



Traverso

User Manual

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English

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1. Introduction

Traverso is a multitrack audio recording and editing programme for GNU/Linux with special emphasis on an intuitive, clean, and above all efficient user interface. It uses a contextual interaction concept—instead of relying on the mouse to operate on graphical objects, combinations of mouse and keyboard are used to control the programme. This results in a higher flexibility and much faster control of the programme compared to the 2 or 3 mouse buttons available in the traditional approach. The mouse only has to be placed on an object and all functions become available instantly by pressing a key on the keyboard. Since the object under the mouse cursor is automatically selected, this concept is called “soft selection”.

1.1. License

Traverso is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.

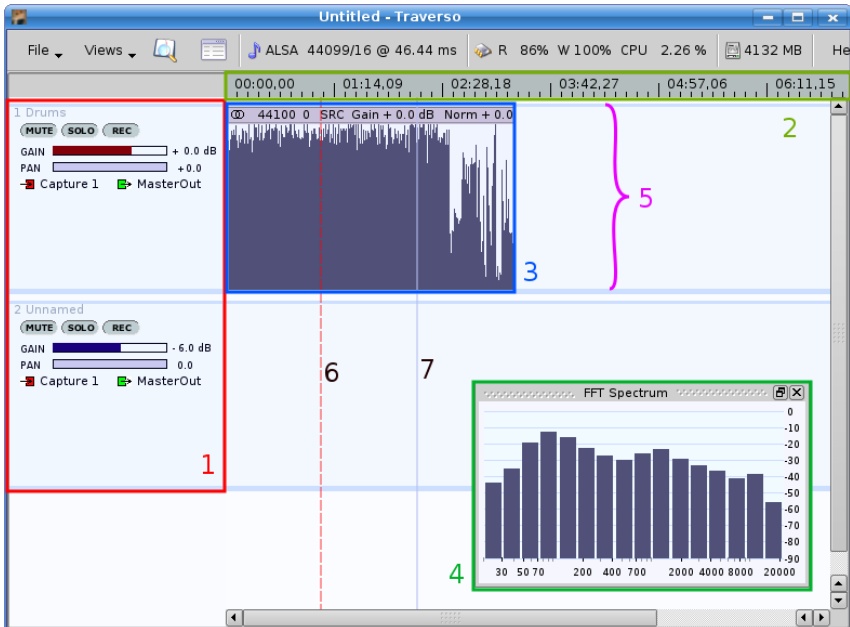


Figure 1.1.: GUI elements of Traverso: 1 Track panel; 2 Time line; 3 Audio clip; 4 Dock window / Dock widget; 5 Track; 6 Work cursor; 7 Play head.

1.2. Conventions

The main window of Traverso contains different regions which are sensitive for soft selections. The nomenclature used in this manual is shown in figure 1.1.

If the mouse points to a graphical object, some key command has to be performed, for example to mute an audio clip, or modify the gain of a track. A key command is a single key press, a combination of key presses, or a key hold action in combination with a mouse movement. Don't be afraid, this is not as difficult as it sounds! The following description shows how the different categories of key actions are notated and how they are performed.

1.2.1. Single Key Action: Press and Release

This action is noted as follows:

<K>

This reads as: “Press and Release a Key”, just like if you were typing in a letter. “K” is the key you should use. (*Note:* Even though capital letters are used to write down these actions, you should just press the “K” key and never use shift or caps lock, unless it is explicitly mentioned.) For example:

<F>

means press and release the “F” key.

1.2.2. Single Key Action: Press and Hold

This action is noted as follows:

[K]

This reads as: “Press and Hold the Key”. Pretty self explanatory, in a text editor you would get lots of kkkkkkkkkkk. . . . Again, “K” is the letter associated with this action. For example:

[D]

means press and hold the “D” key.

Hold keys in itself don’t do anything. However if a “hold key” is active, and you move the mouse, an “analogue” action can be performed like moving an audio clip.

1.2.3. Single Key Action: Press and Release Twice

This action is noted as follows:

«K»

It reads as: “Press and Release the key twice”. Like typing in one letter twice, rather fast, like a double click. For example:

«G»

means press and release the “G” key twice.

1.2.4. Double Key Action: Press and Release

This action is noted as follows:

<K K>

This reads as: “Press and Release 2 keys at once”. One of the more difficult actions. For example:

<F G>

means press and release both the “F” and “G” key at the same time.

1.2.5. Double Key Action: Press and Hold

This action is noted as follows:

[K K]

It reads as: “Press and hold 2 keys at once”. For example:

[F G]

means press and hold at the same time both the “F” and “G” key.

The same idea applies as for the “Single Key Action: Press and Hold”, however you have to press and hold 2 keys. This is a bit more difficult to do than with a Single Key Action, and is meant for more advanced usages/users.

1.2.6. Double Key Action: Press and Release Twice

This action is noted as follows:

«K K»

It reads as: “Press and Release the 2 keys twice”. A difficult action to learn. Two keys have to be pressed and released at the same time, two times rather fast after each other! For example:

«F G»

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means press and release both the “F” and “G” key at the same time twice.

This key command isn’t used much actually, due the fact it’s rather hard to perform. But this makes it an ideal candidate for destructive actions!

Although most of the actions in Traverso can be undone, it still makes sense to have this type of action available. It doesn’t make you do anything by accident which could be potentially unrecoverable.

1.3. Motivation

It was already mentioned above that one of the motivations to introduce the concept of soft selection was our believe in the superiority over the traditional point-and-click concept in regard to efficiency, speed, and ergonomics. Users who are new to Traverso often have difficulties seeing the advantage, because something that breaks with existing standards requires time and effort to learn, and it takes even more time to overcome long-trained habits. But let’s have a look at the different working styles with a trivial example.

The “analogue way”

In an analogue recording studio with a mixing desk, you have lots of channels, and each channel has lots of buttons, faders, knobs etc. If you want to switch something, e.g. solo or mute one track, you identify the channel strip on the mixing desk, and press the corresponding button. If you want to do the same with several channels, you can quickly press many buttons in a row. Once you have found the right button (which is not always trivial, depending on the size of the desk), switching it is a fast, natural, and simple task.

The “Digital Way”

On a conventional digital audio workstation (DAW) you identify your channel and press the corresponding solo or mute button with the mouse. Depending on the user’s skills and the size of the button, this can already be a minor challenge. Switching several channels in a row, however, is very slow and inefficient, because hitting the button requires careful positioning of the mouse cursor each time.

