

# **Renoise 3 User Manual**

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# 1 Welcome to the Renoise User Manual

Welcome to the Renoise user manual. Renoise provides a large number of features which perform a wide variety of tasks for music and sound creation. This manual will help you to understand how everything works by explaining all available aspects of Renoise in detail. You can use the category list to look through the various topics, or use the search function to find something specific.

You can also find a quickstart guide, a beginner's video tutorial and version of this manual online at the official Renoise site: <http://tutorials.renoise.com>

If you have any questions or suggestions, then please don't hesitate to [contact us](#).

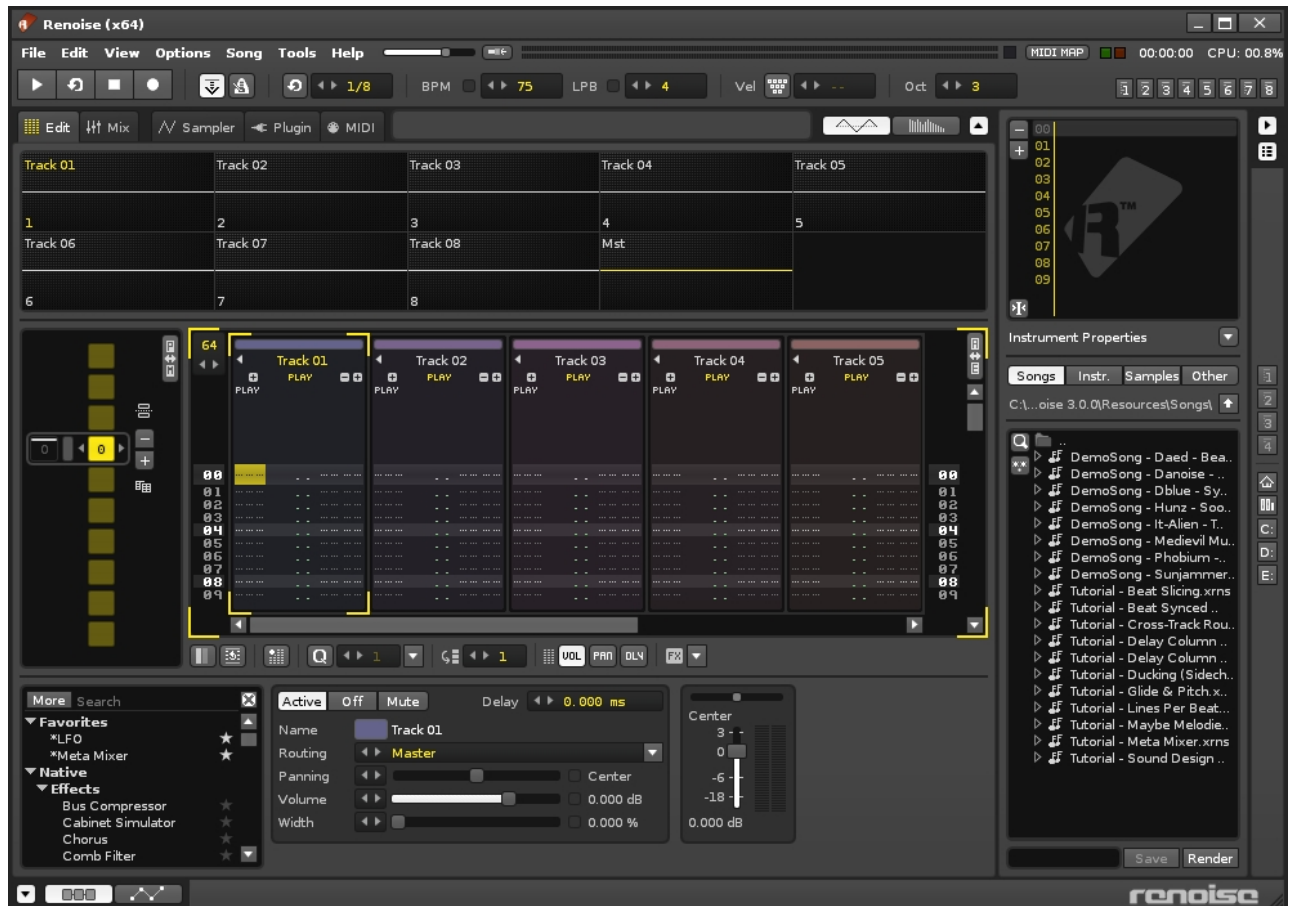
Copyright © 2014 by the Renoise authors. All rights reserved. All other product and company names are registered trademarks of their respective owners. The Renoise User Manual was created by Vincent Voois [vV], Sato Takashi [sato], Dac Chartrand [Conner\_BW], Eduard Müller [taktik], Duncan Hemingway [Achenar] and Erik Jälevik [sharevari]

## 2 Main Screen

Welcome to Renoise. This introduction will familiarise you with the main components of the Renoise interface and explain their basic function.

### 2.1 Main Screen Overview

Renoise is significantly different from most other music creation packages and consequently it also looks different. When you load Renoise for the first time you will be presented with something similar to this:



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Now we will briefly go through the main areas of the Renoise interface. Note the links in red, which you can click on for more detailed information about the various components.

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## 2.1.1 Upper Status Bar

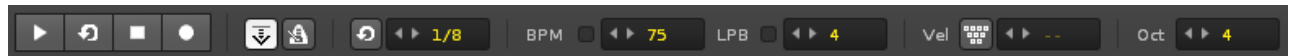
Located at the very top of the interface is the Upper Status Bar:



The left section of the status bar offers a variety of menu options. To the right of this is the Master volume slider which controls the overall volume of the song. Next is the button to auto adjust the Master volume level and avoid clipping (the volume is automatically lowered when clipping occurs). Further right is the VU meter showing the current Master volume level, followed by the MIDI controls ([MIDI Mapping](#) button, MIDI I/O LEDs), Song Timer and the current CPU usage.

## 2.1.2 Global Song Control

Just below the Upper Status Bar on the left-hand side are the basic [Transport Panel](#) controls.



From here you can start/stop the song and access basic editing features such as Edit Mode (record) and the metronome.

## 2.1.3 Song Visualisation

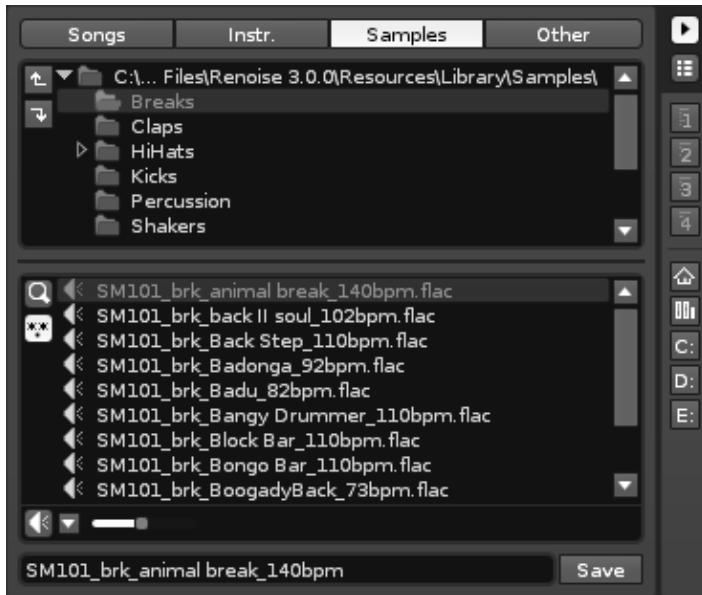
Below the Transport Panel are the [Scopes](#).



The various [Scopes](#) help you to visually analyse the song.

## 2.1.4 Loading & Saving Files

At the bottom right corner of the interface is the [Disk Browser](#).



Using the [Disk Browser](#) you can load or save songs, instruments, samples, effect chains etc. Upon first loading Renoise you will see a list of demo songs here. Double click on a song to load it, then press play to see and hear Renoise in action.

## 2.1.5 Selecting Instruments

Just above the Disk Browser is the [Instrument Selector](#).



The [Instrument Selector](#) allows you to choose the instrument that you wish to play or record with, using either the [computer keyboard](#) or an [external MIDI keyboard](#). Also, [VST/AU or external MIDI instruments](#) will appear in this section when they are loaded.

## 2.1.6 Creating & Editing Instruments



An [Instrument](#) in Renoise may be one or any combination of [samples](#), [plugins](#) and [MIDI](#), and each type can be created or edited by selecting the appropriate tab from the top left of the Renoise interface.

## 2.1.7 GUI presets



Directly above the Instrument Selector are a set of eight global preset buttons used to switch between various sections of the interface and are accessed by either clicking on them or pressing *F1* - *F8* on the keyboard. Renoise comes with eight presets already stored by default.

## 2.1.8 Sequencing Patterns

Located at the far left of the screen is the [Pattern Sequencer](#).



Renoise uses a sequence of patterns to arrange the structure of a song and the [Pattern Sequencer](#) is used to create, copy and organise your patterns.

## 2.1.9 Creating Patterns

To the right of the Pattern Sequencer and occupying the main central space is the [Pattern Editor](#).

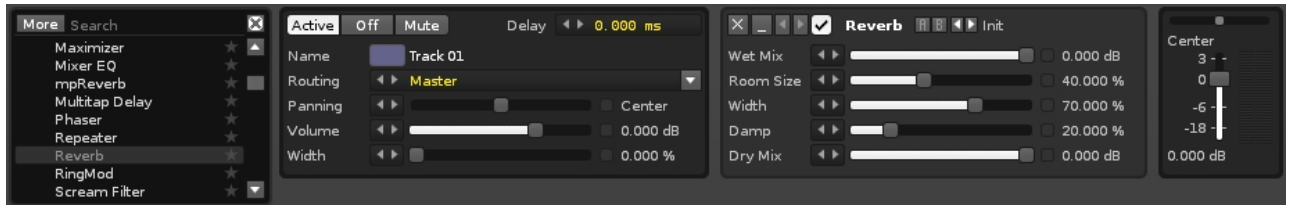




This is the main tool for composing and editing within Renoise. Although it may look intimidating to beginners, the method of adding/recording notes into tracks using the [Pattern Editor](#) is actually incredibly simple.

## 2.1.10 Applying Effects

Beneath the central area is the panel for [Track Effects](#):



This displays and controls all of the effects that are being applied to the current track (the track which the cursor is in). Besides the typical [Audio Effects](#) (Renoise/VST/AU/LADSPA) you can also assign [Routing Devices](#) to send/receive audio, and [Meta Devices](#) such as LFOs that do not affect audio, but are instead used to alter parameters and automation.

## 2.1.11 Lower Status Bar

Finally, at the very bottom is the Lower Status Bar.



The icons at the left allow you switch between the [Track Effects](#) and [Graphical Automation](#) panels or hide them completely. At significant points, Renoise will display information regarding its status and current operations here. If you wish to see the Welcome dialog box again, click on the Renoise logo at the right.

## 2.2 Guide Yourself Through the Interface: *Tooltips*

As you are using Renoise watch out for Tooltips, which can be seen by hovering the mouse pointer over a button or part of the interface for a second. Almost every button in Renoise will provide you with a small tip about its function.

## 2.3 Renoise Work-flow: *Learning the Keys*

While Renoise supports drag'n'drop and mouse gestures, it is primarily a keyboard-based application. As such, there are keyboard shortcuts for practically every function. To view the available shortcuts, select "*Help->List Keyboard Shortcuts...*" from the Upper Status Bar. If you are interested in a shortcut specific to an interface area, you can right-click to open a context menu. Finally, the keyboard shortcuts can also be customised in the "*Edit->Preferences->Keys*" menu.

A list of most important shortcuts can also be found in the **Keyboard Shortcuts** section in this manual.

## 3 Setting Up Audio Devices

Audio devices are what enables your computer to create the sounds you hear. This is not necessarily a sound-card; it can also be built into your computer's hardware. Regardless of whatever generates the actual sound output, what you control in Renoise is a driver, which is what allows the hardware and software to communicate.

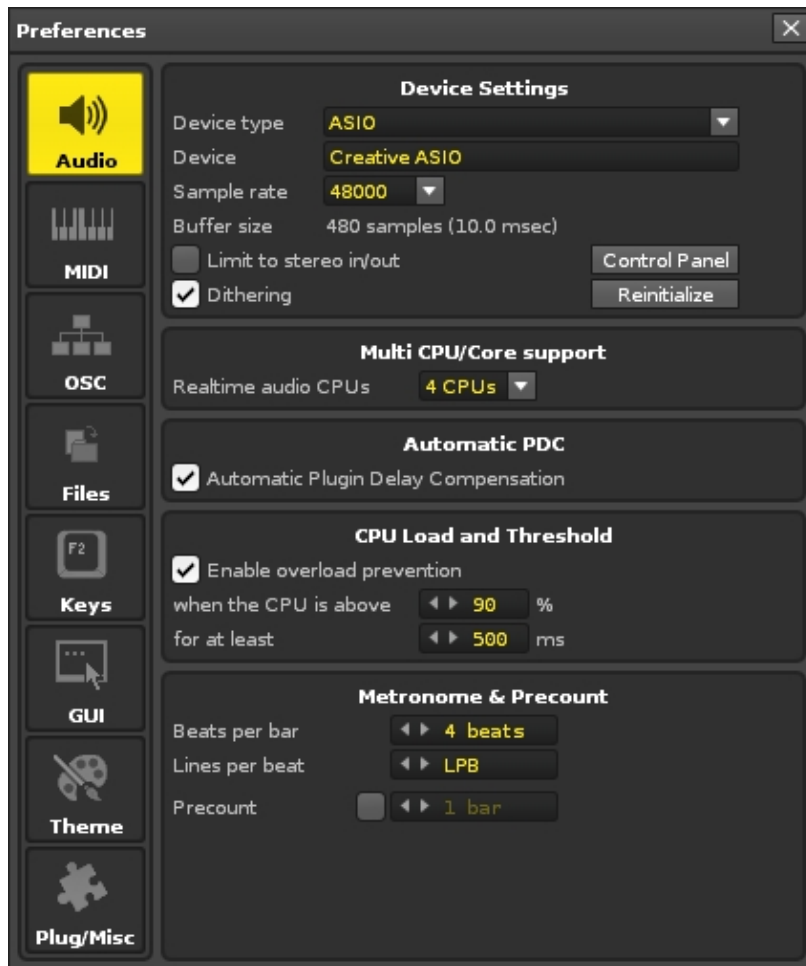
### 3.1 Default Setup

By default, Renoise is configured to use the system's default audio output device at a high latency, ensuring that in most cases Renoise is ready to go and output can be heard. No input device (something you can record with) is selected by default. Because the default settings are often not optimal for your particular machine, you should have a quick look at the Audio Preferences in case adjustments can be made.

### 3.2 Audio Preferences

To change the audio settings in Renoise, select "*Edit->Preferences*" from the Upper Status Bar. On OSX you will find the "*Preferences*" in the "*Renoise*" menu at the very left.

In the Preferences menu, select the Audio tab:



(Example of the Audio Preferences tab on Windows)

What follows is a quick overview of how to set up devices. For a more detailed explanation of the Audio Preferences, take a look at the [Preferences](#) section of the manual.

### 3.3 Audio Setup on Windows

On Windows you will have the choice between two different audio architectures:

- **Direct Sound:** This is the Windows default setup for audio and will work with all devices that are recognised by Windows. It is reliable, but also has a relatively high latency (the time it takes for the sound output by Renoise to be heard). Direct Sound only offers one stereo channel as input or output, so if your sound-card offers multiple audio channels you will not be able to use them in Renoise via this method.
- **ASIO:** An audio architecture created specifically for professional audio applications such as Renoise. It offers low latencies and combines recording and playback into one driver, making recording more reliable and stable. It also allows software to access multiple channels at once. So if your sound card has

more than one output, you can directly address them in various ways when using ASIO.

Because of its many advantages, using ASIO is highly recommended. Even if your sound-card does not provide ASIO drivers (i.e. your device does not show up in the ASIO device list in Renoise), you could try out a free general ASIO driver for Windows: [ASIO4All](#). This driver will work with most audio hardware, but may not be as reliable as your specific sound-card vendor's official drivers.

## 3.4 Audio Setup on Mac OSX

On OSX there is only one driver architecture present and it will work out of the box on all available Macs. Named Core Audio, it is similar to ASIO, offering low latencies and allowing the use of multiple sound-card outputs (when present) in Renoise.

To use Core Audio, simply select the device for output and recording and then select the latency and sample rate you want to use. Please see below for a more detailed description of the latency and sample rate setup.

## 3.5 Audio Setup on Linux

On Linux you have the choice between two different architectures:

- **ALSA:** This is the default audio architecture on most Linux systems and it should work out of the box in Renoise. In most cases it is very fast and reliable, but may require some fine-tuning before being usable. Please see the notes just below for more info about the "tweaking" that is needed for Linux Audio in general.
- **Jack:** Not installed by default on many Linux systems, but this is still a relatively common and advanced way to access your sound hardware. Jack does not just bridge Renoise to your sound-card, but also allows the routing of audio between multiple applications (provided they also support Jack). Please visit the official Jack audio pages at [jackaudio.org](http://jackaudio.org) for more detailed information.

Configuring Linux for Audio in general: Many Linux distributions are, by default, not optimized to the standards required for real-time audio creation in Renoise. So when using either ALSA or JACK with Renoise it is recommended to:

- use a real-time kernel
- configure PAM (/etc/security.conf) to allow Renoise and other applications to create low latency and high priority tasks

Both topics are described in depth in our Linux FAQ. For more information on the subject, this general Linux and Audio FAQ is also recommended: [linuxaudio.org](http://linuxaudio.org)

## 3.6 Latency & Sample Rates

Latency is the time that it takes for sounds output by Renoise to be played on your speakers or headphones. The lower the latency, the quicker Renoise will respond to what you play or modify. So lower latencies are preferable, but they also require more CPU power to maintain. If the CPU becomes overloaded then the audio will start to crackle and choke. If you hear such crackles in the sound output, the first thing you should do is increase the latency via the Preferences menu.

The sample rate defines how much detail is contained within the sound that you hear. The higher the sample rate, the more detail. 44,100 Hz is the rate that is used by CD players, so that rate offers an excellent playback quality. Whether higher rates result in a noticeably better listening experience is debatable, but they do offer increased resolution for effects. Rates below 44,100 Hz are not recommended because there is an audible reduction in sound quality.

Note that CPU consumption is affected by the sample rate. A doubling of the sample rate roughly corresponds to a doubling of CPU consumption in Renoise, because everything requires twice the number of calculations. So be aware that when using higher rates you will reach your computer's processing power limit sooner.

## 4 Setting Up MIDI Devices

You can connect external MIDI devices to Renoise in order to play notes or record controllers (automation). This is often done with a MIDI master keyboard or an external synthesizer which is capable of sending MIDI. While it is possible to [use the computer keyboard to enter notes](#) in Renoise, it is not velocity sensitive and can only map two and half octaves at once. So a MIDI keyboard is highly recommended when you want to accurately [record "live" playing](#).

Using the [MIDI Mapping](#) function, you can externally map things like starting/stopping the song, changing sequences, levelling tracks and FX etc. This can be done by either mapping regular notes from a master keyboard, or with MIDI hardware which is dedicated to the task, such as MIDI controllers and mixers.

With the MIDI clock you can sync external MIDI capable devices to the Renoise clock or vice versa.

To play external MIDI instruments from within Renoise you just use "*MIDI Instruments*", which do not need to be set up via the Preferences menu. You can find the relevant information in the [MIDI](#) section of the manual.

### 4.1 Default Setup

By default, Renoise is set up to use the first two devices it finds as input devices. If you don't have more than two devices, MIDI IO might work right out of the box for you. To verify that Renoise recognises your MIDI keyboard or controller, load up a sample and press notes on the keyboard. If you can't hear what you're playing, you should open up the Preferences menu and have a look at the settings.

### 4.2 Monitoring MIDI-IO

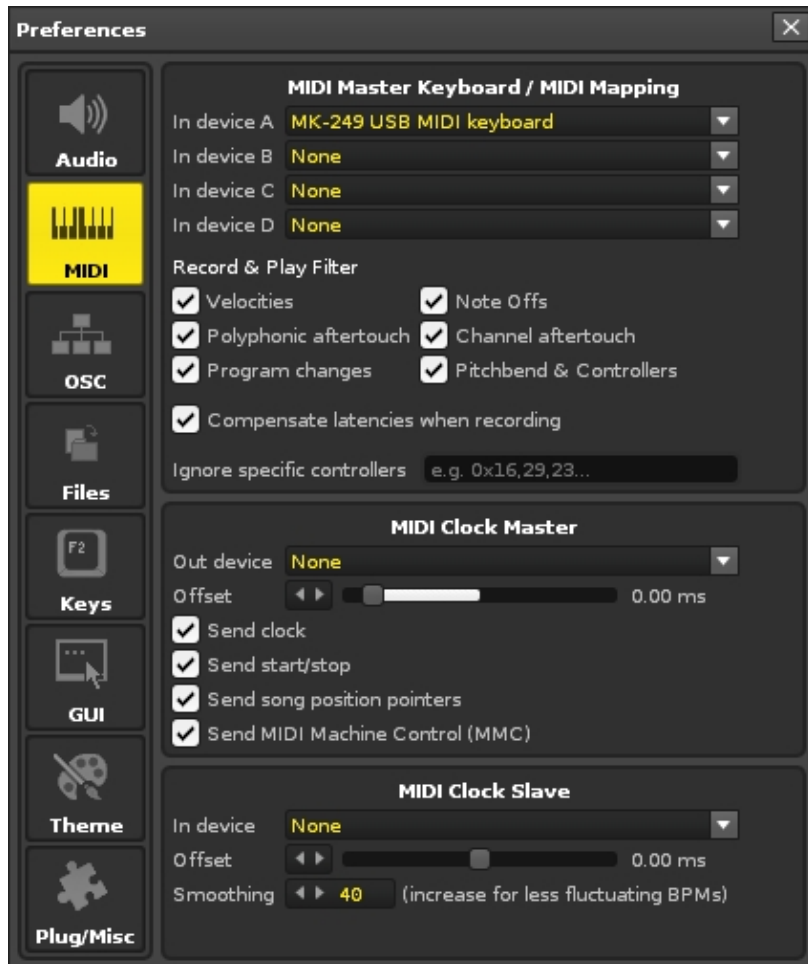
To the right of the menu options within the [Upper Status Bar](#) will be either two or four small LEDs. If there are four LEDs then the left set refer to MIDI Clock signals, while the right set refer to general MIDI transfers. If there is no MIDI Clock set up, then there will be only two LEDs, representing general MIDI transfers. Every message that is sent from Renoise will blink the red LED, while every message that is received by Renoise will blink the green.



## 4.3 MIDI Preferences

To change the MIDI settings in Renoise, select "*Edit->Preferences*" from the Upper Status Bar. On OSX you will find the "*Preferences*" in the "*Renoise*" menu at the very left.

In the Preferences menu, select the MIDI tab:



(Example of the MIDI Preferences tab on Windows)

## 4.4 Device Setup

Clicking on one of the device drop down boxes shows a list of the currently installed MIDI devices. Simply select the one that you would like to use.

On Windows, you may find the same entry appearing twice, one with WDM before the name and one without. If that's the case, then your sound-card or MIDI device offers two different drivers for the same device. WDM is a new kind of driver which offers better timing, so select this one if it works.



On Linux, you will also see some generic names (Renoise Input A/B). These devices are virtual ports that Renoise registers so that other applications can connect to them easily. To do all MIDI routing outside of Renoise with the ALSA MIDI patch-bay applications, take a look at the [Linux MIDI HowTo FAQs](#) for more information about this and ALSA in general.

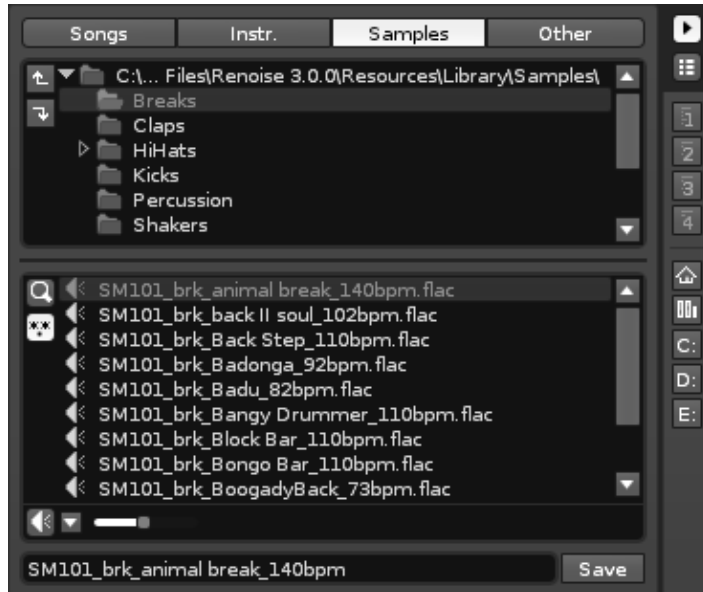
In the above picture, you can see three configuration panels:

- **MIDI Master Keyboard / Mapping:** Connect your external MIDI master keyboard or MIDI controller to Renoise
- **MIDI Clock Master:** Send MIDI clock timing information to other MIDI devices
- **MIDI Clock Slave:** Sync Renoise to external MIDI devices

All that is needed to start is to select the required devices. For a detailed description of the other advanced settings, take a look at the [Preferences](#) section of the manual.

## 5 Disk Browser

Located at the bottom right corner of the interface, the Disk Browser allows you to load and save files, preview samples or instruments and store your favourite locations for quick access.



### 5.1 Load & Saving Files

To load a file simply double-click on it in the file list. To save a file, type the desired name into the text box at the bottom and press the Save button.

### 5.2 File Types Selector

Using this panel you select what file type to load or save. Note that the File Panel will display all of the files that Renoise is capable of reading, but the files which are relevant to the selected file type are highlighted and listed at the top.

- **Songs** - Load and save Renoise Song files (XRNS), or load other song formats that Renoise can import (see below for full list).
- **Instr.** - Load and save Renoise Instruments (XRNI files).
- **Samples** - Load (see below for format list) and save samples (saving will always save in WAV format).
- **Other** - Load other Renoise file types (saving is done by other means).

Depending on the file type selected, Renoise may also show some additional options & buttons at the bottom:

- **Song:** A "Render" button will appear, which will open the [render dialog box](#) and allow you to render the current Song as a .wav file.
- **Instr./Sample:** A small pre-hear icon and a volume slider will appear. When enabled, samples will play when selected in the file list and instruments will play when loaded. Clicking the small arrow next to the slider allows selection of whether the sample/instrument will be played back on the [Master Track](#) or the currently selected [track](#) (including all track [effects](#)).

## 5.2.1 Supported Formats For Song Importing

- **.xrns, .rns, .ptk, .ntk** - Renoise Songs
- **.xm** - FastTracker II
- **.it** - ImpulseTracker II
- **.mod** - Amiga Mod
- **.mid, .midi** - standard MIDI

## 5.2.2 Supported Formats For Sample Importing

### 5.2.2.1 Lossless

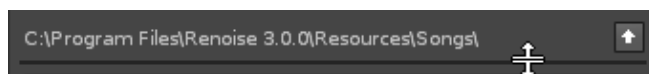
- **.aif, .aiff** - AIF wave (uncompressed only)
- **.wav** - PCM wave (uncompressed only)
- **.fla, .flac** - Flac audio
- **.aifc** - compressed AIF (requires Quicktime)
- **.au, .snd** - rare Mac formats (requires Quicktime)
- **.caf** - Core Audio file format used by many Apple apps (requires Quicktime)

### 5.2.2.2 Lossy



- **.ogg** - Ogg Vorbis
- **.mp2, .mp3** - standard MP2/3 (requires mpeg123 on Linux)
- **.m4a, .mp4 .mp4a, .aac** - new MP4, AAC format (requires Quicktime)

## 5.3 Folder Panel

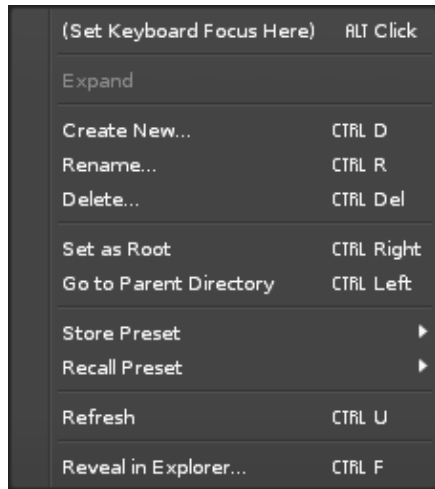
Initially, only the current folder will be shown, with the arrow at the right moving the list to the parent directory. To expand the Folder Panel and show the directory tree, click-grab the bar shown below and drag down:



The Folder Panel gives you an overview of the directory structure. Left-clicking on a folder will display its contents, while double-clicking will enter the folder.

-  - Go up one level in the directory hierarchy.
-  - Set current folder as new root directory (only show folders below the current position).

Right clicking on a directory within the Folder Panel will also present you with more options:






To the right of the folder panel are four numbered buttons, which are user-configurable presets that can be assigned to your favourite file locations. Right-clicking a button will store the current File Panel directory as a preset. Left clicking will recall a previously stored location. Each file type (Song, Instrument, Sample and Other) has its own set of four customisable presets. Hovering over a preset button with the mouse will show its full directory path.

Below this are a set of common default locations: your home folder, the default library folder (different for each file type: Song, Instrument, Sample and Other) and a list of all available installed system drives.

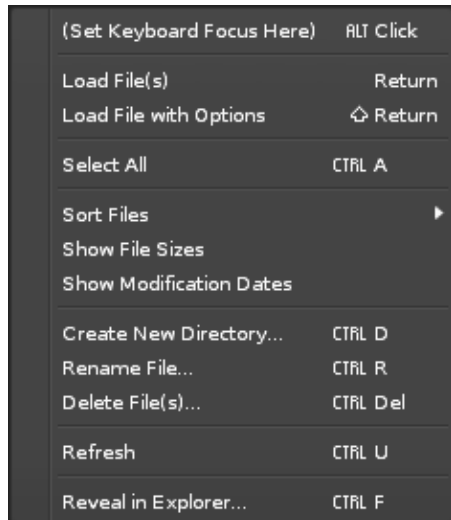
## 5.4 File Panel

The contents of the selected directory are displayed in the File Panel. By default, only files that are readable by Renoise are shown.

-  - Type in a search phrase to filter the file-list.
-  - When enabled, all file types are shown, not just the ones readable by Renoise.
-  - Save a file (the file is named using the text box to the right of the save button).

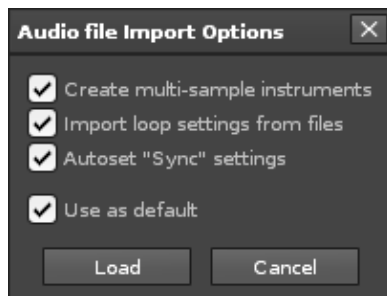
Right clicking on any file will present more options:

### File-Context menu



"Load file with options" can be used to specify exactly how a file should be imported. The options available to you change depending on the type of file selected. They are as follows:

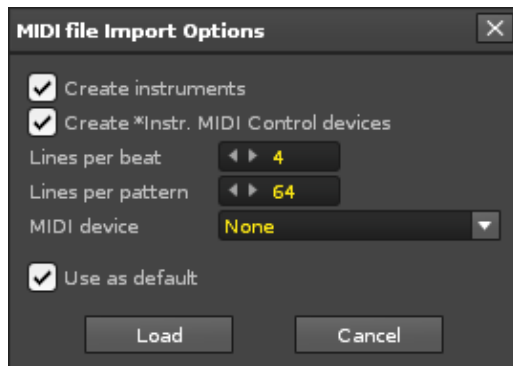
### WAV File Import Options



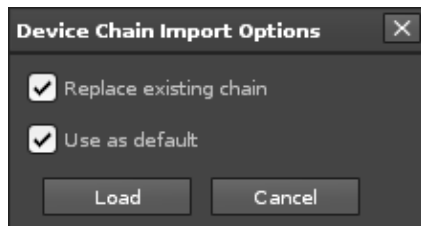
### RAW Audio File Import Options



### MIDI File Import Options





### Device Chain File Import Options



## 5.5 Resizing The Interface

The interface can be expanded horizontally by left-click-dragging the left edge of the panel, and vertically by left-click-dragging on the bar between the [Instrument Properties](#) and the Disk Browser.

-  - Closes or opens the entire right panel, hiding both the [Instrument Selector](#) and the Disk Browser. Note that when closed, the visibility icon below will move next to the [Scopes](#) icons, allowing you to still view the [Instrument Selector](#).
-  - Toggles the visibility of the [Instrument Selector](#).

## 5.6 Loading Multiple Entries at Once

You can load multiple sample or instrument entries by ctrl-clicking individual files and/or shift-clicking to select a range of them. The selected files can then be loaded using the context menu or dragged into a specific spot. Samples can be dragged into the instrument-list area and have an instrument created for each sample, or dragged into the sample-list area and be loaded into a single instrument.

## 5.7 Navigating the Disk Browser with the Keyboard

The default keyboard focus of Renoise is set to control the Pattern Editor, but you can

also activate other parts of the interface for keyboard navigation. You can achieve this through by any of the following methods:

- Right click on the File Panel or Folder Panel to show the context menu and select "*Set Keyboard Focus here*".
- Navigate the keyboard focus through the various interface areas with the *[Control/Command + Tab]*, *[Control/Command + Shift Tab]* shortcuts.
- Click with the middle mouse button on the File Panel or Folder Panel.

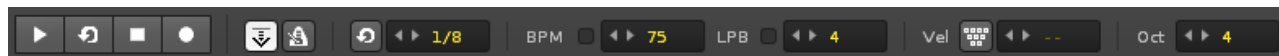
## 5.8 Importing Raw Audio Files (Convert Any File to Audio Sample)

Renoise is able to load anything (yes, *any* file type) as an audio sample file. In order to do this:

- Select the "*Sample*" category in the File Selector.
- Make sure the "*Show All Files*" option is enabled.
- Double click a file which is not normally recognized as a sample file (TXT document, JPEG picture, AVI movie etc.)
- Additionally, right-clicking on the file and selecting "*Load File with Options*" gives you additional options for importing (sample rate, bit depth etc.)

## 6 Transport Panel

The Transport Panel allows you to control song playback and alter other relevant global options.



### 6.1 Song Controls



- Start playing the song or [pattern](#).



- Toggle pattern looping, which constantly repeats the current pattern.



- Stop song/pattern playback. Click twice or right-click to activate Panic: stopping all sounds immediately.



- Toggle [Edit Mode](#). With [Edit Mode](#) enabled, all notes played via the keyboard are recorded into the pattern. Notes can be recorded while the song is stopped or as the song/pattern is playing (if Pattern Follow is on).

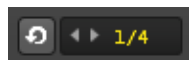


- Toggle Pattern Follow mode. When enabled, the [cursor](#) will follow the playback position down the pattern as the song plays. This allows you to record "live", inserting notes at the current point in the song. When disabled, you can freely move the cursor around as the song plays, inserting notes and making edits wherever you like (most useful with pattern looping on).



- Toggle the metronome. Extra metronome options are available in the ["Preferences -> Audio"](#) menu and via the Options menu in the [Upper Status Bar](#).

### 6.2 Song Parameters



- **Block Loop:** This causes a section of the current pattern to be looped and works independent of the full pattern loop option. The value box to the right allows you to adjust the exact fraction size of the looping section. If you need to concentrate on recording and editing only a small section of a pattern, then this option can be very useful.



- **Beats per Minute:** The current tempo of the song, also known as BPM. As well as whole numbers, the value box can accept numbers with a decimal point, e.g. 125.5. To do this, double click on the value box and enter a new BPM value with the keyboard. To adjust the tempo as the song is playing, you can use the [Pattern Effect ZTxx](#), where **xx** is the new BPM in hexadecimal. This can also be [Automated](#) on



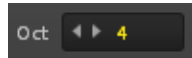
the [Master Track](#).



- **Lines per Beat:** This changes the number of lines in the Pattern Editor that make up a musical beat. The higher the LPB, the greater the resolution available to you for editing notes, effects and automation. This can be also be adjusted as the song is playing via the [Pattern Effect \*\*ZLxx\*\*](#), where **xx** is the new LPB value in hexadecimal. This can also be [Automated](#) on the [Master Track](#).



- **Computer Keyboard Velocity:** When enabled, the computer keyboard will play and record notes at the velocity set in the value box. When disabled, only notes will be inserted, leaving the existing velocity value untouched.







- **Keyboard Octave:** The current octave of both the computer keyboard and external MIDI keyboard. Moving this value up and down alters the octave of the notes played and hence their pitch. Please see [Playing Notes with the Computer Keyboard](#) for more information about playing and recording notes with the computer keyboard.

# 7 Scopes

|             |               |         |                |             |         |                |            |             |
|-------------|---------------|---------|----------------|-------------|---------|----------------|------------|-------------|
| pakka sveip | low           | mid     | sweep          | flyte litt  | ambiang | bursdag        | Sputnik    | Sputnik re  |
| 1>S3,S3,S3  | 2>G6,S2,S2,S3 | 3>G6,S2 | 4>G6,S1,S1,S.. | 5>G6,S1,S3  | 6       | 7>S2,S3,S3,S.. | 8>S2,S3,S3 | 9>S1,S3     |
| lavt        | støy          | støy 2  | støy 3         | bassgris    | output  | delay fx       | reverb mid | reverb high |
| 10>G14,S3   | 11>G14        | 12>G14  | 13>G14         | 14>S1,S1,S3 |         | 1>S2           | 2          | 3           |

The scopes provide a visual representation of your song, allowing you to examine the frequency and amplitude of the final audio signal or see what's currently happening in each individual track. When the scopes are open, you can expand their vertical size by click-dragging the bar just beneath them. The icons for toggling the scopes can be found near the top right of the interface:

-  - Shows the Track Scopes.
-  - Shows the Master Spectrum.
-  - Opens or closes the Scopes/Spectrum panel. Note you can have them independently open or closed for the main interface and the [Instrument Editor](#).
-  - When the main interface's right panel containing the [Disk Browser](#) and [Instrument Selector](#) is closed, this icon will appear, allowing you to still view the [Instrument Selector](#).

## 7.1 Track Scopes

The Track Scopes show the audio output from all tracks simultaneously. The waveform represents not just the volume of the sound, but also its basic frequency characteristics (bass sounds will appear broad and flat, while high pitches look sharp and jagged). MIDI instruments, which only send MIDI events and thus have no audio visualisation, are represented by a small red dot in the lower-right corner of the scopes.

Track names and numbers are shown in the top-left. If the track is routed to a send-track this will be shown in the bottom left corner in the form >X, where X is the number of the send-track. The currently selected track is highlighted with a different text colour.

### 7.1.1 Mouse Operations

- Toggle tracks on/off with the left mouse button.
- Solo / unsolo a track by right-clicking it.
- Mute a track at the current point in the Pattern Sequence (see [Pattern Matrix](#)) with the middle mouse button.
- You can navigate through the various tracks by clicking on their name.
- Scroll through tracks by using the mouse scroll-wheel.

If you have set the track-function to [Mute in the Preferences menu](#), the scope will display **Mute** instead of **OFF**.

## 7.2 Master Spectrum

The Master Spectrum scope analyses the spectral composition of the audio produced by the [Master Track](#) and displays the results within the dynamic range of human hearing (roughly 20 to 20,000 Hz). This can be useful in analysing the character of your music and noting whether any frequencies are dominating or lacking in the mix.

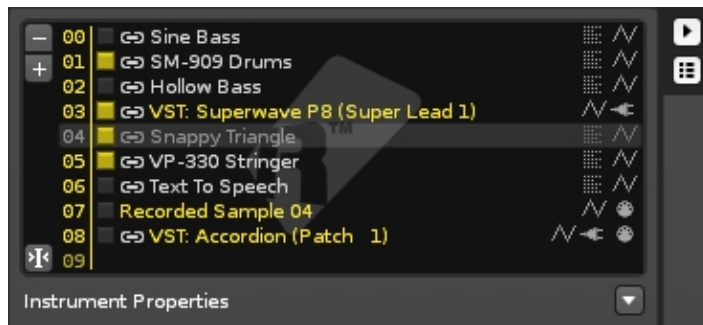
For an exact value of both the frequency and volume at a specific point, move the mouse pointer into the scope and it will transform into a cross. The frequency and volume values present at the centre of the cross will be shown in blue at the top and left sides of the scope respectively.

At the right-hand side is a Phase Meter, displaying the stereo balance and phase of the master audio output. Directly underneath this is the Phase Correlation Meter, which shows you how in/out of phase the left and right signals are.

Right clicking on the Master Spectrum will open a menu with the following options:

- **Show Phase View:** Turns the Phase Meter on/off.
- **Show Scopes/Spectrum:** Choosing Scopes will display the audio produced by the Master Track in stereo. It can be a useful visual tool for examining the amplitude of the left and right channels of your final mix.
- **Track Display A/B:** With these options you can select two sound sources to compare against each other in the Master Spectrum. You can choose from any available track, group or send.
- **Drawing Mode:** Choose how the waveform is drawn from four different styles.
- **Spectrogram Colors/Speed:** Only available with the Spectrogram drawing mode selected, this changes its color and speed.
- **Frequency Scaling:** Switches between Logarithmic and Linear frequency scaling.
- **Block Size:** Alters the drawing resolution of the waveform.
- **Channel Mix:** Choose whether the Master Spectrum is calculated from a combined stereo signal or from each channel separately (takes more cpu power).
- **Peak Fall:** The speed at which the waveform will fall from a higher volume to a lower one.
- **Slope Factor:** Displays an artificial amount of added volume per octave.

## 8 Instrument Selector



Located at the top right of the Renoise interface, the Instrument Selector lists the [Instruments](#) that are contained within the song. The currently selected instrument is highlighted and will be played back and recorded when [editing or recording notes into patterns](#). Instruments are numbered on the left and this number is used by the [Pattern Editor](#) to refer to each specific instrument during playback. When an instrument is playing, the playback indicator to the left of its name will light up. The icons to the right of an instrument's name show whether it contains [samples](#), [plugins](#), [MIDI](#) or [phrases](#) and clicking on an icon will take you to the relevant section of the Instrument Editor.

You can find out how to create new instruments or edit existing ones in the [Instruments](#) section of the manual.

### 8.1 Resizing The Interface

The interface can be expanded horizontally by left-click-dragging the left edge of the panel, and vertically by left-click-dragging on the bar between the [Instrument Properties](#) and the [Disk Browser](#).

- - Closes or opens the entire right panel, hiding both the Instrument Selector and the [Disk Browser](#). Note that when closed, the visibility icon below will move next to the [Scopes](#) icons, allowing you to still view the Instrument Selector.
- - Toggles the visibility of the Instrument Selector.

### 8.2 Instrument Options

- - Removes the selected instrument from the list.
- - Inserts a new empty slot below the selected instrument.
- - When enabled, upon changing the [track](#) or [pattern](#), the instrument under or nearest to the [cursor](#) will be automatically selected in this list.

Right clicking on the Instrument Selector presents you with some extra options:

- **Duplicate:** Creates a new copy of the selected instrument.
- **Clear:** Deletes the selected instrument and leaves a blank slot in its place.
- **Rename:** Give an instrument/sample a new name.

- **Render Plugin To Instrument:** Available for plugin instruments only. This will create a sample-based instrument from the selected plugin instrument. After rendering, the new instrument replaces the plugin, which is also unloaded. Using this method you can share Renoise songs with people who may not have a specific plugin.
- **Render Plugin To New Instrument:** Available for plugin instruments only. This will create a new sample-based instrument from the selected plugin instrument. The new instrument is placed into an empty instrument slot, leaving the original plugin untouched.
- **Delete Unused Instruments:** Will remove and unload all instruments which are unused, i.e. not played on any pattern within the song.
- **Load Instrument...:** Opens a new dialog box to select a file for importing.
- **Save Instrument As...:** Export an instrument to a file for later use and importing. This can also be done in the [Disk Browser](#).

## 8.3 Moving Instruments


The list can be reorganized by dragging and dropping instruments in the Instrument Selector. When this is done, Renoise automatically adjusts the numerical reference of instruments within the Pattern Editor, ensuring that the song still plays the same. If you wish to swap or replace one instrument with another, you can do so by copy/pasting it, or by remapping it in the [Advanced Edit](#) panel.


Samples and instruments can be dragged and dropped from the Disk Browser to the instrument list and files can also be dragged and dropped from external Windows Explorer (PC) or Finder (OSX) windows. Note that in this case the currently selected instrument slot will be used, possibly overwriting an existing instrument.

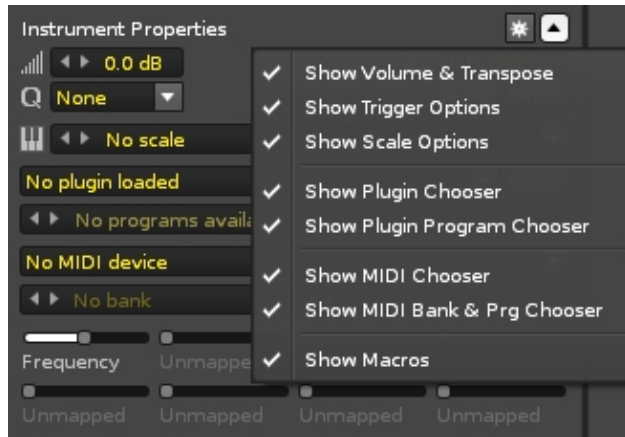
## 8.4 Shortcuts

- **ALT + UP/DOWN:** Select previous/next instrument in the list.
- **NUMPAD KEYS -/+:** Select previous/next instrument in the list.
- **ALT + LEFT/RIGHT:** Select previous/next page in the Instrument Selector.
- **NUMPAD KEYS 1-9:** Select first to ninth instrument currently visible in the list.
- **ALT + SHIFT + UP/DOWN:** Scrolls through the [list of samples](#) contained in the current instrument.

## 8.5 Instrument Properties

At the very bottom of the Instrument Selector is the Instrument Properties section, which can be opened/closed using the  button at the top right. This is intended to give you quick and easy access to the more common instrument options of the selected instrument without having to open the [Sampler](#), [Plugin](#) or [MIDI](#) tabs. When this section

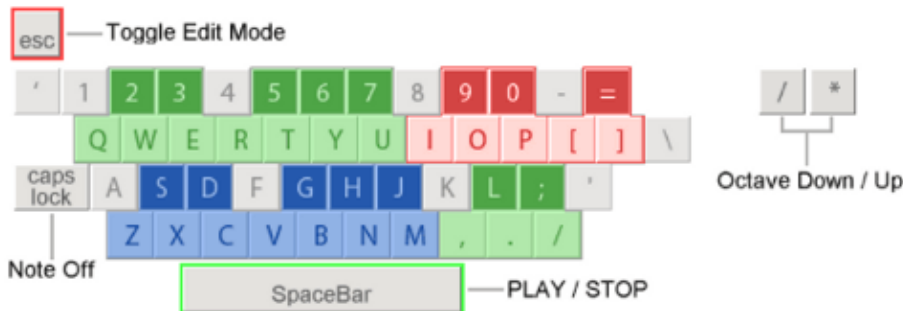
is open, pressing the  button will open the selection menu, allowing you to choose which options will be shown.



## 9 Playing Notes with the Computer Keyboard

*Note:* The following explanation applies to QWERTY type keyboards (See layout). The Z-key may be positioned differently on other type of keyboards.

In Renoise you can use your computer keyboard to play/record and edit notes. This virtual keyboard is always enabled and has the following layout, with the blue keys representing the lower octave, green keys the upper octave and red the octave above that:



### 9.1 Note Off

In addition to the normal musical notes, Renoise also features a Note-Off command to signal that the previous note has stopped. This is automatically inserted when using a MIDI keyboard by releasing the key. Using the computer keyboard, it is inserted with the Caps Lock or A-key. If an instrument has a sustain element at the end of its waveform, then this is triggered when encountering a Note-Off.

