers from Arranger Sections from the pop-up menu to create markers in the Marker Track that coincide with the titles and placements of the sections in the Arranger Track.
- **Select Events in Section** [Alt]/[Option]-double-click a section to select all Events and Parts across all tracks, within the bounds of the section. You can also do this by [Right]/[Ctrl]-clicking a section in the Arranger Track and choosing Select Events in Section from the pop-up menu.
- **Delete Range**[Right]/[Ctrl]-click a section and choose Delete Range from the pop-up menu to delete the range of time that the section covers, and all content within it, from the Song. Any content to the right of the deleted section is moved to meet the content in the preceding section.
- **Zoom** Double-click a section in the Arranger Track to locate the transport to the start of that section, and zoom the view to show the section in full.

Arranger Track Sections and Scratch Pads

You can drag defined sections of your Song from the Arranger Track into a Scratch Pad for safe keeping or for later use, much like you can with normal Events and Parts. Simply clicking-and-dragging a section into a Scratch Pad creates a copy of that section in the Scratch Pad, with all elements and data intact. If you would rather move a section to a Scratch Pad, rather than copy it, hold [Alt]/[Option] while dragging.

You can also [Right]/[Ctrl]-click any section in the Arranger track and choose Copy to new Scratch Pad from the pop-up menu to create a new Scratch Pad containing a copy of the section. Alternately, choose Move to new Scratch Pad to remove the section from the main timeline, and create a new Scratch Pad containing the section.

For more information on working with Scratch Pads, see the **Scratch Pad** section.

Arranger Track Inspector View

When you've selected an item or area in the Arranger Track, the Track Inspector shows a list of all defined sections in your Song, as well as any sections currently contained in a Scratch Pad. You can perform actions on the sections in this list much like you can in the Arranger track.

To locate the transport to the start of a section, click the section in the Inspector list, or double-click to the left of the section to locate the transport and start playback from the start of the section. A playback cursor appears to mark the section that is now playing. To rename a section, double-click its name in the list and enter the new name into the provided field.

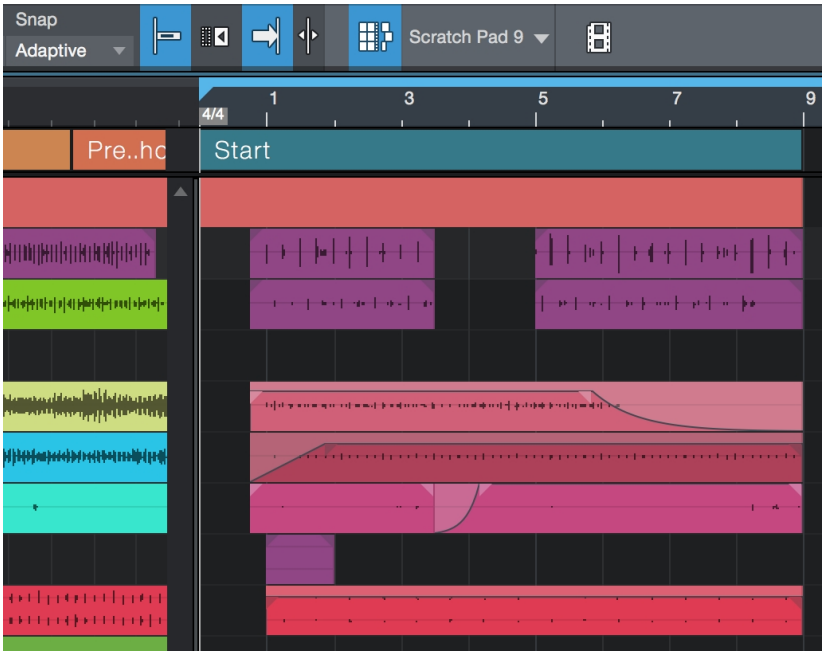
To copy a section to a new location, drag the section from the list to the location of your choice in the main timeline or onto a Scratch Pad. [Right]/[Ctrl]-click any section in the list to access a pop-up menu with other section-editing commands as outlined in **Editing Sections in the Arranger Track**.

Arranger Track Sections and Marker Track Markers

For flexibility, you can automatically create Arranger Track sections based on currently placed Marker Track markers, or vice-versa. To create Markers based on Arranger sections, [Right]/[Ctrl]-click an Arranger Track section and choose Create Markers from Arranger Sections from the pop-up menu. Markers are created marking the start and end of each Arranger section.

To create Arranger sections based on currently placed Markers, [Right]/[Ctrl]-click in the Marker Track and choose Create Arranger Sections from Markers from the pop-up menu. Arranger sections are created, beginning at each Marker location, and ending at the location of the next Marker in the timeline.

Scratch Pad



The Scratch Pad is an editing tool in Studio One. Scratch Pads act as quick storage to hold Events, Parts, and entire Song sections for later use or re-use, reducing clutter in the Arrange view as you assemble your Song. Scratch Pads look and act much like the Arrange view timeline, sharing the same editing capabilities and displaying the same set of Tracks.

When a Scratch Pad is visible, it is displayed to the right of the Arrange view. Because they act like alternate timelines, clicking the ruler above a Scratch Pad changes the focus of the transport to the Scratch Pad. Playback then begins inside the Scratch Pad when you press Play. To switch back, click on the ruler above the Arrange view. This can be done even during playback.

Scratch Pads and the content placed within them are stored with the current Song.

Creating a Scratch Pad

To create and display a Scratch Pad for you to work with, click the Scratch Pad button, which looks like this: Once a Scratch Pad exists in the current Song, the Scratch Pad button changes to reflect that fact, and looks like this: You can click the Scratch Pad button to show or hide the Scratch Pad display.

You can delete or create additional Scratch Pads as needed by clicking the triangle next to the Scratch Pad button and choosing the Add Scratch Pad or Delete Scratch Pad option from the pop-up menu.

Just one Scratch Pad can be displayed at a time, but you can switch to any other by clicking the triangle next to the Scratch Pad button, and selecting the Scratch Pad of your choice from the pop-up menu.

To rename a Scratch Pad, double-click its name in the **Arranger Track Inspector**, and enter the new name into the provided text field.

Working with Content in a Scratch Pad

To copy Events, Parts, or Arranger Track sections to a Scratch Pad, simply click-and-drag them into the Scratch Pad window. To copy content from a Scratch Pad to the main timeline, click-and-drag it into the Arrange view. If you wish to move an Arranger Track section into a Scratch Pad, removing it from the main timeline, hold [Alt]/[Option] as you click-and-drag the section.

Editing within a Scratch Pad works very much like within the Arrange view, as outlined in **Editing**.

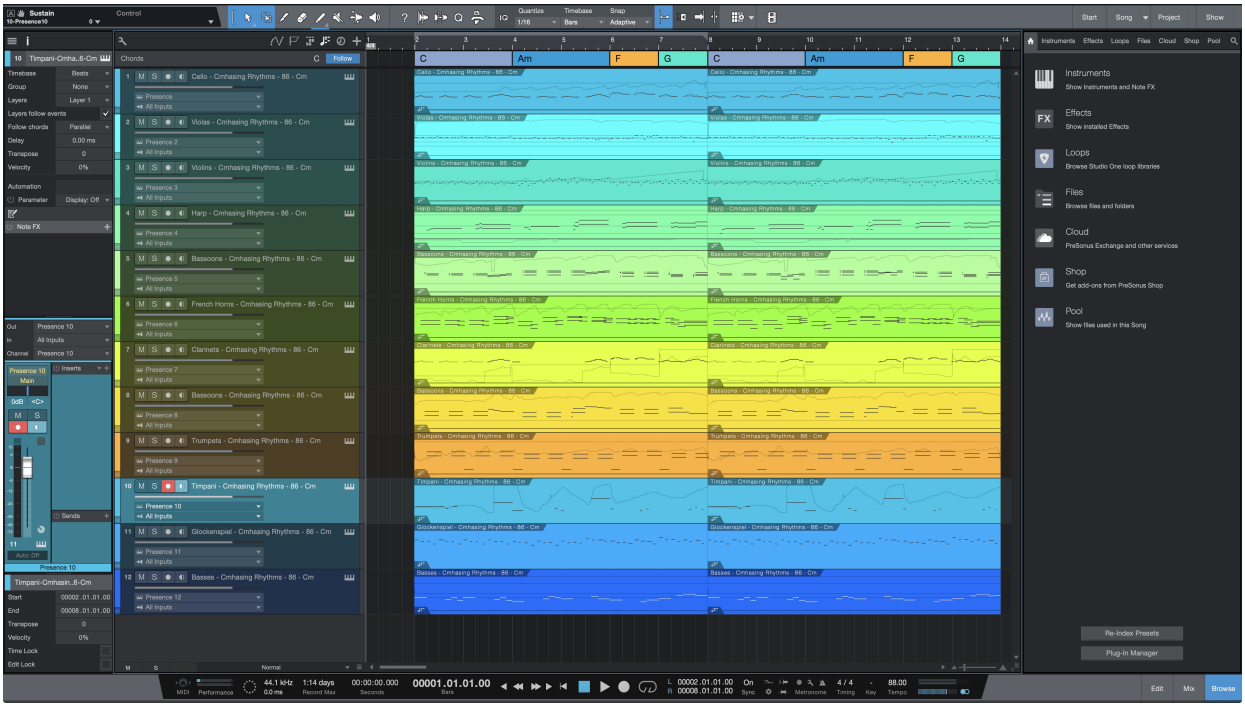
Loop Playback within a Scratch Pad

Each Scratch Pad has its own loop cycle range setting, distinct from the main timeline. The default loop length is four bars, but you can shorten, lengthen, or move the loop range within the Scratch Pad timeline as needed, as described in **Looping During Mixing**.

Using the Listen Tool with Scratch Pads

You can use the Listen tool to audition Events and Parts in Arrange view, in sync with content playing back from the Scratch Pad. To do so, while the transport is playing, select the Listen tool and click on the desired Event or Part in Arrange view.

Chord Track



The Chord Track is a global track (similar to the **Arranger track**) that provides the ability to perform "harmonic editing" of both Instrument and Audio Parts. This restructuring of chord progressions can affect an entire song, or only the Tracks of your choice. This lets you write

musical content with a chord progression that appeals at the time, and make sweeping changes later, without exhaustive editing or re-recording of Parts.

Want to modulate that final chorus for a little extra push of energy, or rethink the harmonic structure of a composition in progress? The Chord Track lets you try these sorts of changes on a whim.

While the Chord Track is capable of very powerful effects, it does have its limits, primarily in that audio cannot be pitch-shifted without some level of artifacts added. We recommend that once you're done experimenting and "prototyping" your song, you re-record any audio parts to fit the new chord progression, especially if they are critical parts.

To show or hide the Chord Track, click this button, above the arrangement view: To toggle the effect of the Chord Track on or off for all affected Tracks, click the [Follow: On/Off] button.

Getting Started with the Chord Track

First, set the key signature of the song to ensure proper chord display in the Chord Track. To do this, click the [Key] button in the Transport and select the key of your choice from the pop-up selector that appears.

You can also automatically derive the key signature of your song from any Instrument Part. To do so, select the Part, then navigate to *Event/Detect Key Signature* (or [Right]/[Ctrl]-click the Part and navigate to *Instrument Parts/Detect Key Signature* in the pop-up menu that appears).

Once you've set your key signature, you can begin to populate the Chord Track with chords. This can be done manually, or by automatically detecting the chord structure of your song from its Instrument or Audio Parts.

If any one Instrument or Audio Part in your Song contains musical content that spans the entire length of the Song, you can use that Part alone to auto-detect the chord progression. Otherwise, you may find it useful to export a mixdown of your song, re-import the mixdown to an Audio Track, and use that track as the basis for **chord detection**. Once that's done, you can remove the mixdown Track.

Next, we'll learn how to add, delete, and edit chords in the Chord Track.

To add chords manually, select the Paint tool (or hold [Ctrl] to select it temporarily) and click inside the Chord Track. You can also add a chord by double-clicking in the Chord Track with the Arrow tool.

Each new chord section you add is one bar long by default, or the length of the current selection in the timeline. You can change the length of a chord by clicking one of its ends and dragging it to the desired length. If adding chords with the Paint tool, you can also click-and-drag in the Chord Track to create longer chords.

Once you've added a chord, you can change it to a different chord or variation in a variety of ways. Try double-clicking a chord to open the Chord Selector. This window lets you choose from all of the main chord types and extensions. Keep in mind that the Chord Track cannot add notes to chords played in affected Parts. It can only shift the notes that exist. If you want to select a chord with 7, 9, 11 or other extensions, you will only hear those notes if the chords in your Parts contain four or more notes.

If you enable the Instrument Input option by clicking this button you can play a chord on any connected MIDI keyboard to change the selected chord. The Chord Selector then shows you the name of the chord you've played, and the current chord changes to match. With Instrument Input enabled, you also can select one or more chords in the Chord Track and play any chord shape on a MIDI keyboard to change all selected chords.

Next to the Instrument Input button is the Audition Chords button. When enabled, each chord you select will be played for you. This is a great way to audition different chords to hear how they sound. A Gmaj7sus4 chord might be perfect right there.

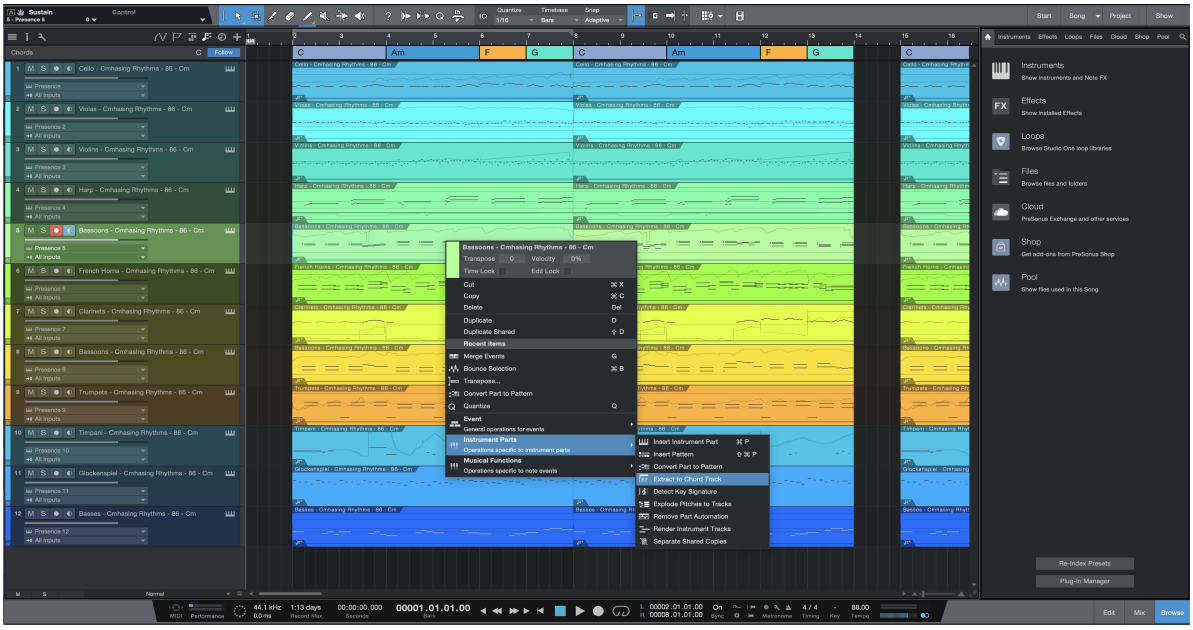
Here are some other features you may want to try:

- See if adjacent chords work well together by clicking the Chord Track arrows in the upper left corner of the Chord Selector window.
- Build complex chords by holding [Alt]/[Opt] and clicking more than one of the Intervals buttons. If a song calls for a Gm13 add 11, it's yours.
- If you want to see a C# chord somewhere instead of a Db chord, for example, click the Root note in the Chord wheel to toggle between the two. This may be faster sometimes than selecting it in the dropdown Root menu on the right.

When you're done editing a chord, you can close the Chord Selector or select another chord in the Chord Track and continue editing.

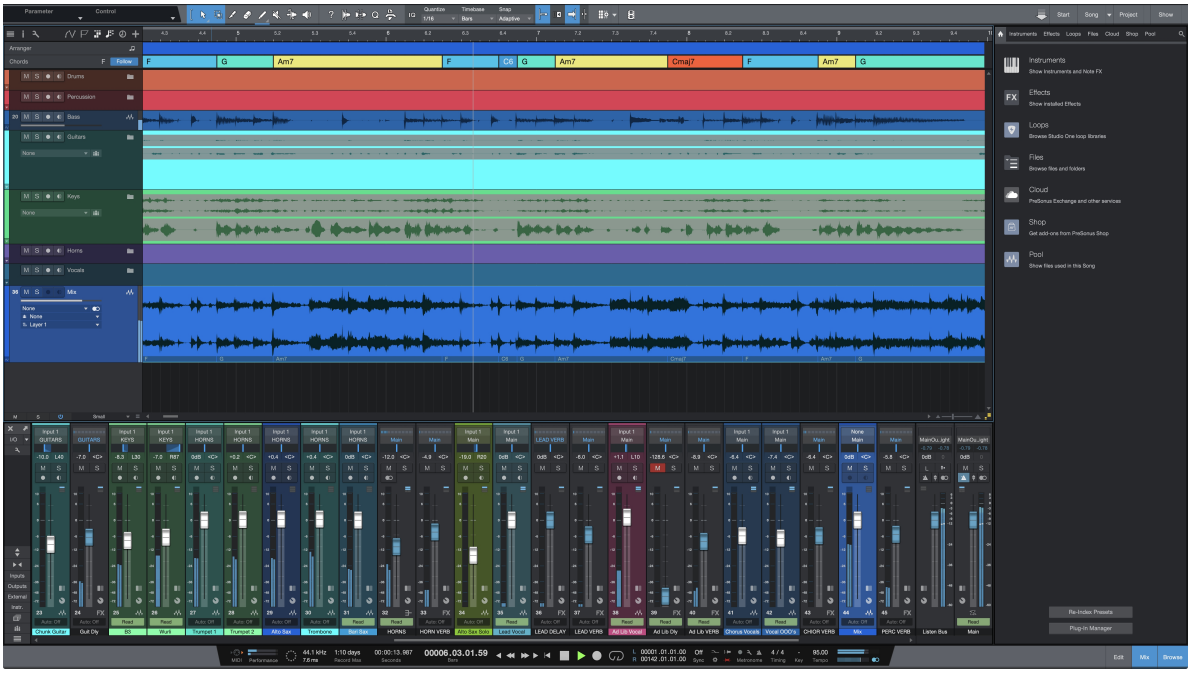
To delete one or more chords from the Chord Track, select them and press the [Delete] or [Backspace] key on your keyboard.

Extracting Chords from Instrument Parts



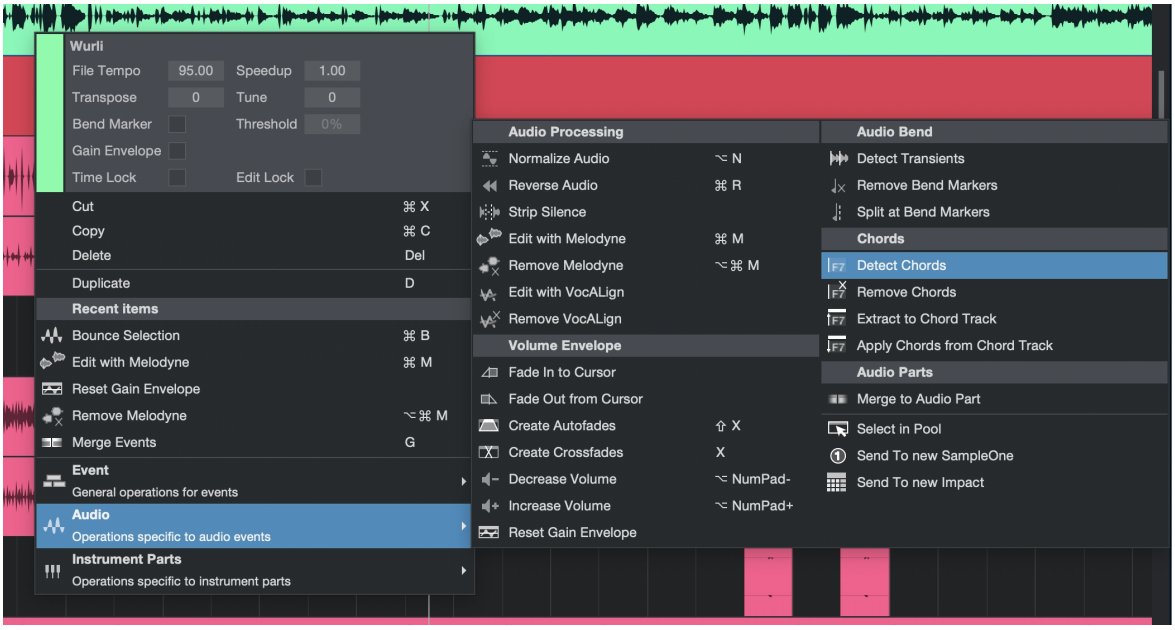
One simple way to become familiar with the Chord Track is to populate it with the chord structure from one or more Instrument Parts. [Right]/[Ctrl]-click on a Part (or multiple selected Parts) in the timeline, then choose [Extract to Chord Track]. This function analyzes the musical relationships of the notes in the selected content, and fills the Chord Track with the chords it recognizes.

You can also simply drag selected Instrument Parts (single or multiple, across as many Tracks as you like) onto the Chord Track to extract their shared chord progressions. This is one easy way to detect chords across a large area of your Song, especially if you're using different Instrument Tracks (with distinct instruments and sound) in each section.

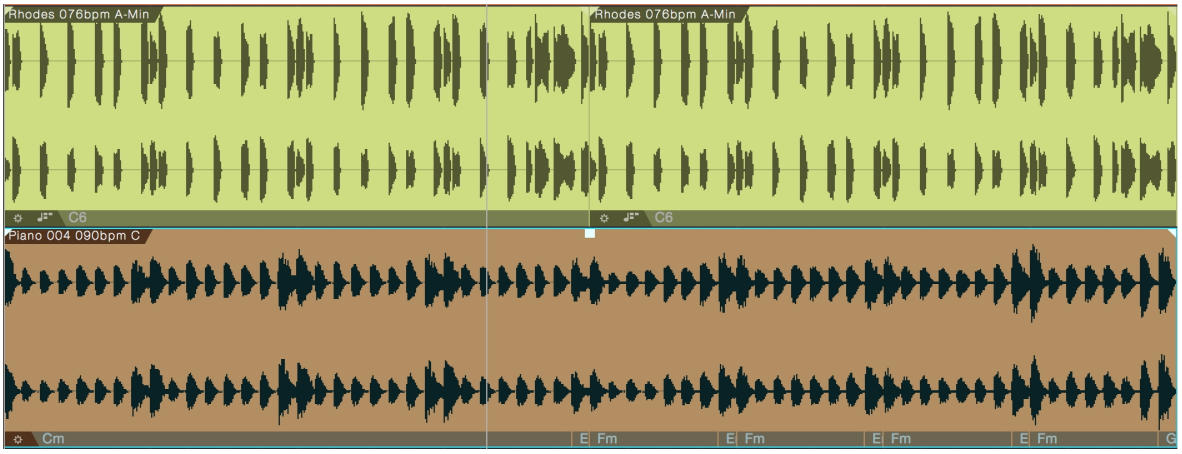


Some types of note data can cause the Extract to Chord Track algorithm to choose chords inaccurately. If you notice any errors, feel free to edit or replace chords using the methods described in **Entering and Editing Chords Manually**.

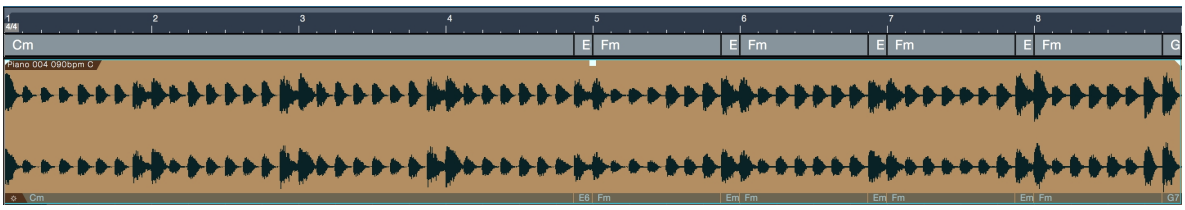
Extracting Chords from Audio Parts



You can also extract chord information from Audio Parts. To do this, select an Audio Part and navigate to *Audio/Detect Chords* (or [Right]/[Ctrl]-click the Part and navigate to *Audio/Detect Chords* in the pop-up menu) to analyze the harmonic structure of the Part. Once completed, you can see the detected chords along the bottom edge of the Part.



To apply the detected chords to the Chord Track, select the Part and navigate to *Audio/Extract to Chord Track* (or [Right]/[Ctrl]-click the Part and navigate to *Audio/Extract to Chord Track* in the pop-up menu).



The extracted chords are then visible in the Chord track, and can be changed and edited as needed. As with Instrument Parts, some types of audio information can result in incorrect chord detection. If you notice any errors, feel free to edit or replace chords using the methods described in **Entering and Editing Chords Manually.**

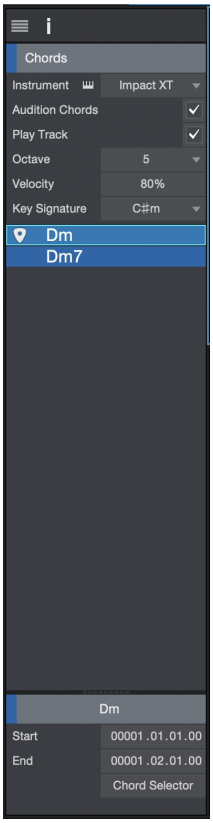
Apply Chords from Chord Track

Some audio data doesn't lend itself easily to automatic chord detection, and if the wrong chords are detected, harmonic changes made in the Chord Track may not bring the desired result. If you find that one or more of your audio tracks do not show the proper chords after

using Detect Chords, here is a good way to get around that.

First, detect the chords for that section of the song from another source that detects more accurately. If no Instrument or Audio Parts seem to work, you can try entering the chords manually or with a MIDI keyboard. Then, select the Audio Part that you could not accurately analyze, and navigate to *Audio/Apply Chords from Chord Track* (or [Right]/[Ctrl]-click the Part and navigate to *Audio/Apply Chords from Chord Track* in the pop-up menu). This applies the chord designations from the Chord Track to that Audio Part, ensuring that when it is pitch-shifted during harmonic editing, its notes are shifted more accurately.

The Chord Inspector



While working in the Chord Track, you can open the Chords Inspector (by clicking the "i" button above the timeline). This reveals a wealth of features and information, including the Instrument Output for the Chord Track and the chord progression of the Song. Working from top to bottom:

- **Instrument** Specify the default instrument for the Chord Audition feature by selecting one from the menu. You can use the Preview instrument, any instrument in the Song, or choose an Instrument or Preset from the Browser and drag-and-drop it onto header of the Chord Track. This will become the new default preset for auditioning chords. Click the small keyboard icon to open/close the Instrument view.
- **Audition Chords** This button is linked to the "speaker" button in the Chord Selector window; toggle one and the other will toggle also.
- **Play Track** Enable this to hear the Chord Track play along with the Song. This will help confirm whether the chords entered manually match the Audio Events, for example.
- **Octave** Select the center octave for the Audition Chords.
- **Velocity** Click-and-drag or double-click the field to set the velocity at which the Audition Chords will play. The range is from 0 to 100.
- **Key Signature** This menu is linked to the Key Signature in the Transport, and opens an identical window.
- **Chord Progression** All of the chords in the Song are listed in order here. It's a quick way to select a Chord near the end of the Song, for example, without having to locate it in the Chord Track.
- **Chord Color** Use this field to select a different color for the selected Chord in the chord progression. It's faster and more specific than finding that Chord in the Chord Track and using [Right]/[Ctrl]-click, although that method also provides other features (see Replacing Chords below).

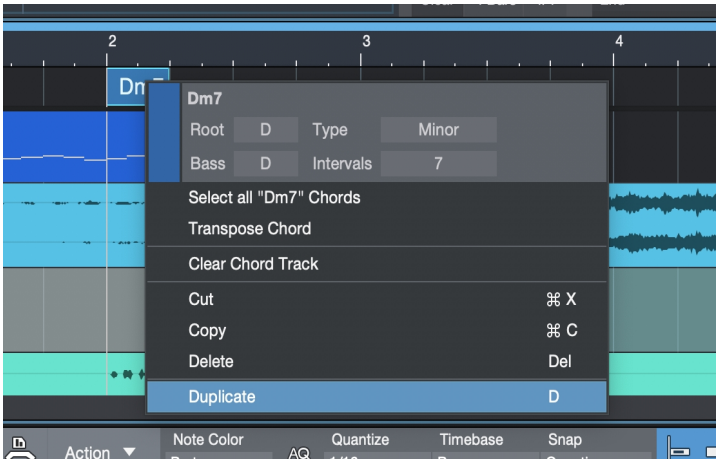
- **Start/End** You can set the duration of the selected chord with great precision using these fields.
- **Chord Selector** This button opens and closes the Chord Selector window.

Quantizing the Chord Track

Once you've populated the Chord Track with chords, you may find it helpful to quantize the start positions of those chords. To do so, select the chords you want to quantize, and navigate to *Event/Quantize/Quantize on Track*.

Often, chord changes do not happen precisely on-beat, especially when working with live recorded audio. After quantizing chords, you may find it helpful to subtly shift the start and end positions of each chord to minimize unnatural shifting behavior and better match the movement of the performance.

Replacing Chords



Let's say you like a particular chord better than the one you've been using and want to replace it throughout the Song. [Right]/[Ctrl]-click any one of those chords in the Chord Track to open a menu. You can quickly change the chord root, type, bass note, and intervals here, along with the following options:

- **Chord Color** Use this field to select a different color for this Chord wherever it appears in the Song.
- **Select all "Dm" Chords** Note: D minor is used here as an example, but the actual name will be that of the selected chord. This field allows you to substitute a new chord for the old one throughout the Song. Select this option and the menu will close, then use the Chord Selector to select the chord you prefer.
- **Transpose Chords** Enter the number of chromatic steps by which the selected chord should be transposed throughout the Song.
- **Clear Chord Track** This option will delete every chord in the Chord Track.
- **Cut, Copy, Delete** These are standard functions. A chord can be pasted elsewhere in the Chord Track by selecting a new location in the timeline, using [Right]/[Ctrl]-click, and selecting Paste.
- **Duplicate** This option will place the selected chord in the next measure, overwriting any chord that is already there.

Quick Chord Tricks

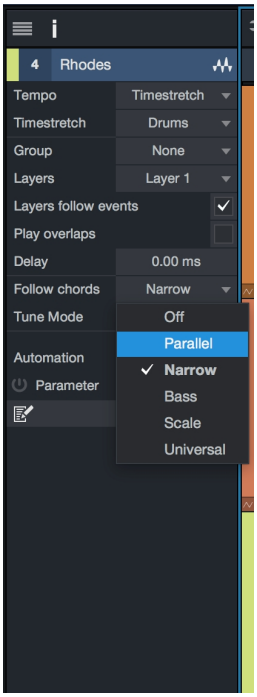
You can cut, copy, paste, and delete one or more chords from the Chord Track the same way you'd perform other Studio One functions with your computer keyboard. To paste a chord elsewhere in the Chord Track, select a new location in the timeline, use [Right]/[Ctrl]-click, and select Paste from the menu.

The [D] key can be used as a quick way to paste multiple copies of the selected chord or chords in a row. Then minor adjustments can be made to each without having to define the root note, for example. This method will overwrite any chords in its path, so proceed with caution.

Setting Chord Follow Behavior

By default, the Tracks in your Song are unaffected by the Chord Track. To allow a Track to change its harmonic structure along with the Chord Track, you must enable one of the Follow Chords modes for that Track.

Follow Chords



If you select a Track with the Inspector shown, you'll see its Follow Chords selector. This selector offers the following modes, each with its own style of operation:

- **Off** The default mode. The Chord Track has no effect on a Track in this mode.
- **Parallel** In this mode, chords in the affected Track are shifted in parallel, aligning the root note of the musical content with the root of the target chord. This maintains chord note relationships in the musical content, which may result in some out-of-key notes.
- **Narrow** In this mode, notes in the affected Track are shifted to the nearest note in the current chord in the Chord Track.
- **Bass** This is a special mode for monophonic bass Parts. In this mode, all notes are shifted to the bass note of the target chord.
- **Scale (Audio Tracks only)** In this mode, notes in the affected Track are snapped to the nearest scale note in the target chord.
- **Universal (Audio Tracks only)** This mode does not require the use of the Detect Chords feature before use. In this mode, notes in the affected Track are forced to follow the scale notes of the target chord.

Tune Modes (Audio Tracks only)

Each type of audio material reacts to pitch shifting in a different way. For this reason, you have a choice of Tune Modes that help to optimize the algorithm for each type of source: **Bass Guitar**, **Guitar**, **Piano**, **Brass**, **Lead**, and **Strings**. Whatever your source, feel free to try different modes until you get the most pleasing result. The Tune Mode selector can be found in the Inspector when an Audio Track is selected.

Keep in mind that Tune Modes do not affect the way that the Chord Track shifts the harmony of a Track. They only affect the way the shifted audio sounds.

Harmonic Editing with the Chord Track

Now that you have chords in the Chord Track, and some Instrument and Audio Parts to go with them (with Follow Chords modes selected), it's time to get into some harmonic editing. To do this, simply select one or more chords in the Chord Track and change them in one of the ways described in Entering and Editing Chords Manually. You can enter a chord using a connected MIDI keyboard, double-click a chord to change it with the Chord Selector, or change its parameters in the Inspector. You can add, delete, and change the lengths of each chord to suit the changes you wish to make.

You can also shift the root note of one or more chords by selecting the chords, holding [Alt]/[Opt], and moving the scroll wheel on your pointing device (or using the scroll gesture on your trackpad).

As you experiment with harmonic editing you may notice that certain chords cause undesired results on certain tracks, whether simply creating unpleasant note movement, or with audio, unwanted pitch-shifting artifacts. To help alleviate these issues, feel free to try the various

Follow Chords and Tune Modes, or simply tweak the chords in the Chord Track. Sometimes adding additional intervals or changing to a different Bass note can make all the difference.

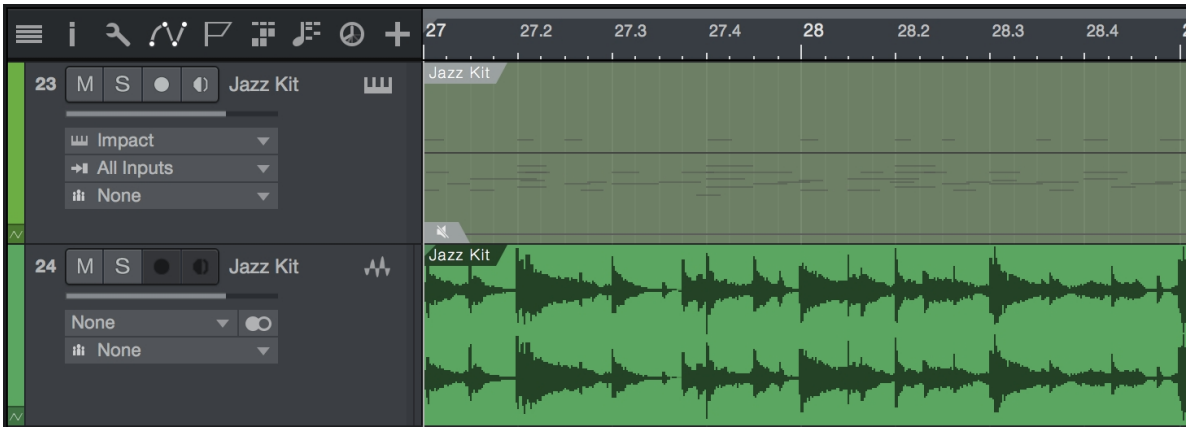
Remember that you can always switch the effects of the Chord Track on or off for the entire song at once by toggling the [Follow: On/Off] button, to the left of the Chord Track.

Bouncing

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.

To quickly bounce any Instrument Part to an Audio Track, select the Instrument Part, and then select Bounce Selection in the Event menu or simply press [Ctrl]/[Cmd]+[B] on the computer keyboard. This renders the selected Instrument Part to a new Audio Event and places it at the correct Timeline position on a new Audio Track. Note that the Instrument Part's active Insert Effects, as well as Volume and Pan settings, are rendered to the new bounced audio file. The new Audio Track is created without Inserts, and with Volume and Pan set to their defaults.



When an Instrument Part is bounced, the Part is muted, since the new Audio Event is taking its place. The Instrument Part is 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 is 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 Events, or press [G] on the keyboard.

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.

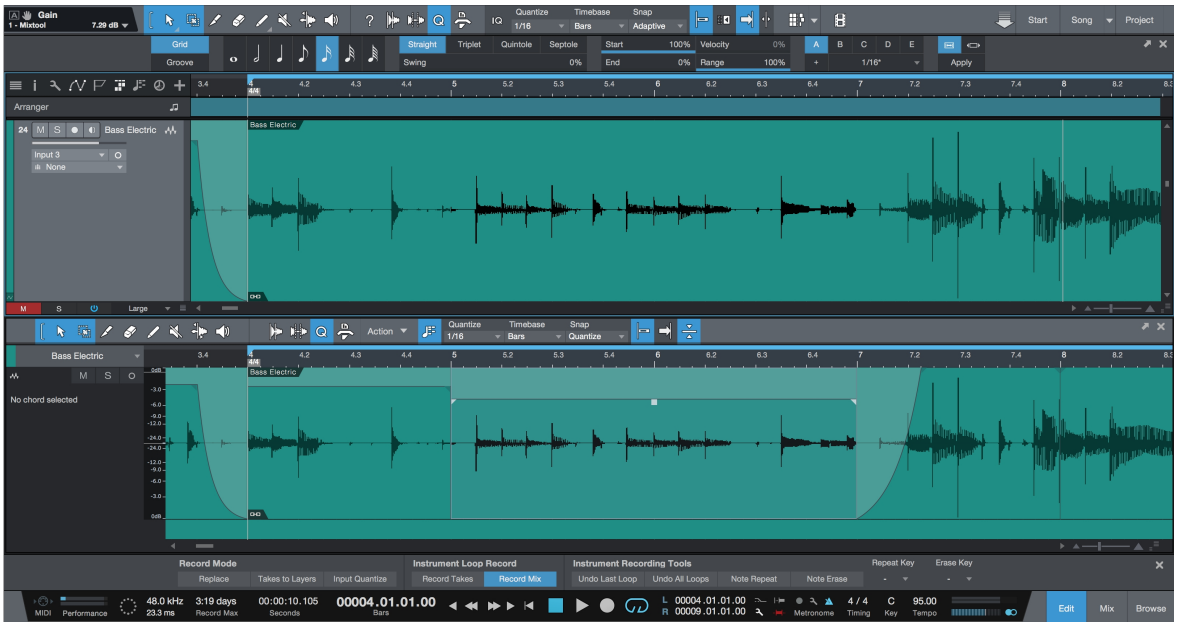
In this case, it may be helpful to render some or all of the contents of a Track to a single, continuous, new Audio Event. To do this, select the desired Audio Events and press [Ctrl]/[Cmd]+[B], or select Bounce Selection from the Event menu. A new Audio Event is created for each Track that has an Event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

Note that Bounce Selection 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 does not affect what you hear; it is simply an organizational tool.

Similarly, drag-and-drop any Audio Event or selected range of audio to a location in the File Browser to export an audio file to that location.

Creating Audio Parts

It is also possible to clean up the arrangement by using Audio Parts, where multiple separate Audio Events can be placed into a single container in the arrangement, while keeping the separate Events accessible in the Audio Editor. To do this, select multiple Audio Events in the arrangement and then press [G] on the keyboard, or [Right]/[Ctrl]-click and select Event/Merge Events from the contextual menu.



If you drag-and-drop an Audio Part from the arrangement to the File Browser, an Audio Loop is exported. For more information on Audio Loops, refer to the **Editing** chapter.

To dissolve an Audio Part so that the separate Audio Events are again accessible in the arrangement, [Right]/[Ctrl]-click on the Audio Part and select Audio/Dissolve Audio Part from the contextual menu.

Bounce to New Track

You can create a new Audio Track from a selected Instrument or Audio Track which includes all Insert effects, by selecting Bounce to New Track from the Event menu, or pressing key command [Ctrl]+[Alt]+[B] in Windows, or [Option]+[Cmd]+B in macOS.

You can also right/[Ctrl]-click on an Event and chose the function from the Events sub-menu.

Bounce File Management

Every Bounce operation creates new audio files that are placed into the Pool for the current Song.

Mixdown Selection

Sometimes, it can be useful to mix down Events from multiple Tracks to a new Track within your Song, such as when you want to consolidate a group of backing vocals or drum elements to a single Track. To do so, first select the Events you want to mix down, across as many Tracks as needed. Then choose Mixdown Selection from the Events menu, or [Right]/[Ctrl]-click one of the selected events, and choose Mixdown Selection from the pop-up menu.

The resulting mixed-down Track is placed after the last selected Track.

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 to insert silence. With the range selected, press [Ctrl]/[Cmd]+[Alt]+[I] on the keyboard to insert silence in that range.

Any Events that were in the range where silence was inserted are split, if necessary, and moved to the right across the timeline. If automation data is present, it is moved to follow the Events. Hidden Tracks are not affected, in this case.

If your chosen range of Tracks spans all Tracks in the arrangement, global parameter settings (such as tempo changes, time signature changes, and markers) follow the Events, as well. Hidden Tracks are not affected, in this case.

You can also add time to the arrangement without making a selection. Simply place your cursor at the time in the arrangement that you want the silence to be inserted, and press [Ctrl]/[Cmd]+[Alt]+[I]. A window appears which lets you specify a range of time to insert silence. Hidden Tracks are split and moved just like visible Tracks, in this case.

Deleting Time from the Arrangement

It can be very useful to remove a section of the arrangement, while simultaneously moving any material that comes after the removed section back in time, rather than leaving a gap of silence. To do this in Studio One, select a range with the Range tool and then select Delete Time from the Edit menu or press [Ctrl]/[Cmd]+[Alt]+[D] on the keyboard. You can Delete Time from a single Track, or from any number of Tracks you select across using the Range tool. Automation data for all affected Tracks is split, trimmed, and moved to match the new Event position. Hidden Tracks are not affected by this operation.

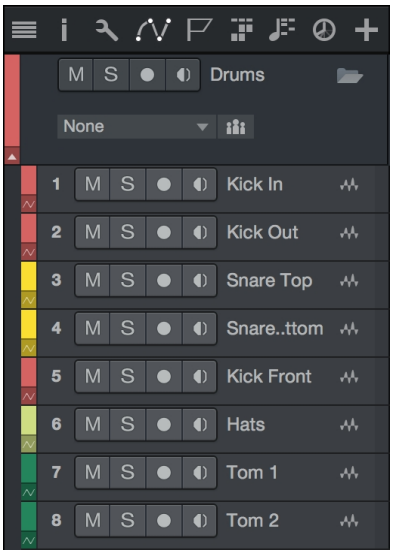
If no range is selected in the timeline, the Delete Time command brings up a dialog that lets you specify start and end times for the time deletion.

Folder Tracks

Keeping the Arrange view organized can be critical to workflow, and Folder Tracks have traditionally helped in this area. Studio One's Folder Tracks also include Grouping and Busing options, extending improvements to editing and mixing workflow.

Create a Folder Track

If organizing existing Tracks, the simplest method of placing the Tracks into a new Folder Track is to select them all in the Track Column, then [Right]/[Ctrl]-click and choose Pack Folder from the contextual menu. This creates a new Folder Track and place all of the selected Tracks in it. Alternatively, you can drag-and-drop any Track onto an existing Folder Track. It is also possible to create a Folder Track from the *Tracks/Add Tracks* dialog, just like any other Track. Folder Tracks can contain Audio, Instrument, Automation, and even other Folder Tracks.

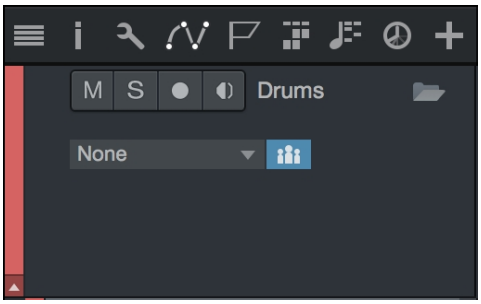


Clicking on the Folder icon on a Folder Track shows and hides the Tracks within the Folder in the Arrange view.

Note that Folder Tracks also have Mute, Solo, Record, and Monitor Enable buttons. Clicking on these engages the appropriate action for any Track within the folder.

Folder Track Grouping

Clicking on the Group icon on a Folder Track creates a Group with the name of the Folder Track and places all Tracks it contains into the Group. This is exactly the same as selecting all of the Tracks and grouping them with [Ctrl]/[Cmd]+[G]: The Tracks are selected together in the Console and Arrange views, and the Events on the Tracks are edited together. If the Group icon is engaged on a Folder Track, clicking on it again removes the Group.



If a Track is already in a Group prior to being placed in a Folder Track, and the Folder Track Group is engaged, the Track is placed in the Folder Track Group when it is placed in the Folder Track. If removed from the Folder Track, a Track retains its Group setting.

Folder Track Editing

When a Folder Track is collapsed, a single "Event" with lanes representing each Track in the Folder across the arrangement is displayed. It is possible to directly edit this consolidated Event, including Size, Move, Cut, Copy, Paste, and Duplicate. This ability saves time in cases where simple edits do not require viewing a particular Track in the Folder or even grouping the Tracks within.

Folder Track Busing

Clicking on the Bus selection box to the right of the Group icon on a Folder Track allows the selection or creation of a Bus Channel. Choose from an existing Bus Channel, or add a Bus, to switch the output for all Tracks contained in the Folder Track to a Bus Channel. If adding a new Bus Channel, the Bus takes the name of the Folder Track.

If a bus selection is made, the Folder Track acts as an effects-drop target for the Bus Channel when dragging effects from the browser onto the Folder Track.

As with Folder Track grouping, if the Folder Track has a Bus Channel selection, any Track added to the folder is routed to that Bus when placed in the Folder Track. If removed from the Folder Track, a Track keeps the Bus as its Output Channel selection.

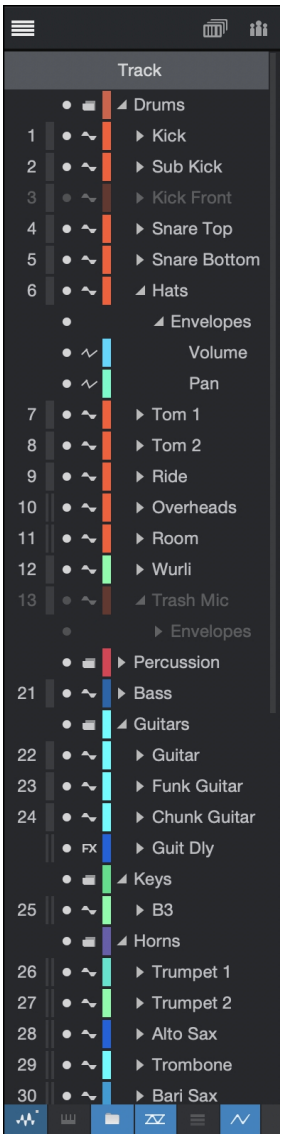
For Instrument Tracks, the Track's related Audio Channel is routed to the Folder Track Bus Channel. The related Audio Channel is the one shown in the Inspector under the Out and In selections for an Instrument Track. As noted elsewhere in this manual, the Audio selection for an Instrument Track is purely organizational and allows Studio One to accomplish workflow enhancements like the aforementioned. If a virtual instrument is using multiple Output Channels, you should take the time to organize which Instrument Tracks routed to that virtual instrument are related to which Output Channels in the Inspector.

Folder Track Nesting

When Folder Tracks are nested—that is, when one Folder Track is placed inside another—the Folder Track Grouping and Busing options still only apply for the Tracks within each folder. Here is an example:

Tracks 1 through 8 are in Folder Track A, which has Group enabled and is routed to Bus A. Tracks 9-12 are packed to a new Folder B, Group is enabled there, and a new Bus B is created. Folder B is then dragged into Folder A. The Tracks in Folder B are still grouped in Group B, and are still routed to Bus B. The only difference is organizational: Hiding Folder A Tracks also hides Folder B.

Track List



The Arrange view Track list is opened by clicking on the Track List icon in the upper left corner of the Song page. The Track list gives an overview of all existing Tracks. Each Track has a drop-down arrow next to it that, when clicked, displays related Tracks, Envelopes, and Layers.

Level meters to the far left of Track names indicate levels during playback for every Track. You can click-and-drag the Track icon next to the Track name to change the Track order. If any Track is in a Group, the Group name is displayed next to it in the Group column of the Track List.

Tracks can be hidden or shown by clicking the round button to the left of the Track name. Click-and-drag quickly through the round buttons to hide or show any number of Tracks. Hiding a Folder Track also hides all of the Tracks it contains. Hidden Tracks are not visible in the Arrange view, but they remain faintly visible in the Track List.

Icons for each Track type are visible at the bottom of the Track List. Click them to hide or show all Tracks of that type.

The Track List can be synced to the Console Channel List, so that any Tracks hidden or shown in the Track List have their related Audio Channels hidden or shown in the Console, and vice versa. This is done inside the Channel List Options window.

The Track List and Groups

Tracks can be placed in a Group 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 moved, the relative timing between the Tracks remains intact.

The quickest way to create a Group is to select the desired Tracks and use [Ctrl]/[Cmd]+G. For additional details on working with Track Groups, see **Edit Groups**.

The Track List and Scenes

Scenes provide an easy way to save and recall different configurations of Tracks and Channels, as well as different settings for the FX, etc. For example, let's say you have defined a Scene called "Drums." Selecting that Scene recalls the show/hide settings, which shows the selected drum Tracks and Channels and hides all of the others. You can then make as many changes as you like to this Scene, save those as another Scene, and then go back and forth between them to see which you prefer. Any number of Scenes can be saved and recalled within each Song.

Scenes are accessed through the Show Scenes button at the top of the Track List. There's also a Show Scenes button available in the Console navigation panel. For details, see the **Scenes** section of the Mixing chapter.

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 different types of Channels, and the use of Inserts and Sends. Further information on mixing with Studio One can be found throughout this manual.

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 Large 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.

Channel Features

The following features are common to all Channels.

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 below it. All Channels are configured with Main Out as their Output by default.

Audio Channels show the hardware audio input selection. Instrument Channels display the name of the virtual instrument from which they get their input. Bus and FX Channels display a graphical count of the number of Tracks assigned or sent to them, rather than a discrete display of input channels, as their input source is usually from multiple Channels. Click on the Input area on a Bus or FX Channel to display a pop-up list of all assigned/sent Tracks. Clicking on a Track in this list selects and expands that Track in the Mix view.

Click on any Input or Output to display and choose from a list of available routing options for any Channel. If several Channels are selected they can be assigned instantly to the same Input or Output by making a selection for any one of the selected Channels. It is also possible to assign all selected Inputs or Outputs in ascending order based on the audio hardware configuration.

Clicking on the Input for an Instrument Channel opens the interface for the source virtual instrument.

Panner and Fader

All Channels feature a horizontal panner and vertical volume 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 volume fader can be click-and-dragged vertically to control the output volume for each Channel. Numerical values may also be entered for pan and volume.

Studio One uses a -3 dB pan law for all channel panning. On stereo Channels, the panner adjusts the balance of left and right signal levels.

Mute/Solo

Solo mode is also known as Solo-in-Place, or SIP. 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 selected Channels. Muting silences the Channel's audio from the Console so you won't hear it. Soloing silences all except the audio for the soloed Channel, so you only hear the soloed Channel. Any number of Channels can be muted or soloed at one time.

When using the [M] or [S] keys to mute or solo an Instrument Track that has a virtual instrument attached to it, mute or solo is applied to the note data Track in the Arrangement view, rather than to the audio Track in the Mix view. [M] and [S] have no effect on Bus or FX Channels (see Solo Safe below).

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 recalls 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.

Solo Safe

It is possible to place Console Channels in Solo Safe mode. When any Channel in the Console is soloed, all Channels with Solo Safe engaged are also soloed, and all other Channels are muted. To engage Solo Safe on any Channel, [Shift]-click on its Solo button in the Console. The Solo button is green when Solo Safe is engaged.

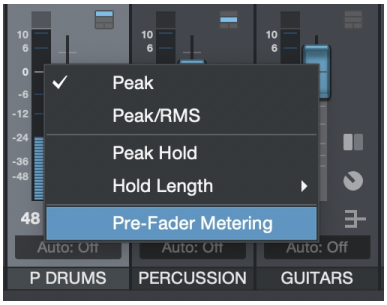
Note that FX Channels have Solo Safe engaged by default because effects may be critical to how soloed Channels sound in the mix.

Metering Mode

Each Channel has a level meter to provide a visual display of audio levels. Several metering modes are available: Peak, Peak/RMS, and Pre-Fader Metering. To select the metering mode, [Right]/[Ctrl]-click inside the meter of any Channel.

Peak and Peak/RMS modes are described in the **Metering** section of this manual. They are mutually exclusive. Note that this selection does not affect the metering mode of the Main Out or Sub Outs. Either mode can use Pre-Fader Metering.

Pre-Fader Metering is not enabled by default. When it is enabled, the level meters show levels independent of fader position. When it is disabled, the level meters respond to fader position. This is known as Post-Fader Metering. The selection you make will be applied globally to all Channels including the Main Out and Sub Outs.



Copy/Paste Channel Settings

It is possible to copy the settings of one Channel in the Console and paste them onto another Channel. This allows you to carry the level, panning, and insert/send effects between Channels in the current Song, the Channels of other Songs, and even to the Channels in Show mode. Any Channel type can be a source or destination: Audio, Instrument, Aux, Bus, VCA, or Master, with the exception of the Listen Bus.

This is as simple as using the normal copy/paste commands: select a Channel, use [Ctrl]/[Cmd]+[C] to copy its settings, select another Channel, and use [Ctrl]/[Cmd]+[V] to paste the settings.

These commands are also available in the contextual menu: [Right]/[Ctrl]-click a Channel and you'll see those options near the top of the list.

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.

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.

Insert and Send Device Racks

Each Channel in the Console can have its own set of Device Racks. Audio, Instrument, and Bus Channels include Insert and Send Device Racks; FX Channels only have an Insert Device Rack. Send Device Racks can be hidden or displayed: Open the Console options (the wrench-shaped button) and change the setting of the Sends/Cue mix option inside Channel Components. Note that the Insert Device Racks are hidden in Small Console mode.

In Large Console mode the Insert and Send Device Racks can be sized vertically by clicking-and-dragging on the divider between them. Hold [Shift] while dragging the divider to change the size of the Insert Rack for a single Channel. Double-click the divider to unify the Insert Rack size for all Channels, or hold [Ctrl]/[Cmd] while dragging the divider.

Channel Types

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.

Audio

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

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 has a corresponding Channel in the Console.

Aux

An Aux Channel allows an external audio source to be controlled by the Console without the need for an associated track. The incoming audio can be processed by the native plug-in effects, and its volume can be controlled through the sample-accurate automation provided by Studio One. For more information, see **Set Up an Aux Channel**.

Bus

The audio output of multiple Channels can be routed directly to a single Bus Channel. This lets you create a submix 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.

Bus Channels can be mono or stereo. Click the Channel Mode button in the Bus Channel to select the desired option.

FX

FX Channels are what are traditionally known as effects return channels, used to apply effects to multiple signals simultaneously through the use of Sends. 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 plug-in inserted, so that all of the instruments sound like they are in the same physical space.

Dragging an audio effect or FX Chain to the Send slot of a Channel in the Console creates a new FX Channel with the same name as the effect or FX Chain, and routes audio from the original Channel to the new FX Channel, via a Send.

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 has 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 generally listen to this output when monitoring your mix, as this is the output from which exported mixdowns 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**. Other configured hardware outputs are represented in the Console by a type of Output Channel called a Sub Out. Sub Outs appear to the right of the mixer when the Outputs panel is open.

The Main Out and Sub Out Channels feature Metronome controls, allowing independent metronome on/off and level control for each hardware output. Note that every stereo Output Channel also features a Mono switch to allow for quick summed-mono monitoring, which is commonly used to check a mix for mono compatibility.

Console Options

Click the Options button (shaped like a wrench) to bring up a menu with options that let you shape the behavior of the Console to suit your needs and organizational style. The following options are available:

Grouping Options

- **Keep FX channels to the right** Enable this to cause all FX Channels to be placed together, at the right end of the Console. This can aid in keeping track of FX Channels in a large-scale Song.
- **Keep bus channels to the right** Enable this to cause all Bus Channels to be placed together, at the right end of the Console. This can aid in keeping track of Bus Channels in a large-scale Song.
- **Keep VCA channels to the right** Enable this to cause all VCA Channels to be placed together, at the right end of the Console. This can aid in keeping track of VCA Channels in a large-scale Song.
- **Preserve order of channels with folder track** Enable this to ensure that any Bus Channels that are associated with a Folder Track remain next to the Folder Track's enclosed Channels when the Keep Bus Channels to the Right option is enabled.

Visibility Options

- **Link show/hide of Track List and Console** Enable this to link the show/hide status of the Track List and the Console. When you hide an item in the Track List or Console, it is hidden in the other as well.
- **Link expand/collapse of Folder Tracks with show/hide** Enable this to hide Console Channels associated with a Folder Track when the Folder Track is collapsed in the Arrange view.
- **Auto-expand Selected Channel** When enabled, this option makes it easier to view expanded Channels in the Console one at a time. Double-click the first Channel to expand it, and when the next Channel is selected, two things happen: The currently selected channel auto-expands, and the previously selected channel collapses. If you hold [Alt]/[Option] and click the second Channel, the previous Channel does not collapse.
- **Colorize Channel Strips** Enable this option to apply channel color coding to full channel strips in the Console. Normally the color only shows on the channel labels.
- **Colorize Plug-in Header** Enable this option to apply channel color coding to the open editor window of a plug-in. This is handy when the same plug-in is being used for several Console Channels (the PreSonus Compressor, for example).

Channel Components

Audio device controls (when a suitable PreSonus audio interface is connected).

- **Audio device controls** This option can be accessed when a suitable PreSonus audio interface is connected.
- **Input controls** Enable this option to display the Input Gain and Polarity Invert controls at the top of each Channel in the Console. These are present for every Channel Type except Output Channels and VCA Channels. The controls are described in the Inputs and Outputs section of this chapter.
- **Sends/Cue mix** Use this option to show the Sends above the fader on each Channel in the Console. When enabled, click the + sign to select an existing destination Channel, add a new one, or make a Sidechain connection. Prefader buttons and Send Level controls are provided for each Channel.
- **I/O connections** Enable this option to display Input / Output routings above the fader on each Channel in the Console.
- **VCA connections** Enable this option to display **VCA Channel** connections beneath the meter on each Channel in the Console. When enabled, you can click this selector to assign or de-assign a Channel to any available VCA Channels.
- **Group assignment** Enable this option to display **Group** assignments above the labels on each Channel in the Console. When enabled, you can click the Group assignment field and assign the Channel to a different Group.
- **Channel notes** Enable this option to display Channel notes beneath the faders on each Channel in the Console. When enabled, you can double-click the small window and add more information about the Channel.

Solo Mode

- **Enable Listen Bus** activates the **Listen Bus**. It can provide an audio feed to the control room monitors or headphones that is separate from the Main Out Channel. The Listen Bus is completely independent from the other Solo modes.

» **Solo through Listen Bus** is independent of the Enable Listen Bus checkbox. After it is engaged, soloed Channels are routed through the Listen Bus. When it is disengaged, soloed Channels are heard through the Main Out Channel and all other Channels are muted.

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. Click one or more of the buttons to view the desired panels.

Alternative Console Layout

The Console has two viewing modes: Small and Large. Additionally, each mode can be made Narrow. 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 audible difference between the Small and Large mode, nor does detaching the Console affect its functions.

The Small Console

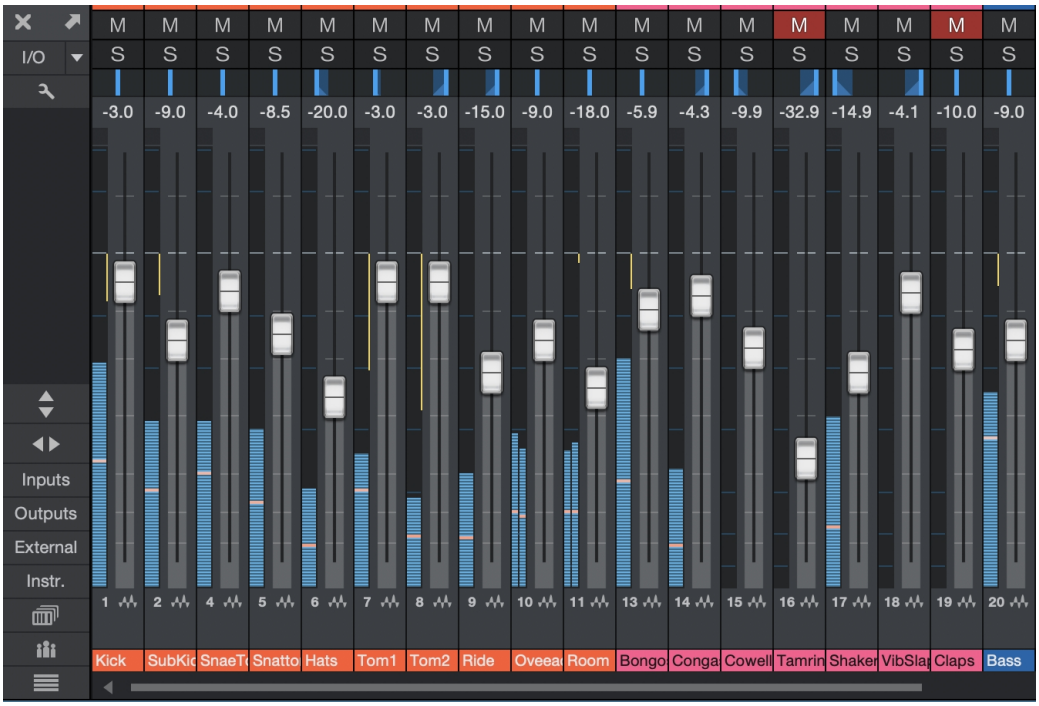
The Console is in Large mode by default. To switch to Small Console mode, click on the Small/Large button at the top of the Console Navigation column. Alternatively, you can press [Shift]+[F3] on the keyboard when the Console is open.

In Small Console mode the Insert and Send Device Racks are hidden, allowing a more efficient use of screen space. To view the Device Racks for a Channel, double-click the Expand button that appears above the Channel Editor button next to the Fader in Small mode. This expands the visible Channel to the right, revealing further Console routing possibilities. Note that the Expand button is only visible in Small mode when Normal view is selected. It is not visible in Narrow mode.

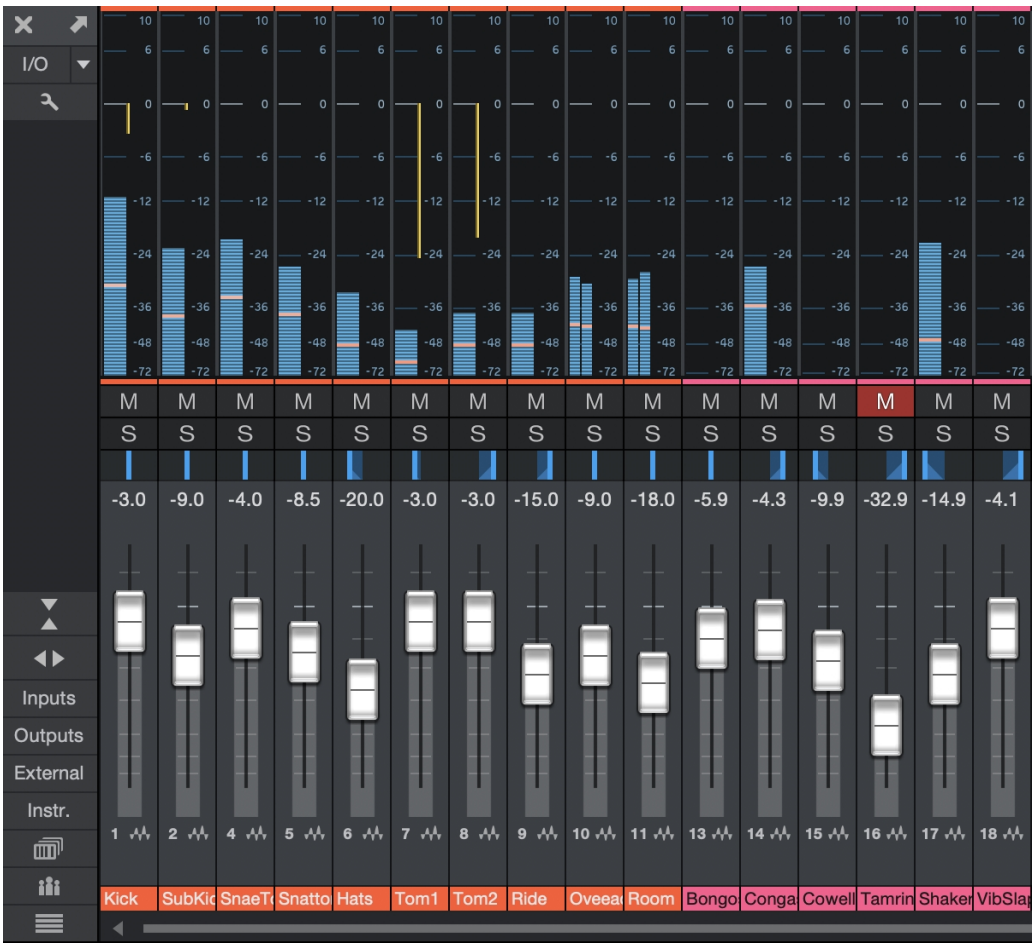
Narrow Mode

Both the Small and Large Consoles can be made narrow via the Narrow/Normal button to the far left of the Console. Narrow mode has been designed to maximize the number of visible Channels from left to right in the Console.

When in Narrow mode, the Small Console Channels change so that a volume-fade handle is overlapped on the level meter, with Mute and Solo controls above the meter. It remains possible to expand a Channel to reveal its Inserts and Sends by double-clicking in open space on the Channel.



The Large Console in Narrow mode replaces the Insert and Send Device Racks with channel level meters, in addition to narrowing the other controls. To expand any Channel to show its Insert and Send Device Racks while in Narrow mode, double-click on any open space in the channel display or use its Expand button. Doing so again collapses the display for that Channel.



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 displays Audio Channels in the Console for each configured hardware audio input, as described in the Channel Types section of this chapter.

The top of each Input Channel has controls for Input Gain and Polarity Invert. For stereo channels there will be two of each control; for mono channels there will be one. These perform the following functions:

- **Input Gain** These controls adjust the Input Gain for the signal before it is sent anywhere else. The range is from -24.0 dB to +24.0 dB in increments of 0.1 dB.
- **Polarity Invert** Click this button to invert the polarity of the signal for that Input Channel. When it is lit the polarity has been inverted. The buttons are independent for stereo Input Channels.

The Outputs panel is closed by default and can be opened and closed by clicking on the [Outputs] button in the Console Navigation column. The Outputs panel displays Audio Channels in the Console for each configured hardware audio output.

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 (or [Right]/[Ctrl]-clicking anywhere on the device) and selecting one of the following from the menu:

- **Edit** for control mapping configuration, and to set up an **Aux Channel** (external instruments only)
- **Expand/Collapse** to show/hide the Aux Channel assignments of a hardware instrument
- **Setup** for device configuration (MIDI routing, etc.)
- **Reset** to reload the device in Studio One
- **Remove** to remove the device from the list.

Click on the Add External Device button to add an external device. To quickly access the Edit dialog for a device, double-click its name in the External panel.

Instruments

The Instruments panel is open by default and is closed and opened by clicking on the [Instr.] button in the Navigation column. The Instruments panel displays all currently loaded virtual instruments, with each occupying an Instrument Slot. If an Instrument is not connected to an Instrument Track, it is grayed out.