The “Traverso Way”: Soft Selection

In Traverso you move the mouse over the track you want to process, and press a key on the keyboard, e.g. <U> for mute, or <O> for solo. Even users with average skills usually find the key without looking at the keyboard. The track panel is a large area, which is entirely sensitive for the key actions, so even if several tracks should be switched, the mouse cursor can be placed anywhere on the track, which requires much less aiming.

So what is the difference between the digital and the Traverso way? In our opinion, moving the mouse on the desk in order to move the cursor on the screen is like using a remote control or a “finger extension”. Imagine you were allowed to press buttons on your analogue mixing desk only by using a 30 cm long ruler. You would have to target carefully, and would miss the tiny button some times. All in all it would be very tiring and time consuming. Pressing buttons with our fingers, one for mute, one for solo etc., is more ergonomic and intuitive, and we tried to find an interface concept for Traverso that gives a feeling as direct as analogue buttons, without requiring additional hardware control surfaces. So once we have identified the channel we want to process (in Traverso this is done by hovering the mouse cursor over it), we want a real world button for each function to press with our real world fingers. And since our left hand could as well be ready on the keyboard instead of picking our nose, we have all the 104 buttons of our keyboard at our disposal which can give direct access to a large number of functions. This concept is closely related to the handling of action games (e. g. “first-person shooters”), which are highly optimized for efficient and intuitive access to various actions (moving, running, shooting, ducking, ...) and a large number of tools. In summary, the advantages of these concepts are:

- the distances on the keyboard are shorter than on the screen
- the hit-to-miss ratio for key strokes is usually much better than for clicking buttons with the mouse
- using both hands allows to work faster and relieves the mouse hand, resulting in a less fatiguing working style
- the “remote control” feeling is reduced

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- more actions can be reached directly, requiring less and shallower menu structures
- the keys can be found blindly, leading to less distraction from the work flow

The downside is a steeper learning curve, particularly at the very beginning, since the keys are labeled with “A, B, ...Z” rather than with the function name (“Solo, Mute, Rec” etc.). But you will soon internalise the commands just as you did with “Ctrl+C” for copy and “Ctrl+V” for paste. As for the higher efficiency: Could you imagine driving your car, and when approaching a red light first having to open the menu “brakes”, choose the sub-menu “change hydraulic pressure”, and adjust the pressure for each wheel manually with the mouse?

2. Installation

The most convenient way to install Traverso is to use the precompiled packages. For Traverso 0.40.0 packages are available for (K)Ubuntu 6.10 Edgy Eft and Gentoo (ebuild). However, in the fast-moving open source world things change rapidly. It is thus recommended to refer to the Traverso homepage in order to find up-to-date information on binary packages. Alternatively, compilation from source is the second best option, and explained in detail here. It's actually quite simple as you will see! The last option if the two former don't work, is to download the "ready to run binary", which is usually provided for the i386 platform on the Traverso website.

2.1. Binaries

The precompiled binaries (or in case of Gentoo an ebuild) are either available for download on the download page:

```
http://vt.shuis.tudelft.nl/~remon/traverso/
```

or from our (K)Ubuntu repository. Add the line:

```
deb http://www.doebelin.org/traverso binary-i386/
```

to your `/etc/apt/sources.list` file. You will require administrator permissions to alter this file. Then use your favourite package manager and update the package information. Traverso should now appear in the list of available software, where you can mark it for installation.

2.2. Compiling from Source

This section describes how to compile Traverso from source on a (K,X)Ubuntu 6.10 Edgy Eft system. For other distributions, the package

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names may be somewhat different, but you should be able to identify the correct package with your distributions package manager. Note that Traverso requires Qt libraries version 4.2.3 or newer.

First you will need to make your system fit to compile Traverso. And while we're at it, install some more useful packages. Use your favorite package manager (like synaptic or adept) to install the following packages:

- libqt4-core, libqt4-gui, libqt4-dev
- libsndfile1, libsndfile1-dev
- libsamplerate0, libsamplerate0-dev
- libjack0.100.0-0, libjack0.100.0-dev
- libasound2, libasound2-dev
- fftw3, fftw3-dev
- jackd, qjackctl, gcc, g++, make
- build-essential

On (K,X)Ubuntu the following will get you going:

```
$ sudo apt-get install build-essential libqt4-core \
libqt4-gui libqt4-dev libsndfile1 libsndfile1-dev \
libsamplerate0 libsamplerate0-dev libjack0.100.0-0 \
libjack0.100.0-dev libasound2 libasound2-dev \
fftw3 fftw3-dev jackd qjackctl gcc g++ make
```

If some packages are not available, you should enable the universe repository. Instructions on how to add repositories are available for Kubuntu and Ubuntu on the distribution website and related forums / wikis.

In case you have version 3 of the Qt library installed, you must make sure that the tools of version 4.2 are used. Open a terminal, enter the following commands and always select the Qt4 version when asked:

```
$ sudo update-alternatives --config qmake
$ sudo update-alternatives --config moc
$ sudo update-alternatives --config uic
```

Now your system is ready to compile Traverso from source! Download the latest stable release of Traverso from the Traverso homepage. Extract it in some directory like `/home/you/traversosource/` and compile it with the following commands:

```
$ tar -zxvf traverso-x.x.x.tar.gz
$ cd traverso-x.x.x
$ qmake
$ make
```

This will take some time, and if you followed the instructions above carefully, it should run through without errors. When the make process has finished and you get back the usual command line, check the last 10 lines for the word “Error”. If you don’t find it, everything is ok. If you find it, check again if you followed the instructions above correctly. Now you can install the software by typing the following lines:

```
$ sudo make install
$ sudo echo /usr/local/lib >> /etc/ld.so.conf
$ sudo ldconfig
```

To start `traverso`, type `traverso` in a command shell, or start it from the application menu of your desktop environment.

3. Setting It Up

3.1. The Project Directory

This chapter assumes that you have Traverso 0.40.0 or later installed on your system. If not yet so, please refer to chapter 2 and come back afterwards.

Start Traverso by typing `traverso` in a shell. The first thing you will see is a file dialog asking you for the project directory. If you don't have one yet, create a new one. This directory will contain all projects, including the audio files. So be aware that if you want to do some serious audio work, you will need *lots* of hard disk space. Change into the directory and press OK. After confirming your selection, the Traverso main window will be shown (fig. 3.1). How to change the project directory once it has been set will be explained later.