### 9.2 Octave Settings

By default, the lower keys (ZXCVBNM) are set to octave 3 and the upper ones (QWERTYU) use octave 4. To play lower and higher octaves than this, you can change the "Keyb. Octave" setting in the [Transport Panel](#) panel or use the `/` and `*` buttons located on the numpad (alternatively, use "`Left Ctrl + [` or `]`"). Note that the octave setting also applies to the MIDI master keyboard input.

### 9.3 Note Velocity

This option is found in the [Transport Panel](#). When enabled, the computer keyboard will play and record notes at the velocity set in the value box. When disabled, all notes will be at maximum velocity.

## 9.4 Computer Keyboard Limitations

To simply edit and record notes in the [Pattern Editor](#), the computer keyboard will do the job just fine. You can even use the computer keyboard for [Recording and Editing Notes](#) as the song is playing. Unfortunately, most computer keyboards do not allow all key combinations to be pressed at the same time, nor are they velocity sensitive. So when the accurate recording of "live" playing is essential, the use of a MIDI keyboard is highly recommended. See [Setting Up MIDI Devices](#) on how to configure a MIDI keyboard.



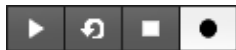
# 10 Recording and Editing Notes

There are two ways of recording notes in Renoise:

- **Live Recording:** Record what you are playing "live", as the song is playing back. This is how most sequencers record notes.
- **Step By Step:** Enter and edit notes manually with the [computer keyboard](#) or a MIDI keyboard, step by step. This can be done while the song is stopped or while it's playing back.

## 10.1 Edit Mode

First, in order to be able to record anything, make sure that Edit Mode is enabled by pressing the "ESC" key on your keyboard. Alternatively, you can click the record button in the [Transport Panel](#):



The red border around the Pattern Editor indicates that Renoise is now ready to record.



## 10.2 Live Recording

To record notes "live":

1. Ensure that Pattern Follow is **ON**  in the [Transport Panel](#).
2. Start the song playing with Edit Mode enabled.
3. Play notes with the computer keyboard or your MIDI master keyboard.

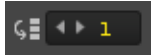
The played notes will now be recorded into the track at the current playback position in the [Pattern Editor](#).

## Tips

- To enable Edit Mode and start playing with a single button press, you can also use the "*Right Shift*" key.
- To just start playing, you can use either the "*Spacebar*" or "*Right Ctrl*".
- Pressing the "*Right Alt*" key will start playing, but also with looping of the current pattern enabled.
- To enable a count-in for live recording, turn on the Metronome pre-count via the Options menu in the [Upper Status Bar](#). You can also adjust the amount of bars the count-in lasts here.

## 10.3 Entering Notes Step By Step

To record notes step by step while playback is stopped, simply enter notes with Edit Mode enabled. The note will be inserted into the Note column at the current cursor position and the cursor will move downwards within the Pattern Editor. The amount of lines that the cursor moves by can be changed with the [Edit Step](#) value at the bottom of the Pattern Editor, which can even be set to zero:



To record notes step by step while the song is playing:

1. Ensure Pattern Follow is *OFF*  in the [Transport Panel](#).
2. Start the song playing with Edit Mode enabled.
3. Enter notes with the computer keyboard or your MIDI master keyboard.

So to clarify, the [Pattern Follow](#) button allows you to switch between the live recording and step by step modes.

**Shortcuts:** To quickly switch Pattern Follow *ON* and *OFF* you can use the "*Scroll Lock*" key. To quickly change the Edit Step value you can use "*Left Ctrl* + 1,2,3,4,5,6,7,8,9,0".

## 10.4 Real-time and Manual Quantization

When recording notes "live", by default they will be recorded with the highest possible precision using the [Note Delay](#) column in the [Pattern Editor](#). The note delay column allows you to delay notes with a precision of 1/256th of a line.

If you do not want to precisely record your notes, you can let Renoise quantize them either in real-time or after recording something. This is done with the quantize controls in the Pattern Editor control bar:



The "Q" button enables or disables live quantization, while the value box to the right specifies the quantization value in lines. Use the drop down menu next to the value box to manually quantize a range within the current pattern after recording.



## 10.5 Polyphonic vs. Monophonic Recording

The Mono button located in the [Instrument Editor](#) allows you to toggle the recording a single note at a time, or chords (i.e. multiple notes simultaneously).

Sequential (monophonic) recording can often be better when recording drums or monophonic instruments.

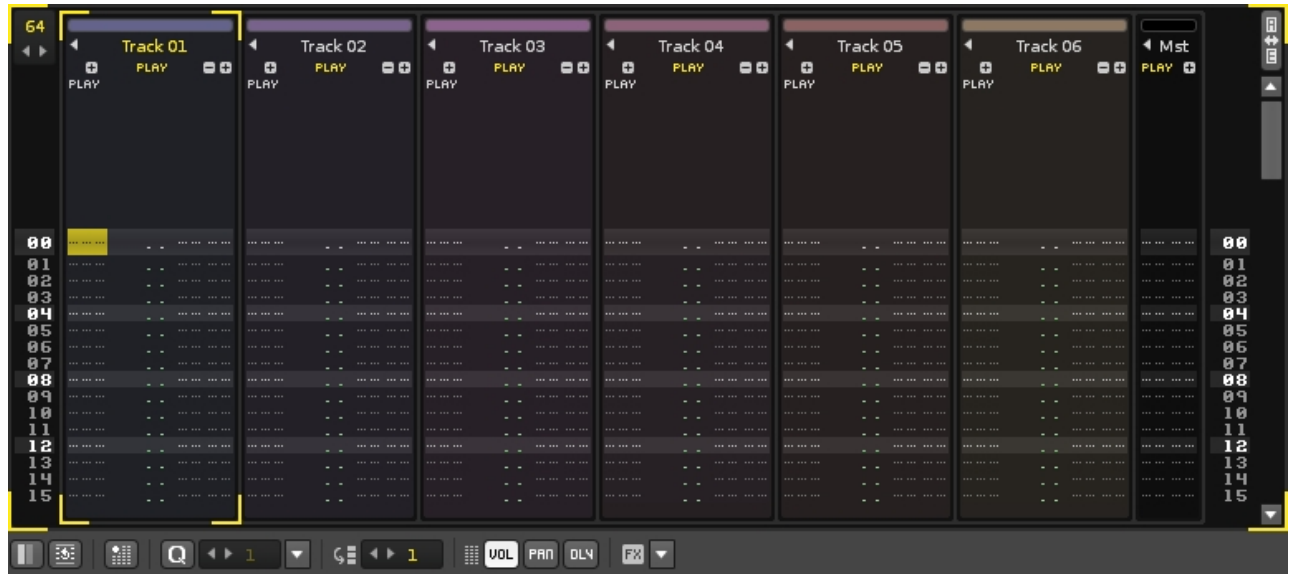
## 10.6 Entering Chords with the Computer Keyboard

When entering notes step by step with the computer keyboard, Renoise will by default place all notes entered sequentially. If you want to quickly insert chords without live recording, you can do this by holding down "*Left Shift*" while entering the notes. This will automatically create columns to the right and enter the new notes there.

Note that MIDI keyboards will always record chords when pressing more than one key at a time.

# 11 Pattern Editor

The Pattern Editor is the main editor used to create music in Renoise. Instruments are recorded by entering notes onto lines in the order that they are to be played, from top to bottom. A pattern can contain multiple tracks, typically one for each different instrument and each with their own separate set of effects. Songs are created by arranging a sequence of patterns with the [Pattern Sequencer](#) and the [Pattern Matrix](#).



## 11.1 Patterns

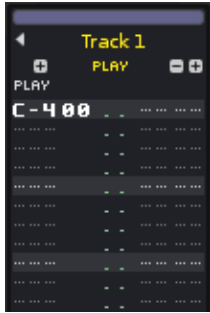
A pattern is simply a block of time containing the notes played by different instruments in different tracks. The easiest way to understand this is to load in a demo song by double-clicking on it in the [Disk Browser](#) and observing what happens after you press Play with the "Spacebar".

As the horizontal bar moves down the pattern, it plays the notes that it encounters on the way. When the end of a pattern is reached, the song moves on to the next pattern in the sequence, as controlled by the [Pattern Sequencer](#). So, a pattern is usually used to represent a specific section of a song that may be repeated again in future. The length and speed of a pattern can be changed, so the exact nature of a specific pattern can vary wildly depending on the whims of the composer.

## 11.2 Tracks

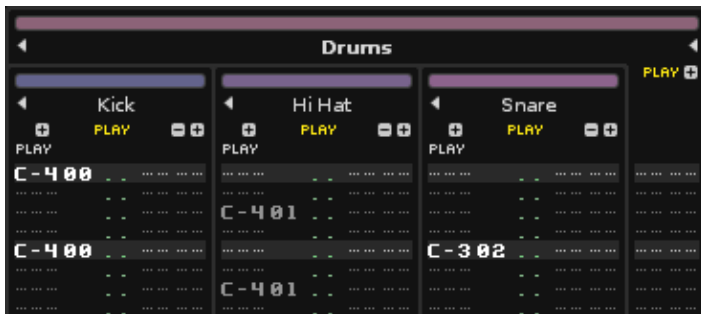
There are four different types of track in Renoise:

## 11.2.1 Sequencer Tracks



These standard tracks are where you record notes onto the lines of a [Note Column](#). Each track also features [Effect Columns](#), which are used to apply effect commands to instruments and to control [Track Effects](#).

## 11.2.2 Group Tracks



Used to logically group together similar Sequencer Tracks, such as all percussion, all lead synths etc. The child tracks have their output automatically routed through the parent track, though you can change this with the [Pre Mixer](#). This means that [Track Effects](#), [Automation](#) and [Pattern Effect Commands](#) used in the Group Track will affect the audio coming from the Sequencer Tracks contained within it.

## 11.2.3 Send Tracks



Send Tracks are fed audio from other tracks using Send Devices and are typically used to apply the same set of [Track Effects](#) to multiple tracks at once. Notes cannot be entered into Send Tracks and so they only feature Effect Columns, which are used to control the [Track Effects](#) and [Pattern Effect Commands](#).

## 11.2.4 Master Track



The Master Track is where all audio produced by the other tracks finally ends up. Effects placed on the Master Track will therefore affect the output of the entire song. Notes cannot be entered into the Master Track and so it only features Effect Columns, which are used to control the [Track Effects](#) and [Pattern Effect Commands](#).

## 11.2.5 Organising Tracks

Any track can be renamed by double-clicking on its name and typing in a new one.

To add or remove tracks, you can use the *"Edit->Insert Track"* (Left Control/Command + T) and *"Edit->Delete Track"* (Left Control/Command + Left Shift + T) commands from the menu in the Upper Status Bar. If the currently selected track is a Sequencer Track, then a new Sequencer Track will be added to the right of it. If the currently selected track is a Send Track or the Master Track, then another Send Track will be added.

To add a group track, use the *"Edit->Insert Group"* (Left Control/Command + G) command or drag a track onto another one while holding down Alt. This will create a new group and add both tracks to it.

To reposition a track, click on its name, hold the button down and drag the track to either side. This can be done in both the Pattern Editor and the [Mixer](#). You can also move tracks by using the *Ctrl/Command + Alt + Left/Right* shortcuts.

To duplicate tracks, you can use the *"Edit->Duplicate Track"* (Left Control/Command + D) command from the menu in the Upper Status Bar.

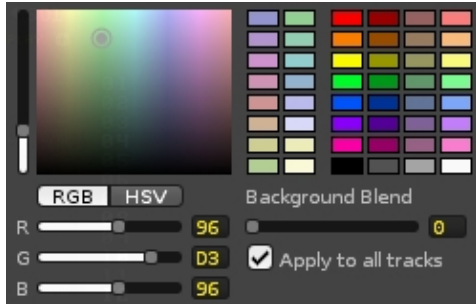
## 11.2.6 Collapsing Tracks

To collapse a track, press the small arrow to the left of the track's name. This just hides most of its information; the track will still play as normal. You can collapse groups of tracks in the same way and using the arrow to the right of a group's name, you can also collapse its [Effect Column](#).

Using [Single Track Edit Mode](#) will cause all of the tracks and groups to collapse, except the one that cursor is currently in. Moving the cursor to other tracks while in this mode will automatically expand those tracks and collapse the one you were previously in.

## 11.2.7 Changing Track Colors

To change the color of a track, left-click on the color slot above the track name. Using the color picker you can move around the grid to choose a color, while the left-hand slider controls the saturation. You can also pick colors from the available swatches or right click on a swatch to save your current color to it. The "*Background Blend*" slider controls the amount of color present in the track's background. Enabling "*Apply to all tracks*" will apply the slider value to all of the tracks at once.



## 11.3 Columns

There are two types of columns in tracks:

1. Note columns, used to record instruments by entering notes.
2. Effect columns, used to apply [Pattern Effect Commands](#) and control [Track Effects](#).

### 11.3.1 Adding / Removing Columns

To add/remove Note or Effect columns, you can use the small +/- icons next to the track names. Alternatively, you can use the shortcut, "*Left Control/Command + Left Shift + left/right arrow key*" to either add/remove a Note or Effect column, depending on where the cursor is (place it where you would like that column type to be duplicated).

Each [Sequencer Track](#) can have up to 12 Note Columns and 8 Effect Columns.

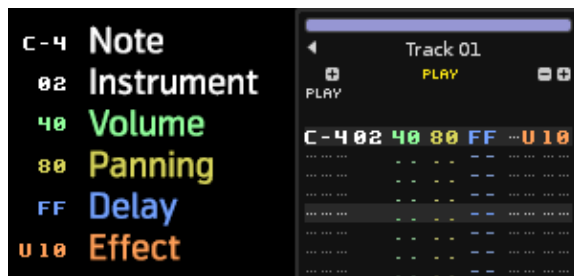
[Groups Tracks](#), [Send Tracks](#) and the [Master Track](#) can have up to 8 Effect Columns, but cannot have any Note Columns.

**Please Note:** All numbers in the effect columns and note sub-columns are notated in hexadecimal (counting from 0 to 16, where decimal is 0 to 10). If you are unfamiliar with hexadecimal, then you can read an explanation of it [here](#).

### 11.3.2 Sub-Note Columns

Note columns also have three extra sub-columns each, which are used to control the following parameters on a per-line basis: volume, panning and delay.

- **Note:** e.g. C-4, A#3. The first two characters represent the musical note, while the third character is the octave number. The notes are not entered letter by letter like a text editor, but like a piano, using the computer keyboard or a MIDI master keyboard.
- **Instrument Number:** The instrument that will play the note. This is automatically entered when the note is recorded, but it can be changed by hand.
- **Volume:** (00-80) - The note velocity/volume. Additional effects can also be triggered from here; see the [Pattern Effect Commands](#) section of the manual for more details.
- **Panning:** (00-80) - The panning of the note. This can only be applied to sample-based instruments in Renoise (MIDI and VST plugins will be unaffected by values in this sub-column). Additional effects can also be triggered from here; see [Pattern Effect Commands](#).
- **Delay:** (00-FF) - A time delay added to the note.



By default, the panning and delay columns are not visible. To show/hide them you can use the keyboard shortcuts, "*Left Control/Command + Left Shift + V (Volume), P (Panning), D (Delay)*", or you can press the corresponding buttons in the [Pattern Editor's Control Panel](#), located at the bottom of the editor.


### 11.3.3 Sub-Effect Columns

Effect columns are set up in the format: xxyy.

- **Effect Number:** The first two digits (xx) define the effect that should be triggered (like a cutoff parameter in a filter, or a sample effect like pitch glide). See the [Pattern Effect Commands](#) section of the manual for a full list of the available effects.
- **Effect Value:** The next two digits (yy) define the effect's value. For example, to a cutoff parameter this would change the frequency, for a pitch glide this would change the rate of the glide.



## 11.4 Lines

Each individual pattern can have a different length, from 1 to 512 lines, which can be changed by altering the value in the box at the top left of the Pattern Editor: 

### 11.4.1 Lines, Beats and Pattern Resolution

In the [Transport Panel](#) there is a "*Lines/Beat*" option, which changes the number of lines in the Pattern Editor that make up a musical beat. The higher the LPB, the greater the resolution available to you for editing notes, effects and automation. This can be also be adjusted as the song is playing via the Pattern Effect **ZLxx**, where **xx** is the new LPB value in hexadecimal.

By default the LPB is 4, meaning that placing a note on every highlighted line will create a simple 4/4 beat in a pattern that is 16 lines long. How many lines you use for a beat is totally up to you, but it can be important to get it correct if you're using Renoise to interact with other beat-based instruments or sequencers, (e.g. plugins which use beat timings) or when syncing a Renoise song with other applications via ReWire.

When working with time signatures other than 4/4, it's useful to set your number of lines in a pattern to a factor of the time signature's numerator multiplied by the LPB. For example, when working in 3/4 and a LBP of 4, you could use a pattern length of 12, 24 or 48; when working in 5/4 you could use a pattern length of 20 or 40 etc. This will allow you to place your notes on exact pattern lines without having to delay notes with the delay column.

You can turn off the LPB highlighting via the [Song Settings](#) tab.

## 11.5 Pattern Editor Control Panel

At the bottom of the Pattern Editor is the control panel:



- **Single Track Edit Mode:** When enabled, only the currently selected track will be shown in the [Pattern Matrix](#).
- **Pattern Wrap Mode:** Decides what will happen upon reaching the end of a pattern when entering notes step-by-step in Edit Mode. When enabled, the cursor will move to the top of the next pattern in the sequence. When disabled, the cursor will move back to the top of the current pattern.
- **Pattern Automation Recording Mode:** When enabled, right-clicked and MIDI mapped parameters are recorded into Automation instead of the pattern's Effects Column.
- **Chord Mode:** Toggles the recording of a single note at a time, or [chords](#) (i.e. multiple notes simultaneously) when recording "live".

- **Quantize Controls:** Toggles live quantization. The value box to the right specifies the quantization value in lines. Use the drop down menu next to the value box to manually quantize a selected area of the current pattern after recording.
- **Edit Step:** Sets how many lines the cursor should skip down in the Pattern Editor when entering a note or effect.
- **Vol/Pan/Dly:** Toggles the volume, panning and delay sub-columns.
- **FX:** Quickly show and add pattern effect commands.

## 11.6 Editing and Navigating in Patterns

Before anything can be recorded into the Pattern Editor, Edit Mode needs to be enabled, which is done by either pressing the "ESC" key or the record button in the [Transport Panel](#).

### 11.6.1 Basic Shortcuts

Moving the cursor around in the Pattern Editor can be done with the arrow keys. The Page Up/Down buttons will move the cursor up and down 16 lines at a time. To quickly jump to the next note column press "TAB", while "Left Shift + TAB" will jump back to the previous note column. "F9", "F10", "F11" and "F12" will move to the beginning, first quarter, half, last quarter of the pattern, respectively. Hit "End" to skip to the last note in a pattern.

To select an area in the Pattern Editor, hold down the "Left Shift" key while moving around with the arrow keys. This can also be done by left-clicking and dragging with the mouse. The selection can also be cut, copied and pasted using the standard keys: "Left Control/Command + X (Cut), C (Copy), V (Paste)".

A selection can also be made by starting with "Left Control/Command + B" and ending with "Left Control/Command + E".

### 11.6.2 Advancing mode in the effect columns

When entering an effect column value, the cursor automatically advances to the next row in contrary what happens in most spread-sheet applications. If you want your cursor to advance to the right position, simply hold the left shift-modifier key and the cursor advances to the right.

### 11.6.3 Column/Track/Selection/Pattern Shortcuts

To quickly edit, copy and paste in the Pattern Editor:

- **F1 + MODIFIER:** Transpose one note down
- **F2 + MODIFIER:** Transpose one note up
- **F3 + MODIFIER:** Cut
- **F4 + MODIFIER:** Copy

- **F5 + MODIFIER:** Paste
- **F6 + MODIFIER:** Flip
- **F11 + MODIFIER:** Transpose one octave down
- **F12 + MODIFIER:** Transpose one octave up

Where *MODIFIER* is:

- **Left ALT:** Selection in the Pattern
- **Left CONTROL/COMMAND + SHIFT:** Current Column
- **Left SHIFT:** Current Track
- **Left SHIFT + ALT:** Current Group
- **Left CONTROL/COMMAND:** Whole Pattern

### 11.6.4 Drag & Drop of Selections

To quickly move and copy a selection of notes or effects, you can also use the mouse. First mark an area in the pattern by left-clicking and dragging, then re-click and hold on the selected area with the mouse and drag the selection to a new position. Holding down the "*Left Control/Command*" key while dropping will copy the selection instead of moving it.

## 11.7 Recording of Notes into Patterns

Instead of editing notes step by step, you can also record "live". This is done by playing the song with Edit Mode enabled and recording the notes using the keyboard. For a more detailed description, have a look at the [Recording and Editing Notes](#) section.

## 11.8 Recording of Effects

To quickly record effect parameter changes into a pattern, click and drag any slider in the [Track Effects](#) panel with the right mouse button. This can also be done as the song is playing. For more information, see [Recording and Editing Pattern Effects](#) .

## 11.9 Applying Effects

Finally, to get a full list and detailed description of the effects available for use in the Effect Columns, take a look at [Pattern Effect Commands](#) section of the manual.

## 12 Pattern Sequencer

The Pattern Sequencer crafts a song's overall progress by defining the order in which the various patterns are played. A song begins with the pattern at very top of the sequence. When this pattern has finished, the next in the sequence is started. This carries on until the final pattern has played and the end of the song is reached. At this point, a song can either loop back to the beginning again or just stop.

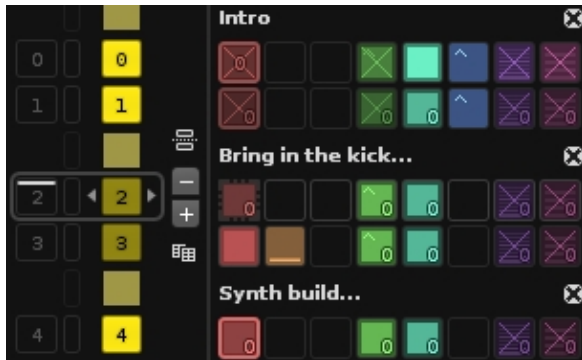
### 12.1 Overview

The sequencer refers to patterns via their number. Patterns of different values hold different content within them, while patterns that share a number contain identical content. When you begin creating a new song there will be only a single empty pattern present: "0".

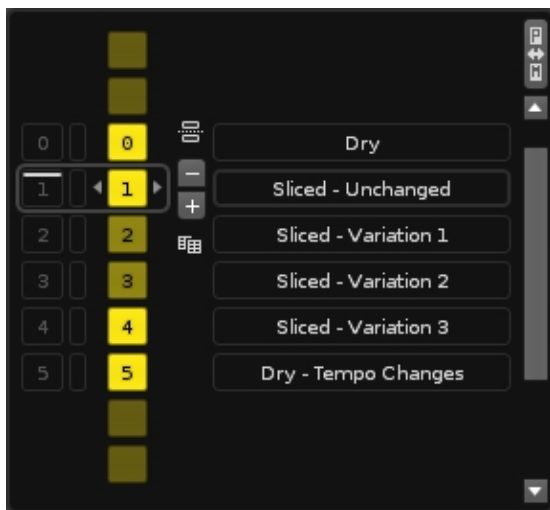


The pattern which you're currently editing in the [Pattern Editor](#) is shown in the Pattern Sequencer with a shaded border around it. On the far left of the interface is the sequence number, which also doubles as a [pattern trigger](#) button. At the immediate left and right of the pattern number are two arrows which change its value. You can also double-click on the number and type in a new value with the keyboard.

To the right of the pattern number are a set of buttons. The plus and minus buttons insert and delete patterns. Beneath this is the Clone Pattern button, which inserts a copy of the current pattern into the pattern sequence. At the top is the Section Header button, used to enter text into the sequence to provide descriptions and keep things organised.



To aid with this, you can also name each pattern. Click and drag the right edge of the Pattern Sequencer over to the right. This will expand it and reveal the name slots. Click on a slot and enter a name with the keyboard, finishing with "Enter".



## 12.2 Creating/Cloning/Adding/Removing Patterns



### Create a new pattern

Left-clicking the circled plus button creates a new empty pattern below the current pattern. Right-clicking repeats the current pattern.



### Delete the current pattern

Clicking the minus button will delete the current pattern and all of its contained information.




### Clone the current pattern

Clicking the Clone Pattern button creates a new pattern with duplicates all of the note, effects and automation data from the current pattern. Cloning is the same as copying & pasting

everything from an old pattern to a new one.

## 12.3 Decoupled Playback

You can detach the playback position from the current edit position, letting you edit a pattern while other patterns are playing. To do this turn off the "Pattern Follow"  option in the [Transport Panel](#). This way you never have to stop the song while editing a separate section.

## 12.4 Triggering Patterns

Patterns can be scheduled for playback via the number/play buttons to the left of the numbers in the Pattern Sequencer. Without stopping playback, you can trigger new sequences in the song in real-time. This lets you freely change the order of playback to sketch out and improvise new ideas.



- While the song is playing, left-clicking on a specific number/play button will move the sequence on to that position as soon as the current pattern reaches the end.
- While the song is playing, clicking with the right mouse button will immediately jump to and play that pattern without starting from the top.
- Double-left-clicking will immediately jump to and play that pattern from the top.
- Holding "Left Shift" while left-clicking on a number/play button allows you to specify more than one pattern for playback, so you can set up a "playlist" of patterns (the next pattern to be played is highlighted, as shown in the image above).

## 12.5 Looping Patterns

Using the column to the immediate left of the pattern numbers, you can cause a pattern or sequence of patterns to loop. Left-click and drag in this column to indicate the patterns you want to loop. To remove a loop just click on a single slot twice.

## 12.6 (Auto)Sorting Patterns

By default Renoise will automatically keep pattern numbers in the sequence sorted, so that patterns are listed from 0, ascending. This helps to see if and where a pattern is used more than once in the sequence: You will then notice that the sequence numbers on the left do no longer match the pattern numbers on the right.

If this automatic sorting is in your way, you can of course also disable it. To do so, click with the right mouse-button somewhere in the sequencer and disable the "*Keep Sequence Sorted*" option in the context menu. This option is memorized per song.

The context menu also offers a few more related options in its "*Organize*" sub menu.

## 12.7 Working With Selections

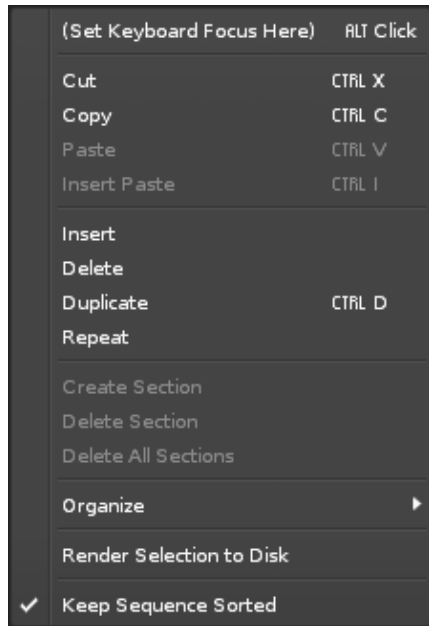
Clicking on the number slot itself allows you to select it. Likewise, clicking and dragging will select a sequence of patterns. You can also click once and then Shift-click on another pattern to select a range in just two clicks.

### 12.7.1 Drag and Drop

Once patterns have been selected, they can then be copied, pasted, moved or cloned.

- Drag and Drop without any modifier to move the selected patterns to a new position.
- Holding down "*Left Control/Command*" will insert copies of the selected patterns.
- Holding down "*Left Alt*" will insert repeats (aliases) of the selected patterns.

Right-clicking on any pattern number will bring up a menu with available shortcuts and yet more operations that can be applied to a selection:



## 12.8 Sequencer Shortcuts in the Pattern Editor

While editing patterns in the [Pattern Editor](#), you can also quickly navigate and modify the sequence using keyboard shortcuts:

- **Left Control/Command + Arrow Up/Down:** Select the next/previous pattern in the sequence.
- **Left Control/Command + Arrow Left/Right:** Change the current pattern's number.
- **Left Control/Command + Insert Key:** Insert a new pattern into the sequence.
- **Left Control/Command + Delete Key:** Delete the current pattern from the sequence.
- **Left Control/Command + Spacebar:** Schedules the pattern currently being edited for playback. This only works with decoupled playback enabled.
- **Left Control/Command + Left Shift + Spacebar:** Immediately plays the pattern currently being edited. This only works with decoupled playback enabled.



# 13 Pattern Matrix

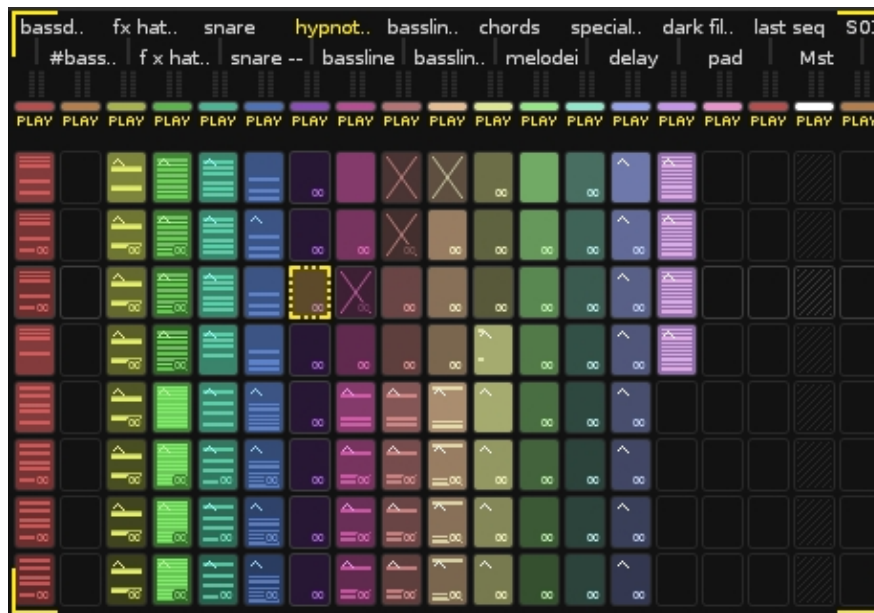
## 13.1 Overview

To open the Pattern Matrix, click on the "P<>M" button at the top left corner of the

[Pattern Editor](#): 

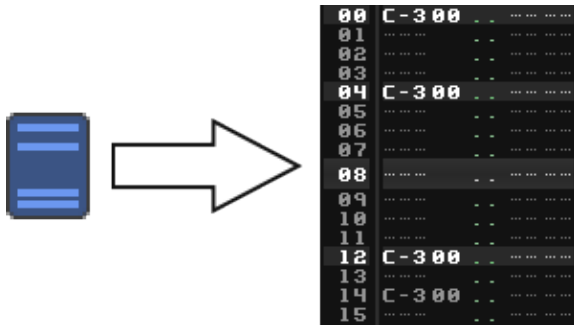
The Matrix is a "bird's eye view" of the patterns and tracks in the [pattern sequence](#). Patterns and tracks are divided into blocks that can be moved, copied and pasted, enabling you to manage the flow of the music quickly and easily.

The Pattern Matrix also allows the muting of different tracks in duplicate patterns (indicated with a cross in the picture below) and the aliasing of individual blocks. With these simple yet versatile tools, it is possible to create a whole song (or song draft) from a single pattern. Starting with one pattern containing many tracks, you can repeat this pattern again and again in the sequencer, muting and aliasing individual blocks to build up the song structure. Later on you can create new patterns from the original to add variations.





## 13.2 Matrix Blocks

When you input data into a track in the [Pattern Editor](#), a coloured block automatically appears in the current track and sequence position in the Pattern Matrix.



The blocks can be re-sized by clicking the small and large square icons under the

"P<>M" button:  

Left-clicking these icons changes the height of the blocks, while right-clicking changes their width.

### 13.2.1 Drag and Drop



To move a block from one place to another, select a block by left-clicking and releasing, then dragging and dropping it into the desired place.

- Hold down "*Left Control/Command*" while dragging to copy blocks instead of just moving them.
- Hold down "*Left Control/Command + Left Alt*" while dragging to [alias](#) blocks.
- Hold down "*Left Control/Command + Left Shift*" while dragging to copy the blocks and place them into a newly created pattern.
- Hold down "*Left Control/Command + Left Alt + Left Shift*" while dragging to [alias](#) blocks and place them into a newly created pattern.

### 13.2.2 Selection & Mouse

To select multiple blocks at once, you can click on an unselected block, hold and drag. Alternatively, left-clicking and releasing, then holding down "*Left Shift*" before clicking a second time will allow you to select a range of blocks. To remove or add a single block at a time, "*Left Control/Command + left-click*".

With these key combinations you could, for example, select everything from Track 1 to Track 5, then exclude a single block in Track 2.

### 13.2.3 Muting Blocks

"*Left Alt + left-click*" or middle-mousebutton-click on blocks to mute/un-mute them. This also works for muting/un-muting multiple selected blocks at once.

This key and mouse combination also works in the [Track Scopes](#).

### 13.2.4 Cloning Blocks

To quickly clone the contents of a block into one or more other patterns, position the mouse pointer over the bottom edge of the desired box. The cursor will change to a downwards facing arrow. Now left-click, hold and drag down over the desired patterns. This also works for a selection of multiple boxes.

### 13.2.5 Aliasing Blocks

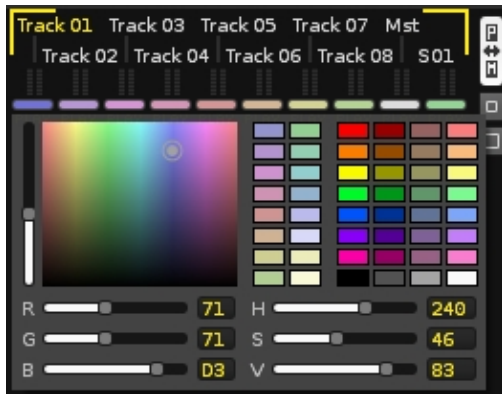
Block aliases are identical copies, where any changes made to the content of one alias are automatically made to the others. This only applies to content within the [Pattern Editor](#), so used with [Automation](#) this can be a very quick and easy way to build up a song structure with minimal individual blocks.

The easiest way to alias a block or a selection of blocks is to position the mouse over the bottom edge and drag downwards while holding down ALT. The number of the aliased pattern is now shown in the bottom right corner of each aliased block.

You can also alias a block by right clicking on it and selecting "*Create Alias*" from the menu. A flashing cursor will appear in the block. Using the keyboard, type in the number of the pattern in the [pattern sequence](#) that you wish to create an alias of, followed by *Enter*. To remove the alias, right-click and choose "*Un-alias*".

### 13.2.6 Colouring Blocks

By default, blocks are coloured equally per track. To change a track's colour, click on the small colour indicator below the track name in the Pattern Matrix. Using the color picker you can move around the grid to choose a color, while the left-hand slider controls the saturation. You can also pick colors from the available swatches or right click on a swatch to save your current color to it.



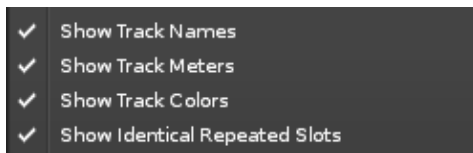
It is possible to colour each block individually. To do this, select one or more blocks, then right-click on them and select "Set Slot Color..." in the context menu. The custom colours will still be used if the blocks are copied.

### 13.2.7 Basic Shortcuts

- Clone selected blocks into new patterns with "*Control/Command + K*".
- "*Left Control/Command + I*" instead of "*Control/Command + V*" to insert instead of pasting.
- "*Left Control/Command + Left Shift + Arrow Up/Down*" to quickly select multiple rows.
- "*Left Alt + P*" and "*Left Alt + T*" to select the whole Pattern or Track.
- "*Left Control/Command + P*" will create an alias, while "*Left Control/Command + U*" will remove the alias from a slot.
- To bring Focus to the Pattern Editor, hit "*ESC*". To bring Focus back to the Pattern Matrix, press "*Left Shift + ESC*".

## 13.3 Visualization Options

Right-click on a slot in the Pattern Matrix to view the context menu, where you can choose to show/hide the Track Names, the colors and the VU Meters.



If you activate the "*Show Identical Repeated Slots*" option from the context menu, a tiny icon will be shown in the bottom-right corner of the slot(s) to indicate repeating content.



When the repeating content spans many slots, a gradient will be applied to their colour.

## 14 Advanced Edit

To open the Advanced Edit panel, click on the "A<>E" button at the top right of the

Pattern Editor:



### 14.1 Overview

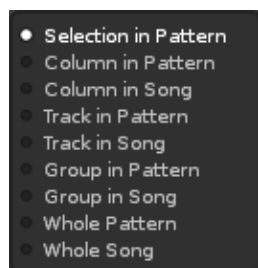
The Advanced Edit panel allows you to perform batch operations on pattern and automation data, such as transposing notes, remapping instrument numbers, interpolating effect command values etc. There are multiple sections to the Advanced Edit panel, which can be hidden/shown to either take up less space or to fully reveal their options. Each section deals with a specific topic of modification.



### 14.2 Processing Scope

The first thing that needs to be set up is what will be edited and where this will take place. This is done with the "*Section to Process*" and "*Content Mask*" panes at the top:

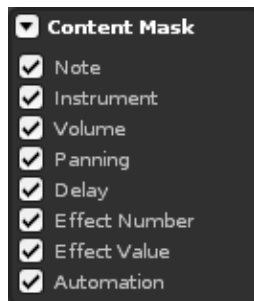
#### 14.2.1 Section to Process



This section is always visible because it applies to all of the other sections beneath it, by defining what part of the song will be affected:

- **Selection:** Perform actions on what is currently selected in the Pattern Editor.
- **Column in Pattern:** Perform actions on the note or effect column where the cursor is, in the current pattern only.
- **Column in Song:** Perform actions on the current note or effect column where the cursor is, in all patterns.
- **Track in Pattern:** Perform actions on the whole track (all columns) in the currently selected pattern only.
- **Track in Song:** Perform actions on the whole track (all columns) in all patterns.
- **Group in Pattern:** Perform actions on the group in the currently selected pattern only.
- **Group in Song:** Perform actions on the group in all patterns.
- **Whole Pattern:** Perform actions on the entire current pattern.
- **Whole Song:** Perform actions on the entire song; all columns, all tracks and all patterns.

## 14.2.2 Content Mask



With the Content Mask you can specify what will be processed and what will be ignored:

- **Notes:** Apply processing (Cut, Copy, Paste, Flip) on note sub-columns in Note Columns.
  - **Instrument:** Apply processing (Cut, Copy, Paste, Flip) on instrument sub-columns in Note Columns.
  - **Volume:** Apply processing (Cut, Copy, Paste, Flip, Interpolate and Modify) on volume sub-columns in Note Columns.
  - **Panning:** Apply processing (Cut, Copy, Paste, Flip, Interpolate and Modify) on panning sub-columns in Note Columns.
  - **Delay:** Apply processing (Cut, Copy, Paste, Flip, Interpolate and Modify) on delay sub-columns in Note Columns.
  - **Effect Number:** Apply processing (Cut, Copy, Paste, Flip) on effect numbers in the the Effect Columns.
  - **Effect Value:** Apply processing (Cut, Copy, Paste, Flip, Interpolate and Modify) on effect values in the Effect Columns.
  - **Automation:** Apply processing on graphical Automation attached to the tracks. Copy/pasting Automation in general only works when copying patterns or tracks, not selections.
- Left clicking on the individual check-box enables/disables a mask.
  - Right clicking enables a mask, but disables all other masks (solo).

## 14.3 Performing Actions

All other panels allow you to modify the content you've specified in various ways:

### 14.3.1 Cut/Copy/Paste



- **Cut:** Copy then delete the content. Not all selections have clipboards and in those cases the "Cut" button will be changed to "Delete".
- **Copy:** Copies the selected content. Not available for all selections.
- **Paste:** Pastes previously copied content.
- **Flip:** Reverse the content in place in the time-line (starting content will become ending content). When applying this to selections which cover more than one pattern, the patterns will be flipped one by one.
- **Shrink:** Halves the length of time that the content takes to play. Note that if the content does not have enough room to be placed on individual lines after being shrunk, some of the content will be removed.
- **Expand:** Doubles the length of time that the content takes to play. This is especially useful when doubling the [Lines Per Beat](#) value to add more resolution. If you were to only double the LPB without expanding the content, then it would just play twice as fast as before.

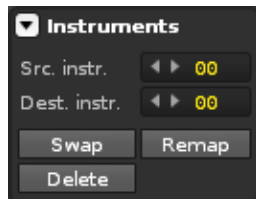
**Mix-Paste:** When pasting with mix-paste enabled, empty notes, instruments, effects etc. are not copied. This way you can merge the copied selection with the existing content that you're pasting on top of.

### 14.3.2 Modifying Notes



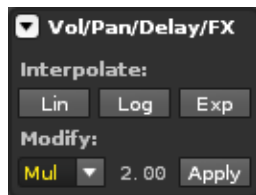
- **Safe Mode:** Applies transpose settings only when the transposed note does not fall outside of the available octave range in Renoise. With Safe Mode disabled, notes that fall below C-0 or above B-9 will be removed.
- **Apply to:** Either apply the following operation to all instruments in the current selection, or just the one specified in the value box.
- **Transpose:** Transpose notes a semitone or an octave at a time.
- **Mirror:** Swaps every note's height around the specified "*center note*". This can be very useful for creating variations of melodies.
- **Preserve Lengths:** When using the quantize function, Note-Offs will not be quantized, but will retain their original distance from the Note-On.
- **Quantize:** Quantize notes by the given subline factor (the factor used in the note delay column). 100 sublines (256 in decimal) make up one full line. For example, to quantize by 3 lines, you would use 300 sublines.
- **Nudge:** Moves notes up/down by the specified amount of sublines.

### 14.3.3 Modifying Instruments



- **Src instr.:** Select the instrument number that will be modified.
- **Dest. Instr.:** Set the destination instrument number that the source instrument will be transformed into.
- **Swap:** Swap both the source and destination instruments within the selection.
- **Remap:** Swap only the source for the destination within the selection.
- **Delete:** Delete the source instruments within the selection.

### 14.3.4 Modifying Effects



Using these controls you can interpolate, fill in values, create fades for a given effect, or apply mathematical operations on effect values (multiply, divide, sub, add, randomize and humanize).

#### 14.3.4.1 Interpolating Values

Suppose you wanted to create a volume fade in a track between the pattern lines 00 and 64. You could type the values in manually, line by line. However, you can instead



specify the desired starting and ending values of the fade on lines 00 and 64. Then by selecting the area from 00 to 64 in the appropriate track and using interpolation, the intermediate numbers will automatically and accurately be filled in.

- **Lin:** Create a linear range.
- **Log:** Create a logarithmic range.
- **Exp:** Create an exponential range.

Note that Renoise will require valid starting and ending values in order to perform interpolations. When interpolating effect column values, you must also ensure that the starting and ending effects use the same effect numbers.

To quickly interpolate selections in the Pattern Editor, you can also use the shortcuts, "*Left Control/Command + I*" to interpolate linearly and "*Left Control/Command + L*" to interpolate logarithmically.

### 14.3.4.2 Modifying Values



- **Apply** Perform the following action, modified by the specified value.
  - ◆ **Set:** Set all values in the selection to the specified value.
  - ◆ **Add:** Add the specified value to the existing values.
  - ◆ **Sub:** Subtract the specified value from the existing values.
  - ◆ **Mul:** Multiply the existing values by the specified value.
  - ◆ **Div:** Divide the existing values by the specified value.
  - ◆ **Humanize:** Randomise the existing values by adding or subtracting a number within the specified value range.

**Tip:** Humanizing can be used to randomize note delay, volume and panning for instruments. Small variations to such values can create a more human feel.

For example, to humanize drum note delays in a single track for the whole song:

1. In "*Section to Process*", enable "*Track In Song*".
2. In the "*Content Mask*", enable "*Delays*" only.
3. Set "*10*" as the factor in "*Modifying Values*" and select "*Hum*" as the processing type.
4. Move the cursor to a drum track in the Pattern Editor.
5. Hit the "*Apply*" button in "*Modifying Values*".

You can try repeatedly pressing the "*Apply*" button, or use values other than "*10*" to make the effect stronger.

## 14.4 Advanced Edit and Pattern Editor Interaction

Content Mask settings in the Advanced Edit panel (as well as the mix-paste option) also apply to the Pattern Editor's regular Cut, Copy, Paste and Flip commands. So you can apply the mask settings and use Pattern Editor shortcuts to quickly affect selections.

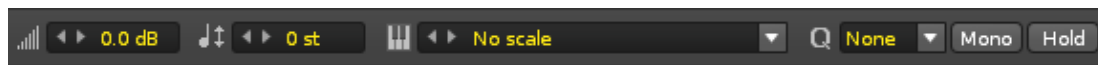
Note that neither Drag and Drop of selections in the Pattern Editor, nor any operation in the Pattern Matrix are influenced by the Advanced Edit options.

# 15 Instruments

To edit an instrument or create a new one, select an existing instrument or empty slot from the list in the [Instrument Selector](#) panel. An instrument in Renoise may be one or any combination of [samples](#), [plugins](#) and [MIDI](#), and each type can be edited by selecting the appropriate tab from the top left of the Renoise interface:



## 15.1 Instrument Properties





An instrument's properties affects the audio produced by all three sources. You will find these options at the top right of the instrument editor.

- **Volume:** The instrument's volume.
- **Pitch:** The instrument's pitch, in semi-tonal increments.
- **Scale:** Forces note playing and recording to conform to a chosen scale by making restricted notes (shown as green on the [keyboard](#)) play as desired notes. When a scale is selected, an additional option will appear to left of it for choosing the scale's key.
- **Quantize:** The time resolution of quantization. Choose from Line, Beat or Bar.
- **Mono:** Restricts the instrument to playing or recording only a single note at once. Simultaneous notes in the Pattern Editor will still be played, however.
- **Hold:** When enabled, Note-Off (key release) messages are ignored and the instrument continues playing. This is incredibly useful for triggering samples from devices that are not traditionally 'held down' e.g. drum pads.


You can also access these options in the Instrument Properties section under the [Instrument Selector](#).

## 15.2 Detaching The Editor

Just above the instrument properties and to the left of the [Scopes](#) options is the  Detach button. It opens the instrument editor in a completely separate window, which can be moved around and resized. There are also additional buttons at the window's top right corner for minimizing, maximizing and closing. Clicking  Attach will reattach the window to the main interface.

## 15.3 Macros

Macros allow the automation of a sample-based instrument's [modulation](#) and [fx](#) parameters via the [\\*Instr. Macros](#) track effect. Only available in the [Sampler](#) tab, the **Macros** button is located at the top left corner of the instrument editor. Pressing this will open a panel with eight macros, each of which can be assigned to any number of parameters. Automating a macro will then alter the values of all assigned parameters.


To rename a macro, just click on its name. To map a macro, press the  button to open the mappings list and reveal any mappable parameters (by default, highlighted in red). Clicking on a parameter will add it to the list and allow you to specify its Min/Max values and Scaling. Pressing the X at the right will delete the mapping.




You can also access the macros in the Instrument Properties section under the [Instrument Selector](#).



## 15.4 Scopes

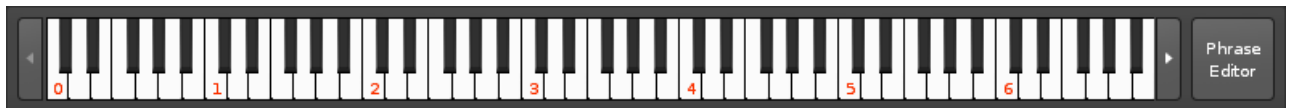
The [Scopes](#) provide a visual representation of your song, allowing you to examine the frequency and amplitude of the final audio signal or see what's currently happening in each individual track. The icons for toggling the [Scopes](#) can be found near the top right of the interface:

-  - Shows the Track Scopes.