Each Instrument Slot pop-up menu offers the following options:

- **Edit...** Select this option to open the Instrument Editor window. You can also [Right]/[Ctrl]-click the device name and select Edit, or simply double-click anywhere inside the Instrument Slot.
- **Expand/Collapse** Expand lets you choose from an instrument's available outputs (if applicable). Select Collapse to hide that information again.
- **Rename...** Allows you to rename the instrument, which can be useful when working with multiple instances of the same instrument.
- **Bypass** This lets you silence the instrument without deactivating it. The instrument remains attached to its Track, which keeps the instrument from being affected by the Remove Unused feature.
- **Favorite** Use this to designate a virtual instrument as a Favorite. Then it can be located easily in the Favorites folder of the Browser Instruments tab.
- **Store Preset...** Select this option to save the current settings for any virtual instrument as a Preset. You can enter a Name and Description for the preset, as well as specify a Subfolder within the preset list to store the preset.
- **Disable/Enable** Use this to disable an instrument if it is not needed in the Song temporarily, such as after transforming an Instrument Track into an Audio Track. This is one way to reduce the CPU load. Select Enable if you need to make changes to the Instrument Track.
- **Remove** This option removes the virtual instrument from your Song.
- **Copy to Clipboard** Use this option to Copy the virtual instrument and its preset to the Clipboard. After this it can be added to the Instruments panel of another Song or a Show. To do this, switch to the desired Song or Show and use the Add Instrument from Clipboard command, which is inside the menu at the top of the Instruments list.
- **Restore from Clipboard** This option is visible after having used the Copy to Clipboard option. Use it to restore the previously copied virtual instrument and its preset to the Instruments panel.
- **Send to Song/Show** This performs the "Copy/Add Instrument" routines described above with a single action. Note that there must be an existing target, such as a second Song or a Show, or this command is not visible.

Instruments that have not been used on any Tracks can be removed from the Instruments list. To do this, click the menu arrow at the top of the Instruments list and select Remove Unused. There is also an option here to disable/enable all instruments with a single action.

The Instrument Editor window

Double-clicking inside an Instrument Slot opens the Instrument Editor window. If more than one virtual instrument is present in the Song, you can switch between them using the tabs above the Instrument Editor window.

The menu at the top of the Instrument Editor window provides unique options such as **Enable MPE** and **Show in Console**, and also contains many of the features from the Instrument Slot pop-up menu: Rename, Favorite, Copy to Clipboard, Send to Show, etc.

Show Scenes

Scenes let you specify which Channels and Tracks you want to work with during a session. For example, you could create a Scene called "Drums" and recall it whenever you want to focus on the drum mix for a while. You can save multiple versions of the drum mix with different FX and EQ settings, etc., save each as a Scene, and audition them one after the other to see which one you prefer. Any number of Scenes can be saved and recalled within each Song.

Scenes are accessed through the Show Scenes button in the Console Navigation column. For details, see the **Scenes** section.

Show Groups

It is possible to group multiple Channels together so that when one of the faders within the Group is moved, they all move. Their movements are relative to one another, so that the correct dB value relationships are maintained.

Groups are accessed through the Show Groups button in the Console Navigation column. To learn more, see the **Groups** section.

Channel List

Click the Channel List button to view a list of the Channels that can be shown or hidden in the Console. If a Channel is in a Group, the Group name is displayed next to it in the Group column of the Channel List.

Click the round button next to any Channel name in the list to show or hide that Channel. Click-and-drag quickly through the round buttons to hide or show any number of Channels. Hidden Channels are not visible in the Console, but they remain faintly visible in the Channel List.

Icons for each type of Channel are visible at the bottom of the Channel List. Click them to hide or show all Channels of that type.

The Console Channel List can be synced to the Track List, so that any Tracks hidden or shown in the Track List have their related Audio Channels hidden or shown in the Console, and vice versa. To do so, click the wrench-shaped Options button in the Channel List and enable the Link Show/Hide of Track List and Console option.

Remote Bank

The [Remote] button appears when the Channel List is open. The Remote Bank is a special Scene that governs which Channels are shown and available for manipulation on a connected control surface. Click the [Remote] button to show this scene, then show/hide tracks as necessary to set which channels are available for control. To hide the Remote Bank, click [Remote] again.

Detach the 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. All of the features described above and in the **Groups** and **Metering** sections of this manual are available when the Console is detached.

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 in Narrow or Normal mode. 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.

Effects Signal Routing

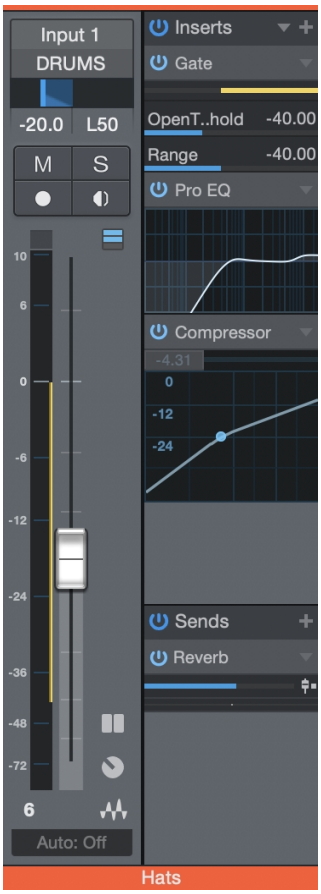
Effects processing is critical when mixing. Effects are traditionally applied to audio via an Insert or a Send.

Inserts

Inserts are used to apply an effect directly to a single Channel or Bus. Insert effects are literally inserted into the audio signal chain within the Channel or Bus.

Adding Inserts

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, drag-and-drop 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.



When navigating audio effects in the Browser, 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. The plug-in menu functions like a smaller version of The Browser, giving you sorting options, and access to the Favorite and Recent Plug-ins lists. You can navigate this list using the [Arrow] keys on your keyboard. Click in the search bar and type to find plug-ins by name.

Alternatively you can choose to browse plug-ins from a basic menu. To change the plug-in menu style, go to the Console Advanced Options and select the Plug-in Menu style from the popup menu.

Editing Inserts

To edit an Insert, double-click on it in the Insert Device Rack, or click on the menu arrow (or [Right]/[Ctrl]-click anywhere on the Insert) and select Edit from the pop-up menu. This opens the user interface for the Insert effect, where you can edit the effect's parameters.

When audio effects are inserted on the same Channel, all of the plug-ins appear in tabs at the top of the plug-in header GUI. This makes switching between effects in the same Insert Device Rack and signal path quick and easy.

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

Reordering 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.

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, click on the chosen effect tab at the top of the plug-in header GUI.

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

Inserts can be also re-ordered by dragging them from one position to another in the list of Inserts at the top of the plug-in GUI.

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

Copying Inserts to Other Channels

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 scrolls the Console left or right to expose any Channels beyond those currently viewable.

It is also possible to click on the Copy button in the plug-in header GUI, then switch to another instance of the same plug-in and click on Paste to copy settings from one instance to another.

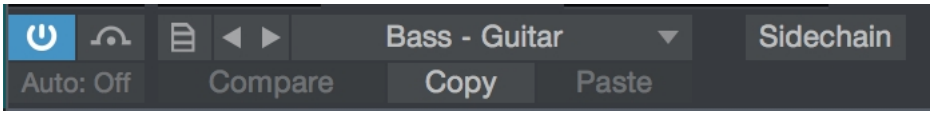
You can drag an Insert effect to any Sends Device Rack to create a new FX Channel with that effect inserted (its settings intact), and route that Send to the new FX Channel.

Moving Inserts to Other Channels

In the event that you want to move, rather than copy, an Insert to another Channel, hold [Alt] as you drag the Insert from one Channel to the other.

Compare

The [Compare] button in the plug-in header GUI allows you to compare the current settings for a plug-in to the settings stored the last time the Song or Project was saved.



This makes it possible to freely compare potential changes for a plug-in to existing settings, while retaining a quick way back to existing settings.

Bypassing, Deactivating, and Disabling Inserts

It is possible to bypass, deactivate, or disable Insert devices. When an Insert is bypassed, the audio signal is simply rerouted around the Insert, and any CPU or RAM the Insert is using remains in use. When an Insert is deactivated, it is turned completely off, which can free up CPU resources, but the process remains in RAM, enabling you to instantly turn the plug-in on/off for comparison purposes. When an Insert is disabled, both CPU and RAM loads are relieved, however, this process is not as instant as bypassing or deactivating an insert. While Insert bypassing is automatable, deactivation and disabling are not.

To bypass an Insert effect, click on the Bypass button found either in the top left of the effect's GUI header or within the effect GUI, depending on the effect.

To deactivate 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. Deactivating an Insert effect stops 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.

To disable an Insert effect, [Right]/[Ctrl]-click it in the Inserts list, and choose Disable from the context menu. Once an Insert is disabled, it cannot be activated unless it is re-enabled. To do this, [Right]/[Ctrl]-click the Insert and choose Enable from the context menu.

Activating Inserts Across Multiple Channels

If two or more Channels are selected, pressing the Activate button for any Insert on a selected channel also toggles the activation state of the Inserts in that same slot on the other selected Channels. Pressing the Activate All button at the top of the Insert list for a selected Channel makes all other selected Channels follow suit, activating or deactivating their Inserts, as appropriate.

Toggle all Active Inserts Off/On

If you wish to temporarily deactivate all Inserts across all Channels in your song, press the Activate All Inserts button at the bottom-left of the Arrange view. Press the button again to return all Inserts to their most recent activation state. In this way, you can instantly compare the sound of your Song with and without all activated Insert effects. In addition, any Insert effects or Instruments can be deactivated from the expanded Performance Monitor window using the check-box next to the Plug-in name.

Removing Inserts

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 (or [Right]/[Ctrl]-click anywhere on the device) 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.

Mix Engine FX (Studio One Professional Only)

Mix Engine FX is a plug-in format for Studio One, specializing in processing tasks that affect multiple channels in a song (such as console emulation). In the case of console emulation, most systems require you to insert a special "channel" plug-in on each channel in the song, and a "bus" plug-in across any busses. This increases the time it takes to set up a new song, and makes managing the process complex, as any changes desired for the whole mix often must be carried out across multiple channel and bus plug-ins.

Mix Engine FX centralizes this and other similar processes. You simply drop a compatible plug-in onto the Mix Engine FX slot on the Master Bus, or any other bus you wish to affect. All Channels that feed that Bus are affected by the Mix Engine FX plug-in at their source (taking the place of the "channel" plug-in), and all parameters are controlled from the one central plug-in interface (which takes the place of the "bus" plug-in).

Unlike most solutions that rely on multiple plug-ins working together, Mix Engine FX can be bypassed with just a click, allowing for easy A/B testing between dry and processed signals across the whole mix. Another advantage to this method is inter-channel processing. Because Mix Engine FX are "aware" of all channels flowing into them, effects like inter-channel console-style crosstalk are made possible.

Each Bus can have one Mix Engine FX plug-in inserted at a time.

For more information on Mix Engine FX, see **Mix Engine FX**.

Hardware Inserts

You can insert external hardware processors into Audio Channels in the Console, using the Pipeline XTplug-in (only in Studio One Professional). The Pipeline XT plug-in can be found in the PreSonus folder of the Effects Browser when sorted by Folder, Vendor, or Category.

The Pipeline XT 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 the process. You can insert an instance of Pipeline XT in any Insert Device Rack.

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

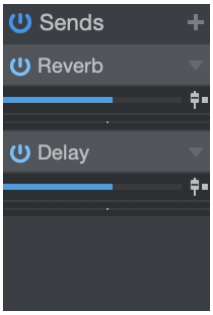
Channel Editor and Macro Controls

Each Channel in the Console has a special set of effects-related options and controls called the Channel Editor. With it, you can create complex combinations of insert effects, controlled by easy-to-access Macro Controls. For more information see **Channel Editor**.

Configuring Sends

Sends are used to route the audio output (pre- or post-fader) from one Channel to another, such as an FX Channel.

Creating a 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 creates a Send for the Channel to a new FX Channel with the selected effect loaded in its Insert Device Rack. This also works with FX Chains.

You can press [F11] to quickly open the FX view for the currently selected Channel, or press [Shift]+[F11] to open the Instrument window of a selected Instrument Track.

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.

Dragging an audio effect or FX Chain to the Send slot of a Track lets you create a new FX Channel with the same name as the plug-in or FX Chain.

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

FX Channels are routed to the Main Out Channel of the Console by default, but can be routed to any other configured hardware outputs or Bus Channels, as needed.

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

Send Level and Pre/Post Fader

Once a Send has been added to a Channel, the Send device appears in the Send Device Rack for that Channel. An Activate button, horizontal Level and Pan faders, and a Pre/Post Fader button are available. 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 -∞ 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.

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. Alternatively, the sidechain connection can be assigned inside the target insert effect. Click on the arrow button next to the Sidechain activation button, then select one or more channels from the popup menu. 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 opens and closes 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 built-in effects support sidechaining, including the Compressor and Gate. For more information, refer to the **Built-In Effects** chapter.

Sending Signals to Busses

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. This can be used, among other things, for "multing"—routing a Channel to multiple places—which is a convenient way to layer sounds.

Copying Sends to Other Channels

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 creates a Send to the same FX Channel assigned to the original Track.

The FX and Solo Safe

FX Channels have **Solo Safe** engaged by default, because effects may be critical to how soloed Channels sound in the mix. So when any Channel in the Console is soloed, the FX Channels remain active.

The Solo button is green when Solo Safe is engaged.

Navigating Effects Presets

To view the available presets for an effect, click on the preset selector in the plug-in editing window, and browse the pop-up list. To select a preset, click once on the preset in the list. The presets list remains open, to allow for easier switching between presets while auditioning. To close the list, click anywhere other than the preset list. To select a preset and close the list in one action, double-click the preset of your choice.

Once the preset list is open, you can navigate through the presets with the arrow keys. To activate a preset and leave the list open, press [Space]. To activate a preset and close the list, press [Return].

Creating and Managing Effects Presets

In the upper left area of every plug-in editing window, you'll see the Preset Menu button, which lets you create, load, and import & export presets. Click the Preset Menu button to choose from the following preset management functions:

- **Store Preset...** Saves the current effects setting as a preset, in your library in the Browser. You can enter a title and description for the preset, as well as specify a subfolder within the preset list to store the preset.
- **Replace Preset** Update the currently loaded preset with any new settings made since loading the preset.
- **Store as Default Preset** Causes the current preset to load by default whenever a new instance of the current plug-in is added to a Song.
- **Load Preset File...** Loads an exported preset file from your file system into your current Song.
- **Import Preset...** Loads an exported preset file from your file system into the current Song, and imports the preset into your Studio One library, for later use.
- **Export Preset...** Exports the current settings as a preset file, for use by others or for storage.
- **Show in Browser** Locates the currently loaded preset in the Browser.

You can also store any effect or Instrument preset by dragging-and-dropping the Insert effect or Instrument from the Console to the Browser. If dragged to a location in the File Browser, the preset is stored in that location. If dragged to the Effects or Instruments Browser, the preset is stored in your User Data location (as set in the *Studio One/Options/Locations* menu (macOS: *Preferences/Locations*) and becomes available in the preset dropdown lists of the Browser and effect or Instrument.

FX Chains

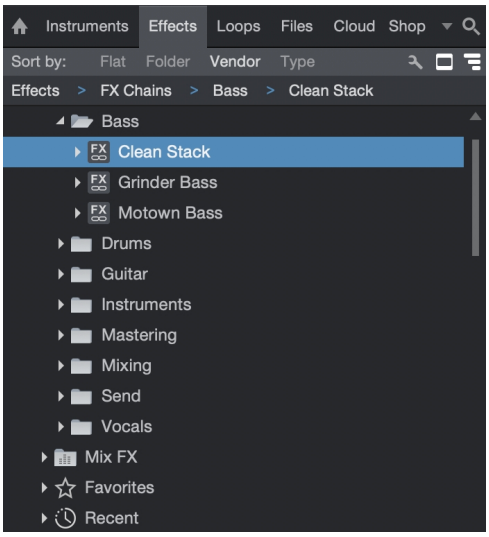
Sometimes, a favorite combination of effects can become a staple of your workflow. For instance, you might regularly apply a compressor, EQ, and chorus to your vocal tracks. FX Chains let you save the exact setup of the Inserts on a Channel, so that the entire chain of effects, including all settings, can be recalled instantly for later re-use.

To create an FX Chain:

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

Alternatively, you can drag and drop the Insert Device Rack header to the Effects Browser to instantly create an FX Chain with the name of the Channel. You can also drag and drop the Insert Device Rack header to the File Browser, to export an FX Chain as a file, with the name of the Channel. To replicate all Devices currently assigned to a Track on another Track, drag and drop the Insert Device Rack header from the source Track to the Track of your choice.

FX Chains incorporate any parallel processing you set up in the Routing view of the **Channel Editor** window. Complex multi-effects configurations with custom **Macro Controls** can be stored and recalled with ease.



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. To replace an effect in the Device Rack, drag the FX Chain on top of the device to be replaced. Drag the FX chain between plug-ins or to an open spot in the Device Rack to insert it without affecting existing device assignments.

Click on the menu arrow next to the FX Chain name in the Audio Effects Browser to view and select the individual effects. 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 loads the selected FX Chain in the Insert Device Rack.

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 drum 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]/[Ctrl]-click in blank space in the Console, or on any channel, and select Add Bus. You can also select any number of Channels, then [Right]/[Ctrl]-click on one of the selected Channels and choose Add Bus for Selected Channels to quickly create a new Bus and route the selected Channels to that new Bus.

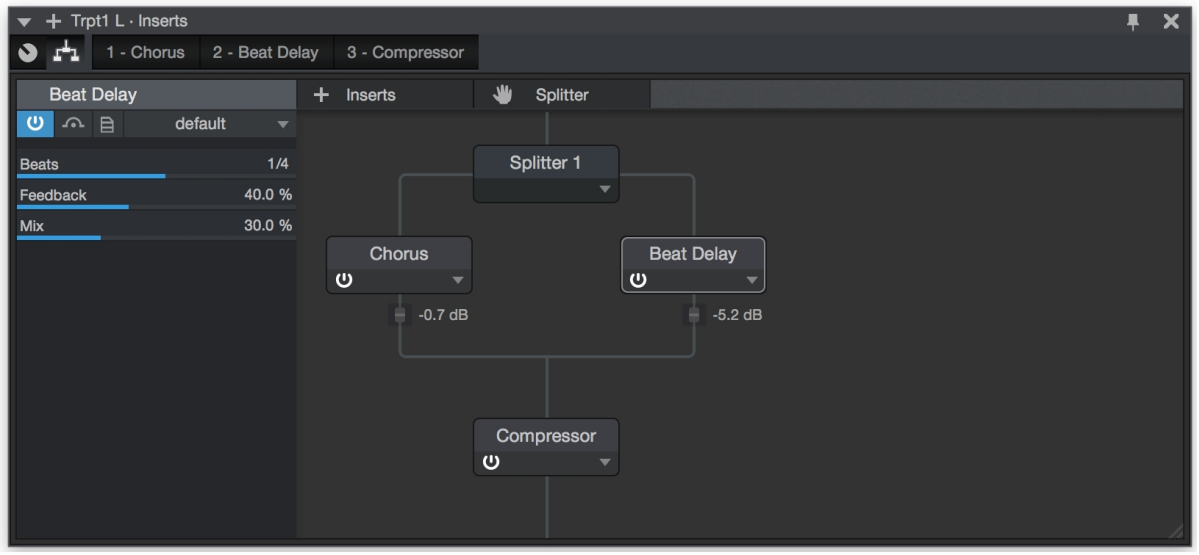
Once you have a Bus with Tracks assigned to it, you can [Right]/[Ctrl]-click the Bus and choose Hide Sources to hide all Tracks assigned to that Bus in the Console. [Right]/[Ctrl]-click the Bus again and choose Show Sources to make source Tracks visible again.

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.

It is possible to nest buses infinitely (A to B, B to C, C to D, and so on). Feedback prevention is in place so that you can't create a bus routing that would cause a feedback loop (e.g., A to B, B to C, C to A).

To remove a Bus and re-route all source Tracks to the Main Out, [Right]/[Ctrl]-click the Bus and choose Remove.

Channel Editor



Each Channel in the Console has a corresponding Channel Editor, which has two main views: the Routing view, and the Macro Controls view. The Routing view lets you control the structure and signal flow of effects for the Channel. The Macro Controls view provides a set of freely assignable knobs, buttons, and X/Y pads that provide easy access to any parameters in any of the plug-ins currently used in the Channel.

Because the Channel Editor is all about configuring and controlling audio effects, only Audio Channels and Channels associated with software Instruments have this feature.

You can display the Channel Editor in the following ways:

- Click the Channel Editor button (which looks like this:) on your chosen Channel in the Console.
- Select a Channel, and click the Channel Editor button (which looks like this:) in the Track Inspector.
- Click the number of the corresponding Track in the Arrange view.
- Click the Macro Controls or Routing button in an open effects window.

Macro Controls

A single Channel in the Console can host multiple plug-in effects, and you can control them all one-by-one simply by switching from one plug-in window to another. However, in some cases, it is convenient to be able to access controls from multiple plug-ins in a central control panel. The Macro Controls feature in the Channel Editor gives you a blank canvas upon which to place crucial control parameters from any of the present effects, giving you quick access to often-needed controls. This becomes even more useful when creating FX Chain presets that are geared toward specific sounds.

For example, let's say you create an FX Chain called "Chorused Crunch Guitar Delay," that includes the **Ampire**, **Chorus**, and **Analog Delay** plug-ins. You might assign Macros to the gain controls on Ampire, rate and depth controls on Chorus, and the delay length and feedback on Analog Delay. In this way, as soon as you load up that FX Chain, the vital parts of its functionality become available in a central, single window, even though you're really controlling three plug-ins at once.

There are eight knobs, eight buttons, and two X/Y control pads available for each Channel. You can assign any available plug-in parameter (or multiple parameters) to each of these Macro Controls. Each control (and each axis of each X/Y pad) displays the name of the associated parameter, and the current setting of that parameter. If multiple parameters are assigned to a Macro Control, the name of the first parameter assigned is shown, with a "+" symbol next to it.

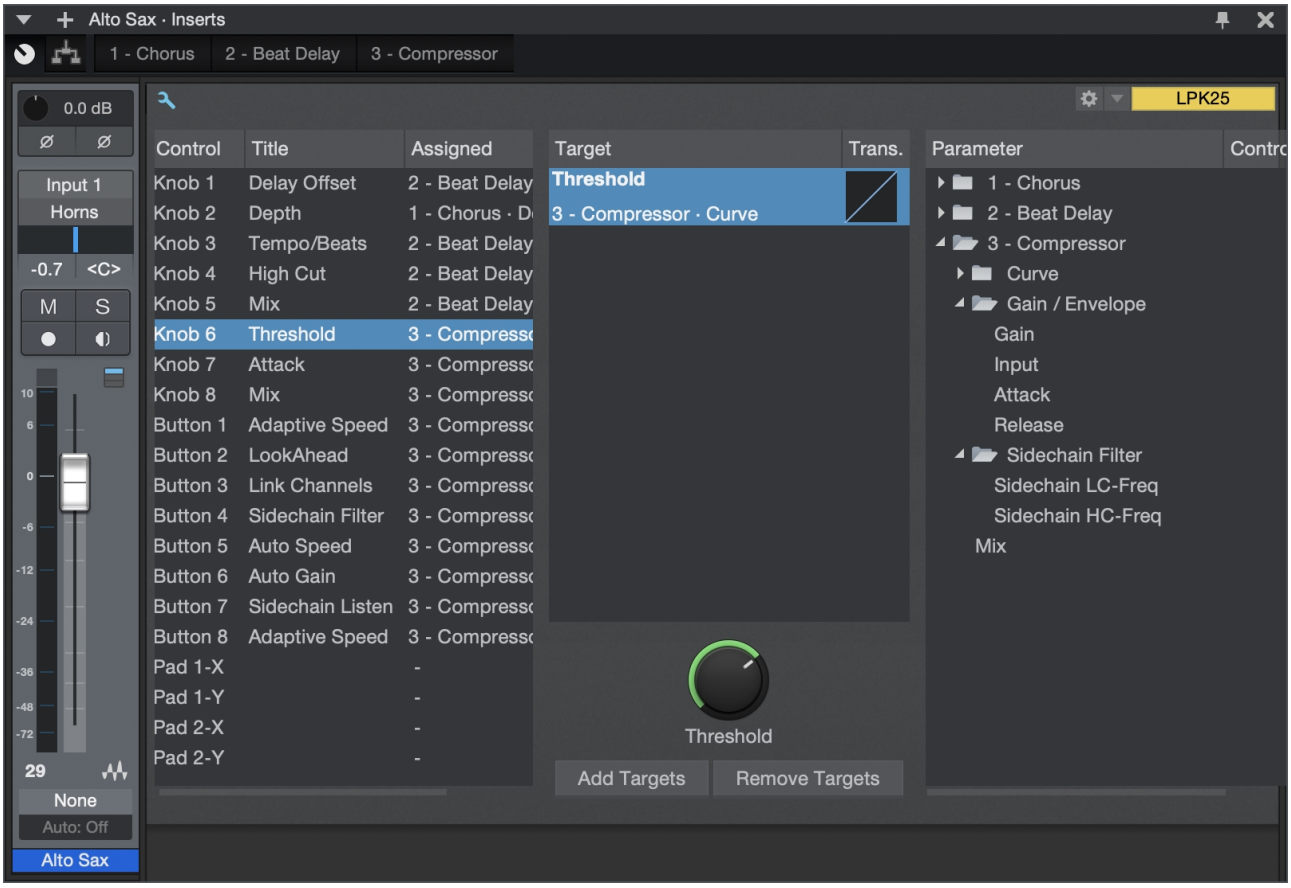
If things get complex, you can get more in-depth info about assigned parameters in the **Macro Controls Mapping** view.

When working with the built-in PreSonus plug-ins, assigning parameters to Macro Controls is especially easy—simply [Right]/[Ctrl]-click the control of choice, select "Connect (name of control) to Channel Macro Control" from the pop-up menu, then choose the desired Macro Control from the secondary pop-up list.

To clear all assignments for any Macro Control, [Right]/[Ctrl]-click the control and choose "Clear (control name) Connections"

Right-click a Macro Control knob or switch to get access to automation for that control.

Macro Controls Mapping



You can bring up the Macro Controls Mapping view by clicking the small wrench-shaped button in the Macro Controls window. This view gives you the ability to assign 3rd-party plug-in parameters to Macro Controls, and also provides some useful additional features for working with Macros.

The Macro Controls Mapping view shows three columns of information. The left column lists all available Macro Controls, and their current assignments (if any). The right column shows all effects plug-ins that are currently inserted into the Channel. Expand any plug-in in the list to show all assignable parameters for that plug-in. The central "Target" column is a place where Macro assignments can be made, configured, or broken.

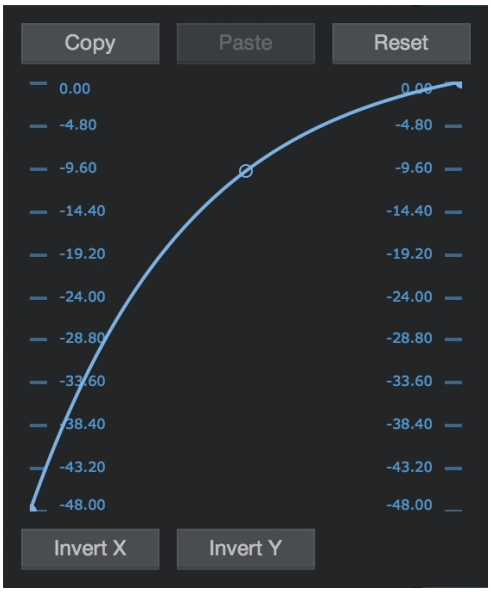
You can assign an unlimited number of parameters to the same Macro Control, each with its own range and polarity, to create powerful “morphing controls”. As more parameters are assigned to a Macro Control, plus signs (+++) are added to the right of the default name in the Title column. You can rename the Macro Control if you like; just double-click the name in the Title column.

The simplest way to map a parameter to a Macro is to simply drag the parameter from the right column onto the Macro Control of your choice in the left column, or into the central Target column when a Macro Control is selected. You can also do this by selecting a Macro Control and a parameter, and clicking the [Add Targets] button. Once assigned, the parameter of your choice is displayed in the Target column.

To remove an assignment from a Macro Control, select the Macro in the left column, select the assignment you wish to remove in the Target column, and click the [Remove Targets] button.

Macro Control Transform Settings

You can shape the relationship between the movement of a Macro Control and the settings of its assigned parameters quite extensively. With a Macro Control selected in the left column of the Macro Controls Mapping view, the current mappings for that control are displayed in the Target column. Next to the name of each parameter is a button that gives you access to the control transform settings.



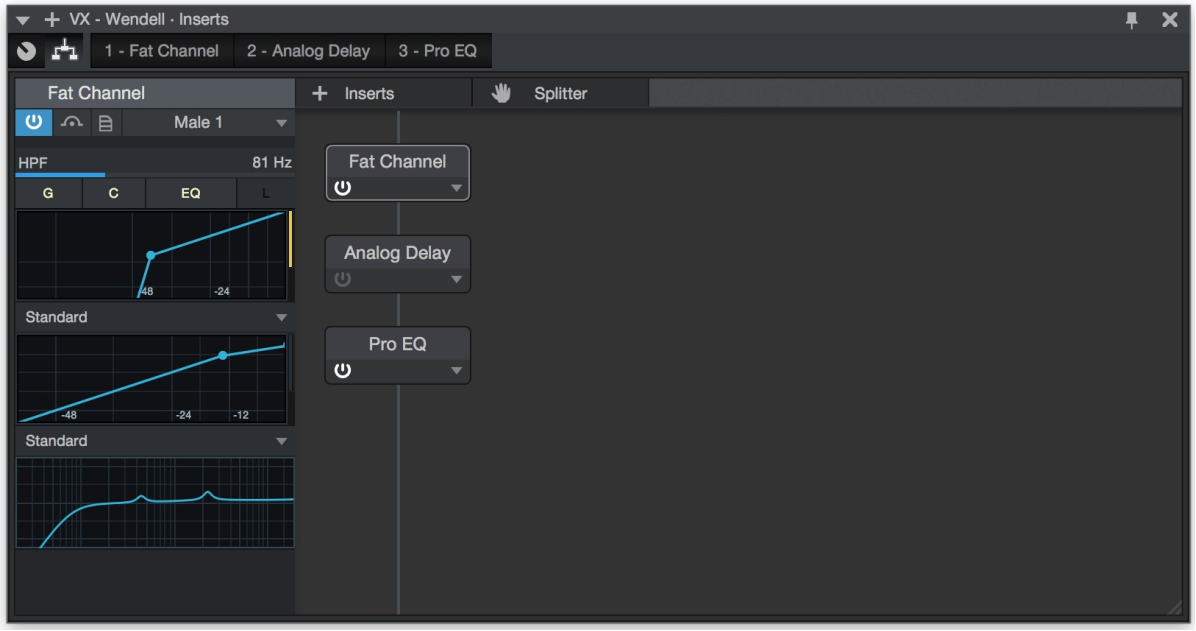
This graph traces the response curve from the beginning of the macro control's travel (the draggable point on the left end of the curve) to the end of its travel (the point on the right end), with a handle in the middle that you can drag to set the shape of the curve. Dragging these points up and down the control scales on the left and right of the graph lets you set the effective range of motion for that Macro control.

For example, the whole range of a Macro knob could be set to affect just a quarter of a parameter's range, for fine-tuning purposes. You can also move the right point below the left, reversing the action of the knob, according to whatever scale you wish.

Below the graph are buttons that let you Reset the graph to its default setting, Invert the shape of the curve, or Copy the curve setting and Paste it onto another parameter.

Note that because Macro buttons are an on-off type of control, they have no curve setting. However clicking in the Trans column next to a button assignment inverts its response, causing the parameter to be enabled when the Macro button looks disabled, and vice-versa.

Routing View



Normally, if you add multiple effects to a Channel, they are connected in series; the output of the first effect feeds into the second effect, which feeds into the third, and so on. If you open the Routing view in the Channel Editor for a Channel with multiple effects, this is what you'll see.

Each effect in the Routing view is displayed as a module. When they're in series, a line runs through them from top to bottom, signifying the path of the signal as it runs through the modules. The signal starts at the top, and flows through the effects, to the bottom.

You can click on an effects module to select it. If a selected effect is a built-in plug-in, a selection of the plug-in controls are displayed in the inspector to the left. You can load patches for the effect from this inspector, as well as set a color for the selected effects module, by clicking the color picker to the left of the effect's name in the inspector.

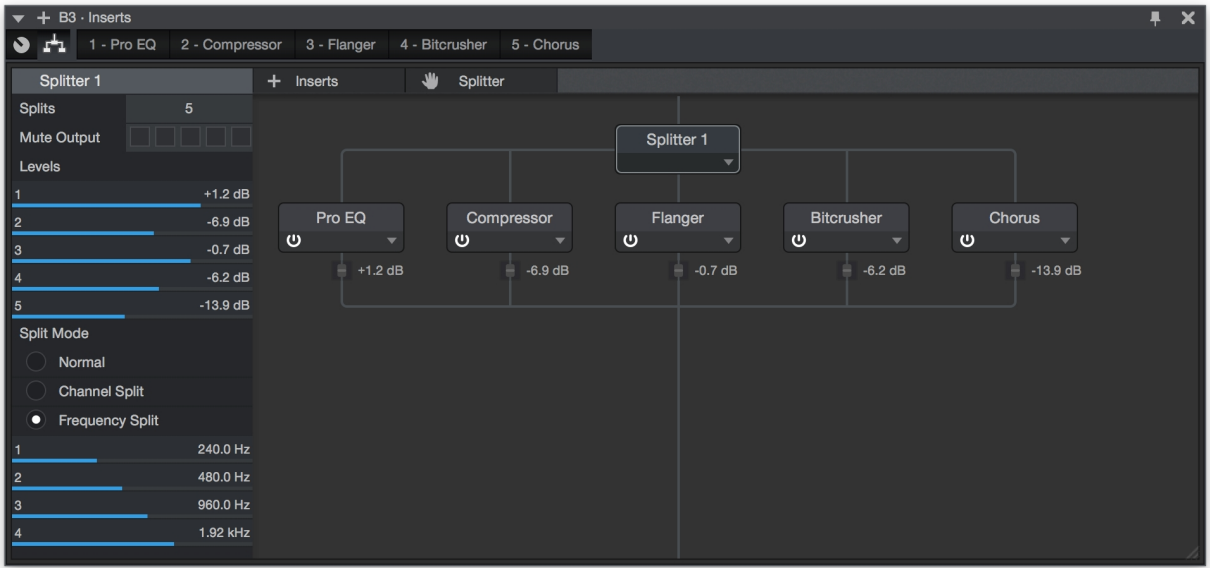
Each module in the Routing view has a Bypass button, as well as a drop-down menu that offers the following operations:

- **Edit** Opens the editor window for the selected plug-in.
- **Rename** Lets you rename the selected effect.
- **Remove** Removes the selected effect from the Channel.

Adding and Moving Effects

You can add effects by dragging them into the Routing view window. Drag them into position above or below other effects to change the order in which they process the signal. You can also add effects by clicking the [Inserts] button, which brings up a menu of available effects.

Splitting Signals



The Splitter module lets you split signals, letting you process them through multiple parallel effects paths. These split signals are then mixed back into a single signal. You can add a Splitter to your effects setup by clicking-and-dragging from the [Splitter] button to your choice of location in the Routing view.

You can click on a Splitter to select it, and its options are shown in the inspector to the left. The following options are available:

- **Splits** Lets you specify the number of independent paths to split the signal into.
- **Mute Output** Click the boxes to mute and unmute individual split paths.
- **Levels** Lets you set the output level of each split path, from fully off (-∞ dB) to +10 dB. To set the level of a split path, simply move the corresponding slider, or click its numerical dB display to enter a value with your computer keyboard. Split path levels can also be adjusted in the Routing view. Click-and-drag the small fader icon on your chosen path to set its output level, or click in the corresponding numerical display to enter a value in dB.
- **Split Mode** Select the Splitter mode that suits your needs, from the following choices:
  - **Normal** Splits the signal into two or more identical copies. This is useful for any sort of parallel processing, such as "New York" compression or vocal multiprocessing.
  - **Channel Split** Splits stereo signals into pairs of mono signals, for independent processing of left and right channel information. With two splits, this turns a stereo signal into a pair of left/right mono signals. With four splits, you get two sets of left-right mono signals.
  - **Frequency Split** Splits a signal into isolated bands of frequencies, at the frequencies you specify. With two splits, the signal is crossed-over into two frequency bands, split at a single frequency. With three splits, there are three bands, split at two crossover frequencies, and so on. When more than one frequency split is employed, The splits are numbered from low frequency to high.

Much like you can move effects modules into different places in the signal chain, you can move Splitter modules to the position of your choice, as well as freely move effects into and out of each split path. To remove a Splitter module, click its triangle to open the pop-up menu

and choose Remove. If you remove a splitter module that has effects inserted within its split signals, those effects are reconnected in series.

Splitter effects chains are compensated for plug-in delay automatically, retaining the proper time relationship between all split channels.

Quick Access to Main Bus Inserts

To quickly open the Channel Editor for the Main output bus, double-click the main output meters in the Transport bar.

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 behave in the Console.

Create or Dissolve a Group in the Console

To create a Group in the Console, select the desired Channels and then [Right]/[Ctrl]-click and select Group Selected Tracks from the pop-up menu. Or you can use the shortcut: Select the Channels and then use [Ctrl]/[Cmd]+G to create a Group. Groups can be nested: two Channels can be part of a smaller Group and also part of a Group with more Channels.

To dissolve (ungroup) the grouped Channels, [Right]/[Ctrl]-click on any Channel in the Group and select Dissolve Group from the pop-up menu. There's also a shortcut for this: After selecting one the grouped Channels, use [Ctrl]/[Cmd]+Shift+G to dissolve the Group.

When an Audio Channel is in a Group, the Group icon appears inside the Channel above the level meter. Note that the Group icon is not visible when the Console view is in Narrow mode.

Group Behavior in the Console

When a Channel is placed in a Group its fader is linked to the faders for all other Tracks in the Group, so that if one of them is moved, they all move. Their movements are relative to one another, maintaining the correct dB value relationships among the faders.

Channel Pan is not part of the Group by default, as Channels within a Group are very often panned separately. But you can enable this behavior for the Group if you want. This is described in the Group Attributes section below.

Solo, Mute, Record Enable, and Monitor Enable controls are also linked for all Channels in a Group. No other aspect of the Channel in the Console is affected by grouping. Selecting a new Insert effect for one of the Channels will affect the Group, however.

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 have corresponding channels in the Console. Grouping Instrument Tracks in the Arrange view only affects editing Events on those Tracks, unless the Tracks are routed to virtual instruments. In this case, grouping behavior is applied to the corresponding Instrument Channels in the Console as well.

Temporarily Suspend Groups

It is possible to suspend a Group temporarily 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. Note that [Alt]/[Option]-clicking Solo on a grouped Track clears the Solo status of all Tracks in the Console; if you wish to solo a grouped Track along with other Tracks outside the Group, you must first solo the grouped Track, then enable solo for any additional Tracks. It is not possible to solo single Tracks from two separate Groups simultaneously, though you can solo a single Track from one Group and solo all Tracks in a second Group.

To suspend an entire Group, hold [Shift]+G and type the number of the Group or the first letter of its name into the small window that appears. Use the same command to reactivate the Group. Another way is to hold [Alt]/[Option] and enter a Group number between 1 and 10.

To suspend or reactivate all Groups at once, use [Ctrl/Alt]/[Cmd/Opt]+G. Note that Group suspensions are not saved or remembered when Studio One is restarted.

Show Groups

When the Track / Channel List is open you can view the list of Groups by clicking the Show Groups button. You can temporarily suspend a Group from this list by clicking the dot next to its name. You can also suspend all Groups by clicking the bracketed Groups icon in the upper left corner of the Group list.

Nested Groups

Channels can be part of a smaller Group and also part of a larger Group that includes those Channels. In this case the Groups have been nested. Note that in order to make adjustments to the smaller, nested Group, the larger Group must be temporarily suspended.

Group Attributes

You can specify which controls within a Group will be affected by the other Channels. For example, if you want to be able to pan all of the grouped Channels at the same time, [Right]/[Ctrl]-click the Group name in the list of Groups and enable Pan. The relative stereo positions of the Channels in the Group are maintained when the Pan control for one of the grouped Channels is moved. Other features that can be included or excluded from a Group are Editing, Volume, Mute / Solo, Record / Monitor, Inserts, and Sends.

Viewing / Changing Group Assignments

Tracks and Channels can be assigned to more than one Group. Group assignments can be viewed by [Right]/[Ctrl]-clicking anywhere inside the Channel area and selecting Group Assignment. A check mark by a Group name indicates a Group to which that Channel has been assigned. To add or remove a Group assignment, select one of the Group names. The change will be made and the window will close.

Groups and Effects

The first time Channels are grouped they keep the individual effects settings and assignments they had. But changes that are made to the effects of any grouped Channel will cause all of the Channels within the Group to adopt the same changes. Note that this does not add the new effects to the ones already on the Channels; those will be replaced.

For example, if a new Insert preset is selected for one Channel within a Group, that same preset will be selected for the rest of the Group. Any changes made to the Sends of a grouped Channel will affect the entire Group also.

If you want to change the effects settings for one of the grouped Channels without affecting the others you can suspend the Group temporarily. You can also specify that the Inserts and the Sends not be affected by other actions within a Group. To ungroup those actions, disable them in the Group Attributes window.

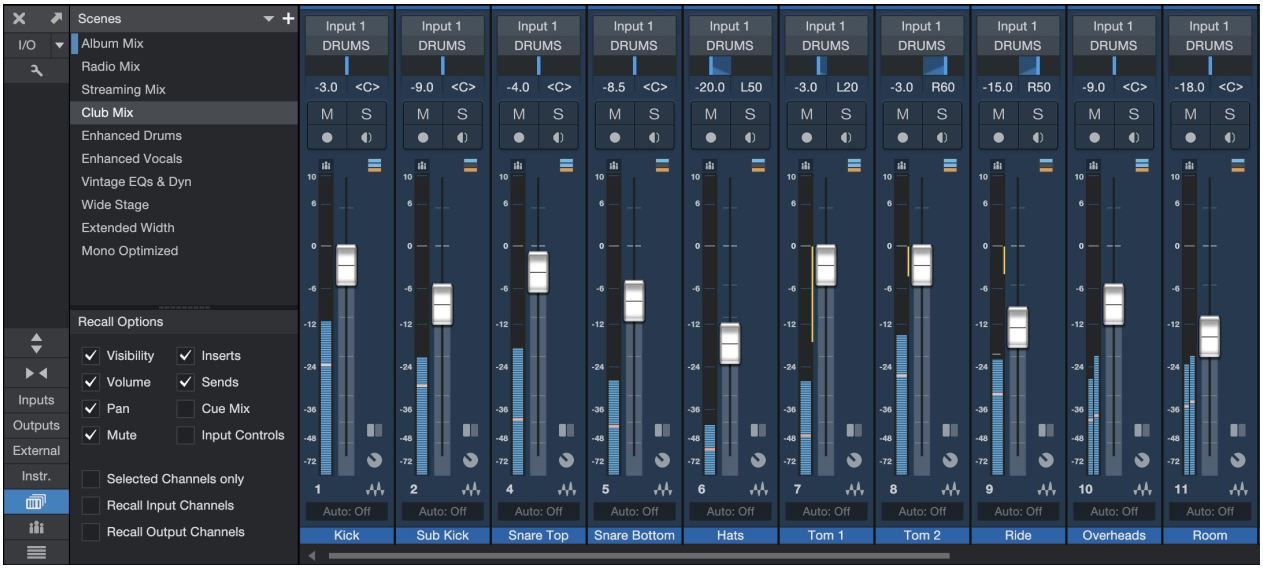
Scenes

Scenes provide an easy way to save and recall different configurations of Channels and Tracks, as well as different settings. For example, let's say you want to audition different FX for the drum Channels: you can create a Scene called "Drums", make as many changes as you like, save those as another Scene, and then go back and forth between them to see which you prefer.

Recalling a Scene shows the desired Channels and Tracks and hides all of the others, which makes it easier to focus on those items. You can specify which portions of a Scene are recalled, and for which Channels: Volume, Pan, Mute status, Output Channels, etc.

Any number of Scenes can be saved and recalled within each Song. They also can be saved as part of a Song Template.

Working with Scenes



Click the Show Scenes button in the Console navigation column to access the Scenes list and Recall Options.

To save the current set of Channels and Tracks as a Scene, click the Plus button at the top of the Scenes window. You can give the Scene a unique name to help you remember its contents.

Link list actions

The following Options can help you construct Scenes quickly. Click the wrench-shaped button in the Console Navigation column to enable or disable them:

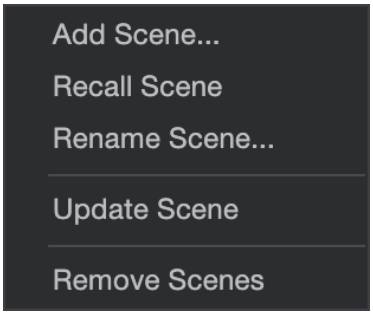
- **Link show/hide of Track List and Console** Enable this to link the show/hide status of the Track List and the Console. When you hide an item in the Track List or Console, it is hidden in the other as well.
- **Link expand/collapse of Folder Tracks with show/hide** Enable this to hide Console Channels associated with a Folder Track when the Folder Track is collapsed in the Arrange view.

Recall options

All of the Track and Console settings are stored when you Add or Update a Scene. But you can use the Recall Options menu to specify which aspects of a Scene are recalled. For example, if you want to retain the current Volume setting for the Channels when another Scene is recalled, disable Volume in the Recall Options menu.

- **Visibility** Disabling this option allows you to compare the settings of two Scenes without changing what is displayed in the Arrange view and the Console. When it is enabled, the Channels and Tracks are shown/hidden according to the Scene settings.
- **Volume** This option allows the Volume settings to change when a Scene is recalled. Disable it to prevent these changes.
- **Pan** This option allows the Pan settings to change when a Scene is recalled. Disable it to prevent these changes.
- **Mute** This option allows the status of the Mute buttons to change when a Scene is recalled. Disable it to prevent these changes.
- **Inserts**This option allows the status, contents, and settings of the Insert effects to change when a Scene is recalled. Disable it to prevent these changes.
- **Sends** This option allows the status, contents, and levels of the Send effects to change when a Scene is recalled, including the Pre-fader On/Off settings. Disable it to prevent these changes.
- **Cue Mix** This option allows the status and levels of the Cue mixes to change when a Scene is recalled. Disable it to prevent these changes.
- **Input Controls** This option allows the Input Gain and Polarity of the Input Channels to change when a Scene is recalled. Disable it to prevent these changes. The Recall Input Channels option must also be enabled for the changes to be applied.
- **Selected Channels only** This option allows you to specify which Channels are modified when a different Scene is recalled. Disable it to allow all Channels to be changed.
- **Recall Input Channels** Enable this option to recall the settings for the Input Channels (Input Gain and Polarity). The Input Controls option must also be enabled for the changes to be applied.
- **Recall Output Channels** Enable this option to recall the level settings for the Output Channels, including the Main Out Channel or the Listen Bus.

Scene management



[Right]/[Ctrl]+[Click] one of the Scenes to reveal a menu with the first four options, or click the down arrow next to the [+] symbol inside the Scenes menu to view all five.

- **Recall Scene** This option recalls the selected Scene.
- **Rename Scene...** Use this option to rename the selected Scene.
- **Update Scene** This option replaces the settings of the selected Scene with the current settings.
- **Remove Scene** Use this option to remove the selected Scene from the list of Scenes.
- **Remove Scenes** To remove two or more Scenes at the same time, hold [Ctrl]/[Cmd] + click to select the desired Scenes, or use [Ctrl]/[Cmd] + [A] to select them all. Then select Remove Scenes from the menu to remove the selected Scenes.

VCA Channels

As we touched on in **Groups**, sometimes it's helpful to tie the volume settings of multiple Channels together, so that they can be easily controlled as a Group. However, when you create a Group, the volume faders for all included Channels move simultaneously when any grouped fader is moved. This means that any inter-channel volume balancing involves either temporarily ungrouping the Channels, or changing the relative gain of a Channel using the gain control on an inserted plug-in.

Also, it can be desirable to write automation that changes volumes for a whole set of Channels, which can be cumbersome when it must be done on a per-channel basis. A similar effect can be accomplished by routing Channels to a Bus and writing volume automation for that Bus. However, this means that the audio from all affected Channels must pass through that Bus, which may not be desirable, depending on your needs.

VCA Channels give you a solution to all these issues. They are special assignable control faders in the Console that allow simultaneous movement (and automation) of the volume of multiple Channels. The individual volume faders of affected Channels can still be moved independently—all faders move as one only when you change or automate the setting of the linked VCA Fader.

Creating and Assigning VCA Channels

You can create and assign a VCA Channel in two different ways:

- Select the Channels you want to control in the Console. [Right]/[Ctrl]-click and choose "Add VCA for Selected Channels" from the pop-up menu. This creates a new VCA Channel and assigns the selected Channels to it.
- [Right]/[Ctrl]-click in the Console and choose "Add VCA Channel" from the pop-up menu, creating a new VCA Fader. Assign the desired Channels to the new VCA Fader by clicking the selector under the meter/fader for each Channel in the Console and choosing the desired VCA from the pop-up list.

If the VCA Channel selectors are not visible beneath the meters for each Channel in the Console, you can re-enable them by toggling the "Show VCA Connections" option in **Console Options**.

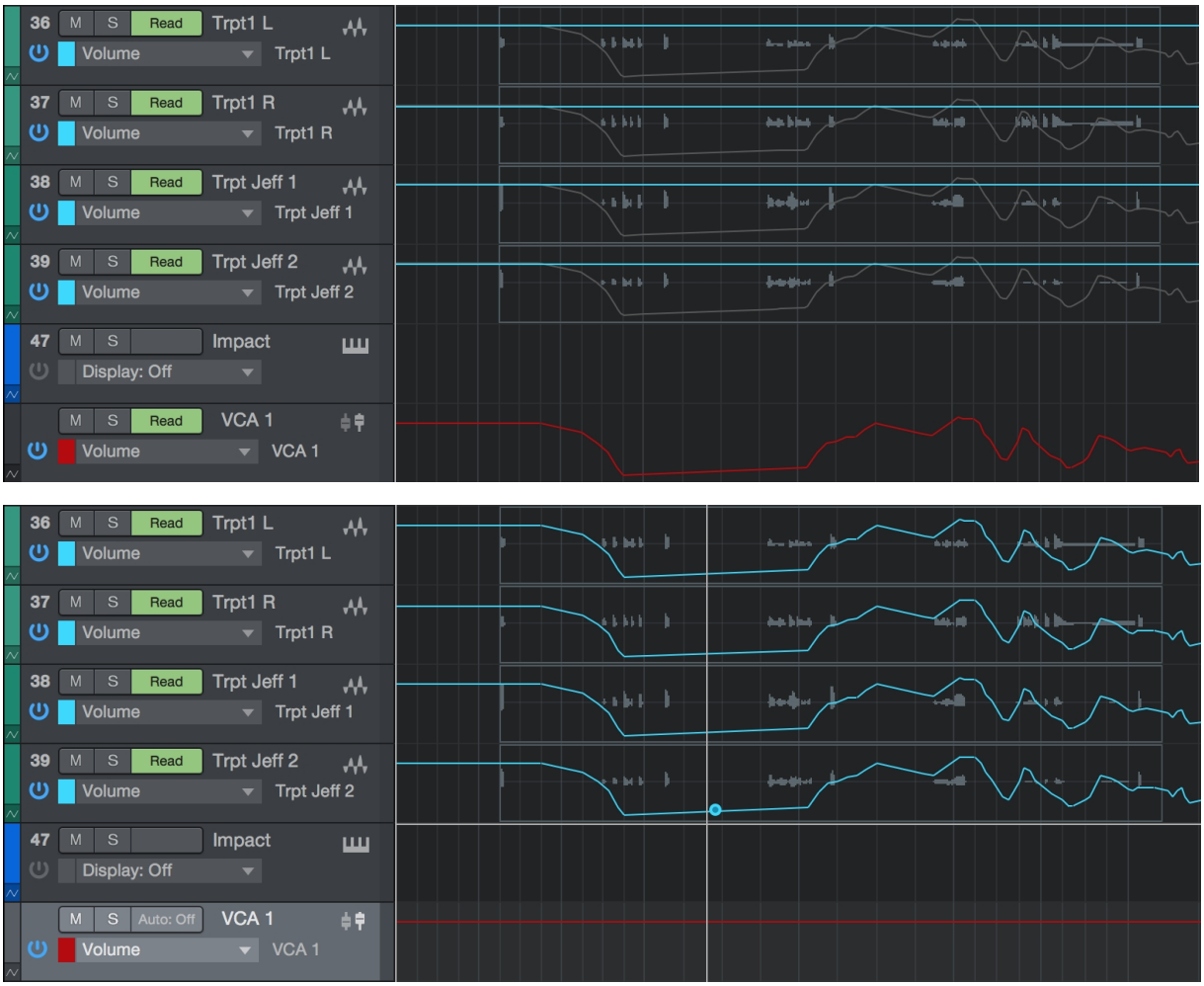
Channels may be unlinked from an assigned VCA Channel by clicking VCA selector for the Channel and choosing None from the pop-up menu.

Automation with VCA Channels

One of the advantages of VCA Channels is that they can be automated, thus automating the volumes of all affected Channels without the need to route their audio to a bus or write individual volume automation for each Channel. Any volume automation that exists on the individual channels continues to be active, along with any changes enacted by movement of the VCA.

To automate the setting of a VCA Channel, [Right]/[Ctrl]-click the fader and choose "Edit Volume Automation" from the pop-up menu. An automation lane for the VCA Fader appears in the Edit view, and can be edited just like you would for normal Tracks. Any automated changes in VCA Fader level are applied in a relative manner to the faders for any linked Channels. You can see this reflected in a gray automation line that sits alongside the volume automation of each affected Track in the Edit view.

Merging VCA Automation

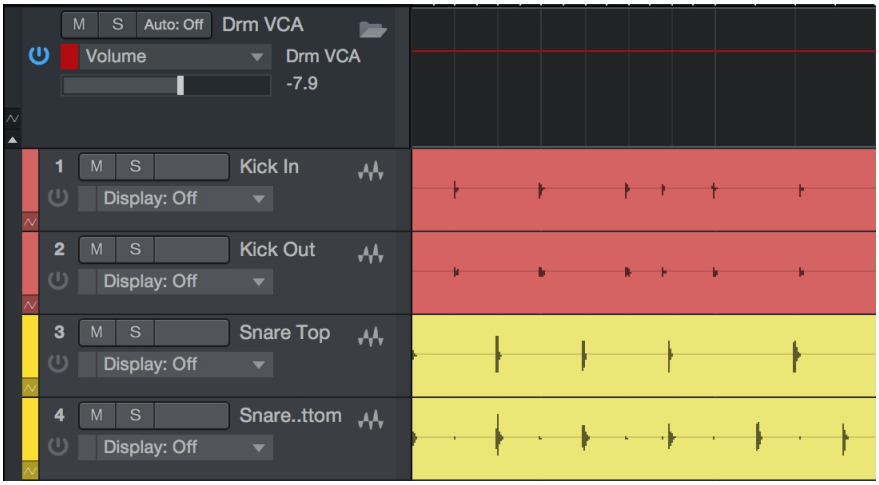


Once you've written some automation moves for your VCA Channel, you may decide that you want those changes to be permanently applied to the automation for the Tracks controlled by the VCA. To do so, [Right]/[Ctrl]-click the VCA Fader Track in the Edit view, and choose "Merge VCA Automation" from the pop-up menu. This merges the VCA automation with the extant automation on each affected Track, and returns the VCA automation lane to its default state, for easy manual control.

Controlling VCA Channels with VCA Channels

Another nice feature of VCA Channels is, because they're simply controllers, their effects can be nested. For example, if you have multiple snare Channels, they could be linked to a snare-specific VCA fader for simultaneous control. Then, all drum-related VCAs (and drum Channels not yet linked to a VCA) could be linked to a "master" VCA Fader that controls overall drum level. In this way, large amounts of Channels can be mixed and managed with ease.

Folder Tracks and VCA Channels



Much like you can assign a Folder Track (and its associated Tracks) to a Bus, you can also assign them to a VCA Channel. This gives you simultaneous control over volumes for all tracks in the Folder Track without the need to route the audio from those tracks into a Bus.

To assign a Folder Track to a VCA Channel, click the Bus/VCA selector in the Folder Track's control panel in Edit View, and select the VCA of your choice from the pop-up menu. This assigns all Tracks in the Folder to your chosen VCA Fader. This assignment can then be defeated or changed on a per-track basis.

The Listen Bus

A dedicated Listen Bus is available for monitoring Solo signals, which allows you to solo individual Channels and sources without affecting the Cue Mix busses. It can provide a separate audio feed to the control room monitors or headphones, independently from the Main Out Channel. When activated, initiating Solo on any Channel sends the solo signal to the designated outputs.

Another potential use is to run a room calibration plug-in as a Listen Bus insert while keeping the Main Output unaffected.

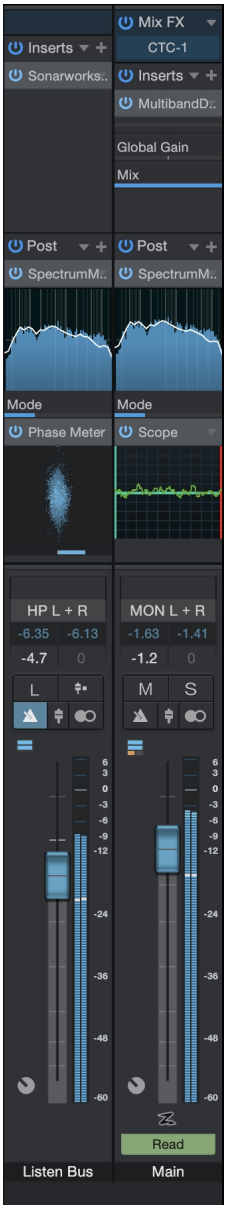
To activate the Listen Bus, [Right]/[Ctrl]-click any Channel in the console. You'll see two options near the bottom of the menu:

- **Enable Listen Bus** activates the Listen Bus and adds it to the Console, immediately to the left or right of the Main Out Channel. It can be dragged to either side. When active, audio passing through the Listen Bus can be routed to any of the output pairs on your audio interface in the Song Setup window, which can be accessed through the **Audio I/O Setup** button in the Console Navigation column. The status of the Listen Bus is saved with each Song.
- **Solo through Listen Bus** can be toggled independently of the Enable Listen Bus checkbox. After it is engaged, soloed Channels are routed through the Listen Bus and the other Channels are heard through the Main Out Channel. When it is disengaged, soloed Channels are heard through the Main Out Channel and all other Channels are muted.

These two options are also found in the Options menu of the Console Navigation column.

Note that the Listen Bus is completely independent from the other Solo modes (**Solo Safe** and **Solo-in-Place**).

Listen Bus features



Some of the features of the Listen Bus are similar to other Bus Channels, and others resemble the features of the Main Output Channel. For example:

- Insert FX and Post-fader FX can be added as needed.
- The Output Channel can be selected in the field above the Peak Hold meters.
- You can specify the **Peak Hold** behavior of the meters.

The button features are mostly familiar:

- **L** stands for Listen Bus. It is highlighted when any Channel is in Solo mode. Use it as a master Solo button to enter and exit Solo mode for all soloed Channels at the same time.
- **Prefader Listen** The Listen Bus offers a dedicated PFL (Pre-Fader Listen) option. Signals soloed in PFL mode are monitored pre-fader and pre-pan. With PFL disengaged, the solo signal is monitored after fader and pan.
- **Click On/Off** Click this button to toggle the Click on and off for the Listen Bus.
- **Click Volume** Click and hold this button to reveal the Click volume fader. Use this to adjust the Click volume for the Listen Bus.
- **Channel Mode** Click this button to toggle the Listen Bus between stereo and monaural operation.

Metering

Metering is a critical part of the production process. Studio One's meters visually display audio levels according to your choice of metering style, and you can meter these levels at various stages in the signal path. The meters automatically display in mono or stereo depending on the audio source.

Two Metering Mode menus are available: one for the Output Channels and another one for the other Console Channels. Use [Right]/[Ctrl]-click to access the Metering Mode menu for the desired set of Channels. Note that the Pre-Fader Metering setting is applied globally to all meters, including the Output Channels. Changing that setting in one menu will change it automatically in the other menu.

The menu for most of the Console Channel Types allows a choice between Peak or Peak/RMS metering modes. The selection will be applied to all Channels in the Console except the Output Channels.

Peak meters are not available for the Output Channels, which feature Peak/RMS metering with **K-System Metering** options.

[Right]/[Ctrl]-click on any meter to adjust the Peak Hold and Hold Length settings globally for all Channels.

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.

Peak/RMS Meters

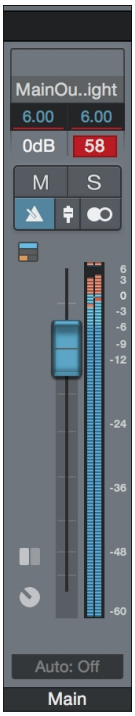
Peak/RMS meters simultaneously show both peak and RMS levels. Whereas a peak meter shows the highest output level at any instant, an RMS meter shows an average of the peaks and troughs of an audio signal over time. An RMS meter is intended to indicate the perceived loudness of the audio being measured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

Pre-Fader Metering

[Right]/[Ctrl]-click on any meter to access the menu and enable or disable Pre-Fader Metering. When it is enabled the level meters show levels independent of fader position. When it is disabled the level meters respond to fader position. This is known as Post-Fader Metering. The selection you make will be applied globally to all Channels, including the Output Channels.

Main Out Clip Counter

The Main Out Channel features a Clip Counter above its Peak/RMS meter.



The counter turns red when the Main Out signal clips, and counts the total number of clips that occur. Use the counter to help prevent clipping the final stereo mix of your Song. The counter resets when clicked or when the Main Out fader is adjusted.

K-System Metering

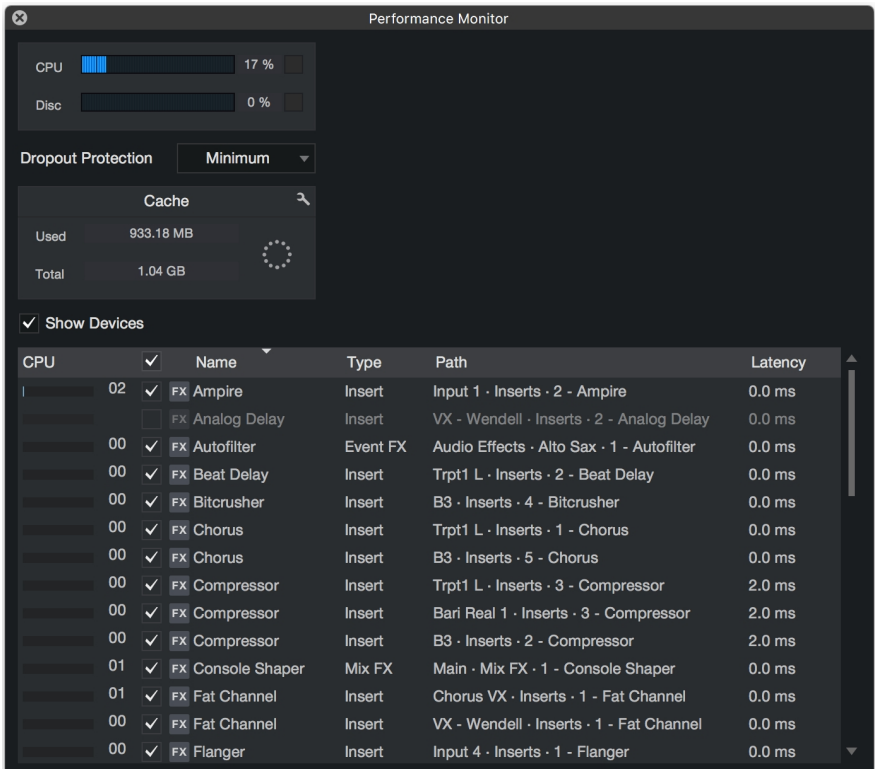
The Peak/RMS meters in the Output Channels also feature K-System metering options. The K-System is an integrated metering system tied to monitoring gain, and it is intended to standardize the levels at which sound is mixed and mastered. This metering system features three different meter scales called 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 K-System inventor Bob Katz in his Audio Engineering Society technical paper "**An Integrated Approach to Metering, Monitoring, and Leveling 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]/[Ctrl]-click on an Output Channel 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 causes 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.

Performance Monitor



You can open the Performance Monitor window by navigating to *View/Performance monitor*. This window displays the current total CPU and disk usage, as well as specific usage data for Insert effects and Instruments. To open the editing window for an Insert or Instrument, double-click its name. To deactivate an Insert or Instrument (to free up the associated RAM and CPU), click the check-box next to its name. To activate a deactivated item, click the check-box again, or click the Activate button on the Insert or Instrument slot in the Console.

The Cache section shows you the amount of audio data currently in the Audio Cache, with options to show its contents or clean up unused items in the cache.

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 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.

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 (at sea level, at 1 atmosphere of pressure) in feet per 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, enter a Delay value of -88.5, which removes the recorded delay and puts the Tracks in sync with the rest of the recording.

Using the Marker Track

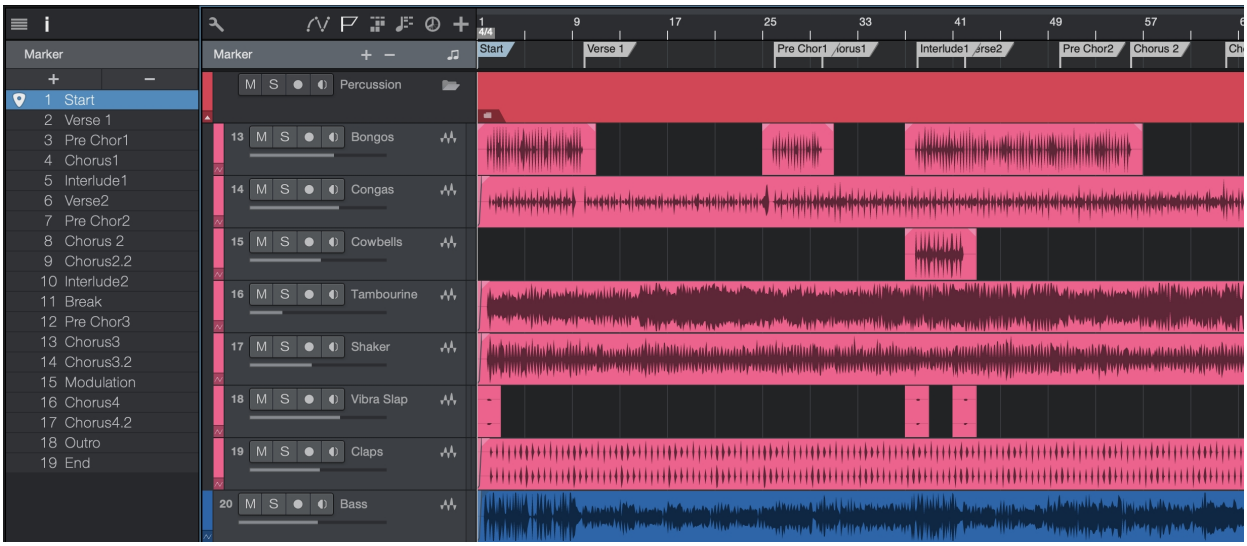
You'll often want to navigate quickly to various areas of your Song during mixdown. In Studio One the Marker Track is used to place Markers at desired places in the timeline, after which navigation to the Markers is easy. To open the Marker Track, click on the Marker Track button above the Track Column 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 move forward or backward in time in relation to their musical position.

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

Inserting Markers

To insert a new Marker into the Marker Track, with playback running or stopped, click on the Add Marker button or press [Y] on the keyboard. Each new marker is numbered sequentially by default (1, 2, 3…). To insert a named Marker, press [Shift]+[Y], enter a name in the pop-up window, and click [OK], or press [Enter]. To rename a Marker, double-click on it in the Marker Track, type in a new name, and then press [Enter] on the keyboard. Note that, for clarity, the Start and End markers cannot be renamed.