3.2. The Main Window

If the main window looks as cluttered as in figure 3.1, you can easily rearrange it by dragging the dock widgets to another position. Just grab each one by the title bar and drag it to a new position. You can even stack the dock widgets on top of each other or detach from the main window and move freely. The latter is particularly handy with dual-screen setups, for the main window can occupy one screen, and the dock windows can be moved to the second screen (fig. 3.2).

3.3. The Driver Backend

Traverso supports three driver backends: The Null driver, ALSA, and the jack soundserver. Let's have a look at all three of them, what the advantages and disadvantages are, and how to set them up correctly. The currently loaded driver is displayed in the menu bar.

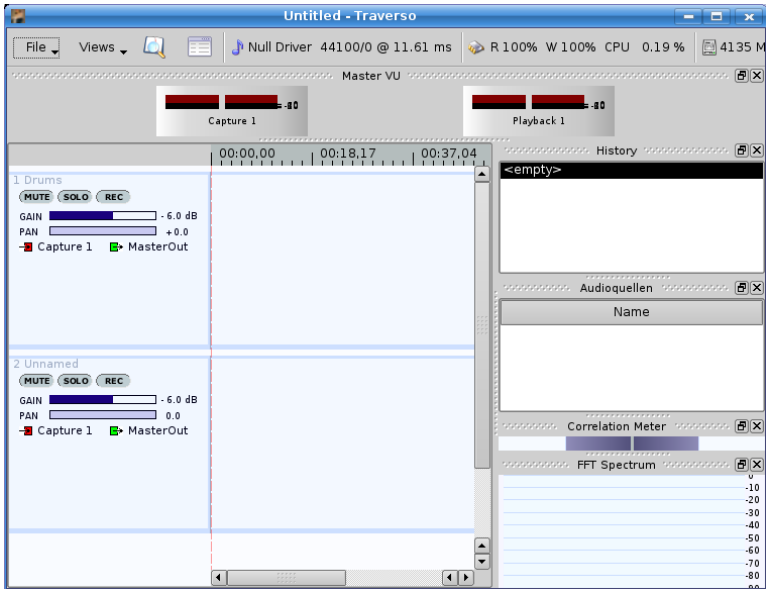


Figure 3.1.: The main window of Traverso possesses several sub-windows (dock widgets) which can be re-arranged by dragging to other positions, allowing for an individual window configuration.

3.3.1. Null Driver

The Null driver is a fallback solution which is set if no other driver is available, but you won't hear any output as long as the Null Driver is loaded. Hence there's hardly a situation where you want to load it manually. To select a valid driver, click on the *Null Driver* label in the menu bar to open a configuration dialog (fig. 3.3).

3.3.2. ALSA

If ALSA is selected, Traverso communicates directly with the ALSA layer, which is only possible if no other application occupies the sound system. So before selecting ALSA as your driver, make sure you terminated all

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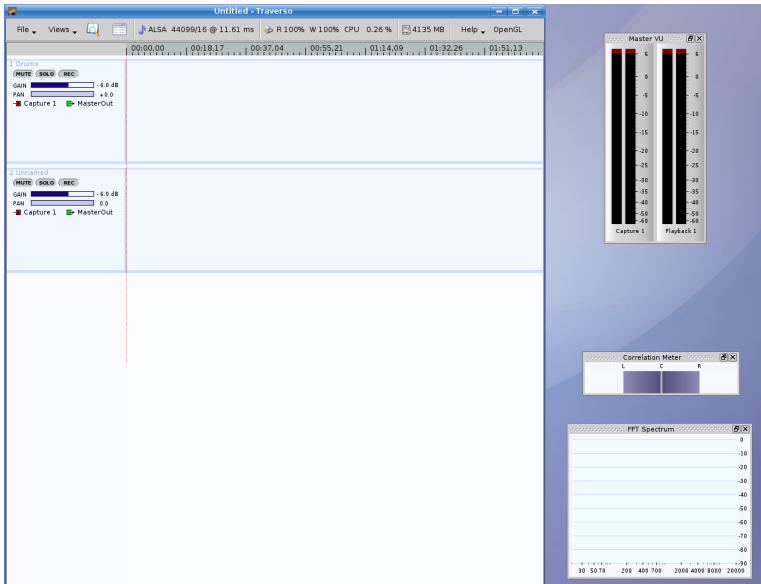


Figure 3.2.: The dock windows can also be detached from the main window and moved to the second screen in a multi-screen setup.

other sound applications. Also check the KDE/Gnome system tray for minimized instances of amarok, XMMS, etc. Back in Traverso's driver configuration dialog set the driver to *ALSA*, the rate to 44100, and leave the latency. Then press *Save* and *Apply* and check if the entry in the menu bar has switched to *ALSA*. If it refuses to load the new driver, your sound card may still be occupied by another application, so check again if you correctly terminated all multimedia applications and make sure no sound daemon (e. g. aRTs) is running. Then try again to set the driver to *ALSA*. If it was accepted as a valid driver, the sound driver is set up correctly.

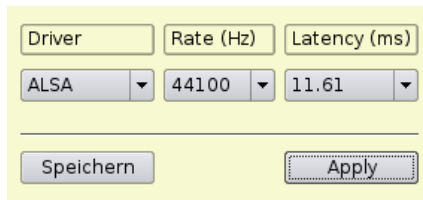


Figure 3.3.: The audio driver backend can be selected from the menu bar. Traverso supports ALSA and jack drivers, and has a *Null Driver* as fallback solution if no working driver is available.

3.3.3. Jack

Traverso can also connect to the jack soundserver, which provides advanced routing features and zero-latency connections between clients. If you don't want to use these features and ALSA works for you, you probably don't need jack. In order to use jack, we recommend to use *qjackctl*, which allows to easily setup jack for your system. Start the jack daemon by pressing *Start* in *qjackctl*. When it is running, set the driver in Traverso's configuration dialog (fig. 3.3) to *jack* and press *Save* and *Apply*. The menu bar should display *jack* if the driver was loaded correctly. Now go back to *qjackctl* and open the *Connect* dialog. *Important:* You must set up the connection manually, otherwise you won't hear any sound. Select the Traverso entry in the left part ("Readable Clients"), and *alsa_pcm* in the right part ("Writable Clients"), then press *connect*. If a line connecting the two clients is drawn, the sound system is set up correctly.