-  - Shows the Master Spectrum.
-  - Opens or closes the Scopes/Spectrum panel. Note you can have them independently open or closed for the [main interface](#) and the Instrument Editor.
-  - When the main interface's right panel containing the [Disk Browser](#) and [Instrument Selector](#) is closed, this icon will appear, allowing you to still view the [Instrument Selector](#).

## 15.5 Keyboard

The keyboard will display any keys pressed on the computer keyboard or played by a MIDI device. You can also click with the mouse on the keys to play them. If not all keys are visible, the arrow buttons at the left and right sides will move the keyboard an octave in that direction. You can open the [Phrase Editor](#) by pressing the button next to the keyboard.



## 15.6 Track Selector

Unless the Instrument Editor has been [detached](#), this option will be present at the bottom left of the interface and allows you to select a track to play sounds on without having to move back to the [Pattern Editor](#).

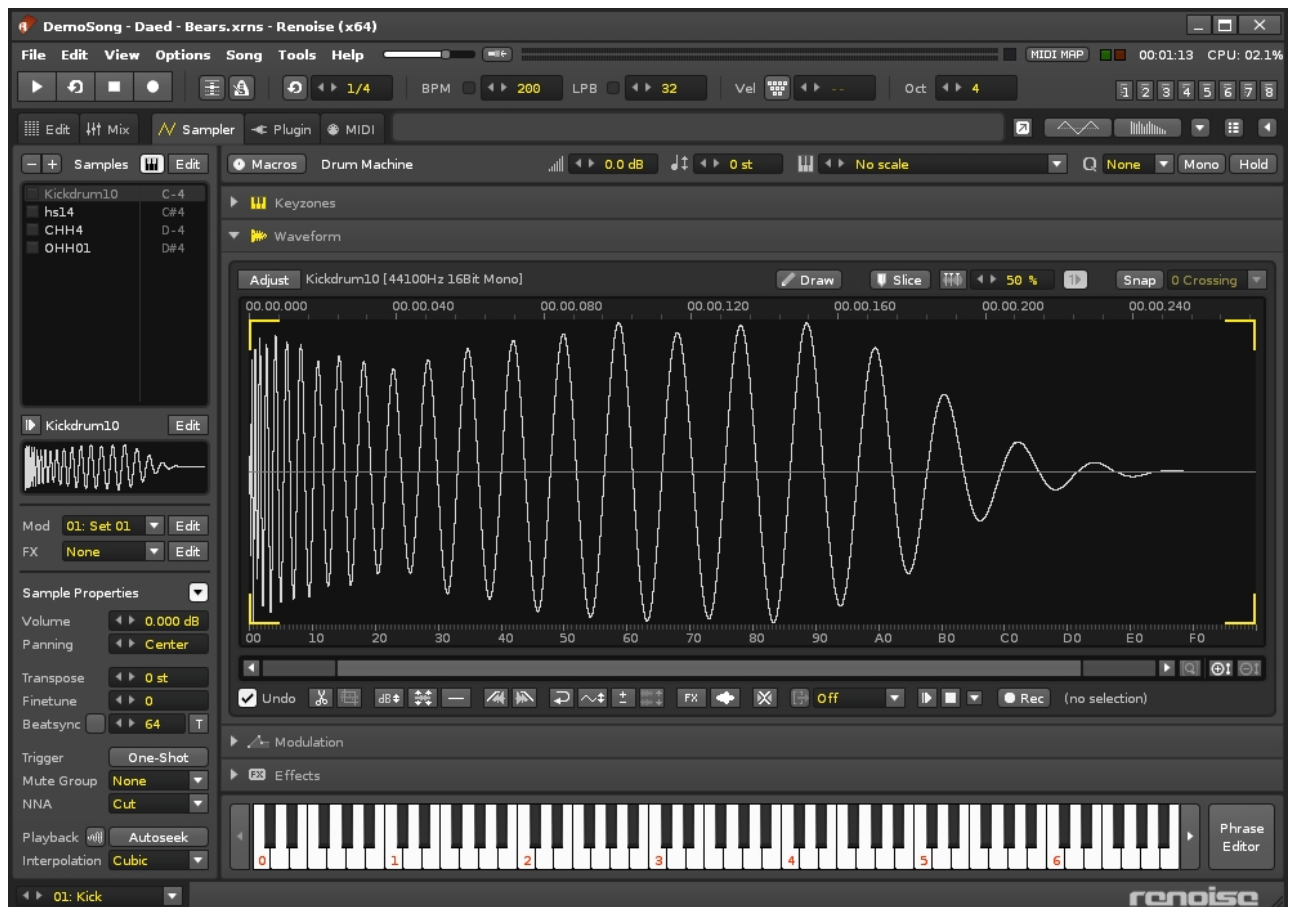


# 16 Sampler

Renoise has a strong focus on samples and at the heart of this is a powerful built-in Sampler for creating and sculpting sounds. An instrument may contain any number of samples and these are always listed in the [Sample List](#) section on the left. The main central section of the Sampler is split into four different parts, each devoted to a different aspect of sample-based instrument construction.

[Keyzones](#) allow different samples to be triggered over a variety of note and velocity ranges. The [Waveform editor](#) displays the samples so you can edit them with the provided tools and see the results graphically. Adding [Modulation](#) and [Effects](#) to samples greatly expands the possibilities of their sound beyond the original audio.

New sounds can be recorded directly into the Sampler from external sources, or created by hand with the simple Draw tool. Any changes made to samples are exclusive to each individual Renoise song. The source samples are never modified unless you explicitly save and overwrite the file by saving it in the [Disk Browser](#). Besides being non-destructive, the Sampler also supports endless undo/redo-ing of all your actions.



## 16.1 Sample List

Located at the left, this section provides a list of the instrument's samples and is always accessible no matter what central section you're working with, so you can switch between different samples whenever you wish. To select a sample, left-click on it in the list. This will also show the sample's name, waveform and assigned Modulation/FX sets at the bottom. When a sample is playing, the playback indicator to the left of its name will light up.

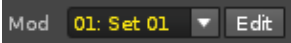



### 16.1.1 Selecting Multiple Samples

Left-click on a sample to select it. Now if you hold down "*Left Shift*" and left-click on another sample, both samples and any between them in the list will become selected. Holding "*Left Ctrl*" ("*Command*" on Mac) and left-clicking on samples will select/deselect them, allowing you to pick any combination from the list. When multiple samples are selected, any changes made to the [Sample Properties](#) will affect them all.

### 16.1.2 Controls


- - Deletes the selected sample from the list.
- - Inserts a new blank sample into the list.
- - When enabled, a sample from the list will be automatically selected when it is played on the keyboard or by MIDI.
- - Opens the [Keyzones editor](#). Note that the Keyzone range of each sample in the list is displayed to the right of it.
- - Previews the selected sample (the preview track is set in the [Waveform editor](#)).
- - Opens the selected sample in the [Waveform editor](#).

-  - Assigns a Modulation set to the selected sample. Pressing Edit will open the [Modulation editor](#).
-  - Assigns an FX set to the selected sample. Pressing Edit will open the [Effects editor](#).

### 16.1.3 Note On/Off Layers


Samples can be triggered for either Note-On (key press) or [Note-Off](#) (key release) inputs. To move a sample to the Note-Off layer, right-click on its name in the Sample List and select "Move to 'Note-Off Layer'". Use the same method to move samples back to the Note-On layer. When there are samples using the Note-Off layer, tabs will appear at the top of the Sample List allowing you to switch between the layers and view the samples contained within.

## 16.2 Sample Properties

Directly under the Sample List, the properties of the currently selected sample(s) are displayed. The  button at the top right toggles the opening and closing of this section.



### 16.2.1 Options

- **Volume:** The sample playback volume.
- **Panning:** The panning of the sample.
- **Transpose:** Transposes the note playback in semi-tonal increments.
- **Finetune:** Fine-tuning of the Transpose value.
- **Beatsync:** When enabled, the sample's pitch will be automatically changed so that it lasts for the stated amount of pattern lines and is especially useful for syncing drumbeat loops. It will also automatically update its pitch if the song changes [BPM](#). As a consequence though, the sample is 'locked' and you will be unable to use it at other pitches. As an alternative, you can leave the tickbox disabled and instead press the  button, which will automatically set the Transpose and Finetuning values to match the current BPM, leaving you free to



change them and play the sample at other pitches.

- **Trigger:** When enabled, Note-Off (key release) messages are ignored and the sample continues playing. This is incredibly useful for triggering samples from devices that are not traditionally 'held down' e.g. *drum pads*.
- **Mute Group:** Samples which are assigned to the same Mute Group will "Cut" each other off in the same [track](#). A sample's Mute Group number is also displayed to the left of its name in the Sample List. Useful for drum kits, where triggering the same drum will realistically interrupt its previous sample, but not interfere with the other drum sounds.
- **NNA:** New Note Action. When a note is in the process of playing and a new note is played in the same [column](#), NNA dictates how the previous note will behave. By default, notes in the same column will "Cut" each other off, meaning the previous note will stop its playback, instantly silencing it. Using "Note-Off" will also stop the previous note, but any Note-Off samples assigned via the [Keyzone editor](#) are still played. To achieve polyphony you normally just use multiple columns, but by setting the NNA to "Continue" you can create the sustained playback of multiple notes using a single column.
- **Playback**
  - ◆ **Autofade:** Automatically inserts a quick fade at the beginning and end of a sample. Useful for preventing unwanted audio clicks.
  - ◆ **Autoseek:** During song playback a sample is normally only heard once it has been triggered by reaching its position in the [pattern](#). Enabling Autoseek allows the sample can be heard at any point during song playback without the need for triggering. Highly recommended for vocals, background ambience and other lengthy recorded audio.
- **Interpolation:** This is the quality of re-sampling used when samples are played at pitches other than the original. "Cubic" is an excellent default interpolation, offering the best ratio between sound quality and CPU usage. "Sinc" is more precise but requires more CPU power, while "Linear" is the opposite and sounds rougher when played at lower pitches. Set to "None", samples will sound a bit more metallic and rough, which can be good if that's the kind of sound you're after and is also useful when creating wave-table generators with very short sample loops.

# 17 Keyzones

For each sample in an instrument, the Keyzones editor can create a zone that stretches across a range of note and velocity values. Notes played via the keyboard can then trigger these zones to play their samples. This can be done for both Note-On (key press) and [Note-Off](#) (key release) inputs via separate layers.

## 17.1 The Interface

The Keyzones interface consists of a large central section that displays the zones, with various options above and below. The note range of C-0 to B-9 is represented horizontally, while the velocity range of 00 to 80 is shown vertically. This grid is used to create a Keyzone's range for a sample. When a note is played on the keyboard its note/velocity co-ordinates are displayed on the grid and the zone(s) whose range contains those co-ordinates will trigger their samples.

Placing the mouse pointer over the grid and scrolling the mouse wheel will zoom in/out, giving you access to more/less detail horizontally. The scrollbar underneath can be used to move around while zoomed in.




## 17.2 Creating Keyzones

### 17.2.1 Selecting & Adjusting the Zones

A zone can be selected by left-clicking on it or by selecting a sample from the [Sample List](#). This becomes the active zone, with a highlighted colour and small squares on all four sides. The range of a zone is displayed in the Note and Vel. Range value boxes at the bottom left of the interface. You can resize the range of an active zone by click-dragging one of its edges. Click-dragging inside the zone will move it around.

If you hold down "Left Shift" and left-click on another zone, both this and the active zone are selected, along with any zones between them on the grid. You can also left-click (anywhere except the active zone) and drag to select a range of zones. Holding "Left Ctrl" ("Command" on Mac) and left-clicking on zones will select/deselect them, allowing you to pick any combination from the grid. When multiple zones are selected, any changes made to the active zone will also affect the others.

- Double clicking a zone will open the sample in the [Waveform editor](#).
- It is possible to have overlapping zones so that multiple samples are triggered with a single note.
- If the auto-select option  in the [Sample List](#) is enabled, zones will be automatically selected by notes that are played within their range.

### 17.2.2 Inserting & Deleting Zones

To create a new Keyzone you can either insert a new sample via the [Sample List](#) or right-click on the grid to open the context menu and choose "Insert New -> Load Sample(s)". Alternatively, select one or more samples from the [Disk Browser](#), drag them onto the Keyzone grid and place them where you want (the horizontal size can be adjusted by moving the mouse pointer up and down before letting go of the mouse button).

A zone can be deleted by selecting it and pressing "Delete" or using the right-click menu and selecting "Remove".

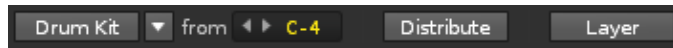
### 17.2.3 Note On/Off Layers



At the top left of the interface are two buttons that switch between creating Keyzones for Note-On (key press) and [Note-Off](#) (key release) inputs. It is possible to have a sound only play when a note is released by placing a zone over its grid co-ordinate in the Note-Off layer but not in Note-On.

To move a sample's Keyzone to the Note-Off layer, right-click on the zone or its name in the [Sample List](#) and select "Move to 'Note-Off Layer'". Use the same method to move zones back to the Note-On layer.

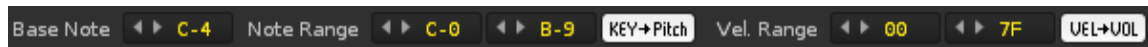
## 17.2.4 Automatically Distributing Zones



You will find the distribution options at the top right corner of the Keyzones interface.

- **Drumkit:** This will assign each zone to a single note, starting from the note selected in the value box. Opening the drop down menu will reveal two additional options. "Use White Keys Only" will only assign zones to the white keys, while "First Octave for Transposing" will assign an entire octave to the first sample of the instrument.
- **Distribute:** This evenly distributes all zones across the entire note range.
- **Layer:** Every zone will span the full note and velocity range. This causes all of an instrument's samples to be simultaneously triggered by any note played.

## 17.2.5 Keyzone Options



These options are located underneath the main central grid.

- **Base Note:** The note representing the original pitch of the selected zone's sample. This can also be changed by right-clicking on the note axis along the top/bottom of the grid (the current Base note is shown there as a coloured block). A Base note is automatically assigned to a newly created zone. Moving a zone around the grid will not change its Base note.
- **Note Range:** The note range of the active zone.
- **KEY->Pitch:** When disabled, the sample will always play at the pitch of the Base note.
- **Vel. Range:** The velocity range of the active zone.
- **VEL->VOL:** When disabled, the sample will always play at full volume. This can be useful for lower velocities when samples have already been recorded at a lower volume.
- **Overlap:** This dictates how samples will be played when their zones overlap. The default option, "Play All" will play all samples simultaneously. "Cycle" will play each sample in the sequence one at a time. "Random" will randomly play a sample in a round robin sequence (all samples will be played at least once in the randomised sequence).

## 17.3 Using Keyzones with a Sliced Sample

With a [sliced sample](#) your options are far more limited: the Note-Off layer is unavailable, zones cannot be adjusted by velocity and (aside from the initial sample) can only be a single key in width. However, the "KEY->Pitch", "VEL->VOL" and "Drumkit" options are still available.



# 18 Waveform

The Waveform editor displays an instrument's samples so you can edit them with the provided tools and see the results graphically. New samples can be recorded directly into the editor from external sources, or created by hand with the simple Draw tool. Any changes made to samples are exclusive to each individual Renoise song. The source samples are never modified unless you explicitly save and overwrite the file by saving it in the [Disk Browser](#). Besides being non-destructive, the editor also supports endless undo/redo-ing of all your actions.

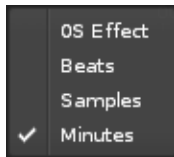


The large central section displays the waveform and allows you to select parts of the sound for editing. [Loop points](#) and [Slice markers](#) are also placed and displayed here. The top section features the sample-type options on the left and the [Draw](#), [Slice](#) and [Snap](#) controls on the right. The lower section contains the options used to edit or modify the sample, with additional options available via the right-click context menu.

## 18.1 Working With The Waveform

### 18.1.1 Upper and Lower Rulers

Directly above and below the waveform are rulers which display various time measures. You can set the measures individually by right-clicking on a ruler and selecting an option from the menu:



- **OS Effect:** The waveform is automatically split into 256 equal parts. Playback can be triggered from a part's position using the [OS Pattern Effect Command](#) (unless the sample has been [sliced](#)).
- **Beats:** Measures how many beats the waveform lasts for. This will change depending on the song's current [BPM](#).
- **Samples:** These are the individual data points that the waveform is constructed from. At a sample rate of 44.1KHz, there are 44,100 samples in a single second.
- **Minutes:** This will show the time in minutes, seconds and fractions of a second.

### 18.1.2 Mouse Navigation and Selection

- **Left Mouse Button:**
  - ◆ Single-click sets a cursor (edit/play) position.
  - ◆ Click and drag spans an area in the editor. In a stereo sample, moving the mouse pointer above/below the top/bottom 0dB line will allow you to select the left or right channel only.
  - ◆ Click and drag with "*Left Shift*" extends/shrinks either side of the selection area.
  - ◆ Double-click selects the entire visible area of the waveform.
  - ◆ Click, drag and move the cursor past the left/right side of the waveform editor to select while zooming out. Holding down "*Left Ctrl*" ("*Command*" on Mac) while doing so will speed up the zooming.
- **Right Mouse Button:**
  - ◆ Single-click opens the context menu.
  - ◆ Click and drag extends/shrinks either side of the selection area (same as left-click and drag with "*Left Shift*").
  - ◆ Click, drag and move the cursor past the left/right side of the wave editor to select while zooming out. Holding down "*Left Ctrl*" ("*Command*" on Mac) while doing so will speed up the zooming.
- **Middle Mouse Button:**
  - ◆ Single-click plays the sample from the clicked position to the end of the visible waveform.
  - ◆ Click and drag selects an area then immediately plays that selection.
- **Scroll Wheel:**
  - ◆ Zoom in/out of the waveform. Note that the zooming happens from the position of the mouse pointer.
  - ◆ Hold "*Left Alt*" while scrolling to scroll horizontally instead of zooming.

### 18.1.3 Keyboard Shortcuts




- **Arrow Left/Right:** Move cursor position to the left/right. In combination with "*Left Shift*", a selection is created.

- **Arrow Down/Up:** Move cursor position up/down (in a stereo sample).
- **Ctrl/Command + Arrow Down/Up:** Zoom in/out at the cursor position.
- **PageDown/PageUp:** Zoom in/out vertically.
- **Home/End Key:** Move cursor to the start/end of the waveform. In combination with "*Left Shift*", a selection is created.
- **Enter:** Play/restart the sample from cursor position.

Standard operations such as Copy/Paste ("*Left Ctrl* + *C/V*") etc. are available as well.

### 18.1.4 Lower Scroll/Zoom Bar



As an alternative to using the mouse or keyboard shortcuts to navigate around in the waveform, you can use the scrollbar beneath the Lower Ruler to scroll or zoom. Drag the bar to scroll or drag the side handles to zoom. Clicking on a free space next to the scrollbar will jump to the immediate left or right of the waveform's current location. Just to the right of the scrollbar are extra zooming controls:

-  - View full sample (zoom back out to show the whole sample, horizontally and vertically).
-  - Zoom in one step vertically.
-  - Zoom out one step vertically.


## 18.2 Upper Control Bar

### 18.2.1 Create/Adjust Sample Properties

Located at the top left of the interface. Changes the basic properties of an existing sample or, in a blank sample slot, creates a new sample.


-  /  - Edit sample properties / Create new sample.

### 18.2.2 Drawing




 - The Draw button is located at the top right of the interface. Draw mode allows you to draw on the central waveform area with the mouse, where you can create brand new sounds or make adjustments to existing sounds, such as removing clicks.

### 18.2.3 Slice Markers

The slicing controls are located at the top right of the interface. Slicing allows you to non-destructively split a sample into pieces by inserting markers, which can be usefully placed on individual drum hits, notes, vocal phrases etc.

-  - Activating the Slice button will change the mouse pointer to the Slice Marker Tool. With this you can left-click on the waveform to slice it into different sections.



-  - Automatically insert markers into the waveform at points where beats/transients are detected.
-  - The sensitivity of the auto-slicing beat detection can be adjusted using this value box. Higher values will lead to more markers being inserted.
-  - If enabled, a triggered slice will stop playing at start of the next slice.

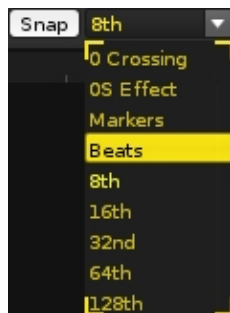
As you add slices to a sample, the [Keyzones](#) editor will automatically lay these out across the keyboard according to its current [Drum Kit](#) settings, allowing you to trigger each slice from a different key on the keyboard. You can also trigger a slice via the [OSxx Pattern Effect Command](#), where the **xx** value corresponds to a slice number. Each slice you place is given a numbered tab at the top, and left-click-dragging on it will move the slice around. Right-clicking on a tab will bring up a menu with the option to: select all markers, delete the current marker or delete all markers.

Although you can still edit the original sample, you cannot edit the individual sample slices. However, the [Loop type](#) and all [Sample Properties](#) like volume, panning etc. can be changed per slice. A newly created slice will inherit the original sample's properties.

To destructively render an instrument's slices into individual samples, right-click on the waveform and select "*Slices > Destructively Render Slices*" from the menu.

## 18.2.4 Snapping

The Snap controls are located at the top right of the interface.



Snapping applies to the waveform when selecting with the mouse, using keyboard shortcuts to navigate, and when applying or dragging loop points and slice markers. It can be useful to have "*0 Crossing*" enabled, as this will ensure that cutting and pasting parts of a sample does not produce clicks in the audio, because the start and end points will always match up at 0dB.


Selecting "*OS Effect*" will snap to the OS markers typically shown along the bottom of the waveform, while selecting "*Markers*" will cause the selection to "stick" to sample slice markers as the mouse pointer approaches them.

Snapping to beats (the length of time for a single beat) is useful when cutting out beats from loops, in combination with the "*Copy Into New Instrument*" context menu/keyboard shortcut. The other Snap options are smaller fractions of a beat.



## 18.3 Processing Controls and Options

Located underneath the waveform, most of the processing options below will apply to the whole sample unless a specific area has been selected.




### 18.3.1 Undo/Redo Support

-  - Enable/disable undo in the Waveform editor. When working with very large samples, temporarily disabling undo may be useful to save time. Renoise saves all undo/redo processing on disk, so running out of memory should not be a problem.



### 18.3.2 Cut/Copy/Paste

-  - Cut the selection (or whole sample if nothing is selected).
-  - Trim to selection (delete everything outside of the selection).





### 18.3.3 Amplitude

-  - Change the volume of the sample or selection (will open up a dialog to specify the exact amount).
-  - Raise the volume of the sample or selection to the maximum possible value without clipping.
-  - Insert silence into the selected range, or silence the whole sample if no range is selected.


### 18.3.4 Fading


-  - Fade the sample in linearly (can fade logarithmically via the right-click context menu or shortcuts).
-  - Fade the sample out linearly (can fade logarithmically via the right-click context menu or shortcuts).

### 18.3.5 Reverse & Swap




-  - Reverse the sample or selection.
-  - Center the sample or selection to the DC line. Fixes vertical DC offsets.
-  - Invert the phase of the sample or selection.
-  - Swap the left and right channels of the sample or selection. Only possible for stereo samples.

### 18.3.6 Process Track FX




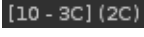
-  - Apply the current track's effect chain directly to the sample's waveform (applies both native and plugin effects). Note that this will not automatically extend the length of the sample for reverbs, delays etc. that last longer than the original sample.

-  - Smooth the sample. A simple interpolation process which removes hiss and sharp edges from the waveform. Useful to smooth out hand-drawn samples.

### 18.3.7 Loop Controls

-  - Automatically create a smooth cross-faded loop.
-  - Toggles whether a sample will finish its current loop after a [Note-Off](#) input.
-  - When looping is enabled by selecting a loop type from the menu, start and end points are inserted into the waveform, causing playback to loop between them. The loop points can be moved by click-dragging their tabs at the top/bottom of the waveform.
  - ◆ Off: No loop.
  - ◆ Forward: Loop playback from start to end.
  - ◆ Reverse: Loop playback from end to start once the end point is reached.
  - ◆ PingPong: Loop playback from start to end to start to end etc.

### 18.3.8 Play/Stop and Record

-  - Start/Stop playing sample from the cursor position to the end of the visible waveform, or Start/Stop playing the selection if one is present.
-  - Select where the sample will be played back: On the [Master Track](#) to bypass the [current track](#)'s effects, or on the selected track to hear the sample with the currently active effects.
-  - Open up the record dialog box, to [record new samples](#) from various sources (e.g. microphone, line-in etc.) For further details, see the [Recording New Samples](#) section.
-  - The current cursor position or selection range positions are shown in the format of the Lower Ruler. To change the format, right-click on the [Lower Ruler](#) and choose from the list.

### 18.3.9 Right-Click Context Menu

Right-click on the waveform to open this menu. There are extra processing options beyond the ones detailed above:

- **Mix Paste:** To use this, "Copy" a sample or a selection of a sample into the clipboard. When you select "Mix Paste" from the menu, a dialog box will appear that offers options for mixing the clipboard content with the existing content.
- **Copy Into New Sample/Instrument:** Automatically copies a selection of a sample and places it in either the current instrument or a new instrument. This can be very useful when copying parts of a large sample for further playback and editing.
- **Process**
  - ◆ **Fade In/Out Logarithmically:** Fades the selection area in/out logarithmically instead of with the standard linear process.
  - ◆ **Set Loop Start/End:** Inserts a loop start/end point directly onto the cursor position. If a selection area is present then both the start and end points will be placed to loop that exact range.

### 18.3.10 Copy/Paste With External Sample Editors (Windows only)

On Windows, Renoise shares its clipboard content with the entire system, meaning you can quickly swap sample data to and from Renoise when using an external sample editor that supports this feature. In many external editors you have to select/activate this feature first. To find out how to do this, please look at the external editor's manual and search for the keywords: "*System Clipboard*", "*Copy*".


## 18.4 Recording New Samples

Renoise allows you to create new samples by recording them from various sources, including a line-in jack or microphone. To do so, in the Sampler Waveform tab press the **Rec** record button located under the waveform or choose, "*File->Record New Sample...*" from the main menu at the very top left of the interface. Opening the record dialog and controlling the main record options can be mapped to a MIDI Controller with the [MIDI Mapping](#) options. This way you can quickly make new recordings using just your MIDI controller or master keyboard.

To record new samples in Renoise, first configure the device you want to use for recording, which is done via the "[Edit->Preferences->Audio](#)" panel. This is only necessary when using DirectSound (Windows), Core Audio (OSX) or ALSA (Linux). ASIO is pre-configured to be used as a recording and playback source. When your soundcard has more than one input channel you'll be able to set this as the input device in the Audio Preferences, or you can select this in the recording dialog.

### 18.4.1 Recording Controls



This VU meter displays incoming audio activity, allowing you to monitor the signal and make adjustments if necessary. The  button lets you listen to the input through Renoise while recording.



Select which channel you would like to record: left, right or both (stereo).



Select the audio device that will be the source for the recording.



Select the track effect chain (the list displays all tracks in the song) that will be applied to the recording, or just to the the preview of the recording.

- **Sync start & stop:**

- ◆ None - No quantization is applied. Hitting the start/stop button will start/stop recording immediately.
- ◆ Pattern - Applies quantization from the start to the end of the current pattern. When the song or pattern plays, recording will be started or stopped only at pattern boundaries or block loops. This is useful to record "live" (e.g. playing a guitar riff along to your Renoise song). The resulting samples can then be placed into the patterns and will always match your song.

- **Record dry (monitor FX):** When enabled, the input signals are recorded without the Track FX applied, but will be previewed with them. This way you can hear and record exactly what will be played later when adding the recorded sample to the selected track.

- **Create a new instrument on each take:** When enabled, each recording is placed into a new instrument slot in the [Instrument Selector](#), so you can simply hit start/stop again and again to create multiple takes without overwriting anything.

- **Compensate input and output latencies:** When enabled, the latency of your soundcard will automatically be compensated for when creating synced recordings.

- **Extra latency (ms):** Soundcards or other devices can introduce latencies that Renoise may not be aware of. When your recordings are slightly out of sync on playback, you can manually compensate the latency offset of future recordings here.

- **Start:** Start or stop the recording (changes into "Stop" when recording has started).

- **Done:** Closes the recorder window when no recording is taking place. While recording, this will "Cancel" the current recording.

## 18.4.2 Recording Without Quantization

Once everything is set up, hit "Start" to begin recording. A red border will appear around the dialog box to indicate that recording is active. To stop recording and load the sample into the instrument slot, simply hit the "Stop" button. Currently active recordings can be discarded by pressing "Cancel".



### 18.4.3 Recording With Quantization

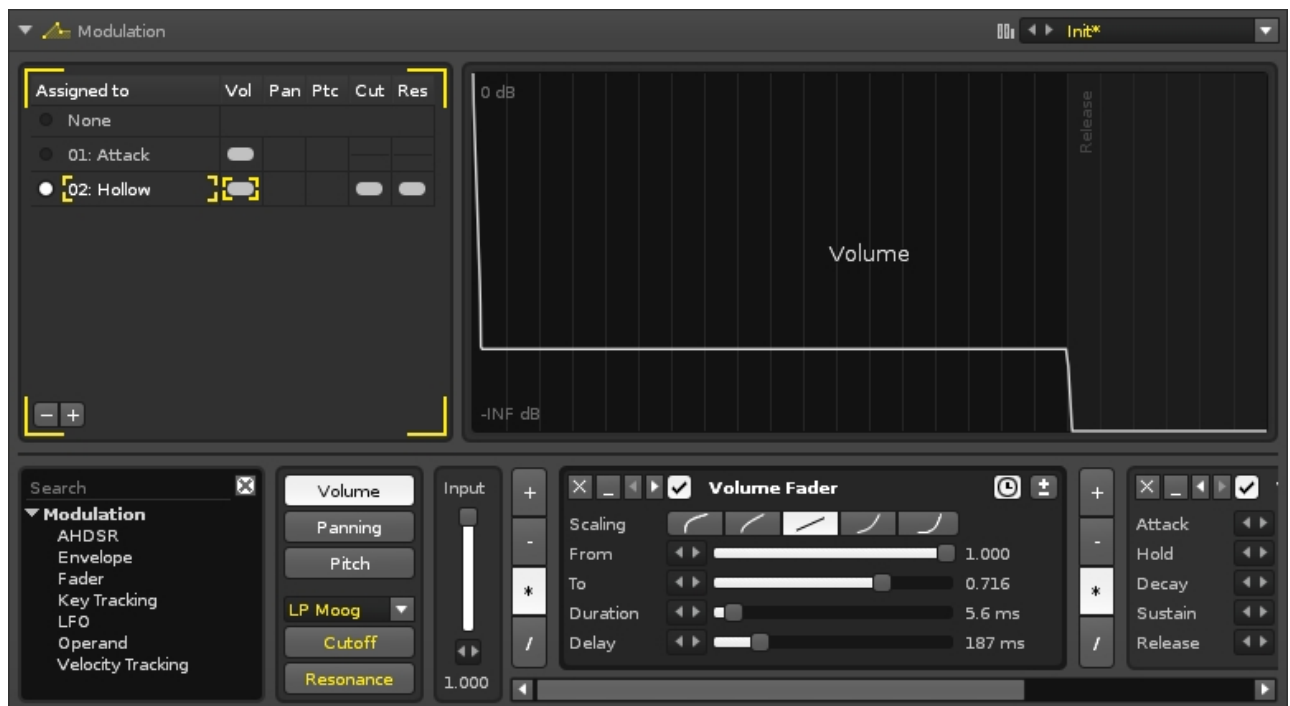
When using the quantization (Sync start & stop) option, Renoise will make sure that recordings are started and stopped at pattern boundaries only. To use the sync you have to start playing the song first. A progress bar will display playback information.

# 19 Modulation

Adding modulation to samples greatly expands the possibilities of their sound beyond the original audio. The modulation is created by inserting devices into an interactive chain, constructing an envelope. Separate envelopes are used to modulate five basic properties of a sample. These five envelopes are collected together as a Set, which can be used to affect any number of samples simultaneously.

Modulated samples are processed polyphonically (each instance of a sound is generated independently).

The interface is split into three sections. At the upper-left is the Set list, the large section to right shows the selected property's envelope, and the lower section contains the property selector and device chain.





## 19.1 The Set List

A Set is a collection of five modulation envelopes, one for each sample property. Any number of Sets can be created and each instrument has its own unique Set list. The individual samples of an instrument can be assigned any one of its Sets, allowing different samples to be affected by modulation in different ways. A Set can also be assigned to multiple samples simultaneously and any changes made to a Set will affect all linked samples.









































The Set assigned to the current sample is marked with a circle at the list's left. Clicking on an empty circle slot will assign that Set to the sample. Clicking on a Set's name will

select it for editing, while double-clicking allows you to rename it. Sets can be added or removed using the buttons at the bottom left:

-  - Inserts a blank Set below the currently selected Set.
-  - Deletes the currently selected Set.

Right-clicking on a Set will select it and open a context menu with additional options:







- **Cut All Devices:** Cut all of the Set's devices.
- **Copy All Devices:** Copy all of the Set's devices.
- **Paste All Devices:** Paste all of a previously copied Set's devices (overwrites the selected Set).
- **Delete All Devices:** Delete all of the Set's devices.
- **Load:** Loads in a Set (overwrites the selected Set).
- **Save As:** Saves the currently selected Set.

Sets can also be loaded and saved as presets using the menu located at the top right corner:                                            



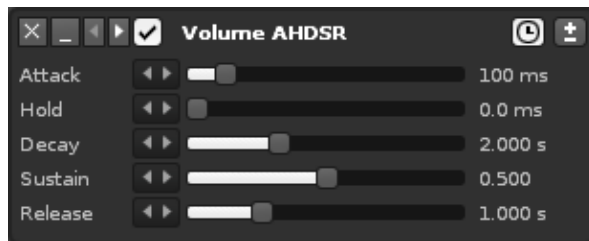
### 19.2.1.1 Common Device Layout and Controls

Each modulation device has a standard set of buttons to perform common functions:

-  - Remove the device from the chain.
-  - Minimize/maximize the device.
-  - Move the device to the left or right. Right-click to move to the start or end of the chain.
-  - Enable/disable the device.
-  - Toggle synchronizing the device to milliseconds or beats. Not present on all devices.
-  - Toggle values to bipolar (positive and negative) or unipolar (only positive).

### 19.2.1.2 AHDSR

The AHDSR device is an envelope whose five properties alter its shape over time.



- **Attack:** How quickly the value rises up from zero.
- **Hold:** The value is held for this length of time before falling.
- **Decay:** How long it takes for the value to decrease to the percentage level set by Sustain.
- **Sustain:** The value will be sustained at this level until a [Note-Off](#) (key release) event.
- **Release:** How long it takes for the value to fall to zero.

### 19.2.1.3 Envelope

This device is a heavily customisable envelope with additional Sustain and Release properties.



The main graphical section of this device displays the envelope and the points used to create it. Left-clicking on a point will select it and click-dragging will move it around. Using "Left Ctrl" will display the current value of a point and also lock it in place horizontally, allowing you to fine-tune its value vertically. Double-clicking in the

envelope will create a new point, while double-clicking on an existing point will remove it. For more advanced editing options, see the [Using The Envelope Device](#) section.

The following options are directly under the envelope graphic, from left to right:

- **Time:** The selected point's location in time.
- **Value:** The value of the selected point. Left-click to enter a new value.
- **Envelope Type:** Dictates how the envelope's value will change over time.
  - ♦ **Points:** Only changes value when a point is encountered.
  - ♦ **Linear:** Interpolates between points in a linear fashion.
  - ♦ **Curve:** Interpolates with a smooth cubic curve, easing into and out of points.
- **Length:** Length of the envelope.

These are the options found on the right side of the device:

- **Ext. Editor:** This will open the envelope graphic in the large central section of the Modulation interface, allowing for finer control over details and access to additional tools. For more details, see the [Using The Envelope Device](#) section.
- **Loop:** When looping is enabled by selecting a loop type from the menu, start and end points are inserted into the envelope, causing playback to loop between them. The loop points can be moved by click-dragging their tabs at the top/bottom of the envelope.
  - ♦ **Off:** No loop.
  - ♦ **Forward:** Loop playback from start to end.
  - ♦ **Reverse:** Loop playback from end to start once the end point is reached.
  - ♦ **PingPong:** Loop playback from start to end to start to end etc.
- **Sustain:** When enabled, a Sustain line will appear in the envelope and can be moved by dragging the top tab. When playback reaches the Sustain line, it will be held there until a [Note-Off](#) (key release) event.
- **Release:** Changes how long it takes for the volume to fall to silence after a [Note-Off](#) (key release) event. Higher values equal less time. Only available for the Volume envelope.
- **Presets:** Store and recall your favourite envelope settings. Right-clicking will save a preset, while left-clicking will restore a previously saved preset. Presets are stored by Renoise and will show up every time you use the device in future.

#### 19.2.1.4 Fader

A configurable fader used to create a variety of fade in/outs.



- **Scaling:** The scaling that will be applied to the fade. The default is linear, but you can also select from two exponential and two logarithmic scales.

- **From:** The starting value.
- **To:** The ending value.
- **Duration:** The length of time the fade will last.
- **Delay:** The start of the fade will be delayed by this amount of time.

#### 19.2.1.5 Key Tracking

This device alters its output value by responding to the key values of notes. The full output value range of 0 to 1 is scaled to fit within the min/max range.



- **Min:** Minimum key value.
- **Max:** Maximum key value.

#### 19.2.1.6 LFO

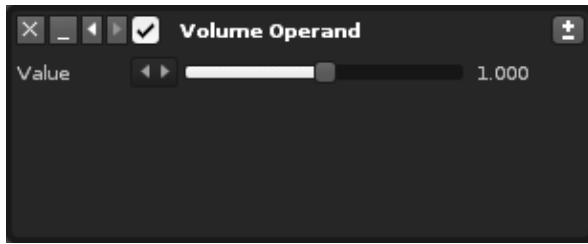
The LFO device constantly cycles its output value in a pattern that is constructed by its properties.



- **Mode:**
  - ◆ - Sine wave oscillator.
  - ◆ - Sawtooth oscillator.
  - ◆ - Pulse oscillator.
  - ◆ - Random oscillator.
- **Frequency:** The speed of the oscillation.
- **Amplitude:** The maximum range that the value will oscillate to.
- **Dephase:** Changes which part of the oscillation cycle that the output will start at.
- **Delay:** The start of the oscillation will be delayed by this amount of time.

#### 19.2.1.7 Operand

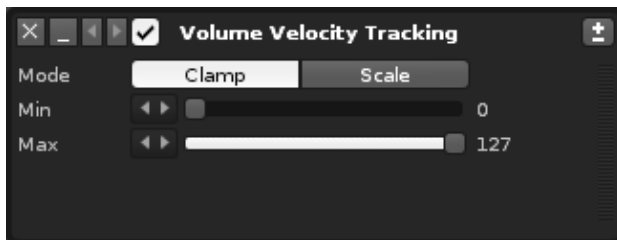
A simple value output device. The "Input" slider at the beginning of the chain is also an Operand device.



- **Value:** The value which will be output.

### 19.2.1.8 Velocity Tracking

This device alters its output value by responding to the velocity values of notes.



- **Mode**
  - ♦ **Clamp:** Note values played outside of the min/max range will be clamped at the min/max values.
  - ♦ **Scale:** The entire velocity range is scaled to fit within this device's min/max range.
- **Min:** The minimum output value.
- **Max:** The maximum output value.

## 19.2.2 Right-click Context Menu

Right-clicking on a device will select it and open a context menu with additional options:

- **Cut:** Cut the device.
- **Copy:** Copy the device.
- **Paste:** Paste the previously copied device after the selected device.
- **Delete:** Delete the device.
- **Rename:** Rename the device.
- **Bypass/Activate:** Enable/disable the device.
- **Copy Settings:** Copy the parameter settings from the device.
- **Paste Settings:** Paste the previously copied settings into the selected device. Note that settings cannot be pasted between different types of devices.
- **Init Settings:** Reset the device settings to their default values.

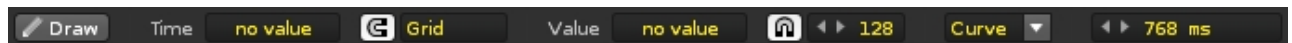
- **Modulation Set:** The options function exactly as they do in the [Set List](#), with the addition of:
  - ♦ **Append:** Paste a previously copied Set's device chains onto the end of the existing chains.
- **Min/Maximize All:** Min/maximizes all devices in the Set.

## 19.3 Using The Envelope Device




Pressing the "Ext. Editor" button will open the envelope graphic in the large central section of the Modulation interface, allowing for finer control over details and access to additional tools. Using the mousewheel on the envelope will zoom in/out. Clicking either the top right "X" or "Ext. Editor" button will remove the larger editor.

Left-clicking on a point will select it and click-dragging will move it around. Holding "Left Shift" while moving a point will remove all other points that it touches. Using "Left Ctrl" will display the current value of a point and also lock it in place horizontally, allowing you to fine-tune its value vertically. Double-clicking in the envelope will create a new point, while double-clicking on an existing point will remove it. Left-click-dragging across the envelope will create a highlighted area and select any points contained within, allowing them to be adjusted all at once.

### 19.3.1 Processing Controls And Options



- **Draw:** Draw mode allows you to draw points on the envelope with the mouse.
- **Time:** The selected point's location in time.
- **Snap to Grid:** Will snap the horizontal creation and movement of points to the current resolution of the grid.
- **Value:** The value of the selected point. Left-click to enter a new value.
- **Snap to Value:** Will vertically snap points to values of 1/divisor (the divisor is set in the value box).
- **Envelope Type:** Dictates how the envelope's value will change over time.
  - ♦ **Points:** Only changes value when a point is encountered.
  - ♦ **Linear:** Interpolates between points in a linear fashion.
  - ♦ **Curve:** Interpolates with a smooth cubic curve, easing into and out of points.
- **Length:** Length of the envelope.
- - Cut the whole envelope.
- - Copy the whole envelope.
- - Paste the whole envelope.
- - Move the envelope or selected points to the left/right. Will wrap around the edges.
- - Flip the envelope or selected points horizontally/vertically.

-  - Humanizes the envelope or selected area by randomly adding or subtracting a small amount to the point values.
-  - Opens the envelope editor in a completely separate window, which can be moved around and resized. There is also an additional maximize button at the window's top right corner. Clicking  "Attach" will reattach the window to the main interface.

### 19.3.2 Right-click Context Menu

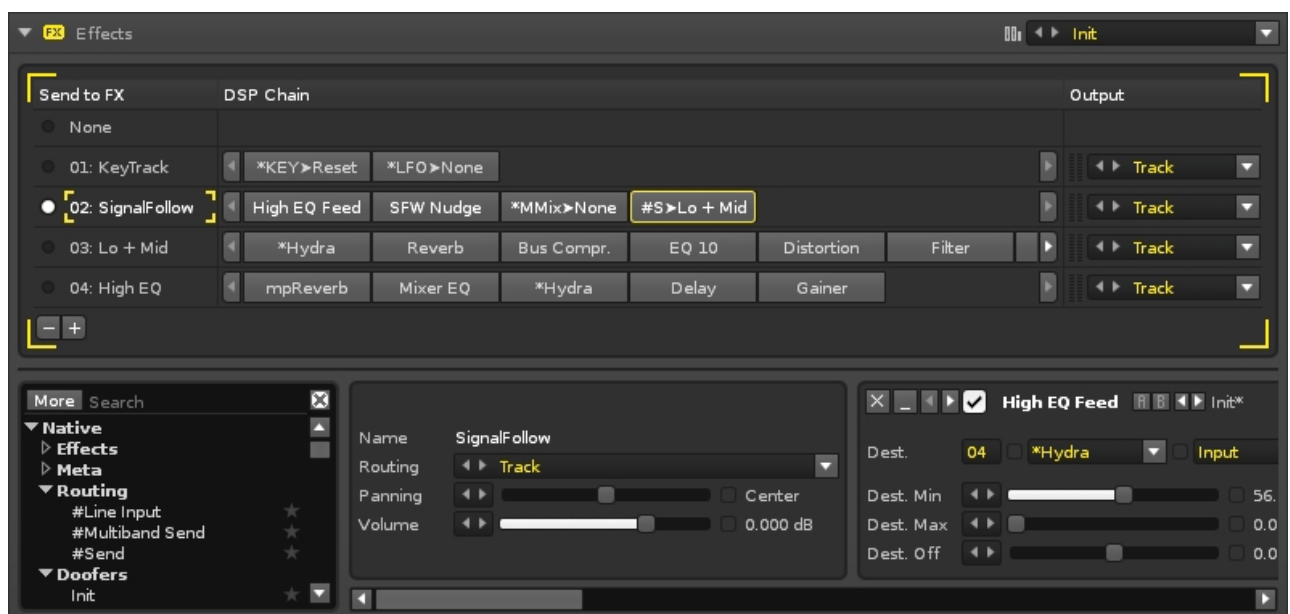
- **Cut:** Cut the points contained within the selection area.
- **Copy:** Copy the points contained within the selection area.
- **Paste:** Paste the previously copied points into the envelope from the cursor position (left-clicking in the envelope will set the cursor position for pasting operations).
- **Paste Continuously:** Paste the previously copied points into the envelope from the cursor position and repeat until the end of the envelope.
- **Insert Paste:** Paste the previously copied points into the envelope from the cursor position and move the rest of the envelope to the right. Note that this will not affect the length of the envelope and so any points shifted outside of it will be lost.
- **Cut Selected Time:** Cut the selected area.
- **Delete Envelope:** Delete the whole envelope.
- **Process:** Applies to the entire envelope or the selected area if there is one.
  - ♦ **Create Random Points:** Create points of random value.
  - ♦ **Create Exponential Curve:** Create an exponential curve rising from 0 to 1. Use the flip buttons to achieve other curves.
  - ♦ **Create Linear Curve:** Create a linear curve rising from 0 to 1.
  - ♦ **Create Sine Curve:** Create a single cycle sine curve.

## 20 Effects

Adding effects to samples greatly expands the possibilities of their sound beyond the original audio. To achieve this, various audio effects and other devices are placed together to construct an FX Chain, which can be used to affect any number of samples simultaneously.

Instruments that make use of sample FX Chains can, like [plugin instruments](#), only be played on a single [track](#) at a time.

The interface is split into two sections. At the top is the FX Chain list, which also shows some of the devices and output routing. The lower section is where the selected FX Chain is constructed.



### 20.1 The FX Chain List

An FX Chain is a collection of effect devices. Any number of Chains can be created and each instrument has its own unique FX Chain list. The individual samples of an instrument can be assigned any one of its FX Chains, allowing different samples be affected in different ways. An FX Chain can also be assigned to multiple samples simultaneously and any changes made to a Chain will affect all linked samples.

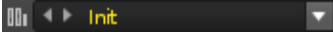
The FX Chain assigned to the current sample is marked with a circle at the list's left. Clicking on an empty circle slot will assign that FX Chain to the sample. Clicking on an FX Chain's name will select it for editing, while double-clicking allows you to rename it. FX Chains can be added or removed using the buttons at the bottom left:

- - Inserts a blank FX Chain below the currently selected Chain.
- - Deletes the currently selected FX Chain.

To the right of the FX Chain's name is a minimized view of that Chain's devices, which you can scroll through using the arrow buttons at either side. Further right is the Output routing for the Chain, so if your soundcard offers multiple channels you can route the audio there and even send it for post-processing to a hardware mixer.

Right-clicking on an FX Chain or device will select it and open a context menu with additional options:

- **Cut:** Cut the selected device.
- **Copy:** Copy the device.
- **Paste:** Paste the previously copied device after the selected device.
  