Marker Track Inspector

Open the Inspector by clicking the [i] button above the Track column, or by pressing [F4] on the keyboard. This opens a window on the left side that shows a list of existing Markers.

A locator icon shows the current location, and always highlights the Marker that was passed most recently. Click the area to the left of the Marker name to move the playback cursor to that location. Double-click the Marker to rename it.

The plus icon at the top of the Inspector can be used to create a new Marker at the current position, which allows you to enter a name right away. If there is already a Marker at the current position a new Marker is not added.

Markers can be deleted using the minus sign. Hold [Shift] to select more than one Marker for deletion.

At the bottom of the Inspector is a window that shows the Marker Start time and a **Stop At Marker** check box. Click-and-drag the Start time numbers to adjust the Marker position.

[Right]/[Ctrl]-click any Marker for quick access to the **Create Arranger Sections** and **Stop At Marker** features.

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 between Markers during playback enables quick comparisons between sections of your Song. To jump to a specific marker, hold [Ctrl]/[Cmd], press [NumPad .], and enter the Marker number in the Recall Marker window. You can also jump to up to seven different Markers from the *Transport/Goto Marker* menu.

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 to define the timeline region to be exported in the Export Mixdown and Export Stems functions in the Song menu, and they are used by default in the Update Mastering File process.

Cut, Copy, Paste and Delete Markers

You can use standard Cut, Copy, Paste and Delete commands to distribute and manage your Markers. To cut or copy a Marker, select it by clicking its name flag, and either press [Ctrl]/[Cmd]+[C] to copy or [Ctrl]/[Cmd]+[X] to cut, or [Right]/[Ctrl]-click the Marker to open the pop-up menu and choose Cut or Copy. To paste a Marker, place the cursor at the desired location and press [Ctrl]/[Cmd]+[V]. To delete a Marker, select it and press the Delete Selected Markers button in the control area of the Marker Track. Alternately, you can delete a Marker by [Right]/[Ctrl]-click its name flag and choose Delete from the pop-up menu, or by selecting the Marker and pressing [Delete] on your keyboard.

You can also access these commands in the Edit menu.

If you have cut a Marker and wish to return it to its original position (and have since done other operations that would make using Undo impractical), press [Ctrl]/[Cmd]+[Shift]+[V] or select Paste at Original Position in the Edit menu.

Stop Playback with Markers

Markers can optionally stop playback when reached by the playback cursor. To engage this option for any Marker, [Right]/[Ctrl]-click on a Marker and engage the Stop at Marker option, or select a Marker and engage the same option in the Inspector. Note that this cannot be enabled for the End Marker.

Create Arranger Sections from Markers

There's a quick way to populate the Arranger Track with sections while working with Markers. Simply [Right]/[Ctrl]-click on a Marker and select the Create Arranger Sections from Markers option, and the Markers are instantly translated into Arranger sections.

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.

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. Hold [Alt] on the keyboard while dragging to simultaneously engage Loop in the Transport.

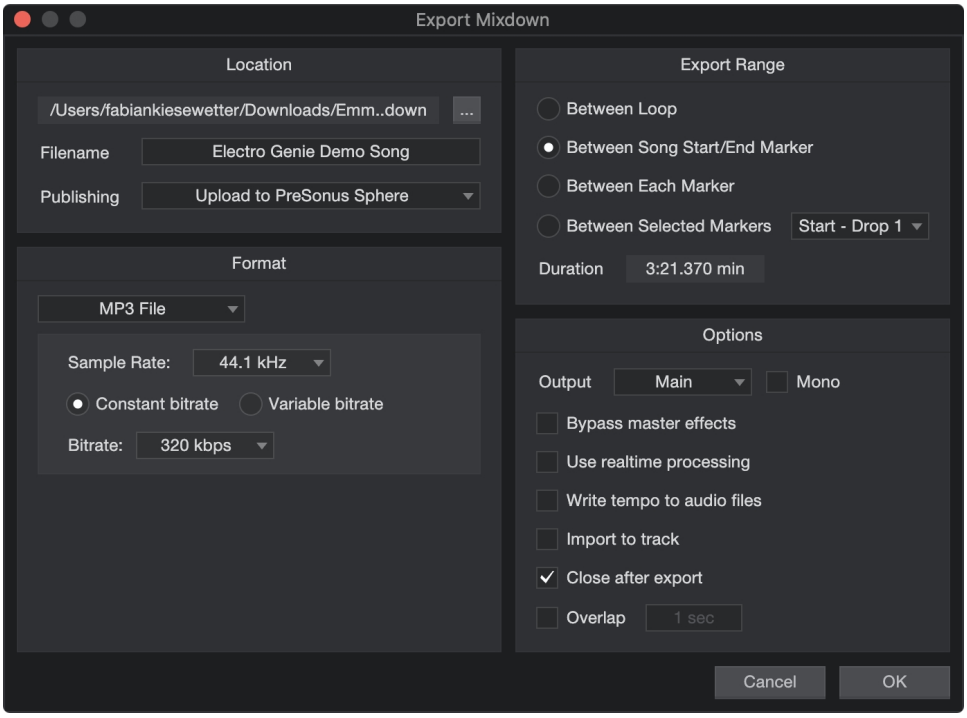
You can also manually move the Left and Right Locators by clicking and dragging them left or right in the Timeline Ruler. To move the entire range of the loop along the timeline, click and drag the gray line that connects the Loop start and end locators.

To quickly enable or disable looping, double-click the gray line that connects the Loop start and end locators.

Mixing Down

In most cases, you'll record multiple Tracks in a Song, but you'll need to mix these Tracks to a stereo format for distribution online, or on CD or DVD. With a DAW such as Studio One, this simply means saving your mix to a stereo file.

Create a Mixdown



To create a mix of your Song in Studio One, navigate to *Song/Export Mixdown* or press [Ctrl]/[Cmd]+[E] on the keyboard to open the Export Mixdown menu.

Location

The top section of the Export Mixdown menu is where you can select a location and name for the mix file. Click on the [...] button to choose a file location. Click on the file name, type in a new name, and press [Enter] to choose a name for the file. Location defaults to the Mixdown folder in folder for your Song, but once you set a new mixdown location, Studio One uses that location for further mixdowns, until the next time you close the Song. Mixdowns are titled "Mixdown" by default, but once you set a name, that name is used by default for any further mixdowns of the current Song.

The Publishing menu lets you choose to send your mixdown to PreSonus Notion software (choose "Send to Notion"), upload it to PreSonus Sphere, or upload it to a connected SoundCloud account (choose "Upload to SoundCloud"), once the mixdown is completed. For more information on working with Notion in combination with Studio One, see **this section**. For more information on working with SoundCloud, see **SoundCloud Support**. For more detailed information on uploading to PreSonus Sphere see **PreSonus Sphere Support**.

Format

Select the format for your mix file in the middle section of the Export Mixdown menu. Choose from the Wave, AIFF, FLAC, CAF, Ogg Vorbis, M4A, AAC/ALAC, or MP3 file formats, and then choose the desired resolution and sample rate.

The MP3 format also offers an option to export at a Constant or Variable bit rate. The encoder will vary the bit rate during export, allocating more bits to complex passages and fewer bits to simple ones. This flexibility allows generating higher quality output files compared to the Constant bit rate mode at the same overall bit rate.

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

Export Range

Choose the Between Loop option to only export the range of your Song between the Left and Right Locators. Choose Between Song Start/End Marker to export the range of your Song between the Song Start and End Markers, as seen in the Marker Track. Choosing Between Each Marker exports separate audio files for the range between each marker in the Song for each Track, placing them in folders named after the markers. Choosing Between Selected Markers lets you choose a pair of Markers to export the range between.

The duration of the range to be exported is displayed in the Duration field. Note that when Between Each Marker is selected, the Duration field still shows the full length of the Song, signifying the total length of audio to be exported, rather than the length of any one section as dictated by the Markers.

Options

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

Choose an output from which the mix is to be created in the Output selection box. Only the Main Out appears in the list, by default. If there are any Sub Outs in the Console, they 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 Mono to generate a monaural mix. This is useful to check for phase cancellation issues between the left and right channels of a stereo mix when the user is listening through a single speaker.

Check Bypass Master Effects to bypass the Insert effects on the Main Output Channel of the Console when rendering the mixdown. This is useful if you have inserted effects to simulate the mastering stage, such as a compressor and limiter, but would like to render the mixdown without them in order to address this in a mastering Project, or to preserve flexibility for another mastering engineer.

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 note data and audio flow to and through these external sources during mixdown.

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

Check Overlap and specify a duration if you would like to add an overlap to the exported range so you can create crossfades between them later on.

Song Meta-Information

Certain file formats, such as MP3, can contain additional information about the audio which is referred to as "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 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 that can contain meta-information are 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 Song Information window also contains a Notes tab, in which you can type in any text information about the Song that may be useful later.

The meta-information displayed represents what listeners 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 is 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.

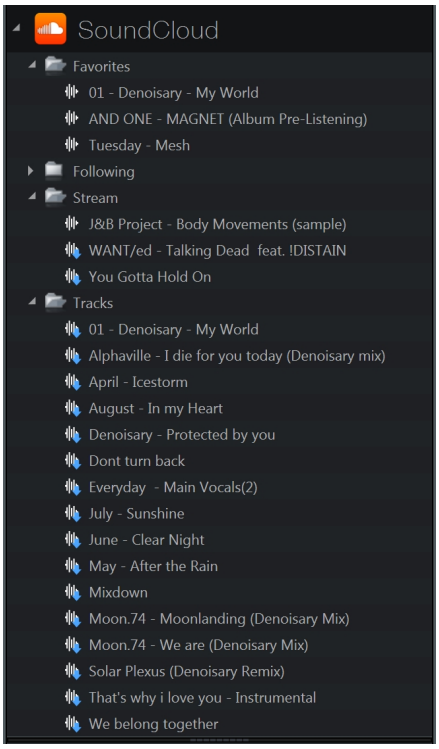
SoundCloud Support

When you're done mixing down, you can upload your sounds to SoundCloud, a web-based music sharing service, directly from Studio One. You can also download sounds from SoundCloud (when available) directly into Studio One.

To upload a new mixdown to a connected SoundCloud account as soon as it is created, choose "Upload to SoundCloud" from the Publishing menu in the Export Mixdown window. The SoundCloud Client opens when the new mixdown is complete. In this dialog, you are able to upload audio straight to SoundCloud, and set various SoundCloud-specific options as you do so. You can also access the SoundCloud Client directly by navigating to *Studio One/SoundCloud Client*.

SoundCloud in the Browser

You can find SoundCloud features in the Cloud tab in the Browser.



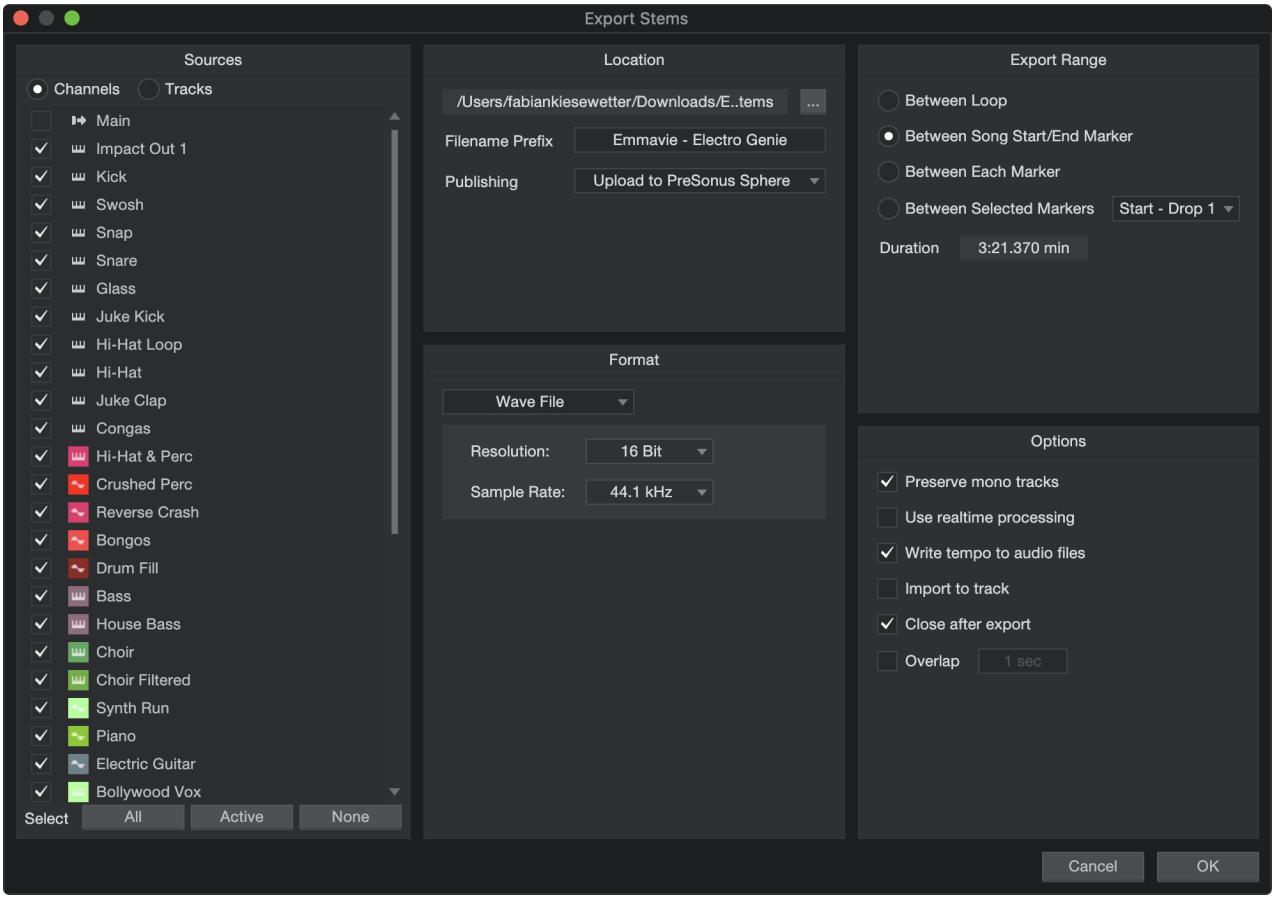
You can drag and drop audio from the SoundCloud locations listed here just as you would from any other file location, and audio is downloaded (if downloads are allowed for the chosen file) accordingly. You can even preview the audio in the Browser.

For instance, you might have a music partner creating beats for you, and he shares that audio directly with you through SoundCloud. You would browse to that person's SoundCloud folder, listed under the SoundCloud heading in Cloud, and drag the desired audio into the arrangement. A special Event is placed in the arrangement, and the Transfers menu opens to indicate the download's progress. When the download is complete, the waveform appears for the Event, and you can proceed as you normally would with any audio material.

Export Stems 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, to prepare a different mix or remix the Song. The Export Stems feature in Studio One provides an easy way to accomplish this.

Select Tracks and Channels



To export stems from your Song in Studio One, navigate to *Song/Export Stems* to open the Export Stems menu.

Once in this menu, you can see two tabs labeled Tracks and Channels. The list of Tracks reflects the Tracks in the Arrange view, while the list of Channels reflects the list of Channels in the Console. Muted Tracks and Channels are unchecked by default, and can be identified by a (Muted) indicator. Select the Tracks and Channels you wish to export by checking each Track or Channel in the list.

You can easily select all Tracks, select only active Tracks, or deselect all Tracks, by pressing the Select All/Active/None buttons below the Track list.

Note that the audio file created for any selected Track or Channel is the equivalent of soloing the Track or Channel in the Console and listening to the result. The audio file includes the results of all Inserts and Sends on the Track or Channel. If you don't want the Inserts or Sends included in the exported audio, disable them before exporting.

Location

You can select a location and name for the exported files in the top section of the Export Stems menu. Click on the [...] button to choose a file location. Click on the file name, 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 is appended to the user-specified file name.

The Publishing menu lets you choose to send your stems to PreSonus Notion software (choose "Send to Notion"), upload them to PreSonus Sphere (choose "Upload to PreSonus Sphere") or a connected SoundCloud account (choose "Upload to Soundcloud"), once the stem export is completed. For more information on working with Notion in combination with Studio One, see this section. For more information on working with SoundCloud, see SoundCloud Support. For more detailed information on uploading to PreSonus Sphere see **PreSonus Sphere Support**

Format

Choose from the Wave, AIFF, FLAC, CAF, Ogg Vorbis, M4A, AAC/ALAC, or MP3 file formats, and then choose the desired resolution and sample rate. The MP3 format allows the additional option to export at a Constant or Variable bit rate.

Export Range

Choose the Between Loop option to only export the range of your Song between the Left and Right Locators. Choose Between Song Start/End Marker to export the range of your Song between the Song Start and End Markers, as seen in the Marker Track. Choosing Between Each Marker exports separate audio files for the range between each marker in the Song for each Track, placing them in folders named after the markers. Choosing Between Selected Markers lets you choose a pair of Markers to export the range between.

The duration of the range to be exported is displayed in the Duration field. Note that when Between Each Marker is selected, the Duration field still shows the full length of the Song, signifying the total length of audio to be exported, rather than the length of any one section as dictated by the Markers.

Options

The bottom section of the Export Stems menu has several options that affect how the files are created:

- Check **Preserve Mono Tracks** 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 MIDI instruments or external hardware processing, so that note data and audio flow to and through those external sources in real time during the export process.
- Check **Close After Export** if you would like to close the Export Tracks as Audio Files menu after exporting your Tracks.
- Check **Overlap** and specify a duration if you would like to add an overlap to the exported range so you can create crossfades between them later on.

Mixing Suggestions

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 relationships between all of the parts in your Song, which affects 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.

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.

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.

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.

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.

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. Avoid placing compressors or limiters on the master channel of your mix.

Maximizing Computer Processing Power

If you are only listening to playback of previously recorded audio, 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 keeps 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 enables you to use more plug-ins and other processing.

To adjust the Block Size, navigate to the *Studio One/Options/Audio Setup* menu (macOS: *Preferences/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 macOS there is a pop-up 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 macOS there is no difference between Internal and Hardware Block Size.

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.

The most flexible option you have is to use Track Transform to render Audio and Instrument Tracks and temporarily remove the related virtual instruments or effects, as described in the **Editing** chapter.

Alternatively, you can do the following to accomplish this:

1. Select all of the Instrument Parts on the Instrument Tracks that you would like to render to audio.
2. Select Bounce Instrument Parts from the Event menu or press [Ctrl]/[Cmd]+[B] on the keyboard. Each Instrument Part is rendered to an Audio Event and placed appropriately on a new Audio Track.
3. 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 frees 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 Stems* function, with the Import to Track option enabled. Then, you can simply remove the original Audio Track, freeing up the resources formerly used by its effects plug-ins.

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 overloads, causing the application to become unresponsive or frozen.

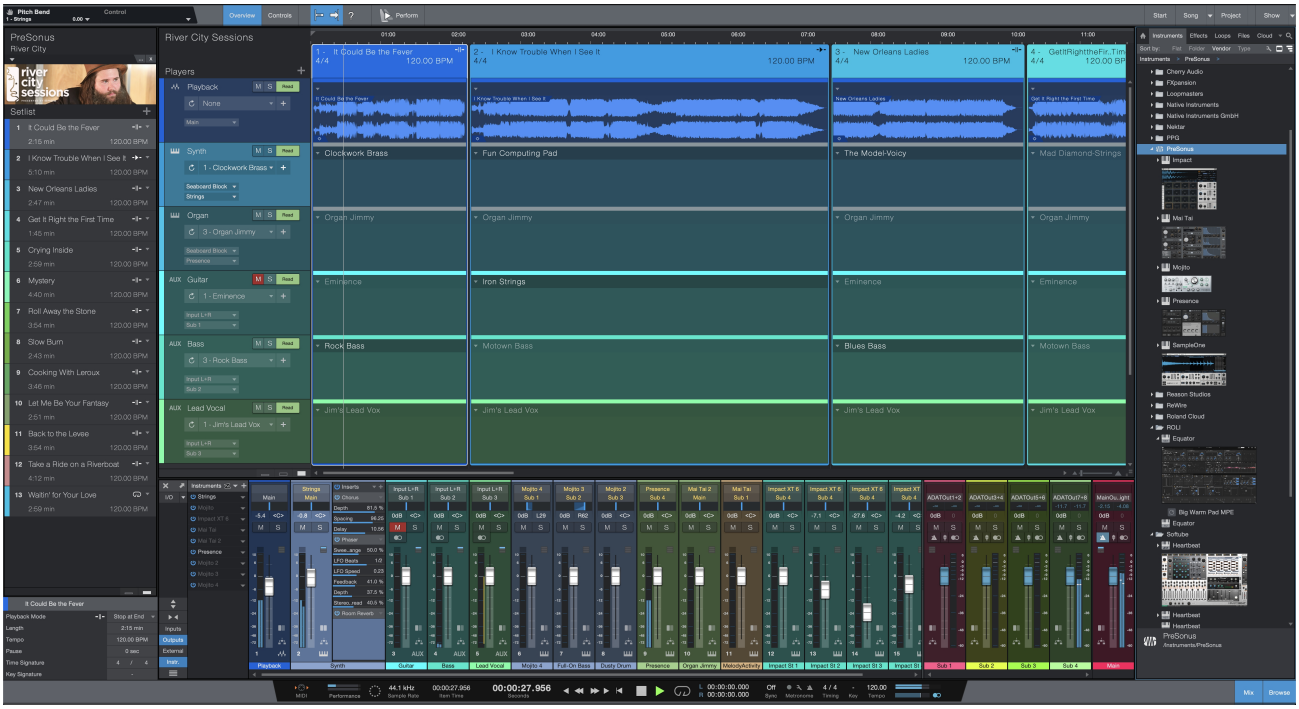
If this happens, and Studio One becomes unresponsive for more than 15 seconds, the system is automatically stopped, and the audio device is suspended. A warning message is displayed to notify you that this has happened.

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 are unlikely to overload the audio engine.

The Show Page

The Show page is a powerful, fully integrated live performance environment that makes it possible to run complete shows from a single computer. It combines Setlist management, the playback of backing tracks, virtual and real instrument Players, and Patch management inside a single window. With assignable Macro Controls and a dedicated full-screen performance view, running a show is simple and reliable even in difficult lighting conditions.



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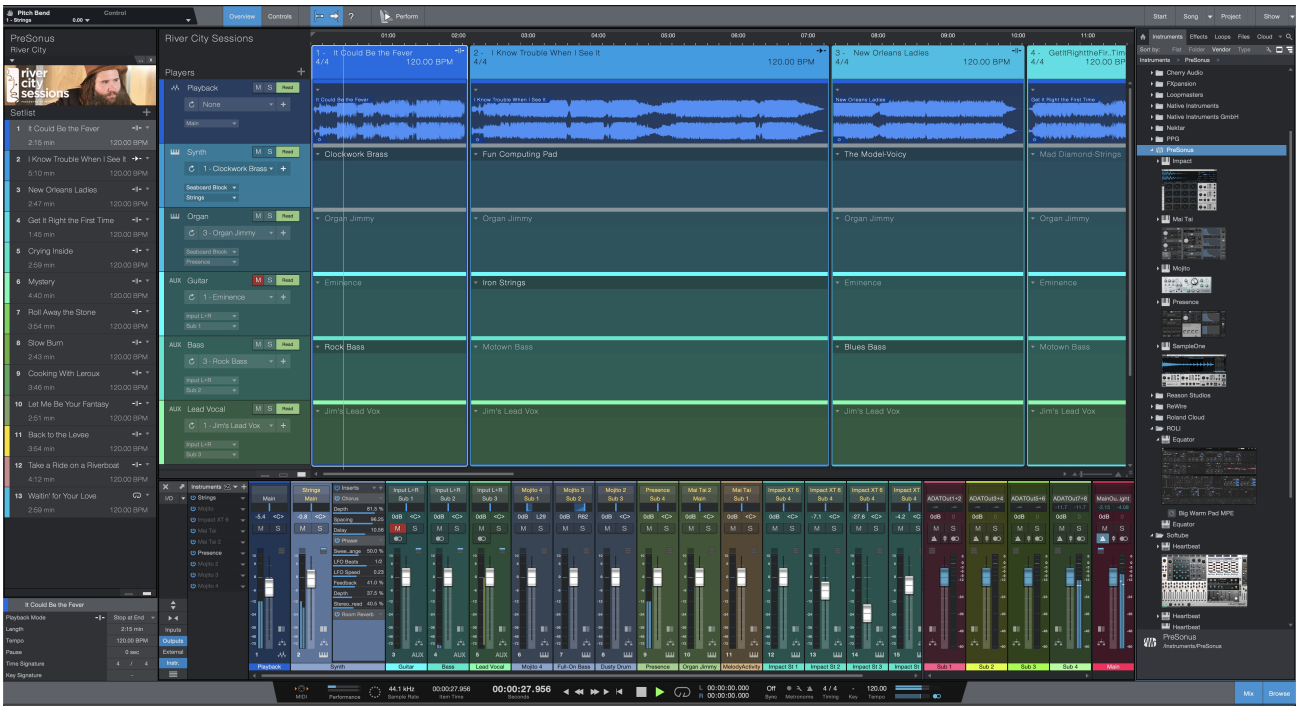


A Tour of the Show Page

The Show page consists of five main sections:

- **Setlist** The Setlist adds a clearly defined structure into a live performance by adding and managing Setlist Items (these could be songs, musical cues, or patch performances). When an Item is added to the Setlist, a color-coded entry also appears in the **Overview**. This window displays the Items on a timeline based on their position in the Setlist. Items can be reordered with a drag-and-drop in either window.
- **Players and Patches** The Players column defines the contents of a show with each Player representing a source or artist. The Show Page provides three different Player types:
  - **Backing Track Player** for playback of audio files (mixes or stems).
  - **Real Instrument Player** for external audio sources processed through a mixer channel, such as a guitar player using Ampire or a singer processing his voice using the Fat Channel.
  - **Virtual Instrument Player** for any type of virtual instrument, including the Multi Instrument for complex split/layer combinations.

  Each Player is associated with one or more mixer channels. Any number of Players in any combination can be part of a Show. The current state of a Player can be saved into a Patch, including a complete snapshot of all instrument, plug-in and mixer settings.
- **Macro Controls** The Controls view is a powerful controller mapping environment. Any parameter of any Player instrument, plug-in or mixer channel can be mapped to a set of up to 24 controls (knobs, faders, and/or buttons) in predefined configurations. These controls are then mapped to knobs and buttons on a hardware controller such as the PreSonus FaderPort 8 or -16, the ATOM or ATOM SQ, or any other external MIDI controller.
- **Mixer and Browser** The Mixer is a streamlined version of the familiar Studio One Console. The familiar Browser provides access to instruments, effects, audio files and presets of any kind. These can be click-dragged into the Show and placed where they are needed.
- **Performance Mode** The Show Page features a dedicated Performance mode with its own custom view replacing the edit window when launched. This predefined full-screen view reduces the user interface to just the essential elements needed in a live performance:
  - Transport controls and a large time/bars counter
  - Setlist and Patch navigation
  - Current player status
  - Realtime controllers
  - Metering

Although a live show may be entirely run off the Show page edit window, the Performance view offers the best visual experience – even in difficult lighting conditions and when running on a small notebook computer screen.

Select a Show

To access the Show Page, select a Show from the Start page or the Studio One toolbar. The drop-down menu in the toolbar contains a list of existing Shows. If none exist yet, there are two ways to create a Show: Select New Show from the File menu, or **create a Show from a current Song**.

Create a New Show

To create a New Show, do one of the following:

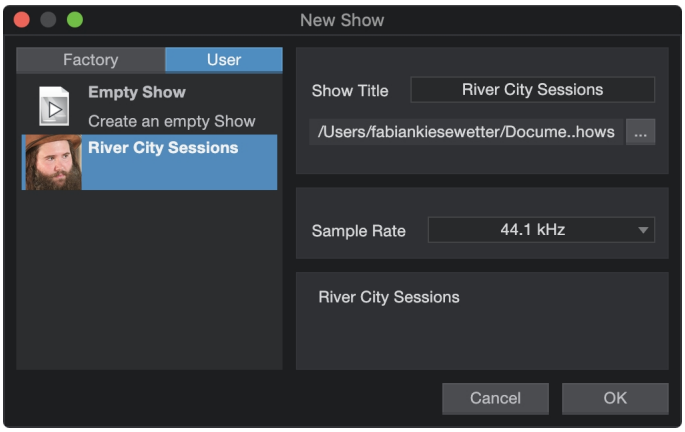
- From the Start page, click the **New Show...** link.
- Navigate to *File/New Show*.
- Press [Ctrl]/[Cmd]+[Alt]+N on the keyboard.
- If a Show is not currently open, click the quick-access Show button in the Studio One toolbar.

Give the Show a name in the Show Title field, or select the Show template you'd like to use and then give fhe Show a name.

Show Templates

On the left side of the New Show window there are two sets of Show Templates (Factory and User). The preset Show Templates include a selection of preconfigured shows designed around the main Show Page tasks: playing backing tracks, playing real instruments, playing virtual instruments, and using the Show Page as a virtual FX rack for a digital mixer such as the PreSonus StudioLive consoles.

Templates can help you create a Show very quickly. If you'd like to start from the ground up, select the Empty Show template.



Create a Template

If you plan to use a Show setup more than once, it can be helpful to create a template. To do this, first create a new Empty Show. Next, create and configure the basic Setlist, the Players, and add your favorite virtual instruments, effects, and any other aspects of the Show that are your go-to solutions. Then select **Save as Template** in the File menu.

Type in a title and description, choose an icon image (512 x 512 pixels) or drag one onto the image icon, and click OK. Your template is now one of the User templates available in the New Show window.

Replace a Template

If you'd like to replace an existing Show template with the current settings, navigate to *File/Save As Template* and select **Replace Existing...** at the bottom of the window. The Title, Description, and Icon of the older Template are loaded into the Save As Template window. Click OK to overwrite this file.

Show Location

New Shows are saved to *Studio One/Options/Locations/User Data* (macOS: *Preferences/Locations/User Data*). You can choose a different folder by clicking on the [...] button in the New Show window and browsing to the preferred location.

Sample Rate

Use this field to specify the sample rate for the show. The sample rate should match your audio interface by default.

If you plan to use Backing Track Players, it may make sense to choose the same sample rate the backing tracks used. If the sample rate doesn't match, the backing track audio files are automatically converted in the background and a new audio file is added to the Pool.

Add an Open Song to a Show

To add a Song you are currently working on to a new or open Show, select **Add to Show** from the Song menu. Select any open Show from the list or select **New Show**. This automatically renders a mixdown and places it in the Setlist and Overview of the selected Show.

Add Content to the Show

Once a Show exists, you can fill it a number of ways:

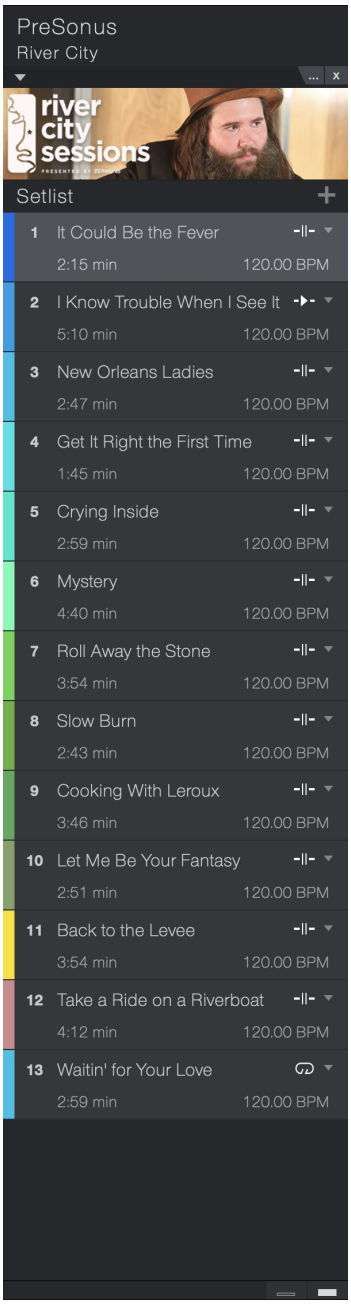
- Transfer a mix from the current Song (see the previous section).
- Export stems from a Song, and then add the stems from the Browser via drag-and-drop.
- Transfer your favorite Instruments to an open Show with the **Send to Show** option in the Instrument Slot pop-up menu, which is found in the **Instruments Panel** of the Console.
- **Copy and paste Channels** from the Console, complete with their levels and Insert/Send effects.
- Drag items from **the Browser** into the Show (instruments, FX Chains, etc.).
- Add Channels to the Console with a [Right]-[Ctrl]-click (Bus, FX, Listen Bus, etc.).

Show Setup

Navigate to *Studio One/Options/Show Setup* (macOS: *Preferences/Show Setup*) to access the Show Setup information and settings. These include the General settings, Audio Input/Output settings, and the Meta Information for the Show.

- **General Settings** includes the Sample Rate, which can be changed and applied on this page.
- **Meta Information** includes the Title, Artist, Venue, and Logo, which can be changed on this page.
- **Audio I/O Setup** allows you to route the Players and other components of the Show through the inputs and outputs of your audio interface, as described **here**.

The Setlist



The Setlist is where you decide the order for the songs, musical cues, and/or patch performances that make up a Show. Each entry in the Setlist is called a Setlist Item. They are named automatically as they are added ("Item 1", "Item 2", etc.). You can rename each Setlist Item, assign it a color, and set it to one of three playback modes (Continue, Stop at End, or Loop). Setlist Items can be reordered with simple drag & drop.

The view size can be set to Small or Normal for all Setlist Items, using the buttons between the Items and the Setlist Inspector. When set to Normal, the Item length and BPM are also displayed.

The Setlist Inspector is located at the bottom of the Setlist window. It shows specific information about the selected Item, which can also be edited here.

You can give each Show a unique identity by adding the name of an Artist and Venue at the top of the Setlist window. It's also possible to add a logo or some other image below the Venue name. The maximum image size is 1400 x 1400 pixels, and the image you select is automatically scaled to fit. Alternative versions of a Setlist can be made by saving a new version of a Show *(File/Save New Version)*, just as you would save alternate versions of Songs or Projects.

Add Setlist Items

At the top of the Setlist is the Add Setlist Item button . Click this to add an Item to the Setlist. Each Item is given a unique color, which you can change by clicking the color field to the left of the Item number. To name an Item, double-click the field to the right of the Item number.

When an Item is placed in the Setlist it also appears in chronological order in the **Overview**, using the same color as the Setlist Item for easy identification. You can reorder Items in the Setlist or the Overview with a simple drag-and-drop action.

Working with Setlist Items

There are three ways to select Setlist Items: with a click of the cursor, with the up and down arrows on a computer keyboard, or with the ◄ and ► buttons in the Studio One transport.

Set the Playback Mode

The playback mode tells the Setlist what to do when it reaches the end of a Setlist Item. Click the upper-right corner of the Item and choose whether the Setlist should proceed to the next Item (Continue), wait for you to press Play (Stop at End), or repeat that Item indefinitely (Loop).

Change the Item Length

When the view size is set to Normal, the Item length is visible. This is automatically set to the audio file length when a Backing Track Player is used, but a different value can be entered: a shorter value ends the file playback earlier; a longer value leaves a gap between this Item and the next one. If you want a gap, a better way is to enter a Pause value for the next Item in the **Setlist Inspector**.

Change the BPM

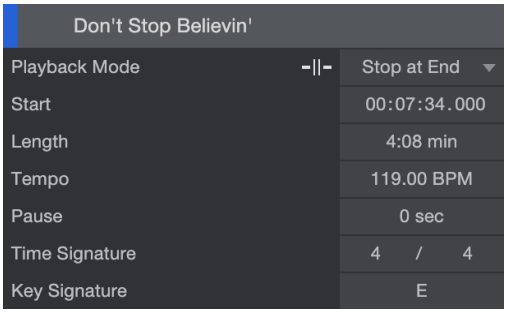
When the view size is set to Normal, a BPM value is visible. If a backing track audio file includes tempo information, this value will be imported. You can enter another value if you like. This affects the Metronome click, but it does not affect the length or playback speed of an Item.

Duplicate, Remove, or Disable an Item

[Right]/[Ctrl]-click on an Item to open a contextual menu with four options:

- **Add Setlist Item** provides another way to add an Item to the Setlist.
- **Duplicate Setlist Item** adds a copy of the Item to the Setlist. You can set a different Length for each. All Patch assignments are duplicated as well.
- **Remove Setlist Item** deletes the Item from the Setlist.
- **Disable Setlist Item** darkens the Item in the Setlist and hides it in the Overview so it is skipped during the Performance. [Right]/[Ctrl]-click and select **Enable Setlist Item** to restore the Item to the Show.

Setlist Inspector



The Setlist Inspector shows specific information about the selected Item. You can also change that information here.

- **Color** can be changed by clicking the color field to the left of the Item name.
- **Name** can be changed by double-clicking the field and adding text.
- **Playback Mode** can be set by clicking on the icon or the current Mode name and selecting the desired option.
- **Start** shows the start time of the Item in hours, minutes, seconds, and milliseconds. An Item can begin at the precise moment you enter here. When running a Show synced to an External MIDI Device via **MTC**, the start timecode will be the offset at which a Setlist Item will start playback. The Pause time is adjusted automatically.
- **Length** can be entered for an Item. Shorter values end file playback earlier; longer values leave a gap until the next Item. We recommend using the Pause parameter to create a gap, though (see below).

- **Tempo** can be entered here. This affects the Metronome click, but it does not affect the length or playback speed of an Item.
- **Pause** can be used to place a gap between the selected Item and the previous one. The pause can be as little as 0.001 seconds and as much as 30 minutes. A Pause is recognized instantly in the Overview, since it leaves a gap between Items.
- **Time Signature** can be entered for informational purposes.
- **Key Signature** can be set using the familiar pop-up selector; simply click and select the key for the current Item.

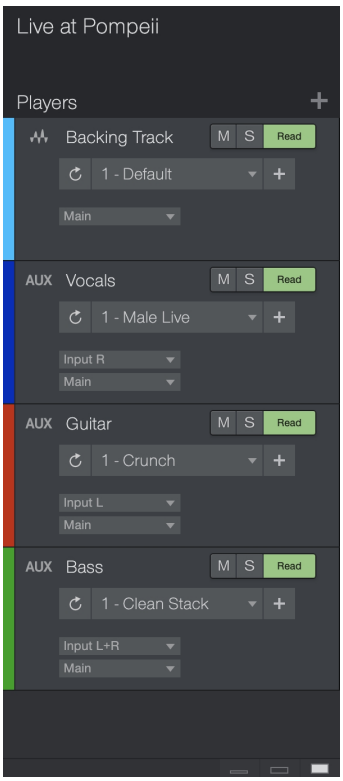
Players and Patches

The Players column can hold as many Players as you need for a Show. A Player can be a backing track, a virtual instrument, or a live audio input with its associated Channel, through which a live musician or singer is combined with all of the other Players in your Show.

In addition to its location in the Players column, each Player has its own color-coded "lane" in the Overview. The Overview also displays the Setlist Items in columns. The intersection between a lane and a column is called a "slot". Each slot in a Virtual or Real Instrument Player lane can hold one Patch, which will be explained later.

Each Player is associated with one or more Channels in the **Console**. Use [F3] to show or hide the Console, or double-click an empty space inside any Player.

The Players Column



The Players column lets you assemble a list of the Players you need for the Show. You can navigate through the Players column with the left and right arrows on a computer keyboard, or click a specific Player to select it.

The Players column provides these features:

- **Title** Click the field once to enter a name for the Show.
- **Add Player** This button lets you add a Player to the Players column.
- **Color** As Players are added they are assigned a color automatically. This becomes the color for the lane as well. Click the color field to select a new color.
- **Instrument Editor** Click the keyboard icon to open the Editor for a Virtual Instrument Player.
- **Mute/Solo** These buttons allow you to silence or solo a specific Player.
- **Patch Automation** Each Player can be set to Read or Auto: Off. See the Patch Automation section below for details.

- **Size buttons** At the bottom of the Players column are three buttons that let you specify the Player size (Small, Medium, or Large). This naturally affects the lane size in the Overview.
- The larger Player sizes show more options, which include:
  - **Update Patch** Click this button to update the current Patch with any changes you have made to a Virtual Instrument or an plug-in effect.
  - **Patch Menu** The arrow opens a menu, which is described in the next section.
  - **Save Patch** The + button opens the Save menu, which lets you save the current Patch. Give it a new name if you like, and click OK.
  - **Input/Output** These menus provide the same options you see when adding a similar Player.

Patch Menu

Each Player in the Players column has a drop-down menu with the following options:

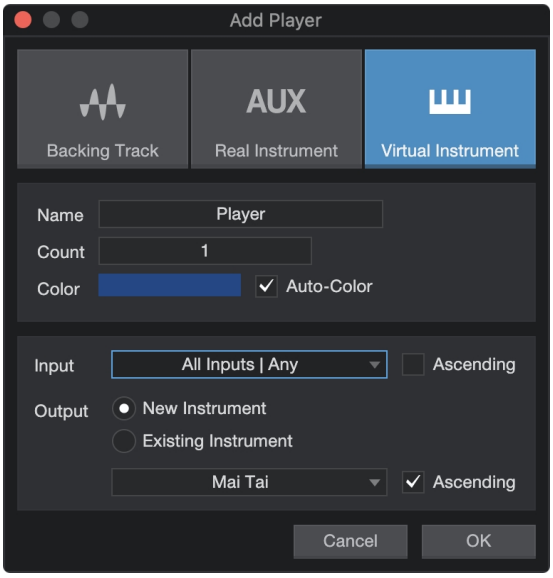
- **Patch list** If you have saved Patches for this Player they appear at the top of the menu. To reselect "None", use the **Reset Default Patch** option described below.
- **Default Patch** tells you which Patch is the current default for the Player. The default Patch is automatically applied to all slots in the Player lane. You can select a different Patch for each Item using the menu for that slot.
- **Set (Patch name) as Default Patch** sets the current Patch as the default for the Player.
- **Reset Default Patch** clears the Default Patch selection but retains the Patch in the Patch list for the Player.
- **Save Patch...** opens the Save menu so you can name the Patch and save it.
- **Update Patch** updates the current Patch with any changes you have made.
- **Rename Patch** opens a window that allows you to give the Patch a new name. Click OK to save it.
- **Remove Patch** deletes the current Patch from the Patch List for the selected Player.

Contextual Menu per Player

[Right]/[Ctrl]-click on a Player inside the Players Column to open a contextual menu containing these features:

- **Save/Update/Rename Patch** These features are described in the previous section.
- **Duplicate Player** This adds another Player of the same type below the selected Player.
- **Remove Player** This option deletes the selected Player from the Players column, and removes its lane from the Overview.
- **Add Player...** Use this to open the Add Player window, which provides specific assignment options for the Player. Or if you want to add a Player with the default settings, select **Add Backing Track Player**, **Add Real Instrument Player**, or **Add Virtual Instrument Player**.

Add a Player



Click the + at the top of the Players column to add a Player to the Show. Each Add Player window type has slightly different options, but they are similar to what you see when adding a Track.

- The options for the Backing Track and Real Instrument Players are similar to the ones you see when Creating an Audio Track:
  - **Name** Click here and type in a name for the new Player.
  - **Count** Choose the number of Players you would like to create.
  - **Color** Choose a color.
    - **Auto-Color** Check this box if you would like your Players auto-colored.
  - **Preset** Choose an **FX Chain** to be pre-loaded on the Players.
  - **Input** Assign an audio Input to the new Player(s). When creating multiple Players, you can engage the Ascending option to assign Inputs to each Player in ascending order (Player 1, Input 1, Player 2, Input 2, etc.).
  - **Output** Assign an audio Output to the new Player(s). When creating multiple Players, you can engage the Ascending option to assign Outputs to each Player in ascending order (Player 1, Output 1, Player 2, Output 2, etc.).
- The options for the Virtual Instrument Player are similar to the ones you see when Creating an Instrument Track:
  - **Name** Click here and type in a name for the new Player.
  - **Count** Choose the number of Players you would like to create.
  - **Color** Choose a color.
    - **Auto-Color** Check this box if you would like your Players auto-colored.
  - **Input** Assign a MIDI input Device to the new Player(s). Choose All Inputs | Any to accept input from any connected MIDI Device. When creating multiple Players, you can engage the Ascending option to assign inputs to each Player in ascending order of device and MIDI channel.
  - **Output** Assign an Instrument to the new Player(s). To create a new instance of a software instrument for each new Player, choose New Instrument and select an instrument from the provided list. To assign the new Players to a hardware instrument or to a software instrument already in use in the Song, choose Existing Instrument, and select from the provided list.
    When creating multiple Players, you can engage the Ascending option to assign Outputs to each Player in ascending order of Instrument and MIDI channel.

Each of the Player types has features of its own.

Backing Track Player

The **Backing Track Player** is for playing mono or stereo audio files. These can be Song mixes, stems, .wav, .mp3, etc. You can drag what you need directly into the Players column from the Browser. Note that individual stems require individual Backing Track Players.

- When you drag a file to the blank space under an Item, it adds a new Player and adds the audio file to that Item, all at the same time.

- If you drag a file onto an empty slot in the lane of an existing Player, the file becomes part of the Item at that location.
- When you drop the file onto a slot that already has an audio file, the new file replaces the old one.
- If you drop a file at the end of the timeline, it adds a new player *and* a new Item to the Setlist. The new Setlist Item is given the name of the file.

Real Instrument Player

The **Real Instrument Player** is designed for external audio sources that are processed through a Channel in the Console. This could be a live guitar or bass routed through Ampire, for example, or a singer's voice routed through his signature FX Chain. You can drag FX presets or entire FX Chains from the Browser onto a Player, if you like, or drag them onto a Console Channel.

Virtual Instrument Player

Use the **Virtual Instrument Player** for any type of virtual instrument. Options include the Studio One **Multi Instrument**, which allows more complex combinations like splits and layers. You can drag an instrument from the Browser to add a new Player or replace the instrument for an existing Player. You can drag specific presets, too, which saves a step later.

If an instrument or preset is dragged onto a specific slot in a Virtual Instrument Player lane, it becomes the selected Patch in that slot. If it is dragged into the Players list on top of a non-empty Player, two options are available:

- **Insert**adds the preset with a new instance of the instrument (recommended).
- **Load/Replace** adds the preset using the same instance of the instrument (if it's the same) or replaces the existing instrument with the new instrument and preset

Insert is the default option. Press [Alt] when dragging the instrument or preset to choose**Load/Replace**

We generally recommend the use of separate instrument instances per Patch, especially when working with samplers. This allows for faster switching during a performance.

For example, if you plan to use two multi-sampled Presence instruments in the same Player, here's the best way:

1. Drag the first preset onto a slot in a Virtual Instrument Player lane.
2. Drag the second preset onto the next slot in the same Player lane.

This adds separate instrument instances for each preset. Now when the Show crosses from the first Setlist Item into the second, the Player switches instantly from the first Presence instrument to the second Presence instrument, rather than loading a new set of samples into the first Presence instrument.

Note FX and the Players List

Dragging one of the Note FX or a Note FX preset from the Browser/Instruments tab onto an empty spot in the Players List creates a new Player and a new Multi Instrument, to which you can add other instruments. If you drag one of the Note FX or a Note FX preset onto a Player with an existing Multi Instrument, the effect is added to that Multi Instrument.

Patches

The current state of a Player can be saved into a Patch, including a complete snapshot of all instrument, plug-in and mixer settings. There are two ways to save a Patch:

- **All views** [Right]/[Ctrl]-click and select **Save Patch...** from the menu.
- **Medium / Large views** You can also click to open the Save Patch window.

In either case, give the Patch a name and click OK to confirm.

Working with Patches

Here's a quick description of some of the ways Patches can be used:

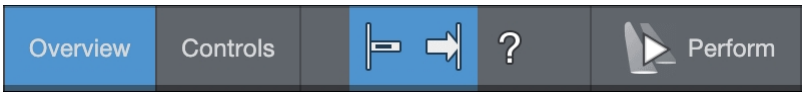
- When you drop an instrument preset into an empty slot in an existing lane, this loads the instrument and preset and automatically creates a new patch with the same name as the preset.
- After saving a Patch you can make this Patch the default for every unassigned slot in the lane. A slot that already has a Patch assignment will not change.
- If the Player has a default Patch, you can add another preset to the same Player and save it as a Patch too. After this you can select it as the Patch for any Item slot in that lane instead of the default preset.
- For a Virtual Instrument Player you can simply drag the new preset from the Browser to the desired slot and it is substituted for the existing Patch without altering the default Patch selection.
- If you change an instrument parameter, you can save that edit as a new Patch inside the current slot without the need to store it as a preset for the instrument.

Patch Automation

As stated previously, each slot in a Virtual or Real Instrument Player lane can hold one Patch. Having Read mode enabled for a Player means that when a Setlist Item is activated, either manually or during playback, the Patches that were assigned to each slot for that Player lane are recalled. If Patch Automation is disabled (i.e., set to Auto: Off), Patches are not recalled unless they are selected from the Patch menu or from the Patch List in Performance Mode.

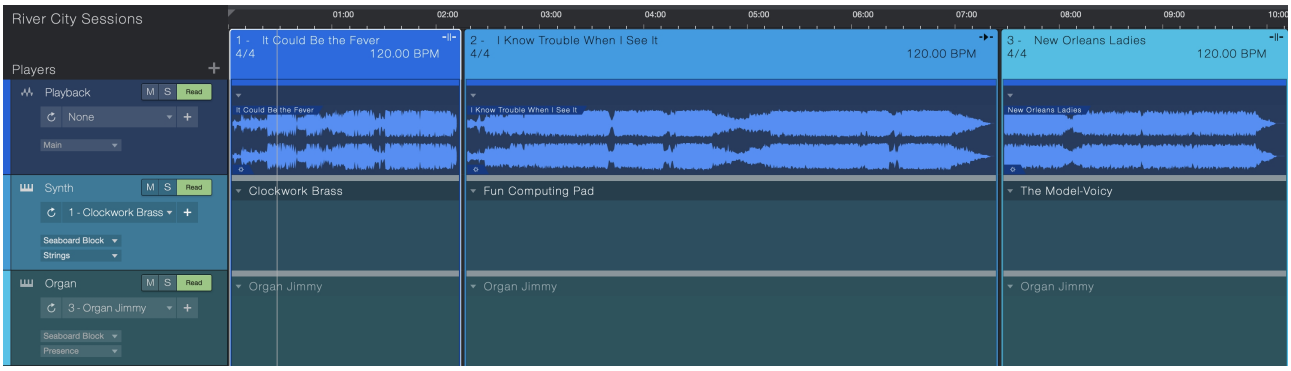
The Show Page Toolbar

The toolbar provides quick access to all of the Show Page features.



- **Overview** Select this button to display the Overview window. This reveals the Setlist Items and their locations on the timeline, with a lane for every Player in the Show. This is the view where **Patches can be assigned** to a Player for each Setlist Item.
- **Controls** This opens the page where you can select the control configuration and assign the Macro Controls you want to use during the Performance. Details are in the **Controls View** section.
- **Snap** When Snap is engaged, the current **Snap setting** is applied as you adjust the Loop range or the size of a Setlist Item.
- **Toggle Snap** Press [N] to toggle Snap mode on and off.
- **Autoscroll** This determines if the Overview window follows the playback cursor. Click this button or press the [F] key to toggle Autoscroll on and off.
- **Info View** Click the question mark icon to open the **Info View** bar. It shows which options are available depending on where you hover the cursor.
- **Perform** takes you to Performance View. You can also use [Ctrl]/[Cmd]+[Enter], where "Enter" is the Enter key on an extended keyboard.

The Overview window



The Overview displays the Setlist Items in vertical columns and the Players in horizontal lanes. The columns and lanes are color-coded: the columns are outlined by the Item color, and the lanes are filled with the Player color.

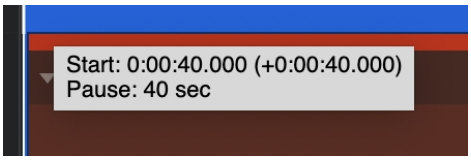
Item Columns

The head of a column shows the Item name, its Playback Mode, as well as the time signature and tempo for the Item. (link to Setlist descriptions.) The Item name and Playback Mode can be changed here (see context menu section below), but the time signature and tempo must be changed in the Setlist.

Beneath the column head are the slots where the column intersects with the lane for each Player in the Show.

Click-and-drag the column head to reorder Setlist Items in the Overview window, which also changes their order in the Setlist. Drag an Item in either place, it affects the other.

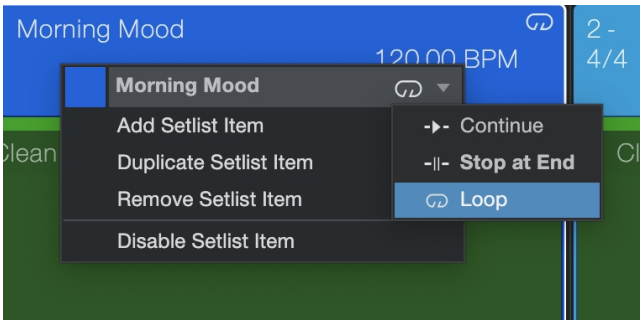
Click-and-drag the left edge of the column head to the right to add or increase a Pause (this value changes at the same time in the Setlist Inspector window). If a Pause exists, drag the left edge of the column head to the left to reduce the Pause value. A small window appears while dragging the left edge and shows the new Start Time, the amount of deviation from the previous Start Time, and the Pause length.



Click-and-drag the right edge of the column head to the left or right to change the Setlist Item length. A small window appears while dragging the right edge to show the Item length.

Note that you can change the size of the Players with the buttons at the bottom of the Players list. (The term was "column" in the Players file. Change?).

Contextual Menu per Column

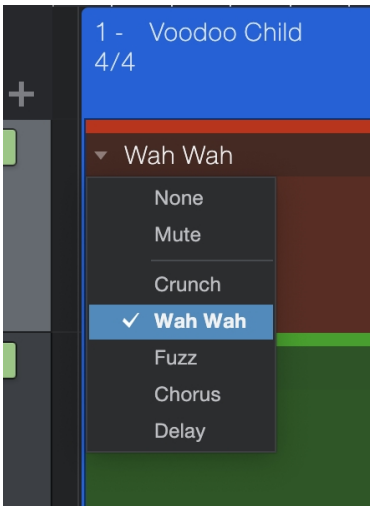


[Right]/[Ctrl]-click the head of an Item column to open a contextual menu. From this window you are able to select the Item color, change its **Playback Mode**, or **Add, Duplicate, Remove or Disable** the Setlist Item. The changes made here are also made in the Setlist.

Player Lanes

The intersection between a column and a lane is called a "slot".

Patch Selection per Slot



Each Setlist Item can recall one Patch automatically for each Player, and any number of additional Patches can be recalled manually during a Performance. A Player can have a list of Patches, one of which can be designated as the default Patch for the entire lane. You can override the default Patch for any slot; simply click the arrow at the top of a slot to open the Patch list and make a selection.

There are two other options in the Patch list for each slot in addition to the Patches:

- **None** means that no automatic Patch change happens for this Player when the Setlist Item begins.
- **Mute** silences the Player during that Setlist Item. This also activates the Mute button for that Player in the Player list for the duration of the Setlist Item. The Player is unmuted by the next slot that has a Patch assignment.

If your Show uses backing tracks then the Patch you assign to a slot is recalled automatically during playback. However, if your Show does not use backing tracks then you'll need to navigate the Setlist manually. This can be done using a mouse, keyboard shortcuts, pre-assigned buttons on a hardware controller, or with the Studio One Remote app.

Contextual Menu per Slot

[Right]/[Ctrl]-click on an Item slot to open a contextual menu. The options available in this window depend on the Player type.

For the Backing Track Player type only, [Right]/[Ctrl]-click the audio file inside the slot. The options in this contextual menu can

- **Delete** the file from the slot;
- **Duplicate** the file in the next slot in the lane, or
- **Select in Pool**, which opens the Browser/Pool tab with the audio file selected.

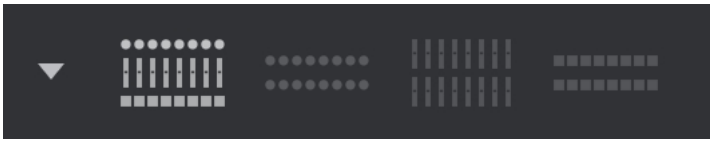
If you [Right]/[Ctrl]-click a different slot in any lane after selecting an audio file inside a slot, you have the additional options of Select All, Deselect All, and Undo/Redo last action.

If you [Right]/[Ctrl]-click a slot in the lane for a Virtual or Real Instrument Player, only Undo and Redo are available. The other options are grayed out.

The Controls View

The Controls view lets you map the parameters of any Player instrument, plug-in or mixer channel to a set of up to 24 controls (knobs, faders, and/or buttons), which are available in four predefined configurations. These controls then can be mapped to similar controls on a hardware controller such as the PreSonus FaderPort 8 or -16, the ATOM or ATOM SQ, or any other external MIDI controller.

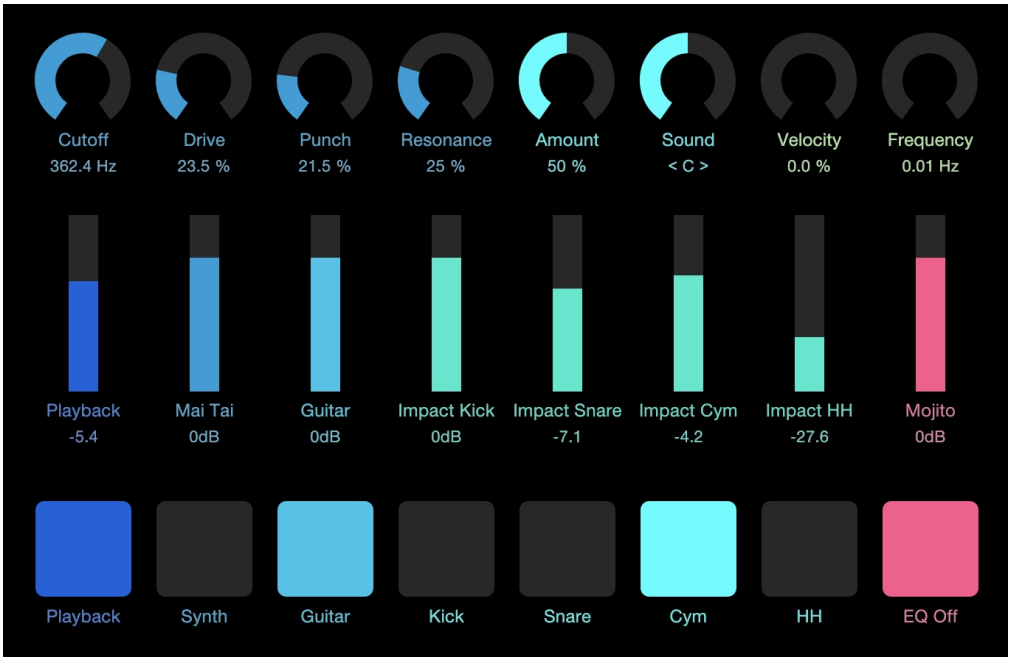
Select a Configuration



The four buttons at the top of the Controls view window are used to select a configuration. From left to right the configurations are **8 Buttons + 8 Knobs + 8 Faders**, **16 Knobs**, **16 Faders**, and **16 Buttons**. Select one of these configurations to use it in the current Show.

The arrow opens a window so you can preview the configurations. Up to 16 of the controls you see can be assigned to control multiple parameters. These customized Macro Controls play a prominent role in the **Performance View**.

Configuration 1: 8 of Each

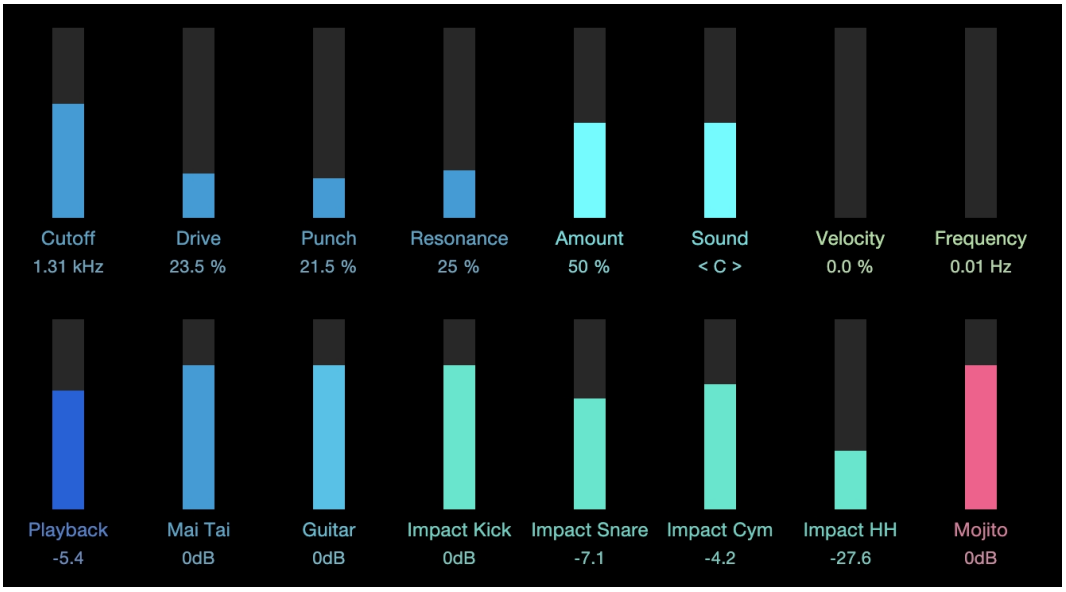


This configuration shows 8 of each type of control (Knobs, Faders, and Buttons). Choose up to 16 of those controls and assign them as needed. Their individual behaviors can be adjusted in the "Trans." area of the Targets column.

Configuration 2: Knobs

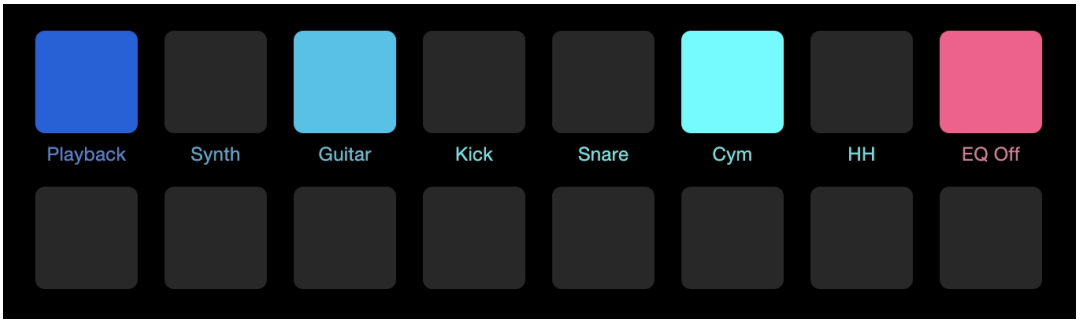
This configuration shows 16 assignable knobs. You can assign them as needed. Their individual response curves can be shaped in the "Trans." area of the Targets column.

Configuration 3: Faders



This configuration shows 16 assignable faders. You can assign them as needed. Their individual response curves can be shaped in the "Trans." area of the Targets column.

Configuration 4: Buttons



This configuration shows 16 assignable buttons. You can assign them as needed to toggle parameters on and off. Their performance can be inverted by selecting that behavior in the "Trans." area of the Targets column.

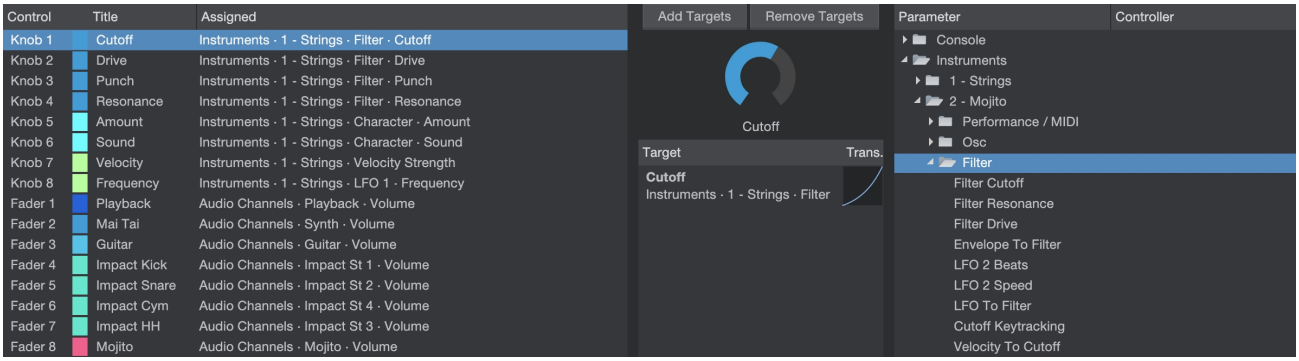
The Preview Window

Click the arrow to open the preview window. Here's a quick description of how it works.

- As each configuration is selected the window changes to display the selected configuration.
- You can click-and-drag the variable Macro Controls (knobs, faders) to change their values, and you can click anywhere inside a fader to jump to a new value. The status of a button can be toggled by a click.
- Hover the cursor below a Macro Control until an arrow appears. You can then click to open the color selection menu for that control.
- Double-click the name field under a Macro Control to rename it. Double-click the value field to enter a specific value.
- [Right]/[Ctrl]-click to view the current assignment, enter a new value, or clear the connections for that Macro Control.
- As a Macro Control is activated the response is also visible in the **Control Link** view on the left side of the Studio One toolbar. This is true of the selected control in the Targets column as well.

It's easy to make a Macro Control assignment. We'll describe that in the next section.

Assigning a Macro Control



The Macro Controls Mapping view shows three columns of information. The left column lists all available Macro Controls and their current assignments (if any). The right column shows all plug-ins that are currently part of the Show. Expand any plug-in in the list to show all assignable parameters for that plug-in. The central Target column is a place where Macro assignments can be made, configured, or broken.

You can assign an unlimited number of parameters to the same Macro Control, each with its own range and polarity, to create powerful “morphing controls”. As more parameters are assigned to a Macro Control, plus signs (+++) are added to the right of the default name in the Title column. You can rename the Macro Control if you like; just double-click the name in the Title column.

You also can choose a specific color for a Macro Control. To do this, click the box between the Control and Title columns for that Macro Control. Select a color and the menu will close. You'll see that color whenever this Macro Control has a non-zero value.

When working with the built-in PreSonus plug-ins, assigning parameters to Macro Controls is very easy—simply [Right]/[Ctrl]-click the control of choice, select "Connect (name of control) to Channel Macro Control" from the pop-up menu, then choose the desired Macro Control from the secondary pop-up list.