3.4. Switching Some Buttons

The default project automatically created by Traverso contains six empty tracks and is called *Untitled*. By now you probably have noticed that clicking on buttons such as *Solo*, *Mute*, *Rec* etc. is futile, and so is dragging the pan and gain sliders. Nothing happens. So let's try some key actions. Move the mouse over a track and press <O> on the keyboard. This switches *solo* on and off. Try the same with mute (<U>), and arm it for recording (<A>). Now let's try a key-hold action: Press [G] and hold it,

and move the mouse vertically. This changes the gain fader. Also try the double-click action `<<G>>` a couple of times on a track, and you will see that it resets the gain to -6 dB, and toggles between -6 and 0 dB. Also try `[P]` and move the mouse horizontally to alter the panorama. `<Q>` shows a menu with all actions on a track.

3.5. Importing Audio Files

For this section you will need a wave audio file, or better a couple of them. Place them in your Traverso project directory, and further in "Untitled/audiosources" to keep you directories tidy. Back in Traverso, press `<I>` on an empty track, navigate to the wave files in the file dialog, and select one of them. It will be placed in the track, and after a couple of seconds the wave form will be drawn (it takes a few seconds to calculate the wave form the first time). Hit `<space>` to start playback, and if the driver is set up correctly, you should hear something. To position the play cursor move the mouse to the desired position and hit `<shift.left>` (that is the left shift key on your keyboard). To move the play cursor to its previous start position hit `<W>`, and to move the cursor to the beginning of the project hit `<home>`. If you press `<Q>` on the audio clip, you will notice that the menu has changed. It now shows all actions that apply to audio clips, as opposed to the track actions before. You will further notice that `[G]` changes the gain of the audio clip if the mouse is pointing to a clip, but the gain of the track if it is pointing to the track background or the track panel.

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4.1. Correlation Meter

The correlation meter monitors the stereo output of Traverso and displays the correlation coefficient of the left and the right channel signal. Unlike many other correlation meters it interprets the coefficient as a measure for stereo width and draws a gradient representing the stereo field.

In order to explain what correlation is and why it is important, we assume that a pure sine wave is played back on both the left and the right master channel. When both signals are merged (which happens if the signals are played back in mono), the resulting signal is the sum of the left and the right channel. Depending on the phase difference between the source signals, interference effects occur. That is, if two positive amplitudes are summed, the absolute value is greater, whereas if a positive and a negative amplitude are summed, the absolute value becomes smaller. In some cases this can lead to complete extinction, leaving nothing but a silent signal (fig. 4.1).

If the two audio signals contain more complex data, e. g. music or spoken word, such extinction effects (also known as *phase cancellations*) do not cancel out the entire signal, but merely certain frequencies, leading to a “hollow” or otherwise strange sound. Needless to say that such effects are rather devastating for a high quality audio production. Although it is indisputable that we should use our ears and listen to the mono signal in order to detect phase problems, computer based audio workstations allow to provide visual feedback of the audio data in many ways, which is one of the reasons for many users to prefer digital audio workstations. There are several ways to visually represent the correlation, but in order to understand how to interpret Traversos correlation meter, some more theory is required.

The amount of correlation is represented in the *linear correlation coeffi-*

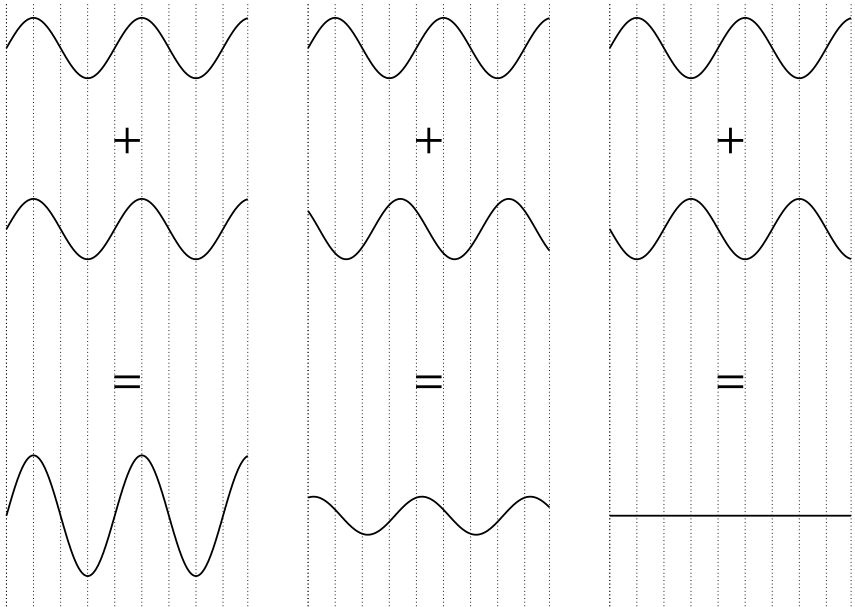


Figure 4.1.: When summing up two sine waves, interference can either lead to amplification (in phase, left), remain more or less unchanged (uncorrelated, middle), or lead to extinction (out of phase, right).

cient r , which is calculated over an array of pairs of samples (x_i, y_i) :

$$r = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2} \sqrt{\sum_i (y_i - \bar{y})^2}}$$

r ranges from -1.0 to 1.0 . A value of $r = 1.0$ means the left and right signal are perfectly correlated. The master signal would be mono in that case, since there is no phase difference between the left and the right signal. The more difference there is between the two channels, the lower the correlation coefficient becomes. In case of totally uncorrelated data (which could read as “no phase similarity whatsoever between the left and right channel”), r becomes 0.0 . Such a signal produces a wide stereo image with a low risk of phase cancellations when summed to mono. The difference between the signals can be further “increased” by one channel becoming the inverse of the other. In that case r becomes -1.0 . Negative r values indicate high risk for phase cancellations.

The correlation meter of Traverso (menu “Views → Correlation meter”) uses an intuitive way to display the correlation coefficient. Instead of focusing on the numerical value, it shows it’s meaning in terms of stereo width (fig. 4.2). A gradient spreading between the left and the right speaker (marked by the L and R lines) indicates totally uncorrelated signals ($r = 0.0$) and thus a very wide stereo image. As long as the gradient does not extend beyond the L and R lines, there is no negative correlation and hence a low risk for phase cancellations. However, if it *does* extend beyond the lines, phase cancellations are likely to occur if the signal is summed to mono, and the stereo image sounds unnaturally wide. This should be avoided by all means. A mono signal, on the other hand, causes the gradient to collapse to a line in the center.