- **Delete:** Delete the device.
- **Rename:** Rename the device.
  
- **Bypass/Activate:** Enable/disable the device.
- **Open External Editor:** If the effect is a non-native plugin, this will open the plugin's editor.
  
- **Device**
  - ◆ **Copy Settings:** Copy the property settings from the device.
  - ◆ **Paste Settings:** Paste the previously copied settings into the selected device. Note that settings cannot be pasted between different types of devices.
  - ◆ **Init Settings:** Reset the device settings to their default values.
  
- **Device Chain**
  - ◆ **Cut:** Cut all of the Chain's devices.
  - ◆ **Copy:** Copy all of the Chain's devices.
  - ◆ **Paste:** Paste all of a previously copied Chain's devices (overwrites the selected Chain).
  - ◆ **Delete:** Delete all of the Chain's devices.
  - ◆ **Load:** Loads an FX Chain (overwrites the selected Chain).
  - ◆ **Save As:** Saves the currently selected Chain.

FX Chains can also be loaded and saved as presets using the menu located at the top right corner:  Init

## 20.2 Creating FX Chains

The method of creating Chains is identical for both sample FX and track effects, so for the sake of simplicity this is covered in one separate section: [Effects In Renoise](#). Please refer to it for full details on this subject.

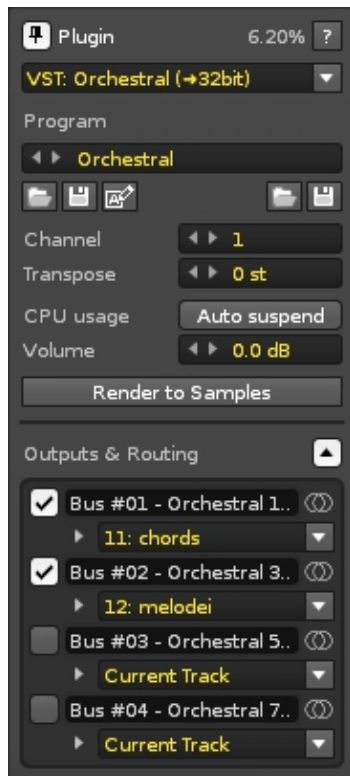


## 21 Plugin

Renoise has the ability to load in and make use of external plugin instruments (VST, AU, DSSI). Besides the common MIDI properties, they also offer a custom GUI, audio routing options and can be rendered down to sample-based instruments.




### 21.1 Plugin Instrument Properties



- - Enable to pin the plugin's external editor to the Renoise window.
- - Set up [compatibility options](#) for the plugin. Hovering the mouse over this button will display some information about the plugin, such as latency, where the file is loaded from etc.
- **Instrument:** The plugin instrument which you would like to use. This will initially display "None". Click to show a list of available plugins.
- **Program:** When available, select a specific patch in the plugin. Note that some plugins only allow changing and setting up patches in their external editor.
- - Load, save or rename the currently active preset.
- - Load or save all presets as a bank.
- **Channel:** The MIDI channel that will be used to trigger the plugin. For most plugins any channel will do, but when using [multi-timbral plug-ins](#) you can use multiple channels to play different sounds from a single plugin instance.
- **Transpose:** Transpose note playback in semi-tonal increments.
- **Auto Suspend:** When enabled, Renoise will completely shut off the plugin when it is no longer producing sound. This is mainly done to reduce CPU usage. While plugins are Auto Suspended they will automatically wake up as soon as they are triggered again by playing notes or automation. Additionally, while suspended you will be unable to play the plugin by clicking on the virtual piano keys in its custom GUI.
- **Volume:** The overall playback volume of the instrument.
- **Render to Samples:** Render the plugin (freeze it) to a sample-based instrument. Left-clicking will replace the current plugin, while right-clicking

creates a brand new instrument. See [Render or Freeze Plugin Instruments to Samples](#) for a detailed description.

- **Output & Routing:** Click the  button at the right to open the panel. By setting up track routing you can force the output to be bound to a single track, no matter which track you send the notes from. This can be useful if you want to route different [aliases](#) to different tracks to keep things organised, or route multiple instruments to same track to use its [effect chain](#).

You can also load in plugins and change the program via the Instrument Properties section under the [Instrument Selector](#).

## 21.2 Setting Up VST Paths

Plugins (VSTs or Audio Units) are external components that are installed on your computer. Renoise will try to locate them automatically, but is sometimes unable to do so. If you have plugins installed but they don't appear in Renoise, you can specify directories where Renoise will look via the "*Edit->Preferences->Plug/Misc*" menu. See the [Plugins/Misc](#) section of the Preferences for more information.



### 21.2.1 Selecting a Plugin

Initially, the Instrument box will show "*None*". Click on it to select, search and organize plug-ins. To select a plugin, double click on its name. To unload it, select "*None*" from the list.

As soon as the plugin list is opened, you can start typing in the search field. If, for example, you want to load a plugin called "*Filter Modulator*", then typing "*Filter*" will list only plugins which have the term "*Filter*" in their plugin category or name. To select a plugin using the keyboard, hit the "*TAB*" key to set the focus on the plugin list, then navigate with the arrow keys to the desired plugin and hit "*ENTER*". Hitting "*ESCAPE*" will close the list without selecting anything.

## 21.2.2 Organising/Customising the Plugin List

Right-clicking on a plugin name will bring up a context menu with the following options:

- **Add To Favorites:** Adds the selected plugin or vendor to your [favorites list](#).
- **Add To Group:** Opens a new dialog box where you enter a name for the group. If it is a new name, then the group will be created and the selected plugin(s) moved under it. If the group already exists, then the plugin(s) will be moved over to the group.
- **Ungroup:** *(Only available when clicking on an existing group or vendor name)* Removes the selected group from the effects list.
- **Rename:** *(Unavailable for native effects)* Opens a new dialog box where you can change the plugin or vendor name. Any changes made here will only be saved within Renoise; the actual plugin name remains the same, since it may be used by other applications.
- **Hide:** Excludes a plugin or a category of plugins from the list. This can be useful if you no longer use a plugin, but don't want to uninstall it because old songs still use it. To make a hidden plugin visible again, enable the "Show Hidden Devices" option, then simply "Unhide" it again.
- **Collapse Whole Tree:** Collapses the entire effects list, showing only the Favorites (if any exist), Native and VST categories. Handy if you need to show just a few effects.
- **Expand Whole Tree:** The effects list will expand back to its full size again.
- **Show Hidden Devices:** Enables hidden plugins to become visible again.
- **Show Short Names:** Instead of sorting plugins by vendor, you can also display them as a single list. With this option enabled you can still categorise the plugins by renaming them as described above.

## 21.2.3 Favorites List

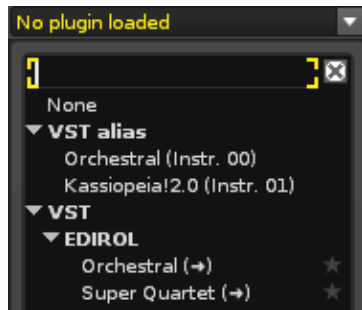
To add a plugin to your custom favorites list, click the star icon to the right of it. Your favorites are located at the very top of the instruments list. To remove a plugin from your favorites, simply click the star icon again.

## 21.3 Plugin Aliases (multi-timbral plugins)

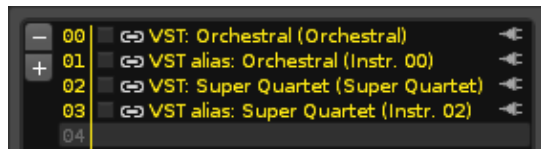
Some plugins allow the use of multiple [MIDI channels](#) to play different sounds from a single plugin instance. This is not absolutely necessary, as you can always load a separate instance of a plugin to use a different sound, but it can be helpful to save on CPU consumption. To find out if your plugin supports this, search for the keyword "multi-timbral" or "routing" in the plugin's manual.

To create an alias, first load your chosen plugin into an instrument slot, use the [Instrument Selector](#) to select another instrument slot and then open the plugin list

again. You will see at the top of the list is the new category, "*VST Aliases*" (or "*AU Aliases*" if you've used an Audio Unit). The aliases refer to the previously loaded plugin. Double-click on one of the aliases in the list to create it, then change the [channel number](#) to use it.



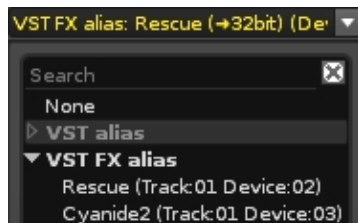
The instrument is shown in the Instrument Selector with its alias name:



Note that any changes made to the options in the plugin properties panel, except for "*Channel*" and "*Transpose*", will be applied to all of the aliases, as well as the original plugin. Furthermore, deleting the original plugin will also delete all of the aliases.

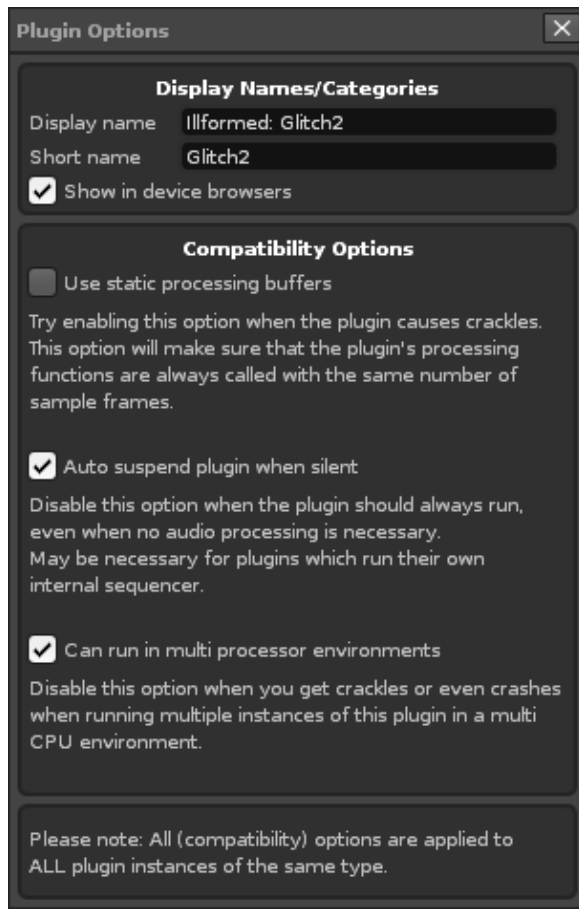
### 21.3.1 Plugin FX Aliases (routing MIDI to existing plugin effects)


You can also create and control aliases for existing plugin devices in [Track Effect](#) chains.



Most plugin effects do not support notes or other MIDI events. Those that do, use them to control more advanced features such as vocoders. Other possible uses include preset or parameter switching with notes or sending MIDI CC messages to plugins. Once you've set up an alias to an effect, you can play and record with it just like a normal instrument. You can also use a \*MIDI Control Device to automate it with MIDI.

## 21.4 Plugin Compatibility Options

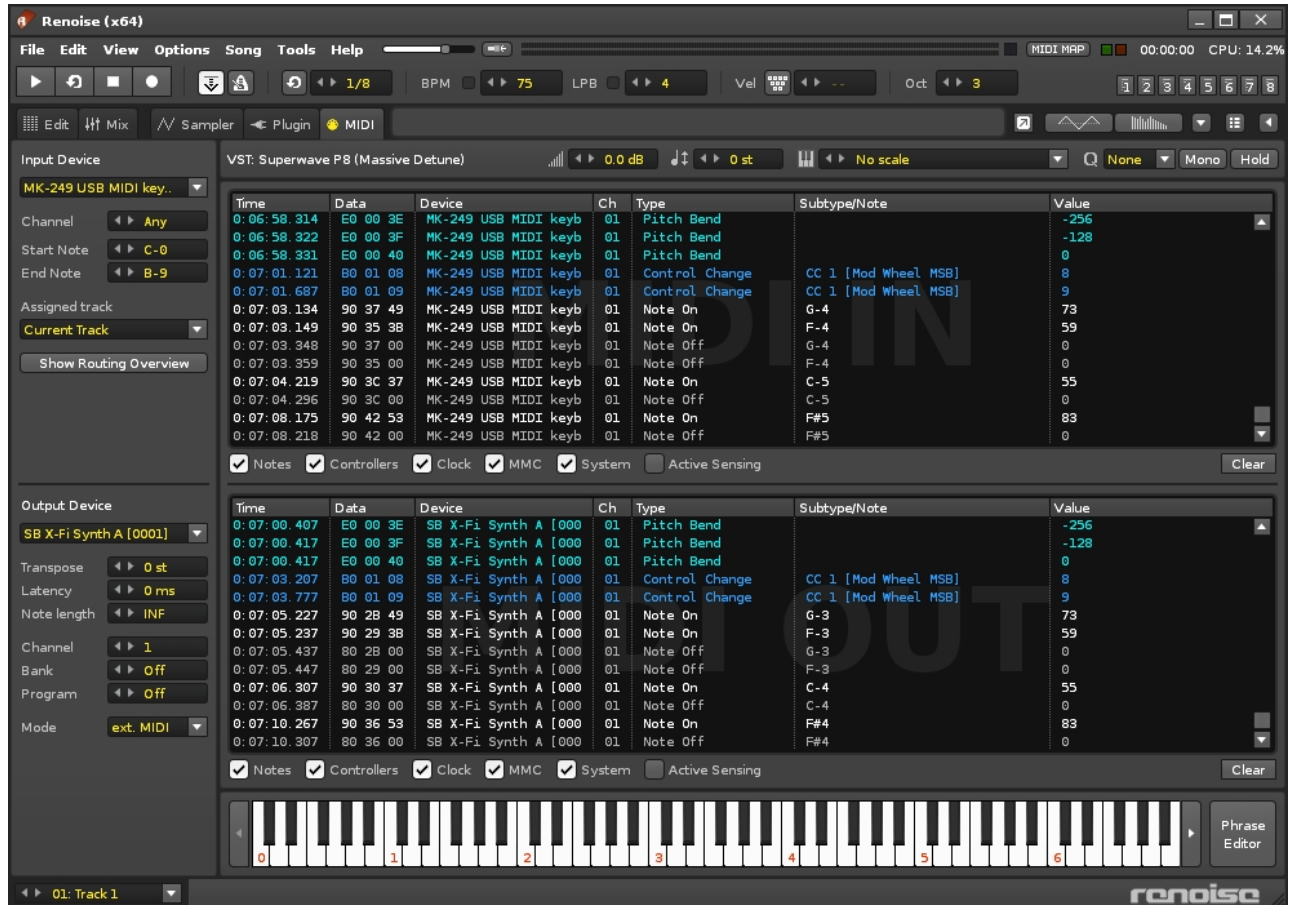


This dialog will appear after clicking on the  button in the [plugin properties](#) after a plugin instrument is loaded. In most cases these options will already have the correct settings, as Renoise comes with a database which sets the defaults for you. If you are experiencing any of the problems described in the dialog, then you might want to try altering the settings.



## 22 MIDI

With the MIDI section you can use external MIDI devices to trigger an instrument in Renoise or vice versa. The MIDI input and output events are listed in the large central panels, where you can also filter the listing of certain events.



### 22.1 MIDI Input

You can assign individual MIDI input devices to an instrument or even several different instruments. You can also specify the MIDI channel and note range which the instrument is activated by, as well as assign it to be played on a particular track within Renoise. These options are particularly useful when performing live.



- **Input Device:** The MIDI input device. If the [MIDI Master device](#) is used as the input, from that point on it will only trigger the assigned instruments.
- **Channel:** The MIDI channel which the instrument will be activated by.
- **Start/End Note:** The note range which the instrument will be activated by.
- **Assigned Track:** The track that the instrument will be played on. Note that a single Renoise track only supports up to 12 notes triggering at once. So when linking several instruments to a single device it is possible for this limit to be exceeded, resulting in some notes going unplayed. To avoid this, assign each instrument to a dedicated track.
- **Show Routing Overview:** Opens a dialog box with an overview of all routings that have been made in the song. You can quickly reset them with the "Clear All" button.

## 22.2 MIDI Output

With a MIDI instrument you can play external synthesizer hardware or control software synthesizers running on your computer. The latter is done by using virtual MIDI devices (MIDI Yoke on Windows, the IAC BUS on Mac OSX) and programs which receive MIDI. When running Renoise as a ReWire master, loaded ReWire slaves (e.g. synthesizers like Reason) will also show here as virtual MIDI devices.



- **Output Device:** The MIDI device which you would like to send MIDI to. Without setting up a device, no MIDI data can be transferred, so this is your first priority when creating a MIDI instrument.



- **Transpose:** Transpose note playback in semi-tonal increments.
- **Latency:** A custom manual latency that all events will be sent with. This is sometimes needed to get external devices properly synchronised. Please note that in order to use a negative latency, the Mode (see below) must be set to "ext. MIDI" and that the smallest possible negative latency is limited to the current latency of your soundcard. If you need further negative latency, you can increase your audio latency in the [Audio Preferences](#).
- **Note Length:** When set to INF, [Note-Offs](#) (key release) must be explicitly sent in order to stop notes from playing. When enabled (not INF), the MIDI instrument will behave as if it has a finite duration. This can be especially useful for playing drum samples, since you no longer have to manually turn every single one off.
- **Channel:** The MIDI channel that will be used to trigger the MIDI device.
- **Bank:** When set, this is the bank number you want to apply before the instrument is loaded with songs. When disabled, no bank change information will be sent to the device. The bank number is a 14-bit value, so you have to enter combined LSB and MSB values when needed.
- **Program:** When set, this is the program number you want to apply before the instrument is loaded with songs. When disabled, no program change information will be sent to the device.
- **Mode:** Adjusts the latency depending on how you capture the audio from your external instrument (see [Latency handling with External MIDI Instruments](#) for a more in-depth explanation):
  - ♦ **ext. MIDI:** The MIDI device is routed to an external synthesizer, which then outputs its own sound directly.
  - ♦ **LineIn Ret:** The MIDI device is routed to an external synthesizer, but the audio signal is routed back to Renoise via a [#Line Input device](#).

You can also access some of these options via the Instrument Properties section under the [Instrument Selector](#).

## 22.2.1 Latency Handling with External MIDI Instruments

The syncing of external MIDI instruments can become rather complicated and so requires some explanation. There are a number of factors to take into account including the soundcard's audio output latency, the MIDI connection's MIDI latency, the automatic plugin delay compensation (PDC) and the soundcard's audio input latency (if feeding the external audio back into Renoise).

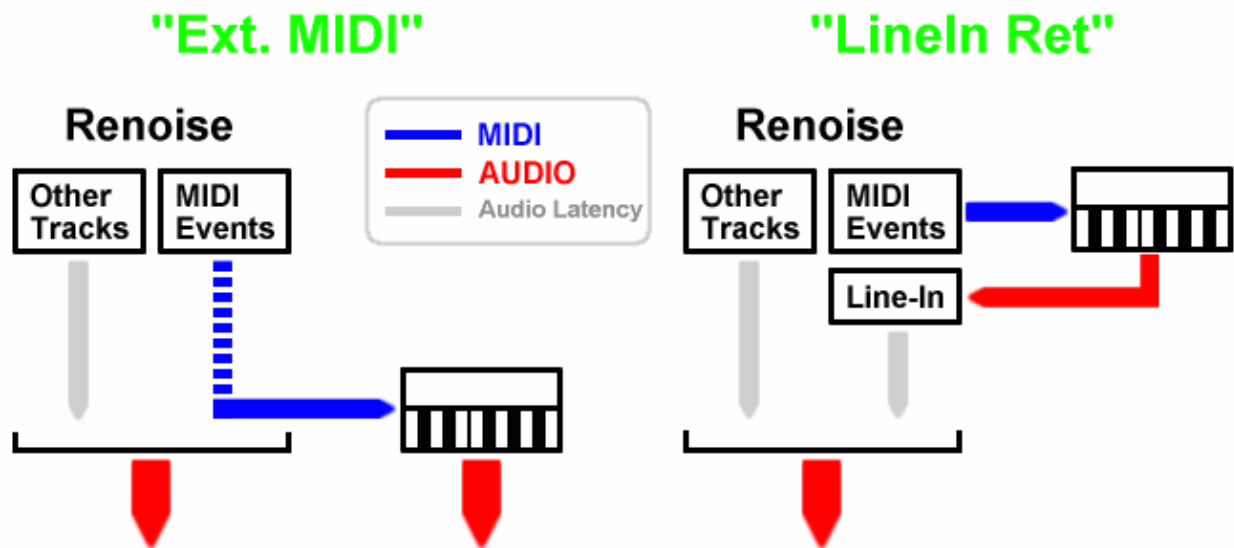
If you're feeding any audio produced by outboard equipment directly to the speakers, set the instrument's mode to "ext. MIDI". This will delay all MIDI events sent to the instrument by Renoise's internal audio latency (which is composed of the soundcard's output latency plus any PDC). This way it will be sent to the external synth at the same time that the audio generated internally by Renoise reaches the soundcard outputs. If your MIDI interface and external synth introduce no extra delays in handling the MIDI signal, the audio produced by the synth and Renoise should now be perfectly in sync.

In reality however, it is likely that there will be a few milliseconds of MIDI latency between the time that Renoise sends out the MIDI event and the time that the synth's

audio output reaches the speakers. To compensate for this extra MIDI latency you can either use the [Latency value in the MIDI Output panel](#) or the [track delay setting in the Mixer](#) for the track which the MIDI instrument is being triggered from.

If you want to feed the audio from the outboard equipment back into Renoise for further processing, set the instrument's Mode to "LineIn Ret". Then add a [#Line Input device](#) to the same track which you're triggering the notes for the external instrument from. In the #Line Input device, set Latency to "MIDI Return Mode". You also need to make sure that [PDC](#) is enabled in the Renoise Preferences. Now MIDI events sent to the instrument will not be delayed by the audio latency, like when using "ext. MIDI", but rather get sent out immediately. This is because the audio coming back from the synth into Renoise will be subject to the soundcard's input latency (which is the same as the output latency). So assuming no MIDI latency, the externally produced audio should now be in sync with the internally generated audio.

Again, the MIDI connection to the external instrument is likely to introduce some delay. This time however, you can only compensate for it by using the [track delay setting in the Mixer](#) for the track on which you are triggering the MIDI instrument. The MIDI Output Latency value can't allow negative latencies in the "LineIn Ret" mode, since in this mode Renoise sends out MIDI events the instant they are encountered. The following diagram illustrates this.



It's important that you keep the #Line Input device on the same track that you trigger the MIDI instrument from and that PDC is enabled for this routing scheme to work. Without PDC enabled, Renoise does not compensate for audio latencies.

## 23 Phrase Editor

With the Phrase Editor you can compose musical phrases that will be activated when specific notes are played. Phrases are recorded using a scaled-down version of the [Pattern Editor](#), consisting of just a single track in a single pattern. However, an instrument can feature up to 120 different phrases, one for each key, and the phrases can be constructed using any combination of an instrument's [sample](#), [plugin](#) and [MIDI](#) components.



### 23.1 Creating Phrases

The Phrase Editor can be opened by pressing its button to right of the [keyboard](#). If the selected instrument does not have an existing phrase the [Create Phrase](#) button will need to be pressed, which inserts a single phrase across the entire key range. On/Off buttons will appear above the Phrase Editor button to enable/disable an instrument's phrases.

While editing a phrase, notes played with the computer keyboard will play the instrument as normal, while playing via a MIDI device or the [on-screen keyboard](#) will trigger the phrase itself. Recording notes and effects is done in exactly the same way as the [Pattern Editor](#). The [phrase length](#) is changed by altering the value in the box at the top left. Note and effect [columns](#) can be added and removed with their usual +/- buttons. A phrase can be renamed by double-clicking on its name and typing in a new

one.

### 23.1.1 Selecting & Adjusting the Phrases



Phrases can be played across a range of keys and are shown spanning this range above the [keyboard](#). A phrase can be selected by left-clicking on it, making it the active phrase with a highlighted colour and its [properties](#) displayed above the keyboard. You can shrink/expand the range of an active phrase by click-dragging its left or right edge, though note that phrases cannot overlap each other. Click-dragging inside the phrase will move it around.

If you hold down "Left Shift" and left-click on another phrase, both this and the active phrase are selected, along with any phrases between them. When multiple phrases are selected, any changes made to the active phrase will also affect the others.

### 23.1.2 Inserting & Deleting Phrases

To insert additional phrases just double-click on a blank space in the phrase area. If there is no blank space, you will need to shrink an existing phrase to make room (phrase ranges cannot overlap). A phrase can be deleted or duplicated by right-clicking on it and selecting the appropriate option from the context menu. Phrases can also be duplicated by holding Ctrl and click-dragging to a blank area of suitable size (the duplication will fail if the area is too small).

### 23.1.3 Phrase Effects

[Effect Commands](#) inserted into a phrase's [effect column](#) behave as normal. However, a few commands will behave differently when used in the [Pattern Editor](#) to affect a phrase:

- **0Bxx** - Play phrase backwards (xx = 00) or forwards (xx = 01).
- **0Sxx** - Trigger phrase from line xx.
- **0lxx, 0Oxx, 0Txy** - Will also affect any Plugin or MIDI playing in the phrase.

## 23.2 Phrase Editor Options

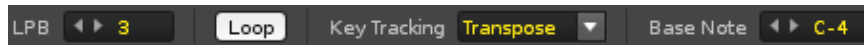


These options are found at the top of the Phrase Editor interface.

- **Play:** Start/stop playing the phrase.
- **Stop:** Stop phrase playback.

- **Record:** Toggle [Edit Mode](#). With [Edit Mode](#) enabled, all notes played via the keyboard are recorded into the phrase. Notes can be recorded either while the phrase is stopped or playing.
- **Edit Step:** Sets how many lines the cursor should skip down in the Phrase Editor when entering a note or effect.
- **Vol/Pan/Dly:** Toggles the volume, panning and delay [sub-columns](#).
- **FX:** Quickly show and add phrase effect commands.
- **Presets:** Load and save phrase presets.
- **X:** Close the Phrase Editor.

## 23.3 Phrase Properties



These options are found just above the [keyboard](#) and can be different for every single phrase.

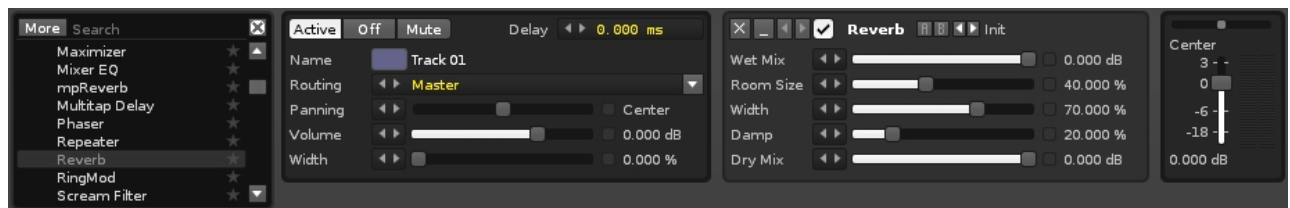
- **Lines per Beat:** This changes the number of lines in the Phrase Editor that make up a musical beat. The higher the LPB, the greater the resolution available to you for editing notes and effects. A phrase's LPB operates independently from the [song's LPB](#).
- **Loop:** Toggles whether the phrase will repeat while a key is held down.
- **Key Tracking:** Sets the behaviour of the phrase across a key range.
  - ♦ **None:** The phrase is played exactly the same for all keys.
  - ♦ **Transpose:** The pitch of the phrase's notes are transposed to the key played. The playback speed of the phrase is unaffected.
  - ♦ **Offset:** Different keys will cause the phrase to begin playing from different lines (lower keys from earlier in the phrase, higher keys from later).
- **Base Note:** The note representing the original pitch of the phrase when "Key Tracking" is set to "Transpose". This can also be changed by right-clicking on the keyboard (the current Base note is shown there as a black circle).

## 24 Effects In Renoise

In Renoise, effects can be applied in two ways: in [tracks](#), affecting all sounds that are played there, or [directly onto samples](#), affecting only those sounds. Either way, devices are inserted into an interactive effect chain, with the audio signal running through each device from left to right. The devices can be chosen from the pool of native effects included with Renoise, or any [third-party plugin](#).

The native devices come in four different categories. [Audio Effects](#) alter the sound in a variety of ways. [Routing Devices](#) either send audio to another FX Chain/track or receive a signal from an external source. [Meta Devices](#) do not change the actual audio signal themselves, but instead alter the parameters of another effect. [Doofers](#) are special devices that contain their own effect chain within them and provide easy access to their most useful parameters through macros.

A song created using these native effects can be saved, given to other people and it will play back on their copy of Renoise exactly as it did on yours. However, this is not the case with plugin effects or instruments (VST, AU, LADSPA, DSSI). These external programs have to be installed on a system in order to be played back in a Renoise song.



### 24.1 The Effects List

If you're adding effects to a track, use the effect list in the [Pattern Editor](#) by selecting its icon at the lower left corner of the interface:



If you're adding effects to samples, make sure you're in the [Sampler -> Effects](#) section. Either way, the list of available effects is found at the bottom left and is categorised like so:

- Native
  - ◆ [Audio Effects](#)
  - ◆ [Routing Devices](#)
  - ◆ [Meta Devices](#)
  - ◆ [Doofers](#)
- [VST/AU/LADSPA/DSSI](#)
  - ◆ Plugin Devices

Note that although plugin effects and instruments may have the same format name i.e. VST, they are still fundamentally different. VST effects will show up in the effects list shown here, while VST instruments are handled in the [Instrument -> Plugin](#) section.

You can quickly search for an effect by typing part of its name in the search bar at the top of the list. This also works for categories, so typing in "VST" will show only VST plugins in the list.

To add a device from the list to the effect chain, either double-click on it or drag and drop it into the chain at the desired position. You can also drag and drop an effect into any track while using the [Mixer](#):



## 24.1.1 Organizing the List

By default, the plugin effects list is sorted by vendor name. Clicking the "More" button next to the search field will vertically expand the list, giving you more room to organise the effects.

Right-clicking on a plugin or vendor/group name will bring up a context menu with the following options:

- **Add To Favorites:** Adds the selected plugin or vendor to your [favorites list](#).
- **Add To Group:** Opens a new dialog box where you enter a name for the group. If it is a new name, then the group will be created and the selected plugin(s) moved under it. If the group already exists, then the plugin(s) will be moved over to the group.
- **Ungroup:** *(Only available when clicking on an existing group or vendor name)* Removes the selected group from the effects list.
- **Rename:** *(Unavailable for native effects)* Opens a new dialog box where you can change the plugin or vendor name. Any changes made here will only be saved within Renoise; the actual plugin name remains the same, since it may be used by other applications.
- **Hide:** Excludes a plugin or a category of plugins from the list. This can be useful if you no longer use a plugin, but don't want to uninstall it because old songs still use it. To make a hidden plugin visible again, enable the "Show Hidden Devices" option, then simply "Unhide" it again.
- **Collapse Whole Tree:** Collapses the entire effects list, showing only the Favorites (if any exist), Native and VST categories. Handy if you need to show just a few effects.
- **Expand Whole Tree:** The effects list will expand back to its full size again.
- **Show Hidden Devices:** Enables hidden plugins to become visible again.





- **Show Short Names:** Instead of sorting plugins by vendor, you can also display them as a single list. With this option enabled you can still categorise the plugins by renaming them as described above.

### 24.1.2 Favorites List



To add a plugin to your custom favorites list, click the star icon to the right of it. Your favorites are located at the very top of the effects list. To remove a plugin from your favorites, simply click the star icon again.

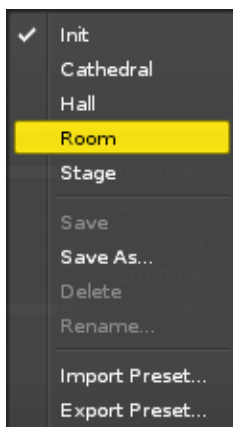
## 24.2 Common Device Layout and Controls

Each effect device has a standard set of buttons to perform common functions:

-  - Remove the device from the chain.
-  - Minimize/maximize the device.
-  - Move the device to the left or right. Right-click to move to the start or end of the chain.
-  - Enable/disable the device.

## 24.3 Storing/Recalling Effect Presets

-  - Right-clicking A or B stores the current parameter set, while left-clicking restores it. This allows you quickly switch between two presets and compare them. The stored presets are saved with your song.
-  - Select, edit or create presets for the current effect. Clicking upon the preset name shows a list of available presets, along with some options:



By clicking "Save as", the current parameters will be saved into a new preset. Saved presets are stored by Renoise and will show up every time you use the device in future.



Presets created by you can also be deleted and renamed.

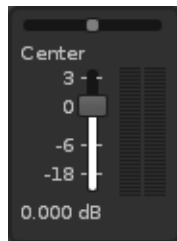
To save/load parameter presets to/from disk, use the "Import" and "Export" options in the same context menu. This method allows you to share your presets with other Renoise users.

## 24.4 Pre and Post Mixer Effects

Two devices are always present in every effect chain and cannot be removed or repositioned: the Pre and Post Mixer devices.

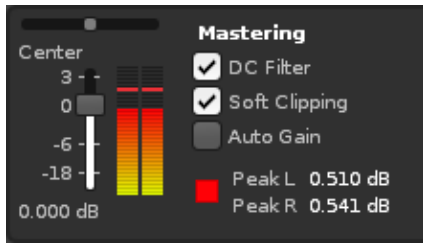



The Pre-Mixer device is located at the beginning of each effect chain and controls the volume, panning, width and delay of the incoming signal. For standard [Sequencer Tracks](#) this is the audio from the notes in the [Pattern Editor](#). For [Groups](#), [Sends](#) and the [Master Track](#), this is the audio that is being routed to them. For a [sample FX chain](#), this is the audio before it is played on a track.



The Post-Mixer is located at the end of the effect chain and controls the volume and panning of the sound that leaves it. By default, the audio from a track's effect chain is routed to the Master Track, while the audio from a sample's FX chain is routed to the track it is played on. This can be changed through the "Routing" tab of the Pre-Mixer, the [Mixer](#) (for tracks), or the Output section of [the FX Chain List](#) (for samples). If your soundcard offers multiple channels, you can route audio from different chains to different channels and even send them for post-processing to a hardware mixer.

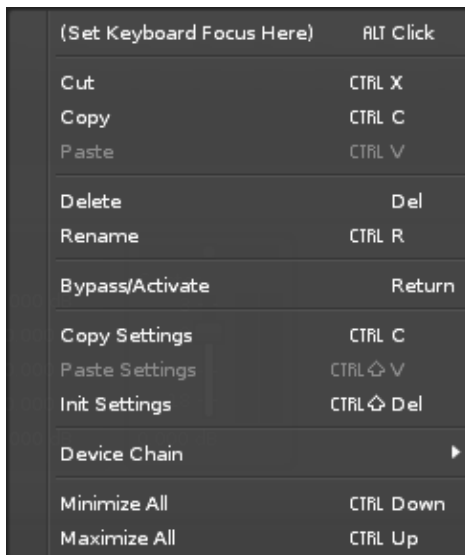
The Post-mixer device in the [Master Track](#) has a few extra options:



- **Auto Gain::** Automatically lowers the master volume to avoid clipping. This is the same as the [Upper Status Bar](#)'s auto gain button: 
- **DC Filter:** When enabled, DC offsets in the master signal are automatically removed.
- **Soft Clipping:** When enabled, the master signal will be softly saturated when clipping occurs.
- **Peak Levels:** Shows the actual master signal. Using this you can easily see if the master signal is clipping.

## 24.5 Copy/Pasting Effect Chains

Right clicking on a device or into the free space between the effects will show a context menu with various options for the whole chain, or the currently selected chain. This way you can delete, cut, copy or paste whole chains, or also minimize all effects in the current chain. Please have a look at the following screenshot for all available options:



## 24.6 Loading/Saving Effect Chains

It is possible to export effect chains to disk for later use through the "Other" category in the [Disk Browser](#). Note that when loading in effect chains, Renoise will replace the existing chain with the new one. You can avoid this by right-clicking the chain file in the

Disk Browser and then selecting, "*Load file with options...*".

## 24.7 MIDI Mapping and Automating Effects

Every effect parameter can be attached to a MIDI controller via the [MIDI Mapping](#) dialog box. They can also be automated using either [Graphical Automation](#) or [Pattern Effect Commands](#).

## 25 Audio Effects

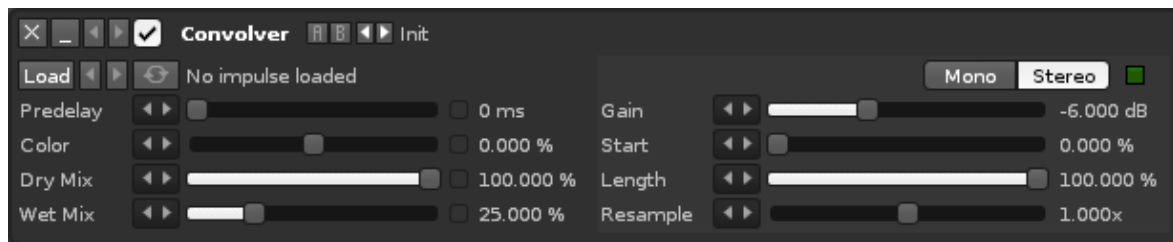
Audio Effects alter the sound in a variety of ways and Renoise offers a wide range that can be applied to tracks or samples.

### 25.1 Delay Devices

Delay devices repeat an audio signal and mix it with the original sound. By repeating and dampening the sound over and over again, this simulates spatial effects.

#### 25.1.1 Convolver

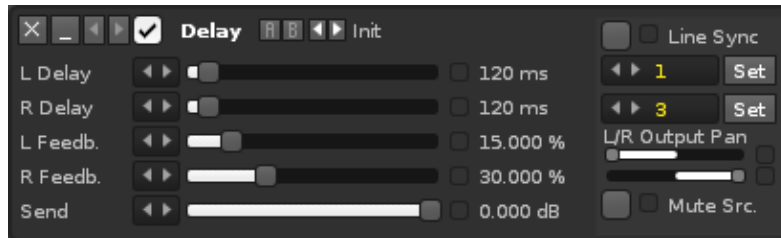
The Convolver applies the sonic character of an impulse response to the input audio by convolution, which is a more complex intertwining of the sounds compared to a simple reverb. An impulse response is typically a recording of an acoustic space's reverberation after an impulse (short sound burst) is played within it. However, impulse responses are not merely limited to reverb and can be created by any method, including just loading in any audio file.



- **Load/Reload:** Pressing the load button will open up a dialog box where you can load in an audio file to use for convolving. The arrows will automatically load in the previous/next file from the current directory. The reload button will simply reload the current sample.
- **Predelay:** An initial delay that is applied before any convolution occurs.
- **Color:** Used to attenuate or boost mid-frequencies of the convolved signal.
- **Wet Mix:** The gain of the convolved signal.
- **Dry Mix:** The gain of the non-convolved input sound.
- **Mono/Stereo:** Selecting "Mono" will use only the left signal of the impulse response in order to lower CPU usage.
- **Gain:** The gain of the impulse response.
- **Start:** Changes at what point in time within the impulse response that convolution will start from.
- **Length:** The length of the impulse response, as a percentage of its original length.
- **Resample:** Changes the speed which the impulse response is convolved at.

## 25.1.2 Delay

The Renoise Delay effect is a two-line echo device with the parameters of a classic digital delay unit. It is commonly used to add spatial echoes in either rhythmic or non-rhythmic patterns, but has other subtle uses such as short-delay induced 'width'. The available parameters allow for versatile use, both creatively and for more practical mixing applications.



- **Line Sync Switch:** This switches the mode of the delay effect from the initial un-synced mode to "*Line Sync*" mode. When disabled, the delay lengths can be set to a value and they will remain at those values. When enabled, the delay lengths are tied to the numbers in the "*Delay Set Boxes*" and synced with the song's [BPM](#). So when the tempo of the song changes, the delay lengths are altered accordingly. "*Line Sync*" mode also enables the delay lengths to be offset from their set values (see below).
- **L/R Delay/Offset:** Controls the "*Left*" and "*Right*" delay line lengths in milliseconds when in un-synced mode, or in a  $-/+%$  offset from 0 when in "*Line Sync*" mode. The delay range that can be set is from 1 ms to 2000 ms.
- **L/R Feedback:** Controls the amount of diminishing feedback for the "*Left*" and "*Right*" delay lines, roughly equating to how many 'echoes' are sounded. 0% means that the delay is sounded once, whereas 100% means the delay will keep sounding forever.
- **Send:** This controls the volume of the 'wet' delay output (where 0db equates to the same volume as the input sound).
- **Delay Set Boxes:** In un-synced mode, a beat-step value (relative to current [BPM](#)) can be selected and 'set' with the "Set" button. In "*Line Sync*" mode, the values can be altered as the song is playing and will also automatically change with song tempo. The "*L/R Offset*" can be used to offset the timing of the delay relative to the value specified in the box.
- **L/R Output Pan:** This controls the panning position of the "*Left*" (top slider) and "*Right*" (bottom slider) delay outputs.
- **Mute Src. Button:** Mutes the source signal (the 'dry' sound), leaving only the delayed echoes.

### Tips and tricks

- The Delay device can be used as a classic 'Send Echo': Place the Delay effect into a [Send Track](#) and enable "*Mute Src.*", so that the dry signal will not double up with the source. Now add a [#Send device](#) into the source track, select the chosen Send Track as the "*Receiver*" and adjust the "*Amount*" sent. If you apply the [#Send device](#) in this way to multiple tracks, then they can all make use of the same echo effect.

- Panning the input and output of the delay is important: If an input sound happens on the left, then the echoes will sound on the left. This may not be desirable, so the "*L/R Output Pan*" sliders can be used to place the delay output in a different position than the input. Common usages of this feature include panning the outputs to the centre to create a mono echo, or a left/right swap where the output echoes happen on the opposite side of the input. This can be very useful for filling out the spatial characteristics of a mix.
- When both the L and R delay lengths are set to the same value, then the panning of the output sound automatically becomes mono (unless the output pans are adjusted).
- When using a 'Send Echo', "*HighPass*" and "*LowPass*" filters can be placed after the output of the Delay device to simulate acoustic echo properties and to remove unwanted frequencies from cluttering the mix.
- When the "*Delay/Offset*" settings change, or the "*Delay Set Boxes*" value is altered and "Set" is pressed, a quick 'scrubbing' sound is heard that simulates the 'tape delay' speed change sound. This also occurs when in "*Line Sync*" mode when either the BPM or LPB change, or when the "*Delay Set Boxes*" value is altered.
- As an alternative to stereo expansion effects, the Delay can be used to create wider ambience. Example settings could be: "*Delay*" = 7-11 ms, "*Feedback*" = 0%, swapped panning on the "*Output Pans*" and a "*Send*" value somewhere between -18db to -8db. This technique is even more effective in a 'Send Echo', with the output filtered to focus on the mid-frequencies.
- Sometimes simplistic percussive and melodic input sounds can turn into complex, exciting rhythmic flows by using rhythmic delays. Experimenting with different "*Line Sync*" or "*Delay Set Boxes*" values can yield interesting results. A common echo rhythm can be created using a 6-beat delay, but other values may be appropriate depending on the input rhythm and sound.

### 25.1.3 Multitap

This is a four stage delay device with individual controls for each "Tap".



- **L/R Delay/Offset:** Controls the "*Left*" and "*Right*" delay line lengths in milliseconds when in un-synced mode, or in a  $\pm$ % offset from 0 when in "*Line Sync*" mode. The delay range that can be set is from 1 ms to 5000 ms.
- **L/R Feedback:** Controls the amount of diminishing feedback for the "*Left*" and "*Right*" delay lines, roughly equating to how many 'echoes' are sounded. 0%

means that the delay is sounded once, whereas 100% means the delay will keep sounding forever.

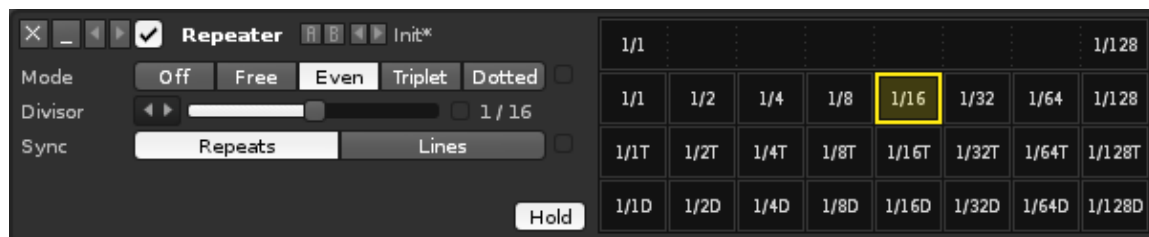
- **Amount:** This controls the volume of the 'wet' delay output (where 0db equates to the same volume as the input sound).
- **No Panic:** Immediately stops the feedback from the Taps.
- **Mute Dry Signal:** Mutes the source signal (the 'dry' sound), leaving only the delayed echoes.
- **Expand Additional Controls:** Reveals the extra controls available for each Tap.
- **Tap 1-4:** Swaps between each of the four Taps.

Extra parameters are shown by pressing the "*Expand Additional Controls*" button:

- **Line Sync Switch:** This switches the mode of the delay effect from the initial un-synced mode to "*Line Sync*" mode. When disabled, the delay lengths can be set to a value and they will remain at those values. When enabled, the delay lengths are tied to the numbers in the "*Delay Set Boxes*" and synced with the song's **BPM**. So when the tempo of the song changes, the delay lengths are altered accordingly. "*Line Sync*" mode also enables the delay lengths to be offset from their set values (see below).
- **Delay Set Boxes:** In un-synced mode, a beat-step value (relative to current **BPM**) can be selected and 'set' with the "Set" button. In "*Line Sync*" mode, the values can altered as the song is playing and will also automatically change with song tempo. The "*L/R Offset*" can be used to offset the timing of the delay relative to the value specified in the box.
- **Input Source:** How much of the original signal is used for this Tap.
- **Input Tap 1-3:** (Available on Taps 2-4) How much of the previous Tap's signal is used for this Tap.
- **Filter Type:** Choose from four different types to filter the Tap: low/high/band-pass or notch.
- **Filter Freq.:** Sets the cutoff/target frequency for the selected filter type.
- **Filter Drive:** Controls the amount of diminishing feedback for the filtered sound.
- **Filter Q:** (Available for bandpass and notch only) Creates a ringing feedback loop for frequencies around the selected frequency.
- **Filter Position:** Specifies where the filter is applied in the Tap's signal path.
- **Output Pan L/R:** This controls the panning position of the "*Left*" and "*Right*" filtered delay outputs.
- **Ping Pong:** Inverts the feedback signal of the Left and Right channels.

## 25.1.4 Repeater

This effect captures a small chunk of sound that is currently playing and keeps repeating it.



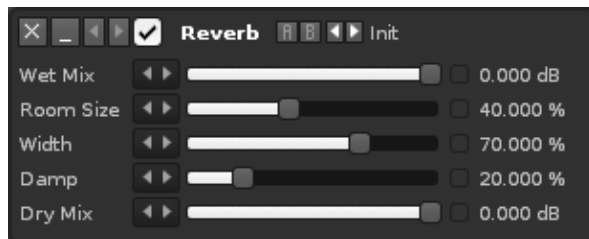
- **Mode Type** - Four buttons select the method of repetition:
  - ◆ **Off:** Deactivates the repeating.
  - ◆ **Free:** Allows for "Divisor" fractions of any value.
  - ◆ **Even:** Repeats the sound exactly once per "Divisor" value.
  - ◆ **Triplet:** Repeats the sound at two thirds of the "Divisor" value.
  - ◆ **Dotted:** Repeats the sound one and half times per "Divisor" value.
- **Divisor:** The length of the captured sound to be repeated. The value represents this as a fraction of four beats, also know as a Whole Note or Semibreve (*with [Lines Per Beat](#) at the default value of 4, this is 16 lines of the [Pattern Editor](#)*).
- **Sync:** Determines how changes to the repeat length are handled. "Repeats" will change it after the end of the current repetition, while "Lines" will allowing changing it per pattern line.
- **Hold:** With this setting off, the "Mode Type" will automatically return to "Off" after the mouse button is released when using the "Grid".
- **Grid:** Clicking on the grid will change the "Mode" and "Divisor" settings.