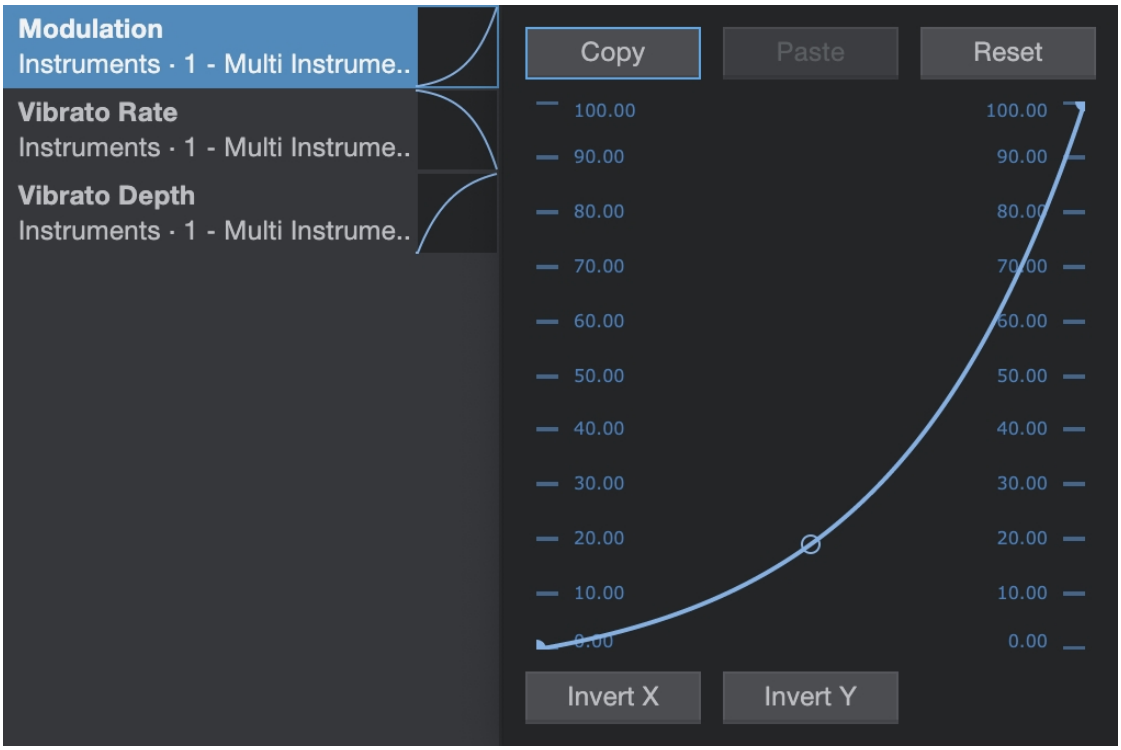
Add/Remove Targets

The simplest way to map a parameter to a Macro is to drag the parameter from the right column onto the Macro Control of your choice in the left column, or into the central Target column when a Macro Control is selected. You can also do this by selecting a Macro Control and a parameter, and clicking the [Add Targets] button. Alternatively, you can drag the parameter directly onto a Macro Control in the Preview window. However you do it, once the assignment is made, the parameter of your choice is displayed in the Target column.

To remove an assignment from a Macro Control, select the Macro in the left column, select the assignment you wish to remove in the Target column, and click the [Remove Targets] button.

Transform Window

You can shape the relationship between the movement of a Macro Control and the settings of its assigned parameters quite extensively. With a Macro Control selected in the left column of the Macro Controls Mapping view, the current mappings for that control are displayed in the Target column. Next to the name of each parameter is a button that gives you access to the control transform settings.



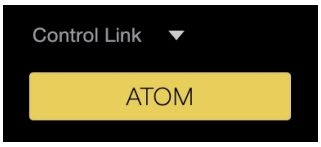
This graph traces the response curve from the beginning of the control's travel (the draggable point on the left end of the curve) to the end of its travel (the point on the right end), with a handle in the middle that you can drag to set the shape of the curve. Dragging these points up and down the control scales on the left and right of the graph lets you set the effective range of motion for that Macro Control.

For example, the whole range of a Macro knob could be set to affect just a quarter of a parameter's range, for fine-tuning purposes. You can also move the right point below the left, reversing the action of the knob, according to whatever scale you wish.

Below the graph are buttons that let you **Reset** the graph to its default setting, **Invert** the shape of the curve, or **Copy** the curve setting and **Paste** it onto another parameter.

Note that because Macro buttons are a binary control, they have no curve setting. However, clicking in the Trans. column next to a button assignment inverts its response, causing the parameter to be enabled when the Macro button looks disabled, and vice-versa.

Control Link



Click the Control Link button to enable or disable the connection to your controller. Click the arrow above the button to open a menu of available controllers and make a selection. For more details on how to map a hardware controller, see the **Control Link chapter**.

Performance Mode

It's possible to run a live show from the Show page edit window, but Performance mode offers the ideal combination of factors – large controls, a basic layout, easy to read onstage, and a screen that tells you instantly *what's happening now* and *what's happening next*. It's perfect for a notebook computer, which invariably has a smaller screen than what people use in their studios.

To enter Performance mode from the Show page, click the Perform button in the toolbar or navigate to *Show/Perform*. You also can use [Ctrl]/[Cmd]+[Enter], where “Enter” is the Enter key on an extended keyboard.

Visibility and Control

The Performance View display is remarkably uncluttered, for all the features it contains. Depending on the size of the screen used, the text and controls are scaled to make the best use of the available space.

The Setlist

Most Shows revolve around a Setlist, so we made it easy to find by placing it in the first column on the left. The Setlist Items are listed from top to bottom.

If your Setlist has multiple Setlist Items, you can select them directly from the list in Performance View. After selecting a Setlist Item from the Setlist, you can then use the up and down arrows on your computer keyboard to move through the Setlist.

As each Setlist Item is selected it triggers the Patches on all the Players to change their sounds and mix snapshots. If no backing tracks are used, this is the way to navigate the Setlist (instead of using the transport controls). You can also select Patches manually. If you don't want Patches to change automatically at all, just set the **Patch Automation** of the respective Players to Off. This is done inside the **Players Column** in the Show page edit view.

Note that automatic Patch selection is also affected by the "None" and "Mute" settings for each Player in each Setlist Item. For more information about this, see **Patch Selection per Slot**.

Players and Patches

A list of Players and the Patches they use for each Setlist Item is in the next column. After selecting a Player from the menu, you can then use the navigation arrows on your computer keyboard to select the Players: the up and left arrows move upward through the list, and the down and right arrows move downward.

After selecting a Player, you can switch Patches manually for that Player. At the top of the list of Patches there's a Mute setting, which can be used to silence that Player for the duration of the Setlist Item. Your choices are remembered for each Setlist Item.

Selecting a Patch returns focus to the Setlist, so you can use the up and down arrows to move through the Setlist again. This makes it easy to change which Patch the selected Player uses for any Setlist Item: click the desired Patch, change the Setlist Item, click the desired Patch, etc. This can be done within seconds while the curtain is rising, without leaving Performance View.

Performance and Timeline Information

The area above the Controls displays vital information about what is happening right now in the Show and what is next in the queue.

- **Now Playing** displays the name of the current Setlist Item and its Playback Mode (Continue/Stop/Loop). If the Setlist Item contains an audio file, a blue progress bar under the Setlist Item name indicates the current location inside the Setlist Item.
- The large **Time/Bars counter** tells you where you are in terms of Seconds or Bars, depending on the Timebase setting for the Show. This selection is made in the Show page edit view by clicking under the numbers immediately to the left of the Transport.
- **Time/Total** Select the Time button if you want to view the elapsed time of the current Setlist Item. Select the Total button when you want to know the time that has elapsed since the Show began.
- **Remaining** This displays the amount of time that remains for the current Setlist Item.
- **Next** This shows the name of the next Setlist Item.

Control Link

This button shows the Control Link status. When it is bright yellow, the selected controller is active. Click the button to enable/disable it. The arrow above the button provides a menu from which you can select alternate controllers as needed.

Performance Controls

The majority of the Performance View is occupied by huge, color-coded controls that are visible from across the stage. You can adjust the controls with your mouse as needed, but it's much faster with a controller like the PreSonus FaderPort 16 or a controller keyboard.

As in the Show page edit view, you can double-click the name field under a control to rename it. Double-click the value field under a control to enter a specific value. You can also click-drag knobs or faders to change their values, and you can click inside a fader to jump to a value. The status of a button can be toggled by a click.

Transport

Transport The transport provides two buttons: Stop and Play. You can also use the space bar on your computer keyboard to start and stop playback.

Utility Buttons

These two buttons are there to help you to manage the unexpected.

- The **Mute** button mutes all output from all Players.
- Use the **All Notes Off** button if you get a stuck note on one of your MIDI instruments.

Level Meter

Last but not least, Performance View provides a level meter that stretches vertically almost the entire height of the screen. It shows the combined output of all Players at any given moment during the show.

Let the Show Begin!

Press Play or hit the space bar on your computer keyboard to start the Show. Instantly the Bar/Time counters start counting, and the progress bar starts progressing. Note that while the Show is in playback, Performance View will only let you select Players and Patches. This way you can't accidentally locate to another part of the Show by clicking the progress bar, clicking a different Setlist Item, or using the up and down arrows.

Remember, each Setlist Item has a **Playback Mode** that can be set to Stop at End, which means the Show stops automatically when playback reaches the end of the longest audio file in that Setlist Item. But you can stop the Show at any time, if needed: simply click the Stop button or hit the space bar.

During Playback: The Show Must Go On!

If you need to make a change in the Show page edit view without stopping playback, you can. Simply click the X to close the Performance View, or use [Esc] and then click the X. The show keeps playing unless you hit the space bar or the Stop button in the transport.

Once you are on the Show page edit view, you can disable Setlist Items, rearrange them, etc. This allows you to be as responsive as possible to the mood of the crowd, broken guitar strings, or any number of impromptu decisions you might need to make on the fly.

Automation

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

What is Automation?

Automation lets you record changes in parameter values; thereafter, Studio One can perform these value changes for you. 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.

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.

In Studio One, 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.

Automation Types

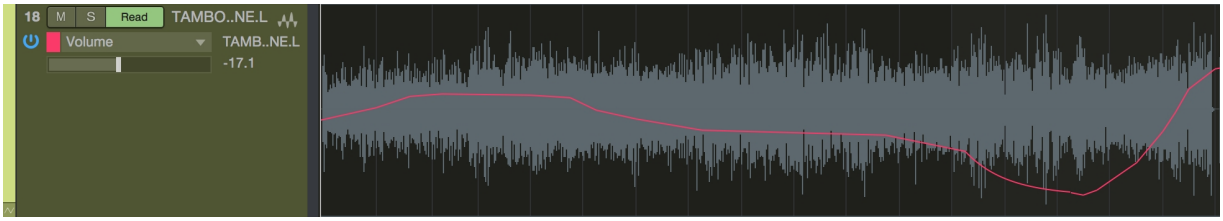
Nearly every parameter in Studio One can be automated. Several ways to automate parameters are provided, including Track automation, Automation Tracks, and Part automation. The following sections describe these automation types.

Track Automation

Track automation allows you to automate any parameter related to an Audio or Instrument Track and the Events it contains. Automation can be viewed via the Show Automation button at the top of the Track Column in the Arrange view or by [Right]/[Ctrl]-clicking on a Track and selecting Expand Envelopes. Note that for Instrument Tracks (which do not have automation enabled on any parameters by default), Expand Envelopes does not show automation unless one or more parameters have been enabled for automation.

Note that automation envelopes on Instrument Tracks control 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.

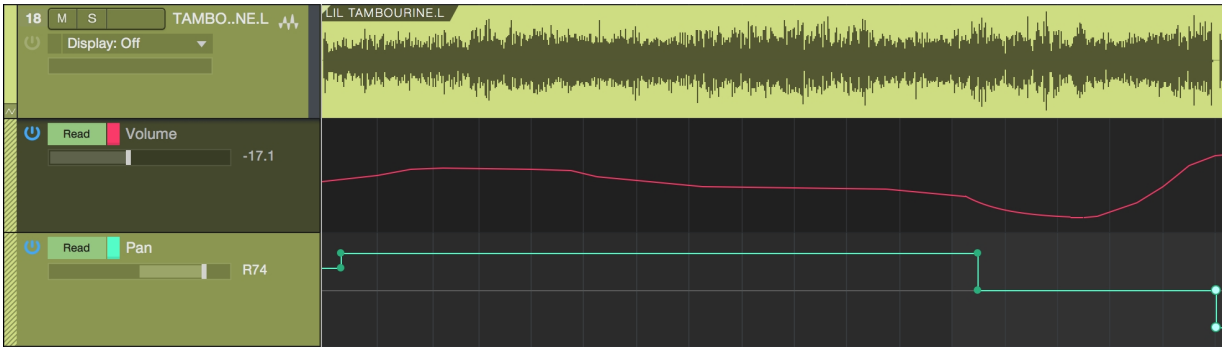
Automation Envelopes On the Track



To view automation envelopes one at a time, superimposed on top of Events on the Track, Press [A] on the keyboard or click on the Show Automation button at the top of the Track column in the Arrange view. With this engaged, 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 “Display: Off” by default, to reveal the available automation envelopes for a Track (“Display: Off” indicates that the Events on the Track are displayed, instead of an automation 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 dialog for the Track.

Automation Envelopes In Lanes



To view multiple automation envelopes at once, with each in a lane under the Track, [Right]/[Ctrl]-click on a Track and select Expand Envelopes. Alternatively, you can click the drop-down arrows for a Track in the Track List to expose its automation envelopes in the same way. To hide the automation envelopes, deselect Expand Envelopes in the Track contextual menu.

Turn Automation On/Off

Automation envelopes can be turned on and off, so you can decide when they affect the controlled parameter. To turn an envelope on or off, click on the On/Off button for that Envelope. Each automation envelope 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.

Add Automation Envelopes to a Track

Any number of automation envelopes can be added to a Track. The fastest way to add an automation envelope to a Track is as follows:

1. Modify any parameter for an Track or its Inserts or Sends, and that parameter is displayed in the Software Parameter window in far left of the Arrange view toolbar in the Song window.
2. Click on the Hand icon in the Software Parameter window, and drag it to the Track to add an automation envelope for that parameter to the Track. If the envelope already exists, it is displayed, and a new envelope is not added.

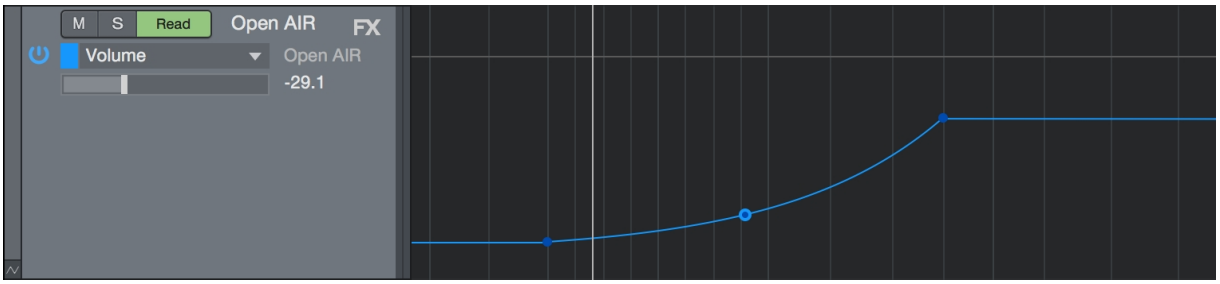
An alternative way to add automation envelopes to a Track is described as follows.

1. Press [A] on the keyboard to show automation.
2. Click on the Parameter window on the Track in the Track column of the Arrange view and select Add/Remove from the list. This opens the Automation dialog for that Track.
3. On the left side of the Automation dialog, the existing automation envelopes are listed, along with their associated automation mode and device. On the right side of this dialog are the parameters for which new automation envelopes can be added.
4. 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 dialog, 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.

Automation Tracks

Studio One features a Track type dedicated to automation that 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 [T] on the keyboard to open the Add Track dialog, and select Automation. Note that at least one envelope on Automation Tracks is always visible, and the envelopes can be viewed on the Track itself or in lanes, just as with the other Track types.



Only those parameters for which an automation envelope does not already exist are available for automation. However, you can drag and drop an automation envelope from any other Track to an Automation Track. All other aspects of Automation Track automation envelopes work in the same way as with 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.

Clicking the Show Automation option (or pressing [A] on the keyboard) toggles the visibility of Automation Tracks on and off, along with automation lanes associated with audio and instrument Tracks.

Editing Automation Envelopes

Automation envelopes can be edited directly, using the mouse, as well as with external hardware controllers. The following section describes editing automation envelopes with the mouse. Refer to the **Automation with Hardware 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 clicking on the Show Automation button at the top of the Track column or by choosing Expand from the Track contextual menu. A Track must also be selected in order for the automation envelope points to appear.

Arrow Tool

Editing an automation envelope with the Arrow tool lets you 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.

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 cursor appears. Click-and-drag the envelope to create a new point and move it to your desired position.

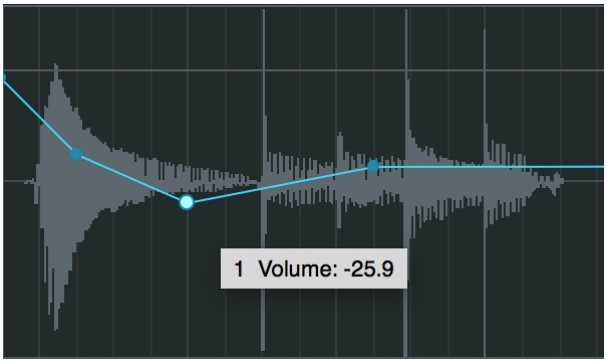
Move an Automation Point

To move any point on an automation envelope, using the Arrow tool, click-and-hold any existing point on the envelope. While holding, moving the selected point vertically changes its parameter value, and moving the point horizontally changes its time position. Hold [Ctrl]/[Cmd] while dragging an automation point to lock the time (horizontal movement) or value (vertical movement), depending on the distance from the point.

Automation points can also be nudged left and right on the timeline by using the left and right arrow keys. It is also possible to float the Arrow tool over an envelope point and then hold [Alt]/[Option] and scroll the mouse wheel up or down to increase or decrease the value of the point (that is, move it along the vertical axis).

To make very precise automation moves, hold down [Shift] while moving an automation point. This moves the point at a slower rate than normal as you move the mouse, enabling finer control.

When moving an automation point, notice the pop-up value indicator.



This displays the current parameter value. The range and the type of value depend on the parameter being automated and on the current time value displayed in the Timebase selected in the Arrange view.

[Right]/[Ctrl]-click on any automation point to bring up the contextual menu, where the point value and envelope color can be changed.

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 causes the other points to move as well. The other points being moved are restored to their original positions on the timeline if the point that caused them to be moved is moved back beyond their original positions.

Note that when Audio Events or Instrument Parts are moved, any underlying Track automation is moved along with the Events, by default. To disengage this option, see the *Studio One/Options/Advanced* (macOS: *Preferences/Advanced*) menu and uncheck the Automation Follows Events option.

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]/[Ctrl]-click on any automation point and select Delete from the pop-up menu to delete it.

Editing Multiple Points at Once

It is possible to simultaneously edit any number of points on an automation envelope. Using the Arrow tool, click in the Track Lane, away from any existing automation point, and then drag to draw a selection box around the points you want to edit. You can also hold [Alt]/[Option] and click in empty space, or directly on a point, to select all points on the envelope from that point in time forward.

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 adjusts each parameter value relative to the point being moved.

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. However, a single click with the Paint tool adds a single point.

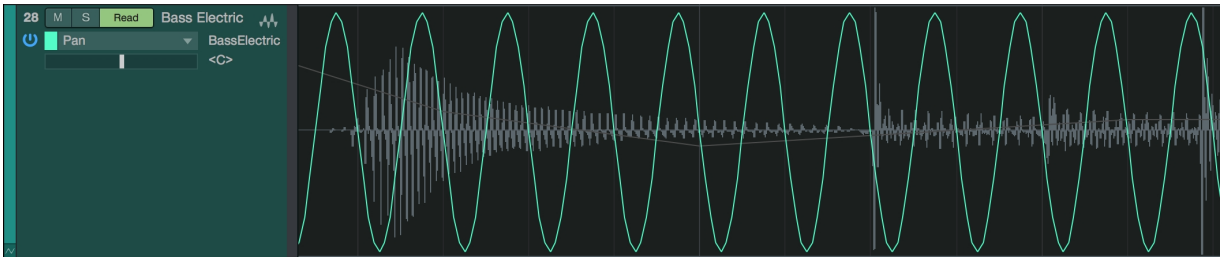
You can choose from several figures when using the Paint tool, or you can use the Transform editor, as described in the following subsections. Be sure to Show Automation and select the Paint tool in the Arrange view before attempting the following processes.

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 are added at different time increments based on the current Timebase. However, when the mouse button is released after drawing an envelope with the Paint tool, the drawn curves of the envelope are 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 snap to the grid accordingly.

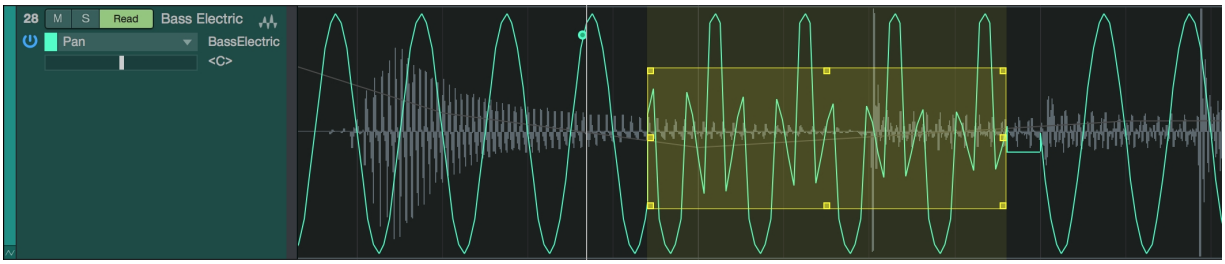
Drawing an envelope with the Paint tool over existing points on an automation envelope causes the existing points to be overwritten with the newly drawn points. These actions can be undone and redone.

Draw with Figures



When selecting the Paint tool, scroll the mouse wheel to reveal several figure-drawing tools, including a Line tool and Square, Saw, Triangle, and Sine waveform tools. With any of these tools selected, click-and-drag on any automation envelope to draw the desired envelope. When using the waveform tools, you can hold [Alt] to adjust the frequency of the waveform while dragging, or hold [Ctrl] to vary waveform phase (amplitude and polarity). Hold [Ctrl]/[Cmd]+[Alt] while dragging, to move the currently defined automation shape left or right along the timeline.

Transform Automation



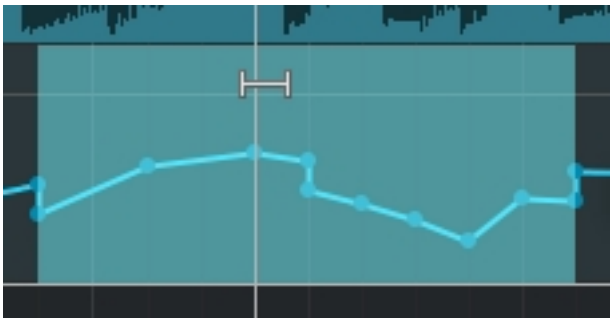
You can choose the Transform tool from the Paint tool drop-down list to alter existing automation, or add new automation. With the Transform tool selected, click-and-drag a selection box around any area of an automation envelope; then adjust the selection box by clicking-and-dragging one of eight handles (four sides and four corners) to scale the selected automation points.

As a shortcut, you can select a range of automation with the Range tool, and press [Alt]+[T] on the keyboard to automatically create a Transform selection over the chosen range.

Range Tool

You can use the Range tool to quickly trim select ranges of automation up or down in value. This can be done in two ways.

Trimming a Selected Range of Automation



If you want to trim a certain range of automation data up or down, select a range of automation with the Range tool. Then, hover the cursor in the upper half of the selected range, until the cursor changes into the Trim Tool. Click-and-drag up or down to trim the selected automation.

Trimming a Segment of Automation

If you want to trim a certain segment of automation (the span between two points) up or down, select the Range tool, and hover the cursor in the upper half of the automation lane, above the segment of your choice, until the cursor changes into the Trim Tool. Click-and-drag up or down to trim your chosen automation segment.

Remove Track Automation

To strip all automation from a Track, [Right]/[Ctrl]-click the track in Arrange view, and select Remove Track Automation from the pop-up menu. Any previously created automation lanes remain, but all written automation data on the Track is purged.

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.

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.

Auto: Off

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

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

Read

When you select Read in the Automation Mode window, any existing automation envelopes on the Track for the related device is read, and these envelopes control their related parameters. Read mode is automatically 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.

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 resumes 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 is read when you are not moving the hardware controller.

Latch

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

Write

When Write is selected in the Automation Mode window, automation is continuously written based on the current position of external hardware controllers. Existing automation is not read at any point and is instead overwritten with the new automation.

Instrument Part Automation

In a feature unique to Studio One, automation envelopes for any given virtual instrument can written and accessed directly within Instrument Parts, just like note 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 stays 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 additional flexibility.

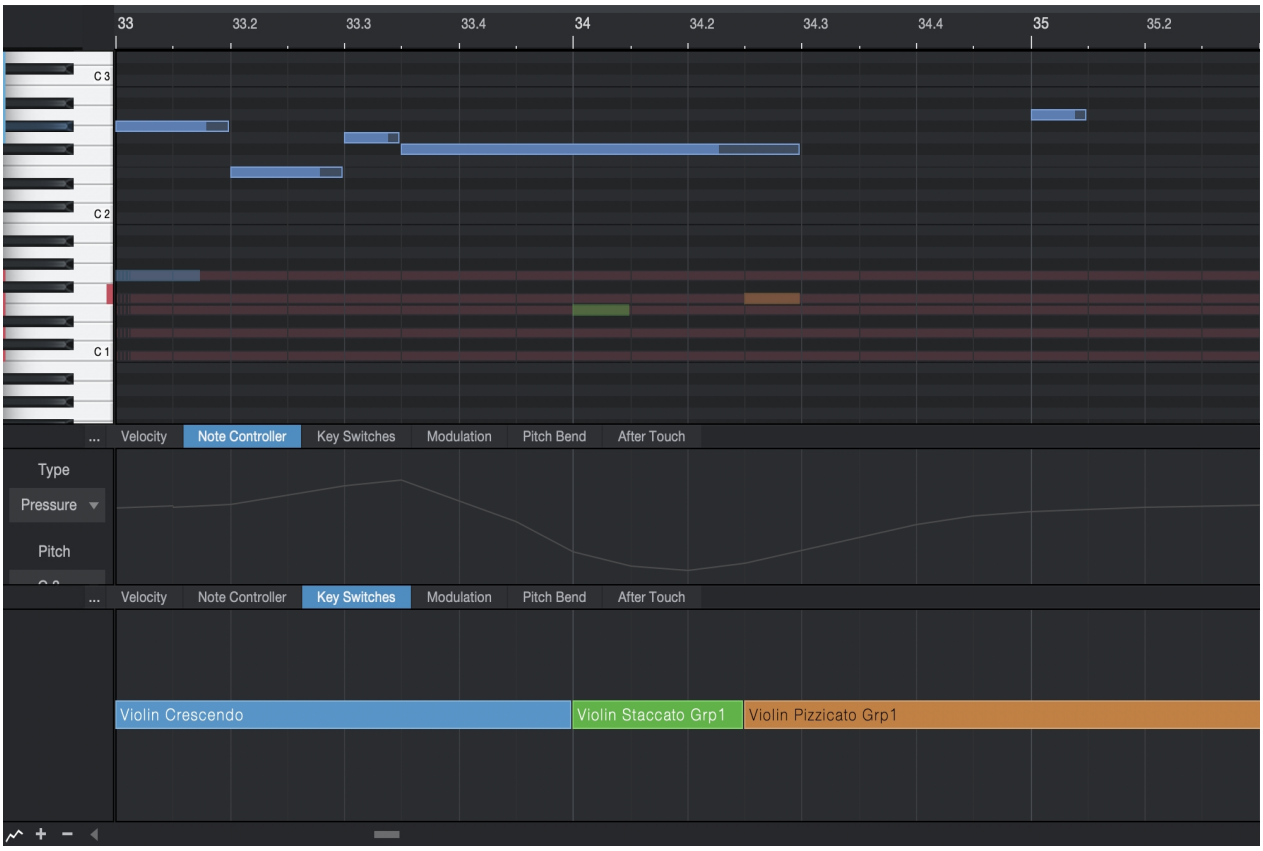
Recording Part Automation

When an Instrument Part is being recorded, and any of a connected virtual or external instrument's controls are manipulated with the mouse or with an external hardware controller, those control changes are recorded into the Part as Part automation. 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 or external instrument in order for Part automation to be recorded.

View Part Automation

To view and edit Part automation for an 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.



In the bottom-left corner of the Note Editor there's a small button that looks like a couple of jagged mountain peaks ( ). Click that to show / hide the Automation Lanes. The Parameter tab along the top of the lane shows the parameter currently displayed in the lane.

Manually Add and Edit a Part-Automation Envelope

Click one of the Parameter tabs 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 assign a new automation envelope to its own Parameter tab, click the Add/Remove button (**...**) or [Right]/[Ctrl]-click an existing Parameter tab and select Add.... This opens the Automation dialog, which is identical to the window mentioned in the **Automation Envelopes on the 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 the parameter to the Note Editor to add a Part Automation envelope for that parameter to the Instrument Part.

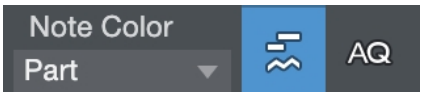
The parameters that you can add to the Part Automation lane are based on the virtual instrument to which the Instrument Track that contains the selected Instrument Part is connected. Only those parameters for which an automation envelope does not already exist are available.

Editing Part automation envelopes is nearly identical to editing Track automation envelopes, as described in the **Editing 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 only use two envelope points.

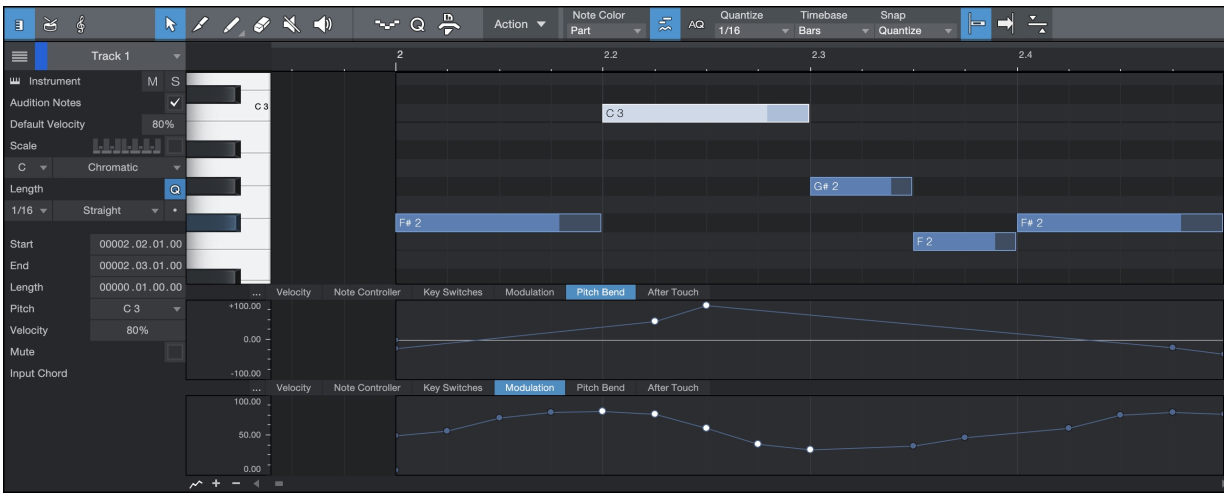
It is possible to view and edit different parameters in separate Part Automation lanes. You can add and remove lanes using the plus and minus buttons in the bottom-left corner of the Note Editor window. Click the Show/hide Automation Lanes button ( ) to show / hide all of the Part Automation lanes at the same time. Any written Part automation is read, regardless of whether it is currently being viewed in either Part Automation lane.

Select Part Automation with Notes

With this option enabled, selecting notes automatically selects any currently visible Part Automation within the selected note range. As a result, applying any edits to note position will automatically be applied to the selected Part Automation within the same range. This includes changing the note position manually or using Quantize, as well as cut/copy/paste/duplicate/delete operations. Part Automation currently not visible won't be affected.



In order to select all Part Automation associated with a note, first make sure all Part Automation lanes are visible by adding additional automation lanes and selecting the correct tab to display the automation curves.



This option works with all types of automation, including standard types such as Modulation and Pitch Bend, with the exception of Note Controllers such as Poly Pressure and MPE. Note Controller automation data is always selected with their associated notes, regardless of the current state of the “Select Part Automation with Notes” option.

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.

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 are turned. However, in most cases the implementation is limited and difficult to learn.

Studio One improves on this model with the Control Link system, simplifying the control mapping process with no need for knowledge of MIDI. Control Link is also capable of context-sensitive mapping, so the same hardware controls can control many different things based on the current area of focus.

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

Mackie Control/HUI Support

Studio One is optimized for use with Mackie Control and HUI-format devices, including Control Link Mapping and Send slot navigation, with the ability to scroll through, and select from the lists of available plugins and instruments, and their presets. You can also control various Channel and Track parameters such as Mute/Solo, and FX Bypass (EQ button). Further information can be found in the **Mackie Control** section.

Set Up Your External Devices

To use any external hardware device with Studio One, the device must first be set up so that Studio One recognizes it. Once an external device is set up, it is 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.

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:

1. Open the Mix view by pressing [F3] on the computer keyboard, and open the External panel by clicking on External in the Console Navigation column to the far left of the Console.
2. Double-click on the desired device in the External panel to open the Device Control Map.
3. In the upper left corner of the Device Control Map window, click on the [MIDI Learn] button to enter MIDI Learn mode.
4. With MIDI Learn enabled, simply move any hardware control to map it. As controls are mapped, the default Knob object created for that control is displayed, and it moves in correspondence with its related hardware control.
5. When editing the control map for a Keyboard device (MIDI Learn enabled), you can select Transmit Value from the contextual menu for each control. This option sends parameter updates for a given hardware control out of the Keyboard device's MIDI Out port when the software parameter to which the control is linked changes. This makes it possible for user-created Keyboard devices that have soft controls (endless rotary encoders with LED indicators, motorized faders, etc.) to reflect the correct current state of any parameter that is being controlled. (This option is also available for Control Surfaces.)
6. 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 the **Control Linking** section.

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

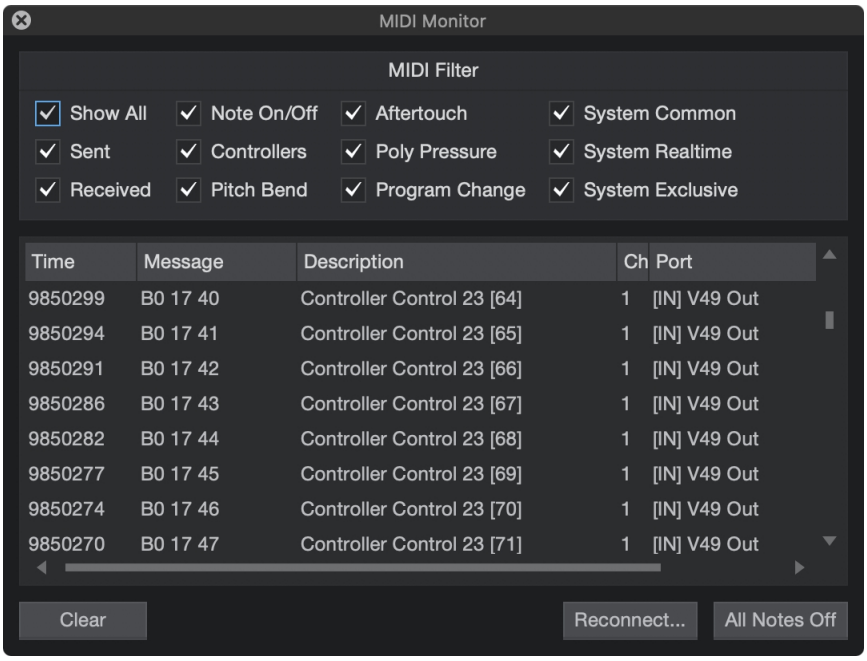
When using predefined keyboard devices, it is not possible to map new controls for the device. You must follow the instructions in the Add Device window (for example, select a certain preset).

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 can 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 menu. Use the boxes in the MIDI Filter section to specify which incoming MIDI messages you want to view. For example, to see which MIDI CC data is sent by the knobs on a MIDI controller, engage the "Received" and "Controllers" boxes. Then activate the controls on the MIDI device to view their behavior so you can choose the correct map-object type.

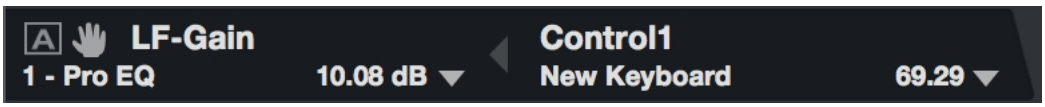
It is highly recommended that the control objects be made to look similar to the controls they represent, using the map-object types, as this helps make the relationship of the software object to the related hardware control easier to recognize.

Control Linking

With a 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.

Parameter Windows

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



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.

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 Assign button in the middle of the two parameter windows, or press [Alt]/[Option]+[M] on the keyboard, and the button should light up.
4. Your hardware control is now linked to the software control; manipulating the hardware control manipulates the linked software control.

A second way to link hardware and software controls is:

1. Open the control map for the desired controller 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; manipulating the hardware control manipulates the linked software control.

Finally, you can [Right]/[Ctrl]-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]/[Ctrl]-click on the desired software parameter and choose "Assign X to Y," where 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; manipulating the hardware control manipulates the linked software control.

Global and Focus Mapping

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

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.

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, or the Gain of a distortion plug-in, or 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 displays the name of the related Keyboard.

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 no longer affects 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. 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 your external hardware always controls the plug-in that is currently in Focus.

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

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 appear. Also, notice the MIDI channel selector above the control map. Only MIDI channels you enabled for the instrument are 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 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 of 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, using the mouse to move any knob in the control map should adjust the linked 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.

Using Multiple External Devices

Any number of External Devices can be used simultaneously. As long as the device has a control map with some learned controls, it can be used with the Control Link system. In each plug-in window, you can see 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 is 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.

Automation with Hardware Controllers

As mentioned earlier in the **Editing 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 as 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.

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 integrate with the automation and Control Link systems.

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.

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 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 has the following results:

- During playback, touching the rotary encoder writes automation until the encoder is no longer being touched. When the encoder is not being touched, any existing automation is read.
- If automation is being read during playback, and then the rotary encoder is turned, automation is written by incrementing/decrementing from the current automation position. In this way, the new automation effectively picks up from the existing automation.

If you do the same thing with a touch-sensitive, fixed-position knob, the following happens:

- During playback, touching the knob writes automation until the control is no longer being touched. When the control is not being touched, any written automation is read.
- If automation is being read during playback, and then the knob is turned, automation is written, starting at whatever the current value of the knob is, based on its absolute position. The new automation being written does not pick up from the existing automation.

Writing Track Automation

There are three Track-automation modes in which automation can be written using external controls: Write, Touch, and Latch. It is recommended you be familiar with these modes, as described in the **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, the three automation modes give different results.

- Touch mode allows automation to be read until a touch-sensitive control is manipulated; automation is read again when the control is no longer being manipulated.
- Latch mode results in automation being read until a control, touch-sensitive or not, is manipulated, after which automation is written until playback is stopped.
- When in Write mode, no existing automation is read, 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.

Writing Instrument Part Automation

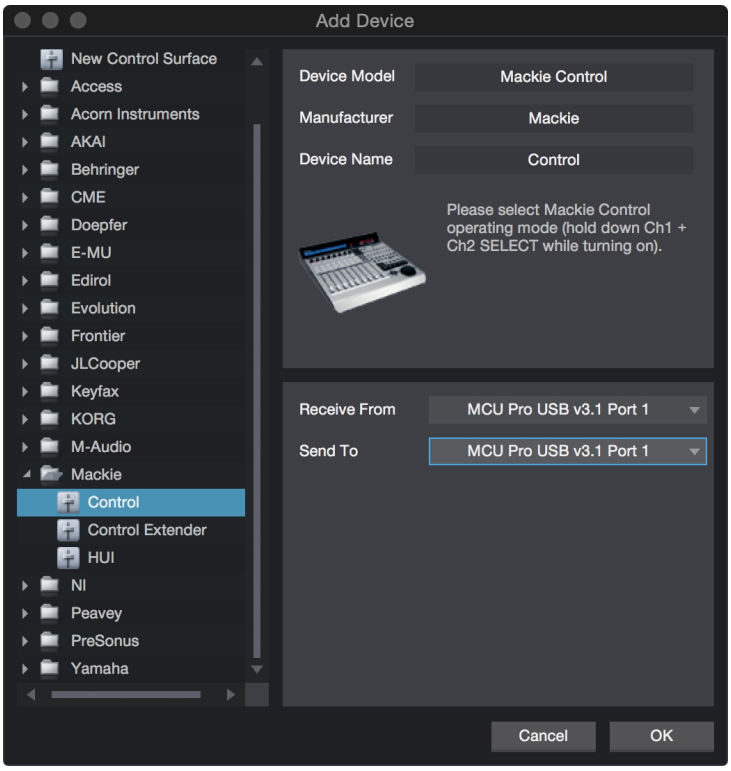
Using external controls with Part automation is similar to using them with Track automation, except that there are no automation modes. Existing Part automation is read and can be overwritten, and new automation can be written at all times while recording to a Part, as explained in the **Instrument Part Automation** section of the **Automation** chapter. Part automation is an integral part of the Instrument Part and therefore is accessible at all times.

Mackie Control Support

Studio One supports Mackie Control and compatible hardware control devices. The following is an overview of all remote control functions currently supported with the Mackie Control protocol. If you haven't set up your Mackie Control-compatible devices, you can do so from *Options/External Devices* (macOS: *Preferences/External Devices*). More information about using your controller can be found elsewhere in the **Control Link** chapter.

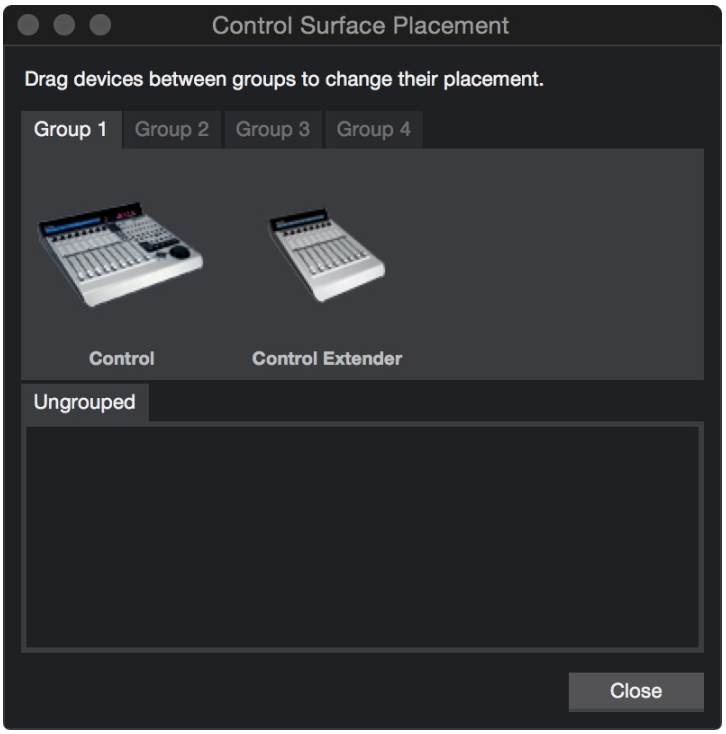
Mackie Control Setup

Follow this procedure to set up your Mackie Control (or equivalent) main unit, as well as any extender units:



1. Put the unit into Mackie Control Universal mode by holding down the Ch. 1 and Ch. 2 Select buttons while powering on the controller. Do not use a lexan overlay.
2. Add your Mackie Control in the *Options/External Devices* (macOS: *Preferences/External Devices*).
3. Select the Send and Receive MIDI ports of your controller.
4. Repeat this process for any extender units you plan to use.

Grouping Units



Use the Surface Placement option to create a Group and define the placement of each unit. Put two or more devices in the same group to create a connected mixer bank.

Function Overview

Mixer Layout

The channel order follows the Remote Bank in the Studio One Mixer Bank pane. Here you can show and hide channels for the remote banks.

Channel Controls

Record	Arms the assigned audio track of the Channel.
Solo	Solos the Channel (with Momentary mode).
Mute	Mutes the Channel (with Momentary mode).
Select	Sets the Channel to the Select state.
V-Pot	Changes the assigned parameter. Push to set the default value. For more infomation, see **Assignment Buttons**.

Bank Channel-Type Filter Using Global View Buttons

Global View	Shows all Studio One channels (Send, Console, and Outputs).
Inputs	Unused.
Audio Tracks	Displays Audio Channels.
Audio Instrument	Displays Instrument Output Channels.
Aux	Displays FX Channel
Buses	Displays Buses.
Outputs	Displays Outputs.
User	Displays all remote back channels.
Fader Flip	Flip button flips the V-Pots with their corresponding faders.

Assignment Buttons

The assignment buttons are used to assign controls to the V-Pots.

Pan (Default)	Shows the track names in the LCD strip and assigns V-Pots to Channel Pan.
Sends	Assigns V-Pot to Sends
	"SE" displays all Sends per selected Channel.
	"S1-8" displays Send slot 1-8 on all channels.
	Press Sends several times to step through the layers.
Track	Modify track parameters of the selected Channel.
	Bypass all plug-ins.
	Monitoring on/off.
	Select Channel Input.

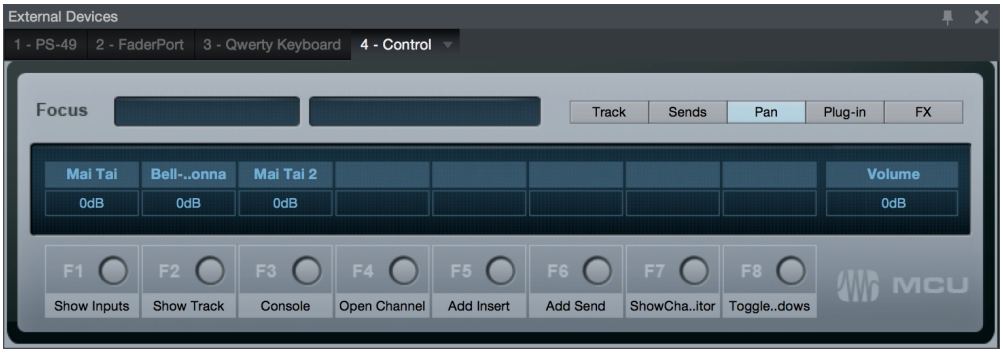
	Select Channel Output.
	Bypass Sends 1-4.
EQ	Bypass for Insert 1-8 of the selected Channel.
Plug-in	Sets the V-Pots to Control Link mode.
Instruments	Unused.

Automation

Toggle the automation mode for the selected Channel.

Control Link for Plug-ins

In Control Link mode, you can customize the parameters shown in the plug-in mode for each plug-in. This can also be done by dragging parameters to the Mackie Control device editor from the top left of the toolbar or from the plug-in editor.



Each Mackie Control Universal and Mackie Control Extender is a separate Control Link device.

Transport

The Play, Rec, Stop, FF, and RW buttons control the transport.

With the Marker button enabled, FF and REW jump between markers, and the REC button inserts a marker at the cursor position.

Function Keys

Function keys are predefined but can be modified using the Mackie Control device editor.

F1	Show Inputs
F2	Show Track
F3	Console
F4	Open Channel
F5	Add Insert
F6	Add Send
F7	Show Channel Editor
F8	Toggle Floating Window

Utility Functions

Save	Press the Save button to save.
	Press Shift + Save button to open the Save As dialog.
Undo	Press to undo the last edit.

	Press Shift + Undo to redo edit.
Cursor Keys	Navigate in the arrangement.
	Horizontal and vertical zoom when zoom button is enabled.
	Can be used to navigate in the Insert/Send list and can be combined with Enter/Cancel to add plug-ins or Sends.
Option + Bank Select	Selects previous and next device in an open plug-in editor.
Option + Channel Select	Selects previous and next preset in an open plug-in editor.

- Cursor Keys navigate the arrangement (depending on current window focus).
- Wheel jumps to the nearest bar in the Arrangement (no scrub support).
- SMPTE/Beats button toggles the time display.
- Name/Value button toggles the value and track name in the display when the assignment is Send 1-8 or Control Link Mode.
- Momentary mode for Solo and Mute:
  - Press the button to quickly toggle the state.
  - Press and hold the button to switch momentarily.
- Press the V-Pot to set the default parameter.

Mastering

Mastering is the process of preparing and transferring the final mix to a master copy from which all distribution copies are 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, web distribution, etc.

Studio One Professional features the Project page, a complete integrated mastering solution. This creates a tight, easy-to-manage creative workflow that spans all the way from recording to mastering.

The Studio One Professional 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 section describes the Project page workflow in detail.

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.

Project Setup

In the New Project dialog, you can specify a Project Title and save a location, as well as the Project sample rate. Click on OK to create the New Project.

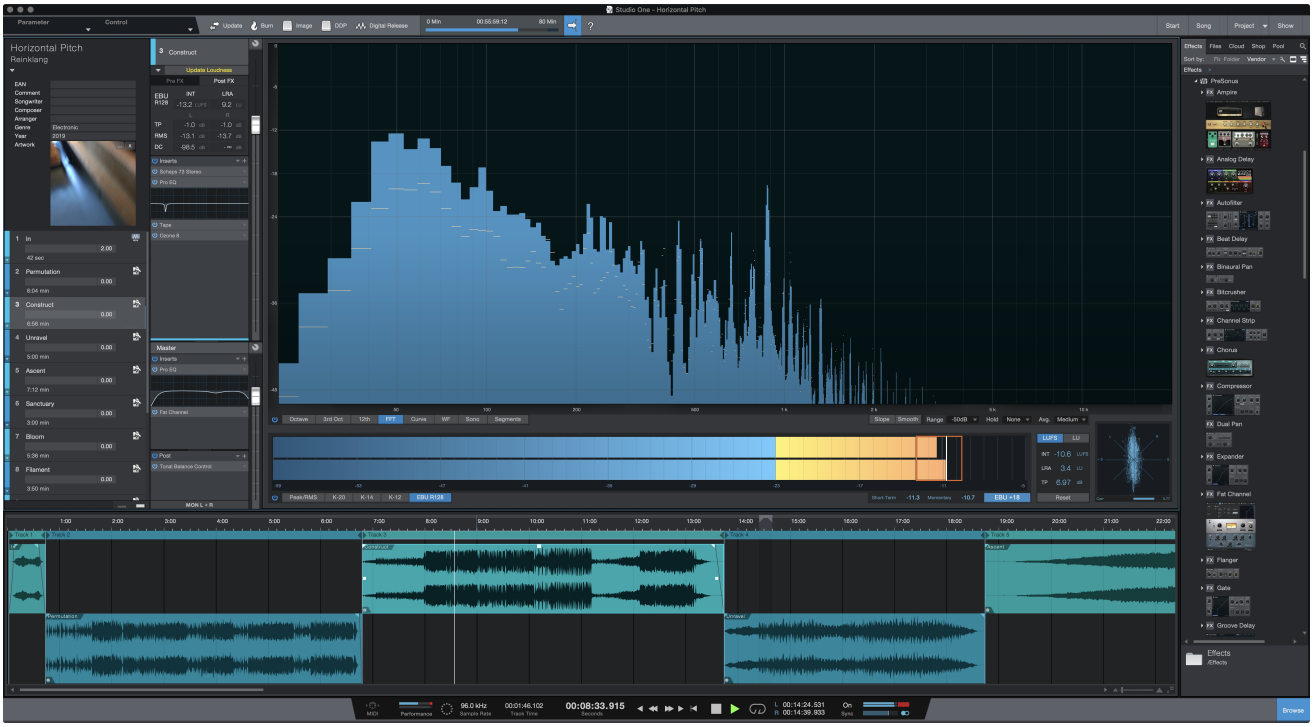
DDP Import

If you'd like to base your new Project on an existing DDP image, do the following:

1. Enable the "Import Tracks from DDP Image" option in the New Project window.
2. Click OK to create the new Project, and navigate to your DDP image in the file browser that appears.
3. Select the folder that contains your DDP image, then press [Open], and the image is imported, with all metadata and media intact.

This ability to import, edit, and export DDP images, often reserved for high-end standalone CD mastering systems, helps to make Studio One a powerhouse mastering tool. For information on exporting DDP images, see **DDP Export**.

Album Title and Artist Name



You can enter a title for the album in the Album field, and an artist name (if applicable) in the Artist field. A drop-down arrow below these fields gives you access to a variety of additional metadata fields (such as EAN, songwriter, and genre) that you can fill out as needed. 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. When selecting artwork, the image size is limited to 512 x 512 pixels, and can be automatically scaled to fit.

Adding Tracks

The first step in the mastering process is to place the desired source material into a Project.

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, including files in the current **Browser Pool**. Press [F5] on the keyboard, or click on Browse in the lower right hand corner of the Project page interface, to open the Browser.

Add a Song

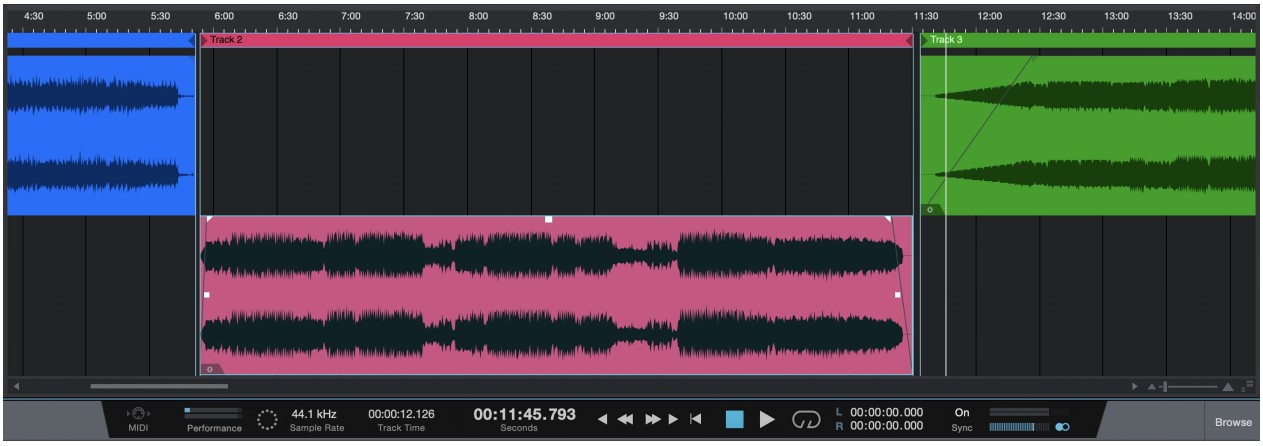
Any Song created in Studio One Professional can be added directly to a Project by importing the Song file into the Project. There is no need to create a mixdown of the Song first, as this process is automated.

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 places it in the Track column. If no master file exists for the Song, you are 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 Studio One renders a mix of the Song you added, 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 these markers are set to the desired locations in the Song.

Track Time



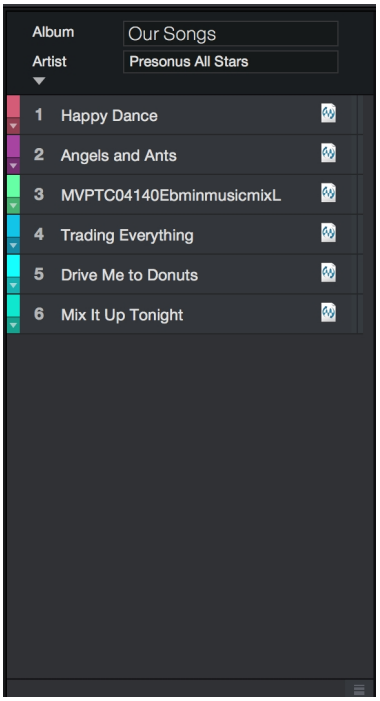
As you edit Songs within your Project, it is useful to be able to keep track of where you are in time within each Song, as well as the entirety of your Project. When you place the cursor along the timeline, the Track Time display in the transport shows you the position of the cursor within the current Song, and the main time display shows the cursor position within the whole Project.

Add an Audio File

Of course, any Wave, Ogg Vorbis, AIFF, REX, 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.

Track Column

All Songs and audio files in your Project are listed vertically in the Track column, with the name of the Song or audio file clearly displayed.

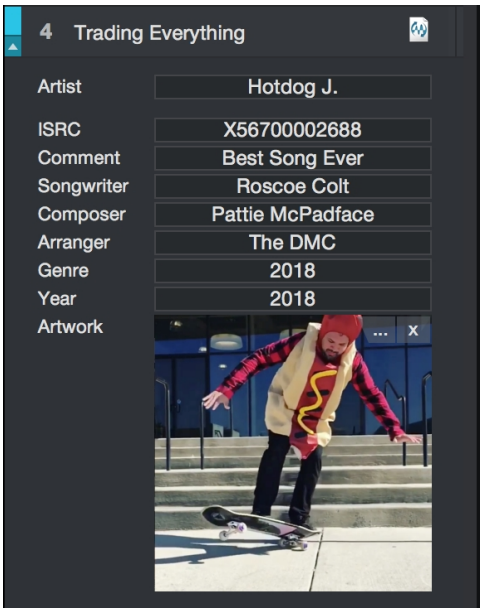


Meta-Information

At the top of the Track column, you can see Album and Artist meta-information fields. To edit these fields, click in the space next to the field, type your text, and then press Enter. If you want to enter further metadata for the album as a whole, click the small triangle button below the Artist field, and enter your information as needed.

Beneath the color-coding bar to the left of each Track in the Track Column, there is a down-arrow button. Click on this button to reveal all other meta-information fields for that Track. These fields may be edited on a Track-by-Track basis, or multiple Tracks may be selected and their fields edited simultaneously.

To copy meta-information from a single Track to all Tracks in your project, [Right]/[Ctrl]-click the Track and choose "Copy Meta-information to All Tracks" from the pop-up menu.



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 fans. When selecting artwork, the image size is limited to 1400x1400 pixels, and can be automatically scaled to fit.

Meta-information that has been filled in for any Song is automatically imported to any mastering Project that includes the Song, Any changes made to the meta-information of a Song after import into a Project are not automatically applied to Song meta-information inside a Project, and must be updated manually.

Auto-Incrementing ISRC Codes

In most cases, ISRC codes are assigned sequentially to each track in an album, increasing by one with each subsequent track. Because of this, if you enter an ISRC code in the meta-information of the first Track in your Project, a dialog pops up, asking if you'd like to automatically assign incrementing ISRC codes to the rest of your Tracks. Press [Yes] if so, or [No] if you'd rather enter them manually. If track order or selection changes later on, you can always re-assign the ISRC code for the first Track in your Project to be prompted again to auto-assign the rest.

Pause

It is common for the tracks on audio CDs to be separated by a brief pause. By default, any Track added to the Project has a Pause setting of two seconds, as per the Red Book standard. In practice, this means that two seconds of silence are appended to the beginning of the Track, so that although the Track begins immediately after the end of the previous Track, there is 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.

CD Time Display

This display shows the CD Length of your Project based on the total length of all included audio materials.

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.

Track Lane and Timeline

The Track Lane is where your Tracks are represented as Audio Events. You may 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. By default, the Tracks are 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.

Editing Tracks

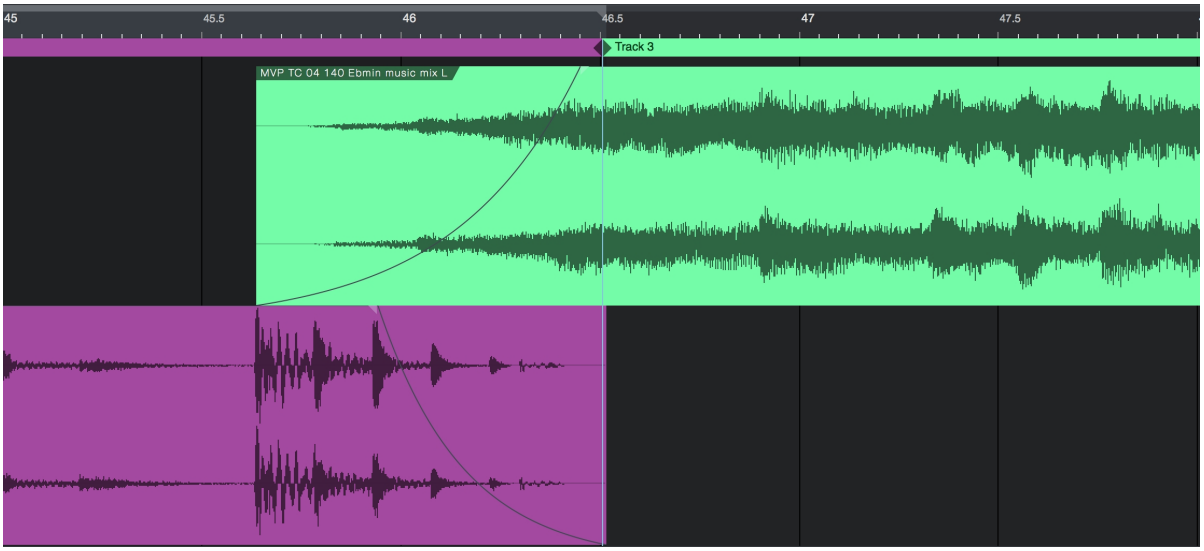
Sizing Tracks

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. Note that a Track cannot be sized to less than four seconds in length, per the Red Book CD standard.

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.

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 fades out as the other fades in. To crossfade overlapping Tracks, select the two Tracks and press [X] on the keyboard. A linear crossfade is drawn that can be edited by clicking-and-dragging on each Track's fade handle.

Any Track that begins after another Track in time is normally the beginning of a new track on a CD or other medium. Its starting position serves as the beginning of the track, regardless of the timing of crossfades. If you want to change the point at which the new CD track begins, simply drag the song marker to a new location within the overlapping range.

Splitting Tracks

To split any Track, set the playback cursor where you want the split and press [Alt]+[X] on the keyboard. The resulting two Tracks can now be edited like any other, including editing meta-information in the Track column. Splitting a Track for a Song does not adversely affect the ability to automatically update that Song's mastering file, so it is possible, for instance, to split a long recording into many Tracks in a Project and still edit the related Song normally.

Note it is not possible to split a Track where the resulting two Tracks would not be at least four seconds in length, per the Red Book CD standard.

Enabling and Disabling Tracks

Any Track can be disabled at any time. Disabling a Track removes the Track from the Timeline but keeps 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 menu. To enable a disabled Track, select it and choose Enable Track from the Project menu. You can also enable or disable a track by [Right]/[Ctrl]-clicking the track in the list, and choosing Enable Track or Disable track from the contextual menu.

Track Markers

All Tracks in a Project automatically have a Track marker attached to the beginning of the Event in the Timeline. It is possible to manually insert other Track Markers by positioning the playback cursor at the chosen spot in the timeline, then [Right]/[Ctrl]-clicking in the Track Marker lane and choosing Split Track at Cursor from the drop-down menu.

Manually inserted Track Markers are green in color, while automatically placed markers are blue in color. Track Markers can be moved across the Timeline by clicking-and-dragging left or right. Track Markers can be placed anywhere on the timeline, so long as they're in numerical order, and are not tied to the limits of any single Event. This lets you create a single Track that encompasses multiple Events, create hidden tracks, and a variety of other mastering magic tricks.

Note that Track Markers are only used when burning a CD, or exporting an image file or DDP file. When exporting a digital release, manually placed Track Markers are ignored, and separate files are only rendered for actual Tracks, as listed in the Track column.

Click-and-Drag Features

- **Move Events** Click and drag on the beginning or end of a Track Marker while holding [Alt]/[Option], to move all Events at or after that Track Marker across the timeline as one. This allows for easier mass-editing of track position and spacing.
- **Move only Start/End Marker** Click and drag on the beginning or end of a Track Marker while holding [Ctrl]/[Cmd], to set a pause period between the two Tracks at that split point.
    - **Note:** Any audio that exists in the pause zone you create between two Tracks will still continue to play during the pause. If you want silence during a pause, you'll want to accomplish that by editing your Track to suit.
- **Move Track** Click and drag in the center portion of a track marker to move Track marker and its related Track to a new location. This is analogous to dragging tracks up and down the Track List.
- **Duplicate Track** Click and drag in the middle of a track marker while holding [Ctrl]/[Cmd] to duplicate that Track Marker and its primary Track to a new location on the timeline
- **Add (Index) Marker** Hold [Alt]/[Option] while hovering over the middle portion of a Track Marker to enable the Add Marker tool, used for placing additional Index markers within the current Track Marker.

If you click and drag on the beginning or end of a Track Marker while holding [Alt]/[Option], all Events at or after that Track Marker can be dragged across the timeline as one, for easier editing of track position and spacing. If you click and drag on the beginning or end of a Track Marker while holding [Ctrl]/[Cmd], you can drag to set a pause between the two tracks at that split point. Note: Any audio that exists in the pause zone you create between two Tracks will still continue to play during the pause. If you want silence during a pause, you'll want to accomplish that by editing your Track to suit.

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 **Inserts** section of the **Mixing** chapter, including the ability to use FX Chains and the built-in effects Micro Views.

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 affects each Track in a similar way. For instance, each Track probably requires individual equalization. A Track fader is available in the Track Device Rack to fine-tune the output level of each Track, and an Insert Device Rack Activate All button enables you to quickly A/B any processing.

Loudness Detection

At the top of the Track Device Rack, a Loudness Information dropdown menu is available. When you first click this menu on a Track, a Loudness Detection process runs on that Track. Once the detection process finishes, you're provided with readings for **EBU-R128** Integrated Loudness (INT) and Loudness Range (LRA), as well as True-peak readings, RMS, and DC levels for the left and right channels. All measurements are shown both pre-FX and post-FX. This information can help when making level balance decisions from Track to Track across the Project.

If you make changes to a Song and later wish to re-calculate its loudness, [Right]/[Ctrl]-click the song in the Track column or lane, and choose Detect Loudness from the pop-up menu. To detect loudness for multiple Tracks at once, select the desired Tracks and [Right]/[Ctrl]-click one of the selected Tracks, then choose Detect Loudness from the pop-up menu.

Track Editor

Each Track in your Project has a Track Editor, in which you can create a variety of advanced effect configurations, with assignable Macro Controls. You can open the Track Editor for a Track by clicking the knob-shaped Editor button in its Track Device Rack. For more information, see **Channel Editor**, which explains the equivalent function in the Console in Song view.

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. To copy all effects from one Track to another, click and drag the Insert Device Rack header from the source Track, and drop it onto your chosen Track in the Track Column or Track Lane.

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.

Using Hardware Inserts in a Project

As fully discussed in **Pipeline**, you can use hardware inserts by means of the Pipeline plug-in in Studio One Professional. When using Pipeline, you may need to access the audio I/O setup for your Project (found in the *Project/Project Setup/Audio I/O Setup* menu) in order to configure the inputs and outputs your hardware insert uses.

Note that when Pipeline is inserted anywhere in a Project, it is no longer possible to render audio exports offline for CD burning, disc image creation, or digital release creation. Real-time processing is used, as this is required to incorporate your hardware insert into the audio export.

Bouncing Tracks

If you feel the need to free up computer resources or external processors (used through Pipeline), you can bounce a Track in place, retaining the effects of any plug-ins or external gear in use. To do so, [Right]/[Ctrl]-click the Track in the Track Column, and choose "Bounce Track" from the pop-up menu. If an external hardware effect is in use on the Track (via Pipeline), the bounce must occur in real time.

Master Device Rack

Inserts in the Master Device Rack 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. Effects and FX Chains can be dragged to and from the Master Device Rack, just as with other types of Device Racks.