The correlation meter can also be used to balance the master output. If the levels of the left and right channel are well balanced, the gradient center line should “wobble” around the center indicator.

Since the gradient usually occupies the area between the L and R lines, the space outside of the lines is wasted most of the time. Thus the scale of the correlation meter can be changed by pressing <M>.

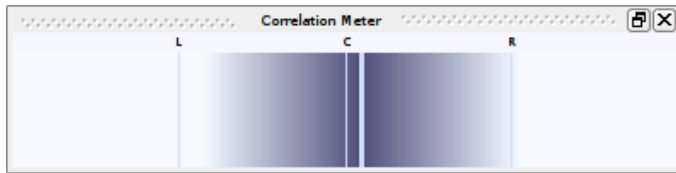
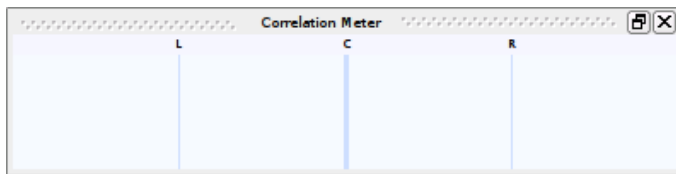
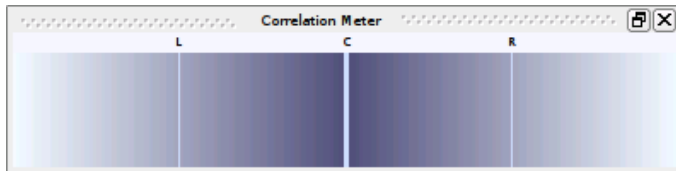
(a) Stereo, $r = 0.0$ (b) Mono, $r = 1.0$ (c) Phase cancellation, $r = -1.0$

Figure 4.2.: The correlation meter in Traverso shows the correlation coefficient of the master output signal as a gradient between two lines representing the left and the right channel. If the gradient spreads from L to R, the data is uncorrelated (correlation coefficient $r = 0.0$), and the signal has a wide stereo width (top). If the gradient is collapsed to a line, the data is perfectly correlated ($r = 1.0$), which means the signal is mono (middle). If the gradient spreads beyond the L and R lines, the correlation becomes negative, which means there's a high risk of audible phase cancellations if the output is switched to mono (bottom).

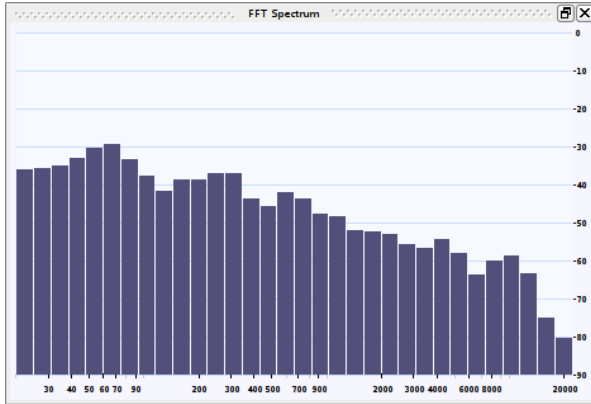


Figure 4.3.: The FFT spectrum analyzer decomposes the master output signal into its frequencies.

4.2. FFT spectrum analyzer

A spectrum analyzer using the fast fourier transformation (FFT) to calculate the spectral power distribution of an audio signal is standard equipment in digital audio workstations. The FFT spectrum analyzer in Traverso can be opened from the menu “Views → FFT Spectrum”. It is a dock window which can either be docked into the main window, or moved freely by dragging with the mouse.

The FFT spectrum analyzer monitors the stereo output channel and decomposes the signal into frequency bands. Each band shows the highest value $dB_{left} + dB_{right}$ in its range (fig. 4.3). A configuration dialog can be called with $\langle E \rangle$, or from the menu opened with $\langle Q \rangle$ or a right mouse button click.

The configuration dialog shown in figure 4.4 allows to define the dB- and frequency range to be displayed. The audible spectrum ranges from 20 to approximately 18000 Hz, whereas CDs range from 20 to 22050 Hz. These are thus recommended values for the lower and upper frequency limit. The upper limit for dB values on the y axis is usually in the range from -6 to $+6$ dB, the lower limit between -60 and -120 dB. The num-

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ber of bands can be chosen freely, but high numbers (≥ 128) cause significantly higher CPU load.

The feature “show average spectrum” activates a curve which calculates the average frequency spectrum by accumulating the values as long as Traverso is playing back. The curve is reset if playback is restarted or by the key action <L>. The average curve can also be toggled by the key action <M>, and as soon as there is average data available, the curve can be exported either as raw numbers, or in `grace` format, which can be opened with the program `XmGrace` (key action <<Return>>).

Parameters related to the FFT calculation can be configured in the section “Advanced Options”. The FFT size determines the lower end of the spectrum; larger FFTs extend to lower frequencies, but cause more CPU load. The lowest frequency captured by the FFT is calculated as:

$$f_{min} = \frac{\text{Samplerate}}{\text{FFT size}}$$

The *lowest* frequency of an FFT of 1024 samples from an audio signal sampled at 44100 Hz is thus 43.1 Hz. Increasing the FFT size to 2048 samples increases the range to 21.5 Hz. The *highest* frequency captured by an FFT is

$$f_{max} = 0.5 \cdot \text{Samplerate}$$

For audio data sampled at 44100 Hz the upper limit is thus fixed at 22050 Hz.

The windowing function is highly FFT specific and it is beyond the scope of this document to explain it in detail. Users who don't have a particular reason to use a different function are advised to use the “Hanning” window.

Note: For very large FFT sizes the update rate of the spectrum analyzer becomes low. This is not necessarily caused by CPU overload (although CPU load becomes higher for larger FFT sizes), but by the fact that it takes some time to fill the buffers with such large amounts of data. The widget waits until the buffers are full before updating the display.