## Tips and tricks

- When the settings are changed, it is the sound playing at that exact moment that is captured. So make sure a sound is actually playing when using the Repeater, or only silence will be repeated.
- Hold down the left mouse button on the "Grid" and move the mouse around. This will quickly and easily change the settings and is especially useful on the "Free" section at the top.
- Using the right mouse button, you can record changes made via the grid directly to the [Pattern Editor](#).

## 25.1.5 Reverb

A straightforward reverb effect.



- **Wet Mix:** The gain of the reverberated signal.
- **Room Size:** The size of the room, i.e. the delay time of the echoes.
- **Width:** The width of the reverberated stereo signal. 0 = mono, 100 = full stereo.
- **Damp:** A filter cut-off to simulate sound-absorption level of walls.
- **Dry Mix:** The gain of the non-reverberated input sound.

## 25.1.6 mpReverb

A complex reverberation effect with many parameters to modify the sound of the reverberated signal.





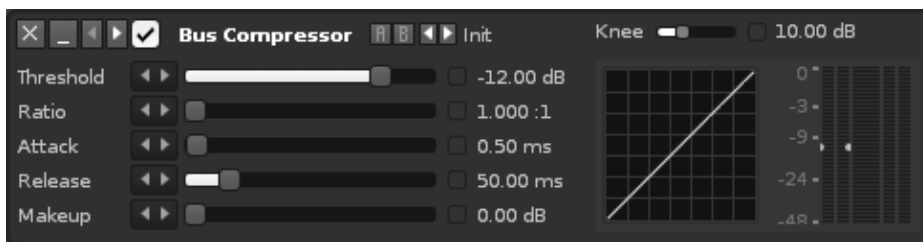
- **Duration:** The reverberation time in milliseconds.
- **Predelay:** An initial delay that is applied before any reverberation occurs.
- **Low Cut:** The cut-off frequency of the dampening filter.
- **Low Gain:** The gain of the dampening filter. Lower values create more dampened sounds.
- **Color:** Used to attenuate or boost mid-frequencies of the reverberated signal, in order to simulate walls.
- **Width:** Controls the stereo separation of the reverberated signal.
- **Pan:** The panning of the reverberated signal.
- **Wet Mix:** The gain of the reverberated signal.
- **Dry Mix:** The gain of the non-reverberated input sound.

## 25.2 Dynamics Devices

Dynamic devices are used to dynamically change the amplitude of an audio signal.

### 25.2.1 Bus Compressor

The Bus Compressor, unlike the normal Compressor, doesn't merely react to the incoming signal. The signal is first analysed and then the appropriate action is taken. Short peaks are handled via a feed-back algorithm, while constant signals are handled via a feed-forward algorithm. This way both compression methods are used where they work optimally. The Bus Compressor is a perfect tool for mastering or levelling.



- **Threshold:** The minimum dB value at which the compression will take place.
- **Ratio:** The strength of the compression.
- **Attack:** The time it takes the Compressor to react to the signal breaching the Threshold.
- **Release:** The time it takes for the Compressor to deactivate after the signal falls beneath the Threshold.
- **Makeup:** The volume boost that is applied to the output.
- **Knee:** The point at which the signal will begin to be gradually compressed as it

approaches the Threshold. This allows for a softer, more natural sounding compression.

## 25.2.2 Compressor

A Compressor "squashes" an audio signal as it rises above a specific Threshold level, reducing its dynamic range and providing extra headroom for the signal to be boosted in volume after compression. This results in a "fattening" of the sound.

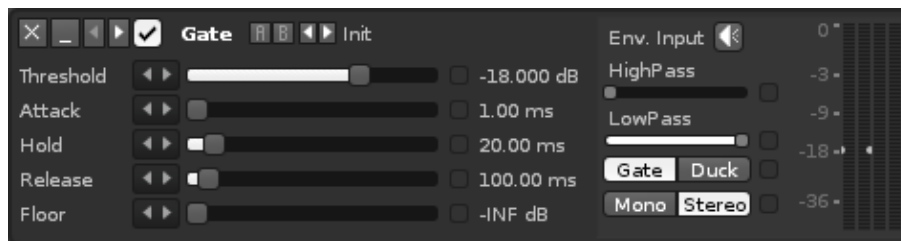
For more information about compression and EQs: [John Vestman's compression page](#). Compression specific guide: [Beginner's guide to compressors](#).



- **Threshold:** The minimum dB value at which the compression will take place.
- **Ratio:** The strength of compression.
- **Attack:** The time it takes the Compressor to react to the signal breaching the Threshold.
- **Release:** The time it takes for the Compressor to deactivate after the signal falls beneath the Threshold.
- **Makeup:** The volume boost that is applied to the output.

## 25.2.3 Gate

A Gate only allows a signal to be heard if it exceeds a specific volume Threshold. This can, for example, be used to silence a constant low noise floor from a signal, or to cut out low volume parts of complex signals (such as drum loops). Using the Gate's input filters you can analyse and therefore gate certain frequency ranges or instruments.



- **Threshold:** The minimum dB value at which audio signals will be heard.
- **Attack:** The time it takes the Gate to react to the signal breaching the Threshold.
- **Hold:** Determines how long the signal will be held after the signal has fallen below the Threshold, delaying the Release phase.
- **Release:** The time it takes for the Gate to fully deactivate after the signal falls below the Threshold. Longer Release times will result in slower fade-outs.

- **Floor:** Setting this volume level above zero will merely reduce the gated sound instead of silencing it.
- **Env. Input:** Click to listen to the input after it has been affected by the High and Low Pass filters. Useful to hear exactly what part of the signal will be affected by the Gate.
- **High Pass:** The frequency of the High Pass filter applied to the input. The output signal is not affected by the filters.
- **Low Pass:** The frequency of the Low Pass filter applied to the input. The output signal is not affected by the filters.
- **Gate/Duck:** Duck mode reverses the behaviour of the Gate: the Floor volume will be applied when the signal falls below the Threshold.
- **Mono/Stereo:** Toggle gating channels equally or individually.

## 25.2.4 Maximizer

The Maximizer is a hard limiter which boosts and limits audio signals. It will hard-clip a signal that exceeds the Threshold, but then soften the Release when it falls back under that Threshold (contrary to plain hard-clipping). The Maximizer is often used for final mastering to block any stray, unnecessary peaks without harsh sounding full hard-clipping.



- **Boost:** Gain applied to the signal before the Threshold.
- **Threshold:** The dB value that the Maximizer limits the input to.
- **Peak Rel.:** Compression release factor for peaks (transients).
- **Slow Rel.:** Compression release factor for non-peaks (constant signals).
- **Ceiling:** Final gain applied to the output.

The small red LED below the VU meters indicates when the Peak Rel. factor is being used.

## 25.3 Filter Devices

Audio filters manipulate a sound's frequency spectrum. There are various digital and analogue emulation filters present in Renoise:

### 25.3.1 Comb Filter

The Comb Filter adds a delayed version of the signal to itself, causing constructive and destructive interference.

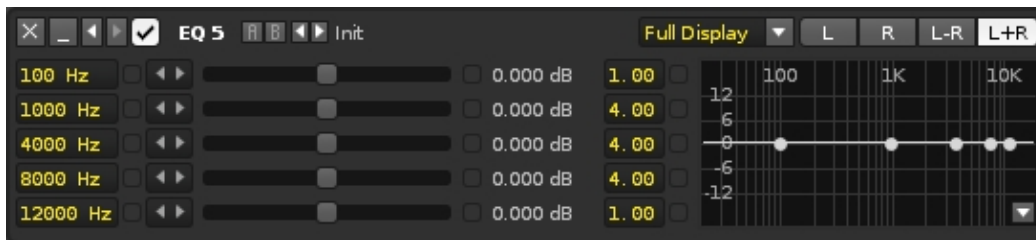


- **Frequency:** The rate at which the delayed signal is applied to the original.
- **Feedback:** The direction and strength of the delayed signal.
- **Inertia:** Determines how fast parameter changes are applied. Low Inertia will create sweeping effects by noticeably sliding from one parameter setting to another.
- **Wet Mix:** How much of the processed signal will be kept.
- **Dry Mix:** How much of the original, clean signal will be kept.

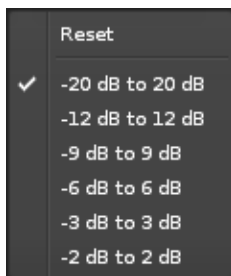
### 25.3.2 EQ 5

A 5-band equalizer which amplifies or attenuates up to five frequency bands. You can switch between the three display modes using the menu at the top right of the device.

The frequencies to the left of the sliders are adjustable, as are the Qs (width of the bands) to the right. Each band can also be changed by using the left mouse button to drag the node dots in the graphical panel. Using the right mouse button and moving up/down will change the notch width. If you hold "*Left Shift*", the node is locked to allow adjustment of the amplification value only, while "*Left Alt*" allows adjusting only the frequency value. "*Ctrl/Cmnd*" is used for fine tuning.



The volume scale of the graph at the right side of the device can be changed by clicking on the small button in the bottom right corner:

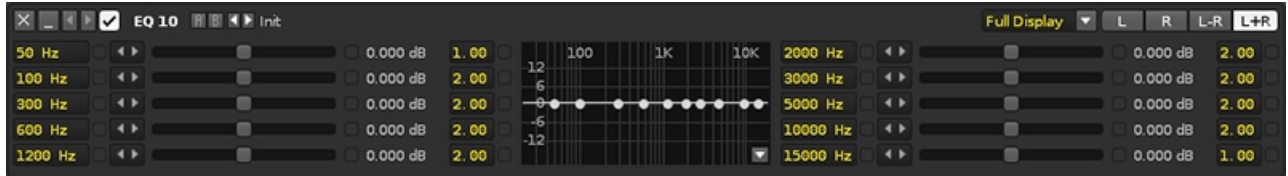


The "*L*", "*R*", "*L-R*", "*L+R*" buttons are only show in "*Full Display*" mode and specify how the EQ is processed in the stereo field:

- **L:** Only processes the left channel.
- **R:** Only processes the right channel.
- **L-R:** Processes the left channel normally and the right channel inversely. This can create nice spatial effects, especially when modulated.
- **L+R:** Processes both channels equally, which is the default.

### 25.3.3 EQ 10

The EQ 10 device is identical to the 5 band equalizer, but with 10 bands and different frequency and Q defaults.



### 25.3.4 Exciter

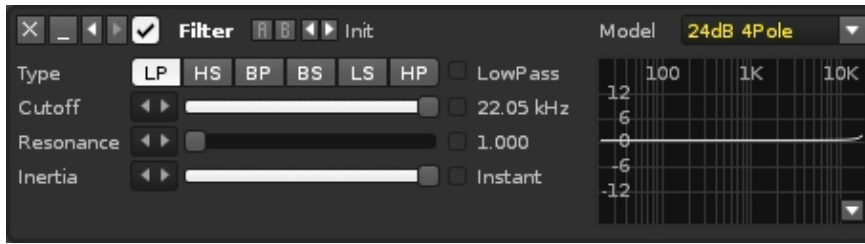
This enhances a signal through use of dynamic equalization, phase manipulation, harmonic frequency synthesis and the addition of subtle harmonic distortion. It is traditionally used as a mastering device for adding clarity and width to a mix.



- **Band Selector:** Choose from High, Mid and Low frequency bands. Each band has its own separate set of parameters to affect. The two value boxes underneath the graph allow you to alter the frequency band values. Clicking and dragging on the vertical lines within the graph will also do this.
- **Band Mode:** Choose from "Stereo", which affects both Left and Right channels equally, or "Mid & Side", which allows you to independently affect the central and side spatial ranges of the mix.
- **(Mid/Side) Sharpness:** Increasing this value will weigh the effect more to the higher frequencies of the selected band.
- **(Mid/Side) Amount:** The general strength of the effect.

### 25.3.5 Filter

The Filter device contains many filter types and models.



The available Filter models are:

- **24dB 4 Pole:** A standard, fast, digital bi-quad filter, as used in many audio applications.
- **24dB Moog:** An experimental but fast Moog filter emulation, with a very unique sound and resonance near to self-oscillation.
- **Butterworth 4n:** A fourth order Butter-worth filter. Butter-worth filters are designed to have a frequency response which is as flat as mathematically possible in the passband, precisely cutting off frequencies.
- **Butterworth 8n:** An eighth order Butter-worth filter, which has an even flatter frequency response than the fourth order version.

Each model has five types of filter:

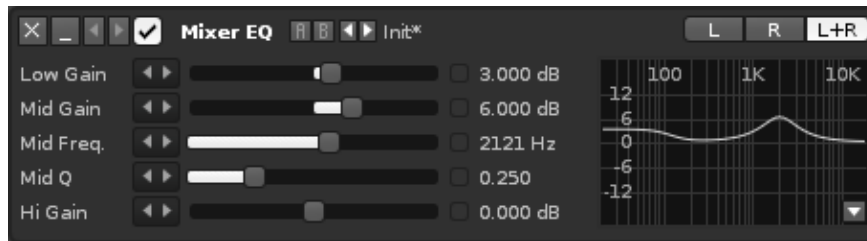
- **Low Pass:** Passes low frequency signals but attenuates frequencies higher than the cutoff value.
- **High Shelf:** Attenuates signals with frequencies lower than the cutoff value with a custom amount of gain.
- **Band Pass:** Passes frequencies within a certain range and attenuates frequencies outside of that range.
- **Band Reject:** Passes most frequencies unaltered but attenuates those in a specific range to very low levels.
- **Low Shelf:** Attenuates signals with frequencies higher than the cutoff value with a custom amount of gain.
- **High Pass:** Passes high frequency signals but attenuates signals lower than the cutoff value.

Each filter type has up to four parameters:

- **Cutoff/Freq.:** Sets the cutoff/target frequency for the currently selected filter model and type.
- **Resonance/Q:** Creates a ringing feedback loop for frequencies around the cutoff value.
- **Gain:** Available for Low/High Shelf filters only. Adjusts the gain of the attenuated frequencies.
- **Inertia:** Determines how fast parameter changes are applied. Low Inertia will create sweeping effects by noticeably sliding from one parameter setting to another. This can be useful to soften the effect of cutoff changes applied to sounds with mostly low frequencies.

### 25.3.6 Mixer EQ

The Mixer EQ is a standard EQ that was designed to sound and behave like common DJ mixers.



## 25.4 Modulation Devices

Modulation Devices apply various types of oscillators to enrich the sound.

### 25.4.1 Chorus

As the name implies, a Chorus effect enriches the sound by layering on differently pitched duplicates of itself. This can be especially useful to make simple wave shapes deeper and warmer.



- **Rate:** Frequency of the applied modulation.
- **Depth:** Modulation depth.
- **Feedback:** Amount of feedback that is injected into the signal.
- **Delay:** Delay before the modulation is played.
- **Dry/Wet:** Specify how much of the clean and modulated sounds are kept.
- **Phase:** Phase offset of the modulation, applied to only the right channel to create a stereo effect.
- **Filter type selection:** Type of filter that is applied to the modulated signal.
- **Filter Option 1:** An additional option that will change depending on the type of filter used.
- **Filter Option 2:** An additional option that will change depending on the type of filter used.

### 25.4.2 Flanger

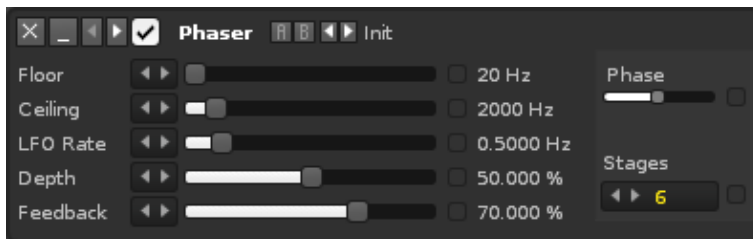
A Flanger mixes two identical signals together, with one of them delayed by a small and gradually changing amount.



- **Amount:** Modulated signal volume. Negative values will invert the signal.
- **Rate:** Modulation frequency.
- **Amplitude:** Modulation amount.
- **Feedback:** Feedback, applied to the modulated signal.
- **Delay:** Phase offset of the modulated signal.
- **Phase:** Phase offset of the modulation, applied to only the right channel to create a stereo effect.
- **Filter type selection:** Type of filter that is applied to the modulated signal.
- **Filter Option 1:** An additional option that will change depending on the type of filter used.
- **Filter Option 2:** An additional option that will change depending on the type of filter used.

### 25.4.3 Phaser

A Phaser uses a series of filters to create peaks and troughs in the frequency spectrum. The positions of the peaks and troughs are modulated so they vary over time, creating a sweeping effect.



- **Floor:** Lower frequency boundary of the filter modulation.
- **Ceiling:** Upper frequency boundary of the filter modulation.
- **LFO Rate:** Frequency of the filter modulation.
- **Depth:** Strength of the modulation.
- **Feedback:** Amount of feedback that is applied to the modulated signal.
- **Phase:** Phase offset of the modulation, applied to only the right channel to create a stereo effect.
- **Stages:** Number of used filters. The more filters are used, the stronger the effect.

### 25.4.4 Ringmod

Ring modulation simply multiplies an incoming signal with an oscillator. Low frequencies can be used to modulate the panning or volume of the signal. High frequencies will add a new harmonic frequency to signal.





- **Oscillator:** The type of oscillator waveform to be applied.
- **Frequency:** The frequency of the Oscillator.
- **Amount:** The amplitude of the Oscillator.
- **Phase:** Phase offset between the left and right channels' oscillation.
- **Inertia:** Determines how fast parameter changes are applied. Low Inertia will create sweeping effects by noticeably sliding from one parameter setting to another.

## 25.5 Shape Devices

Shape Devices modify the amplitude of the signal in various ways.

### 25.5.1 Cabinet Simulator

The Cabinet Simulator emulates the sound of hardware amplification cabinets. It features a tube that is used for distortion and a built in EQ. This effect is recommended for bass, synth, guitar or drums, to add roughness to your sound. Also try combining it with the other Shape Devices and/or chaining multiple Cabinet Devices for interesting effects.

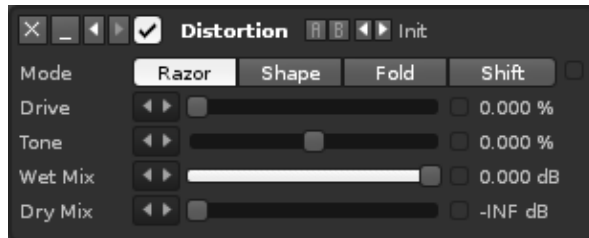


- **Cabinet:** Select the type of the Cabinet that will be used. There are bass, guitar and various other models available.
- **Routing:** Set how the Cabinet Simulator will internally route the signal through the cabinet, EQ and tube.
- **Gain:** Amount of Gain applied in the tube. More Gain will result in more distortion.
- **Wet Mix:** How much of the processed signal will be kept.
- **Dry Mix:** How much of the original, clean signal will be kept.
- **Mono/Stereo:** When set to Mono, incoming stereo signals will be combined and processed as a mono signal only. The Cabinet is twice as fast in Mono, so this can be useful to save on CPU consumption if the input signal is mono.
- **EQ:** A standard EQ with 5 bands and Q settings. See [EQ 5](#) for a detailed

description.

## 25.5.2 Distortion

The Distortion effect is a versatile way of changing an input sound in real-time to produce a range of characteristic distortion sounds, from traditional overdrive to bizarre sonic extremes.



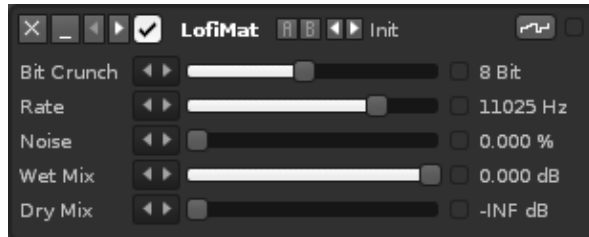
- **Mode Type** - Four buttons select the type of distortion:
  - ◆ **Razor:** Razor mode cuts off the top of the waveform by amplifying and clamping the signal, also known as clipping. This gives the traditional digital overdrive sound that is quite harsh and full in character.
  - ◆ **Shape:** Similar to Razor mode, except that instead of clipping, the signal is saturated. This results in a warmer sounding overdrive that emulates analogue distortion.
  - ◆ **Fold:** Instead of clipping or saturating, part of the waveform is folded back towards the DC line, giving the waveform a slightly triangular shape. This is an aggressive foldback type distortion that mangles the sound and growsl fiercely at high gain.
  - ◆ **Shift:** Shift mode generates a new waveform from the original by folding amplitudes below the DC line. The introduced DC offset is corrected by shifting the signal. This is a noise-floor distortion with a very scratchy sounding character.
- **Drive:** Controls the amount of distortion. Depending on the selected mode, different amounts of drive produce different sound characteristics.
- **Tone:** Controls a pre-filter for adjusting distortion colour. Values above 0% add brightness to the sound, whereas values below 0% dull the sound.
- **Wet Mix:** Controls the output volume of distorted sound. Initially set to full volume.
- **Dry Mix:** Controls the volume of the unaltered original signal. Initially set to silent.

### Tips and tricks

- The Wet Mix will usually need to be reduced, depending on the amount of distortion applied.
- Sometimes the distortion can sound too harsh or 'cold' - this can be countered by adding a small amount of Dry Mix to add warmth.
- Extreme distortion can bring out a lot of harmonic overtones and high frequency detail - sometimes not all of it is desired. This can be controlled with a Low Pass Filter after the distortion effect.

### 25.5.3 LofiMat

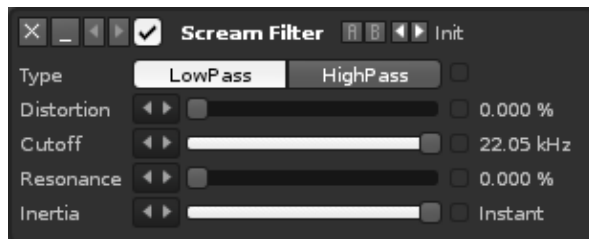
The LofiMat degrades the input signals quality by either lowering the bit-depth or lowering the effective sample rate of the signal. Applied softly, this can add nice harmonics.



- **Bit Crunch:** The applied bit-depth.
- **Rate:** The applied sample rate.
- **Noise:** The amount of extra noise that will be added to the signal. The noise will also be degraded by the Bit Crunch.
- **Wet Mix:** How much of the processed signal will be kept.
- **Dry Mix:** How much of the original, clean signal will be kept.
- **Smooth:** Located at the top right, this will enable smoothing of the waveform.

### 25.5.4 Scream Filter

The Scream Filter is a unique combination of a Filter and a Shift Distortion. Because of the resonating and distorted feedback, it often sounds as if it is screaming, hence the name.



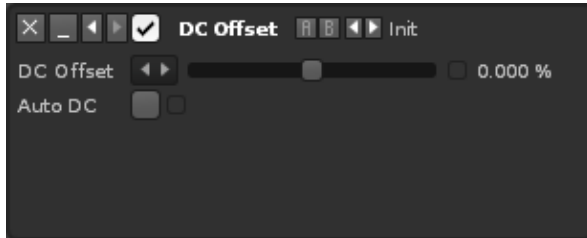
- **Type:** Select the basic filter type: Low or High Pass.
- **Distortion:** How much distortion will be applied.
- **Cutoff:** Cutoff frequency of the filter.
- **Resonance:** Amount of resonance applied to the filter.
- **Inertia:** Determines how fast parameter changes are applied. Low Inertia will create sweeping effects by noticeably sliding from one parameter setting to another.

## 25.6 Tools Devices

The Tools Devices are a small set of utilities which are often useful to "correct" sounds.

### 25.6.1 DC Offset

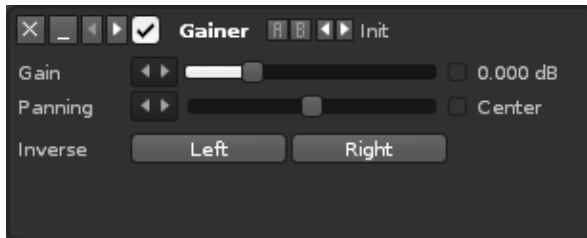
The DC Offset device allows you to shift the signal up and down on the DC line. It is mainly used to correct unwanted DC offsets from signals.



- **DC Offset:** Shift the signal up or down on the DC line. Use the [Scopes](#) to analyse the changes.
- **Auto DC:** When enabled, incorrect DC offsets will be automatically corrected by the device.

### 25.6.2 Gainer

The Gainer simply amplifies and pans a signal, just like the Pre/Post-Mixer devices. The advantage of having a dedicated device for this though, is that you can apply volume and panning changes at any position in the effect chain.



- **Gain:** Sets the volume level.
- **Panning:** Sets the panning of the signal.
- **Inverse:** Allows you to invert the phase of each channel separately. This should mainly be used to correct wrongly inverted phases in recordings. Playing back the same signal inverted on one channel creates a spacial effect when speakers are very near to the ear, like with headphones, but further away this is barely audible.

### 25.6.3 Stereo Expander

The Stereo Expander can strengthen or attenuate the stereo effect of a stereo signal. Surround effects can enrich the stereo field of a mono signal by creating spatial effects. This is more audible on headphones than with speakers.



- **Expand:** Emphasises or attenuates the differences between the left and right channel.
- **Surround:** Adds a spatial stereo effect to the signal. This will phase-shift some frequencies of the signal on a single channel to create a stereo effect.
- **Mono Mix:** When using the Expand option to create a mono signal, you can define which part of the stereo signal will be kept. "L+R" will use the average of both channels.

## 26 Routing Devices

Routing Devices either send audio to another FX Chain/track or receive a signal from an external source.

### 26.1 #Line Input

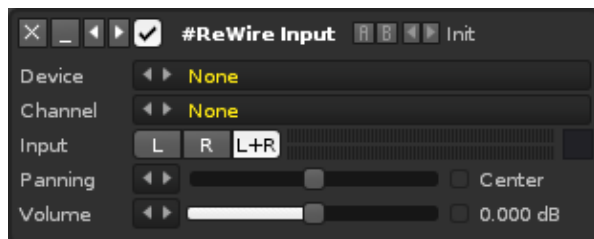
The #Line Input device can route inputs from your soundcard into Renoise, e.g. microphone or line-in jack, allowing you to listen to an instrument directly. You can also route to this device the audio from MIDI devices that have been triggered with Renoise.



- **Channel:** When your soundcard offers more than one input, you can choose a sub-channel here. The recording device is set up in the [Audio Preferences](#).
- **Input:** The channel to be routed to Renoise (left, right or both). The level meter to the right of the buttons displays the current input levels.
- **Latency:** Select from "Live Recording Mode" for guitar, vocals etc. or "MIDI Return Mode" for Renoise-triggered synths routed back into Renoise. This will apply the appropriate amount of latency to the signal (see [Latency handling with External MIDI Instruments](#) for a more in-depth explanation).
- **Panning:** The panning of the input stream.
- **Volume:** The gain of the input stream.

### 26.2 #ReWire Input

When running Renoise as the [ReWire](#) master, you can route other [ReWire](#) slave applications into Renoise by using this device. A ReWire slave can be another audio sequencer or a softsynth like VSampler or Kontakt. Once the device is selected and the application is opened, both program's time-lines will be synchronised. If available, MIDI inputs of ReWire devices will then show up as regular devices in the Renoise [MIDI](#) panel, allowing you to automate and trigger the ReWire applications from Renoise.



- **Device:** The ReWire slave to be loaded into Renoise. After selecting a device, many applications (e.g. Reason) will be auto-started. If this doesn't happen, then just launch the program yourself and it should be automatically set as a slave to Renoise.
- **Channel:** When the device has more than one audio channel available, you can select it here. To route more than one channel from the same slave to Renoise, simply use multiple #ReWire Input devices with the same "Device" setting.
- **Input:** The channel to be routed to Renoise (left, right or both). The level meter to the right of the buttons displays the current input levels.
- **Panning:** The panning of the input stream.
- **Volume:** The gain of the input stream.

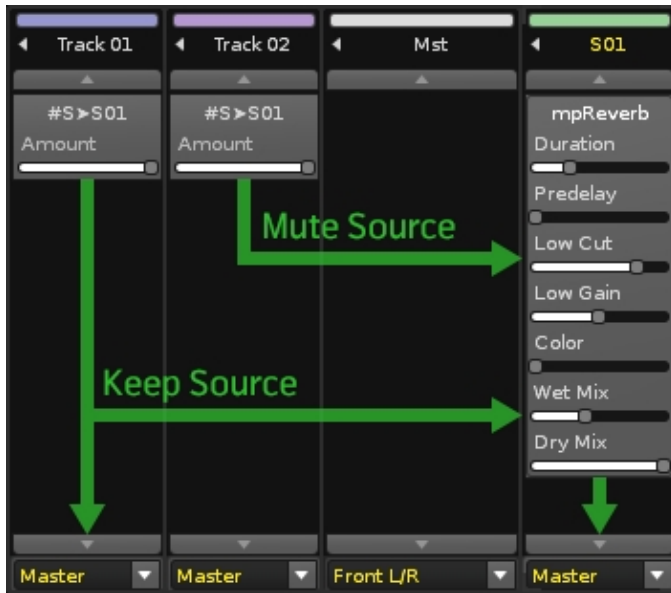
## 26.3 #Send

**Track Effects:** A #Send device routes a track's output to a [Send Track](#) within Renoise. By routing more than one track to the same Send Track, you can apply the same effect chain to the audio from multiple tracks simultaneously. A Send Track can also make use of a #Send device, so there are many possibilities available for complex routing.

**Sample FX:** The device works in the same way, but instead routes the audio to another FX Chain.

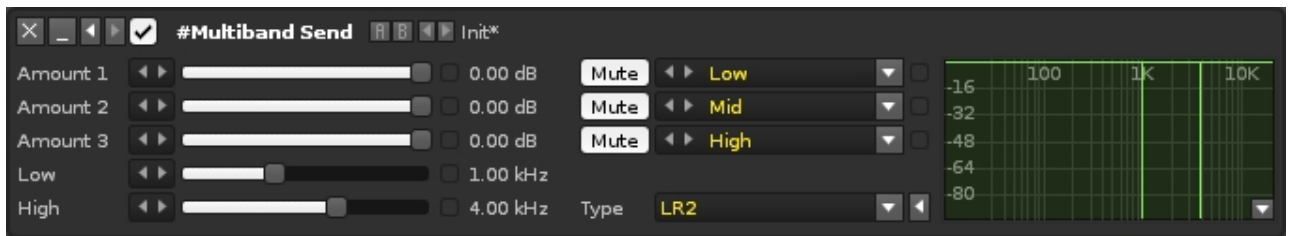


- **Mute/Keep Source:**
  - ♦ **Mute Source:** The signal is muted after it is routed to the Send Track/FX Chain, meaning that the current track becomes silent and effects appearing after the Send device in the chain will have no effect.
  - ♦ **Keep Source:** The signal is routed to the Send Track/FX Chain, but also continues to play on the current track (see illustration below).
- **Amount:** The volume of the signal sent to the Send Track/FX Chain.
- **Panning:** The panning of the signal sent to the Send Track/FX Chain.
- **Receiver:** The Send Track/FX Chain that will receive the audio.

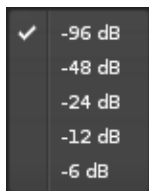


## 26.4 #Multiband Send

A more advanced version of the standard #Send device, this allows you to split an audio signal into three separate frequency bands and individually route them to different [Send Tracks/FX Chains](#). The "Amount" of each band, plus the "Low" and "High" limits can be adjusted in the right-hand graph by left-click dragging the lines.



The volume scale of the graph at the right side of the device can be changed by clicking on the small button in the bottom right corner:



- **Amount 1:** The volume of the lower band signal sent to the Send Track/FX Chain.
- **Amount 2:** The volume of the middle band signal sent to the Send Track/FX Chain.
- **Amount 3:** The volume of the upper band signal sent to the Send Track/FX Chain.
- **Low:** The upper frequency limit of the lower band.
- **High:** The lower frequency limit of the upper band.



Each Amount slider has two additional options to the right of it:

- **Mute/Keep Source:** Determines whether the original signal is muted or continues to play on the current track.
- **Receiver:** The Send Track/FX Chain that will receive the audio from this frequency band.

There are two additional controls under this:

- **Type:** Changes the type of crossover filter used around the Low and High frequency bands. There is a choice of three Linkwitz-Riley filters, a FastFIR and a SteepFIR.
- **Show/Hide Graph:** Shows or hides the graph at the right side of the device.

## 27 Meta Devices

Meta Devices are effects that modulate or control other device parameters instead of manipulating audio. They can even be linked between different tracks/FX Chains, making for complex and powerful routing possibilities.

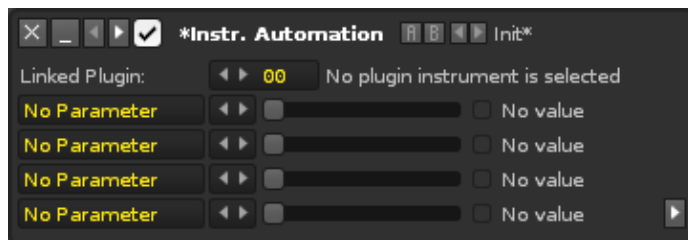
Common usages for Meta Devices are applying modulations with the [\\*LFO device](#) or [\\*Signal Follower](#), controlling plugin instrument automation via the [\\*Instrument Automation device](#), or sending MIDI to plugins using the [\\*Instrument MIDI Control device](#). There are also devices which can use various real-time inputs (notes, velocity, audio output etc.) to guide their behaviour, such as the [\\*Key-Tracker](#) or [\\*Velocity Tracker](#). Finally, there are devices which can also be used to route and control other meta or audio effect parameters via the [\\*XY Pad](#) and [\\*Hydra](#).

### 27.1 Automation Devices

**Track Effects:** These devices can be used to automate [instrument macros](#) or [MIDI](#) and [plugin instruments](#). Unlike other sequencers, instruments in Renoise can be played on any track and with these devices you can also control their automation from any track, including ones that the instrument is not playing on.

**Sample FX:** These devices are unavailable.

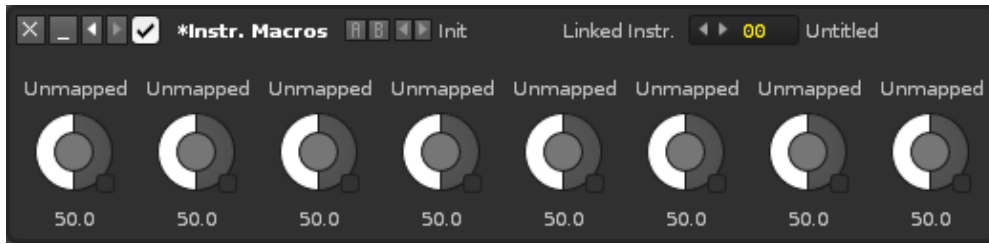
#### 27.1.1 \*Instrument Automation (Automating VST instrument parameters)



The Instrument Automation Device directly broadcasts parameter value changes to [plugin instruments](#) instead of using MIDI. You can manually select which parameter you want to send or automate. The number of available parameters depends on the plugin instrument. Every plugin has a different parameter set, so the parameters which you can control with an automation device depends on those that are available to you.

In the bottom-right corner is a small arrow button, which allows you to expand the device to show more parameters.

#### 27.1.2 \*Instrument Macros



The Instrument [Macro](#) Device provides simple [macro](#) controls for altering the assigned modulation or FX parameters of a linked instrument.

### 27.1.3 \*Instrument MIDI Control



The MIDI Control Device broadcasts [MIDI](#) pitch bend, channel pressure, control change and program change commands to instruments.

By default, up to four parameters can be freely configured per device. If you need more than this, then you can extend the number of parameters up to a total of thirty five by clicking on the small arrow in the lower-right corner.

Every parameter in the device has the following options:

- **"Custom Name"** for CC: Allows you to name your control change parameters, to specify what the CC number does in your plugin or MIDI instrument. CC numbers can be freely assigned in plugins or MIDI instruments. You will find a MIDI implementation chart in your plugin or MIDI synthesizer's reference manual, describing the available parameters.
- **On/Off** for PB or CP. A **number** for CC: Toggles the parameter and specifies the CC number that you want to send.
- **MIDI Message Type**: Can be PB (pitch bend), CP (Channel Pressure), CC (controller change) or Prg (program change).
- **Parameter Value**: The actual value that is sent or automated.

The MIDI channel cannot be configured in this device; it always uses the instrument's channel setting.

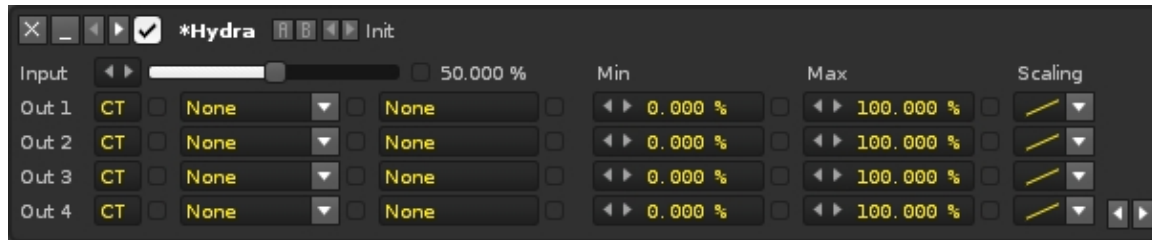
As soon as a song with a MIDI Control Device is loaded, the device will immediately send out all of its enabled parameter messages. Disabling the parameters or setting them to "Off" avoids sending out any messages for parameters you don't want to.

If you want to control a General MIDI instrument quickly (through parameters like volume, panning etc.), you can do so by selecting the "General MIDI" preset of the MIDI Control Device (click on "Init" and change it to "General MIDI").

## 27.2 Mapping Devices

Mapping Devices can be used to route, cross-link or mix automation from different devices.

### 27.2.1 \*Hydra

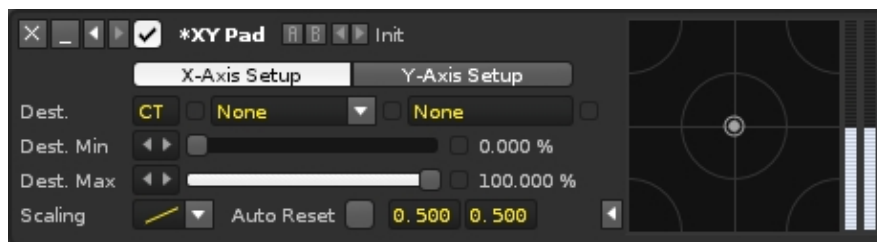


Imagine you would like to control three different sliders in different tracks/FX Chains, using just a single slider. This is possible via the Hydra device, which allows you to map a single parameter to up to nine destination parameters. This opens up a lot of possibilities for cross-routing or macro automation.

The device is named after the Hydra from Greek mythology, a serpent with nine heads.

- **Input:** The parameter to be mapped to the destination parameters. This value can either be changed by moving the slider in the GUI, by [Pattern Effect Commands](#) or via [Graphical Automation](#).
- **Dest:** The parameter which you want to map to. As soon as a valid connection is made, the Min and Max values will appear and the destination becomes active. To invert a mapping (e.g. control volume from 0 dB to -INF dB, instead of -INF dB to 0 dB), simply swap the Min and Max values.
- **Scaling:** The scaling that will be applied from the input to the destination. By default, the input will be mapped linearly, but you can also select from two exponential and two logarithmic scales.
- **Show/Hide Parameters:** The two small arrow buttons in the bottom-right corner allow you to expand/shrink the device to show/hide parameters.

### 27.2.2 \*XY Pad



The XY Pad is a small Hydra Device which only maps two destination parameters, but offers a two dimensional XY pad for the automation. With the pad you can easily control two parameters at once.

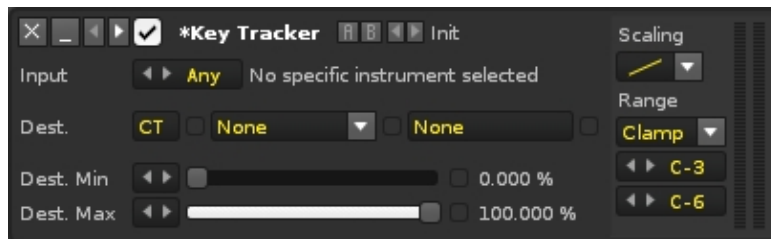
- **X/Y Axis Setup:** Configure the X axis destination parameter or the Y axis destination parameter.
- **Dest & Scaling:** See [\\*Hydra Device](#).
- **Auto Reset:** Toggles whether releasing the mouse button on the XY pad will cause the device to jump back to the specified values, much like an auto-centring joystick.
- **Show/Hide Parameters:** The small arrow button next to the XY pad allows you to show/hide the parameters.

## 27.3 Modulation Devices

Modulation Devices, as the name suggests, modulate other effect parameters. They can be triggered and synced by pattern effect commands, automation, velocity values and even note values and volume envelopes of audio data.

### 27.3.1 \*Key-Tracker

The Key-Tracker device works in much the same way as the [Velocity Tracker](#), except it adjusts a parameter according to note value instead of velocity.



- **Instr.:** The instrument to be used for input. Selecting "All" will affect every instrument played in the current track/FX Chain.
- **Dest.:** Destination track/FX Chain, effect and parameter, allowing you to specify the parameter to be modulated.
- **Dest. Min:** The minimum value to be used from the destination parameter's range.
- **Dest. Max:** The maximum value to be used from the destination parameter's range.
- **Scaling:** The scaling that will be applied from the input to the destination. By default, the input will be mapped linearly, but you can also select from two exponential and two logarithmic scales.
- **Range:** Minimum and maximum note range that will be used for input.

### Range Modes

In addition to applying a scaling mode to the Key-Tracker's range, you can also set up how the range will handle notes:

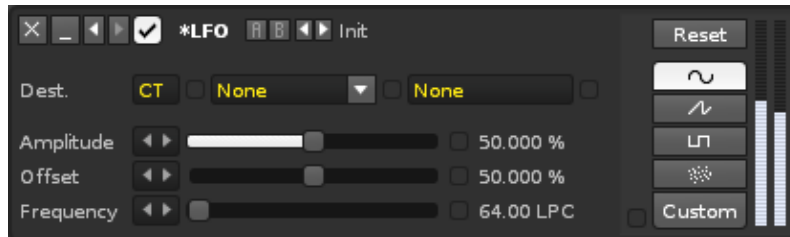
- **Clamp:** Each note within the range will trigger an event, while notes outside of the range will be clamped to the specified limits.

- **Soft:** Notes outside of the range are completely ignored and will not trigger anything.
- **Octave:** Notes played on different octaves will be handled equally, e.g. a C-5 will have the same effect as a C-4 or C-3.

### 27.3.2 \*LFO

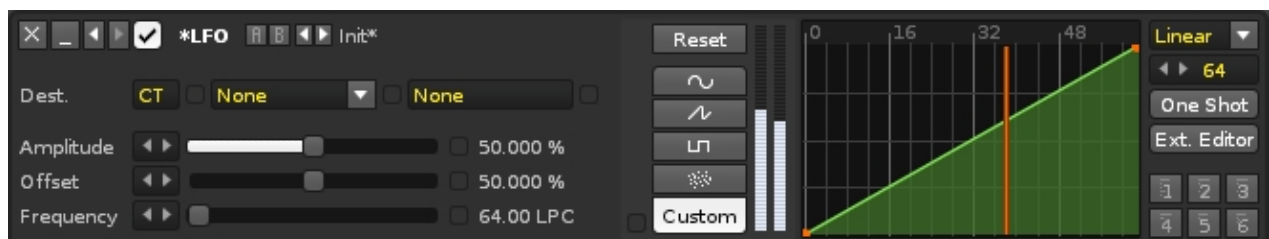
The LFO device allows you to easily create a constantly looping [Automation](#). Any effect parameters can be modulated this way, even those of plugin effects or instruments which cannot normally be modulated within the plugin itself.

LFO Device using a preset waveform:



- **Dest.:** Destination track/FX Chain, effect and parameter, allowing you to specify the parameter to be modulated.
- **Amplitude:** The maximum range that will be applied to the destination parameter. 100% will modulate the full range.
- **Offset:** The modulation offset applied to the destination parameter.
- **Frequency:** The speed of the modulation in Lines per Cycle. For example, an LPC of eight will cycle the LFO once every eight pattern lines.
- **Reset:** Left-clicking resets the LFO's current phase, while right-clicking (track effects only) will automate the reset by placing a command in the current track's effect column. LFOs run constantly, even while the song is stopped. In order to sync the LFO's cycle to the song, you have to automate the "Reset" button. See below for more details.
- **Modulation shape:**
  - ◆ Sine wave oscillator.
  - ◆ Sawtooth oscillator.
  - ◆ Pulse oscillator.
  - ◆ Random oscillator.
  - ◆ Custom allows you to draw a custom waveform. If you set the custom wavelength to match the Frequency value, then one automation grid point becomes equal to one [Pattern Editor](#) line.

LFO Device using a custom waveform:



- **Envelope Type:** Dictates how the envelope's value will change over time.
  - ♦ **Points:** Only changes value when a point is encountered.
  - ♦ **Linear:** Interpolates between points in a linear fashion.
  - ♦ **Curve:** Interpolates with a smooth cubic curve, easing into and out of points.
- **Envelope Size:** Alters the length of the envelope by changing the amount of points.
- **One Shot:** When enabled, the envelope will run only once until a "Reset" command is given.
- **Ext. Editor:** This will open the envelope waveform graphic in the large central section of the Renoise interface, allowing for finer control over details. This also gives you additional tools to use, as well as the "Detach" button in the lower right hand corner. When clicked, this will open the envelope in a completely separate window, which can be moved around and resized. Clicking "Attach" will reattach the window to the main interface. Clicking either the top right "X" or "Ext. Editor" button will remove the larger editor.
- **Presets:** Right-clicking a button will store the current envelope as a preset. Left clicking will recall a previously stored envelope.

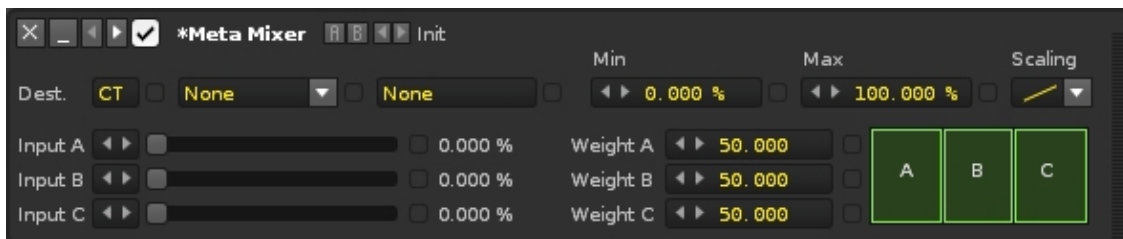
## Syncing LFOs

The "Reset" button can be triggered with the pattern effect command: `x8yy`, where `x` stands for the position of the LFO device in the effect chain (if it's the first device: 1, if the second: 2 etc.) and `yy` is the offset value:

- 00 restarts the LFO from the beginning.
- 40 restarts the LFO from a quarter of the way through of the cycle.
- 80 restarts the LFO from halfway through the cycle.
- C0 restarts the LFO from three quarters of the way through the cycle.

### 27.3.3 \*Meta Mixer

The Meta Mixer accepts input from up to three other Meta Devices and combines them in a customisable way to create its own output value. This final value is then used to automate another device.