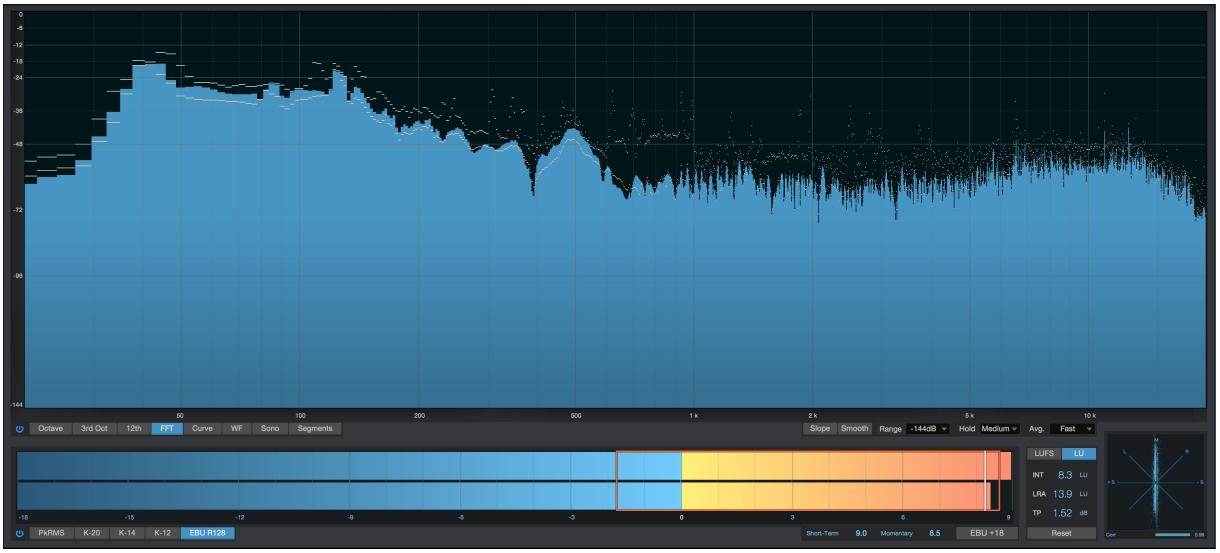
Pre- and post-fader Insert Racks are provided, each with Activate All buttons, for ultimate flexibility in adding and auditioning any processing. If you plan to use a third-party plug-in to provide dithering, place the Insert post-fader and be sure to disable the Use Dithering for Playback and File Export option in the *Studio One/Options/Advanced/Audio* pane (macOS: *Preferences/Advanced/Audio*). Note that by default, Studio One only dithers when necessary (e.g., for reducing bit depth within a device or during file export) and always uses triangular-type dither with no noise-shaping.

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). Note that this directly affects the output level of your Project for all export mediums. All of the output pairs provided on your audio interface can be accessed by clicking on the currently displayed audio output.

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.

Spectrum Meter



The Spectrum Meter is a flexible audio-spectrum meter that offers octave, 1/3-octave, 12th-octave, FFT, Waterfall (WF), Sonogram (Sono), and Segments display modes. The Spectrum Meter displays standard peak levels and can be adjusted to display Peak Hold levels for Short, Medium, and Long time intervals, as well as average (RMS) levels within Fast, Medium, and Slow time intervals. As you move the cursor around the frequency display, the note value of the current frequency is displayed.

The visible range of the meter can be changed in any mode, to help focus in on the range you're interested in. Do this by setting the Range controls, or simply by clicking and dragging vertically within the meter.

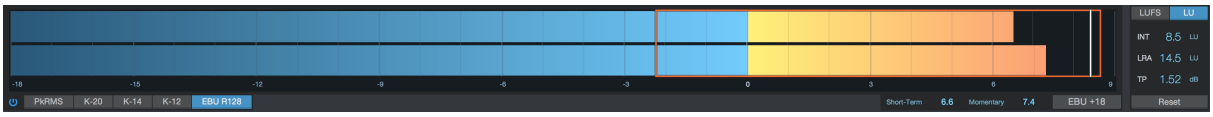
When using the FFT display, a -3 dB/octave line is displayed in addition to the frequency and level crosshair. This line represents compensation for the shrinking frequency-width of the FFT bands towards the higher end of the spectrum, which leads to a lower energy content. A well-balanced mix should somewhat approximate the slope of this line.

To disable the Spectrum Meter, click the "power" button under the lower left corner. Click again to re-enable the meter. To temporarily "freeze" the current state of the Spectrum Meter, click the snowflake button below the meter.

12th-Octave Meter

The bands in the 12th-octave meter correspond to the 12 musical tones in an octave, each in its appropriate place on a piano-like keyboard. This allows for easy reading of the pitch or note value of a given signal.

Level/Loudness Meter



The Level/Loudness Meter is located directly beneath the Spectrum Display and is capable of displaying high-resolution Peak/RMS levels, three K-System scales (as described in **K-System Metering**) as well as the more recent **EBU R128** standard. To choose a standard to view, click the selector below the Level Meter or [Right]/[Ctrl]-click within the meter and make your selection from the drop-down menu.

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 illuminates at the bottom of the Level Meter display, which can only be cleared by clicking on the indicator.

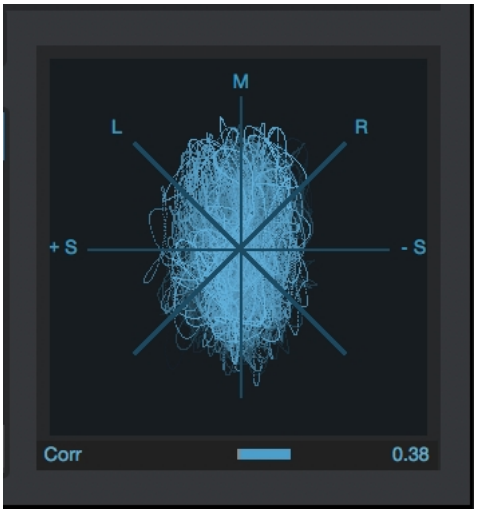
When Peak/RMS mode is selected, you can [Right]/[Ctrl]-click on the meter display to show additional metering options, such as RMS Length, VU Hold, and Hold Length.

To disable the Level Meter, click the "power" button under the lower left corner. Click again to re-enable the meter.

Loudness Display

Real-time numerical loudness information for the final output is displayed here, in LUFS (Loudness Units Full Scale, for absolute loudness measurements), or LU (Loudness Units, for relative loudness measurements). In either mode, you can see the Integrated loudness (INT), Loudness Range (LRA), and True-peak (inter-sample peak meter) reading. To reset the measurements, click [Reset].

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 oscilloscope. A vertical line in the Goniometer represents a mono signal. 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).

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.

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, maximum number of tracks, and how audio is encoded to the CD. Because the Project page adheres to this standard, you can be sure your audio CDs are compatible with almost any CD player.

To burn your Project to an audio CD, click on the [Burn] button at the top of the Project page. In the Burn Audio CD dialog, you can select the device you wish to 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.

Burn Options

Several options in the Burn Audio CD dialog are intended to prevent common CD-burning errors: Test Write, Use Burnproof, and Use Temporary Imagefile. These options usually increase the time it takes to burn a CD in the Project page but they help to prevent wasting time and blank CDs on failed attempts.

The Test Write option runs 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 changes 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.

Make a Disc Image

Publishing your Project might require a disc-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 disc images, 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 [Image] button at the top of the Project page. Options are available for file format, resolution, and sample rate, as well as the ability to toggle Realtime Processing and simultaneously upload the Project to a linked SoundCloud account. In making an image, Studio One creates a cue file and a single, continuous audio file of your entire Project and places 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.

DDP Export

DDP images are quickly becoming the standard method of getting a disc image from mastering to disc manufacturing. The DDP image contains all the contents of your master disc, plus formatting information that ensures your replicas exactly match your master. To create a DDP image of your Project, click on the [DDP] button at the top of the Project page.

All of the DDP image data is exported to a single folder with the name of the Project appended with "DDP." This folder can be delivered to a duplicator.

Digital Release

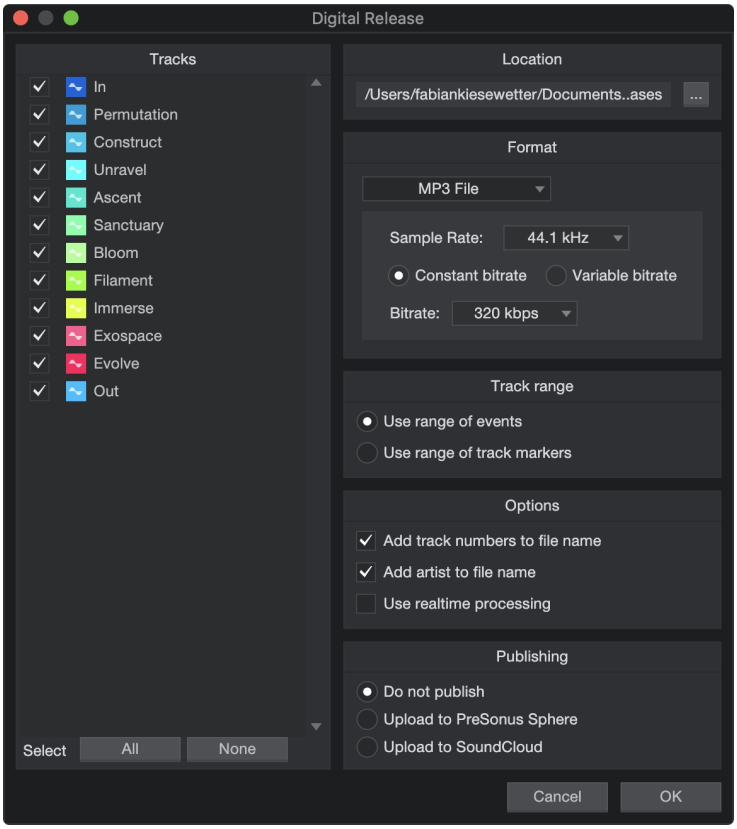
It is possible to publish your Project to a single folder containing all Tracks in your Project, properly tagged with the appropriate meta-information. A common use for this would be to quickly create an MP3 album in one folder and then upload it to a Web site or online retailer for distribution. This process is similar to creating a mix on the Song page, as described in the **Create a Mixdown** section.

Click on the [Digital Release] button at the top of the Project page to open the Digital Release dialog. In this dialog, you can choose whether you want to create WAV, AIFF, FLAC, CAF, Ogg Vorbis, or MP3 files (or, at 384 kHz sample rate, just WAV, AIFF, or FLAC), and where you wish to store the files. You can also choose a sample rate, a resolution (bit rate), and select Constant or Variable bit rate, depending on the format. You also have the option to simultaneously upload your Project to a linked SoundCloud account.

The folder to which all new files are written is named according to the Artist and Disc fields in the Project meta-information, at the top of the Track Column. If the Artist field is disabled, the new folder takes its title from the Disc name field. If the Artist field is enabled, the new folder title shows the artist name followed by the disc title. If neither the Artist or Disc fields have been filled in, the folder gets its title from the name of the Project.

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 window, 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 is used to tag the new files appropriately.

You can also choose Realtime Processing, to mix the Project down in real time.



Publishing

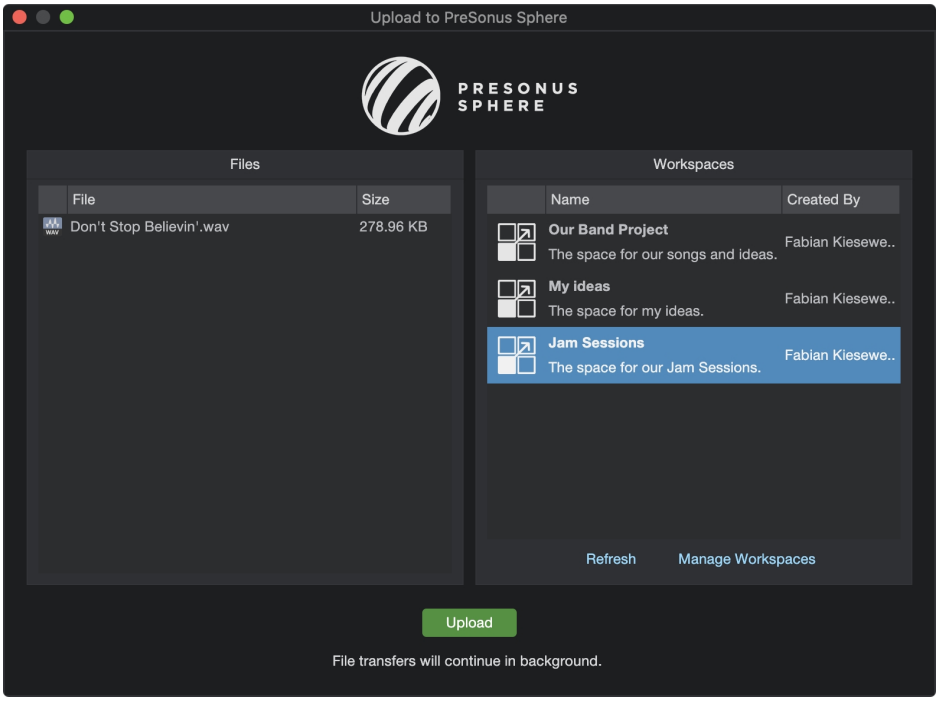
Studio One provides options to directly publish your finished project either by uploading to SoundCloud or to PreSonus Sphere for sharing and collaboration. To publish your project after exporting the Project, select Upload to PreSonus Sphere or Upload to SoundCloud in the Publishing section.

PreSonus Sphere Integration

If you're running a PreSonus Sphere subscription license you have access to additional services such as sharing your work with others and even collaborating on a project with other PreSonus Sphere users. These services are available directly from within Studio One as soon as you're connected to the Internet and your PreSonus Sphere license is activated.

Upload to PreSonus Sphere

When you're running an active PreSonus Sphere subscription license and your computer is connected to the Internet, uploads can be initiated directly from within Studio One. First make sure to check Upload to PreSonus Sphere in the Publishing section of the Digital Release window on the Project Page, or select Upload to PreSonus Sphere in the Publishing menu of the Export Mixdown or Export Stems window.



As soon as the mixdown or rendering process is completed, the "Upload to PreSonus Sphere" window will appear. First make sure the mixed and rendered files in the Files column are complete. Then select a destination Workspace from the Workspaces list. Click the [Upload] button to initiate the upload to PreSonus Sphere.

To add files to a Workspace, at least one Workspace needs to exist in your PreSonus Sphere cloud storage account. You can manage your Workspaces by clicking on Manage Workspaces which takes you directly to the Workspaces area of your PreSonus Sphere account. Here you can manage your storage space, share content with other users, and invite other PreSonus Sphere users to join your workgroup.

Visit **http://www.presonus.com/sphere** for more information on PreSonus Sphere.

SoundCloud Integration

PreSonus has partnered with the popular SoundCloud Web service to make it possible for you to upload your music to SoundCloud from within Studio One. This integration is the first of its kind.

Connect with SoundCloud

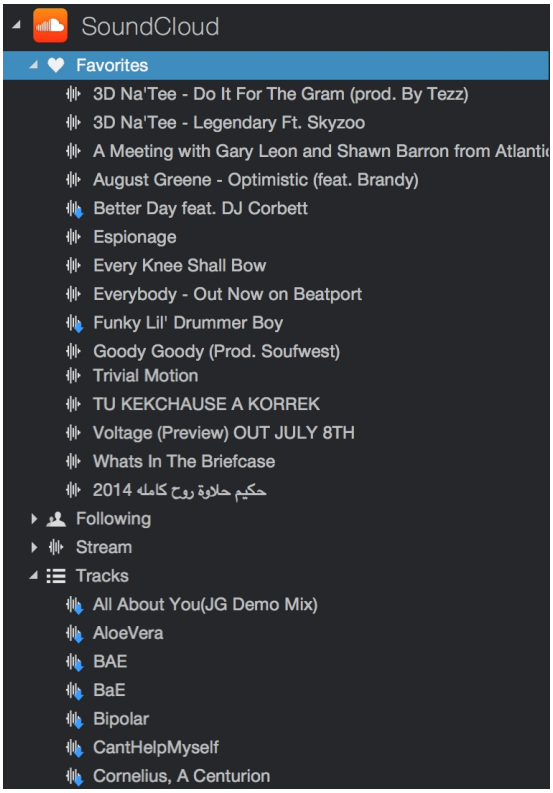
To publish your music to SoundCloud, you first need a SoundCloud account. Visit **http://www.soundcloud.com** to create your free account. Then, open the *Studio One/SoundCloud Client* dialog and click on Connect with SoundCloud. Your Web browser then opens to a special page to allow Studio One to connect with your SoundCloud account. Log in to your SoundCloud account on this page, click on Connect.

Studio One is now connected to your SoundCloud account.

Upload to SoundCloud

Once Studio One is connected to SoundCloud, you can upload music from your Project to SoundCloud directly from Studio One. To do this, create a digital release from any Project and choose Upload to SoundCloud in the options, or open the *Studio One/SoundCloud Client* dialog.

If creating a digital release, the Tracks from the digital release are added to the SoundCloud Client window automatically, with the appropriate meta-information already filled in. If accessing the client directly, click on Add Tracks to add any audio file to the list. SoundCloud supports the upload of any audio file from Studio One, at any resolution, and at any file size. Any number of Tracks can be uploaded at once, added from a digital release or manually.



After adding your Tracks, select any Track in the list to edit its information in Track Info and More Info. If you want the Track to be available publicly, meaning any SoundCloud user can see it, select this option under Track Info. If you want the uploaded file for Track to be downloadable or streamable, select the corresponding option under More Info.

When finished editing Track information, click on Upload to upload the Tracks to SoundCloud. The Tracks appear in your SoundCloud account once the upload has completed.

Song and Project Integration

At the center of Studio One Professional'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.

Open a Song from Within a Project

During mastering, changes are often needed in various Tracks in a Project, after which changes to the mix are made. Traditionally, this process can be grossly inefficient, taking many hours, if not days or weeks.

In Studio One, however, 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 (labeled with a small icon of a wrench) in any Track in the Track column. Your Song opens 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 are 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 are given the opportunity to update the master file. The Automatic Update of Mastering Files section below explains this option.

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, new mixes have to be created 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 re-sequencing the tracks in the Project.

Studio One Professional 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 are asked if you would like to update that Song’s mastering file. If you choose to do so, the following happens:

- The Song is automatically opened in its last saved state.
- A mixdown of the Song is rendered.
- The new mix file replaces the old one in the Project.
- The Song is automatically closed.
- A report is 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 appears 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]/[Ctrl]-clicking on the Track and selecting Update Mastering File. When the file is up to date, a blue light appears.

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 because saved changes have occurred to the Songs are updated in the same process described earlier.

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 menu. Select any open Project from the list or select New Project. This adds the Song file to the desired Project and automatically renders a mixdown, placing it in the Project timeline.

Update a Mastering File from the Song Page

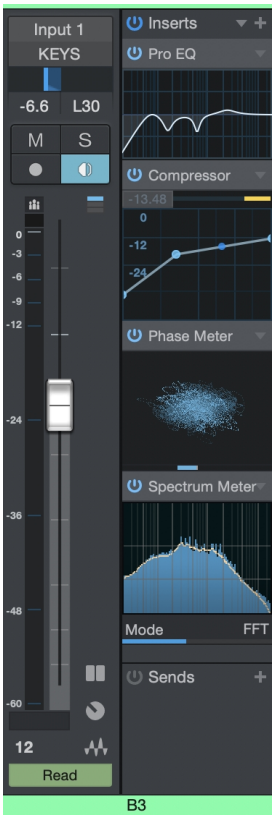
To update a mastering file for the currently open Song from within the Song page, select Update Mastering File from the Song file menu. This updates the mastering file for the Song, which can exist in any number of Projects. The next time any Project that contains the Song is opened, the new mastering file appears automatically for that Song.

Built-In Effects

Studio One features a number of built-in, high-quality, 64-bit audio effects and virtual instruments. The following chapter describes each audio effect in detail. Virtual instruments are covered in the **Built-in Virtual Instruments** chapter.

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 often prevents 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.



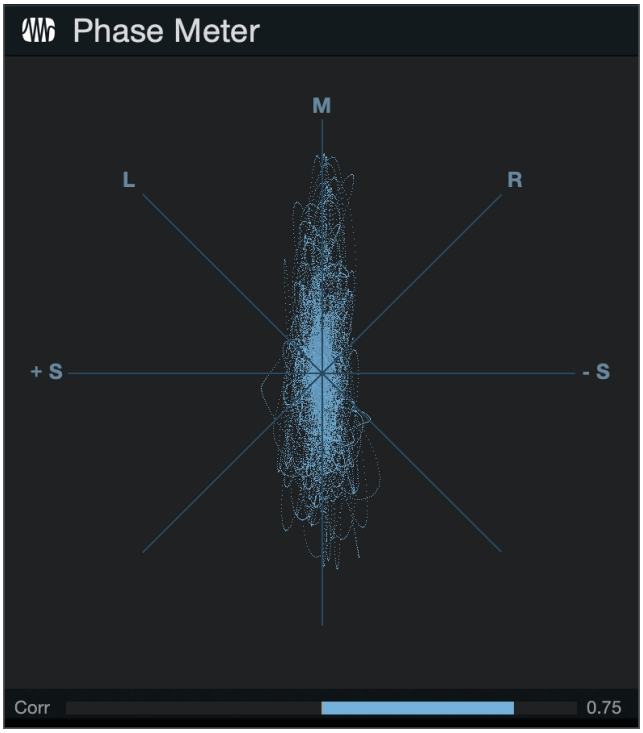
To expand the Micro View for any built-in effect, open the Console and click once on the effect in the Insert Device Rack. The Micro View expands downward, revealing certain parameters of the effect. Not all parameters of each effect are available in the Micro View, only those you are likely to change frequently.

In the large Console view, 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.

Analysis and Tools

Some of the following metering and analysis plug-ins can switch between Peak/RMS and a range of K-System level metering modes. If available, you can [Right]/[Ctrl]-click a plug-in's Peak/RMS meter to open a list of alternate metering modes to choose from.

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.

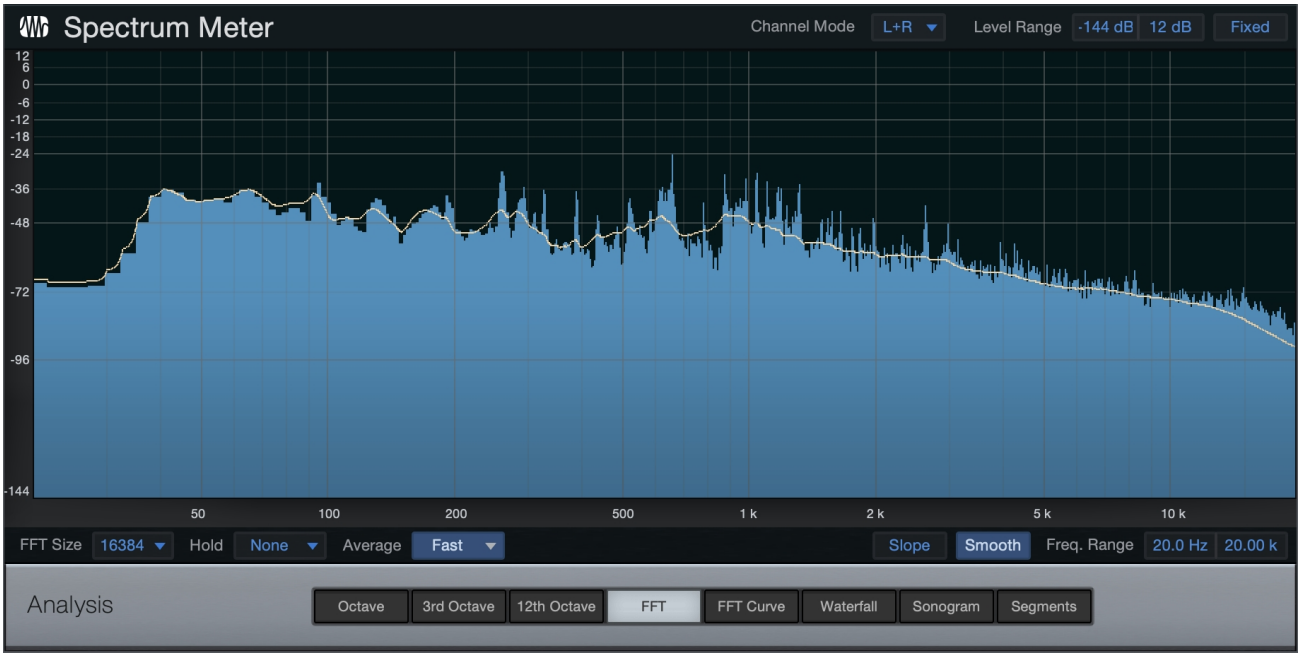
The goniometer displays left versus right channel amplitude on several axes. A line in the following directions of the Goniometer display would mean:

- **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 a Mid-Side (MS) encoded or recorded signal

The correlation meter shows the average amount of in-phase and out-of-phase audio signal. Correlation meter parameters are:

- **+1** Mono signal
- **-1** Reversed-phase mono signal
- **0** Independent signals (true stereo or dual mono)

Spectrum Meter



Spectrum Meter 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. Spectrum Meter can help diagnose these problems, and many others.

Spectrum Meter is fully adjustable using the following parameters at the bottom of the plug-in window:

Channels

When 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 between left and right channels

Analysis Mode

- **Octave** Octave Band displays frequency content divided into octaves, useful for determining broad balance across the frequency spectrum.
- **3rd Octave** Third-Octave Band displays frequency content divided into 1/3 of an octave, useful for determining balance with good precision across the frequency spectrum.
- **12th Octave** The bands in the 12th-octave meter correspond to the 12 musical tones in an octave, each in its appropriate place on a piano-like keyboard. This allows for easy reading of the pitch or note value of a given signal.
- **FFT** A Fast Fourier Transform, or FFT, 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. frequency 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.
  - When using the FFT display, a -3 dB/octave line is displayed in addition to the frequency and level crosshair. This line represents compensation for the shrinking frequency-width of the FFT bands toward the higher end of the spectrum, which leads to a lower energy content. A well-balanced mix should somewhat approximate the slope of this line.
- **FFT Curve** This performs the same analysis as the FFT mode, but displays the result as a single white line.
- **Waterfall & Sonogram** Two modes that graph changes in frequency content and dynamics over time.
- **Segments** Closely resembles the output of an FFT display. However, the X/Y grid is split up in uniform segments, rather than varying in resolution depending on frequency. Switchable amplitude segment sizes of 0.5, 1, and 2 dB.

Level Range

- **Minimum Level** Minimum amplitude to be displayed for all frequencies. Variable from -144 dB to 6 dB less than the maximum level.
- **Maximum Level** Maximum amplitude to be displayed for all frequencies. Variable from 0 dB to 6 dB more than the minimum level.
- **Fixed** When engaged, five level ranges are available in the menu to the left: -50 dB, -72 dB, -96 dB, -120 dB, and -144 dB.

Note: You can also quickly change the Level Range by clicking and dragging vertically within the meter.

Frequency Range

- **Minimum Frequency** Minimum frequency to be displayed. Variable from 20 Hz to within 10 Hz of the maximum frequency.
- **Maximum Frequency** 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.

Sidechain Input

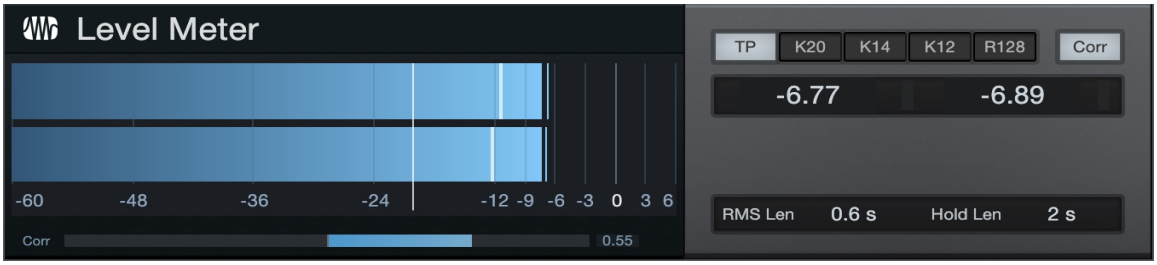
To enable the sidechain feature, click the Sidechain button. This brings up a second spectrum display below the main display, showing the frequency content of any signal you route to the Spectrum Analyzer's sidechain. This lets you compare the frequency response of two different signals simultaneously, such as a rough mix and a reference track. For more information on routing signals to effect sidechains, see Sidechaining in the Effects Signal Routing section.

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 lower left corner. A Calibration knob enables calibrating the Tuner to a center frequency from 415 Hz to 465 Hz. Click on the [Strobe Mode] toggle switch 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.

Level Meter



The Level Meter plug-in is a level meter that can be sized as a horizontal or vertical display type. The following parameters are available in the Level Meter:

- **Mode** Select True Peak, K-20, K-14, K-12, or R128 (Loudness) metering mode.
- **Corr** Engage to display phase correlation.
- **RMS Len** Click the field and select an RMS length value from the menu.
- **Hold Len** Click the field and select a Hold length value from the menu.

Scope

The Scope provides the functions an engineer would expect from a digital oscilloscope and is useful for debugging problems in the studio, such as analyzing crosstalk and noise levels.

There are three signal channels and one math channel. Each channel can either show the left or right signal of the Insert Channel, or side-chain input, while the math channel can show the difference between two of the signal channels. (B and C can be inverted to sum instead, or to do a polarity flip.)

Each of the color-coded channels can be scaled and offset in the Y axis, and scaling is shown as percent of full scale per division. (Full scale is 1.f, equivalent to 0 dB.) All channels can be activated/deactivated by clicking on the colored channel letter.

The time (x axis) can also be scaled and offset. This setting is for all channels. The offset is shown with a green vertical line.

The units follow the samples/seconds switch above the display, and can be expressed in decibels (dB) or percentages (-100% to 100%).

The scope is triggered from one of the following sources:

- **Slope** Triggers when the signal level on the selected channel crosses a threshold level in the right direction. The threshold is adjusted by the Trigger Level control. Note that this does not apply to the Math channel.
- **Transients** This uses the same audio channel, and the Slope and Level controls still apply, but the transient level is usually much more narrow: somewhere above 0% and typically around 1.5%.
- **External Signals** Notes sent to the scope MIDI input or not sent at all (free).

Engaging Oneshot turns triggering off after the first received trigger. Retrig waits for one new trigger in case you get the wrong signal or change the signal.

The Scope display is latching, meaning that a signal is shown only on the second trigger. Note that the scope does not clear its buffer on stop, so there may be unwanted signal shown until another display trigger occurs.

The Hold control adjusts the length of time shown for a trigger signal, and during this period, no new signal triggers the scope. This is adjusted in percent of the display width and is also shown in the selected time unit and as a green vertical line. The display is clipped on a new trigger.

Finally, there is a crosshair for measuring the signals. It has a tool-tip readout using the units displayed in relation to the selected channel. Use this for measuring distances/differences for the selection, where dB levels are rectified signal levels, so you can compare positive and negative peak levels.

Tone Generator

Tone Generator is capable of generating noise, frequency sweeps, and other signal types commonly used for signal-path testing and calibration. The Scope would commonly be used in conjunction with Tone Generator to analyze return signals at the end of the signal path being tested or calibrated.

The following parameters are available in Tone Generator:

- **Waveform** Choose from sine, saw, square, white noise, and pink noise.
  - **Anti-Alias** The saw and square waveforms have Anti-Aliasing engaged by default in order to prevent aliasing artifacts from appearing.
- **Frequency** Set the tone frequency from 1 Hz to 22 kHz.
- **Modulation**
  - **Wobble** Engage this to make the tone frequency move from the set frequency to the modulation Target Frequency, according to the Modulation settings.
  - **Log. Sweep** Engage to make the frequency sweep logarithmic instead of linear.
  - **Length** Set the length in time of the sweep from Frequency to Target Frequency; range is from 10 ms to 60 seconds.
  - **Phase Shift** Set the phase shift that occurs over the chosen Length of time, from 0° to 180°.
  - **Target Frequency** The end frequency to which the tone is swept during modulation.
- **Gated** Gated allows the output to be turned on via a note played on a Keyboard (set the output of an Instrument Track to Tone Generator).
- **Off/On** The default setting is Off. On activates the Tone Generator.
- **Level** The output level of Tone Generator, from -144 dB to +24 dB. (Use caution!)

IR Maker

IR Maker is a utility plug-in that allows you to capture your own impulse responses for use with OpenAIR and with the cabinet section of Ampire. The following describes general guidelines on how to use IR Maker to create impulses:

1. In the *Song/Song Setup/Audio IO Setup* menu, create an Output Channel configured with the physical output on your interface that the IR Maker sweep signal routes through. That output might be connected to a speaker in the space for which you want to capture an IR, or to the Effects Return on an amplifier connected to a cabinet for capturing a guitar cabinet IR.
2. Then, create an Input Channel in *Song/Audio IO Setup*, configured with the physical input on your interface that IR Maker gets the return signal from. A microphone, or the output of a hardware processor, connects to this input when capturing the IR.
3. Now create an Audio Track in a Song, set its input and output to the Input and Output you just created, and insert IR Maker on the Track.
4. Signal-path latency is important. That latency may vary because of the distance of the mic from the source, for instance, and may be a part of the impulse response to be captured. So, it is easiest to detect the signal path latency with a loopback from interface output to interface input. To do this, you need to route the physical output directly into the physical input, creating a loopback for the I/O you created before. Then, press Detect in the Latency Compensation section. If the latency box still shows zero after testing, then something is wrong with your audio setup (levels, audio I/O ports, monitors, cables, interface settings, etc.).
5. After detecting latency in the signal path, disconnect the loopback from before. Connect the output to the device that receives/outputs the IR Sweep signal (a speaker in a room, a guitar amplifier Effects Return, etc.), and the input to the device that captures the IR (a microphone in a room or in front of a guitar cabinet, or the output of a hardware device).
6. The file Output Path is structured as a base part (the path to the folder where your IRs reside), a device part (the subfolder for that cabinet, space, etc.), and an IR base-name (mic/mic-position).
7. Select the Sweep Length (longer = higher-frequency resolution and less noise). In general, 60 seconds should be enough for high fidelity. IR Length can always be shortened later to save CPU resources but it should be long enough to contain the whole response. As a default for cabinets, we recommend using 0.1 s. Shorter Sweep and IR Lengths get calculated much faster.
8. Normalizing ensures maximum loudness in IR but can be done later, and can destroy loudness relationships between different devices.
9. Usually you need to trigger the sweeping several times to adjust the levels. It helps to show Input and Output Channels in the mixer to watch the metering closely.
10. Check the Open checkbox to have your computer's file browser open the newly created impulse response after calculation. You can then drag that onto a new Track to view the IR and make any edits you desire, such as fades; or drag the IR into OpenAIR or Ampire for immediate use.

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:

- **Gain** Set overall output Gain. Variable from -24 dB to +24 dB. Use [Ctrl]/[Cmd]+[Shift] and drag to fine-tune the value.
- **Swap Channels** Click to swap left and right Mixtool input channels. Stereo Tracks only.
- **MS Transform** Click to perform a 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.
- **Block DC Offset** Re-centers the incoming waveform, to remove any DC Offset in the audio signal.
- **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.

When used on a mono Track, the Mixtool plug-in has one control to invert the phase of the signal.

Delay

Analog Delay

Analog Delay emulates a one-head tape delay with optional tempo sync, LFO, filtered feedback, and other features. 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:

Delay

- **Time** The base delay time.
- **Sync** Optional Sync mode for Time.
  - Sync disengaged results in speed expressed as time from 1 ms to 3 s.
  - Sync engaged results in time expressed as beats from 4/1 to 1/64, with triplets.
- **Feedback** Feedback percentage; that is, the amount of delayed signal to be fed back into the delay input. Variable from 0 to 100%.
- **Boost** Enable this parameter to boost feedback levels.

LFO

- **Speed** The base LFO speed.
- **Sync** Optional Sync mode for LFO Speed.
  - Sync disengaged results result in Speed expressed as frequency, from 0.01 Hz to 5 Hz.
  - Sync engaged results in Speed expressed as beats, from 4/1 to 1/64, with triplet and dotted-time variants.
- **Amount** Modifies the effect of the LFO on delay speed. Variable from -50% to 50%.
- **Type** The shape of the LFO waveform; select from triangle, sine, sawtooth, and square.

Color

- **Low Cut** Filters frequencies below this value from the delayed signal. Variable from Off to 20 Hz to 3.2 kHz. Filter is 6 dB per octave.
- **High Cut** Filters frequencies above this value from the delayed signal. Variable from 400 Hz to 16 kHz to Off. Filter is 6 dB per octave.
- **Drive** Emulates tape saturation with State Space Modeling. Variable percentage from 0 to 100%.

Motor

- **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.

Synced LFO and synced delay with LFO slower than delay means that modulation is not perceptible (except with high inertia).

Width

- **Width** Regulates the stereo width of the delay feedback. Variable from mono to full stereo width.
- **Ping-Pong Mode**
  - **Off** Select this setting to shut off Ping-Pong Mode. This also can be used to freeze the delay effect to one side, for example.
  - **Sum** Select this setting to feed a mono-summed mix of both channels into the delay. Try higher settings of the Width control to achieve the full ping-pong effect.
  - **2-Ch** This option feeds the stereo mix into the delay. Try lower settings of the Width control to "monoize" the delay effect.
- **Swap** Click this to swap the left and right sides of the Ping-Pong effect. If Ping-Pong Mode is Mono and Width is 100%, for example, this determines whether the delay effect starts on the left or right sides.

Global

- **Dry/Wet** Adjusts the mix of processed signal and the original dry signal. Variable from 0 to 100%. A setting of 100% is likely to increase feedback.
- **Locked** Engage this switch to prevent changes to the Dry/Wet balance.

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). Beat Delay has the following parameters:

Beats Delay time expressed as beats. Variable from 4/1 to 1/64, with triplet and dotted-time variants.

Offset Adjusts a time offset from -30 to +30% of the specified Beats value.

Feedback Percentage of delayed signal added back into the delay input. Variable from 0 to 99.99%.

Modulation

- **Ping-Pong**
  - **Off** Select this setting to shut off Ping-Pong Mode. This also can be used to freeze the delay effect to one side, for example.
  - **Sum** Select this setting to feed a mono-summed mix of both channels into the delay. Try higher settings of the Width control to achieve the full ping-pong effect.
  - **2-Ch** This option feeds the stereo mix into the delay. Try lower settings of the Width control to "monoize" the delay effect.
  - **Swap** Click this to swap the left and right sides of the Ping-Pong effect. If Ping-Pong is Mono and Width is 100%, for example, this determines whether the delay effect starts on the left or right sides.
- **Width** Regulates the stereo width of the delay feedback. Variable from mono to full stereo width.
- **Cross Delay** When not set to Off (center), the input is sent, in mono, to the left or right channel, with a delayed signal sent to the other channel. Variable from L 50 ms (right channel dry, left channel delayed 50 ms) to R 50 ms (left channel dry, right channel delayed 50 ms). Extreme left or right settings create a pronounced stereo effect.
- **In Pan** Sets the ratio between the left and right channels of a stereo input signal. When it is set to full Left, for example, only the left channel of the input signal is delayed.
- **Pong-Factor** Applies a multiplier to the delayed signal, with a variety of rhythmic subdivisions.

Color

- **Low Cut** Scoops out the low end of the delayed signal using a 6 dB/octave filter. Variable from 20 Hz to 1 kHz.
- **Hi Cut** Rolls off the high-frequency content of the delayed signal using a 6 dB/octave filter. Variable from 1 kHz to 20 kHz.

Global

- **Mix** Adjusts the blend of the processed signal and the original dry signal. Variable from 0 to 100%.
- **Lock** Engage this switch to prevent changes to the Dry/Wet balance.

Groove Delay

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, Swing, or LFO, 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.
- **Filter Controls** Click this to show/hide the bottom area of the Groove Delay. This is where the Filter settings and Cutoff LFO Amount controls are located.
- **Level, Pan, Cutoff, Swing, LFO** Click on these buttons to display and edit the respective parameter for each tap in the Grid display.
  - **Level** Adjusts the output level and timing for each tap.
  - **Pan** Adjusts the pan and timing for each tap.
  - **Cutoff** Adjusts the filter cutoff frequency for each tap.
  - **Swing** Adjusts 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 off-beat positions). Helps achieve “swing” grooves.
  - **LFO** Adjusts the Cutoff LFO Amount for each tap.

Beatlength

Select one of the note icons to adjust the Grid subdivisions by note value. Options range from 1/2 to 1/64.

Tap Parameters

- **Beat Position** Adjusts the delay length for the currently select tap, in beats. Variable from one beat to two bars. The number of positions within a bar is determined by the Beatlength: when set to 1/2 Beats, only 4 positions exist; when set to 1/32 or 1/64, 64 positions exist.
- **Tap Groove** Adjusts 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%).
- **Tap Feedback** Adjusts the amount of signal fed back into the delay effect.
- **Tap Output Level** Adjusts the level of the currently selected tap as a percentage of the input level. Variable from 0 to 100%.
- **Tap Output Pan** Adjusts the pan of the currently selected tap. Variable from Left to Center to Right.

Global

- **Feedback**
  - **Dry/Wet** Adjusts the mix of processed signal with the original dry signal. Variable from 0 to 99%. A value of 100% could cause runaway feedback, so that value cannot be reached.
- **Mix**
  - **Effect Depth** Adjusts the mix of processed signal with the original dry signal. Variable from 0 to 100%.
  - **Lock** Locks the Effect Depth control position in place.

Filter Controls

The following controls become available when the Filter Controls button above the display is engaged.

- **Filter** Click on the [Filter] button to engage the filter for the currently selected tap.
- **Type Mix** Drag the red dot around the X/Y grid to adjust the character of the filter (X axis: low-pass to high-pass; Y axis: bandpass to peak).
- **Cutoff/Reso.** These controls adjust the cutoff frequency and resonance of the filter.
- **Cutoff LFO Amount** 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.)
- **Cutoff LFO** The Cutoff LFO is a modulation source that can affect the cutoff value of the filter for each tap, depending on each tap's Cutoff LFO Amount setting.
  - **LFO Speed-[Beats/Frequency]** Adjusts the speed of the LFO. Beats variable from 4/1 to 1/64 with triplet and dotted time variants. Frequency variable from 0.10 Hz to 30 Hz.
  - **Sync** Click to engage Cutoff LFO sync. This enables LFO speed adjustment in beats (synced to Song position).

Distortion

Distortion effects focus on the creation of a range of audio clipping artifacts that can add character and attitude to sounds—or destroy them completely. Studio One includes the following distortion-oriented processors:

Ampire

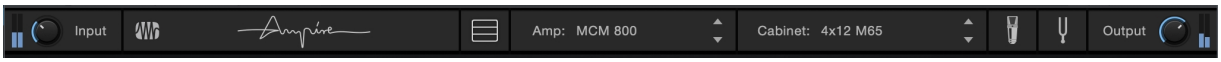
Ampire is a powerful and versatile collection of guitar- and bass-amplifier models based on our proprietary State Space Modeling technology, with precise emulation of every component in the signal path. Convolution-based speaker cabinets and microphones play a vital role, with variable mic positioning and phase. Signals can be processed pre- and/or post-amplifier by a bevy of effect stompboxes, some of which employ State Space Modeling of their components. Use Ampire with guitars, basses, or any audio signal to create spot-on emulation of guitar amps and cabinets and a rougher, harmonically-enriched sound.

The Ampire window is divided into four main sections:

- **Toolbar** This runs along the top of the Ampire window, and provides the basic functions such as input / output levels, window configuration, amp / cabinet selectors, and access to the microphone settings and a tuner.
- **Gallery** The first section under the toolbar allows visual selection and display of the amps and cabinets models. It can be hidden to reduce the overall size of the Ampire window.
- **Edit section** The next section houses the controls for the selected amplifier model. It is always visible.
- **Pedalboard** The bottom of the Ampire window is home to the Pedalboard, which allows you to add up to eight effects units to the signal path and configure them however you want. These effects units are also known as Stomps.

Each of these four sections is described in the following paragraphs.

Toolbar



The gateway to Ampire is the toolbar, where component selections are made and basic levels are set. Viewing options are available here too, along with access to a handy tuner and other features.

- **Input Level** Trim the input level directly at Ampire's input to pull up weak instrument signals or to attenuate loud, processed signals. With a good input level, the signal is in the optimal range for dynamic distortion within Ampire. Variable from -12 dB to 24 dB. This parameter is not saved with each preset. It stays at a static setting for each instance of Ampire until you change it.
- **Show / Hide Views** This button ( ) hides or reveals different sections of the Ampire window so you only see what you want. Click above the button to toggle the Stage view; click below the button to toggle the Stomps view.
- **Amplifier Model** Select an amplifier model by clicking on the Amp name in the toolbar and choosing an amplifier from the Gallery. Move the cursor over the Gallery images to read a brief description of each amp. You can also use the up / down arrows in the toolbar or on the left side of the Stage view to select an adjacent amplifier.
  Changing the amp model changes the characteristics of the entire amplifier, including preamp and power amp distortion and amplification, the differences between channels 1, 2, and 3 (where applicable), and tone stack behavior. Select "None" if you want to bypass the amp head and run the signal directly through the cabinet.
- **Cabinet Model** Click the Cabinet Model selection box to choose a cabinet from the Gallery. Move the cursor over the Gallery images to read a brief description of each cabinet. You can also use the up / down arrows in the toolbar or on the left side of the Stage view to select an adjacent amplifier. If you want to take the direct output of the amp head, choose the Bypass icon ( ). You can also drag and drop Impulse Response files into the Mic A, B, and C slots for the User Cabinet (see IR Maker). WAV and AIFF files are supported.
- **Mic Edit Controls** Click the Mic Edit Controls button to access the settings for the microphones that were used to capture the sound of each cabinet.
  - **Mic Mix Link** Activate this button to link the microphone channel levels. When linked, moving one fader adjusts all three proportionately, for a combined level of 100%. If a mic level is at 0, moving the other faders adjusts only those channels. Disengage this button for independent control of each microphone level.
  - **Mic A/B/C Mix** Adjust these faders to achieve the desired level for each mic. When linked (as described above), adjusting one adjusts all three.
  - **Mic Mute** Each channel has a Mute button. Use the appropriate button to mute only that microphone. Note that this does not affect the Link status of that channel.
  - **Mic Polarity** Each channel has a Polarity switch. Use the appropriate button to invert the phase of that microphone.
  - **Mic B/C Delay** These controls simulate moving Mic B and Mic C further from the cabinet. Variable from 0 to 2.9ms.
- **Show / Hide Tuner** This button reveals or hides the Tuner window.
- - **Frequency/Difference** When a pitched input signal is detected, several things happen:
    - The name and octave number of the nearest fundamental pitch is shown below the tuning meter (i.e., D#2), with arrows on either side to indicate whether the note is flat, sharp, or in tune (both arrows lit)
    - **Frequency** The fundamental frequency of the input signal is displayed in Hertz (Hz)

- **Difference** The amount of deviation from center is shown as a positive number (sharp) or a negative number (flat).

- **Strobe** Click this switch to toggle the tuner between the standard and strobe tuner views.
- **Calibration** Click and drag the knob to set the tuning reference frequency, or enter a value manually in the number field. [Ctrl]/[Cmd]-click to reset the value to A=440.00.
- **Mute** Activate the Mute switch to defeat the input signal temporarily while the instrument is being tuned. The signal is restored when the Tuner window is hidden. However, if the Ampire Editor window is closed while the Mute switch is still engaged, the input signal is not restored.

- **Output Level** Distortion and amplifier emulation may result in massive level changes. Use Output Level to adjust the signal to normal levels. Unlike the Input Level setting, the Output Level value is saved with each preset. Variable from -24 dB to 12 dB.

State Space Amplifier Models

PreSonus used our State Space Modeling technology to perform a component-level analysis of every circuit in these sought-after amplifiers. This enables Ampire to recreate the dynamic behavior and non-linearities that are critical to the distinctive tone and character of tube and semiconductor-based analog circuits.

After an amplifier is selected its controls appear in the middle of the Ampire window (the Edit section). Here's a description of each control.

MCM 800

- **Tone Controls** **Presence** controls the amount of negative feedback; increasing the value changes the high frequencies and harmonics. **Bass**, **Middle**, and **Treble** are basic tone controls for their respective frequency ranges.
- **Gain Controls** **Master Volume** controls the final output volume. **Pre-Amp Volume** controls the level of the input signal before it enters the amplifier circuitry.
- **Sensitivity** Click one of the connectors to route the signal into the High sensitivity input or the Low sensitivity input.

Dual Amplifier

The channels of the Dual Amplifier model are numbered from right to left. They have similar EQ and tone controls, but each has different gain and circuit characteristics.

- **Channel selector** This knob selects channel 1, 2, or 3. You can also use the small selector buttons between the toggle switches to select a channel. The channel indicators have different colors (green, orange, and red) to help you see which is active. The green channel is "clean", while the orange and red channels are more distorted.
- **Main Power** There are two options for the power supply characteristics: Spongy or Bold.
- **Tone Controls** These are identical for channels 1-3. **Bass**, **Mid**, and **Treble** are basic tone controls for their respective frequency ranges.
- **Gain Controls** These are identical for channels 1-3. **Presence** controls the amount of negative feedback; increasing the value changes the high frequencies and harmonics. **Master** controls the final output volume for the channel. **Gain** controls the pre-amp input level.
- **Mode switch: Channel 1** Two positions: **Clean** and **Pushed**, each with different sound characteristics. Pushed has a boost, so the tone controls contribute less to the sound of Channel 1 in that position.
- **Mode switch: Channels 2 and 3** Three positions: **Raw**, **Vintage**, and **Modern**. Each provides sound characteristics that were modeled after different amplifiers from the same manufacturer.
- **Rectifier switch: All Channels** Two positions: **Diode** and **Tube**. These determine the basic character of the selected channel, which changes the output volume, the harmonic response, and the amount of headroom for that channel.

VC30

- **Channel Inputs** The VC30 has three channels: **Vib-Trem**, **Normal**, and **Brilliant**. Each channel has two inputs on the front panel, arranged vertically. The low-sensitivity inputs are on the top row, and the high-sensitivity inputs are on the bottom row. Each channel corresponds to a section of controls on the right side. The active channel is determined by which input is used.
- **Vibrato** The controls in this channel are used when one of the Vib-Trem inputs is connected. Use the **Speed** selector to choose one of the three speeds. The **Vib-Trem** selector also has three settings (Vibrato, Off, or Tremolo). Adjust the level with the Vib-Trem control in the Volume section.
- **Volume** Adjust the gain of each channel with the corresponding control in the Volume section. Usually only one channel is active, depending on which input is connected. But when the Vib-Trem and Brilliant channels are "jumpered" as shown below, the gain controls for both channels can be used to achieve the perfect blend.
- **Tone** The **Treble** and **Bass** controls are dedicated to the Brilliant channel. The Cut control attenuates the high frequencies, and is active for all three channels. 0% = no cut, 100% clockwise = maximum cut.
- **Vib-Trem > Brilliant** The Vib-Trem and Brilliant channels can be patched together and used at the same time. To do this, click input 2 of the Vib-Trem channel, then click it again and a patch cable appears between Vib-Trem input 1 and Brilliant input 2. This shows that the connection has been made.

  This "jumpered connection" sends the signal through both the Vib-Trem and Brilliant circuits, so you have the dirt and tone control from the Brilliant channel *and* the vibrato / tremolo effect from the Vib-Trem channel available. The relevant controls in each chan-

nel can be used to modify and blend the two outputs.

Blackface Twin

This well-known amp has two channels (normal and vibrato). Each channel has two input jacks that differ in input volume, as well as a Bright switch.

- **Normal Channel** A simple channel with three EQ knobs and a Bright switch. The EQ knob range is from 1 (maximum cut) to 10 (maximum boost); 5 is neutral (no change). With **Bright** switched on, high frequencies can pass through the volume stage more easily. The effect depends on the Volume setting; when the volume is low, the Bright switch makes a bigger difference.
- **Vibrato Channel** The features are identical to the Normal Channel, with the addition of Reverb and Vibrato controls. The **Reverb** knob controls the amount of spring reverb, with a setting of 1 shutting off the reverb. The **Speed** and **Intensity** knobs control the "Vibrato" effect (it's actually tremolo), with a minimum to maximum range of 1 to 10. An Intensity setting of 1 shuts off the Vibrato. The Reverb and the Vibrato Intensity can be toggled between their current value and "Off" by clicking below the appropriate knob.

Amp STV

This amplifier was designed for bass instruments. It has two independent channels, with two inputs per channel (Bright and Normal). The difference between the **Normal** and **Bright** inputs is that the Bright input attenuates the low and mid frequencies.

- **Channel One** Standard volume and boost/cut EQ controls (treble, midrange, bass), with a set of selector switches that influence the results in each EQ range. Click the desired switch to change its setting.
  - **ultra hi** is a two-position switch: flat (0) or boost (+). It has a significant impact on the high frequencies, especially in combination with the other tone controls.

- **mid frequency** is a three-position switch: 220 Hz, 800 Hz, or 3000 Hz. This sets the center frequency of the midrange EQ band.
- **ultra lo** is a three-position switch: cut (-), flat (0), or boost (+). It has a significant impact on the low frequencies, especially in combination with the other tone controls.

- **Channel Two** Identical to Channel One, only without the midrange controls.

Pedalboard and Stomp Boxes

The Ampire Pedalboard features a wide variety of Stomp Box effects, including distortion and modulation of all sorts. Up to eight Stomps can be used at once and placed in any order you like (pre- or post-amplifier). Several have sync-to-tempo capabilities. You can even use the same Stomp in several slots if you want. Flexibility, thy name is Pedalboard.

Note that all effects are placed prior to the cabinets in the audio chain.

Before describing each parameter, let's take a look at the row of buttons beneath the Stomps window.

The numbered slots show the names of the selected Stomps in the order they appear in the Stomps window. An unused slot has no name. Each slot has an on/off switch, and on the far left is one switch to rule them all: it toggles the entire Pedalboard on and off.

Pre-/post amp placement

Notice the double blue line between two of the Stomp slots; that's the dividing line between pre- and post-amplifier effects. Click-drag the blue line to place it between any two Stomps, or even before or after the entire Pedalboard. As it moves you'll see a vertical, silver switch move to the same location in the Stomps window.

Mirrored actions

Many of the actions performed in the Stomps window are mirrored in the Stomps tray, and vice versa. For example:

- Click-drag the silver switch in the Stomps window and the blue line moves too.
- Click-drag a Stomp to a new location and its numbered slot does the same below. Remember that this works both ways.
- Toggle the foot switch of an effect in the Stomps window and the on/off switch in the Stomps tray does it too.
- Hover over a number in the Stomp tray to identify that effect in the Stomps window. Hover over the top of a Stomp to see its number.
  This is useful if you're using more than one instance of the same Stomp, for example, and you want to know which is which. It also helps if the Stomps are not located directly above their position numbers in the Stomp tray. Some of them are fat in more ways than one.

Add or remove a Stomp box

To insert a Stomp, right-click in an empty space in the Stomps window or in the Stomps tray. To remove a Stomp, right-click on the Stomp itself or on its numbered slot below. Note that a right-click on a Stomp control opens the Macro/Automation menu instead.

Select a Stomp box

Click the name area of any slot in the Stomps tray to open the Gallery and select an effect for that slot. There are too many to fit in the Gallery window, so be sure to scroll up or down if you don't seen the one you're looking for at first.

Now let's take a tour of the parameters, Stomp-by-Stomp.

- **Bypass**
  - This selection leaves the Stomp slot empty.
- **Big Fuzz**
  This is one of the PreSonus State-Space Modeling effects.
  - **Volume** Controls the level into the Tone circuit.
  - **Tone** Turn to left to attenuate high frequencies; turn to the right for more treble, less bass. Tone control is post the two clipping stages.
  - **Sustain** A pre-pre-amp stage into the Volume circuit. Adds sustain and fuzz.
- **Delay**
  - **Speed** Adjusts the delay speed from 0.01 to 10 Hz.
    - **Sync** Engage this if you want to sync the delay speed to tempo.
    - **Beats** Selects a beat value for the synced delay speed.
  - **LC** Sets the frequency of the low-cut filter from 20 Hz to 1 kHz.
  - **HC** Sets the frequency of the high-cut filter from 1 kHz to 20 kHz.
  - **Feed** Adjusts the amount of feedback from 0 to 100%.
  - **Mix** Adjusts the mix of the delayed signal with the original signal from 0 to 50%.
- **Equalizer**
  - **Guitar/Bass** Selects the appropriate style, which adjusts the frequency values for each band of the graphic EQ.
  - **Band Sliders** Adjusts the level of each EQ band up or down to achieve the desired EQ setting. Click-drag across them to set a quick curve.
- **Fat**
  This is one of the PreSonus State-Space Modeling effects.
  - **Distortion** Turn to the right to increase the amount of distorton.
  - **Filter** With this control fully to the left, the Filter is open and high frequencies can pass; fully to the right, the high frequencies are attenuated. Tone control is post-Distortion.
  - **Volume** Controls the final output level.
- **Modulation**
  - **Chorus/Flanger/Phaser** Selects the type of modulation.
  - **Chorus**
    - **Delay** Adjusts the delay of the chorus signal from 2 to 20 ms.
    - **Speed** Adjusts the chorus speed from 0.01 to 10 Hz.
    - **Width** Adjusts depth of delay line modulation, from 0 to 100%.
    - **Depth** Adjusts the chorus depth from 0 to 100%.
  - **Flanger**
    - **Delay** Adjusts the delay of the flanged signal from .2 to 4 ms.
    - **Speed** Adjust the flanger speed from 0.01 to 10 Hz.
      - **Sync** Engage this if you want to sync the flanger speed to tempo.
      - **Beats** Selects a beat value for the synced flanger speed.

- **Feed** Adjusts the amount of feedback from 0 to 100%.
- **Width** Adjusts the flanger LFO width from 0 to 100%.
- **Depth** Adjusts the flanger depth from 0 to 100%.

- **Phaser**
  - **Phase** Adjusts the frequency of the phaser from 240 Hz to 8 kHz.
  - **Speed** Adjusts the speed of the phaser from 0.01 to 10 Hz.
    - **Sync** Engage this if you want to sync the phaser speed to tempo.
    - **Beats** Selects a beat value for the synced phaser speed.
  - **Feed** Adjusts the amount of feedback from 0 to 100%.
  - **Width** Adjusts the phaser LFO width from 0 to 100%.
  - **Depth** Adjusts the phaser depth from 0 to 100%.

- **MP Ninety**
  - **Speed** Controls the phaser speed.
- **PAE Chorus 1**
  - **High/Low** Selects the input sensitivity.
  - **Level Control** Adjusts the input level.
  - **Chorus Intensity** Controls the rate and depth of the Chorus effect for Chorus mode.
  - **Vibrato Depth** Controls the depth of the Vibrato effect for Vibrato mode.
  - **Vibrato Rate** Controls the rate of the Vibrato effect for Vibrato mode.
  - **Normal/Effect** This foot switch toggles the effect on and off.
  - **Mode: Vibrato/Chorus** This foot switch toggles the effect between Vibrato and Chorus modes.
- **Pan**
  - **Speed** Adjust the pan speed from 0.01 to 10 Hz.
    - **Sync** Engage this if you want to sync the pan speed to tempo.
    - **Beats** Selects a beat value for the synced pan speed.
  - **Depth** Adjusts the pan depth from 0 to 100%.
- **Reverb**
  - **Size** This control affects several parameters to approximate an overall room size. It adjusts the size of the reverberated signal from 0 to 100%, with lower percentages representing smaller rooms and therefore shorter reverb tails and higher percentages representing larger rooms and longer tails.
  - **Mix** Adjusts the mix of the reverberated signal with the original signal from 0 to 50%.
  - **LC** Sets the frequency of the low-cut filter from 20 Hz to 1 kHz.
  - **HC** Sets the frequency of the high-cut filter from 1 kHz to 20 kHz.
  - **Damp** Adjusts the dampening of the reverberated signal from 0 to 100%.
- **Tremolo**
  - **Speed** Adjusts the tremolo speed from 0.01 to 10 Hz.
    - **Sync** Engage this if you want to sync the tremolo speed to tempo.
    - **Beats** Selects a beat value for the synced tremolo speed.
  - **Depth** Adjusts the tremolo depth from 0 to 100%.
- **Tube Dreamer**
  This is one of the PreSonus State-Space Modeling effects.
  - **Drive** Turn to the right to increase the Drive amount.
  - **Tone** Turn to the left to attenuate high frequencies. The tone control is post-Drive.
  - **Level** Controls the final output stage.
- **Tube Driver**
  - **Amount** Adjusts the amount of drive from 0 to 11.

- **Wah-Wah**
  - **Type Selection Box** Selects the type of wah-wah desired.
  - **Amount** Adjusts the amount of the wah-wah effect from 0 to 100%, equivalent to rocking a traditional wah-wah pedal forward and backward.

Bitcrusher

Perfect for audio abuse, Bitcrusher combines overdrive, bit-depth reduction, downsampling and clipping into a single plug-in. Bit depth reduction and downsampling are both digital resolution-reduction techniques, but each has its own sonic effect. When used in combination, they create a wide variety of tonal options.

The following parameters are available in Bitcrusher:

Wreck

- **Bit Depth** Lets you specify the level of Bit Depth reduction to apply, from 24-bit to 1-bit.
  - **Dirt** Enable this to introduce a high-frequency instability in the Bit Depth reduction effect. Good for creating aggressive sounds.
- **Downsample** Lets you specify the level of downsampling to apply.
  - **Zero** Enable this to emphasize the high-frequency ringing effects added by the downsampling process. When disabled, a smoothing interpolation process is applied to the signal, lessening audible artifacts.

Color

- **Overdrive** Lets you apply a warm distortion effect, ranging from clean to fuzzy.
- **Clip** Lets you set the threshold for the signal clipping effect. At 0 the signal is unaffected, and at settings below 0 the signal is clipped in your choice of the following ways:
  - **Digital** Standard digital clipping. Squarely clips the peaks of the waveform at the chosen threshold.
  - **Overflow** Inverts and offsets peaks at a faster interval.
  - **Fold** Introduces harmonics by inverting waveform peaks at the chosen threshold (and at zero).

Display The central waveform display shows a rough representation of the wave-shaping effects currently being applied.

- **Sine** Click this to switch to a real-time view of the Bitcrusher audio output.

Global

- **Gain** Adjusts Bitcrusher output gain. Variable from -24 dB to +24 dB.
  - **Auto** Enable this to set Gain automatically, to match the gain changes created by other Bitcrusher processors.
- **Mix** Lets you blend between the dry (0%) and effected (100%) signals.

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, this is the tube working-point adjustment (bias). Variable from 0 to 10.00.
- **Low Freq** Filters frequencies below this value from the distorted signal. Variable from 20 Hz to 5 kHz, depending on the High Freq setting.
- **High Freq** Filters frequencies above this value from the distorted signal. 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.
- **Out** Adjust the output gain of Red Light Distortion. Variable from -12 dB to 24 dB.
- **Stages** Number of overdrive stages used serially in the signal path (including filters). Select from 1, 2, or 3 with the horizontal fader.
- **Type** 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.
- **Mix** Lets you set a mix between the wet (effected) and dry (unaffected) signals running through the plug-in, allowing for parallel processing effects.

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 sections contain fundamental details on the shaping of audio dynamics, as well as the functions of Studio One's dynamics processors.

Compressor

The Compressor is a full-featured, RMS-based mono/stereo compression processor with internal and external sidechains. Use this effect to reduce the dynamic range (signal peaks) of any signal.

The following parameters are available in the Compressor:

- **Threshold** Adjusts the lower limit for compression. Variable from -48 dB to 0 dB.
- **Ratio** Adjusts compression range. Variable from 1:1 (no compression) to 20:1.
- **Knee** Adjusts the soft-knee width. (Width refers to the distance from the threshold to the end of the 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 sums 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. The highest peak is held until surpassed by another peak or until parameters are adjusted or clicked on.
  - **Compression Curve** Click the handles in the display to control the curve settings.
    - **Ratio** Click the top right handle to adjust the Ratio when Auto-Gain is not engaged.
    - **Threshold** Click the middle handle to adjust the Threshold when Auto-Gain is not engaged.
    - **Knee** Use the mouse wheel while floating the cursor over the middle handle to adjust the Knee when Auto-Gain is not engaged. If you don't have a mouse wheel, use the Knee knob.
    - **Gain** Click the bottom left handle to adjust the Makeup gain when Auto-Gain is not engaged.
    - **Auto-Gain Engaged** Click on the middle handle to adjust the Threshold and Ratio parameters. The X axis controls the Ratio, and the Y axis controls the Threshold. Hover over the handle to control the Knee, as described above.
  - **Output Level** Displays output level + RMS.
- **Envelope**
  - **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.
  - **Auto** Engage Auto to automatically set varying attack and release settings based on signal content.
  - **Adaptive** Engage to automatically vary attack and release times in order to avoid pumping. This results in less-aggressive but smoother compression.
- **Gain** Attenuates or amplifies the compressor input. Variable from -12 dB to 24 dB.
  - **Input Gain** The name of the Gain control when the Compressor is in Int. Sidechain mode.
  - **Side Gain** The name of the Gain control when the Compressor is in Ext. Sidechain mode.
  - **Makeup** When Auto is not engaged, this allows you to control the output gain manually. It is variable from 0 dB to 48 dB.

- **Auto** Engage to automatically fix the 0 dB input level to the 0 dB output level (guarantees that a 0 dB input level results in a 0 dB output level). This button cannot be activated when in Ext. Sidechain mode or when the Filter is engaged.

- **Sidechain (internal)**
  - **Filter** Click to activate internal sidechain filtering (for frequency-dependent gating). Uses 48 dB/octave filters.
  - **Listen** 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.
  - **Low Cut/High Cut** Frequency selection for internal sidechain filters. Low Cut variable from Off to 20 Hz to 16 kHz; High Cut variable from 20 Hz to 16 kHz to Off.
  - **Swap** Click to swap the frequencies used for Low Cut and High Cut.
- **Sidechain (external)** Engage by clicking the [Sidechain] button at the top of the effect window to allow other sources to control the Compressor. When engaged, you can use the Filter, Listen, Low/High Cut, and Swap controls as described above in the Sidechain (internal) section.
  - **Sources** Click to display a list of external sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.
  - **Ducking** Engage this button at the bottom of the effect window to invert the external sidechain source signal.
- **Mix** This parameter lets you set a mix between the wet (effected) and dry (unaffected) signals running through the plug-in, allowing for parallel processing effects.

Expander

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** Adjusts the maximum amplitude at which processing occurs. Variable from -60 dB to 0 dB.
- **Ratio** Adjust the ratio of the Expander. Variable from 1:1 to 1:20.
- **Display**
  - **Reduction Meter** Displays the maximum reduction amount (-72 dB to +0 dB).
  - **Expansion Curve** Click the handles in the display to control the curve settings.
    - **Threshold** Drag the top handle to adjust the Threshold when Auto-Gain is not engaged.
    - **Ratio/Range** Drag the bottom handle to adjust the Ratio and Range simultaneously.
- **Look Ahead** Click to engage/disengage 2 ms Look Ahead function.
- **Reduction Range** Adjust the maximum amount of attenuation applied to the signal. Variable from -72 dB to 0 dB.
- **Envelope**
  - **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 2 s.

- **Sidechain (internal)**
  - **Filter** Click to activate internal sidechain filtering (for frequency-dependent gating). Uses 48 dB/octave filters.
  - **Listen** Click to listen to the filtered control signal of the internal sidechain. This helps find a specific target frequency for the control signal when de-essing, transient damping, etc.
  - **Low Cut/High Cut** Frequency selection for internal sidechain filters. Low Cut variable from Off to 20 Hz to 16 kHz; High Cut variable from 20 Hz to 16 kHz to Off.
  - **Swap** Click to swap the frequencies used for Low Cut and High Cut.
- **Sidechain (external)** Engage by clicking the [Sidechain] button at the top of the effect window to allow other sources to control the Expander. When engaged, you can use the Filter, Listen, Low/High Cut, and Swap controls as described above in the Sidechain (internal) section.
  - **Sources** Click to display a list of external sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.
  - **Ducking** Engage this button at the bottom of the effect window to invert the external sidechain source signal.

Gate

Gate is a noise-gate processor with range control. It features a large display with grid lines to indicate the Threshold setting relative to 0 dB.

It also has 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 the sidechain.

The following parameters are available for the Gate:

- **Threshold** Adjusts the signal level threshold at which the Gate switches between closed and open. You can also click and drag the dot in the Gate display to adjust the Threshold value. Variable from -60 dB to 0 dB.
- **Reduction Range** Adjusts the maximum amount of reduction. Variable from -72 dB to 0 dB.
- **Display**
  - **Reduction Meter** Displays the amount of reduction, from -72 dB to 0 dB.
  - **Gate Curve** Click and drag the handle in the display to adjust the **Threshold**.
- **Look Ahead** Click to engage/disengage the 2 ms Look Ahead function.
- **Envelope**
  - **Attack** Adjusts the amount of time it takes for the gate to open and let signal through. Variable from 0.05 ms to 500 ms.
  - **Hold** Adjusts the amount of time the gate is held open once the signal has dropped below the Threshold setting. Variable from 1 ms to 1 s.
  - **Release** Adjusts the amount of time it takes for the gate to close after the Hold period. Variable from 50 ms to 2 s.