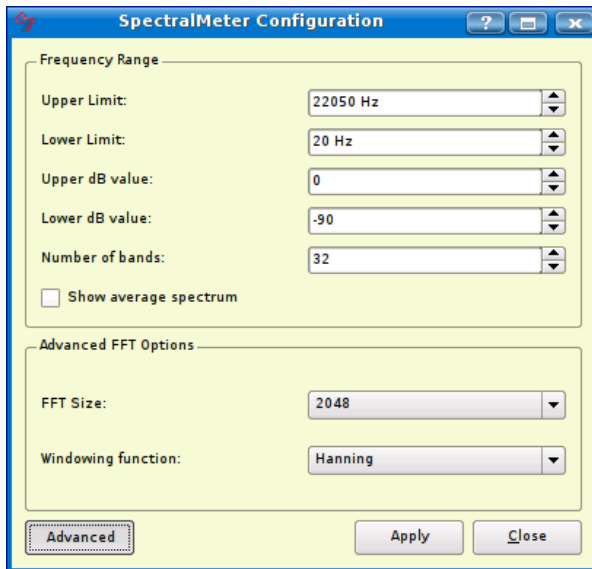


Figure 4.4.: A configuration dialog called with <E> allows to configure many parameters of the FFT spectrum analyzer.

5. Recording

5.1. Creating a new project

To make some test recordings we first create a new project. Start Traverso and press <F4> to open the manager view. In the bottom of the “project manager” page there is a box labelled “New Project”. Enter a name, set the number of songs to 1, and leave the rest empty. Then press “Create” and you will see that the new project was added to the list in the upper part of the page. Select the new project from the list and press the “Load” button. Traverso will automatically switch to the song view and show an empty song with a number of default tracks (usually 6, unless the number was changed in the “Settings” page). All recorded audio data will be stored in `project_dir/project_name/audiosources`, so if you followed our advice and selected a project directory on a partition with lots of free space, you shouldn’t run out of disk space now.

5.2. Setting up the driver

How to set up the driver backend correctly was described in detail in chapter 3. In the driver configuration one can choose the sampling rate, and Traverso always uses the sampling rate of the driver backend for its recordings. It is highly recommended not to mix up different sampling rates in one song, so if you chose 44100 Hz for this project, never try to import audio files with other sample rates into the same song.

The bit depth is given by the driver backend as well, and there is no way of changing it in Traverso. If using jackd as backend, `qjackctl` allows to set the bit depth of the AD converters, in case of ALSA please refer to the ALSA documentation. Traverso always converts the data to 32 bit floating point format before writing it to the disk.

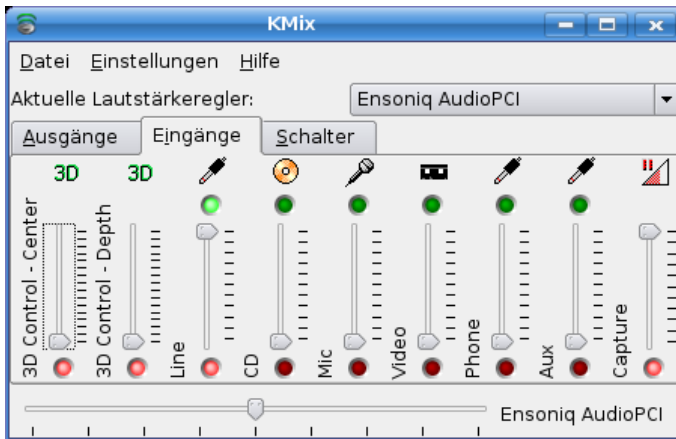


Figure 5.1.: KMix can be used to configure the sound card. Make sure the correct input channels (Line and Capture) are un-muted and set for recording (green and red buttons).

5.3. Recording

Make sure a sound source is connected to the line-in bus of your sound card, and also make sure it really is playing back. In Traverso hit `<BV>` on the first track and select "Capture 1" as input bus, then hit `<A>` to arm the first track. As soon as the track is armed, you should see the VUMeter indicating an input signal on Capture1. If not, the problem is most probably to be searched outside of Traverso. If you are sure your cable connections are correct, open KMix or a similar mixer applet to configure your sound card. As shown in figure 5.1, the Line and Capture channels had to be armed and un-muted on our test system before the line-in signal got through to Traverso.

If you are ready to record, hit `<SPACE>` to start the recording. Hit `<SPACE>` again to stop recording. That's it. Before listening to the result, don't forget to un-arm all tracks by `<<A>>`.

6. Mixing

Mixing features in Traverso 0.40.0 currently include gain, panorama, different fade shapes for fade-in and -out, trimming, splitting, moving of audio clips, and gain curves. An infrastructure for effect plugins using the LV2 standard is implemented, but development of Traverso 0.40.0 is a bit ahead of LV2, hence no plugins are available.

6.1. Moving, trimming, splitting

Clips can be moved freely by holding [D] and moving the mouse. If snapping is active (<S N>), both ends of the dragged clip will snap to the beginning of the song, edges of other clips, and to the work cursor.

Move the mouse cursor on a clip, hold [E], and move the mouse horizontally to drag the edge of the clip which is nearest to the mouse position. If snapping is active, the edge will snap to the positions described above.

Audio clips can be split by pointing the mouse cursor to the desired position and pressing <X>. Of course the edges of the two clip fragments can be fine-tuned by holding [E] as describes above.

6.2. Fades

Both ends of a clip can be faded smoothly by holding [F] on the left or right half of the clip and moving the mouse horizontally. On the left half the key action refers to the fade-in, on the right half it refers to the fade-out. Several fade shapes are available, which can be toggled by <M> (fig. 6.1).

All shapes are based on a cubic spline curve with four knots. Two knots define the bending of the non-linear shapes. The positions of these control knots can be modified by two values “bending” and “strength”. “Bending” defines the direction of the tangent in the end point, whereas

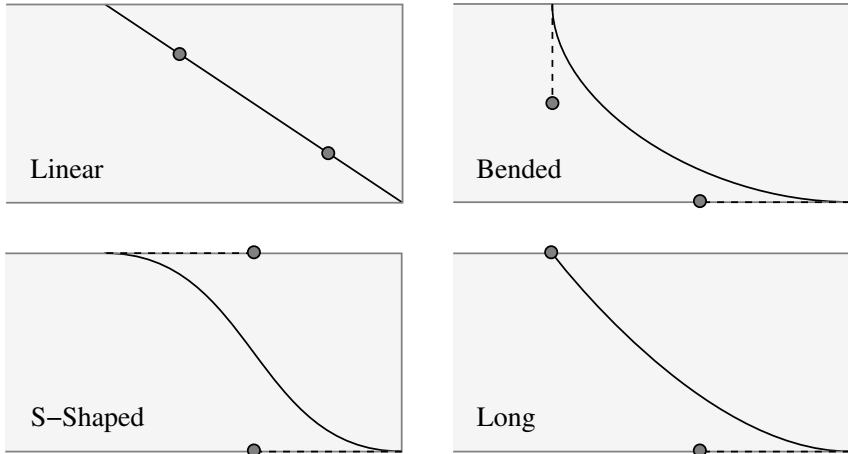


Figure 6.1.: Different fade shapes available in Traverso. Fade curves are defined as splines with two control points (circles) which can be modified by the values “bending” and “strength”.