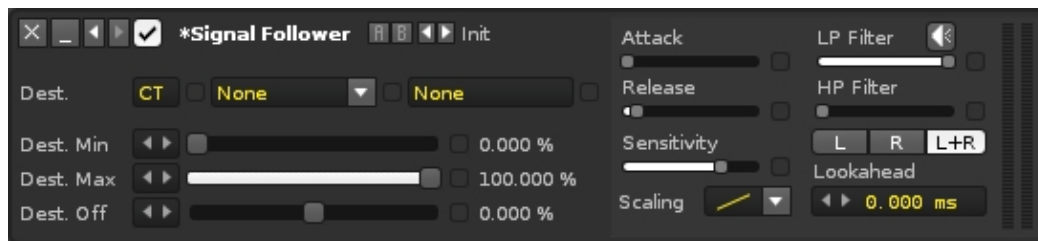


- **Dest.:** Destination track/FX Chain, effect and parameter, allowing you to specify the parameter to be modulated.
- **Min:** The minimum value to be used from the destination parameter's range.
- **Max:** The maximum value to be used from the destination parameter's range.
- **Scaling:** The scaling that will be applied to the final output value. By default, the value will be mapped linearly, but you can also select from two exponential and two logarithmic scales.

- **Input A/B/C:** The value coming from the output of the connected device. If no device is connected, then the value may be manually adjusted.
- **Weight A/B/C:** The *Weight* adjusts the ratio of each input and how much influence they have over the final output value. This ratio is represented on the right-hand graph.

### 27.3.4 \*Signal Follower

The Signal Follower device analyses a track/FX Chain's audio via volume tracking, much like compressors do, and then uses it to automate a destination parameter. To set up a side-chaining effect, place the Signal Follower device in the track/FX Chain you would like to use as a carrier and set the destination parameter as the volume of the Pre-mixer or Gainer in another track/FX Chain.



- **Dest.:** Destination track/FX Chain, effect and parameter, allowing you to specify the parameter to be modulated.
- **Dest. Min:** The minimum value to be used from the destination parameter's range.
- **Dest. Max:** The maximum value to be used from the destination parameter's range.
- **Dest. Off:** Offsets the destination's min and max values equally by the specified amount. This can be especially useful when you want to automate the modulation.
- **Attack:** Attack rate of the volume envelope. Lower values will respond quicker to volume changes in the audio input.
- **Release:** Release rate of the volume envelope. Higher values will cause the volume tracking to react more softly when the input's volume drops.
- **Sensitivity:** The device's sensitivity to the input audio,
- **Scaling:** The scaling that will be applied from the input to the destination. By default, the input will be mapped linearly, but you can also select from two exponential and two logarithmic scales.
- - Listen to the filtered input signal only. Gives you a better idea of how the signal will affect the destination parameter.
- **LP Filter:** Cutoff frequency of a LowPass Filter applied to the input. Used to restrict the frequency range that will trigger the volume envelope.
- **HP Filter:** Cutoff frequency of a HighPass Filter applied to the input. Used to restrict the frequency range that will trigger the volume envelope.
- **L/R/L+R:** Select which channel(s) will be used for the input's volume tracking: left (L), right (R) or both (L+R).
- **Lookahead:** Shifts the envelope back in time by the specified amount, which can be used for snappier attack rates. Activating this will add some latency to the device, so this option will only work if "Automatic Plugin Delay Compensation" is enabled via the "Options" menu.

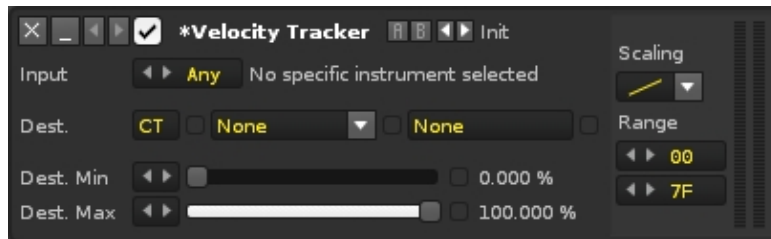


## Cross Track/FX Chain Routing with the Signal Follower

Unlike the other Meta Devices, the Signal Follower cannot affect devices that appear on track/FX Chains to the left of its own host track/FX Chain. It is also unable to control effects on the same track/FX Chain as itself, if that device appears before it in the effect chain. Such track/FX Chains and effects will show in the "*Dest.*" box with the suffix: "(N/A)" (i.e. Not Available). This is necessary to ensure that the Signal Follower does not add latency to the song's signal chain. If you want to affect a track/FX Chain or device that currently shows as "(N/A)", then simply reorder the tracks or reorder your effects so that the Signal Follower appears before (to the left of) the desired parameter.

### 27.3.5 \*Velocity Tracker

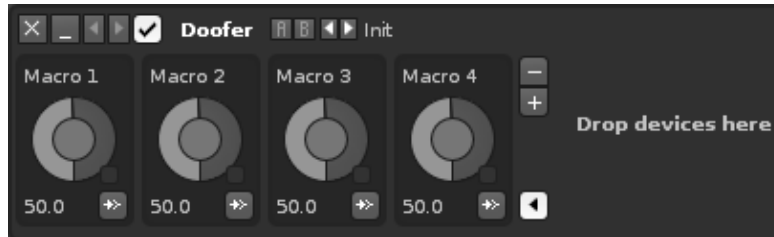
The Velocity Tracker adds another dimension of control by responding to the velocity values of notes. For example, when modulating a Filter's cutoff value with a Velocity device, the sound of an instrument can then be drastically altered by pressing the keys harder or softer.




- **Instr.:** The instrument to be used for input. Selecting "A/" will affect every instrument played in the current track/FX Chain.
- **Dest.:** Destination track/FX Chain, effect and parameter, allowing you to specify the parameter to be modulated.
- **Dest. Min:** The minimum value to be used from the destination parameter's range.
- **Dest. Max:** The maximum value to be used from the destination parameter's range.
- **Scaling:** The scaling that will be applied from the input to the destination. By default, the input will be mapped linearly, but you can also select from two exponential and two logarithmic scales.
- **Range:** Minimum and maximum velocity range that will be used for input.

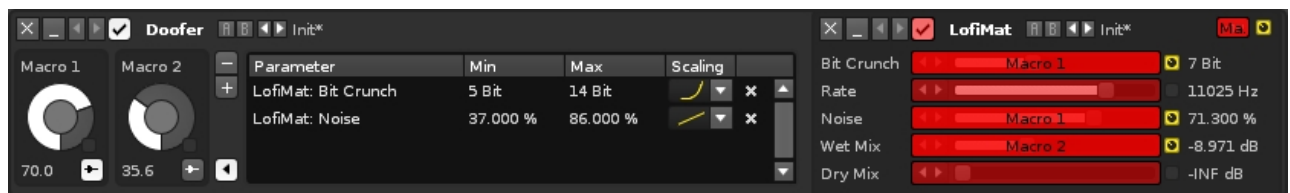
## 28 Doofers




Doofers are special devices that contain their own effect chain within them and provide easy access to their most useful parameters through macros. Automating a macro will then alter the values of all assigned parameters.



To begin using the Doofer, drag and drop another effect into it where stated. You can keep adding as many effects as you like this way.

To rename a macro, just click on its name. To map a macro, press the  button to open the mappings list and reveal any mappable parameters (by default, highlighted in red). Clicking on a parameter will add it to the list and allow you to specify its Min/Max values and Scaling. Pressing the X at the right will delete the mapping.



Once you've finished mapping, you may find it useful to minimize some or all of the devices. If you need to add or remove macros, use the  and  buttons. The  Edit button closes the Doofer's effect chain and prevents new mappings from being created.




Saving a Doofer as a preset will make it and all contained devices into a native effect. It will be added to the effect list under the Doofers section, where you can add it to a track in any song just like you would with any other effect. If you export the Doofer, you can share it with other people (though if it contains non-native plugins they will still need to be installed on the system to work).

## 29 Plugin Effects

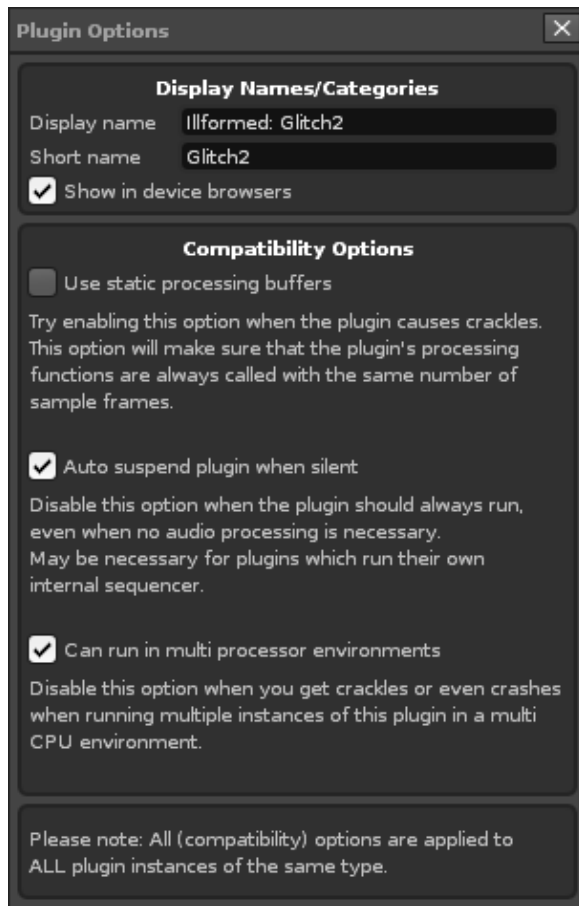
Plugin effects (VSTs on Windows, VSTs or Audio Units on OSX, VSTs, LADSPAs or DSSI on Linux) can be added and used just like any of the other [Effects](#) in Renoise, but you may have to configure them with the Plugin Compatibility Settings. If you can't find your plugins in the Effects list, then please have a look at the [Plugin Preferences](#) section.


### 29.1 Plugin Effect Layout and Options

Besides the usual track effect settings, plugin effects may have a few extra options:

-  - Show/Hide the plugin parameters.
-  - Open the plugin's custom external editor.
-  - Set up compatibility options for the plugin. Hovering the mouse over this button will display some information about the plugin, such as latency, where the file is loaded from etc.

### 29.2 Plugin Compatibility Settings



This dialog will appear after clicking on the  button in the VST Instrument Properties section after a plugin is loaded.

In most cases these options will already have the correct settings, as Renoise comes with a database which sets the defaults for you. If you are experiencing any of the problems described in the dialog, then you might want to try altering the settings.



## 29.3 Sending Notes to Plugin Effects

Most plugin effects do not support notes or other MIDI events. Those that do, use them to control more advanced features, such as vocoders. Other possible uses include preset or parameter switching with notes or sending MIDI CC messages to plugins. This is only possible with Audio Units and VST plugins. Neither LADSPA nor DSSI devices on Linux support this feature.

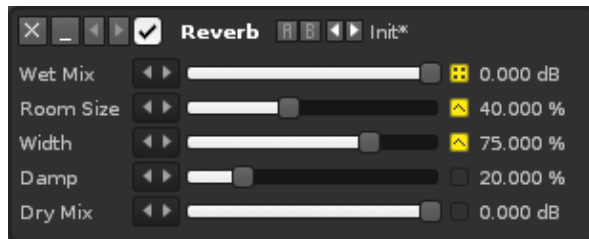
You can also send notes and other MIDI events to effect plugins via FX alias instruments. For more information, take a look at [Plugin Effect Aliases](#).

## 30 Graphical Automation

Automation is the recording and playback of parameter changes over time. A parameter in this case is a [Track Effects](#) parameter, such as a [Filter's](#) Cutoff or Resonance. Every effect device in Renoise can be automated, which can be achieved by two separate methods: graphically or with [Pattern Effect Commands](#). Automation of plug-in instruments and their parameters is also possible by using an [\\*Automation Device](#).

The easiest way to create Automation is to record it. This can be done by clicking, holding and moving a [Track Effect's](#) slider with the right mouse button while playing back the song. Depending on the Automation setting in the [Pattern Editor's](#) Control Bar  / , your changes will then be recorded as either pattern effects or as graphical envelopes.

To quickly create an empty Automation and switch over to the Automation Editor, you can also click on the small rectangle to the right of each parameter. When a parameter is automated, an icon is shown in this rectangle. In the image below, the icons next to the parameters represent automation by (*top to bottom*): pattern commands, envelopes, both.



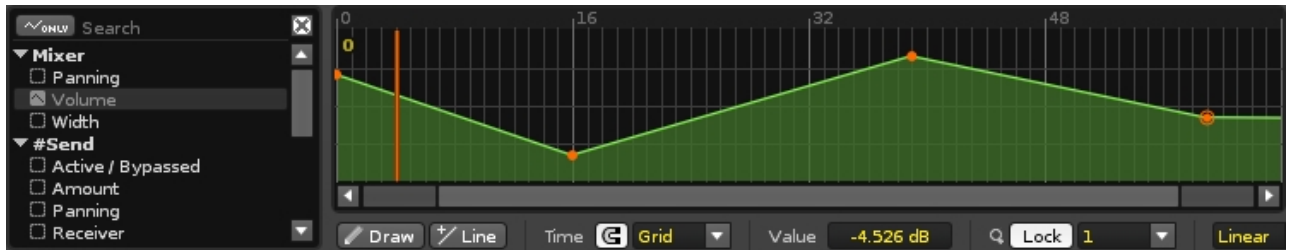
### 30.1 Automation

To open the Automation Editor, select its icon at the lower left corner of the interface:



The Automation Editor consists of two main parts. To the left you will see a list of all available parameters and devices for the the currently active track. To the right of this is the envelope editor, where you will draw and edit the Automation. Beneath the envelope editor are a series of options and buttons used to edit and modify the envelope. You can expand the editor's vertical size by click-dragging the bar just above it.

The envelope grid is labelled along the x-axis at the top with numbers that represent time. The values of the current parameter are represented along the y-axis.



The Automation Editor will follow the progress of a song's playback as it playing. To turn off this behaviour, allowing you to edit any part of the automation while a song is playing, disable Pattern Follow mode in the [Transport Panel](#).

### 30.1.1 Zoom Levels

You can zoom in and out of the Automation envelope by placing the mouse pointer over the grid and scrolling the mouse wheel. The default zoom level is one pattern and so the numbers along the x-axis show the pattern line numbers. Zooming in you can begin to see fractions of lines all the way down to 1/256th, allowing for incredible resolution should you need it. Zooming out you can see individual patterns and eventually the entire song. Pattern numbers are shown in tan envelopes top left corner and the pattern you are currently editing is highlighted, which you can change by clicking on another.

When **Lock** is enabled, the zoom level is shown beneath the grid in the [Automation Toolbar](#) and can be changed there too.

### 30.1.2 Creating Automation

To create an Automation point, select a parameter from the [Automation List](#) and then double-left-click somewhere inside the grid. Alternatively, double-click on the parameter, which will create an envelope and insert a point at line 0 with the parameter's current value.

To create pre-defined patterns, right-click on the Automation grid area and expand the "Process" option. There you can select the options "Create Random Points", "Create Linear Curve", "Create Exponential Curve" and "Create Sine Curve". See also [editing with the mouse](#).

When an Automation already exists for the current pattern, that parameter's name will be highlighted in the [Automation List](#).

### 30.1.3 Editing Automation Envelopes

Once you've created an Automation, it can be edited with the mouse or keyboard in various ways:

### 30.1.3.1 Editing with the Mouse

Double-clicking in the envelope where no point is set will create a new point. Double-clicking on an existing point will remove it. If you click and hold on an existing point then you can drag it around and set a new value. You can also use the Draw tool located at the bottom left of the [toolbar](#) to manually draw in a waveform. If the Snap mode is disabled, or is enabled and set to "Grid", then the waveform will be drawn at the resolution of the current zoom level.

- "Left Shift" + Moving points will remove all points that the mouse pointer touches.
- "Left Control" + Dragging a point will fine-tune its value. "Left Control" + Hovering over a point will display the point's value.

Left-click and dragging across the grid will create a highlighted area. Any points within this area will be selected and can be adjusted all at once. You can also use the right-click menu on the grid to copy, paste, paste continuously to the end of the envelope and insert (*moves the existing waveform to the right*) selected areas.

### 30.1.3.2 Right-click Context Menu

- **Cut:** Cut the points contained within the selection area.
- **Copy:** Copy the points contained within the selection area.
- **Paste:** Paste the previously copied points into the envelope from the cursor position (left-clicking in the envelope will set the cursor position for pasting operations).
- **Paste Continuously:** Paste the previously copied points into the envelope from the cursor position and repeat until the end of the envelope.
- **Insert Paste:** Paste the previously copied points into the envelope from the cursor position and move the rest of the envelope to right. Note that any points shifted outside of the current pattern will be lost.
- **Cut Selected Time:** Cut the selected area.
- **Delete Envelope:** Delete the whole envelope.
- **Process:** Applies to the entire envelope or the selected area if there is one.
  - ◆ **Create Random Points:** Creates points of random value.
  - ◆ **Create Exponential Curve:** Creates an exponential curve rising from 0 to 1. Use the flip buttons to achieve other curves.
  - ◆ **Create Linear Curve:** Creates a linear curve rising from 0 to 1.
  - ◆ **Create Sine Curve:** Creates a single cycle sine curve.

### 30.1.3.3 Editing with the Keyboard

If you middle-click on the envelope, or right-click and select "(Set Keyboard Focus Here)", you can control the envelope with keyboard shortcuts:

- To move the selection cursor in the envelope, use the left/right arrow keys or the "Home" and "End" keys.
- To create a new point or remove an existing one, hit the "Enter" key.

- To enter an exact value for a point in the numerical edit field, press "*Left Shift + Enter*" and type in the value.
- To select parts of the envelope, hold down the "*Left Shift*" key while moving the cursor.
  - ◆ To copy the selection press "*Left Control + C*".
  - ◆ To paste the copied selection, move the cursor to the desired position and press "*Left Control + V*", or "*Left Control + P*" to paste it continuously until the end of the envelope.

#### 30.1.3.4 Tip For Smooth Pattern Transitions

To maintain a smooth envelope between two patterns, simply create a point in the second pattern's envelope and move it to the beginning of the pattern. Now, as you move the point up/down, it will automatically snap to the waveform of the previous pattern.

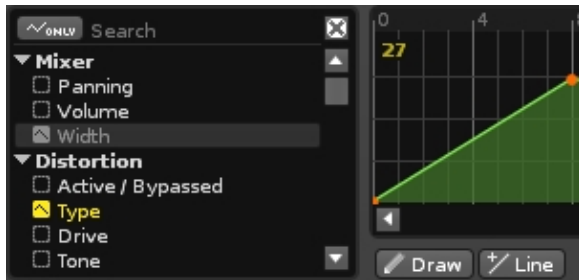
### 30.1.4 Automation Tools



- **Draw:** Draw mode allows you to draw points on the envelope with the mouse.
- **Line:** The Line tool allows you to create a linear ramp across multiple patterns.
- **Snap to Grid:** Will snap the horizontal creation and movement of points to the current resolution of the grid, every pattern line or every beat.
- **Value:** The value of the selected point. Left-click to enter a new value.
- **Snap to Value:** Lock and choose the zoom factor of the envelope view.
- **Envelope Type:** Dictates how the envelope's value will change over time.
  - ◆ **Points:** Only changes value when a point is encountered.
  - ◆ **Linear:** Interpolates between points in a linear fashion.
  - ◆ **Curve:** Interpolates with a smooth cubic curve, easing into and out of points.
- - Cut the whole envelope.
- - Copy the whole envelope.
- - Paste the whole envelope.
- - Move the envelope or selected points to the left/right. Will wrap around the edges.
- - Flip the envelope or selected points horizontally/vertically.
- - Humanizes the envelope or selected area by randomly adding or subtracting a small amount to the point values.

### 30.1.5 Automation List





The list indicates which parameters are automated with a small icon next to their name. Left-clicking on a parameter will select it, while double-clicking on a parameter which has no Automation will create a new blank envelope.

Right-clicking on a name allows you to delete the Automation for the current pattern or the whole song. This also applies when right-clicking on a device name, which will delete the Automation for all of the effect's parameters.

The search field at the top of the list allows you to quickly find a parameter or effect. Enabling the "*Automated Only*" button will only show effects in the list which are already automated.

## 30.2 Master Track Extras

In addition to the usual effect parameters, the [Master Track](#) allows you to control three additional native Renoise parameters via Automation: the song's [Beats Per Minute](#), [Lines Per Beat](#) and [Ticks Per Line](#) settings.

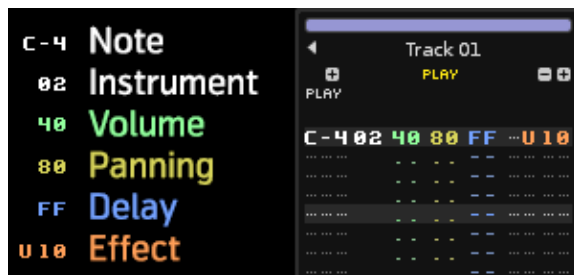
# 31 Pattern Effect Commands

[Track Effect](#) parameters can be automated with either [Graphical Automation](#) or pattern effects. Pattern effects are numerical control codes used in the [Pattern Editor](#) that allow you to change the value of parameters.

Besides controlling Track Effects, the pattern effect commands also allow various manipulations of sample instruments. These can only be done via pattern effects and are one of the things that differentiates Renoise from other sequencers. Examples include: starting to play a sample from the middle (0S effect), then playing it in reverse (0B effect), panning it fully to the left (pan column), pitching it up a bit (0U effect) and finally gliding it down one octave (0G effect). All this can be expressed precisely and easily with the [Pattern Editor](#).

## 31.1 Pattern Effect Columns

Next to the note column(s) are the columns which control volume, panning, delay and pattern effect commands:



By default, the panning and delay columns are not visible. To show/hide them you can use the keyboard shortcuts, "*Left Control/Command + Left Shift + V (Volume), P (Panning), D (Delay)*", or you can press the corresponding buttons in the [Pattern Editor's Control Panel](#), located at the bottom of the editor.

### 31.1.1 Ticks and Values

To understand how the sample-based effects work, you should understand how Renoise interprets them.

1. Patterns are divided into lines where you can place effects and notes. The [Lines Per Beat](#) setting in the Transport Panel defines how many lines make up a musical beat.
2. Ticks divide each line into a smaller fraction. This tick fraction is configurable ([Ticks Per Line](#) in the Song Settings), but is a 12th of a line by default.

Many sample commands make use of these ticks, while Automation playback and interpolation are also calculated at the tick rate.

### 31.1.2 Ticks vs. Note Delays


As noted above, Renoise also has a note delay column, which lets you delay the note to the left of it on the same line. These delays do not use ticks, but instead always divide a line into 256 slices.

### 31.1.3 Recording and Editing Pattern Effects

Values are entered using the row of numbers above the letters on the keyboard, not the numberpad, which is reserved for [quickly switching between instruments in the Instrument Selector](#). Entering a value will place it at that exact digit in the column. For example, if you are at the first digit in the Volume column and press '8', the value will become '80'. If you want the value to be '08', then move the cursor over to the second digit using the arrow keys and press '8' there.

If you are not yet familiar with the Pattern Editor, then please have a look at the [Recording and Editing Notes](#) section of this manual, which provides you with a basic understanding of the pattern editing concepts of Renoise.

## 31.2 Effect Listing

- **xx** and **xy** are place-holders whose meanings are explained in the effect command descriptions. They should be replaced with values to create an effect. **xx** means both digits are one whole value. **xy** means that the **x** and **y** are separate values.
- Effect Column commands are applied to all of the notes in the track to the left of them. If you wish to create effects for specific notes in a track only, use the extra commands available for the volume and panning columns.
- All values noted below are Hexadecimal.
- Similar effect styles are highlighted with the same colour in the Pattern Editor (e.g. pitch up, down and glide are all red, though the exact colour depends on the Theme).
- When typing commands into the Pattern Editor, Renoise will show a small summary about them in the [Lower Status Bar](#).
- Slide commands (pitch/volume/glide) continue to slide up or down by the last valid value if no value (00) is entered. This way you can quickly enter a series of slide commands without having to repeat the same value again and again.
- You can use the small FX drop down menu at the bottom of the Pattern Editor as quick reference: 

## 31.2.1 Effect Column

### 31.2.1.1 Sample Commands

Most of the effects listed here only apply to sample-based instruments and will have no effect on MIDI or plugin instruments, as Renoise does not have full control over properties like playback directions, pitch glides etc. However, the delay (0Q), channel volume (0M), retrigger (0R) and maYbe (0Y) commands will work with MIDI and plugin instruments.

- **0Axy** - Set arpeggio, x/y = first/second note offset in semitones. Using 0 for x or y will use the original note.
- **0Uxx** - Slide pitch up by xx 1/16ths of a semitone (01 is 1/16th of a semitone, 08 is half a semitone, 10 is a whole semitone).
- **0Dxx** - Slide pitch down by xx 1/16ths of a semitone (01 is 1/16th of a semitone, 08 is half a semitone, 10 is a whole semitone).
- **0Gxx** - Glide towards given note by xx 1/16ths of a semitone (01 is 1/16th of a semitone, 08 is half a semitone, 10 is a whole semitone). A value of FF will make the slide instant.
- **0lxx** - Fade volume in by xx volume units (0l01 inserted 256 times will slide from 0 to full volume, 0l7F inserted twice will do the same much faster).
- **0Oxx** - Fade volume out by xx volume units.
- **0Cxy** - Cut volume to x after y ticks (x = volume factor, 0 = 0%, F = 100%).
- **0Qxx** - Delay note by xx ticks (00 - TPL). Also Qx in Volume and Panning columns.
- **0Mxx** - Set channel volume level, 00 = -60db, FF = +3db.
- **0Sxx** - Trigger sample slice number xx or offset xx.
- **0Bxx** - Play sample backwards (xx = 00) or forwards (xx = 01).
- **0Rxy** - Retrigger note every y ticks with volume x, where x represents:
  - ◆ **0** No volume change
  - ◆ **1** -1
  - ◆ **2** -2
  - ◆ **3** -4
  - ◆ **4** -8
  - ◆ **5** -16
  - ◆ **6** \*2/3
  - ◆ **7** \*1/2
  - ◆ **8** No change
  - ◆ **9** +1
  - ◆ **A** +2
  - ◆ **B** +4
  - ◆ **C** +8
  - ◆ **D** +16
  - ◆ **E** \*3/2
  - ◆ **F** \*2
- **0Yxx** - MaYbe trigger line with probability xx. 00 = mutually exclusive mode (will trigger only one note on this line, where the chance of triggering is inserted into the [volume or panning column](#) using Yx).
- **0Vxy** - Set vibrato (regular pitch variation), x = speed, y = depth.
- **0Txy** - Set tremolo (regular volume variation), x = speed, y = depth.

- **0Nxy** - Set auto pan (regular pan variation), x = speed, y = depth.
- **0Exx** - Set active [sample modulation envelopes' position](#) to offset xx.
- **0Lxx** - Set [track pre-mixer's](#) volume level, 00 = -INF, FF = +3db.
- **0Pxx** - Set [track pre-mixer's](#) pan, 00 = full left, 80 = center, FF = full right.
- **0Wxx** - Set surround width, 00 = min, FF = max.
- **0Jxx** - Set [track's output routing](#) to channel xx, 01 upwards = hardware channels, FF downwards = parent groups (00 is the master track, 01 is the first soundcard output channel and FF is the closest parent group track).
- **0Xxx** - Stop all notes and FX (xx = 00), or only effect xx (xx > 00).

## 31.2.1.2 Track Effect Commands

You can also change any [Track Effect](#) parameters with pattern effect commands. The sample commands all start with 0 (e.g. 0G for glide), but Track Effects also make use the first number to specify which effect in the chain is being altered:

xyzz -> x is the the xth effect in the chain, y is the yth parameter in the device. For example: let's say you have a Filter as the first effect in the chain, then 13FF will set the Filter's Resonance to the maximum value (1 = Filter device (the first effect), 3 = Resonance (the third parameter), FF = maximum value).

You can also enable and disable effects with [Track Effect](#) commands:

- **x000** - Turn effect x off.
- **x001** - Turn effect x on.

Moving a slider in the [Track Effects](#) panel will also show the pattern effect code in the [Lower Status Bar](#). Right-clicking a slider will automatically record the parameter changes into the Effect Column when [pattern Automation recording mode](#) is set to Pattern Effects.

## 31.2.1.3 Global Commands

- **ZTxx** - Set [tempo \(BPM\)](#) (20 - FF, 00 = stop song)
- **ZLxx** - Set [Lines Per Beat \(LPB\)](#) (01 - FF, 00 = stop song).
- **ZKxx** - Set [Ticks Per Line \(TPL\)](#) (01 - 10).
- **ZGxx** - Toggle [song Groove](#) on/off (00 = turn off, 01 or higher = turn on).
- **ZBxx** - Break pattern. The current pattern finishes immediately and jumps to next pattern at line xx (hex).
- **ZDxx** - Delay (pause) pattern playback by xx lines.

## 31.2.2 Volume Column

- **00 - 7F** - Set note volume (velocity) of triggering note or set aftertouch value on current playing note (note value should be empty!) in current column (polyphonic after-touch).
- **Ix** - Volume fade in in the current note column, with step x \* 10 (91 = 0I10 in effect column, 92 = 0I20 in effect column etc.)
- **Ox** - Volume fade out in the current note column, with step x \* 10 (A1 = 0O10, A2 = 0O20 etc.)

### 31.2.3 Panning Column

- **00 - 80** - Set panning of current note column: 00 = full left, 40 = center, 80 = full right.
- **Jx** - Panning slide left with step x (0 - F).
- **Kx** - Panning slide right with step x (0 - F).

### 31.2.4 Volume or Panning Column

- **Ux** - Slide pitch up by x semitones.
- **Dx** - Slide pitch down by x semitones.
- **Gx** - Glide towards given note by x semitones. A value of F will make the slide instant.
- **Cx** - Cut the note after x ticks (0 - F).
- **Qx** - Delay a note by x ticks (0 - F).
- **Bx** - Play sample in the current note column backwards (0 is backwards, 1 is forwards again).
- **Rx** - Retrigger a note every x ticks (0 - F).
- **Yx** - MaYbe trigger note with probability x.

**Note:** The panning/volume **Rx** version of retrigger does not restart the sample from the beginning, while the **ORxy** effect command does. This behaviour is intended to give you a choice of two different retrigger modes.

### 31.2.5 Delay Column

The delay column can only be used to delay note or [Note OFF](#) values. For example:

- **40** - 25% delay
- **80** - 50% delay
- **C0** - 75% delay

### 31.2.6 MIDI Commands

With **Mx** in the panning column and a valid instrument number next to it, you can also send MIDI commands via pattern effects:

--- 0A M0 017F -> will send a control change to the MIDI or plug-in instrument 0A, with control change number 01 and a value of 7F

- **M0** - Controller change message (xx = controller number, yy = controller value).
- **M1** - Pitch bend (xx main value amount, yy = fine value amount).
- **M2** - Program change (yy = program number from 00 - 7F).
- **M3** - Channel pressure (monophonic after-touch) (yy = pressure amount).



**Note:** Insert the **Mx** MIDI commands in the panning column of the right-most note column, next to the effect column. MIDI commands show a different syntax colour than when they function as panning values and a 0000 value is automatically filled in on the effect column.

Take care that you also add the instrument number, so that Renoise knows which MIDI instrument it should use for the command.

MIDI and plugin instruments can also be Automated through \*MIDI Control Devices or \*Automation Devices.

## 31.3 Entering Multiple Digit Values with the Computer Keyboard

By default, when entering values with the computer keyboard, Renoise will place a single digit value and immediately move down within the Pattern Editor by the number of lines specified by the [Edit Step](#). If you want to enter multiple digit values in a single line without this occurring between each value entry, this can be achieved by holding down "*Left Shift*" while entering the values. This works individually with the Volume, Panning, Delay and each of the Effect columns.

## 31.4 Effect Examples

Some very basic sample command examples to get started:

### 31.4.1 Pitch Slide

|    | 1     | 2     |
|----|-------|-------|
| 00 | C-400 | C-400 |
| 01 |       |       |
| 02 |       |       |
| 03 |       |       |
| 04 |       | A-400 |
| 05 |       | G20   |
| 06 |       | G00   |
| 07 |       | G00   |
| 08 | OFF   | G00   |
| 09 |       | G00   |
| 10 |       | G00   |
| 11 |       | G00   |
| 12 |       | OFF   |

### 1. Pitch slide up [0Uxx]: [Sound file \(mp3\)](#)

From line 00 to 07, the sample is pitched up at a constant rate of 28 (hexadecimal notation), where 00 means "repeat the previous value".

### 2. Glide to note [0Gxx]: [Sound file \(mp3\)](#)

The first note is played at C-4. At line 04 the pitch rises a constant rate of 20 (hexadecimal notation) towards A-4. Once the glide reaches the desired pitch of A-4, subsequent 0G commands are ignored.

## 31.4.2 Breakbeat Tricks

|    | 1     | 2     | 3     | 4      |
|----|-------|-------|-------|--------|
| 00 | C-400 | C-400 | C-400 | C-400  |
| 01 |       |       |       |        |
| 02 |       |       |       |        |
| 03 |       |       |       |        |
| 04 |       | C-400 | S80   | B0 S80 |
| 05 |       |       | R4    |        |
| 06 |       |       | R4    |        |
| 07 |       |       | R4    |        |
| 08 |       | C-400 | S40   |        |
| 09 |       |       |       |        |
| 10 |       |       |       | B1     |
| 11 |       |       |       |        |
| 12 |       |       |       |        |
| 13 |       |       |       |        |
| 14 |       |       |       |        |
| 15 |       |       |       |        |
| 16 | OFF   | OFF   | OFF   | OFF    |

### 1. Original Loop: [Sound file \(mp3\)](#)

### 2. Sample offset [0Sxx]: [Sound file \(mp3\)](#)

The offset command works by splitting a sample into 256 equal parts. The larger the sample, the more inaccurate this command will be. As the range of values is 00 to FF, 0S80 plays the sample from halfway through and 0S40 plays the sample from one quarter of the way through.

### 3. Retrigger note [Rx] : [Sound file \(mp3\)](#)



This effect replays the sample very quickly at its current position in the waveform playback. x sets how many ticks to count before retriggering the sample again. By default, there are 12 ticks per line. Setting R4 will retrigger a sample 3 times per line ( $12 \div 4 = 3$ ).

## 4. Reverse sample [B0, B1]: [Sound file \(mp3\)](#)

B0 plays the sample backwards from that point. B1 resumes normal playback.

## 31.4.3 Programming Delays

Here are two techniques for programming a delay:



**1. Delay note [Qx]:** Qx delays by ticks. A line is divided into equal ticks, the default value being 12. By using the Q8 command in the volume or panning column, the note is delayed by 8 ticks.

**2. Using the Delay Column:** The Delay Column divides a line into 256 equal parts and so is much more precise than ticks. Use this column to get more accuracy.

## 31.5 Pattern Effects Quick Reference Card

If you can't remember all those commands, here is a small reference card which can be printed out and put next to your monitor.

- [Pattern Effects Reference Card](#)

## 32 Mixer

If you are familiar with hardware mixer consoles, the Mixer in Renoise will look familiar to you. It provides a quick overview of all available tracks, [Track Effects](#) and output levels. This is especially useful in the last production stage, when you are finished with the main song structure and need to concentrate on polishing the final mix. The Mixer also allows you to display a subset of track effect parameters which you can customise. Using this, you can prepare your songs for live performance by showing only the parameters you would like to concentrate on adjusting.



### 32.1 Pre/Post Volume and Panning Concept

Volume and panning controls in the Mixer can be set up to show two different levels:










- **Pre:** Volume and panning levels which are applied after instrument playback, but before [Track Effects](#) are applied.
- **Post:** Volume and panning levels which are applied after all [Track Effects](#) are applied. This is the final sound leaving the track and being fed into the Master Track.

The idea behind the Pre/Post mix separation is that you should use the Pre levels while composing the song. Automation, like the fade-in of tracks, should be applied here or

with a Gainer Device. Post volume and panning levels cannot be automated and should only be used in the final mixing stage to balance the mix.

## 32.2 Customizing the Mixer Layout

At the right side of the Mixer you will notice a set of buttons that allow you to show/hide to some of the components:

-  - Parameter labels above effect sliders.
-  - Mute and solo track controls.
-  - Panning sliders.
-  - VU meters and main volume faders.
-  - Volume edit box.
-  - Custom track delays. Entering a negative value will play the track before others, while a positive value will play it after. This is only available for [Sequencer Tracks](#). This can be useful to compensate small latency problems with MIDI and plugin based tracks.
-  - Audio routing control. Audio routing defines where the track's final output will be send to. Selecting "Master" will send the output to the Master Track and through its effect chain. Selecting a dedicated output of your soundcard will bypass the Master Track, allowing you to separate and mix Renoise tracks with an external mixer console. This is only possible if your soundcard allows the use of multiple channels. To make use of this feature on Windows, you have to use ASIO; on Linux, Jack Audio.

Track colours can be shown or hidden in the Mixer as well. Right-click anywhere in the Mixer effect chain section and select, "*Show Track Colors*".

## 32.3 Working with Effects and Chains

[Track Effects](#) devices are shown in the Mixer rack above the track levels. Right-clicking an effect brings up a set of options for both that specific effect and the whole chain. To show/hide particular effect parameters, right-click on the effect and choose them from the "*Show Sliders*" menu option.

|                      |             |
|----------------------|-------------|
| Cut                  | CTRL X      |
| Copy                 | CTRL C      |
| Paste                | CTRL V      |
| Delete               | Del         |
| Rename               | CTRL R      |
| Bypass/Activate      | Return      |
| Open External Editor | CTRL Return |
| Show Sliders         | ▶           |
| Insert Track         | CTRL T      |
| Delete Track         | CTRL ⇧ T    |
| Insert Group         | CTRL G      |
| Delete Group         | CTRL ⇧ G    |
| Device               | ▶           |
| Device Chain         | ▶           |
| Track                | ▶           |
| ✓ Show Track Colors  |             |

## 32.4 Send Devices/Tracks and the Post Mixer

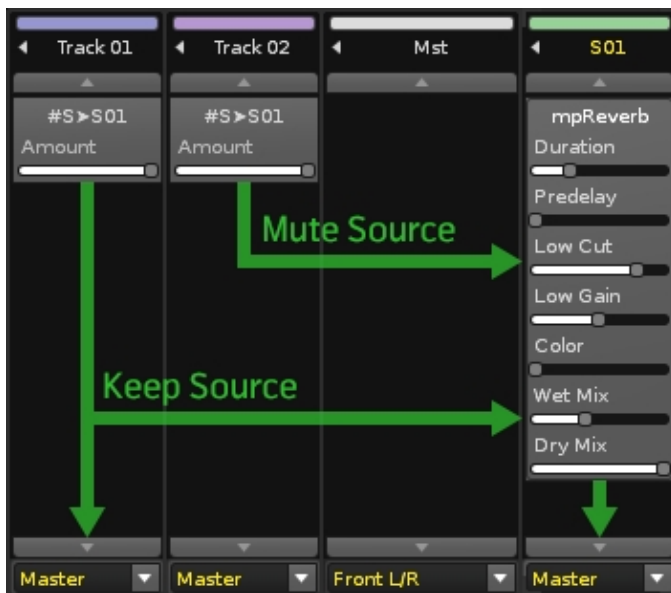
To route a track into a [Send Track](#), a `#Send` device is inserted into the original track. For a full explanation of how this works, see [#Send device](#) in the Routing Devices section of the manual. In the Mixer, the `#Send` device's slider controls the amount of audio that is sent to the send track.

When `#Send` devices use the "*Mute Source*" option, the post volume and panning levels will have no effect. That's because the signal is muted before it reaches post-mixer device. To change the track's levels in this case, you either have to have to adjust the `#Send` device's sliders or use the receiving Send Track's volume and panning levels.

To visualize this in the mixer, track levels which do not reach the Post volume and panning are shown by a different colour (white by default instead of green, but this may vary depending on the Theme):



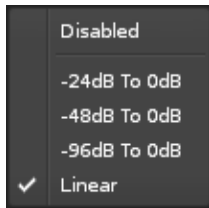
(Track with a Send Device using Mute Source)



(Send Device Routing in the Mixer)

## 32.5 Adjusting Level Meters

To disable or change the scaling for all meters, right-click on any level meter in the mixer and choose from the list. This also works for the master level meter at the top of the Renoise interface.



## 32.6 Controlling the Mixer with a MIDI Controller

You can attach MIDI controllers to the Pre/Post volume and mute/solo controls, allowing you to comfortably mix a song using the controller. To do so, select "*View -> Midi Mapping...*" from the main menu or click on the "*MIDI Map*" button at the top of the Renoise interface, next to the main VU meter.

Have a look at the [MIDI Mapping](#) section of the manual for a more detailed description of the available features.

## 32.7 Drag and Drop, Copy and Paste

To copy an effect from one track to the another, simply click and drag it to a new place. Holding "*Left Control*" while dropping the effect will create a copy of the device. The standard cut/copy/paste commands also work in the Mixer ("*Left Control + X*", "*Left Control + C*", "*Left Control + V*").

Note: Copying or moving an effect from one track to another will not move device's Automation(s) as well. When moving a device, the original Automation(s) will be removed.

## 33 Render Song to Audio File

To create an audio file from your song you have to render it. Rendering is only enabled in the registered version of Renoise. As well as exporting the whole song as a .wav, you can also save and reuse parts of a song. By rendering each track into a separate file you can even post-process your tracks in other multi-track audio editors.

Renoise cannot directly render .mp3 files, only uncompressed .wav files. Those .wav files can then be easily converted to .mp3 files with free external applications.

### 33.1 Opening the Render Dialog

You can open the Render dialog by either hitting the "Render" button in the [Disk Browser](#) with the "Song" category selected, or by using the main menu option: "File -> Render Song To Disk...". To quickly render, resample and reuse parts of the song in the Pattern Editor, see Render & Resample Parts of the Song.



#### 33.1.1 Part to Render

This specifies which part of the song you want to render. Note that muted tracks and columns are never rendered by Renoise, making it easy to exclude tracks you don't want to export.

- **Entire Song:** Renders the entire song.
- **Selection in Sequence:** Render only a selected pattern range from the [Pattern Sequencer](#). You can also select this range in the [Pattern Sequencer](#) directly by using the Pattern Sequencer's context menu: "*Render Sequence Selection To Sample...*".
- **Selection in Pattern:** Renders only the area selected in the current pattern (see Render & Resample Parts of the Song). This can also be quickly done using the Pattern Editor's context menu: "*Render Selection To Sample...*".

### 33.1.2 Destination

This determines where the .wav file will be saved and under which name. Hitting the "Browse" button will prompt you to select the folder where you would like the rendered files to be saved. Enter the name of the file in the text field under the "Browse" button. The destination file(s) will always be standard .wav audio files.

- **Use automatic file naming:** Will name the saved render(s) automatically. Clicking the right-hand arrow will open a menu that shows the various commands which can be inserted into the naming scheme. Clicking on an option will place that text at the end of the existing command.
- **Reveal in Explorer when rendering finished:** Will automatically open the Destination folder upon completion of rendering.

### 33.1.3 Render Mode

Rendering Offline is faster, more accurate and allows more options. Rendering in real-time will simply play the song and record the output, which also allows the recording of Line-In Devices and MIDI instruments that play in real-time. Some plug-in instruments and effects may render incorrectly when run faster than real-time, so use this mode for those occasions.

### 33.1.4 Render Options

- **Priority:** Select the priority of the rendering process. "Low" will leave plenty of CPU power over for other tasks, while "High" will use as much CPU power as possible.
- **Interpolation:** Choose the re-sampling quality that will be used in the rendering process. "Default" is what you've heard during composing and playback. "Precise" gives the best possible sample quality by running [Cubic and Sinc interpolated samples](#) in more precise, non lookup table based HQ modes, which can remove a bit of interpolation noise (mostly inaudible, below 96dB) without changing the character of the sound.
- **Sample Rate:** Select a sample-rate for the rendering process. By default, the currently active sample-rate is selected and it is recommended to use this. Many DSPs may sound slightly different at other rates, so changing the rate could result in a slightly different sound from what you expect. Some external VST or AU plugins don't even support sample-rate changes. If you change the rate to something other than the default, then listen back to the rendered result to



ensure that everything is correct. Alternatively, play back your song in Renoise using the different rate first and fine-tune the song when needed. This can be done by changing the sample-rate in the ["Edit -> Preferences -> Audio"](#) tab.

- **Bit Depth** - Choose the bit-depth of the resulting .wav file. Renoise internally renders in 32-bit float, the highest quality, so you should use this format when you plan to reuse the rendered song in other applications. CDs use 16-bit with a sample-rate of 44,100 kHz, so you can choose to render in this format for burning songs directly to CD (bear in mind the potential issues with changing your default sample-rate as noted above, though).
- **Save each track into a separate file:** When enabled, the song will not be rendered into a single file, but instead will create one file per track. This can be useful if you want to export loops (when used in conjunction with ["Selection in Sequence/Pattern"](#)) or to post-process the tracks in an external multi-track audio editor. Note that completely silent tracks will be deleted at the end of the rendering process.
- **Save each pattern into a separate file:** When enabled, this creates new files for every single position in the [Pattern Sequencer](#) (not just one copy of each numbered pattern). This is extremely useful to quickly cut and export your song as a set of loops. Note that completely silent patterns will be deleted at the end of the rendering process.

### 33.1.5 Hidden Rendering Feature

- **Sequence marker positions:** When rendering your song, all of the Renoise [sequence positions](#) are written into the .wav file, giving you markers to easily cut up your work in external editors. The markers may also be useful to developers who can use them with their own internal play routines to trigger playback from any sequence position.

## 34 Quickly Rendering Parts of the Song

By using the [Render Dialog](#) in Renoise, you can already quickly and comfortably render the whole song as an audio file, or render only small parts of it in order to reuse them. This technique is called re-sampling or freezing, and can be used to either generate new samples and instruments, or to render down parts of the song which require a lot of CPU power.

To avoid opening up the render dialog, then rendering and reloading the wav file again and again, Renoise offers a shortcut which automates all of this for you. To do this, select one or more lines within the [Pattern Editor](#), then right click on the [Pattern Editor](#) and select "*Render To Sample*" from the context menu. Alternatively, you can use the shortcut "*Left Control/Command + Alt + Shift + R*". The newly created sample will be loaded into the next free instrument slot.

If you want to create sample-based instruments from plugin instruments, you can use a dedicated function in Renoise to do so. See [Render or Freeze Plugin Instruments to Samples](#) for more information.

## 35 Render or Freeze Plugin Instruments to Samples

The Plugin Grabber allows you to create sample-based instruments out of any plugin based instrument (VSTi/Audio Units). You can also quickly render and replace (freeze) a plugin instrument this way.

Replacing a plugin with samples has advantages:

- When sharing your Renoise *.xrns* song file, your song can be opened and played back on any computer with Renoise, without the need for the plugin to be installed.
- Sample-based instruments always use less CPU power than plugins, because samples can be played back and pitched instead of being synthesized and generated on the fly.
- When not replacing, but creating new instruments with the grabber, you can quickly sample your favorite synthesizer sounds and create a small sample library for later processing and sound mangling. Samples in Renoise also can be manipulated in many ways that plugins cannot. For example, you can control the playback pitch, direction and offset at any time in the pattern with the [Pattern Effect Commands](#).

Replacing a plugin with samples also has disadvantages:

- Automation of plugin synthesizer parameters with an [\\*Automation Device](#) will only work with the original plugin. The Automation can no longer be applied to the rendered samples.
- Samples always are limited in length. Even though you can apply cross-fading to create smooth loops in Renoise with the grabber, such automatic loops may not always sound as detailed as the original.

### 35.1 Opening the Plugin Grabber Dialog

To directly sample and then replace a plugin instrument, you can use the Plugin Grabber in the [Plugin](#) section. Left-clicking the Render To Samples button will set the grabber to replace the plugin instrument (render the plugin and then unload it). Right-clicking will set the grabber to render the plugin into a new instrument slot.