- **Trigger**
  - **Send Trigger Notes** Click to engage sending a trigger when the gate opens. Select the gate as an input on any Instrument Track.
  - **Note** Click the field and enter a note name, or click-drag the field to adjust the MIDI note to send.
  - **Velo** Click the field and enter a number, or click-drag the field to adjust the MIDI velocity value to send.
- **Sidechain (internal)**
  - **Filter** Click to activate internal sidechain filtering (for frequency-dependent gating). Uses 48 dB/octave filters.
  - **Listen** 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.
  - **Low Cut/High Cut** Frequency selection for internal sidechain filters. Low Cut variable from Off to 20 Hz to 16 kHz; High Cut variable from 20 Hz to 16 kHz to Off.
  - **Swap** Click to swap the frequencies used for Low Cut and High Cut.
- **Sidechain (external)** Engage by clicking the [Sidechain] button at the top of the effect window to allow other sources to control the gate. When engaged, you can use the Filter, Listen, Low/High Cut, and Swap controls as described above in the Sidechain section.
  - **Sources** Click to display a list of external sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.
  - **Ducking** Engage this button at the bottom of the effect window to invert the external sidechain source signal.

Limiter²

Limiter² 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 Limiter²:

- **Input**
  - **Gain** Adjusts the input level into the limiter. Variable from 0 dB to 18 dB.
  - **Ceiling** Adjusts the maximum output of the limiter. Variable from -12 dB to 0 dB.
  - **Threshold** is relative to Ceiling. Variable from Ceiling value to 12 dB below Ceiling value. Automatic make-up gain is applied as the Threshold is lowered.
  - **Mode** Toggles between Modes A and B. With Mode A the limiter is always clean with no distortion. However, in Mode A the limiter response is a bit slower. With Mode B the limiter reacts more quickly to the signal, but depending on the settings a small amount of distortion may occur.
- **Envelope**
  - **Attack** Select Fast, Normal, or Slow attack for the limiter.
  - **Release** Adjust the amount of time it takes for the limiter to stop processing once the input level falls below the Ceiling setting. Variable from 1 ms to 3 s.

- **Metering**
  - **Peak/RMS** Click to engage Peak/RMS metering.
  - **K-14, K-20, K-12** Click one of these to select a K-System metering option.
  - **Reduction** Displays the amount of signal reduction, from -36 dB to 0 dB.
- **True Peak** Often the sample that represents the "peak" of a waveform is not truly at the peak, but rather just near it. This can create inter-sample peaks, in which the true outputted amplitude can surge past the limiter threshold. Enable True Peak to detect and protect from these inter-sample peaks.
- **Soft Clip** Reduces square wave clipping characteristics when the limiter is clipped. Click to engage Soft Clip.
- **Sidechain** Engage by clicking the [Sidechain] button at the top of the effect window to allow other sources to control the limiter.
- **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.

Pro EQ²

Pro EQ² is an eight-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 EQ² on any mono or stereo Track to accurately apply highly musical equalization to any signal.

The following parameters are available for Pro EQ²:

- **Input Meter** Peak/RMS meter shows the unmodified input signal level. The RMS level is represented by a white horizontal line.
- **Display** Click-and-drag 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, adjust the desired Q knob or type in a value below the knob.) Note that LLC frequency must be selected with the buttons.
- **Band Controls** Click to show/hide the bottom half of the Pro EQ² window. This is where all controls, buttons, and options for each EQ band are located.
- **Level Range** Click this field to select one of three level range options for the Pro EQ² display: 6 dB, 12 dB, or 24 dB. This affects the vertical scale within the display only; it does not affect the audio output.
- **Show Curves** Click to display all EQ curves or only their combined curve, which is white. When the individual curves are hidden you can hover over a band-handle to view its curve, and as any band is adjusted its curve is displayed temporarily.
- **Spectrum Display Type** Click this field to select one of four output-spectrum metering modes: Third Octave, 12th Octave, FFT Curve, or Waterfall. Select None to deactivate spectrum metering.

- The bands in the 12th Octave meter correspond to the 12 notes in each octave on a piano keyboard. A keyboard graphic below the spectrum display helps identify the pitch or note value of a given signal.
- A second signal can be routed into the spectrum display using the included Sidechain input, for comparison.
- The Spectrum display is fixed at 20 Hz to 20 kHz and -24 dB to 24 dB.

- **Sidechain Spectrum Peak Hold** The snowflake button is only available for the Sidechain input when the FFT Curve is selected. When engaged, the highest peaks of the sidechain input spectrum are held indefinitely. To clear or release the peak curve, click the snowflake button again.
- **High Quality** Click to engage High Quality mode, allowing more accurate equalization. This is achieved using 2x oversampling and requires more computer processing power. Note that when High Quality is enabled, due to oversampling, the signal is slightly altered, even when all controls are set to neutral settings.
- **Sidechain** Toggle on to use the spectrum analyzer in Pro EQ² to display the characteristics of another Channel (routed in using a send to ProEQ's **Sidechain** input). This can come in handy for comparing the frequency makeup of two channels you're trying to match or balance against one another.
  - **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.
- **Bands** Click Activate button to engage/disengage each band.
  - **LLC** Phase-linear Low-cut filter.
    - **80 Hz, 50 Hz, 20 Hz** Select frequency at which filter cut begins.
    - **Soft** When engaged, this band has a 12 dB per octave slope. When disengaged, the slope is 24 dB per octave. This affects the shape of the filter curve.

    Note: High-quality phase-linear filters like the LLC band are CPU-intensive and should be used with caution. If CPU load is an issue, try using a conventional low cut filter instead. Another option is to render the insert FX using Track Transform, which preserves the FX settings in case changes are needed later. Find this at *Track/Transform*, or [Right]/[Ctrl]-click the Track in the Track List and select Transform to Rendered Audio.
  - **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. This affects the shape of the filter curve.
  - **LF, HF** Selectable low-frequency and high-frequency, shelf or peaking filters.
    - **Q** Adjust the Q of the frequency band. Q = the ratio of center frequency to 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, with 6, 12, or 24 dB per octave slope.
  - **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 the band center frequency.
- **Auto** Click to engage Auto-Gain, which adjusts Pro EQ² output level to match the original input-signal power (guarantees a 0 dB input signal equals a 0 dB output signal).
- **Output Meter** Peak/RMS meter; RMS level is represented by a white horizontal line.

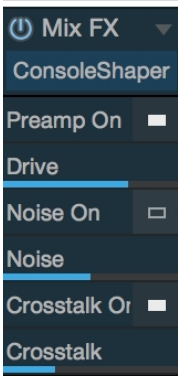
Delete this text and replace it with your own content.

Mix Engine FX (Studio One Professional Only)

Console Shaper

Console Shaper is a **Mix Engine FX** plug-in that offers quick, easy-to-manage console emulation. Quality analog mixing consoles are revered for their depth and richness of tone, forgiving gain staging, and for a number of charming technical "flaws" that are unseen in digital mixers. These issues, such as circuitry self-noise and crosstalk (a low-level bleeding of signals between a console's channels and busses) were once the bane of console designers. Ironically, they are now thought to contribute to the euphonic nature of analog summing.

Console Shaper is uniquely qualified to provide these sought-after analog attributes for your own mixing within Studio One. This is due in part to the special processing functions of the Mix Engine FX system, which enable inter-channel crosstalk, just like a physical console.



Insert Console Shaper into the special Mix FX slot on your Master Bus, or on any Bus you wish to process separately (such as a drum bus). All Channels flowing to that Bus are processed individually at their source, and tone shaping parameters for all affected tracks are set simultaneously with the controls on the central Console Shaper plug-in window or Console controls.

Channel Volume Controls

When a Channel sits in a Bus affected by Console Shaper, the Channel's volume fader does double-duty as both a standard volume control and input gain control to the processes in Console Shaper. This means that you can safely crank the volume of affected channels, and analog-style soft saturation will result, rather than undesirable digital "overs." This further works to lend the forgiving feel of an analog console to your digital mixing experience.

The following parameters are available in Console Shaper:

- **Drive** Lets you dial in the right amount of analog-style saturation for your mix. Lower settings bring just a hair of pleasing drive, while higher settings can get into crunchier territory.
- **Noise** Lets you add analog-style noise to the channels affected by this instance of Console Shaper. This type of per-channel noise can have a "gluing" affect on your mix, and add a sense of depth to some sources. Lower settings add just a bit of noise to each channel, while higher settings can add a more significant amount.

- **Crosstalk** Lets you add a specified amount of inter-channel crosstalk to the channels affected by this instance of Console Shaper. Lower settings let smaller amounts of crosstalk occur, and higher settings give you more. Note that as you add crosstalk, overall signal level rises.

All Console Shaper parameters offer on-off switches, for easy toggling of a given feature.

Mastering

Multiband Dynamics

Multiband Dynamics is a compressor/expander with five completely independent compression/expansion bands, optional simultaneous adjustment over all bands, and multiband 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.
  - **Mix** This control lets you set the mix between effected and non-effected (dry) signals, allowing for parallel processing.

Dynamic changes occur only between Low/High Threshold and Low/High Gain. If the signal is above or below these settings, only linear gain is 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 moves other bands when the bandwidth is below one octave. Editing using automation is limited to a one octave bandwidth. Moving the crossover to limit frequencies disables bands.

- **Metering**
  - **Range Low** This is the 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** This is the 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 changes 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 ratio. 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 is slightly slower than the shown length.

- **Sidechain** Engage by clicking the [Sidechain] button at the top of the effect window to allow specific sources to control the Multiband Dynamics processor.
- **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.

Tricomp™

Tricomp is a three-band compressor. 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 Gain** Set overall Input Gain to the compressor
- **Mix** Adjust the mix between dry (unaffected) and wet (effected) signals, for parallel compression effects.
- **Low** Adjusts the relative amount of compression to be applied to the Low compression band. Variable from -5 to 5 depending on the Compress setting.
- **High** Adjusts 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.

- **Low Freq** Adjusts the upper corner frequency of the Low compression band. Variable from 80 Hz to 480 Hz.
- **High Freq** Adjusts the lower corner frequency of the High compression band. Variable from 800 Hz to 12 kHz.
- **Input Meter** Displays Tricomp's input level.
- **Reduction Meter** Displays the amount of signal reduction.
- **Compression Amount** The relative amount of compression to be applied to all three compression bands. Variable from 0 to 10.
- **Output Meter** Displays Tricomp's output level.
- **Knee** Adjusts the distance/curve of the compressor knee. Variable from 0 dB (hard knee) to 6 dB (soft knee).
- **Gain** Set overall output Gain. Variable from -18 dB to +18 dB.
- **Attack** When Auto is not engaged, these buttons select the compressor attack time. Fast Attack is 0.1 ms; Slow Attack is 10 ms.
- **Release** When Auto is not engaged, this adjusts the compressor release time. Release is variable from 1 ms to 300 ms.
- **Auto** Click to engage adaptive settings for the compressor attack and release times, based on signal content.
- **Saturation** Saturation recreates the saturation sound of famous leveling amplifiers using State Space Modeling. Variable from 0 to 100%.
- **Sidechain** Engage by clicking the [Sidechain] button at the top of the effect window to allow specific sources to control the Tricomp processor.
- **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.

Mixing

Many tools can help to achieve proper balance and create space for the various parts of your mix. The following effects can help you craft your mix with precision and excellent sound quality.

Binaural Pan

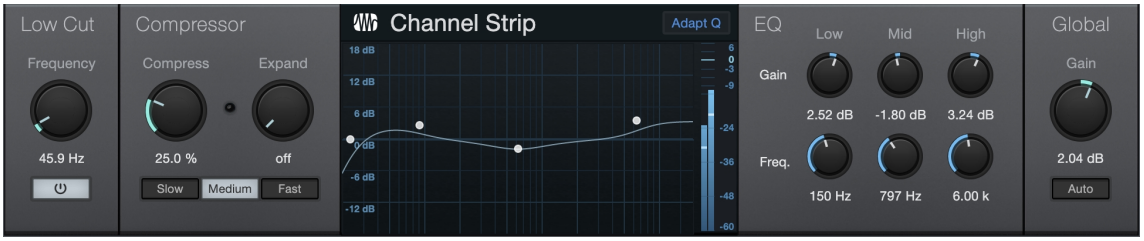
The Binaural Pan is a panning effect that employs mid/side processing to manipulate the perceived width of stereo signals, from mono to double the normal width. Use the Binaural Pan on any stereo Track to tightly control its stereo width and pan, as well as to check for mono compatibility using the Mono switch.

The following parameters are available for the Binaural Pan:

- **Pan** Adjusts the balance in the left and right channels for the stereo Track. Variable from 100% L to 100% R.
- **Mono** Switch to mono playback of the stereo Track.
- **Width** Adjusts the stereo width of the stereo Track. Variable from 0 (mono) to 200% (double stereo width).

The Binaural Pan can only be used on stereo Tracks. If loaded onto a mono Track, the plug-in display shows "MONO CHANNEL."

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:

Low Cut

- **Low Cut Active** Click on the Low Cut Active button to engage/disengage the Low Cut filter.
- **Frequency** Adjusts the Low Cut Frequency to change the filter cutoff frequency. Variable from 40 Hz to 400 Hz.

Compressor

- **Compress** Adjusts the compression amount. Variable from Off to 100%. Simultaneously adjusts threshold (0 dB to -20 dB) and ratio (2:1 to 10:1).
- **Expand** Adjusts the 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 a red “LED"-like indicator.
- **Slow, Medium, Fast** Adjusts the RMS averaging speed. Slower speeds may reduce artifacts with some audio material. The default is Medium, and Studio One version 1 presets open set to Fast.

Display Displays low-cut filter and parametric EQ settings. Click on handles to adjust gain (up/down) and frequency (left/right).

- **Adapt Q** Enable to change band Q depending on the level of boost or cut applied.

EQ

- **Low, Mid, High** Adjusts gain and frequency for each band of the parametric EQ. Each band has fixed Q.

Global

- **Gain** Adjusts the output gain of the Channel Strip. Variable from -12 dB to 12 dB.
- **Auto** Click to engage automatic output-gain setting. This guarantees that a 0 dB input signal equals a 0 dB output signal.

Dual Pan

Dual Pan is a fully variable stereo panner with input balance control, selectable pan law, and independent left/right panning. The following parameters are available for Dual Pan:

- **Input Balance** Adjusts the balance of the stereo input signal from full left to full right.
- **Pan Law** Select a pan law, choose from -6 dB Linear, -3 dB Constant Power Sin/Cos, -3 dB Constant Power Sqrt, 0 dB Balance Sin/Cos, and 0 dB Linear.
- **Pan**
  - **Left** Adjusts the pan of the left input signal from full left to full right.
  - **Right** Adjusts the pan of the right input signal from full left to full right.
  - **Link** Link the Left and Right panning.

Fat Channel XT

Fat Channel is a complete virtual version of the channel strip found on the PreSonus StudioLive III line of mixers, which allows you to use all Fat Channel XT presets in both Studio One and on StudioLive III. With gate/expander, compressor, parametric EQ and limiter functions, Fat Channel combines many essential processing functions into one easy-to-use tool. Along with its "clean" modern dynamics and EQ processors, Fat Channel XT gives you a selection of high-quality emulations of vintage compressors and EQs to suit your needs..

Fat Channel XT Preset Interchange

To send a Studio One Fat Channel XT preset to StudioLive III or AI, click Export Channel Preset in the Preset Options menu of the Fat Channel XT plug-in header. This saves the current preset to the Universal Control user preset folder, for use by a connected StudioLive III or AI mixer.

Newly added presets from a connected StudioLive III mixer are automatically added to the Studio One Fat Channel XT presets list each time Studio One is launched.

StudioLive AI mixers do not have the ability to use the non-standard EQ and compressor models in Fat Channel XT. If you wish to send a Fat Channel XT preset to your StudioLive AI mixer, be sure to use the standard processor models only.

Fat Channel XT Controls

Fat Channel XT features the following controls:

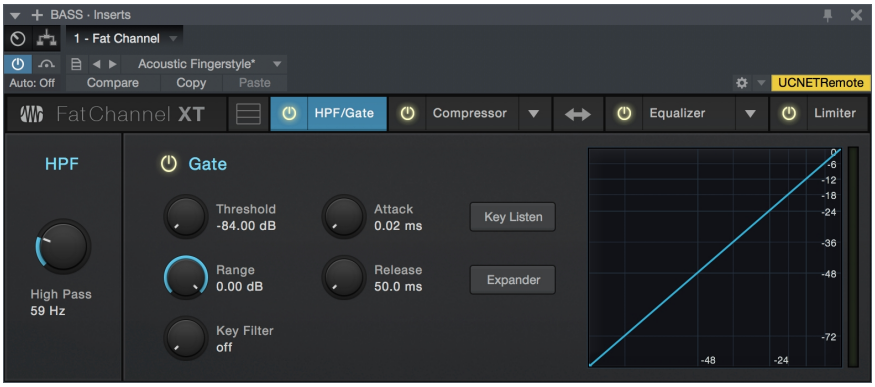
Header

- **Stacked Mode** Click this option to toggle the display state of Fat Channel XT. When disabled, only the currently selected processor (such as Gate or Compressor) is displayed. When enabled, all four processors are displayed at once, in a stacked arrangement.
- **Processor Select Buttons (HPF/Gate, Compressor, Equalizer, Limiter)** When Fat Channel XT is not in Stacked Mode, click these buttons to display the processor block of your choice.
  - **Processor Enable/Disable** Click the round button next to the processor name of your choice to toggle the on/off state for that block of processing. Each processor also has its own enable/disable switch within the module interface.
- **Compressor and Equalizer Model Selectors** Click the menu next to the name of the Compressor or Equalizer processors to open a Gallery view, from which you can choose the desired Compressor or EQ model. Hover the cursor over each image to view a brief description, then click to select the one you want.

- **Compressor** offers the following choices:
  - **Standard** A flexible, modern compressor, with a clean, hi-fi sound.
  - **Tube** A model of one of the best-loved vintage tube-based opto-compressors. Excels at vocal smoothing and at making bass instruments sound larger-than-life.
  - **FET** A model of one of the most-used vintage FET-based compressors. Great for adding an aggressive edge and accentuating room sound for drums, guitars, and other highly transient signals.
- **Equalizer** offers the following choices:
  - **Standard** A flexible, full-featured modern EQ, with a clean, hi-fi sound.
  - **Passive** A model of the "rolls-royce" of vintage tube-based passive EQs. Deceptively simple controls and a rich, thick sound make it perfect for gentle tone shaping or adding vintage character.
  - **Vintage** A model of what some call the "final word" in vintage solid-state EQs. Combines an "everything sounds better through it" quality with musically-chosen EQ frequencies for quick, reliable tonal magic.

- **Swap Comp/EQ Order** Click this button to swap the places of the Compressor and Equalizer processors in the signal chain.
- **Sidechain** Engage by clicking the [Sidechain] button at the top of the effect window to allow other sources to control the limiter.
- **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.

High-Pass Filter (HPF)

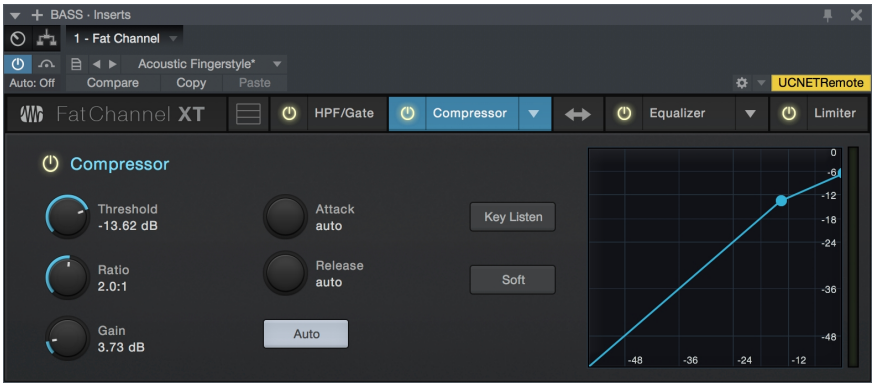


- **Enable/Disable** Click the "HPF" legend to enable or disable the high-pass filter module.
- **High Pass**Sets the frequency of the high-pass filter. Turn all the way left to disengage the filter.

Gate

- **Enable/Disable** Click the "Gate" legend to enable or disable the Gate module.
- **Threshold** This knob sets the level at which the gate opens. Essentially, all signals above the threshold setting are passed through unaffected, whereas signals below the threshold setting are reduced in level by the amount set by the range control. If the threshold is set all the way to the left, the gate is turned off (always open), allowing all signals to pass through unaffected. You can set the threshold from 0 to -84 dB.
- **Range** This adjusts the amount of gain reduction the gate produces. The range can be set from 0 to -84 dB. The Range control is not available when using the expander.
- **Key Filter** This knob adjusts the frequency at which the gate opens. Setting a specific frequency, in addition to a specific decibel level, provides more sonic shaping. The key filter can be triggered by the selected channel or bus's signal or by sidechaining a channel and using its signal as the source.
- **Attack (Att)** This adjusts the rate at which the gate opens on the selected channel or output. You can set the attack time from 0.02 to 500 ms.
- **Release (Rel)** Adjusts and displays the rate at which the gate closes on the selected channel. The release time can be set from 0.05 to 2 seconds.
- **Key Listen** This button engages and disengages the Key Listen function, which lets you hear how the gate Key Filter is set.
- **Expander** Switch the gate into expander mode.
- **Interactive Graph** This graph provides a visual representation of the settings and current activity of the gate. You can also adjust the setting by moving the blue dots to adjust Threshold and Range.

Compressor Module - Standard Mode



- **Enable/Disable** Click the "Compressor" legend to enable or disable the Compressor module.
- **Threshold** This knob adjusts the compressor threshold for the selected channel. The compressor engages as soon as the signal level (amplitude) exceeds the threshold value. Moving this control to the left lowers the threshold so that compression begins at a lower amplitude value. The threshold can be set from -56 to 0 dB.
- **Ratio** This knob adjusts the compression ratio (or slope). The ratio is a function of the output level versus the input level. For example, if you have the ratio set at 2:1, any signal levels above the threshold setting are compressed at a ratio of 2:1. This means that for every 2 dB of level increase above the threshold, the compressor's output only increases by 1 dB. The ratio can be set from 1:1 to 18:1 or "limit" which is the equivalent of infinity:1.
- **Gain** This sets and displays the makeup gain of the compressor for the selected channel. Compressing a signal usually results in an overall reduction in level (gain reduction), and the Makeup Gain control lets you increase the volume to make up for this gain loss, if desired. You can adjust the Makeup Gain from 0 dB (no gain adjustment) to +28 dB.
- **Attack** This adjusts the speed at which the compressor acts on the input signal. A slow attack time (moving the slider to the right) allows the beginning component of a signal (commonly referred to as the initial transient) to pass through, uncompressed, whereas a fast attack time (fully to the left) triggers compression immediately when a signal exceeds the threshold. You can set the attack from 0.2 to 150 milliseconds.
- **Release** This determines the length of time the compressor takes to return the gain reduction back to zero (no gain reduction) after crossing below the compression threshold. Release can be set from 2.5 to 900 milliseconds.
- **Key Listen** This button engages and disengages the Key Listen function, which lets you listen to the signal that is being fed to the compressor's detector.
- **Auto** This enables Automatic Attack and Release mode. When Auto mode is active, the Attack and Release controls become inoperative, and a pre-programmed attack and release curve is used that sets the attack to 10 ms and the release to 150 ms. Meanwhile, all other compressor parameters can still be adjusted manually.
- **Soft** This engages soft-knee compression. In normal operating mode, the compressor is set for hard-knee compression, meaning the gain reduction applied to the signal occurs as soon as the input signal level exceeds the threshold value. When the Soft Knee button is engaged, the ratio increases gradually as the signal reaches the threshold.
- **Interactive Graph** This graph provides a visual representation of the settings and current activity of the compressor. You can also adjust the setting by moving the blue dot to change the Threshold and Ratio values.

Compressor Module - Tube Mode

- **Enable/Disable** Click the power switch to enable or disable the Tube Compressor module.
- **Comp/Limit** Toggles the Tube Compressor between its compressor and limiter modes. When in compressor mode, it acts with a variable ratio of 1:1-10:1. When in limiter mode, it acts with a variable ratio of 10:1-20:1, more aggressively limiting peaks.
- **Gain** Sets input gain to the compressor. Because this type of compressor operates in a different way than a standard compressor, much of the way that it affects signals is based on the input level. Try different settings to see what suits your needs.
- **Peak Reduction** Sets the amount of peak reduction to apply to the signal. Higher settings result in more gain reduction and more pronounced compression effect.
- **Key Filter** Sets the frequency of a high-pass filter that sits in the compressor sidechain. The higher the setting, the more frequencies are excluded from reaching the compressor's detector, with a variety of useful dynamic results. Ranges from "Off" to 16 kHz.
- **Key Listen** This button engages and disengages the Key Listen function, which lets you listen to the signal that is being fed to the compressor's detector, after it has passed through the Key Filter.
- **VU Meter (Gain Reduction)** This vintage-style VU meter shows a smoothed representation of gain reduction applied by the compressor over time.

Compressor Module - FET Mode

- **Enable/Disable** Click the power switch to enable or disable the FET Compressor module.
- **Input** Sets input gain to the compressor. This setting affects the action of the compressor, so feel free to try various settings to find the optimal effect for your needs.
- **Output** Sets the amount of "makeup gain" to apply to a signal. Once a signal is compressed, its overall level is often reduced. This gain control lets you bring it back up to the proper level after compression occurs.
- **Attack** This adjusts the speed at which the compressor acts on the input signal. A slow attack time (moving the slider to the right) allows the beginning component of a signal (commonly referred to as the initial transient) to pass through, uncompressed, whereas a fast attack time (fully to the left) triggers compression immediately when a signal exceeds the threshold. Attack ranges between 0.8 to 0.02 milliseconds.
- **Release** This determines the length of time the compressor takes to return the gain reduction back to zero (no gain reduction) after crossing below the compression threshold. Release ranges between 1.1 second to 50milliseconds.
- **Ratio Selector Buttons** These buttons let you choose a compression ratio: 4:1, 8:1, 12:1, 20:1, or "All."The ratio is a function of the output level versus the input level. For example, if you have the ratio set at 4:1, any signal levels above the threshold setting are compressed at a ratio of 4:1. This means that for every 4 dB of level increase above the threshold, the compressor's output only increases by 1 dB. The "All" setting recreates the "all buttons pushed in" setting that helped make this compressor type a legend, providing massive punch and crunch when driven hard.
- **Key Filter** Sets the frequency of a high-pass filter that sits in the compressor sidechain. The higher the setting, the more frequencies are excluded from reaching the compressor's detector, with a variety of useful dynamic results. Ranges from "Off" to 16 kHz.
- **Key Listen** This button engages and disengages the Key Listen function, which lets you listen to the signal that is being fed to the compressor's detector, after it has passed through the Key Filter.
- **VU Meter (Gain Reduction)** This vintage-style VU meter shows a smoothed representation of gain reduction applied by the compressor over time.

Equalizer Module - Standard Mode

- **Enable/Disable** Click this button to enable or disable the Equalizer module.
- **Low Shelf (LS) & High Shelf (HS) Buttons** These buttons turns Shelving mode on or off for the High and Low bands. When the Shelf button is engaged, the associated High or Low frequency section is switched from parametric EQ to shelving EQ.
- **Band Enable/Disable Buttons** These buttons select which EQ band is being controlled by the Frequency, Gain, and Q controls.
- **Freq** This knob selects the center frequency of the corresponding band. You can adjust the center frequency in the following ranges for each band: Low Band: 36 to 465 Hz Low-Mids: 90 Hz to 1.2 kHz Hi-Mids: 380 Hz to 5 kHz Highs: 1.4 to 18 kHz
- **Gain** This knob boosts and attenuates the selected frequency with a range of -15 to +15 dB.
- **Q** This adjusts the Q value for the corresponding frequency band. The Q is the ratio of the center frequency to the bandwidth. When the center frequency is constant, the bandwidth is inversely proportional to the Q, so as you raise the Q, you narrow the bandwidth. Hence, the smaller the number, the wider the curve.
- **Interactive Graph** This graph provides a visual representation of the current settings. You can change the settings by moving the blue dots to adjust the frequency and gain at the same time. The first time you touch a dot, the associated band automatically turns on. Tapping or clicking a dot turns the band on and off.

Equalizer Module - Passive Mode

- **Enable/Disable** Click this On/Off switch to enable or disable the Passive Equalizer module.
- **(Low) Boost** Sets the level of boost applied around the chosen low frequency. This control interacts nicely with the Low Attenuation control, allowing for boosts in apparent bass energy while keeping overall bass energy within optimal limits.
- **(Low) Attenuation** Sets the level of attenuation applied around the chosen low frequency. This control interacts nicely with the Low Boost control, allowing for boosts in apparent bass energy while keeping overall bass energy within optimal limits.
- **Low Frequency** Sets the center frequency of the band covered by the Low Boost and Low Attenuation controls.
- **(Hi-Mid) Boost** Sets the level of boost applied around the chosen high-mid frequency.
- **(Hi-Mid) Bandwidth** Sets the Q (or width) of the effect of the high-mid EQ band.
- **(Hi-Mid) Frequency** Sets the center frequency of the high-mid EQ band.
- **(High) Attenuation** Sets the amount of attenuation applied in a shelving fashion to frequencies at and above the chosen high frequency.
- **(High) Attenuation Selector** Sets the frequency at and above which the High Attenuation control attenuates treble content.

Equalizer Module - Vintage Mode

- **Enable/Disable** Click the power button to enable or disable the Vintage Equalizer module.
- **Low Frequency** Sets the corner frequency of the low-frequency shelving band of this EQ. Choose from 35, 60, 110, or 220 Hz.
- **Low Gain (LF)** Sets the amount of boost or cut to apply the to low-frequency band of this EQ. Range of plus or minus 16 dB.
- **Low-Mid Frequency** Sets the center frequency of the low-mid-frequency band of this EQ. Choose from 360 Hz, 700 Hz, or 1.6 kHz.
- **Low-Mid Gain (LMF)** Sets the amount of boost or cut to apply to the low-mid-frequency band of this EQ. Range of plus or minus 16 dB.
- **High-Mid Frequency** Sets the center frequency of the low-mid-frequency band of this EQ. Choose from 3.2, 4.8, or 7.1 kHz.
- **High-Mid Gain (HMF)** Sets the amount of boost or cut to apply to the high-mid-frequency band of this EQ. Range of plus or minus 16 dB.
- **High Gain (HF)** Sets the amount of boost or cut to apply the high-frequency shelving band of this EQ. Range of plus or minus 16 dB.

Limiter Module

- **Enable/Disable** Click the "Limiter" legend to enable or disable the Limiter module.
- **Threshold** Sets and displays the threshold of the limiter on the selected channel. The limiter engages as soon as the signal level (amplitude) exceeds the threshold value. Moving this control to the left lowers the threshold so that limiting begins at a lower amplitude value. The threshold can be set from -28 to 0 dB.

Modulation

Modulation processors are great tools for creating interesting and innovative sounds. Studio One features the following modulation processors:

Autofilter

Autofilter features two resonant filters with six selectable filter models. The filter cutoff frequency and resonance can be modulated by an LFO using standard waveforms, a 16-step sequencer, and an envelope. Use Autofilter to create filtered effects from basic filter sweeps to complex tempo-synced rhythmic filter patterns.

The following parameters are available for Autofilter:

- **Filter Type**
  - **Filter 1 and Filter 2** Select from 8 filter emulation types, including Ladder LP 12 dB, 18 dB, and 24 dB; Analog SVF 12 dB and 24 dB, Digital SVF 12 dB, Comb, and Zero Delay LP 24 dB (as found in the **Mai Tai** and **Presence XT** instruments). Note that Filter 2 also has a Bypass option.
    - **SVFs** State Variable Filters can blend between low-pass, bandpass, and high-pass. Click-drag the vertical Filter Mix fader on the right to blend the filter types.
  - **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).
- **Filter**
  - **Cutoff** Adjusts the cutoff frequency for both filters. Variable from 30 Hz to 16 kHz. Can be modulated by the envelope and LFO.
  - **Resonance** Adjusts the resonance of the filters. Variable from 0 to 100%.
  - **ENV/LFO** Adjust the modulation amounts for each filter using the Env and LFO vertical faders. Variable from -100% to 100%. Negative values are phase-inverted. The LFO modulates around the value.
- **Speed**
  - **LFO Speed** Can be synced to tempo or run free.
    - **Sync** Click to engage/disengage LFO tempo sync. When tempo is synced, the speed is variable from 4/1 to 1/64, with various triplet and dotted-time variants.
  - **ENV Follow** Adjusts the attack and release times of the volume envelope (Env), affecting cutoff and resonance.
    - **Auto** Click to engage/disengage automatic envelope-length selection.
- **LFO Steps Display** This area shows the amplitude for each step in the LFO. A vertical line sweeps through the display to indicate the current position in the selected waveform. The LFO runs freely when Sync is disengaged; with Sync engaged the line starts and stops with Song playback.
- **LFO Type** Five LFO types are available along the bottom of the display. Click the buttons to select one of the following types:
  - **16 Steps** Click in the LFO display to adjust each step. The steps divide the current Speed/Beats time value. The LFO is bipolar: the value of each step represents amplitude at that step from maximum negative to maximum positive, with the mid-point as the zero-crossing frequency (no modulation). Click-drag to draw unique shapes.
  - **Waveforms** Select triangle, sine, sawtooth, or square.
- **Color**
  - **Drive** Adjusts the filter's feedback overdrive, which features State Space Modeling. Variable from 0 to 100%.
  - **Cutoff 2 Shift** Adjusts the offset of Filter 2 Cutoff frequency. Variable from -2 octaves to 2 octaves.
- **Global**
  - **Gain** Adjusts Autofilter output gain. Variable from -24 dB to +24 dB.
  - **Auto** Click to engage Auto-Gain, to keep input and output signals at equivalent levels.

- **Mix** Adjusts the mix of the Autofilter-processed signal with the original dry input signal. Variable from 0 to 100%.

- **Sidechain** Click the Sidechain button at the top of the effect window to engage sidechain for envelope detection. This allows you to use another Track to control the envelope.
  - **Sources** Click to display a list of potential sidechain channel sources. A checked box indicates the current source. Multiple selections can be made.

Chorus

The Chorus is a 1-3-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:

- **Delay** Adjusts the delay of the Chorus voices. The value you set is the delay time between voices.
- **LFO Shape** Choose between the four waveforms for the LFO: Triangle, Sine, Sawtooth, or Square.
- **Voices** Adjusts the number of added voices in the Chorus; select from 1, 2, or 3.
- **LFO** The LFO modulates the Spacing parameter.
- **Depth** Adjusts the mix of the processed Chorus output with the dry input signal. Variable from 0 to 100%.
- **St. Width** Adjusts the spreading of the Chorus voices in the stereo field. Click the Spread button to engage/disengage the Stereo Width feature.
- **LFO Speed** Adjusts the speed of the LFO.
- **LFO Width** Adjusts the range of the LFO modulation of Spacing. Variable from 0 to 100%. A value of 100% would modulate the Spacing parameter from 0 to 2x Spacing.
- **Low Freq** Sets the corner frequency of the low-cut filter.
- **High Freq** Sets the corner frequency of the high-cut filter.
- **Mode** Choose between Doubler mode (equivalent to the Chorus effect in Studio One 2.5 and earlier) and Chorus mode, which employs inverse all-pass movement, for truer chorus effect.

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:

- **Feedback** Adjusts 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.
- **Modulation** This section uses an LFO to modulate the Speed/Beats parameter.
  - **LFO-Amount** Adjusts the range of the LFO modulation on delay time (speed). Variable from 0 to 100%. A value of 100% would modulate the Speed parameter from 0 to 2x Speed.
  - **Sync** Click to engage LFO tempo sync. Time is expressed as Beats.
  - **Speed/Beats** Adjusts the speed of the LFO.
  - **Speed** Variable from 0.01 Hz to 10 Hz.
  - **Beats** Select from 4/1 to 1/64 with triplet and dotted-time variants.
- **Global**
  - **Mix** Adjusts the mix of the processed Flanger output with the original dry input signal. Variable from 0 to 100%.

Phaser²

Phaser² applies a variable number of allpass filters in series (one fed into the other), along with one overall feedback loop, to the input signal. Phaser² features an LFO to modulate the center frequencies for each all-pass 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 signals, including synths, guitars, and even vocals, to create a distinctive frequency-shifting effect.

The following parameters are available for Phaser²:

- **Stages** Adjusts the number of allpass filter stages in Phaser². Variable from 2 to 20.
- **Speed/Beats** Adjusts the speed of the LFO.
  - **Speed** Variable from 0 Hz to 10 Hz.
  - **Beats** Select from 4/1 to 1/64, with triplet and dotted-time variants.
  - **Sync** Click to engage LFO tempo sync. Time is expressed as Beats.
- **Color** Modulates the frequency for the allpass filters within the limits set by the Range control, with the Center frequency as the mid-point.
  - **Center** Adjusts the center frequency for the allpass filters. Variable from 10 Hz to 8 kHz.
  - **Range** Sets the range of Phaser² modulation from 0 to 100%.
  - **Log. Sweep** Changes the LFO behavior so that it operates on a logarithmic scale.
  - **Soft** Selects a triangle wave as the Phaser² modulation shape. When this is disengaged, a sine wave is used as the modulation shape.
  - **Feedback** Adjusts the amount of the filtered output signal to be fed back into the input. Variable from 0 to 95%.
- **Global** Adjusts the speed of the LFO.
  - **Stereo Spread** Adjusts the spread of each allpass filter in the stereo field from 0 to 100%.
  - **Mix** Adjusts the blend between the processed Phaser² output and the original dry input signal. Variable from 0 to 100%.

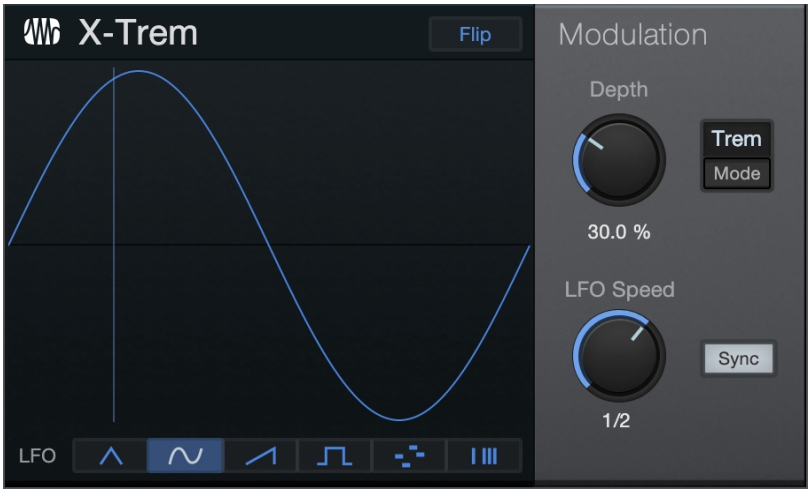
Rotor

Rotor is a rotary speaker effect that simulates the sound of a tube-powered amplifier with independently rotating high-mid horn and bass woofer, as you might find attached to a classic electric organ. Rotor excels at adding a sense of motion and unique tonal character to organ sounds, guitars, or anything you want to try. Each speaker's rotation can be set to a range of speeds, with realistic braking and acceleration effects when changing speeds.

The following parameters are available for Rotor:

- **Off/On** Toggles the rotating action of the virtual speakers on and off, with a smooth speed transition between states.
- **Slow/Fast** Toggles between the two preset speeds for the woofer and horn, with a smooth transition between speeds.
- **Amp**
  - **Drive** Add the desired amount of amp drive to the tone using State Space Modeling technology. Lower settings are cleaner, higher settings are more overdriven.
  - **Horn Q** Blends in a midrange peak that emulates the resonance of rotating horn speakers. Lower settings are more flat, higher settings have a more pronounced resonance.
  - **A/B** Toggles between two amplifier models that are recreated using State Space Modeling technology.
- **Position**
  - **Distance** Lets you choose the position of the virtual microphone that picks up the rotating speaker. At low settings, the mic is close to the speaker, and the stereo sweeping effects are more pronounced. At higher settings, the mic is further away from the speaker, and the effect is subtler and more diffuse.
  - **Balance** Lets you blend between the woofer and horn, to achieve the desired tonal balance. Fully down, you mainly hear the woofer. Fully up, you mainly hear the horn.
  - **Spread** Controls the stereo width of the rotating speaker elements. At low settings, the part of the signal signifying the front of each rotating element moves in a tight, distinct band across the stereo spectrum. At higher settings, the rotating element appears wider and more diffuse.
- **Trim**
  - **Woofer Speed and Horn Speed** These dual-slider controls let you set the speed at which the woofer and horn spin at slow and fast speed settings. You can set them to identical values for more coordinated rotation between woofer and horn, or to differing values that set up contrasting rotations.

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 X-Trem 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 X-Trem:

- **LFO Steps Display** This area shows the amplitude for each step in the LFO. A vertical line sweeps through the display to indicate the current position in the selected waveform. The LFO runs freely when Sync is disengaged; with Sync engaged the line starts and stops with Song playback.
- **LFO Type** Six LFO types are available along the bottom of the display. Click the buttons to select one of the following types:
  - **Waveforms** Select triangle, sine, sawtooth, or square.
  - **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. Click-drag to draw unique shapes.
  - **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 the gate is closed, and total color fill means gate is open.
- **Flip** This button above the display flips the phase of the selected waveform. It is grayed out and can't be selected when the LFO mode is "16 Steps" or "16 Gates".
- **Modulation** This section controls the depth, speed, and destination of the LFO.
-
  - **Depth** Adjusts the relative amount of maximum amplitude modulation. Variable from 0 to 100%.
  - **Pan/Trem** Click to switch the mode of the X-Trem to affect overall amplitude (Trem) or the left- and right-channel balance (Pan). Pan is only selectable on stereo Tracks.
- **LFO Speed** Adjusts the speed of the LFO. With Sync disengaged the speed is expressed in frequency (rate); with Sync engaged the speed is expressed in rhythmic values (beats).
  - **Rate** Variable from 0.01 Hz to 30 Hz.
  - **Beats** Select from 4/1 to 1/64 with triplet and dotted-time variants.
  - **Sync** Click to engage LFO tempo sync.

Reverb

Reverb effects are used in almost all music productions and 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. three built-in reverbs: Mixverb, Room Reverb, and OpenAIR. The following describes these reverb effects.

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 predelay time. Variable from 0 ms to 500 ms. Predelay is the amount of time before the first reverberated signals are heard.
- **Size** Adjusts the relative size of the reverberating space. Variable from 0 to 100%.
- **Damping** Adjusts 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 Tail** Click to engage/disengage the gate.
  - **Gate Threshold** Adjusts the threshold of the gate. Variable from -36 dB to 12 dB.
  - **Gate Release** Adjusts the release time of the gate. Variable from 10 ms to 250 ms.
- **Global**
  - **Width** Adjusts the width of the stereo field. Variable from 0 to 100%. Only for stereo Tracks.
  - **Mix** Adjusts the mix of processed signal with the original dry signal. Variable from 0 to 100%.
  - **Lock Mix Level** Locks the Mix control in place.

OpenAIR

[Screenshot] OpenAIR - OpenAIR plug-in editing window

OpenAIR is a highly efficient convolution reverb capable of delivering ultra-realistic reverberation based on impulses captured from both real spaces and classic hardware reverbs.

OpenAIR provides the following parameters:

- **Predelay** Defaults to 0 ms; adds predelay to the impulse response with a positive value, or truncates existing predelay in the impulse response with a negative value. Values range from -150 to 300 ms.
- **Length** For values smaller than the original impulse response length, this cuts the end (that is, shortens the reverb). For larger values, the range between the ER/LR (early reflections/late reflections) crossover point and the impulse response end gets timestretched. The beginning (up to the ER/LR crossover point) is not stretched, so the room impression created by the early reflections stays intact. [Ctrl]/[Cmd]-click restores the length to the impulse response length.
- **IR Display and Selection**
  - **Log Time** When engaged, this shows more details for the early reflections, making it easier to set ER/LR crossover point.
  - **Log Level** When engaged, this makes it easier to see RMS curves.
  - **IR Name** Click to open file selector, or drag and drop any IR file here.
  - **Prev/Next** Switches the impulse response to the previous or next file in the same file location as the existing impulse response.
- **ER/LR** Scales volumes before and after the ER/LR crossover point, from 0 to 1.00.
- **Gain** Sets the overall output volume.
- **Mix** This is the wet/dry mix, from 0 to 100%.

- **Envelope**
  - **Fade-In** Fades in the impulse response, from 0 ms to 2.0 s.
  - **ER/LR Crossover.** Sets the crossover point in time for early and late reflections; affects the impulse response processing. Range is from 0 to 500 ms.
  - **Fade-Out** Fades out the impulse response, from 1 ms to the length of the impulse response.
- **Shorten with Stretch** When this is activated, and the length is smaller than the original impulse response, the impulse response is not cut and is instead timestretched between the ER/LR breakpoint and impulse response end. (The content of the impulse response before the ER/LR breakpoint is not stretched or compressed, preserving the character of those reflections and thus a large part of the reverb character.)
  - **Stretch with Pitch** When this is activated, timestretching is not used for length changes, and resampling is used instead. This scales the early reflections as well.
- **Processing** As OpenAIR does not feature true stereo processing, channel cross-feed and cross-delay is built-in.
  - **Cross-Feed** Adjusts the amount of the delayed "other" channel that gets fed into the left and right IR channels, from 0 to 100%
  - **Cross-Delay** Adjusts the delay of the cross-fed channels, effectively acting as stereo distance, from 0 to 25 ms.
  - **Asymmetry** Adjusts delays and the mix of cross-feed to simulate an asymmetric recording setup, from full left to full right.
  - **6-band Graphic EQ** Scales frequency ranges in the impulse response.

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:

- **Pre** Adjusts the offset for room-derived natural predelay amount. Variable from 0 ms to a higher value determined by current Room settings.
- **Length** Adjusts the offset for room-derived natural reverb tail length. Value range is variable based on current Room settings.
- **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.

- **Room**
  - **Type** Select one of four Room Type models: Small Room, Room, Medium Hall, or Large Hall.
  - **Size** Adjusts the geometric average of the width, depth, and height of the virtual-room model. Variable from 1 m to 20 m.
  - **Width** Adjusts the width relative to size. Variable from 0.1 to 2.
  - **Height** Adjusts the height relative to size. Variable from 0.1 to 1.
- **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 a colored envelope.
- **Character**
  - **Population** Adjusts 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.
  - **Reflexivity** Adjusts the relative smoothness of the surfaces of the virtual room. Variable from 0 to 1. Higher values evoke a more echo-like reverb tail.
  - **Dampness** Adjusts 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.
- **Geometry**
  - **Dist** Adjusts the relative distance between the source and the listener position within the virtual room. Variable from 0.1 to 1.
  - **Asym.** Adjusts 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** Adjusts 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 model: Small Room, Room, Medium Hall, and Large Hall.
  - **W, D, H Display** Displays approximate room dimensions based on current Room settings.
- **Global**
  - **Eco/HQ Mode** HQ mode (High Quality) is selected by default. Engage Eco (economy performance mode) to use fewer CPU resources by disabling floor and ceiling reflections and reducing the calculation accuracy for the reverberation.
  - **Mix** Adjusts the mix of the Room Reverb signal with the original dry signal. Variable from 0 to 100%.
  - **Lock Mix Level** Locks the Mix control in place.

Pipeline XT

As mentioned in the **Removing Inserts** section, Pipeline XT 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.”

[Screenshot] Pipeline XT- Pipeline XT plug-in editing window

[Screenshot] For SO 5: has the GUI been redesigned?

Configuring an Instance of Pipeline XT

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 XT. Use the version that is appropriate for your hardware processor. If your processor is mono-in-stereo-out (as with some delay and reverb units), use the stereo version of Pipeline XT and feel free to assign a mono send and a stereo return.

Automatic Latency Compensation

Pipeline XT automatically compensates for the latency involved in routing audio from Studio One to your audio interface and back. This is based on the reported input and output latency from your hardware interface driver. The roundtrip latency being compensated for is displayed in milliseconds at the top of the Pipeline XT interface and can be manually adjusted if necessary.

Automatic Audio Routing Latency Compensation

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, a few other sources of latency may affect the signal, including DA/AD-converter latency and digital signal processing (DSP) 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. To compensate for this, tap the Auto button. This sends a "ping" signal through your external processor, then measures the time it takes for that signal to return, and automatically compensates for this latency.

Before clicking Auto, set the hardware processor to be in Bypass, if possible, so that no processing is done on the signal. You also want the send and return signal levels to match as closely as possible.

To make manual timing adjustments, manipulate the Offset control. The Offset value is added to the total roundtrip latency. Setting a positive value increases the latency-compensation time, and setting a negative value decreases the latency-compensation time.

As you move the knob or set a value, the signal path is automatically pinged again, and the scope updates to provide instant feedback on the calibration.

You can also click on the [Difference] button to see the difference between the send and return signals. The smaller the waveform becomes (less amplitude), the more aligned the signals are. This is also helpful for matching send and return levels.

Once you have the correct Offset value established, you should store a preset, as described in the next section. You can get back to the normal mode by clicking the wrench-shaped button.

Once you do this, the real-time send and return signals are displayed. Using the Sensitivity fader, it is possible to trigger the display to only update based on detected transients. For instance, you may want to see how the kick and snare drums are lining up from a drum-bus channel, and you'd want to avoid having the scope display the entire signal all of the time. To do this, move the Sensitivity fader to the right until the only the transients you want to see—in this case a kick or snare hit—are displayed.

Images and Notes

When working with external processors in the context of a DAW, one challenge you may run into is settings recall. When returning to a Song after your initial work, you may find that your external processors have been reconfigured for another use in the meantime. So, how to recall your original settings?

Pipeline XT gives you two useful ways to jog your memory: Images and Notes.

To add a photo of the current settings for your external processor, first click the Show Image button in the lower left part of the plug-in window, then drag your photo into the center of the window. Alternatively, click the "…" button in the top-rigth corner of the display area to access your file system and add an image manually. You can reference this photo anytime by clicking the Show Images button again. To see your photo full-size, just click the photo. Click the "x" button in the top-right corner of the display to remove the current photo.

To enter a text note with settings information or other important info, click the Show Notes button. This shows a text field to the right of the button. Click within this field and type in your information.

Images and Notes are stored with each instance of Pipeline XT in your song and will be saved with presets, so they're always available to help.

Pipeline XT Controls

- **Setup Mode** Shows or hides the "Ping" signal overlay.
- **Auto** Automatically "pings" your external processor send/return chain and compensates for any latency induced by AD/DA converters and hardware processors.
- **Offset** Set an offset value in samples to account for the latency induced directly by AD/DA converters and hardware processors.
- **Label** Click in the empty space to type in a label. This is used to clearly identify the inserted hardware.
- **Send Selection** Select the output Channel that is used to route audio from Studio One to your hardware processor.
- **Return Selection** Selects the input Channel that is used to route audio from your hardware processor into Studio One.

Send and Return Controls:

- **Send Gain** Adjust the send gain to prevent clipping the hardware input.
- **Return Gain** Adjusts the return gain as needed to prevent clipping after the hardware insert.
- **Phase Invert** Inverts the phase of the return signal (relative to the send signal). This is useful when auditioning for calibration purposes .
- **Mix** Adjusts the mix of send and return signal. This makes parallel processing possible.

Realtime Display Controls:

- **Signal Scope** Displays an oscilloscope view of the send and return signals, overlaid on one another for easy comparison.
- **Sensitivity** Controls the update rate of the signal scope.
- **Difference** Displays an oscilloscope view of the difference between input and output signals.
- **Zoom** Displays a detailed view of the current signal.

To the far left and right of the Pipeline XT interface are Send and Return meters with separate clip indicators, enabling you to accurately monitor send and return levels.

Change the Look

If you'd like to color-code your Pipeline XT instances for organizational purposes, or simply want a fresh new look, click the PreSonus logo in the plug-in window to switch background colors.

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 an effects preset. Any number of presets can be stored, which allows you to recall configurations for any number of hardware processors. These presets 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 dialog. This ensures 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 effectively sums at the specified output, and that summed signal returns from the hardware processor to every Channel simultaneously. While this might lead to interesting possibilities, exercise caution, as levels could easily become excessive.

Mixing Down with Pipeline

When Pipeline XT is being used on an active channel in a 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.

This is handled automatically, so that when any instance of Pipeline XT is inserted on a track that contains content in a Song or Project, the mixdown is always done in real time. If Pipeline XT is only inserted on tracks that do not currently contain or produce audio, real time rendering is not required.

Built-in Virtual Instruments

Studio One has five built-in virtual instruments: SampleOne XT, Presence XT, Impact XT, Mai Tai, and Mojito. These instruments provide a solid foundation for music production in any style. The following sections describe each instrument in detail.

SampleOne XT

A sampler is a bit like a synthesizer. However, instead of generating sounds using oscillators or operators, samplers start with an audio clip, or “sample,” and then play and process that sample based on how the instrument is configured.

SampleOne XT is a full-featured sampler that builds on the strengths of our original SampleOne instrument. It features triggered sampling, automatic time-stretching, a full range of tone-shaping tools, and flexible onboard effects. The following section describes how to use SampleOne XT.

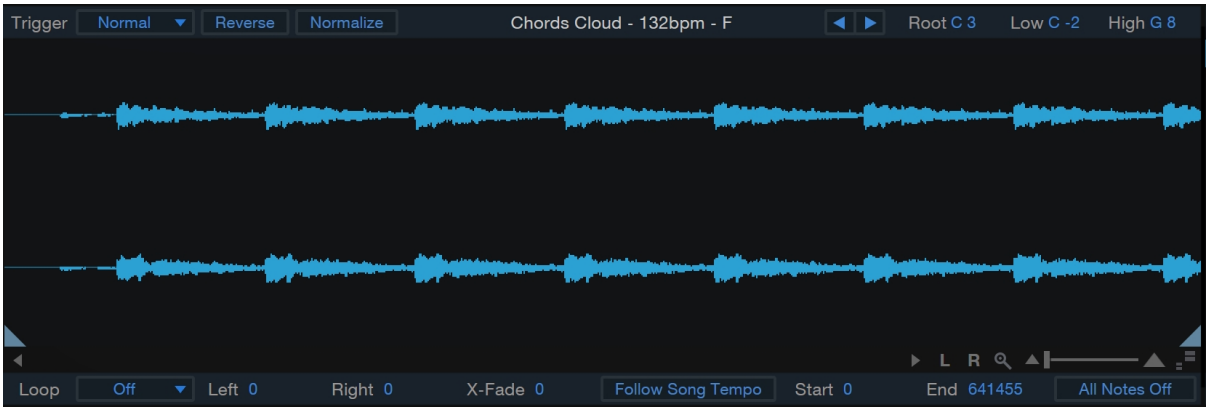
Interface Overview

The main display features four "tabs" along the top, each of which gives you access to a distinct set of tools and parameters:

- **Wave** is where you do the bulk of your sample and loop editing.
- **Mapping** is where you map the loaded samples across the span of the MIDI range.
- **Envelopes** gives you access to graphical representations of the Pitch, Filter, and Amp envelopes, for easy shaping.
- **Record** lets you record audio directly into SampleOne XT from nearly any audio input, send, output, or Instrument track, including a mode where samples are split automatically based on amplitude.

To the right of the tabbed interface is the **Samples** list, which shows the samples that make up the current patch. In the lower half of the plug-in interface, you'll see controls for sample **Pitch** (playback frequency), **Filter** (tone shaping), **Amp** (amplitude shaping), **LFO** (modulation), and effects. Rounding things out are the global settings in the Master module, and a playable onscreen keyboard.

Wave View



Wave view is where you do the bulk of your sample and loop editing. To select the range of the sample that plays when you trigger it, click-and-drag the blue triangles below the waveform. To fine-tune the start-and-end points, you can click-and-drag or click and type a value into the **Start** and **End** fields.

Trigger

Open the Trigger menu to choose the method by which to play the currently selected sample, from the following choices:

- **Normal** In this mode, the sample starts playing when you trigger it, and stops when you let go of the key (or when the recorded note that triggers it ends).
- **One Shot** In this mode, the sample plays through in its entirety when triggered. This is often used for drum sounds.
- **Toggle** In this mode, the sample begins playing when triggered, and stops playing when triggered a second time. This is most useful for loops and continuous, droning sounds.

Reverse Enable this option to reverse the current sample.

Normalize Enable this option to boost the amplitude of the current sample until its highest peak reaches a point just below full scale.

Load Next/Previous Sample in Folder These buttons let you quickly swap the current sample for its neighbor in the enclosing folder. This allows for quick auditioning of a range of samples, to find just the right candidate.

Root, Low, and High These selectors let you set the root note and note mapping for the current sample. You can also set these parameters in the dedicated Mapping view.

Loop a Sample

To loop playback of a sample, open the Loop selector and choose a looping mode:

- **Sustain** In this mode, when a note ends, playback continues beyond the selected loop range until the end of the release phase of the Amp envelope.
- **Release** In this mode, when a note ends, playback continues to loop until the end of the release phase of the Amp envelope.
- **Ping-Pong** In this mode, loop playback proceeds to the end of the loop range, then the sample is played in reverse until it reaches the beginning of the loop range, and so on.

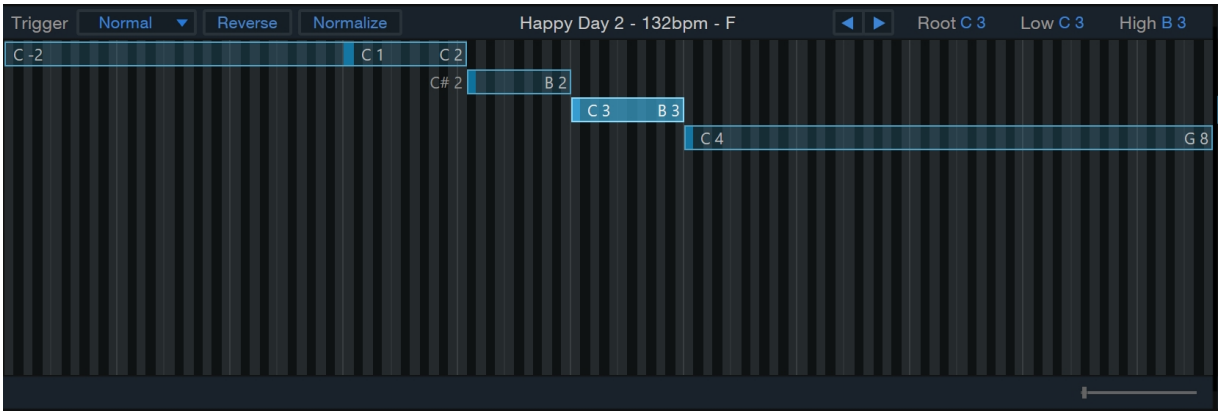
When a looping mode is selected, the Loop Range bracket appears above the sample waveform, indicating the section of the sample to be looped. If the loop range begins after the initial playback range begins, the sample plays from the beginning of the playback-range position to the end of the loop-range position; then it plays from the start of the loop range to the end of the loop range and back for as long as the sample is triggered.

X-Fade Click-and-drag or click and type in this field to specify a number of samples of crossfade to apply to the loop points, to assist in removing audible clicks.

Follow Song Tempo Enable this option to automatically timestretch the current sample to fit the tempo of the Song. This is most effective when using rhythmic loops, such as drum samples. The sample must be tempo-tagged to enable this feature.

All Notes Off Click this button to stop playback of all currently enabled voices.

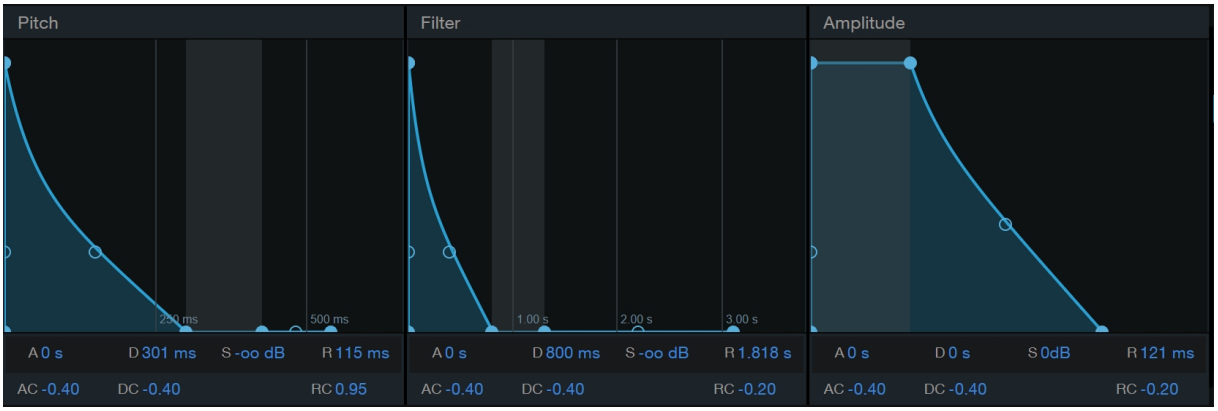
Mapping View



Mapping view shows each currently loaded sample as a Keymap Range selector that occupies a certain range of MIDI notes. The bright mark within each selector shows the current root note of the sample.

To change the root note of a sample, click-and-drag the sample's root-note handle left or right across the keyboard display. The notes on your keyboard that trigger the sample are indicated in the Keymap Range selector, which is the blue bar extending to the right and left of the note handle. To restrict the range of notes that can trigger the sample, click-and-drag the left or right edge of the Keymap Range selector.

Envelopes View



Envelopes view gives you graphical representations of the Pitch, Filter, and Amplitude envelopes that you can freely shape using the mouse. Click-and-drag the handles on each envelope to change the shape. The Attack, Decay, Sustain, and Release values are shown as numeric selectors below each envelope. These can also be changed by click-and-drag or click-and-type. Below them are the curve controls for each applicable envelope value ("AC" for "Attack Curve," "DC" for "Decay Curve," and so on), which let you precisely set the curve of each envelope segment.

Record View

Record view lets you record audio directly into SampleOne XT, for immediate use as new samples. To do this, first select the **Input** to record, which can be any hardware audio input, send, output, or Instrument output. The **Monitor** selector lets you choose which bus should receive the cue signal for monitoring as you record.
There are two main ways you can record:

- **Record** Press Record to begin recording immediately. Press the button again to conclude recording. The resulting audio is shown in the Samples list, and is then available for use.
- **Gate Record** Press Gate Record to enable amplitude-based recording, in which each distinct region of audio (as specified by the Gate Threshold controls) is recorded as a separate sample. This is a great way to record a set of drum samples, for example.

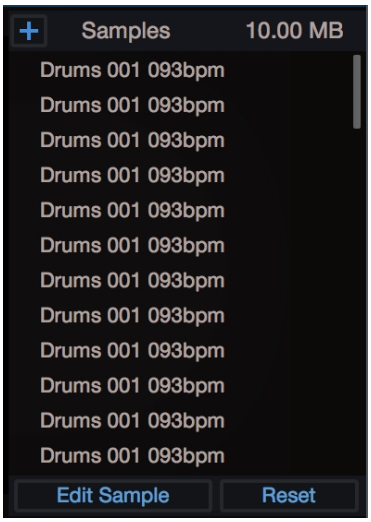
Gate Threshold The **Open** setting specifies the signal level at which recording begins while in Gate Record mode. The **Close** setting specifies the signal level at which recording ends. You can also set these ranges by clicking-and-dragging the triangle-shaped markers in the signal level display.

Name This field lets you specify the name of the next recorded sample. If more than one sample is recorded before the name is changed, the samples will share the specified name, followed by a numeric identifier.

Resolution This selector lets you set the bitrate of the recorded samples.

Insertion Key This selector lets you choose the initial root note of the recorded samples. If more than one sample is recorded before the Insertion Key is changed, the samples are assigned to the next-higher note each time.

Samples List



To add a sample to SampleOne XT, drag any audio clip from the Browser, or any Audio Event or selected range from the Arrange view, into the Samples list. The waveform for the audio clip appears in the main display. If you drag in a selected range from the Arrange view, the range is bounced to a separate audio file and then added to SampleOne XT.

Note you can quickly access samples that are in the same file location as a loaded sample by using the [Previous] and [Next] button to switch to the previous or next sample in that file location.

By default, the keymap range is set from C0 to B5, with C3 set as the sample's root note. With the SampleOne XT instrument Track properly set up, and Monitor engaged, press any key within the default keymap range on your keyboard to play the loaded sample. C3 is set by default as the sample's root note, so playing the C3 (middle C) key on your keyboard plays the sample at its original pitch and speed. Playing the keys above C3 shifts the sample pitch higher, and playing below C3 shifts the sample pitch lower and slows down playback speed.

When adding a REX file to SampleOne XT from the Browser with the Send to New SampleOne XT command, the REX file's individual slices are mapped across the keymap (starting at C3 by default, dependent on number of slices), with each slice given its own note.

Playing Multiple Samples

Up to 96 samples can be loaded into SampleOne XT 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 are 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 triggers every sample at once. In this way, multilayered, or multitimbral sample-playback can be achieved.

Replace a Sample

To replace a sample in SampleOne XT, select the sample that you wish to replace in the Samples list. Then drag any audio clip from the Browser, or any Audio Event from the Arrange view, into the main display. The sample replaces the previous one in the sample list, and the previously displayed sample waveform updates to reflect the new sample.

Edit Sample This button lets you specify individual envelope settings for the currently selected sample, rather than changing those parameters for all samples, as done by default. If after you've made custom alterations to one sample, you wish to reunify all samples under the same settings, press **Reset**.

Edit Pitch, Filter, and Amplifier Parameters

The output of each sample loaded in SampleOne can be modified with pitch, filter, and amplifier parameters. Note the [Edit All] button, which allows the simultaneous editing of all sample parameters at once when engaged. The following describes the use of these envelopes.

Pitch

The Pitch controls modify the pitch characteristics of the audio output. Click the button in the upper left corner of the module to activate/deactivate the effects of the Pitch controls.

- **Transpose** Transposes the pitch of the sample in semitones. Variable from -48 to +48 semitones.
- **Tune** Adjusts the tuning of the sample. Variable from -100 cents to 100 cents.
  - **LFO** Adjusts the range within which the LFO affects pitch. Variable from -4 octaves to +4 octaves.
  - **Env** Adjusts the range within which the envelope affects pitch. Variable from -4 octaves to +4 octaves.
- **Attack (A)** Adjusts the amount of time it takes to reach the Env value from the original pitch of the sample once a sample has been triggered. Variable from 0 to 20 seconds.
- **Decay (D)** Adjusts the amount of time it takes to reach the sustain level after reaching full volume. Variable from 0 to 20 seconds.
- **Sustain (S)** Adjusts the Sustain level. Variable from -∞ dB to 0 dB. The sustain period continues until the sample trigger stops.
- **Release (R)** Adjusts the amount of time it takes to reach the original pitch after sample trigger has stopped. Variable from 0 to 30 seconds.

Filter

The Filter parameters modify the frequency characteristics of the audio output. Click the button in the upper left corner of the module to activate/deactivate the effects of the filter.

- **Cutoff** Adjusts the filter cutoff frequency. Variable from 20 Hz to 20 KHz.
  - **Vel** Adjusts the maximum range, in octaves, within which note velocity can affect the maximum filter range (the value used when velocity equals 127).

- **Mod** Adjusts the range, expressed as distance in octaves, within which the modulation wheel on your Keyboard can adjust the instantaneous filter cutoff frequency (the value used when the mod wheel value equals 127).
- **LFO** Adjusts the range within which the LFO affects the cutoff frequenecy. Variable from -8 octaves to +8 octaves.
- **Env** Adjusts the range within which the envelope affects the cutoff frequency. Variable from -8 octaves to +8 octaves.