“strength” changes the weight of the tangent (fig. 6.2). It is not possible to move the control knots freely and independently, instead Traverso knows several modes which are relevant for fade shapes (fig. 6.1):

6.2.1. Linear

Linear fades are a straight line between the start and end point. The control knots can’t be changed. Linear fades tend to sound rather abrupt at the low-level end of the fade, and are thus not the preferred mode for long fade-outs, e. g. at the end of a song.

6.2.2. S-shaped

The S-shaped mode starts with a horizontal tangent, is steep at the center, and passes into a horizontal tangent again. The beginning and end are very smooth, but the center part can sometimes change too quickly in short S-fades. The “strength” parameter can be used to soften the center

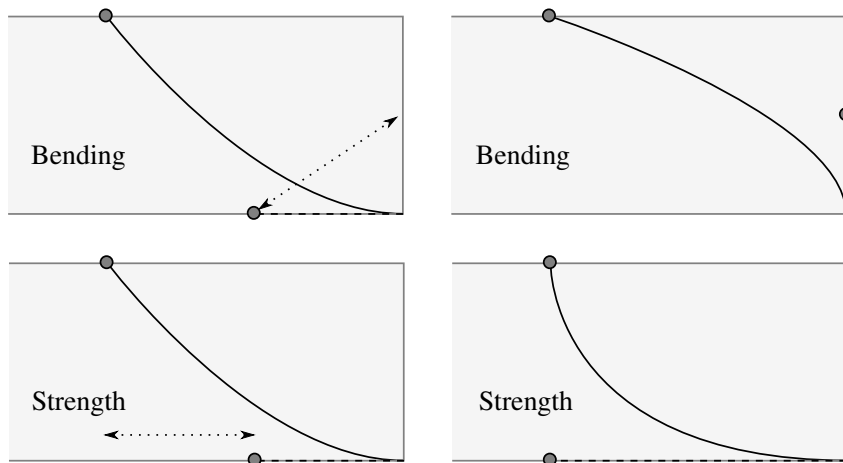


Figure 6.2.: Bending and strength values can be used to alter the shape of the fade curves. (Demonstrated with the “Long” mode.)

part and make the volume change less obvious. The “bending” factor should usually remain between linear and horizontal tangents, however, vertical tangents can be used for effects.

6.2.3. Bended

The bended mode acts similar to the S-shaped mode, but the control knots point to the same side. This mode can be used to achieve very fast volume drop at the beginning of the fade-out, and very soft towards the end. Both control parameters are useful to find the best balance between a beginning that is not too fast, and an ending that is still slow enough for a soft fade-out effect.

6.2.4. Long

The long mode only allows to change the control knot at the low-level end of the fade. This mode is often used for very smooth fade-outs, e. g. at the end of a song. The high-level end changes fastly, but the low-level

tail is very soft. The long mode often sounds more musical than a similar bended mode.

6.3. Gain curve

Gain curves are a powerful feature to change the gain of an audio clip in the time line. The curves are child elements of audio clips and move with the clips if they change position. To change to curve mode press <F2> (fig. 6.3), to change back to edit mode press <F1>. A default curve node is added automatically at the beginning of the clip at 0 dB. Additional nodes can be created by <<C>> at the position of the mouse cursor. Nodes can also be dragged ([D]) and removed (<<R>>). These actions always apply to the node closest to the mouse cursor, which is indicated by a pulsing effect.

6.4. Export

Before a song can be burned to CD, it must be rendered (exported) into a stereo file. Hit <<RETURN>> to open an export dialog (fig. 6.4). You can chose the location of the export file and set options for the file format. If you want to burn the file to CD later on, chose WAV as file type, 16 bit resolution, stereo channels, and 44100 Hz sampling frequency. If the file should be processed further, chose a higher bit resolution, e. g. 32 bit float.

6. Mixing

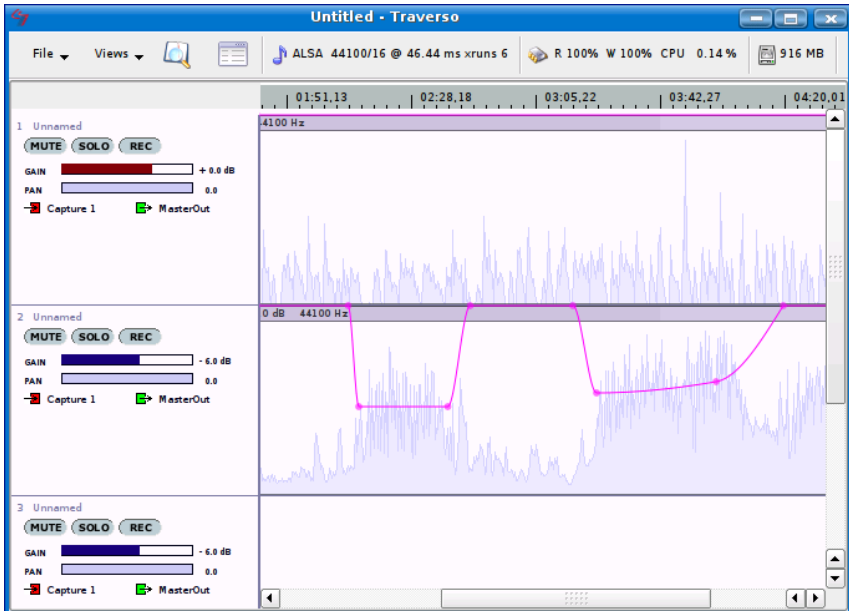


Figure 6.3.: The “curve mode” of Traverso can be activated by $\langle F2 \rangle$. Gain curves are only visible in curve mode. Nodes can be added, removed, and dragged freely.