Alternatively, you can right-click the plugin instrument in the [Instrument Selector](#) and then choose "Render Plugin To Instrument..." or "Render Plugin To New Instrument...".

Finally, you can also bring up the grabber by selecting "File -> Render Plugin To Instrument..." from the main menu.



### 35.1.1 Instrument Selection

- **Source:** The plugin to be rendered. Only plugin instruments that can be grabbed will show in the list. Plugin instrument and effect aliases cannot be grabbed and so will not be listed.
- **Destination:** Where the resulting samples will be placed after rendering. "Current instrument" will overwrite the actual source instrument.
- **Remove the source plugin after rendering:** When enabled, the plugin will be unloaded after the rendering has finished. Unloading the plugin can be undone, just like any other operation, with "Left Control + Z".

**Note:** These options will be set up for you automatically when either clicking the record button in the [Waveform section of the Sampler](#) or launching the plugin grabber from the [Instrument Selector](#). You still can change the settings after a rendering, so you can record a batch of instruments without opening and closing the dialog.

### 35.1.2 MIDI Options

- **Note Range:** The note range to be rendered. This and the "Step" option define how many samples will be created in the resulting instrument. When more than one sample is rendered, a multi-sample instrument will be created. "Set From Song" will parse your song and automatically fill in the range, using the lowest played note as the lower boundary and the highest played note as upper boundary.
- **Step:** How many samples will be rendered in the "Note Range". Setting this to 1 will individually render every single note. Setting this to 12 will render one

sample per octave. The more samples are rendered, the closer the rendered result will be to the original.

- **Velocity Range:** The Note-On velocity that will be used to trigger the instrument when sampling it. Plugins may modulate some of their settings depending on the velocity.
- **Step:** How many samples will be rendered in the "*Velocity Range*". Setting this to 1 will render only a single sample for the entire velocity range. The more samples are rendered, the closer the rendered result will be to the original.

### 35.1.3 Sampling Options

- **Auto-loop samples (cross-fade):** When enabled, the sample is cross-faded and looped. Cross-fading creates a smooth, click-free loop and so is incredibly useful for pads or other long sounds. Enabling cross-fading will also disable the "*Tail*" ([Note OFF](#)) settings below.
- **Duration:** The duration in milliseconds of the Note-On phase, before a [Note OFF](#) is sent to the plugin. With cross-fading enabled, this will be the total length of the sample. Entering a number into the right value box and hitting "Set" will apply the correct length calculated from the line duration.
- **Tail:** How long the [Note OFF](#) phase will last. This is needed to sample the sustain phase of plugin instruments. Entering a number into the right value box and hitting "Set" will apply the correct length calculated from the line duration.
- **Fadeout Tail:** When enabled, the tail/sustain phases of the samples are cleanly faded out to zero.

### 35.1.4 Sampling Format

- **Bit depth:** The destination format of all rendered samples. 32-bit will create the highest quality files, but also the largest in terms of file size. 16 or 24 are good alternative bit depths, which still sound excellent and create smaller files.
- **Channels:** Allows the option of forcing the rendering to take place in stereo or mono.

## 36 Template Song

### 36.1 Template Song

A Template Song is a special song file which is used as the initial document when Renoise is loaded or when creating a new song. By default, a new song is blank. However, if you would like every new song to be created with a specific set of tracks, DSPs, instruments and/or MIDI mappings etc, then you can create such a base song and save it as a template by selecting "*File -> Save As Template Song*" from the menu options in the Upper Status Bar. To delete the template choose "*File -> Delete Template Song*". You can bypass the template song and use a blank one instead without having to delete the template by selecting "*File -> New Song (no Template)*".

## 37 MIDI Mapping

With MIDI Mapping you can remotely control Renoise from your external MIDI controller or master keyboard. Nearly everything you can do in Renoise with the mouse or the keyboard can also be done from an external MIDI controller.

MIDI mappings are saved along with your song, unlike the keyboard mappings in the preferences. This way you can create unique MIDI mapping sessions for every song and also share the settings by either using [Template Songs](#) or by importing/exporting common MIDI mappings in the MIDI dialog (see below).

Renoise will never automatically detect your MIDI controller and configure the mappings for you. You have to manually (at least once for a [Template Song](#)) set up the controller.

### 37.1 MIDI Device Setup

First make sure Renoise knows which device you want to use for MIDI mapping by setting it in the ["Edit -> Preferences -> MIDI"](#) panel.

### 37.2 Opening the MIDI Mapping Dialog

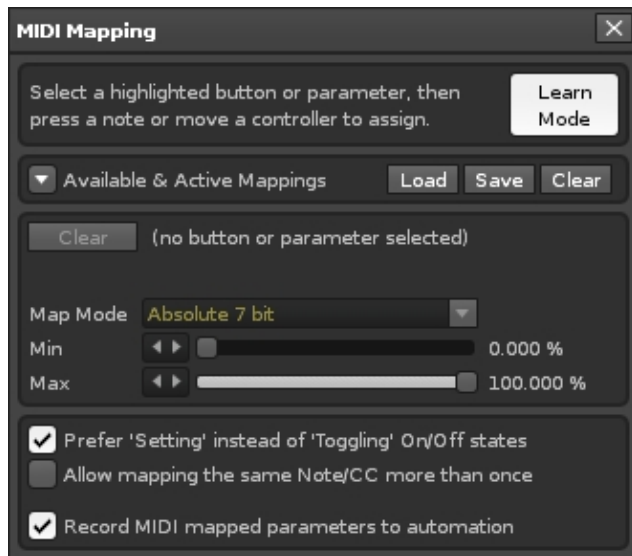
The MIDI Mapping dialog box can be opened with the *"Options -> MIDI Mapping..."* option in the main menu (or by pressing *"Left Control/Command + M"*). It can also be opened by clicking the **MIDI MAP** button to the right of the VU meters at the top of the Renoise interface.

Next to the *"MIDI Map"* button you will also find two small LEDs which show the MIDI input/output that Renoise receives/sends. If you are in doubt about whether your MIDI controller is set up and connected correctly to Renoise, then watch the green LED (input), which should blink when you use the controller.



- **Left:** MIDI Clock (if enabled in the [MIDI Preferences](#))
- **Right:** General MIDI input and output

### 37.3 The MIDI Mapping Dialog at a Glance



- **Learn Mode:**

- ◆ Highlights all the parts of Renoise available for MIDI Mapping (see image below). Select a highlighted button or parameter, then press a key or move a controller to assign.
- ◆ When clicked, "*Learn Mode*" will become "*Test Mode*", which allows you to test out what you've just mapped without having to close the MIDI Mapping dialog.

- **Available & Active Mappings:** Clicking the arrow will unfold a list of the currently available and active mappings.

- **Selected parameter:** Displays the currently mapped parameter in Renoise.

- ◆ **Channel:** The MIDI channel currently mapped from your controller.
- ◆ **CC No:** The CC number currently mapped from your controller.
- ◆ **CC Type:** The type of MIDI CC controller.
  - ◇ **Absolute 7 bit:** Use the CC value as an absolute value.
  - ◇ **Relative signed bit:** Increase at [065 - 127], decrease at [001 - 063].
  - ◇ **Relative signed bit 2:** Increase at [001 - 063], decrease at [065 - 127].
  - ◇ **Relative bin offset:** Increase at [065 - 127], decrease at [063 - 000].
  - ◇ **Relative two's comp:** Increase at [001 - 64], decrease at [127 - 065].
- ◆ **Min:** When mapping, for example, a MIDI fader or encoder to an effect parameter in Renoise, this allows you to set up the lower boundary of the controller.
- ◆ **Max:** This allows you to set up the upper boundary of the controller in Renoise. Tip: Swap min and max values to reverse the controller.

- **Prefer 'Setting' instead of 'Toggling' On/Off states:** Specify how the controller should change things that are turned On/Off in Renoise. See [Set, Trigger and Toggle Mappings](#) for a detailed description.

- **Allow mapping the same Note/CC more than once:** When enabled, you can assign the same controller button or fader (the same MIDI message) to multiple things in Renoise. As an example, this could be used for cross-fades of two track volume parameters.



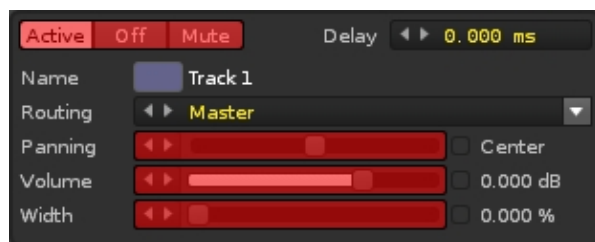
- **Record MIDI mapped parameters to automation:** When enabled, any parameter changes you make with the MIDI controller will be recorded into either the [Pattern Editor](#) or [Automation Editor](#). This only applies when [Edit Mode](#) is enabled.

Note that the highlighted colour may vary according to the current theme:



## 37.4 Create Mappings

- Click on a highlighted parameter or button.



- Send MIDI from your controller (press a key, push a button, move a fader etc.)

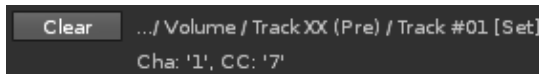


Renoise will automatically map the selected parameter to the chosen key/button/fader of the controller.

Note: When using endless encoders, which may send one of the relative CC modes noted above, slowly turn it to the left in order to map it. This allows Renoise to estimate how the encoder works (guess the relative CC modes) and stop you from having to keep manually resetting the mode.

## 37.5 Remove Mappings

To remove a mapping, open the MIDI Mapping dialog and click on the mapped part of the Renoise GUI. Then hit the Backspace or Delete key on your keyboard. Alternatively, press the "Clear" button next to the parameter description:



To clear all of the mapped parameters, click the "Clear" button at the top of the dialog (next to the "Load" and "Save" buttons).

## 37.6 Import/Export Mappings

If you want to share MIDI mappings you've set up, you can do so by importing/exporting them. To export, click on the "Save" button at the top of the dialog. This will prompt you for a file name and a location to save the mappings to. Exported settings can be imported by clicking the "Load" button and selecting a file.

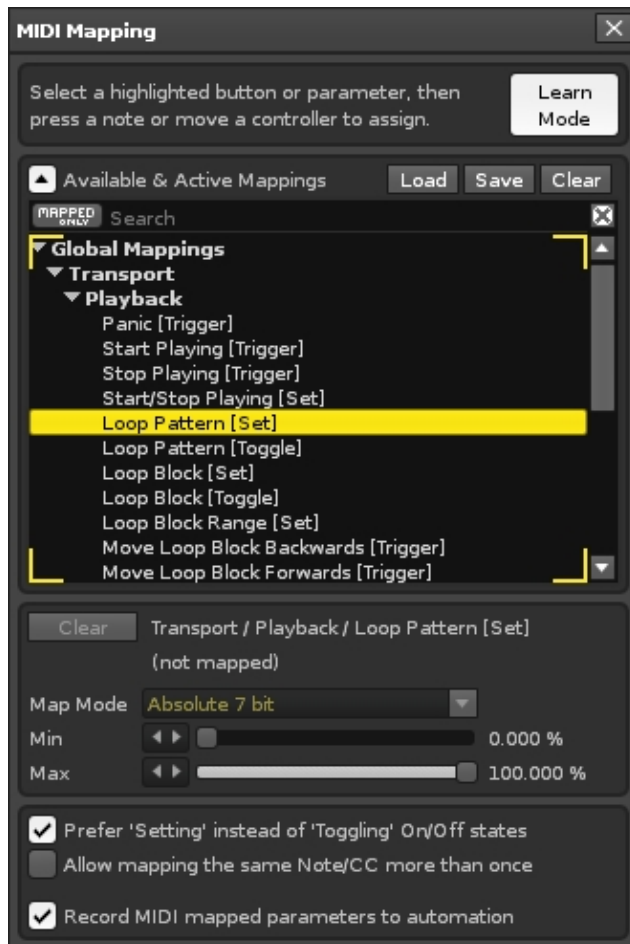
Note that Renoise will not import/export parameter mappings as these are specific to [Track Effects](#) and so will be completely different for every song. What is imported/exported though, are the parameters found under "Global Mappings" in the "Available and active mappings" list, such as Start/Stop, select/trigger sequences etc.

If you want to repeatedly use the same mappings for your songs, then it might be useful to create a [Template Song](#). Because all mappings are saved with a song, you can set up your favourite mappings in a blank song and save this as a template, enabling them by default for every new song.

## 37.7 Set, Trigger and Toggle Mappings

The list of "Available and active mappings" shows you all the possible parameters and functions that can be mapped in Renoise. This list contains far more entries than what is shown highlighted in the GUI. For example, there are mappings to select the currently active track, to control the selected [Track Effects](#) and much, much more.

Further, many things can be mapped in more than one way. Note the postfix of the mapping names in the list: [Trigger], [Toggle] or [Set].



- **[Trigger]:** Whenever your controller sends a command to Renoise, ignoring any values or states from the MIDI messages. This is, for example, used for things like "Start Playing" or "Stop Playing".
- **[Toggle]:** Allows the controller to only change an On/Off value, ignoring any values or states from the MIDI messages.
- **[Set]:** Allows the controller to specify exactly when something is On or Off, giving it total control.

To understand the difference between [Toggle] and [Set] better, let's take a look at what commands MIDI controllers may send out. Here is an example for a button that sends a MIDI controller change message:

**A)**

*Button Pressed:* Controller with Value 127 (or something above 64) is sent.

*Button Released:* Controller with Value 0 (or something below 64) is sent.

*Button Pressed again:* Same as before.

*Button Released again:* Same as before.

**B)**

*Button Pressed:* Controller with Value 127 (or something above 64).

*Button Released:* Nothing.

*Button Pressed again:* Controller with Value 0.

*Button Released again:* Nothing.

**C)**

*Button Pressed:* Controller with Value 127 (or something above 64).

*Button Released:* Nothing.

*Button Pressed again:* Controller with Value 127 is sent again.

*Button Released again:* Nothing.

Some controllers may use protocol A, others B or C, or even other non-listed combinations. Renoise needs to deal with all of these possibilities, which is why the [Toggle] and [Set] options exist.

Now let's say you want to set something On or Off in Renoise. You have to tell Renoise how it should deal with the incoming messages. Take the global "*Edit Mode*" as an example, where there exists two variants for it in the list of available MIDI mappings:

- **Edit Mode [Toggle]:** Will ignore Controller Values of 0, so you can use controller protocol A or C.
- **Edit Mode [Set]:** Will not ignore Controller Values of 0, but will instead interpret them as "*state*": CC value > 64 On, CC value < 64 Off, so you can use controller protocol B with encoders or faders.

If you are unsure what the right mode is for your controller, simply try out both variants. If this works, then select that variant for the other mappings, because it's very likely that the controller sends MIDI in the same manner for the other buttons too. Note that Renoise will always choose the [Toggle] variant when executing MIDI "*Learn Mode*".

To automatically choose [Set] or [Toggle]:

When clicking on something in the Renoise GUI to create mappings, the "*Prefer 'Setting' instead of 'Toggling' On/Off states*" option in the MIDI mapping dialog defines which mappings should be used for your controller. [Set] will be selected when the option is enabled, otherwise [Toggle] is used. This way you only have to decide which type of mapping you want and can quickly create the mapping without using the "*Available And Active Mappings*" list.

## 37.8 Dynamic Mappings

The list of "*Available and active mappings*" shows you all the possible parameters and functions that can be mapped in Renoise. This list contains far more entries than what is shown highlighted in the GUI. For example:

### 37.8.1 Selected Track Mappings

- **Global Mappings/Navigation/Tracks:** Allows you to switch over to the next or previous track in Renoise.
- **Global Mappings/Track Muting/Current Track:** Allows you to mute/unmute the currently selected track.
- **Global Mappings/Track Levels/Volume/Current Track:** Allows you to control the volume of the current track.
- **Global Mappings/Track Levels/Panning/Current Track:** Allows you to control the panning of the current track.

Using this you can control every track in a song with just a few buttons and faders on your controller.

### 37.8.2 Selected DSP FX Mapping

The same is also possible for [Track Effects](#):

- **Global Mappings/Navigation/Track DSPs/Select:** Mapping the selection of DSPs ([Track Effects](#)).
- **Global Mappings/Track DSPs/Selected FX/Parameter #XX:** Controlling up to 32 DSP parameters.
- **Global Mappings/Track DSPs/Selected FX (Mixer Subset)/Parameter #XX:** Controlling up to 32 DSP parameters in the Mixer.

When using the "*Selected FX (Mixer Subset)*" mappings, only the DSP ([Track Effects](#)) parameters which are seen in the Mixer can be controlled. This allows you to customise which parameters are seen (right-click on the FX in the Mixer and choose a parameter from the "*Show Sliders*" option) and controlled, so you can quickly and easily navigate through a small subset of parameters during a live performance.

### 37.8.3 Sequencer Navigation & Triggering

Just like the track and effects, the sequencer can be also be controlled in a dynamic manner. Feel free to explore this on your own, using the above information as a guide.

## 37.9 The Duplex Tool

Renoise Tools are downloadable packages that extend the functionality of the program, using the Renoise Scripting API. Created with this, Duplex is a flexible system for using external controllers in Renoise. When you install Duplex, each supported device has a

number of configurations that control important Renoise parameters like the Mixer, Matrix or Effects. You can combine these so-called 'applications' to form your own, unique mix of features. For example, some pre-installed device configurations have entries like 'Mixer+Effect'.

You can download and find more information about the Duplex Tool at [its page in the Renoise Tools](#) section of the site.

## 38 Open Sound Control

Open Sound Control (OSC) was created as a successor to the MIDI control protocol. It enables communication between computer software, sound synthesizers and other multimedia devices that support OSC.

Its advantages over MIDI include: an open-ended and dynamic URL-style symbolic naming scheme, symbolic and high-resolution numeric argument data, pattern matching language to specify multiple recipients of a single message, high resolution time tags and "bundles" of messages whose effects must occur simultaneously. The protocol is also not bound by specific hardware (i.e. MIDI cables and ports) and can be transferred across any network connection, even remotely via the internet.

This makes OSC much more powerful than MIDI, but due to its open-ended specification, both the OSC client (*which sends OSC data*) and the OSC server (*which receives data, i.e. Renoise*) must be separately configured, unlike MIDI which is essentially "Plug & Play".

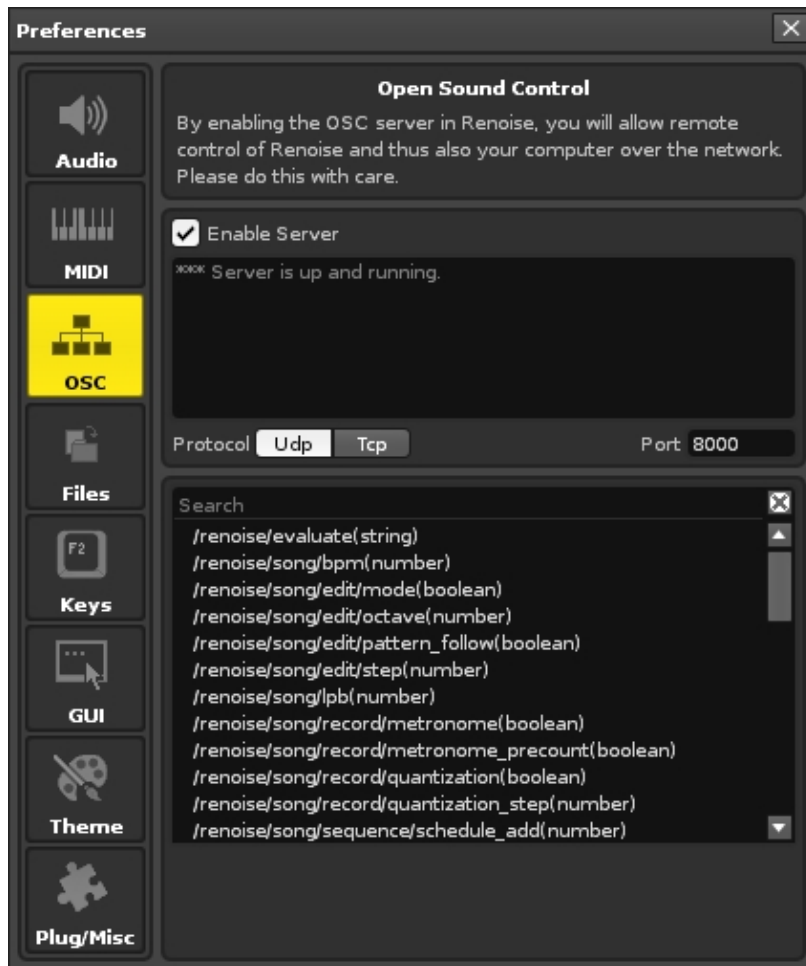
For more general information about OSC, see the [OSC Wikipedia page](#) and the [official OSC homepage](#).

### 38.1 Setup

Renoise can use OSC in one of two ways:

1. Using Renoise as an OSC server (*OSC receiver*) via a preconfigured OSC message set.
2. Using the fully configurable and customisable Renoise scripting API. This allows you to send and receive any form of OSC message and define your own communication protocol, but obviously requires programming knowledge. See the [Renoise Scripting API pages](#) for more information.

To setup Renoise as an OSC server, open the OSC options panel by choosing "*Edit -> Preferences -> OSC*" from the main menu:



- **Enable Server:** This starts the Renoise OSC server and the network port is changed to a listening state, so you may get a firewall warning the first time this is enabled.
- **Incoming Messages:** This panel simply displays messages relevant to the networking process.
- **Protocol:** Select the protocol which the Renoise server will use:
  - ◆ **Udp:** Provides a high transfer rate with lower reliability than Tcp.
  - ◆ **Tcp:** Provides a lower transfer rate than Udp with higher reliability.
- **Port:** Select the Port number for messages to be transferred over. Generally, a number greater than 1024 is used.
- **Command List:** Lists the various commands that it is possible to use to communicate with Renoise.
- **Explanation Panel:** When clicking on a command in the Command List, an explanation of what the command does is displayed here.

### 38.1.1 The Default OSC Implementation of Renoise

- **/renoise/evaluate(string)**

Evaluate a custom Lua expression (e.g. `renoise.song().transport.bpm = 234`).

- **/renoise/song/bpm(number)**



Set the song's [current BPM](#) value [32 - 999].

- **/renoise/song/edit/mode(boolean)**

Set the song's global [Edit Mode](#) on or off.

- **/renoise/song/edit/octave(number)**

Set the song's [current octave](#) value [0 - 8].

- **/renoise/song/edit/pattern\_follow(boolean)**

Enable or disable the global [Pattern Follow](#) mode.

- **/renoise/song/edit/step(number)**

Set the song's current [Edit Step](#) value [0 - 8].

- **/renoise/song/lpb(number)**

Set the song's current [Lines Per Beat](#) value [1 - 255].

- **/renoise/song/record/metronome**

Enable or disable the [metronome](#).

- **/renoise/song/record/metronome\_precount**

Enable or disable the [global metronome precount](#).

- **/renoise/song/record/quantization(boolean)**

Enable or disable the global [Record Quantization](#).

- **/renoise/song/record/quantization\_step(number)**

Set the global [Record Quantization](#) step value [1 - 32].

- **/renoise/song/sequence/schedule\_add(number)**

Add a scheduled [sequence playback position](#).

- **/renoise/song/sequence/schedule\_set(number)**

Replace the currently scheduled [sequence playback](#) position.

- **/renoise/song/sequence/slot\_mute(number, number)**

Mute the [specified track at the specified sequence slot](#) in the matrix.

- **/renoise/song/sequence/slot\_unmute(number, number)**

Unmute the [specified track at the specified sequence slot](#) in the matrix.

- **/renoise/song/sequence/trigger(number)**

Set the playback position to the specified [sequence position](#).

- **/renoise/song/tpl(number)**

Set the song's current [Ticks Per Line](#) value [1 - 16].

- **/renoise/song/track/XXX/device/XXX/bypass(boolean)**

Set the bypass status of [a device](#) [true or false].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/device/XXX/set\_parameter\_by\_index(number, number)**

Set the parameter value of [a device](#) [0 - 1].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/device/XXX/set\_parameter\_by\_name(string, number)**

Set the parameter value of [a device](#) [0 - 1].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/mute**

Mute track XXX.

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/output\_delay(number)**

Set track XXX's delay in ms [-100 - 100].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/postfx\_panning(number)**

Set track XXX's [post FX panning](#) [-50 - 50].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/postfx\_volume(number)**

Set track XXX's [post FX volume](#) [0 - db2lin(3)].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/postfx\_volume\_db(number)**

Set track XXX's [post FX volume](#) in dB [-200 - 3].

*(XXX is the device index, -1 chooses the currently selected device)*

- **/renoise/song/track/XXX/prefix\_panning(number)**

Set track XXX's [pre FX panning](#) [-50 - 50].  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/song/track/XXX/prefix\_volume(number)**

Set track XXX's [pre FX volume](#) [0 - db2lin(3)].  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/song/track/XXX/prefix\_volume\_db(number)**

Set track XXX's [pre FX volume](#) in dB [-200 - 3].  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/song/track/XXX/prefix\_width(number)**

Set track XXX's [pre FX width](#) [0, 1].  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/song/track/XXX/solo**

Solo track XXX.  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/song/track/XXX/unmute**

Unmute track XXX.  
(XXX is the device index, -1 chooses the currently selected device)

- **/renoise/transport/continue**

Continue playback.

- **/transport/loop/block(boolean)**

Enable or disable pattern [Block Loop](#).

- **/renoise/transport/loop/block\_move\_backwards**

Move the [Block Loop](#) one segment backwards

- **/renoise/transport/loop/block\_move\_forwards**

Move the [Block Loop](#) one segment forwards

- **/renoise/transport/loop/pattern(boolean)**

Enable or disable [looping the current pattern](#).

- **/renoise/transport/loop/sequence(number, number)**

Disable or set a new [sequence loop](#) range.

- **/renoise/transport/panic**

Stop playback and silence all playing instruments and effects.

- **/renoise/transport/start**

Start playback or restart playing the current pattern.

- **/renoise/transport/stop**

Stop playback.

- **/renoise/trigger/midi(number)**

Trigger a raw MIDI event.

*arg#1: the MIDI event as number*

- **/renoise/trigger/note\_off(number, number, number)**

Trigger a [Note OFF](#).

*arg#1: instrument (-1 chooses the currently selected one)*

*arg#2: track (-1 for the current one)*

*arg#3: note value (0-119)*

- **/renoise/trigger/note\_on(number, number, number, number)**

Trigger a Note-On.

*arg#1: instrument (-1 for the currently selected one)*

*arg#2: track (-1 for the current one)*

*arg#3: note value (0-119)*

*arg#4: velocity (0-127)*

Note that the default OSC implementation can be extended by editing the file "GlobalOscActions.lua" in the "Scripts" folder, found within the directory where you installed Renoise (*on OSX this is found in the app bundle*).

## 38.2 Examples

### 38.2.1 TouchOSC via Duplex

The Duplex Tool comes with a Device preset for TouchOSC, an iPhone / iPod Touch / iPad app, that allows those devices to control Renoise via OSC. To use it, select "TouchOSC" from the "Device" pulldown menu in the Duplex Browser and adjust the configuration as needed within the "Settings" dialog box. Then, using the TouchOSC app on the Apple device, you can change the values of the various knobs and sliders on

the screen to control various features of Renoise.

Duplex uses Renoises Scripting API to communicate with touch OSC, so its fully configurable, and can also be used as an example on how to wrap up your own OSC implementation in Renoise.

### 38.2.2 Pure Data

PD (aka Pure Data) is a real-time graphical programming environment for audio, video, and graphical processing. PD was created to explore ideas of how to further refine the Max paradigm with the core ideas of allowing data to be treated in a more open-ended way and opening it up to applications outside of audio and MIDI, such as graphics and video. There are [different versions available to download](#) for PC, Mac and Linux.

#### 38.2.2.1 Using PD With Renoise Via OSC

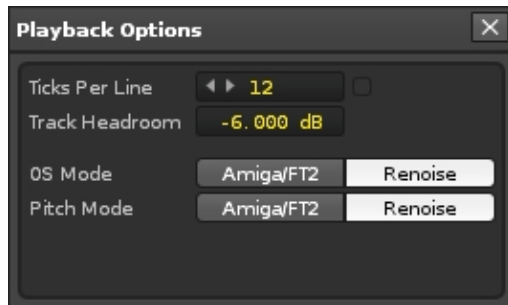
- First install PD, then download, unzip and open the ["test-renoise-osc.pd" file](#) within PD.
- In the top left corner you can set the port number to match the OSC port number you have chosen for Renoise [*connect localhost XXXX*]. With Edit Mode (*Ctrl + E*) you can edit the numbers.
- To the right, you can start and stop playing Renoise with the [*send / renoise / transport / start*] and [*send / renoise / transport / stop*] buttons.
- The test program comes with a set of commands already loaded in. Make sure a sample is loaded into slot 00 within Renoise and press the "chord-test" button in PD. You should hear a chord being played. You can also click on the individual commands to hear the individual notes.
- If you would like to enter new OSC messages yourself:
  - ◆ Select from the menu "*Put -> Message*", place the box on the screen and enter your desired command (check the [OSC Command List](#) for available commands).
  - ◆ Connect the new message box by hovering over the bottom left corner (the cursor will become a circle) then clicking and dragging over to the "*sendOSC*" box.
  - ◆ Cancel edit mode with (*Ctrl + E*) and click the box to send the message to Renoise via OSC.

## 39 Song Settings

There are a variety of options for configuring a song, such as general playback behaviour or compatibility settings.

### 39.1 Player Options

When starting a new song in Renoise (saved with Renoise 3.0 or later) and choosing "Song -> Playback & Compatibility Options" from the main menu, the Playback Options will look like this:

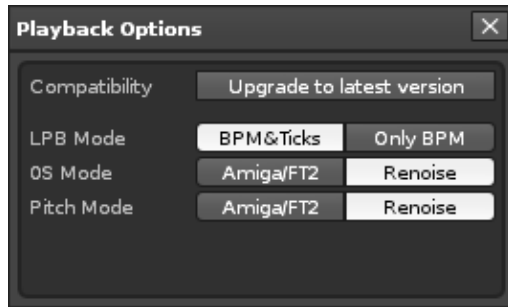


- **Ticks Per Line:** Changes the internal event rate for Renoise, stating how many ticks make up a horizontal line in the [Pattern Editor](#). This applies to Sample Effects like re-triggers or volume gates, and also to meta devices like the LFO device, which will use this to determine how often values are updated. This rate also affects automation interpolation, i.e. how often line values are smoothed for playback. In general, the default value of 12 is just fine and makes musical sense (it is divisible by 2, 3 and 4). If you need even higher resolution, you could try a value of 16. Lower values may make your sounds and automation a bit more "rough", which could be useful if that's what you're after.

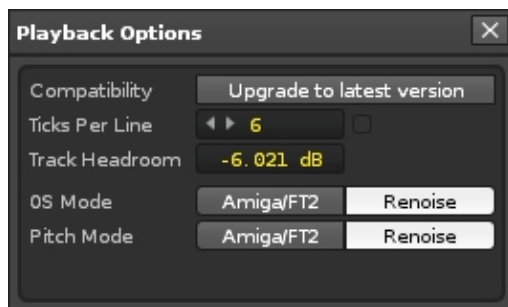
To adjust the Ticks Per Line as the song is playing, you can use the [Pattern Effect ZKxx](#), where **xx** is the new TPL in hexadecimal. This can also be [Automated](#) on the [Master Track](#).

- **Track Headroom:** The amount that each track's input is lowered by, which helps avoid clipping in the final mix.
- **OS Mode:** Applies only to the [OS Pattern Effect Command](#). The "Amiga/FT2" option will slice samples into chunks that are 256 bits long, starting from the beginning of the sample. The "Renoise" mode will divide the whole sample into 256 pieces, where 00 is the start of the sample and FF is the start of the final piece. This is mainly a compatibility feature used to achieve slightly better playback for old XM / MOD files.
- **Pitch Mode:** As with the "OS Mode", this is a compatibility feature for XM / MOD sound files and only applies to pitch related effects in the Pattern Editor. XM / MOD pitches are coarse, while "Renoise" pitches offer much more accuracy.

When opening an old Renoise song (saved with Renoise previous to version 3.0) or loading a MOD, XM or IT song, the Player Options will look like this:

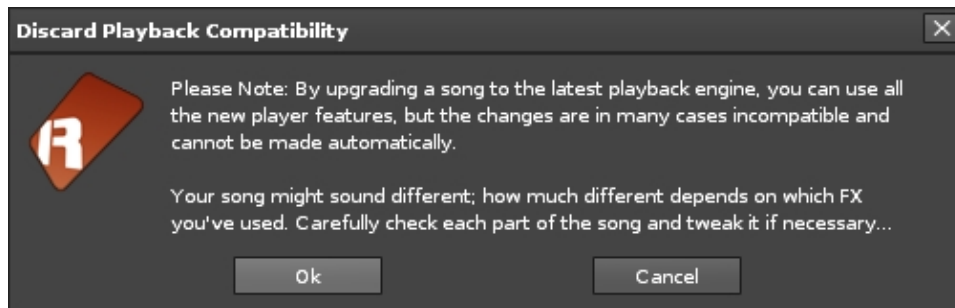


(This shows the panel in Renoise versions 1.0 - 1.91 compatibility mode)



(This shows the panel in Renoise versions 2.0 - 2.82 compatibility mode)

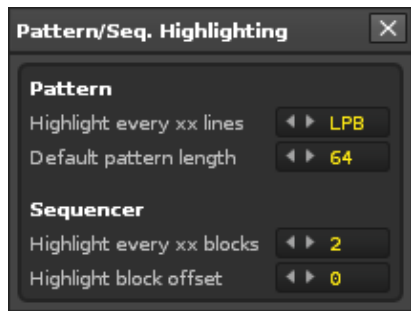
- **Upgrade to latest version:** Upgrade the song to the new Renoise 3 playback behaviour.



- **LPB mode:** Set up how Renoise will pass Beat and BPM information on to plugins. Selecting "*BPM & Ticks*" will cause Renoise to try and double or half the transmitted BPM, depending on the Speed settings used. "*Only BPM*" will just transmit the set BPM value.
- **OS/Pitch Mode:** see Player Options above.

## 39.2 Pattern/Sequence Highlighting

Choose "Song -> Pattern Highlight Options" from the main menu.



- **Highlight every xx lines:** Indicates every *xxth* row in the [Pattern Editor](#) with a highlighted colour. When this is set to LPB, Renoise will automatically highlight rows for every beat. This is typically the most useful setting, but other configurations can be helpful depending on the particular song.
- **Default pattern length:** Set the default pattern length for newly created patterns.
- **Highlight every xx blocks:** Highlights every *xxth* block in the [Pattern Sequencer](#).
- **Highlight block offset:** Start the block highlighting after the stated amount of patterns. Useful to skip an introduction section, for example.



## 40 Song Comments

### 40.1 Song Comments

Using the Song Comments box you can leave notes either for yourself or for others when sharing a song. The comments can be displayed via the main menu option, "*Song -> Song Comments...*"



The "*Show song comments after loading*" option is only applied to the current song, not globally for all songs.

# 41 Groove Settings

## 41.1 Groove Settings

The Global Groove settings are found at the end of the effect chain in the [Master Track](#) and allow you to shift the playback of the pattern lines in a beat back and forth, creating a swinging feel for the whole song.



Adding groove with a slider means that the first note will be extended, while the second note will be shortened and triggered after a delay. Note that the sliders will apply to a different amount of pattern lines when using different [Lines Per Beat](#) settings.

For example: Increasing the 0&1 slider and setting other sliders to 0 will make the first pattern line longer, delaying the second pattern line, repeating after 8 lines (at LPB 4). Setting all sliders to ~50% will delay all second, fourth, sixth and eighth lines, resulting into a typical swing groove.

It's not vitally important to understand the exact technical details here, since groove is about adding a feeling to the beats. The best way to get a feel for the settings is to just play around with them. To make it easier to hear what's going on when you do, try adding something like a steady hi-hat line, which will be triggered fast and often.

## 42 ReWire

ReWire (Windows and Mac OS X only) allows you to connect and synchronise multiple software applications, so that you can run them side by side while passing Audio/MIDI information between them. ReWire is available on Windows/Mac only, but on Linux, [Jack Transport](#) can be used to do similar things.

For example, you could connect Renoise to Logic and program your drums in Renoise while arranging the bulk of your song in Logic. Or you could connect both Reason and Ableton Live to Renoise, then arrange your track in Renoise, control Reason's built-in synthesizers and play around with clips in Live.

ReWire has two modes, both of which are fully supported by Renoise:

- **ReWire Master:** Commonly known as a Mixer application, the master controls other ReWire slaves. A ReWire master has exclusive control of the soundcard, while slaves must route audio through the master application. There can be multiple slaves, but only one master.
- **ReWire Slave:** Also known as a ReWire Synth application. Slaves are controlled by a ReWire master and feed their audio back into it. They receive MIDI from the master, but can also send MIDI to the master and ask it to reposition itself.

Because Renoise can be either Master or Slave, you can use it with any application that supports ReWire.

### 42.1 Start/Stop Procedure for ReWire Applications

**Starting:** The ReWire master application should be started first, then the slave(s).

**Closing:** Close the ReWire slave application(s) first, then close the master.

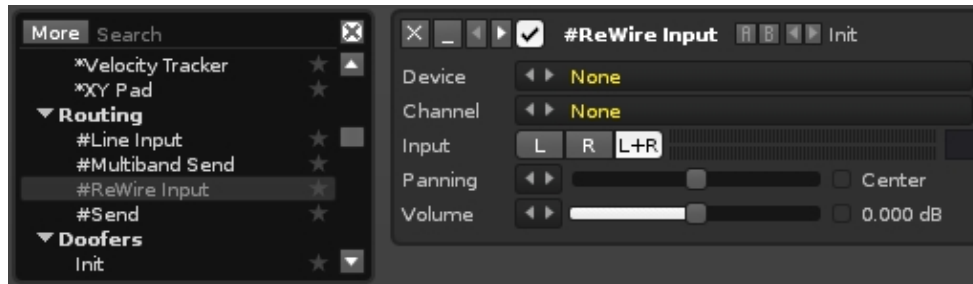
**Important:** When working on songs, you must save them separately in both applications. You must also load them up individually when continuing a session. ReWire only handles Audio and MIDI routing and so will not automatically exchange/restore songs or patches.

The basic workflow is:

1. Start ReWire master (and load a pre-saved session).
2. Start ReWire slave (and load a pre-saved session).
3. Work on the song.
4. Save the session and close ReWire slave.
5. Save the session and close ReWire master.

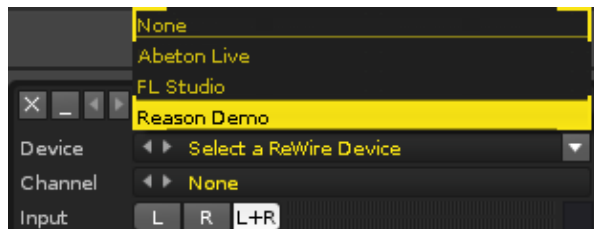
## 42.2 Using Renoise as ReWire Master

First, make sure that no other ReWire master application is open. Start Renoise, automatically making it the master, then in the [Track Effects](#) tab select a [#ReWire Input device](#) and add it anywhere in the song ([Send Tracks](#) are the ideal place to use this meta device).



### 42.2.1 Routing Audio To Renoise

Use the "Device" option to select a slave from the list. In most cases the slave will automatically launch. If not, then launch the application manually.



The audio signal from the slave will be routed into Renoise via the [#ReWire Input device](#). Both applications are now bound together and everything is automatically configured for you. If you hit play in Renoise, the slave will start playing too. If you navigate around in the song, the slave will follow. If you change the playback in the slave, Renoise will follow.

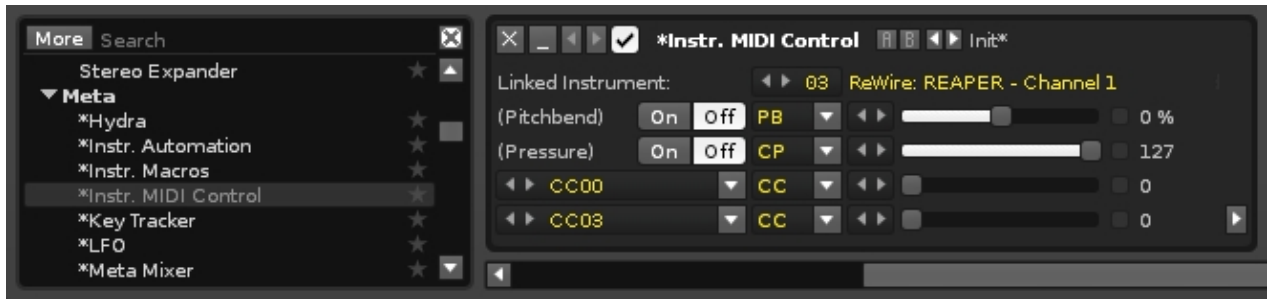
If you want to capture another audio bus from the same slave, simply add another [#ReWire Input device](#) and select the same slave but choose a different bus. This will allow you to stream multiple buses from the same application.

### 42.2.2 Trigger MIDI from Renoise

If a slave has MIDI inputs, you will find them listed as regular devices in the [MIDI Output](#) section. This way you could, for example, use Reason synths from within Renoise.

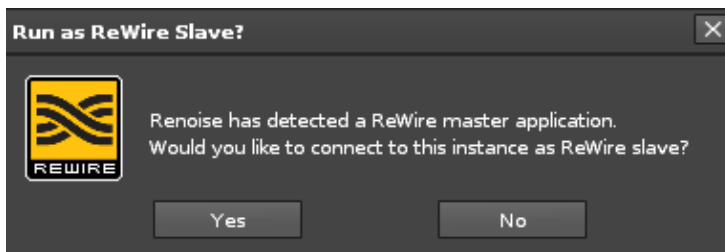
### 42.2.3 Automating ReWired synths like Reason

As soon as you've created a ReWire MIDI instrument you can use the [\\*Instr. MIDI-Control](#) device in Renoise to automate it. If the synth supports this, the mapped parameters will be shown there so you know which CC number automates which parameter.



## 42.3 Using Renoise as ReWire Slave

First, start the music application that will be designated as the master. After the master application has launched, start Renoise. Renoise will ask you if it should run as slave. Click "Yes".



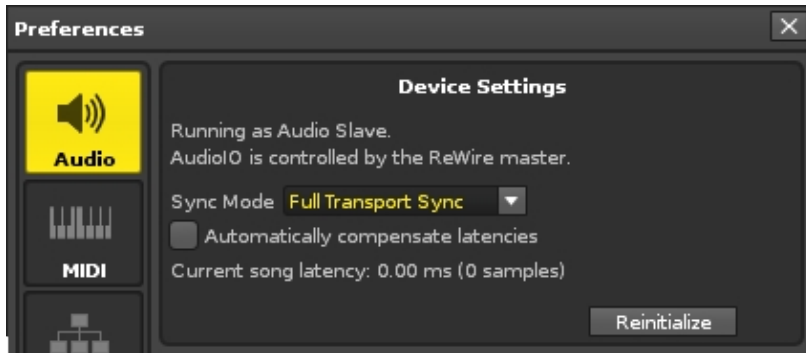
In many cases you will then have to explicitly tell the master to use Renoise as a slave. In most multi-track sequencers this is done by selecting Renoise as "Audio Input". Please refer to the master's documentation for more details. Once you have routed Renoise into the master mixer, you are ready to go and the audio signal from Renoise will be routed into the host. Starting, stopping, and navigating through the song will be synchronized in both apps.

Some hosts allow you to start Renoise from within the host when you insert Renoise as a Rewire audio/midi device (depending on the host its options, again refer to the host's manual). In that case you won't be asked whether Renoise should start as a ReWire slave, it simply does so.

If for some reason you want to start Renoise in a forced slave mode without requiring to confirm slave-mode, you can use the command parameter "-ForceRunningAsSlave". A ReWire master however has to be active and perhaps in specific cases be prepared to accept Renoise as a slave host, prior to starting Renoise with this parameter. If no Rewire master is active (or detected!) during the startup, Renoise ignores the parameter and starts up (by default) in master-mode.

### 42.3.1 Setting up Transport Sync Mode in Renoise

When running Renoise as a ReWire slave, you have two choices regarding how Renoise should sync to the master. This can be set up in the [Audio Preferences](#), but only after Renoise is already running as a ReWire slave:



- **Full Transport Sync:** Any changes to the time-line in Renoise and the ReWire master will be synced. This is very useful for creating a song in multiple applications at once.
- **BPM & Bar Sync:** You can start, stop and navigate freely in Renoise while the time-line of both applications remains beat-synced. Very useful for improvisations or live mixing.
- **Automatically compensate latencies:** The ReWire protocol does not allow the passing of latencies that either the master or slave are using. When running Renoise as a slave and the song makes use of plugins which introduce latency, Renoise must shift its time-line to compensate and ensure synchronicity. This shifting may unfortunately lead to missed first notes upon starting the song or pattern.

## 42.4 General Notes about Renoise as Master or Slave

Some ReWire slaves may have limited control over the transport. It's up to the ReWire master to allow transport changes (or not). For example, some ReWire masters might ignore tempo changes, loop changes or position changes. This is not the fault of Renoise, but rather a limitation in the ReWire implementation of the designated master application.

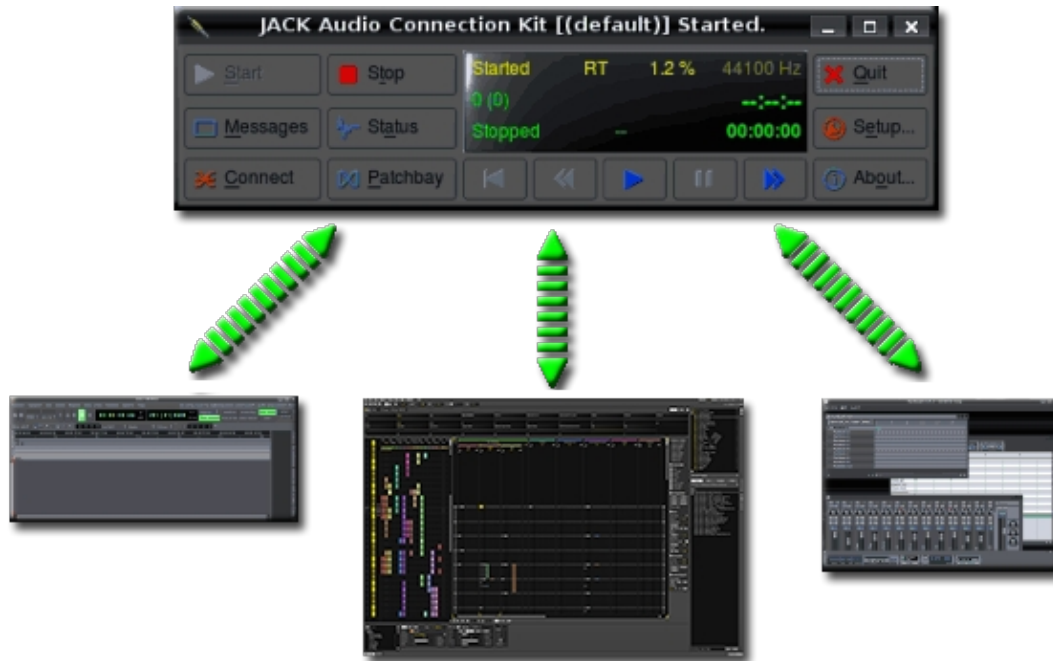
## 42.5 ReWire Demo Restrictions

If you have purchased Renoise and are a registered user, there are no restrictions. If you are using the free demo, then ReWire has some limitations. These are:

1. When Renoise is the master, only the first stereo pair is used.
2. When Renoise is a slave, the demo version will occasionally generate a small, subtle hiss.