- **Res** Adjusts the relative resonance of the filter. Variable from 0 % to 100 %.
- **Type** Selects the filter type. Choose from LP24 Ladder, LP24 Zero-Latency, LP12 Ladder, BP12 Ladder, HP12 Ladder, LP12 State, BP12 State, HP12 State, and Eco Filter (lowest CPU use).
- **Attack (A)** Adjusts 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 Variable from 0 to 20 seconds.
- **Decay (D)** Adjusts the amount of time it takes to reach the sustain level after reaching the envelope value. Variable from Variable from 0 to 20 seconds.
- **Sustain (S)** Adjusts 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 -∞ dB to 0 dB. The sustain period continues until the sample trigger stops.
- **Release (R)** Adjusts the amount of time it takes the filter to reach the frequency value after the sample trigger has stopped. Variable from Variable from 0 to 30 seconds.
- **Drive** This lets you specify an amount of filter overdrive, to add fullness and saturation artifacts to your sound.
- **Punch** This control lets you add a range of percussive attack to the start of each note. At the lowest setting, dynamics are unchanged. At higher settings, the sound becomes more aggressive and more readily pops through the mix.
- **Key** This control sets the relationship between incoming note Pitch and filter Cutoff. In physical instruments, higher notes tend to produce higher harmonics, brightening slightly as you go up the scale. On a synthesized instrument, if the filter stays static, setting the proper tone in the lower note ranges may cause inappropriate dullness in the higher notes. So, with the Key parameter, we can compensate for this, and create a more natural-sounding range of timbres up and down the keyboard.
- **Soft** This control lets you switch between two differing analog-modeled processing circuits within the filter. Engage Soft for a mellower, darker tone. Disengage it for a brighter, more aggressive sound.

Amp

The Amp controls modify the amplitude characteristics of the audio output. Click the button in the upper left corner of the module to activate/deactivate the effects of the Amp controls.

- **Gain** Adjusts the maximum volume of the audio output. Variable from -144 to +20 dB.
  - **Vel** Adjusts the relative amount that note velocity affects the maximum amplitude. Variable from 0 to 1.
  - **Mod** Adjusts the relative amount that the modulation wheel on your Keyboard can adjust the instantaneous amplitude at any time. Variable from -1 to 1.
  - **LFO** Adjusts the range with which the LFO affects playback volume.
- **Pan** Adjusts the stereo pan of the audio output. Variable from full L to full R.
- **Attack (A)** Adjusts the amount of time it takes to reach full volume once a sample has been triggered. Variable from 0 to 20 seconds.
- **Decay (D)** Adjusts the amount of time it takes to reach the sustain level after reaching full volume. Variable from 0 to 20 seconds.
- **Sustain (S)** Adjusts the sustain level. The sustain period continues until the sample trigger stops.
- **Release (R)** Adjusts the amount of time it takes to reach a level of -∞ after the sample trigger has stopped. Variable from 0 to 30 seconds.

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 the Activate button to activate/deactivate.
- **Sync/Free** Choose to sync the modulation speed to tempo (variable from 1/64T to 4 bars), adjust the speed freely as frequency (variable from 0.01 Hz to 500 Hz), or sync to note-on by selecting neither Sync nor Free (variable from 0.01 Hz to8 KHz).
- **Rate** Set the modulation speed of the LFO, in either rhythmic subdivisions of the Song tempo (Beats), or milliseconds (Speed), depending on Sync/Free status.
- **Type** Click to select, from top to bottom, the sine, saw, triangle, square, or sample and hold LFO waveform.
- **Delay** Adjusts the amount of time before the LFO affects anything once a sample is triggered. Variable from 0 to 2 seconds.
- **Mod** Adjusts the peak amplitude amount with which the modulation wheel controls the LFO signal strength (LFO strength when mod wheel value equals 127). Variable from -1 to 1.

Master

The Master controls act on a global level, affecting all samples in the current patch.

Master Sets master volume for the entire patch. Variable between -∞ and +10 dB.

Mono Turn on this option to enable monophonic playing (one voice at a time only).

Glide Enable this option to introduce Glide, and adjust the relative amount of Glide using the Glide Time knob below. Glide creates gradual shifting over time between consecutive notes, as opposed to the usual immediate switch from one note to the next.

Polyphony By default, up to 32 voices can play simultaneously, meaning you can play 32 separate notes before the first note you played are cut off to allow more voices to play. Click and drag on the blue number to add or subtract total voices. 64 voices is the maximum.

Effects (FX A & FX B)

SampleOne XT offers seven built-in effects processors to add dimension to your sounds. They are arranged in two banks: FX A (Modulation, Delay, and Reverb) and FX B (Gater, EQ, Distortion, and Pan). You can enable or disable each effect by clicking its name. You can show or hide the FX section of the plug-in window by clicking the [FX] button.

FX A

Modulation

This processor creates time-based modulation effects. Choose from the following modes by clicking the [Chorus], [Flanger], or [Phaser] button:

- **Chorus** This processor creates effects similar to that of multiple identical instruments playing the same part simultaneously. The synth signal is fed through a short, modulated delay, which is then mixed with the dry signal. Chorus offers the following controls:

- **Mono** Engage this option to sum the wet (effected) signal to mono.
- **Delay** This control lets you set the length of the modulated delay. Higher settings create full-bodied chorusing effects, while lower settings create more pronounced harmonics, akin to the effects of a Flanger.
- **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
- **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler chorusing effects, while higher settings produce more pronounced changes in timbre over time.
- **Depth** This control lets you blend between the dry signal (all the way left) and the chorused signal (all the way right).

- **Flanger** This processor creates resonant, hollow-sounding sweeping effects. The synth signal is fed through a short, modulated delay, which is mixed with the dry signal. While similar to the workings of a Chorus effect, Flangers get their signature sound by employing smaller delay times than those used in chorusing, combined with a feedback system that can add extra resonance to the sweep. Flanger offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Delay** This control lets you set the length of the modulated delay (in ms), which changes the pitch of the resultant resonance. Higher settings create lower-pitched resonance, while lower settings create resonances at a higher pitch.
  - **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler flanging effects, while higher settings produce more pronounced changes in timbre over time.
  - **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Flanger. Higher amounts of Feedback add to the resonance of the sweeping effect.
  - **Sync** Engage this option to enable setting Flanger modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the flanged signal (all the way right).
- **Phaser** This processor creates dreamy, otherworldly sweeping effects. The synth signal is fed through a series of all-pass filters that alter its phase. When mixed with the dry signal, this creates a series of peaks and valleys in the frequency response that changes depending on the degree of phase shift applied. Phaser offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Shift** This control lets you specify the amount of phase shift to apply. Lower settings focus the phasing effect in the lower frequencies, while higher settings focus the effect in higher frequencies.
  - **Speed** This control lets you set the speed of modulation applied to the phase shift amount. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the phase shift amount is modulated. Lower settings produce subtler effects, while higher settings produce more pronounced changes in timbre over time.
  - **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Phaser. Higher amounts of Feedback add to the resonance of the sweeping effect.
  - **Sync** Engage this option to enable setting Phaser modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the phase-shifted signal (all the way right).

Delay

This processor creates an echo effect, either as a single delayed repeat of the input signal, or a trailing series of echoes. The Delay effect offers the following controls:

- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the delayed signal.
- **Delay Time** This control lets you specify the length of the delay effect, in rhythmic values (such as 1/8th-note or 16th-note) relative to the tempo of the Song.
- **Feedback (FB)** This control lets you set the amount of effected signal that is fed back into the Delay effect. At zero, there is just one repeat. As you increase the value, the trail of repeats grows.
- **Mix** This control lets you blend between the dry signal (all the way left) and the delayed signal (all the way right).
- **Ping-Pong Mode** This menu lets you enable and configure the stereo Ping-Pong delay mode. You can choose from the following modes:

- **Off** The delay works as normal, without ping-pong functions.
- **Panned** Using a multi-tap delay structure, this mode pans each delay repeat to the right or left, in sequence.
- **Dotted and Double** These modes work similarly to Panned mode, but employ staggered spacing of the delay taps to produce a dotted-note or syncopated straight rhythm in the delay repeats.

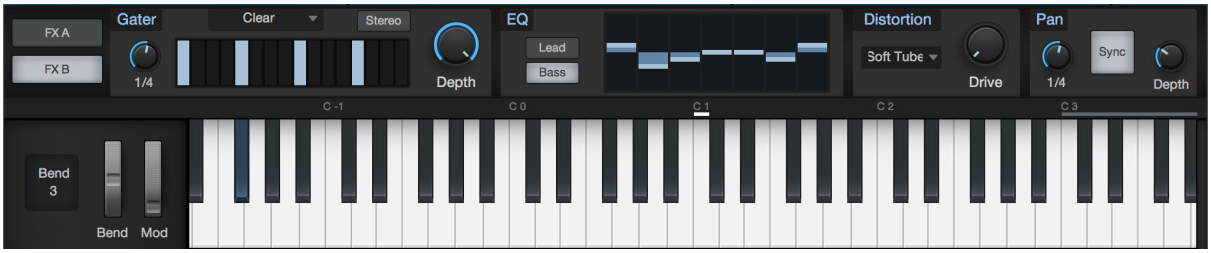
- **Reverb** Enable this option to route the output of the Delay effect to the Reverb effect, enabling further diffusion and abstraction of the delay signal.

Reverb

This effect places the synth signal within a synthesized reverberant physical space, ranging from short reverbs that emulate smaller rooms, to long reverbs that evoke the sounds of large spaces, such as halls and cathedrals. Reverb offers the following controls:

- **Pre-Delay (Pre)** This parameter lets you specify an amount of delay applied to the reverb-processed signal, in a range between zero and 500 ms. This emulates the delay inherent in large spaces between the impact of a sound and its audible reverberation. Lower settings are best suited to shorter reverb times, and longer settings with longer reverb times, but let your own taste be the judge.
- **Damping (Damp)** This control lets you set an amount of high-frequency attenuation to apply to the reverb signal. Spaces with soft surfaces tend to lose treble quickly as the sound reverberates, resulting in a short bright reverb followed by a progressively darker tail. Spaces with harder surfaces retain high-end more efficiently over time. Set Damp to its lower range to emulate hard surfaces, and to the higher ranges to enable further damping, to emulate softer surfaces.
- **Size** This control lets you set the length of reverberation from the moment a sound starts, in a range between 100 ms and 10 seconds. The larger the size, the longer the tail of the reverb, and the larger the emulated space sounds.
- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the reverb signal.
- **Mix** This control lets you blend between the dry signal (all the way left) and the reverb signal (all the way right).

FX B



Gater

This is a rhythmic gating effect, able to create a series of syncopated breaks in the synth signal. A variety of presets are provided, each with a different rhythmic gating pattern. However, the fun really begins when you create your own. Gater offers the following controls:

- **Beats** This control lets you set the length of the gating cycle, in rhythmic values (such as 1 bar or 1/2-note) relative to Song tempo. For example, at a setting of 1 bar, the 16 steps in the cycle repeat every bar, effectively representing 16th-notes. At a 1/2-note setting, the 16 steps repeat each half-bar, representing 32nd-note values.
- **Beat Steps** This grid lets you specify which steps in the cycle let signal pass through, and which gate the signal to silence. Click on a step to enable or disable gating for that step.
- **Stereo** Engaging this option creates a separate beat grid for each side of the stereo field. When engaged, you'll see two rows of beat steps, the top row specifying gate steps for the left channel, and the bottom row gating the right channel.
- **Depth** This control lets you blend between the gated and dry signals, allowing for rhythmic gating effects while retaining the continuity of the synth sound.

EQ

This is a graphic equalizer effect, perfect for quick tonal shaping. Set the EQ bands to emphasize or attenuate bands of frequencies to suit your needs. When a band is in the center of its range, it neither adds nor subtracts. When moved above the center, it emphasizes the chosen frequency. Moved below the center, it attenuates that frequency.

Choose between Lead mode, with frequencies chosen to suit aggressive, up-front sounds, or Bass mode, with wider-ranging frequencies that work better for basses and mellower chordal parts.

Distortion

This is a variable distortion effect, which adds grit and character to your sounds. Choose from a variety of distortion types, from fizzy transistor fuzzes to thick, warm tube overdrives. Set the amount of distortion with the Drive knob.

Pan

This is an auto-pan effect, which pans the synth signal left and right over time. Pan offers the following controls:

- **Speed** This control lets you set the speed at which the signal is panned left and right.
- **Sync** Enable this option to set pan speed to a rhythmic value (such as 1/4-note or 16th-note) relative to Song tempo. Disable this option to set pan speed along a continuous range.
- **Depth** This control lets you set the degree to which the signal is panned. Lower settings give a subtly panned effect, while higher settings pan the signal more radically, all the way to fully left and right in each cycle.

Virtual Keyboard

The virtual keyboard lets you easily click to play notes or manipulate the Pitch and Mod wheels, while auditioning or editing patches when you're away from a MIDI keyboard. The keyboard display also shows you which notes are currently being played, as well as the root note and pitch mapping span of the currently selected sample. You can show or hide the virtual keyboard at any time by pressing the [Keys] button.

Note that for a more playable keyboard experience when away from your MIDI controller, you can also use Studio One's **QWERTY Keyboard Device** to play notes using your computer's keyboard.

Next to the virtual keyboard is the Bend parameter, which lets you set the pitch bend range of the Pitch wheel, in semitones.

Working with .multisample and .soundx Files

Given that it's so easy to create new sample libraries in SampleOne XT, you may find that you want to exchange them with other people, or use them in different instruments, such as Presence XT. To export the current set of samples as a .multisample file, click the menu button and choose **Export Multisample File...** To export the current patch as a .soundx file for other SampleOne XT users to try, click the menu button and choose **Export Preset...** To import a multisample or soundx preset file into SampleOne XT, simply drag-and-drop it onto the plug-in window.

Export to Impact XT

Once you've created some samples you love, you can always import them to Impact XT using drag-and-drop. To do this, click and drag your chosen sample from the sample list in SampleOne XT, and hover your cursor over an Impact XT tab at the top of the Instruments window. Impact XT is then shown, and you can drop your sample onto any pad. You can also select multiple samples in SampleOne XT, then click and drag the group into Impact XT as described above.

By default, when multiple samples are dropped onto a pad, they are all assigned to that pad and are played interchangably, according to the current Layer Mode. To distribute multiple samples across multiple pads, press and hold [Shift] before dropping them. The first sample is assigned to the selected pad, and each subsequent sample is assigned to subsequent pads in ascending note order.

Color Themes

Looking for a little personalization? Try clicking the PreSonus logo at the top right corner of the SampleOne XT window for a selection of new color themes.

Presence XT

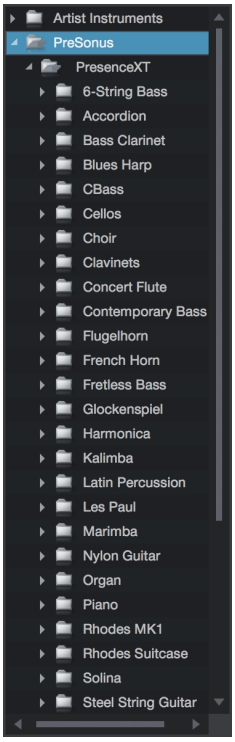
Presence XT is a virtual sample-player instrument that enables you to play an endless variety of sounds. Presence XT uses a generic multisample format (also supported by Bitwig Studio) packaged into Sound Sets, and can also load and play presets in EXS, Giga, Kontakt (version 4 and below), and SoundFont formats. The bundled Sound Sets include a variety of high-quality instruments. You can shape your sounds with the provided filter, LFOs, envelopes, mod matrix, and effects.

While Presence XT is, by default, limited to playing sounds from existing libraries, by purchasing the Presence XT Editor Option, you can upgrade it to a full-featured sampler. With this option installed, you can create your own sample-based instruments, with powerful layering and scripting features. For more information, see **Presence XT Editor**.

Presence XT employs a high-performance disk-streaming sample playback system, enabling the use of presets that use very long samples. Up to 128 sample voices can play simultaneously. One voice is often equivalent to one note. However, some sounds have elements (such as layers and articulations) that can consume more than one voice per note played.

The central preset display shows the number of sample voices being used at any moment, as well as the name and size of the loaded preset. The Voice Limit parameter lets you set the level of polyphony you want (1-128, 64 by default).

Loading and Playing Sounds



You can locate and load presets from Studio One Sound Sets in the following ways:

- Click the Preset menu in Presence XT, browse to your preset of choice, and click the preset to load.
- With the Presence XT window open, choose a Presence XT preset in the Instruments section of the Browser, and double-click the preset to load.
- Drag a preset from the Sounds section of the Browser onto the Presence XT plug-in window or the Track on which Presence XT resides.
- Create a new Instrument Track with Presence XT and your choice of preset already loaded, by dragging the preset between two Tracks (or next to the top or bottom Track) in the Arrange view.

Once loaded, the preset is immediately playable with your MIDI controller, or by clicking the virtual keyboard at the bottom of the plug-in window.

Working with Presence Content

Presence XT takes the place of the Presence sample playback instrument, featured in previous versions of Studio One. Songs that use the Presence instrument open as expected in Studio One 5.0, with Presence XT replacing any instances of Presence.

However, Presence XT features an improved Reverb effect algorithm, so songs created using Presence (and its built-in reverb) show a difference in sound when played with Presence XT in place. This difference can be minimized by adjusting the settings of the new **Reverb effect**.

You may still notice some slight sound differences between presets played through Presence and the same presets played through Presence XT. You can always open affected songs in a previous version of Studio One and transform the affected tracks to audio. Songs saved in this state sound exactly the same when opened in Studio One 5.0.

Find More Sounds in the PreSonus Shop

Sample libraries created especially for Presence XT are available in the PreSonus Shop. For more info on purchasing content from the Shop, see **PreSonus Shop**.

Using 3rd-Party Sample Formats

Sounds in EXS, Giga, Kontakt (version 4 and below), and SoundFont formats can be loaded directly, with no conversion required. You can load these presets by dragging from the Windows Explorer or macOS Finder onto the plug-in window, or onto a Track with Presence XT

loaded. You can create a new Instrument Track with Presence XT and your choice of preset already loaded, by dragging the preset between two Tracks (or next to the top or bottom Track) in Arrange view.

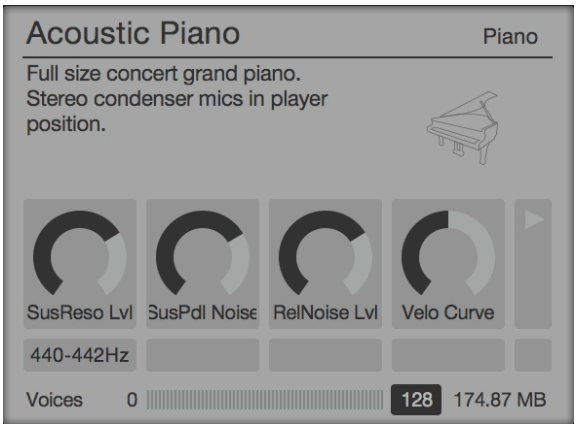
You can also locate and access 3rd-party presets using the Files tab in the Browser. If you have an established directory for sampler content, you can create a new Browser tab pointing to that directory, for quick access. For more on setting up new tabs in the Browser, see **Make Finding Your Favorite Files Easy**.

We recommend storing your sampler presets and any needed sample collections together, in the same directory. If needed samples cannot be found when loading a preset, you are given the chance to locate them in your file system.

Relative Parameter Control

Multiple samples are used to create sounds in a single instrument, and presets can potentially comprise multiple instruments. Each sample in any given preset can have different absolute settings. Expressive control of such complex presets is achieved by the use of relative controls, that can modify all samples simultaneously. Changes are made relative to the absolute settings within the loaded preset.

Script Controls



Some sounds offer additional controls that interact with a control script built into the sound. When Script Controls are available in a loaded sound, they appear in the central display. You can tweak and automate these special controls just as you would the built-in controls in Presence XT.

In some cases, Script Controls can replace the functionality of one or more of the standard controls (such as envelope settings). When working with sounds such as these, use the provided Script Controls to affect those parameters.

Articulation Key Switches

Some sound libraries are built with a special area of the keyboard that acts as a set of switches between different versions of the sound. For example, a guitar sound might offer open notes, muted notes, slides, and so on. These different articulations are instantly available as you play or program a part, by pressing a key (or programming a MIDI note) in that special range.

When Articulation Key Switches are available in a sound, the name of the currently selected articulation is shown at the upper-right corner of the central display of Presence XT. Click this name to toggle a list of available articulation switches and their places on the keyboard. These keys are also marked with red bars on the virtual keyboard.

When you play one of these keys, the new articulation is shown in the central display, and the character of the sound changes according to the way the sound was designed.

Controls Overview

The main control panel lets you control the Filter, LFOs, Envelope Generators, and sample playback parameters. These are the primary controls you'll use to sculpt your sound. To the right of these controls are the Global parameters: Volume, Velocity, and key mode (Poly, Mono & Glide).

Along the bottom of the window, you'll see the Mod/FX section (which gives you access to the modulation matrix and effects) and the virtual keyboard. You can hide or show each of these elements by pressing the [MOD/FX] and buttons.

LFO 1 and LFO 2

LFO stands for Low Frequency Oscillator, and Presence XT has two of them. LFOs create slow-moving regular cycles of control signal that are useful for modulating other parameters over time. One common example is the way many keyboard patches respond when you move the Mod Wheel up from zero; the pitch of the oscillators wavers up and down in an expressive manner, much like the sound of vocal vibrato. This is simply an LFO modulating oscillator pitch to a degree set by the position of the mod wheel.

LFO 1 and 2 have identical controls, so the following explanations apply to both:

- **Bypass** Click the [LFO 1] or [LFO 2] button to turn the selected LFO on or off.
- **LFO Type** Choose between Sine, Triangle, Sawtooth, Square, and Random shapes for the oscillation of the LFO.
- **Rate** Sets the rate at which the LFO oscillates, from inaudibly low (0.01 Hz) for long, sweeping changes, all the way to higher ranges (up to 8 kHz) useful for FM and AM techniques. When the LFO's [Sync] button is engaged, Rate can be set in terms of rhythmic values relative to Song tempo, such 1/8th-note and 1/4-note.
- **Sync** Engage this option to enable setting LFO Rate to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate by Hz.
- **Key** Engage this option to bind LFO speed to incoming note pitch. Higher notes result in higher LFO speeds, while lower notes result in lower LFO speeds.
- **Free** Engage this option to let the LFO run continuously, resulting in a differing LFO start point for each note played. Disengage to restart the LFO waveform at the start of each note.
- **Delay** This control lets you specify an amount of time (in milliseconds) for the LFO to wait before becoming active after a note is played. This lets you do things like adding a bit of expression to held notes, or creating layers of modulation that start at different points in each note by setting distinct Delay values for each LFO.

Sample Playback Parameters

This set of controls lets you manipulate the way that Presence XT plays the samples in the currently loaded preset.

- **Sample Start Mod** Lets you specify an amount of negative or positive velocity-controlled offset, applied to the point in the sample at which playback begins. At settings above and below the default of 0, lower-velocity notes trigger a smaller amount of sample offset, and higher-velocity notes trigger a larger amount of offset.
- **Pitch Fine Tune** Lets you tune sample pitch in a range of -100 to +100 cents (equaling one semitone up or down).
- **Sample Shift** Lets you manipulate sample playback speed with no change in pitch. While pitch is not affected, the range of Sample Shift is -36 to +36 semitones, which references the amount of transposition that would normally be needed to shift a sample's speed the specified amount. When playing one-shot (non-looping) samples, this control varies the length of the sample. When playing looped samples, this control enables useful textural and harmonic changes.
- **Transpose** Lets you transpose incoming note pitch in a range of -12 to +12 semitones.

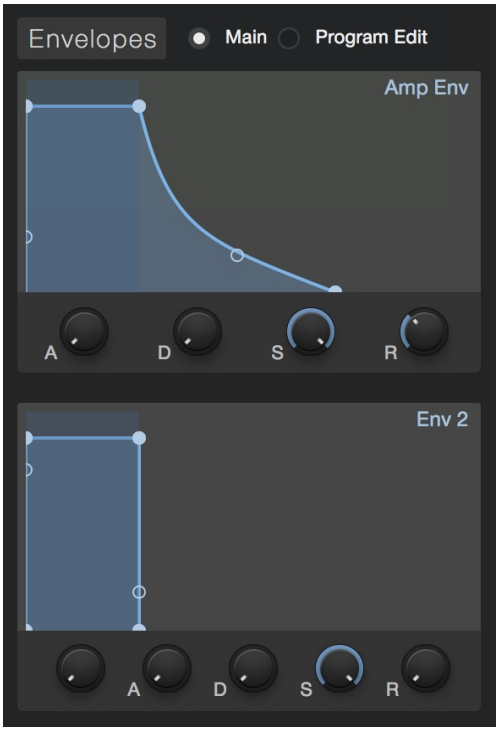
Filter

Presence XT offers a versatile multi-mode Filter, which lets you shape and enhance your sounds. The filter is often one of the most important defining elements to the sound of an analog synthesizer, and likewise, this filter's unique characteristics have much to do with the sound of Presence XT. The Filter offers the following controls:

- **Bypass** Click the [Filter] button to turn the filter on or off.
- **Filter Mode** Choose from the following filter modes, each with its own sound-shaping characteristics.
  - **LP 24 dB Ladder** This mode emulates a classic 24-dB-per-octave low-pass filter based on a transistor-ladder configuration, as found in many classic synthesizers. This type of filter allows frequencies below the chosen Cutoff frequency to pass through, which cutting frequencies above Cutoff at a rate of 24 decibels per octave—a fairly aggressive slope.
  - **LP 24 dB Zero** This is a 24-dB-per-octave low-pass filter, based on a zero-delay-feedback architecture that closely models the tone and modulation behavior of analog filters.
  - **LP 12 dB Ladder** This is a low-pass filter with a 12-dB-per-octave curve, which cuts frequencies less aggressively than the 24 dB filters.
  - **BP 12 dB Ladder** This is a high-pass and low-pass filter in series, known collectively as a band-pass filter. It allows a selected band of frequencies to pass through, then cuts frequencies above and below that band at a rate of 12 decibels per octave.
  - **HP 12 dB Ladder** This is a high-pass filter with a 12-dB-per-octave slope. This lets frequencies above the chosen Cutoff frequency pass through, while cutting frequencies below Cutoff at a rate of 12 decibels per octave.
  - **LP 12 State, BP 12 State, HP 12 State, Eco Filter** These are a set of simple, clean digital filter models, in low-pass, band-pass, high-pass, and eco (low-CPU low-pass) modes. You can access these filter types in the drop-down menu at the end of the row of Filter Mode switches.
- **Cutoff** This lets you set the corner frequency of the filter—the point in the slope of the filter at which the filter cuts incoming audio by 3 dB. In the case of the Band-Pass filter, this sets the center frequency of the passed frequency band.
- **Soft** This control lets you switch between two differing analog-modeled processing circuits within the filter. Engage Soft for a mellower, darker tone. Disengage it for a brighter, more aggressive sound.
- **Drive** This lets you specify an amount of filter overdrive, to add fullness and saturation artifacts to your sound.
- **Punch** This control lets you add a range of percussive attack to the start of each note. At the lowest setting, dynamics are unchanged. At higher settings, the sound becomes more aggressive and more readily pops through the mix.
- **Resonance (Res)** This lets you set the amount of resonance in the filter, which is an emphasis centered on the chosen cutoff frequency. At lower settings, the filter cuts frequencies smoothly. As you increase Res, the emphasis at the cutoff frequency becomes more pronounced, able to mimic resonances such as those in voices or acoustic instruments, as well as many classic synthesis effects. At the highest settings, the filter can self-oscillate, emitting a pitched tone at the current cutoff frequency. This filter oscillation can be treated somewhat like an extra oscillator, especially in conjunction with the Key parameter.
- **Velocity (Vel)** This control sets the relationship between incoming note Velocity and filter Cutoff. When set at the center, velocity does not affect cutoff. When moved to the right, cutoff rises as note velocity increases. When moved to the left, cutoff lowers as note velocity increases.
- **Key** This control sets the relationship between incoming note Pitch and filter Cutoff. In physical instruments, higher notes tend to produce higher harmonics, brightening slightly as you go up the scale. On a synthesized instrument, if the filter stays static, setting the proper tone in the lower note ranges may cause inappropriate dullness in the higher notes. So, with the Key parameter, we can compensate for this, and create a more natural-sounding range of timbres up and down the keyboard.
  - When Key is set all the way to the left, the filter is unaffected by note pitch. In the middle, cutoff follows note pitch subtly, allowing high notes to shine. When set all the way right, filter cutoff follows note pitch closely in a relative fashion, moving

upward and downward in semitone values as notes are received. This lets you use the filter as an additional pitched oscillator or resonator when filter Res is set high.

Envelopes



Envelope generators are a vital part of sound synthesis, giving us the ability to shape the amplitude and timbre of our sounds within the time-scale of each note. Presence XT has two envelope generators, labeled Amp Env (so named because it is hard-wired to amplitude), and Env 2 (which is often routed to filter cutoff, for timbral shaping).

Both Env modules are triggered when a note is played. Each Env then outputs a control signal that follows the shape set by the following controls:

- **Attack (A)** This control lets you set the time required for the envelope to go from zero (silence) to full amplitude, in a range from 0 ms to 20 seconds.
- **Decay (D)** This control lets you set the time required to drop from full amplitude to the sustain level, in a range from 0 ms to 20 seconds.
- **Sustain (S)** This control lets you set the signal level that is maintained from the end of the decay period, until the key is released, in a range from -∞ dB (silence) to 0.0 dB (full amplitude).
- **Release (R)** This control lets you set the time required to fall back to silence after the key is released, in a range from 0 ms to 30 seconds.
- **Delay (△ - Env 2 only)** This control lets you specify a length of time (in ms) for the Env to pause before starting its attack phase after a note is played. This can assist in creating evolving sounds, where cycles of modulation occur at differing times over the length of a note.

Envelope Graphical Display

Each envelope has a corresponding graphical display that represents the shape created by the settings of its parameters. There are handles on the corners and slopes of each envelope that you can click and drag, letting you shape the ADSR envelope and the curve between its points visually. If you wish to lengthen any phase of the envelope beyond the time limits of the current display, simply drag the point toward the right of the graph, and the time scale adjusts to properly display the new setting.

Global Settings

The following Global parameters let you configure Presence XT's overall behavior and capabilities, to meet your needs.

- **Volume** This control lets you set the total output volume, in a range from -∞ dB (silence) to +10.0 dB (ten decibels above unity gain).
- **Velocity** This control lets you set the degree to which Presence XT's volume is affected by note velocity, from zero (no velocity sensitivity) to 1.0 (full velocity sensitivity).
- **Poly, Mono, and Glide** Enable Poly mode to allow polyphonic playing (more than one note at a time). Enable Mono mode to play just one note at a time. When in Mono mode, you can enable Glide to cause the pitch to sweep smoothly from that of the currently held note to that of the next note, when played legato (one note played while the previous note is held). The Glide knob lets you set the rate of pitch change over time, from 1 ms to 1 second.

Effects

Presence XT offers seven built-in effects processors to add dimension to your sounds. They are arranged in two banks: FX A (Modulation, Delay, and Reverb) and FX B (Gater, EQ, Distortion, and Pan). You can enable or disable each effect by clicking its name. You can show or hide the Mod/FX section of the plug-in window by clicking the [Mod/FX] button.

Modulation

This processor creates time-based modulation effects. Choose from the following modes by clicking the [Chorus], [Flanger], or [Phaser] button:

- **Chorus** This processor creates effects similar to that of multiple identical instruments playing the same part simultaneously. The synth signal is fed through a short, modulated delay, which is then mixed with the dry signal. Chorus offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Delay** This control lets you set the length of the modulated delay. Higher settings create full-bodied chorusing effects, while lower settings create more pronounced harmonics, akin to the effects of a Flanger.
  - **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler chorusing

effects, while higher settings produce more pronounced changes in timbre over time.

- **Depth** This control lets you blend between the dry signal (all the way left) and the chorused signal (all the way right).

- **Flanger** This processor creates resonant, hollow-sounding sweeping effects. The synth signal is fed through a short, modulated delay, which is mixed with the dry signal. While similar to the workings of a Chorus effect, Flangers get their signature sound by employing smaller delay times than those used in chorusing, combined with a feedback system that can add extra resonance to the sweep. Flanger offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Delay** This control lets you set the length of the modulated delay (in ms), which changes the pitch of the resultant resonance. Higher settings create lower-pitched resonance, while lower settings create resonances at a higher pitch.
  - **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler flanging effects, while higher settings produce more pronounced changes in timbre over time.
  - **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Flanger. Higher amounts of Feedback add to the resonance of the sweeping effect.
  - **Sync** Engage this option to enable setting Flanger modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the flanged signal (all the way right).
- **Phaser** This processor creates dreamy, otherworldly sweeping effects. The synth signal is fed through a series of all-pass filters that alter its phase. When mixed with the dry signal, this creates a series of peaks and valleys in the frequency response that changes depending on the degree of phase shift applied. Phaser offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Shift** This control lets you specify the amount of phase shift to apply. Lower settings focus the phasing effect in the lower frequencies, while higher settings focus the effect in higher frequencies.
  - **Speed** This control lets you set the speed of modulation applied to the phase shift amount. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the phase shift amount is modulated. Lower settings produce subtler effects, while higher settings produce more pronounced changes in timbre over time.
  - **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Phaser. Higher amounts of Feedback add to the resonance of the sweeping effect.
  - **Sync** Engage this option to enable setting Phaser modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the phase-shifted signal (all the way right).

Delay

This processor creates an echo effect, either as a single delayed repeat of the input signal, or a trailing series of echoes. The Delay effect offers the following controls:

- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the delayed signal.
- **Delay Time** This control lets you specify the length of the delay effect, in rhythmic values (such as 1/8th-note or 16th-note) relative to the tempo of the Song.
- **Feedback (FB)** This control lets you set the amount of effected signal that is fed back into the Delay effect. At zero, there is just one repeat. As you increase the value, the trail of repeats grows.
- **Mix** This control lets you blend between the dry signal (all the way left) and the delayed signal (all the way right).
- **Ping-Pong Mode** This menu lets you enable and configure the stereo Ping-Pong delay mode. You can choose from the following modes:

- **Off** The delay works as normal, without ping-pong functions.
- **Panned** Using a multi-tap delay structure, this mode pans each delay repeat to the right or left, in sequence.
- **Dotted and Double** These modes work similarly to Panned mode, but employ staggered spacing of the delay taps to produce a dotted-note or syncopated straight rhythm in the delay repeats.

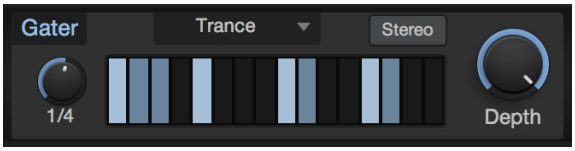
- **Reverb** Enable this option to route the output of the Delay effect to the Reverb effect, enabling further diffusion and abstraction of the delay signal.

Reverb

This effect places the synth signal within a synthesized reverberant physical space, ranging from short reverbs that emulate smaller rooms, to long reverbs that evoke the sounds of large spaces, such as halls and cathedrals. Reverb offers the following controls:

- **Pre-Delay (Pre)** This parameter lets you specify an amount of delay applied to the reverb-processed signal, in a range between zero and 500 ms. This emulates the delay inherent in large spaces between the impact of a sound and its audible reverberation. Lower settings are best suited to shorter reverb times, and longer settings with longer reverb times, but let your own taste be the judge.
- **Damping (Damp)** This control lets you set an amount of high-frequency attenuation to apply to the reverb signal. Spaces with soft surfaces tend to lose treble quickly as the sound reverberates, resulting in a short bright reverb followed by a progressively darker tail. Spaces with harder surfaces retain high-end more efficiently over time. Set Damp to its lower range to emulate hard surfaces, and to the higher ranges to enable further damping, to emulate softer surfaces.
- **Size** This control lets you set the length of reverberation from the moment a sound starts, in a range between 100 ms and 10 seconds. The larger the size, the longer the tail of the reverb, and the larger the emulated space sounds.
- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the reverb signal.
- **Mix** This control lets you blend between the dry signal (all the way left) and the reverb signal (all the way right).

Gater



This is a rhythmic gating effect, able to create a series of syncopated breaks in the synth signal. A variety of presets are provided, each with a different rhythmic gating pattern. However, the fun really begins when you create your own. Gater offers the following controls:

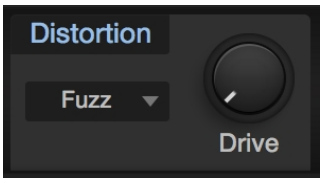
- **Beats** This control lets you set the length of the gating cycle, in rhythmic values (such as 1 bar or 1/2-note) relative to Song tempo. For example, at a setting of 1 bar, the 16 steps in the cycle repeat every bar, effectively representing 16th-notes. At a 1/2-note setting, the 16 steps repeat each half-bar, representing 32nd-note values.
- **Beat Steps** This grid lets you specify which steps in the cycle let signal pass through, and which gate the signal to silence. Click on a step to enable or disable gating for that step.
- **Stereo** Engaging this option creates a separate beat grid for each side of the stereo field. When engaged, you'll see two rows of beat steps, the top row specifying gate steps for the left channel, and the bottom row gating the right channel.
- **Depth** This control lets you blend between the gated and dry signals, allowing for rhythmic gating effects while retaining the continuity of the synth sound.

EQ

This is a graphic equalizer effect, perfect for quick tonal shaping. Set the EQ bands to emphasize or attenuate bands of frequencies to suit your needs. When a band is in the center of its range, it neither adds nor subtracts. When moved above the center, it emphasizes the chosen frequency. Moved below the center, it attenuates that frequency.

Choose between Lead mode, with frequencies chosen to suit aggressive, up-front sounds, or Bass mode, with wider-ranging frequencies that work better for basses and mellower chordal parts.

Distortion



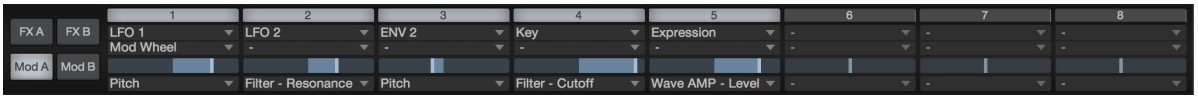
This is a variable distortion effect, which adds grit and character to your sounds. Choose from a variety of distortion types, from fizzy transistor fuzzes to thick, warm tube overdrives. Set the amount of distortion with the Drive knob.

Pan

This is an auto-pan effect, which pans the synth signal left and right over time. Pan offers the following controls:

- **Speed** This control lets you set the speed at which the signal is panned left and right.
- **Sync** Enable this option to set pan speed to a rhythmic value (such as 1/4-note or 16th-note) relative to Song tempo. Disable this option to set pan speed along a continuous range.
- **Depth** This control lets you set the degree to which the signal is panned. Lower settings give a subtly panned effect, while higher settings pan the signal more radically, all the way to fully left and right in each cycle.

Modulation Matrix



Presence XT provides 16 configurable modulation routings, in two banks of eight (Mod A and Mod B). Modulation signals can be routed from a selection of incoming MIDI controller signals (such as Pitch Bend, Mod Wheel, and Aftertouch), modulation generators (such as the LFOs and envelopes), or the pitch or velocity of played notes.

These modulation signals can be used to vary most of the parameters throughout Presence XT, including modulation sources themselves (such as LFO 2 modulating the rate of LFO 1, or the Decay of Env 2).

Each modulation slot has a bypass button at the top, which lets you enable or disable the flow of modulation signal. Below that are the input selector and modifier selector. If you assign a modulation source to the input selector only, that signal is routed directly to the chosen destination. In some cases, you'll want to govern the flow of one mod source before it reaches its destination, using the signal from another mod source. For example, you may want to control the output level of LFO 1 (routed to a parameter such as oscillator pitch) with the Mod Wheel. In this case, you'd choose Mod Wheel with the input selector, and LFO 1 with the modifier selector below.

Below that is a slider that controls the amplitude and polarity of the modulation signal. Set at its center, no modulation occurs. Move the handle right of center to send an increasing amount of the modulation signal, at its normal (positive) polarity, to the chosen destination. Move it left of center to send the signal to its destination with a negative value.

If the parameter you wish to modulate is set to a high value, you may want to send a negative modulation signal to it, driving the setting downward and causing more audible effects. Positive-going modulation signals are more efficient when modulating parameters set to low values.

A selector at the bottom of each modulation slot lets you choose the destination of the chosen modulation signals.

Virtual Keyboard

The virtual keyboard lets you easily click to play notes or manipulate the Pitch and Mod wheels, while auditioning or editing patches when you're away from a MIDI keyboard. The keyboard display also shows you which notes are currently being played.

Note that for a more playable keyboard experience when away from your MIDI controller, you can also use Studio One's **QWERTY Keyboard Device** to play notes using your computer's keyboard.

Next to the virtual keyboard is the Bend parameter, which lets you set the pitch bend range of the Pitch wheel, in semitones. The upper value sets up-bend range, and the lower value sets down-bend range.

Presence XT Editor

By default, Presence XT is a sample player, which lets you play (and tweak) sounds from existing libraries. If you want to create your own sample-based instruments, you can purchase and install the Presence XT Editor Add-on, available from the **PreSonus Shop**. This option upgrades Presence XT to full sampler functionality, with powerful scripting and layering features.

This editing function can also be used to deeply change and further optimize programs from imported sound libraries (such as those in EXS or Giga format), or Presence XT libraries created by other users. Commercial Presence XT libraries (such as those included with Studio One or bought separately) are protected, and cannot be edited.

Purchasing the Presence XT Editor Add-on

To purchase this Add-on, head to the **Studio One Add-ons** section of the PreSonus Shop. Add the option to your cart, and complete the purchase. You are now ready to install.

Installing from Within Studio One

To install this option from within Studio One, ensure that your Studio One machine is connected to the internet, then navigate to *Studio One/Studio One Installation...* Click the box next to the option in your "My Purchased Items" list to select it, then click [Install] to complete the installation.

Installing from the Web

To install this option using our web site, download the installer from your **my.presonus.com** account (in the Add-ons section of the My Products page). If you wish to install the option on a different computer than the one you used to download the file, move the installer file to the desired computer. Then, double-click the installer file and follow the instructions as prompted to complete the installation.

Once you've installed the Presence XT Editor Add-on, when you open a Presence XT window, you'll see a new button, marked "Editor." Press this button to open the editing interface. To return to the normal view, click the [Player] button. You'll notice there are four main sections in the editing interface:

Program

This area shows you the saved name and disk size of the program you're editing. If you click the menu button next to the [Program] button, a pop-up menu appears. Choose from the following functions:

- **New Program** Resets Presence XT to a default state, with a blank program loaded. If you've begun to create a program and have not yet saved it, you'll receive a warning, telling you that your samples and parameter settings will be lost if you go through with creating a new program.
- **Pack Program** Lets you package your program, with all its samples and settings, into a single file, for easy storage and sharing. Packed programs are created with a ".soundx" file extension.
- **Set Program Password** Lets you set a password that Presence XT prompts for if a person attempts to edit this program. This lets you keep a program from being edited, even when sharing it with others.

To the right of the program area, you'll see three buttons that control the editor display. They look like this:

The first button shows or hides an information drawer at the top of the editor window. Here, you can edit the program's name, set its category, and add a description and information about yourself, as author of the program. The information you enter here is shown in the Player view when your program is loaded, so we recommend you always fill in these fields.

The second and third buttons arrange the Layers and Zones areas either side-by-side, or vertically stacked, according to your preference.

Finally, you'll see the [Script] button, which opens the scripting view, in which you can write scripts in JavaScript, for greater creative control and interface flexibility in your programs. For more information on working with JavaScript in Presence XT, see **Scripting**.

Layer

This area deals with Layers, which are entire sample sets, arranged in Zones (as discussed below) across the range of MIDI key and velocity values. These layers can be combined to create fuller sounds and textures, or to set up one or more MIDI-switchable variations for a given sound.

For example, a layer could be a single variation, such as "Pizzicato," in a string sound (made up of many layers), with multiple sample zones spread across the keyboard, horizontally. Or, a layer could be a single drum instrument, such as a snare drum, containing multiple velocity zones, stacked vertically on a single MIDI note. For more information on working with the layer functions, see **Layers**.

Zones

This area deals with Zones, which are areas in which a single sample is placed across the range of MIDI key and velocity values. These sample zones are the pieces that make up a layer (as discussed above), letting you decide exactly how your samples are placed, played, and processed.

For example, a high-quality piano sound may have a group of separate samples for every note on the piano, arranged to be played at low, mid, or high velocity. In the Zones area, you can make decisions like this with your own samples, setting up the range of the keyboard and key velocity in which each sample plays, along with many other options. For more information on working with zones, see **Zones**.

Parameters

This area gives you access to a wide variety of modulation, tonal, and behavioral options for each layer and the zones within them. The parameters available in this area can pertain to the program as a whole, to the currently selected layer, or the currently selected zone.

Clicking the [Program], [Layer], or [Zones] button changes the focus of the Parameters area to address each of those categories, as needed. You can also switch the mode of the parameters area between these three settings by clicking the [Parameters] button. You can easily keep track of which mode you're in, because the Parameters area is color-coded: Program mode is blue, Layers is red, and Zones is turquoise.

For more information, see **Parameters**.

Creating a New Program

To get started creating a new program, open an instance of Presence XT and click the [Editor] button to open the editing interface. A blank preset is shown by default. It has a single layer, and no samples yet placed in zones. You can then begin dragging samples from the Browser into the Zones area on the Presence XT window.

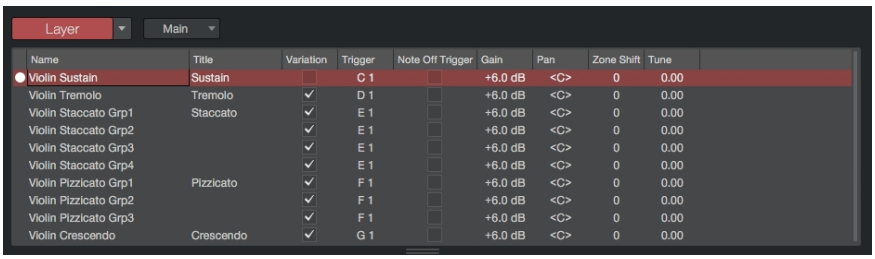
Looking at the Zones area, you can see the samples you add to your new program. By default, they are displayed in a list-style view, showing the sample name and a variety of available parameters for each. If you click the [Grid] button, you'll see the samples displayed along a grid that represents the full range of MIDI notes (horizontally) and velocity values (vertically). You can get back to the list view at any time by clicking the [List] button.

The first sample you add defaults to playing on MIDI note C-1, the second defaults to C#-1, and so on, in ascending order. This can be helpful when creating drum programs or heavily multisampled sounds, where each key may have a sample of its own. If you intend for a sample to cover a larger span of keys, you can specify the desired span using the Key Low and Key High parameters for each sample (if looking at zones in list view) or by dragging the edges of each sample to the beginning and end of the desired range (if looking at zones in grid view).

Once you have the start to a new sound in place, you'll probably want to save the preset, to preserve your work. To do this, follow the instructions shown in **Creating and Managing Effects Presets**.

For more detailed information on the available functions and parameters to help you develop sounds, see the following sections: **Layers**, **Zones**, and **Parameters.**

Layers



The Layers area of the Presence XT editor window is used to establish sound layering in your program. Layers are entire sound sets, with samples placed in zones, and most of the necessary sample-by-sample decisions already made (such as key and velocity ranges, processing details, and so on). You can add multiple layers to your program, to create hybrid sounds that play together, or provide MIDI-selectable variations on a given sound, such as different bowing and plucking styles in a violin sound.

If you're just getting started creating a new program and you want to import samples and get them placed and configured, you'll be doing most of that work in the Zones area of the Presence XT window. See **Zones** for more info to get you started.

Once you've added and configured your first set of samples in the Zones area, you've put together your first layer. If you look at the Layer area in the Presence XT editor window, you'll see "Layer 1" listed, along with a set of editable parameters for that layer. For more info on parameters available when editing layers, see **Layer Parameters**.

Managing Layers

To add a new layer, [Right]/[Ctrl]-click in the layers list or click the menu button next to the [Layers] button. Choose "Add Layer" from the pop-up menu. A new layer is created and added to the layers list. This pop-up menu also offers the following options:

- **Remove Layer** Removes the currently selected layer from the program. This also removes all samples placed in zones within that layer.
- **Duplicate Layer** Creates a duplicate of the currently selected layer, with all sample placements and parameters the same.
- **Merge Layers** Combines the sample placements and related parameter settings for all selected layers, into one new layer.
- **Copy Page Parameters** Copies the parameter settings shown on the current visible page for the currently selected layer, so that they can be pasted to a different layer.
- **Paste Page Parameters** Pastes the copied parameter settings to the currently selected layer.

If you select more than one layer at a time, you'll see all of the zones in all selected layers shown in the Zones area below, whether in list or grid mode.

Layer Parameters

Each layer in your program has several pages of parameters available for editing, to help you shape the sound to your liking. By default, the Main page of parameters is shown. When navigating through a layer's parameters, you can use the cursor keys on your keyboard to move between them, as well as up or down from layer to layer. To edit a selected parameter, press [Enter] on your keyboard, then edit the parameter, and press [Enter] again to lock in the new value.

The Main page contains the following parameters for each layer:

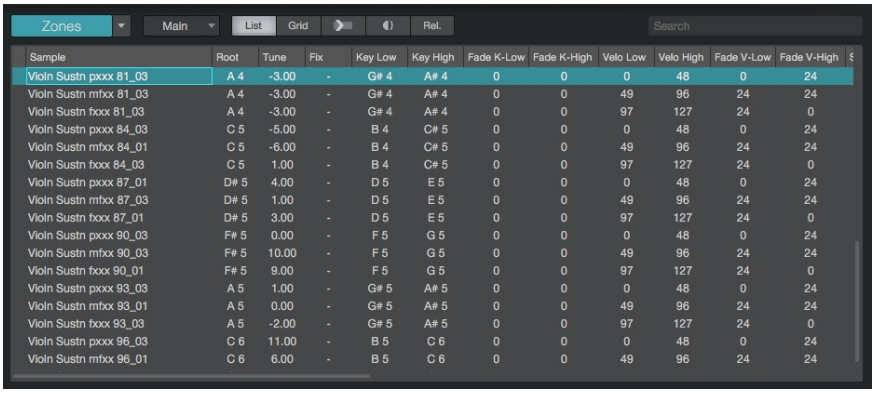
- **Title** Lets you set the title for the layer.
- **Variation** Lets you designate a layer as a key-switched variation of the sampled sound set (such as different styles of picking or strumming on a guitar sound). If enabled, this layer becomes active when the MIDI note specified in the Trigger parameter (described below) is played. When another variation is activated by its own MIDI key trigger, this layer stops playing. To designate one variation as the default, leave its Variation box unchecked, but still provide a note for the variation in the Trigger column.
- **Trigger** Lets you specify the MIDI note that activates this layer, if it has been enabled as a Variation.
- **Note Off Trigger** Enable this to trigger sounds within this layer only when a MIDI note ends. This is most useful for adding release sounds to a sample program, such as piano hammers falling back into place after a note is played.
- **Gain** Sets overall gain for an entire layer.
- **Pan** Shifts overall pan placement for an entire layer, relative to the pan settings for each zone in that layer.
- **Zone Shift** Moves all zones contained within a layer up or down the MIDI key range. When you do this, the range of playable notes for each zone is moved up or down, and the base note for each zone shifts with it.
- **Tune** Adjusts tuning of all samples contained in a layer.

If you click the menu button next to the button currently marked "Main," you can access the following sets of modulation and processing parameters for each layer:

- **LFO 1 & 2** These settings mirror the LFO settings in the Player view of Presence XT, setting LFO parameters for all zones in a layer.
- **Amp Env & Env 2** These settings mirror the Envelope settings in the Player view, setting envelope parameters for all zones in a layer.
- **Filter** These settings mirror the Filter settings in the Player view, setting filter parameters for all zones in a layer.
- **Other** These settings mirror the Glide Time, Velocity Strength, and Velocity Curve controls in the Player view, setting configuration options for all zones in a layer.

When you make changes to parameters in these pages, those changes are applied to all zones in that layer. If any affected zones have differing settings for those parameters, their values are shifted in a relative fashion as you change the corresponding layer parameter.

Zones



The Zones area is where you do most of the work when sound designing with Presence XT. You drag samples here from the Browser for inclusion in your program, and then you set the parameters for each sample zone. This lets you place the sample in the desired area of the MIDI key and velocity range and make all the necessary decisions about sample behavior, modulation, and processing.

By default, the sample zones you create by adding samples are shown in a list. This shows the name and parameters for each sample. You can search for a zone by name within the currently selected layer by typing into the Search bar above the Zones display.

Managing Zones

You add zones to a layer by selecting that layer and dragging samples into the Zones area. If you click the menu button next to the [Zones] button, a pop-up menu appears with the following functions:

- **Apply Parameters from File** Updates zone parameters to match those found in source file (such as root note, tuning, and loop mode).
- **Remove Zone** Removes the currently selected zone from the program.
- **Copy Page Parameters** Copies the parameter settings shown on the current visible page for the currently selected zone, so that they can be pasted to a different layer.
- **Paste Page Parameters** Pastes the copied parameter settings to the currently selected zone.
- **Refresh Selected Zone(s)** Lets you re-import samples in the selected zones, if the original samples have been changed or edited since you originally imported them.
- **Show in Finder/Explorer** Opens an Explorer (Windows) or Finder (macOS) window, showing you the location of the currently selected sample.

Zones Area Options

There are a set of buttons at the top of the Zones area that change how you see and interact with it.

- **List** Shows the zones in the currently selected layer in a list view, along with pages of parameters for fine editing of each zone. For info on the available parameters, see **Zone Parameters**.
- **Grid** Shows the zones in the currently selected layer as regions in a grid that represents the span of MIDI notes (horizontally) and MIDI velocity values (vertically). For more information on placing samples in grid mode, see **Zones in Grid View**.
- **Input Triggers Selection** Enable this option to select zones by playing keys on a MIDI keyboard. When a key is played, all zones that play within its note range are selected in the zones list.
- **Audition Focus Zone** Enable this option to audition a sample whenever its zone is selected when looking at **zones in grid view**.
- **Rel.** Enable this option to enter relative editing mode. When this mode is off, if you select multiple zones and change a parameter value in one of the zones, that parameter is set to the chosen value in all selected zones. When this mode is enabled, if more than one zone is selected, and you change a parameter in one zone, that parameter is changed in all selected zones, but in a relative fashion, up or down from the current setting.

Zone Parameters

Looking at zones in list view, you see the list of samples in the currently selected layer, and several columns of parameters with values for each zone. By default, the Main page of parameters is shown.

When navigating through the parameters for a zone, you can use the cursor keys on your keyboard to move between them, as well as up and down, from zone to zone. To edit a selected parameter, press [Enter] on your keyboard, then edit the parameter, and press [Enter] again to lock in the new value.

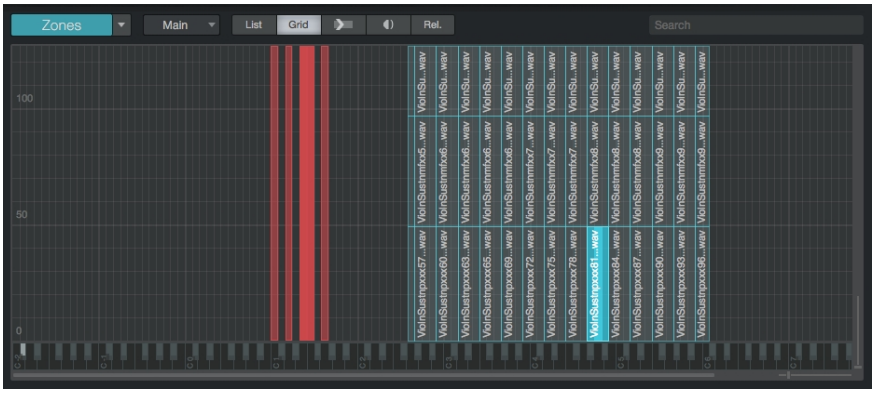
The following parameters are available in the Main parameter page:

- **Root** Sets the root note for the current sample zone. Generally, it's best to set this to the actual note at which the sample plays, ensuring that it plays at the proper pitch when triggered by MIDI notes.
- **Tune** Fine-tunes the pitch of the sample, in cents.
- **Fix** Lets you set a defined pitch at which the sample plays, regardless of what MIDI note triggers it. This can be helpful for percussion kits or other non-pitched sample sets, where MIDI notes should not transpose a sample from its intended pitch.
- **Key Low & Key High** Lets you set the low and high limits of the MIDI note range in which a sample zone should play.
- **Fade K-Low & Fade K-High** Lets you specify the degree to which a zone fades down in volume as you play notes closer to the top or bottom of its note range. This can be helpful when you want a smooth transition between two zones, each blending into the other.
- **Velo Low & Velo High** Lets you set the low and high limits of the MIDI velocity range in which a sample zone should play.
- **Fade V-Low & Fade V-High**Lets you specify the degree to which a zone fades down in volume as you play notes closer to the top or bottom of its velocity range.
- **Start & End** Lets you specify the point within a sample that playback begins and ends.
- **Loop Mode** Lets you choose the loop mode for a zone. Off disables looping, Sustain enables looping while a MIDI note is held, and Release enables looping when a MIDI note is released, and the release portion of the sound is playing.
- **Loop Start & Loop End** Lets you specify the start and end of the looping range of the sample (if applicable).
- **Loop XFade** Lets you specify a length of fade to apply at the transition point between the end of a loop and its subsequent beginning. This is often helpful when working with sustained sounds, which may need some smoothing.
- **Gain** Lets you set gain for an individual zone.
- **Pan** Lets you pan a zone across the stereo field.
- **Round Robin** By default, samples that are placed in overlapping zones play concurrently when a note in the proper range and velocity is played. When you select Round Robin values for overlapping zones, they switch places with successive plays of a note, according to the order of the numbers you specify. This can help to introduce natural-sounding variations from note to note, especially in sounds made from samples of live instruments. Type "random" into this field for any set of overlapping key zones, and those samples will play in random order as keys are struck, rather than numerical.
- **Play** Lets you specify the play mode for a zone. Normal is the default mode, with zones playing and stopping according to the length of incoming MIDI notes. One-Shot plays the whole specified range of a sample when a note is played. Toggle mode lets long or looped samples play indefinitely, until the same note is played again.
- **Follow Tempo** Allows samples with a rhythmic component to be timestretched as needed in order to follow the Song tempo. This feature can be activated per zone and per sample, but it should be used sparingly because real-time timestretching is CPU-intensive.
- **Path** Shows the disk path in your file system where the sample for each zone is stored.

If you click the menu button next to the button currently marked "Main," you can access the following sets of modulation and processing parameters for each zone:

- **LFO 1 & 2** These settings mirror the LFO settings in the Player view of Presence XT, setting LFO parameters for a zone.
- **Amp Env & Env 2** These settings mirror the Envelope settings in the Player view, setting envelope parameters for a zone.
- **Filter** These settings mirror the Filter settings in the Player view, setting filter parameters for a zone.
- **Other** These settings mirror the Glide Time, Velocity Strength, and Velocity Curve controls in the Player view, setting configuration options for a zone.5.0

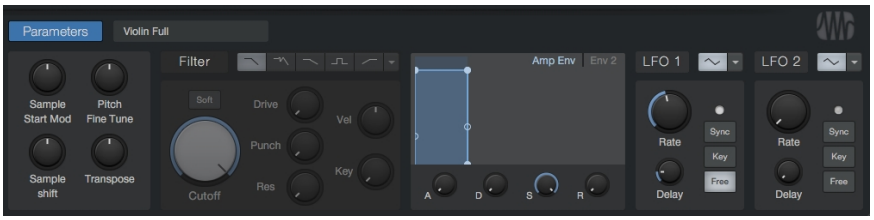
Zones in Grid View



When you look at zones in grid view, you see them as labeled regions, filling a certain space within the range of MIDI notes (horizontally) and velocity values (vertically). You can click and drag the top, bottom, and side edges of each zone to select the desired range in which that zone will play. If you select multiple zones (by holding [Shift] or [Cmd]/[Ctrl] and clicking the desired zones), you can edit their ranges or move them as a group.

If you click one of the "keys" in the keyboard display at the bottom of the grid, all zones triggered by that note are selected.

Parameters



There are a great many available layer and zone parameters that you can access in the Layer and Zones areas of the editor window. While editing in this "spreadsheet" style can be fast and precise, sometimes it can be helpful to use the type of knobs, buttons, and displays you're used to in the Player mode to help set and visualize these parameters. The Parameters area of the editor window lets you set many of the available parameters in this way.

The Parameters area can show controls for the program as a whole (all layers and zones, together), or for one or more selected layers (and the zones they contain), or for one or more selected zones. You can choose to display parameters for each by clicking the [Program], [Layer], or [Zones] button, or cycle through them by clicking the [Parameters] button. You can easily keep track of which mode you're in, because the Parameters area is color-coded: Program mode is blue, Layers is red, and Zones is turquoise.

Whatever mode is selected, parameters pertaining to modulation, filter, and mode-specific settings for that level in the program are shown

Zone Waveform Display

When the Parameters area is in Zones mode, a [Wave] button appears. Clicking this brings up a waveform display for the sample in the selected zone. Click and drag along the top edge to set the loop range for the displayed sample. Click and drag at the beginning or end of the sample to move the play start or end point for the displayed sample.

While loop editing is possible in this fashion, it lacks the control and accuracy of a dedicated wave editor. As a result, clicks and pops may appear when changing loop start and end points in this display. Adding a loop crossfade may solve this problem. This waveform display is mainly meant for monitoring or reference. If in-depth loop editing is required, a dedicated wave editor software should be used.

If you want to replace the sample in a zone with a new sample, simply select the zone, and drag the new sample onto the waveform display. This retains any parameter settings you made for the previous sample.

Scripting

Presence XT offers powerful scripting functions, based on JavaScript. We chose this language because it is well supported and documented, and known by many. Scripting can be used to affect many functions in a program, most notably to assign macro knobs and buttons to your choice of parameters. Once script controls are assigned here, these controls appear in the central display in the Player mode of the Presence XT window.

You may have seen these sorts of controls in some of the included Presence XT programs. Scripting is the way to make this happen.

To access scripting for a program, click the [Script] button in the editor view. This brings up a window in which you can enter your JavaScript code, with some helpful structure added by default. To return to the editor view, press the [Edit] button. There are two buttons at the top of the Script view, that look like this:

The first button shows or hides a drawer that displays the eight scriptable control knobs and buttons for the program. By default, it looks blank. To enable a control, click the dot-shaped button in its lower left corner. To rename a control, click the pencil-shaped button that appears when you hover the mouse cursor over the control. The functions that these controls relate to are set in the script that you create.

The second button opens our documentation for the JavaScript structure you can use to script within Presence XT. It goes through the various entry points, objects, and parameters that you can use to interface with Presence XT's engine.

Between this information and the wide range of info resources available on the internet, you can soon dig into scripting for your programs, unlocking many useful functions.

You can click the [Reset] button to return the code window to its default (blank) state, or press [Apply] to apply your script and try out its functions.

Impact XT

Impact XT 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.

Interface Overview

Impact XT is arranged as a 4x4 grid of pads, with controls for each pad. There are eight selectable banks of 16 pads, labeled A through H. 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. At the top of the window is the waveform display, which shows the currently selected sample along with controls for setting start and end points. To the right of the waveform display are the sample controls, which let you set playback behavior for the samples on each pad.

Add and Play Samples

To add a sample to a pad, drag any audio clip from the Browser, or any Audio Event or selected range from the Arrange view, directly onto the desired pad. If you drag in a selected range from the Arrange view, the range is bounced to a separate audio file and then added to Impact XT. Dragging a sample to a pad that already contains a sample replaces the old sample with the new one, by default.

To mute a pad, click the Mute button beneath the pad. To solo a pad, so that you hear only its sound, click the Solo button beneath the pad. Note that each pad has its own Pitch, Filter, and Amplifier controls.

To import a drum loop and automatically split its hits across multiple pads, hold [Shift] while dragging the loop onto Impact XT.

A variety of useful actions can be taken by right-clicking a pad and choosing from the drop-down menu:

- **Replace Sample** Replace the currently loaded sample with a new one.
- **Add Sample** Add a sample to the pad.
- **Rename Pad** Assign a new name to the pad.
- **Clear Pad** Clear all samples from the pad.
- **Clear Bank** Clear all samples from all pads in the current bank.
- **Play One Shot** Change the Trigger mode for the pad to One Shot.
- **Play Loop** Change the Trigger mode for the pad to Loop.
- **Play Normal** Change the Trigger mode for the pad to Normal.

Multiple Velocity Layers

It is possible to add more than one sample to a pad, enabling you to trigger different samples based on velocity. For instance, you may want to have three different samples for a single snare drum pad: one soft, one medium, and one loud. This way, when you play Impact XT, the snare drum sounds much more realistic than if you use a single sample.

To do this, select multiple samples in the browser or in your computer's file system, and drag them to a pad.

Waveform Display

When you select a pad, its currently loaded sample is shown in this display. Here, you can set sample start and end by moving the triangle-shaped markers. If more than one sample is loaded in the pad, you can switch between them by clicking the numbered buttons above the waveform display. You can click-and-drag the demarcations between the sample selector buttons to set the velocity-switching values (for use with the Velocity Layer Mode).

Add Sample (+) Choose this option to add an additional sample to this pad.

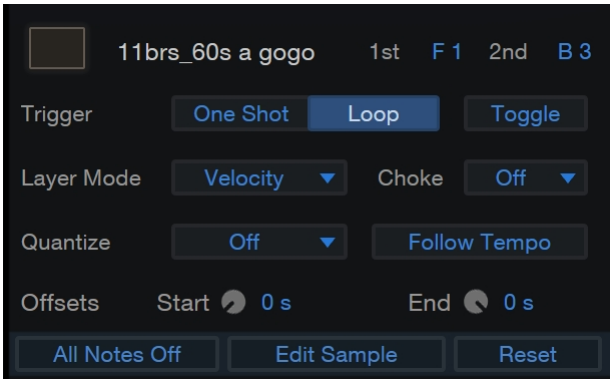
Reverse Enable this option to reverse the current sample.

Normalize Enable this option to boost the amplitude of the current sample until its highest peak reaches a point just below full scale.

Load Next/Previous Sample in Folder These buttons let you quickly swap the current sample for its neighbor in the enclosing folder. This allows for quick auditioning of a range of samples, to find just the right candidate.

Start and End Sets the sample start and end, in samples.

Sample Controls



These controls let you fine-tune sample behavior for each pad:

Color Choose a color with which to mark the pad.

1st and 2nd Note Assignment Choose two MIDI note values to trigger this pad.

Trigger Choose **One Shot** to play the loaded sample once when a pad is struck, no matter how long it is held. Chose **Loop** to continuously loop the sample as long as the pad is held. Choose **Toggle** to begin playing the sample when the pad is struck, and continue playing it (even if looped) until the pad is struck a second time. Select Normal to begin playing the sample when the pad is struck and held down, and continue playing it until the pad is released.

Layer Mode This parameter lets you choose how multiple samples are treated if loaded onto a single pad. Choose **Velocity** to switch between the samples depending on pad velocity. Choose **Round Robin** to step through the samples one by one each time the pad is struck. Choose **Random** to choose a sample at random each time the pad is struck. Choose **Stack** to play all loaded samples simultaneously.

Choke This parameter lets you specify the relationship between different pads, such as those set up to play closed and open hi-hat cymbals. Choose **Self** to allow a pad's playback to be stopped when the pad is played a second time (rather than continue to ring out). Choose a Choke group (1-32) to tie the playback of this pad to all other pads also assigned to that choke group.

Quantize This parameter lets you limit your ability to play a pad to a preset rhythmic value. Choose from Off (no rhythmic limits), Bars (once at the start of each bar), Beats (once per quarter note), 1/2-Beats (once per eighth-note), and 1/4-Beats (once per 16th note).

Follow Tempo Enable this option to automatically timestretch the current sample to fit the tempo of the Song. This is most effective when using rhythmic loops, such as drum samples.

Offsets Introduce a playback offset of up to 2.5 seconds at the start or end of the loaded sample.

All Notes Off Press this button to end playback for all currently playing samples.

Edit Sample This button lets you specify individual settings for the currently selected sample, rather than changing those parameters for all samples, as done by default. If after you've made custom alterations to one sample, you wish to reunify all samples under the same settings, press **Reset**.

Pitch Controls

You can modify the pitch for each pad's sample using the Pitch controls.

- **Transpose** Adjusts the transposition in semitones for the selected pad. Variable from -48 to +48.
- **Tune** Adjusts the tuning, in cents, for the selected pad. Variable from -100 to 100 cents.