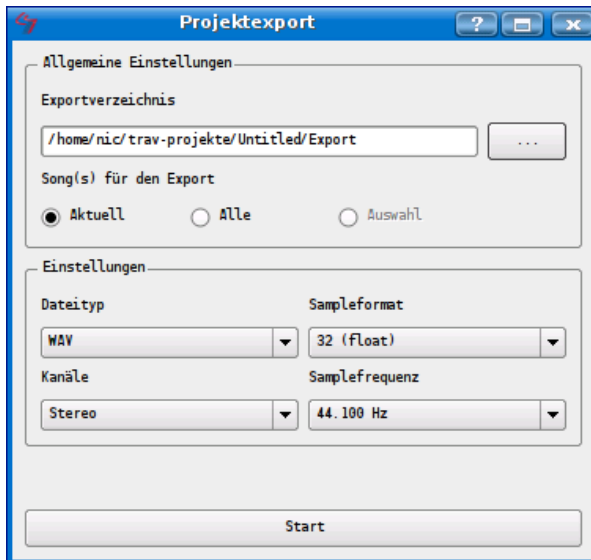


Figure 6.4.: By hitting `RETURN` the current song (or all songs of the project) can be rendered into a wave file. The file format can be selected in the export dialog.

A. Command Reference

A.1. Abbreviations and symbols

<i>L-MB</i>	Left mouse button
<i>R-MB</i>	Right mouse button
<i>M-MB</i>	Middle mouse button
<i>SW</i>	Scroll wheel (mouse)
←	Cursor key “left”
→	Cursor key “right”
↑	Cursor key “up”
↓	Cursor key “down”
↕	Move the mouse vertically
↔	Move the mouse horizontally
↻	Move the mouse in all directions

A.2. Global actions

Key	Mouse	Description
<H>		Show the online help file
<Q>		Show the context menu (list all key commands)
<F1>		Switch to editing mode
<F2>		Switch to curve mode
<F3>		Switch to the track window
<F4>		Switch to the configuration window
<F5>		Undo
<F6>		Redo
<F11>		Switch to fullscreen
<←>		Scroll the track view left
<→>		Scroll the track view right
<↑>		Scroll the track view up
<↓>		Scroll the track view down
<SHIFT>		Touch the object beneath the cursor

<W>		Move the playhead to the work cursor
<HOME>		Go to the beginning of the track view
<END>		Go to the end of the track view
<Z>		Zoom in horizontally
<SPACE>		Play / Stop
<A B>		Show the "About Traverso..." box
<CTRL S>		Save the current project
<S N>		Toggle snapping on / off
<Z X>		Zoom out horizontally
<Z A>		Zoom in vertically
<Z ALT>		Zoom out vertically
[Z]	↔	Zoom freely
[S]	↔	Shuttle freely
<S>		Select a project
<<U>>		Toggle mute state of all tracks, or if one or more tracks are muted, un-mute all tracks
<<O>>		Toggle solo state of all tracks, or if one or more tracks are soloed, un-solo all tracks
<<ENTER>>		Show export window
	R-MB	Show the context menu (list all key commands)
	SW	Scroll the track view up and down
<B V>	↑	Select the input channel
<F G>		Select the fade-in shape
<G H>		Select the fade-out shape
<<T>>		Append a new track
[SPACE]	↔	Move the play head
[S G]	↑	Set the master gain
<<ESC>>		Exit Traverso
>W >E		Set the work cursor to the next clip edge
>W >Q		Set the work cursor to the previous clip edge

A.3. Tracks

A.3.1. Edit mode

Key	Mouse	Description
<↑>		Increase the gain
<↓>		Decrease the gain
<A>		Arm the track for recording (toggle)
<O>		Solo the track (toggle)
<U>		Mute the track (toggle)
<I>		Import an audio file
<E>		Edit the track properties
<J L>		Set capture from both channels
<J K>		Set capture from the left channel
<K L>		Set capture from the right channel
«R»		Remove the current track
<SW>		Increase / decrease the gain
[G]	↑	Change the gain freely
[P]	↔	Change the panorama freely
[O]		Silence all other tracks (solo temporarily)
«G»		Reset the gain, toggle the gain between -6 and 0 dB
«P»		Add a new plugin
«DEL T»		Remove the current track

A.3.2. Curve mode

Key	Mouse	Description
<↑>		Drag a curve node upwards
<↓>		Drag a curve node downwards
<C>		Add a new curve node
«R»	SW	Move a curve node vertically
		Remove the active curve node
	L-MB	Add a new curve node
[D]	↗	Drag the active curve node freely

A.4. Audio Clips

Key	Mouse	Description
<S>		Select the current clip
<U>		Mute the current clip
<X>		Split the clip
<N>		Normalize the clip
<S D>		Add the current clip to the selection
<S A>		Remove the current clip from the selection
<A D>		Invert the clip selection
«S D»		Select all clips
«S A»		Un-select all clips
«F G»		Reset the fade-in
«G H»		Reset the fade-out
«F H»		Reset both fades
«C X»		Delete the selected clips
[E]	↔	Drag the nearest clip edge
[G]	↑ ↓	Change the gain
[C]	↶ ↷	Copy the audio clip
	<i>L-MB</i>	Drag the audio clip
[D]	↶ ↷	Drag the audio clip
[F G]	↔	Change the length of the fade-in
[G H]	↔	Change the length of the fade-out
«N»		De-normalize the clip (set normalize gain to 0 dB)
«G»		Reset the gain, toggle between -6 and 0 dB

A.5. Fades

Key	Mouse	Description
<F>		Change the length of the fade
		Bypass the fades (toggle)
[B]	↔	Change bending of the fade curve beneath the cursor
[S]	↔	Change strength of the fade curve beneath the cursor
<M>		Change the mode of the fade (shape of the curve)
<L>		Reset all parameters
<R>		Toggle the value raster

A.6. Plugins

A.6.1. General

Key	Mouse	Description
<E>		Edit the properties of the current plugin
		Bypass the current plugin
«R»		Remove the current plugin

A.6.2. Visualisation

Correlation Meter

Key	Mouse	Description
<M>		Toggle the displayed area between 180, 240, and 360 degrees

FFT Spectrum Analyzer

Key	Mouse	Description
<E>		Open the settings dialog
«ENTER»		Export the average curve values
<M>		Toggle the average curve
<L>		Reset (restart) the average curve
<S C>		Save a screen capture of the widget

B. Change Log