## 43 Jack Transport

Jack Transport (Linux only) adds the ability to sync Renoise with multiple Jack clients on Linux. This allows audio programs to be in sync with each other, all connected via Jack Transport. You can start, stop and relocate the play position from any of the Jack enabled applications. All software "*jacked into*" the session will react and synchronise accordingly.



### 43.1 Levels of Jack Transport Control

**Level 1:** Each Jack client has the power to start, stop and relocate (change the playback position of) the transport. This is represented in either seconds or sample time.

**Level 2:** Only one Jack client can control the Time Base, which is the tempo, time signature and beat position.

Most applications support the first level of Jack Transport control. The second level is, at the time of writing, rarely supported. If there is more than one application running which supports the Time Base, Jack will select one automatically.

### 43.2 Dealing with Tempo

Tempo information is exchanged only when the synchronized application supports Time Base. As stated above, most applications do not support this and so you will have to set the tempo manually.

In the case where all Jack Transport applications are Time Base aware, you still have to make sure that all clients are using the same tempo and automation. This is because playback relocation will be done in sample time instead of "beat time". All clients need to have the same base tempo in order to jump to the same positions.

## 43.3 Dealing with Loops

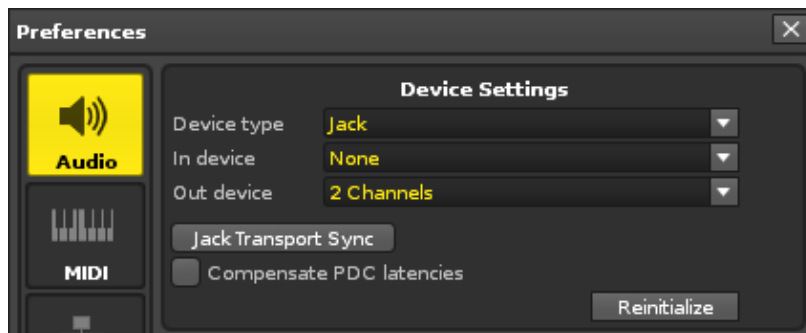
There is no loop information in the Time Base. Every client will try to apply its own loops, fighting with the other Jack programs to reposition. To avoid this conflict, enable loops in the application that is currently active and disable them in the others.

## 43.4 PDC and Jack Transport

Jack doesn't provide a way to explicitly handle latencies. When PDC (automatic plugin delay compensation) is enabled in Renoise and, for example, you want to use Ardour to tell Renoise to jump to pos 0, Renoise will attempt to compensate by jumping to "Pos 0 + overall PDC Latency". This offset may result in a small misfire. If this becomes a problem you should temporarily disable PDC in Renoise.

## 43.5 Configuring Jack Transport

The option to turn on Jack is in the [Audio Preferences](#) panel. Jack Transport is disabled by default, even when Jack is selected as the audio device in Renoise.





## 44 MIDI Clock

MIDI Clock is a MIDI protocol that allows the syncing of playback (transport and tempo) of multiple sequencers, synthesizers, drum machines etc. This can be external MIDI hardware, other software on your computer, or software running on other computers and connected to Renoise via MIDI cables.

There are two MIDI Clock modes: master and slave. Renoise fully supports both modes.

The MIDI Clock master sends a series of 24 ppqn (pulses per quarter note) beat clock messages to all slaves. The interval of these messages allows the connected slaves to determine the master's tempo and beat position. Along with the 'beat clock' messages, 'Start', 'Stop', 'Continue' and 'Relocation' (Song Position Pointer) messages are sent to sync the timelines of the master and slaves.

Only the MIDI Clock master can start or stop the playback or change the tempo. Slaves are forced to follow the master, thus the terms 'master' and 'slave'.

### 44.1 Running Renoise as MIDI Clock Master

#### 44.1.1 Set Up Devices

To use Renoise as the master, simply set up a MIDI Clock master device in the ["Edit -> Preferences -> MIDI"](#) panel. You can also specify which message types should be sent from Renoise. Send only MIDI Clock messages if you just want to transfer tempo to the slaves. Note that Renoise only sends out MIDI clock messages while playing back a song.

#### 44.1.2 Adjust Offsets


You can use the "Offset" slider in the "MIDI Clock Master" preferences to shift clock messages back and forth in time. This is sometimes needed to compensate delays (phase offsets) that are introduced by MIDI hardware. The easiest way to test and adjust this is by using a steady metronome sound on both the master and slave. If the sounds do not play back on exactly the same beat, try adjusting the "Offset" slider in Renoise until they match.

Please note that the smallest possible negative latency is limited to the current latency of your soundcard. If you need further negative latency, you can increase your audio latency in the [Audio Preferences](#).

### 44.2 Running Renoise as MIDI Clock Slave

### 44.2.1 Set Up Devices

To connect Renoise to a MIDI Clock master, use the MIDI Clock slave device section in the ["Edit -> Preferences -> MIDI"](#) panel.

To quickly enable and disable the connection to the master clock, use the small  button in the Renoise [Transport Panel](#), next to the BPM. This icon will only show up when a MIDI Clock slave device has been set.

Important: A MIDI device must be selected and the sync clock mode icon must be enabled to sync Renoise to other devices. After you have done this, you should notice a small green blinking LED at the top of the Renoise interface:



The LEDs next to the small clock icon show the MIDI Clock input in green and output in red.

### 44.2.2 Adjust Offsets

As with the MIDI Clock master mode, you can correct small offsets between Renoise and the master with the *"Offset"* slider in the preferences. Again, the easiest way to test and adjust the offset is by using a steady metronome on both the master and slave. If the sounds are not in sync, try adjusting the offset slider in Renoise until they match.

### 44.2.3 Adjust Smoothing

MIDI messages often only have very rough timing, so the beat clock messages transferred from a MIDI Clock master to Renoise may be imperfect. Depending on how precise the incoming MIDI clock stream is, you can use this option to set how fast Renoise should react to changes from the MIDI Clock master. The higher the Smoothing value, the more stable the sync will be, but the slower Renoise will react to 'real' BPM changes from the master. Try playing around with the Smoothing to find a good value for your setup.

### 44.2.4 Loading New Songs Without Losing Sync

You can detach and reattach Renoise to a running master at any time without losing sync. To do so, simply stop the song in Renoise when running as MIDI Clock slave, instead of stopping the master. Now you can even load a new song and hit start again, whereupon Renoise will resync itself as smoothly as possible to the master, which is still playing. This is extremely useful when playing live, because you can continuously run a master and also switch songs in Renoise. When reattaching Renoise in this manner, the closer you start playing to an on-beat, the less correction will be needed and the smoother the adjustment will be.

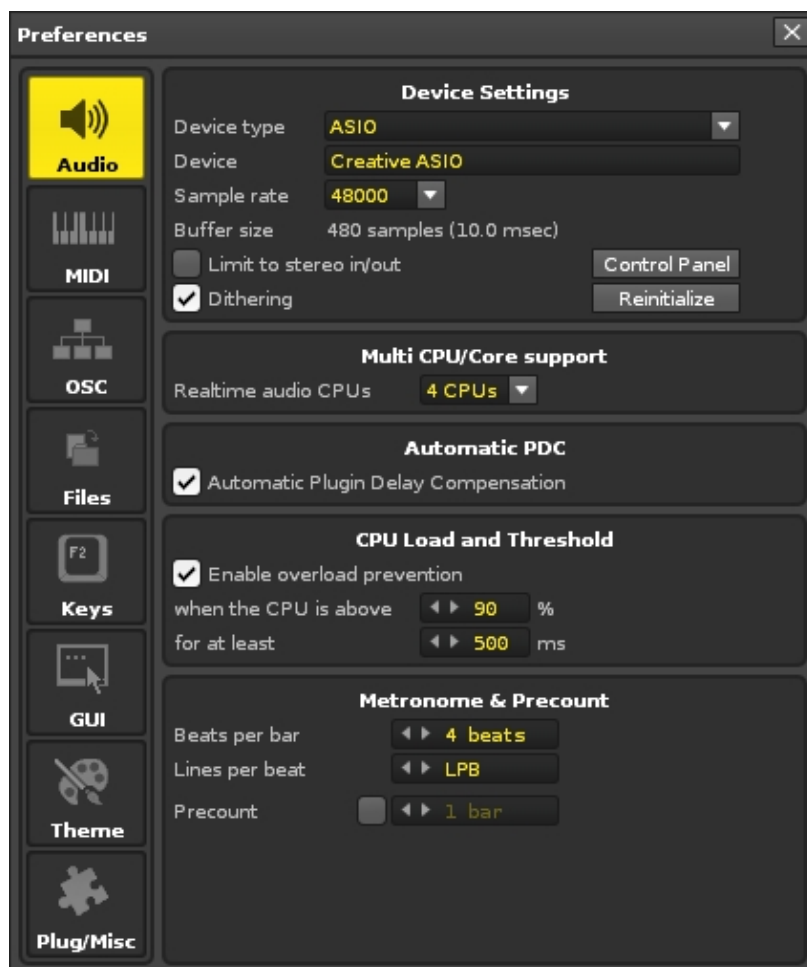
## 45 Preferences

The Renoise Preferences panel lets you set various general options for the program, such as soundcard settings, MIDI device settings, how files are loaded/saved etc. These settings need to be set only once and will be applied to all songs and sounds you create with Renoise.

To open the Preferences panel, choose "*Edit -> Preferences...*" from the main menu (Windows + Linux). On the Mac, choose "*Renoise -> Preferences...*".

When setting up Renoise for the first time, you should only need to tweak the Audio and MIDI pages. The rest of the default options should be sufficient until you are more familiar with Renoise. The [Setting Up Audio Devices](#) and [Setting Up MIDI Devices](#) sections of the manual can help you with the initial setup.

### 45.1 Audio



### 45.1.1 Device Settings (Windows)

- **Device Type:** Determines the sound driver that Renoise will use. On Windows you will have the choice between DirectSound and ASIO. If available, ASIO is highly recommended as it provides better timing with MIDI instruments and lower latencies in general.
- **In Device:** (*DirectSound only*) If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here. Choose "*Primary Device*" to use the system's default.
- **Out Device:** (*DirectSound only*) If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here. Choose "*Primary Device*" to use the system's default.
- **Sample Rate:** Select the Sample Rate for playback. All internal audio processing in Renoise will be done at this rate. The higher the Sample Rate, the more detailed the results will be, but also the more CPU power will be used.
- **Latency:** (*DirectSound only*) Set the buffer size affecting overall latency. Higher numbers will reduce the possibility of crackling sound at high CPU usage, but will also cause more latency (the time it takes the sound from Renoise to reach an output and be heard).
- **Use hardware buffers:** (*DirectSound only*) This option may speed up playback processing a bit, but only some soundcards support this. If you enable this option, then experiment with recording in the [Sampler](#) before deciding to use it permanently, as it may cause issues. If you experience strange results then disable this function.
- **Limit to stereo in/out:** (*ASIO only*) If you have a multi-IO soundcard, you can disable all inputs and outputs except for the main stereo pair. This may lead to better performance when you don't need the other channels.
- **Dither:** Apply dithering to the audio stream when the soundcard uses a bit depth of 8 or 16 bit. 24 and 32 bit audio is never dithered.
- **Control Panel:** (*ASIO only*) Opens the ASIO driver's control panel where you can configure your soundcard in more detail.
- **Reinitialize:** Shut down and then reopen all connections to the soundcard/driver. May be useful for troubleshooting.

### 45.1.2 Device Settings (OSX)

- **In Device:** If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here.
- **Out Device:** If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here.
- **Sample Rate:** Select the Sample Rate for playback. All internal audio processing in Renoise will be done at this rate. The higher the Sample Rate, the more detailed the results will be, but also the more CPU power will be used.
- **Latency:** Set the buffer size affecting overall latency. Higher numbers will reduce the possibility of crackling sound at high CPU usage, but will also cause more latency (the time it takes the sound from Renoise to reach an output and be heard).
- **Dither:** Apply dithering to the audio stream when the soundcard uses a bit depth of 8 or 16 bit. 24 and 32 bit audio is never dithered.

- **Reinitialize:** Shut down and then reopen all connections to the soundcard/driver. May be useful for troubleshooting.

### 45.1.3 Device Settings (Linux)

Setting up Linux for fast and reliable audio usage can be quite complex, depending on the distribution you are using. For general questions and FAQs regarding sound output on Linux, take a look at the Linux FAQ.

- **Device Type:** Determines the sound driver that Renoise will use. On Linux you have the choice between ALSA and Jack. ALSA will be available on all setups. Jack is more advanced, but also harder to set up and may have to be installed manually. Jack is highly recommended though, because it allows you to use several Jack based audio applications at once with the ability to route audio between them.
- **In Device:**
  - ♦ **ALSA:** If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here.
  - ♦ **Jack:** Select the number of input pairs you would like to pass over to Jack.
- **Out Device:**
  - ♦ **ALSA:** If you have multiple soundcards installed, you will be able to select the one you want to use with Renoise here.
  - ♦ **Jack:** Select the number of output pairs you would like to pass over to Jack.
- **Sample Rate:** (*ALSA only*) Select the Sample Rate for playback. All internal audio processing in Renoise will be done at this rate. The higher the Sample Rate, the more detailed the results will be, but also the more CPU power will be used.
- **Buffer Size:** (*ALSA only*) The base buffer size that will be used for audio processing in Renoise. Higher numbers will reduce the possibility of crackling sound at high CPU usage, but will also cause more latency (the time it takes the sound from Renoise to reach an output and be heard).
- **Periods/Buffer:** (*ALSA only*) How many "Buffer Sizes" will be used. The final latency for ALSA playback is: "*Periods/Buffer*" \* "*Buffer Size*". Some drivers need three buffers to work reliably, while others need only two. If you hear crackling output from Renoise, try changing this value or the setting for "*In Device*".
- **Use realtime priority:** (*ALSA only*) On most 'out of the box' Linux systems, applications are not allowed to execute realtime performance critical tasks. They are needed for realtime audio processing though, so they should be enabled when possible. Please see the Linux FAQ for more info about this topic. If you cannot configure your system to allow realtime tasks, then you can disable Renoise from trying with this option.
- **Enable Transport Support:** (*Jack only*) Send and receive time and transport information to/from other applications that are running with Jack. This is only useful to sync multiple audio applications together. If you are only running Renoise, this option should be disabled.
- **Dither:** Apply dithering to the audio stream when the soundcard uses a bit depth of 8 or 16 bit. 24 and 32 bit audio is never dithered.
- **Reinitialize:** Shut down and then reopen all connections to the

soundcard/driver. May be useful for troubleshooting.

#### 45.1.4 Multi CPU/Core support

- **Realtime Audio CPUs:** If you have a processor with multiple CPUs or cores, you can adjust how Renoise makes use of them for realtime audio processing. By default, all cores are used, which is highly recommended.

#### 45.1.5 Automatic PDC

- **Automatic Plugin Delay Compensation:** This automatically compensates all delays that some Renoise internal effects and VST/AU plugins introduce. Used to ensure all tracks and instruments are played back in sync. If you are troubleshooting, you may want to temporarily disable this option.

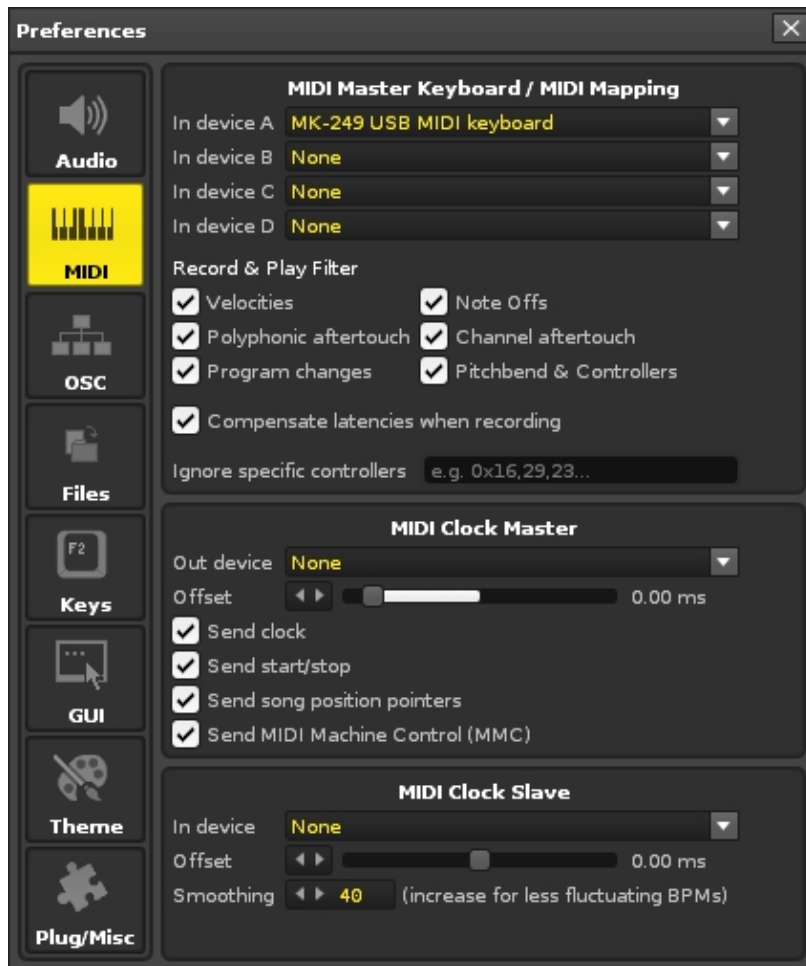
#### 45.1.6 CPU Load and Threshold

- **When the CPU is above, For at least:** - When the conditions are fulfilled, Renoise executes Panic (instantly stops all playback). This option prevents very high CPU loads from freezing your computer.

#### 45.1.7 Metronome & Precount

- **Beats Per Bar:** Set how many beat clicks (see Lines Per Beat below) will be treated as a bar.
- **Lines Per Beat:** Set how many lines in Renoise will make up a beat for the metronome.
- **Precount:** Toggles the precount option for [live recording](#) and the amount of bars to precount.

### 45.2 MIDI



### 45.2.1 MIDI Master Keyboard/Mapping

- **In Device A/B/C/D:** Select up to four devices to be used for general MIDI input in Renoise ([Recording and Editing Notes](#)) and for MIDI remote control ([MIDI Mapping](#)).
- **Record and Play Filters:** Toggle the input and recording of specific MIDI messages for Renoise. This only applies to recording into patterns and realtime playback.
- **Compensate latencies when recording:** Will automatically compensate for MIDI latencies, so that you record what you hear, not what you play.
- **Ignore specific controllers:** Explicitly prevent certain MIDI Control Change messages from being received and recorded. You can enter a list of CC numbers here, separated by commas.

### 45.2.2 MIDI Clock Master

- **Out Device:** Set a MIDI device that Renoise will send MIDI Clock data to.
- **Offset:** Manually shift all messages sent out to the devices by the given amount. This can be useful to manually compensate additional latencies that external devices introduce (audio latency is always automatically compensated by Renoise). Please note that the smallest possible negative latency is limited to the current latency of your soundcard. If you need further negative latency, you can

increase your audio latency in the [Audio Preferences](#).

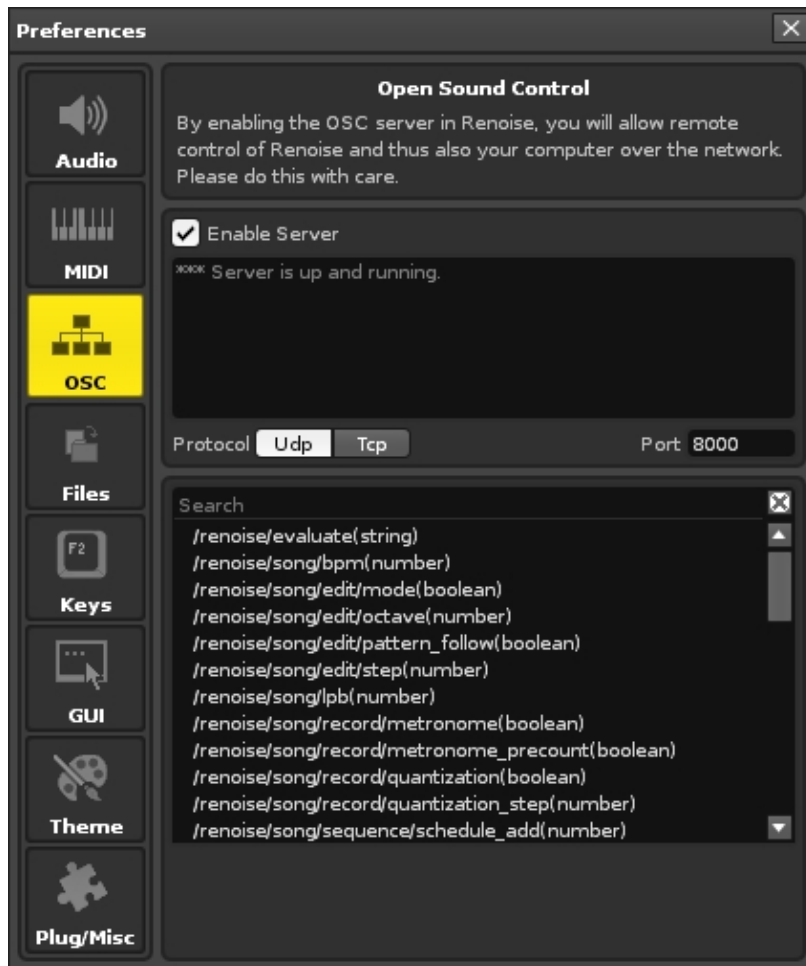
- **Send clock:** Include sending MIDI Clock pulse messages.
- **Send start/stop:** Include sending MIDI Clock start/stop messages.
- **Send song position pointers:** Include sending MIDI Clock song position messages.
- **Send MIDI Machine Control (MMC):** In addition to the MIDI clock, also send MMC sysex messages to sync external devices to Renoise.

### 45.2.3 MIDI Clock Slave

- **In-Device:** Select the MIDI Device that Renoise will use to receive MIDI Clock messages. When enabled, you can slave Renoise to a MIDI Clock master (a device which sends MIDI Clock messages). As soon as a MIDI Clock device is set, you will see a new option in the [Transport Panel](#). This option must be enabled to activate sync from external devices and so can also be used to toggle sync quickly without having to constantly open the Preferences.
- **Offset:** Manually shift incoming timing information by the given amount. This can be useful to manually compensate extra latencies that the external MIDI Clock devices introduce (audio latency is always automatically compensated by Renoise). Since Renoise can't predict the future, a negative latency setting will lead to the offset being gradually shifted to its requested position after playback starts.
- **Smoothing:** MIDI messages often only have very rough timing, so the beat clock messages transferred from a MIDI Clock master to Renoise may be imperfect. Depending on how precise the incoming MIDI clock stream is, you can use this option to set how fast Renoise should react to changes from the MIDI Clock master. The higher the Smoothing value, the more stable the sync will be, but the slower Renoise will react to 'real' BPM changes from the master. Try playing around with the Smoothing to find a good value for your setup.

## 45.3 OSC





### 45.3.1 Server

Enable the server by checking the checkbox. Note that when enabling the server, you are opening up a port that listens to incoming traffic upon that port. If you are not planned to use OSC messaging between Renoise and any other OSC client, you are advised to leave the OSC server off. Beneath the checkbox is the messaging log window that shows you the incoming data and gives feedback if the data is sent correctly or not correctly

- **Protocol:** Either choose UDP (local network and anything close) or TCP (Remote networks requiring more secure feedback if packages arrive)
- **Port:** Port number, by default 8000 but can be changed to any desired port.

### 45.3.2 Renoise OSC messaging protocols

Renoise holds four sub-trees in its own messaging tree `/renoise/`:

- **evaluate** - Send Lua strings for Renoise to evaluate
- **song** - Send song specific triggers to activate
- **transport** - Send transport specific triggers to activate
- **trigger** - Send note specific triggers to activate

Detailed OSC description: [Open Sound Control](#)

Other locations containing info about how to use the OSC Messaging system visit <http://scripting.renoise.com/>

## 45.4 Files



**Note:** All import options mentioned below can also be quickly accessed in the [Disk Browser](#) by right-clicking the file, then choosing "Load File with Options..."

### 45.4.1 WAV Import

Applies to WAV, FLAC, AIF, OGG and MP3 files.

- **Create multi-sample instruments:** When enabled, and multiple samples are loaded at once in the [Disk Browser](#), Renoise will load all samples into a single instrument and create a drum kit mapping, using the drum kit settings from the [Keyzones](#). When the option is disabled, each sample will be loaded into a new instrument.

- **Import loop settings from files:** Enables the importing of loop settings that are saved along with WAV, FLAC and AIF files.
- **Autoset 'Sync' Settings:** When loading samples, Renoise automatically estimates a good beat-sync value in the [Sample Properties](#), overwriting previous values. If you don't want this to happen, disable it here.

## 45.4.2 Raw Audio Import

Applies to any non-audio files that are forced to be loaded as audio. See [Importing Raw Audio](#) for more details.

- **Bits:** Bit-rate that will be applied to the imported raw sample.
- **Sample Rate:** Sample rate of raw samples.
- **Skip header bytes:** Will skip the specified number of bytes and not treat them as audio data.
- **Big Endian:** Select the byte order that will be used for the raw sample import. Only applies to bit depths of 16 or more.

## 45.4.3 Device Chain Import

Applies to XRNT files.

- **Replace Existing Chain:** When enabled, loading a device chain will completely erase all existing devices first. When disabled, the imported chain is appended.

## 45.4.4 MIDI Import

Applies to MID or MIDI files.

- **Create instruments:** Create instruments based upon the instruments used in the MIDI file. When disabled, only notes and CC events are imported and so instruments have to be set up manually.
- **Create \*Instr. MIDI Control Devices:** Create MIDI Control devices to import and send MIDI control change messages (e.g. modulation wheel).
- **Lines per Beat:** Set the Lines Per Beat resolution that will be used for the new song. The higher the value, the more precisely MIDI events can be plotted into the new song.
- **Lines per Pattern:** Divide the imported MIDI song into patterns of the given length.
- **MIDI Device:** Choose the MIDI device for selecting the MIDI instruments from (and send output to).

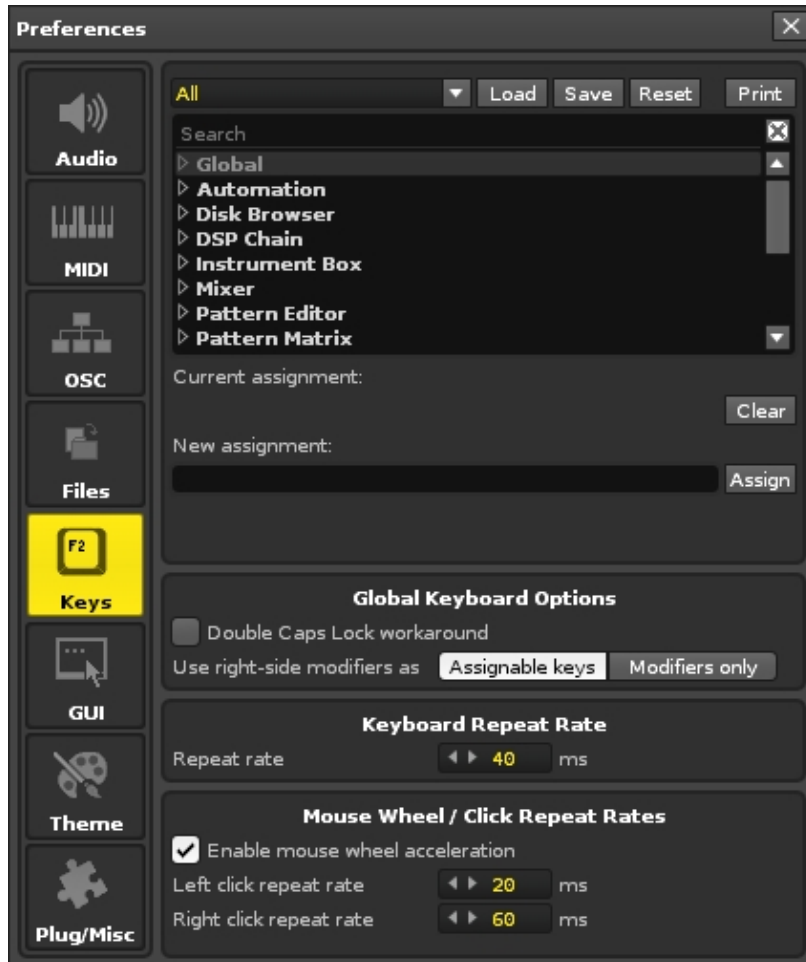
## 45.4.5 Song/Instrument Export

Applies to exported XRNI (Renoise Instrument files) and XRNS (Renoise Song Files).

- **Sample Format:** Select how samples are stored in Renoise song or instrument files. XRNI and XRNS files are regular zip files with a custom extension, so it is possible to open them with any tool which can use zip files (e.g. WinRar/WinZip on Windows, Stuff-it on OSX) and extract all of the samples manually. "Flac" will

result in smaller files and should be used by default. "Wav" files might be useful if you later want to extract the files and use them in other programs.

## 45.5 Keys







### 45.5.1 Keyboard Mapping List

All of the keyboard shortcuts in Renoise can be re-configured. Above the list you can choose the Focus of the mappings, which changes the part of the interface that the shortcuts apply to. Selecting "All" will give an overview of all existing keyboard shortcuts in Renoise, making it easier to search for a specific setting.

There are many mappings which are not assigned by default, so if you need to create one that does not exist yet, take a look at the available mappings in the relevant section. To change or create a keyboard mapping, select the mapping in the list and click on the "New Assignment" box. Press the key combination you would like to use and then hit the 'Assign' button. If the given combination is already used somewhere else you will be warned of this. The new configuration will be saved automatically.

## 45.5.2 Importing/Exporting Keyboard Mappings

-  - Load a saved set of key-bindings.
-  - Save a custom set of key-bindings.
-  - Reset to the default key-bindings.
-  - Display the current key-binding layout in your default browser in a print-friendly format.

## 45.5.3 Global Keyboard Options

- **Double Caps Lock workaround:** If your Caps Lock key is not behaving as normal (requiring two presses, or entering two Note Offs instead of one), then enable this option.
- **Use right-side modifiers as:** Changes whether the right-side Control/Shift/Alt keys are to be used as modifiers (in combination with other keys, e.g. Ctrl + Z) or can be assigned functions on their own.

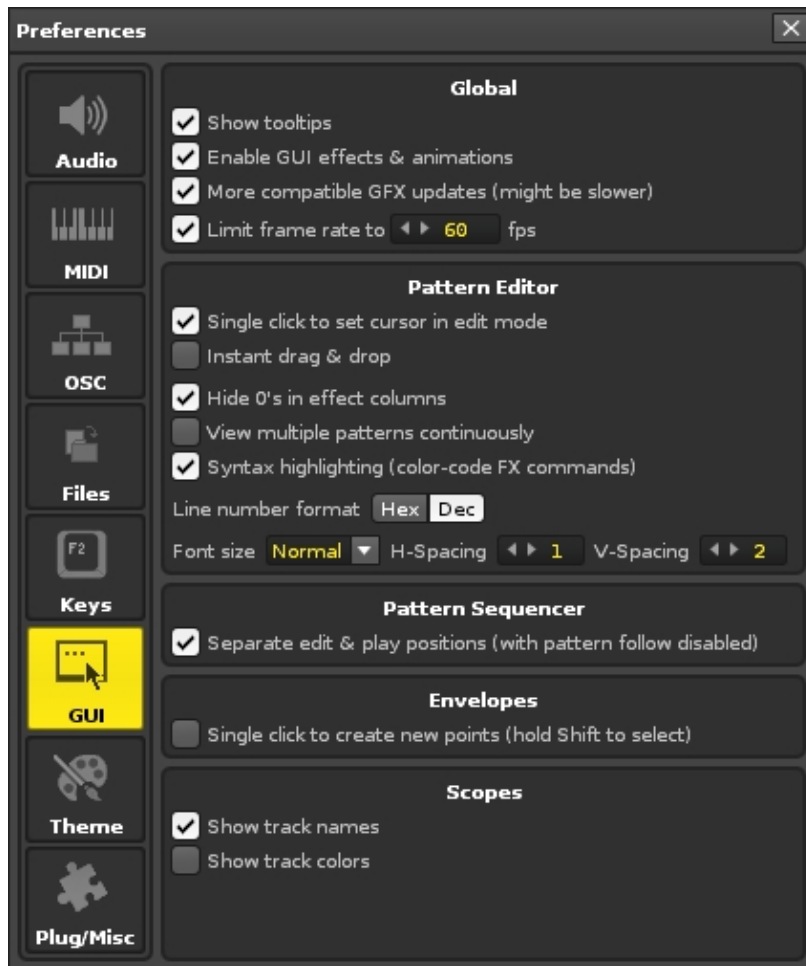
## 45.5.4 Keyboard Repeat Rate

- **Repeat Rate:** Configure how fast Renoise repeats key presses.

## 45.5.5 Mouse Wheel/Click Repeat Rate

- **Enable mouse wheel acceleration:** Will make the use of the mouse wheel more sensitive.
- **Left-Click Repeat Rate:** Set how fast changes to a value with a left-click will be repeated (e.g. increasing the BPM using the small arrows).
- **Right-Click Repeat Rate:** Same as above, but for right mouse button clicks.

## 45.6 GUI



The GUI options allow the customisation of the general display behaviour in Renoise.

### 45.6.1 Global

- **Show tooltips:** Toggles the displaying of tooltips when the mouse pointer hovers over a significant part of the interface for a second.
- **Enable GUI effects & animations:** When enabled, Renoise will use animations in some parts of the interface, e.g. smooth scrolling, fading of menus, transparency etc. Disable this option if you dislike them or are using a very slow computer.
- **More compatible GFX updates (might be slower):** (*Windows only*) Uses a possibly slower method of drawing the Renoise GUI with your graphics card. This option should be kept on unless it needs to be disabled to avoid problems with multi-monitor setups.
- **Limit frame rate to:** Set how fast the Renoise GUI will update itself. Lower values require less CPU power, while higher values result in a more responsive user interface. Disabling the frame rate will allow Renoise to use the necessary amount of CPU power to update the GUI as responsively as possible.

## 45.6.2 Pattern Editor

- **Single click to set cursor in edit mode:** This allows a single left-click in a pattern to move the cursor to that exact position when Edit Mode is on. When Edit Mode is off, it also allows a single left-click to move the cursor to that column without changing the pattern line. A double-click will always move the cursor to that exact position regardless of whether this option is enabled or not.
- **Instant drag & drop:** When enabled, clicking upon a selected area in the Pattern Editor will instantly start to drag the selection. When disabled, you have to click and hold for a second to drag.
- **Hide 0s in effect columns:** Hides 0s in the effect columns.
- **View multiple patterns continuously:** Show previous/next patterns at the edges of the current pattern.
- **Syntax highlighting (color-code FX commands):** Highlights different types of pattern effect commands with different colors.
- **Line number format:** Use either decimal or hexadecimal for the Pattern Editor line numbers.
- **Font size:** Choose between four font sizes.
- **H-Spacing:** The horizontal spacing between individual letters and numbers.
- **V-Spacing:** The vertical spacing between lines.

## 45.6.3 Pattern Sequencer

- **Separate edit & play positions (with pattern follow disabled):** When enabled, the sequencer's playback position will be detached from the edit position when [Pattern Follow](#) is disabled.

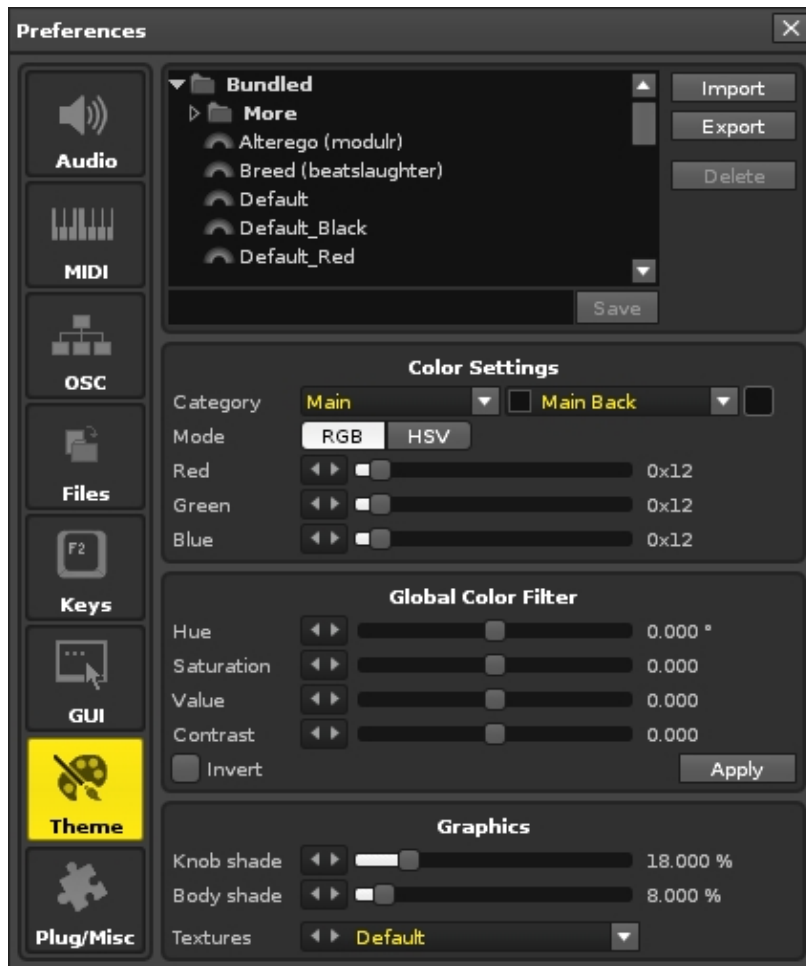
## 45.6.4 Envelopes

- **Single click to create new points (hold Shift to select):** When enabled, reverts to the old behaviour of a single left-click to create new points in envelopes.

## 45.6.5 Scopes

- **Show track names:** Deactivating this will remove the track names from the Scopes and display their track numbers instead.
- **Show track colors:** Show the [background colors selected for each track](#) as the background color of its [Track Scope](#).

## 45.7 Theme



### 45.7.1 Theme Files

Import/Export the current colour settings to a file. Theme files can also be Imported/Exported in the [Disk Browser](#).

### 45.7.2 Color Settings

Change individual colour settings. Colours are organized into multiple categories.

### 45.7.3 Global Color Filter

Adjust all colour settings at once by applying Hue, Saturation or Value changes to them.

### 45.7.4 Graphics

Change the texture set and bevel amounts that are used for the current Theme.



## 45.8 Plugins/Misc



### 45.8.1 Audio Unit Plugins (OSX only)

- Enable the use of Audio Unit plugins in Renoise.

### 45.8.2 LADSPA Plugins (Linux only)

- Enable the use of LADSPA plugins in Renoise.

### 45.8.3 VST Plugins (Windows, Mac & Linux)

- Select up to two folders where Renoise will scan for VST plugin files. The folders can be temporarily deactivated with the small check boxes.

### 45.8.4 Plugins General (Windows, Mac & Linux)

- **Rescan previously failed plugins:** When hitting the "Rescan" button, Renoise will try to open plugins that failed to open in previous scans. Plugins which caused a crash upon scanning are never rescanned though, unless you delete the VST cache files in the Renoise preferences folder. When this option is

disabled, hitting the "Rescan" button will only look for new plugins.

- **Rescan:** Rescan for new plugins or try to rescan previously failed plugins (see above).
- **Scan for new plugins on startup:** By default, Renoise will always start scanning for new plugins when launched. If you have a large amount of plugins installed then disabling this option can vastly improve startup time. If disabled, then after installing new plugins you will have manually scan for them with the "Rescan" button, as described above.
- **Run all plugins in sandboxes (?separate process):** When enabled, plugins will be started in their own process, preventing bugged ones from crashing Renoise.

## 45.8.5 Backup

- **Auto save backups:** When enabled, Renoise will periodically save backups of your current song. For existing songs, the backups are saved into a new folder named after the song. For Untitled songs, the backups will be saved into the Renoise preferences folder.
- **Save also during playing:** When enabled, backups will be saved as songs are playing, which could possibly cause interruptions in the audio. If you want to avoid this while composing, disable this option.
- **Save every xx minutes:** How often backups will be saved.
- **Keep xx backups:** Specify how many revisions of the backups will be kept.
- **Save at:** Instead of being saved next to the original song files, you can specify a folder to place the backups.

## 45.8.6 Misc

- **Auto play songs after loading:** When enabled, Renoise will automatically start playback as soon as a song is loaded.
- **Stop playing notes on pattern sequence navigation:** When navigating around in the [Pattern Sequencer](#), Renoise will stop all playing notes and then skip over to the new pattern to continue playback, avoiding 'hanging' notes. You can disable this behaviour here.
- **Update automation on song position changes:** When navigating around in the [Pattern Sequencer](#), Renoise will ensure that any changes to pattern or envelope Automations are correctly updated. You can disable this behaviour here.
- **Space record/stop mode**
  - ◆ **Renoise:** Use the space key to start/stop playing.
  - ◆ **FT2:** Use the space key to stop the song or toggle Edit Mode if the song is already stopped.
- **Mute mode (left click):**
  - ◆ **Off:** After a track is muted, any existing sounds may carry on until finished, but notes and other events will not be triggered (Soft Mute).
  - ◆ **Mute:** The track is played back completely and can be immediately silenced/unmuted without affecting how any of the sounds are executed (Mixer Mute).
- **Solo mode (right click):**

- ◆ **Mute Others:** Solo-ing a track will cause all other tracks to be muted. Unsolo-ing will unmute all other tracks.
- ◆ **Solo:** Solo-ing and unsolo-ing track will retain the mute states of all other tracks.

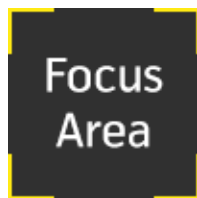
## 46 Keyboard Shortcuts

Renoise features an enormous amount of keyboard shortcuts, but in the previous topics we often only noted a few of the important ones. Besides those, there are many other shortcuts available and even unassigned shortcuts, which you can customise yourself if they fit well into your work-flow.

### 46.1 Keyboard Focus Concept

Renoise utilises a shortcut Focus system for the keyboard, which means that most keyboard shortcuts only apply to a specific region in the interface. We will refer to those as *local*. Other shortcuts apply to all regions and we will refer to them as *global*.

The currently focused area is indicated by small corners that are coloured yellow by default:



To change the Focus area, you can either:

- Click anywhere in Renoise with the middle mouse button.
- Left-click anywhere in Renoise while holding down the "Left Alt" key.
- Right-click anywhere in Renoise and choose "(Set Keyboard Focus Here)" from the context menu.
- Use the shortcuts "Left Control/Command + TAB" or "Left Control/Command + Left Shift + TAB".

Here is a small example on how to use the Focus:

When you start up Renoise, the [Pattern Editor](#) is focused by default. If you use the arrow keys then the Pattern Editor's cursor will start moving around. Now left-click somewhere in the [Disk Browser](#) while holding down the "Left Alt" key, which will set the Focus to the Disk Browser. Notice that the orange corners now surround the Disk Browser and the arrow keys move around to select files and folders.

The idea behind this is that the main components of Renoise (such as the Pattern Editor) should always be ready for editing. The keyboard Focus should not move loosely around, unless you want it to. If you want it to, you can change it via the "View->Lock Keyboard Focus" option in the Upper Status Bar.

## 46.2 Customising and Printing Shortcuts

Using the menu panel "*Edit->Preferences->Keys*", you can customise any keyboard shortcut and also print out a list of the currently set shortcuts. To print the shortcuts, simply click the **Print** button in this dialog:



## 46.3 List of Important Shortcuts

Below is a list of the most commonly used keyboard shortcuts (Mac users: Replace "*Control*" with "*Command*" and "*Alt*" with "*Option*" below):

Renoise also supports most of the common shortcuts that apply to any application: "*Left Ctrl + X*" (Cut), "*Left Ctrl + C*" (Copy), "*Left Ctrl + V*" (Paste), "*Left Ctrl + Z*" (Undo), "*Left Ctrl + Y*" (Redo).

## 46.3.1 Global

### 46.3.1.1 Panel Switching

- **F1, F2, F3, F4, F5, F6, F7, F8:** Activate Window Layout Presets

**Tip:** You can save and customise the layouts by right-clicking on the 1, 2, 3, 4, 5, 6, 7, 8 buttons at the top right of the Renoise interface. The current keyboard Focus is also saved with the preset.

### 46.3.1.2 Play and Record

- **Space:** Start/Stop playing.
- **Enter:** Only play the line directly under the cursor (play step by step).
- **Right Alt:** Start playing and looping the current pattern.
- **Right Ctrl:** Start playing the song.
- **Right Shift:** Start playing the song with Edit Mode enabled.
- **Escape:** Toggle Edit Mode.
- **Numpad Enter:** Activate Block Loop and start playing.

### 46.3.1.3 Instruments

- **Numpad / \*:** Decrease/increase keyboard octave.
- **Numpad - +:** Decrease/increase instrument slot selection.
- **Numpad 1-9:** Select instrument from instruments visible in the Instrument Selector.
- **Left Alt + Left/Right Arrow Keys:** Jump up/down a page in the Instrument Selector.
- **Left Alt + Up/Down Arrow Keys:** Select previous/next instrument.

## 46.3.2 Pattern Editor

### 46.3.2.1 Edit Step & Navigation

- **Left Ctrl & - +:** Decrease/increase the [Edit Step](#) value.
- **Left Ctrl & 1-0:** Set the [Edit Step](#) number.
- **Left Ctrl & Shift & 1-0:** Set note quantize amount.
- **Arrow Keys:** Navigate through the Pattern Editor.
- **PageUp/PageDown:** Move up/down in pattern.
- **Home/End:** Go to start/end line of pattern.
- **F9:** Move cursor to line 0.
- **F10:** Move cursor 25% of the way down the pattern.
- **F11:** Move cursor to the centre of the pattern.
- **F12:** Move cursor 75% of the way down the pattern.

#### 46.3.2.2 Note-Off

- **Caps-Lock:** Insert a Note-Off when Edit Mode is enabled.

#### 46.3.2.3 Cut/Copy/Paste

- **Left Ctrl + X:** Cut selection to clipboard.
- **Left Ctrl + C:** Copy selection to clipboard.
- **Left Ctrl + V:** Paste contents from clipboard to target.
- **Backspace:** Delete all notes and effect commands at the current line in the track and scroll everything beneath the current line up.
- **Insert:** Insert clean row into track and push all notes and effects in current track down.
- **Left Ctrl + Left Shift + Delete:** Delete note under cursor and scroll column beneath current note up.
- **Left Ctrl + Left Shift + Insert:** Insert clean row into column and push all data in current column down.
- **Left Ctrl + Left Shift + Left/Right arrow:** Remove/add note or effect column.
- **Left Shift + F3:** Cut current track.
- **Left Shift + F4:** Copy current track.
- **Left Shift + F5:** Paste current track.
- **Left Ctrl + F3:** Cut current pattern.
- **Left Ctrl + F4:** Copy current pattern.
- **Left Ctrl + F5:** Paste current pattern.
- **Left Alt + F3:** Cut current selection in pattern.
- **Left Alt + F4:** Copy current selection in pattern.
- **Left Alt + F5:** Paste current selection in pattern.

#### 46.3.2.4 Pattern Sequencer

- **Left Ctrl + Left/Right Arrow Keys:** Change number of current pattern.
- **Left Ctrl + Up/Down Arrow Keys:** Move to prev/next pattern in sequence.
- **Left Ctrl + Home:** Go to first pattern in sequence.
- **Left Ctrl + End:** Go to last pattern in sequence.
- **Left Ctrl + Insert:** Insert new pattern into sequence.
- **Left Ctrl + Delete:** Delete current pattern in sequence.