- **Pitch Envelope (One-Shot Trigger Mode Only)**
  - **Attack** Adjusts the amount of time from when the pad is triggered to when the envelope value is reached. Variable from 0 s to 20 s.
  - **Hold** Adjusts the amount of time the envelope value is held after the attack period and before decay begins. Variable from 0 s to 20 s.
  - **Decay** Adjusts the amount of time it takes after the hold period to return to the envelope value. Variable from 0.98 ms to 20 s.
- **Pitch Envelope (Loop and Normal Trigger Modes Only)**
  - **Attack** Adjusts the amount of time it takes to reach the Env value from the original pitch of the sample once a sample has been triggered. Variable from 0 to 20 s.
  - **Decay** Adjusts the amount of time it takes to reach the sustain level after reaching full volume. Variable from 0 to 20 s.
  - **Sustain** Adjusts the Sustain level. Variable from -∞ dB to 0 dB. The sustain period continues until the sample trigger stops.
  - **Release** Adjusts the amount of time it takes to reach the original pitch after sample trigger has stopped. Variable from 0 to 30 s.
- **Env** Adjusts the detune range of the pitch envelope in cents. Variable from -4 to +4 octaves. (The default value is 0, meaning the pitch envelope has no effect.)
- **Vel** Adjusts the maximum detune value, in cents, that pitch is affected by velocity (the maximum detune value when triggered note velocity equals 127). Variable from -4 to +4 octaves.

Filter Controls

Each pad features a variable filter to allow anything from subtle tonal shaping to heavily processed filter sweeps.

- **Cutoff** Adjusts the cutoff frequency of the filter. Variable from 20 Hz to 20 kHz.
- **Res** Adjusts the resonance of the filter. Variable from 0 to 100.
- **Filter Env (One-Shot Trigger Mode Only)**
  - **Attack** Adjusts 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 s to 20 s.
  - **Hold** Adjusts the amount of time the envelope value is held after the attack period and before decay begins. Variable from 0 s to 20 s.
  - **Decay** Adjusts the amount of time it takes to return to the cutoff level after reaching the envelope value. Variable from 0 s to 20 s.
- **Filter Env (Loop and Normal Trigger Modes Only)**
  - **Attack** Adjusts 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 to 20 seconds.
  - **Decay** Adjusts the amount of time it takes to reach the sustain level after reaching the envelope value. Variable from 0 s to 20 s.
  - **Sustain** Adjusts 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 -∞ to 0 dB. The sustain period continues until the sample trigger stops.

- **Release** Adjusts the amount of time it takes the filter to reach the frequency value after the sample trigger has stopped. Variable from 0 to 30 seconds.

- **Env** Adjusts the range of the filter envelope in octaves, relative to the cutoff value. Variable from -8000 to +8000. (The default value is 0, meaning the filter envelope has no effect.)
- **Vel** Adjusts the maximum value in octaves affected by velocity . Variable from -100 % to + 100 % (the maximum value when triggered note velocity equals 127).
- **Filter Type** Selects the filter type. Choose from LP24 Ladder, LP24 Zero-Latency, LP12 Ladder, BP12 Ladder, HP12 Ladder, LP12 State, BP12 State, HP12 State, and Eco Filter (lowest CPU use).
- **Drive** This lets you specify an amount of filter overdrive, to add fullness and saturation artifacts to your sound.
- **Punch** This control lets you add a range of percussive attack to the start of each note. At the lowest setting, dynamics are unchanged. At higher settings, the sound becomes more aggressive and more readily pops through the mix.
- **Soft** This control lets you switch between two differing analog-modeled processing circuits within the filter. Engage Soft for a mellower, darker tone. Disengage it for a brighter, more aggressive sound.

Amplifier Controls

To adjust the amplitude for each pad, use the following parameters:

- **Gain** Attenuates or boosts the amplitude, in dB, of the sample assigned to the selected pad. Variable from -144 to 20 dB.
- **Pan** Adjusts the sample's stereo pan for the selected pad. Variable from fully left to fully right.
- **Amp Env (One-Shot Trigger Mode Only)**
  - **Attack** Adjusts the amount of time from when the pad is triggered to when maximum amplitude is reached. Variable from 0 s (no attack, sample starts at maximum amplitude) to 20 s.
  - **Hold** Adjusts the amount of time the maximum velocity is held after the attack period, before decay begins. Variable from 0 s to 20 s.
  - **Decay** Adjusts the amount of time it takes after the hold period to reach an amplitude of -∞ from the maximum amplitude. Variable from 0 s to 20 s.

  Amp Env (Loop and Normal Trigger Modes Only)

-
  - **Attack** Adjusts the amount of time it takes to reach full volume once a sample has been triggered. Variable from 0 to 20 seconds.
  - **Decay** Adjusts the amount of time it takes to reach the sustain level after reaching full volume. Variable from 0 to 20 seconds.
  - **Sustain** Adjusts the sustain level. Variable from -∞ to 0 dB. The sustain period continues until the sample trigger stops.
  - **Release** Adjusts the amount of time it takes to reach a level of -∞ after the sample trigger has stopped. Variable from 0 to 30 seconds.
- **Vel** Adjusts the maximum amplitude value, in dB, affected by velocity (the maximum amplitude value when triggered note velocity equals 127). Variable from 0 to 1.

Pad Focus

By default, the Pitch, Filter, and Amplifier controls act on the pad you most recently selected. To make editing easier when working on multiple pads, you can enable Pad Focus by clicking the [Pad Focus] button at the top of the plug-in window. When this mode is enabled, "focus" shifts to whatever pad you most recently played, letting you edit parameters for that pad.

Pad Focus and Control Linking

When in Pad Focus mode, if you use Control Link to assign a hardware control to a Pitch, Filter, or Amplifier control in Impact XT, that hardware control is linked in Focus mode. This means that the hardware control acts on the assigned parameter not only for the originally

assigned pad, but for whatever pad is most recently played. Using Control Linking under Pad Focus mode can make editing many pads a faster and easier process.

Using Multiple Outputs

Impact XT provides 16 stereo outputs and 16 mono outputs for each pad. To change the output routing, click on the Output selection box below the desired pads and choose the desired Output Channel for each pad. If the Output Channel does not already exist in the Console, it is added automatically.

Working with .soundx Files

Given that it's so easy to create new sample kits in Impact XT, you may find that you want to exchange them with other people. To export the current patch as a .soundx file for other Impact XT users to try, click the menu button and choose **Export Sampler File...** To import a multisample or soundx preset file into Impact XT, simply drag-and-drop it onto the plug-in window.

File Sharing with SampleOne XT

Once you've created some samples you love in SampleOne XT, you can import them to Impact XT using drag-and-drop. To do this, click and drag your chosen sample from the sample list in SampleOne XT, and hover your cursor over an Impact XT tab at the top of the Instruments window. Impact XT is then shown, and you can drop your sample onto any pad. You can also select multiple samples in SampleOne XT, then click and drag the group into Impact XT as described above.

By default, when multiple samples are dropped onto a pad, they are all assigned to that pad and are played interchangably, according to the current Layer Mode. To distribute multiple samples across multiple pads, press and hold [Shift] before dropping them. The first sample is assigned to the selected pad, and each subsequent sample is assigned to subsequent pads in ascending note order.

Color Themes

Looking for a little personalization? Try clicking the PreSonus logo at the top right corner of the Impact XT window for a selection of new color themes.

Mai Tai

Mai Tai is a polyphonic analog modeling synthesizer with a simple and straightforward interface. It excels at pad sounds, leads, rhythmic chords, and many other synth duties. Mai Tai includes the following features:

- 32 synth voices with up to 8x oversampling
- 2 oscillators (sine, triangle, saw, square) with sub osc
- Osc spread, sync, PWM & Random Phase
- Noise generator
- Character processor (for creative tonal effects)
- Multi-Mode Filter
  - 24 dB Ladder Filter
  - 24 dB Zero Delay Feedback Filter
  - 12 dB Low-Pass, Band-Pass, and High-Pass Filters
- 2 LFOs (with sync, free run, and sample & hold)
- 3 ADSR Envelopes (two with pre-attack delay)
- 16-slot modulation matrix
- Effects: Chorus, Flanger, Phaser, Delay, Reverb, Gater, EQ, Distortion, Pan

Interface

The central control panel contains controls for the Oscillators (Osc 1 and 2) and Noise generator, the Character processor and Filter, and the LFOs and Envelope Generators. These are the primary controls you'll use to sculpt your sound. You can enable or disable each of these modules by clicking the module's name. To the right of these controls are the Global parameters, which let you tune the overall behavior and capabilities of the synth to your needs.

Along the bottom of the window, you'll see the Mod/FX section (which gives you access to Mai Tai's modulation matrix and effects) and the virtual keyboard. You can hide or show each of these elements by pressing the [MOD/FX] and buttons.

Oscillators

Two oscillators are available, per voice, allowing for rich sounds with a wide tonal palette. Each Osc has its own set of parameters, which differ in small but significant ways. In both Osc 1 and Osc 2, you'll see the following controls:

- **Bypass** Click the [Osc 1] or [Osc 2] button to disable or enable each oscillator. This can be helpful when you want to create a one-oscillator sound, or to temporarily disable an oscillator, so that you can focus on shaping the sound of the other.

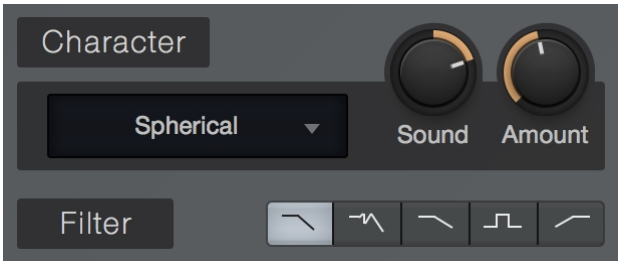
- **Oscillator Waveform** Choose between Sine, Triangle, Sawtooth, or Square.
- **PWM** Only available when Square Wave is selected, this control lets you vary the pulse width of the square wave, changing the distribution of harmonics, and thus, the tone of the oscillator.
- **Octave** Lets you set the frequency range, in octaves, for the current oscillator. Range is set in number of feet (like a pipe in a pipe organ), so the lower the number, the higher the pitch.
- **Random Phase (RP)** Enable this option to set the oscillator to Random Phase mode, in which, when a note is played, the oscillator starts its waveform at a random start point. This establishes a varying phase relationship between both oscillators whenever a note is played (if both oscs are enabled), which creates pleasing shifts in tone over time. Disable this option to restart the waveform at the beginning when a note is played, which can be preferable when creating percussive sounds, because it allows a uniformity of attack, from note to note.
- **Semi and Fine** These controls let you set the center pitch of the oscillator, in semitones (Semi) and cents (Fine).
- **Spread (Osc 1 only)** This control lets you layer in additional oscillators that follow Osc 1 pitch, with increasing amounts of detuning as more oscillators are blended in. This creates a richer, fuller sound. With Spread all the way to the left, you hear a single oscillator. As you turn Spread to the right, more oscillators are added, with greater detuning and stereo spread.
- **Sync (Osc 2 only)** Enable this option to restart Osc 2's waveform each time Osc 1's waveform repeats. This is a classic analog synthesis technique, creating rich harmonics and a sharp and strident sound. This is further expanded when pitch modulation is applied to one or both of the oscillators with an LFO or envelope.
- **Sub** Each of Mai Tai's oscillators has an attached sine wave sub-oscillator, which plays the same relative pitch as the main osc, but an octave down. This control lets you blend in the signal from the sub-oscillator, which is a nice way to add additional thickness and fullness to your sound, without having to dedicate the second main oscillator to the task.
- **Level** This control lets you set the volume of each oscillator, to blend their tones to your liking.
- **Pan** This control lets you position each oscillator separately in the stereo field, from left to right.

Noise Generator

The Noise section is a noise generator that can add texture and character to your sounds. The Noise module offers the following controls:

- **Bypass** Click the [Noise] button to turn Noise on or off.
- **Level** Lets you set the volume level for the noise generator.
- **Pan** This control lets you position each oscillator separately in the stereo field, from left to right.
- **Color** Lets you set the timbre of the noise from dark to bright.

Character



The Character processor is one of the unique features of Mai Tai, offering a range of waveshaping effects that broaden its tonal range. The Character module offers the following controls:

- **Bypass** Click the [Character] button to turn the Character processor on or off.
- **Mode Menu** Choose from a range of different spectral and formant processing modes.
  - **Analog Color** These character modes emulate a variety of characterful analog audio circuits. In the following modes, the Sound knob blends between two different circuits, with distinct effects on sound.
    - **Ardency**
    - **Bassmoderator**
    - **GrandClass**
  - **Formant** These character modes effect the sound using formant-shifting techniques. In the following modes, the Sound knob sweeps through the range of formants.
    - **CharacterSaw**
    - **Subvox**
    - **Talky**
    - **Voxil**
  - **Harmonics** These character modes generate harmonics and spectral effects. In the following modes, the Sound knob sweeps through the range of harmonics.
    - **Ampog**
    - **Fuzzarmonics**
    - **Harmonia**
    - **Harmson**
    - **Spherical**
    - **Subharmonium**
- **Sound** Lets you vary the effect of the Character processor. Each Character mode responds to this control in a unique way, so feel free to experiment.
- **Amount** Lets you blend between the dry signal and the signal from the Character processor.

Filter

Mai Tai offers a versatile Filter, which lets you shape and enhance your sounds. The filter is often one of the most important defining elements to the sound of a subtractive synthesizer, and likewise, this filter's unique characteristics have much to do with the sound of Mai Tai. The Filter offers the following controls:

- **Bypass** Click the [Filter] button to turn the filter on or off.
- **Filter Mode** Choose from the following filter modes, each with its own sound-shaping characteristics.
  - **LP 24dB Ladder** This mode emulates a classic 24dB-per-octave low-pass filter based on a transistor-ladder configuration, as found in many classic synthesizers. This type of filter allows frequencies below the chosen Cutoff frequency to pass through, which cutting frequencies above Cutoff at a rate of 24 decibels per octave—a fairly aggressive slope.
  - **LP 24dB Zero** This is a 24dB-per-octave low-pass filter, based on a zero-delay-feedback architecture that closely models the tone and modulation behavior of analog filters.
  - **LP 12dB Ladder** This is a low-pass filter with a 12dB-per-octave curve, which cuts frequencies less aggressively than the 24dB filters.

- **BP 12db Ladder** This is a high-pass and low-pass filter in series, known collectively as a band-pass filter. It allows a selected band of frequencies to pass through, then cuts frequencies above and below that band at a rate of 12 decibels per octave.
- **HP 12dB Ladder** This is a high-pass filter with a 12db-per-octave slope. This lets frequencies above the chosen Cutoff frequency pass through, while cutting frequencies below Cutoff at a rate of 12 decibels per octave.

- **Cutoff** This lets you set the corner frequency of the filter—the point in the slope of the filter at which the filter cuts incoming audio by 3dB. In the case of the Band-Pass filter, this sets the center frequency of the passed frequency band.
- **Soft** This control lets you switch between two differing analog-modeled processing circuits within the filter. Engage Soft for a mellower, darker tone. Disengage it for a brighter, more aggressive sound.
- **Drive** This lets you specify an amount of filter overdrive, to add fullness and saturation artifacts to your sound.
- **Punch** This control lets you add a range of percussive attack to the start of each note. At the lowest setting, dynamics are unchanged. At higher settings, the sound becomes more aggressive and more readily pops through the mix.
- **Resonance (Res)** This lets you set the amount of resonance in the filter, which is an emphasis centered on the chosen cutoff frequency. At lower settings, the filter cuts frequencies smoothly. As you increase Res, the emphasis at the cutoff frequency becomes more pronounced, able to mimic resonances such as those in voices or acoustic instruments, as well as many classic synthesis effects. At the highest settings, the filter can self-oscillate, emitting a pitched tone at the current cutoff frequency. This filter oscillation can be treated somewhat like an extra oscillator, especially in conjunction with the Key parameter.
- **Velocity (Vel)** This control sets the relationship between incoming Voice Velocity and filter Cutoff. When set at the center, velocity does not effect cutoff. When moved to the right, cutoff rises as note velocity increases. When moved to the left, cutoff lowers as note velocity increases.
- **Key** This control sets the relationship between incoming Voice Pitch and filter Cutoff. In physical instruments, higher notes tend to produce higher harmonics, brightening slightly as you go up the scale. On a synthesized instrument, if the filter stays static, setting the proper tone in the lower note ranges may cause inappropriate dullness in the higher notes. So, with the Key parameter, we can compensate for this, and create a more natural-sounding range of timbres up and down the keyboard.
  - When Key is set all the way to the left, the filter is unaffected by note pitch. In the middle, cutoff follows note pitch subtly, allowing high notes to shine. When set all the way right, filter cutoff follows note pitch closely in a relative fashion, moving upward and downward in semitone values as notes are received. This lets you use the filter as an additional pitched oscillator or resonator when filter Res is set high.

LFO 1 and LFO 2

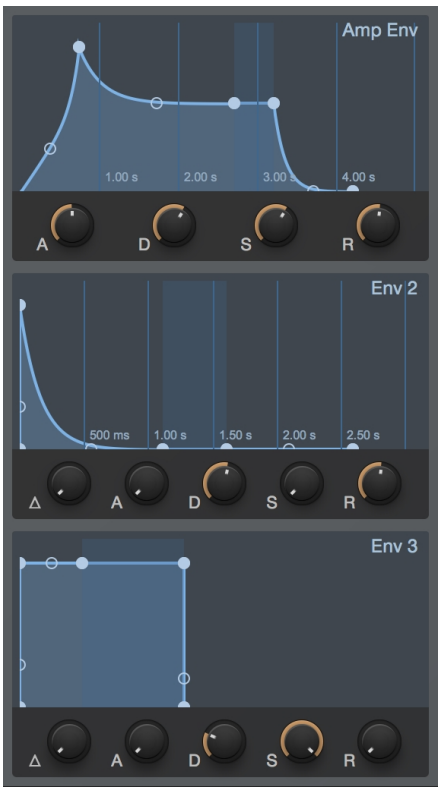
LFO stands for Low Frequency Oscillator, and they work very much like Osc 1 and 2 in Mai Tai, only slower. Standard oscillators are used mainly to create audible pitched tones, LFOs create slow-moving regular cycles of control signal that are useful for modulating other parameters over time. One common example is the way many synth patches respond when you move the Mod Wheel up from zero; the pitch of the oscillators wavers up and down in an expressive manner, much like the sound of vocal vibrato. This is simply an LFO modulating oscillator pitch to a degree set by the position of the mod wheel.

LFO 1 and 2 have identical controls, so the following explanations apply to both:

- **Bypass** Click the [LFO 1] or [LFO 2] button to turn the LFO on or off.
- **LFO Type** Choose between Sine, Triangle, Sawtooth, Square, and Sample & Hold shapes, for the oscillation of the LFO.

- **Rate** This control lets you set the rate at which the LFO oscillates, from inaudibly low (0.01 hz) for long, sweeping changes, all the way to higher ranges (up to 8 kHz) useful for FM techniques. When the [Sync] button is engaged, Rate can be set in terms of rhythmic values relative to Song tempo, such 1/8th-note and 1/4-note.
- **Sync** Engage this option to enable setting LFO Rate to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate by Hz.
- **Key** Engage this option to bind LFO speed to incoming note pitch. Higher notes result in higher LFO speeds, while lower notes result in lower LFO speeds.
- **Free** Engage this option to let the LFO run continuously, resulting in a differing LFO start point for each note played. Disengage to restart the LFO waveform at the start of each note.
- **Delay** This control lets you specify an amount of time (in milliseconds) for the LFO to wait before becoming active after a note is played. This lets you do things like adding a bit of expression to held notes, or creating layers of modulation that start at different points in each note by setting distinct Delay values for each LFO.

Envelopes



Envelope generators are a vital part of sound synthesis, giving us the ability to shape the amplitude and timbre of our sounds within the time-scale of each note. Mai Tai has three envelope generators, labeled Amp Env (so named because it is hard-wired to amplitude), Env 2 (which is often routed to filter cutoff, for timbral shaping), and Env 3.

All three Env modules are triggered when a note is played. Each Env then outputs a control signal that follows the shape set by the following controls:

- **Attack (A)** This control lets you set the time required for the envelope to go from zero (silence) to full amplitude, in a range from 0 ms to 20 seconds.
- **Decay (D)** This control lets you set the time required to drop from full amplitude to the sustain level, in a range from 0 ms to 20 seconds.
- **Sustain (S)** This control lets you set the signal level that is maintained from the end of the decay period, until the key is released, in a range from -∞ dB (silence) to 0.0 dB (full amplitude).
- **Release (R)** This control lets you set the time required to fall back to silence after the key is released, in a range from 0 ms to 30 seconds.
- **Delay (Δ - Env 2 and 3 only)** This control lets you specify a length of time (in ms) for the Env to pause before starting its attack phase after a note is played. This can assist in creating evolving sounds, where cycles of modulation occur at differing times over the length of a note.

Envelope Graphical Display

Each envelope has a corresponding graphical display that represents the shape created by the settings of its parameters. There are handles on the corners and slopes of each envelope that you can click and drag, letting you shape the ADSR envelope and the curve between its points visually. If you wish to lengthen any phase of the envelope beyond the time limits of the current display, simply drag the point toward the right of the graph, and the time scale adjusts to properly display the new setting.

Global Settings

The following Global parameters let you configure Mai Tai's overall behavior and capabilities, to meet your needs:

- **Volume** This control lets you set the total output volume, in a range from -∞ dB (silence) to +6.0 dB (six decibels above unity gain).
- **Velocity** This control lets you set the degree to which Mai Tai's volume is affected by note velocity, from zero (no velocity sensitivity) to 100% (full velocity sensitivity).
- **Poly, Mono, and Glide** Enable Poly mode to allow polyphonic playing (more than one note at a time). Enable Mono mode to play just one note at a time. When in Mono mode, you can enable Glide to cause the pitch to sweep smoothly from that of the currently held note to that of the next note, when played legato (one note played while the previous note is held). The Glide knob lets you set the rate of pitch change over time, from 1 ms to 1 second.
- **Voices** This parameter lets you set the level of polyphony (number of available simultaneous voices) for Mai Tai, in a range from 1 to 32. Note that this control has no effect when in Mono mode (in which there is only one voice available, by default).
- **Quality** Choose from a variety of sound quality modes to suit the power of your CPU and your taste in synth timbres. The following modes are available:
  - **80s** The simplest and most CPU-efficient of the modes. High-frequency modulation can create harsher, more typically "digital" artifacts in this mode, much like some early digital synths of the 1980s.
  - **Normal** The default mode, Normal makes a good compromise between CPU load and sonic complexity. This mode is useful in most standard synthesis tasks.
  - **High** This mode budgets additional CPU power to handle high-frequency modulation (such as that used in FM synthesis) smoothly.

- **Supreme** This mode strives for the most realistic simulation of analog synthesis; rich and complex. CPU usage is high, but the results can be worth it.

Effects

Mai Tai offers seven effects processors to add dimension to your sounds. They are arranged in two banks: FX A (Modulation, Delay, and Reverb) and FX B (Gater, EQ, Distortion, and Pan). You can enable or disable each effect by clicking its name. You can show or hide the Mod/FX section of the plug-in window by clicking the [Mod/FX] button.

Modulation

This processor creates time-based modulation effects. Choose from the following modes by clicking the [Chorus], [Flanger], or [Phaser] button:

- **Chorus** This processor creates effects similar to that of multiple identical instruments playing the same part simultaneously. The synth signal is fed through a short, modulated delay, which is then mixed with the dry signal. Chorus offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Delay** This control lets you set the length of the modulated delay. Higher settings create full-bodied chorusing effects, while lower settings create more pronounced harmonics, akin to the effects of a Flanger.
  - **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler chorusing effects, while higher settings produce more pronounced changes in timbre over time.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the chorused signal (all the way right).
- **Flanger** This processor creates resonant, hollow-sounding sweeping effects. The synth signal is fed through a short, modulated delay, which is mixed with the dry signal. While similar to the workings of a Chorus effect, Flangers get their signature sound by employing smaller delay times than those used in chorusing, combined with a feedback system that can add extra resonance to the sweep. Flanger offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Delay** This control lets you set the length of the modulated delay (in ms), which changes the pitch of the resultant resonance. Higher settings create lower-pitched resonance, while lower settings create resonances at a higher pitch.
  - **Speed** This control lets you set the speed at which the delay line is modulated. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the delay line is modulated. Lower settings produce subtler flanging effects, while higher settings produce more pronounced changes in timbre over time.
  - **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Flanger. Higher amounts of Feedback add to the resonance of the sweeping effect.
  - **Sync** Engage this option to enable setting Flanger modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
  - **Depth** This control lets you blend between the dry signal (all the way left) and the flanged signal (all the way right).
- **Phaser** This processor creates dreamy, otherworldly sweeping effects. The synth signal is fed through a series of all-pass filters that alter its phase. When mixed with the dry signal, this creates a series of peaks and valleys in the frequency response that changes depending on the degree of phase shift applied. Phaser offers the following controls:
  - **Mono** Engage this option to sum the wet (effected) signal to mono.
  - **Shift** This control lets you specify the amount of phase shift to apply. Lower settings focus the phasing effect in the lower frequencies, while higher settings focus the effect in higher frequencies.
  - **Speed** This control lets you set the speed of modulation applied to the phase shift amount. Lower settings create slow, sweeping effects, while higher settings create faster, more aggressive modulation.
  - **Width** This control lets you set the degree to which the phase shift amount is modulated. Lower settings produce subtler effects, while higher settings produce more pronounced changes in timbre over time.

- **Feedback (FB)** This control lets you set the amount of output signal to feed back into the Phaser. Higher amounts of Feedback add to the resonance of the sweeping effect.
- **Sync** Engage this option to enable setting Phaser modulation speed to a rhythmic value (such as 1/8th-note or 1/4-note) relative to Song tempo. Disengage to set Rate on a continuous scale.
- **Depth** This control lets you blend between the dry signal (all the way left) and the phase-shifted signal (all the way right).

Delay

This processor creates an echo effect, either as a single delayed repeat of the input signal, or a trailing series of echoes. The Delay effect offers the following controls:

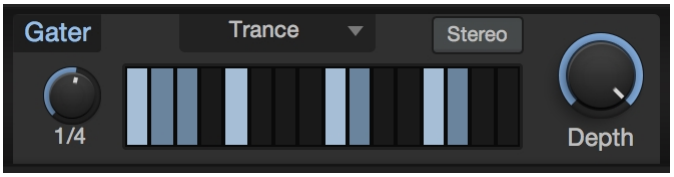
- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the delayed signal.
- **Delay Time** This control lets you specify the length of the delay effect, in rhythmic values (such as 1/8th-note or 16th-note) relative to the tempo of the Song.
- **Feedback (FB)** This control lets you set the amount of effected signal that is fed back into the Delay effect. At zero, there is just one repeat. As you increase the value, the trail of repeats grows.
- **Mix** This control lets you blend between the dry signal (all the way left) and the delayed signal (all the way right).
- **Ping-Pong Mode** This menu lets you enable and configure the stereo Ping-Pong delay mode. You can choose from the following modes:
  - **Off** The delay works as normal, without ping-pong functions.
  - **Panned** Using a multi-tap delay structure, this mode pans each delay repeat to the right or left, in sequence.
  - **Dotted and Double** These modes work similarly to Panned mode, but employ staggered spacing of the delay taps to produce a dotted-note or syncopated straight rhythm in the delay repeats.
- **Reverb** Enable this option to route the output of the Delay effect to the Reverb effect, enabling further diffusion and abstraction of the delay signal.

Reverb

This effect places the synth signal within a synthesized reverberant physical space, ranging from short reverbs that emulate smaller rooms, to long reverbs that evoke the sounds of large spaces, such as halls and cathedrals. Reverb offers the following controls:

- **Pre-Delay (Pre)** This parameter lets you specify an amount of delay applied to the reverb-processed signal, in a range between zero and 500 ms. This emulates the delay inherent in large spaces between the impact of a sound and its audible reverberation. Lower settings are best suited to shorter reverb times, and longer settings with longer reverb times, but let your own taste be the judge.
- **Damping** This control lets you set an amount of high-frequency attenuation to apply to the reverb signal. Spaces with soft surfaces tend to lose treble quickly as the sound reverberates, resulting in a short bright reverb followed by a progressively darker tail. Spaces with harder surfaces retain high-end more efficiently over time. Set Damping to its lower rage to emulate hard surfaces, and to the higher ranges to enable further damping, to emulate softer surfaces.
- **Size** This control lets you set the length of reverberation from the moment a sound starts, in a range between 100 ms and 10 seconds. The larger the size, the longer the tail of the reverb, and the larger the emulated space sounds.
- **Low and High** These controls let you set the cutoff frequencies of the provided high-pass and low-pass filters, which effect only the reverb signal.
- **Mix** This control lets you blend between the dry signal (all the way left) and the reverb signal (all the way right).

Gater



This is a rhythmic gating effect, able to create a series of syncopated breaks in the synth signal. A variety of presets are provided, each with a different rhythmic gating pattern. However, the fun really begins when you create your own. Gater offers the following controls:

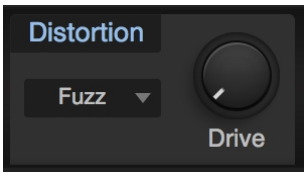
- **Beats** This control lets you set the length of the gating cycle, in rhythmic values (such as 1 bar or 1/2-note) relative to Song tempo. For example, at a setting of 1 bar, the 16 steps in the cycle repeat every bar, effectively representing 16th-notes. At a 1/2-note setting, the 16 steps repeat each half-bar, representing 32nd-note values.
- **Beat Steps** This grid lets you specify which steps in the cycle lets signal pass through, and which gates the signal to silence. Click on a step to enable or disable gating for that step.
- **Stereo** Engaging this option creates a separate beat grid for each side of the stereo field. When engaged, you'll see two rows of beat steps, the top row specifying gate steps for the left channel, and the bottom row gating the right channel.
- **Depth** This control lets you blend between the gated and dry signals, allowing for rhythmic gating effects while retaining the continuity of the synth sound.

EQ

This is a graphic equalizer effect, perfect for quick tonal shaping. Set the EQ bands to emphasize or attenuate bands of frequencies to suit your needs. When a band is in the center of its range, it neither adds nor subtracts. When moved above the center, it emphasizes the chosen frequency. Moved below the center, it attenuates that frequency.

Choose between Lead mode, with frequencies chosen to suit aggressive, up-front sounds, or Bass mode, with wider-ranging frequencies that work better for basses and mellower chordal parts.

Distortion



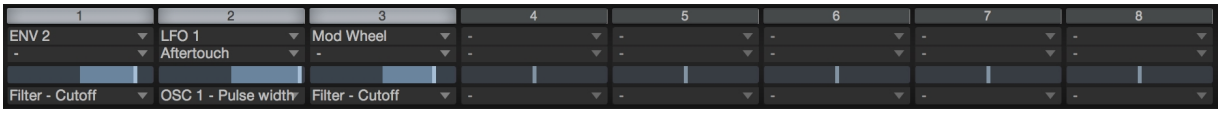
This is a variable distortion effect, which adds grit and character to your sounds. Choose from a variety of distortion types, from fizzy transistor fuzzes to thick, warm tube overdrives. Set the amount of distortion with the Drive knob.

Pan

This is an auto-pan effect, which pans the synth signal left and right over time. Pan offers the following controls:

- **Speed** This control lets you set the speed at which the signal is panned left and right.
- **Sync** Enable this option to set pan speed to a rhythmic value (such as 1/4-note or 16th-note) relative to Song tempo. Disable this option to set pan speed along a continuous range.
- **Depth** This control lets you set the degree to which the signal is panned. Lower settings give a subtly panned effect, while higher settings pan the signal more radically, all the way to fully left and right in each cycle.

Modulation Matrix



Mai Tai provides 16 configurable modulation routings, in two banks of eight (Mod A and Mod B). Modulation signals can be routed from a selection of incoming MIDI controller signals (such as Pitch Bend, Mod Wheel, and Aftertouch), modulation generators (such as the LFOs and envelopes), or the pitch or velocity of played notes.

These modulation signals can be used to vary most of the parameters throughout Mai Tai, including modulation sources themselves (such as LFO 2 modulating the rate of LFO 1, or the Decay of Env 2)

Each modulation slot has a bypass button at the top, which lets you enable or disable the flow of modulation signal. Below that are the input selector and modifier selector. If you assign a modulation source to the input selector only, that signal is routed directly to the chosen destination. In some cases, you'll want to govern the flow of one mod source before it reaches its destination, using the signal from another mod source. For example, you may want to control the output level of LFO 1 (routed to a parameter such as oscillator pitch) with the Mod Wheel. In this case, you'd choose Mod Wheel with the input selector, and LFO 1 with the modifier selector below.

Below that is a slider that controls the amplitude and polarity of the modulation signal. Set at its center, no modulation occurs. Move the handle right of center to send an increasing amount of the modulation signal, at its normal (positive) polarity, to the chosen destination. Move it left of center to send the signal to its destination with a negative value.

If the parameter you wish to modulate is set to a high value, you may want to send a negative modulation signal to it, driving the setting downward and causing more audible effects. Positive-going modulation signals are more efficient when modulating parameters set to low values.

A selector at the bottom of each modulation slot lets you choose the destination of the chosen modulation signals.

Virtual Keyboard

The virtual keyboard lets you easily click to play notes or manipulate the Pitch and Mod wheels, while auditioning or editing patches when you're away from a MIDI keyboard. The keyboard display also shows you which notes are currently being played.

Note that for a more playable keyboard experience when away from your MIDI controller, you can also use Studio One's **Use Your Computer Keyboard as a MIDI Keyboard** to play notes using your computer's keyboard.

Next to the virtual keyboard is the Bend parameter, which lets you set the pitch bend range of the Pitch wheel, in semitones.

Mojito

Mojito is a simple, monophonic, subtractive synthesizer with effects that is 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.

Interface

Mojito is organized into Oscillator (OSC), Amplifier (AMP), Filter (FLT), and FX sections, with easy-to-use, yet powerful controls.

Oscillator

Mojito's Oscillator section is on the upper left of the plug-in window. 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 affects the cutoff frequency only via key tracking. Pitch is 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 effectively adjust the level of the even harmonics.
- **Width** Adjusts the pulse width of the pulse wave from almost zero to square. This adjusts 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 are modulated. The speed of the 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 string-like sounds, vibrato, and other familiar modulated sounds.

There is also a Sub Oscillator knob, which can be adjusted from 0 to 100% to add more low frequency content to the sound.

The Portamento section lets you control pitch slewing between notes. Using the mode selector, you can choose between three modes:

- **Off** A note that is played while another note is playing silences the previous note and trigger the new one.
- **Legato** An overlapped note does not trigger a new envelope but the pitch slowly changes to the pitch of the new note.
- **Retrigger** An overlapped note retriggers the current envelope, starting at its volume at the moment it is retriggered. This also slowly changes the note's pitch. Note velocity is not 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 1 s.

Amplifier

Below the Oscillator section is the Amplifier section. This consists of a Gain control, which responds 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 1 s.
- **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 2 s.

Filter

The section on top of the right side of Mojito only affects the resonant 24 dB low-pass 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!
- **Drive** Controls the amount of filter drive from 0 to 100%.
- **Cutoff Knob** Controls the corner, or cutoff, frequency, which is the point above which frequencies are 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.

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.

Multi Instruments

Sometimes, just one instrument isn't enough to get the sound or functionality you're looking for. You might want each half of the keyboard to trigger a different instrument, or to create powerful layered sounds with multiple instruments responding to your touch simultaneously. Creating flexible, playable instrument configurations with multiple plug-ins, keyboard splits, layers, and real-time **Note FX** processing is easy using the Multi Instrument function in Studio One.

To simplify the process of controlling multiple instruments and effects at once, we've included a page of Macro Controls you can assign to parameters in any plug-in hosted in the Multi Instrument, giving easy access to vital parameters without the need to open multiple plug-in windows.

Creating a Multi Instrument

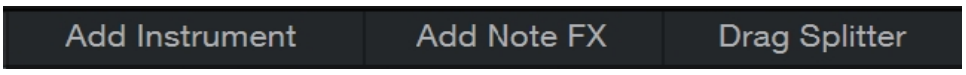
To get started making your own Multi Instrument, open the Instruments tab in the Browser, expand the Multi Instruments folder within, and create a Multi Instrument in one of the following ways:

- Drag the New Multi Instrument preset to an existing Instrument Track.
- Drag the New Multi Instrument preset to the top or bottom of the track list or between two existing tracks to create an Instrument Track containing a new Multi Instrument.

This procedure also applies when creating a new instance from a non-default Multi Instrument preset.

Once the new Multi Instrument is created, its editor window opens. Here, you'll find a device routing matrix, instrument inspector, and keyboard range settings. You can click-and-drag the corner of the window to re-size it to your needs.

Adding Devices to the Routing Matrix



Each instance of Multi Instrument can host multiple plug-in instruments and Note FX processors. Before any devices are added, the routing matrix in the center of the main control window is empty. To add an instrument, click the [Add Instrument] button and select the instru-

ment of your choice from the menu. Once the instrument is loaded, its editor window is displayed. You can also simply drag instruments from the Instruments tab of the Browser directly into the routing matrix.

The chosen instrument appears as a module in the routing matrix, with a line leading to it, signifying the flow of note and control data to that instrument. If you add additional instruments, the line splits, to show the flow of data to each instrument.

To bypass or enable an instrument or Note FX module, press its Activate button.

To open the editing interface for an instrument, double-click on its name, or click the small triangle on the right of the module and choose Edit... from the pop-up menu. To rename an instrument or Note FX module, choose Rename... from its pop-up menu. To remove an module, choose Remove from its pop-up menu.

Adding Note FX to the Routing Matrix

Using Note FX within a Multi Instrument can add dimension and animation to your sound. You can use them to affect note data feeding all instruments at once, or use different Note FX on each instrument, or on pairs of instruments, using the Splitter function.

To add a Note FX processor to your Multi Instrument, click the Add Note FX button and choose a processor from the menu. You can also do this by clicking-and-dragging the processor of your choice from the Note FX folder in the Instruments tab in the Browser onto the routing matrix. Once the Note FX module is loaded, its editor window is displayed.

Where you place a Note FX module in the routing matrix determines how the module is routed. If you want a Note FX to affect all instruments within the Multi, drag its module to the top of the routing matrix. In this case, all data flows through the module before splitting off to feed the instruments. To affect just one instrument, drag the Note FX module just above the instrument module of your choice.

Note FX Splitters

To affect two instruments in tandem with one Note FX module, you'll want to use a Splitter. To add a Splitter to the matrix, click-and-drag the Drag Splitter button, and place your Splitter between the two chosen instruments. Any Note FX placed above the Splitter affects all note data running to the two instruments, for simultaneous chord generation, arpeggiation, and so on.

Note that FX Splitters are only available (and needed) when three or more instruments are present in the current Multi Instrument. If just two instruments are present, you can affect both instruments with a single Note FX by dragging the Note FX module onto the top of the signal flow diagram.

To remove an instance of Note FX or a Note FX Splitter, click the triangle on the right side of the module, and choose Remove from the pop-up menu.

Keyboard Splits and Layers

By default, each instrument in a Multi Instrument receives note data from the full range of the keyboard. If you want to split the keyboard into distinct ranges (such as synth bass on the left side, and piano for the right hand), or simply specify an instrument's playable range, you can use the range sliders, just above the virtual keyboard display.

Each instrument in a Multi Instrument has a range slider that specifies the range of keys in which that instrument is allowed to play. Click-and-drag the ends of each range slider until the desired range of keys is selected for each instrument.

If two or more instruments overlap in their ranges, those sounds are layered when keys in overlapping ranges are played. Layering can be useful for building rich, complex tones from multiple sources.

Multi Instrument Inspector

When you select an instrument module in the matrix, the Multi Instrument Inspector shows a mix of parameters you would normally see in the Track and Instrument Inspectors elsewhere in Studio One. Here, you can set transposition and key range, as well as get access to audio settings, Inserts, and Sends for the selected instrument.

You can color-code Instrument or Note FX modules by selecting them and clicking the color picker to the left of the name of the module in the inspector.

Because Inserts and effects settings are saved as part of Multi Instrument presets, you may find it helpful to use Multi Instruments to save complex single-instrument configurations with many Insert effects, for later use.

When you select a Note FX module in the matrix, its controls are made available in the Inspector.

Macro Controls

Given that a Multi Instrument may contain several instruments and a selection of Note FX and audio effects, we've included a set of assignable Macro Controls in each Multi Instrument (much like the **Channel Editor and Macro Controls** controls you'll find in the Console). This lets you assign often-used parameters throughout all devices in your Multi Instrument to a single page of knobs, buttons, and X/Y pads.

To show the Macro controls, click the Instrument Macro button in the Multi Instrument editor window. To assign an instrument or effect parameter in your Multi Instrument to an Instrument Macro control, [Right]/[Ctrl]-click the control element in the plug-in, and choose Connect [parameter name] to Instrument Macro Control [control of choice]. Your choice of assignments is displayed next to each Macro control.

[Right]/[Ctrl]-clicking a control that is already assigned to a Macro gives you the option to break that connection.

For more on the use of Macro Controls, see **Channel Macro Controls**.

Audio Routing and Insert Effects

Each instrument in a Multi Instrument routes its audio to a Channel in the Console as usual, all of which are encapsulated in a group Bus, titled "Multi Instrument" by default. To access individual mixing controls for instruments within a Multi, click the folder icon at the bottom of the Multi Instrument channel strip in the mixer. All individual routing and processing flexibility remains, while the Bus keeps the instruments together and easier to manage as a group, especially in larger sessions. If you wish to send an instrument to the Main bus or other bus (rather than run it through the Multi Instrument bus), you can make these changes in the Console or in the Inspector view in the Instrument Editor window.

Storing and Loading Multi Instrument Presets

Once you've set up a satisfying Multi Instrument, you may want to store it as a preset, so that you can call it up for use in other projects. You can also export your preset as a file, or import a preset from a previously exported file. Click the Preset Actions button in the menu bar of a Multi Instrument window, and choose from the following preset management functions:

- **Store Preset...** Choose this to save a preset to your library in the Browser. You can enter a title and description for the preset, as well as specify a subfolder within the preset list to store the preset.
- **Replace Preset** Choose this option to update the currently loaded preset with any new settings made since loading the preset.
- **Store as Default Preset** Choose this option to make the current preset load whenever a new Multi Instrument is created.
- **Load Preset File...** Choose this option to load an exported Multi Instrument preset file from your file system into your current Song.

- **Import Preset...** Choose this option to load an exported Multi Instrument preset file from your file system into the current Song, and import the preset into your Studio One library, for later use.
- **Export Preset...** Export the current Multi Instrument configuration as a preset file, for use by others or for storage. This does not save audio effects assignments or settings used within the Multi Instrument.
- **Export Instrument+FX Preset...** Export the current Multi Instrument configuration as a preset file, including all audio effects inserted for each instrument, and the corresponding effects settings.
- **Show in Browser** Locates the currently loaded preset in the Browser.

Note FX

Note FX are real-time effects processors that change and reinterpret incoming note data before it reaches your choice of plug-in instrument or external MIDI device. Arpeggiator, Chorder, and Repeater are most useful for creative expansion and adaptation of note data. Input Filter is a utility processor that limits note output to a selected range of note and velocity values. You assign Note FX to Instrument Tracks in the Note FX section of the Track Inspector. For more information, see **Track Inspector**.

Once you've loaded one or more Note FX processors onto an Instrument Track, you can quickly access the related settings by clicking the Note FX Editor button on the control area for that Track in Arrange view. You can also access these settings by double-clicking one of the processors in the Note FX section of the Track Inspector.

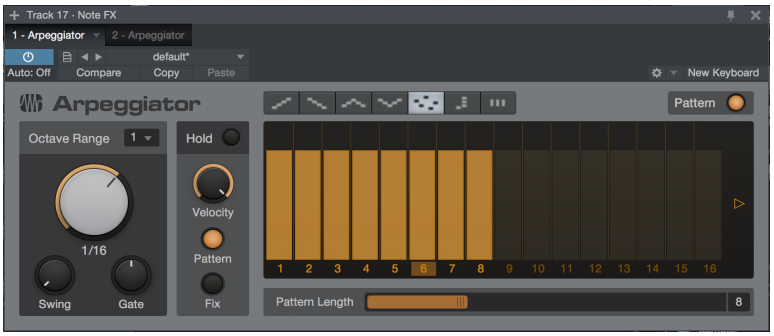
You can save and load Note FX settings as presets, just as you can with other instruments and effects. For more information on saving and loading presets, see the **Signal Routing** chapter.

Rendering Note FX

If you wish to make the effects of Note FX processing permanent (part of the note data, rather than a real-time process), select the Track and navigate to *Event/Render Instrument Tracks*, or [Right]/[Ctrl]-click the desired Part in Arrange view and choose *Instrument Parts/Render Instrument Tracks* from the pop-up menu.

This also makes permanent any transposition or velocity changes you've made within the Inspector view for the track.

Arpeggiator



Arpeggiator turns chords (as well as single notes) into arpeggios—rhythmic cycles of single notes, derived from the notes currently held. Like the arpeggiator functions found in many synthesizers, Arpeggiator creates repeating patterns of notes that can travel upwards in pitch, downwards, up-and-down, down-and-up, or in a randomized pattern. You can also use Arpeggiator to play repeated patterns of whole chords, or note patterns that follow the order in which notes are played.

Going beyond the basics, you can use the Pattern function to create rhythmic patterns of velocity and note length that the arpeggio follows as it plays, opening many creative options for repeating musical articulations.

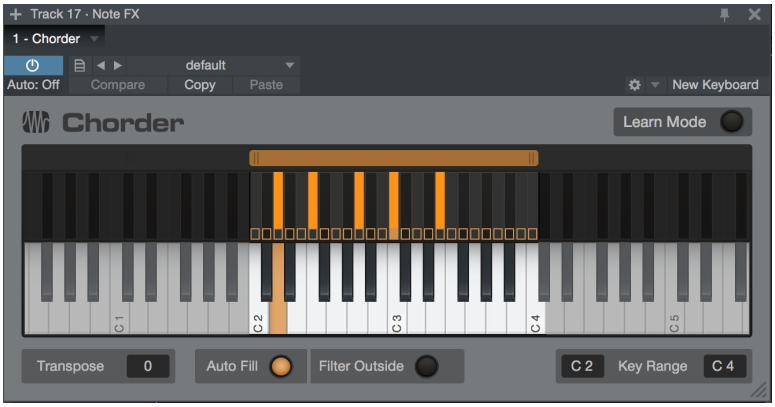
The following parameters and functions are available in Arpeggiator:

- **Arpeggio Direction** Choose the note direction that creates the pattern you want, from the following options:
  - **Up** The arpeggio starts at the lowest held note and travels upward through the held notes, then returns to the lowest note as the arpeggio begins again.
  - **Down** The arpeggio starts at the highest held note and travels downward through the held notes, then returns to the highest note as the arpeggio begins again.
  - **Up/Down** The arpeggio starts at the lowest held note, travels upward to the highest, then travels back down to the lowest note, and the arpeggio begins again.

- **Down/Up** The arpeggio starts at the highest held note, travels downward to the lowest, then travels back up to the highest note, and the arpeggio begins again.
- **Random** The arpeggio plays the currently held notes in a random pattern.
- **Chord Mode** The currently held chord (or single note) is repeated as long as it is held.
- **From Input** The arpeggio pattern is derived from the order in which notes are played and held.

- **Octave Range** Lets you extend the range of the arpeggio by mirroring the currently held notes an octave above (at a setting of 2), the two octaves above (at 3), or the three octaves above (at 4). At 1, no mirroring occurs and the arpeggio plays according to the held notes. Setting Octave Range above 1 when in Chord Mode causes an upward-rising cycle of repeated chords, an octave apart, its length determined by the Octave Range setting.
- **Rate** Lets you select a rhythmic value, determining the length of each arpeggio step. Range is from a bar to a 64th-note, in all triplet and dotted varieties.
- **Swing** Lets you add swing to the timing of the arpeggio, creating a range of rhythmic feels. For more information on swing timing, see Swing.
- **Gate** Acts as an overall note-length control. Lower settings create shorter notes, and higher settings create longer notes. When a Pattern is active, Gate works relative to the gate settings in the Pattern.
- **Hold** Enable this to hold all currently played notes. Each new chord or single note that you play replaces the previous memory and holds until the next note input is received.
- **Velocity** Acts as an overall note-velocity control. When a Pattern is active, Velocity works relative to the velocity settings in the Pattern.
- **Pattern/Fix Switches** Choose Pattern to allow Velocity data from the Pattern to control note velocity (in tandem with the Velocity control). Choose Fix to set a fixed velocity for all notes, with the Velocity control.
- **Pattern** This is a 32-step pattern sequencer you can use to create repeating patterns of note velocity and gate (length) that are applied to the control output of the Arpeggiator. The Pattern area contains the following controls:
  - **Activate Pattern** Toggle this on or off to enable or disable the Pattern sequencer.
  - **Pattern Sequencer** This series of sliders is where you'll create your velocity/gate pattern. You can click and drag each step in the sequence vertically (to set velocity) and horizontally (to set gate length). 16 steps are shown at any one time. To reach the second set of 16 steps, click the right-arrow to the right of the pattern. To return to steps 1-16, click the left-arrow to the right of the pattern.
  - **Pattern Length** Lets you choose the length of the pattern.

Chorder



Chorder is an intelligent chord generator that lets you trigger chords by playing single notes. You can specify intervals in the chord manually, or capture chord shapes played on the keyboard. Each key can trigger a different chord of your choice, or you can choose a single chord shape, to play across multiple keys. You also have control over the area of the keyboard that triggers these chords, letting you, for example, trigger chords in the upper part of the keyboard, while playing single-note bass parts in the lower half.

The central interface shows two rows of piano-style keys. The lower row is used to audition chord shapes; click and hold a key to play. In Learn Mode, the lower row lets you select a keyboard key for chord assignment (selected key turns orange). The upper row displays the notes being played (both by MIDI input and the chord generator), and which keyboard keys have been assigned chord shapes (small square at the bottom of each key turns orange). In Learn Mode, the upper row displays the currently assigned chord shape for the selected key (chosen notes turn orange).

Assigning Chord Shapes

Chorder defaults to an example chord setting that you can play with. The next thing you'll want to do is assign your own chord shape to one or more keyboard keys. You can do so by following this procedure:

1. Press the [Learn Mode] button to put Chorder into Learn Mode.
2. Select a keyboard key for chord assignment by clicking it in the lower row of keys. The selected key turns orange. C3 is selected by default.
3. Build the chord shape of your choice by selecting notes in the upper row of keys with the mouse, or by playing notes on a connected MIDI controller. Selected notes turn orange. Click or play a note a second time to deselect it.
4. If you want to assign custom chord shapes to other keyboard keys, select each chosen key in the lower keyboard, and assign chord shapes to each, as described in step 3.
5. Press [Learn Mode] again to disengage, and begin playing.

The following parameters and functions are available in Chorder:

- **Learn Mode** Enables Learn Mode. When Learn Mode is active, the following controls appear:
  - **Clear All** Clears all chord assignments for all keyboard keys.
  - **Clear** Clears chord assignments for the currently selected keyboard key.
  - **Copy** Copies the currently shown note pattern, for pasting into other keys.
  - **Paste** Applies copied note pattern data to the currently selected key.
  - **Selected Keyboard Key** Shows the pitch of the currently selected keyboard key. To specify a particular note value, click this field to select it and type in the note name and octave number (such as C3). You can also click-and-drag in the note field, or click on the note field and select with your mouse's scroll wheel.
- **Chord Range** Drag the ends of this slider to select the portion of the MIDI keyboard that triggers chords.
- **Transpose** Lets you transpose the chord output, in a range of -12 to +12 semitones. Notes outside the Chord Range are unaffected.
- **Auto Fill** Enable this to automatically assign any unassigned keyboard keys in the Chord Range to the chord shape mapped to the lowest keyboard key. Disable to ensure that only assigned keyboard keys trigger chords.
- **Filter Outside** Enable this to stop all notes that fall outside of the Chord Range. Disable to allow playing notes outside the range.

Repeater

Repeater works just like it sounds—it creates rhythmic repetitions of the notes you play. These repetitions can be simple copies of incoming notes, or can change in velocity, gate length, and pitch as the pattern plays.

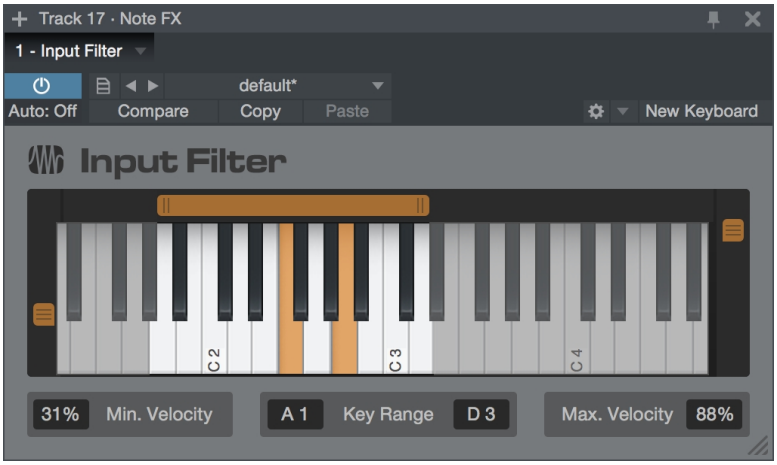
The following parameters and features are available in Repeater:

- **Individual Velocity & Gate** Engage to enable individual setting of note velocity and gate length for each step.
- **Individual Pitch** Engage to enable individual setting of note pitch for each step.
- **Sequencer** This lets you specify velocity, gate, and pitch values for each step in the sequence of repetitions. The following controls are available for each step:
  - **Level/Gate Slider** With Individual Velocity and Gate enabled, you can click and drag the upper edge of this slider up or down to set note velocity for the current step. You can also click and drag the right edge of the slider left or right to set note gate length for the current step. With Individual Velocity and Gate disabled, moving velocity or gate sliders manipulates that setting for all steps (equivalent to turning the Velocity Level and Gate knobs).

- **Pitch** With Individual Pitch enabled, you can click and drag this slider up or down to apply a positive or negative pitch transposition to the current step. With Individual Pitch disabled, moving a pitch slider changes pitch transposition for all steps simultaneously. At 0, no transposition occurs.

- **Rate** Lets you set the rate of repetition. When Sync is enabled, you can choose a tempo-synced rhythmic value between one bar and one 64th-note, in all triplet and dotted varieties. When Sync is disabled, you can choose a repetition frequency between 2 and 25 Hz (repetitions per second).
- **Sync** Enable Sync to snap the Rate control to rhythmic values, in sync with Song tempo. Disable to set repetition speed in Hz.
- **Steps** Select your desired number of repetitions (and sequencer steps), from just two steps, to 32.
- **Velocity Level** Acts as an overall velocity level control, scaling every step's velocity, relative to its custom setting.
- **(Velocity Relative to) Input** Enable this to derive overall repetition velocity from note input, attenuated or boosted by the setting of the Velocity Level control.
- **Velocity Scale** Turn this to introduce a sloping change in velocity in the sequence over time, relative to each step's setting. At center, no slope is added. Turned left of center, a downward slope is introduced. Turn to the right for an upward slope.
- **Gate** Acts as an overall gate length control, scaling every step's gate length, relative to its custom setting.
- **Gate Scale** Turn this to introduce a sloping change in gate length in the sequence over time, relative to each step's setting. At center, no slope is added. Turned left of center, each step in the sequence is shortened more than the last. Turn to the right, and each step is lengthened more than the last.
- **Pitch Scale** Turn this to introduce a sloping change in pitch in the sequence over time, relative to each step's setting. At center, no slope is added. Turned left of center, you get a range of downward pitch shift slopes. Turn to the right for upward slopes.

Input Filter



Input Filter lets you filter out unwanted notes before they reach your instrument or MIDI device. You can specify a range of note pitches to allow, and a range of note velocities to allow, and all notes that fall outside of either of those ranges are stopped. The following parameters are available in Input Filter:

- **Key Range (Low and High)** Set the low and high limits for note pitches. This can be done by moving the ends of the slider above the keyboard graphic, or by manipulating the Key Range displays by typing in values or scrolling through values with your pointing device's scroll function. Any incoming notes that fall outside of the chosen Key Range are stopped.
- **Minimum and Maximum Velocity** Set the low and high limits for note velocity. This can be done by moving the sliders to the left and right of the keyboard graphic, or by manipulating the Min Velocity and Max Velocity displays by typing in values or scrolling through values with your pointing device's scroll function. Any incoming notes that fall below the Min Velocity percentage or above the Max Velocity percentage are stopped.

Video Playback and Sync

Studio One Professional has a built-in video player that enables you to score to picture by syncing Song and video playback. The following chapter describes how to use this video player in detail.

Video Player Interface

Open the Video Player by clicking on the Video Player icon in the toolbar or by selecting it from the View menu. When first opened, you see a black screen with the text “Movie Not Loaded” displayed. The bottom toolbar contains controls for the video player as follows:

- **Remove Video** Click to remove the currently loaded video.
- **Extract Audio** Click to extract the audio from the video and place it on an audio Track in the arrangement. This will enable the original audio to be part of the Song when the video is exported.
- **Video Offset** Set a value.
- **Video Options** Choose to display the video as Half Size, Default (original) Size, or Double Size.
- **Stop/Play** Click to stop or start video playback independent of the Song.
- **Online** This is engaged by default and enforces sync between the Song timeline and the video playback. Click to disengage if you prefer that the Song and video playback positions not be synced.
- **Mute** This is engaged by default and mutes the audio output from the video. Click to disengage if you want to hear the audio output from the video.
- **Size** Click-and-drag the lower right corner of the video player to freely size the window.

In the upper right corner of the video player, there are buttons to maximize the video player window and to close the video player.

Import Video

The simplest way to import a video file is to drag-and-drop it from the File Browser into the arrangement. Supported video files appear in the browser with a Film Strip icon. You can also use the Import Video menu in the Video Player to import any supported video file.

Drag a video file from the File Browser to the arrangement to import the video file to the Video Player. When doing this, note that the position to which you drag the video is used to set the offset for video playback. For instance, if you drag-and-drop a video to 10 seconds in on the timeline, the offset is set at 10 seconds, and video playback does not begin until that position is reached.

Hold [Ctrl]/[Cmd] while dragging to only extract the audio from the video and place it in the position to which you drag. Hold [Alt] while dragging to simultaneously import the video file to the Video Player and extract the audio from the video and place it on an audio Track.

Sync to Video

Once the video has been imported, as long as the Online button in the Video Player is engaged, Song and video playback will be in sync. When you locate the timeline cursor while stopped or during playback, the video adjusts to the correct frame.

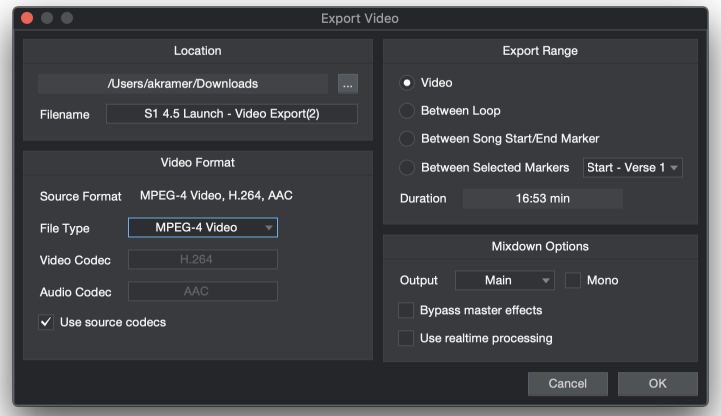
When video playback starts, a small amount of data needs to be pre-loaded. Should there be a resulting timing offset between the video and Song playback, Studio One syncs the video during playback. This may cause the picture to jump a little after start, which is normal. For a smooth start of video playback we recommend that you stop, locate, and then start.

In common practice, it is good for you to know the frame rate of the video you are working with, and to set that frame rate in the *Song/Song Setup/General* menu. You may choose from 24 fps, 25 fps, 29.97 fps, 29.97 dfps, 30 fps, and 30 dfps. Ideally, you should have a reference timecode burned into the video itself so that you can compare the Song frame position with the video timecode position and ensure accurate frame sync.

Using Follow Edit Position with Video

It is common to use markers to denote hitpoints in the video; that is, time positions where the sound should sync closely with the video. Refer to **Using the Marker Track** for information on how to use markers. When adjusting the position of a marker, it is possible to have the playback position, and thus the current video frame, follow the marker position. To do this, enable Follow Edit Position in the toolbar, next to Follow Song. This helps you accurately place markers to use as hitpoints while viewing the exact frame to which the marker corresponds. Similarly, Follow Edit Position helps when trying to sync Event or Note position with video.

Exporting Video Files



The process of importing a video and extracting its audio track is described in the **Video Playback and Sync** chapter. Extracting the audio from the video file is an important step, because otherwise the audio from the video will not be exported with the Song.

To export the Song to a Video file, select Export Video from the Song menu. Choose a file name and storage location in the pop-up window, and then choose the File Type, Video Codec, and Audio Codec. Note that the codec options are provided by your computer's operating system, and the options could change when an OS update is released.

Next, choose the Export Range. This can be defined by the length of the video, by the Loop points, or by certain Markers within the Song. Mixdown Options are provided too, such as the preferred Output, Mono export, and whether to include the master effects when the file is rendered. Select *Use realtime processing* if external devices are part of the mix.

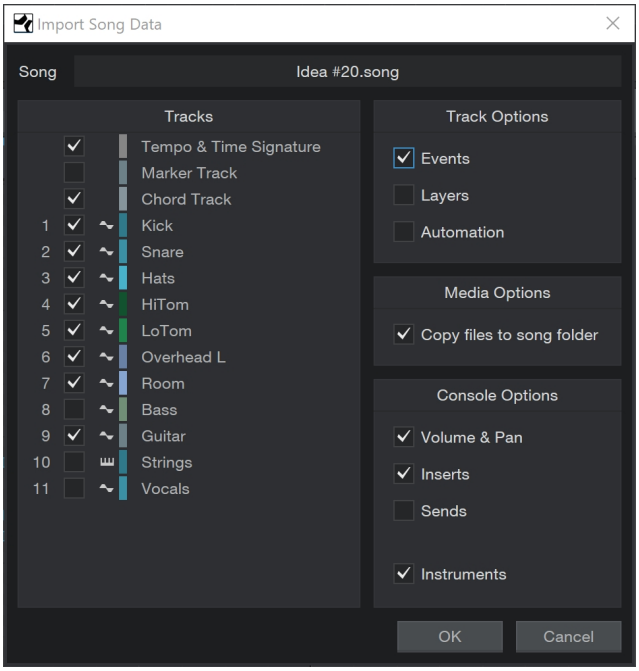
Once those decisions are made, click OK or Save to export. The Video file will be created and given the appropriate file extension.

Import and Export

Studio One provides several ways to exchange data with other applications.

This is done by importing or exporting of various format types.

Import Song Data



There are many situations in which importing data from one Song to another can be useful. Whether you want to create an alternate version, re-use musical content in a new composition, or bring in useful non-musical content, you can make that happen with the Import Song Data function. Apart from Audio and Instrument tracks, you can also import the Tempo Track, Marker Track, and Chord Track from one Song to another.

To begin, navigate to *Song/Import Song Data* and choose a .song file from your file system to open the Import Song Data window. You can also reach this function by navigating to the song of your choice in the Files tab of the Browser, [Right]/[Ctrl]-clicking a .song file and choosing Import Song Data from the pop-up menu.

The Tracks column on the left lists the available tracks in the Song. Click the check boxes next to the Tracks of your choice to mark them for importing.

The Track Options section lets you choose whether or not to import the Events, Layers, or Automation from the selected tracks. This lets you do things like reusing the track structure of a Song as a template for a new Song without bringing in any note data, or for stripping extensive automation data when starting an alternate mix.

In the Media Options section, you can choose whether or not to copy the related media files from the original Song to the new one.

In the Console Options section, you can choose whether to bring over Volume & Pan settings, Inserts, Sends, and Instruments to the new song. Feel free to exclude any of these elements if you want to start fresh.

Once you've selected your desired Tracks and selected your chosen options, click [OK] to import the Tracks to the current Song.

Exporting Audio and MIDI Files

Follow the procedures below to export selected Audio Events as audio files, or Instrument Parts as Standard MIDI files or MIDI Musicloops,

Exporting Audio Files

To export an Audio Event to an Audio File, [Right]/[Ctrl]-click on the Event and select Export Selection. Choose a file name and storage location in the pop-up window and click OK or Save to export.

You can also drag-and-drop any Audio Event to a location in the File Browser to export it as an audio file to that location. As you hover over the Browser, you can press [Alt] to choose between rendering the Audio Event with or without its associated Insert FX.

Exporting MIDI Files

To export an Instrument Part to a MIDI file, [Right]/[Ctrl]-click on the Part and select Export Selection. Choose a file name and storage location in the pop-up window, and choose a file type (Musicloop or Standard MIDI file). Then click OK or Save to export. A file will be created with the appropriate file extension (.musicloop or .mid).

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, choosing the Standard MIDI option in the save window. One MIDI file is created that includes individual MIDI clips for each Part, in the correct sequence, with a common start time.

You can also drag-and-drop any Instrument Part to a location in the File Browser to export a Musicloop or MIDI file to that location. As you hover over the Browser, you can press [Alt] to choose between Musicloop and MIDI file formats. If you drag-and-drop multiple parts at once, they are written to one MIDI file with multiple Parts.

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

AAF Import and Export

AAF (or Advanced Authoring Format) is a professional cross-platform file interchange format supported by many DAWs, non-linear video editors, and other media authoring tools. Given that most major software platforms are unable to read the project files created by other platforms, it is useful to be able to employ a neutral format that many tools can use.

The AAF support in Studio One is particularly robust, allowing the import and export of mono and stereo audio files, automation data, fades, and crossfades.

Exporting AAF

To export a Song in AAF format, navigate to File/Save As... and choose "AAF File (*.aaf)" from the [Save as type:] selector. Select a target location and choose a name for your new AAF file, then press Save. Then, you have a few useful options to choose from:

- **Embed audio** Store WAV and AIFF files from your Song within the exported AAF file. If disabled, references to files are used instead.
- **Split stereo tracks** Convert stereo tracks to mono pairs. This ensures compatibility with applications which do not support import of stereo tracks.
- **Convert audio files** Create copies of all audio data in a different format for export.
- **Trim audio files** Discard silent regions in audio files to reduce the file size of your AAF project.
- **Export pan** Include pan automation in your AAF export. Some DAWs do not accept pan automation in AAFs, so if you have trouble importing your AAF, try re-exporting it with this option disabled.
- **Legacy mode** Enable to improve compatibility with older applications.

Note that AAF only recognizes standard audio files, so you may want to render your Audio and Instrument Tracks as continuous audio files before exporting the AAF. One easy way to do this is to save a copy of your song to use for export, then select all of your Song content and navigate to Event/Bounce Selection (or [Right]/[Ctrl]-click one of the selected Parts and choose Bounce Selection from the pop-up menu). Then, just remove any Instrument Parts that were bounced, and your Song is ready to export.

Importing AAF

To import an AAF into Studio One, open or create a Song, then simply drag-and-drop the AAF file onto the timeline. You can also import an AAF by navigating to *File/Open* and choosing the AAF file, or by double-clicking the AAF file in your file system. Any available audio tracks and one video track referenced in the AAF are added to your Song.

Note that only one video file can be imported, so if the source project contains multiple video clips, they should be consolidated in the original NLE or DAW before the AAF is exported. Only the raw video is imported, without any filters or VFX.

Importing Project Files from Other Applications

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.

StudioLive/Capture Mix Import

When a Capture session containing StudioLive mix data is opened in Studio One, all fader, pan, and mute settings are imported along with any Fat Channel XT settings, and a Fat Channel XT plug-in is inserted on each Channel. All Submix Busses (including their channel routing) are imported into Studio One as well. Empty FX Busses are created for each Send effect and send levels per Channel are imported. Pick any suitable reverb or delay plug-in and manually adjust the FX Bus level and plug-in settings to your taste.

See **Fat Channel XT** for more information about working with Fat Channel XT presets.

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Be sure to check out **www.presonus.com** for the latest feature lists, compatibility, and computer requirements.

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